PEAT CUTTING IN UPLAND BRITAIN, WITH SPECIAL REFERENCE TO THE PEAK DISTRICT- ITS IMPACT ON LANDSCAPE, ARCHAEOLOGY, AND ECOLOGY

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CONTAINS PULLOUTS

Dedicated to Joan Eileen Brightmore

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SUMMARY

Although peat has been an important resource for at least two millennia, its historical exploitation is seldom considered a factor in determining the landscape we see today; a notable exception being the Norfolk Broads. However, by reference to modern industrial peat digging and extant domestic exploitation, such as the Scottish Islands, it is easy to appreciate the impact this activity can have. The impact of peat cutting in the hills is even less well appreciated than in the lowlands. This upland land use is seldom written about or discussed; those accounts found describe localised industries and typically review 'the traditional use of peat', give a few historical references to the activity, and perhaps mention a few place names. However, the archaeological remains of the activity are almost never mentioned and then not in detail (an exception being the recent survey of Bodmin Moor); so the actual sites of the digging and the extent of overcutting remain unclear.

Recent archaeological reconnoitre in the Upper Derwent Valley of the Northern Peak District led to the identification of extensive but discrete removals of deep blanket peat around the fringes of the upland plateau. These features typically show near complete removal of peat down to the mineral soil, with subsequent vegetation change over the cut areas. The limit of peat extraction is marked by steep banks often running across ridges (in contrast to the eroded edges of the blanket peat which trace the interface between plateau and valley) and there is an accompanying sudden change in the vegetation from *Nardus-Molinia* within the cut area, to *Eriophorum-Calluna* on the remaining intact peat beyond. The most obvious cut over areas are located on the ridges between tributaries and are linked to known settlement sites in the valley bottom by hollow-ways.

Subsequent research sought to identify areas of peat exploitation throughout the Peak District and study their settlement associations, using a combination of field survey, aerial photograph interpretation, literature review, place-names, and archive search. The extent of the activity was found to be even greater than initially thought; a minimum of between 52,881,700 and 79,819,200 cubic metres of peat are estimated to have been removed from the Peak District as a whole; the actual figure is probably much higher. Since the cutting which formed the Norfolk Broads accounted for an estimated 30,000,000 cubic metres of peat, the significance of the Peak District industry is obvious. A preliminary

investigation of other upland areas in Britain, suggests large scale peat cutting, mainly during the Medieval Period, was widespread.

The peat cutting has altered and diversified moorland ecosystems, through the vegetation change, associated drainage, and the creation of a characteristic archaeology. There is a rich array of peat working archaeology in the form of cuttings, radiating hollow-ways, loading features, baulks between extractions, clearance cairns etc.; which together with secondary features, form an important, previously largely undescribed, archaeological resource. Furthermore, the activity has influenced subsequent land use, through the exposure of hidden mineral resources and soils. The exploitation has also exposed prehistoric archaeology, leading to its deterioration or destruction; detrimentally impacted on the environmental record contained within the peat; and impacted on upland hydrology causing erosion and degradation of the remaining blanket bogs, leading to the decline of peat-forming *Sphagnum* communities.

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NB- During the course of the field research (October 1994 to October 1998) a complete photographic record of the peat cut landscapes, features, and associated ecology was made. This collection of 35mm colour images (prints and transparencies) will be retained by the author. The ground-based photographs illustrating the thesis are part of this collection.

CHAPTER 1

INTRODUCTION

INTRODUCTION

After twenty years of working in the Peak District and other parts of upland Britain (Fig. 1.1.), it occurs to me that there remains a popular misconception that the land surface of moorlands is on the whole natural and that the current extent of the blanket peat, which largely determines key elements of the landscape of these areas, is, more or less, at its maximum extent. Expert authorities have, recognised that these areas have been modified to some extent by human influences, notably grazing, moor-burning, drainage (Gimingham 1972; Pearsall 1989), and in the case of the Peak District, atmospheric pollution (Phillips, Yalden & Tallis 1981). Furthermore, at an academic level, it is held that the peat forming bog mosses, which are no longer generally abundant on the moors, declined, in particular, because of grazing pressure and regular burning of upland vegetation which took place from the fourteenth century onwards, and then at an accelerated rate from 1780 onwards, under the influence of atmospheric pollution during the industrial revolution (Anderson & Shimwell 1981). Finally, the large-scale exploitation of peat for fuel etc. is widely recognised and described from lowland bogs and fens (e.g. Rackham 1996), but not generally from upland locations; although there are some notable exceptions to this, for example, on the North Yorkshire Moors (Hartley & Ingleby 1985). Observations made recently suggest that a reappraisal of these ideas is necessary (Ardron 1993).

1:1. BACKGROUND

Peat is formed from the partially preserved remains of plants accumulated under anaerobic conditions (Glossary). These deposits develop fastest in wetland habitats, where suitable conditions prevail for the growth of *Sphagnum* mosses (Anderson & Shimwell 1981; Daniels & Eddy 1985). The latter cover large tracts of land in the Northern Hemisphere (Daniels & Eddy 1985), where peat development is still rapid, but in much of Britain this process is now greatly reduced (Pearsall 1989).

The Pennine plateau is typically covered by deposits of blanket peat which occur on flat tops or shallow slopes; it started to form on the high moors during the Atlantic Period (7500 BC- 5000 BP), but became more widespread during the Sub-Atlantic (after 2600 BP). Peat initiation and development differed greatly within the Peak District, under the influence of localised climate and topography. In the relatively high and wet north west, peat started to form in a few hollows on the plateau top as early as c.9000 BP, spreading onto all the flat areas above 450m OD after 7500 BP (Tallis 1991). Even on the relatively low level Eastern Moors (Fig. 5.1.), peat had, by the Post-Roman Period, developed widely on land above c.250m OD (Hicks 1972). After about 1300, peat accumulation is thought to have declined dramatically because of climate fluctuations (Anderson & Shimwell 1981).

Sphagnum remains are abundant in the older blanket peat, up to AD 1300, after which a marked decline is detectable, with hare's tail cottongrass (*Eriophorum vaginatum*)

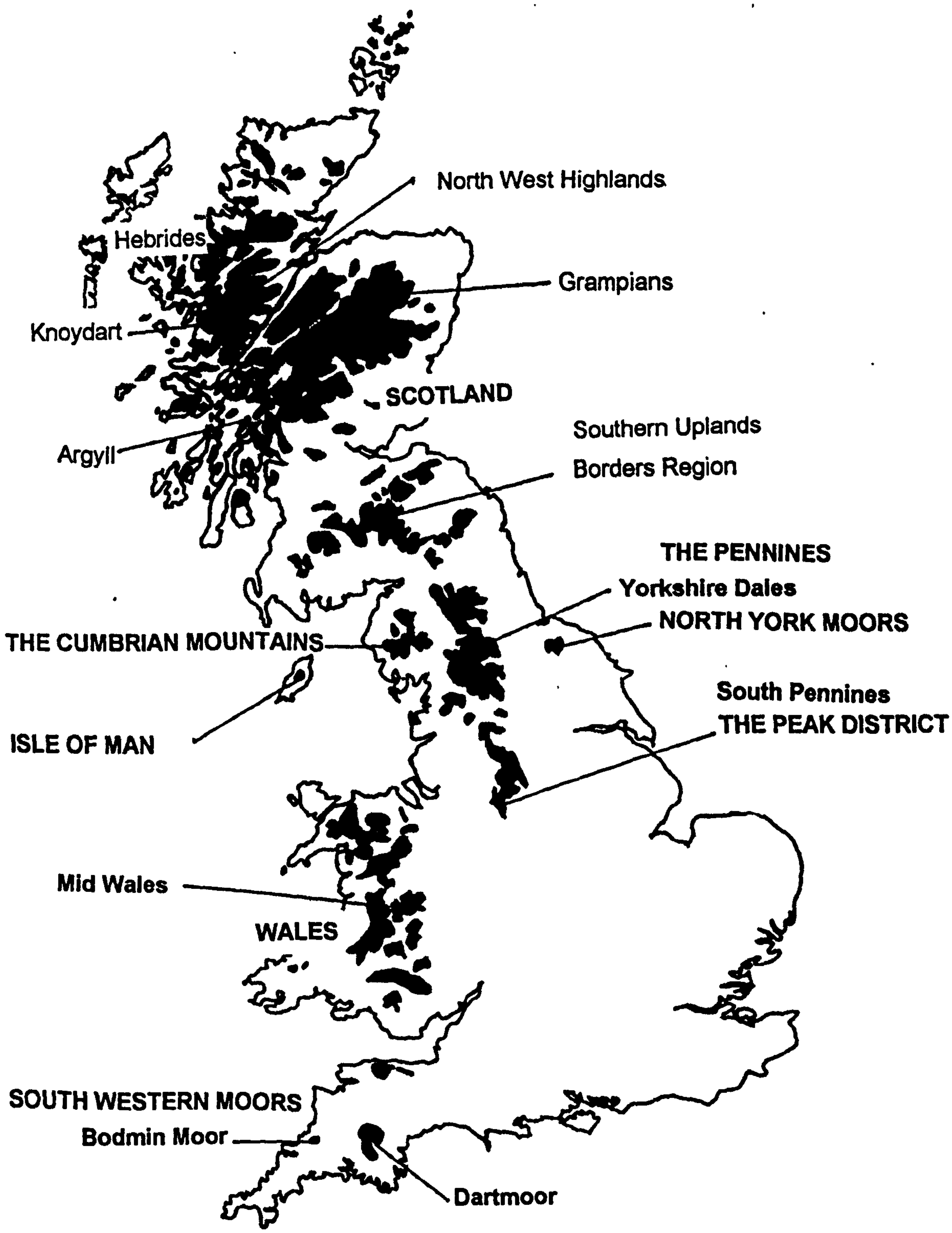


Fig. 1.1. Map showing peat cutting areas mentioned in the text. Land over 370m is shaded.

taking over as the dominant component (Anderson & Shimwell 1981). Today *Sphagnum* is scarce on the exposed moors, with those species recognised as the major peat formers being rare or absent, and when found, mainly limited to the bottoms of tributary valleys (Ardron in prep. a)).

Deposits of blanket peat are generally present in the South Pennines above about 275m OD and range in depth from about 20cm at their lowest altitude to over 4m on the higher plateaux. However, even above 370m on the gritstone moors of the Peak District and elsewhere in Britain, there is much land which is potentially suitable for blanket peat formation, where it is presently scarce or completely absent.

1:2. PEAT-CUTTING IN THE PEAK DISTRICT

Recent archaeological reconnaissance in the Upper Derwent Valley of the Northern Peak District (Fig. 1.1. & 5.2 (flap).), has identified extensive but discrete removals of deep blanket peat around the fringes of the upland plateau. These features typically show near complete removal of peat down to the mineral soil, with subsequent vegetation change over the cut areas. The limit of peat extraction is marked by steep banks/working faces often running across ridges (in contrast to the eroded edges of the blanket peat which trace the interface between plateau and valley) and there is an accompanying sudden change in the vegetation from *Nardus-Molinia* within the cut area, to *Eriophorum-Calluna* on the remaining intact peat beyond (Ardron 1993) (Figs 1.2.,1.3., & 1.4.). Associated with the extensive peat workings are broad drains/linear peat cuts, up to c.50m in width and 2km long; these are often linked to drains/earthen boundaries which appear to enclose large moorland land holdings (Fig. 1.2.). The most obvious cut over areas are located on the ridges between tributaries and are linked to known settlement sites in the valley bottom by hollow-ways (Figs 1.2.,1.5., & 1.6.).

After the initial identification of these workings, a preliminary search of the Upper Derwent area to assess their extent, (using aerial photographs and field survey), led to the discovery of at least twelve major peat extractions, all of which were linked to known long-standing settlements in the valley. All of the settlement sites which have been tied to peat cuts have Medieval origins (established by documentation and/or datable artefact finds). Archive research, in which the 1628 Senior Survey was consulted, indicated that the drains/ linear cuts mentioned above already existed and in one case the modern-day limit of peat extraction was recognisable as a boundary; additionally there was little general reference to contemporary peat working. The presence of such large-scale peat workings already in position by that date suggests a Medieval origin for these features, since extraction must have taken place over several hundred years to account for the removal of such vast quantities of peat by the settlements involved.

Survey of the cut areas revealed a rich array of more subtle evidence of peat working activity in the form of radiating hollow-ways, steps in the ground, apparent loading sites, baulks between extractions, clearance cairns etc. Armed with this knowledge, it was possible

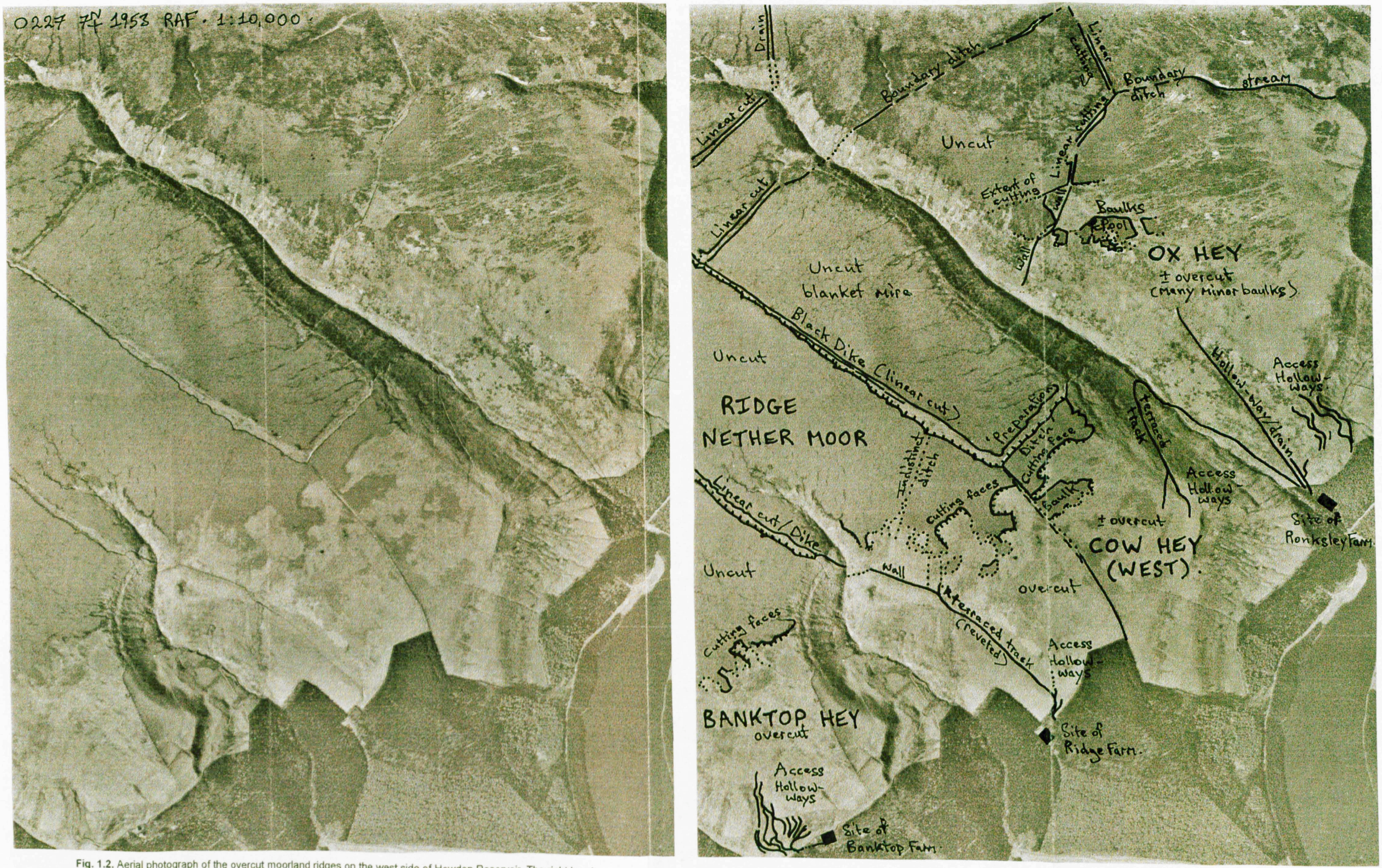


Fig. 1.2. Aerial photograph of the overcut moorland ridges on the west side of Howden Reservoir. The right hand copy has been interpreted, to highlight the position of the peat cutting faces, major drains, and access hollow-ways.

Fig. 1.3. Diagonal view of a section of the worked face at the peat cutting on Lockerbrook Heights, in the Upper Derwent. The photograph illustrates the abrupt nature of the cutting face and how it has slumped and been colonised by a vegetation mosaic. It further highlights the change from *Eriophorum vaginatum* on the uncut peat, to *Nardus* grassland within the overcut area.

Fig. 1.4. A second view of the peat cutting on Lockerbrook Heights, looking towards the working face. This photograph also highlights the dramatic vegetation change between the uncut and overcut areas. Vegetation anomalies (patches of mixed dwarf-shrub), on the overcut ground, signal the presence of traces of uncut peat and other peat cutting archaeology.

Fig. 1.5. A view of the extensively overcut ridge of Pikenaze Moor, in Longdendale, showing the well-defined pattern of abandoned, access hollow-ways, which spread uphill, from the site of Pikenaze Farm.

Fig. 1.6. A view across the enclosed pastureland at the base of Black Moor, near Glossop, showing an extensive pattern of braided, access hollow-ways (highlighted by melting snow), spreading uphill, from a nucleated settlement in the copse, towards abandoned peat workings on the moor. The photograph demonstrates the potential impact of peat cutting infrastructure on upland landscapes.

to tentatively identify other more heavily disguised but potentially very extensive peat workings. In these cases there appears to have been almost total removal of peat from middle level shelves and ridges, which has eliminated all evidence of former blanket peat on these sites. Additionally, it appears that large areas of valley-side may have held thin deposits of peat which may have been skimmed off, since extraction features have been identified in a few places well down the sides of the valleys.

The operations described above appear to have affected a large proportion of the land in the Upper Derwent between the heights of about 320 and 440m and are even found up to about 500m. Clearly the implications for our view of the landscape are very significant. These workings appear responsible for determining the vegetation cover over large areas, through their influence on mineral soil exposure and altered drainage. Observations elsewhere in the Dark Peak (Gritstone area), and in other regions such as mid-Wales, suggest large-scale Medieval peat cutting may be significantly more widespread in upland Britain than previously recognised (Ardron *et al.* 1995 & 1999).

It is a widely held view that peat cutting has never been a major feature of the Peak District. For instance, Anderson and Shimwell, in their definitive 'Wild flowers and other plants of the Peak District' (1981), state that, "there is little evidence to suggest that peat-cutting has ever been a significant land use on the blanket peat of the Peak District" (see 1:6). Until recently, the archaeological remains of few peat cuttings had been identified in the Peak District; these mostly on the Staffordshire moors, of relatively small size and thought to have been associated with domestic use during the last two centuries (Barnatt pers. comm.).

1:3. OVERALL OBJECTIVES OF THE STUDY

The objectives of the study were:-

a) To assess by means of a literature search, the current level of knowledge of past peat cutting operations within upland Britain [the area defined in Pearsall's 'Mountains and Moorlands' (1989), as "north and west of a line striking diagonally across England from Yorkshire to Devon"; but here mainly considering land over approximately 200 metres].

b) To identify peat cuts in the Peak District, by the use of aerial photographs and field survey and carry out archive research to locate further documented peat cuttings which may not be detectable in the field.

c) To investigate the history of peat cutting in the Peak District with special reference to the Upper Derwent Valley.

d) To evaluate possible links between the peat cutting and other industries, such as charcoal burning and lead smelting, operating in the Upper Derwent, in order to further an understanding of the development and history of settlement in the vicinity. To investigate the possibility that the establishment of some of the Upper Derwent farms may have been specifically related to these industries.

e) To gain an overview of the effect of peat cutting on landscape, ecology, archaeology and the development of settlement.

f) To assess the extent of peat cutting in the uplands (in zone defined in a)., by literature search, field reconnaissance and other means.

1:4. ARCHAEOLOGICAL OBJECTIVES

The archaeological objectives of the study were:-

a) To identify and categorise the archaeological features resulting from peat cutting in the Upper Derwent, in order to produce a basis for identifying and ageing cuts generally.

b) To distinguish the differences between peat cutting features and those found naturally on eroded areas and on ground where destructive peat fires have occurred.

c) To establish what effect peat cutting has had on previously existing archaeological features; i.e. have monuments which were previously protected by covering peat been damaged, slighted or destroyed by the activity and subsequent erosion?

d) To determine what effect the peat cutting has had on lithic and other artefact deposits: 1) have they been exposed and therefore subjected to possible damage? 2) has there been re-deposition of artefacts? 3) have lithics etc. been transported within turves to settlement sites and from there scattered with peat mulch/used fodder/peat ash etc. onto the land, thus affecting artefact assemblages elsewhere?

1:5. ECOLOGICAL OBJECTIVES

The ecological objectives of the study were to:

assess the impact of the peat workings on overall animal and plant communities; and in particular:

a) To assess the significance of peat cutting in determining the nature of the current vegetation cover.

b) To identify the effect on the moorland food-web of creating large tracts of upland grassland.

c) To establish the probable influence of peat cutting on the decline of peat-forming *Sphagnum* communities, through habitat destruction and/or change.

d) To identify any community types which might be specific to cut over areas.

1:6. CURRENT AND PREVIOUS PERCEPTIONS

It seems likely that the early demise of large-scale peat cutting as an everyday activity in Britain, coupled with the lack of obvious structural monuments associated with the industry have led to its omission from most writings on landscape, geography, ecology, archaeology or local history. Excepting, those relating to some of the islands of north-west Scotland where the tradition has been maintained. Even the lowland Norfolk Broads were only recognised as abandoned peat cuttings in 1951 (Lambert et al. 1960; Lambert & Jennings 1965). However, in many accounts from the early 19th Century peat cutting is clearly identified as a still widespread and common activity for domestic usage. Comment on the subject is brief; presumably quantities being removed were then small and therefore had a minimum obvious impact on the landscape. For example Glover (1829) in 'The History of the County of Derbyshire', states that peat "is in many places used for fuel". There are a few notable accounts which show that peat and turf cutting (sometimes synonymous; Glossary) was still taking place as late as the 1940s/1950s, such as in North Yorkshire, the Yorkshire Dales, and Wales, (Hartley & Ingilby 1972 &1985; Owen 1970). Even here however, the information does not seem to have been picked up in the wider academic literature.

One of the earliest standard texts on Peak District ecology (Moss 1913), was published nearly a century after significant peat-cutting stopped within the area. His only direct reference to peat exploitation is as follows, "The inhabitants of the moor-edges, up to a comparatively few years ago, possessed turf-cutting rights; but these, in nearly all cases, seem to have been lost". However, the general disinterest in peat is noted; "It is remarkable that very extensive deposits of peat in this country, both lowland peat and hill peat, should be ignored on most of the maps of the Geological Survey, even on their published drift maps". Moss has clearly appreciated the significance of peat in influencing land use and as fuel, and whilst not recognising the impact of past peat-cutting on the Peak District landscape, innocently suggests the potential benefits which might be associated with the re-introduction of such activity. His section on 'Afforestation' suggests the removal of peat in order to facilitate the planting of trees; while the 'Utilisation of the Peat-Moors' includes the passage "there is fuel enough in the Pennine peat to last the hill-side population for a thousand years. In addition to the value of the peat as a fuel, the various products which might be manufactured from the peat could be made to furnish a satisfactory revenue, as is proved by the experience in certain foreign countries, such as Sweden. Finally if the peat were gradually removed and utilised, the surface thus laid bare would, in many places, become fit for successful reclamation or afforestation".

In 'The British Islands and their Vegetation' (Tansley 1939), references to peat cutting are absent from the index and when found are assigned to passages concerned with Irish lowland mires. The author describes the probable fragmentation of the vegetation on north-east Irish Fens as a result of changes to peat level where cutting has occurred and later talks about the "nibbled" edges of raised bogs. Again there is a failure to appreciate the impact of peat cutting on the upland landscape, or even recognise its presence as a land use; although there is a statement on the effect of cutting along drains: "Peat 'hagging' by the formation of deep cracks and channels is due, according to Fraser, to the cutting away of the peat along drainage channels and subsequent erosion of their sides". There is also limited comment on the erosion of 'blanket moss' and its possible causes: "to-day many of the peat bogs are subject to severe erosion, probably due to the combined action of wind and water, so that the peat is extensively 'hagged', large areas are laid bare and sometimes removed down to the mineral soil below. Other mosses are progressively desiccated and occupied by other communities such as Vaccinietum, Callunetum and Nardetum, a process hastened of course by drainage and burning." The development of *Calluna*-dominated communities as a result of draining and burning is also mentioned.

Even in modern, standard texts, peat cutting has been totally overlooked as a subject, with peat loss being attributed solely to other agents. Pearsall (1950) describes peat loss mainly in terms of gully erosion, due largely to natural processes of drainage development within the upland peat bog landscape. Any mass-wasting of the peat is put down to bog-flows; the result of destabilisation of the bog mass after peat growth beyond a certain volume. The factors of climate change, burning, and drainage are cited together to explain an alternative mechanism of peat dissection. Peat cutting gets its own small paragraph, but is described purely in terms of its intrinsic economics (uses and transport costs); there is no mention of its impact on the landscape. Pennington (1974), when writing about the erosion of Pennine blanket bog, states, "In some places, erosion has proceeded so far that the peat cover has been stripped from quite extensive areas".

Recently, there has been an attempt to more fully understand the process of peat loss in the Peak District; it identified a range of agents. In some cases these were found to be working together to produce erosion and vegetation change. The standard reference on the subject (Phillips, Yalden & Tallis 1981) collates a number of detailed studies into the processes of peat erosion operating in the area. However, there is a striking lack of reference to peat cutting within the *corpus* of the report. A loose map in their report (Fig. 10.1, Landslides, Artificial Drainage Gullies and Peat Cuttings in the Northern Peak District), shows the location of eight peat cuttings within the Peak District by the letter "P" alone, and is included merely as an appendix.

Anderson and Shimwell (1981) make reference to "numerous postulated causes and little consensus on the basic agents responsible" for peat erosion. They then go on to describe a number of these factors, which include peat cutting; "Peat drainage and peat cutting (turbary) for fuel, are other activities thought to contribute to peat erosion.". However, they marginalize the impact of this activity; "there is little evidence to suggest that peat cutting has ever been a significant land-use on the blanket peat of the Peak District.", qualifying this by stating the frequent association between turbary rights and heathland commons and mentioning "only occasional references to peat cutting" in the Peak District, (examples are located on moors around Chapel-en-le-Frith, Whitfield and Glossop). They finish by saying "Some peat was removed from the moors then, but a comparison with Scottish moors, where peat cutting is still extant, shows little evidence of the regular depressions and pools that might be associated with extraction. Furthermore, no evidence for cutting has been put forward by researchers examining peat profiles for pollen analysis where the top 2cm is intact and associated with the soot of the last 200 years.". However, the same authors do highlight turbary as a factor causing fluctuations in the extent of the limestone heath compared with grass pasture prior to the 1760 parliamentary enclosures, and mention, that many records exist, testifying to the exercise of rights of turbary in a majority of the upland parishes of the White Peak.

Elkington (1986) identifies fires, severe air pollution, high levels of sheep grazing, natural minor climatic cycles and peat cutting as the agents of blanket peat erosion, stating that the latter, "by destroying the surface vegetation, could also have initiated erosion; rights of turbary are known to have existed around Glossop, for example. Peat was cut not only for burning, but also to compost with lime and manure for use on the poor soils of the fields adjacent to the moors, as was reported in 1815 for farms in the Hayfield area". The same text goes even further in that it contains reference to the presence of peat and its past exploitation, not just in the Dark Peak, but also within the White Peak "From time immemorial there existed jealously-guarded rights of turbary (the common right to dig turves for the fire and for mending the roof). Disputes were common from the twelfth century, and many of the enclosure awards actually set aside a parcel of land specifically for this practice. Contemporary agricultural writers, such as Farey (1811-17), recording reclamation between 1770 and 1815, reported that the whole district between Tideswell and Castleton had "recently been reclaimed from the black ling" and that the moors of Middleton and Youlgrave were "still to be enclosed and covered with heath".

Since the pioneering study of the Norfolk Broads (Lambert *et al.* 1960), few landscape historians have considered peat cutting as a phenomenon fully responsible for determining certain local British landscapes. Godwin's description of Fenland history (1978) and Rackham's accounts of peat and turf cutting in the Broads and on the Lizard (1986) are notable exceptions. In Rackham, the impact of cutting on upland peat is overlooked, as exemplified by two short passages under the heading of uses of moorland: "Moors were important sources of fuel, both peat and furze or ling, and of bracken, although only on the smaller moors (e.g. the Lizard) could cutting have had more than a local effect.", and later, under moors as they are now: "Peat-cutting may affect large areas where the peat is thin". However, even though the Lizard example is from lowland blanket bog, the inclusion of this case study, still represents a major leap in terms of recognising the importance of peat cutting in the wider British landscape. Wisniewski and Paull (1980) state that peat cutting for domestic fuel was widespread in many areas of Wales, both lowland and upland, but do not quantify its impact on the landscape. However, Fenton (1986), recognises the impact of peat and turf cutting on the wider Scottish landscape; he writes: "It is also of much interest to see how, over the centuries, the use of turf for manure and of peat for fuel (the ashes of which also went back on to the land) has cleared and changed now unimaginable stretches of the countryside".

Archaeological texts have also paid little attention to peat cutting, which is surprising since the activity has been responsible for creating whole new archaeological landscapes and has had a great influence on those existing before. Crossley (1990), in his standard reference on British Post-Medieval archaeology, while stressing the scale and effect of marsh and fen drainage, only mentions peat cutting in passing. He describes the localised use of peat fuel in sixteenth century Northern Pennine, bellows-blown, lead-smelting hearths and in Holland in clay-pipe kilns. The author who is Sheffield-based, makes no reference to peat cutting in the Peak District or South Pennine area.

Barnett and Smith (1997), in their up to date, pioneering account of the archaeological landscapes of the Peak District, address the peat cutting issue more fully; drawing from earlier findings of this research. They describe the use of the higher, unenclosed, parts of the limestone plateau as a source of peat and turf; the occurrence of Medieval documentation of rights of turbary for the same White Peak areas; and the presence of hollow-ways linking settlements to local peat cuts and quarries. They also mention that there are large peat cuttings still recognisable above the Upper Derwent and Edale valleys and smaller ones on the western gritstone moors. Scurfield (pers. comm. & 1999) also noted the importance of peat use, and the presence of peat houses associated with farms in the Upper Derwent Valley. Landscape and environmental change in the South Pennines has been extensively researched from the largely peat-associated palynological record (e.g. Conway 1947 & 1954; Tallis 1964). Over twenty years or more Dr. John Tallis has made detailed studies of this area.

1:7. THE SURVEY OF PEAK DISTRICT PEAT CUTTINGS

After the preliminary field and aerial photographic search had revealed the great extent of abandoned peat cutting occurring in the Peak District, it was felt impractical to survey the whole area in detail. Instead, all peat cuttings identified from photographs or other sources were ground-truthed (see Research Methodology), and others, identified by this subsequent fieldwork, added to the distribution. The areas of all the peat cuttings were mapped, along with any associated routeways which had been identified (see Chapter 5), but not the complete infrastructure. It was considered most effective to study one peat cutting area in greater detail, as a case-study, to identify all the related archaeology, settlement associations, and impacts of the industry. The Upper Derwent was chosen because it is conveniently close to Sheffield, there were on-going surveys of archaeology and ecology in place, and as being the most appropriate in terms of the apparent scale of the industry.

1:8. THE PEAT-CUTTING PROCESS

In order to fully interpret the historical peat cut landscape, it was necessary to study the known documented and extant techniques employed in procuring the resource. It is likely that the same basic techniques of hand cutting have always been used and therefore the signs left on the land by the process now, will be similar to those from the past. Those originating in antiquity will be disguised by degradation, revegetation, and sometimes redeveloped peat deposits (Fig. 1.7.).

A variety of implements are required when digging peat. These include, tools for, marking out the area to be cut, removing the overlying turf, cutting the peat vertically, or cutting it horizontally (Hartley & Ingilby 1972 & 1985; Gale & Berry 1996). The form of these basic implements has differed from area to area and has had bearing on the peat cutting methodology applied. Soft peat could have always been dug with wooden tools, but the fibrous turf would have caused problems before metals were widely used. Spades had been devised by the Bronze Age (Thomas 1970), but were probably not being used widely. Crescent-shaped, bifacially worked flint 'sickles', found in northern areas of the Netherlands, and of probable Late Bronze Age and Early Iron Age, are thought to have been used for sod cutting (Jensen 1994).The first peat spades were most likely made from wood, but from the Roman Period onwards, some peat spades and turf cutters were made of iron (Manning 1970; Adkins & Adkins 1982). See Glossary for definitions of peat, turf, and sod.

There are various comprehensive accounts of peat cutting methods employed in Britain over the last two centuries; the earliest in Victorian books on agriculture and rural practice (for example, Wilson 1849; Stephens 1851), the more recent in popular texts on local rural history (for example, Hartley & Ingilby 1972 & 1985). There are some isolated communities, mainly in the far north and north-west of Scotland, where peat is still cut using techniques developed over many centuries. Even the methods employed in the lowlands in recent times, which were imported from Holland, have likely originated from an ancient tradition in that country.

The basic peat-getting procedure involves cutting the living turf away from the bog surface, before removing rectangular pieces of peat, in sequence, from a cutting bank. In some areas the green turf has been traditionally replaced on the overcut ground to regrow (Fig. 1.8.), but elsewhere has been taken off site for building purposes or burning (Chapter 4). The peat turves have been cut both horizontally and vertically along a usually straight, but sometimes curved working face, which could have been orientated along the line of a previously cut drainage ditch, or uphill into the naturally draining edge of a bog. Where the cutting has taken place along the line of drains, usually on the surface of mires, the tendency will be towards the creation of a rather regular pattern of linear peat cuttings; which can be seen where there has been Dutch-style extraction on lowland raised mires. Occasionally, small sub-rectangular pot-pits have been dug into the surface of bogs, sometimes in a piece-meal manner, on other occasions along an interconnecting drain; these have generally led to the creation of bog pools after abandonment through flooding (Figs 8.5. & 8.6.). Cutting on the fringe of bogs may have occurred either at right-angles to, or along the line of the peat edge; in the former instance leading to the formation of sub-rectangular recessed peat pits (Fig. 7.1.), in the latter case to the open-cast type peat workings so characteristic of upland plateau areas like the Peak District (Figs 1.2., 1.3, & 1.4.).

The cut turves have generally been dried on or near the peat workings. Initially they would either be laid out singly on the adjacent uncut green turf (Fig. 1.9.), or stacked end-on,

Fig. 1.7. A sub-rectangular peat cutting on the edge of Birchinlee Pasture, in the Upper Derwent Valley; showing how slumping of the cutting face and extensive growth of degenerate phase *Calluna* has disguised the extent of the working. However, the upper edge of the cutting bank is still discernible, as a line of dark shading running diagonally across the photograph; while its lower limit is traced by patches of light coloured *Nardus*.

Fig. 1.8. A recent, small-scale, domestic peat cutting in blanket peat, Upper Loch Torridon, Highland Region of Scotland. At this site, where occasional digging continues, there is a tradition of restoring the bog vegetation to the overcut ground; as a result of this practice, the peat pit in the foreground, supports the same mix of *Eriophorum* and *Calluna* dominated as that growing in the general area of the workings.

a few together. Later, they would be placed carefully in stacks located on well drained ground to finish drying (Fig. 1.10.). The drying grounds could either be the baulks between the peat workings, or airy, well ventilated sites some distance away. After the turves had dried, they would be transported, in a basket, sled or cart, via well established trackways, to the settlements.

At certain times and locations, peat cutting has been rigidly controlled; with allocations strictly marked out and sometimes specific types of spade and cutting methods mandatory. In other areas and at other times the activity seems to have been much more relaxed. Certain well-defined peat cuttings clearly show the rigorous subdivisions of turbary; pot-pitted areas and other mosaics of small sub-rectangular workings probably in the main indicate less methodical, but sometimes highly competitive workings, where fights between peat cutters have been recorded; more dispersed piece-meal delvings may testify to more relaxed regimes, exploitation by the land owners themselves, or clandestine robbings.

The cuttings, trackways, drains, remains of baulks, stacking features etc. have together created the varied appearance of peat cut landscapes and influenced ecological change; differences in the individual features have provided additional diversity. Variation in the treatment of the living turf may also have been fundamental in the development of former peat cut landscapes; differences have a bearing on the subsequent appearance of the peat cuttings. Leaving the mineral soil exposed, would lead to initial erosion and then a new form of vegetation, whereas replacing the turf should prevent erosion and leave the overcut ground with the same vegetation as before, or one slightly modified by the process.

Fig. 1.9. A small concave peat working, North Uist, Outer Hebrides; showing how the recently cut turves have been laid out individually around the cutting face to dry, both within the working, and on top of the uncut bog vegetation beyond. The photograph also shows, that here too, there is a tradition of replacing the growing sod on overcut ground.

Fig. 1.10. Peat stacks, Bog Bay, County Galway, Ireland. Here, partially dry turves have been stacked together to finish drying. To facilitate drainage, the turves have been set in a tilted manner, and the stacks have been located on the raised verge of a metalled trackway skirting the cutting grounds.

CHAPTER 2

CATCHMENT OF THE UPPER RIVER DERWENT

CATCHMENT OF THE UPPER RIVER DERWENT

The Upper Derwent Valley (Figs 2.1., 2.2., & 5.2.) was selected as the main area of study into upland peat cutting and was subject to intense walk-over survey, along with detailed aerial photographic evaluation. It was initially studied because it was the first place where large-scale peat cuttings were found in the Peak District. After the widespread extent of the industry became apparent, this area formed the core of the work programme for a number of reasons. Its discreet central position in the Peak District made it ideal; especially because its relatively isolated and still largely rural character have ensured that the peat cuttings are generally well-defined and the associated archaeology well-preserved. Also, the ecology of the valley is well-known following a base-line survey (Ardron *et al.* 1989). The area supports a good number of important upland species, and its peat cuttings have been colonised by all the main types of vegetation associated with overcut moorland in the Peak District. The valley's accessibility by modern transport was also a factor.

All moorlands surrounding the River Derwent, north of its confluence with the tributary Noe (SK 204824), were studied and mapped in detail; the extent of peat cuttings to the south of the Noe were studied in the broader Peak District context. All the following descriptions of land called the Upper Derwent, except that for the geology and topography, relate to the part of the valley north of SK 204824. The area selected for detailed study covers approximately 170 sq.km.

2:1. GEOLOGY AND TOPOGRAPHY

The Upper Derwent is a complex pattern of watercourses dissecting the highest moors of the Peak District. The system has two major branches the River Noe and the River Ashop and over one hundred minor tributary cloughs. The majority of these watercourses are highly incised with slopes of 25% or steeper. The land within the Upper Derwent catchment rises from an elevation of 150m at the confluence of the Noe and Derwent (SK 204825) to 604m on the summit of Kinder Scout (SK 115877).

The catchment is characterised by its numerous deeply incised cloughs, by the presence of many peri-glacial landslips, by gritstone outcrops, and flat topped hills. Some of the land-slips are very large, and are of national importance as geological features.

Two major rock strata outcrop within the Upper Derwent Valley, the Millstone Grits and the Yoredale Rocks. The former strata occur on or close to the surrounding hill tops; the latter on the lower valley sides. The Yoredale Rocks are comprised of folded, alternating beds of shale and sandstones; with shale beds ranging from a few centimetres to several metres in thickness and sandstone beds mainly less than 60cm, but occasionally up to 2.5m thick (Robinson 1993). The millstone grits are generally formed from much coarser and more massive sandstones which facilitates the formation of prominent rock outcrops or edges.

2:2. ECOLOGY

The topography in and around the Upper Derwent Valley, together with related land-use has led to the formation of a variety of habitats (Figs 2.1, 2.2., & 2.3.). These are species-rich where there is local base enrichment from shaley rock strata. The construction of the three reservoirs Ladybower (Figs 2.1. & 2.2.), Derwent and Howden has led to the flooding of the majority of the former valley floor. These reservoirs are deep water and acidic and therefore in the main, species-poor, but locally support semi-aquatic habitat and at times of drought notable drawdown-communities. Many of the valley sides are wooded, mainly by coniferous and broad-leaved plantations established by the water authority, but also by small pockets of ancient semi-natural woodland (Fig. 2.1.). Prior to reservoir construction (pre-1900s) the majority of the valley bottom and its sides had been enclosed and converted to pastoral agriculture; remnants of these improved grasslands still occur in the vicinity of surviving farmsteads (Fig. 2.2.). The cloughs have largely escaped improvement but many have been shaded out by conifers and their vegetation impoverished as a result. None-the-less, the cloughs hold most of the species-rich communities, particularly where flushes occur along base-enriched spring lines. These environments support a number of rare or local plants (*Anagallis tenella, Carex pallescens, C. pulicaris, Pinguicula vulgaris, Scutellaria minor, Wahlenbergia hederacea*, etc.) and are the main refuge for sphagna, including several peat forming species, notably *Sphagnum papillosum* (10:1.). Intakes extend in places onto the plateau, but most of this land is dominated by moorland vegetation of dwarf shrub, tussocky grass and sedge (Fig. 2.3.). As will be demonstrated later, this community has been fundamentally influenced by peat cutting and related drainage.

The Upper Derwent moors are part of the Kinder- Bleaklow S.S.S.I, recognised as a nationally important site for cottongrass (*Eriophorum*) blanket mire and heather (*Calluna vulgaris*) moorland (Ardron *et al.* 1989). The latter reference is the definitive ecological account of the area and lists *Eriophorum* blanket mire, *Calluna* moorland, mixed blanket bog, eroded areas, *Molinia* grassland, rushy (*Juncus effusus*) marshes and gritstone edges as the seven main habitats occurring on the Derwent moors; there is no reference to the importance of *Nardus* grassland in the area. The cottongrass blanket mire is described thus; "mainly tussocky vegetation of about 10-30cm high dominated by hare's-tail cottongrass (*Eriophorum vaginatum*), usually with common cottongrass (*Eriophorum angustifolium*) amongst it and frequent wavy hair-grass (*Deschampsia flexuosa*). Common sedge (*Carex nigra*) is locally frequent in some areas but there are few other species, except where it grades into the mixed blanket bog. *Sphagnum* mosses, a key component in the blanket bog vegetation in other parts of the country, are rare except in a few lower plateau areas. This type of community is almost entirely restricted to the Southern Pennines in Britain, and within the Upper Derwent Valley is particularly extensive on Little Howden Moor. The cottongrass areas are of particular importance to breeding moorland waders, most notably dunlin (*Calidris alpina*) and golden plover (*Pluvialis apricaria*)". The section on heather moorland makes the following

Fig. 2.1. View westwards along the western (Woodlands Valley) arm of Ladybower Reservoir. There are several abandoned farm sites on the edge of the conifer plantations, to the left, and the drawdown zone below, has produced extensive evidence of human activity in this part of the valley, from pre-history, through to the time of reservoir construction. Grimbocar Wood, an area of ancient, semi-natural woodland, lies on the right side of the picture.

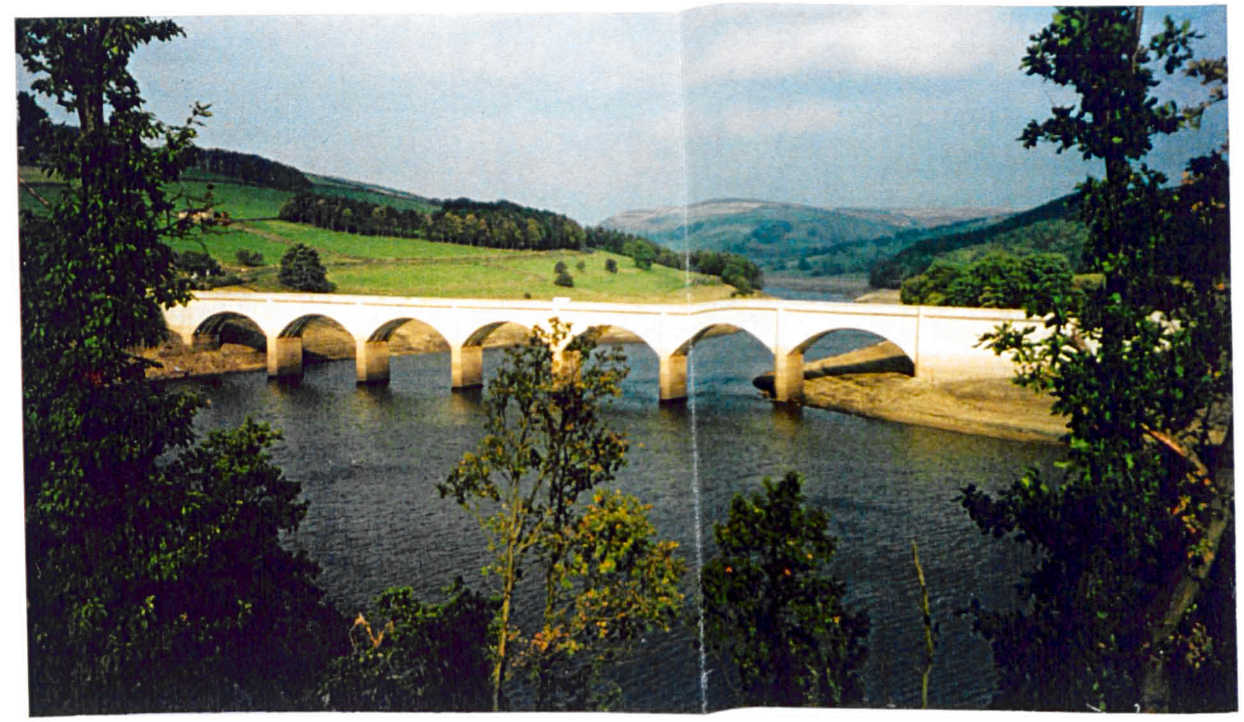


Fig. 2.2. View across Ladybower Reservoir, towards the Ashopton Viaduct, and northwards up the Derwent Valley. Part of the hamlet of Ashopton, flooded after the construction of the Ladybower Reservoir, lies beneath the bridge, while beyond is an area of grazing pasture associated with the ancient Crook Hill Farm.

Fig. 2.3. Panorama of Win Hill, looking north. The interpretation, below, shows the settlements, including the ancient villages of Hope and Aston, and the access hollow-ways to the moors, which remain well-defined above the fields.

statements "heather dominates extensive areas of blanket peat, particularly on the lower levels where the peat is shallower. In areas where the management of the heather involves rotational patch burning it has resulted in a fairly homogenous community in which heather is virtually the only species present, with very occasional bilberry. At higher levels with deeper peat there are areas of 70-90% heather cover, but crowberry (*Empetrum nigrum*), bilberry (*Vaccinium myrtillus*) and common cottongrass are generally frequent giving a more mixed community. Cloudberry (*Rubus chamaemorus*) and hare's-tail cottongrass are occasionally present but there is virtually no vegetation below the heather."; "This community is primarily managed for red grouse (*Lagopus lagopus scoticus*),"; "It is also a particularly important habitat for other moorland birds such as golden plover, twite (*Acanthis flavirostris*) and the nationally rare merlin (*Falco columbarius*)." The section on *Molinia* grassland includes the comments "There are extensive areas of the moorland that are dominated by tussocks of purple moor-grass (*Molinia caerulea*) with virtually no other species being present except for wavy hair-grass and occasional mat grass (*Nardus stricta*). These large tracts of grass moor are principally concentrated in the shallow basins at the head of cloughs, where the gentle slopes provide ideal conditions for *Molinia* growth. In a few soaks and small pools in this habitat mats of *Sphagnum cuspidatum* have been seen. This is an uncommon and local species of moss in the Peak District. This appears to be an important habitat for small mammals such as field voles (*Microtus agrestis*), which in turn make them important hunting areas for birds of prey like short-eared owls (*Asio flammeus*)."

The same text includes a summary description of the Upper Derwent peatlands: "The deeper peat areas are mostly covered by the cottongrass and mixed blanket bog communities, some of which are heavily eroded. These communities, particularly the cottongrass areas, are largely restricted to the Pennines in Britain. Shallower peat deposits are mainly dominated by heather, with extensive areas of *Molinia* grassland on the lower levels. A characteristic of these blanket peat communities is the very low plant species diversity, with most species-rich areas restricted to the marshes. However peat studies show that it was more species rich in the past and it is generally considered that the main causes for the loss of diversity have been atmospheric pollution combined with burning of the moor".

2:3. EROSION

The Upper Derwent plateau has largely escaped the extensive mass-wasting of blanket peat so frequently encounted on moors in the north-western Peak District (Figs 5.8. & 10.1.). However, there is still significant dendritic gullying on the higher ground. Bare peat and/or mineral soil is mainly exposed within the gullies and at the top edges of abrupt slopes, where there is limited erosion along the margin of the deeper blanket mires. These types of erosion feature appear to have generally stabilised in the area since vegetation occurs on all but the most abrupt peat banks and this seems to have a bonding effect. There is even some active re-colonisation of both bare peat and mineral soil; a phenomenon recognised in the 1986-88

Upper Derwent Ecological Survey (Ardron *et al.* 1989) and described thus: "Locally some re-colonisation is occurring where the erosion has reached the mineral soil, and this usually consists of cottongrass, wavy hair-grass and occasional crowberry. In one or two sites on the high plateau small patches of the local *Sphagnum cuspidatum* have been found on the wet bare peat." This apparent developing equilibrium within the majority of the dissected blanket mires of the Upper Derwent argues for an historical initiation of the gullying process, which has been suggested by other current researches (Anderson *et. al.* 1997; Tallis 1997).

2:4. HUMAN HISTORY

Although there are relatively few presently occupied settlements in the Upper Derwent, there has been human activity in and around the area for at least 12,000 years. Indeed, some sites in the valley bottom show evidence of continuous use from the end of the Mesolithic Period through to the present century. Prehistoric evidence comes mainly in the form of lithics (stone tools and the waste products of their manufacture), but there are other artefact finds and also a few scattered structures including barrows and clearance features. Artefact finds are the best evidence for later activity as well, since reliably datable surface features which pre-date the Post-Medieval Period are rare in the area; exceptions include the foundations of two long-houses.

The following description of human history in the Upper Derwent Valley is largely based on the findings of the archaeological surveys described in the research methodology (Chapter 3). See Appendices 13-16 for summaries of this information.

2:4:1. Upper Palaeolithic Period

A single fragment of a broad-blade (Glossary) in white flint, found on the reservoir shore at Well Head (SK 184886), may date from this period. Such a scarcity of finds from this period is not surprising and typical of the Dark Peak in general, since surface deposits would have been very mobile then, under the influence of late glacial processes. Although no ice masses are thought to have been present in the area during the last glaciation (Anderson & Shimwell 1981), there would none the less have been considerable periglacial wasting of the landscape as evidenced by the deeply incised valleys and presence of abundant slips, fluvial-clutter in the valley bottoms, and solifluction deposits below escarpments. Most surface Palaeolithic artefacts would have been covered by or incorporated into these heavy periglacial deposits or transported out of the area by melt water. As a result, it would be unsafe to infer that a lack of lithic assemblages from the Upper Palaeolithic Period necessarily demonstrates scarce human activity in the area at that time.

2:4:2. Early Mesolithic Period

Discrete concentrations of flints, mainly the result of knapping-activity and characterised by a high content of White Wolds Flint (Glossary) have been found in the past at a number of locations within the Peak District, mainly on high moors to the north-east of the Upper Derwent Valley (Myers pers comm.). These have been associated with the so called Maglemosian Culture, now considered synonymous with the Early Mesolithic Period (Adkins & Adkins 1982). Other groups of lithics discovered on the surface of eroded ground located around the north-eastern watershed of the Upper Derwent also appear to be associated with the period (Ardron 1993). Whilst a few individual obliquely-blunted points recovered from the drawdown-zones of the Derwent Reservoirs are diagnostically Early Mesolithic (Adkins & Adkins 1982). Additional finds from widely scattered locations on the drawdown-zone were only doubtfully of Early Mesolithic origin; these included several end-scrapers and a heavy core (Glossary). Indeed of all the lithics found during the reservoir survey only a small number were safely assignable to a particular prehistoric period, mainly because they were usually found in very mixed assemblages. However, even the presence of a few obliquely-blunted points (used in multiple-point weapons) indicates that in immediate post-glacial times there was at least some intermittent hunting and foraging taking place in the bottom of the Upper Derwent Valley. This is significant because of the general scarcity of Early Mesolithic finds within the Peak District; in particular within valley contexts.

2:4:3. Late Mesolithic Period

A large proportion of the securely datable lithics found during the reservoir drawdown survey were asignable to this prehistoric period. These finds, mainly narrow-blade microliths and small cores (Glossary) produced from a diverse range of raw materials came from many sites but were particularly abundant at Low Field Abbey (SK 170920). This site has yielded approximately thirty Later Mesolithic microliths, mainly 'rods' but also 'scalene triangles' and a single transverse-arrowhead. It comprises a large flat area (five hectares) sited at the confluence of the River Derwent and Abbey Brook and is unique in the Upper Derwent because it is the only extensive river side level which is subject to regular drawdown and is not heavily silted. Even so a significant percentage of the site is silted to some extent; a factor which, along with the area's flatness, greatly limits the recovery of lithics (Chapter 3). The size and range of the artefact assemblage in general suggests that the Low Field Abbey site may have been one of the first places to have been settled in the Upper Derwent Valley, albeit perhaps intermittently. Other related sites may be located under reservoir bottom silts (Ardron in prep. b). Its location at the base of one of the major tributary valleys of the Upper Derwent would perhaps have ensured its early settlement and explained its varied and possibly continual human usage ever since. Intriguingly the 'rod' component of the site's microlith assemblage resembles that found at the Dunford Bridge B site, which has been dated very late in the Mesolithic sequence, at 5380 BP (Radley *et al.* 1974). This factor along with a usage of diverse and sometimes poor quality raw materials in the manufacture of the microliths, may suggest more permanent settlement and possibly reflects the change from a wide ranging hunter-gathering lifestyle to that of localised nature-harvesting and primitive farming (Ardron in prep. b).

2:4:4. Early Neolithic Period

Few sites of proven Early Neolithic date (the period when people are thought to have switched from a hunter-gathering lifestyle to more permanent settlement) have been found. The rarity of these sites is due to the localised nature of this change in activity, and the difficulty in recognising diagnostic lithics. The characteristics of the stone tools of the Early Neolithic are still being assessed; but individual finds, although sometimes suggestive of the period, do not seem to be reliable on their own. It is the overall nature of the industry which is diagnostic (Myers pers comm.); so only isolated assemblages are likely to be securely datable. Two sites in the Upper Derwent, Linch Clough, and Low Field Abbey, contain quantities of the carefully dressed broad-blades which typify the Early Neolithic industry, but the provenance of this material is insecure because of the multi-period nature of the lithic assemblages found at these two sites.

2:4:5. Neolithic / Bronze Age

Most of the relatively few prehistoric structures which have been located in the Upper Derwent Valley can be assigned to the Late Neolithic and Early Bronze Ages in general, but to neither of these two periods specifically. The same applies to much of the flint work located during the Reservoir drawdown survey. Concentrations of lithics originating from these periods were found at Linch Clough by Howden Reservoir (SK 168939), on the Birchinlee shore of Derwent Reservoir (SK 169921-168913), at Low Field Abbey (SK 170920), and around the bay on the south side of the Woodlands arm of Ladybower (SK 187861-178866). The variety and quantity of the material recovered from these four sites suggests that there were at least temporary encampments present; but perhaps even seasonal or long-term settlements. A more settled, non-hunting usage of the valley bottom is also indicated by the relative scarcity of arrowheads, which as a type have been much more frequently found on the high moors surrounding the Upper Derwent Valley.

Longer periods of prehistoric tenure, possibly during the Neolithic or Bronze Age, are indicated at Linch Clough and at Derwent (SK178889-184886) specifically, by the presence of groups of stone-filled hearths and many burnt stone fragments. Additionally, at Linch Clough there are two possible small barrows; while at Low Field Abbey there is a large multi-phase barrow which has been exposed by wave action. The erosion has revealed the presence of a stone built cist on the side of the monument, which contained traces of burnt human bone. One of the Linch Clough structures, similarly located on the reservoir drawdown, also produced a spillage of burnt bone fragments, from the remains of an apparent cremation deposit containing further human bone and two pieces of bunt flint. Interestingly, a very fine plano-convex knife (Fig. 2.4.), probably of Early Bronze Age origin, was found c.100m to the south of the two possible Linch Clough barrows. This tool was of exceptional quality, well used and considered likely to be from a ceremonial context (possibly connected with de-fleshing bodies (Myers pers. comm.)).

Several lithics found around the reservoirs can be safely assigned to the Neolithic; these include a fragment of a perforated stone macehead found in the foundations of a Post-Medieval drystone wall at Low Fields Abbey; a leaf-shaped arrowhead found on the south side of the Linch Clough inlet; a convex scraper found in the Westend inlet of the Howden Reservoir (at SK159930); and an oblique arrowhead (Fig. 2.5.) found on the Birchinlee shoreline. The leaf-shaped arrowhead, convex scraper, and by virtue of its hour-glass perforation probably also the macehead fragment, are of Early Neolithic origin; the oblique arrowhead from the Late Neolithic. Both the oblique arrowhead and the macehead fragment are of ceremonial character; the quality of the former (Fig. 2.5.) suggests that it may have been disturbed from a burial context (Myers pers. comm.).

A few finds are also specifically datable to the Bronze Age, including a barbed and tanged arrowhead fragment found at Low Field Abbey; a similar artefact, reused as an awl picked up on the Nabs Wood shoreline of Derwent Reservoir (SK 170900); a fragment of a pendant whetstone from Shireowlers (SK 172910); and a V-perforated shale button from Nether Ashop on the Woodlands arm of Ladybower Reservoir (SK 179863).

2:4:6. Iron Age / Romano-British Period

No archaeological features or monuments present in the Upper Derwent Valley have been specifically dated to the Iron Age. Furthermore, no artefacts characteristic of the period were found during the reservoir drawdown survey; iron-work and pottery would not survive exposure on the shoreline for very long. Iron-made items quickly rust into shapeless forms in acid soils like those in the Upper Derwent and prehistoric pottery, including that from the Iron Age, is poorly made, unglazed and friable, so would perish rapidly when exposed to the action of the water. As a result of these factors, it was not possible to confirm that the valley was occupied in the time between the Late Bronze Age and Roman Period. However, a quernstone of Iron Age origin and three others possibly from the same period have been found at locations within the area; which suggests cereal cultivation may have being taking place there during that time (Bevan 1998).

There are a variety of stone built structures and earthworks present in the Upper Derwent Valley which could have been constructed during the Iron Age, but are only safely determinable as prehistoric. However, recent excavations on the Eastern Moors of the Peak District (about 15 km away) indicate that there was continuity of use at prehistoric sites in that area, from the Neolithic through to the Iron Age at least (Barnatt, Bevan & Edmonds 1995-97); so the same may have been true in the Upper Derwent. Significantly, at most of the sites around the Derwent Reservoirs where concentrations of flintwork occur, Romano-British artefacts are also found. This suggests continuity through the Iron Age, since it seems

Fig. 2.4. A plano-convex flint knife , found on the drawdown of Howden Reservoir, in the Upper Derwent Valley. This unusually fine artefact probably originated from a Bronze Age ceremonial context.

Fig. 2.5. An oblique flint arrowhead recovered from the drawdown of Derwent Reservoir, in the Upper Derwent Valley. This is another very finely made artefact and dates to the Late Neolithic Period.

unlikely that all these sites were abandoned in the Bronze Age and then systematically re-occupied during the Romano-British Period.

The remains of a prehistoric field system, comprising cairns, linear heaps of stone, a lynchet, and possible house sites, occurs on Derwent Moor (SK 2087). Until recently this site would have been assigned specifically to the Bronze Age; but in light of the work on the Eastern Moors, it could have been occupied during the Iron Age as well, and through to the Romano-British Period.

Significantly, settlements dated to the Romano-British Period, occur less than 0.5km to the south of the prehistoric field system on Derwent Moor and there are other similar sites concentrated around the confluence of the Derwent and Ashop Valleys. However, there appears to have been more widespread Romano-British settlement in the Upper Derwent, because as mentioned above, pottery scatters of the period have been found at many of the artefact sites located on the reservoir drawdown zones (including those with rich lithic assemblages, e.g. Linch Clough, Low Field Abbey, Derwent and Nether Ashop). Also lead-made spindle-whorls, of characteristically Romano-British design, have been found at Tinker's House by Ladybower Reservoir (SK 192872) and at Walkers Farm on Derwent side (SK 173909).

The Romano-British pottery found at all the sites on the reservoirs (51 sherds in total) was well scattered, which suggests that it was originally derived from midden material scattered on fields, rather than *in situ* chance loss or breakage of full pots. The majority of sherds were of second to fourth century Derbyshire Ware; but there was some undated Grey Ware and a few diagnostic rim sherds of Rough Ware, probably of third or fourth century origin (Beswick 1996).

2:4:7. Saxon Period / Early Medieval Period

This is another little known period; again due to the rarity of contemporary structures and artefacts. The only object datable to the period which has been found in the Upper Derwent Valley is a fragment of a pre-Conquest cross shaft (probably tenth century) excavated from the ruins of Derwent hamlet (Sidebottom 1996). No pottery or other characteristic Saxon or Early Medieval artefacts were found around the reservoir shores during the survey of the drawdown zones.

The reason for a lack of recognisable iron work has been described above; the absence of pottery was also not surprising, because the period was largely aceramic. Pots of this era which have been found in other parts of the country are usually high status imports from the continent. This apparent gap in human activity in the Upper Derwent Valley, is probably like the one in the Iron Age, false, and is more to do with changes in material culture, rather than indicating a genuine abandonment of the area. Indeed, Linch Clough, Low Field Abbey, Derwent, Nether Ashop and the other reservoir drawdown sites, which have both prominent scatters of prehistoric lithics and Romano-British pottery, also hold good quantities of Later Medieval sherds, and much Post-Medieval material; which suggests continuity over an even longer period of time.

2:4:8. Later Medieval Period

Although only five building sites of probable Medieval date have been located in the Upper Derwent Valley, the area has a rich history from that period. The land to the west of the River Derwent was granted to William Peveril in 1068 by King William and was within the Royal Forest of the Peak; later, around the end of the twelfth century, a large section of the valley, at least in part within the bounds of the forest, was given over to the Premonstratensian Abbey of Welbeck by John, Earl of Mortaigne, who was later to become King John; while land to the east side of the River Derwent appears to have been gradually taken over by the order between the twelfth and fourteenth centuries, in part due to endowments from the manors of Hathersage and Sheffield (Bevan 1998).

To the south of the Derwent Reservoirs, there are a number of significant long-standing settlements, particularly within the Noe Valley; these include, the Domesday King's Manor of Hope (SK 172835), which had six outliers; Hathersage (SK 234818), with four outliers, including Bamford (SK 207836); Castleton (SK 150829), which was called Peak's Arse (Morgan 1978); and Thornhill (SK 199835), which is first documented in 1200 (Cameron 1959). Figure 5.2. shows the location of these settlements.

The types of settlement run by the Premonstratensian canons in the Upper Derwent is in the main unclear, but in 1252 Crookhill was an equicium, or stud for horses, with 20 horses and 20 mares (Ward 1956-57); both this site and Abbey Farm (sited at Low Field Abbey) have been identified as the centres of monastic granges, but there is no clear evidence to support this. What is certain, is that these two settlement sites and several others dispersed around the present day reservoirs, were occupied during the period of monastic tenureship up to the mid-sixteenth century dissolutions and afterwards. Indeed many of the buildings, still to be found as ruins or occupied farmsteads, which were rebuilt during the seventeenth century or later (Bevan 1998), seem to have origins in the Late Medieval Period or earlier.

The survey of the reservoir drawdown zones provided much of the evidence for the longevity of settlement sites located within the bottom of the Upper Derwent Valley; the antiquity of most sites further up the valley sides, where pottery and other artefacts have not been exposed, is inferred largely from the presence of well-defined access trackways to peat cuttings. The pottery finds (Fig. 2.6.) suggest that at least thirteen sites, located in the vicinity of the reservoirs, may have been occupied during the Medieval Period. This conclusion is based on the fact that the majority of the Medieval sherds were found in loose concentrations, which were in the vicinity of known settlement sites. The generally mixed and well scattered character of these assemblages, indicates that they were derived from midden material produced at the settlements.

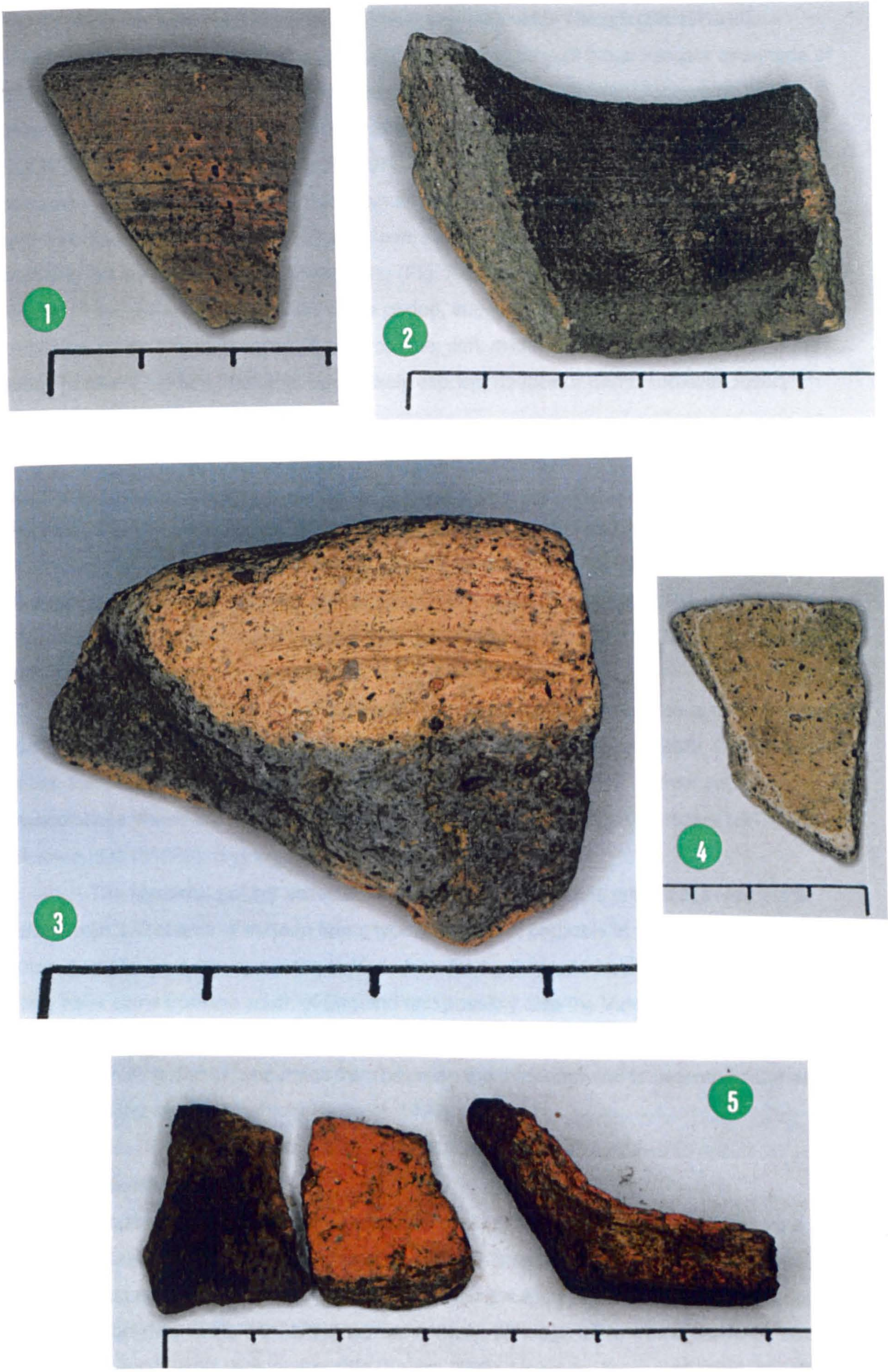


Fig. 2.6. A selection of Medieval pottery from the Upper Derwent Valley. Sherds 1-4 were recovered from the reservoir drawdowns (1, 2, and 3 are the type sherds of pottery fabrics of probable 14th to 15th century date; while 4 is 13th to 16th century). 5 shows sherds of the early 13th century coarse-ware found during excavation in Howden Clough.

The excavation of a small lead working site in Howden Clough (SK 176936), revealed the remains of two Medieval pots (Bevan 1997). One of these vessels was made of a Coal Measures fabric, of a type previously found around the Derwent reservoirs; but the other (Fig. 2.6.5) was different and may have been made within the valley, during the early half of the thirteenth century (Beswick 1997). The latter vessel is of added significance because it appears to be slightly older than any of the pottery found around the reservoirs, and was made from an unglazed, coarse, soft, sandy, friable fabric, of a type which would probably not survive exposure for very long (Fig. 2.6.5). Its occurrence in Howden Clough, isolated from any known settlement of the period, suggests it may have derived from habitation within the main valley. If, such coarse, soft, and friable pottery was typical of the early thirteenth century, then this would likely explain the lack of Early Medieval pottery on the reservoir drawdown zones.

The following settlement sites were identified as Medieval on the basis of their associated pottery scatters:
Ronksley Farm / Linch Clough (Sk168940); Abbey Farm / Low Field Abbey (SK170919); Birchinlee (SK 166918); Shireowlers (SK172910); Walkers Clough (SK 173908); Hollin Clough (SK 174901); Fairholmes (SK 173892); Old House (SK 177892); Dewent hamlet / Wellhead (SK 185885); Tinkers House (SK 192872); Underbank (SK 177866); Nether Ashop (SK 179862); Ashop Farm (SK 188860).

The recent archaeological survey of the Upper Derwent Valley lists a total of eleven definite Medieval settlements and thirteen other possible ones (Bevan 1998). Of the definite sites, there are five which have not also been identified as Medieval by their pottery associations; these are Alport (SK 135911); Crookhill (SK 186868); Grimbocar (SK 172870); Rowlee (SK 153893); and Westend (SK 153928).

The Medieval pottery associated with the settlement sites around the reservoirs comprised 379 sherds of thirteen fabric types (Fig. 2.6.), probably in the main originating from Coal Measure sources in South Yorkshire, Derbyshire and Nottinghamshire; but some may have come from the south of England and possibly also the Vale of York. This material derives from a variety of vessels, include cooking pots, jugs, dishes, pipkins, cauldrons, possibly chafing dishes, and dates from between the thirteenth and fourteenth centuries through to the sixteenth century (Beswick 1996).

2:4:9. Post-Medieval Period

The continuity of long-standing settlements in the Upper Derwent Valley through to the Post-Medieval Period has already been discussed. There is little evidence to suggest widespread additional settlement of the valley after the Medieval Period, until the period of reservoir building at the start of the current century; although there was a phase of rebuilding from the seventeenth century onwards (Bevan 1998). However, there was some limited, localised, Earlier Post-Medieval settlement within the valley; in particular the development of the Ashopton hamlet (SK 195863), after the building of the Sheffield to Glossop Turnpike in 1821. Further building in the valley may have occurred around the same time, in response to a related possible increase in charcoal export to the Sheffield iron foundries.

In 1901 a temporary village called Birchinlee was built to accommodate a proportion of the workforce whom were to be employed in the construction of the Howden and Derwent reservoirs; the remains of this site, which was abandoned in 1912, can still be seen on the west side of the Derwent dam. The building of these two reservoirs also resulted in the desertion of eleven farmsteads and a cottage; while a further 21 farmsteads, four cottages, and the hamlets of Derwent and Ashopton, were abandoned because of the construction of the larger Ladybower Reservoir, which was started in 1935 (Bevan 1998). After the three reservoirs had been filled, settlement in the valley became largely dispersed, and comprised in the main farmsteads located on the valley sides. Vestiges of the hamlets of Derwent and Ashopton remain above the shores of Ladybower Reservoir and a purpose built water-workers estate was built immediately below the dam wall, near Yorkshire Bridge (SK200850).

The variety and quantity of Post-Medieval pottery recorded on the reservoir drawdown (1528 sherds in total) was reasonably consistent from site to site, but a few locations had more distinctive assemblages. Notable amongst these was Linch Clough, which produced fine, decorated Cistercain Ware, as well as Rhenish and possible Dutch glassware. These finds were considered by Beswick (1996) to be indicators of "some degree of economic success and social pretension here, during the sixteenth century".

2:4:10. Summary history

Settlement around the upper reaches of the Derwent Valley is characterised by its largely dispersed pattern and apparent great faithfulness of location. Many of the settlements, particularly those sited where tributary brooks meet the River Derwent, at the base of sheltered cloughs, show evidence of occupation from pre-history through to recent times. The evidence for this long-term settlement is largely provided by artefact scatters which have been exposed on the drawdown zones of the Howden, Derwent, and Ladybower Reservoirs at times of drought. Prehistoric flint work (Figs 2.4. & 2.5.); Romano-British, Medieval (Fig. 2.6.), and Post-Medieval pottery sherds; plus other dateable artefacts, were found in concentrations, sited in the vicinity of known settlement sites. Of the sites occupied from the Medieval Period, through to recent times, which were identified by pottery scatter association, only Hollin Clough (SK 174901) and Underbank (SK 177866), have no significant deposits of flintwork or Romano-British pottery.

The randomly scattered character of the pottery assemblages, generally located within c.100m radius of the settlements, indicates that they are derived from midden material which has been spread on the land surrounding dwelling sites. The rich variety of prehistoric raw materials indicate that the human communities operating in the Upper Derwent were well travelled, or involved in active trade with other areas. For instance, the macehead fragment found at Low Field Abbey appears to have been manufactured from stone originating from the Lake District; which is also the likely source of the pitchstone items found at various locations between Linch Clough and Dewent. It is exceptional to find the latter material so far south of its site of origin. The whetstone fragment recovered from Shireowlers on the eastern shore of Derwent Reservoir had been manufactured from Welsh slate; while other prehistoric whetstones of uncertain date, found in a variety of locations around the dams, were made out of mica-schist and a jasper-like stone.

The Birchinlee and Low field Abbey sites face each other across opposite sides of the Derwent Reservoir, but examination of the lithic scatters at times of exceptionally low water levels suggest that they are parts of a common assemblage, divided by the River Derwent. The reservoir bottom in this area is very flat and the present day course of the river, under the reservoir, may not be as it was in prehistory. The site in general is exceptional for the quantity of flint-work that is exposed; which is all the more remarkable considering the flatness of the area and the relatively large proportion of the ground that is silted over rather than laid bare. The variety of the lithics and later artefacts suggests considerable re-use or long term occupation of Low Field Abbey, from the Early Mesolithic through to the start of the twentieth century, making it the most significant long-standing occupation site known in the Upper Derwent Valley .

CHAPTER 3

RESEARCH METHODOLOGY

RESEARCH METHODOLOGY

In the Peak District, prior to this research, peat cuttings identified from their archaeological remains, were limited to a handful of small domestic pit-like examples located on the Staffordshire Moors (Barnatt pers. comm.). The recognition of large scale open-cast removals in the Upper Derwent Valley and on Kinder Scout during 1993, led to the widespread identification of similar features within the South Pennine uplands. The nature of the present-day vegetation on the overcut areas and the peat cutting archaeology were used to identify a major proportion of the peat workings described in this thesis. However, because of the previously unknown nature of the phenomenon, the search for features took many routes and continued throughout the course of the project as new types of evidence came to light. Indeed, a number of factors ensure that there will always be incomplete determination of the extent of past peat exploitation.

3:1. FIELD OBSERVATIONS

The first site, Fagney Clough (South) (Figs 3.1. & 3.2.), was initially identified by chance, as the result of an incidental archaeological walk-over survey of the ridge affected. A rough transect along the ridge revealed the presence of a grouping of low banks, which were initially identified as possible prehistoric boundary features.

As the transect was extended upslope, westwards, a dramatic change in peat depth and vegetation was noted. At approximately the level of the 450m contour there was an abrupt bank of peat (c.1.5m in depth), to the west of which the peat cover was extensive and vegetated by *Calluna* and *Eriophorum*; but to the east there was only patchy, thin peat and mineral soil covered by *Nardus* grassland (Fig. 3.2.). The peat bank had a slope of approximately 45 degrees and was largely vegetated by a mosaic plant community, richer in species than either the *Calluna/ Eriophorum* dominated ground or that covered by *Nardus*. It was realised that this peat bank differed fundamentally in several respects from the typical eroded edges of the Peak District blanket mires; in that it was largely vegetated; had a straighter line with abrupt right-angle recesses (rather than irregular and fimbriate); the sloping element of the bank had a more even 45 degree slope; and furthermore, it ran across the line of contour, more or less at right-angles to the line of the ridge (rather than following the line of the contour). The presence of a broad trench within the blanket mire (Fig. 3.1.), c.50m back from the peat bank and running more or less parallel with it, led to the conclusion that both these features were the product of human activity, rather than erosion. Subsequent reassessment of the minor earthworks present on the *Nardus* area established that at least some of these were banks of shallow peat, rather than lynchets (Glossary) produced by soil movements within an area of prehistoric, or any other episode of past cultivation. Appraisal of all the features on the ridge as a whole established the presence of an area of open-cast style peat extraction, with its maximum extent marked by the abrupt bank between deep peat

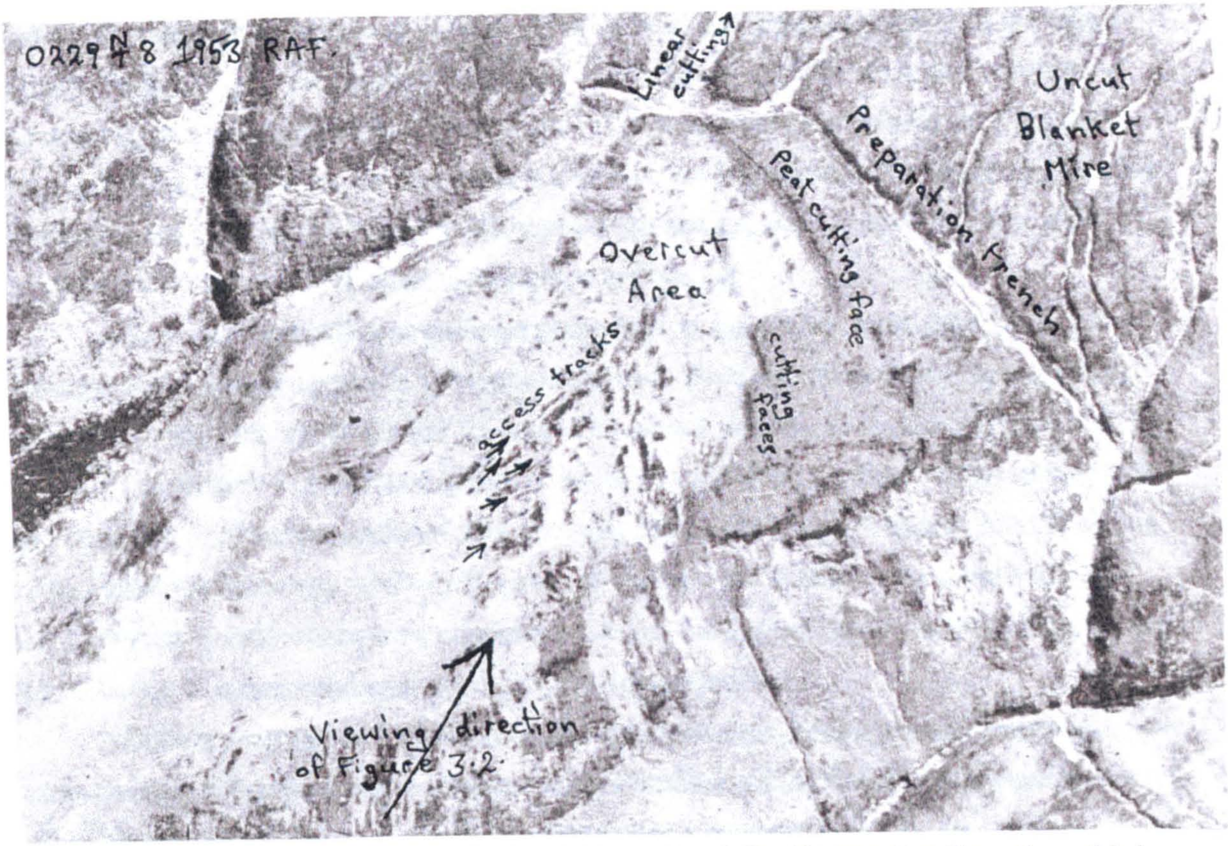


Fig. 3.1. A section of an aerial photograph showing the Fagney Clough (South) peat cutting. The patterns of dark markings (dwarf-shrub vegetation), on the light coloured overcut ground, indicate the position of some of the baulks and other minor features which first signalled the anthropogenic nature of the site. Annotations mark the position of the cutting face and other major archaeological features.

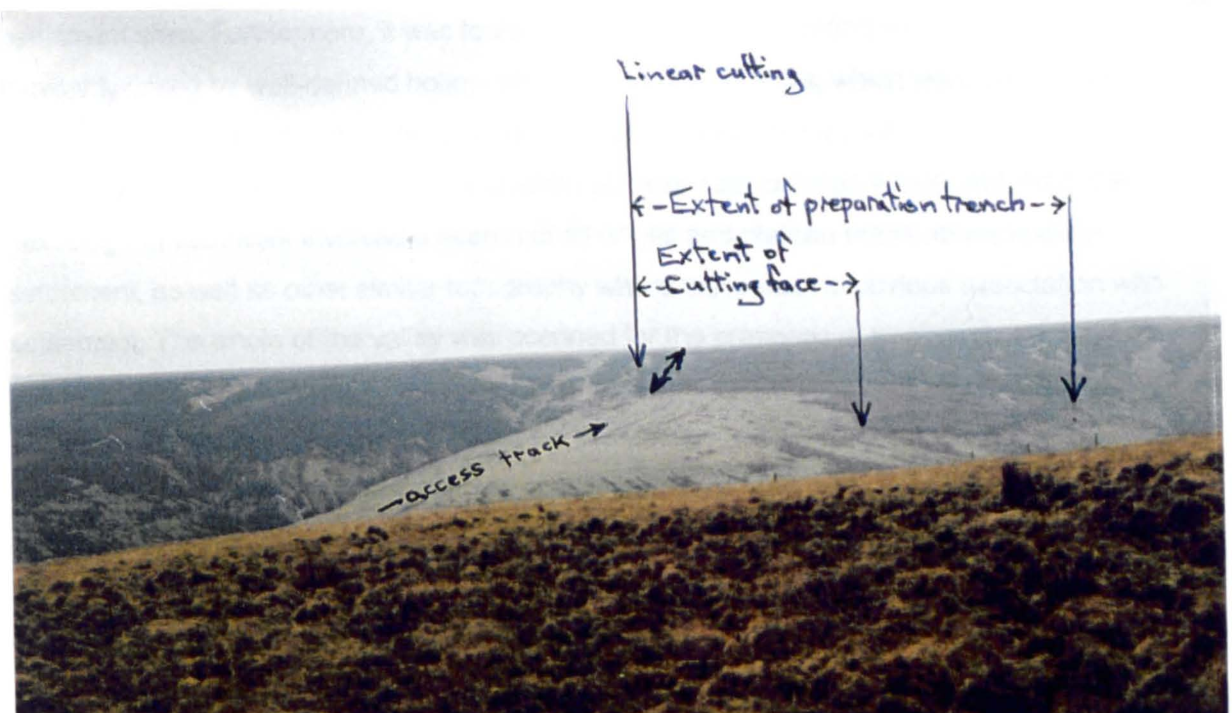


Fig. 3.2. Photograph of the Fagney Clough (South) peat cutting, from Banktop Hey. The abrupt change, from light coloured *Nardus* on the overcut ground, to the dark of the uncut blanket mire upslope, is very clear. Annotations indicate the positions of the same major archaeological features highlighted on Figure 3.1.

and mineral soil; with evidence of internal subdivision of workings, preserved as the minor lynchet-like banks; and preparatory drainage of the adjacent portion of uncut blanket mire, indicated by the occurrence of the broad trench running parallel with the abrupt peat bank (Figs 3.1. & 3.2.). Further close examination of the cut-over area led to the discovery of other associated archaeology, including minor hollowed trackways and an earthen ramp, which was interpreted as a possible peat stacking/ loading feature.

The occurrence of this large-scale peat working, lying on a ridge directly upslope of Westend Farm, one of several long-standing settlements in the Upper Derwent, suggested that more similar cuttings should be present in the valley. Indeed, overview from this site revealed the presence of identical abrupt changes in vegetation on other ridges to the north and observation of these candidate peat cuttings, through binoculars, appeared to show the same surface archaeology. Walk-over survey of the nearest of these ridges the same day, and the others shortly afterwards, confirmed this was indeed the case; therefore establishing the presence of widespread peat cutting in the Upper Derwent.

Once a precedence for the occurrence of these peat workings was established within the Upper Derwent others were located by obtaining a variety of good overviews of the valley. However, this proccedure only identified peat cuttings demonstrating dramatic vegetational change.

Subsequent field work established that these large peat workings on the whole occupied areas with clear topographical characteristics; namely peripheral plateau ridges with slopes of about 1 in 10 or less, located at c.370m or more, above long-standing settlement sites. Furthermore, it was found that these settlements and the overcut areas were inevitably linked by well-defined hollow-ways/ terraced trackways; which were clearly not through-routes, but showed evidence of considerable usage in the past.

Once the basic criteria for the location of these peat cuttings was established, the next stage of field work involved a search of all ridges and plateau areas above known settlement, as well as other similar topography where there was no obvious association with settlement. The whole of the valley was scanned for the presence of trackways leading from the valleys to higher ground, and any located were followed in search of additional peat-workings. This follow-up survey revealed the presence of many less obvious, but not necessarily less extensive peat cuttings, where there had been no significant vegetation change.

3:2. AERIAL PHOTOGRAPHIC INTERPRETATION

After the primary stages of fieldwork aerial photographs were examined, to see if any of the features found so far would show up diagnostically from the air. It was hoped that if this was the case it would greatly aid a more comprehensive survey; not just within the Upper Derwent, but in the Peak District generally.

The Peak Park Joint Planning Board's archive of aerial photographs, lodged at their head office at Bakewell, was consulted initially and subsequently throughout the project. It comprises a diverse range of aerial photographs taken between 1953 and 1995 (Appendix 1.), including four sets of images which cover the whole of the national park (1976-78, O.S., 1:25,000 monochrome; 1984, Ministry of Agriculture, Fisheries and Food (A.D.A.S.), 1:14,000 monochrome; and 1989, M.A.F.F. (A.D.A.S.), 1:20 000 monochrome and non-metric colour). Scales of photographs within the collection range from 1:700 to 1:25,000, and there are monochrome, colour, non-metric colour and false colour infra-red images.

Initially the large format 1984, M.A.F.F., 1:14,000 monochrome photographs were examined, since these facilitated easy scanning of the whole of the Peak Park plateau. These images proved invaluable since they not only showed the majority of peat workings already located by the primary field work, but more importantly the cut-over areas where there was vegetation change stood out very clearly as unnatural features, because of their angular form and the presence of associated trackways. By reference to these now well established peat cuttings, it was a straightforward process to provisionally identify a number of other similar sites in various parts of the Peak District. Known peat workings, showing no dramatic vegetation change, did not stand out clearly; but by closely examining the photographic images could still be distinguished by the presence of their trackways and differences in the minor surface features found on the cut-over areas and the adjacent uncut blanket mire. Reference to the false colour images proved to be particularly valuable when looking for surface features, since they were found to often show linear earthworks such as hollow-ways exceptionally clearly; indeed it was possible to provisionally identify additional peat cuttings even on areas covered by uniform *Calluna.*

3:3. GROUND-TRUTHING

After the whole of the Peak District plateau (plus some peripheral uplands covered by the aerial photographs), had been examined for evidence of peat workings, and this information had been traced onto base maps (where possible 1:25,000 Dark Peak and White Peak O.S. Outdoor Leisure Series), further field work was required to verify any provisionally identified peat cutting sites. This verification was achieved by walk-over survey, checking for the presence of worked peat faces and associated earthworks. Additional ground-truthing was required from time to time, throughout the project, as more potential new sites were located by other criteria developed through continuing use of aerial photographs and archive research.

3:4. SECONDARY AERIAL PHOTOGRAPHIC WORK

Eventually the complete collection of Peak Park aerial photographs was examined, since any one may have held additional evidence of former peat cutting activity. Many archaeological features in the landscape are very subtle; especially when covered by coarse, leggy vegetation such as *Calluna*. Because the collection of aerial photographs used comprised different types of image (monochrome, colour, non-metric colour and false colour infra-red), was taken over a 42 year period, from varying angles, flight paths and times of day, as well as under a mixture of lighting effects and surface weather conditions, some tend to show certain features better than others, or record completely different ones. For instance, when there is snow, light wind-blown dustings can collect against and therefore highlight linear earthworks with very low relief (perhaps otherwise indiscernible in the field), and sub-surface features sometimes show where different thermal qualities of the archaeological sediments produce varying settling and/or thawing effects.

As was the case with the ground-truthing work, secondary aerial photographic interpretation was required occasionally throughout the research in order to cross-check/ verify additional discoveries. In addition, many examples of small scale peat workings, extractions disguised by regrowth of vegetation, and evidence of turf/shallow blanket peat-paring (7:1:7), only became apparent through a learning process involving cross-use of aerial photographs and/or field observation. This was particularly the case with the turf/peat-paring, which was first identified well into the research, and was then only fully assessed by very close re-examination of images already scanned for open-cast removals.

3:5. MAPPING AND RECORDING

The final full extent of peat cuttings within the Upper Derwent Valley (Fig. 5.2.) determined by this research was mapped at 1:25,000, since this was the scale used during much of the aerial photographic search and follow-up field work. This scale also gave a manageable final overview, while allowing for some representation of the form of the individual peat workings, as well as the associated archaeology. However, 1:50,000 and 1:63,360 maps were used for some of the other overcut areas of the Peak District, where there was less intensive survey.

Plans of peat cuttings used as case-studies (Lockerbrook Heights and Black Dike), were drawn at 1:2,500, to show the complexity of their associated archaeology (see Figures 7.3. & 7.6.). These scales were selected, in order to show the distribution of all identified surface features, while giving an adequate representation of their form and comparative scale.

3:6. CASE-STUDY SURVEY

The Peak District was selected as the main area of study since the phenomenon of large-scale historical upland peat cutting within blanket mires and its huge impact on landscape was first recognised there. The National Park's close proximity to Sheffield also made it appropriate for detailed field survey, since the work would require a large number of site visits. The most detailed survey was carried out in the Upper Derwent Valley.

Additional field survey was undertaken in mid-Wales, mainly around the Elan Valley (Fig. 3.3.), since this area was found to be similar topographically to the Upper Derwent and has had similar land-use history. The survey of this area involved over-view from roadways, walk-over of a few targeted moors, and the laying down of a small number of quadrats (Fig. 3.4.). Targeted moors were selected because of the presence of hollow-ways and the apparent absence of thick blanket peat on topography where it was considered there should be significant deposits.

Lockerbrook Heights (Fig. 3.5.; 6:47; SK 161898) and Black Dike (6:67; SK 141955-SK 160940) were selected for full walk-over archaeological survey, as examples of large scale open-cast peat working and linear cutting respectively. These sites were surveyed by a combination of aerial photograph interpretation, ground-truthing, full walk-over and secondary aerial photographic work. Details observed on the aerial photographs (Fig. 3.5.) were initially traced onto transparent drafting film and if confirmed by ground-truthing combined with those features discovered by the walk-over. It was intended that the latter, achieved by making a number of relevant (not necessarily regularly spaced) transects, would record the majority of visible field archaeology present. The positioning of the transects was governed by the localised nature of the topography, vegetation and complexity of the archaeology.

3:7. ECOLOGICAL SURVEY

As the extent of historic peat cutting in the uplands was recognised, it became clear that the impact of this activity on the ecology of these landscapes must be considerable. The overall changes to vegetation and substrate, (i.e. the gross conversion of *Eriophorum* dominated blanket peat to poor grasslands on mineral soils) was obvious and clearly fundamental in its own right; but at this stage the knock-on effect of this on the full range of fauna and flora could only be speculated about. In order to identify and quantify the changes to the fauna and flora in general, a number of peat cuttings were selected for detailed ecological appraisal.

3:7:1. Quadrat work

This work was carried out to assess the impact of peat exploitation on the flora of the uplands; in particular within the Peak District. Peat cuttings used in this study were selected to represent each of the broad types of vegetation associated with overcut areas; namely, those dominated by either *Nardus*, *Molinia* or *Calluna*. The majority of sites picked were large scale cuttings where there had been near total removal of deep blanket peat. These were chosen because the latter type of workings collectively form the major proportion of the cut-over area of the gritstone moorlands of the Peak District.

The method used was designed to assess the differences in the vegetation found on overcut ground with that on adjacent uncut blanket mire, and involved the laying down of single quadrats within the overcut area, on the revegetated peat working face, and on the

Fig. 3.3. View north-west up the Claerwen Valley, Central Wales, from Esgair Ceiliog. This is an extensively overcut landscape, reminiscent of the Upper Derwent Valley, but where *Molinia* grassland is dominant on the high plateau.

Fig. 3.4. Eroded peat cutting face on Esgair Ceiliog; the site of trial botanical quadrat work in Central Wales. The ridge in the background has been extensively overcut, but has been consistently colonised by *Molinia*.

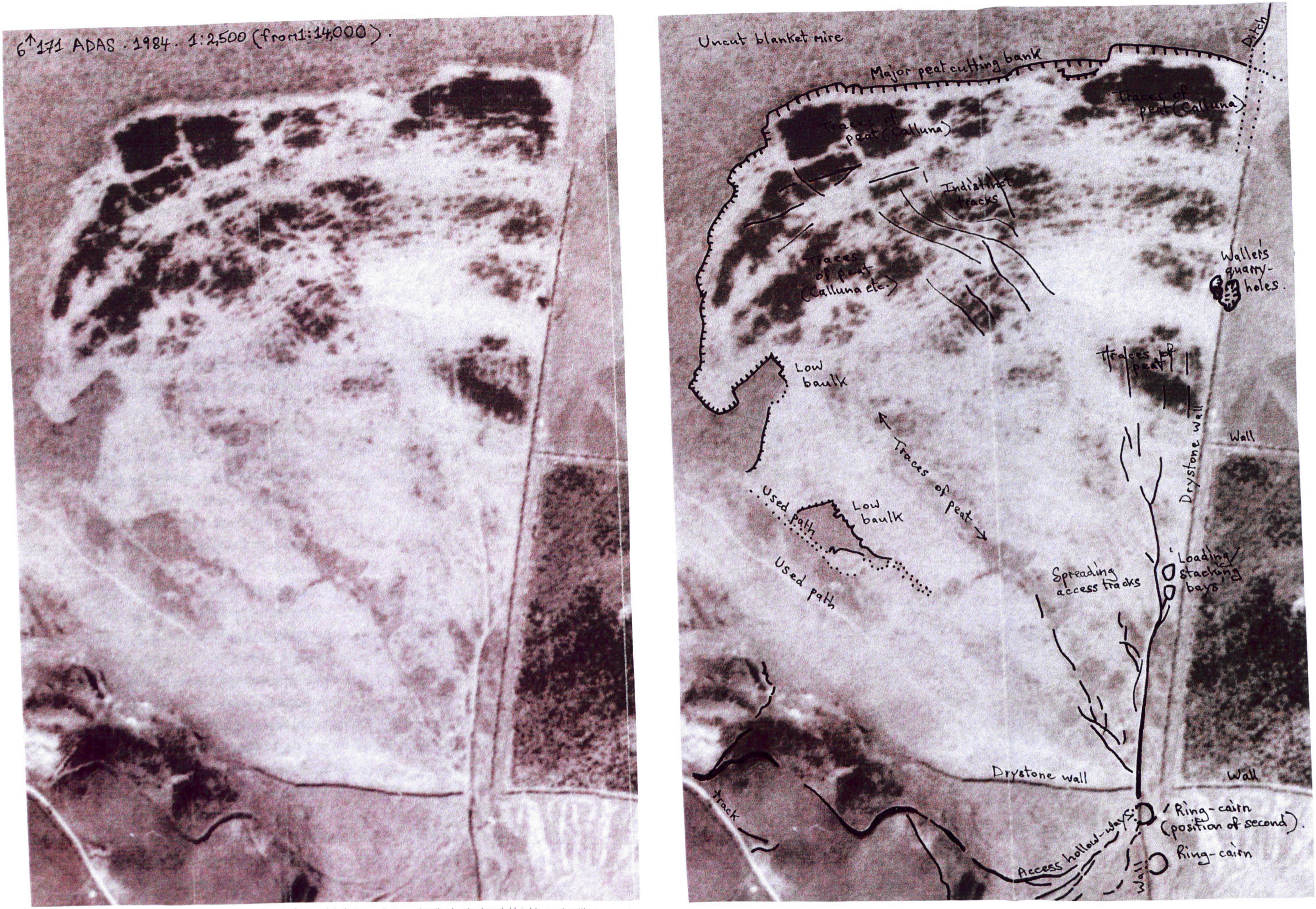


Fig. 3.5. Identical 1:2500 enlargements of part of an aerial photograph, targeting the Lockerbrook Heights peat cutting in the Upper Derwent Valley; the site of intensive ecological and archaeological study. The right hand copy carries the interpretation and annotations used during 'ground-truthing' and subsequent archaeological mapping.

uncut blanket mire. A fourth quadrat was set up if there was 'prepared blanket peat' isolated between the peat working face and a preparation-ditch (7:1:8.).

Where possible 4m x 4m quadrats were used, since these were considered large enough to cover representative sections of the vegetation, but small enough to allow for a complete examination of the ground flora, including the bryophytes, lichens and macro-fungi. However, since the slope of a collapsed peat working face often extends for more than 4m between the intact blanket peat and the overcut ground, a linear quadrat was required to assess the vegetation of these features fully. A quadrat covering the same area, but with dimensions of 8 x 2m, was found to be most appropriate, since it would adequately take in the ecotome between intact blanket and overcut ground, without incorporating any of the typical mire or peat cutting floor vegetation.

The quadrat size and number chosen allowed the assessment of either one or two peat cuttings in a day, depending on the distance from access points and the proximity of the sites to one another. Given the isolation of many sites and the broad remit of the research, these quadrats were considered most suitable; being adequate to establish the general composition and structure of the plant communities which have developed on and around peat cuttings.

The quadrats were set up after an initial walk-over at each site. This allowed a general assessment of the vegetation to be made and established the most representative location for the quadrats. Where possible the quadrats were aligned at right angles to the line of the worked peat face, with those on the overcut ground and the intact blanket mire located approximately 50m either side of the face. These criteria were applied in order to be consistent, but could not always be rigidly adhered to, for instance if a projected quadrat location fell on a patch of atypical vegetation. If the latter was found to be the case, the quadrat was displaced to the nearest suitable location found either side of the alignment.

The flowering plants, pteridophytes, bryophytes, lichens and macrofungi were recorded for each quadrat. Species belonging to the first four of these groups were then given a DOMIN rating (Shimwell 1971); however, since the fungi were only recorded by their fruiting bodies, these were counted individually or recorded in terms of the DAFOR scale (Glossary). The quadrat was initially scanned to assess the major components of the plant community, then the ground between and under the vascular plants checked meticulously to record the full range of non-vascular plants. The quadrat area was also studied for the presence of any significant invertebrates, animal droppings, or signs etc. and their abundance was also assessed. Droppings and other animal signs were aged if possible, but only in broad terms. Each quadrat was recorded for a standard period of twenty minutes. All but obscure cryptogams and vegetative shoots of grasses occurring as rare components of the sward could easily be spotted within this time scale. It was considered unnecessary to spend a disproportionate amount of time trying to record absolutely every species present in each quadrat.

After each quadrat had been appraised in the way described above, the ground within its immediate vicinity was scanned for about five minutes, to identify any possible variations in the dominant plant community, and to record any additional species and information.

3:7:2. Breeding bird survey

This survey was carried out in order to quantify the impact of peat cutting on upland bird populations at a typical *Nardus* dominated site. Lockerbrook Heights in the Upper Derwent Valley was chosen (Fig. 3.5.; 6:47; SK 161898) because it had been used as the main case study site for archaeological survey and other ecological work.

The method used aimed to assess the differences in breeding bird populations found on the overcut area with that on the adjacent uncut blanket mire. This involved a modified version of the moorland bird transect methodology devised by the Nature Conservancy Council (undated leaflet). This type of field survey is normally very time consuming, requiring at least four visits during each breeding season, repeated over at least a three year period. Lockerbrook Heights was visited on four occasions during 1996, but not subsequently, since the aim was to establish the number and species of birds breeding locally rather than study population dynamics. As with the quadrat work, the broad remit of the research, dictated that this element of the ecological research was less intensive than it would have been if it had been the main focus of the study.

The technique involved walking two parallel transects across the study site; in each case covering the length of the over-cut area and a similar section of the adjacent intact blanket mire. This was considered necessary to compare the bird populations present on the two habitats. In compliance with the Nature Conservancy Council methodology the individual transects had a separation of 200m, which allows for accurate identification of species 100m either side of the line walked, while minimising disturbance. Any disturbance may be detrimental to breeding success and can effect survey results through displacement of birds to other parts of the site and subsequent duplication of recordings.

All the bird sightings were recorded and mapped on 1:10,000 O.S. base maps, using standard British Trust for Ornithology denotations. The latter indicate species, sex, number of individuals, activity, breeding signs such as the presence of a nest, and direction of flight etc. Other information recorded included the time the survey started, the time of survey completion, weather conditions, and significant incidental records (e.g. unusual or important records of animals or plants). Binoculars were used as an identification aid and a compass to aid navigation.

Transects were undertaken between the hours of 9 a.m. and 12 noon in order to be consistent and to avoid recording bias. The Nature Conservancy Council suggested that surveys made during this time slot produce the most reliable results, since birds can be exceptionally active during the first few hours of daylight and very quiet during the afternoon.

In addition, survey was cancelled if the weather was unsuitable; i.e. if precipitation was heavy or persistent, if there was heavy mist or fog, or if the wind was stronger than force 5 on the Beaufort Scale. The latter policy is adopted since during such conditions eggs or young may be chilled and adult birds may become disorientated.

The Nature Conservancy Council criteria dictate full recording of all species other than meadow pipit (*Anthus pratensis*) and skylark (*Alauda arvensis*); the latter to be recorded simply in terms of the number of individuals counted on each transect. This policy was adopted because these two birds are considered so abundant on moors that they confuse and clutter the field maps. Past experience of moorland bird survey within the Peak District (Ardron 1990) has indicated that this is not the case, provided care is taken and that these two species are recorded on the field map in an abbreviated way (Fig. 8.11.). Indeed in terms of this research these data are essential, since the meadow pipit and skylark are both significant components of the moorland food web.

3:7:3. Pitfall trapping

This survey was carried out to assess the impact of peat exploitation on selected elements of the upland invertebrate fauna. The method used, aimed to assess the differences in invertebrate populations found on peat-stripped moorland, with those on uncut blanket mire. Since the aim was to establish broad trends in populations rather than study their dynamics a single site, Lockerbrook Heights, was studied. As with the quadrat work and the bird transects, this element of the ecological research was less intensive than it would have been if it had been the main focus of the study. However, the level of work was considerable and established the general nature of invertebrate populations which have developed on and around peat cuttings where *Nardus* grassland occurs.

The basic methodology involved, setting up a line of six pitfalls on the overcut ground and an identical series on the intact blanket mire. As with the quadrats used to access the vegetation, these were located approximately 100m apart and equidistant from the disused peat working face. Individual pitfalls were excavated 2m apart and were lined with plastic drinking beakers whose tops were set flush with the earth surface. Care was taken not to expose peat or soil beyond the holes and disturbance of the vegetation around the pitfalls was kept to a minimum. Trampling of the adjacent vegetation (particularly that occurring on the blanket peat), while setting up the pitfalls, retrieving the samples, and resetting the traps, was of concern and was reduced by only making essential movements back and forth along the trap lines. Also each of the two phases of trapping (see below) used different lines of pitfalls displaced by approximately 10m. Each pitfall was primed with a small quantity (c.2cm depth; 50ml) of preserving fluid (yellow ethylene glycol anti-freeze liquid) which was chosen because its staining effect on collected material is minimal. To the latter was added a small squirt of concentrated detergent in order to break surface tension of the collecting fluid and thereby facilitate the capture of those invertebrates trapped. The quantity of fluid was kept low in order reduce the chance of flooding out of the traps contents during periods of heavy rain.

Three collections were made during the first part of the summer (25:6:96-23:7:96); each separated by approximately two weeks. Three more collections were made in the late summer (19:9:96-16:10:96), again at two week intervals. After each collection the contents of the pitfalls were sorted and the invertebrate specimens preserved in 70% alcohol.

During visits to the traps casual invertebrate records were also made; this provided useful additional data, since pitfalls are somewhat selective and in particular seldom catch lepidoptera and other habitually flying insects.

Pitfall bias was further counteracted by making a series of sweep-net trials on the collection days. Sweeping was carried out in a grid pattern where the peat-working face formed a centre line. In this, a group of four 50m transects, each separated by 50m and set at 90 degrees to the peat working face was walked on the overcut ground and a similar and opposite group on the intact blanket peat (Appendix 2.). Each of the latter two groups of transects was walked independently in order to separate the collections made either side of the peat working face. Collections from all four individual 50m transects within each group were retained together within the net and then transferred in total to an aspirator for killing and later sorting. Each transect was worked using a stooped, side to side sweeping action, with one sweep of the net every pace (c.1m). Firm contact was made with the vegetation cover on each stroke, in order to dislodge clinging specimens, as well as catch those disturbed by the action and others flying freely about. A white muslin, flexible rimmed, net was used for all this sweep-netting.

3:8. ARCHAEOLOGICAL SURVEY

3:8:1 Walk-over survey

This work was confined to the Upper Derwent Valley since this area was selected as a case study where interrelationships between settlements utilising peat could be studied. It was chosen because it contained an isolated group of peat-using settlements. In order to fully understand the history and socio-economic development of this area, in particular the fuel economy, it was considered necessary to record the majority of the surface archaeology present. Knowledge of the latter was poor, as evidenced by the paucity of entries contained within the local Sites and Monuments Record.

Survey involved walk-over of the entire watershed (Fig. 5.2.); including clough bottoms, ridges and plateau areas. A regular transect methodology was not adopted; this would have been far too time consuming and the intention was to discover most rather than all surface structures. Transects were in fact irregular both in line and in spacing; but were selected in order to take in good overviews, so that the topography could be scanned from a variety of directions, both with the naked eye and through binoculars. This was considered the most time-effective way of recording most of the features while also assessing their relationships within the landscape. Some work was carried out prior to this research (Ardron 1993), then subsequently on an intermittent basis throughout the project. Finds were recorded mainly on 1:25,000 O.S. maps in the field and then transfered to a 1:25,000 master-map.

3:8:2. Upper Derwent survey

In response to the findings of the walk-over survey a comprehensive archaeological appraisal of the Upper Derwent Valley was organised by the archaeology service of the Peak Park Joint Planning Board. This was a four year project (1994-1997) involving a more intensive form of the type of survey described above (3:8:1); the same basic method was employed, but the intention was to record all features and plot them in detail. The latter was accomplished by mapping features found on rough moorland at 1:10 000 and those on in-bye at 1:2 500 scale.

3:8:3. Survey of peat cutting features

The Lockerbrook Heights peat cutting, Black Dike and features used as examples within the archaeological typology (Chapter 7) were surveyed and mapped in greater detail.

In the case of Lockerbrook Heights, an aerial photograph of the site (M.A.F.F./A.D.A.S. 6 171; 1:14,000) was enlarged to 1:2,500 (Fig. 3.5.) and details traced off onto drafting film. Copies of this tracing were then taken into the field for verification of the interpretation and addition of any features not apparent on the aerial photographs. Field survey was achieved by criss-crossing the site; the coverage increasing over areas of greater complexity. Afterwards, back-reference was made to the original aerial photograph studied, to look for evidence of those features identified in the field. The final site plan was made at 1:2,500 scale.

Black Dike was also mapped at 1:2,500 scale, but in this instance, because the feature is linear and therefore more easily surveyed, a copy of a 1:2,500 O.S. map was used for the fieldwork. This copy simply showed the outline of the dike; but by walking backwards and forewards along its length, it was relatively easy, by pacing, to plan in and scale the individual componants of the feature.

Other small-scale peat cutting features were mapped at a variety of larger scales depending on their size and complexity. The off-set surveying technique was used on these examples; whereby details are recorded by laying a baseline measuring tape across the feature on a standard compass bearing and then plotting-in component features by reference to the latter. The plan drafted onto finely divided graph paper, whose smallest divisions have been given a representative scale; with measurements taken at right angles to the baseline and then matched against the scaled grid on the graph paper.

3:8:4. Lithics survey

Although the majority of large-scale peat workings in Britain, including those located in the uplands, appear to date from the Medieval Period, people's usage of peat clearly goes back to much earlier times (Chapter 4). With this in mind it was considered necessary to trace the development of human activity from its earliest roots within the Peak District, to see if there was any evidence of Pre-Medieval peat cutting present, or at least discover how this land use may have originated. The most widespread evidence of prehistoric human activity comes from deposits of flint and stone tools and the waste products of their manufacture; these lithic scatters are everywhere and tell the story of people's early movements in the landscape, before the days of permanent settlement. In the South Pennines, lithics from the Mesolithic Period were deposited prior to blanket mire formation, while those of the Neolithic and later sometimes occur within the peat itself; recovery of such artefacts is reliant on their exposure on the surface through the various processes of erosion.

This work was undertaken not only to help fill-in gaps in the historical picture but also to assess if possible whether the peat cutting process has damaged lithic deposits through exposure or by initiating erosion, or has led to the re-deposition of artefacts.

Lithic recording in the Peak District has in the past been on an incidental basis over the area as a whole or been linked to very specific find sites where there may have been intense field walking or excavation. Over many years this has produced a significant distribution of find sites, but reference to the local Sites and Monuments Record show that large gaps remain in the cover.

During the course of this research areas of eroded ground associated with peat-cuts have been carefully examined for the presence of lithic scatters (Fig. 3.6.). The level of coverage given to individual erosion areas has varied from site to site and has depended on the nature of the ground surface and related prominence of artefacts (Ardron 1998). In broad terms, erosion patches were covered by irregularly spaced parallel transects; the closeness of the latter varying in order to produce a recovery of the majority of the lithics exposed on the surface. On certain gravely areas lithics are particularly camouflaged and good recovery requires 0.5-1m transects walked in a deliberate stooped manner; while on bare peat surfaces transects may be several metres apart and be undertaken much more quickly.

Reservoir drawdown-zones

During the summer and autumn of 1992 water levels in the Howden and Derwent Reservoirs were unusually low, due to a series of dry summers, and in the case of Derwent in particular repairs being carried out to its banks. This resulted in the presence of significant drawdown-zones around both these reservoirs, in which the exposed banks had been largely denuded and stripped of their soil. The discovery of a robbed Neolithic or Bronze Age barrow in plantations adjacent to the Linch Clough inlet of the Howden Reservoir and subsequently worked flint and the remains of another barrow on the drawdown of the reservoir nearby, led to further exploration of the eroded reservoir shores (Fig. 3.7.).

A survey was carried out during the autumn of 1992, encompassing all areas of the drawdown-zone around the Derwent Reservoirs. For the duration of the survey the drawdown-zone had a vertical range of about five metres; horizontally it varied between about 10m and 100m depending on the degree of slope, although for the most part it ranged between 20m and 30m. On sections of drawdown with flat or gently sloping shelves minor differences in water level produced significant changes in sediment distribution (Fig. 3.7.).

The first stage of the survey involved walking around the perimeter of the two reservoirs, on a line roughly half way down the drawdown-zone; in effect following a transect corresponding to a contour. When an artefact was located the ground in the immediate vicinity was closely checked to see if it belonged to a larger assemblage. At this stage the finds were recorded on a 1:25,000 map of the area; their locations marked by white plant tags and then photographed. This technique intended to detect scatters rather than individual finds; prior to a more systematic survey being carried out in any areas where flints were located.

The second systematic part of the survey covered ground around find sites located during the first phase of the work. This involved walking backwards and forewords in transects of between half and one metre separation; new find spots being recorded in the same way as during the first phase. The details of concentrations were recorded by thumbnail sketches, with distances calculated by pacing (Ardron in prep. b).

Water levels in the Howden and Derwent Reservoirs were low again during the 1993 and 1994 summer and autumn seasons, which allowed some follow-up work to be carried out on both of these water bodies. This work involved filling in a few small gaps in coverage as well as some secondary systematic survey of sites holding particularly significant lithic assemblages.

During these three years of lithic survey, water levels in the much larger Ladybower Reservoir remained consistently high. Fortunately, continuing dry weather resulted in a significant drawdown on all three reservoirs during 1995 and 1996, so a survey of Ladybower Reservoir employing the same basic methodology as that described for the two smaller dams was undertaken. In the region of 2000 individual lithics were recovered from the reservoirs during these surveys.

3:8:5. Pottery survey

Since large-scale peat cutting in the South Pennines appears to have started in the Medieval Period it was thought important to obtain as much evidence of human activity during this period as possible, particularly with respect to settlement. Some present day towns and villages in the area have well-known Medieval origins, but the origins of the dispersed settlements are less clear.

Fig. 3.6. An eroded section of the Saddleworth Moor turbary (with linear baulks running left to right and peat cutting bank in the background). Any patches of exposed mineral soil such as these, found on overcut moorland, were checked for lithics and other artefacts.

Fig. 3.7. Drawdown of Howden Reservoir, Linch Clough, Upper Derwent Valley. Numerous fragments of cremated human bone have been found in the vicinity of the amorphous barrow in the left foreground; while the site in general is a rich source of multi-period lithics, pottery fragments, and miscellaneous artefacts.

Work during the early stages of the Derwent reservoirs lithics survey had revealed the presence of Medieval and later pottery fragments. Some of this pottery had been collected and established the potential importance of this material as a source of historical evidence for the Medieval and Post-Medieval Periods. As a result, work on these pottery scatters continued throughout the peat cutting research.

Recording of pottery scatters within the Peak District has in the past been largely incidental or site intensive. During the course of this research areas of eroded ground associated with peat cuts have been carefully examined for the presence of pottery sherds. Like the lithics survey the level of coverage given to individual erosion areas has varied site to site and has depended on the nature of the ground surface and related prominence of artefacts (Ardron in prep b); 3:8:4.). In broad terms, erosion patches were covered by irregular transects; the closeness of the latter varying in order to produce a recovery of the majority of the pottery exposed on the surface (i.e. on certain gravelly areas pottery is particularly camouflaged and good recovery requires 0.5-1m transects walked in a deliberate stooped manner; on bare peat surfaces transects may be several metres apart and be undertaken much more quickly).

Reservoir drawdown-zones

A preliminary pottery survey of the drawdown around the Derwent reservoirs followed the same basic method as that used to record lithic scatters. However, it soon became clear that most scatters of pottery sherds were related to known settlement sites and appeared in the main to represent midden scatter over adjacent land. Concentrations of lithics on the other hand were invariably associated with very specific sites of tool manufacture or encampment. Bearing these points in mind, as well as the limited amount of time which could be allowed for survey, and the large quantities of finds involved, it was decided that pottery sherds should be collected generally from designated areas of the drawdown, rather than plotted individually. However, within these limited areas, the collecting was achieved using the same methodology utilised in the secondary systematic survey of lithics. A total of over 3000 pottery sherds were collected from the drawdowns of the three reservoirs.

3:8:6. Upper Derwent reservoirs drawdown surveys

In addition to lithic and pottery scatters, the drawdown surveys revealed a variety of archaeological features, including parts of the drowned villages of Derwent and Ashopton. Full recording of these was necessary to assess the landscape history of the valley. Features were recorded as they appeared, both photographically and on 1:10,000 or 1:25,000 O.S. field maps. The drawdown-zone was also included in the Peak Park Joint Planning Board's Archaeology Service Upper Derwent Survey (Sidebottom 1996); but within that project the zone was only covered by a single sweep.

3:9. LITERATURE AND ARCHIVE RESEARCH

Since upland peat cutting has been generally regarded as an insignificant land-use, little reference is made to it in texts; indeed it is often difficult to find any mention of the subject, even in books concerned with subjects such as upland vegetation and history. This has posed a problem in terms of trying to build up an historical picture of the activity; since the little information available is usually in the form of an anecdotal comment or a one-line statement. This has necessitated the collection of many fragments of information contained not just within written texts and academic papers but also extracted from letters and other transactions located within archives, as well as place-name evidence found on a variety of maps. The relationship of peat cutting to a group of broad disciplines (archaeology, history, ecology, geography, geology, agriculture, soil science, law, economics etc.) has meant that information could be gleaned from other sources, but this greatly increases the number of potential references.

Initially, the standard references on vegetation history were consulted (Chapter 1), followed by texts on agricultural and local history. The latter two sources provided some useful pieces of information as did reference to a variety of geographical and agricultural journals, as well as other miscellaneous documents such as ancient court rolls translated from the Latin.

Other major sources of reference have been the maps and documents contained within the Chatsworth Archive; the Derbyshire Sites and Monuments Record lodged at the Peak National Park Headquarters in Bakewell, together with their collection of aerial photographs, historical maps, and other miscellaneous material; and current and historical O.S. maps. Most of these sources provided information specific to the Upper Derwent and the Peak District, but O.S. maps covering a variety of upland areas in Britain gave clues to more widespread upland peat cutting as well as general place-name evidence.

CHAPTER 4

PAST AND PRESENT USE OF PEAT, TURF, AND BOG MOSS

PAST AND PRESENT USE OF PEAT, TURF, AND BOG MOSS

The origins of peat, turf, and bog moss exploitation are unknown; but are undoubtedly located in prehistory. The potential of peat as a fuel may have been first recognised by accident, during the Mesolithic Period, when upland areas were burnt to create clearings for hunting (6:76. and 6:77.); but may have not been applied then because of the abundance of wood . Limited peat utilisation for other purposes certainly goes back to the Late Neolithic or Early Bronze Age; evidenced in the Peak District by a recently discovered peat-made barrow on Margery Hill, in the Upper Derwent Valley (Fig. 4.1.; 4:3:10.). Organised peat cutting was taking place by the Iron Age, at least in localised areas, testified by bog bodies from that period found associated with peat pits (Glob 1969; Fischer undated); while after the Norman Conquest the practice became widespread and amounts used for fuel and other purposes increased dramatically. In the last two centuries peat cutting in Britain has declined rapidly and is now largely confined to extreme western localities because of generally available coal-fuel.

Turf use probably has an equally long history to that of peat, at least for building purposes; for instance Neolithic and Bronze Age burial mounds have been shown in some cases to have been made of cut turves (4:3:10.), as was the Roman Antonine Wall (4:3:8.). There was also significant usage of this resource during the Medieval Period for building and during Post-Medieval times it was burnt extensively as fuel and as part of land improvement schemes. Bog moss was used extensively during the Post-Medieval Period and probably earlier, for insulating roofs and walls of dwellings; this was a particularly significant industry in the South Pennines.

Domestic use of peat for the home-fire, as still practised today, in for instance crofting areas of north-west Scotland, might be thought insufficient to explain the vast extent of over-cutting suggested by this study; even in those areas containing many long-standing settlements. However, an exploration of current and historical uses of peat shows the immense adaptability of this resource and the very large quantities which have been exploited for a variety of purposes. Diverse usage occurring over a period of several centuries adequately accounts for the level of exploitation postulated.

Before modern road construction and the railways allowed efficient transport of heavy goods such as coal, peat is likely have been the most basic raw material for every day life. Where it was abundantly available it might have been exploited ruthlessly; where relatively scarce, perhaps more frugally, with much more secondary usage. One of the greatest values of peat is its durability and multi-use potential; it has for instance been initially used for cattle bedding, then scattered on the land as fertiliser; while peat and turf ash have been used to soak up the liquid in cattle sheds (Davidson & Simpson 1994).

The majority of peat used in the past has been for fuel on the domestic home-fire, and in a multitude of industrial processes, as well as to produce fertiliser for agricultural improvement; today there is still large-scale exploitation of the resource as a source of fuel for specialised power stations (Hay 1947) and as the major component of many garden composts (Caufield 1991; Gale & Berry 1996). Significant amounts of peat have probably also been used for building purposes and for animal bedding; while relatively small quantities have and continue to be used for other purposes, for instance within the fields of medicine and modern industry.

The following account describes the properties, qualities, the major uses, and many of the minor uses of peat. It is likely that some ancient uses of peat, perhaps significant ones, remain unknown. However, the descriptions of peat uses are not intended to be definitive, rather, comprehensive enough to show the flexibility of the resource and thereby explain the huge level of its exploitation. The majority of the information has come from literature sources. See Appendix 3. for a full list of all the peat, turf, and *Sphagnum* uses identified.

4:1. THE PROPERTIES AND QUALITIES OF PEAT

The use to which peat is put depends very much on its chemical composition and textural qualities. These vary considerably from site to site and also within the depth of individual peat deposits. Generally, denser more humified types of peat, with increased concentrations of combustibles, make the better fuels; while fibrous and less humified forms, with greater powers of absorbency, are more suited for litter or compost (Wilson 1849; Fraser 1948).

In 'British Peats' a paper in the Ministry of Agriculture's journal 'Agriculture' (Fraser 1948), three broad classes of peat are identified, namely, 'moss peats'; 'deer grass (*Scirpus*) peat'; and 'reed grass (*Phragmites*) and sedge peats'. 'Moss peats' are graded higher the more sphagnum moss they contain, since this gives "lightness of texture and absorptive power" to this type; which is recommended for soil-conditioning and for use as moss-litter. Moss-litter is said to be "a much better basis for manure than straw, since it can absorb much more liquid and nitrogenous waste, and gives a richer product than straw, and is free from weed seeds and plant diseases". 'Deer grass peats' are considered good fuels because of the durability of the turves extracted from them. 'Hill peats' are said to be usually of this type, but more decomposed and fibrous. 'Reed grass peats' are considered too friable to be used as fuel and not absorptive enough when dried to be used as bedding, but are said to be very rich in mineral nutrients, especially lime, and therefore very suited to agricultural improvement. However, the lower layers of deep deposits of any of these three peat types are considered to be useful as fuel peat if sufficiently decomposed and compressed.

On Fenn's Moss, a lowland raised mire on the Welsh/English border, a 1923 lease between the land owners and two peat cutting companies distinguished between basal 'black' or fen peat considered suitable for distillation, and upper 'white' and 'grey' peat used for packing, in the production of molasses-based cattle feed, and for animal bedding (Gale & Berry 1996).

4:1:1. Value as fuel

The different types of peat appear to be very varied in their fuel value; generally the upper deposits are poor, because of their uncompacted and friable nature on drying; while the lower, denser forms cut better and contain relatively more combustible material.

In Wilson's volume 'The rural cyclopedia' (1849), the author says that 'flow-moss peats' "produce a very weak fire, burn fast and produce little ash"; 'heath peats' and 'spongy brown peats' "produce a better fire, that burns longer; while solid black basal peats are preferable to the other two types and are in many districts the best fuel". He goes on to say that "dredged black mud from the bottom of deep parts of bogs is better still as a fuel, and that charred prime black peat is in most circumstances the most valuable peat of all". The author makes further divisions of 'fuel peats', singling out peat containing birch remains as being "more inflammable than peat from a bog which contains only oak"; while that "formed by pine or fir falls catches fire more readily, throws out more heat and supports combustion longer than any other peat".

The basal, more dense, and humified peat deposits seem always to have been the most highly regarded as fuel, because they cut readily into solid turves and are the most combustible; with those from upland blanket bogs the best of all. Fraser (1948) affirms this opinion, stating that "compact black peats, such as are obtained from the lower layers of many basin peats, from blanket moss, and especially from hill peat, have greater heating value than timber as usually sold, and may approach ordinary coal in this respect". He also mentions that in general the better peat has approximately "75% of the heating value of household coal or 50-55% of that of steam coal", and that the "Light-textured, undecomposed peats have a lower practical value than coal or even wood". Comparative and supporting evidence of the fuel value of deep peat is provided by 'Life and tradition in the Yorkshire Dales' (Hartley & Ingelby 1985), which states that "The peats from the bottom of the peat pots drying black and very hard compared favourably with coal". Indeed, dried peat fragments seen recently in the Swaledale Folk Museum at Reeth appeared similar to an anthracite coal in general appearance, weight in the hand, and texture.

Other attributes of peat as a domestic fuel are, its pleasant smell in the hearth and its slow and consistent burning on fires easily kept alight indefinitely, sometimes reputedly for nearly a hundred years (Hartley & Ingilby 1972). Furthermore, peat use has even been considered beneficial to health, evidenced by a quote from 'The English rural labourer' (Fussell 1949), in which the author states that "peat was reckoned a particularly healthy fuel and it was said that where it was used pestilential disorders were more rare and less fatal".

Although different types of peat clearly have different qualities as fuel, the way they are burnt also plays a part in their efficiency. For example, in the Yorkshire Dales 'general peat fuel' has been mixed with small lumps of coal, and peat from the bottom of pot-pits which has been broken up into small pieces to "improve their effectiveness" (Hartley & Ingelby 1985). Additionally, peat fires could be damped-down by placing a large piece of turf at the back of the hearth. According to Wilson (1849), "Large pieces of bog turf, having a mossy surface, an intermixture of earth and rank growth of heath and other plants when cut of proper size and depth with the breast plough and placed at the back of a peat fire upon the hearth, burn slowly, throw out a great deal of heat, and make the combustion of any set of peats last longer than it would otherwise".

4:1:2. Value as building material

The potential value of peat as a building material lies not just in its insulating properties and ease of cutting into suitable building blocks, but also in its ability, when dried, to turn water, as indicated by Hartley and Ingelby (1972), who state that peat turves, "by pressing on them as you drew the spade away, you 'slipped' them, thus putting a 'glaze' on that withstood water. A well-dried peat could be immersed in water and turn the wet".

On the down side, exposed peat appears to be susceptible to the action of frost; Hartley and Ingelby (1972) commenting "Good peat won't bear the frost", while Wilson (1849) observes that "as much as a three or four inch frosted skin of peat is uncutable on peat faces worked the previous year". This implied inability of peat to withstand the effects of sub-zero temperatures has probably resulted in a preference for growing turf over peat turves throughout the history of 'earthen building work', encouraged regular demolition and reconstruction, and therefore presumably the scattering of old building material on farmland as manure.

4:1:3. Value as ashes

Some types of peat have been found to be much better than others for producing the ash based fertilisers which have been used widely in land improvement schemes. Indeed, the chemical composition of peat ashes vary considerably. According to Wilson (1849), Sir Humphrey Davy carried out experimental 'ashing' of peat at various sites and found that "those from Newbury, Berkshire contained 25-33% of gypsum, those from Stockbridge in Hampshire over 33% gypsum and those from Wiltshire "considerable proportions" of gypsum; while in Northern England, West England, various districts of Wales, Scotland and Ireland there were no useful quantities of gypsum, but great amounts of oxide of iron and siliceous and aluminous earths". The conclusion of the experiment was that "if the soil or substratum is calcareous the ultimate result is the production of gypsum". The same author states that "British peats cut for fuel yield whitish ashes of little use as manure; but those from the bottom of pools or ditches made during the cutting of these peats produce 'Dutch ashes' celebrated for half a century as fertilisers".

4:2. USE AS FUEL

Probably the single most important use of peat by ordinary people has been as fuel, both in uplands and lowlands. This use has also been the most sustained, with widespread exploitation in Britain continuing unbroken from at least the early part of the current millennium right through to present day. The practice became much less widespread during the nineteenth century, but remains important in certain isolated areas such as the Hebrides and Shetland; where the considerable impact of the activity on the landscape is clearly evident (Fig. 4.2.). In Ireland and Russia, peat has recently been hugely exploited for use in peat-fired power stations. Very small-scale peat cutting for fuel still takes place around the north-eastern boundary of the Peak National Park, at Hardern, Hade's Pits, and Wessenden Head, by the archaic Graveship of Holme (5:1:5.). Prior to the spread of the railways, peat cutting for fuel appears to have still been common in the area; for instance, in Derbyshire in 1829 peat "is in many places used for fuel" (Glover 1829).

4:2:1. In the dwelling

The use of peat as a source of fuel for heating and cooking on home-fires is well-known and extensively referenced, but most accounts are cursory and anecdotal, with the practice seldom given much weight. However, there are a few writings which collectively testify to the huge scale of domestic peat cutting and its likely dramatic impact on the landscape. The scale of domestic peat cutting is especially well-documented in the lowlands and is perhaps most dramatically illustrated by accounts of its use in the kitchens of Norwich Cathedral Priory, where in the fourteenth century approximately 400,000 turves were being consumed each year (Rackham 1986).

Writings about the uplands seldom provide quantitative information. However, in the Yorkshire Dales turf or peat has been recognised as being the chief fuel used for centuries, especially after forest clearance and even where local pit coal was available. It was cut in this area by isolated settlements, particularly at the dale heads, up to the Second World War (Hartley & Ingilby 1985). Large-scale peat exploitation for domestic fuel has also been described from Cornwall. In 'Cornwall and Its people' (Hamilton-Jenkin 1932), the author states that "huge quantities of bog turf were annually brought in from the surrounding moors".

The quantities of peat consumed as fuel in dwellings would vary, as a result of many factors, including, the type and quality of the available peat, the size of the building, its exposure, construction, the number and affluence of the occupants, and whether the peat was being used simply for heating or for other purposes as well. None-the-less, a farmstead with average unpretentious needs, using peat mainly for cooking and heating, would if long-standing remove a considerable quantity of peat. For instance if a traditional Cornish farm which burnt about one thousand turves annually (Hamilton-Jenkin 1932), was occupied for three hundred years, it would during that time use about 300,000 turves (each c. 0.5m X 16.5cm); the equivalent of about 4166 cubic metres of peat, or a one metre layer of peat 41.6 X 100m. Even greater consumption of peat is recorded for north-east Yorkshire, where the moderately sized farm of North Ghyll, Farndale, used 17,500 turves per year (Hartley & Ingilby 1972). Since the turves cut in this Yorkshire area measured 15-18 X 5 X 4 inches, in a

Fig. 4.1. The eroded side of the peat-made barrow on Margery Hill. This monument which is located on the eastern edge of the Upper Derwent Valley, at 540m, was identified by exploratory excavation, after the underlying cairn and stone built kerb, shown here, became exposed on the edge of the eroding blanket mire.

Fig. 4.2. Extensive domestic peat cutting near Fladdabister, Shetland Islands. This photograph eloquently demonstrates the considerable impact domestic peat cutting can have on the landscape. Since all the cutting banks to the left of the track have been recently worked, it is easy to appreciate the potential impact of several hundred years of turbary and a similar period of abandonment.

300 year period, it would consume the equivalent of a one metre depth area of peat 400m X 100m.

4:2:2. In the field

Peat may also have been used as a fuel by people working long-term in the field. This would be as a source of heat within temporary dwellings or around open camp fires. It would have been a difficult fuel for travellers to use, since all but eroding surface deposits, exposed to the summer sun, would have required drying before being burnt. Shepherds operating from summer shielings could however have left peat stacks on the high moors for their fuel. This type of peat use by shepherds operating on the Upper Derwent plateau is indicated by the presence of extensive linear peat cuttings found along ancient land boundaries which cross sheep-walk areas (Chapters 6 & 7; Glossary), and by minor cutting features preserved around isolated, apparently man-made pools, sunk within the general blanket mire surface. During World War 1 peat was also important as a smokeless fuel used in the trenches (Gale & Berry 1996).

4:2:3. In past industry

Peat has been used as fuel by a variety of industries throughout the current millennium. Accounts of this type of usage occuring in the Peak District area include, up to the early seventeenth century lime kilns fuelled in part by peat (Harris 1971); a 19th century peat processing works called Kelly's located on moors to the west of Sheffield (Fig. 4.3.), using peat as a fuel for the peat drying and pressing machinery (Ward 1950); and references to holly (*Ilex aquifolium*) bark used in the manufacture of bird lime being boiled using peat fuel (Chatsworth archive) (Figs 4.4., 4.5., 4.6., & 5.3.).

Iron & steel

Peat has probably been widely used as fuel for iron smelting throughout the history of that industry. It was most likely generally converted into peat-charcoal before use. The quantities of peat consumed by this industry may have been considerable; evidenced for instance by the example of the eighteenth century Leighton Furnace in Lancashire, which at its time of peak production used 406,400 kg (400 tons) of peat a year (Ayre 1984). Compressed peat which had been converted into charcoal was greatly valued for making and tempering best quality cutlery steel; on account of it having a low sulphur content and being more dense than wood charcoal (Chambers 1923).

Peat has probably also been extensively exploited as fuel throughout the history of iron smithing. The peat was likely generally converted into charcoal before use and this may have been more heavily utilised in upland areas than in the lowlands; since highland smiths are known to have used peat charcoal up to recent times (Tylecote 1981). In the Yorkshire Dales, blacksmiths used peat fuel for hooping wheels (Hartley & Ingilby 1985). A further use

Fig. 4.3. Kelly's peat works, Ringinglow, near Sheffield. Part of the ruins of the settlement is on the right side, and extensively pitted bog in the centre. The peat-pitting is indicted by the mosaic of bog, grass, and dwarf shrub vegetation.

Fig. 4.4. An ancient holly pollard in the Woodlands Valley. Since it is growing on the bank of a charcoal hearth, it has probably been exploited for a variety of purposes; including as a source of bark for bird lime production.

To be SOLD,

(To the beſt BIDDER.)

At the Houſe of Mr. *Deakin*, known by the Sign of the *Falcon* Inn, in *Cheſterfield*, on *Saturday*, the Fifteenth Day of *December* next, between the Hours of Two and Four in the Afternoon.

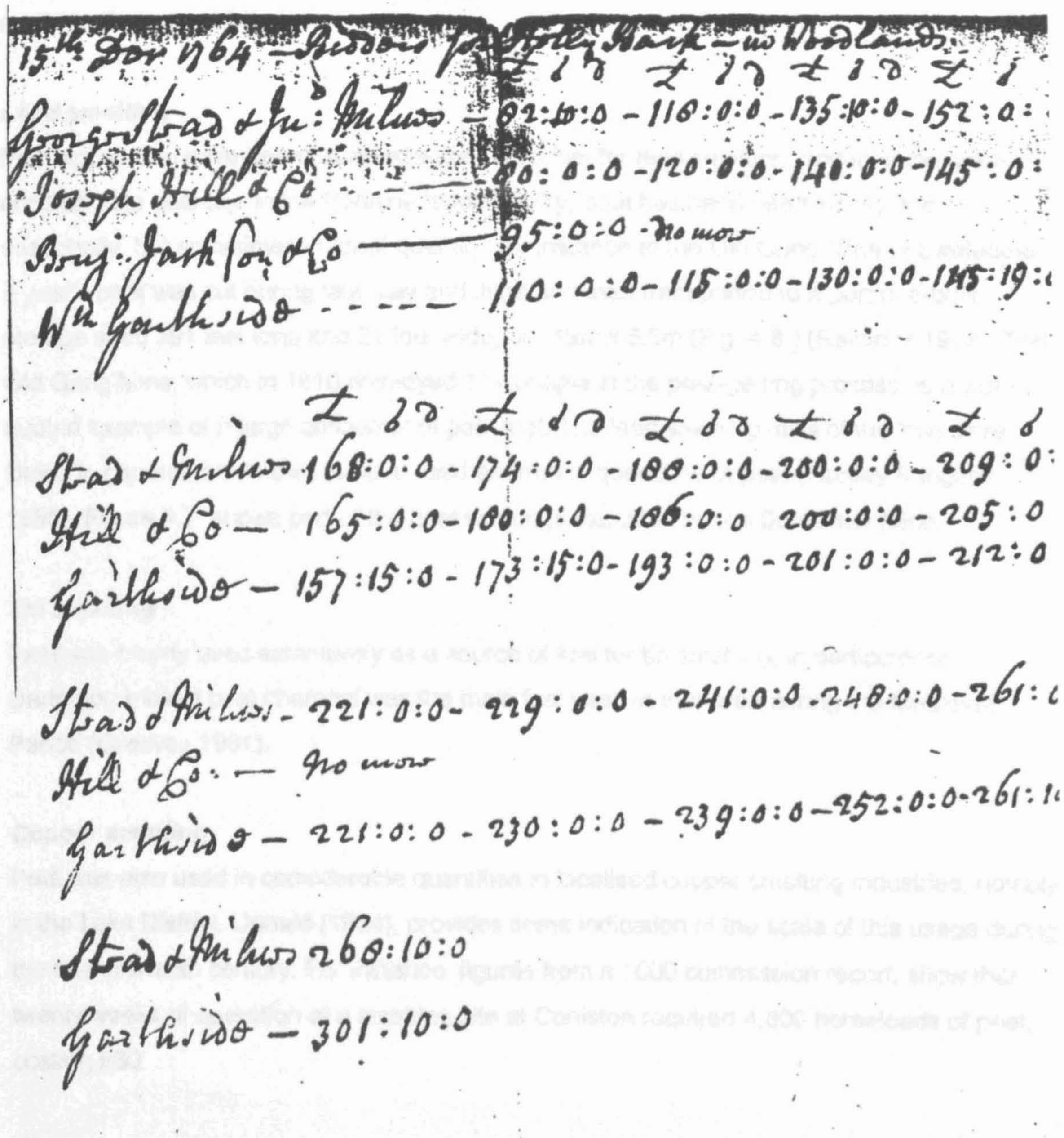
THE Bark of all the HOLLYS within his Grace the Duke of *Devonſhire's* Woods, in the *Woodlands*, (excluſive of the Fences) which are intended to be cut down by yearly Parcels within the Term of twelve Years now next, enſuing.

Alſo in like manner will be then ſold all the Rammell which ſhall ariſe from the Cordwood and Bruſhwood, which will be cut in the ſaid Woods during the ſaid Term.

The Conditions of Sale will be ſhewn at the Time of Bidding.

N. B. The cutting of the Cordwood will be ſet at the ſame Time.

Fig. 4.5. Copy of a poster, dated 27th November 1764, advertising the sale of bark from the holly trees within the Duke of Devonshire's woods in the Woodlands Valley.



15th Decr 1764 – Auction for Holly Bark – in Woodlands.

	£ s d	£ s d	£ s d	£ s
George Stead & Jno. Milnes	82:10:0	110:0:0	135:10:0	152:0:
Joseph Hill & Co.	80:0:0	120:0:0	140:0:0	145:0:
Benj. Jackson & Co	95:0:0 – no more			
Wm Garthside	110:0:0	115:0:0	130:0:0	145:19:

	£ s d	£ s d	£ s d	£ s d	£ s
Stead & Milnes	168:0:0	174:0:0	180:0:0	200:0:0	209:0:
Hill & Co	165:0:0	180:0:0	186:0:0	200:0:0	205:0
Garthside	157:15:0	173:15:0	193:0:0	201:0:0	212:0

Stead & Milnes	221:0:0	229:0:0	241:0:0	248:0:0	261:
Hill & Co.	no more				
Garthside	221:0:0	230:0:0	239:0:0	252:0:0	261:1

Stead & Milnes 260:10:0

Garthside – 301:10:0

To Mr William Garthside at Dyson Holin
near Bradfield Bird Lime Maker

To be left at Mr James Watsons the two
Fighting Cocks in Sheffield

Fig. 4.6. Copy of an auction account, dated 15th December 1764, showing the sale of holly bark from the Woodlands Valley, to a Mr. William Garth, bird-lime maker, of Dyson Hollins, near Sheffield.

of peat in the iron and steel industry has been as a preventative against pitting of iron castings (Burnett 1964).

Lead smelting

Peat appears to have been exploited widely as a fuel for lead smelting, and in some areas in considerable quantity. In the Pennine lead industry, peat has been used locally and seasonally, but sometimes in great quantity; for instance at the Old Gang Mine in Swaledale a year's peat was cut during late May and June and then transported to a purpose-built storage shed 391 feet long and 21 feet wide, or 119m x 6.3m (Fig. 4.8.) (Raistrick 1983). The Old Gang Mine, which in 1810 employed 111 people in the peat-getting process, is a well-quoted example of a large consumer of peat fuel. The lead smelting mills of the Yorkshire Dales in general, are known to have used enormous quantities of peat (Hartley & Ingilby 1985). Figure 4.7. shows part of the peat workings exploited by the Surrender Mine.

Tin smelting

Peat was clearly used extensively as a source of fuel for tin smelting, in particular on Dartmoor; indeed peat charcoal was the main fuel used in that area during the Medieval Period (Greeves 1981).

Copper smelting

Peat was also used in considerable quantities in localised copper smelting industries, notably in the Lake District. Donald (1994), provides some indication of the scale of this usage during the late sixteenth century. For instance, figures from a 1600 commission report, show that twenty weeks of operation at a smelting site at Coniston required 4,800 horseloads of peat, costing £60.

The pottery industry

Peat has been exploited in significant quantities as fuel in the pottery industry. This seems to be particular so during the Medieval Period. Wood and coal were also used then, but a late fourteenth century dispute at Cowick which mentions the non-delivery of 20,000 turves (Moorhouse 1981), gives some indication of the quantities of peat consumed by Medieval kilns.

Brick and tile manufacture

Peat was sometimes used as a fuel for brick and tile manufacture during the Medieval Period; for instance at Ely in 1334, Hull in the 15th century and occasionally at Ingatestone, Essex in the fourteenth century (Drury 1981).

Fig. 4.7. Peat cuttings located above the Old Gang Smelting mill, Swaledale. Although these workings occur directly upslope from the latter, they are linked by access tracks to the Surrender Mill, which is found further down the valley.

Fig. 4.8. The peat storage shed used by the Old Gang Smelting Mill, Swaledale. This structure, which is currently being renovated, is 119m in length and was open-sided and heather-thatched to facilitate the drying of the peat.

Lime-burning

Lime kilns in the Peak District and surrounding areas were fuelled in part by peat, at least up to the early seventeenth century (Harris 1971), and probably much longer. Indeed, peat appears to have been considered a suitable source of fuel for lime burning, during the early nineteenth century. This conclusion is evidenced by a reference to the Woodlands area of the Upper Derwent Valley in the 'General view of the agriculture and minerals of Derbyshire' (Farey 1811), which states; "If coals cannot be procured in these Woodlands, peat certainly can, in the greatest quantities, for burning of lime".

Salt production

In the early part of the current millennium peat obtained from the fenlands of East Anglia was used to boil salt along the edges of the Wash; which was then a major salt producing site. Peat may have been used as the fuel for the same industry prior to the Norman Conquest since saltpans are mentioned in the Domesday Book accounts of the area (Rackham 1986).

Bird-lime production

Peat has also been used as a fuel when boiling holly bark in a process of bird lime production; the estates of the Dukes' of Devonshire were involved in this industry during the 18th century. A covenant concerned with the leasing of lands in the Woodlands Valley, Upper Derwent, dated around 1770 (Chatsworth archive), states: "And his Grace the Duke of Devonshire or his agents shall have liberty to get and carry away what turves or peats he or they shall want for boiling holly bark or any other matter or thing whatsoever" (Fig. 5.3.). The level of Chatsworths' involvement and the significance of the activity is shown by an advertisement-to-sale and a subsequent bill found in the Chatsworth archive and dated 1764, which relate to holly bark from the Woodlands Valley, to the value of £301:10:00 (Figs 4.5. & 4.6.).

It is uncertain whether the bird lime produced by this local industry would have been used to capture small birds for food, or for the cage. However, since small birds have probably always been part of the subsistence economy, it is possible this use of peat fuel has been widespread in the uplands over a considerable time span. A long-standing link with the industry, within the Woodlands Valley, may be indicated by the survival of an ancient holly pollard (Fig. 4.4.).

Alum & copperas/ green vitriol (ferrous sulphate) production

During the latter part of the sixteenth century peat was used as a fuel in the manufacture of alum and ferrous sulphate around Poole Harbour in Dorset; where Celia Fiennes described the "great furnaces" connected with the activities (Webb 1986). The quantities of peat used by these industries, may have been significant; high levels of consumption are certainly suggested by her account.

The well-preserved remains of a copperas works is present at Ringinglow to the west of Sheffield (SK 292834), but it is unclear whether it used coal or peat as fuel. The copperas was produced from iron pyrite and used in the manufacture of writing ink, Prussian-blue, sulphuric acid, and employed in tanning and dying processes (Chatsworth archives L 94/ 77).

4:2:4. In modern power production

During the twentieth century a number of countries in the Western Palearctic region have exploited lowland peat on a vast scale as fuel for electricity generation. An early example was set up at Wiesmoor in Germany at the start of the 1920s. At this site a year's supply of fuel for the power station required 1,200 tons of peat to be cut by machine every twenty-four hours during the four months between April and July; as a result, in the first twenty-five years of activity 1,500 acres of peat bog were cut over and subsequently converted to agriculture (Hay 1947).

4:2:5. Forms of peat fuel

Peat has been cut into blocks and dried for use as a fuel since at least the early part of the current millennium. Thick beds of peat have generally been the most valued; but where peat deposits were less than a single spade depth, turves may still have been obtained, by cutting the thin layer of peat with its covering mat of vegetation. This type of peat fuel was particularly important on Dartmoor and was called 'vags' (Harvey & St. Leger-Gordon 1962). Sometimes, where peat has been dug in ill-drained locations, the resulting water-logged pits have been used as a source of mors, a volatile mix of fine peat and mineral sediment, which on drying can still be cut into blocks (Stephens 1851). These raw forms of fuel have in the main been used for domestic purposes, but various industries have modified the peat resource, to produce purpose-made fuels more suited to their requirements.

Compressed peat

During the last two centuries industrial processes have been devised for compressing peat prior to its use as fuel. In 1878 the West of England Compressed Peat Company Ltd which operated at Rattlebrook Head on Dartmoor had as their aim "to convert the vast peat beds of Dartmoor into fuel by a process of hydraulic compression". This procedure hoped to provide fuel at half the cost of coal, which could be used as simple fuel, or for producing gas, or for smelting and fertilising. Although large quantities of peat were utilised by these works, they went out of production in about 1880, in part because of the high cost of maintaining the five mile peat railway constructed to access the site (Harris 1968).

Hot air dried peat

Between 1884 and 1887 the Rattlebrook Head peat works on Dartmoor, mentioned above, used a machine which dried brick sized peat blocks using blown hot air. This process apparently reduced the soft peat blocks to a final product about the same size as a man's finger (Harris 1968).

Peat briquettes

Soft peat has sometimes been moulded and dried for use as fuel. This process was industrialised at Fenn's and Whixall Mosses on the Welsh-English borders during the nineteenth century, where the Moulded Peat Charcoal Company Limited held a patent in 1860 to make briquettes from either wet peat and ground pitch; peat charcoal dust, pitch and resin; or other suitably volatile materials. The briquettes, because of the pitch content, when 'coked', were thought to make "a very hard and blast-resisting charcoal ideal for metallurgical purposes". The process was commercially unsuccessful and only carried out up to 1864. However, general moulding of peat for fuel at Fenn's and Whixall mosses had a much longer life, taking place from as early as 1810 (Gale & Berry 1996).

Peat charcoal

Raw peat appears to have been converted into charcoal to make it more suitable as fuel for a number of industrial processes. This practice has unknown origins but was certainly employed in Medieval tin smelting (Greeves 1981), and in iron smithing in the highlands of Scotland through to recent times (Tylecote 1981). Mechanised production of peat charcoal took place at Fenn's and Whixall Mosses on the Welsh-English borders during the mid nineteenth century (Gale & Berry 1996). As indicated above, the volume of peat is significantly reduced by drying; then to convert it to charcoal results in a greatly deminished final product. For instance, Harris (1968) states that "c.36lb of charcoal is produced from 100lb of peat", or about 16kg from 45kg. Any industry normally using peat-charcoal would therefore consume vast quantities of peat, particularly if long-standing.

Coke from peat charcoal

Some peat charcoal may have been converted into coke during the Victorian era; a patent held by the Moulded Peat Charcoal Company, operating at Fenn's and Whixall Mosses in 1860, incorporated "improvements in the preparation of peat and charcoal for fuel, in the manufacture of coke there from, and in the machinery and apparatus employed for effecting the same" (Gale & Berry 1996).

4:3. USE FOR BUILDING PURPOSES

4:3:1. In dwelling construction

Peat or turf has been used in the construction of walls and roofs of dwellings, animal shelters and other buildings since pre-history; indeed turf-built dwellings have been occupied through to modern times as testified by the following comments, "strange as it may seem there are still thousands of buildings in Britain made of earth", "and even turf buildings which are still inhabited" (Brunskill 1992). The majority of such buildings are likely to be several hundred years old, but peat houses were built on Fetlar, Shetland, from about 1860 and into the current century (Mack 1994). After World War 2, experiments at Wiessmoor in Germany, showed that peat could still be used to build cheap and visually attractive houses which were warm in winter, but cool in summer; although very prone to insect infestation (Hay 1947).

Up to the beginning of the present century, charcoal burners working in the ancient semi-natural woodlands around Sheffield, built conical wigwam-like huts made of poles with a covering of sods (Innocent 1916; Jones 1993); similar shelters were used by charcoal burners working in the Lake District (Bragg 1990); and Post-Medieval shielings used in various parts of Scotland were also of the same basic form (Smout 1971). Indeed, sod-made huts of this type have been used widely in Europe by charcoal burners and woodcutters and are considered to have origins in pre-history. A variety of other forms of wood-workers huts made of wattle, sod and poles have been used in Britain this century (Innocent 1916)

References to the use of turf in more general dwellings in the Peak District, are two near identical passages from Abney Manor court rolls of 1669, which stated that "No one to dig turf except clods for houses" and "No one to dig turf except for clods to cover their houses". The place-names Clod Hall Moor and Clod Hall Farm, from the eastern moors of the Peak District (SK 295726), are additional evidence of a more varied building application of the resource.

4:3:2. In roofing

Peat or turf has probably been used for roofing purposes since people first built covered shelters and dwellings; although distinctions between walls and roofs were less clear when these were of simple lean-to or wigwam-like construction. However, separate peat or turf roofs were used regularly to cover walled farmsteads and cottages in western parts of the British Isles, including Ireland, Scotland, Wales and the Isle of Man, during the Medieval Period, through to recent times. Two references which indicate this use of turf in the Peak District, including a pre-1219 grant for the Manor of Sheffield with the statement "the right to take heath, stone, turf, rushes and gorse for covering their houses and buildings" (Ward 1955), and the Abney Manor court ruling mentioned above. However, the wording of both these statements does not indicate whether the sods were to cover roofs supported on walls, or lean-to type of dwellings.

4:3:3. In roof insulation

Bog moss or peat was probably extensively used during the Medieval and Early Post-Medieval Periods to insulate dwelling roofs. In North Wales peat has been packed under roofing slates within living memory (Rotherham pers. comm.), and comments in various Hallamshire court rolls of the fifteenth century testify to the use of moss for the same purpose in the Sheffield area (Thomas 1924).

4:3:4. In wall lining & insulation

Thick walls of turf have been used to line drystone facings; for instance in the black-houses or clachans of Lewis and on the Isle of Man. In these buildings, the total width of the wall could be over 2m in width; the turf portion was easily replaceable (Innocent 1916). Peat or turf has also been used as a filler in the cavity-walls of certain buildings (Naismith 1989); both these materials should have provided effective insulation if they were thoroughly dried before use and especially if the outer walls were waterproof.

4:3:5. In floor covering

Sods have been used in the construction of floors in sod-lofts in Baldersdale , in the Yorkshire Dales. Here within living memory the floors of these lofts were "constructed of rough beams, crossed with birch sticks and covered with sods" (Hartley & Ingilby 1985).

4:3:6. Fortifications, encampments & other major earthworks

Various ancient fortifications, encampments, and other major archaeological features have an earthen construction; some have been made by excavating soil from around the earthwork, which is then formed from the upcast; but others may have been built out of cut turves. An interesting place name on the Isle of Man, Castleward, derived from Cashtal-ny-waaid, meaning "the sod castle" (Stenning 1958), indicates one such use of turves.

4:3:7. In dam construction

Sods have been used in the construction of dams, particularly small, improvised, temporary examples, and for making other forms of water-break. For instance, sheep washing dams in the Yorkshire Dales have been made out of stones with the spaces between packed with sods (Hartley & Ingilby 1985); Medieval tin and gold miners have used sod-made water-breaks to filter out the metals (Hoover & Hoover 1950). Furthermore, many present-day Sheffielders will remember as children making swimming and paddling pools along the Don tributaries from stones found in the streams and sods roughly torn from the adjacent banks. These types of activity are likely to have been widely practised in Britain.

4:3:8. In boundary construction

Although most modern linear boundaries in the uplands are demarcated by stone walls or wood and wire fences, a large proportion of earlier ones were of earthen construction. Many of these were banks and ditches, with the banks formed from the upcast produced by the excavation of the ditch; but others were free-standing features built out of cut turves, or peat. One of the most dramatic examples of a turf-built boundary is the Roman, Antonine Wall, whose three metre high ramparts and beacon-platforms were largely constructed from turves. This feature was originally built to replace Hadrian's Wall on a more northerly line spanning the Clyde-Forth divide and was begun in about AD 140 (Adkin & Adkin 1982). On the high peat moors of the Peak district there are many lengthy boundary features of earthen construction. Many of those that appear to be connected with the large scale peat cutting in this area comprise double-ditches enclosing a central bank, apparently made up of peat excavated from the ditches (Fig. 7.4.). These 'earthworks' criss-cross the Dark Peak plateau, dividing large land blocks, and are in most cases best preserved away from the turbaries; closer to the main peat cuts they have often been enhanced into linear peat cuttings/ trench boundaries (Chapter 7). These banks and double ditches may have Anglo-Saxon origins (Ward 1931).

4:3:9. In embankment work

A Victorian method of preventing flooding of land adjacent to rivulets carrying low levels of summer water flow, using an embankment made partly of turf, was advocated in 'The book of the farm' (Stephens 1862). The embankment incorporated a drystone wall built by the watercourse, a backing wall of turves, and a supporting earthen bank, itself clothed by a skin of turves.

4:3:10. In burial mound construction

A variety of ceremonial burial features have an earthen construction. Some have been built by excavating soil and other material around the site of the structure, which is then formed from the upcast; but others have been found by excavation to have been made largely out of cut turves. Examples of this form of construction of burial mound are relatively rare in the Peak District area, probably due to social factors and the topographical location of the main concentrations of these features; those in the limestone White Peak are largely made of stone and earth, while those in gritstone Dark Peak areas are mainly small stone built cairns. The gritstone burial cairns are typically associated with prehistoric field systems on middle level moorland shelves, where there is usually much surface stone and patchy soils.

However, several turf-built barrows have been identified in the vicinity of the Peak District. At Hognaston, in the Amber valley (SK 24445151), the excavation of a Bronze Age round barrow revealed the individual turve-by-turve build (Collis 1996); while excavation of two badly damaged round barrows at Lodge Moor on the western outskirts of Sheffield (SK 291863) indicated a similar construction (Bartlett 1957; Henderson 1957).

Although cut turf was probably regularly used for the construction of prehistoric burial mounds, peat would have been only rarely used for the purpose, because in the Bronze Age its distribution was localised and mainly restricted to valley bottom bogs and the highest moors. However, a stony bank and cairn, recently found exposed on the edge of the blanket mire on Margery Hill, Upper Derwent (Ardron 1993; Fig. 4.1.), was shown to be part of a much larger peat-made monument about 50m in diameter (Reeves & Batchelor 1994; Reeves 1994).

4:4. USE IN PAST AGRICULTURE

4:4:1. In the production of ashes

Fully combusted peat produces ashes which have been widely used to increase soil fertility. The chemical content of these ashes varies considerably depending on the source of the peat (Wilson 1849). For instance the properties of peat from a lowland fen differ markedly with that from an acid blanket mire; while peat from the base of a mire will vary greatly from that closer to the surface. These different peat deposits have been exploited to produce various purpose-made ashes.

Purpose-made ashes

It appears that potash-rich peat ashes have been widely used for agricultural land improvement in Britain. In the Peak District, "potash was made available by the burning of turf and ling when rough land was reclaimed" (Harris 1971). During the latter part of the eighteenth century there was a peat works at Kelly's near Ringinglow (Fig. 4.3.), on the outskirts of Sheffield, which was pressing peat used in making potash manure (Ward 1950).

In many situations, these ashes may have been produced by simply firing stacks of dried turves set up close to or upon the land to be improved; but in other locations, including the Peak District, they may have been made in purpose-made hearths. Possible peat-ashing or charring-hearths have been found in association with several of the Upper Derwent settlements which are known to have used peat and a similar feature has also been seen in mid-Wales. These features are now preserved as circular pits recessed into shallow slopes, with an opening on the downslope side (Fig. 7.1.).

Ashes from domestic hearths

Peat ashes from domestic hearths would sensibly have been scattered on farm land to improve fertility. This re-use of the peat resource is known to have taken place in at least some peat burning cultures; being documented for instance from the Shetland Isles. On Papa Stour peat ash from midden heaps was spread on the fields and was also used to soak up liquid products in the cattle sheds before being scattered on the land (Davidson & Simpson 1994).

Dutch-ashes

During the nineteenth century ash was produced from the material extracted from the bottom of flooded ditches and ponds made by peat diggers. The soft peaty product was turned out onto the adjacent ground and left to thicken, before being cut into blocks for final drying, prior to conversion into ashes (Stephens 1862). These Dutch-ashes were used on clover crops in Holland and Flanders before being introduced to Britain.

Burnt peat and lime (Ess)

Peat has also been burnt and the product mixed with lime to produce ess which was used to improve the fertility of land. Apparently towards the end of the eighteenth century many parcels of moorland in the Peak District were enclosed as unofficial small holdings by squatters and the lands thus treated, before sowing with oats and potatoes (Harris 1971).

4:4:2. In the production of mulches, manure and composts

Peat has been widely employed, often mixed with other materials, to produce mulches, manure and composts for soil improvement.

Raw peat

During the mid nineteenth century air dried peat was converted into manure at Fenn's and Whixall Mosses on the Welsh-English borders (Gale & Berry 1996).

Raw peat mixed with other materials

An example of this type of usage from the Hayfield area of the Peak District, described in 1815, involved mixing peat with lime and manure for use on the poor soils of fields on the edge of the surrounding moors (Anderson 1986).

Black-earth

During the nineteenth century a manure called black-earth was "highly esteemed" as a mulch for covering seeds; it was apparently " common in all the agricultural districts" (Stephens 1862). This material was made up of burnt earth and "decomposed vegetable matter", comprising various vegetable rubbish, straw, grass and parings of turf (Stephens 1862). It is unclear however what is meant by "parings of turf"; they could be the waste from peat turves, but might alternatively be just grass cuttings?

Secondary after use as bedding

Peat has probably been widely and heavily used as bedding in animal stalls because of its great ability to absorb liquids. After use the waste product would have made a good manure for spreading onto cultivated land. This process has likely taken place wherever there has been subsistence farming, but has, for instance, been noted from the crofting communities of Papa Stour in the Shetlands (Davidson & Simpson 1994).

Secondary as soot in thatch

Thatched roofs with no ceilings seem to have accumulated soot at a prodigious rate; this characteristic may have been exploited by many subsistence communities to help with land improvement, by removing the soot impregnated thatch and scattering it on their fields. An example of this process has been described from Lewis in the Western Islands of Scotland, in which the crofters removed the curved rush and grass thatch from their clachans each year, because it was considered a "valuable stimulating manure"; perhaps suggesting that this type of short-lived thatch may have been designed for its soot collecting qualities (Innocent 1916).

4:4:3. In the production of bedding/ litter

There has been at least localised exploitation of peat for use as animal bedding. For instance on the borders of Yorkshire and Lincolnshire, near Whitchurch in Shropshire, on the marshy lowlands of Somerset and on the English shores of the Solway Firth, where the extent of peat mosses appears to have been greatly reduced by the process (Simpson 1930). There was also commercial production of peat-litter from the late part of the nineteenth century, up until the 1960s. A number of peat-litter companies were established, for instance the English Moss Litter Company, which had interests on Thorne Moors near Doncaster prior to its takeover by Fisons in 1963 (Caufield), and Fenn's Moss on the Welsh-English border from 1886 until at least 1915. The Midland Moss Litter Company of Scotland worked Fenn's Moss from 1923 to 1962 (Gale & Berry 1996). Only the upper, fibrous, peat was used in the manufacture of litter; but on the moors bordering the Humber Estuary as much as four feet was removed for this purpose (Simpson 1930).

The use of unprocessed raw peat as bedding in cattle sheds and horse stables probably has a very long history, predating any commercial interest, but in the twentieth century there has been more specific application of manufactured litters. During the First World War peat litter was used extensively as horse bedding by the military and also within deep-litter poultry-houses through to the 1950's (Gale & Berry 1996). Peat is particularly suitable as bedding because of its sterilising properties, powers of absorbency and low flammability. Indeed, the 'Manual of horsemanship' (Hadfield 1981) advocates the specific use of moss-peat litter where there is a fire risk; for instance, "behind the scenes" at large shows.

4:4:4. As fodder

Evidence for the use of peat as animal feed is largely circumstantial and anecdotal, but in poor communities is likely to have been substantial. Peat has been used as bedding (6:4:4.), and stock is always likely, indeed expected, to in part consume fresh bedding. Peat may alternatively have been fed directly to animals, especially when mixed with other materials such as green herbage or molasses (Berry pers. comm.). Indeed, cattle will eat moist fresh peat on its own if it is offered to them in the hand (Berry pers. comm.) and new-born calves have been observed to "nuzzle at and actually eat peat" (MacNally 1968). In Yorkshire, peat dust produced as a by-product of the peat-litter industry was ground to a powder and mixed with molasses to make a type of cattle feed (Simpson 1930).

4:4:5. Burning turves on land

Cut turves have sometimes been burnt directly on farmland; probably in the main to enhance soil fertility prior to cultivation. The extent of this practice is very difficult to assess but vast areas of marginal upland blanket peat are likely to have been consumed in this way.

Illegal turf burning certainly occurred on farmland in the Whixall Moss area during the early seventeenth century; possibly to clear land of stubble or weeds, or to fertilise the land before cultivation. The local court rolls of 1626 include references to nineteen persons presented "for burninge turves gotten on the Lordes wast uppon their severall fallowes"; Thomas Benyon "for burning a load of turves to burne ground"; and John Challener "for burning dug turves on his own ploughland" (Berry & Gale 1996).

4:5. HORTICULTURAL PEAT

Since the late 1930s peat has been exploited for use in horticulture; at first mainly in commercial nurseries, then in the 1960s increasingly in the domestic garden. This has been promoted in part by advertisements on television gardening programmes. The quantities of peat cut for this use since the 1960s have been considerable; for instance in the two years up to the end of 1990, 65,000 cubic metres were dug on Fenn's and Whixall Mosses (Gale & Berry 1996). This usage is outside the scope of this study, which concentrates on the uplands, because most horticultural peat used in Britain comes from the few lowland, raised bogs remaining in the south of Britain, .

4:6. USE AS A SOURCE OF DISTILLED PRODUCTS

The Victorians were probably the first to fully recognise the potential value of peat as a raw material, from which a variety of useful chemical agents could be extracted. Potash was procured by ashing certain types of peat, but a number of distillation processes were later devised in order to extract more specific components. For instance, at Fenn's Moss in 1923 the Bettisford Trust Company Ltd obtained a lease to extract "black peat" from the base of the bog for the "extraction of paraffinoid and other chemical products"; then the following year they lodged a patent for a process called "destructive distillation", in which at high temperatures benzinoid products were envisaged and at moderate and low temperatures paraffinoid products (Gale & Berry 1996). It is unclear whether the latter processes were ever fully established. Various enterprises to produce Naptha-oil from peat were set up on Dartmoor over a one hundred year period (Gant 1978); one of which produced gas as a bi-product (Harris 1968).

4:7. MISCELLANEOUS USES

Peat has been used for many other purposes, some of which may have only resulted in minor exploitation. These uses include, to make moulded peat pipes and to create turve-built box-drains as part of bog reclamation work (Stephens 1862); fish curing; paraffin production; ester wax extraction for use in the manufacture of polishes, carbon paper and soaps; coke production as the result of distillation (O'Dell & Walton 1962); coal-gas purification; packing; as an insulating material (Fraser 1948); drying china-clay; in ice production and storage (Herring 1998); as fuel for aluminium smelting; to extract magnesium; and in packing munitions during the World War 2 (Gale & Berry 1996).

Turves were used in Medieval and Post-Medieval Cornwall to block water courses, as a 'trap', for the extraction of tin ore in streamworkings. The same activity occurred elsewhere in Europe, where turves were further employed, in a similar manner, to 'wash gold' from earthy deposits, from at least Roman times through to the sixteenth century. From the sixteenth century, perhaps earlier, turves were also set in wood-made 'traps' to 'wash gold' (Hoover 1950).

Sphagnum moss has had many uses and vast amounts have been exploited during the twentieth century (Howkins 1997). Fresh *Sphagnum* moss was used in the Crimean and First World War to make surgical dressings (Gale & Berry 1996; Howkins 1997); it has also been used this century to line wire hanging-baskets planted out with garden flowers and for horticultural purposes such as packing plants and for making wreaths (Burnett 1964; Howkins 1997).

4:7:1. Mineral/ moor/ mud baths

One of the oddest uses of peat was employed at the thermal baths at the Crescent in Buxton (Porter 1994), and more widely in Europe (Rotherham pers. comm.), during the Victorian Period and early part of this century, in the variously named mineral, moor, or mud baths. At these baths a patient would be immersed in a fluid made from natural thermal water and peat (Porter 1994). Although this appears to have been a rare usage of peat, it is of local significance to the Peak District, and is of added interest because the cuttings associated with the Buxton baths can still be identified in the field (Figs 4.9. & 4.10.).

Fig. 4.9. A photograph taken around the start of the current century, showing workmen digging peat for use in the Buxton Peat baths.

Fig. 4.10. Abandoned, small-scale, linear peat cutting, on moors near 'The Terret', south-west of Buxton; identified as those being worked in Fig. 4.9. around the start of the current century.

4:7:2. Usage in whisky production

Peat is used widely in Scotland as a fuel in the production of whisky. It may be used to fire the kilns used in the distillation process, or sometimes, particularly on the island of Islay, when drying the barley prior to distillation (Milroy 1986). It has also been used as a fuel in the distillation of illicit whisky in North Wales (Rotherham pers. comm.), and therefore possibly more widely in the brewing and distillation of alcoholic beverages.

4:8. MINOR USES

Turves have been used recently to construct the base of artificial Merlin nests in Scotland (Orchel 1992); while in Baldersdale in the Yorkshire Dales sods have traditionally been positioned in the stall heads of cowsheds for the cattle to kneel on (Hartley & Ingilby 1985). Fibrous '*Eriophorum* peat' was apparently used by the peat cutters of Fenn's and Whixall Mosses as a substitute for tobacco (Gale & Berry 1996); and peat soot has been employed to make a yellow dye used in Harris tweed manufacture (Harris Tweed Authority). The use of turves has also been involved with a variety of superstitions (Hole 1995).

4:9. SUMMARY HISTORY OF PEAT, TURF & BOG MOSS USE IN BRITAIN

?-c.4300 BP	Peat and turf used in barrow construction.	Margery Hill barrow constructed.
?-c.2300-1947.	Peat and turf used in Dwelling construction.	
c.700 BC-AD 43.	Iron Age peat cutting.	(peat cuttings used as 'depositories' for bog-bodies, with associated peat spade find).
AD c.43-AD 410.	Romano-British peat-cutting.	(peat spades found).
- Domesday-	Boundary construction with turf and peat.	
-Domesday-1900-	Industrial use of peat.	
c.Domesday-1300-?	Norfolk Broads created.	
1300-1400-?	400,000 turves consumed each year by Norwich Cathedral.	
-1500-1700-	Peat used extensively in Cornish lead smelting.	
-1700-1800-?	Peat fuel used in iron smelting.	Up to 406,400kg (400 tons) of peat consumed annually by the Leighton Furnace.
-1770-1815-	Widespread paring and burning	
-1800-?	Ashes produced from burnt peat used as fertiliser.	
-1800-?	Peat fuel used in lead smelting.	In 1810, 111 people seasonally employed in peat-getting at the Old Gang Mine.
-1800-1900-	Peat applied to many experimental industries.	
-1900-1950	Commercial production of peat litter.	
c.1920-	Peat-fired power stations.	e.g. in Ireland, Germany and Russia.
-1940-1998-	Horticultural use of peat & bog moss.	
?-1998-	Localised peat cutting for domestic fuel.	

4:10. SUMMARY HISTORY OF PEAT, TURF & BOG MOSS USE IN THE PEAK

?-c.2300-700 BC-?	The Margery Hill peat-made barrow constructed in the Upper Derwent Valley
-Domesday-1998-	The Graveship of Holme administrating peat cutting rights in the Holmefirth area, around the north-eastern boundary of the Peak Park.
-Domesday-?	Possible peat cutting at the Domesday settlement of Flagg, in the White Peak; indicated by its place-name.
-1219	People in Sheffield using turf to cover their houses and buildings.
1251	The people of Tideswell able to take turves from the Forest of the Peak without license.
13th century	Frequent disputes over rights of turbary in the White Peak.
14th century	Illegal digging of turf and peat on the Eastern Moors.
15th century	'Moss' used in the Sheffield area for insulating dwelling roofs.
16th century	Still disputing rights of turbary in the White Peak
-17th century	Lime kilns fuelled in part by peat.
17th century	Rented property holders in Sheffield cutting turf and clods on the commons
	Turf used in dwelling construction in the Peak District.
	In the mid 17th century the settlements of Haslebache, Litton, Tideswell, and Wardlow paying turbary-money to obtain peat within the Forest of the Peak.
18th century	Peat used as fuel for boiling Holly (*Ilex aquifolium*) bark, used in the manufacture of bird lime.
	Peat used as fuel by the Duke of Devonshire and his tenants in the Woodlands Valley.
	Peat used as fuel by the poor of Longdendale.
	Peat burnt and the product mixed with lime to produce ess, used to improve the fertility of land on moorland in the Peak District.
	Towards the end of the 18th century extensive paring and burning in the White Peak.
19th century	Peat processing works at Kelly's, on moors to the west of Sheffield, using peat as a fuel for the peat drying and pressing machinery.
-20th century	Charcoal burners around Sheffield building conical wigwam-like huts with a covering of sods.
	Peat used at the thermal baths at the Crescent in Buxton
-1998-	The Graveship of Holme still active.

CHAPTER 5

AREAS OF EXPLOITATION

AREAS OF EXPLOITATION

The following is a summary, area by area, of peat and turf cutting within upland Britain (Fig.1.1.). It is not intended to be definitive, but more a comparative guide to the types of exploitation which have occurred in selected areas. Only the South Pennines has been studied in detail. The characteristics of the individual areas reflect differences in human population, industrial development, infrastructure, and topography. Peat has only been extracted in large volumes where topography has allowed the development of deep blanket, or valley mires; although in other areas a greater proportion of the land surface may have been affected by shallow peat cutting or turf stripping.

5:1. THE PEAK DISTRICT

The main area of study, the Peak District (Fig. 1.1.), can be split into seven different peat cutting areas, determined by a combination of topographical, geological, and social factors (Fig. 5.1.). The following table lists the peat cuttings identified within these seven areas and gives their grid references and altitude range. Where possible, the approximate area of overcutting is indicated and volumes of peat removed. The areas are estimates based on the extent of the peat cutting archaeology, associated vegetation change, and topographical criteria. With respect to the hill top peat cuttings, only areas of deep peat loss are shown; no attempt was made to include the likely areas of turf stripping and thin peat exploitation on the slopes below. The volumes were calculated, assuming an average 1m of peat had been removed; however, some peat cutting faces are over 2m in depth, while elsewhere they are as shallow as 0.5m or less. Furthermore, depths may vary across sites and there has not always been complete overcutting; although there may have been considerable shrinkage of the uncut peat deposits around workings, in particularly, the cutting faces. Calculations were made in order to avoid overestimating the total volumes of peat cut. It is likely that extensive areas of peat deposits of under 0.5m depth were not cut for use, but instead, either pared and burned, or improved by liming, and ploughing. A more accurate assessment of the volumes of peat removed would require considerably more site work at each peat cutting.

Table 5.1. Summary of the peat cuttings

THE UPPER DERWENT	ha	vol.
1. THE LANDS (SK 156968; 410-430m OD)	12	120000
2.LITTLE MOOR (SK 174958; 390-410m OD)	20	200000
3. CUT GATE (SK 183958-SK 193975; 460-520m OD)	1.5	15000
4. LONG EDGE, NORTH (SK 175950; 380-420m OD)	10	100000
5. LONG EDGE (SK 178942; 430-446m OD)	20	200000
6. COW HEY, EAST (SK 173937; 390-405m OD)	30	300000

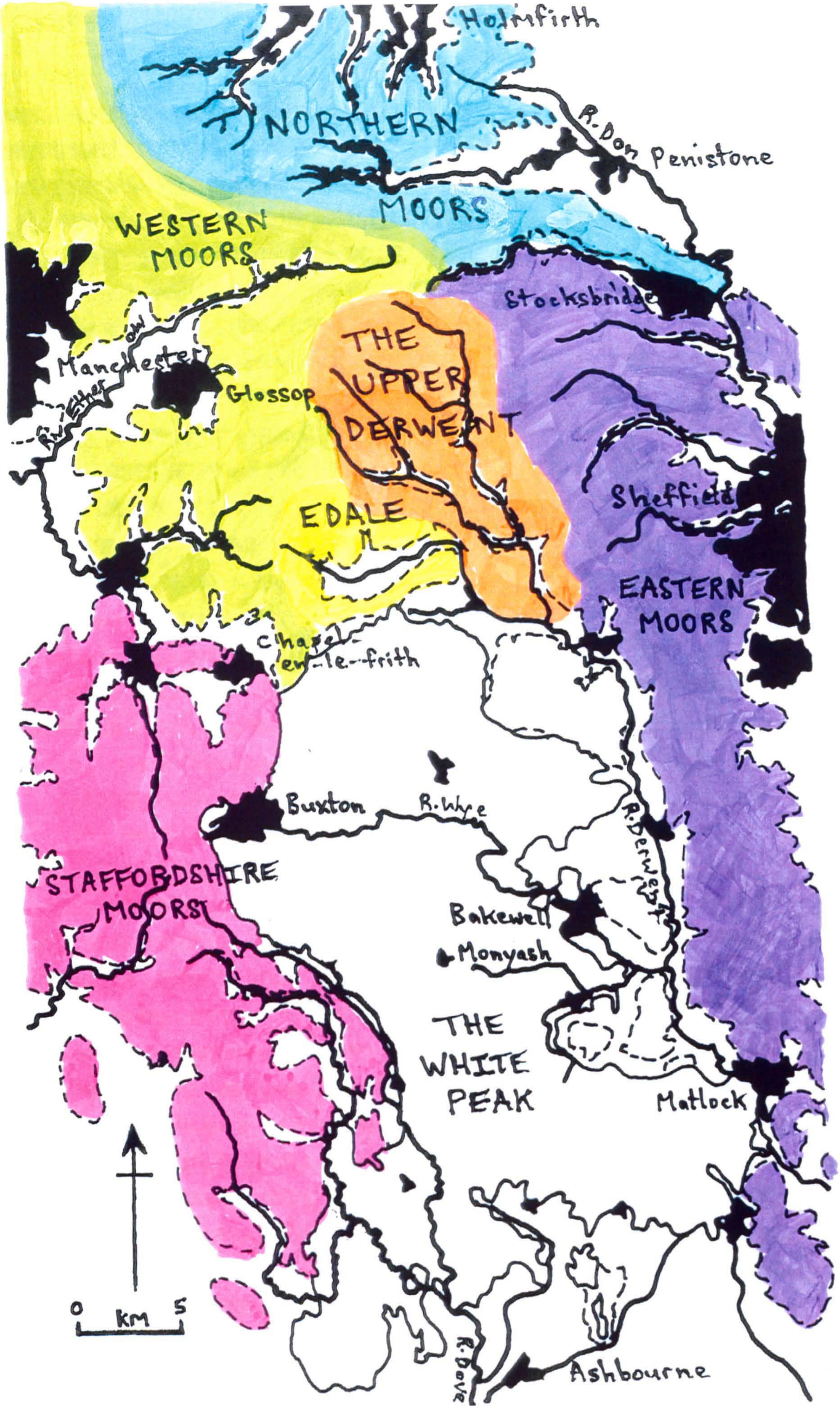


Fig. 5.1. The seven distinct geographical areas of peat cutting in the Peak District.

7. NETHER HEY (SK 180930; 340-416m OD)	-100	100000
8. WET STONES (SK 191937; 530-540m OD)	1.5	15000
9. HOWDEN DEAN PITS (SK 188923-193923; 425-450m OD)	1	10000
10. BAMFORD HOUSE (SK 178913; 380-430m OD)	80	800000
Cutting scars (SK 176915; 397m OD)	-	-
Peat remnants (SK 178912; 390-410m OD)	-	-
Cutting scars (SK 179909; 410-430m OD)	-	-
11. PIKE LOW (SK 180898; -340-405m OD)	48	480000
12. GREEN SITCHES (SK 187910; 380-443m OD)	56	560000
Peat pit (SK 184911; 440m OD)	-	-
13. GREYSTONES MOSS etc. (SK 186916; 400-440m OD)	84	840000
14. JOHN FIELD HOWDEN (SK 192902; 365-470m OD)	55	550000
15. BRADFIELD GATE HEAD (SK 195909; 500-520m OD)	1	10000
16. DERWENT EDGE (SK 198890; 440-500m OD)	15+	150000
16:1. Derwent Edge trench cut (SK 197893; 495-500m OD)	1.5	15000
16:2. Derwent Edge drain (SK 197896; 490-495m OD)	0.1	1000
17. DERWENT MOORS (SK 208881; -370-460m OD)	20+	200000
18. RISING CLOUGH (SK 210891 - SK 215883; 370-420m OD)	86+	860000
18:1. Rising Clough a) (SK 210891; 420m OD)	-	-
18:2. Rising Clough b) (SK 213886; 390m OD)	-	-
18:3. Rising Clough c) (SK 214885; 380-385m OD)	-	-
18:4. Rising Clough d) (SK 215883; 370m OD)	-	
19. MOSCAR TOP (SK 233878, 360-370m OD)	10	100000
20. BOUNDARY STONES, NORTH (SK 231876; 375m OD)	4+	40000
21. BOUNDARY STONES, SOUTH (SK 229871; c.390-405m OD)	7+	70000
22. STANAGE END, NORTH (SK 225864; 452m OD)	1	10000
23. STANAGE END, SOUTH (SK 225860; 440-450m OD)	2+	20000
24. CROW CHIN (SK 225858; 440-450m OD)	3+	30000
25. MOSCAR MOOR (SK 218869; 320-350m OD)	50+	500000
26. MOSCAR FIELDS (SK 223872; 325-340m OD)	65+	650000
27. HORDRON EDGE (SK 215871; 340m OD)	4+	40000
28. CUTTHROAT BRIDGE (SK 210874; 320m OD)	2	20000
29. HIGHSHAW CLOUGH (SK 213876; 310m OD)	1	10000
30. NETHER BROOK 1) (SK 207871; 300m OD)	0.5+	5000
31. NETHER BROOK 2) (SK 201871; 345m OD)	1+	10000
31. NETHER BROOK 3) (SK 201872; 335m OD)	0.25+	2500
31. NETHER BROOK 4) (SK 198872; 365m OD)	0.25+	2500
32. BAMFORD MOOR (SK 213848; -390-426m OD)	133+	1330000

33. OFFERTON MOOR etc. (SK 200811; 320-410m OD)	**94+**	**940000**
34. WIN HILL (SK 184851; 360-462m OD)	**120+**	**1200000**
35. UPPER MOOR (SK 140874; 390-560m OD)	**40+**	**400000**
36. NETHER MOOR (SK 147873; 390-450m OD)	**28+**	**280000**
37. CROOKSTONE OUT MOOR (SK 141882; 320-560m OD)	**170**	**1700000**
38. UPPER ASHOP (SK 139888; 330-500m OD?)	**19+**	**190000**
39. ASHOP MOOR (SK 135886; 415-500m OD)	**4**	**40000**
40. DEAN HILL (SK 133891; 300-440m OD?)	**9+**	**90000**
41. WOOD MOOR (SK 123891; -400-440m OD)	**11**	**110000**
42. COWMS MOOR (SK 124902; -370-450m OD)	**70**	**700000**
43. HEY RIDGE (SK 131905; -450-505m OD)	**10**	**100000**
44. SWINT CLOUGH, NORTH (SK 128914; 470-505m OD)	**20**	**200000**
45. BIRCH BANCKE (SK 135920; 350-480m OD)	**18+**	**180000**
46. BIRCHIN HAT (SK 140917; 484-490m OD)	**6**	**60000**
47. BIRCHIN HAT TRENCH (SK 141916- 144921; 440-484m OD)	**0.6**	**600**
48. ALPORT CASTLES (SK 144915; 475-484m OD)	**14**	**140000**
49. LITTLE MOOR (SK 143912; -450-480m OD)	**4**	**40000**
50. WHITEFIELD PITS (SK 146902; -300-470m OD?)	**9+**	**90000**
51. BRIDGE END PASTURE (SK 176879; -330-390m OD)	**68+**	**680000**
52. LOCKERBROOK HEIGHTS (SK 161898; 350-445m OD)	**17+**	**170000**
53. GORES HEIGHTS (SK 164905; 380-425m OD)	**7+**	**70000**
54. LOWER GORES HEIGHTS (SK 165907; -340-380m OD)	**4+**	**40000**
55. PASTURE TOR (SK 151900- 160895; 420-450m OD)	**2+**	**20000**
56. ALPORT GRAIN PEAT PIT (SK 155900; 435-445m OD)	**0.01**	**100**
57. ALPORT GRAIN PITS (SK 158900- 156899; 430-445m OD)	**0.06**	**600**
58. ROWLEE PASTURE (SK 153905; 425-445m OD)	**5**	**50000**
59. ALPORT GRAIN TRENCHES (SK 156902; 400-460m OD)	**0.5**	**5000**
60. BIRCHINLEE PASTURE (SK 161920; -340-410m OD)	**65**	**650000**
60:1. Birchinlee Pasture a) (SK 155923; 400-410m OD)	0.5	-
60:2. Birchinlee Pasture b) (SK 159925; 400-410m OD)	1.5	-
60:3. Birchinlee Pasture c) (SK 160925; 400-405m OD)	0.5+	-
60:4. Birchinlee Pasture d) (SK 162925; -375-405m OD?)	1.5	-
60:5. Birchinlee Pasture e) (SK 165927; -340-375m OD?)	2	-
60:6. Birchinlee Pasture f) (SK 161918; -340-405m OD?)	3	-
61. DERWENT CHAPEL (SK c170921; c.220m OD)	Un	-
62. FAGNEY CLOUGH, SOUTH (SK 146923; -390-450m OD)	**7.5**	**75000**
63. WESTEND DIKE 1) (SK 134936- SK 141928; 450-490m OD)	**0.8**	**8000**
64. WESTEND DIKE 2) (SK 141928- SK 142931; 430-440m OD)	**0.15**	**1500**

65. **FAGNEY CLOUGH, NORTH** (SK 145928; -370-420m OD)	5.5	55000
66. **BLACK CLOUGH, RIDGE** (SK 141938; -380-440m OD)	1.5+	15000
67. **RIVER WESTEND, EAST** (SK 136946; 345m OD)	0.05	500
68. **RIVER WESTEND, WEST** (SK 132946; 370m OD)	0.1	1000
69. **BANKTOP HEY** (SK 154934; -390-450m OD)	23	230000
70 **BANKTOP HEY DIKE** (SK 151942- SK 155938; 430-470m OD)	1.4	14000
71 **RIDGE NETHER MOOR** (SK 160938; -370-450m OD)	13.5	135000
72 **BLACK DIKE** (SK 141955- SK 160940, 440-510m OD)	5.5	55000
73 **BLACK DIKE, EASTERN OFFSET** (SK 160942; 420-445m OD)	0.5	5000
74 **COW HEY, WEST** (SK 162940; -370-445m OD)	10	100000
75 **OX HEY** (SK 163946; -370-445m OD)	19+	190000
76 **MOSLEY BANK, SOUTH** (SK 165956; -370-415m OD)	5+	50000
77 **MOSLEY BANK, NORTH** (SK 167961; 370-400m OD)	3+	30000
78 **POOL ON ALPORT MOOR** (SK 106943; 540m OD)	0.1	1000

NOE VALLEY

1. **UPPER MOOR** (SK 140874; 390-560m OD).	Upper Derwent 35	
2. **NETHER MOOR** (SK 147873; 390-450m OD).	Upper Derwent 36.	
3. **ROWLAND COTE MOOR** (SK 134866; -400-520m OD)	10+	100000
4. **DRUID'S STONE, SOUTH** (SK 131873; 540-580m OD)	4	40000
5. **DRUID'S STONE, NORTH** (SK 132875; 585-590m OD)	0.25	2500
6. **DRUID'S STONE, EAST** (SK 133875; 585m OD)	0.5	5000
7. **THE NAB** (SK 126870; -540-505m OD)	13	130000
8. **NETHER TOR** (SK 123876; 580m OD)	1	10000
9. **PEAT MOOR** (SK 111863; -500-565m OD)	48+	480000
10. **CROWDEN** (SK 096861; -400-560m OD)	3+	30000
11. **JACOB'S LADDER** (SK 086862; -460-525m OD)	1+	10000
12. **COLBORNE** (SK 096841; -480-535m OD)	14.3+	143000
13. **LORD'S SEAT** (SK 106833; -480540m OD)	51+	510000
14. **MAM NICK** (SK 122836; 404-470m OD)	17.5	175000
15. **MAM TOR** (SK 128836; -370-517m OD)	9.4	94000
16. **LOSE HILL** (SK 152852; -370-476m OD)	10+	100000

WESTERN MOORS

1. **STANDEDGE** (SE 016098; 390-420m OD)	47+	470000
2. **ROUND HILL** (SE 018092; 370-400m OD)	30+	300000
3. **SADDLEWORTH MOOR** (SE 018059; 440-460m OD)	97+	970000

4. BUCKTON MOOR (SK 995020; 330-450m OD?)	**82+**	**820000**
5. SLATEPIT MOOR (SK 998009; 300-380m OD?)	**-45**	**450000**
6. TURF PITS, WEST (SK 998002; 300-381m OD)	**-74**	**740000**
7. TURF PITS, EAST (SK 001996; c.290-350m OD)	**-55**	**550000**
8. BOAR FLAT (SK 014996; c.290-355m OD)	**70+**	**700000**
9. HOLLINGWORTHALL MOOR (SK 992981; -300-399m OD)	**139+**	**1390000**
10. ARNFIELD MOOR (SK 027996; -340-460m OD?)	**52+**	**520000**
11. TINTWISTLE MOOR (SK 032988; -250-370m OD)	**32+**	**320000**
12. TINTWISTLE KNARR (SK 038990; -400-455m OD)	**13+**	**130000**
13. RAKES MOSS (SK 058995; -400-475m OD)	**50**	**500000**
14. HEY EDGE, WEST (SK 076000; -380-415m OD)	**18**	**180000**
15. HEY EDGE, CENTRAL (SE 081002; -390-405m OD)	**1**	**10000**
15. HEY EDGE, EAST (SE 083003; -380-410m OD)	**10**	**100000**
16.ANCOTE HILL (SE 089004; -360-400m OD)	**18+**	**180000**
17. BUTTERLEY MOSS (SE 093008; -350-405m OD)	**20**	**200000**
18. PIKENAZE MOOR (SE 106003; -350-282m OD)	**23+**	**230000**
19. IRONBOWER MOSS (SK 120998; -340-450m OD)	**(12+)**	**(120000)**
20. LONGSIDE EDGE (SE 130001; -370-430m OD)	**(71+)**	**(710000)**
21. LONGSIDE MOSS (SE 133006; 390-450m OD)	**(35+)**	**(350000)**
22. SALTER'S BROOK (SE 140001; 400-410m OD)	**(0.25)**	**(2500)**
23. LONG GUTTER EDGE (SK 071975; -370-400m OD)	**(6)**	**(60000)**
24. PEAKNAZE MOOR (SK 054971; 340-443m OD)	**156**	**1560000**
25 GLOSSOP LOW (SK 061963; -340-480m OD)	**94**	**940000**
26. HARROP MOSS (SK 070957; 450-490m OD)	**(10)**	**(100000)**
27. LOWER SHELF (SK 069947; 310-330m OD)	**(3)**	**(30000)**
28. COLDHARBOUR MOOR (SK 068936; -340-400m OD)	**27**	**270000**
29. BLACK MOOR (SK 058922; -340-460m OD)	**100**	**1000000**
30. BRAY CLOUGH, EAST (SK 055915; -350-410m OD)	**4**	**40000**
31. BRAY CLOUGH WEST (SK 052914; -350-410m OD)	**-32**	**320000**
32. SHAW MOOR (SK 043910; 360-440m OD)	**(20)**	**(200000)**
33. CHUNAL MOOR (SK 042906; -320-440m OD)	**30**	**300000**
34. COWN EDGE, EAST (SK 025918; 350-384m OD)	**(30)**	**(300000)**
35. COWN EDGE, WEST (SK 017915; 340-400m OD)	**(70)**	**(700000)**
36. OLDPITS PLANTATION (SK 047876; 340-367m OD)	**20+**	**200000**
37. LEYGATEHEAD MOOR (SK 052888; -330-460m OD)	**-89+**	**890000**
38. WILLIAM CLOUGH etc. (SK 062891; 330-500m OD)	**(55+)**	**(550000)**
39. UPPER MOOR (SK 068879; -330-420m OD)	**50+**	**500000**

40. BROAD CLOUGH (SK 066870; -330-480m OD)	-54	540000
41. OAKEN CLOUGH, NORTH (SK 065099; -330-430m OD)	(18)	(180000)
42. OAKEN CLOUGH, SOUTH (SK 069855; -350-470m OD)	25	250000
43. NEW ALLOTMENTS (SK 035845; -330-451m OD)	(200)	(2000000)
44. MOUNT FAMINE (SK 053848; -350-470m OD)	(59+)	(590000)
45. THE ROYCH (SK 070845; -330-510m OD)	130	1300000
46. ROYCH CLOUGH (SK 080842; -350-490m OD)	(30)	(300000)
47. TOM MOOR (SK 089831; -330-490m OD)	150	1500000
48. RUSHUP PASTURE (SK 100820; -330-540m OD)	(-540+)	(5400000)

STAFFORDSHIRE MOORS

1. LYME PARK (SK 965824; -370-402m OD)	UN	-
2. TAXAL MOOR (SK 998792; -355-390m OD)	(10)	(100000)
3. COMBS MOSS (SK 058773; 420-507m OD)	-200	2000000
4. THE BUXTON PEAT CUTTINGS (SK 036713; -440-500m OD)	29+	290000
5. CORBAR HILL (SK 050744; -425-437m OD)	(5+)	(50000)
6. WYTHEN LACHE (SK 027775; -340-385m OD)	(53+)	(530000)
7. PYM CHAIR etc. (SK 994766; -450-500m OD)	9.5+	95000
8. WITHINLEACH MOOR (SK 996761; -450-520m OD)	2	20000
9. TOAD BROOK, WEST (SK 988750; c.425m OD)	(5)	(50000)
10. SHINING TOR (SK 993746; -400-450+m OD)	(37+)	(370000)
11. STAKE FARM, NW (SK 996728; 470-485m OD)	1	10000
12. STAKE FARM, NE (SK 000728; c.520m OD)	0.25	2500
13. STAKE FARM, SE (SK 999722; 475-515m OD)	9+	90000
14. STAKE FARM, SW (SK 992723; 405-440m OD)	2.5	25000
15. CAT & FIDDLE (SK 001718; 512m OD)	0.02	200
16. CAT & FIDDLE, SOUTH (SK 000715; 520-530+ m OD)	1.5	15000
17. TINKERSPIT GUTTER (SK 012709; 480-485m OD)	0.4	4000
18. TINKERSPIT GUTTER, EAST (SK 016706; 460-465m OD)	0.5	5000
19. TINKERSPIT (SK 020708; c.470m OD)	3+	30000
20. DERBYSHIRE BRIDGE INTAKES (SK 014717; 420-475m OD)	38+	380000
21. MOSS CHAIN (SK 022712; 425-485m OD)	27+	270000
22. FEATHERBED MOSS (SK 030709; 500-520m OD)	1.5+	15000
23. CISTERN'S CLOUGH SK 032700; 515-525m OD)	3+	30000
24. DANE HEAD (SK 023701; 475-480m OD)	0.1	1000
25. AXE EDGE (SK 030691; 500-525m OD)	1+	10000
26. WOLF EDGE/ OLIVER HILL (SK 026679; -420-513m OD)	(17+)	(170000)

27. **ORCHARD COMMON** (SK 022688; -450-475m OD)	**(2.5+)**	**(25000)**
28. **KNOTBURY COMMON** (SK 018685; -415-455m OD)	**(15+)**	**(150000)**
29. **TURN EDGE** (SK 011676; -405- 434m OD)	**(15+)**	**(150000)**
30. **BLACK CLOUGH** (SK 010688; -385-400+m OD)	**(6+)**	**(60000)**
31. **CUT-THORN HILL** (SK 003684; 400-462m OD)	**(4+)**	**(40000)**
32. **HOLE-EDGE** (SK 999676; -375-460m OD)	**(34+)**	**(340000)**
33. **BERRY BANK** (SK 989683; 370-375+m OD)	**(1.5+)**	**(15000)**
34. **ALLGREAVE HILL etc.** (SK 980672; 300-395m OD)	**(10.5+)**	**(105000)**
35. **PIGGFORD MOOR** (SK 970688; -300-410m OD)	**(35+)**	**(350000)**
36. **MOUNT PLEASANT** (SK 974690; -420-425m OD)	**(5+)**	**(50000)**
37. **SHUTLINGSLOE, WEST** (SK 970694; -375-430m OD)	**(9+)**	**(90000)**
38. **SHUTLINGSLOE, NORTH** (SK 978702; -420-455m OD)	**(25+)**	**(250000)**
39. **HIGH MOOR** (SK 963699; -390-400m OD)	**(40+)**	**(400000)**
40. **BUXTORS HILL** (SK 977708; -400-455m OD)	**(13+)**	**(130000)**
41. **YARNSHAW HILL** (SK 986710; -400-405m OD)	**(6.5+)**	**(65000)**
42. **ROUND KNOWL etc.** (SK 055624; -380-435+m OD)	**(13+)**	**(130000)**
43. **PETHILLS** (SK 9468; c.275-300m OD). **I**	Un	-
44. **PETHILLS** (SK 0365; c.430-440m OD). **I**	Un	-
45. **PETHILLS** (SK 0552; c.320-335m OD). **I**	Un	-
46. **GREAT MIRES** (SK 088648; 260-275m OD). **I**	**1.5+**	**15000**
47. **LITTLE MIRES** (SK 088647; 260-275m OD). **I**	**1+**	**10000**

NORTHERN MOORS

1. **PULE HILL** (SE 035110; 350-440M OD)	**57+**	**570000**
2. **BOBUS** (SE 037095; -360-390m OD)	**24+**	**240000**
3. **BUTTERLY** (SE 049095; -320-350m OD)	**11+**	**110000**
4. **BINN MOOR** (SE 058105; -350-409m OD)	**33+**	**330000**
5. **BINN MOOR DIKE** (SE 063100-065093; 410-420m OD) **E**	**1**	**10000**
6. **MELTHAM MOOR** (SE 085095; -350-400m OD)	**16+**	**160000**
7. **WESSENDEN HEAD, EAST** (SE 077079; -440-470m OD)	**8**	**80000**
8. **HARDEN MOSS** (SE 098086; -350-410+m OD)	**-69**	**690000**
9. **WESSENDEN HEAD** (SE 075073; 450m OD)	**3**	**30000**
10. **ISLE OF SKYE PEAT GROUND** (SE 072071; 450m OD)	**1**	**10000**
11. **ISLE OF SKYE PEAT GROUND** (SE 078071; 430m OD)	**4**	**40000**
12. **BRADSHAW** (SE 083075; -370-470m OD)	**65+**	**650000**
13. **ISSUES PEAT GROUND** (SE 084061; 400-450m OD)	**15+**	**150000**
14. **HERBAGE FLAT** (SE 116042; -370-420+m OD)	**15.5+**	**155000**

15. **HOLME MOSS** (SE 097040; 500-524m OD)	6+	60000
16. **GREEN HOUSE HEY** (SE 126049; -370-430m OD)	-81	810000
17. **HADES PEAT GROUND** (SE 129045; 389-420m OD)	6	60000
18. **COOK'S STUDY MOSS** (SE 134043; -370-450m OD)	44+	440000
19. **UPPER SNAILSDEN MOSS, WEST** (SE 131038; 440-470m OD)	25	250000
20. **UPPER SNAILSDEN MOSS, EAST** (SE 144041; 396-440m OD)	81+	810000
21. **DAISY LEE MOOR** (SE 156044; -370-408m OD)	47+	470000
22. **LOWER SNAILSDEN MOSS, NORTH** (SE 144038; 380-430m OD)	20	200000
23. **LOWER SNAILSDEN MOSS, SOUTH** (SE 150033; 380-400m OD)	13+	130000
24. **COCKER EDGE** (SE 169035; -360-390+m OD)	65+	650000
25. **SAND RIDGE MOSS** (SE 156033; -370-380+m OD)	3+	30000
26. **HARDEN PEAT GROUND** (SE 151040; c.396m OD)	1.5	15000
27. **HEALD COMMON** (SE 172023; -280-350m OD)	(52)	520000
28. **GALLOWS MOSS, NORTH** (SE 151009; -370-400m OD)	7	70000
29. **GALLOWS MOSS, SOUTH** (SE 153004; 400-440m OD)	3.5	35000
30. **FIDDLERS FLAT** (SE 157002; c.455m OD)	1.5	15000
31. **SNOW ROAD 1** (SE 173011; c.380m OD)	0.3	3000
32. **SNOW ROAD 2** (SE 174012; 370m OD)	0.5	5000
33. **SNOW ROAD 3** (SE 177012; c.350m OD)	0.6	6000
34. **SWINDEN INTAKES** (SE 175008; -320-420m OD)	50+	500000
35. **UPPER HORDRON etc.** (SK 180998; -350-410m OD)	9+	90000
36. **HARDEN MOOR** (SK 170991; 350-410m OD)	3.5	35000
37. **BRADSHAW** (SK 187992; -300-350m OD)	(11)	(110000)
38. **HINGCLIFF COMMON** (SK 196998; -310-358m OD)	(13)	(130000)
39. **CALF KNOLL** (SK 195990; -350-370+m OD)	(13)	(130000)
40. **STANNY COMMON** (SK 199985; -340-400m OD)	(-16)	(160000)
41. **FLOUCH INN** (SK 197015; 281m OD) I	-	

EASTERN MOORS

1. **CROOKESMOOR** (SK 337876; c.150m OD). A	Un	-
2. **ROLLESTONE WOOD** (SK 371836; c.145m OD)	0.005+	50
3. **HALLAM MOORS/ BLACK MOOR** (SK 232862; c. 430m OD)	83+	830000
4. **BROWN EDGE** (SK 253861; 370-402m OD)	67+	670000
5. **HIGH NEB, EAST** (SK 233850; 425m OD)	0.5+	5000
6. **LONG CAUSEWAY, NORTH** (SK 239846; 430m OD)	2+	20000
7. **LONG CAUSEWAY, SOUTH** (SK 243843; 430m OD)	5+	50000
8. **COWPER STONE** (SK 246834; -420-457m OD)	(23+)	230000

9. **FAIRTHORN CLOUGH** (SK 254841; 410m OD)	**0.1+**	**1000**
10. **FRIAR'S RIDGE** (SK 259838; 415m OD)	**0.25+**	**2500**
11. **RUD HILL** (SK 267842; -370-415m OD)	**(135+)**	**(1350000)**
12. **RUD HILL, PITS** (SK 267440; 415m OD)	**0.1+**	**1000**
13. **KELLY'S** (SK 278835; 350-400+m OD)	**24.5+**	**245000**
14. **UPPER BURBAGE BRIDGE** (SK 260831; 400m OD)	**1.5**	**15000**
15. **HOOKCAR SITCH** (SK 242834-SK 244831; 330-350m OD)	**2.5+**	**25000**
16. **CATTIS-SIDE MOOR** (SK 242827; -370-384m OD)	**(7.5+)**	**(75000)**
17. **CALLOW BANK** (SK 254826; 400-432m OD)	**(56+)**	**(560000)**
18. **BURBAGE MOOR, WEST** (SK 273814; c.420m OD)	**1+**	**10000**
19. **BURBAGE MOOR, EAST** (SK 274814; c.427m OD)	**1+**	**10000**
20. **BURBAGE MOOR, SOUTH** (SK 272813; -370-420+m OD)	**53+**	**530000**
21. **HOUNDKIRK MOOR, CENTRAL** (SK 280815; -370-400m OD)	**(26+)**	**(260000)**
22. **HOUNDKIRK MOOR, EAST** (SK 279812; 370-426m OD)	**(48+)**	**(480000)**
23. **COWSICK** (SK 282802; -340-350m OD)	**0.1+**	**1000**
24. **TOTLEY MOOR** (SK 276798; 370-400m OD)	**(75+)**	**(750000)**
25. **TOTLEY MOSS, WEST** (SK 269790; c.365m OD)	**3.5+**	**35000**
26. **BAR BROOK, SOURCE** (SK 275787; c.355m OD)	**0.005**	**50**
27. **TOTLEY MOSS, CENTRAL** (SK 277789; c.360m OD)	**0.02+**	**200**
28. **FLASK EDGE** (SK 285787; -370-395m OD)	**(67+)**	**(670000)**
29. **SALTER SITCH** (SK 288785; c.365m OD)	**0.25+**	**2500**
30. **LUCAS MOSS, NORTH** (SK 265768; 340-346m OD)	**10+**	**100000**
31. **LUCAS MOSS, CENTRAL** (SK 263765; c.345m OD)	**0.2+**	**2000**
32. **BIG MOOR** (SK 270762; c.325m OD)	**0.1+**	**1000**
33. **LEASH FEN** (SK 293739; c.275m OD)	**2+**	**20000**
34. **LEASH FEN, SOUTH-EAST** (SK298734; c.285m OD)	**10+**	**100000**
35. **CLOD HALL MOOR** (SK 283730) **I**	Un	-
36. **BIRCHEN EDGE** (SK c.280730; c.300m OD)	Un	-
37. **BASLOW MOOR** (Unknown) **A**	Un	-
38. **EAST MOOR** (SK 293707) **A**	Un	-
39. **RABBIT WARREN** (SK 279687; -275-290m OD)	**(37+)**	**(370000)**
40. **HAREWOOD MOOR** (SK 310676; 305m OD)	**0.25**	**2500**

WHITE PEAK

1. **OFFERTON MOOR etc.** (SK 200811; 320-410m OD).	Upper Derwent 33.	
2. **BRADWELL MOOR** (SK 138805; -400-470m OD)	(4K2)	(4000000)
3. **WARDLOW MIRES etc.** (SK181756; 240-297+m OD)	(6K2)	(6000000)

4. **THE MIRES** (SK 205716; -190-205+m OD) **I**	Un	-
5. **PEETHILL PLANTATION** (SK 221680; 120m OD) **I**	Un	-
6. **GREAT BOG** (SK 241670; 155-175m OD) **I**	**3.5+**	**35000**
7. **LITTLE BOG** (SK 239672; 155-170m OD) **I**	**1+**	**10000**
8. **MONYASH & other moors** (SK 163676; c.285m OD) **A**	(12K2)	12000000
9. **FLAGG MOOR** (SK136684) **A**	(5.5K2)	5500000
10. **PEAT PITS** (SK 323522; c.225m OD) **I**	**46+**	**460000**
11. **RUSHUP PASTURE** (SK 108824) **A.**	Western Moors 48.	

TOTALS	Area of overcutting (in hectares)	Volume of cut peat (in cubic metres)
UPPER DERWENT	1838.37	18,361,700
NOE VALLEY	182.95	1,629,500
WESTERN MOORS	1837- 2996.25	18,370,000- 29,962,500
STAFFORDSHIRE MOORS	329.27- 691.27	3,317,700- 6,937,700
NORTHERN MOORS	792.4- 897.4	8,019,000- 8,124,000
EASTERN MOORS	267.88- 742.38	2,678,800- 7,423,800
WHITE PEAK	50.5- 2800.5	505,000- 6,875,000
ALL AREAS	**6070- 10,058.87 ha** **60.70- 100.5887 km2**	**52,881,700- 79,819,200**

5:1:1. The Upper Derwent Valley

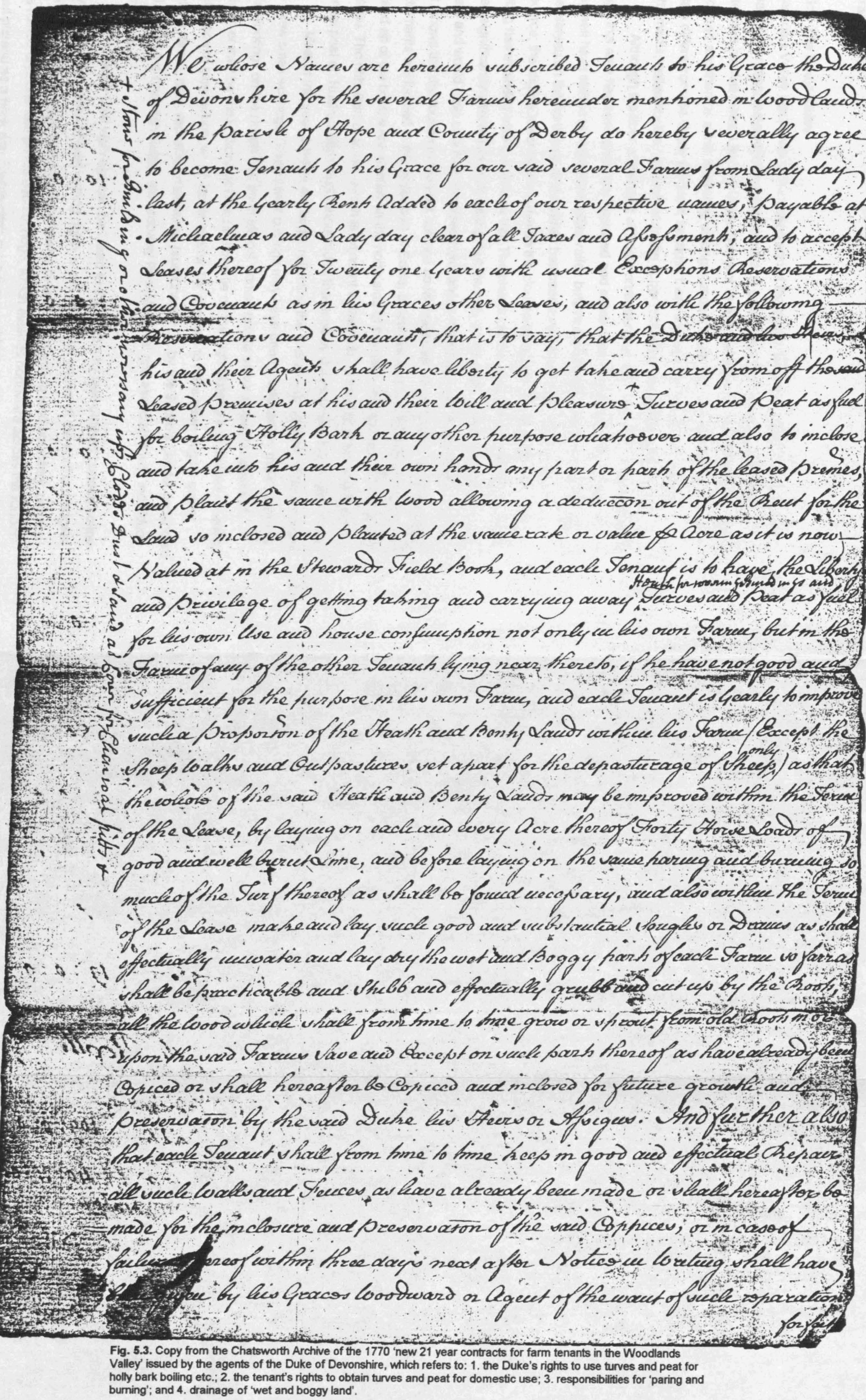
The core study area, the Upper Derwent (Fig. 5.2., in flap in back cover), has a very distinct peat cutting history, because of its isolation within the upland mass of the Peak District (Fig.1.1.). Although now connected by trunk roads, it was for centuries only reached with difficulty, via packhorse routes, hollow-ways and minor tracks. Because the population was mainly dispersed, each settlement typically had its own peat cutting, usually isolated from neighbouring turbaries by deep clough-tributaries. However, there are a few peat cuttings in the Upper Derwent Valley which were multi-settlement turbaries; these include, that on Derwent Edge serving the inhabitants of Derwent Hamlet; the Crookstone Out Moor site which supplied the village of Hope; Win Hill, associated with Aston and a number of other long-standing settlements; and the extensive Pike Low, Green Sitches and Greystones Moss area, also used by the inhabitants of Derwent Hamlet, and several scattered farmsteads. Chapter 6 describes all the Upper Derwent peat cuttings (shown on Figure 5.2.) in detail.

Since many of the settlement sites in the Upper Derwent Valley are very long-standing, probably with prehistoric origins (Chapter 2), the individual peat cuttings would be expected to be large. However, calculations of volumes of peat removed, compared with the likely level of domestic consumption of the resource at these sites, suggests that much more peat was dug than was needed for household use alone. It is therefore likely that the Upper Derwent settlements engaged in various localised industries, utilising unknown, but likely large volumes of the resource. As described in Chapter 4, there is documentary evidence of peat fuel being used for bird-lime production in the Upper Derwent Valley. Since, various lead and iron slags and artefacts were recovered from the vicinity of the peat consuming settlements, during the reservoir drawdown survey, it seems likely that peat fuel was used for these purposes. The creation of extensive intakes within the valley probably also diminished the peat resource (10:4 & 9:2:1) and some may have been exported to outside markets, possibly within the White Peak, where the generally much thinner deposits of peat would have been exhausted relatively quickly.

References to peat cutting in the Upper Derwent Valley, which are site specific, will be dealt with in Chapter 6. However, there are a few Post-Medieval accounts, which provide more general information on the history of this land-use in the valley. For instance, in the 1770 'new 21 year contracts for farm tenants in the Woodlands Valley' issued by the agents of the Duke of Devonshire (Chatsworth Archives I/96/5), there are sections which read: "The Duke and other leasees (and their agents) shall have liberty to get take and carry from off their leased premises at his or their pleasure stone for building or other necessary uses, clodds, dust and said *ad Cour* for charcoal pits and turves and peat as fuel for boiling holly bark or any other purpose whatsoever and also- - - - - - each tenant is to have the liberty and privilege of getting taking and carrying away turves and peat as fuel for his own use and house consumption not only for his own farm, but in the farm of any of the other tenants lying near there to, if he have not good and sufficient for the purpose in his own farm- - - - - -". The same document also contains clauses which refer to land improvement; notably concerning, paring and burning of 'heath and benty lands' and drainage of 'wet and boggy parts'. Figure 5.3. is a copy of the complete document.

The hardship of life in the Upper Derwent during the latter part of the 18th century, and surprisingly, an indication that peat was at that time an unreliable fuel in the valley, is provided by, a 'letter of petition for bridges and better roads', sent to the Duke of Devonshire by a group of tenants. This reads: "The next thing to be observed is fire to warm our benuned limbs, the cut gate is as bad as any rode we have and of as much benefit to the Tenants, for why the greatest part of his Grace's rent must come over there if ever it be paid —— besides theres good coals at 2 pence per load Sometimes the summer season is so wet, we cannot pretend to get our earthen fewel, the wood being taken away; so we and our families may starve to death; Means must be used to prevent such fatal misfortunes".

As shown in Table 5.1., a total at least 18,361,700 cubic metres of peat have been removed from the hills around the Upper Derwent Valley, affecting c.1838ha of the land surface. However, much more of the Upper Derwent landscape has been fundamentally



We whose Names are hereunto subscribed Tenants to his Grace the Duke of Devonshire for the several Farms hereunder mentioned in Woodlands in the Parish of Hope and County of Derby do hereby severally agree to become Tenants to his Grace for our said several Farms from Lady day last, at the Yearly Rents Added to each of our respective names, payable at Michaelmas and Lady day clear of all Taxes and Assessments; and to accept Leases thereof for Twenty one Years with usual Exceptions Reservations and Covenants as in his Graces other Leases; and also with the following Reservations and Covenants, that is to say, that the Duke and his Heirs his and their Agents shall have liberty to get take and carry from off the said Leased Premises at his and their Will and Pleasure Turves and Peat as fuel for boiling Holly Bark or any other purpose whatsoever and also to inclose and take into his and their own hands any part or parts of the leased Premises and plant the same with wood allowing a deduccon out of the Rent for the Land so inclosed and planted at the same rate or value p Acre as it is now Valued at in the Stewards Field Book, and each Tenant is to have the Liberty and Privilege of getting taking and carrying away House for warming [illegible] and Turves and Peat as fuel for his own Use and house consumption not only in his own Farm, but in the Farm of any of the other Tenants lying near thereto, if he have not good and sufficient for the purpose in his own Farm, and each Tenant is Yearly to improve such a Proporcon of the Heath and Benty Lands within his Farm (Except the Sheep Walks and Outpastures set apart for the depasturage of Sheep only) as that the whole of the said Heath and Benty Lands may be improved within the Term of the Lease, by laying on each and every Acre thereof Forty Horse Loads of good and well burnt Lime, and before laying on the same paring and burning so much of the Turf thereof as shall be found necessary, and also within the Term of the Lease make and lay such good and substantial Soughs or Drains as shall effectually unwater and lay dry the wet and Boggy parts of each Farm so far as shall be practicable and Stubb and effectually grubb and cut up by the Roots, all the wood which shall from time to time grow or sprout from old Roots more upon the said Farms Save and Except on such parts thereof as have already been Copiced or shall hereafter be Copiced and inclosed for future growth and preservacon by the said Duke his Heirs or Assigns. And further also that each Tenant shall from time to time keep in good and effectual Repair all such Walls and Fences as have already been made or shall hereafter be made for the inclosure and preservacon of the said Coppices; or in case of failure thereof within three days next after Notice in Writing shall have been given by his Graces Woodward or Agent of the want of such reparation forfeit

+ Stone for building or other necessary ups, Clay Sand & Land as soon for Charcoal pits +

1.
2.
3.
4.

Fig. 5.3. Copy from the Chatsworth Archive of the 1770 'new 21 year contracts for farm tenants in the Woodlands Valley' issued by the agents of the Duke of Devonshire, which refers to: 1. the Duke's rights to use turves and peat for holly bark boiling etc.; 2. the tenant's rights to obtain turves and peat for domestic use; 3. responsibilities for 'paring and burning'; and 4. drainage of 'wet and boggy land'.

affected by the exploitation of turf and valley bottom mires, as well as the peat cutting infrastructure.

5:1:2. The Edale Valley

The Edale Valley lies between the Ashop arm of the Upper Derwent Valley and the White Peak. It is another isolated valley, surrounded by gritstone and shale hills, supporting extensive blanket mires. Like the Upper Derwent Valley, the lower slopes of Edale have been enclosed and there is a thin scattering of long-standing dispersed settlements. However, Edale differs from the Upper Derwent, because there are also five small nucleated settlements, called booths, located within the upper half of the valley, the Vale of Edale.

Although the floor of the Vale of Edale probably originally contained extensive valley bogs, this area has been generally improved and subdivided into many fields. Peat cutting may well have shifted upslope after initial valley bottom exploitation and the improvements. The plateau on the north side of the valley has been extensively exploited for its peat resource; the slightly lower ridges between the cloughs being almost totally worked out, so cutting has extended onto the plateau top. The plateau at the head of the valley has also been significantly affected by peat cutting, but the hills on the south side of the valley are sharp and would have only held localised topogenous mires and thin blanket peat. Figure 5.4. shows the distribution of the peat cuttings so far identified. Significantly, the majority of settlements are located in the upper part of Edale, below the areas of extensive blanket mire; indeed all of the booths are located on the north side of the river, four at the base of the high plateau. The fifth, Barber booth, which is adjacent to the river, is closest to the widespread blanket peat on Rushup Edge and connected to that area by the ancient Chapel Gate track.

Most of the peat cuttings are large, reflecting the shared exploitation; although there are a few small workings. The smaller cuttings may have been produced as 'trials', after the main workings on the ridges had been almost worked out; to serve a specific localised activity; or may be illicit. Those at Druid's Stone lie on the high plateau and certainly mark a final phase of exploitation; while that at Nether Tor appears to have been dug by quarry workers. Small, neat, racket-form workings (see Chapter 7), by the Jacob's Ladder packhorse trail and on the Crowden Ridge, are probably Post-Medieval and associated with individual farmsteads.

The larger peat workings can be linked to the booths by well-defined braided hollow-ways. The organisation of peat cutting rights is still very clear on two of the northern ridges. The Rowland Cote ridge is divided lengthways by an long-standing land boundary, defined by a ruined drystone wall on the overcut ridge, which extends northward across the Kinder Scout plateau as a bank and double-ditch cut in the peat blanket. West of this boundary the Ollerbrook Booth extended peat cutting onto the high plateau, there perhaps incurring onto the east side of the boundary; while the Nether Booth settlement made less inroads into the peat on the east side of the ridge. Peat Moor is divided into three turbaries marked by peat-affected by the exploitation of turf and valley bottom mires, as well as the peat cutting infrastructure.

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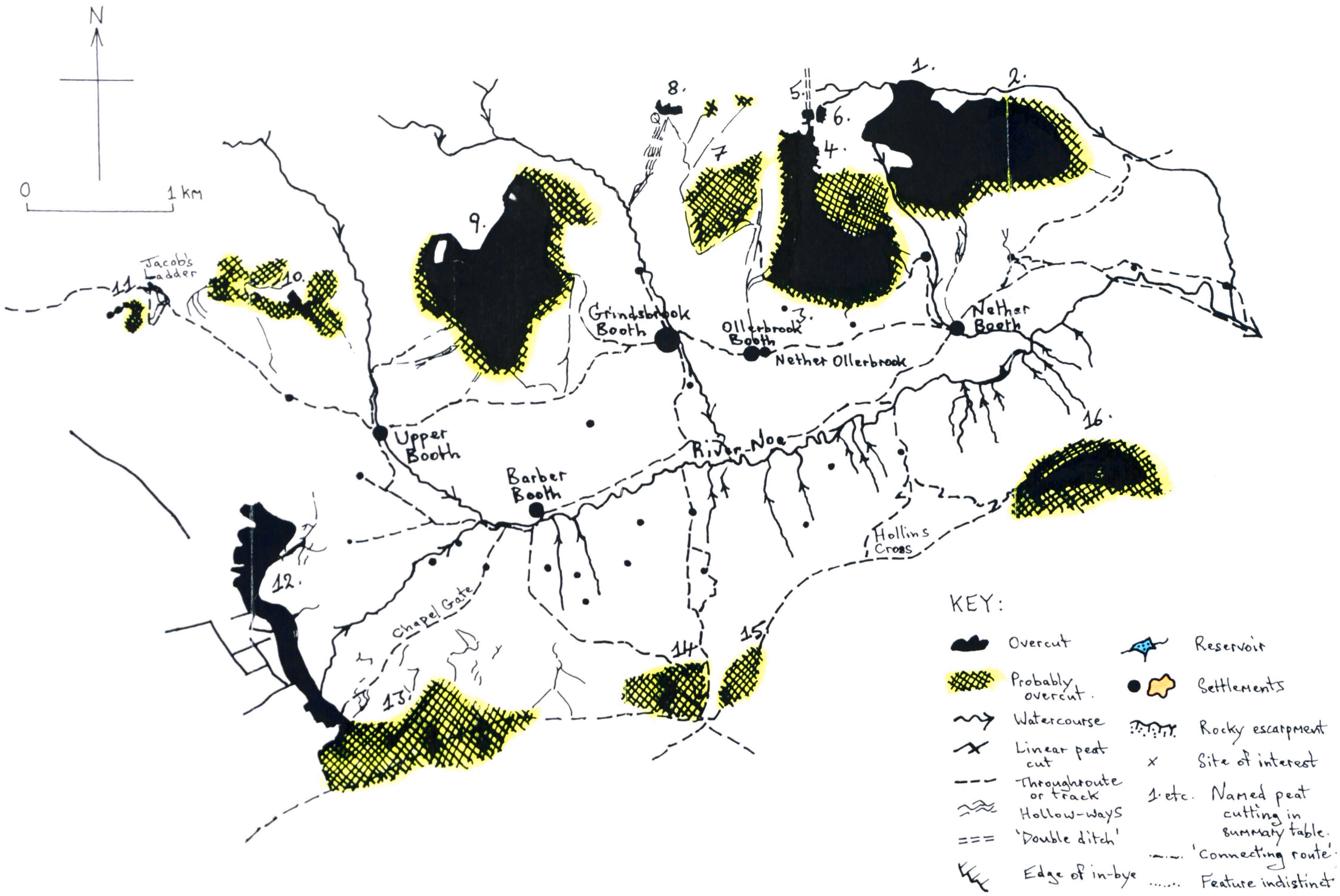
Fig. 5.4. The peat cuttings of the Edale Valley, showing the overcut ground, infrastructure, settlements, and place-names of significance.



baulks; there is a main boundary baulk running length ways across the ridge top, with another set at right-angles to this on the west side (Fig 5.5.). The eastern half of the ridge served Grindsbrook Booth, the north-west quadrant Upper Booth and the south-west quadrant possibly Barber Booth.

5:1:3. The western moors

Large-scale open-cast peat working is most spectacularly represented on the western side of the Peak District, where almost all the peripheral moorland ridges and slopes have been extensively overcut (Fig. 5.6.). This massive exploitation correlates directly with the extensive settlement on the adjacent lowlands. There are many long-standing nucleated and dispersed settlements, many of which expanded rapidly with the industrial revolution. Those located away from the plateau exploited the extensive raised mires on the Cheshire Plain, but others, clustered around the bases of the hills utilised the blanket mires. Because the western moors rise abruptly from the lowland plain, well-defined ridge top peat cuttings were formed; these accessed by an extensive infrastructure of lanes and terraced trackways.

The peat cuttings of the western moors are characterised by their great size, extensive infrastructure, and the presence of frequent parallel baulks; all of which reflect division of turbary. Parallel baulks dividing the overcut area are particularly prominent on Saddleworth Moor (Figs 5.7. & 5.9.), Turf Pits (Fig. 5.8.), Peaknaze Moor, and Black Moor. These features are rare on other peat cuttings in the Peak District and clearly demarcate linear divisions of the turbary. Since they are often found on peat cuttings which can be directly linked by routeways to present day towns, this type of subdivision probably indicates Medieval, or Early Post-Medieval exploitation, because each strip would likely be the peat cutting ground of an individual householder and the divisions can be counted in tens rather than hundreds! For instance, Black Moor, which appears to have served Whitfield, now incorporated within Glossop, appear to have been divided into between forty and fifty linear divisions. The extent of the baulks on Black Moor at least provides evidence that much of the peat cutting took place before the time of enclosure, because the walled lane to the site, which overlays the much braided accesses to the individual strip holdings, leads to an area of baulk-free overcutting covering at most 2ha, whilst the turbary as a whole extends to 100ha.

The linear baulks, braided access tracks, and peat cutting faces provide evidence of the effects of erosion on the extent of blanket peat on the western moors; where much peat loss has been attributed to mass wasting as a result of fire and atmospheric pollution. There does appear to have been considerable surface erosion of the blanket mires, but only localised mass wasting down to mineral soil. At most sites where there are linear baulks these features are well preserved and generally indicate the extent of overcutting. Only very rarely do baulks stop short of the peat edge; indicating erosion of the abandoned cutting face. At Coldharbour Moor, there has been surface wasting of the peat blanket beyond the

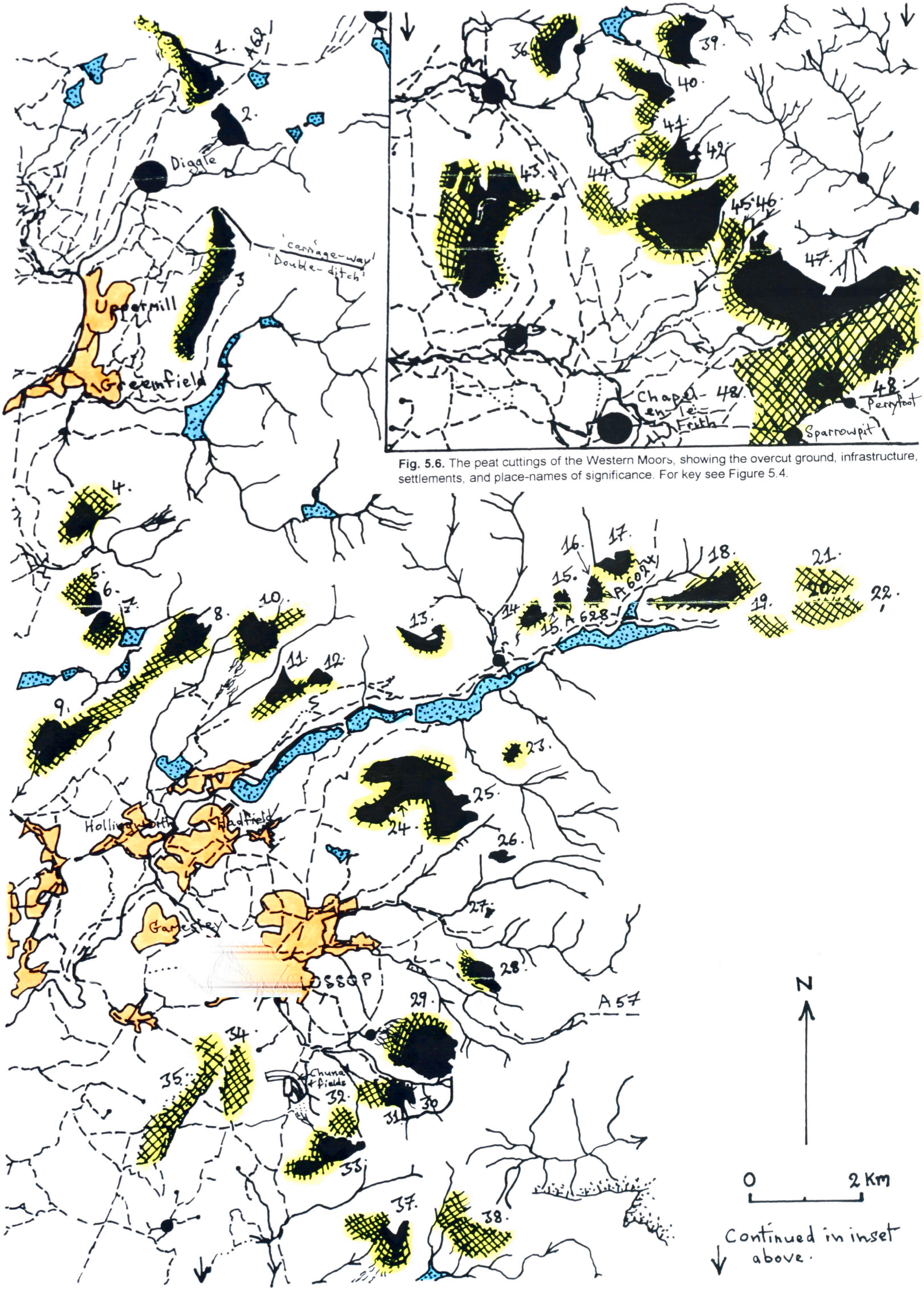


Fig. 5.6. The peat cuttings of the Western Moors, showing the overcut ground, infrastructure, settlements, and place-names of significance. For key see Figure 5.4.

Fig. 5.5. A peat formed boundary baulk (arrowed) on Peat Moor in the Edale Valley, which probably divided the Upper Booth and Barber Booth turbaries. The feature, which is about 1.5-2m in height, is bordered on its south side by an indistinct ditch or hollow-way (defined by *Juncus effusus*), and topped by patches of *Calluna*.

Fig. 5.7. A section of the Saddleworth Moor turbary, showing the degraded peat cutting face running into the distance and at right-angles to that, a series of indistinct parallel baulks. The latter run up to the cutting face and probably divided individual holdings within the turbary. The stony nature of some of the baulks (exposed by erosion), suggests that they may also have served as stacking/drying lines.

Fig. 5.8. Two copies of a section of an aerial photograph of moorland to the west of Mossley, showing severe mass-wasting and peat cutting. The right hand copy has been interpreted to show the difference between mass-wasting on Buckton Moor and Hare Hill, with turbary at Turf Pits on Slatepit Moor. The interpretation highlights the abundance of access tracks on the overcut and their scarcity on the eroded moorland.

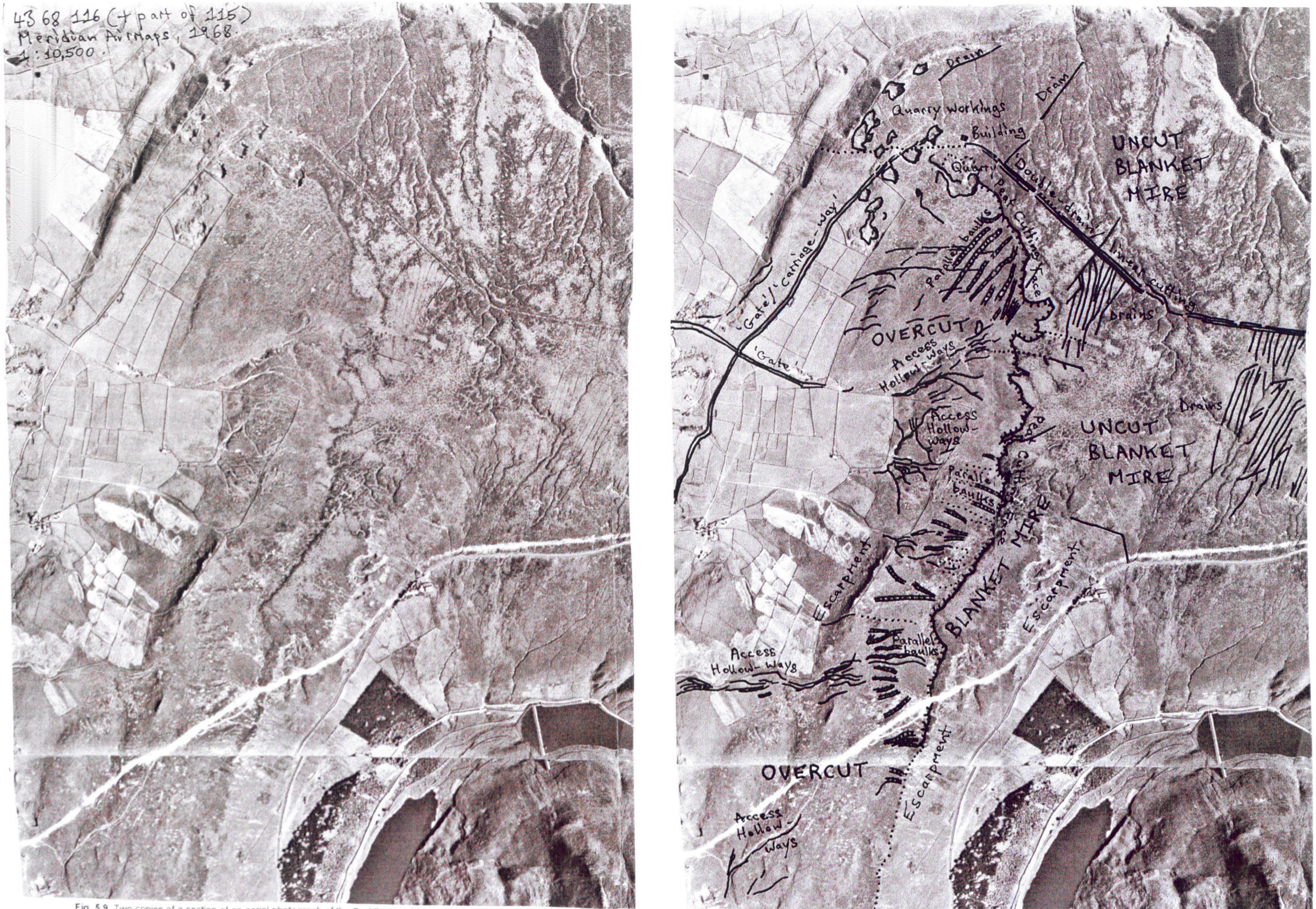


Fig. 5.9. Two copies of a section of an aerial photograph of the Saddleworth Moor turbary. The right hand copy has been interpreted to highlight the extensive peat cutting face, vast overcut area, parallel baulks, infrastructure, and drainage. Also note, the stone quarries located within the overcut area.

cut face, but only to the extent of about 2ha. The only area on the western moors where there has been widespread mass wasting of uncut blanket mire is on Hare Hill, Swineshaw Moor and on Windgate Edge, but even here much of the peat free ground has been overcut; the areas where fire and erosion alone have induced the peat loss, are shown by an absence of braided peat cutting tracks (Fig. 5.8.).

The western moors have many interesting and significant peat cuttings. Saddleworth Moor has very prominent peat cutting archaeology, which is especially clear from the air (Fig. 5.9); at Turf Pits there are two large turbaries, divided by a broad baulk of peat (Fig. 5.8.); on Arnfield Moor (SK 026995) there are cuttings in a bog slip; on Peaknaze Moor and Glossop Low, which collectively cover about 250 ha, the peat cutting archaeology has been degraded by recent grazing improvement experiments; on Chunal Moor the access routeways show an association with the Medieval farming landscape around the hamlet of Chunal, fossilised in the present-day field layout; while very extensive areas of peat cuttings to the north and east of Chapel-en-le-frith, appear to have dictated a complex infrastructure of moorland roads and tracks (Fig. 5.6.).

Longdendale

Longdendale is a deep valley which bisects the western moors and separates the northern moors of the Peak District from the watershed of the Upper Derwent. It contains the River Etherow, which at its headwaters meets the source of the River Don, to form a pass across the South Pennines. This natural east to west routeway, now called the Woodhead Pass, was an important saltway in Medieval times (Dodd & Dodd 1982); so much so that it dictated the alignment of the Cheshire boundary as set in the tenth or eleventh century (Hey 1980). There are a number of well-defined peat cuttings located on the ridges bordering the north side of the valley; these are similar in type to those in the Upper Derwent and can be linked by their hollow-ways to dispersed settlements scattered along the bottom of the valley (Fig 5.6.).

Although of similar appearance to the peat cuttings in the Upper Derwent Valley, those in Longdendale are a little smaller; perhaps reflecting the general abundance of peat in neighbouring areas and therefore reduced need for trade in the resource; and a poorer, more subsistence population. This conclusion is indicated by a passage in 'A description of the country from 30-40 miles around Manchester' (Aiken 1795), which states that, "On the top of Tinsall Morr, Woodhead and other high hills are deep and thick peat mosses. in which fuel is got by the poor". At least some of the cuttings in Longdendale were communal; the Hey Edge, west peat cutting for instance is divided by linear baulks, reflecting its association with the hamlet at Crowden and the western moors peat cutting tradition. Significantly, the settlements, peat cuttings, and through-routes are located on the north side of the river; the south side of the valley being strewn with boulder clutter.

5:1:4. The Staffordshire moors

The Staffordshire moors are separated from the western moors by the broad headwaters of the River Goyt and lie on the west side of the White Peak. As the hills are generally less abrupt than those in the northern Peak District and the local population more dispersed, there are few prominent large-scale peat cuttings; although extensive examples can be recognised to the west of Buxton. Due to the terrain, the expansion of in-bye and peat cutting probably took place simultaneously over a greater proportion of these moors than for instance on the Western Moors and in the Upper Derwent Valley. The same process seems to have also occurred on the northern and eastern moors of the Peak District. On the highest moors of Staffordshire, recognisable peat cuttings are typically small-scale; reflecting the subsistence type of farming and sometimes Post-Medieval settlement. Figure 5.10. shows the peat cuttings which have been identified.

The extensive overcutting to the west of Buxton, demonstrates its long-standing importance, as a Roman settlement and a spa. It was known to have held free rights of turbary within the Peak Forest in 1251 (Cox 1905). The Buxton peat cuttings have added interest because they contain prominent peat cutting features and datable workings, where the peat was dug for use in thermal peat baths up to the early part of this century (Porter 1994) (Figs 4.9. & 4.10.; 4:7:1.). Significant areas of overcutting, accompanied by major incursions of in-bye, can also be seen on the hills to the east of the towns of Bollington and Macclesfield. There are a number of 'moss' place-names within the improved areas of these hills, and on in-bye land on similar topography over much of the Staffordshire uplands to the south. Other place-names of peat cutting significance, within present day in-bye, include Higher Pethills and Lower Pethills, which lie between Sutton and Cessbank Commons; and Pethills Farm and Lower Pethills Farm. See Glossary for origins of pethills.

The total volume of peat removed from the Staffordshire moors is difficult to assess, due to the nature of the overcutting, and because much of the marginal land may have been affected by paring and burning associated with land improvement, rather than peat exploitation.

5:1:5. The northern moors

These moors are located around the northern boundary of the Peak District, on the broad watershed of the rivers Colne and Holme. Most of the tributary valleys are now densely populated, with sizeable nucleated settlements extending well into the headwaters. Much of the intervening land has been improved and there are many dispersed settlements. There is a complex infrastructure of major roads spreading up the main valleys with interconnecting minor roads and lanes; a number of which extend out through the upper limits of intake to terminate on the unimproved uplands as peat-gates.

Peat digging and land improvement has extended some way onto the hills and there are a number of well-defined turbaries; significantly, these originate from two distinct peat

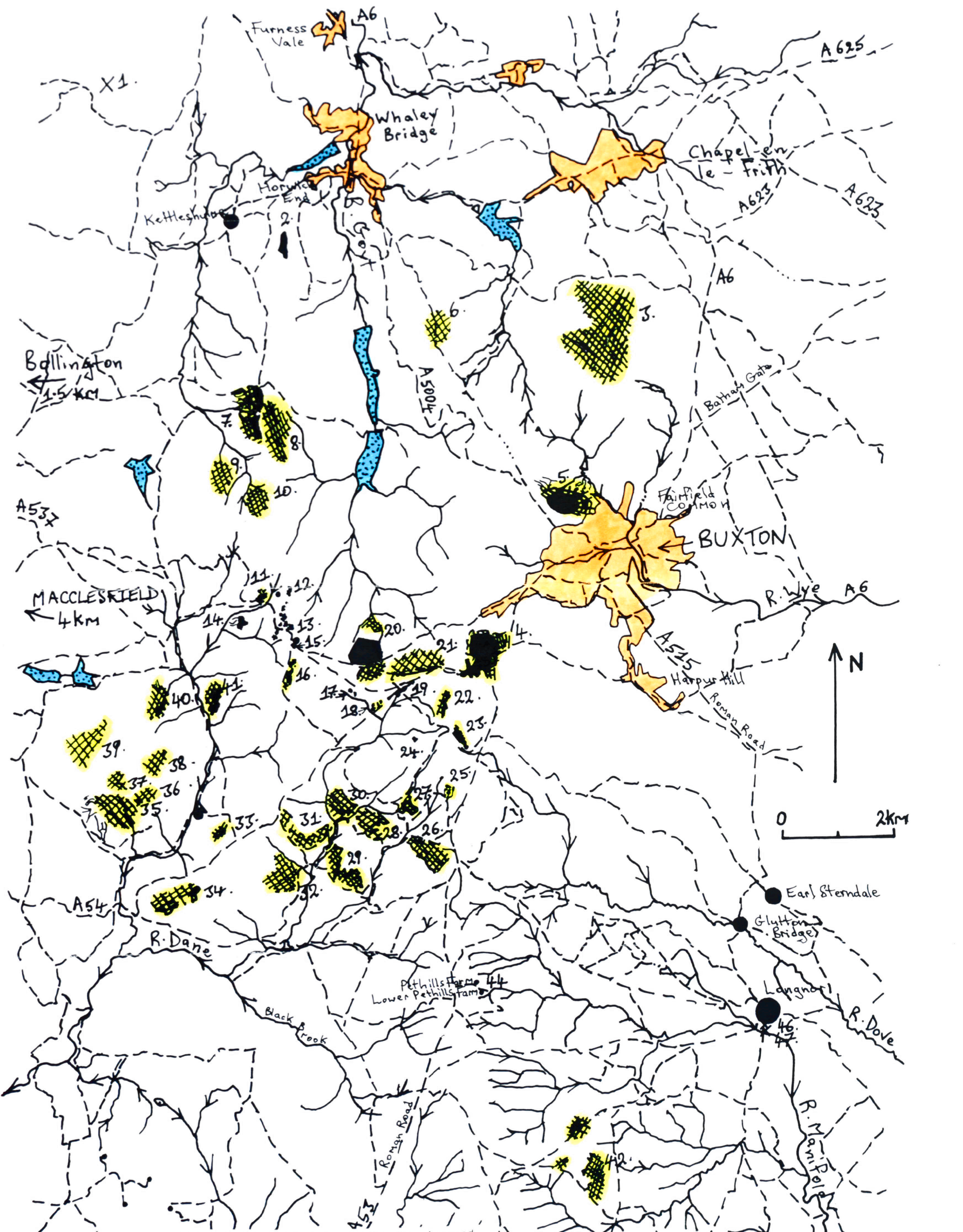


Fig. 5.10. The peat cuttings of the Staffordshire Moors, showing the overcut ground, infrastructure, settlements, and place-names of significance. For key see Figure 5.4.

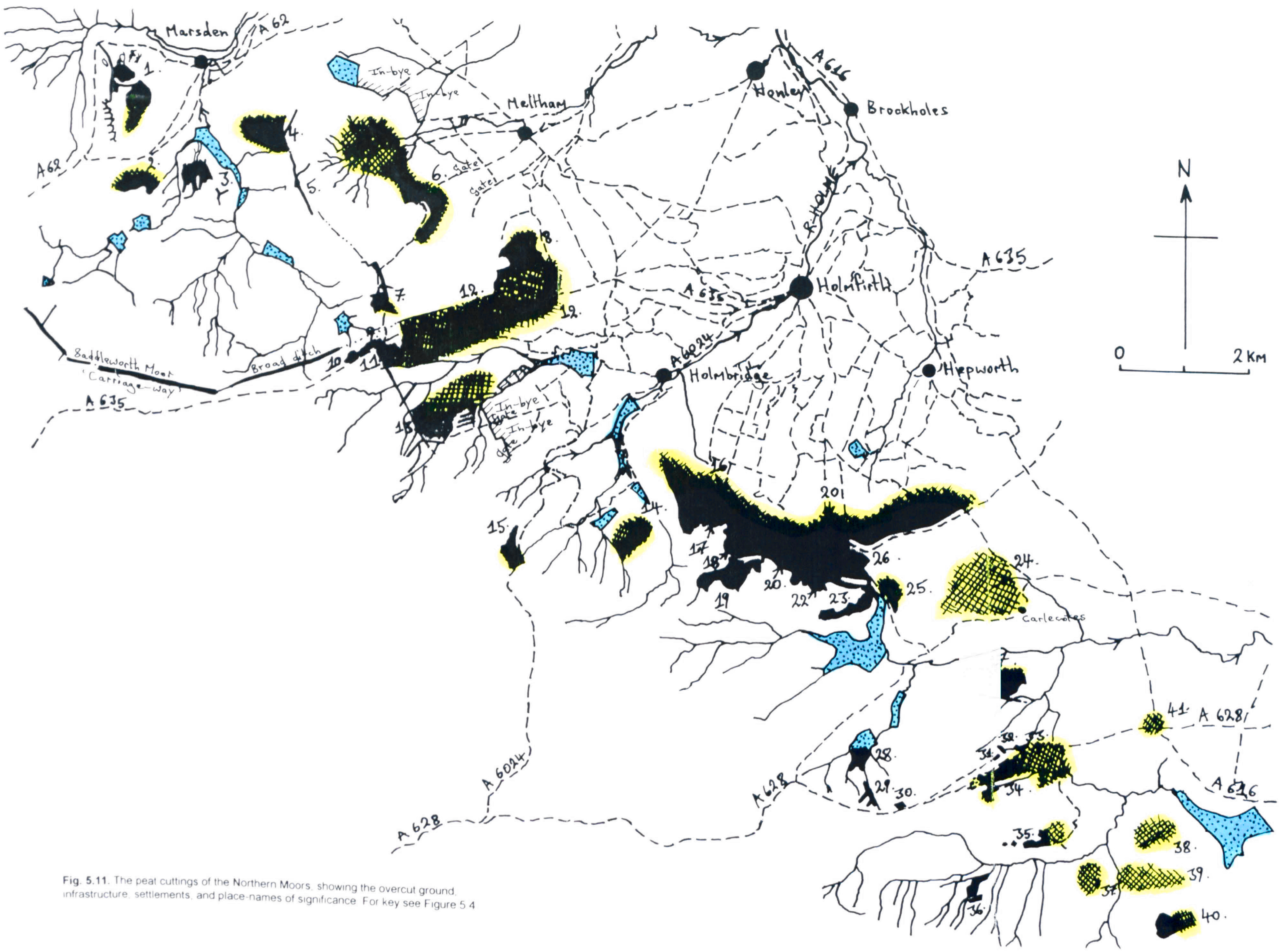


Fig. 5.11. The peat cuttings of the Northern Moors, showing the overcut ground, infrastructure, settlements, and place-names of significance. For key see Figure 5.4

cutting traditions. There is a western group of peat cuttings, distributed around the upper reaches of the River Colne, which show similarities with the turbaries on the Western Moors; and an eastern group, located at the headwaters of the River Holme, which is an autonomous collective called the Graveship of Holme (described in detail below). The peat cuttings which have been identified so far are shown on Figure 5.11. The western group of cuttings includes one of the clearest examples of peat working found in the South Pennines; Pule Hill, where three turbaries with well-defined linear baulks are separated by a triangular-shaped section of uncut peat (Fig. 5.12.).

The Graveship of Holme

Small-scale peat cutting still takes place on the north-eastern edge of the Peak District. This activity is controlled by the archaic Graveship of Holme, an authority and administrative area that possibly has Anglo-Saxon origins, but certainly dates back to the time of Henry V (Quarmby pers. comm). Indeed, the present day name of the organisation may demonstrate its early origins, because the element '*grave*' can mean to dig or engrave, deriving from the Old English '*grafan*', or similar European sources (see Glossary). The land within the Graveship, which used to be part of the Manor of Wakefield, incorporates the town of Holmfirth, five ancient townships, and many hamlets and farmsteads.

The Graveship still has two officials, an overseeing officer, called The Constable of the Graveship of Holme and his assistant. The constable holds the peat cutting grounds, in trust for the inhabitants of the Graveship. The title of Constable, previously Chief Constable, is honorary and elected, but the office traditionally rests in one family. The present constable, Arthur Quarmby (Fig. 5.13.), is the fourth generation within his family to hold the title. His responsibilities include, advertising the availability of peat cutting rights in the local paper each year and sending the names of the participants to the local council, so that they will not be prosecuted for not using smokeless fuel. Grazing rights within the five peat cutting areas are also controlled by the constable; in 1887 the rent of £20 was distributed amongst the poor, whilst the current rent of £300 per year is available for the maintenance of roadways. Figure 5.14. is a photograph of a poster of 1887, advertising the sale of the grazing rights (then called Herbage).

Theoretically, all residents of the Graveship still have the right to cut peat for domestic use, but current turbary is restricted to five small plots, allotted at the time of enclosure, which in total cover about 22ha (Fig. 5.11.). Only about 100, of a population of thousands dwelling within the Graveship, take up their peat cutting rights each year and at present only three of the turbaries are being worked (Isle of Skye, Hades Peat Pits and Harden Peat Pits). Figure 5.15. illustrates the peat cutting face at Harden Peat Pits.

There is little organisation of the cutters once on the peat grounds; though rights are claimed with a marker at the end of Easter (Fig. 5.16.) and cutting takes place in May and June. Traditionally, a two to two and a half metre bank is created in the peat prior to turves

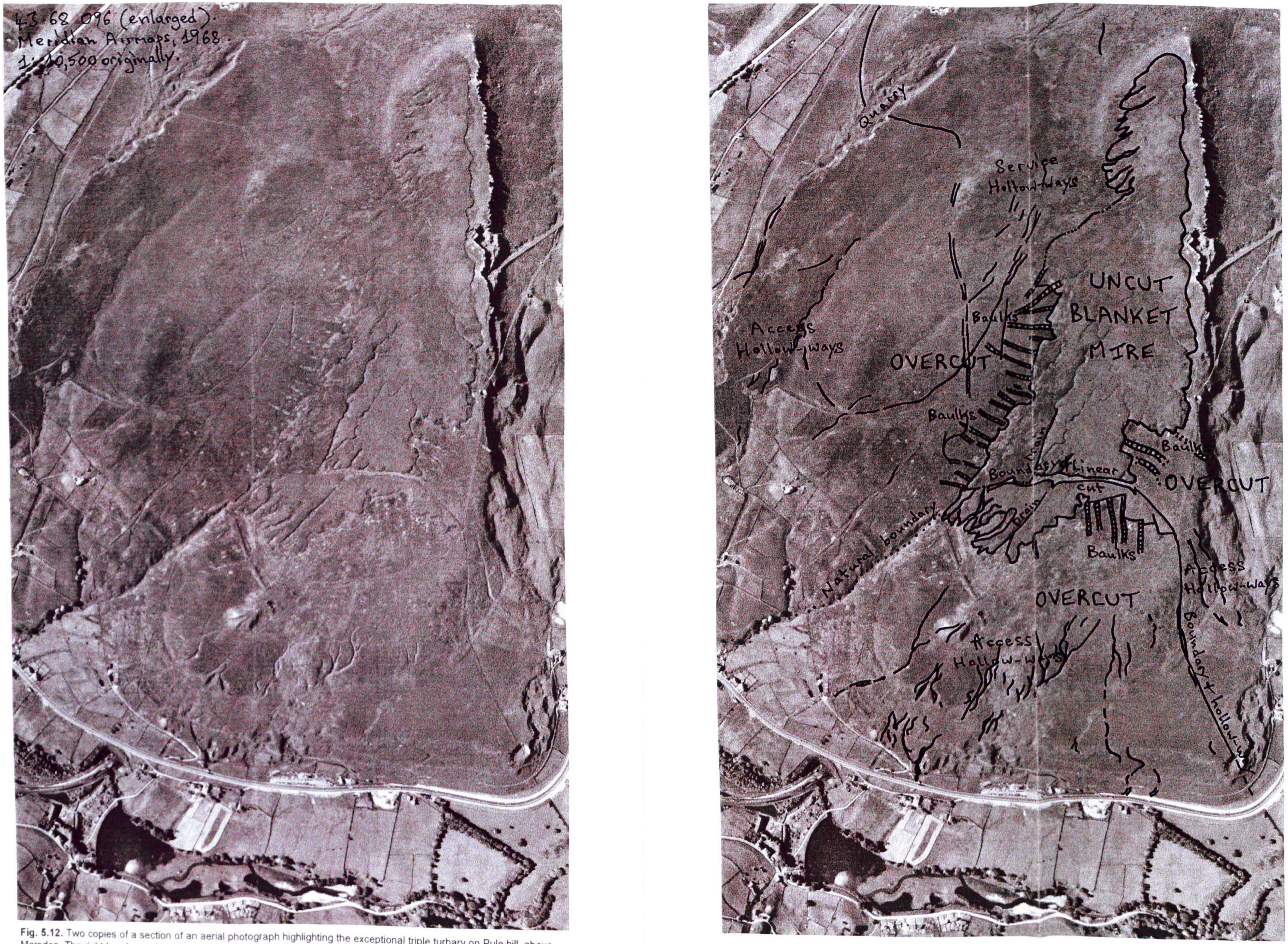


Fig. 5.12. Two copies of a section of an aerial photograph highlighting the exceptional triple turbary on Pule hill, above Marsden. The right hand copy has been interpreted to show the arrangement of the three peat cutting faces, baulks, boundary drains, and infrastructure.

Fig. 5.13. Arthur Quarmby, the present 'Constable of the Graveship of Holme', with his peat barrow and traditional 'Holme turfing spade'.

Fig. 5.14. Photograph of a poster of 1887, advertising the letting, by auction, of the grazing rights to the five peat cutting grounds within the Graveship of Holme (In the home of A. Quarmby).

Fig. 5.15. The Harden Moss peat cutting grounds of the Graveship of Holme, looking from the currently unused west end of the workings, where there has been reversion to *Eriophorum angustifolium* dominated vegetation.

Fig. 5.16. Section of the Harden Moss peat cutting grounds in the Graveship of Holme, showing three of the small plots in current use. These plots, worked by individuals, are marked by boards bearing the initials of the claimant (arrowed).

being removed; then these are cut horizontally, from 60cm deep beds, while standing on the floor of the working. The peat is worked down to the mineral soil, with the last bit, cut vertically; the turf is not replaced after cutting. Few ancillary features are used by the peat cutters and not all of them use a proper peat spade (Fig. 5.13.). The cut turves are either taken away wet, or left to dry in small piles, on the exposed gravel surface, on the top of the peat face, on wooden pallets, or on pieces of plastic sheet. Sometimes barrows and carts are still used to move the turves about on the cutting grounds, but the peat is generally taken home in motorised vehicles; peat storage buildings are no longer used within the Graveship. The peat is now mainly burnt on modern coal hearths, where it produces only a little ash; which may be scattered on gardens (Quarmby pers. comm.).

Although an anachronism in the modern world, the Graveship of Holme's historical responsibilities and authority were significant to the local communities' every day life. This is demonstrated by notes from the Manor Court of Wakefield, which when meeting in 1640, ordered every householder within the Graveship to "come or send a sufficient labourer to the mending of the high wayes and turfe gates"; then the following year the constable, along with sworn men from Ardsley West, presented the owners and occupiers of William Lindley's land to the same court, "for not doinge five Common day workes with a draught this yeare last past" (Hey 1980).

The Graveship of Holme is important because it is an archaic, living institution, and because it preserves the peat cutting tradition of the area; indeed, hand peat cutting is an almost extinct activity in England as a whole, rare in Wales and very localised in Scotland. Of particular significance is the way the peat is still cut; horizontally from a prepared face. This is in keeping with the open-cast peat cutting methodology which has been the tradition in the Peak District for centuries; but is not part of the more general tradition in Britain, where the peat is cut vertically from the mire surface. Of additional significance is the fact that the five current peat cutting grounds within the Graveship of Holme lie at the limits of more extensively overcut areas; apparently marking the extent of the pre-enclosure turbaries of the Graveship (Fig. 5.11.).

5:1:6. The eastern moors

The eastern moors are a zone of medium level moorland, which forms the eastern fringe of the South Pennines. At the northern end they are contiguous with the high moors found on the east side of the Upper Derwent; but further south, run up to the eastern escarpment of the Derwent Valley. The low land to the east of these moors is now heavily populated, but the city of Sheffield and the other major settlements, although long-standing, have grown around groups of villages since the Industrial Revolution. There are many dispersed settlements, and in-bye and infrastructure have spread extensively over the majority of the lower moors. Because most of this country rises upwards from the east relatively gradually, the distinction between pared-land and peat cut land is generally indeterminable; but there are many

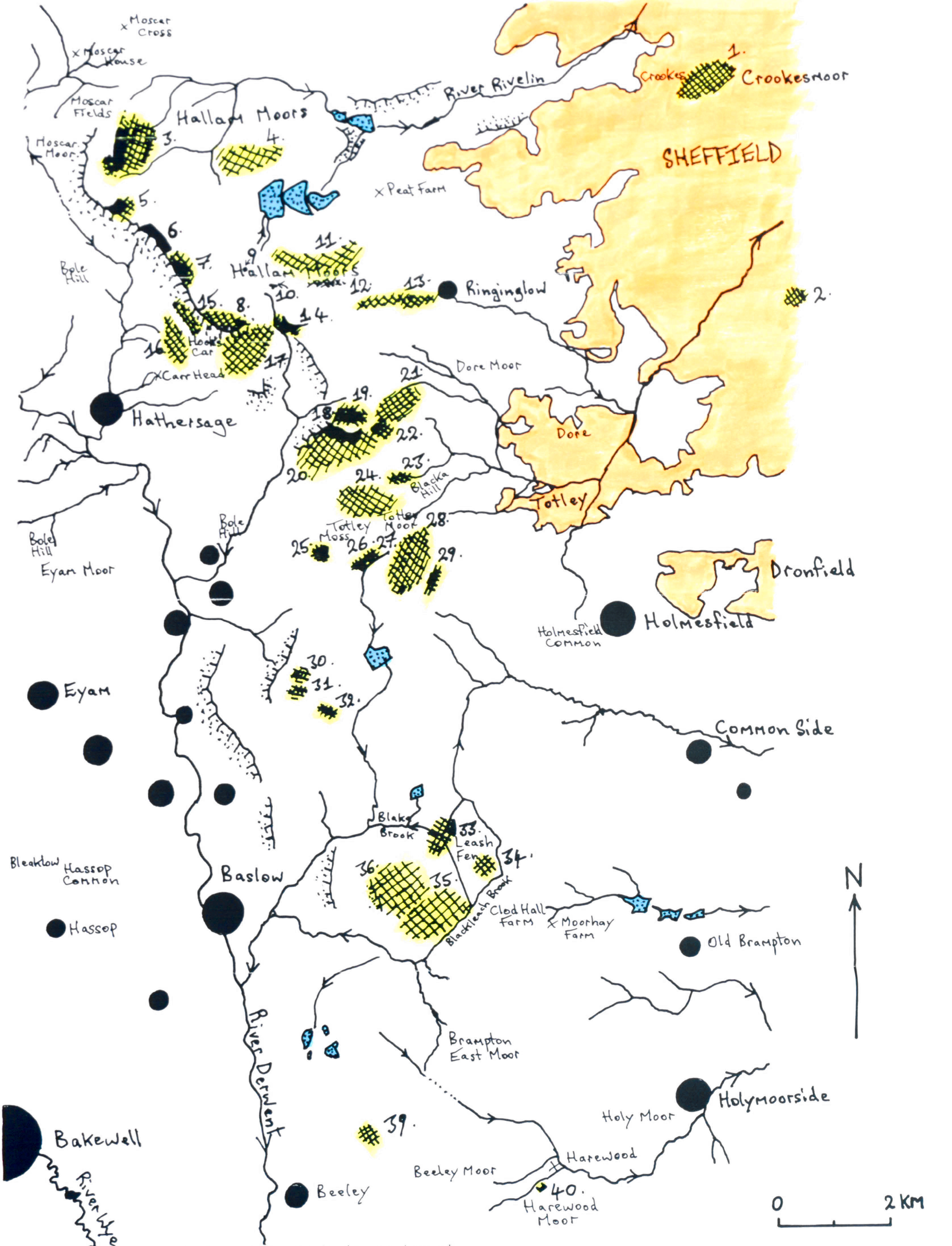


Fig. 5.17. The peat cuttings of the Eastern Moors, showing the overcut ground, infrastructure, settlements, and place-names of significance. For key see Figure 5.4.

references that indicate widespread peat cutting . These references, the common occurrence of peaty soils in the in-bye, the frequent heaths and commons, remnants of peatlands even on the lowest moors, and place-name evidence, all show that peat was widely available and probably exploited at all altitudes. Figure 5.17. shows the peat cuttings which have been identified and those areas where exploitation is implied.

The historical significance of peat cutting on the eastern fringe of the South Pennines can be demonstrated by reference to the ancient area of Hallamshire, which incorporates Sheffield. In c.1540 John Leland remarked that "Hallamshire hath plenti of woodde, and yet ther is burned much se cole" (Hey 1991). However, at that time and until relatively recently, although wood and mineral coal were abundant resources, they were not necessarily generally available; wood was largely reserved for industry and construction, while coal mining was still small-scale, and its usage localised, because of transport problems. There are a number of writings which confirm the historical significance of peat cutting in the area, these include, a description of the rights of rented property holders in Sheffield Manor, up to 1651, to cut turf and clods from the commons (Hey 1991); a statement, that before the enclosures, the large tracts of common land on the slopes of the Rivelin Valley were used by the inhabitants of Crookes, Walkley, Stannington and Clough Fields (nucleated settlements now incorporated into the western suburbs of Sheffield) to provide turf or peat (Porter and Watson 1910); and a description of nineteenth century peat extraction, processing and use as boiler fuel, at a works at Kelly's, on the edge of Ringinglow Bog (see below and Chapter 4), which produced potash manure and dried or pressed peat for sale (Ward 1950).

The references to peat and turf cutting mentioned above only give limited information on their usage; namely, for nineteenth century land improvement and as industrial fuel (Ward 1950). Prior to this, most of the peat and turf would have been used by the poor for domestic fuel, building purposes, and small scale land improvement. As described in Chapter 4, up to the beginning of the present century, charcoal burners working in the ancient, semi-natural woodlands around Sheffield, built wigwam-like huts covered by sods; but turf-built dwellings were widespread in the area in earlier times (Innocent 1916). Bog moss has also been widely exploited on the moors around Sheffield, for building purposes; shown for instance by several references in the Hallamshire court rolls of the fifteenth century (Thomas 1924).

Some of the most informative documentary evidence of peat exploitation on other parts of the eastern moors, is provided by certain translations of fourteenth century court rolls of Baslow (Kerry 1901); these include six references to persons being brought before the court for their involvement in a variety of unlawful actions on the moors; either "digging of turf and peat", "carrying it away without license", or "grubbing the heath". Significantly, two of the references mention the digging of "turves" specifically; one "turf"; and two both "turf" and "peat"; which indicates that both peat and sods were being exploited. Of additional significance, the name of Lady Catherine Eyre was mentioned; showing that not only ordinary people were involved in the activity. The limit of the moorland involved in these court cases is uncertain, but in the fourteenth century Baslow, would likely have controlled extensive areas of 'wasteland'. East Moor is mentioned specifically at one court meeting, but Clod Hall Moor (4:3:1.) and Leash Fen (see below) are closer, and Big Moor a similar distance to the north-east.

As mentioned earlier, the nature of the topography and the widespread land improvement has limited the amount of peat cutting evidence to be found on the eastern moors. Most well-defined peat cuttings are small scale features occurring on and around deep topogenous bogs; for instance on Ringinglow Bog, Totley Moss, and Lucas Moss. At Ringinglow Bog and Lucas Moss there are prominent surface pits; but there are marginal cuttings at all three sites. These bogs and Leash Fen, have been severely degraded by drainage, some of which may be related to peat cutting; all show evidence that they were once forms of upland raised bog. Lucas Moss which still has a raised profile and vegetation characteristic of a raised mire, has some of the best preserved peat cutting archaeology; including a line of sub-rectangular peat pits, which were probably dug along the length of a surface drain.

There are a few clearly recognisable opencast peat workings in deep blanket mires on the eastern moors. Some of the best examples occur on Hallam Moors, which was called Black Moor at the time of parliamentary enclosure (see Glossary) and around Burbage Moor. Extensive exploitation of the more typical thin blanket peat deposits and various topogenous bogs is evidenced by the references described above, by the presence of large areas with little or no peat cover, minor peat cutting scars, and other peat cutting archaeology. For instance, there are many tracks on the eastern moors which appear to have little function; apart from as access to peat cutting grounds. Additionally, apparent peat loading-ramps have been found for instance on the top of Birchin Edge, on moorland now more or less devoid of peat, where there is no sign of stone-getting, or other activity, which might otherwise explain the occurrence of such features (Ainsworth pers. comm.).

5:1:7. The White Peak

The limestone plateau which lies in the centre of the Peak District is known as the White Peak. This area, which is now characterised by its extensive drystone walls, green fields and gorge-like dales; was from Late Sub-Boreal times (c.2,600 BP) until the time of enclosure (1760-1820) generally covered by heathland (Anderson & Shimwell 1981). Peat has tended to form on the hills of the White Peak because the area is extensively covered by silty loess, which is acidic (Pigott 1970). Indeed, these soils, are still capable of supporting peat forming vegetation, even though they have been made less acidic by repeated liming over the centuries (see below).

Although, the heath was considered by Farey (1811) to be the product of agricultural neglect in the early 19th century, it was in fact an extensively overcut peatland. Much of the peat cutting had occurred during Medieval times, but as on many lowland heaths, there was also probably repeated turf cutting as organic material re-deposited. This reformation of peat is shown by Farey's own writings, when he states: "where the limestone hills have been suffered for a long period to be covered with heath, for want of liming, a thin black wet earth is formed". Indeed, this process is still taking place on the few remnants of limestone heath and very locally on enclosed and improved areas of former limestone heath; at the head of Coombs Dale for instance, where there is a little surface seepage, there were until recently three species of *Sphagnum* surviving in the closely grazed grassland sward.

Originally much of the White Peak plateau would have been covered by relatively deep deposits of blanket peat, because the great majority of the land is over 300m, gently sloping, and covered by loess. The highest point at SK 123819 is 477m OD, but there are many areas, often with the name moor, which rise to at least 350m; Bradwell Moor, one of the few surviving areas of limestone-heath, is over 460m at its highest point. After the main deposits of peat had been removed, the relatively high population, would have increasingly resorted to thin peat and turf as fuel. Towards the end of the eighteenth century, the remaining peaty soils became an hindrance to agricultural development; so much of the limestone-heath was improved by paring and burning and then enclosed as good grazing or cropland (Farey 1811-17). Eight references to paring and burning on the common lands of Ashford around that time (Chatsworth Archives L/96/4), further demonstrate the significance of the activity. By the early part of the nineteenth century only localised, very thin, re-forming peat deposits would have remained; but by then sources of fuel from outside of the area would have become generally available because of improving infrastructure. Figure 5.18. shows the White Peak locations where peat or turf cutting is indicated by documentation or place-name evidence.

The White Peak has many long-standing settlements. Most of the nucleated settlements developed within the middle reaches of the Derwent Valley, which skirts the east side of the limestone plateau and where there would have been significant local deposits of valley peat, as well as deep blanket peat on the nearby gritstone hills. Those settlements dispersed across the plateau top arose because peat was widely available, but in most places thin enough to be readily removed in order to create farmland. Those nucleated settlements located on the White Peak plateau, occur either within broad vales, or close to the highest hills, where, in both situations, relatively thick peat deposits would have formed.

The relationship between White Peak settlement and the availability of peat is easily demonstrated by reference to a number of the villages and towns. The villages of Bradwell, Great Hucklow, Foolow, Eyam, and Stoney Middleton, lie at the base of the western and southern escarpments of the outlying and extensively overcut Offerton, Shatton, Abney, and Eyam Moor gritstone plateau. Peak Forest, the site of the former chamber of the Royal Forest of the Peak, is located near the foresters peat cutting grounds at Rushup (Cox 1905; Anderson & Shimwell 1981). Bradwell, Tideswell, and Taddington, all occur near moors over

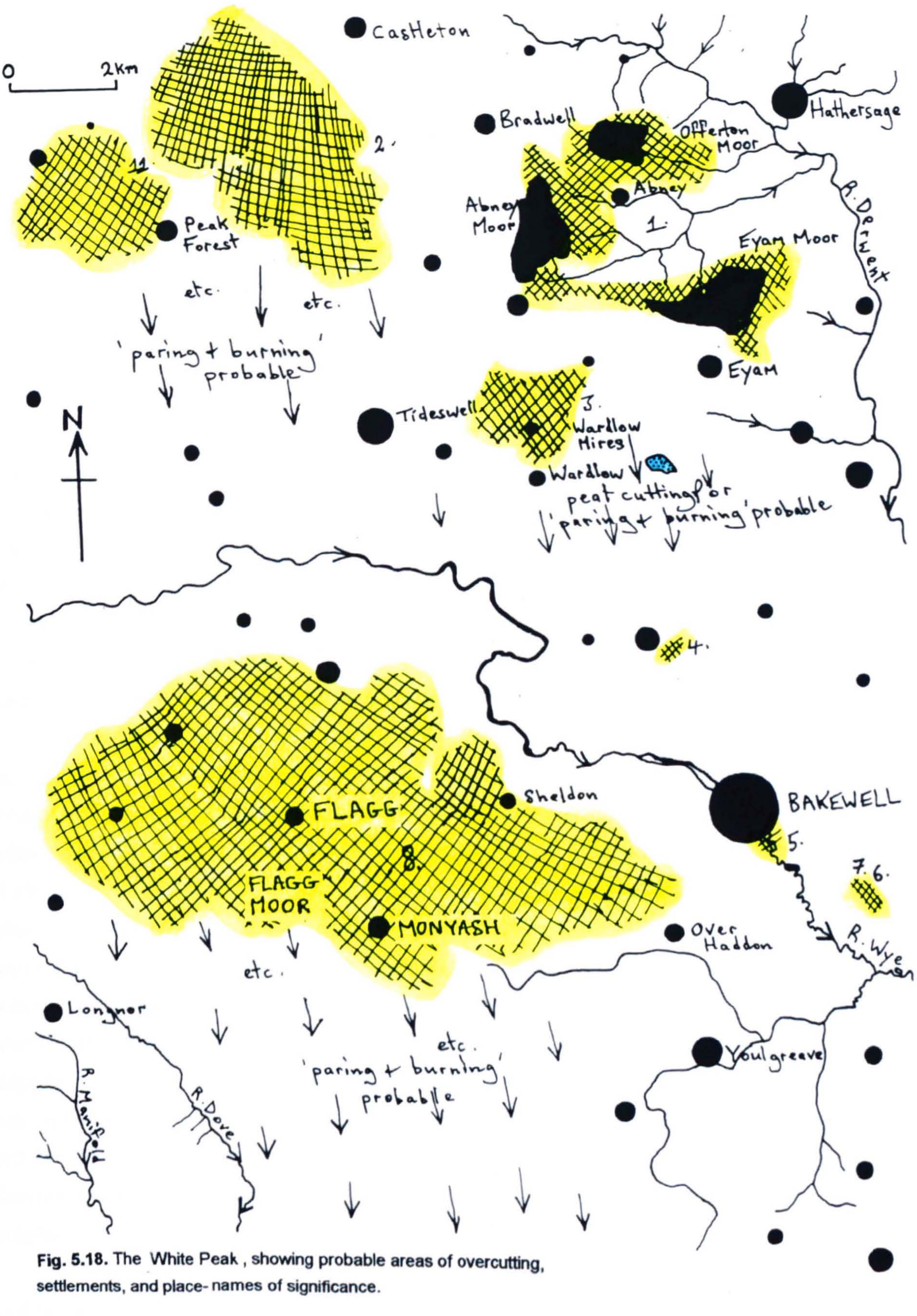


Fig. 5.18. The White Peak , showing probable areas of overcutting, settlements, and place- names of significance.

400m, bearing the same names; while, Monyash and Flagg are at the vale-like head of Lathkilldale.

Tideswell, Great Hucklow, Foolow, Wardlow and Litton (Fig. 5.18.), with their Medieval strip fields 'fossilised' by drystone walls, surround the basin of Wardlow Mires and Stanley Moor, where an outlier of the *Pendleian* Millstone Grit Series occurs. This area of rushy farmland, with a Post-Medieval field layout, now has little peat, but lies in a location where the geology and topography should have resulted in the formation of a deep bog. However, such a bog, lying isolated within extensive limestone heath, would have been heavily exploited by the inhabitants of the surrounding settlements and likely completely worked out before being converted to into farmland.

Confirmation that valley head peat bogs existed on the limestone plateau and were subsequently worked out is provided by the place-names Peat Pits and Peat Pits Brook (a tributary of the River Derwent south of Matlock), which can be found on the current 1:25,000 OS map of the White Peak. There is also a minor road, sign-posted Peat Lane, located nearby. Peat Pits, which lies within an area of plantation, retains no visible evidence of peat cutting and no peat deposits; only a patch of relict alder coppice. However, it is likely that this peat cutting ground was originally extensive, since the headwaters of the brook form a vale, which rises only about 25m to its source about 1km beyond the plantation; in this area, there is now improved farmland, drained by a simple canalised watercourse. Interestingly, there are no villages in the vicinity; only farmsteads and small hamlets. Clearly, if Peat Pits has been worked out by these minor settlements, then the villages surrounding Wardlow mires and Stanley Moor could also be expected to exhaust that peat resource.

Buxton, the largest White Peak settlement, is located at the headwaters of the River Wye, on the very edge of the highest of the Staffordshire Moors. There are extensive areas of peat cutting associated with the town (see 5:1:4.). It was known to have held free rights of turbary within the Peak Forest in 1251 (Cox 1905). Bakewell, which was the Badecan Wiellon of 924 (Cameron 1959) and probably an important centre even at that time, is located over alluvial peat deposits up to 53cm in depth exposed by recent development work (Spode pers comm.) and is near to areas of valley bottom marshland. The local occurrence of peat at this settlement is shown by the place-name Peat Well and its exploitation by Peethill Plantation which is described by Field (1989), as "land from which peat was obtained". That topogenous bogs were also exploited by the people of Bakewell is indicated by the field names Great Bog and Little Bog, shown on poor-law-valuations and census returns of 1851-61 (Peak Park archive). These fields are located at the head of a valley side tributary, connected to Bakewell by a narrow lane known as Coombs Road; which was probably a peat gate originally.

There is documentary evidence to suggest that much of the peat on the limestone plateau was exploited early in the current millennium. The process probably started in Anglo-Saxon times, or even in the Romano-British Period. Pre-Norman exploitation of peat, or turf, is indicated by the village name Flagg, which derives from the Domesday *Flagun*, which may have been Old Norse for a "place where turfs were cut" (Cameron 1959; Spray 1989). That the local resource was already scarce by the thirteenth century is shown by the occurrence of disputes between neighbouring villages over rights of turbary. For instance, the commoners of Ashford, Monyash, Over Haddon, Sheldon, and Taddington, had regular conflicts over turbary on the intervening common land, resulting in the ransacking of turf piles between 1278 and 1290; these disputes continuing into the 16th century (Anderson & Shimwell 1981). By the mid-seventeenth century the settlements of Haslebache (probably now Hazlebadge Hall), Litton, Tideswell, and Wardlow are known to have paid turbary-money to obtain peat within the Forest of the Peak; significantly, in 1251, Tideswell was able to take turves from the forest without need for a license (Cox 1905).

5:2. SCOTLAND

Peat cutting has occurred widely in Scotland since prehistoric times, but due to the relatively low population, intense activity has been more localised than in England. Especially before the clearances, there seems to have been a considerable amount of dispersed piece-meal exploitation. There are numerous accounts of domestic peat cutting in lowland areas of the Hebrides and exploitation of the raised mires. The following concentrates on the high level peat cutting, in the North West Highlands, Grampians, and Southern Uplands; although in Scotland, the climate ensures that the distinction between upland and lowland is indistinct.

In the Highland Region there are localised deposits of topogenous peat. As a result peat cutting has also been localised and relatively low level, although there has been considerable exploitation of the resource within the surrounding lowlands, particularly on raised mires. There are many references to peat cutting in the 'Highlands' but most give no indication as to whether the peat was cut in the valleys or on the mountains. Furthermore, in some areas references to peat cutting including the word hill have to be treated with caution, since a 'hill' may refer to a gentle slope, a peat bog, or a place where peats are cut, rather than an upland mass (see Glossary). However, the wording of some accounts indicate that true hill peat was being exploited; for instance in Argyll, "Up in the hills lay the communal peat-banks and the summer pastures" (Campbell 1977). Field evidence of high level peat cutting can be found, for example on the mountains of the Knoydart estate in the north-western highlands; one site there, on the Druim Righeanaich ridge, at c.300m, is located just over 1km from a ruined settlement in the valley below. The relatively large population of central Scotland heavily exploited the raised bogs and probably also middle level blanket mires, but there has been a tradition of hill-top peat cutting in the sparsely populated Southern Uplands, for example around the relatively more frequent settlements of the Borders Region (Kay pers. comm.).

Peat was probably utilised mainly for domestic heating and cooking in the mountains, but highland-smiths have used peat charcoal as fuel up to recent times (Tylecote 1981), and peat was exploited increasingly for lime making during the eighteenth century, and experimentally in iron smelting (O'Dell & Walton 1962). All these industries would have been more intensive in the valleys between the mountains, using moss-peat; but localised iron smithing and land improvement no doubt also took place at higher levels.

Turf may have been more generally exploited in the Scottish mountains than peat, because of its widespread availability. Its potential as a fuel, building material, and as a source of ash for land improvement, would have made it an especially important resource to those highlanders existing at subsistence levels. Boundaries and enclosures were usually earth-made; while most pre-eighteenth century houses were turf built (O'Dell & Walton 1962). Shieling huts, which were occupied during the summer, by people tending stock on hill pastures, were constructed from poles covered by sods (Smout 1971); much like the charcoal burners huts used in the woodlands around Sheffield and elsewhere. So called bruntlands, on the valley slopes, were areas of usually topogenous peaty soil, where the turf was heaped and burnt to produce ash for planting cereal crops (O'Dell & Walton 1962).

According to Coupar *et al.* (1997), in Scotland as a whole, a total of c.53,000 ha of land has been directly modified by either domestic or industrial peat cutting. This would amount to only 5% of the total area of blanket mire and 'intermediate' peatlands stated to occur in Scotland by the same authors. Since they also state that most cut over areas are located adjacent to roads, it seems unlikely that upland peat cuttings have been included in this estimate, which will be seriously low.

5:3. THE CUMBRIAN MOUNTAINS

Although similar topography, has ensured that peat development and its subsequent exploitation, in the Cumbrian Mountains and Scottish Highlands show commonalities, peat cutting only became important in the former area during the Post-Medieval Period. Woodland is still very extensive there and has been an important and long-standing fuel. However, from the 16th century, the woodland resource was largely used in the production of charcoal for industry; so peat became the main domestic fuel, until the late 18th centuries, when road improvements made coal more generally available (Bevan 1990).

In Great Langdale, the archaeology of hill-top peat cutting is well preserved, with sledways leading up the valley sides from the settlement sites, peat huts, and peat cutting scars. However, only a few peat cutting scars have been found, these on land above 390m (Bevan *et al.* 1990). The majority of peat extracted from hill tops in the Cumbrian Mountains was probably utilised for domestic purposes. Some peat was used by the local industries, but may have mainly come from valley bottom bogs. It was for instance, exploited for use in the copper smelting industry during the latter part of the sixteenth century (Donald 1994) and the 18th century Leighton Furnace used peat fuel for iron smelting (Ayre 1984). As in Scotland, turf may have had a wider application; used as fuel, building material, and burnt to produce ash fertiliser. The likely long exploitation of turf as a building material is indicated by the conical huts made of poles and turf, which were used by charcoal burners operating in the woodlands of the Lake District, up to the start of the current century (Bragg 1990).

5:4. THE PENNINES

5:4:1. Yorkshire Dales

There is a very long history of peat and turf cutting in the Yorkshire Dales, as these resources have been the main fuel used in the area for centuries; even when local coal was being dug. Rights of turbary are mentioned in monastic grants of the twelfth century and commonly in deeds of property. The peat has been used for domestic purposes, as well as for smelting lead, hooping, and for fuelling lime kilns; with domestic usage persisting up to World War 2, at isolated dale head settlements (Hartley & Ingilby 1985).

Peat seems to have been the basic domestic fuel of the Yorkshire Dales for at least eight centuries, and so considerable quantities must have been consumed for that purpose. It is also likely that significant amounts would have been used as ash fertiliser in the extensively improved valleys. However, from the late sixteenth century well into the nineteenth century, peat was the major fuel used in ore-hearth lead-smelting; which was the most important local industry, with over eighty mills documented (White 1997). The volumes of peat used by this industry, over the approximate three hundred year period that it was in place, is difficult to assess, but must have been vast. Hartley & Ingilby (1985), for instance, state that, "Enormous quantities were cut for the smelting mills". However, not all the mills were as large and some may not have been in operation for very long, but collectively the amount used must have been considerable. The huge quantities of peat fuel required for this purpose can be demonstrated by reference to, the Old Gang Lead Smelting Mill, which in 1810 employed 111 people in procuring peat (Hartley & Ingilby 1985). The peat was stored in a purpose-built heather-thatched peat store 119m in length (Fig. 4.8.), which was supposed to hold three years supply (White 1997).

Extensive evidence of peat cutting can be found on the ridge directly above the remains of the Old Gang mill site (Fig. 4.7.). The name of the moor, Surrender Moss, and the orientation of access tracks, suggest that these peat workings are actually linked with the Surrender Lead Smelting Mill, further down the Valley. Slopes apparently stripped of their peat cover, perhaps for domestic consumption, can be seen just over 2km to the east, on Turf Moor (Fig. 5.19.); which appears to be the peat cutting grounds of the settlements of Langthwaite and Arkle Town in Arkengarthdale, so the source of the peat for the Old Gang Mill remains to be identified.

There is also extensive place-name evidence of the use of peat fuel in the Yorkshire Dales; upland areas with the elements moss or moor, frequently have a second name associating them with settlements in the valleys; while firmer links are provided by, for instance, Swaledale place-names such as Hurst Peat Moor, Peat Moor Rigg, Peat Gate

Head, Peat Moor Green, Ash Pot Holes, Turf Moor, Turf Moor Hush, and Sod Hole Gill. The name Ash Pot Holes, seems to indicate the specific digging of peat for use as fertiliser; which may be linked to the creation of isolated moorland enclosure, c.1km to the north. The name Sod Hole Gill appears to allude to the use of growing turf, which has been employed locally in traditional roofing work; for instance, an example of a sod-ridged house survived in the Dales into the late 1930s (Hartley & Ingilby 1985).

5:4:2. South Pennines

As a result of extensive settlement, much of which has ancient origins, the South Pennines have been particularly heavily exploited for their natural fuel reserves. There has been widespread and large-scale exploitation of the peat resource; but wood charcoal has also been an important fuel in places such as Sheffield where numerous ancient, semi-natural woods still survive. Coal, extensively mined in the surrounding lowlands, became the main fuel over much of the area with the development of the road and rail network. Coal has been dug locally throughout the South Pennines since at least Late Medieval times, but peat and turf appear to have been major domestic fuels for many areas until the nineteenth century.

Peat cutting in the highest and more sparsely populated, southern part of the South Pennines, the Peak District, has been described in detail above. The level of peat exploitation in the northern part of the South Pennines is not known, but is likely to be at least as great as in the Peak District, because there is much surrounding long-standing settlement. Indeed, large-scale opencast peat cuttings have been identified immediately north of the Peak District around the towns of Marsden and Meltham, while there are many place-names which indicate peat cutting was a widespread and significant landuse (Ardron *et. al.* 1998).

5:5 NORTH YORK MOORS

Both peat and turf have been widely utilised on the North York Moors, depending on the proximity of the resources to individual settlements. Up to the present century the majority of houses in the valleys burnt turf or peat exclusively and many have access tracks and hollow-ways leading to the hill top workings. Peat deposits appear to have varied considerably, but one worked-out cutting, on Peat Bog Moor, off the Scarborough to Whitby Road, was about 6.5m deep. It is known that specific peat-roads occurred, and that some people travelled several miles to sources of peat (Hartley & Ingilby 1972).The present day distribution of minor roads, which incorporates a number of blind-ending routeways extending onto the higher ground, particularly from the valley of the Yorkshire Derwent, in the south, reflects this landuse.

There appears to have been a localised tradition of surface stripping of peat on the North York Moors, whereby the peat was cut with its covering vegetation, using a cock-spade which was pushed along in front of the body. Photographs taken this century suggest, that this activity took place on deposits of peat more than a single turf depth, and that the procedure was repeated periodically. While most of the peat and turf cut on the North York Moors appears to have been used for domestic fuel, buildings made of growing turf have a long history; indeed, one primitive shelter with sod walls could still be seen in Ryedale around 1900.

Although peat or turf cutting appear to have had a major impact on the landscape of the North York Moors, the area's peatlands have also been significantly degraded by drainage for land improvement. Byland Abbey was constructed on land drained by the monks during the twelfth century. This was documented by the chronicler of Byland in about 1200, with the statement, "and by long and broad ditches to draw off much water from the swamps so that eventually solid ground appeared" (Spratt & Harrison 1989). Some small-scale, domestic peat cutting still occurs in the area, with perhaps two to three active peat cutters (Rotherham pers. comm.).

5:6. ISLE OF MAN

Here the population has traditionally made use of a mixture of fuels, including peat, ling, gorse, driftwood, "or anything else that would burn". However, "most houses used turf in the (18)80's", even though some settlements close to ports found it easier to use imported coal (McArdle 1992). When peat was used, it appears that the hill deposits were favoured over those in the boggy lowland Curraghs. This preference is indicated by a statement which shows that there was kudos in obtaining turves from the hills: "The men who were going to Snaefell felt they were head and shoulders above those who went only to the Curraghs" (McArdle 1992). Snaefell, and the nearby Beinn y Phott, still hold peat at least 3m in depth (Garrad 1972). Beinn y Phott is Manx for "Mount of the turbary" (Stenning 1978). Both these mountains were clearly important peat cutting sites for the north and central part of the island; even though there has not been complete overcutting. The lower southern hills, with relatively thinner peat deposits, appear to have been more generally cut over. Accounts from a manorial inquiry in about 1826-7 show that over 4,000 acres (1618 ha) were affected; the turf was designated domestic fuel, but it was claimed that "excessively large fires were maintained", in order to produce the basic fertiliser of garden plots (Garrad 1972).

On the Isle of Man, peat appears to have been mainly used for domestic fuel; even though ash fertiliser was produced as a by-product. Turf was used, along with stone and soil, to build Manx-hedges, up to at least 1763; and set under the thatch of traditional roofs (Garrad 1972). Because, on the Isle of Man, the word turf can apply to cut peat, it is unclear whether growing sod or peat was employed for these purposes; both may have been used. However, the place name Castleward, derived from Cashtal-ny waaid, "the sod castle" (Stenning 1978), implies that growing turf has had at least limited building usage on the island.

5:7. WALES

There has been widespread peat exploitation in the upland regions of Wales, mainly for domestic fuel, but also for building purposes. Topogenous and valley bottom peat were generally exploited in the mountains of the north, but in the hills of mid-Wales, in the Black Mountains and Brecon Beacons, there was considerable overcutting of blanket mires. In these areas the hill-top peat workings can usually be identified by the presence of well-defined access trackways linking the high ground with the settlements.

5:7:1. Mid-Wales

Blanket peat has been extensively cut for domestic fuel on the hill tops of mid-Wales. This exploitation took place until coal from South Wales became available by train (Slater 1990). The centuries old tradition of this activity and its social significance has been recognised (McBride 1987; Clark undated), but not its impact on the landscape. However, the cuttings are often difficult to identify because there has typically been surface working of deep peat deposits, rather than opencast exploitation down to mineral soil. In those areas where deeper peat has been extracted, the abrupt cutting faces, appear to have been badly Affected by erosion, which has disguised their anthropogenic origins. Furthermore, most peat cuttings have been disguised by tussocky *Molinia* grassland, which in this region readily dominates any high ground, overcut, or uncut (Figs 3.3. & 3.4.).

The widespread exploitation of hill peat in mid-Wales is clearly shown by the many disused access trackways. These occur, for instance in the Elan Valley, running up onto the high ground from almost every occupied and abandoned valley bottom farmstead. Extensive ridge-top cuttings can be seen for example on Esgair Celliog (Figs 3.3. & 3.4.) and Clawdd-du-bach (Chapter 8); while peat diggings, sledding tracks and drying platforms have been identified on Copa Hill in the nearby Ystwith Valley (Timberlake 1993). Although peat cutting appears to be now extinct in the hills of mid-Wales, it was still taking place in the Elan Valley about eighteen years ago; when the residents of the farmstead The Clyn (SN 934633) cut topogenous peat, at SN 936634, c.380m OD. Furthermore, valley bottom mires located in the same tributary were exploited c.40 years ago at Talwrn (SN 945639) and c.80 years ago at Cnwch (SN 932644), (Edwards pers. comm.).

5:8. SOUTH WESTERN MOORS

The history of peat cutting on the South Western moorlands of England is relatively well known. This is probably because it was a widespread activity there within living memory, and for centuries peat was the only abundantly available fuel source. There was no locally mined coal and the poor infrastructure ensured that it could not be widely distributed in the area, from the remote coalfields.

5:8:3. Dartmoor

Historically, "Peat took the place of coal on Dartmoor" (Booker 1970). Indeed, until the 1930s, peat and turf were still the cheapest forms of domestic fuel. Deep blanket peat deposits have been exploited on the high moors, but thin deposits have been extensively removed as slabs of turf, or so-called vags, particularly on upland commons (Harvey & St. Leger-Gordon 1962). The early exploitation of peat is well documented, because it was the fuel of the tinners, from at least the thirteenth century. In 1222, Henry 3rd gave the tinners unreserved rights to take peat from the moor (Harris 1968). In the last two centuries, peat has been used in a number of experimental industries on Dartmoor, most notably as a source of naptha (Gant 1978; Harris 1968).

The impact of peat cutting on the Dartmoor landscape has been partly recognised; Booker describes the legacy of the peat cutter thus, "he has left his mark as surely as the tinner, seaming the ground with pits and trenches often twenty feet deep" and, "particularly around Okement Hill, Hangingstone Hill, Wild Tor and Quintin's Man, where the moor has been lowered several feet through centuries of peat cutting. Harris, states that peat cutting scars are, "met with all over the moor" and, "the tinners of Medieval times must have been responsible for the stripping of peat from considerable areas". Groves (1970), as well as Harvey and St. Leger-Gordon, describe the significance of many peat-getting trackways in the moorland landscape.

5:8:2. Bodmin Moor

Unlike Dartmoor, there are only vestiges of blanket peat remaining on Bodmin Moor; most of the moor, including the highest ground, appears to have been totally cut over. There are some deposits of topogonous peat left, but most of these have been severely degraded by the cutting (Fig. 5.20.). Peat and turf cutting is still carried out in a few isolated situations, although on a very small-scale. The extent of the over-cutting on Bodmin Moor is clearly demonstrated by a widespread absence of thick blanket peat on land where conditions should have allowed its formation (Chapter 1); scattered peat drying platforms on peat-free areas, for instance on Minions Moor (Stanier 1996); and traces of peat cutting. Recently, a comprehensive archaeological survey of Bodmin Moor was completed, which identified many peat cutting features, in particular widespread peat drying platforms (Herring in press).

The blanket mire resource of Bodmin Moor appears to have been exhausted as a result of many centuries of domestic exploitation and unlimited use by tinners who even transported peat from Dartmoor to Cornwall (Booker 1970). Even though the majority of upland farms in Cornwall possessed rights of turbary, coal seems to have become widely used from an earlier date than on Dartmoor. This may have been through necessity, as the peat resource declined, and because the less severe landscape allowed coal to be transported more freely. The general change from peat to coal fuel can be correlated with the

Fig. 5.19. Turf Moor , in the Yorkshire Dales; probably the former peat cutting grounds of the settlements of Langthwaite and Arkle Town in Arkengarthdale. This area, where peat cutting is evidenced by place-name , appears to have been extensively overcut, although there are few archaeological features on site that are clearly related to the activity. The circle of *Juncus* (arrowed), with faint track leading to it, could be a peat drying/stacking platform.

Fig. 5.20. Overcut and highly degraded, topogenous mire, at the base of Rough Tor, Bodmin Moor. There is a badly eroded, minor, peat cutting face in the foreground (arrowed).

introduction of the coal-fired cooking range in the fifty year period prior to the 1930s (Hamilton-Jenkin 1932).

5:9. OTHER RESOURCES

5:9:1. Peat and turf in woodlands

There is evidence of extensive cutting of organic deposits in ancient, semi-natural woodlands, including thin peat and turf from the general wood floor, and deeper peat in topogonous mires. This evidence includes, cutting marks found within peaty deposits (Fig. 5.21.); a lack of, general thinness, and truncation of soil profiles; patterns of dried out drainage ditches; old stands of alders in uncharacteristically dry areas; and pockets of colonising *Sphagnum*. All these features can be found in ancient, semi-natural woods around Sheffield and the Peak District.

Ecclesall Woods, covering 150ha within the suburbs of Sheffield, appears to have been heavily exploited by the charcoal industry for its organic soil resource (Rotherham & Doram 1990). It contains the remains of about three hundred charcoal hearths and has little or no soil on its generally level woodland floor. A wetter, boggier, past is indicated by the presence of eight species of *Sphagnum* (Ardron 1997b), many redundant drainage ditches, and several drained topogenous bogs. Another woodland area, Peat Pits, by Peat Pits Brook, near Matlock, was, by inference, a site of former peat cutting; but there are no longer any peat deposits to be found, just an area of wet woodland, with a small, localised stand of ancient alder stools. At Seckar Wood, near Wakefield, there is clear field evidence of the exploitation of deep valley mire within an area of long-standing woodland, including remnants of dried-out peat over one metre deep and an abrupt cutting bank preserved under regrown *Sphagnum* (Fig. 5.22.).

The early exploitation of organic deposits and repeated stripping of any re-forming peat would have been likely in many wet woods, because they had easier access and were closer to centres of settlement and industry than were the high moors. The charcoal industry appears to have been responsible for much stripping of turf in ancient woodlands in Sheffield (Rotherham & Doram 1990), and probably elsewhere. However, the turf and peat would not only have been exploited by charcoal burners; it would also have been used by the general populace, for domestic fuel, agriculture and building purposes, and so on.

5:9:2. Peat and turf on heaths and commons.

Heaths and commons, both in the lowlands and uplands, have been extensively exploited for peat and turf over the centuries; generally by the poor, for domestic consumption. Indeed, the commons were by definition, unimproved lands where all the local people could graze stock and obtain natural resources for subsistence. Peat and turf cutting, as well as the gathering of other types of fuel, have been thought responsible for the maintenance of the open

Fig. 5.21. Spade marks in vestigial organic soils, Rollestone Wood, Gleadless Valley, Sheffield. The evidence of de-turfing seen here, is a relict of extensive turf cutting, which appears to have taken place in the ancient, semi-natural woods around Sheffield.

Fig. 5.22. Remnant of a peat cut valley bottom bog, Seckar Wood, near Wakefield. Here a one metre deep and abrupt cutting bank is preserved under regrown *Sphagnum*. Isolated and dried out peat deposits, of similar thickness, occur nearby.

vegetation of heathland (Webb 1986); this would of course require repeated exploitation of the resources. In the South Pennines, the surviving commons (44 according to a recent survey by the Rural Surveys Research Unit), are generally found on areas of middle level moorland and heath, immediately above the conurbations. Many others occurred at lower level and have subsequently been engulfed by settlement or agricultural improvement. For example, Scurfield's mapping of seventeenth century Sheffield (1986), shows that a number are now incorporated within the city; including Attercliffe Common, which is located in the industrial east.

Particularly on the east side of the South Pennines, where there is a relatively gradual fall from high plateau, through foothills, to lowland plain, then moorlands, heaths and commons can be indistinguishable. At least around Sheffield, historical accounts of land-use, show that moorland was synonymous with 'waste'; and heaths, commons, and greens, could also occur on the same land. Indeed, moorlands extended into the valley bottoms (Sheffield Moor was located near the present day city centre) and commons and 'greens' onto the ridges above. The 'greens' formed within rings of dispersed settlements when moorlands, 'wastes', and commons were gradually reduced by piecemeal encroachment (Hey 1991). The encroachment would have resulted from a combination of the gradual attrition of deeper peat deposits, turf cutting, and paring and burning. This means that the extent of peat, or turf cutting remains unclear. However, there is sufficient documentary evidence to indicate that these activities occurred widely on the lowland heaths, commons, moors, and wastes around Sheffield (see 5:1:6.).

That peat and turf cutting occurred extensively at all altitudes is also indicated by the widespread tendency of poorly-drained land to revert to peatland. This is demonstrated by the *Sphagnum* colonisation which is taking place at a variety of secondary, lowland sites on the eastern side of the South Pennines; in spite of continuing atmospheric pollution. For instance, there are nine taxa growing on demolition spoil at Holbrook, a former colliery site, on the east side of Sheffield; three on railway ballast at Rowsley Sidings, in the Derwent Valley north of Matlock; and eleven at Seckar Wood, on an area of restored open-cast coal mining. Additionally, *Sphagnum* continues to thrive on a number of areas of relict rough land within the valleys of Sheffield; for example, on Rivelin Hagg, which is valley-side heath, eight taxa of *Sphagnum* have been recorded; on Loxley Common there are four types; at Shirebrook three; and at Carbrook seven (Table. 5.2.).

5:9:3. *Sphagnum* moss

The high-level, blanket mires were the centres of a bog-moss industry in upland areas like the Peak District, and over time, this may have affected much of the mire surface. *Sphagnum* moss was used as insulation under grey-slate (Glossary) roofs and probably also within wall cavities. In the Peak District, many of the highest moors are called moss, a name which in that area may allude to the bog-moss gathering activity. Accounts testify to an industry that was very large and long-lasting; these include comments in various Hallamshire Court Rolls of the fifteenth century, which record the use of *Sphagnum* for packing roofs in the Sheffield area (Thomas 1924). The effect of centuries of *Sphagnum* moss gathering on the environment and its plant communities is unknown.

Table 5.2. The sphagna of former industrial and relict sites in the south-east Pennines

	H	RS	SW	RH	LC	S	C
S. palustre	R/O	-	O	O/LA	-	R	R
S. papillosum	R/O	-	O	-	-	-	VLA
S. subnitens	A	-	F/A	R	-	R	R
S. c. capillifolium	R	R/LF	R	-	-	-	O/F
S. c. rubellum	LO	-	F	-	-	-	-
S. russowi	-	-	LF	-	-	-	-
S. girgensohnii	-	-	LF	VLF	-	-	-
S. fimbriatum	F?LA	R/LO	F	O/LA	O/LA	F/LA	O/F
S. squarrosum	O/F	R	R	R	-	-	R
S. s. inundatum	-	-	R	VLF	-	-	-
S. auriculatum	-	-	-	O/LF	R/O	-	-
S. cuspidatum	VLF	-	-	-	R		
S. flexuosum	-	-	-	R	-	-	-
S. recurvum	R/O	-	O/F	O	O/LA	-	R/O

H- Holbrook **RS**- Rowsley Sidings **SW**- Seckar Wood **RH**- Rivelin Hagg **LC**- Loxley Common **S**- Shirebrook **C**- Carbrook.

CHAPTER 6

PEAT CUTTINGS IN THE UPPER DERWENT VALLEY

PEAT CUTTINGS IN THE UPPER DERWENT VALLEY

The following is a catalogue of the peat cuttings identified in the Upper Derwent (Fig. 5.2.). Their approximate size in hectares, suggested volumes of peat removed in cubic metres, and six-figure grid references (marking the approximate centre of the cuttings), are listed in Table 5.1. The peat cuttings and their extent have been identified by the criteria outlined in Chapters 1 and 2.

6:1. THE LANDS

A possible peat-cutting, indicated by an abrupt and unexpected peat bank, located on a middle level area of moorland called The Lands. The bank is approximately 0.75m high and runs along the line of a shelf with 5-10% slopes, lying between the upper reaches of the Derwent River and its northern watershed; it divides a generally peat free area of at least 12ha from intact blanket mire, on ground where a uniform covering of deep peat would be expected. Over 90,000 cubic metres of peat appear to be missing from this ridge, which is vegetated by *Calluna* on the largely peat free ground and by *Calluna* and *Eriophorum* on the remaining blanket bog. The area of peat free ground, although now generally thickly vegetated, is crossed by many minor gullies, which indicate that it has been subject to past erosion. By comparison, the largely unvegetated peat bank is almost vertical, and still eroding to a degree. These episodes of erosion have clearly greatly modified the form of both the peat face and the open ground surface, and may have removed any traces of other peat cutting archaeology that may have occurred there.

Since no obvious associated peat-cutting archaeology was located during field survey of the site, the peat bank is only tentatively identified here as a peat cutting face. Identification is largely based on the occurrence of the large area of peat loss and the affected ridges sheltered nature. The bank could be interpreted as an erosion feature, but such mass-wasting of peat generally only occurs in very exposed locations, mainly in the north-west of the Peak District.

The intact, blanket peat deposits of The Lands are cut by an extensive system of drains of herring-bone form, which probably post-dates the formation of the peat face and are most likely Victorian; these are clearly visible on some aerial photographs (notably the 1995 R.A.F. sequence), but are indistinct in the field. An un-metalled track which runs along the eastern side of the River Derwent serves a line of grouse-shooting butts constructed by Lands Clough, which forms the north-western boundary of the site. This track becomes indistinct where it runs up slope toward the butts, but in overview can be seen to braid out to some extent over the north-western section of the moor. Some of the branches do not show clear relationships to the line of butts and may therefore have earlier origins, possibly as former peat cutting access trackways?

The place-name The Lands is intriguing and may be interpreted as further evidence for a peat-cutting land-use of the area, since in Old English the word land can signify a division of a strip within an open field system (Field 1989). Clearly this area would not have been cultivated in the Saxon Period, even if the peat cover was first removed, since podsolization would already have affected the soils. Unsurprisingly, there is no evidence of strip cultivation on the peat-free ground, so the implied division may have related to units within an area of peat cutting.

6:2. LITTLE MOOR

A ill-defined area of peat-cutting, located on a middle level moorland shelf or ridge called Little Moor. The interpretation of this area as a site of peat exploitation is largely based on the presence of a disturbed area of blanket bog associated with an indistinct zig-zag access trackway. Most of the surface of the ridge (c.25ha) retains traces of blanket peat, ranging from 8-36cm in depth. The covering vegetation mosaic of *Calluna, Eriophorum* and *Nardus* stands appear randomly arranged in the field, but on aerial photographs show linear features, which may 'fossilise' divisions of peat cutting or other features of peat cutting archaeology. Calculations of the volume of peat removed from all the middle level sites on the east side of the Upper Derwent Valley are difficult because there is so little intact blanket mire as reference; but deposits of c.0.5m do occur in a few places which have similar topographical characteristics to that of Little Moor. Therefore, since there is now a mean depth of about 25cm depth, it seems likely that at least as much has been removed from the area. This would give a total volume of c.62,000 cubic metres removed. The peat workings on Little Moor may be of considerable antiquity and associated with two other degraded peat cuttings located on the top of nearby Mosley Bank (see 6:76. and 6:77.).

6:3. CUT GATE

This is a section of a currently used routeway, where the track cuts through deep blanket peat down to the mineral soil surface. This feature is reminiscent of a number of broad boundary trenches/ linear peat cuttings found in the Upper Derwent area and may have developed similarly after piece-meal, peat cutting occurred along an ancient boundary feature. Its usage as a track may have come later, but in the case of this particular feature it is perhaps more likely that the cut developed along the line of a previously existing ancient routeway. This conclusion is based on the fact that the track traces the watershed of the Little Don and Ewden rivers between the Don and Derwent Valleys; in so doing taking in the least dissected route between these two major valleys.

The route was present in 1571, when it was called Cart Gate (Dodd & Dodd 1980), but may have much earlier origins. At the northern end of the trench the track runs along Mickleden Edge, an escarpment which has been utilised by people since the end of the last glaciation, c.12,000 years BP; evidenced by the presence of a group of five Early Mesolithic flint sites (Radley & Marshall 1995).

The peat within the feature may have been dug to aid transport across the plateau and taken away by those responsible for upkeep of the track. Since the trench occurs wholly in Yorkshire and the name Cut Gate End occurs at the west end of the feature then it is probable that maintenance of the route was the responsibility of the inhabitants of settlements to the east, within the upper Don Valley.

6:4. LONG EDGE, NORTH

Here, a line of angular recesses, within shallow *Molinia* vegetated blanket mire, defines the upper limit of a ridge top area where there is little peat. These features appear to represent an abandoned line of peat cutting. Other archaeology supporting this interpretation includes a minor zigzag terraced pathway leading up to the area from the west side and possible continuations of this on the ridge top, which are visible on aerial photographs. The zigzag track appears to be associated with a lead smelting site at Cold Side.

6:5. LONG EDGE

A probable series of minor peat pits, penetrating shallow *Molinia* covered blanket mire, and defined by angular patches of more or less peat free ground. These features may have associations with the nearby peat working on Cow Hey (6:6.)

6:6. COW HEY, EAST

A ridge-top peat working, which is defined by an abrupt 0.5m high bank of peat, running across the line of the Cow Hey ridge (Fig. 6.1. & 6.2.). At its south-east end the line of the feature turns south-westerly and becomes very indistinct in the form of a low linear step or terrace, before merging with the upper end of a branched access hollow-way. The area of the ridge to the south-west of the feature has been peat-stripped down to mineral soil. Well-defined access sledways running up to the area from the south, link it with the former Howden Farm settlement. This was already in existence by 1767 (Harley *et al.* 1975), but is now submerged under the Howden Reservoir. This farmstead had a "peate house of 2 bayes" at the time of Harrison's survey for the 2nd Earl of Arundel and Surrey in 1637 (Bevan 1998; Scurfield in press).

The antiquity of the peat cutting is also evidenced by its name, which links it with the Royal Forest of the Peak. The element Hey derives from *heye*, which is a Middle English form of the Anglo-Saxon *heg* ; either meaning "an enclosed place", or "a locality known by defined bounds, but not enclosed"; forests were typically divided into hays for administrative purposes (Duignan 1902; Glossary). The Peak Forest was established in 1068, but disafforested in 1674 (Bevan 1998).

Fig. 6.1. View along the peat cutting face on Cow Hey (East), Upper Derwent, where the end of the feature has been degraded by recent experimental mowing under a M.A.F.F. sponsored scheme. The photograph illustrates the potential detrimental impact of certain kinds of moorland management on the 'non-structural' archaeology of peat cutting.

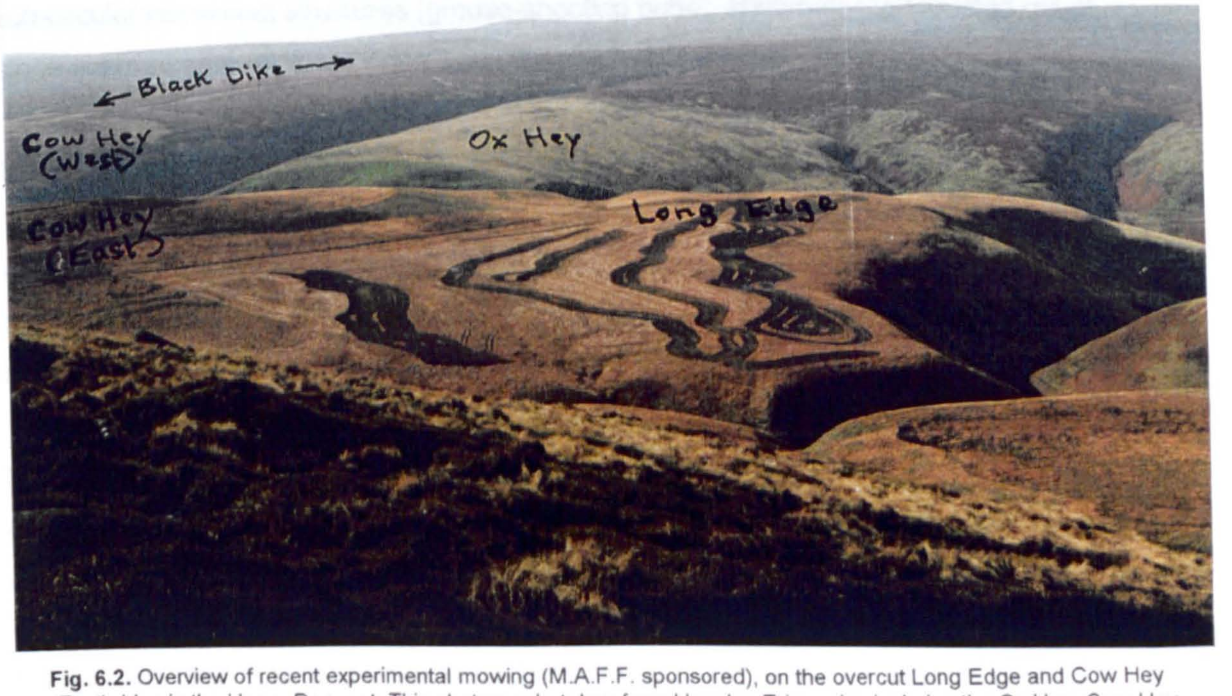


Fig. 6.2. Overview of recent experimental mowing (M.A.F.F. sponsored), on the overcut Long Edge and Cow Hey (East) ridge in the Upper Derwent. This photograph, taken from Howden Edge, also includes the Ox Hey, Cow Hey (West), and Black Dike peat cuttings (annotated).

Although the mineral soil on the end of the ridge has been colonised by the typical *Nardus* dominated vegetation of overcut areas, the remaining peat has reverted to *Molinia.* As a result of this dominance of unpalatable grassland, during the last few years, the whole ridge has been subject to experimental improvement under a Ministry of Agriculture Fisheries and Food sponsored scheme. This has involved extensive mowing, in order to degrade the tussocky growth of the *Molinia* and *Nardus*; with the intention of encouraging the spread of palatable vegetation. Figures 6.1. & 6.2. highlight the potential impact of this type of work on peat cutting archaeology within the uplands (Also see Figs 11.1 & 11.2.).

6:7. NETHER HEY

This is a probably extensively overcut ridge top, where peat cutting is indicated by an absence of deep peat on topography suitable for its formation. Peat is almost completely missing from the end of the ridge where well-formed sledways run up to the area from abandoned settlement sites in the valley bottom. Those from the south link it with the former Abbey Grange settlement, which may be of Premonstratensian monastic origins and dates from the end of the twelfth century (Bevan 1995). Another sledway from the north, implies associations with Howden Farm. Both these settlement sites had peat houses at the time of Harrison's survey of 1637 (Scurfield in press).

6:8. WET STONES

A small but well-defined, angular peat cutting is located on the edge of the high plateau. The small scale of this feature and its extreme situation (occurring at an altitude of 530m OD and approximately two km from the settlements noted above), suggest that it represents a final phase of peat cutting up the Nether Hey ridge (6:7.). The feature encloses a small group of sub-circular stone-built structures (grouse-shooting butts), apparently constructed out of stone quarried from strata exposed when the peat was removed.

6:9. HOWDEN DEAN PITS

This site consists of a row of sub-circular grouse-butt construction-pits cut into the edge of an area of blanket mire (see 7:1:15.). The pits have diameters of 10m to 15m and show abrupt cut faces up to 0.5m in depth. The butts have been set centrally within the pits and have been constructed out of the excavated peat (Fig. 7.1.).

6:10. BAMFORD HOUSE

An apparently extensively overcut ridge top; where large-scale peat removal is evidenced by an absence of deep peat on appropriate topography. An extensive series of access sledways and a small number of minor cutting scars in the relatively shallow blanket peat still to be found on the area, provide further evidence for widespread peat cutting. Probable peat cutting scars occur at SK 176915 and SK 179909; while a group of isolated linear patches of thin peat, at SK 178912, are remnants of blanket mire left after cutting has occurred up the slope to the ridge. Access sledways which run up to the ridge from the north-west link it with the Abbey Grange site, while others from the south-west appear to show an association with Shireowlers (mentioned in 1627; Cameron 1959). A branching hollow-way also leads up from Bamford House (present in 1767; Harley *et. al.* 1975) and another from Hancock House (present in 1618; Cameron 1959).

6:11. PIKE LOW

Another apparently overcut ridge top, where extensive peat cutting is suggested by an absence of deep peat. The presence of a number of access sledways and minor cutting scars in the relatively shallow blanket mire found on this area (SK 179902, 181902, 182902, 178900, 180901, 181900, 182898, 183902, 183904, 183905, and 184904), provide additional evidence for widespread peat exploitation. An isolated linear mound of peat 0.5 m high, with abruptly angular linear banks (SK 181898), appears to be a baulk left after the assumed removal of deeper peat thought to previously cover the Pike Low ridge. This ridge could have been exploited by a number of long-standing settlement sites located below it. However, well-defined sledways which run up from the south, link it with Derwent hamlet (which appears to have tenth century origins; Sidebottom 1996).

6:12. GREEN SITCHES

Here a probably, extensively, overcut, moorland shelf, where widespread exploitation is indicated by a general lack of deep peat. Other evidence of this peat cutting includes access sledways, shallow peat cutting scars, and parallel linear features visible on aerial photographs. A small, rectangular, cutting is recessed into blanket peat of about 0.5 metres depth at SK184911. The alignment of various tracks running up to Green Sitches from the south and south-west, suggest that the area was peat cut by Derwent hamlet and Hancock House.

6:13. GREYSTONES MOSS/ POYNTON BOG

Another moorland shelf, where extensive peat cutting is indicated by an absence of deep peat and the occurrence of access sledways and parallel linear features. This area could have been exploited by a number of settlements located on the eastern side of the Derwent Valley; including Abbey Grange, Shireowlers, Hancock House and Derwent.

6:14. JOHN FIELD HOWDEN

Further extensive overcutting appears to have taken place on this ridge top, which is also devoid of deep peat. The presence of an abandoned settlement on the edge of the ridge, access sledways leading up from other settlements located downslope, a small number of minor peat cutting scars (SK 189903, 190903, 191901, and 192901), and parallel linear features, provide further evidence for widespread peat exploitation. The alignment of various tracks running up to this ridge from the south suggest that it was exploited by the population of Derwent Hamlet. However, the former occupiers of an possible Medieval long-house found on the south edge of the ridge, may well have utilised peat in the area. Furthermore, a sub-rectangular enclosure defined by a bank and ditch, has been created on the ridge (giving rise to the name of the site), and would have required the clearance of any peat covering. These could have been burnt to produce ash fertiliser. Such activity may have resulted in the linear stripping visible today.

6:15. BRADFIELD GATE HEAD

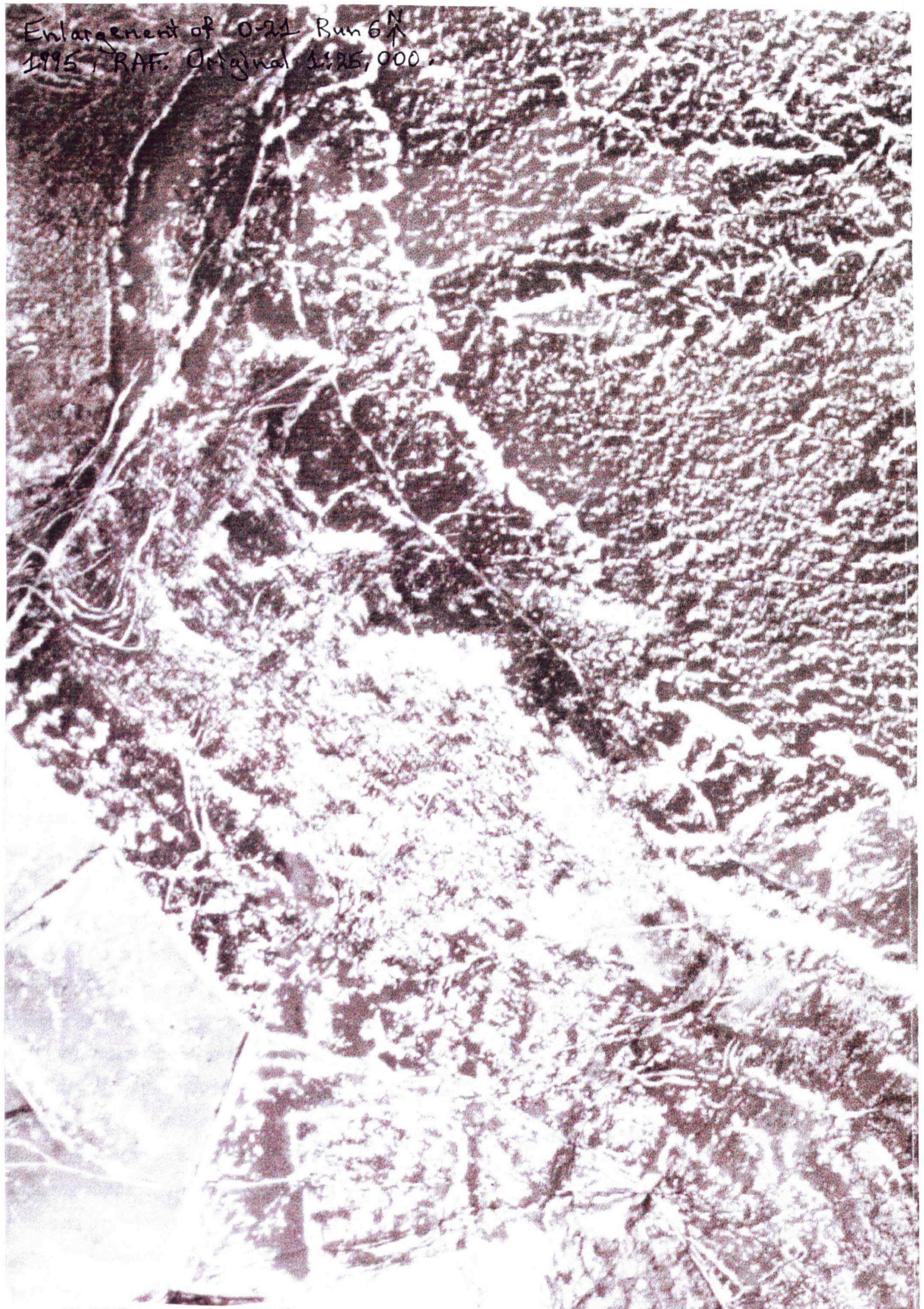
This is a possible area of peat cutting indicated by a sub-circular depression in the blanket mire surface, with fairly well-defined edges (Bevan 1994). If this feature is a peat cutting then it may be an exploratory test-pit marking an upper limit of exploitation by the residents of Derwent or the occupiers of the long-house on John Field Howden. However, the location of Bradfield Gate Head, c.250m to the south-east of this feature, suggests that any cutting may alternatively have been carried out by the people of Bradfield Parish which is located to the east of the Derwent Valley. The peat pit is open to its south side which would have allowed direct access from either John Field Howden or Bradfield Gate.

6:16. DERWENT EDGE

Here we find an extensive peat working face, cut along the fringe of the Derwent Moors blanket mire (Fig. 6.3.). The feature shows distinct angular recesses, angular pitting, peat baulks and many access routeways. The access routeways, comprising a number of braided hollow-ways, spread over Derwent Edge towards the peat workings from a west or south-west direction. These tracks link the site with Derwent Village and its satellite-settlements. The presence of dividing baulks clearly shows division of turbary, which is typical of exploitation by a nucleated settlement. These peat workings appear to have been the main turbary of the Derwent settlement (Ardron 1993; Ardron *et al.* 1995).

6:16:1. Derwent Edge trench cut

This site is indicated by an V-shaped trench cut through the edge of deep blanket peat deposits, the northern arm of which runs along the line of the Yorks./Derbys. County Constituency Boundary. Although the peat faces are rather ragged, bare and eroded, these features still show characteristics of linear peat cuts (7:1:8.). This feature is probably related to the main area of peat extraction on Derwent Edge and the drain described below.



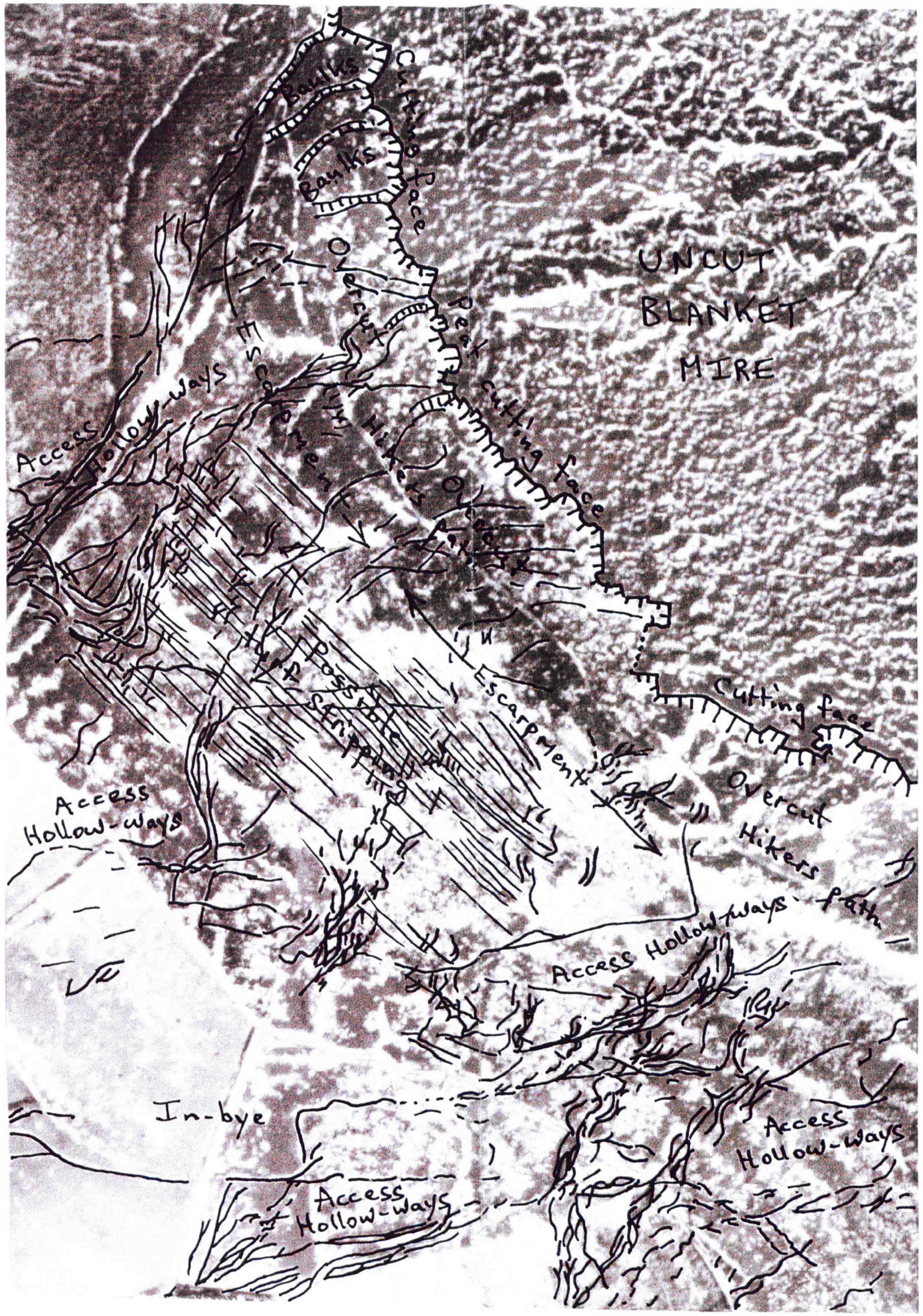


Fig. 6.3. Two copies of a section of an aerial photograph showing, extensive striations below Derwent Edge, thought to be the result of turf stripping. The right hand copy has been interpreted to highlight the possible turf stripping, edge-top peat cutting and access hollow-ways.

6:16:2. Derwent Edge drain

A broad drain cut through the edge of deep blanket mire, runs south-west to north-east, to join a gully draining the trench cut described above. This feature is a part infilled, linear peat cutting, where there may have been internal peat re-formation.

6:17. DERWENT MOORS

The evidence here is an abrupt peat bank, running more or less west to east across Derwent Moors. The ground below and to the south of the feature is virtually devoid of peat and has been extensively overcut. The alignment of the working suggests that it may have associations with braided hollow-ways which runs parallel with it c.300m to the south. There are many minor features of peat cutting archaeology located on the overcut ground between the working face and the hollow-ways; including indistinct tracks terminating at apparent loading-ramps and drying-steads, and even the remains of a turf-pile.

The hollow-way is likely a branch of an ancient common-way running between Derwent and Sheffield which is noted in a 14th century charter (Dodd & Dodd 1980). As previously mentioned, Derwent is a long-standing hamlet which appears to have tenth century origins (Sidebottom 1996), while Sheffield appears in the Domesday Book, where it was "said to have been inland in Hallam", a manor with sixteen outliers. The quantity of peat apparently removed from this area suggests exploitation over a considerable period of time. The common-way could have facilitated the transport of peat to either of the two settlements named above.

6:18. RISING CLOUGH

A series of abrupt cutting banks highlight the eastern extent of deep blanket peat on Derwent Moor. These features occur on the same alignment, but slightly to the west of three crudely manufactured stone posts; which have been set on overcut ground, across the bottom edge of the Moor. The peat banks and stone posts appear to collectively define the western limit of a former right of turbary. A similar arrangement of stone posts and cutting faces occur about 2.5km to the south east, on Hallam Moors, at the head of the Rivelin Valley (Fig. 7.21.; Chapter 7). However, the position of this particular peat cutting boundary is puzzling; curiously it now occurs several hundred metres within Derbyshire, to the west of the present-day boundary with Yorkshire. The actual utilization seems to have been by communities in Yorkshire not Derbyshire.

The division between Derbyshire and Yorkshire may have changed, but if it has, then the original position for this would likely follow the line of the Rising Clough watercourse. This traces a parallel alignment to the current county boundary, but still to the east of the row of posts. This implies that at the time of peat cutting there was legitimate incursion from South Yorkshire into Derbyshire for the purpose of peat-getting. This may have been possible, because collection of other natural resources has occurred in the opposite direction;

residents of Derwent, having been entitled in the 14th century to take herbage and foliage in the Rivelin Valley (Northend 1943).

These boundary anomalies, may be explained by passages in early eighteenth century documents in the Sheffield and Matlock archives. They state that "Part of Derwent commons/moorland was in dispute between the men of Bradfield and those of Hathersage" (Stroud 1996). Bradfield is the parish on the South Yorkshire side of the boundary and Hathersage the former manor which incorporated the Derwent Moors. The present parish of Hathersage is much smaller than the manor of the same name and has no common boundaries with Bradfield.

Indistinct baulks, visible at the northern end of the cutting (6:18:1.), indicate division of turbary and therefore possibly exploitation by a hamlet or village. The villages of Low and High Bradfield, and other settlements within Bradfield Parish, would quite likely have sought peat in this area. The gently sloping nature of the land to the east of the Clough, and the extent of the cutting faces would suggest that a considerable area of blanket peat had been exploited before the workings reached their final limit. The overcutting therefore extended from Bradfield Parish land to that of Hathersage. Bradfield appears to have been a significant consumer of peat till at least the seventeenth century, when tenements in the parish still had peat or turf houses (Scurfield 1986).

6:18:1. Rising Clough 1)

This consists of an area of overcutting defined by an abrupt bank of peat approximately one metre in height. This cutting shows similar angular recesses and parallel vegetation stripes (baulks) to many of the much larger, industrial-scale, peat workings found on the west side of the South Pennines and appears to be a peat working of some antiquity. There has been some degree of peat re-formation over the features. Downslope there is a series of indistinct sinuous furrows in the peat surface, which appears to be the vestiges of extraction tracks associated with the peat bank.

6:18:2. Rising Clough 2)

At this location, an abrupt peat cutting face traces the division between a narrow moorland shelf and rising ground to the west side. Peat has been stripped from the shelf, but not from the steeper ground above.

6:18:3. Rising Clough 3)

Here there is a series of sub-rectangular peat cutting trenches and angular recesses demarcating the exploitation of the blanket mire on a moorland shelf. Although badly eroded, some of these workings might be modern; even nineteenth/twentieth century in origin. In particular, the trench-like pits are small and of a type rare in the Peak District area, and similar to both those within the present-day Graveship of Holme, and those on the Buxton moors connected with Victorian peat-baths (Figs 4.9. & 4.10.). *n.b.*- the orientation of these cuttings, and those at Rising Clough a) and b), indicates that the peat was taken by the inhabitants of settlements lying to the north and east, probably within the upper Loxley Valley.

6:18:4. Rising Clough 4)

An overcut area with isolated peat remnants, is defined by an abrupt cutting face with angular recesses. Indistinct braided hollow-ways lead up to the peat face from the south-east side, possibly linking it with Moscar House [already in existence by 1830 (Fairbank 1830)], and located in a direct line, less than 1km away. Beyond the cutting face, there is a section of remaining blanket mire, forming a baulk, which apparently marks the northern limit of the cutting and the southern extent of extensive peat pitting on its northern side (6:18:3.)

6:19. MOSCAR TOP

This is an area of topogenous bog located between the watersheds of the Rivelin and Derwent Valleys, which shows evidence of various phases of peat cutting. There is a racket-shaped cutting and several minor open-fronted cuttings (see Chapter 7) associated with the Derwent watershed. These appear to have been utilised by settlements to the west; but the surface of the bog also shows evidence of cutting on its surface, possibly by settlements within the Rivelin Valley to the east. The earlier presence of a more extensive bog is shown, by the 1m plus deposit of peat recently exposed in a new drain, cut in the improved field on the north side of the site. The place-name Moscar, indicates that wooded mire with *Sphagnum* occurred in the vicinity (see Glossary); or alternatively "scrubby bog" (Spray 1989).

The site lies within Yorkshire, but the Derbyshire boundary forms its western limits. There are a number of indistinct access trackways leading downslope into the Derwent Valley and others which skirt the bog on its south-west side; but none of these can be linked to specific settlement sites in the area. However, there are a number of currently occupied farms and other settlements close by, both on the Rivelin and Derwent sides of the mire. Those on the Derwent side include Moscar House, and Moscar Lodge [which was present by 1840 (1840 O.S.)]. The racket-shaped pit suggests Post-Medieval domestic cutting, so the latter settlements could have been responsible. Transport of peat to these sites and others more distant would have been made relatively easy by the presence of various well-established routeways in the area. These include the fourteenth century packhorse track, the Commonway (Sidebottom 1995), and an old drove road which runs north to south (Byford 1981). The Commonway, runs adjacent to the workings, in a roughly south-west to north-east direction.

6:20. BOUNDARY STONES, NORTH

Here an undefined area of overcutting centres around a sub-rectangular block of uncut blanket peat, about 1m deep (Fig. 6.4.). This block of peat lies on the boundary of Yorkshire and Derbyshire, the ancient boundary of Hallamshire (Fig. 6.4.), and close to the drove road and other tracks associated with the Moscar Top site; so it may be a baulk left between different peat cutting grounds. The peat could have been exploited by sites within the Derwent and Rivelin Valleys; as well as settlements located to the north or south, via the drove way. There are some indistinct blind-ended hollow-ways which run up the the site from the north-west, establishing a link with the Derwent Valley;

6:21. BOUNDARY STONES, SOUTH

This ill-defined but extensive area of peat cutting is contiguous with the previous site and staddles the Yorkshire Derbyshire boundary. The limited area of low gradient land lying between the boundary and the escarpment on its west side, appears to have been more or less cut over, but there is significant peat cutting archaeology to the east. The cutting features extend up the line of the escarpment for about 700m; upslope of the previous site they comprise a series of minor scars in the peat 25-40cm in height, but beyond there is an apparent stacking platform and indistinct hollow-ways which fan out to a 1m deep cutting face. The orientation of the access tracks and cut faces indicates that the peat cutting advanced along the boundary from the direction of Moscar Top; therefore the site could have been exploited by people from either the Derwent Valley, Rivelin, or Bradfield. The presence of bays in the main peat cutting face suggests division of turbary. There are also a number of minor stone-getting pits on the overcut area, which appear to be opportunistic delving carried out as the peat was removed; although there has been extensive quarrying on Stanage Edge.

6:22. STANAGE END, NORTH

At this site, there are two sub-rectangular peat pits cut into an area of 0.5m deep blanket mire. These features lie on one of the highest parts of Stanage Edge, just to the north side of more extensive peat pitting at Stanage Edge, South. They may be related to those workings, but otherwise could represent piece-meal exploitation. There is no clear evidence of access, but they lie immediately next to the natural edge top routeway.

6:23. STANAGE END, SOUTH

Here there is an extensive zone of edge-top, peat pitting, located on the western fringe of Hallam Moors, within the watershed of the River Rivelin (see 8:2:2. & 8:3:2.). Stanage Edge is an extremely imposing visual barrier in the landscape, and as such has been used as a long-standing administrative boundary, which was functioning at the time of Domesday

(Ward 1962). It has variously signified the western limits of Hallam Moors, Yorkshire, Stannington and Sheffield.

There are a number of tracks which run down the edge from these workings, showing that there has been some exploitation by the inhabitants of the Upper Derwent Valley, most likely those of Bamford. However, there was also access along the edge, north and south, and across the moors to Sheffield and Stannington. The latter, although now a suburb of Sheffield, was originally a separate settlement, with a strong peat cutting tradition. In the seventeenth century, peat or turf houses were, in the Sheffield area, peculiar to tenements in Stannington and nearby Bradfield (Scurfield 1986). Another group of peat cuttings, c.500m to the east, on the main body of Hallam Moors, were clearly cut by people living in the east (see 6:18.).

Transport of peat from Stanage to the east would have been made relatively easy by the presence of the natural way along the top of the escarpment, and the fourteenth century packhorse track, the Commonway (Sidebottom 1995), which runs roughly west to east past the northern end of the edge. Burdett's map of Derbyshire published in 1791 shows two unnamed buildings at the base of Stanage Edge, immediately below the peat pits (Harley *et al.* 1975). The inhabitants were probably quarry workers, and may have taken peat from the site.

6:24. CROW CHIN

This site is another area of extensive edge top peat pitting. As with Stanage End, South, there are tracks which run down the escarpment into the Derwent Valley, and access could also have been gained along the edge, from the north or south; but unlike that site, there are no direct links across the moors from the east. However, a 'boundary hollow-way', which runs east to west, divides the two sites; therefore access from the east, could have been made via that feature, and then southwards along the edge.

These peat pits are the most diverse and best preserved so far found in the Peak District; there is an extensive group of waterlogged sub-rectangular pits on a level area of bog and a series of stepped peat cuttings on the moorland slope further south. The latter incorporate access tracks doubling as drains and there are a number of well-defined baulks. This part of the peat cutting extends around two large barrows located on the top of the escarpment and up to the rocky knoll at High Neb; where indistinct peat banks show that the cutting extended to the base of these features. Interestingly, the waterlogged peat pits and the stepped peat cuttings are separated by the present line of the County Constabulary Boundary, but this is probably fortuitous.

6:25. MOSCAR MOOR

This is probably another extensive area of peat cutting, which is contiguous on its east side with the Moscar Fields site. These sites occur on either side of a broad clough head basin, which is now largely occupied by *Juncus effusus* and *Nardus* rather than blanket mire. The basin, although only rising to about 360m OD, has very shallow gradients, on which moderate deposits of blanket peat would have been expected to form. The widespread exploitation of peat on Moscar Moor is evidenced by a series of c.0.5m high, right-angle recesses, which have been cut into the flank of an isolated zone of blanket mire, occupying the low ridge to the west of the site. Indistinct, but very extensive braided tracks, run across the moor from north-east to south-west. Although these tracks appear to be part of a through route between the Derwent Valley and Sheffield, their extent over the majority of the area, suggests that they may have been in part connected with the peat cutting.

6:26. MOSCAR FIELDS

Here there is an isolated rectangular enclosure, which has probably been created within an extensive area of peat cutting, turf stripping, and paring and burning (Fig. 6.5.). An undated document in Sheffield Archive refers to "Lawrence Green aged 72 When he was about twelve years old he saw Anthony Worrall ... pay moneys ... for a trespass in digging turffs in Moscarr near the place where the new enclosure now is". Indistinct linear stripping in the vegetation, which probably marks an area of turf stripping, can be seen to the west side of the enclosure, from the escarpment above.

6:27. HORDRON EDGE

Above this escarpment, there is a series of four sub-rectangular peat pits cut into the edge of an isolated band of ridge top blanket mire. These workings may have been reached along Hordren Edge, by a branch of the braided routeway which served the Moscar moor cuttings; but there are also a number of indistinct trackways leading up the edge from the Derwent Valley. One of the pits is particularly significant, because it contains the Seven Stones of Hordron, the remains of a free-standing stone circle (see 9:1:2. & Fig. 9.2.). The monument is surrounded on three sides by about a one metre depth of shrunken peat; the top of which corresponds to the height of the tallest of the orthostats within the stone circle. These common scales, indicate that the monument would not have been visible before peat cutting took place. Therefore, since the stone circle was already exposed by 1574, which is shown by a description in a perambulation of the Hallamshire boundary: "a place where certeine stones are set upon the ends" (Barnatt 1990), then the peat cutting must have been dug at an earlier date. This is indicated by the very degraded nature of the cutting bank (Fig. 9.2.); the very indistinct access tracks down Hordren Edge; and the presence of a relatively sharper, secondary, racket-form cutting which has been excavated into one corner of the main pit.

Fig. 6.4. A boundary stone, carved with a letter H , which apparently marked a point on the western limits of Hallamshire. In the background, can be seen the baulk of peat (arrowed) at the centre of the 'Boundary Stones (North) peat cutting', and on the horizon (highest point) the northern end of Stanage Edge.

Fig. 6.5. The isolated rectangular enclosure is Moscar Fields , which was apparently created by turf stripping and/or 'paring and burning'. Hordren Edge occurs below the site, while the escarpment above forms the Yorkshire/Derbyshire boundary. All areas on the photograph have probably been extensively exploited for turf and peat.

6:28. CUTTHROAT BRIDGE

This is a localised area of peat pitting situated within an area of shallow blanket mire (see 8:2:1. & 8:3:2). The archaeology includes: several levels of peat cutting running up slope, a narrow dividing baulk, and several *Sphagnum* filled pits. There are no settlement sites which are obviously related to these peat workings, but they lie very close to the confluence of several well-established routeways, which would have provided good access from both east and west. These are the Grindleford to Penistone Turnpike built in 1771 (Bevan 1996), and the earlier Derwent to Bradfield and Derwent to Sheffield Packhorse Routes. The latter can be traced back to the Medieval Period, and was described as a common-way in a 14th century charter (Dodd & Dodd 1980).

6:29. HIGHSHAW CLOUGH

At this site, a small group of sub-rectangular peat pits are set within an area of shallow blanket mire. This site is located near to the Cuttroat Bridge peat pits and as such was probably dug by the same community.

6:30. NETHER BROOK 1)

Here there is a series of sub-rectangular or angular peat cutting pits excavated into shallow blanket peat. There are no settlement sites which are obviously related to these peat workings, but they lie close to well-established routeways, as described in 6:28. Alternatively, they could have been served by an extensively braided and zigzagging track which runs up to the moors west of this site, from the vicinity of the former hamlet of Ashopton. The latter settlement (now flooded beneath Ladybower Reservoir) is long-standing, being present since at least 1650 (Cameron 1959).

6:31. NETHER BROOK 2), 3) and 4)

Three groups of sub-rectangular or angular peat cutting pits occur here, within shallow blanket mire. There are traces of access or extraction tracks and minor baulks associated with the first two groups of these features, which are defined by lines of differing vegetation. These features may merely be the remnants left after a final phase of peat cutting on an extensively overcut moorland basin and ridge. The area was likely accessed by an extensively braided and zigzagging track which runs up to this moor from the vicinity of the former hamlet of Ashopton. However, the possible area of extensive overcutting described above may have extended northwards as far as the Derwent Moors peat cutting (6:17.), a distance of c.1.5km. Similar sized, single areas of turbary found elsewhere in the Peak District, can be linked to nucleated settlement of much longer standing than Ashopton. At least initially, other settlements were probably involved in the exploitation of the peat resource of this moor. The Domesday Manors of Hathersage and Hope (Cameron 1959) may well have initiated these operations, since outliers of both occur as near as 3 km directly down the Derwent Valley from Ashopton (Fig. 5.2.). Of the two, Hathersage was most likely involved since that manor was centred on the eastern side of the river; whilst Hope, on the west side, can be firmly linked to the very extensively exploited turbary on Crookstone Out Moor.

6:32.BAMFORD MOOR

This is an area of possibly near complete over-cutting. This moor was called Bamford Common on the 1857 enclosure plan of the area (Peak National Park Archive) and lies directly upslope from the village of Bamford and the site of Hurst (in the vicinity of present day settlement of Upper House Farm); both Domesday outliers of Hathersage (Morgan 1978). Tracks accessing this moor from the west provide evidence of associations with the latter settlements and others; possibly including that at Yorkshire Bridge, shown on Burdett's map of 1791 (Harley *et al.* 1975), which may have been a Medieval long-house on the evidence of an elongate sub-rectangular building-platform found recently. Exploitation of the peat resource of Bamford Moor may have Pre-Medieval origins since there are a group of settlement sites which show Romano-British characteristics located either side of the Ladybower Brook, which bounds the northern side of this moor.

6:33. OFFERTON, SHATTON, ABNEY, AND EYAM MOORS

The early and complete stripping of deep peat deposits from this gritstone outlier would have been likely since it is surrounded by a number of long-standing settlement sites. Initial peat cutting may have been undertaken by the occupiers of the Roman fort of Navio; the remains of which are located at the foot of the hill on its north-west side. Later there would have been more extensive cutting by the hamlets of Stoke, Shatton and Offerton; which were outliers of Hope at the time of Domesday (Morgan 1978). All four of the moors are bordered by long-standing settlements baring their names. Other Domesday sites, Bradwell, Hazlebadge, Waterfield and Hucklow occur at the foot of this hill, on its west and south-west sides (Morgan 1978). Hucklow was known to have held free turbary within the Peak Forest in 1251 (Cox 1905). The usage of these moors by settlements on all sides is indicated by the presence of extensive radiating hollow-ways; several of which are very deeply cut.

6:34. WIN HILL

The early and complete stripping of deep peat on this flat shouldered hill would have been likely since it is surrounded by a number of long-standing settlement sites. Initial peat cutting may have been undertaken by the occupiers of the Roman fort of Navio, located immediately south of the hill, and subsequently by the Domesday settlements of Hope and its outlier Aston (Morgan 1978). Aston and the hamlet of Thornhill, which lie at the foot of Win Hill, on its south and south-east sides respectively, are known to have held rights of free turbary within the Peak Forest in 1251 (Cox 1905). Thornhill may be an Early Post-Domesday settlement, since it is not mentioned in that reference, but does occur by name in accounts of 1200 (Cameron 1959); however, its possession of turbary in 1251 suggests earlier origins.

The name Thornhill is interesting since the settlement only occurs on a slight ridge, in the bottom of the Derwent Valley; the name therefore seems likely to indicate an association with a thorn covered hill nearby, logically Win Hill. Furthermore, the place-name Thornhill Brink is given to the flat topped ridge of Win Hill, located to the west side of the summit peak (Winhill Pike). This ridge should have held a substantial proportion of the deep peat deposits found on the hill, but these resources would have been more distant from the Thornhill hamlet than those on the south-east shoulder which lies directly upslope of the settlement. Finally, an area called Thornhill Carrs lies c.1.5km to the north side of the hamlet, on the eastern slopes of Win Hill. These points give some evidence to a close association between the settlement of Thornhill and Win Hill.

The removal of the peat resource of Win hill was probably not just the result of exploitation by Thornhill and the other settlements mentioned above, since a number of dispersed settlements occur around its base. Those in particular on its northern side, within the Woodlands Valley, can be linked to the hill top by well-defined, access hollow-ways. These dispersed farm sites appear to have very early origins; evidenced by the occurrence of significant quantities of Romano-British and Medieval pottery sherds on the nearby reservoir shores. The sherds appear to be derived from midden scatter associated with early cultivation of adjacent land. Other datable artefacts and midden-derived, anthropomorphic soils exposed on the same areas of reservoir shore, provide additional evidence for the long-standing character of these settlements. The usage of Win Hill by settlements on all sides is indicated by the presence of extensive radiating hollow-ways; several of which are very deeply cut.

6:35. UPPER MOOR

A large-scale, ridge-top peat cutting; where the extent of the overcut area is defined by an abrupt peat bank which runs across the ridge. This site constitutes the upslope element of an even larger area of over-cutting along a moorland spur which also incorporates Nether Moor. These sites are contiguous with the Crookstone Out Moor turbary at the head of the dividing Jaggers Clough brook. A few ill-defined trackways link these two major areas of peat cutting at the top of the clough, but these connections likely relate to modern recreational use of the moor, rather than indicating common rights of turbary.

Well-defined access sledways from the south clearly link this peat cutting site with the long-standing hamlet of Nether Booth; which is documented as early as 1577 (Cameron 1959). Others run up from Nether Moor, which suggests later exploitation of this moor by those people responsible for the removal of the peat on Nether Moor. The area may have initially been part of the Hope turbary. The village of Hope pre-dates the Norman conquest, with a reference as early as 926 (Cameron 1959), and was an important settlement at the time of Domesday, when it had six associated outliers (Morgan 1978).

6:36. NETHER MOOR

As mentioned above, this moor, constitutes the downslope element of over-cutting along the moorland spur incorporating Upper Moor. Access sledways run up to the area from a variety of directions, but are particularly well-defined from the east; which suggests that the site may have been part of the Hope turbary.

Upper Moor and Nether Moor lie fully within the Noe Valley, but, are included in this chapter because of their associations with Crookstone Out Moor.

6:37. CROOKSTONE OUT MOOR

A large-scale, ridge-top peat cutting, where the extent of the overcut area is defined by an abrupt peat bank running across the ridge. This is the turbary of the village of Hope, a long-standing settlement with six outliers at the time of Domesday (Morgan 1978). The main peat cutting bank is divided by a regular series of linear baulks (Fig. 6.6.), which appears to reflect its association with a well-established nucleated settlement. Although it is one of the few well-known sites of peat cutting occurring in the Peak District, the scale of exploitation has been dramatically underestimated. The site was mentioned incidentally by Farey in 1811 as "Crookstone Peat Pits", while describing the quarrying of "Bake Stones". The National Trust's archaeological survey (Beamish 1987) boldly identified "an extensive area of shallow pits dug for peat", covering four hectares at the bottom of the ridge; while Barnett and Smith (1997) recently mapped a much larger area of peat cutting at the top of the ridge. In actual fact, this site is one of the most expansive deep-peat turbaries occurring in the Peak District, covering about 200ha. Indeed, collectively with the contiguous Upper, Nether and Ashop Moor sites, at least three square kilometres of the higher plateau in the area have been overcut. The peat cutting described by Beamish, and Barnett and Smith, merely represents the final phases of exploitation.

6:38. UPPER ASHOP

An amorphous area of peat cutting, where in places the extent of the overcut area is defined by an abrupt peat bank which runs across the valley side. This peat cutting can be linked by a group of braided hollow-ways to the Upper Ashop farmstead which is located directly down slope. This settlement was recorded in William Senior's survey of 1627 (Chatsworth archive; Fowkes & Potter 1988), but may have Medieval origins since the site was named Ashop as early as 1215 (Cameron 1959). The eastern side of the overcut area of is more or less contiguous with lower sections of the Crookstone Out Moor turbary, but a deep clough forms a natural boundary between the two.

6:39. ASHOP MOOR

A small peat cutting, where the extent of the overcut area is defined by an abrupt peat bank. The site can be linked by hollow-ways to the Upper Ashop farmstead.

6:40. DEAN HILL

This is a possible area of peat cutting around a ridge top. The site could also have been exploited by the residents of the Upper Ashop farmstead; or alternatively by those at Wood Cottage, another settlement recorded by Senior, located in the bottom of the Woodlands Valley, north of the River Ashop.

6:41. WOOD MOOR

Here, a possible peat working, is indicated by an amorphous area of blanket mire loss and some abrupt banks of peat, but, there are no obvious access routeways. However, the name Wood Moor, could alude to a peat cutting ground, because peat has been known as black-wood (see Glossary), and the place-name suggests links with the Wood Cottage farmstead. This settlement, although on the opposite side of the River Derwent, is only about 500m away. Upper House Farm lies a similar distance away, but can be linked by hollow-ways to peat workings on Cowns Moor.

6:42. COWMS MOOR

A series of peat cuttings is found here, affecting topogenous mires within an extensive area of landslip (Figs 6.7. & 6.8.). The downslope extent of these workings is uncertain, but eastwards the overcut area is likely to be contiguous with earlier phases of peat cutting on the Hey Ridge/Swint Clough, South site. These peat workings can be linked by hollow-ways to Upper House Farm, which was described in Senior's terrier as a subsidiary of Ashop Farm (Fowkes & Potter 1988). Ashop Farm lies on the opposite side of the River Ashop to Cowms Moor, but a still used ford occurs close to that settlement, which is the bridging point of a well established trackway running along the base of Cowms moor and past the farmstead. This track is part of an ancient through route, first recorded in 1627 as "Doctor Talbotes Gate" (Cameron 1959), which would have provided easy access to Cowms Moor. It is likely that Ashop Farm would have utilised the topogenous peat deposits found on Cowms Moor as well as those on Ashop Moor.

6:43. HEY RIDGE/ SWINT CLOUGH, SOUTH

A large-scale, fan-shaped peat cutting (Figs 6.8. & 6.9.), where the cut-over area encloses a variety of archaeological features related to the peat cutting, including well-defined radiating access hollow-ways. The downslope extent of these workings is uncertain, but westwards the earliest phases of peat cutting are likely to be contiguous with those on Cowms Moor.

Fig. 6.6. One of a series of broad parallel baulks which divide the upper areas of overcutting on Crookstone Out Moor. The two metre deep peat cutting face can be seen in the background, defined by gatherings of snow (arrowed).

Fig. 6.7. Degraded, part cut and drained, topogenous peat, on the Cowms Moor land slip, Woodlands Valley. The dried out bog in the hollow shows evidence of sub-rectangular pot-pitting ; while the thin blanket deposits, on the slopes above, have also been part stripped away.

Fig. 6.8. A section of a recent aerial photograph, taken after a light fall of snow, which highlights the fan-shaped peat cutting on Hey Ridge, Alport Dale. The gathered snow defines the peat cutting face, some of the service tracks on the overcut area, and the associated drains/boundary features. The dark, sub-rectangular patches, towards the bottom of the photograph, define remnants of topogenous mire on Cowms Moor.

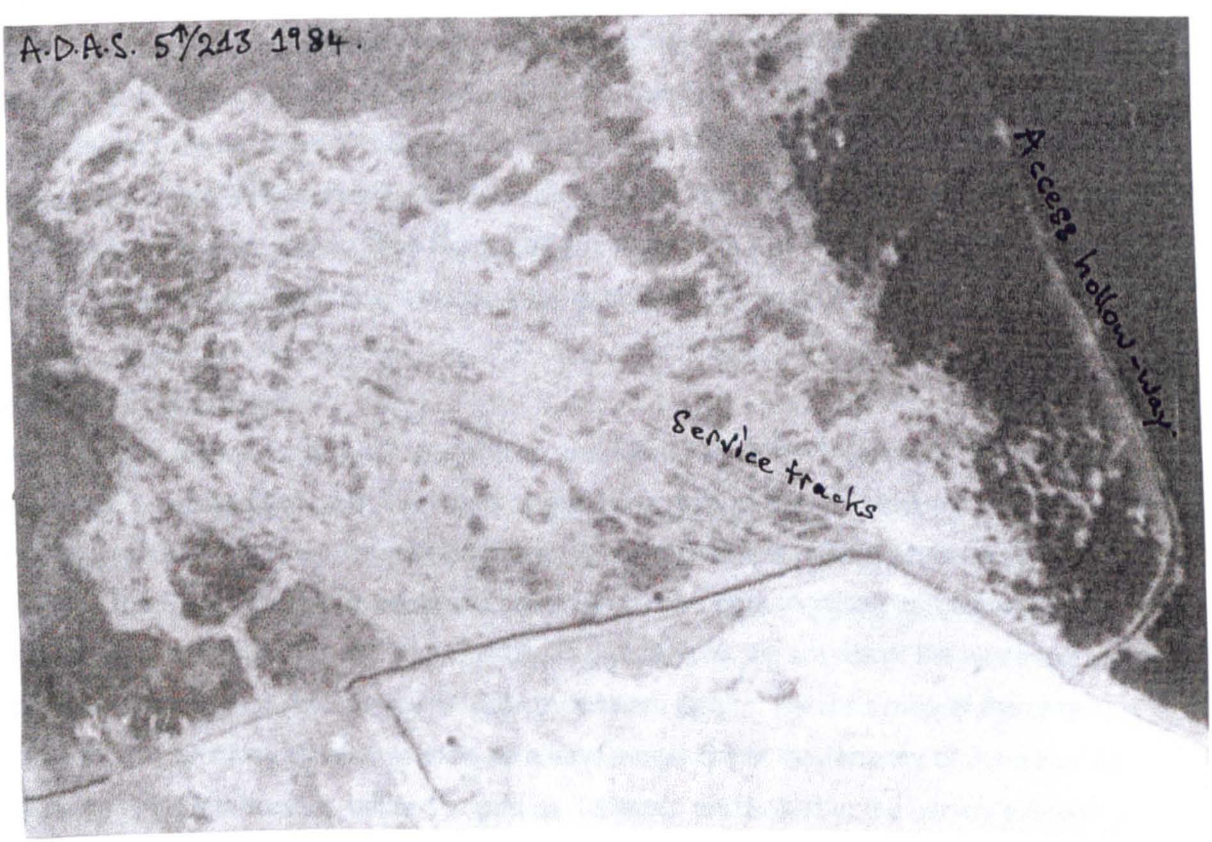


Fig. 6.9. An enlargement of part of another aerial photograph showing the peat cutting on Hey Ridge. Although the archaeology on this image is not enhanced by snow, the peat face (including clear right-angled recesses) and service tracks are still prominent. The curved linear feature within the plantation is the main access hollow-way to Alport Farm.

This peat working can be linked by hollow-ways to Wood Cottage and the Alport hamlet, which are both shown on Senior's map of 1627 (Chatsworth Archive). The Alport settlement may be of considerable antiquity, since the site was already named Aldeport in 1285; possibly referring to the location of an "Old fortification" (Cameron 1959). The tracks between the peat cutting and the hamlet are deeply cut; which suggests considerable usage.

Peat cutting on this area is relatively well-documented with map based and archive evidence. William Senior's survey map of 1627 shows a land parcel called "Edward Harresons Peat Ridge", which not only incorporates the peat cutting, but also the surrounding moorland ridge. The western boundary of the land parcel appears to be the double ditch and peat trench boundary that connects this peat cutting with that on the adjacent ridge to the north (Swint Clough, North). Senior's terrier (Fowkes & Potter 1988) describes the area as "The great pasture or that part which they call the peat ridge". The use of the word "Peat" indicates that peat cutting at this site may have Later-Medieval origins, since this word is derived from the Middle English word *pete*, meaning a "cut piece of" (peat); Middle English being associated with the period 1200-1500 (Fowler & Fowler 1964). See Glossary.

6:44. SWINT CLOUGH, NORTH

A large scale area of opencast peat workings, where the cut-over area encloses a variety of archaeological features related to peat cutting, including various baulks and access hollow-ways. As with the Swint Clough, South site, this peat working can be linked by deeply cut hollow-ways to the Alport hamlet. Peat cutting on this area is again documented by map based and archive evidence from William Senior's survey. His map (Chatsworth Archive) shows a land parcel called "Edward Halls Peat Ridge" which not only incorporates the peat cutting, but also the surrounding moorland ridge; while his terrier (Fowkes & Potter 1988), describes the area simply as "The Peate Ridge". Again, the use of the word "Peate" may suggest that peat cutting at this site has Later-Medieval origins (see above).

6:45. BIRCH BANCKE

An extensive area of apparent turf-stripping was identified by ecological and place-name evidence. It was possibly also exploited by the occupants of the Alport hamlet. However, no obvious tracks link the hamlet with Birch Bancke, and as the two sites occur on opposite sides of the River Alport, it is possible that another now, unrecognised settlement was responsible. An indication that this is likely, is provided by the source of the site's turf cutting place-name evidence, the survey of 1627 by William Senior. Senior's map of the area (Chatsworth Archive) shows this area as a land parcel under the tenancy of John Hall the elder called Birch Bancke, utilised in part as 'turfmofs' and linked in the survey's terrier (Fowkes & Potter 1988) to other holdings including a "buildinge fold and yard". At the time of

Senior's survey, the Alport Valley was divided into five individual holdings containing various buildings and land parcels.

6:46. BIRCHIN HAT

A series of minor peat cutting scars, is indicated by abrupt sub-rectangular recesses cut into the fringe of an area of edge top blanket peat. These features may represent a marginal phase of a more general exploitation of the peat, highlighted because they are peripheral and therefore free-draining. More widespread cutting is indicated by vegetation anomalies which are particularly evident on aerial photographs of the area. This area may have been another peat ground worked by the occupants of the Alport hamlet, or any of the other buildings described above; since a currently used hiker's track of unknown origins, but possibly of some antiquity, links the hamlet with Birchin Hat. However, since the cuttings occur on the east side of a land boundary shown on Senior's survey map (Chatsworth Archive), it is probably more likely that peat was removed eastwards from this site to settlements located within the Westend Valley.

6:47. BIRCHIN HAT TRENCH

This trench which cuts through deep blanket peat, is a linear peat working, and boundary feature, which may also have been utilised as a sheep-driving route (see 7:1:8.). It has been cut along an ancient boundary, which divides land holdings shown on Senior's survey map of 1627. It may have been excavated by the occupants of Westend Farm, which was located on an area of land named Westend in 1285 (Cameron 1959); or alternatively by those living in the settlements associated with Birchinlee Pasture (6:60.).

6:48. ALPORT CASTLES

A possible area of peat cutting is indicated by an extensive growth of Deergrass (*Trichophorum cespitosum*) and a number of abrupt peat banks. Since this site occurs on the east side of a land boundary shown on Senior's survey map of 1627 (Chatsworth Archive), it is likely that peat was removed eastwards to settlements located within the Derwent Valley.

6:49. LITTLE MOOR

A possible area of cutting here, is indicated by a lack of peat on suitable topography. Since this site occurs on the west side of a land boundary shown on Senior's map of 1627 (Chatsworth Archive), which is still visible in the field as a series of linear earthworks, it is likely that any peat which was removed was taken westwards from this site to settlements located within the Alport Valley. The Alport hamlet may have been involved, as a hiker's track links it with Little Moor. As there are no certain access trackways linking Alport with Little Moor it is possible that other settlements were responsible for any peat cutting that took place. As mentioned earlier, a cluster of other buildings occurred in the bottom part of Alport

Dale in 1627; some of which were probably occupied settlements, likely to have been using peat and turf.

6:50. WHITEFIELD PITS

This is an ill-defined, but probably extensive area of peat cutting. This area of peat cutting would most likely have been associated with the Gillott Hey Farm settlement which occurs downslope to the south. This farmstead was in existence by 1808 (Potter 1808).

6:51. BRIDGE END PASTURE

Here there is an extensive ridge which has largely been stripped of its peat cover. This ridge is located between sections of the Derwent and Ashop valleys, where long-standing settlement is concentrated; and so is likely to have been exploited by a number of communities. The early settlements of Crookhill Farm, present in 1101-8 (Cameron 1959) and Two Thorne Fields Farm, recorded in 1623 (Cameron 1959), but according to Senior already a "good auncient buildinge" (Fowkes & Potter 1988), occur on the edge of the ridge. While Grimbocar, which was also present at the time of Senior (Fowkes & Potter 1988) and Derwent, possibly a tenth century Hiberno-Norse settlement (Sidebottom 1996), can be linked to the ridge top by well-defined hollow-ways. The proximity of these settlements and others would likely have resulted in the early exploitation and rapid exhaustion of this peat resource.

Peat cutting on Bridge-end Pasture is testified by William Senior's survey of 1627. His map (Chatsworth Archive), shows a large land parcel called "The Two Thorne Pasture", which is described as "Heathe and turfmoss". The use of the word "turfmofs" may suggest that peat cutting at this site has Early-Medieval origins, since this word is likely derived from the Old English word *turf* (Fowler & Fowler 1964). The word turf, or variants, is of common occurrence in Scandinavian and Northern European countries, where it is generally derived from old forms of individual languages (see Glossary).

6:52. LOCKERBROOK HEIGHTS

This site, called Rowlee Peat Pits up to about seventy years ago (Bunting 1998), has a large-scale, fan-shaped peat cutting, where the cut-over area encloses a variety of archaeological features related to peat cutting; including well-defined, radiating access hollow-ways and loading/storage bays (Figs 1.3., 1.4., 3.5., & 7.3.). The sites previous name and access sledways leading up from the south indicate an association with the Rowlee Farm settlement, which was already in existence by the late fourteenth or early fifteenth century, being recorded in rent rolls for that period (Ward 1949-50; Byford 1981). According to a probate inventory of 1719 lodged in the Lichfield Archive, this settlement then had, a peat house, seven sledges, and four wheelbarrows (Stroud 1996). This confirms that the inhabitants were active peat-getters.

Lockerbrook Heights, has probably been peat cut for centuries, by Rowlee Farm and a number of other long-standing settlements found to the south. These are Lockerbrook Farm, Bellhag farmstead and Haggtor Coppice farmstead; all were in existence by the time of Senior. Transport of peat to these sites and others more distant, would have been made relatively easy by the presence of the adjacent fourteenth century, packhorse track, The Commonway. The site, has certainly been used in relatively recent times, by the inhabitants of Hagg, Bell Hagg, Rowlee, Fairholmes, and Lockerbrook farms. It was still being worked about 1910, by a Willis Bridge of Lockerbrook Farm. Apparently, about a dozen people, working in pairs, co-operated in the digging, stacking, and transport ("wheeling") of the turves (Bunting 1998).

6:53. GORES HEIGHTS

Here there is a fan-shaped peat cutting. This is connected by a well-defined access hollow-way to the the Gores Farm settlement, already in existence by 1627 (Cameron 1959; Fowkes & Potter 1988) Transport of peat to other locations would have been possible using the adjacent The Commonway.

6:54. LOWER GORES HEIGHTS

An area of apparent peat cutting, identified by examination of aerial photographs, is located here. This feature is now covered by dense conifer plantation, but on 1984 M.A.F.F./A.D.A.S. aerial photographs, is clearly visible as a small fan-shaped peat cutting. This feature appears to represent an earlier level of peat working associated with the Gores Heights site.

6:55. PASTURE TOR

This is a series of minor, sub-rectangular recesses, cut along the fringe of an area of shallow edge-top blanket mire. Well-defined access sledways associated with the adjacent Lockerbrook Heights peat cutting would have provided access from Rowlee Farm.

6:56. ALPORT GRAIN PEAT PIT

The site here is a small, concave peat cutting, which is probably a grouse-butt construction-pit (7:1:15.). In the Peak District, most small-scale peat workings are defined by sub-rectangular or right-angled cuttings; rarely is the limit of extraction marked by a concave recess. The relatively recent origin of the pit are shown by cut turves which are still on the floor of the working, although now bound into the vegetation mat.

6:57. ALPORT GRAIN PITS

A line of abandoned grouse-butt construction-pits (7:1:15.), surviving as a row of sub-circular pits is cut into the edge of an area of blanket mire. The pits have diameters of 10m to 15m and abrupt cut faces up to 0.5m in depth. The butts remains are set centrally within the pits and were constructed out of the excavated peat (Fig. 7.1.).

6:58. ROWLEE PASTURE

A large, sub-rectangular area of peat cutting, which is probably associated with the Alport Grain Trenches. Peat cutting on the moorland block called Rowlee Pasture is documented by William Senior's survey map of 1627 (Chatsworth Archive), which calls the area "Rouglee pafture" and describes it as "heathe fetherbed Mofs and turfmofs Containenge 554 acres". The use of the word "turfmofs" may suggest that peat cutting at this site has Early-Medieval origins (see 6:51).

6:59. ALPORT GRAIN TRENCHES

A series of four parallel drains; three of which may be eroded linear peat cuttings. These features are probably associated with the Rowlee Pasture peat cutting.

6:60. BIRCHINLEE PASTURE

An extensively overcut area occurs here, which has become largely revegetated by thick *Calluna.* However, a series of prominent peat-cutting banks, sub-rectangular patches of peat-free ground, linear baulks, access trackways, and many minor steps in the ground surface are still apparent.

6:60:1. Birchinlee Pasture 1)

A sub-rectangular, open-fronted peat cutting, is located within the overcut area of Birchinlee Pasture, and was identified by its abrupt peat banks and well-defined access trackways. The tracks, which run downslope from this peat cutting indicate an association with Westend Farm. This was a farmstead at the time of Senior (Fowkes & Potter 1988), but may have origins before 1285 (Cameron 1959).

6:60:2. Birchinlee Pasture 2)

A discrete open-fronted peat cutting with abrupt banks of peat, located within the overcut area of Birchinlee Pasture, this cutting encloses a small wall-builders quarry hole and two low cairns. The cairns could be simple wall-builders' spoil heaps, but one is some distance from the quarry and its associated wall. It is more likely a small peat stacking feature, or a clearance cairn related to the peat cutting. Ill-defined terraced trackways to the west of this peat cutting suggest a possible association with the Westend Farm; while well-defined access sledways which run downslope to the south-east indicate a relationship with the Birchinlee settlement. This is depicted on William Senior's survey of 1628, but probably has much earlier origins, because Medieval pottery was found on the drawdown nearby.

6:60:3. Birchinlee Pasture 3)

This is a level of peat cutting, located within the overall overcut area of Birchinlee Pasture, which is defined by an abrupt bank of peat. This peat cutting site was served by the same access trackways as Birchinlee Pasture 2).

6:60:4. Birchinlee Pasture 4)

Here two contiguous, abrupt banks of peat, meet at right-angles, to define the upper limit of two levels of peat cutting within the overcut area of Birchinlee Pasture. Access to this site was by the trackways serving Birchinlee Pasture 2) and 3).

6:60:5. Birchinlee Pasture 5)

A further level of cutting on Birchinlee Pasture, is defined by an abrupt bank of peat. This site could have been reached by the trackways serving Birchinlee Pasture 2) to 4); but remnants of other tracks nearby suggest a possible association with the Marebottom Farm settlement, already in existence by 1627 (Fowkes & Potter 1988).

6:60:6. Birchinlee Pasture 6)

This discrete group of sub-rectangular peat pits is particularly interesting because they have clearly been formed within a poorly-drained area of blanket mire, resulting in some re-formation of peat within the cuttings. This is an unusual situation in the Upper Derwent Valley, since the peat cuttings found there are usually associated with well-defined boundary drains or linear cuttings. The presence of re-formed deposits of peat within these cuttings suggests that the exploitation was pre-industrial. Well-defined access sledways found downslope of this peat cutting site indicate an association with the Birchinlee settlement.

6:61. DERWENT CHAPEL

This site of peat cutting was identified by archival evidence alone. Farey (1811-17), describes seeing peat cutting taking place at this site. The peat being dug, possibly by the inhabitants of the Marebottom Farm, was presumably within localised valley bottom mires, but may have been re-deposited peat. Marebottom Farm is another long-standing settlement which was already in existence by 1627 (Fowkes & Potter 1988).

6:62. FAGNEY CLOUGH, SOUTH

A prominant ridge-top peat working is defined by an abrupt bank of peat up to 2m in height. Downslope of the bank, the ridge has little peat cover, even though its topographical characteristics should have allowed for even blanket peat formation. However, this largely peat-free portion of the ridge, does show many minor lynchet-like banks. These fossilise the divisions of the overcut area. Upslope of the main peat bank, a broad trench cuts the remaining blanket mire on a more or less parallel alignment. This is a linear peat cutting/ preparation-ditch associated with the main area of overcutting. Well-defined access sledways found downslope of this site, indicate that it was the main peat ground of the Westend Farm settlement.

Peat cutting on this ridge is again documented by William Senior's survey of 1627. His map (Chatsworth Archive), shows a land parcel at this site called "Westden Peate or Turf moss"; while his terrier (Fowkes & Potter 1988), describes the area as "The Turf moss". The use of the words "Turf moss", as mentioned before, suggests that peat cutting at this site may haves Early-Medieval origins.

6:63. WESTEND MOOR DIKE 1)

This seems to be an abandoned boundary drain, or possible linear peat cutting, related to the Fagney Clough peat cuttings. This feature forms part of a lengthy boundary-drain which incorporates the Fagney Clough, South preparation-trench.

6:64. WESTEND MOOR DIKE 2)

At this site is an eroded drain or possible linear peat cutting related to the Fagney Clough, North peat cutting. This feature is a type of preparation-trench apparently cut to facilitate the draining of the peat on the Fagney Clough, North ridge. It links two tributary watercourses on either side of the ridge. Another possible area of peat cutting occurs at the northern end of the drain and at its southern end it is linked to the Westend Moor Dike 1) by a less distinct drainage ditch which continues south-westwards through the line of that feature.

6:65. FAGNEY CLOUGH, NORTH

This moderate sized area of peat cutting, comprises a series of abrupt banks defining several levels of working. Well-defined, access sledways found downslope of this site, indicate an association with the Westend Farm settlement. Figure 6.10. illustrates a lower level of peat-cutting, where there has been encroachment of in-bye and then forestry.

6:66. BLACK CLOUGH, RIDGE

Here, a series of irregular steps and terraces, located on the edge of the plateau top blanket mire, appear to limit the upslope extent of an area of ridge top overcutting. The ridge downslope is more or less peat free although its topographical characteristics suggest a covering of blanket peat should be present. This ridge would have been one of the closest sources of deep peat to the Medieval long-house found recently at Blacklow in the Westend Valley (Ardron 1997).

6:67. RIVER WESTEND, EAST

Here there has been peat cutting within an area of topogenous valley bottom mire. The latter which has developed in a hollow between the valley side and a line of riverside periglacial clutter incorporates an apparent infilled peat pit; a sub-rectangular area where the bog deposits are unusually soft and vegetated by a mat of *Sphagnum*. The nature of the bog as a whole suggests that all the original peat may have been cut out before new deposits infilled the site, but the sub-rectangular feature was preserved because cutting at that point was into the head of the bog, where deposits were probably concentrated. On a ridge of stable ground between the sub-rectangular feature and the river is a low ring of stones, c.5m diameter, which is possibly the foundations of a peat drying platform (Fig. 7.19.). This peat cutting may also have been worked by the occupiers of the Medieval long-house found recently at Blacklow, since it would have been an easily available source of deep peat. Indeed, the name of the settlement suggests that there was a source of peat in the bottom of the valley; since the element 'black' typically alludes to its presence (see Glossary).

6:68. RIVER WESTEND, WEST

An apparent area of piece-meal peat cutting, is located on the top of a valley bottom knoll. The knoll, which forms the bulk of a small peri-glacial landslip, is relatively flat-topped and has thin deposits of peat, up to c.50cm in depth, some of which has been removed in patches. This is another possible peat working of the Blacklow settlement.

6:69. BANKTOP HEY

This is a large-scale, ridge-top peat cutting, which along with those on the adjacent ridges (see 6:62, 6:65, 6:71-75), collectively form the most striking group of turbaries in the Upper Derwent Valley; prominent in overview from the east side of the valley and on aerial photographs (Fig. 1.2.). At all these sites the overcut areas are clearly defined by dominant *Nardus* growth and abrupt 1.5-2m deep peat banks which cut across the ridges. Well-defined, braided, access hollow-ways link Banktop Hey with the Banktop farmstead, present by 1623 (Cameron 1959).

6:70. BANKTOP HEY DIKE

A broad trench or linear peat cutting (see Black Dike) appears to separate the Banktop and Ridge turbaries, and runs on a line close to that of a land boundary shown on the Senior Survey map of 1628. It may in fact be the latter boundary, since no other feature has been identified, except a faint, discontinuous, linear anomaly visible on 1995 aerial photographs.

6:71. RIDGE NETHER MOOR

A large, ridge-top peat cutting was identified here, the upslope extent of which is defined by a series of abrupt peat banks (Figs 6.11. & 6.14.). This peat cutting lies to the south side of a boundary ditch, which extends from the south east end of Black Dike. The earthwork separates the cutting from the Cow Hey turbary, which occupies the north side of the same ridge. This division of turbary is very striking, as it is not only shown by the ditch, but also by the greater extent of peat cutting on the Ridge Nether Moor side, differences in the workings, and the separate access. Well-defined hollow-ways and a reveted access trackway, link the Ridge Nether Moor peat cutting with Ridge Farm, established by 1623 (Cameron 1959).

6:72. BLACK DIKE

This extensive ridge top trench has been cut through c.2m of covering blanket mire. It incorporates various component elements, including an eroded central-bank, abrupt lateral and transverse changes in level, and various offset arms (Figs 6.12. & 6.13.). It is broadest at the eastern end (up to c.70m across); but continues westwards for c.2.5km before meeting a degraded and infilled double ditch. The south-west face of Black Dike is very abrupt (almost 90 degrees) and mainly vegetation free; the north-east face is sloping (c.45 degrees) and largely vegetated. See 7:1:8. This feature appears to be part of a very significant and ancient land boundary; which has developed around an original bank and double-ditch, into a complex linear peat working. Its irregular, stepped character, suggests, intermittent, piece-meal exploitation of the peat resource over a long period of time. The dike is shown in its entirety on the 1628 Senior Survey map (Chatsworth Archive), as part of a more extensive land boundary. Unfortunately, this gives no indication of its form at the time.

6:73. BLACK DIKE, EASTERN OFFSET

This offset arm of the Black Dike trench, is set at right angles to the line of the latter and is interpreted here as a preparation-trench, cut to isolate and drain a large block of peat prior to its removal. An uncut block of peat has been left between the trench and the Cow Hey peat cutting. (Fig. 1.2.; 7:1:8:2.).

6:74. COW HEY, WEST

A large, ridge-top peat cutting was located, where the extent of the overcut area is defined by an abrupt peat bank (Fig. 6.14.). As mentioned above this site occupies the north side of the Ridge Nether moor ridge. For a number of reasons, it is one of the most interesting of the peat cuttings within the Upper Derwent Valley. Firstly, it incorporates a preparation-trench and a large baulk of prepared peat (7:1:8:2.); secondly the abandoned peat face defines a land boundary which is shown on William Senior survey map of 1627 (Fig. 6.15.), thus

Fig. 6.10. A lower level of peat cutting at the Fagney Clough (North) site, where there has been encroachment of in-bye and then forestry. The wooded field on the left has been set within, and defines, an area of overcutting. The cutting bank traces the outside of the wall and then turns at right-angles along the edge of the conifers (arrowed).

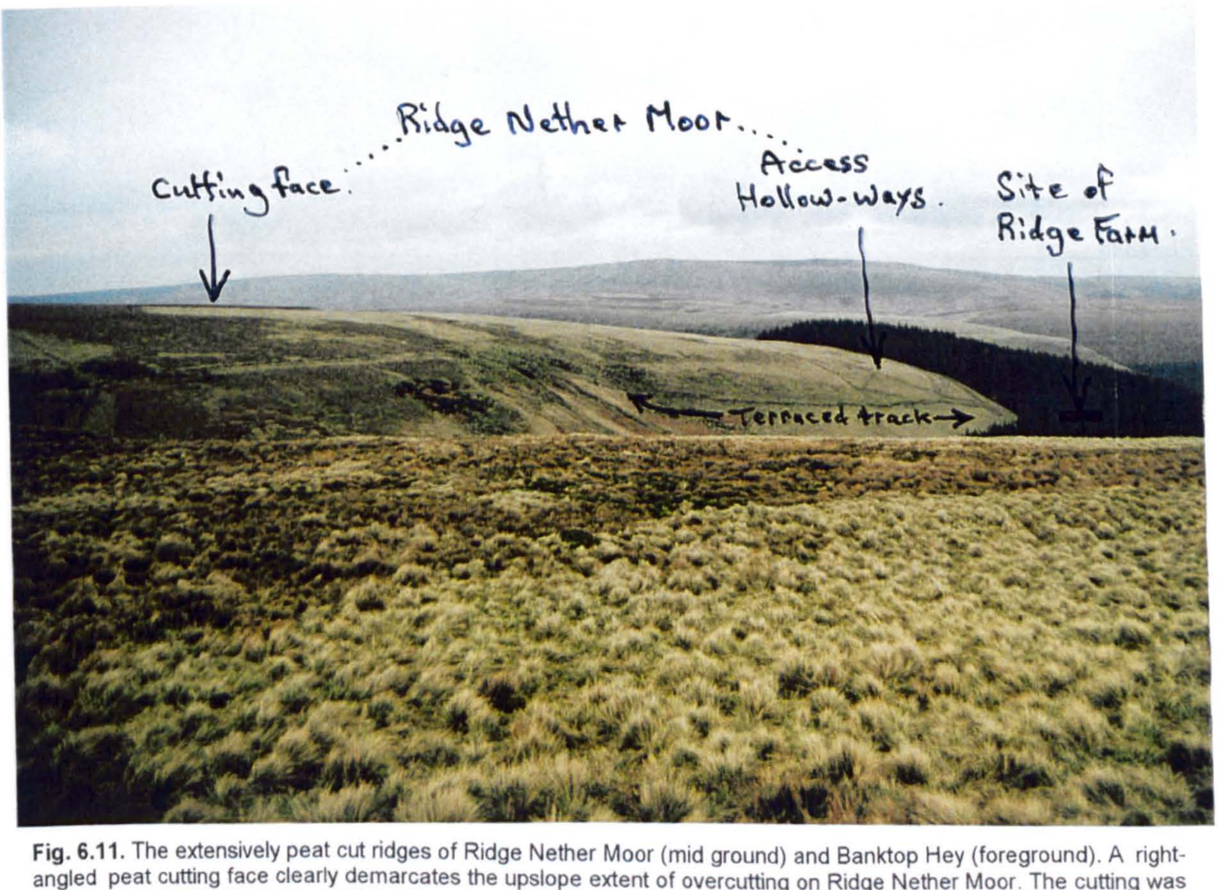


Fig. 6.11. The extensively peat cut ridges of Ridge Nether Moor (mid ground) and Banktop Hey (foreground). A right-angled peat cutting face clearly demarcates the upslope extent of overcutting on Ridge Nether Moor. The cutting was undertaken by the occupants of Ridge Farm (now ruined within the conifer plantation on the right).

Fig. 6.12. The broader, eastern half of Black Dike, looking east, showing the central linear feature (defined by green, dwarf-shrub, vegetation).

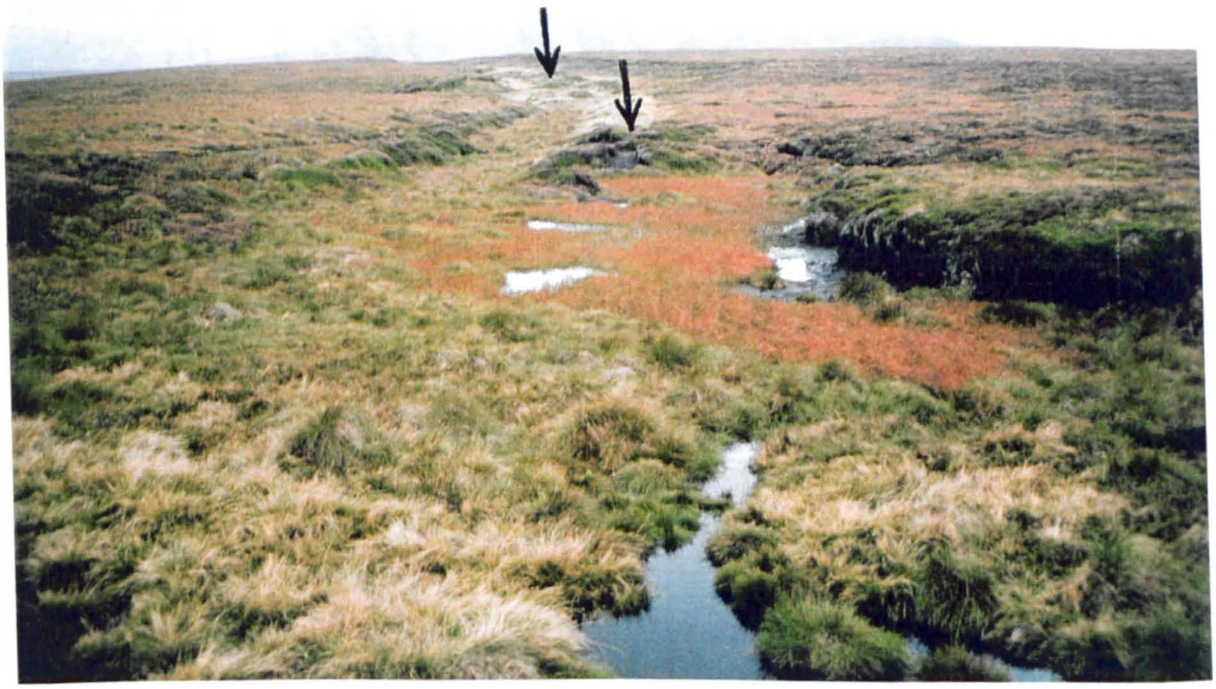


Fig. 6.13. View west along the more varied western half of Black Dike, showing the multi-phase character of the 'monument'. The photograph was taken from a shallow section, looking down into a water-logged, pitted area (colonised by *Eriophorum angustifolium*), occurring at the base of an offset trench (branching to the right). Beyond this, for about 100m only, there has been very little cutting on the north side of the central feature (arrowed).

Fig. 6.14. View of the peat cuttings on the ridges either side of Linch Clough, from Cow Hey (East). The right hand ridge, dominated by light coloured (*Nardus*) vegetation, is the Ox Hey peat cutting; the left hand ridge, comprises the Cow Hey (West) and Ridge Nether Moor turbaries, which are divided by a boundary ditch (arrows 1. & 2.), bordered in part by a drystone wall. Arrow 1. also marks the eastern end of Black Dike, which is just visible.

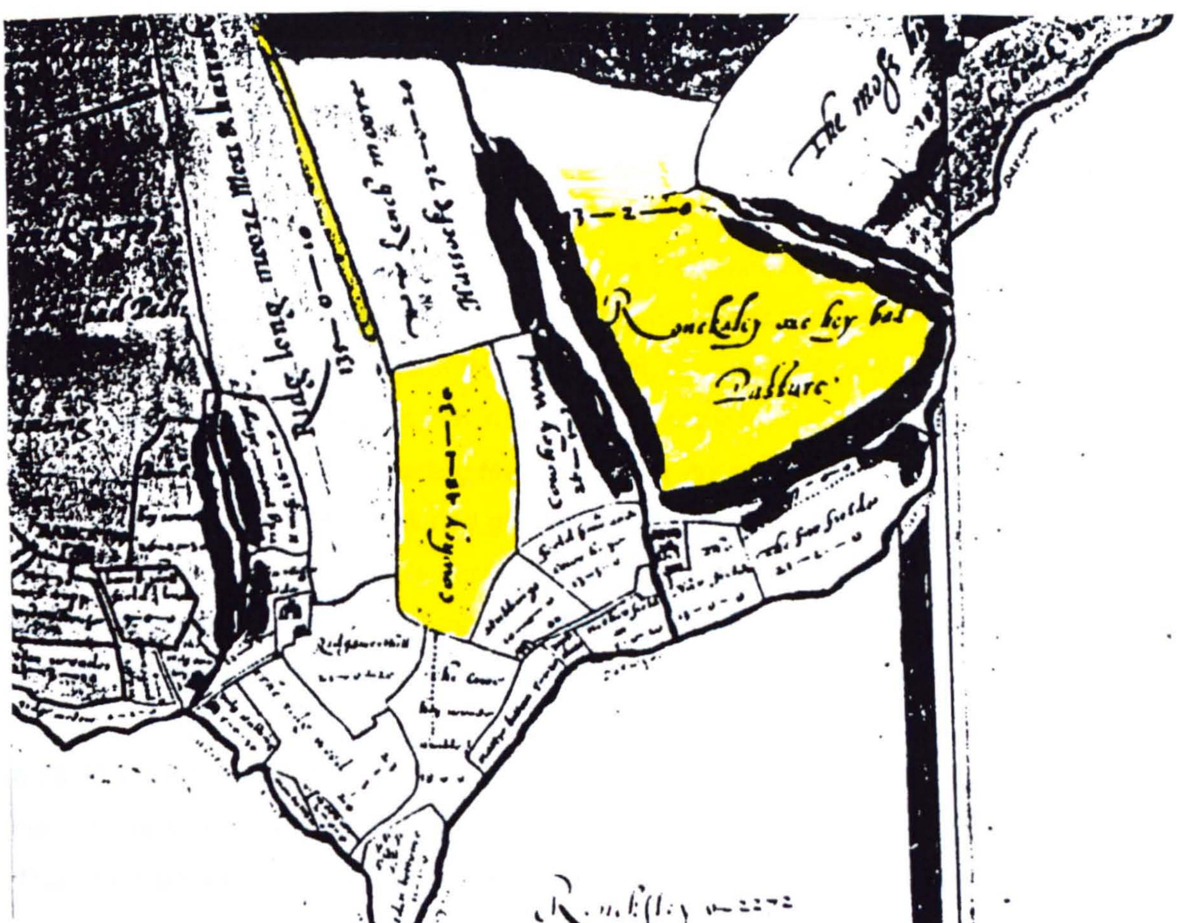


Fig. 6.15. Copy of a section from one of William Senior's 1628 maps of the Upper Derwent. This part of the map is of particular interest, because it shows that Cow Hey (West) and Ox Hey were already in existence, and distinct from the mosses and moors beyond. Furthermore, although Black Dike is not named, a land boundary is shown in its position, which appears more distinct beyond Cow Hey (West). This feature, plus Cow Hey and Ox Hey, are coloured yellow.

establishing the antiquity of the working; and thirdly, the land parcel that the boundary enclosed (Cow Hey), which is included in his terrier (Fowkes & Potter 1988), has by evidence of its name, links with the Royal Forest of the Peak. The element 'Hey' derives from *heye*, which is a Middle English form of the Anglo-Saxon *heg* ; either meaning "an enclosed place", or "a locality known by defined bounds, but not enclosed"; forests were typically divided into hays for administrative purposes (Duignan 1902; Glossary). The Peak Forest was established in 1068, but disafforested in 1674 (Bevan 1998).

The preparation-trench mentioned above, which is about 20m wide, is particularly significant because it links with a tumbled enclosure wall (or fold) at its northern end. This runs up the steep side of Linch Clough, and then diverts to within 1m of the eastern face of the trench. This arrangement is further evidence of the antiquity and peat cut origins of the moor-trenches/ linear cuttings in the upper Derwent, often previously interpreted as eroded ditches [for example, Ward (1936)]. A well-defined, terraced trackway links the Cow Hey peat cutting with the Ronksley Farm settlement, which was a rented property by 1339 (Byford 1981), but probably with earlier origins. Midden-scattered pottery sherds of thirteenth century and Romano-British date have been found close by (Beswick 1996). This settlement may have traded in peat, since it appears to have been relatively prosperous (2:4:9), and unusually had two large turbaries (see Ox Hey). According to a probate inventory of 1679, lodged in the Lichfield Archive, this settlement then had, two peat sledges, two sledge sides, three pair of sledge runners, and three wheelbarrows (Stroud 1996). This indicates that the inhabitants were active peat diggers.

6:75. OX HEY

Here is another large, ridge-top peat cutting, where the extent of the overcut area is defined by a series of peat banks. Figure 6.14. shows the site, viewed from Cow Hey (East). This site was the main peat cutting ground of Ronksley Farm, and reached by two well-used, access hollow-ways. The overcut area is rich in peat cutting archaeology, including, extensive baulks indicating piece-meal cutting; loading features; and a stone-built, possible, drying platform. There is also a row of five abandoned grouse shooting butts on overcut part of the ridge. The extent of the cutting northwards is unclear, because of the piece-meal exploitation and subsequent erosion. The name of the site, like that of the two Cow Heys, gives evidence of its antiquity, through association with the Royal Forest of the Peak (see 6:74 & Glossary).

6:76. MOSLEY BANK, SOUTH

Here, there is an ill-defined area of peat pitting, at the top of a shallow braided hollow-way. This site is possibly of great age and associated with other cuttings located in the vicinity (6:2., and 6:77). Curiously, the uncut blanket mire on Mosley Bank is only a little over one metre deep, which is substantially shallower than on nearby ridges such as Ox Hey. Furthermore, there is a prominent layer of peat charcoal visible at the base of the eroding peat cutting banks. It is possible that Mosley Bank and the nearby Little Moor (6:2.) were maintained as hunting or grazing areas in pre-history, by summer firing the developing mire vegetation, but were later abandoned because of escalating blanket bog development.

6:77. MOSLEY BANK, NORTH

A second, ill-defined area of peat cutting is located on the top of Mosley Bank. This site occurs at the head of a group of indistinct braided hollow-ways, but is not readily associated with any known settlement site.

6:78. POOL ON ALPORT MOOR

This is an amorphous peat pit, with central pool, located within an extensive area of blanket mire. This weathered feature, retains evidence of, sub-rectangular peat pitting, baulks, and turf stripping. The latter is indicated by vegetation change and surface stepping and is very clearly defined in one location. The pit is located on the high point of an exposed ridge and is linked to a gully which runs into the Upper North Grain brook. It occurs on a sheep walk indicated on the 1850 Tithe map of the area (Peak Park Archive) and could therefore have been used by shepherds as a stock drinking hole and intermittent peat working for their own on-site usage.

CHAPTER 7

THE ARCHAEOLOGY OF UPLAND PEAT CUTTING

THE ARCHAEOLOGY OF UPLAND PEAT CUTTING

Whilst abrupt peat banks are the basic element of peat-cutting archaeology, irrespective of topographic or geographical location, their size, shape and extent varies considerably from site to site. These cuttings may occur singly in the landscape, or be grouped in diverse arrangements associated with a variety of other features connected with the loading, processing, transport and use of the peat product.

Certain archaeology connected with peat exploitation in Britain is well documented, but usually relates to cuttings associated with either, lowland raised mires, e.g. the Fenn's and Whixall Mosses (Berry *et al.* 1996); or fen landscapes, notably the Norfolk Broads (Lambert & Jennings 1960; Lambert *et al.* 1965; George 1992). A significant exception is the Lizard Peninsular, where extensive shallow peat stripping and associated charring hearths have been identified. Extraction from raised mires and fens occurred under water-logged conditions which resulted in the production of specific archaeological features. The latter have often been modified or masked by the build-up of further organic bog deposits and sometimes silts (Rackham 1996). Since peat-cutting in the uplands has affected blanket mire and valley bogs, it has resulted in the formation of a different range of archaeological features, which are described in the following catalogue. Certain of these features are analogous with others which can be seen on the extensively, overcut, low-level, blanket mires of the Western Isles of Scotland. Figure 7.1. illustrates the types of peat cutting that have been identified so far in upland contexts and Figure 7.2. illustrates the associated archaeology.

SUMMARY OF FEATURES:

7:1. TYPES OF PEAT CUTTING

7:1:1. Large-scale opencast cuttings on ridges
7:1:2. Long-face cuttings
7:1:3. Large-scale fan-shaped cuttings
7:1:4. Large-scale invasive cuttings
7:1:5. Large-scale amorphous cuttings
7:1:6. Edge-top cuttings
7:1:7. Turf stripped areas
7:1:8. Linear cuttings
7:1:9. Large sub-rectangular cuttings
7:1:10. Minor sub-rectangular pot-pits
7:1:11. Minor invasive sub-rectangular cuttings
7:1:12. Minor racket-form cuttings
7:1:13. Minor concave cuttings

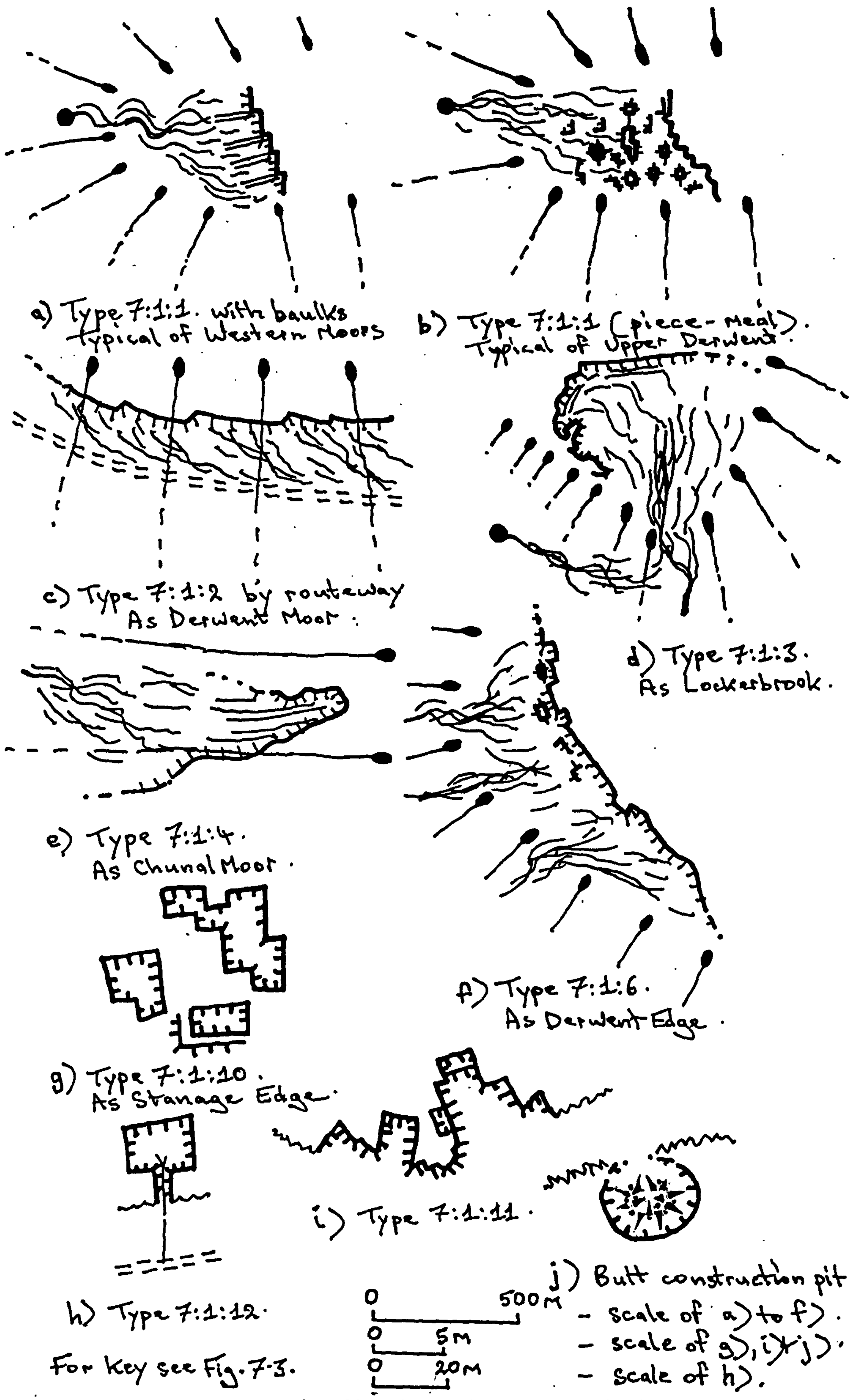


Fig. 7.1. Diagrammatic representations of the main types of peat cutting found in upland contexts, based on named examples, showing slope lines, the peat faces, baulks, access tracks, and settlements.

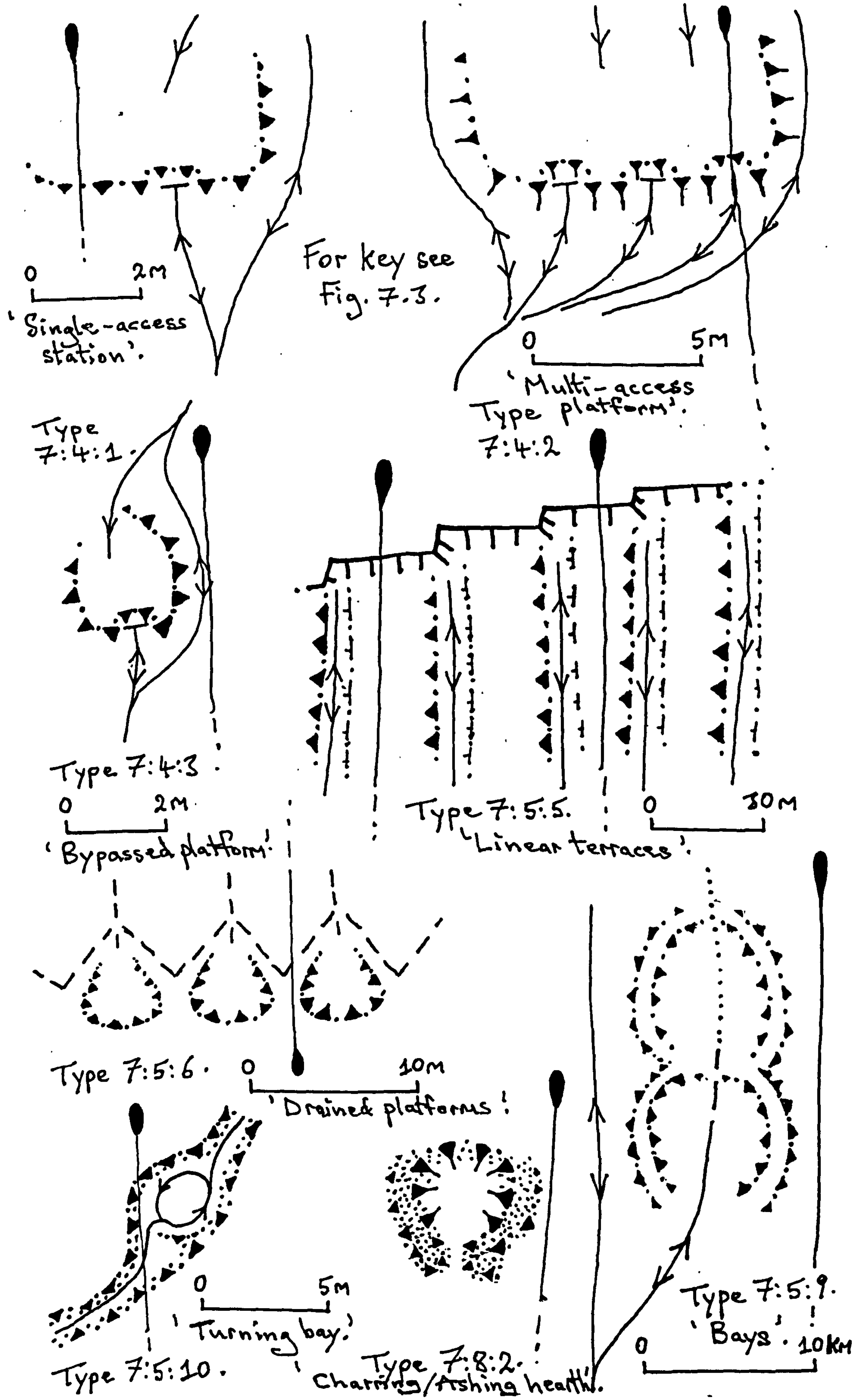


Fig. 7.2. Diagrammatic representations of other, miscellaneous, peat cutting features found in upland contexts.

7:8:2. Charring/ Ashing hearths

7:8:3. Minor drainage grips

7:8:4. Turve remnants within cuttings

7:1. TYPES OF PEAT CUTTING

Unless there has been total removal of isolated peat deposits, the extent of cutting usually forms the most prominent archaeological feature; represented by an abrupt bank of peat, often with rectangular or right-angled recesses. Areas where there has been total or near complete removal of peat, may be suspected from topographical criteria and then confirmed by the presence of associated archaeology, such as access-trackways.

The following typology reflects differences in the form and extent of peat working faces present within the blanket mire landscapes. It should be borne in mind, that the size and shape of any peat cutting is determined by its age; its topographical location; and whether it belonged to a single dwelling, or was divided and worked by a number of settlements. Over centuries, the progress of the exploitation across a varied topography and changes in settlement patterns and population levels, may result in the metamorphosis and merging of individual cuttings, to the extent that overcut areas may become an palimpsest of different types of workings.

7:1:1. Large-scale open-cast cuttings on ridges

The great majority of well-defined, large-scale peat workings occurring in the South Pennines are of this type. They are usually marked by an abrupt peat bank running across the ridge against the line of contour. The peat bank varies in depth from site to site, for instance at Cow Hey it is c.0.5m in depth, while at Saddleworth Moor it is c.3m deep; but will usually show a number of abrupt right-angled steps along its length, indicating division of the turbary. Extensive and clearly defined access hollow-ways, are especially characteristic of this type of peat working. They formed readily on the surrounding slopes and often directly link the peat cuttings with settlements.

Sub-type with parallel baulks

Here steps occurring along the peat face can be linked to low linear features running away perpendicularly across the overcut ground. These features are the remains of baulks which delineated subdivisions of the turbary (see 7:3:1.). Two of the largest opencast peat workings occurring in the Peak District are of this sub-type; namely the Crookstone Out Moor turbary and Peaknaze Moor. In the Peak District this type of peat cutting is mainly found down the western fringe (see 5:1:3); Crookstone Out Moor is a notable exception to this trend.

Sub-type showing piece-meal sub-division

Here there appears to have been a different type of organisation of the individual cuttings within the overall turbary; namely piece-meal division of the area into sub-rectangular blocks. The latter is evidenced by the presence of irregularly spaced steps along the peat face, as well as ramifying trackways and minor lynchet-like features on the overcut surface. Most large peat cuttings occurring in the Upper Derwent Valley are of this type.

7:1:2. Long-face cuttings

This is another form of large-scale, opencast, peat working; but here the cut face may cross contours and the exploitation is not limited to ridge tops. The orientation of the peat face appears to have been controlled by social as well as topographical criteria and because its length was not limited by the width of ridges, may often stretch considerable distances across the landscape. Where peat extraction has taken place on two adjacent ridges and the limit of exploitation has extended beyond the dividing watercourse, two opencast cuttings may effectively evolve into a single long-face type. Notable examples of this phenomenon are provided by the Crookstone Out Moor turbaries and those on Peaknaze Moor.

Occasionally a wall or linear earthwork can be found running parallel with a long-face peat cutting, on the overcut side of the face. In these situations the presence of the peat face seems to have initiated the building of the boundary; presumably because it was perceived as a significant landscape feature demarcating poor land from better land which could be enclosed. Notable examples of this phenomenon can be seen on Tom Moor at the west end of Rushup Edge and on Axe Edge Moor near Derbyshire Bridge. At the latter site, an apparent west-to-east, orientated peat cutting face is bounded by the remains of both an earthen bank and a drystone wall, which enclose an 18^{th} century, turnpike road (Barnatt 1994).

Long-face cutting on ridge

In rare instances the limit of peat cutting on ridge-tops, may run along the length of the ridge, rather than crossing from one side to the other. This occurs where there has been multiple division of a turbary associated with settlements distributed along the base of the ridge. It is a situation akin to that found along the top of gritstone edges within the Derwent Valley (see Edge-top Cuttings). The best example of this type of peat cutting found within the Peak District is located on Saddleworth Moor; where there is a 2km long peat cutting face with dividing baulks Fig. 5.9.).

Long-face cutting adjacent to routeway

Here a long length of peat cutting extends parallel to a well-established routeway. This arrangement apparently facilitating the 'export' of the peat. A good example of this type of arrangement can be seen on Derwent Moors, where an c.0.5km length of peat working face runs adjacent to the Derwent to Sheffield Commonway; a routeway mentioned in a 14th century charter (Dodd & Dodd 1980).

7:1:3. Large-scale fan-shaped cuttings

Two well-defined examples of this form of large-scale peat working were located in the South Pennines; both in the Upper Derwent Valley, at Lockerbrook Heights (Figs 3.5 & 7.3.) and Hey Ridge (Figs 6.8. & 6.9.). This type of extraction could be classed as a variation of 7:1:1 since the two examples mentioned above both occur on ridges and are marked by an abrupt peat bank running across the ridge, generally against the line of contour. However, with this type of cutting there has been an element of invasion into the blanket mire, rather than a more regular stripping back of the peat along a broad front. This has produced roughly fan-shaped areas of extraction, containing spreads of trackways which diverge from well-defined hollow-ways running up to the workings. Abrupt steps occur along the line of the peat bank, but these are rather irregularly spaced and are not connected to parallel baulks running across the overcut ground. In this instance, there seems to have been piece-meal division of the overcut area into sub-rectangular blocks. This interpretation is further evidenced by the ramifying trackways and the presence of minor rectilinear lynchet-like features on the overcut surface.

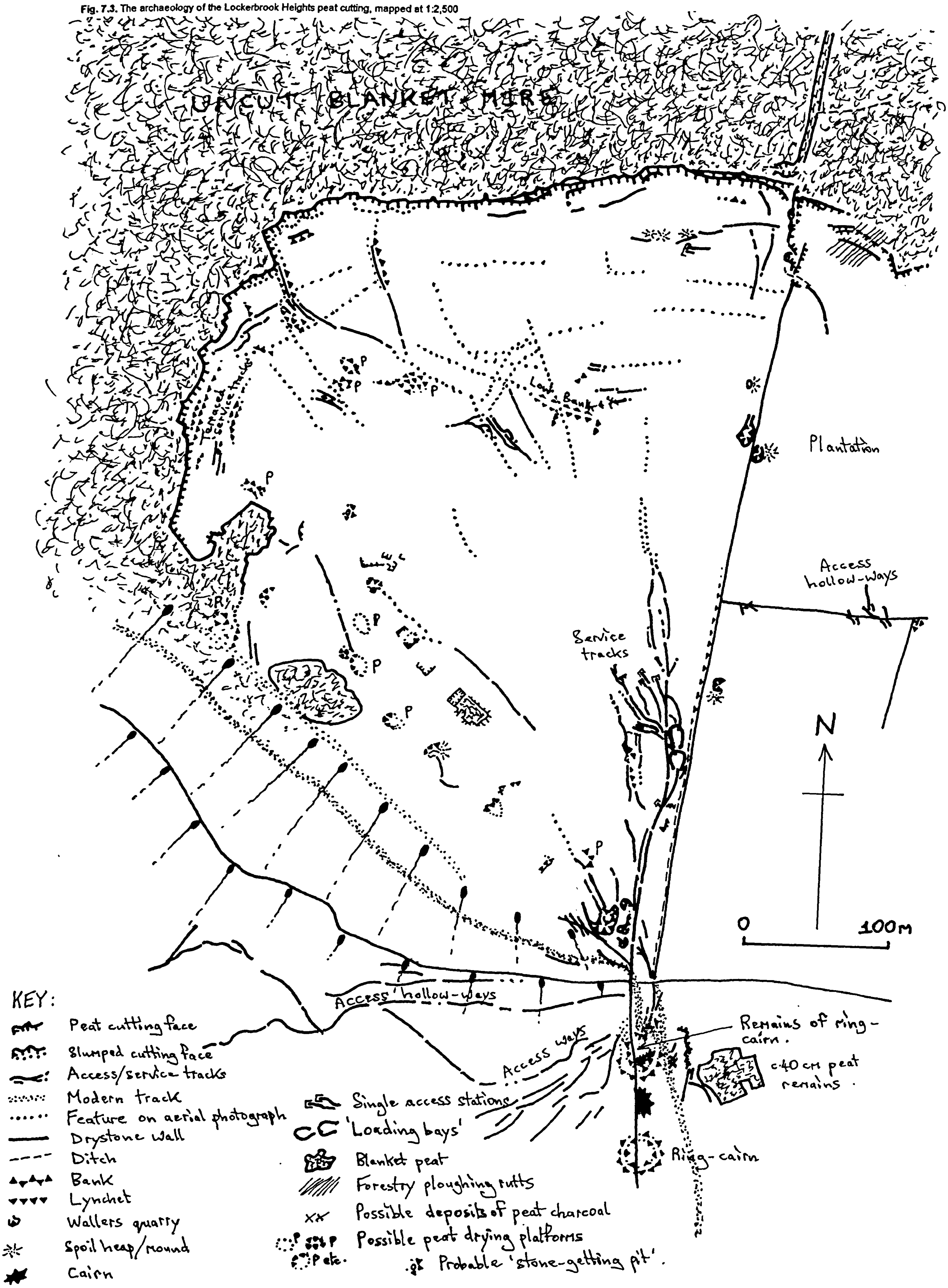
7:1:4. Large-scale invasive cuttings

Only two well-defined examples of this form of large-scale peat working were identified in the Peak District. These were found within close proximity of each other on the western side of the plateau, at Chunal Moor and Leygatehead Moor (Fig. 5.6.). At these sites there has been considerable penetration into the blanket mire; this has produced roughly tongue-shaped areas of extraction. The cuttings and surrounding ground are vegetated by leggy Heather (*Calluna vulgaris*) which probably masks many minor archaeological features, but at both sites there is evidence of earlier broad-front working.

At Leygatehead Moor the peat extraction may have become invasive into the blanket mire due to either there being greater peat exploitation within that section of the turbary or because of abandonment of adjacent divisions of the turbary, and/or after interrupted peat exploitation (and therefore possible change in peat cutting methodology). The latter is supported by the invasive section of cut-over ground being clearly divided by regularly spaced parallel baulks, highlighted by linear growths of bilberry (*Vaccinium myrtilus).* To the WNW, the limit of peat removal occurs much lower down the slope, is broad-front in character and appears to lack any linear baulks.

At Chunal Moor the same factors may have been involved but at this site there are no obvious linear baulks and the 'invasion' seems to have been in part influenced by the local topography. The distal end of the peat cutting seems to turn along the line of contour in

Fig. 7.3. The archaeology of the Lockerbrook Heights peat cutting, mapped at 1:2,500



a NE direction, to follow a prominent incised water course which borders it on its SE side; while the earlier peat workings appear to run up the slope, against the line of contour.

7:1:5. Large-scale amorphous cuttings

This class of cutting includes some of the largest areas of peat working identified within upland contexts. Here there is no well-defined limit of extraction, due to the manner of the cutting, because several individual workings have merged, the extraction has moved across areas of shallow peat, there has been total removal of an isolated topogenous peat deposit, or because the cut landscape has seen significant peat re-formation or erosion.

Derived amorphous cuttings

Extensive areas of overcutting may have affected contiguous topogenous bogs and blanket mires. These extractions' are likely to incorporate several different cuttings and/ or phases of cutting, as well as features connected with later land-use (notably quarrying). Notable examples are the blanket edge extractions' located to the north of Winscar Reservoir and around Harehill Clough; and those affecting various peat deposits in the vicinity of Rushup Edge. These extractions are a palimpsest of various peat cutting and other land-use features.

The peat workings located around Rushup Edge (Fig. 5.6.) have considerable interest because they are an obvious mosaic of different phases of extraction, which extend over a varied topography, apparently affecting significant proportions of the land surface within fifteen different 1km squares. The NW section of the workings at Colborne includes a large-scale opencast peat cutting area, linear cuttings, and an elaborate drainage system cutting the remaining blanket peat. Extending eastwards along the summit of Rushup Edge is an apparent extensive area of peat pits; while at Whitelee there is an isolated sub-rectangular block of deep peat (SK 095815), which has peat cutting scars on its surface and may be the remaining vestige of an upland raised mire (Ardron & Rotherham in prep. b). The interpretation of this feature as a remnant of a former, upland, raised bog is supported by its topographical location and by the presence of an anomalous dark-cloud around it, visible on aerial photographs. Other, similar, dark-clouds, and patterns of linear features, distributed across the gently sloping land below Rushup Edge, suggest the former presence of a considerable expanse of peat bogs and associated drains in this area. Such 'clouds', which are mammariform, have been observed on aerial photographs of other parts of the Peak District (for instance below Combs Moss; at SK 0676), and appear to identify areas where there are relict peat deposits, and broad up-welling of ground water along a spring line. Soil sampling and detailed examination of the vegetation at these sites should elucidate the situation.

The Harehill site is also a palimpsest of peat cuts and associated features, and has added significance, because it is the only peat cut landscape of the Peak District which shows significant mass-wasting of the peat blanket (Fig. 5.8.). The Winscar extractions are notable because they enclose extensive stone quarries, whose upslope limits trace part of the peat face. The latter relationship suggests that the quarrying may have been facilitated and encouraged by the peat removal. This site is also of special interest because it incorporates two of the five peat cutting areas administrated by the Graveship of Holme. One of these (Hades Peat Pits), is the only remaining legitimate peat working in the Peak District.

Pitted amorphous cuttings

This type of cutting is formed of many contiguous, small, sub-rectangular peat pits, which may produce a characteristic patch-work mosaic visible on aerial photographs. It is mostly found on areas of topogenous peat in hollows or on the tops of escarpments, where there is impeded drainage. The individual pits are usually separated by narrow baulks which often support different vegetation. This has the effect of enhancing the appearance of these workings on aerial photographs.

7:1:6. Edge-top cuttings

The dipslopes of the gritstone escarpments of the Peak District are typically covered by blanket mires. Those on the east side of the Upper Derwent Valley have been extensively peat cut. A mosaic of peat cuttings forms a linear zone affecting long sections of the blanket mire perimeter, rather than penetrating far into it. This is probably because only edge tops are more effectively self-draining, and settlements have tended to exploit the most convenient and easily extracted deposits. On Derwent Edge and Stanage Edge, the cuttings vary in character, reflecting different working practices employed by the individual settlement sites responsible. At lower altitudes further down the Derwent, where the peat blanket is thinner, cutting has been more extensive and on some moors there appears to have been near total removal of the peat. Routeways linked to edge-top workings are usually numerous, because each settlement within the valley had its own supply route. This is particularly evident along Derwent Edge, where a series of well-defined, braided hollow-ways run up to the cuttings from the farmsteads scattered across the slopes above Derwent hamlet.

Opencast edge-top cuttings

Here, peat extraction has taken place along a broad front, producing quarry-like faces in the edge of the blanket mire (Fig. 6.3). These features may be subdivided by baulks in the same manner as other types of cuttings and may incorporate, or occur side-by-side with, areas of peat-pitting.

Pitted edge-top cuttings

In these situations, the peat has been extracted by pot-pitting, and impeded drainage has sometimes led to the formation of pit pools (Figs 8.5. & 8.6.). Some of the individual pits may have been disguised by peat re-formation, or the growth of floating rafts of vegetation (Fig. 8.5.).

7:1:7. Turf stripped areas

There are many areas of moorland below c.370m where there is no blanket peat on apparently suitable topography. Examination of relevant aerial photographs reveals that many carry unusual vegetation patterns and other anomalies. These appear unnatural, and are probably the result of turf stripping, or shallow peat cutting.

Striped type

A variety of parallel linear features are found on aerial photographs of moorlands. These may indicate 'herring-bone land drainage' (Fig. 5.9.); ploughing connected with aforestation; ploughing or mowing to control unpalatable grasslands, (especially *Molinia* dominated areas) (Figs. 6.1. & 6.2.); or soil creep and related vegetation banding on steeper slopes. However, other indistinct striping sometimes occurs, which cannot be explained by the above, and may be the result of past peat digging or turf stripping.

Monochrome aerial photographs, taken by the RAF in 1995 from 12,500 feet, when the higher ground was affected by a wind-blown dusting of snow, show a number of unusually clear features of this type. This striping tends to run north-west to south-east, possibly in response to the prevailing wind direction. Other examples run north to south, and a few west to east. They occur on more or less level ground as well as on slopes below escarpments. Typical striations have a separation of about four metres (e.g. those occurring on the boulder slope below Derwent Edge; Fig. 6.3.), but sometimes these may be subdivided by fainter and more intermittent linear features. On Peaknaze Moor near Glossop, lines with an approximate separation of 5m, are in part crossed by the much closer and less distinct ploughing lines of a recent M.A.F.F. (Ministry of Agriculture, Fisheries, and Food), grassland improvement scheme. However, although the plough-lines are the less obvious of the two types of linear feature found on the photographs, they are the only ones noticeable in the field. At this site, both sets of lines occur within the limits of a prominent, ridge-top peat cutting.

Amorphous type

Mosaics of moorland vegetation can often include rather organised patterns of sub-rectangular patches, in particular of, dwarf shrub and grass. Such vegetation patterning suggests widespread removal of shallow peat or turves. In these areas the dwarf shrubs usually occupy patches of ground which still retains traces of uncut peat or the waste from peat stacks, with grasses colonising the exposed, mineral soil.

7:1:8 Linear cuttings

There are many incised, linear features which occur in upland mires and because of their regularity or straightness, cannot be explained by the processes of natural drainage. Some of these are clearly drainage ditches or canalised watercourses, and others boundaries incorporating up-thrown banks or drystone walls. However, there are a significant number of more trench-like features, which while they may in part have served a drainage or boundary function, appear to have also been used as linear peat workings. In the past, their genesis has generally been put down to erosion occurring along drains [for example, Ward (1936))], but this can be dismissed as the major cause since in some cases at least, the topography would prevent eroded peat washing away.

Trench cuttings vary considerably in terms of their length and width, and may be very simple, elongate, rectangular pits or show internal features such as transverse and lateral stepping. Those serving in part a drainage or boundary function, may have developed around previously existing linear features, which may still be partly preserved within the trench. They may be found as single features within the landscape, or be grouped together, sometimes in parallel lines; they may also occur side-by-side with other types of peat cuttings.

Complex boundary type

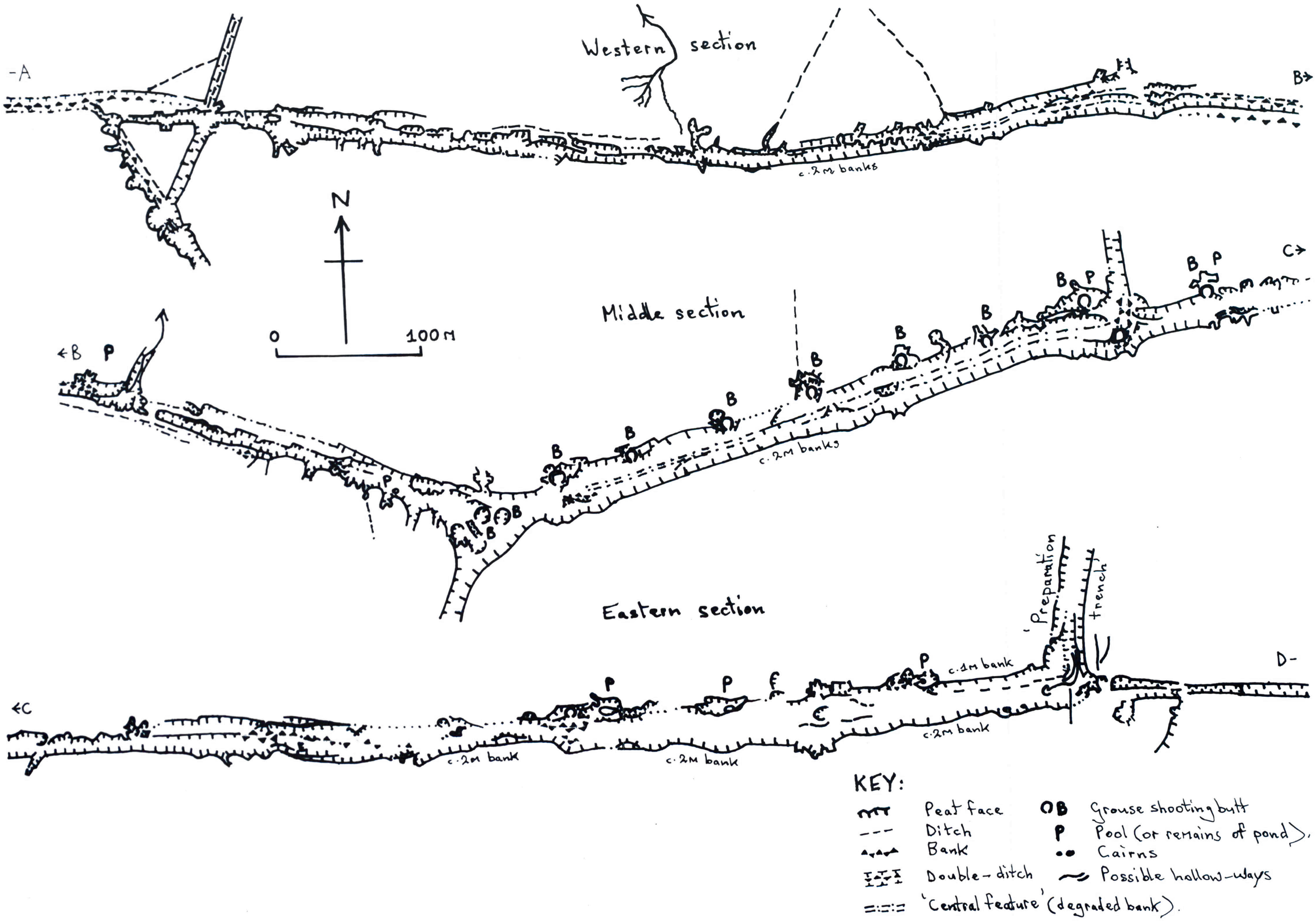
Aerial photographs of the gritstone moors of the Peak District commonly show linear features crossing broad areas of plateau top. These sometimes include very prominent broad sections, which may be delineated by different vegetation (Fig. 1.2.). When examined in the field these linear features are generally found to be major boundaries made up of sections of double-ditch and broader trench-like cuttings (Figs 7.4., 6.12., & 6.13.). The trenches are channels cut in the blanket mire down to the mineral soil, and appear to be linear peat workings which have been formed by cutting either side of the previously existing double-ditches. Because the double-ditches were cut into the blanket peat and the associated central bank constructed from the peat upcast, these elements of the boundary, if they lie within a section of trench, have been largely obliterated by the process. However, evidence of this process can be seen where a section of double ditch runs south-eastwards into the large fan-shaped peat cutting located on Hey Ridge, Alport (Fig. 6.8.). At this site, the bank and ditches are prominent on the intact blanket mire beyond the peat cutting (Fig. 7.4.), part destroyed where they cross the working face, and preserved as an intermittent low bank on the cut-over surface. The more complex linear cuttings will usually have branches and where associated with other large-scale peat workings, sometimes, preparation-ditches (see below and Fig. 7.5.).

Black Dike (Figs 7.6., 6.12., & 6.13.) is the most significant of the trench boundaries found in the Peak District; it runs south-east to north-west across 2.5km of moorland west of Howden Reservoir and is contiguous with a c.500m section of infilled double-ditch boundary

Fig. 7.4. View northwards along the linear peat-work which connects the two Swint Clough turbaries, above Alport Dale. This feature, provides clues to the genesis of linear peat cuttings: in the foreground, it is clearly a degraded double-ditch , but in the middle distance, has been converted into a trench-like feature, with right-angled recess (arrowed).

Fig. 7.5. View along a 'preparation-ditch' associated with the Rakes Moss peat cuttings in Longdendale. The photo also shows a 'prepared' baulk of peat and tumbled drystone wall. The latter appears to have formed a boundary with the central-feature of the 'preparation-ditch' (defined by the line of dark dwarf-shrub vegetation through pale *Nardus*).

Fig. 7.6. The archaeology of Black Dike, mapped at 1:2,500



which continues westwards across the blanket mire. In character with this class of linear cutting it incorporates a diverse range of features, such as, many abrupt changes in width, occasional changes in depth, and traces of a central bank. Curiously, the floor of Black Dike is on the whole slightly higher on the north-east side of the central line than on the south-west side; perhaps due to an attempt to channel drainage down the latter while using the former for purposes such as droving. In fact there are a number of apparent drinking pools/ watering holes along the length of the dike. According to Ward (1933), about 145 years ago, Black Dike and some of the other trench boundaries were fenced with stakes and brushwood. There are also a number of short branches from the main trench, including a preparation-trench (see below), as well as various offset drains. Other features associated with Black Dike include a few tiny cairns (which could be the result of contemporary clearance), and a series of abandoned grouse-shooting butts (which were recessed into the north bank of the cutting and built out of the excavated turves).

Carriage-ways

One of the most prominent linear peat cuttings in the Peak District crosses Saddleworth Moor for 3km as a broad double-trench (Figs. 7.7. & 5.10.). This c.30m wide feature, is part of a 'routeway', shown on an 1834 Saddleworth enclosure map as a Public Carriage Road, continuing westwards as the New Road to Uppermill (Peak National Park 'Sites and Monuments Record'). The New Road to Uppermill is today a walled 'moor-gate'. The double-trenches (c. 4-6m wide) have been inconsistently excavated, particularly towards the west end, where there are also small sub-rectangular lateral cuttings (Fig. 7.8.). There are also extensive drainage ditches associated with the trenches, while the central causeway (largely formed from uncut peat) has several stone-built culverts underneath it. For c.100m, at its west end, the causeway has been built-up from stone aggregate; probably obtained from the nearby quarry located within the Saddleworth Moor turbary. On aerial photographs, eastwards, the double-trench appears to be contiguous with a single broad trench, which may be part of an early boundary of the Graveship of Holme.

Preparation trenches

As intimated above, there can be branches along the main boundary trenches. These link to watercourses within cloughs and thus divide the moors into major sub-rectangular land-holdings (see Figs 1.2. & 5.2.). At the Cow Hey, South (Fig. 1.2.) and Fagney Clough, South (Figs 3.1. & 3.2.) sites, such offset trenches cut the blanket mire c.100m beyond the limit of overcutting, effectively isolating and part draining large, sub-rectangular blocks of peat. These features are thus interpreted as preparation-trenches, intentionally excavated to isolate a peat block from the blanket mire mass, and to aid its drainage, prior to removal.

Fig. 7.7. View westwards along the broad 'double-trench / public carriage-way' on Saddleworth Moor. This part of the feature is dissected by two major erosion gullies, which were probably in existence prior to the carriage-ways inauguration (but not necessarily before a pre-existing boundary). Their flow was likely channelled through culverts under the central bank; which were probably destroyed by storm water, after the carriage-ways abandonment.

Fig. 7.8. Piece-meal peat cutting along the 'double-trench / public carriage-way' on Saddleworth Moor. This photograph, which is taken from within and at 'right-angles' to one of the trenches, shows a degraded drain, with adjacent sub-rectangular peat pits (defined by the redder *Eriophorum angustifolium* vegetation).

Minor domestic linear cuttings

Trench-like peat cuttings are still a common feature in extant peat-getting areas of the British Isles; notably on the Scottish islands. They are typically cut into the surface of the bog by individual crofters, but may occur in groups. Since they are not free-draining, they typically flood before the lowest peat deposits have been removed. In the Peak District, this type of cutting appears to have always been rare, probably because the bottom peat was the most valued. Where they do occur, they are usually excavated into a mire edge and so do not flood, allowing complete removal of the peat. In the Peak, they may all be recent. One example can be linked by photographic evidence to Victorian and early 20th century peat-bathing in Buxton (Figs 4.9. & 4.10.). Sometimes a simple trench cutting may be only a little longer than broad. If the length to breadth ratio is less than two to one, it may grade with those features described under sections 7:1:10. and 7:1:11.

7:1:9. Large sub-rectangular cuttings

Sometimes, sub-rectangular peat pits are cut into the edge of plateau-top blanket mires (Fig. 1.7.). A relatively large example, c.350m X 175m, occurs on Rowlee Pasture on the ridge between the Alport and Upper Derwent Valleys (6:60). Other similar workings can be seen on the north edge of Birchinlee Pasture (6:62) and on Hordren Edge.

7:1:10. Minor sub-rectangular pot-pits

Although it is the various forms of opencast peat workings which dominate the overcut landscape of the Peak District, there are a few areas where there has been substantial pot-pitting into the surface of blanket bogs, for instance along Stanage Edge. These sites have a pock-marked appearance, which when revegetated, may in overview suggest natural hummock-hollow bogland. On close examination however, most of the individual pits will be found to have a sub-rectangular form and typically would be no larger than 10m across. Sometimes several may merge to form a more complicated rectilinear shape (at simplest an 'L') and if the pits are deep enough they may form bog pools. Most pot-pits are poorly drained, unless they occur on the fringe of a blanket mire; so their sharp edges and corners may be heavily disguised by regrown bog vegetation.

The presence of obvious pot-pits, or any abrupt cutting features, is likely to represent only the final phases of exploitation of peat on a site. As pot-pits are only small-scale, and have usually been excavated downwards into the surface of the bog, they often occur within a palimpsest of other peat cuttings [as is the case along Stanage Edge (Figs 8.5. & 8.6.)]. Such overlapping workings are to be considered, wherever a mosaic of bog and heath communities occur around prominent peat pits. Cuttings can be indicated by abrupt changes in the vegetation, in particular the presence of *Sphagnum* dominated areas.

7:1:11. Minor invasive sub-rectangular cuttings

Small, sub-rectangular peat pits may be found excavated into the edge of blanket mires and other bogs. In this case they will tend to be open-fronted on the down-slope side, and therefore free-draining. These recessed cuttings are usually of similar scale to sub-rectangular pot-pits and like them often occur in groups, and may merge to form more irregularly shaped pits. In the Peak District, they appear to be the most recent type of peat working, and may in some cases have been imposed on older opencast cutting faces. Good examples can still be found in use within two of the peat grounds administrated by the Graveship of Holme, at Isle of Skye and Harden Moss (Figs 5.15. & 5.16.). Disused examples are widespread, but often occur along edge tops, for example west of Pasture Tor. This type of peat cutting appears to reflect single season exploitation by individuals. In the case of the Graveship of Holme there is annual establishment of turbary rights, and many of the pits bear the initials of the claimants and the year of allocation.

7:1:12. Minor racket-form cuttings

Here, what was originally a minor, recessed peat working may have been expanded to form a racket-shaped pit, with an entrance. These features, in most cases, appear to be the result of Post-Medieval, exploitation of peat for domestic purposes, and are mainly found in the vicinity of dispersed settlements. Examples are widespread in the Peak District, but are perhaps most common on the Staffordshire Moors. A well-defined example of a racket-form cutting can be seen at Moscar Top, and there is a group of these features near to the Cat and Fiddle Inn (Staffordshire Moors). See 6:27.

7:1:13. Minor concave cuttings

In most instances, small-scale peat workings are defined by sub-rectangular or right-angled cutting faces. However, the limit of extraction is sometimes marked by a concave recess. Usually peat is cut in straight lines, aiding division of turbary. Where concave cuttings occur, there may be a more relaxed, piece-meal approach to peat cutting, which may have developed as the peat resource became economically less valuable. In the Peak District, this type of feature is rare and generally associated with the construction of grouse butts (see 7:1:5).

7:1:14. Amorphous minor peat-getting features

In some unimproved upland areas, where there are no obvious peat deposits, concentrations of shallow but abrupt recesses may be found in the ground surface. These typically have a right-angled form and appear to indicate widespread 'day-pitting' (single visit exploitation) of shallow blanket peat or peaty turf. Often these features are found on slopes where natural drainage facilitates the drying out of any fragmented organic layer; leading to the development of acid grassland, which in overview disguises the presence of any remaining peat. Close examination may reveal the presence of patches of bog vegetation surviving on peat remnants. A significant palimpsest of these small scale workings can be seen on Cowms Moor in the Woodlands Valley.

7:1:15. Miscellaneous small-scale workings

Job-specific turf cuts

In areas where there has been a cessation of industrial and domestic use of peat, there may have been later intermittent, small-scale exploitation of the resource. Such job-specific cutting has been related to land-use and mainly connected with the building of temporary structures close to the sites of extraction. Whatever the purposes, the workings left behind are generally patch-like, one turve deep, and sometimes just a few turves in width; they are typically sub-rectangular in plan, have rather sharp edges, and show prominent right-angled corners. In upland areas, such as the Peak District, where grouse shooting butts have often been made of peat or turf, features of this type are of frequent occurrence (see Fig. 7.20.).

Butt construction pits

Some turve-made grouse shooting butts have been located on mineral soil surfaces, exposed within circular peat pits, cut into the edge of blanket mires. The pits have diameters of about 10m-15m and show abrupt cut faces of up to 0.5m depth. The butts have been set centrally within the pits and have been constructed out of the excavated peat (Fig. 7.1.). In the Upper Derwent, there are lines of these features on Rowlee Pasture, and on Howden Dean top (SK188923 to 192923). At other sites, for instance along Black Dike, butts have been located in recesses excavated into previously cut peat banks (Fig. 7.6.).

Recent roadside robbings

Although commoner's peat cutting rights have largely expired in the Peak District, there remained until recently a belief within elements of the indigenous population that the peat resource was, by unwritten right, there to be exploited. About forty years ago it was not uncommon to see members of the Sheffield public gathering small loads of peat from nearby moors; apparently unhindered. At that time such practice was taken as the norm; today, with the general populace better informed, it still goes on but is carried out surreptitiously. This type of activity generally involved digging a few shovels full of loose peat from an eroding road side peat bank for use in the garden. However, occasionally the peat was cut into turves, stored in suburban garden sheds, and then used on the household fire (Clarkson *pers. comm.*) These roadside 'robbings' are difficult to recognise in the field because they usually affected already eroding bog edges. One of the most popular sites was Upper Burbage Bridge (SK 262831), where the modern 'robbings' were imposed on earlier cuttings.

Mors pits

Sometimes flooded peat workings have been exploited for the organic sludge that collects at the bottom. This was dredged out, left to dry on the bog surface and then cut into 'bricks' for fuel (Stephens 1851). This mors appears to have been most valuable when it incorporated the highly humified and very combustible, basal peat of the bog. Even if dredging disturbed the mineral soil, and this mixed with the sludge, the mors could still be used (provided that there was sufficient organic content). There are a number of pit-features within Peak District mires which could have been used for this purpose. These are more sub-circular than normal for water-filled peat pits, have softer margins, appear deeper, and may penetrate the mineral soil. They occur in a variety of widely scattered locations, sometimes in association with groups of peat pits, e.g. on Stanage Edge.

Watering holes

There are a few isolated pits located on the highest parts of the Peak District plateau which penetrate through the blanket peat well into the underlying mineral soil. At least some of these features appear to have been excavated as watering holes associated with sheep walks. A notable example occurs on Alport Moor (6:80); this feature has a variety of minor cutting features imposed upon the surrounding peat banks, including a de-turfed trench edge.

Bog-hollow extractions

Minor topogenous bogs such as those located behind periglacial landslips and rock clutters in clough bottom appear to have been extensively peat cut and because of their accessibility and relatively small size often totally removed. However, because many were probably exploited immediately after settlement, there may have been re-formation of peat. Tiny lynchet-like steps may highlight the margin of the former bogs after removal of the deeper central peat deposits; while in a few sites minor baulks are still visible in hollows where peat re-formation has not overwhelmed them. Both of these types of feature can be seen within the Cowms Moor slip zone (6:44. Fig. 6.7.); while another good example of a bog-hollow extraction occurs at a site in the Westend Valley (6:69. Fig. 7.19.).

7:2. TYPES OF PEAT TRACK

Along side the cutting banks and vegetation changes the most important field evidence of peat cutting are the trackways used to access the workings (Figs 7.9.-7.12.). Indeed, trackways of some form are always found if significant peat cutting has occurred; whereas there are not always peat cutting faces or vegetational differences. Furthermore, these tracks are the best indicators of the extent of overcutting. Their distribution is usually best determined from aerial photographs; where they may be prominent even under very coarse

Fig. 7.9. Access hollow-ways spreading, onto the large sub-rectangular Hey Edge (East) peat cutting, Longdendale.

Fig. 7.11. Part of the main 'peat-gate' between the village of Hope and its turbary on Crookstone Out Moor.

Fig. 7.10. Braided access hollow-ways on Upper Moor, Edale (the locations of Figs 7.15. & 7.16.are arrowed 1. & 2.).

Fig. 7.12. Extensively braided through-route into the Edale Valley (an adjacent racket-form peat cutting is arrowed).

vegetation such as leggy heather (*Calluna vulgaris*). By contrast, cutting faces will only show on aerial photographs if they cast a shadow.

Trackways associated with peat cutting vary considerably both in form and extent. They may be indistinct single features, related to minor, piece-meal workings; deep braided hollow-ways connected with long-standing turbaries; or walled lanes (called 'gates') which may have been multi-function moorland access-tracks or through-routes. They may have been used as footpaths, packhorse trails, sledways or wheeltracks; or combinations of these through time. Braided hollow-ways incorporating 'hanging' branches are common around the larger peat workings. These indicate long-term usage of the track and may link directly to other peat cutting archaeology such as loading platforms and stacking areas. Most peat cutting trackways change character along their lengths, because of localised differences in topography and usage. These changes may involve, for instance, braiding, degree of cutting of hollowed sections, enclosure of the track, or the presence of associated archaeological features such as loading platforms. If the peat cutters lived in settlements some distance from the workings, there would typically be three distinct elements to their peat-ways. These are described below.

7:2:1. Access-tracks

Typically, steep tracks linked the peat cutting settlements with the hill top turbaries, and now often signal the position of overcut areas (Fig. 7.9.). They are particularly characteristic because they often lead directly upslope from valley bottom settlements, but appear to serve no obvious purpose in the contemporary landscape; 'going nowhere' on the moors above. Similar tracks may have accessed quarries, or grazing areas; but when examined closely, those connected specifically with peat cutting, are usually found to branch into other less distinct trackways which terminate on the higher ground, often at loading platforms and stacking areas (see 7:2:2.). In common with any unmetalled tracks located on slopes, they are typically found as hollow-ways where they run directly upslope, as terraces where they trace the line of contour, or hollowed terraces when they cross the slope diagonally. They often take a zigzag course down steep slopes. This made climbing the hills less arduous and helped to control the descent of the heavily loaded carts and sleds.

Access-tracks are often found to be as sharply defined by their characteristic colonising vegetation, as by their form. Whilst the adjacent slopes may be covered by a dominant growth of mat grass (*Nardus stricta*), the tracks themselves may support abundant dwarf-shrubs, notably of bilberry (*Vaccinium myrtilus*) and bell heather (*Erica cinerea*). See 10:3:1.

7:2:2. Cutting/ service-tracks

These are the trackways which serviced the overcut areas, leading to the peat cutting faces, loading ramps, and stacking areas. They characteristically spread outwards from the top of the access-tracks (7:2:1.), and are usually comprised of shallow hollow-ways, but in some situations deep wheel-ruts. If they are hollow-ways, the branches often get progressively shallower as they spread up the moor, but may be locally quite deeply incised. This is particularly so where they run up to loading features. Abandoned arms of these tracks are frequently found 'hanging', adjacent to deeper branches, of later usage. Hollow-form, service-trackways are found on most overcut moors in the Peak District, with a particularly well-defined group occuring on Lockerbrook Heights (Fig 7.3.). Those made up of wheel ruts are rarer, but can be very extensive, for example on Crookstone Hill, and around Kinder Reservoir.

7:2:3. Infrastructural-routeways

Whenever turbaries are related to nucleated settlement, they are likely to have a series of trackways linking them with different parts of the settlement or other settlements in the area. These tracks may connect with, and have become part of, a wider infrastructure of routeways. These may incorporate walled tracks, turnpikes and modern roads (Fig. 5.6.). The main elements of these infrastructural-routeways are described below.

Direct-access routes ('gates')

A majority of the large peat cuttings in the South Pennines associated with nucleated settlements, particularly those on the Western Moors of the Peak District, are linked to them by well-defined, usually rather direct, trackways (Fig. 7.11.). These tracks may be surfaced with hard-core, and are often bordered on either side by drystone walls. The walls, surfacing, and also the direct alignment of these tracks, are in many cases a product of the enclosure acts. Traces of braided hollow-ways can often be seen bordering them. This type of relationship can be seen very clearly at Black Moor (Fig. 1.6.). Many of these direct-access routes may be named on maps, either as lanes, roads or gates. The term 'gate' is commonly applied to such features, particularly on the north eastern fringe of the Peak District; it is derived from Old Norse (Rich 1995), suggesting that these tracks have ancient origins (see glossary).

Through-routes

Sometimes direct-access routes have had a multi-functional usage, and may pass directly through peat cutting areas. These may be, for instance, packhorse routes of considerable antiquity, or turnpike roads overlying older tracks. Their association with the transport of peat is shown when access and service-trackways merge with them downslope of peat cutting areas. Good examples of this type of through-route, are provided by the various packhorse routes linking the Edale Valley and Castleton, with Hayfield, Chapel-en-le-Frith, and other settlements on the western fringe of the Peak District (Fig. 7.12.).

Connecting-routes

There are other trackways which link the gates and through-routes. These usually run with the line of contour, around watersheds (Fig. 5.6.). While in most cases these connecting-routes are still little-used trackways, there are some metalled roads, which appear to have developed from them. The origin and development of these lanes is generally less clear than that of the 'gates' and roads, because they run with the line of contour, which reduces the chances of remnants of hollow-ways surviving along their alignment. Some may not be directly related to the peat cutting industry, but could have developed after enclosure. In some cases they trace the boundary between intake-land and rough grazing; bridging the top ends of moorland access-tracks (Fig. 5.6.). Whatever their origins, because of their topographical location and relationship to peat cutting tracks, they are likely in the main to trace the lower limit of deep peat workings.

One example of this type of track which shows significant evidence of direct peat cutting origins runs between Hayfield and Tideswell. This is part of a packhorse track joining these two settlements (Dodd & Dodd 1980), which between South Head (SK 062846) and the western end of Rushup Edge (SK 092825) traces the line of contour below extensively overcut moorland (Fig. 5.6.). Several walled, access-trackways run up to this section of the lane; at least two of which overlay spreading hollow-ways. Indeed, the lane appears to run through the interface between several major access-tracks and service-tracks. Most significantly, at the top of one of the access-trackways (SK 065843), where remnants of service routes fan out onto the moor above; there are also to the west side, other vestiges of hollow-ways, which run adjacent to the connecting lane and themselves give rise to branching service-trackways (Fig. 5.6.). These relationships provide evidence that at least some connecting-routes were contemporary with phases of peat cutting. They may have developed when a number of scattered settlements used the same turbary, to allow common movement around the base of the cut over area. They may alternatively, or in addition, have facilitated transport and trade of peat products and other goods between more widely located sites of habitation.

7:3. TYPES OF BAULK

There are a variety of raised, peat formed, features on areas of overcut moorland. These are usually found to be either, the remains of turf stacking lines, thin sections of uncut peat which divided different workings, or blocks of unexploited peat. If peat cutting grounds were used by a number of individuals or settlements, then they would usually be sub-divided into distinct allotments. Over time these might become demarcated by baulks of uncut peat. Alternatively, if cutting was carried out in waterlogged conditions, uncut baulks allowed access between flooded workings. Uncut blocks of peat may be baulks in formation, or simply an artefact of piece-meal exploitation. Formal baulks appear to have been shaped in a way which minimises the non-use of the peat resource, and so are typically narrow, linear features.

Baulks may have abrupt edges and show right-angled changes in alignment. When the breadth to height ratio of a baulk is about two to one, or less, then the whole of the feature is likely to have been eroded to some extent; so that they resemble made-up earthen banks. Broader baulks, with a breadth to height ratio exceeding two to one, are generally defined by typical peat cutting faces and have flat tops. When baulks occur isolated on well drained overcut moorland ridges the peat within them will have shrunk considerably and become dry, encouraging colonisation by *Nardus stricta* or *Vaccinium myrtilus.*

7:3:1. Parallel baulks within open-cast cuttings

Here steps occurring along the peat cutting face, can be linked to low linear features running away perpendicularly across the overcut ground (Figs 5.7.-5.9. & 5.12.). These may be peaty banks, occasionally terraces (e.g. at Black Moor), or rarely very eroded banks of peat and stone (notably at Saddleworth Moor). These features are baulks which delineated subdivisions within the turbary; they may have had a purely boundary function on some sites, but could also have been used as peat stacking lines (7:5.). When stony in nature, they may relate to lines of clearance. At their down-slope ends, they often run into arms of braided hollow-ways (clearly seen on aerial photographs of Black Moor). Two of the largest open-cast peat workings occurring in the Peak District contain these features; namely those on Crookstone Out Moor and Peaknaze Moor. In the Peak District, parallel baulks are a common phenomenon of the majority of the larger peat cuttings, occurring down the western fringe. The Crookstone Out Moor turbary is a notable exception to this trend.

7:3:2. Minor baulks between sub-rectangular cuttings

Nearly all large, upland turbaries contain at least indistinct baulks. Most of these will be minor features separating individual peat pits. If there has been almost complete overcutting, then they may have become degraded and be very small-scale. In cuttings where there has been general removal of the peat down to mineral soil, they will usually be much lower then any preserved peat bank demarcating a limit of extraction. They may, through shrinkage, be even lower than a single turve depth.

Minor baulks are most often seen where there has been peat pitting on the surface of ill-drained topogenous bogs. In this type of location, as noted earlier, the baulk may have served both as a boundary between individual workings and as a walkway. It is suggested that as a result of the peat cutters' tendencies to dig numerous pits in such situations, and because of on-going problems with flooding, relatively more baulks were formed and retained. After the abandonment of the pits, the water-logged conditions, retarded the drying out and subsequent crumbling of any uncut peat, with the result that the minor details and abrupt edges of these baulks are usually well-preserved. However, they may in some locations be disguised by peat re-formation and redeveloped bog vegetation; although frequently the distribution of *Sphagnum* helps to define them. Many minor baulks occur amongst the peat pits located along the top of Stanage Edge and on several cut over ridges in the Upper Derwent Valley, notably Ox Hey and Fagney Clough, South (Fig. 3.1.). Well-defined examples can be seen on Derwent Edge and on Cowms Moor.

7:3:3. Boundary baulks

In addition to the minor baulks which delineate individual holdings within areas of peat cutting, other more substantial features may divide adjacent turbaries. When the overcutting has removed more or less all available peat, these baulks may be narrow bank-like features only visible in the field. However, when the peat resource has not been fully exhausted, they can occur as broad blocks of uncut peat prominent on aerial photographs (Fig. 5.12.). This type of baulk typically occurs on upland ridges which have long-standing, nucleated settlements located either side. Such ridges are likely to have been cut by both communities, after mutual division of the moor. If this type of situation is suspected, but there are no obvious peat cutting banks; there should still be well-defined access hollow-ways running up the ridge from each settlement and spreading out onto the moor either side of an indistinct dividing baulk (e.g. on Peat Moor; Fig. 5.5.). However, several exceptionally clear examples of this type of peat cutting have been identified in the Peak District; for instance at Turf Pits and on Marsden Moor (Figs 5.8. & 5.12.).

7:3:4. Miscellaneous baulk-like features

Any extensive peat working is likely to contain a number of raised peat features which are not genuine baulks. Some are related to stacking activity (see 7:5.); but a proportion are likely to be simply uncut sections of peat, isolated by piece-meal peat cutting. These features are often highlighted by angular vegetation patterns (Figs 7.13. & 7.14.) Many such remnants have probably been removed by secondary peat cutting, but where piece-meal exploitation took place on extensive blanket mires, the abundance of the resource may have encouraged their preservation. Even though most uncut blocks of peat are relatively small in area (up to c.10m across), and often lower than any associated intact bog surface, some can be substantial (c.100m or more in length). Varied assemblages of this type of peat remnant occur, for instance, on Derwent Edge and on Ox Hey (Fig. 7.14.).

7:4. TYPES OF LOADING FEATURE

Certain minor earthworks found on or below areas of peat cutting have been used for the loading of peat after cutting and drying. These usually have the appearance of tiny platforms and are typically found in association with service-trackways. On occasion, they appear to rise slightly proud of the surrounding land surface, suggesting that they are built up features. However, especially in the case of the bypassed-type (7:4:4.), this may be an illusion, due to the abrupt cutting of the adjacent tracks. In fact, most of these loading features seem to have been created by the isolation and subsequent usage of small portions of the original land

Fig. 7.13. Vegetation patterning on a cut-over ridge, by Broad Clough, on the western flank of Kinder Scout. Although, the cut-over ground is dominated by *Nardus*, there are also extensive dark patches of dwarf-shrub signalling, the presence of minor baulks or traces of uncut peat. Some of the nearest patches clearly show the right-angled forms diagnostic of piece-meal peat pitting.

Fig. 7.14. Vegetation patterning at the limit of over-cutting on the Ox Hey ridge, in the Derwent Valley. The light coloured *Nardus* patches, denote areas where the mineral soil has been reached, the green is dwarf-shrub on minor baulks and cutting edges, and in the background, the browner vegetation is intact *Eriophorum* dominated blanket mire. Again, the right-angled forms indicate that piece-meal peat pitting has occurred.

surface between branches of service-tracks (perhaps originally for stacking). The most distinct loading features, are associated with at least one blind-ending service-track branch, which abutts its downslope bank. Carts, sleds or pack horses were presumably backed up the service-trackways to the base of the platform, and then loaded from above by hand. Since turves were most likely brought onto the platform surface by foot, then there would be little wear. By comparison, the track below, would be subject to the erosive effects of the repeated movements of heavily-laden carts and/ or horses.

7:4:1. Single-access station

In this instance there is often little or no evidence of a loading platform; simply a blind-ended service-track arm. Usage of the arm for loading purposes is implied by its incised nature and abrupt end. The majority of peat loading features found in upland contexts are of this type. They are common on the larger areas of overcut moorland, and can be expected wherever service-tracks spread out across the peat cutting. If a peat cutting extends upslope a significant distance, then groups of these loading features may be found at various levels; thus marking stages in the development of the turbary. A notable example of this phenomenon occurs on Crookstone Out Moor. Here, single access stations can be found progressing up-slope for at least a kilometre. Other extensive groups of these features have been observed in mid-Wales. Occasionally, single-access stations have clearly defined platforms (Fig. 7.15.).

7:4:2. Multi-access platform

Sometimes, larger and more obvious platform-like loading features are found, which have several blind-ending service-tracks abutting them. Several good examples have been located in the Peak District. One at the base of Upper Moor, has four abutting service-tracks and others which bypass it on either side (Fig. 7.16.). A similar feature occurs on the northern flanks of Win Hill. The Upper Moor platform is particularly well-defined because it has been colonised by bilberry (*Vaccinium myrtilus*).

7:4:3. Bypassed-platform

Occasionally the loops of braided access hollow-ways enclose relatively pronounced loading platforms, formed from fragments of the original land surface. Usually, there is an indistinct branch track leading onto the platform from the upslope side and another, more incised, blind-ending arm, abutting the abrupt lower bank. The hollow-ways which bypass any individual platform, may themselves form blind-ending trackways to similar features located up or down slope. Groups of these features thus formed are often located on the slopes below cut over areas; suggesting that they may have also been used for drying the cut turves (see 7:5.). Several well-defined groups of these bypassed-platforms have been identified in the Peak District; one example occurs on the slopes below Turf Pits (Figs 7.17. & 7.18.).

Fig. 7.15. Two identical photographs of a minor peat stacking platform on the flank of Upper Moor, Edale (see Fig. 7.10.). The lower copy has been interpreted to show the characteristics of the feature and its relationship to the adjacent access track.

Fig. 7.16. Two identical photographs of a 'multi-access platform' at the bottom of Upper Moor, Edale (see figure 7.10.). The lower copy has been interpreted to show the characteristics of the feature and its relationship to the adjacent access tracks.

Fig. 7.17. A 'bypassed platform', near 'Turf Pits', on the Western Moors, viewed from the lower access track. The 'loading bank' and surface of the feature is highlighted by *Vaccinium myrtillus*.

Fig. 7.18. The same 'bypassed platform' seen on Figure 7.17., but viewed from the upslope side.

7:5. TYPES OF STACKING FEATURE

Turf stacks are a common sight on active peat cuttings; the stacking helps to maintain order on the overcut area as well as facilitating the drying and therefore lightening of the turves prior to their removal. Cut turves can be stacked on level ground on the overcut ground or on the uncut bog surface, but the most efficient drying sites are likely to have both good drainage and ventilation. Drainage might be facilitated by digging grips and ventilation by locating stacks in an exposed positions, while both drainage and ventilation could be achieved by building raised surfaces for the purpose (Fig. 7.19.), particularly on sloping ground.

Purpose-built, stacking features are sometimes prominent on overcut landscapes, but even if the cut peat was placed directly on the flat ground, there is likely to be some visible evidence. This may be either as a result of the accumulation of dust and fragments from the drying turves, or sometimes because the stacks themselves have been abandoned (Fig. 7.20.). This evidence includes atypical patches of vegetation and slightly raised peaty features, sometimes organised in alignments and other regular patterns. Several of the stacking features described below are frequent on overcut areas (7:5:1.- 7:5:4. incl.); the others are rare and possibly in some cases unique to individual locations (7:5:5.- 7:5:10. incl.).

7:5:1. Vegetation patches

Distinct sub-rectangular or sub-circular patches of vegetation are often seen on areas of overcut moorland (Fig. 7.13.). Typically these are relatively dark in appearance and have a high dwarf shrub component, notably of crowberry (*Empetrum nigrum*) and heather (*Calluna vulgaris*), which stands out from the surrounding, generally lighter mat grass (*Nardus stricta*) and purple moor grass (*Molinia caerulea*). Sometimes, sub-rectangular patches may signal the presence of uncut peat vestiges (Fig. 7.14.). Others may indicate the position of former peat stacks (Fig. 7.20.). The difference between these two types of feature may not be immediately obvious, but those associated with stacking can be identified from the regular alignment of individual patches, by the presence of angular turve remnants within the patch (Fig. 7.20.), or by the lack of stratigraphy within any peat deposit present.

7:5:2. Recognisable turf piles

Sometimes, indistinct low mounds with unusually irregular and tussocky surfaces occur on overcut moorlands. In some cases, these may be remnants of uncut peat, affected by past erosion, but others are the remains of abandoned turf stacks. Positive identification of this type of feature is often difficult, but this can be achieved in some cases if turves are found preserved on the ground surface (Fig.7.22.). These may superficially resemble grass tussocks, but on close inspection retain an angular or sub-rectangular appearance, and feel

Fig. 7.19. A ring-shaped wall (three metres diameter and up to 0.5m high) located by the River Westend, in the Upper Derwent, which may be the base of a peat drying platform. It could have supported a platform made from wood lintels onto which turves were placed to dry. The boggy ground beyond and immediately to the left of the feature appears to have been cut-over, but there has been subsequent reformation of peat.

Fig. 7.20. The remains of a turf pile on Derwent Moor, highlighted by its lumpiness and colonisation by *Vaccinium myrtillus*. There is a blind-ending service track leading up to the feature from below (arrowed), where there is a low bank; this indicates that the turf-pile was built on a platform. Recently the feature has been re-cut to repair grouse shooting butts; this has exposed sandy peat, showing that some of the original turves came from near the mineral soil.

hard under-foot. They may also be highlighted by distinct vegetation growing on their surfaces (Fig. 7.20.).

7:5:3. Linear baulks

The linear baulks which divide some upland peat cuttings, were probably often used for stacking purposes along with their boundary function. It would have been logical to utilise any available 'dead ground' for this purpose, and in the case of strip holdings in particular, to maintain direct movement between the peat cutting face, and the access-trackways. Such activity would non the less have required an agreement between the individual peat cutters, as to which side of each strip to use for this purpose. Linear stacking of turves is still practised in some of the remaining peat cutting areas of Britain and Ireland (Fig. 1.10.).

The use of linear baulks in the Peak District for peat stacking purposes was probably widespread. It is evidenced by the alignment of access-trackways with linear terraces and baulks, and by the presence of stony linear baulks. Stacking turves on stony baulks would have aided their drying by raising them above the waterlogged surface; additionally the baulks would have provided a dry walkway, and served to enhance the linear divisions of the turbary. The baulks would likely have been purpose-built from stone cleared off the peat cutting areas. Clear alignments of baulks with access-trackways occur on Black Moor; whilst prominent stony baulks are present on Saddleworth Moor. The linear baulks on Saddleworth Moor have been laid bare by erosion, revealing a stone content. At other sites they are peat covered and fully vegetated, so their composition is uncertain.

7:5:4. Embanked platforms

As noted earlier, many loading features with access-trackways may also have been used for stacking purposes (7:4). Any well-ventilated and drained examples on slopes, or those close to peat cuttings would logically have been used for this purpose. Those located some distance from prominent peat cutting faces, could have been used for stacking turves obtained from now exhausted deposits. The would be particularly well-positioned for the final drying of turves, and so may have been used as staging-posts, on route to the settlements.

7:5:5. Linear terraces

At Black Moor near Glossop (Fig. 1.6.), the linear divisions of part of the overcut area are terraces, rather than raised banks of peat or stone. These terraces run along the line of contour and have been formed in response to the topography; they would have provided a level surface for stacking cut turves. They are broad enough to have accommodated linear stacks of cut peat, while also allowing adjacent parallel movement from the cutting face to the access-trackways.

7:5:6. Drained platforms

On overcut moorland to the west of Rhyader in mid-Wales, a prominent line of sub-circular levelled surfaces, with enclosing drainage grips, was found. The grouping of these features suggests that they had a peat stacking function. Rectangular 'turf steeds' comprising a low mound with surrounding trench, were used for drying and stacking peat on Bodmin Moor (Stanier 1996).

7:5:7. Walled structure

An isolated, low, drystone, ring-shaped wall was located by the River Westend (Fig. 7.19.). This feature may be the base of a peat drying platform (Bevan pers. comm.). It is approximately three metres diameter, up to 0.5m high, and appears to be nearly complete, with insufficient tumble to have disguised any possible entrances. It may have supported a platform made from wood lintels onto which turves were placed to dry. There is a small peat cutting immediately to the north side of the feature (6:69.).

7:5:8. Low cairn

Another isolated feature, a low cairn, located on Ox Hey, may also have been used as a peat drying platform. This cairn is approximately three metres in diameter, 0.5m high, relatively flat topped, and is composed of unconsolidated slabs of shaley sandstone. It occurs on an extensively overcut area of moorland, at the top of a major sledway (SK 163945). Where it would have been ideally positioned for stacking cut peat for final drying, prior to transport off-site. Although the feature resembles a clearance cairn, the fact that it occurs singly, argues against that origin. Indeed, the occurrence of a small outcrop of similar rock on the nearby clough edge suggests that it may have been constructed out of quarried stone.

7:5:9. Bays

Two, small, open-fronted, embanked enclosures located on Lockerbrook Heights may have been used for peat stacking (see Fig. 7.3.). These features, which are of sub-circular form, have been recessed into a shallow slope. They are accessed by several distinct tracks on the downslope side, but enclose other tracks which suggest a complicated usage and through movements. They may have had a variety of functions related to peat cutting; including as a site for temporary dwelling, or as pound for the storage of tools, carts, barrows or sleds. Indistinct hollows at the back of the upper recess indicate that there has been some later exploratory stone delving.

7:5:10. Turning bays

There are a small group of sub-circular recesses, located within braided access sledways on Peat Moor, may have been used for peat stacking. These features occur within flat bottomed hollow-ways, on gradually sloping moorland, and comprise localised broadening-out of the track floor. They may have had a dual function as stacking bays and turning circles; perhaps allowing off-loading of turves from one transport used for carrying them from the peat face, to another, used to take them down the steep slope below.

7:6. TYPES OF CLEARANCE FEATURE

Clearance features of any origin are rare on overcut areas; probably in part due to a natural scarcity of surface stone. Furthermore, any stone exposed by the peat cutting process, including earlier man made structures, would likely have been considered a resource and taken away. Those stone built features which do occur, and resemble clearance, may have been purpose-made to facilitate peat stacking and drying (7:5.). On certain peat cuttings, for instance on Derwent Edge, larger rocks and outcrops seem to have been avoided and simply cut around. However, where the peat resource was scarce, or tightly controlled, the cutting will have been more meticulous, in part explaining the presence of stony linear baulks. Any clearance features found on high level peat cuttings in the Peak District would be expected to be related to the cutting process, since prehistoric structures, including linear clearance and cairns, are largely restricted to middle level shelves (Barnatt pers. comm.).

7:6:1. Linear

As mentioned previously, the stony linear baulks on Saddleworth Moor (Figs 5.7. & 5.9.), appear to have had a multi-function; as convenient lines of clearance, subdivisions within the turbary, and stacking lines.

7:6:2. Cairn

Possible clearance cairns include the single example on Ox Hey (7:5:8.) and a line of small cairns found on the Hey Clough peat cutting. The latter are a little more abrupt than the Ox Hey feature and as such appear more likely to be clearance related, since their current shape would have rendered them unsuitable for peat stacking. However, these features are relatively well set; so they may have prehistoric origins, rather than being products of the peat cutting process.

7:7. WORKING-FACE FEATURES

Although many abandoned peat cutting faces are defined by a simple abrupt break in slope, others may encompass more than one distinct element. These other features may reflect the way in which the turves were removed or stacked, or they may fossilise former levels of peat cutting and preparation of the face prior to cutting.

7:7:1. Vertical steps

Sometimes the abrupt breaks in slope which mark the extent of abandoned peat cuttings show more than one vertical step; these features indicate that turves were removed from the working face in stages.

7:7:2. Recesses

Frequently abrupt steps and recesses occur in the line of the peat cutting face. If these steps form a simple right-angle and are regularly spaced along the face then they are most likely related to division turbary and typically linked to linear boundary baulks. Sub-rectangular recesses may also indicate division of turbary and show that one peat cutter has removed more turves than his neighbours (Fig. 5.16.). However, where sub-rectangular recesses occur along linear peat cuttings, they most likely indicate piece-meal exploitation; features of this type are frequent along Black Dike.

7:7:3. Turving trenches

Sometimes the bases of abandoned peat cutting faces are defined by indistinct ditch-like features. These mark the position of the working floor of the cutting, where the peat cutter stood. When they show, there has probably been some attempt to replace turves behind the line of cutting.

7:7:4. De-turfed trench edges

In rare situations a shallow step may trace the working face on the edge of the uncut bog; this indicates de-turfing prior to removal of another 'bite' in the peat face. Examples of this type of feature can be seen at the modern Bradshaw cutting within the Graveship of Holme and by the cut pool on Alport Moor (6:80.).

7:8. MISCELLANEOUS FEATURES

There are a variety of other types of anthropogenic features which occur on and around areas of peat cutting. Various features such as drystone walls, pits and mounds may reflect subsequent land-use; others may indicate prehistoric activity. Those associated directly with the peat cutting are described below.

7:8:1. Stone marker posts

Crudely hewn stone posts, less than one metre in length, are associated with abandoned peat workings on Derwent and Hallam Moors (Fig. 7.21.; 6:18.); they occur on the same alignment as the cutting faces, on the overcut ground. Because the posts are set on the overcut ground, back from the cutting faces, they are unlikely to mark the legal limit of allocated peat; but more likely define the position of the cutting grounds at the time of abandonment. They would thus have had a similar function to dividing baulks, or the marker signs still in use within the Graveship of Holme, but probably demarcated community peat holdings, rather than individual rights. The small size of the posts would not have allowed them to be permanently fixed, but would have enabled them to be moved periodically, as the peat cutting advanced across the moor.

7:8:2. Charring/ Ashing hearths

Various writings refer to the former use of charred peat and peat ashes for industrial and agricultural purposes (Chapter 4). These products have sometimes been produced in the open, using clamp-kilns; which may have left little evidence. A number of small, open-fronted, earthen kilns located in the Upper Derwent may have been used for this purpose. These features, for example at Bamford House and John Field Howden, resemble small versions of the Q-Pits found in the ancient semi-natural woodlands around Sheffield and elsewhere, which were used to produce kiln dried wood used in seventeenth century lead smelting. Both corn and wood drying pits had a common design; being created by making a concave recess in a slope and using the excavated material to form a semi-circular bank to enclose the pit downslope. A gap was made centrally in the bank to allow air flow, drainage, raking and access. Sometimes the pit was lined with a drystone wall, which supported lintels of stone; fuel was placed under the lintels and the material for drying on top. This type of feature could be used in this way for drying almost anything, or could presumably be covered with sod and used like a clamp-kiln.

7:8:3. Minor drainage grips

In a few situations, traces of minor drainage grips can be found on the overcut ground adjacent to abandoned peat cutting faces. These are more likely to occur where there has been incomplete removal of the peat and reflect an attempt to drain the working area. They are unlikely to have survived away from the limit of extraction because of subsequent activity on the overcut area. This type of feature can be seen in use within the extant Harden Moss peat cutting.

7:8:4. Abandoned turves

In rare instances, cut turves have been left within peat workings. On Roych Moor they occur under an abandoned cutting face, while at the Buxton cuttings they are found in the open, apparently where spread to dry. These abandoned turves can be surprisingly prominent; retaining their shape and sometimes highlighted by dwarf shrub vegetation (Fig. 7.22.). Where present they can provide some indication of how the turves were dried on site.

Fig. 7.21. A line of degraded peat cuttings faces on Hallam Moors, west of Sheffield, with stone marker-post nearby. The latter may have been one of a number of portable boundary markers denoting the limit of turbary.

Fig. 7.22. The remains of turves abandoned on overcut ground near The Terret, west of Buxton. In the background, peat banks (arrowed) denote the extent of the over-cutting and the area cut to supply the Buxton Peat Baths.

CHAPTER 8

ECOLOGICAL IMPACT

ECOLOGICAL IMPACT

This chapter provides results from systematic surveys of flora and fauna carried out in the Peak District. Their intention was to highlight trends rather than provide a definitive statement on the plant and animal populations present. Full details of the methods used can be found in Chapter 3.

Groups of three botanical quadrats were laid down on representative peat cuttings; to record the vegetation of the uncut, the cut over, and the old peat face areas (Fig. 8.1).

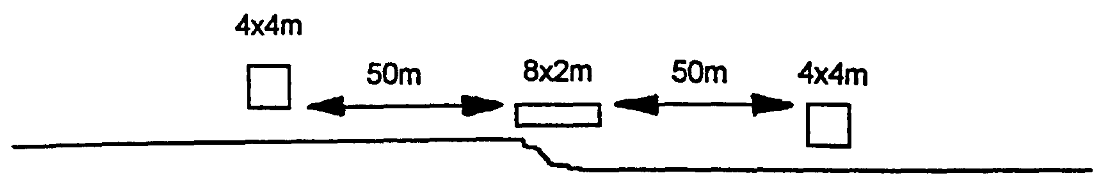


Fig. 8.1 Section through a peat cutting showing the size, shape, and positioning of the botanical quadrats.

The work was concentrated on sites that had reverted to *Nardus* as they are the most frequent. One of these, Lockerbrook Heights, was surveyed for its invertebrate interest, during a single season, using pitfall-trapping; while breeding birds at the same site were studied by standardised moorland transects. A number of localities were regularly checked for flying insects by sweep-netting. In addition, at two sites where there had been pot-pitting of the peat, leading to the creation of bog-pools, botanical transect work and zoological studies were undertaken.

These surveys identified the fauna and flora characteristic of the overcut areas and adjacent uncut blanket peat, and gave some indication of relative numbers. A full account would require more intensive work carried out over at least three seasons.

8:1. BOTANICAL SURVEY

This survey was carried out in order to assess the floristics and structural characteristics of the main plant communities associated with moorland peat cuttings in the Peak District. Fifteen sites were surveyed; eleven had reverted to *Nardus* and four to *Calluna*. An additional *Molinia* dominated site in mid-Wales was also surveyed. The results of these surveys can be seen in Table 8.1. and Appendix 5.

Table 8.1. highlights the distinctive species of the vegetation occupying the uncut mire, overcut ground, and peat banks, at those peat cutting sites where *Nardus* is now dominant and is based on a floristic system described by Shimwell (1971), which boxes mutually exclusive groups of species (so called differential species) and lists those which are

Table 8.1. The vegetation associated with *Nardus* colonised peat cuttings. Differentiated table.

Quadrat	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	'Domin' value																							
Group A (overcut)																								
Nardus stricta	10	10	9	7	8	10	9	10									2	4	4	5	5	4		2
Galium saxatile	1	3		2		3	3	2										1		3				2
Agrostis capillaris	3	4	1																					2
Festuca ovina			6	8														2		3				
Group B (uncut)																								
Eriophorum vaginatum									7	8	9		1	8	9	9	8		5	1		8	8	6
Eriophorum angustifolium									4	8	7					2	1	6	2		3			4
Sphagnum subnitens										1				2										
Group C (transition)																								
Juncus squarrosus			5															1	4		2	6		2
Cladonia coniocraea																				1		1	1	
Group D (companions)																								
Deschampsia flexuosa	5	2	1	4	7	6	8	7	3	4	4	5	7	4	7		5	4	4	5	7	7	9	7
Vaccinium myrtilus	1	2	3		1		2		3	2		2		2	4	2	7	7	3	2	1	1	1	2
Hypnum cupressiforme	3	4	3	2	4	3	7	2	2	2				2			5	4	3	3	4	4		1
Molinia caerulea					4							9	8			2		2		8	8	4	7	2
Campylopus fragilis			2											4	2		1	1		2		2	2	2
Cladonia coccifera													1	2	1	2			3		3	1	2	2
Dicranum scoparium		1					1							2	2	3						2		3
Trichophorum caespitosum		2				2					1			3			2							1
Cladonia chlorophaea														2			1		1	1		1		2
Empetrum nigrum			4						7	3	6			5										
Gymnocolea inflata														1	2	3						1		1
Cladonia floerkeana														1	2						1			1
Calluna vulgaris									7	1								3						
Erica tetralix			2						6							3								
Pohlia nutans			1														1			2				
Barbilophozia floerkei															1	1						1		
Plagiothecium undulatum		2																2						
Polytrichum commune			1																					2
Polytrichum formosum														1								2		
Campylopus paradoxus																1								1
Agrostis canina ssp. *montana*								3																
Poa annua								2																
Carex nigra								2																
Eurynchium praelongum								2																
Cladonia ramulosa																					2			
Anthoxanthum odoratum		1																						
Rhytidiadelphus squarrosus								1																
Cladonia fimbriata														1										
Cladonia polydactyla														1										
Campylopus introflexus																1								
Dryopteris dilatata																				1				
Placynthiella icmalea																				1				
Isopterygium elegans																							1	
Cladonia crispata																								1

Key:

Quadrats 1, 9, & 17- Fagney Clough, south; 2, 10, & 18- Lockerbrook Heights; 3, 11, & 19- Swint Clough, south; 4, 12, & 20- Gores Heights; 5, 13, & 21- Cow Hey, east; 6, 14, & 22- Cow Hey, west; 7, 15, & 23- Ridge Nether Moor; 8, 16, & 24- Banktop Hey

N.B. quadrats 1-8 were located on overcut ground; 9-16 on adjacent uncut blanket mire; and 17-24 on transition zones (cutting faces).
'Domin' numbers in bold highlight the characterising quadrats of the differential groups and all those of the companion species; the former are boxed for additional clarity.

ubiquitous (companions). However, that system was devised in order to sort out the communities represented within a body of quadrats; here, it is intended to highlight the distinctiveness of the three main elements of the *Nardus* colonised peat cuttings.

8:1:1. *Nardus* grasslands

The most significant effect of peat cutting on moorland vegetation, in terms of total area affected, has been the conversion of blanket mire to acid *Nardus* grassland (Figs 1:1 & 1:2.). The quadrats showed that the Nardetum that has developed on mineral soil exposed by large scale peat removal in the Peak District differs from grasslands elsewhere, of similar overall appearance, being generally very species-poor. These grasslands of relatively recent origin show less floristic diversity than the species-poor sub-community of the U5 *Nardus stricta-Galium saxatile* grassland described in the NVC.

U5 species-poor *Nardus stricta- Galium saxatile* grassland contains a high cover of *Vaccinium myrtillus* and *Deschampsia flexuosa*, while *Festuca ovina* is ubiquitous, but usually of low cover; *Agrostis capillaris* is patchy; *Agrostis canina* infrequent; *Anthoxanthum odoratum* is often present, but of low cover; *Danthonia decumbens* is rare; *Juncus squarrosus* moderately frequent but usually of low cover; *Galium saxatile* can be abundant, and *Potentilla erecta* is also very common. *Carex binervis* and *C. pilulifera* occur quite frequently as scattered plants; *Hylocomium splendens* and *Pleurozium schreberi* are frequent, in stands, with vigorous *Vaccinium myrtillus* (Rodwell 1992).

By way of contrast, the Nardetum of peat cuts is usually totally dominated by *Nardus stricta*, which achieves 90-100% cover, and grows in close set tussocks 25 to 40cm tall; the only constant associates are *Deschampsia flexuosa* which occupies gaps between the *Nardus* tussocks, and *Hypnum cupressiforme* which can be frequent on top of the tussocks. Of the other species *Agrostis capillaris* occurs in loose, but defined patches; while *Vaccinium myrtilus* is of varied occurrence. In certain situations the *Nardus* achieves only 70% cover, and has a looser growth. The associates in this grassland are concentrated in the gaps between the *Nardus*; with species such as *Carex nigra* occurring in tufts; while a mix of species including *Festuca ovina*, and *Anthoxanthum odoratum* may form patchy mats. At higher altitudes the *Nardus* tends to be shorter; and can be intermixed with abundant *Juncus squarrosus*, with mats of *Empetrum nigrum* in between (Swint Clough). The mean species number, including lichens and bryophytes, per 4 x 4m quadrat, is 7.18.

Table 8.1. shows that the Nardetum of the overcut ground has four important differential species; *Nardus stricta, Galium saxatile, Agrostis capillaris*, and *Festuca ovina*. Further work may show that *Anthoxanthum odoratum, Carex nigra, Plagiothecium undulatum, Polytrichum commune* and *Rhytidiadelphus squarrosus*, are also differentials, but they occurred too infrequently in the data to be reliably included in the group. It is also clear from the Table, that the vegetation occupying the peat banks is composed essentially of a mix of

plants from the uncut and overcut areas; although it does have two differential species of its own.

There is also a limited but distinct macrofungal flora associated with the *Nardus* of the peat cuttings. This is typified by the ascomycete *Claviceps purpurea* (on *Nardus)* and the agarics *Cystoderma amianthinum* and *Mycena simia;* these are sometimes accompanyed by additional agarics such as *Mycena galopus, Psilocybe semilanceata* and *Stropharia pseudocyanea. Mycena simia* appears to be particularly characteristic of these Nardeta; the fruits being especially abundant during October. It is a little known taxa, but in 'Agarics and Boleti' (Moser 1983), is described as a species of "moorland locations in damp moss". The significance of macrofungi within the ecosystem of upland peat cuttings is unclear; the botanical record of this research (Appendix 5.) inadequately represents this group, because the appearance of fruiting bodies is ephemeral and many of the quadrats were made outside their main season.

Significantly, most of the constant species of the U5 *Nardus-Galium saxatile* community, as defined by the NVC, namely *Agrostis canina, A. capillaris, Anthoxanthum odoratum, Carex binervis, C. pilulifera, Danthonia decumbens, Deschampsia flexuosa, Festuca ovina, Galium saxatile, Hylocomium splendens, Pleurozium schreberi, Potentilla erecta* and *Rhytidiadelphus squarrosus* are rare or absent on *Nardus* dominated peat cuttings in the Peak District. Since the U5 is considered to be an anthropogenic grassland type, largely the result of the burning and grazing of cleared areas of the forest zone (Rodwell 1992), the dominance of *Nardus* and lack of diversity on many overcut areas in the Peak, may be due to its recent origin. If the older and more diverse U5 grasslands are anthropogenic, then they have probably developed over several thousand years, in the period after the major prehistoric woodland clearances. The *Nardus* of peat cuttings on the other hand is much younger; a thousand years at most. Over time the two could converge, but for the moment they represent separate facies.

The actual age of the *Nardus* grasslands of overcut areas is uncertain. They may have started to develop as peat cutting commenced, but alternatively could have formed after abandonment of the workings. It has been argued that the Nardeta of the Peak District plateaux have derived from *Calluna* dominated moorland and are a reflection of factors like overgrazing and poor moor-burning (Anderson & Shimwell 1981); until now peat cutting has not been considered part of this equation. This research indicates that some of the Nardetum has formed as a result of the stripping of peat down to mineral soil, accompanied by the practice of not replacing turf over overcut ground. Previous work in the Peak National Park suggests that soil compaction may have aided the process, as *Nardus* is particularly dominant on the floors of hollow-ways and around quarry workings and bell-pits (Ardron 1991). The particularly species-poor nature of the *Nardus* grasslands found on peat cuttings within the Peak District is especially interesting, since it suggests that many of the constant species present in the described forms of U5 are even poorer at dispersal and establishment than *Nardus*. It is unlikely that the scarcity of these constants relates to the fact that the Peak District is located at the south-eastern limit of U5 in Britain; as typical U5 *Nardus*, supporting a normal suite of constants, is widespread on valley sides within the area.

U5 grassland is widespread in upland areas of the north and west of the UK, where its distribution is mainly influenced by soil characteristics and grazing levels. In the South Pennines it forms mosaics with other grassland, heath and mire communities (Rodwell 1992). In places it could have derived from U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland (Rodwell 1992), as a result of over grazing and poor moor burning practice. However, within a large sheep proof exclosure located on the Lockerbrook Heights peat cutting, it has over 15 years, gradually become dominated by *Deschampsia flexuosa*. These facts support the notion that over-cutting has led to the development of a very species-poor *Nardus* sward on exposed mineral soils, which has been maintained up to the present day by continual grazing.

8:1:2. Diversification

An overall general diversification of the peat cut landscape can be seen from the quadrat data. Peat cutting has created a mosaic of plant communities occupying the overcut and uncut ground on most sites; where prior to cutting, the vegetation was uniform blanket bog. At a smaller scale, observations made during quadrat location in the *Nardus*, clearly indicated the presence of atypical vegetation patches; for instance, mats of *Calluna vulgaris, Empetrum nigrum and Vaccinium myrtilus* where deposits of peat remained, and patches of *Juncus effusus* where secondary stone-getting or other disturbance had caused water-logging on the overcut surface. The lists from individual quadrats made on the overcut areas and peat cutting banks (Appendix 5.), also show the individuality of these habitats. The transitional-zone of the peat cutting banks was found to be an important niche for cryptogams, in particular, a range of *Cladonia* species; but, few seem characteristic of the habitat. However, *Juncus squarrosus* and *Cladonia coniocraea* were found to be differentials (Table 8.1.). Further quadrat work may show that *Dryopteris dilatata, Cladonia chlorophaea, C. ramulosa,* and *C. floerkeana* are also differential species of peat banks associated with *Nardus* dominated cuttings.

The increased species diversity found in the overcut areas, compared with uncut blanket mire, can be demonstrated by examining the number of occasions on which a species was recorded from only one of the quadrats in each group of three. At the fourteen sites where three quadrats were made, there were 49 occasions when a species was seen on overcut ground, 48 on the peat banks, but only 30 on the uncut mire surface.

8:1:3. *Calluna* dominated sites

Many entire former turbaries in the Peak District, including overcut areas, support *Calluna* dominated vegetation (Fig. 1:3.). The reason for this uniformity of flora is uncertain. It could have resulted from several causes; overcut areas were not turned into regularly grazed rough pasture after peat cutting stopped, the peat was not removed down to mineral soil, some peat re-formed, there was an attempt to replace turf on the worked ground; or perhaps a combination of these factors. Four of the sites where quadrats were set up are *Calluna* dominated. These were selected in order to find out whether there were any differences between the Callunetum on the overcut areas and that on the remaining blanket mire.

The quadrats established the dominance of *Calluna vulgaris* at the four surveyed sites, and showed that this type of *Calluna* dominated vegetation (NVC H9) has few characteristic associates, beyond the widespread species *Dechampsia flexuosa, Empetrum nigrum, Eriophorum angustifolium, E. vaginatum* and *Vaccinium myrtilus.* There were however, a number of bryophytes, lichens and fungi that were only found in the quadrats set up on *Calluna* sites (Appendix 5.), but records of these species were generally scarce and the appearance of most appears to be incidental.

Due possibly to their small numbers, the quadrats, provided only limited data in terms of identifying differences between the *Calluna* of the overcut areas, intact blanket bog and cutting banks. *Vaccinium myrtilus* was frequently most abundant on the banks, *Eriophorum vaginatum* and *Eriophorum angustifolium* on the peat; whilst *Deschampsia flexuosa* was most abundant on overcut areas and banks.

Calluna dominated turbaries are most frequent on the west side of the Peak District, on moors with few or no associated drains, or where peat cutting has taken place on broad areas of moorland, rather than on ridges. Thin peat underlies many of the *Calluna* dominated sites. Unlike the Nardetum, the Callunetum of overcut areas was not particularly species-poor.

8:1:4. *Molinia* dominated sites

In mid-Wales upland peat cuttings have been extensively colonised by *Molinia caerulea* dominated grassland (NVC M25), which is the normal blanket bog vegetation of the region (Appendix 5.). In the Peak District *Molinia* is much less widespread and usually restricted to land lying over thinly bedded shales. In both these situations the overcut ground seems to have been readily recolonised by *Molinia* spreading back from the uncut blanket mire.

Molinia dominated grassland is also found covering middle level moorland on the east side of the Upper Derwent between 350m and 450m OD. The presence of widely scattered peat cutting evidence on this area suggests that it has been extensively overcut, while striations seen on aerial photographs imply land-skinning or paring and burning (Fig. 6.3.). The tussocky growth of the *Molinia* often disguises any shallow peat workings present, so it was especially important to study the character of this grassland growing on overcut land, uncut mire and on peat cutting banks, to identify any differences that might be useful in recognising otherwise indistinct turbary areas. Two sites with significant amounts of *Molinia* were surveyed in the Peak District, along with Esgair Celliog in mid-Wales (see Appendix 5.).

The quadrat work unsurprisingly identified significant differences between the *Molinia* of the Peak District and mid-Wales, in terms of species composition, relative diversity, and the spread of the community onto overcut ground (Appendix 5.). The differences can be summarized as follows. The level of dominance of *Molinia* on the blanket peat was very similar at each of the three sites studied; but the degree of spread of the species onto the overcut ground differed fundamentally. At Esgair Celliog, *Molinia* showed denser growth within the quadrat set up on the overcut ground, than in that established on the blanket mire surface; but in some parts of the peat cutting the species occurred as a sparse mat, with frequent eroding tussocks, and on the eroding cut bank was poorly developed. At both Peak District sites, *Molinia* was more or less equally dominant on the blanket surface and peat bank, but much sparser or absent on the overcut ground. From these results it appears that *Molinia* colonises new ground vigorously only in oceanic localities like mid-Wales; but at Esgair Celliog it is experiencing the effects of over grazing and higher levels of rainfall which, from time to time, destabilise and erode the peat banks.

The quadrat work identified a few commonalities in the *Molinia* grasslands; the most notable being the widespread occurrence of *Deschampsia flexuosa.* This species was found in all quadrats at all sites. *Festuca ovina* is often prominent on both overcut ground and cut banks, but was absent from the surviving blanket peat.

8:1:5. Uncut blanket mire

Extant upland blanket bogs have been greatly modified structurally and ecologically by the past exploitation of peat. Their water-holding capacity has been reduced by the associated dissecting drainage systems, and the cutting of the total peat mass, which has led to drying of the bog surface and shrinkage of the underlying peat. There has also been localised surface cutting, which has destroyed the original bog topography; trampling due to access movements across the mire; erosion along drains; and peripheral degradation of the peat where over-cutting has led to destabilisation of the hydrology (10:5.). While the larger drains are usually obvious in the field and on aerial photographs, other anthropogenic features on the blanket mire surface, such as minor ditches, surface cuts, and peat cutters tracks, have in many cases probably been disguised by bog regrowth which took place prior to the Industrial Revolution. The remaining blanket mires of the Peak District are generally impoverished in fauna and flora, but retain widespread remnants of former hummock-hollow structure, which holds testimony to a previous greater level of diversity and wetness.

The quadrat survey demonstrated the species-poor character of the present day Peak District blanket mires; where the vegetation is largely dominated by *Calluna vulgaris* and *Eriophorum vaginatum*, except on the high plateau where *Empetrum nigrum* is also co-dominant. The more topogenous peat deposits and others well away from drains, where ground water is still high, can be richer, supporting for instance, *Sphagnum* communities (10:1.); while areas of localised pot-pitting are even more diverse (see below). On level areas of extensive blanket peat, a hummock-hollow structure is still in evidence, although modified by peat cutting related drainage. For instance on the south side of Black Dike, where the remaining blanket mire is least affected by drainage, there is fairly extensive relict hummock-hollow, showing a rise and fall averaging 0.5m. On this area the hummocks are occupied by co-dominant *Deschampsia flexuosa, Empetrum nigrum, Eriophorum angustifolium* and *E. vaginatum*; while the hollows support in addition frequent *Trichophorum caespitosum* and *Erica tetralix*. The blanket mire associated with *Nardus* dominated peat cuttings was found to have only three differential species, *Eriophorum angustifolium, E. vaginatum* and *Sphagnum subnitens* (see Table 8.1.).

8:1:6. Summary

In addition to identifying the species composition and structure of the main plant communities associated with peat cuttings in the Peak District, the quadrats established that the activity has created a distinctive species-poor Nardetum, while causing general diversification of the moors, through widespread exposure of mineral soil and break up of the blanket mire surface. Also, indirectly through drainage, it has led to impoverishment of the bog flora on the remaining blanket mire.

8:2. PIT- POOL TRANSECTS

Locally diversity has been enhanced by the activity known as pot-pitting (Chapter 7). Waterlogged, boggy, or flooded pits in particular, support far richer pockets of plant and animal life than either the uncut blanket peat, drainage influenced topogenous bogs, or overcut areas. Although very localised the importance of groups of wet pot-pits is considerable; since they not only support their own distinctive flora, but also important invertebrate communities (8:3:2.), and provide feeding habitat for moorland birds. Botanical transects were carried out at two clusters of pot-pits within the Peak District (see below).

8:2:1. Cutthroat Bridge pit pools

This site occupies a shelf on the northern edge of Derwent Moor, it covers 0.5ha, at 320m OD (Site 6:28; Chapter 6). Long ago this small group of water-logged hollows were created by pot-pitting within a shallow remnant of topogenous peat. There is only a tiny amount of open water still present, but ten species of *Sphagnum* occur, forming an active hummock-hollow like bogland which supports vegetation akin to the NVC, M21 community (*Narthecium ossifragum-Sphagnum papillosum* valley mire), now a very restricted habitat in the Peak District.

The transect (Fig. 8.2.) established that these peat pits are a rich and regionally important botanical site, notable for the presence of *Drosera rotundifolia*; other local bog plants include *Narthecium ossifragrum, Vaccinium oxycoccus,* and the mosses *Aulacomnium palustre, Sphagnum papillosum* and *Splachnum sphaericum.*

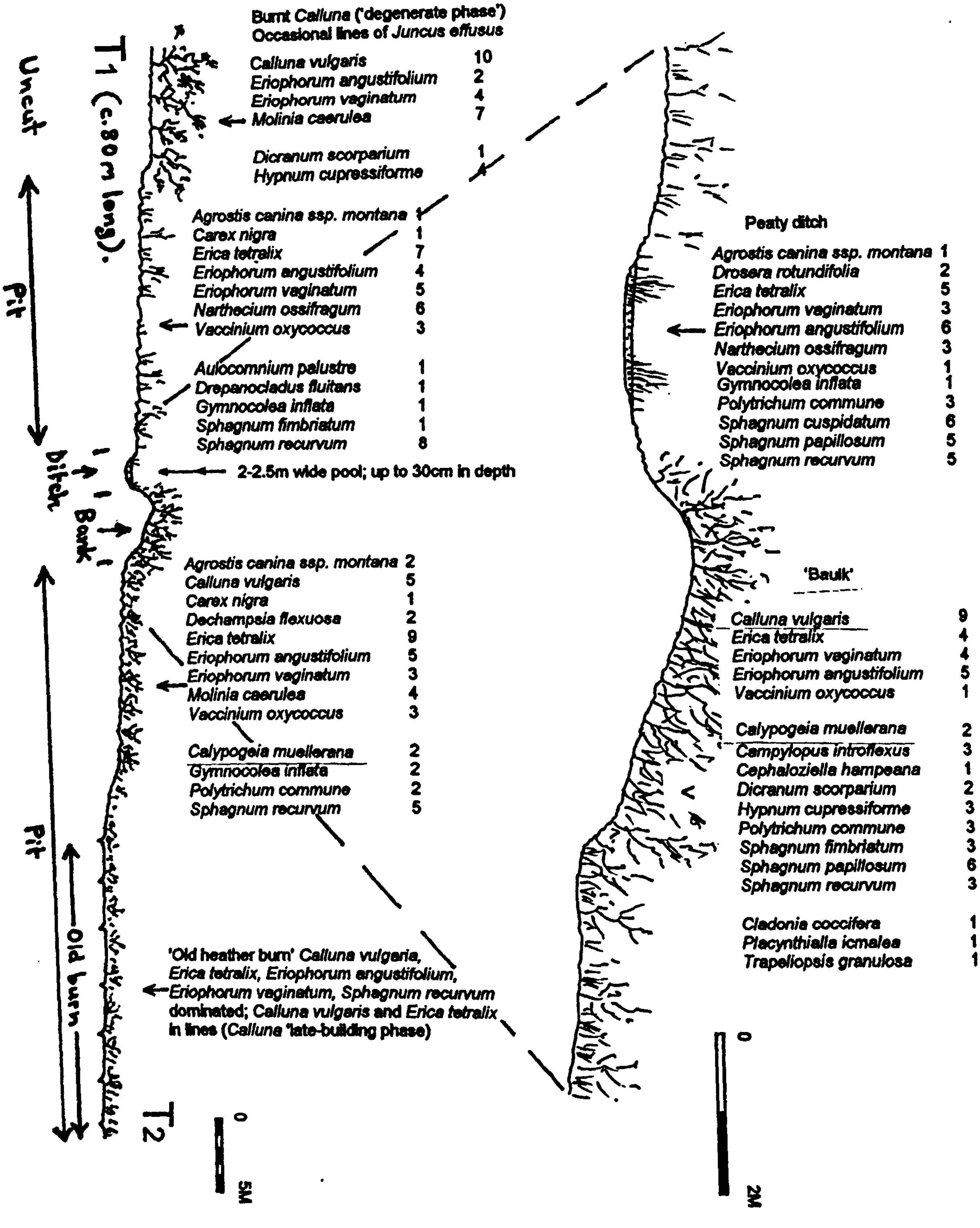


Figure 8.2. Transect across peat pits on Derwent Moors at two scales. Species list with Domin-Scale

8:2:2. Stanage Edge, west, pit pools

The second site comprises a cluster of water-filled pits (Figs 8.5. & 8.6.), covering 0.5ha, located at 450m OD, in an exposed position above Stanage Edge (Site 6:23; Chapter 6). They form a bog pool habitat in an otherwise very extensive area of species-poor *Calluna vulgaris-Eriophorum vaginatum* blanket mire (like a degraded form of NVC M19; *Calluna vulgaris-Eriophorum vaginatum* blanket mire). It is unclear whether the baulks between the pits have been reduced in level by peat cutting, since the whole area may have been shallowly overcut and then pot-pitted.

The transect (Figs 8.3. & 8.4.) show that while these peat pits are less rich botanically than those on Derwent Moor, probably because of the higher altitude and exposed aspect; they do, non-the-less, hold locally significant bog communities. The baulks between the pits, support the typical *Calluna vulgaris-Eriophorum vaginatum* dominated vegetation of Peak District blanket bogs, but with other species more abundant than normal; including locally dense stands of *Eriophorum angustifolium*, *Sphagnum fimbriatum*, *S. papillosum and S. subnitens*. The water-logged pits may be either overgrown with *Eriophorum angustifolium* (NVC M3; *Eriophorum angustifolium* bog pool community), dominated by *Sphagnum cuspidatum* or *S. recurvum* (akin to a very species-poor form of NVC M2; *Sphagnum cuspidatum/ recurvum* bog pool community), or have rings of water surrounding floating mats of *Drepanocladus fluitans* (possibly derived from NVC M3) (Fig. 8.5). One relatively large and mesotrophic pit, has dense stands of *Juncus effusus*, *Glyceria fluitans* and *Sphagnum recurvum*. The transect crosses two typical pit-pools, and a number of baulks, and cut surfaces; to demonstrate how the vegetation is related to the small-scale topography.

8:2:3. Summary

Pit pools provide a habitat where the water table remains high throughout the year and have furnished a refuge for plants that were formerly widespread on the undrained blanket bog. When they were created these bog species would still have been widespread, so despite being a secondary habitat their vegetation has continuity with that of the ancient bogs. Their more notable botanical species include *Drosera rotundifolia* and the range of sphagna.

8:3. FAUNAL SURVEY: INVERTEBRATES

8:3:1. Pitfall trapping

Peat removal and the accompanying exposure of large areas of mineral soil, together with the vegetation change this produced, have caused widespread invertebrate changes, that impact on other wildlife, in particular mammals and birds. In order to investigate this change, a series of pitfall traps were set up on Lockerbrook Heights, in the Upper Derwent Valley, at

Figure 8.3. Plan of peat pits Stanage Edge

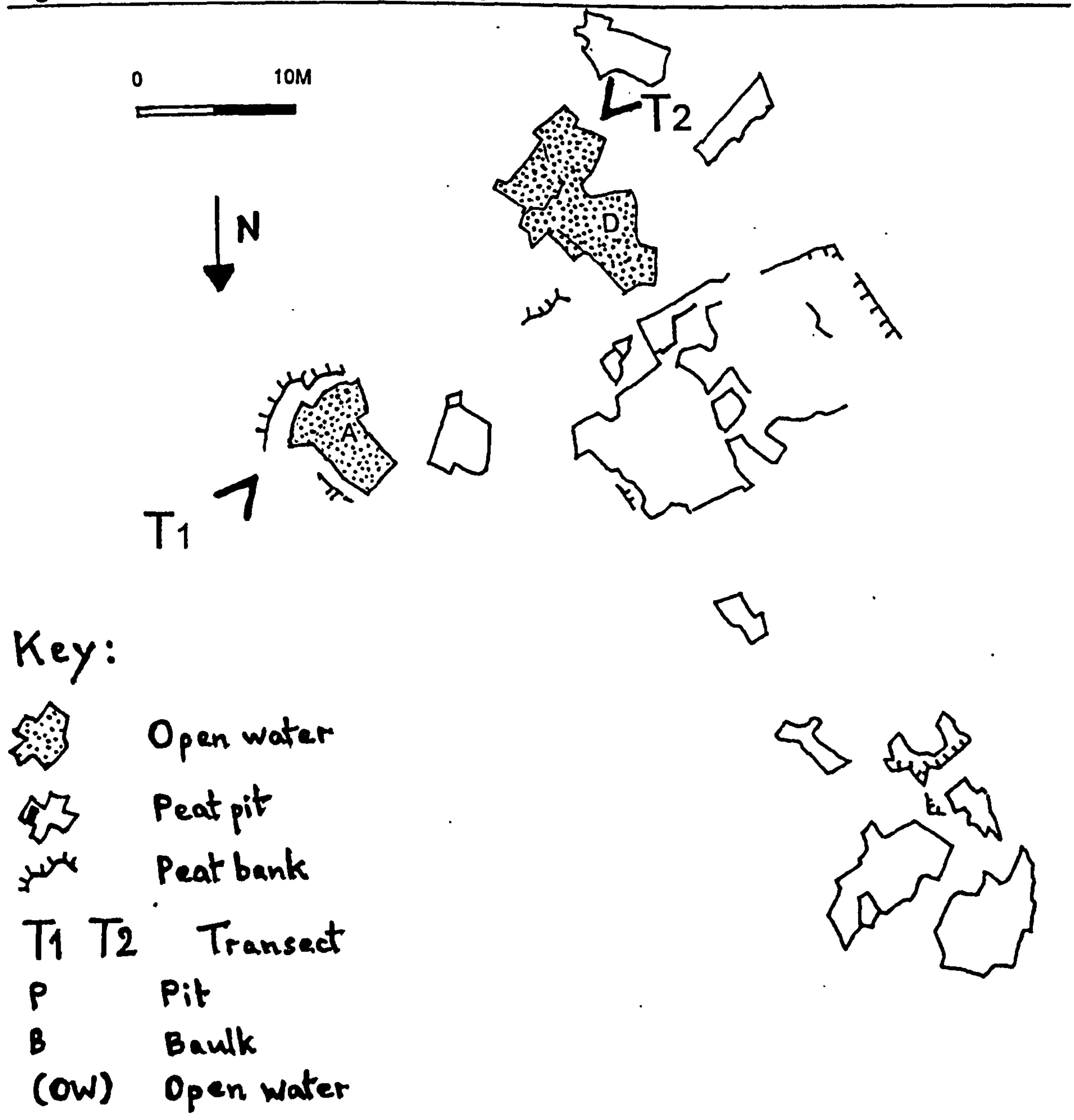


Figure 8.4. Transect across peat pits on Stanage Edge

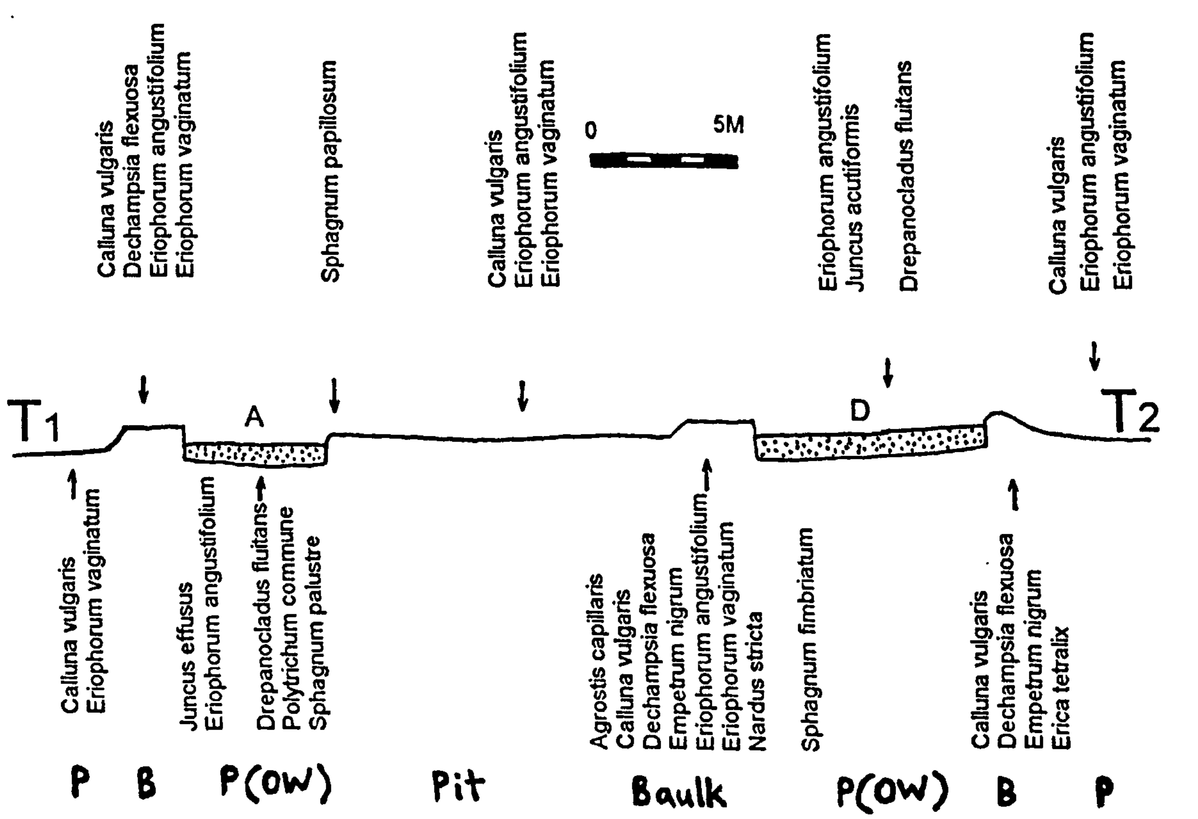


Fig. 8.5. Flooded peat-pit on Stanage Edge, colonised by an extensive raft of fruiting *Drepanocladus fluitans*. Moss rafts like this, are particularly important for the rare cranefly *Phalacrocera replicata*; which uses them as a gathering-ground and site for egg laying.

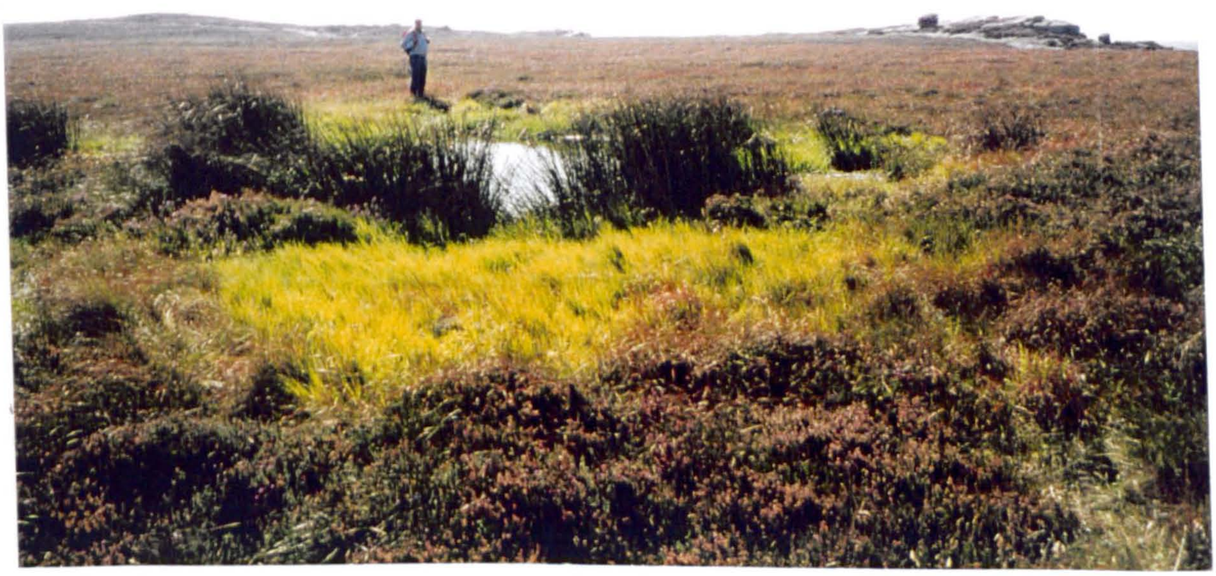


Fig. 8.6. Mesotrophic pit-pool on Stanage Edge, dominated by *Juncus effusus*, *Glyceria fluitans*, and *Sphagnum recurvum*. The typically lowland, emerald damselfly *(Lestes sponsa)*, has been recorded around this pool, and it is a particularly important breeding site for the dragonfly *Aeshna juncea*.

410-440m OD; this, due to its convenience of access and typicalness, became the main location for detailed ecological surveys. Lines of pitfall traps were maintained on the overcut ground and on the adjacent blanket mire (8.6) from 5/96-10/96 (Chapter 3). They produced good catches of beetles and spiders.

The Beetle Fauna

Sixty-one species of beetle (*Coleoptera*) were found in the pitfall traps (Appendix 6.). While the majority are common, 20 have local distributions, and three are rarities. The rare species are *Hydnobius punctatus* and *Coccinella magnifica*, which are nationally notable and *Aphodius lapponum* which is regionally notable. *Coccinella magnifica*, (scarce 7 spot ladybird), is the rarest; this species is normally found in the vicinity of nests of the wood ant, *Formica rufa*, which have not been found around Lockerbrook Heights.

The results of the pitfall trapping, established that clear differences exist between the beetle communities inhabiting the *Nardus* dominated peat cutting and the adjacent intact *Eriophorum* blanket mire (Table 8.2.). The *Nardus* community was richest, with 12 species regularly found, these comprise seven rove beetles, *Arpedium brachypterum, Bolitobius analis, Lathrobium brunnipes, L. fulvipenne, Othius angustus, Quedius molochinus*, and *Tachyporus dispar*; the click beetles *Ctenicera cuprea, Dolopius marginatus*, and *Hypnoides riparius*; the soldier beetle *Rhagonycha limbata;* and *Agatridium convexum* of the *Leiodidae*. The eight distinctive blanket mire species were the ground beetles *Agonum fuliginosum, Patrobus assimilis*, and *Pterostichus rhaeticus*; the rove beetles *Lesteva heeri, Mycetoporus rufescens*, and *Olophrum fuscum*; the water-scavenging beetle *Anacaena globulus*; and the soldier beetle *Cantnaris paludosa*. Common to both trap lines were the ground beetles, *Carabus arvensis, C. problematicus, Leistus rufescens* and *Pterostichus diligens*.

Certain species were seasonally significant, for example the ubiquitous *Carabus arvensis* and *Pterostichus diligens*, and the *Nardus* favouring *Lathrobium brunnipes* and *Hypnoides riperius* were only present early in the trapping season. *Quedius molochinus* increased in abundance on the *Nardus* towards the middle of the trapping period, to be replaced by *Arpedium brachypterum*. On the blanket mire *Pterostichus rhaeticus* and *Cantnaris paludosa* were commonest at the start of trapping; while populations of *Olophrum fuscum* were most frequent towards the end of the season. The pitfall data indicated that *Lesteva heeri*, one of the *Eriophorum* favouring taxa, had two emergences during the trapping period.

Results from the pitfall trapping show that two beetle communities are present, so invertebrate diversification has occurred on the moors as a result of the peat cutting. A total of 367 beetles representing 47 species were caught in the *Nardus*, but only 219 and 29 species on the uncut blanket mire. If this population difference is typical it will have considerable impact on the moorland food web.

Table 8.2. Beetles caught at Lockerbrook Heights; highlighting the ubiquitous species and those characteristic of the *Nardus* and the uncut blanket mire. The bold numbers are the catches within the characteristic habitats.

Trap line location	***Nardus***						**Blanket**					
Day	25	10	23	19	2	16	25	10	23	19	2	16
Month	6	7	7	9	10	10	6	7	7	9	10	10
	Number of individuals in each collection											
***Nardus* species:**												
Rhagonycna limbata		**4**	**1**									
Ctenicera cuprea	**7**	**2**	**1**				1					
Dolopius marginatus	**2**	**1**	**4**									
Hypnoidus riperius	**53**	**11**	**14**				2		2			
Agatridium convexum			**1**	**6**	**2**	**1**						
Arpedium brachypterum			**1**	**16**	**7**	**5**						
Bolitobius analis	**4**		**1**	**2**		**1**				1		
Lathrobium brunnipes	**17**	**8**	**6**	**1**	**1**		2				1	
Lathrobium fulvipenne	**3**	**1**			**1**	**1**			1			
Othius angustus		**2**	**1**		**1**							
Quedius mollochinus	**1**	**1**	**12**	**5**		**2**		1				
Tachyporus dispar	**2**	**6**	**5**									
Blanket mire species:												
Cantharis paludosa							**27**	**8**				
Agonum fuliginosum							**3**	**1**	**2**			
Patrobus septentrionis			1				**4**	**2**	**10**	**1**		
Pterostichus rhaeticus							**15**	**6**	**5**	**1**		**1**
Anacaena globulus							**1**	**5**	**5**	**1**	**3**	
Lesteva heeri							**7**	**10**	**8**	**1**	**12**	**1**
Mycetoporus rufescens										**3**	**1**	
Olophrum fuscum						1				**5**	**12**	
Ubiquitous species:												
Carabus arvensis	**20**			**2**	**1**	**1**	**1**				**1**	**1**
Carabus problematicus	**1**	**2**	**8**					**4**	**2**	**1**		
Leistus rufescens					**2**	**3**			**2**	**2**		
Pterostichus diligens	**25**	**20**	**8**	**5**	**2**	**2**	**9**	**1**	**4**	**1**		**2**

The Arachnid Fauna

Thirty-nine species of spider and two of harvestmen were recovered from the pitfall traps (Appendix 7.). The majority of the species are common and widespread in Britain and fairly catholic in respect to their habitat requirements. The more notable taxa were *Pelecopsis mengei* a widespread but local northern species which likes damp habitats; *Hypomma bituberculatum* which typically occurs in wet locations; *Agyneta cauta* a widespread but uncommon spider of mossy situations; *Lepthyphantes ericaeus* a specialist of dry *Calluna* areas; *Waickenaeria antica* which prefers dry grassy habitats; *Diplocentria bidentata* a local type also of grassy habitats; *Centromerita concinna* which is found mainly in grassy locations in the north; *Allomengea scopigera* a species of wet grasslands in highland regions; *Silometopus elegans* which is uncommon and favours grasslands on high ground in the north; and *Scotinotylus evansi* which only occurs in Northern England and Scotland (Roberts 1985).

The data, identified clear differences between the arachnid fauna of the overcut ground and the uncut blanket mire; although there are also ubiquitous species (Table 8.3.). The following seven species show a clear preference for the *Nardus* grassland; *Agyneta decora, Allomengea scopigera, Alopecosa pulverulenta, Gonatium rubens, Robertus lividus, Tiso vagans*, and *Walckenaeria acuminata.* The blanket mire community has eight characteristic species; *Bolyphantes luteolus, Centromerita concinna, Pardosa nigriceps, Pelecopsis mengei, Pirata piraticus, Tapinopa longidens, Trochosa terricola*, and *Walckenaeria nudipalpis.* Ubiquitous are *Agroeca proxima, Lepthyphantes mengei, Pardosa pullata, Silometopus elegans*, and the harvestman *Paroligolophus agrestis.* Only *Pardosa nigriceps*, and *P. pullata* were caught in large numbers; the former occurs here on blanket mire which is dominated by *Eriophorum vaginatum*, whereas generally the species has been identified with *Calluna* rich habitats (Roberts 1985).

The slightly lower arachnid diversity on the *Nardus*, and the preference shown by one of the two abundant species for blanket mire vegetation, suggest that peat cutting may have had a minor negative effect on the overall abundance of this group of invertebrates. However, this is offset by the total number of individuals caught, which was slightly higher on the *Nardus* than on the *Eriophorum*; 540 and 488 respectively. This greater biomass of spiders in the *Nardus* with a slightly different seasonal peak should benefit the general moorland food web, while the presence of species that are restricted to this habitat, contributes to the overall diversity of the moors.

Table 8.3. Spiders and harvestman caught at Lockerbrook Heights; highlighting the ubiquitous species and those characteristic of the *Nardus* and the uncut blanket mire. The bold numbers are the catches within the characteristic habitats.

Trap line location	***Nardus***						**Blanket**					
Day	25	10	23	19	2	16	25	10	23	19	2	16
Month	6	7	7	9	10	10	6	7	7	9	10	10
	Number of individuals in each collection											
***Nardus* species:**												
Agyneta decora	**3**		**3**									
Allomengea scopigera				**2**	**4**	**2**						
Gonatium rubens				**1**		**2**						
Tiso vagans	**3**		**2**									
Walckenaeria acuminata	**5**	**3**	**3**	**4**	**4**	**2**	2		1		1	
Alopecosa pulverulenta	**54**		**3**	**3**	**1**	**1**	12	1	3			
Robertus lividus	**16**	**25**	**5**					2				
Blanket mire species:												
Bolyphantes luteolus										**3**		**2**
Centromerita concinna							**3**	**1**				
Tapinopa longidens										**1**		**2**
Pelecopsis mengei							**4**				**2**	
Walckenaeria nudipalpis									**2**	**1**	**1**	
Pardosa nigriceps	6		5				**81**	**11**	**53**	**1**	**2**	**3**
Pirata piraticus		1					**26**	**15**	**36**			
Trochosa terricola			1						**1**	**1**	**1**	
Ubiquitous species:												
Agroeca proxima				**25**	**6**					**16**	**4**	
Lepthyphantes mengei		**1**	**2**			**2**	**8**			**1**		
Silometopus elegans	**30**		**1**				**28**		**1**			
Pardosa pullata	**98**	**27**	**119**	**26**	**10**	**5**	**86**	**9**	**38**	**5**	**1**	**5**
Paroligolophus agrestis					**2**	**5**				**1**	**8**	**5**

Summary

Not too much should be read into the results of the pitfall trapping, since the survey only lasted six months and the early part of the season was missed. The exercise was designed to assess broad differences, rather than the detail; which would require several years of uninterrupted trapping.

8:3:2. Sweep-netting and other observations

Sweep netting and casual observation were employed at the Lockerbrook Heights peat cutting, various pit-pool sites, and Black Dike.

Lockerbrook Heights

Sweep netting and casual observation in the cut over area regularly produced records of Tipulids (craneflies) and other *Diptera*; amongst these was *Scleroprocta sororcuta* a nationally notable species, the nationally local cranefly *Tipula vittata*, and a pair of *Tipula vernalis.*

Derwent Edge

This group of peat pits has been cut into the fringe of *Calluna* dominated blanket peat located on the top of Derwent Edge, at 480m OD. The site has a few areas of open water and a species-poor mire flora. Sweep netting and casual observation produced the craneflies *Euphylidorea meigeni, Tipula melanoceras* and *Prionocera turcica*, all nationally local species. They were subsequently recorded at Black Dike and Stanage Edge peat pits; which indicates that they are co-dominants in a tipulid community associated with flooded peat pits in the Peak District.

Cutthroat Bridge

This site, also in the Upper Derwent Valley, is botanically more diverse than either of the two preceding and located in a more sheltered position at 320m OD; it is fully described in 8:2:1. Sweep netting and casual observation revealed a rich cranefly fauna that included the local *Phylidorea squalens*, the nationally local *Euphylidorea meigeni*, and *Tricyphona schummelii.* These three insects appear to form a distinct tipulid community; which inhabits wet-heath, typically vegetated by *Sphagnum* carpets, *Erica tetralix* and *Vaccinium oxycoccus*. At certain sites where this type of vegetation occurs the tipulids *Euphylidorea meigeni, Phylidorea squalens* and *Tricyphona schummelii* may be present together with *Idioptera pulchella*, which is nationally notable (Thomas pers. comm.).

Stanage Edge

This small complex of boggy and water-filled peat pits (Figs 8.5. & 8.6) has been cut into the fringe of a *Calluna/Eriophorum vaginatum* dominated blanket mire, on top of Stanage Edge. The site is at 450m OD and open to the prevailing wind; it is fully described in 8:2:2.

This site has been subject to regular sweep-netting and close observation, which has revealed considerable invertebrate interest. It supports significant populations of several species of cranefly, which form a distinct tipulid community, apparently characteristic of flooded peat pits in the Peak District. They are the nationally local *Euphylidorea meigeni, Prionocera turcica* and *Tipula melanoceras*; the rare *Phalacrocera replicata* (Figs 8.7. & 8.8.), and the local *Tipula subnodicornis;* all are present in good numbers. *Phalacrocera replicata* (Figs 8.7. & 8.8.), and *Prionocera turcica* favour the boggy pools for egg laying; while *Tipula subnodicornis, T. melanoceras* and *Euphylidorea meigeni* are associated with wet heath. This tipulid colony is especially important for the significant numbers of *Phalacrocera replicata* (Figs 8.7. & 8.8.).

The *Odonata* are surprisingly varied for such an exposed upland location; with the common hawker *(Aeshna juncea)*, southern hawker *(A. cyanea)*, common darter *(Sympetrum striolatum)*, black darter *(S. danae)*, emerald damselfly *(Lestes sponsa)*, common blue damselfly *(Enallagma cyathigerum)*, and blue-tailed damselfly *(Ischnura elegans)* recorded during the survey. It is unclear how many of these seven species breed on site; possibly some simply stop-off on dispersal flights and migrations. However, emerging adults of *Aeshna cyanea* (Fig. 8.9.) and *A. juncea* have been seen; along with damselfly exuvia. It is likely that the *Odonata*, with the possible exception of the typically lowland *Aeshna cyanea* and *Lestes sponsa*, comprise a distinct upland pool community. This conclusion is supported by the sighting of *Aeshna juncea, Sympetrum striolatum, Enallagma cyathigerum*, and *Ischnura elegans* around peat-pit pools on an overcut ridge on Kinder Scout.

Several larvae of the great diving beetle (*Dytiscus marginalis*) (Fig. 8.9.) and adult water boatman (*Notonecta* sp.) have also been seen in one of the deeper pools at this site; while the shallower pools with floating rafts of vegetation, and seasonally exposed fringes of wet peat support, *Chironomid* larvae, additional beetle larvae, large colonies of pond skaters (*Gerris* sp.), and considerable numbers of *Tubifex* worms (Fig 8.10.).

8:3:3. Discussion

Sweep-netting confirmed the importance of peaty pools, boggy hollows, and soft rush beds created by upland peat cutters, as a habitat for invertebrates. This was particularly the case in respect of Tipulids which constituted significantly to invertebrate biomass and hence to the upland food webs. For instance the meadow pipit (*Anthus pratensis)* may rely on these insects to feed its chicks; in the same way that blue tits (Parus caeruleus), in broad-leaved woodland, depend on green caterpillars for breeding success. One study carried out in the Pennines revealed that out of 216 food items brought to the first broods of meadow pipit,

Fig. 8.7. *Phalacrocera replicata* (male taking refuge amongst *Calluna*).

Fig. 8.8. *Phalacrocera replicata* (female egg-laying in pit-pool edge).

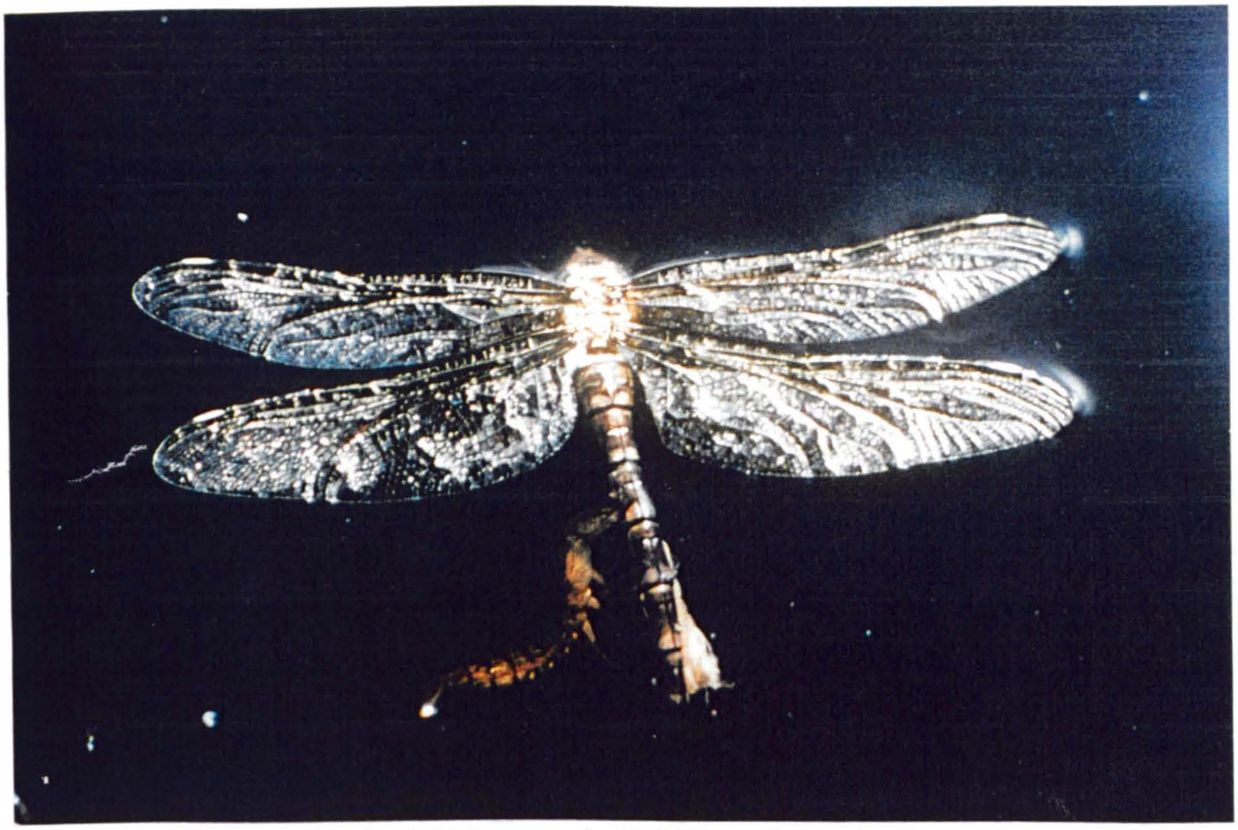


Fig. 8.9. Larva of the great diving beetle (*Dytiscus marginalis*), feeding on the remains of a recently emerged, southern hawker dragonfly (*Aeshna cyanea*), Stanage Peat-Pits. The dragonfly probably fell prey to the beetle larva, after falling back into the pool after emergence, during its vulnerable drying stage.

Fig. 8.10. The margin of a flooded peat-pit at Stanage Edge, to show its invertebrate productivity. Along the edge of the floating raft of vegetation, on the right, are considerable numbers of *Tubifex* worms (the short black 'stalks'); while on the open water, there is a colony of pond skaters (*Gerris* sp.).

84.7% by number were adult *Tipula*; while out of 122 food items fed to second broods, 41% were *Tipula* (Cramp 1988). Both the meadow pipit and blue tit are bottom of the avian food chain in their relevant habitat; being heavily predated by merlin (*Falco columbarius*) and sparrowhawk (*Accipiter nisus*) respectively. The meadow pipit has been identified as the main prey of both adult and young merlin; with one study on the Yorkshire Moors, recording up to 90% of the raptors prey as this species (Cramp 1980). So one of the important upland food chains is:

Peat pits ---> tipulids ---> meadow pipit ---> merlin.

There are a number of craneflies that are seasonally abundant on the moors. Of these only *Tipula confusa*, a summer and autumn species, and the ubiquitous *Tipula paludosa*, appear to occur in large numbers on the open uncut peat blankets of the Peak District. The other species are largely restricted to wetter bog habitats. For example *Tipula subnodicornis* is abundant in the spring amongst leggy *Calluna* growing on and around *Eriophorum angustifolium* and *Sphagnum* mats; while *Euphylidorea meigeni* occupies similar habitat, especially if there is bare wet peat present for egg laying, throughout the spring and summer; *Prionocera turcica* is frequent around boggy pools during the same two seasons, being replaced by *Tipula melanoceros* during the autumn; *Tipula holoptera* (see 10:3:1.; Figs 10.3 & 10.4.) is probably widespread in *Juncus effusus* beds with abundant *Sphagnum* during the late autumn; *Molophilus ater*, a small, almost flightless spring species may be largely restricted to flushed ground where there is abundant *Juncus* and *Polytrichum commune*. Another small species, *Phylidorea squalens*, which flies during the summer, is characteristic of moorland mires; *Tipula alpium*, a spring to autumn species, typically inhabits sheltered cloughs and rock outcrops. Significantly, only *Tipula alpium* can be identified with a habitat type which has not frequently resulted from peat cutting.

8:3:4. Summary

Sweep netting revealed the following Tipulid and *Odonata* communities associated with waterlogged or flooded peat pits in the Peak District.

Pit-pool *Odonata*	Pit-pool Tipulids	Wet heath Tipulids
?Aeshna cyanea	*Euphylidorea meigeni*	*Euphylidorea meigeni*
A. juncea	*Phalacrocera replicata*	*Phylidorea squalens*
Enallagma cyathigerum	*Prionocera turcica*	*Tricyphona schummelii*
Ischnura elegans	*Tipula melanocera*	*?Idioptera pulchella*
Lestes sponsa	*T. subnodicornis*	
Sympetrum striolatum		
S. danae		

8:4. FAUNAL SURVEY: BREEDING BIRDS

8:4:1. Moorland breeding bird transects

The widespread vegetation and land surface changes brought about by peat cutting, has had corresponding effects on the moorland birds; with species favouring grassland and dwarf shrub habitats benefiting at the expense of those preferring wet bogland. The decrease in the area of blanket peat and mire, has considerably reduced the potential of the moors to support wading birds; while favouring other groups. For example, skylark (*Alauda arvensis*), and short- eared owl (*Asio flammeus*) will have populated the new grassland; while red grouse (*Lagopus lagopus scoticus*) will have increased in number where blanket mire has been converted to dwarf shrub dominated heath.

The scale of these changes is open to conjecture. That they have been large is supported by the example of Ringinglow Bog, located immediately to the west of Sheffield. This extensive site has only been partially drained, there has been limited peat cutting around it fringes, and pot-pitting in a few central spots; as a result it still supports a relatively rich wet mire flora, including seven species of *Sphagnum* (Chapter 10). The bird population of this site is exceptional; seven species of breeding wader, curlew (*Numenius arquata*), dunlin (*Calidris alpina*), golden plover (*Pluvialis apricaria*), lapwing (*Vanellus vanellus*), snipe (*Gallinago gallinago*), redshank (*Tringa totanus*), and common sandpiper (*Tringa hypoleucos*), make it one of the most important localities for this type of bird community in the country; comparable for instance with sites in the 'flow-country' of Northern Scotland (Ardron 1990).

With these changes in mind, moorland breeding bird surveys were undertaken, to quantify differences in the birds inhabiting overcut areas, compared with those on the uncut blanket mire. The survey involved walking a series of 200m wide transects across overcut ground and a similar area of adjacent intact blanket mire. In June 1995 pilot transects were made in preperation for the following breeding season when transects were regularly walked on Lockerbrook Heights. In line with the standard bird transect technique four visits were made; to establish the position of breeding territories and other activity. See Appendices 8.,9.,10., and 11.

The survey was carried out on 4 May, 13 June, 25 June and 10 July 1996, and involved walking two transect lines. The numerous sightings of meadow pipit, along with skylark, golden plover, curlew, and red grouse; have allowed a number of firm conclusions to be drawn. First, it is clear that the Lockerbrook Heights peat cutting has some attraction to all these species as there were relatively few sightings on either the open *Eriophorum vaginatum* dominated blanket bog, or tussocky *Molinia* areas. Equally striking was the concentration of recordings around the edge of the overcut area, with few in the open *Nardus* dominated centre. Meadow pipits, which were present in good numbers, show distinct clustering, in sheltered corners of the peat working and along the drystone walls bounding the site on its eastern and southern sides. Another cluster of records, involving golden plover, meadow pipit, red grouse, and skylark, is centred on a low baulk of peat which extends into the peat cutting from the south-west. Away from the overcut area there were large numbers of meadow pipit around a shallow escarpment bordering the clough to the north, and on the flushed slopes of the clough below. Skylark appeared to show the least association with these fringe habitat and was recorded on the open *Nardus*; however there were too few sightings of this species to come to any firm conclusion.

8:4:2. Discussion

The results may be a little misleading, since 200m transects are too widely spaced to achieve total recording of small bird territories. A 100m separation would have been more reliable. The transect technique employed was developed with high-conservation-value raptors and wading birds in mind; which are usually very prominent in the field during the breeding season. It was not designed to pick up inconspicuous meadow pipits; indeed these birds were specifically excluded from the original English Nature mapping instructions, to be recorded instead as a simple total.

8:4:3. Summary

The break up of the blanket mire surface by peat cutting has generally benefited bird species; as the new environment has more varied, more sheltered, and safer niches for nesting and foraging. It is also richer in invertebrates and therefore better for feeding, particularly during the breeding season when nestlings require a higher protein diet.

CHAPTER 9

THE IMPACT OF PEAT CUTTING ON ARCHAEOLOGY AND LANDSCAPE

THE IMPACT OF PEAT CUTTING ON ARCHAEOLOGY AND LANDSCAPE

9:1. THE IMPACT ON ARCHAEOLOGY

9:1:1. Peat cutting archaeology

Peat and turf cutting over the centuries has produced an enormous palimpsest of archaeological remains. This is often so diverse and extensive that they dominate and shape the appearance of whole landscapes. However, paradoxically, because of their great extent, as well as their frequently subtle and elusive character, they have largely been overlooked; with notable exceptions such as the Norfolk Broads area, which was eventually identified as a peat cut landscape in the 1960's.

Peat cutting is a most diverse and plastic form of archaeology, because unlike any other, much of it is imposed upon a soft, somewhat fluid, sometimes still growing, substrate: the peat itself. It is likely to be the most abundant type of archaeology in many areas and often the most difficult to detect. Peat can form on peat, covering archaeology, which may then only be detectable because of resulting minor breaks in slope, subtle vegetational changes, or disguised, unsuspected breaks in depositional stratigraphy.

The archaeology of peat cutting includes the many types of feature described in Chapter 7, the vegetation changes they have effected, and the resulting landscapes. The proportion of the British landscape affected by at least some form of peat cutting, turf stripping, paring and burning, peatland reclamation and, or drainage is unknown, but if assessed collectively, then the proportion is possibly over 50% in many counties.

Such is the scale of general ignorance regarding this land-use that on any hypothetical piece of unimproved land, if peat cutting has taken place, there will be abundant archaeology present which is related to the industry; but the presence of a single prehistoric or later structure, however minor, would likely dominate the archaeological record of that area. For example, on the Upper Derwent moorlands, prior to the Upper Derwent Archaeological Survey (3:8:2.), several 10km squares containing hundreds of peat cutting features, had but a small handful of Sites and Monuments Records, none of which were related to the peat cutting. While the aforementioned survey subsequently redressed the balance, by recording the turbaries, and main related features, such as access trackways, it still largely ignored the minor features of the peat cut landscape. By contrast the same survey meticulously recorded all elements of other classes of archaeological finds, including individual flint finds, and individual stone-getting pits; ironically, in many cases sited within over cut areas.

9:1:2. Exposure of archaeological structures

The exposure of many hectares of the pre-peat land surface by the cutting, has resulted in the uncovering of numerous ancient monuments, especially from the Prehistoric Period (Figs 9.1. & 9.2.). Removal of the protective peat cover results in damage, or even destruction to such monuments through weathering and robbing; wooden structures would likely be demolished for use as fuel; while those made from stone would be available for constructing enclosure walls and for other building purposes. Where peat cutting did not extend down to the mineral soil, it must non-the-less have still exposed some monuments, making them prone to the processes mentioned above.

Bronze-Age field systems are widespread in the Peak District, but only on middle level moorlands. Although they occur at a lower level than the majority of easily definable turbary areas from which deep peat has been extracted, these monuments, may have been affected by shallow peat cutting, which was most likely common on middle level moorland shelves.

Relatively small numbers of definite or probable prehistoric monuments, most likely of Neolithic or Bronze Age date, have been found on overcut moors; for example on Arnfield Flats (SK 024997; 360m OD) and Ancote Hill (SK 089002; 360m OD) on the north side of Longdendale; in Black Dike (SK 159941; 445m OD), on Lockerbrook Heights (SK 161893; 390m OD), Birchinlee Pasture (SK 163922; 360-400m OD), Upper Hey (SK 176943; 440m OD), Pike Low (SK 180897; 405m OD), and Moscar Moor (SK 215868; 340m OD), in the Upper Derwent Valley; and on Abney Moor (SK 195806; 410m OD). Cairns found on Hey Edge in Longdendale (SK 083003; 390m OD); and on Ox Hey (SK 162945; 420m OD) and Cow Hey (SK 173936; 390m OD) in the Upper Derwent, may be clearance features associated with the peat cutting; but they could be prehistoric.

The majority of the features listed above are cairns of unknown purpose and uncertain origin, but thought to be prehistoric. This is because they have been constructed from gathered stones, which appear to be too earth set and compacted to be of later date. The features on Lockerbrook Heights, in the Upper Derwent, include two ring-cairns (Fig. 9.1.); those noted on Arnfield Flats, in Longdendale, are linear, and appear to represent traces of a possible prehistoric field system, which would likely have been at around the altitudinal limit possible for cultivation in the Peak District, during the Bronze Age (Barnatt *pers. comm.*); on Ancote Hill, also in Longdendale, there is an alignment-of-stones formed from three naturally shaped rocks, set upright. The fact that both the Arnfield Flats and Ancote Hill features occur at 360m, seem to confirm an altitudinal limit of approximately that order for prehistoric settlement, which suggest therefore that most of the cairns noted on higher peat cuttings may have been associated with ritual or burial. Consequently, it seems reasonable to conclude that most prehistoric structures present on the gritstone moors of the

Fig. 9.1. Remains of a ring-cairn on overcut at Lockerbrook Heights. This feature, in part overlain by the drystone wall, is defined by raised lines of *Nardus* and the *Juncus* patch.

Fig. 9.2. Views of the Seven Stones of Hordron Stone Circle, located within a sub-rectangular peat cutting. The top picture shows the part of the circle which is closest to the highly degraded cutting face, and a more recent racket-form working behind. The bottom picture is an overview (stone circle arrowed).

Peak District were affected by the largely undefined working of shallow peat and turf, rather than the cutting of deep deposits at higher altitudes.

That significant ceremonial monuments have been exposed by the cutting of blanket peat in the Peak District is beyond doubt. To give an example, the Seven Stones of Hordron, on Moscar Moor (SK 215868; 340m OD), is a free-standing stone circle which is located within a sub-rectangular peat working (Figs 9.2. & 10.2.). The monument is surrounded on three sides by about a one metre depth of remaining peat. The peat has clearly shrunken to its present depth, which corresponds to the height of the tallest of the orthostats within the stone circle. The depth of the shrunken peat and the height of the orthostats indicate that the monument would not have been visible before peat cutting took place. However, it seems to have been subsequently robbed; because there were probably originally sixteen stones in the circle (Barnatt 1990).

Several of the other Upper Derwent monuments mentioned above have also probably been significantly damaged as a result of peat cutting. The barrow on Pike Low and a large cairn on Birchinlee Pasture have been robbed centrally; while the ring-cairns on Lockerbrook Heights (Fig. 9.1.), although still quite prominent, appears to have little stone content, and could merely be vestiges of large robbed barrows. If this is the case, then previously existing barrows could have been demolished in order to build a drystone wall which cuts across the two ring-cairns. Altitudinal and slope characteristics at the Pike Low, Birchinlee and Lockerbrook sites suggest that around 1.5m of peat should have covered the monuments, which would have heavily disguised them. Although large barrows under peat may have still shown as a prominent mound protruding above the general level of the blanket bog, and therefore probably identifiable by probing; the current research has failed to identify the remains of any stone built monuments which have been robbed through thick peat cover, anywhere in the Peak District.

Peat cutting has not been identified before as a process responsible for the exposure of ancient monuments on Peak District moorlands (Smith pers. comm.), and seldom elsewhere. A rare example is illustrated in 'Worth's Dartmoor' (Spooner & Russel 1967) with a photograph which shows a prehistoric stone-row part exposed on the floor of a linear peat cutting, with the caption "Stones of a prehistoric row disclosed by turf-tye". The same text also shows that turf stripping, if not peat cutting, was being carried out amongst ancient monuments during the Victorian Period, with comments relating to the Buttern Hill Stone Circle, which included, "In 1931 a great part of the turf within the circle was skimmed off for fuel, in accordance with an unfortunate habit which prevails in the Chagford district, where little true peat-cutting is now done". It is interesting that neither of the two references described allude to a possible detrimental effect on the monuments by the digging; the one referring to turf stripping does however comment that the process "disfigures the moor and destroys pasture", and goes on to say that "it has one slight advantage. It reveals the worked flints that so often lie immediately under the turf".

9:1:3. Exposure of artefacts

Widespread peat cutting has also had a great impact on the integrity of scatters of archaeological artefacts found on affected landscapes, which would have been originally protected by the intact mire, either contained within the underlying mineral soil, or in some instances within the peat itself.

Diverse multi-period assemblages of artefacts, like those typically detected by field walking the intensively settled lowlands, are only of localised occurrence in the hills, being restricted to the vicinity of dispersed settlement mainly in the valley bottoms; however prehistoric scatters of stone artefacts, so called lithics, are widespread. Mesolithic peoples in particular heavily exploited the uplands for hunting purposes, utilising isolated hills as vantage points, and ridges and edges for the same purpose as well as probably to surprise game; significantly these are the same elements of the upland landscape which have been most worked for peat. Later, during the Bronze Age, when climatic conditions were more favourable for upland cultivation, field systems were established on many middle level moorlands by peoples who still relied heavily on flint tools for day-to-day usage.

Removal of the protecting peat has led to damage occurring to individual lithics through a variety of physical processes, such as weathering, trampling and fire; while the integrity of scatters associated with single episodes of activity, as well as palimpsests, will have been affected by the same processes, as well as the widespread mass-wasting of the exposed land surface, and even through the redistribution of lithics contained within the cut turves. Most Mesolithic artefacts lie below the general peat blanket of the uplands, but later lithics occur in the peat deposits themselves, because both the Neolithic and Bronze Age Periods post-date the start of formation of the majority of the deeper peat. Flint artefacts diagnostic of both the Neolithic and Bronze Age Periods have, for instance, been found in peat banks on Warwick Hill near Marsden, on the northern edge of the Peak District (Edwards 1990).

Although finds of archaeological artefacts other than lithics are scarce in upland situations, they do occur, sometimes contributing important information to the historical record of these areas. Lithic search on Burbage Moor near Sheffield, during the 1980s, on ground where up to 1.5m of peat was reported lost to the effects of destructive moorland fires (Anderson & Shimwell 1981), also revealed the presence of a thin scatter of various artefacts, including mined mineral fragments, First and Second War military ordnance, undated metal objects, and pottery sherds, as well as the remains of a nineteenth century grouse feeding bowl (Ardron 1998). All these finds were made on land where there had been significant peat loss, on either exposed mineral soil, or bare part eroded peat surfaces. These findings demonstrate that peat loss due to any cause is likely to reveal the presence of interesting artefacts; of additional significance is the fact that these finds were located on moorland where the attrition was thought to be the result of fire, but recent resurvey has identified several areas of opencast peat cutting, down to mineral soil, located within the burnt areas. At these locations the fires seem simply to have destroyed vegetation which had recolonised the overcut mineral soil, leading to a secondary phase of mineral soil erosion and resulting artefact exposure; one such site produced the greatest concentration of Late-Mesolithic microliths to be found on the moor (Ardron 1998). Figure 9.3. shows part of this exposed peat working; while Figure 9.4. illustrates some of the lithics found there.

9:1:4. Impact on environmental archaeology

The importance of peat bogs as archives of environmental data is well known; pollen preserved in the different peat layers being used to identify episodes of vegetation change and human activity (Faegri et al. 1964). Additional environmental information is provided by the invertebrate and other animal remains contained within the peat. Furthermore, the ecological repository in general and the minutia of bog stratigraphy are now being studied in order to work out climate change through time (Barber 1995). Clearly, the total peat resource available to palynologists, environmental entomologists and climatologists has been dramatically reduced by the peat cutting. Additionally, large quantities of tree remains, which would have been of value to dendro-chronologists and historical ecologists, have been taken away with the peat; indeed, the peat cutting may have removed a majority of the buried tree resource which occurred in certain moorland areas. In the Peak District for instance, most of the former woodland was on the middle level moors, rather than the highest plateau where the majority of the remaining blanket mire survives. Even the remaining peat resource has been greatly degraded by shrinkage and oxidation resulting from the cutting and related drainage.

9:1:5. Exposure of mineral resources

The removal of vast areas of deep peat has also highlighted the position of various natural resources, which the peat cover previously disguised. Localised deposits of minerals and stone will have been revealed, but perhaps more significantly the removal of the potentially troublesome overburden of wet peat will have facilitated the easy removal of these resources from affected areas. In the limestone dales region of the Peak District the probable Early Post-Conquest removal of localised deep topogenous peat and more extensive shallower blanket deposits, probably assisted the spread of Later Medieval and Post Medieval lead and other mineral working in that area; while in the gritstone Dark Peak the huge exploitation of deep blanket mires influenced the spread of stone and grey-slate quarrying on the moors, as well as localised coal mining and probably also the extraction of other resources such as bog-iron, ganister and clay. An indication that peat over-burden has been a factor in quarrying work, is shown by Defoe's accounts in about 1725, of the "digging of Millstones" around Hathersage; "A large detached block was isolated on a hillside by removing the surrounding peat and rocks" (Ward 1961).

Fig. 9.3. One of a line of peat workings on Burbage Moor, exposed by recent wild-fires , where lithics have been recovered from the mineral soil surface.

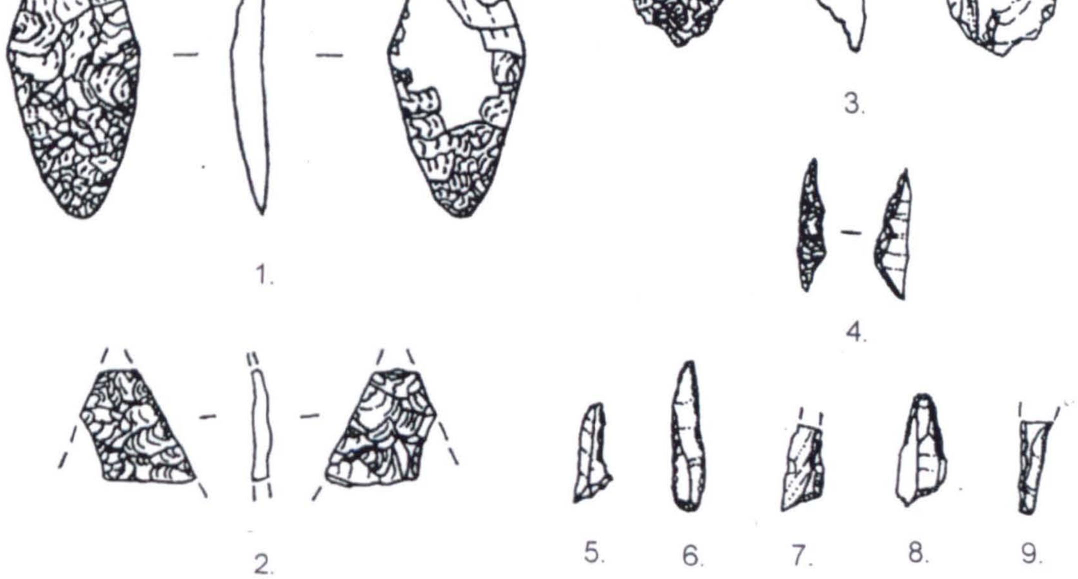


Fig. 9.4. Selection of flint artefacts recovered from fire exposed peat cuttings on Burbage Moor: 1. Neolithic lozenge-shaped arrowhead 2. fragment of arrowhead (Neolithic or Bronze Age) 3. 'thumb-nail knife' (possibly Late Mesolithic) 5.-9. various microliths of Late Mesolithic origin. Illustrations from Ardron (1999).

9:1:6. Jumbling of the archaeological resource

Peat cutting has resulted in considerable damage to the archaeological resource; it has also served to confuse that part of the record which remains. As described above, exposed lithics may have been moved around by weathering and other processes, and others may have been taken off site by peat cutters as curios or inadvertently within turves. Those taken home as trophies may have been lost around the home or become part of the anonymous mass of contextless artefacts within present-day society. Those within the cut turves will have been burnt on the fire or within kilns, and then their remains or fragments put in middens and subsequently scattered on the land, as will those removed in peat exploited for fodder, bedding or building purposes.

Whatever the route, many burnt and unburnt flints must have found their way onto land well away from their original context, thereby potentially 'contaminating' other prehistoric sites. These activities would mostly affect ploughlands. As evidence for this, much of the midden-scattered land associated with peat cutting settlements in the Upper Derwent Valley that have been identified by field walking the exposed reservoir drawdown-zones, held palimpsests of lithics containing unexpectedly high numbers of burnt flints.

9:2. THE IMPACT ON LANDSCAPE

Peat cutting has directly or indirectly changed the appearance of a great proportion of upland Britain, by effecting widespread, visually obvious, vegetation change and breaking-up the uniformity of the land surface. The vegetation change has most visual impact where dark coloured blanket mire vegetation, typically *Calluna* with *Eriophorum* has been substituted by light coloured grassland on exposed mineral soils, notably *Nardus*. In other areas the *Calluna* and *Eriophorum* has been replaced by *Molinia* or a coarse mosaic.

Where the land surface has been totally striped of its peat cover the visual change may be dramatic, sometimes simply in terms of vegetation change, but more often by a combination of peat cutting archaeology, such as peat baulks and access hollow-ways which break up the land surface producing prominent, though relatively shallow surface texturing; this can be dramatically visible in low light and snowy weather. In localised areas of the blanket mire landscape peat-potting has resulted in the creation of distinctive lunar-landscapes, reminiscent of shallow stone quarrying. Complete removal of the peat cover has also led to the creation of intake-land; which in upland areas like the Peak District has produced a very striking, mosaic, moorland fringe landscape, of 'invasive' walled fields nestling between areas of rough grassland and dwarf-shrub heath.

The diverse appearance of the Peak District moors, probably a major factor responsible for the national park being the second most visited in the world, (after Mount Fuji), has largely been determined by the past activities of peat cutters or turf-strippers. The over-riding irony is that this aspect of the landscape, forms the basis of a mind-set, which the urban visitor enjoys as part of the unspoilt-wilderness-experience. This begs the question; would the aesthetic appeal of the moors be as great, if their history as a ravaged-landscape, rather than one largely untouched since prehistory, was widely known.

9:2:1. Expansion of intake-land

Peat and turf cutting in upland Britain have greatly influenced the pattern and expansion of intakes; which in turn has had a major bearing on the appearance of the landscape and distribution of human settlement, particularly around the moorland fringe. The relative proportions of intake-land which have resulted from the removal of turf, thin peat, deep blanket mire, or paring and burning will probably remain unknown, but the collective extent must be very great.

A number of findings collectively suggest that a majority of the intakes extending onto upland areas like the Peak District have been created by the cutting of overlying organic deposits. The most obvious evidence are the chains of deep peat cuttings around the fringe of upland areas; some of which are clearly defined by intake boundary walls lying adjacent to peat cutting banks. Other indications include, extensive signs of shallow peat cutting on middle and low level moors, vegetation mosaics, and turf cutting features on valley sides.

Parcels of enclosed, improved land, locked within surviving peatlands, are very common in areas like the Peak District. Examination of this intake-land in the field clearly shows that a majority have been imposed upon the formerly much more extensive blanket mire landscape. Some retain thin organic deposits, particularly when poorly drained; but all appear to have been formed through the clearance of an original overburden of peat. Many occur in areas where there has been extensive, but incomplete removal of the peat cover and the surrounding land has gone over to a mosaic of unimproved grassland/dwarf shrub/rushy moorland vegetation.

There are some sites, particularly on the north-eastern fringe of the Peak District, where the 'penetration' of intake-land as a result of peat cutting is very clearly defined. One of the best examples occurs along the south side of the A628 trunk road between Sheffield and Manchester (Figs 9.5.-9.7.). This linear parcel of fields, west of Langsett, extends for over 1km into the surviving blanket peat mass (SK 178010-169005; 340-400m OD). The evidence of its peat cutting origins are irrefutable and include, surviving peat cutting banks beyond the western limits of the intake, drained peat baulks within the end land parcel (Fig. 9.7.), and the presence of a cut peat section running parallel with the enclosure on its north side. The latter feature is exposed by a trackside drainage ditch (Fig. 9.8.) and shows the gradation in peat depth from one end of the area of intake-land to the other; 0.62m at the lower east end, to 2.09m at the higher west end (Fig. 9.6.). Other similar parcels of 'penetrative intake' in the Peak District occur at Hordron (SK 183996), Stopes Moor (SK094061), and Wessenden Head (SK 080073).

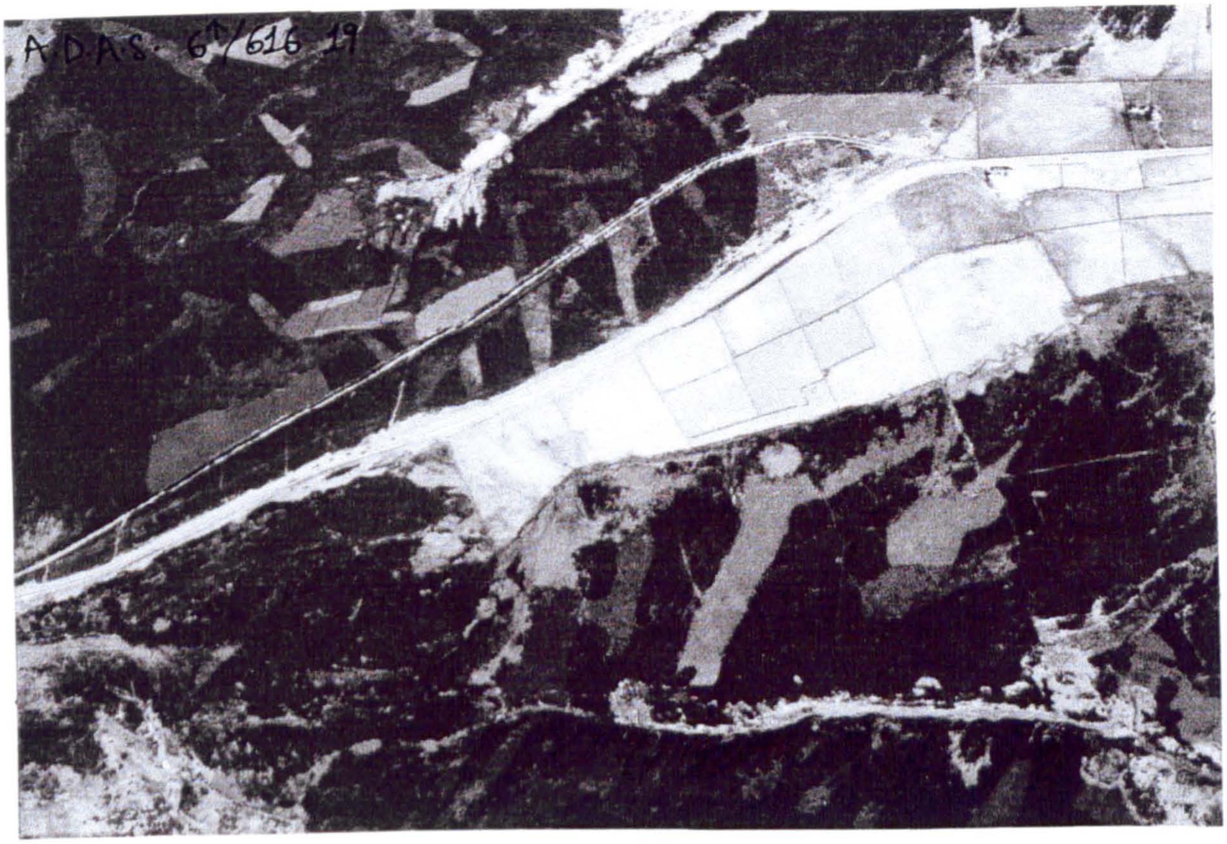


Fig. 9.5. Section of an aerial photograph, showing 'in-bye penetration' onto the moors west of Langsett, which has resulted from 'invasive peat cutting' into blanket mire. The site, defined by the light coloured area of grassland, is bordered on its north side by the A628 Sheffield to Manchester trunk road.

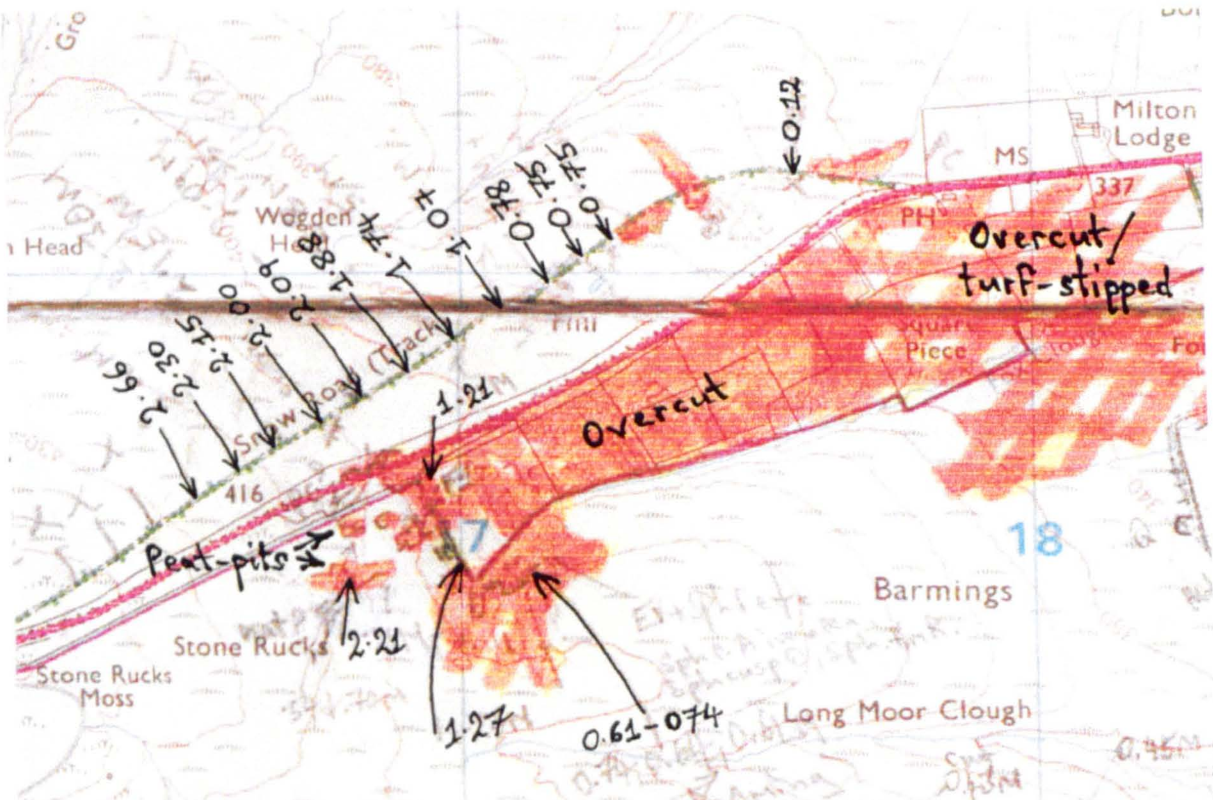


Fig. 9.6. Interpretation of Figure 9.5. This 1:25,000 field map, also shows peat depths (in metres) along the length of the Snow Road track, which runs parallel with the fields and peat cutting; thus quantifying the peat removal.

Fig. 9.7. The limit of 'in-bye penetration' west of Langsett, defined by *Nardus* and the tumbled drystone wall. The irregular half metre deep baulk of peat in the centre of the picture (annotated) has been gripped, while the patch of light vegetation beyond the left hand wall defines exploratory areas of peat pitting near the limit of cutting.

Fig. 9.8. View east along the Snow Road track. The ditch on the left of the track consistently cuts through peat, into the mineral soil; so was used for measuring the depth of blanket mire remaining along this peat cut moorland ridge.

CHAPTER 10

ADDITIONAL IMPACTS OF PEAT CUTTING

ADDITIONAL IMPACTS OF PEAT CUTTING

This chapter covers those impacts of upland peat cutting which are less well substantiated. They have come to light during the course of general field work and have not been studied intensively. All are non-the-less of significance and merit further research.

10:1. EFFECT ON *SPHAGNUM*

It is widely held that the peat-forming *Sphagnum* mosses have declined over much of Britain due to the toxic effects of acid rain. The inhibiting effects of sulphur dioxide and its solution products on bog mosses has been proved experimentally (Lee & Studholme 1992), and is also clearly shown by the distribution of many species, which are concentrated in areas largely outside the polluting influence of urban centres and industry. While this reduction in *Sphagnum* may have been accelerated by atmospheric pollution, peat cutting and associated drainage has also had a direct and indirect bearing on *Sphagnum* populations and may have been one of the prime factors which instigated the process of decline.

Where peat has been removed *en masse* from free-draining ground, suitable conditions for bog moss growth on those areas has been effectively lost; while the extensive drainage described previously appears to have affected the potential of the peat blanket as a whole to support *Sphagnum* populations. Recent survey in the Peak District, however, has shown that a rich variety of *Sphagnum* species still occur in clough bottom situations, growing in spring line flushes (Ardron in prep.); while even on the moor tops there are 'hot-spots' that are relatively species-rich (Ardron & Rotherham in prep. a)). Ringinglow Bog on the western outskirts of Sheffield (SK 2684) supports locally abundant growths of *S. papillosum* and six other species; Lucas Moss (SK 263767), an upland raised mire (Ardron & Rotherham in prep. b)), has active hummock-hollow vegetation where *S. papillosum* is the dominant hummock former; extensive peat pits on Derwent Edge (SK197895-201884) and Stanage Edge (SK 225863-225856) have been colonised by up to seven species of *Sphagnum*, also including the peat forming *S.papillosum*; while highly eroded moorland slopes below Windgate Edge (SK 030003), which are generally devoid of even the pollution tolerant *S. recurvum*, has a flush with seven species. Figure 10.1. shows an area of erosion below Windgate Edge.

At all the above sites ground water influence appears to outweigh the detrimental influence of atmospheric pollution. In contrast, over the majority of the open blanket mire surface ground water is intermittent and seasonal in occurrence, apparently because of the drainage network; which has resulted in acidification of the upper layers of peat through oxidation. Where *Sphagnum* still occurs, ombrotrophic species appear to have been replaced by those favouring soligenous conditions. Generally, mosaics of *S. fimbiatum, S. palustre, S. recurvum,* and *S. subnitens* have replaced *Sphagnum imbricatum* and *S. papillosum* dominated communities. *Sphagnum imbricatum* was until recent centuries a major peat-former in the south Pennines, but is now extinct in the area; possibly because it is particularly sensitive to atmospheric pollution, or because climatic change and/or land-use has caused widespread drying of the blanket mire surfaces (Lee & Studholme 1992).

To summarise, while a significant proportion of the potential *Sphagnum* supporting land surface in upland areas has been destroyed by over-cutting, and similar communities on the remaining blanket mire largely eradicated by drainage, peat cutting has also created *Sphagnum*-rich habitats where pitting has taken place.

10:2. THE SPREAD OF *PTERIDIUM*

Peat cutting has probably led to colonisation of upland fringe areas by bracken (*Pteridium aquilinum* agg.) which is considered a pest because of its toxic properties, harmful spores, and dominating growth. It spreads by rhizomes to form extensive clones, with deep underlying litter, which can suppress virtually all other plant growth. On the positive side dense bracken can be of considerable benefit to wildlife, since it provides exceptional cover for insects, birds and mammals, may support populations of the adder (*Vipera berus*), and on moorland fringe is the most important breeding habitat for whinchat (*Saxicola rubetra*).

Bracken prefers deep well-drained brown earths and is thought to have been a woodland plant before deforestation opened up new habitats, apparently encouraging litter build-up, spore production and prothallus growth (Grime *et al.* 1990). It does not normally grow on blanket peat, but because of its rhizomatous growth, has the potential to invade drying peat and overcut ground.

The species is now generally considered to be invasive on moorland fringes, and the relatively well drained, deep, degenerating blanket mires found in such areas are likely to be further colonised by the species. It would have initially benefited from mineral soil exposure after peat cutting, and drainage of the uncut blanket mires; but its spread would have been checked by its widespread usage for fuel, thatch, litter, compost, fodder, as a source of potash, and its localised, but probably significant use in covering charcoal hearths. The latter usage may have been especially prevalent in the Upper Derwent Valley, where at least 238 charcoal burning platforms have been identified by recent archaeological survey (Bevan 1990); some contain significant bracken remains in their structure. The usage of bracken by rural communities continued in areas such as the Yorkshire Dales up until at least the 1940s (Hartley & Ingilby 1985), but has now effectively ceased; its recent rapid spread is likely, to some extent, related to the twentieth century decline of this activity.

The relationship between over-cutting and bracken spread is not easily demonstrated, because the plant has not yet moved onto the higher moors where the most prominent peat cuttings are found; it is most invasive on middle level areas where the exploitation of thinner peat deposits is less clear. However, in a few places the correlation is dramatic and bracken may actually define the extent of peat cuts, where it has been unable to spread onto the surrounding uncut blanket mire. One of the best examples in the Peak

District occurs on Hordron Edge, Moscar Moor, at 340m OD (SK 215866- 220875), where a series of sub-rectangular edge-top cuttings have been occupied by bracken (Fig. 10:2.).

10:3. SPECIES DIVERSIFICATION

Although the most fundamental effect of the stripping of peat from large areas of the uplands has been the change in the overall proportions of the dominant moorland vegetation types; there has also been localised species diversification, largely because post-peat cutting land surfaces are much more diverse in form than those which existed before. Generally the wetter, richer, but more uniform pre-peat cutting bogland habitat; probably characterised by dominant *Sphagnum*, frequent *Andromeda polifolia*, *Drosera* spp., *Narthecium ossifragum*, *Rhynchospora alba*, and *Vaccinium oxycoccus*, has been lost due to the process and its associated drainage; but a greater range of communities now inhabit the broken landscapes which have resulted. The presence of the later palimpsest of peat cutting banks, baulks, miscellaneous earthworks, water-logged pits, mineral soil exposures, secondary stone-getting pits and other features have ensured colonisation by a range of plant and animal species uncharacteristic of intact blanket mire.

10:3:1. Hollow-ways and other tracks

The numerous hollow-ways which link the upland peat cuttings form a localised habitat characterised by a flora of dwarf shrub, bryophyte and lichen species. Like peat banks these hollowed trackways form transition zones which provide shelter, humidity, and sloping surfaces; but with a mineral substrate.

Hollow-ways provide an abundance of micro-niches because they face all aspects, occur at many altitudes, vary greatly in depth, cross differing geological strata, and contain mineral soil and organic deposits. Also, soil compaction during usage has caused water erosion, which has led to the exposure of rock strata, frequent potting, and to the formation of deltoid-cones of eroded sediment; while clearance of loose material and other obstructions from the floor of these tracks has created localised deposits of scree-like material.

Hollow-way vegetation may contrast markedly with that around it, often providing the signature by which these features are recognised in the landscape. For instance hollow-ways passing through leggy *Calluna* may be highlighted by *Nardus*; while in turn those passing through areas dominated by *Nardus* are usually made obvious by the dwarf shrub element they contain. The typical hollow-way flora incorporates abundant *Calluna vulgaris* and *Vaccinium myrtilus*, sometimes with *Erica cinerea*. In the Peak District *Erica cinerea* is rather local and is only usually found growing abundantly on western moorland slopes; it is well established on the sides of some hollow-ways, where presumably the micro-climate is a little more oceanic. Hollow-ways with beds of *Vaccinium myrtilus* support colonies of the local Green Hairstreak butterfly (*Callophrys rubi*).

Fig. 10.1. Highly eroded moorland below Windgate Edge where there is no field evidence of peat cutting. Areas like this, affected by atmospheric pollution, are devoid of *Sphagnum*. However, one flush in the vicinity, where ground water influence appears to out-weigh the pollution, has seven species.

Fig. 10.2. Part of the sub-rectangular peat cutting occupied by the Seven Stones of Hordron Stone Circle, showing colonisation by *Pteridium*, which has extended in patches up to the base of the degraded peat cutting bank, but not onto the *Calluna* dominated blanket mire surface beyond.

Due to the relatively more moist environment existing within hollow-ways the bryophyte element is usually well developed, but fairly predictable, with *Hypnum cupressiforme* typically abundant and *Dicranum scoparium* frequent; however the lichen flora can be surprisingly rich and in the Peak District contains some locally significant species. *Cladonia* species typical of peat faces (Appendix 5.) are also usually found on the sides of hollow-ways, but additionally there may be well developed *Hypogymnia physodes* and *Cladonia portentosa*, particularly where the growth of the dwarf shrubs is kept in check by grazing. One hollow-way also supports the club-moss *Lycopodium clavatum*, now very rare in the Peak District.

Level or hollowed portions of hollow-ways can become water-logged, particularly if the track crosses a flush line; the mineral soil surface favouring *Calitriche stagnalis, Glyceria declinata, Juncus bufonius, Juncus effusus, Myosotis scorpioides, Ranunculus flammula*, and *Ranunculus omiophylus*. Often the latter species forms dense stands, typically with mats of *Sphagnum recurvum*, leading to a build-up of organic deposits. Soft Rush beds in this environment support significant invertebrate populations, which moorland birds, such as the meadow pipit (*Anthus pratensis*), exploit as a food source; they are especially important where they provide the only cover in an otherwise open landscape. *Juncus effusus* beds with underlying *Sphagnum recurvum* occurring within a peat cutting access hollow-way, and on adjacent ground, on the south side of Linch Clough in the Upper Derwent Valley, holds significant numbers of the rare cranefly *Tipula holoptera* (Figs. 10.3. & 10.4.). This is a near British endemic, of extremely local occurrence.

Peat cutting, access, hollow-ways encompass a variety of other potential niches, including dry sandy patches occupied by mining bees, and the green tiger beetle (*Cicindela campestris*); as well as various rocky features used by common lizard (*Lacerta vivipara*), and nesting birds such as the wheatear (*Oenanthe oenanthe*).

10:3:2. Trench Boundaries/Drains

The importance of trenches and drains to moorland wildlife is best demonstrated by the example of Black Dike, the longest trench cutting in the Peak District and a multi-phase feature (Chapters 6 & 7; Figs 6.12.,6.13. & 7.6.); it forms a ridge top corridor traversing over 2.5km of blanket mire. Black Dike provides a diverse linear habitat, which includes *Nardus* dominated grassland at its broad eastern end, areas of *Eriophorum angustifolium* where there is impeded drainage, and *Sphagnum* filled bog pools. At its western end the dike is ill-defined and continues as a simple infilled double-ditch with central bank. The bog pools and *Eriophorum angustifolium* areas are good habitat for invertebrates and consequently utilised seasonally as feeding sites by moorland birds. In their breeding season golden plover (*Pluvialis apricaria*) are frequently found in the vicinity of linear peat cuttings, with at least five or six pairs occupying the blanket mire either side of Black Dike; while dunlin (*Calidris alpina*) have been seen feeding specifically around boggy pools, both at the western end of Black

Fig. 10.3. *Tipula holoptera*, a near British endemic cranefly, which can thrive in *Juncus effusus* beds with underlying *Sphagnum recurvum*.

Fig. 10.4. The peat cutting access hollow-way, on the south side of Linch Clough, where *Juncus effusus* beds with underlying *Sphagnum recurvum* support a significant population of the rare cranefly *Tipula holoptera*.

Dike and at two locations on similar features. The Peak District is an important breeding outpost for both golden plover and dunlin in Britain, being at the south-eastern limit of their range. The dunlin population in the Peak has declined from an estimated 94 pairs in 1974 to about 45 pairs, probably due to drought during the breeding season (Elkington & Willmot 1996); the relatively stable surface water present in and around trench cuttings are therefore especially important to that species. Black Dike also provides a sheltered foraging habitat for birds outside the breeding season; notably migrating meadow pipits (*Anthus pratensis*). Botanically it is species-poor, but supports well developed *Sphagnum cuspidatum* and *S. recurvum* colonies within its bog pools and occasional small patches of *Sphagnum papillosum*; while along an approximate 200m length of the double-ditch at its western end there is abundant *Rubus chamaemorus,* which here is also at its south-eastern British limit.

10:3:3. Miscellaneous Features

Other miscellaneous features associated with the peat industry, including loading features, stacking features, baulks, isolated remnants of uncut peat, minor banks and hollows within cut-over areas, the remains of abandoned turf piles, minor drainage grips, peat-cutters clearance cairns, secondary and exposed earlier archaeological structures, also play their part in breaking up the post peat cutting landscape; diversifying the flora, and providing a multiplicity of niches for wildlife.

10:4. THE IMPACT ON SOILS

Peat and turf cutting on the scale identified in this thesis will have had a considerable influence on soils of the overcut areas and associated in-bye land. The peat is actually part of the soil itself and its removal will have affected both the chemistry and the stratigraphy of the exposed mineral layers. The instability in hydrology caused by peat cutting has led to erosion and redeposition. Finally at least some of the peat and turves taken to the settlement areas, will have by a variety of processes, been transferred to the farmland, leading to change, improvement, and thickening of the anthropogenic soils found there.

10:4:1. Soil modification

The simple removing of peat, the O-horizon of the moorland soil profile, starts the process; then because the lost peat would have provided acid and organic material to deeper horizons if it had been left in situ, the chemistry and stratigraphy of the underlying mineral soil will have been modified, particularly on cuttings many centuries old. Secondly the exposed mineral soil was left open to attrition, so that at the very least the Ea-horizon of the typical moorland podzol has been reduced on cut over areas, but because the removal of the peat-reservoir (10:5:1.) caused destabilisation of the moor top hydrology, some areas were subjected to mass wasting and deeper erosion of the soils, sometimes down to bed rock, The situation has been further complicated by repeated episodes of redeposition over the remaining truncated soil, both on the overcut surfaces and on land downslope. This has typically led to a very complicated picture, where soil profiles change metre by metre. The rather undulating ground surface may become revegetated, thus masking a palimpsest of eroded patches, minor rills, deeper erosion channels, infilled hollows and gullies, and minor deltoid cones. This situation is clearly seen on Win Hill (6:34.), where profiles exposed by eroding pathways, include intact podzols with traces of the original O-horizon, podzols where the O-horizon is absent, redeposited soils made up of many layers of sandy material and sandy peat, as well as truncated soils capped by redeposition.

10:4:2. Soil improvement and build-up

Cut peat and turf has often been returned to the land in order to improve the quality of the natural soils. This has been achieved by scattering the various peat and turf products (Chapter 4), including mulch, ash, hearth waste, manure, and old building and roofing material onto the fields. The quantities of these materials used for this purpose are impossible to assess since there appears to have been wide differences in their utilisation from place to place. Some districts, notably island communities, are known to have had traditions of using all manner of natural manure on the land, others were very wasteful, and would for instance place midden heaps on river banks, to be washed away by winter floods. However, in areas where peat and turf products are known to have been regularly applied to the land, the quantities were huge and have been responsible, over several centuries, for building up soils to levels well above those existing originally. Notable anthropogenic soils of this type occur, for instance, around settlement sites on Papa Stour on the Shetland Isles, where they are up to 80cm thick and of even composition (Davidson & Simpson 1994).

There are strong indications that similar anthropogenic soils occur in the Upper Derwent Valley. Work on the drawdown zones of the three reservoirs, in particular the pottery survey (2:8:5.), provided irrefutable evidence that midden material was being applied to the land during the Medieval and Post-Medieval Periods, and probably much earlier. Subsequent examination of soil profiles exposed around the eroding edges of the reservoirs, in the vicinity of settlement sites of the latter periods, has revealed the presence of plough soils down to underlying clays containing frequent fragments of charcoal (Fig. 10.5.). The charcoal clearly derives from the hearth, since small fragments of coal, coke, and other burnt midden material, occur. Its type is unknown, a proportion may be derived from wood; but given the amount of peat cutting which has taken place around the valley, it is logical some must be the product of turf burning.

10:5. THE IMPACT ON UPLAND HYDROLOGY

10:5:1. Removal of the natural peat-reservoir

The Dark Peak, from which the majority of peat has been taken, has numerous reservoirs in its valleys, which supply the conurbations of the North Midlands with drinking and compensation water. The removal of an estimated minimum total of 52 million cubic metres of peat from the Peak District plateau has had a major impact on the water-holding capacity of this catchment; equivalent to the loss of a reservoir containing 520,000 million litres (or 114,400 million gallons). The water-storage capacity of peat is prodigious; for example, ombrotrophic *Sphagnum*-peat can hold 500-600% water on a dry weight basis (Cressner *et al.* 1997), while peat on average contains 5.5 gallons per cubic foot (Baird *et al.* 1997).

The lost potential of any removed peat-reservoir to top up water supplies is shown by calculating the water-holding capacity of the peat which has been extracted, then comparing it with that held within the local reservoirs. So for instance, in the Upper Derwent Valley, at least 18,361,700 cubic metres of peat have been removed from within the watershed, which could have held c.180,000 million litres of water; while the three reservoirs in the valley, Howden, Derwent and Ladybower, had a collective capacity of 47,798 million litres, or 10,505 million gallons at inauguration (Robinson 1993). This means that the three reservoirs can only hold about one quarter of that which could have been contained within the cut peat prior to exploitation. However, the water-holding capacity of the moors before peat cutting would have actually been even greater; because, the volumes of peat removed, were estimated by reference to the present day depth of the individual peat working faces. The reduction in the volume of the peat, due to shrinkage, resulting from the cutting and related drainage is unknown and was therefore not taken into consideration.

This said, it is very difficult to accurately quantify the relative water-holding values of peat and reservoirs, because not all the water in either is readily available. The water in a peat mass is locked in the lower humified catotelm and released only gradually from the upper, more open textured, acrotelm (Baird *et al.* 1997); while the lower levels of water in reservoirs are generally unsuitable for drinking and often unavailable; for instance, the bottom 16.75m of water in Derwent Reservoir will not gravitate through the aqueduct (Robinson 1993). What is certain, is that the water-holding potential of an intact peat bog is consistent, whereas that of anthropogenic dams diminishes, because of silting. For instance, by the seventies the combined capacities of Howden and Derwent, had fallen by 105 million litres (Robinson 1993).

10:5:2 Effect on run-off and erosion

The removal of vast quantities of peat from the uplands has also influenced water run-off and therefore erosion. Even though rain runs off readily from a peatland surface, rather than soaking in, as it would with a normal soil (Baird *et al.* 1997), the compaction of exposed mineral soils and the baring of peat on overcut areas, would have led to increased run-off and erosion during peat cutting and initially after the turbary was abandoned. Any erosional effects will have been transferred down the gullies, hollow-ways and drains into the valley systems beyond. Ironically, the subsequent colonisation of the overcut areas by tussocky *Nardus* and *Molinia*, or *Calluna*, will have reversed the trend and may even have led to lower levels of run-off than occurred before the peat cutting took place. Vegetation decreases run-off and associated erosion by binding the soil together; coarse vegetation is thought to be even more effective because of its increased surface area (Sansom 1996).

Also significant, is the effect of peat cutting on water flow and therefore run-off within surviving peatlands. As previously mentioned water is effectively locked in the catotelm but flows gradually from the acrotelm (Baird *et al.* 1997). However, both these peat strata have been affected by drying caused by the peat cutting and related drainage and have shrunken and compacted through oxidation. The shrinkage of the acrotelm will have reduced its ability to both store and release water. Furthermore, in some upland areas, particularly where there has been widespread exploitation of surface peat for domestic fuel, the acrotelm has been interrupted by peat-potting, partially removed, or stripped away completely. In areas like Mid Wales, where there has been widespread surface stripping, water flow through the remaining blanket peat must have been significantly diminished. This may well have led to erosion and break up of some peat masses, particularly on very exposed free-draining hill tops, within areas of very high rainfall.

Significantly, in the Peak District, where there has been very little surface working on hill top blanket mires, the peat cut landscapes are generally well preserved, with on the whole only minor erosion features. In this area, mass-wasting of the peat is usually found instead, where blanket mires occur on steep west-facing slopes, on a few very high moor tops subject to particularly higher levels of rainfall and pollution, or where fires have totally destroyed the vegetation mat. Virtually all other sites bared of their peat cover, which have been previously interpreted as mass-wasting, are in fact areas of large-scale over-cutting.

10:5:3. Changing waterflow

Peat cutting and related drainage has had a considerable impact on the natural water flow from the moors; causing increase or decrease in run-off down individual watercourses and the formation of new streams. Additionally some access hollow-ways have captured water draining from the overcut areas and converted into water courses.

Gullying by drainage or through peat cutting

There are a number of unusually straight water courses running down slope from overcut areas. These features may be eroded ditches, originally dug directly down slope from peat cutting areas to facilitate rapid drainage, that have now taken on the appearance of natural gullies or even small cloughs. They typically show little evidence of present-day water flow;

but have greatly incised sides, indicating that they have contained torrential water in the past. It is likely that the deep incision of these features occurred as a result of the peat cutting, which led to destabilisation of the peat-reservoir, with resulting localised water outflow into the gullies (Griffiths pers. comm.).

Hollow-ways to watercourses

All large peat cuttings occurring on hills, ridges and plateau tops have access routeways, which have usually developed into hollow-ways. Since many of these braid outwards onto the overcut areas they have the character of watercourses. Some indeed develop into watercourses, become further incised, and contain the flora of natural streams; which disguises their anthropogenic origin. Those hollow-ways which run up onto areas stripped of peat, may be dry, except during very wet periods; but others lying close to uncut deep blanket mire may have captured the outflow from dendritic gullies in the mire surface.

An interesting example of a hollow-way which has been associated with drainage is provided by one of the two which served the peat cutting on the north side of Linch Clough in the Upper Derwent Valley. This feature, which runs in a straight line diagonally up slope to the peat workings, is shown on various O.S. maps as a drain; but this identification may have been based on its form, since today it is well vegetated and carries no water flow, except after cloud-bursts. However, there is evidence that it did originally serve a boundary/ drainage function, since on the top of the ridge, it is contiguous with an indistinct linear feature, which may be the remnants of a preparation-ditch (Fig. 10.6.). This feature and many other peat cutters hollow-ways contain numerous minor pot holes, and have deltoid-cones on their downslope sides; which indicate soil compaction and resulting erosion, occurring during use and immediately after abandonment (Spode pers. comm.)

The effect of drains and boundaries on natural gullying

Much has been written about the origins of the extensive dendritic gullying which dissects the blanket mire landscape of many upland areas and is particularly evident in the Peak District. The date of formation of these features has been widely debated and often identified with acidification during the industrial revolution (Phillips *et al.* 1981). Recent stratigraphic data indicates that gully inception in the South Pennines actually occurred between 500 and 700 years ago (Tallis & Meade 1997). This research, supports an early origin of the gullying, and furthermore, identifies situations where natural dendritic gullying has been modified by peat cutting related activities; in particular the creation of extensive bank and double-ditch boundary features, and linear peat cuttings.

The examination of aerial images of linear features on the moors, where they cut through dendritically drained areas of blanket mire, will often reveal that the patterns of gullying remains largely the same either side of the man-made features. These sorts of relationships between linear features and dendritic gullying are very clear, for instance, on

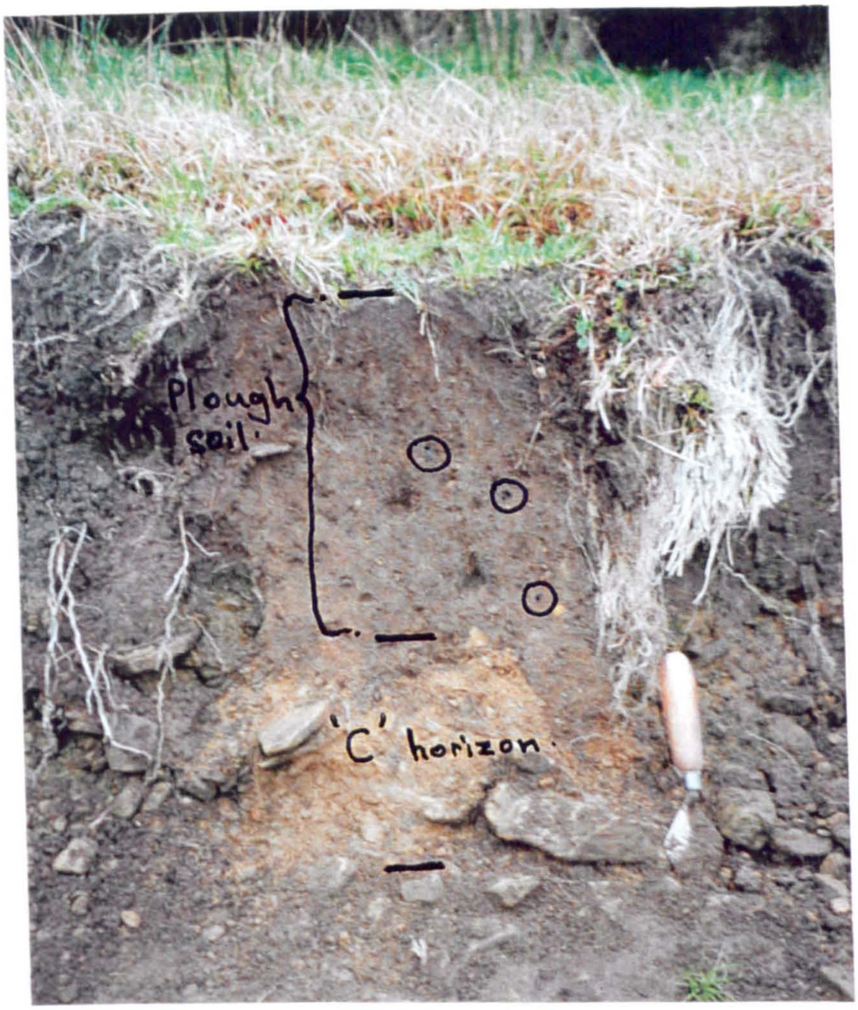


Fig. 10.5. An athropogenic soil profile at the eroded edge of Ladybower Reservoir, near the abandoned site of Nether Ashop Farm in the Woodlands Valley. The A and B horizons have been homogenised by ploughing; the C horizon, incorporating relatively unaltered stony material remains. The plough soil contains clearly discernible charcoal fragments (ringed).

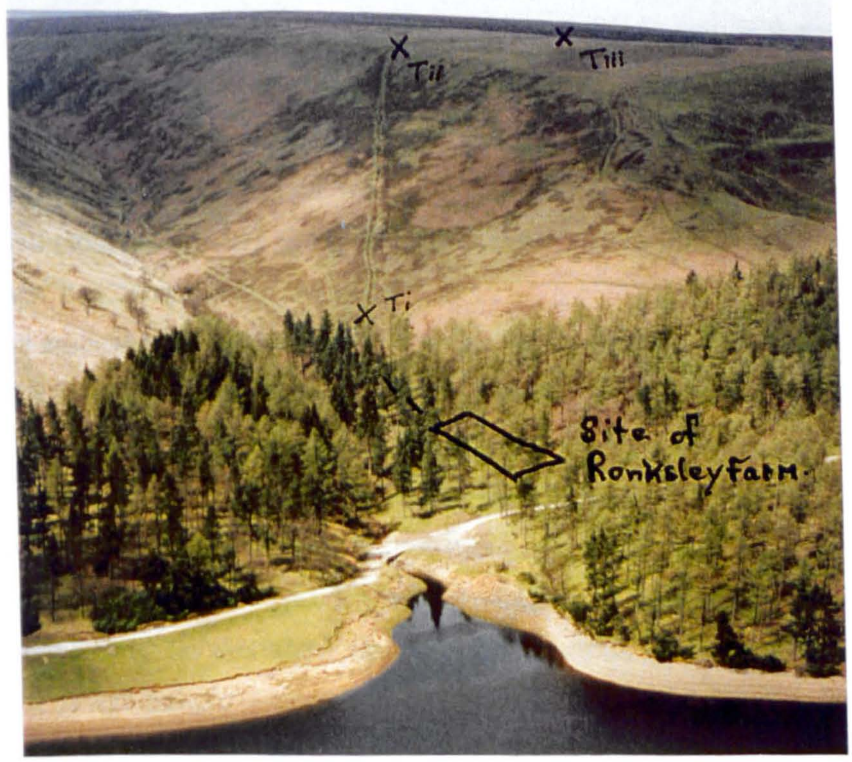


Fig. 10.6. Access hollow-ways associated with the Ronksley Farm peat cuttings, Linch Clough, Upper Derwent. The one running directly upslope (Ti-Tii), has been shown on recent Ordinance Survey maps as a drain, and may have had a history of multi-fuction, in part evidenced by the presence of the indistinct linear feature on the ridge top (Tii-Tiii).

aerial photographs of the Saddleworth Moor carriage-way (Fig. 5.10.). Although this track cannot be dated back beyond 1834, it provides good evidence of the early genesis of the dendritic gullies; because of the good match on either side of it. Though none of the linear features associated with turbaries in the Peak District have been dated to the Medieval Period from archive sources, their relationship with the peat cuttings suggests origins from this period, or earlier.

10:6. MOORLAND FIRES

Peat cutting may have enhanced the destructive effect of wildfires, which are particularly hot fires occurring during dry periods. They can destroy the root mat as well as the surface vegetation, thus leading to the exposure of bare peat and its subsequent erosion by rain and wind. This type of fire is also thought to sometimes penetrate into the peat mass, causing large pits in the blanket bog surface.

Whilst hot-fires are clearly responsible for the laying-bare of peat surfaces, and their subsequent wasting, they probably do not lead to as much erosion as is perceived, or consume great quantities of peat. Evidence on the ground at well documented sites suggests that much peat loss in these areas is actually due to peat cutting, though fire-pits do occasionally occur. Since peat cutting has not been recognised previously as a significant land-use in areas like the Peak District, any major areas without peat have either been assumed to have never developed blanket mire, are thought to have been subject to mass-wasting, or to be the result of fires.

Any hot fire, sweeping, for instance, a moorland area of highly combustible leggy *Calluna*, or *Empetrum*, and coming up against an abrupt peat bank, would tend to bite into such a feature, and because of the shelter and possible draught caused by the feature would continue to nibble-away at it unchecked. Attention would logically at first centre on the main front of the fire consuming the vegetation, so that anyone visiting the peat-fire sites after the main conflagration had passed through, would assume all peat loss was due to fire. The fact that peat pits and banks, like most moorland archaeology, are very prominent when the vegetation cover has been totally removed, but are highly camouflaged when covered by leggy dwarf shrub growth; has compounded the confusion.

There are many examples in the Peak District where moorland fires and the erosion resulting from them have been put forward to explain huge peat loss, which in the main was actually due to peat cutting. One frequently quoted, and long-standing reference by Farey (1815) describes fires on Stanage Edge, where he noted: "The firing of the heath in dry weather had at different periods set fire to the peat, and into which it had continued to penetrate, and make large and irregular holes, apparently, until heavy rains fell to extinguish it". The actual site of Fareys' fires on Stanage Edge cannot be identified, but this area contains numerous peat cutters pot-pits and several smaller opencast workings (Fig. 10.8.), which are clearly identified by their associated archaeology. It seems likely therefore that the peat fires seen by Farey were located within these previously existing features, and that his visitors-perspective led him to conclude that all the peat had been burnt away.

10:7. THE PEATLAND POOL RESOURCE

By creating numerous bog pools, peat cutting has not only benefited the wildlife that flourishes around such features, but also influenced subsequent human use of the peatlands. The pools are watering holes for sheep and grouse etc., often in areas otherwise devoid of standing water; they attract waterfowl and other game; and have probably been used as sites for the extraction of mors, and *Sphagnum*, which often readily re-colonisers them. Prehistoric pit pools may also have been used for ceremonial purposes, perhaps in connection with 'thanksgiving for the peat harvest', which is suggested by the association of bog-bodies with Iron Age peat cuttings (Glob 1969; Fischer undated). These features may have also been used for certain Medieval industrial processes; indeed retting of hemp and flax is documented to have been carried out in old peat cuttings (Astill & Grant 1988).

CHAPTER 11

DISCUSSION AND CONCLUSIONS

DISCUSSION AND CONCLUSIONS

11:1. RESEARCH OBJECTIVES AND ACHIEVEMENTS

At the start of this research, a number of aims were identified; these are set out in Chapter 1. and discussed below. Subsequent findings dictated that some aims had to be changed and other lines of enquiry and targets pursued.

11:1:1. Overall objectives and results

The literature search to identify the level of knowledge about historical upland peat cutting in Britain, provided, as expected, only limited results. This part of the research included a thorough search of key texts. Most texts concerned with the landscape, ecology, archaeology, or geography, of any particular upland area, were found to hold some reference to peat cutting, but in the vast majority of cases such information was brief and anecdotal. Indeed, generally, the impact of peat cutting was dismissed, or not fully appreciated. One good example, of relevance to the South Pennines, was the comment in Anderson and Shimwell (1981): "there is little evidence to suggest that peat cutting has ever been a significant land-use on the blanket peat of the Peak District.". Furthermore, in many books, there was no reference to peat cutting in the index and comments about the subject were only located by trawling through the entire text. Notable examples include, Tansley (1953); Pennington (1974); and Edwards (1990). Archive work was limited to the Peak District, particularly the Upper Derwent Valley. The archive at Chatsworth provided a few interesting, but generally very specific, items of information on peat cutting in the Upper Derwent; for instance its relationship with the production of bird-lime from holly bark (4:2:3.). These items were difficult to locate and decipher from the hand-written sources, so time spent on this activity had to be strictly limited. The Peak Park's archaeological survey of the Upper Derwent resulted in the discovery of other useful snippets of information at Chatsworth and in the other relevant archives, but confirmed just how limited such material was. However, many other, possibly more fruitful, earlier documents were in Latin and not studied.

The part of the research concerned with identifying peat cuttings in the Peak District, from aerial photographs and field survey proved to be a great success. Almost all the large scale peat cuttings which occur on unimproved moorland have been mapped, although a few may remain undiscovered under extensive growths of coarse vegetation, in particular *Calluna* and *Molinia*. The study of aerial photographs in particular was vital for identifying areas of 'intake-penetration' into the peatlands, although only further extensive fieldwork will establish whether this enclosed land was created by peat cutting. Aerial photographs were of no use if areas were wooded and had only limited value for finding small peat cuttings; for instance in conditions of low light. However, it is clear that overcut landscapes can be accurately interpreted from aerial photographs, once their characteristics have been learnt. Indeed, it is recommended that this approach should be the first stage in assessing overcut, upland landscapes in Britain. Initial evaluation of this sort helps to establish the course of any necessary follow-up field survey. Archive research to identify further peat cuttings undetectable in the field, was of limited value in the Peak District, although a few areas of activity were discovered within valley bottoms, enclosed land, and urban development. Such research would be very important in lowland situations, where most of the land has been improved or developed.

Investigations into the history of peat cutting in the Peak District, in particular within the Upper Derwent Valley, allowed only broad conclusions to be drawn. Some specific, Post-Medieval references to peat cutting were found, but the majority only established very localised activity. However, this material at least showed that most of the large-scale peat exploitation must have been carried out during the Medieval Period, because of the general lack of peat re-formation on overcut areas, the result of the climate fluctuations after 1300. The standard texts on the Peak District (see Chapter 1), contain some references to Medieval peat cutting, which indicate widespread exploitation at that time on such areas as Crookstone Out Moor, Rushup Pasture, Tideswell, and Sheldon Moors. However, they only describe general areas of peat exploitation, not specific workings. Reference to relevant original Medieval Latin manuscripts and those concerned with other parts of the Peak District should, provide additional evidence of rights of turbary, but not necessarily datable peat workings. It is likely that further research would establish that intense peat cutting proceeded on the majority of the large sites over several centuries, possibly from Saxon times through to at least the sixteenth century. After that time, the activity will have slowed as industry became less dependent on peat fuel because of improving infrastructure and increased coal mining. The longevity of peat cutting at individual sites is shown for instance by the examples of Crookstone Out Moor and Lockerbrook Heights; while the Post-Medieval reduction in peat cutting is demonstrated by the 1627 maps of William Senior which appear to show areas of peat cutting at their maximum extent at that time. Later peat cutting, appears to have been carried out in a more piece-meal manner, probably often exploiting uncut deposits of peat within the larger workings (Chapter 6.). A few critically datable peat cuttings were identified. Not surprisingly, these were small-scale, for example the early twentieth century trench cutting associated with the Buxton peat baths (Figs 4.9. & 4.10.)

Few links between peat cutting and industry have been identified in the Upper Derwent and it is likely that most peat was used for domestic purposes, with the large size of the peat cuttings explained by their long-term usage and possible trade in the product. However, peat was probably used for a variety of cottage industries and exploitation for specialised industry is quite likely to have taken place at the relatively larger Crookstone Out Moor turbary and many of the peat cuttings on the Western Moors, which were associated with nucleated settlement. Peat was cut in the Upper Derwent for boiling holly bark (4:2:3.); probably for localised lead smelting (6:4.); and possibly as bedding and feed for horses at stud (6:47.).

The far-reaching and fundamental effects of peat cutting on landscape, ecology, and archaeology are discussed below. The impact of the activity on the development of settlement is open to conjecture, but must have been great. Most high-level White Peak settlement necessitated at least initial paring and burning, and many of the villages were located in proximity to extinct bogs (5:1:7.); while the majority of Dark Peak towns and villages occur at the base of peat moors, to which they are linked by a complex infrastructure of long-established tracks (5:1. & 7:2.).

The great extent and complexity of the peat workings found within the Peak District necessitated that the research be concentrated there. However, it was possible to allocate some time to other upland areas and thus identify characteristics of upland peat cutting throughout the UK (see Chapter 5). A complete picture of historical peat cutting in the upland UK will only be gained by carrying out extensive aerial, field, and archive survey, in each of the areas; this research has established the parameters of the necessary work.

11:1:2. Archaeological objectives and results

The main objective of the research was to identify and categorise the archaeological features related to peat cutting in the Upper Derwent. It was hoped that this could then be used to identify and possibly age the cuttings more generally. However, it soon became clear that the archaeology of peat cutting, although having some commonality area to area, also had local distinctiveness. Sites were therefore examined throughout the Peak District. As a result of this work, it was found that many of the large cuttings on the Western Moors are traversed by prominent parallel linear baulks, which were used to divide the turbary and probably to stack and dry the cut turves. In contrast, cuttings along the Eastern Edges are often pit-like and divided by irregular baulks. The variation of features was considerable and in many cases it was difficult to separate distinct types, but non-the-less the majority of peat cutting archaeology was found to be characteristic of that industry and could therefore be used to identify workings where there had been complete overcutting (see Chapter 7). Features such as linear baulks, were found to be particularly prominent on aerial photographs and would generally highlight the presence of overcut areas, even when cutting faces were only obvious in the field. At this stage it is not possible to give any of the archaeological features clear dates. Indeed, the nature of the activity ensures that some types will always be produced and most of the others will be related to a period of history rather than a specific time. For instance, extensive cuttings with long working faces and parallel baulks appear to be Medieval and discrete racket-form workings Post-Medieval.

At the start of the project it was believed that distinguishing between peat cutting features and those found naturally on eroded areas, and on ground where destructive peat fires had occurred might be difficult. However, it soon became obvious that most of the peat cutting archaeology was distinctive, including the working faces (see above & Chapter 7). Some cutting faces are quite difficult to identify, especially where there has been later erosion and the activity has been small scale and there is therefore little associated archaeology. Eroded or burnt peat faces are concave and often fimbriate; cut faces are generally sub-rectangular and more even. Indeed, the difficulty seems to lie in identifying concave peat workings amongst minor erosion scars; fortunately erosion scars usually penetrate well below the peat deposits into the subsoil.

It has been difficult to establish the level of impact of peat cutting on previously existing archaeology. It seems clear that some prehistoric structures of stone and wood will have been removed after their exposure, and reused elsewhere. However, it is likely that in most situations the deeper peat cuttings occur above the general level of prehistoric settlement (Barnatt pers. comm.). A few barrows and other prehistoric structures were found in peat cuttings (9:1:2.) and these have been subject to weathering and in some cases stone-robbing. Many more structures probably occurred on the middle and low level moors, where thin peat deposits were cut. However, in most of these situations, the peat cutting will have assisted the robbing rather than instigated it.

It was not possible within the time available to critically determine the effect of peat cutting on lithics and other artefacts. As with prehistoric structures, the peat cutting has clearly been responsible for their exposure (9:1:3.) and therefore there will have been some damage to the record through weathering of individual artefacts, surface movements, and robbing. In addition, a relatively high incidence of burnt flint fragments around some of the Upper Derwent farmsteads suggests that there may have been re-deposition of artefacts, transported within turves and scattered with peat mulch/used fodder/peat ash etc. onto the land. These issues will be resolved only after intensive specialised research.

11:1:3. Ecological objectives and results

The overall aim of the ecological research was to assess the impact of the peat cutting on the animal and plant communities of the uplands; in particular on the current vegetation, moorland food-webs, *Sphagnum* communities, and the possible genesis of communities specific to cut over areas.

As originally thought, the most fundamental effect of the upland peat cutting on vegetation has been the conversion of large areas of *Eriophorum* dominated blanket mire to relatively dry *Nardus* grassland. The quadrat survey (8:1.), established that the resulting *Nardus* grassland is distinct and species-poor (8:1:1.). By contrast, the *Calluna* and *Molinia* dominated vegetation found on overcut moorland (8:1:3. & 8:1:4.), is little different from that occupying uncut blanket mire; although these types of vegetation, on both surfaces, may have developed because of the drainage of the bogs and subsequent changes in land-use. Less widespread, but also of great significance, has been the creation of localised concentrations of water-logged, *Sphagnum*-rich peat pits, which may support elements of the flora originally found on the undrained blanket mire (8:2.).

The Nardetum of peat cuttings has even less floristic diversity than the species-poor U5 *Nardus stricta-Galium saxatile* grassland described in the NVC, lacking for instance, *Potentilla erecta, Carex binervis, C. pilulifera, Hylocomium splendens*, and *Pleuozium schreberi.* Interestingly, these species are a component of the *Nardus* grassland of clough sides in the Upper Derwent. The *Nardus* community of the peat cuttings may be very species-poor because it is of relatively recent origin and as a result of the dominant being more able to withstand the harsh plateau top environment.

The presence of the *Nardus* grassland, *Sphagnum*-rich peat pits, and other environments created by the peat cutting has greatly increased general diversity on the moors (10:3.). The flora of these areas is very different to that found on the remaining blanket mire and supports characteristic bird populations (8:4.), several distinct invertebrate communities (8:3.), and a number of rare species. The Nardetum was found to be inhabited by distinct beetle and spider communities (8:3:1.); the peat pits by interesting assemblages of Odonata and Tipulidae (8:3:2.), including, at Stanage, a significant population of the rare cranefly *Phalacrocera replicata*; while a rushy access hollow-way in the Upper Derwent was found to support numbers of the near British endemic *Tipula holoptera* (10:3:1.). The presence of rich invertebrate communities on the peat cuttings has made them especially attractive to birds like skylark (*Alauda arvensis*), meadow pipit (*Anthus pratensis*), and avian predators (8:4.).

11:2. LANDSCAPE CHARACTERISATION

The exploitation of peat in the uplands of Britain, on the scale identified by this research, has led to the creation of landscapes very different from those which existed before. This change, which accelerated in the Post-Norman Period, saw a largely natural *Sphagnum*-mire dominated wilderness, substituted by an anthropogenic mosaic landscape of very distinct character and appearance.

The anthropogenic landscapes thus formed (often wrongly perceived as largely natural), are characterised by much reduced and degraded blanket mire masses, and abrupt vegetation changes (Chapters 1. & 8.). Mire vegetation has been replaced by rough grassland where bogland has been totally removed or where remaining peat areas have been drained. Surviving blanket mires, mainly restricted to the highest ground, are often limited by abrupt banks where they have been reduced by extensive peripheral peat cutting. The overcut areas bear the multitudinous scars of the peat industry, in the form of tracks, cutting and stacking features, baulks etc.; as well as those of secondary activities, notably quarrying. They are also cross-connected by boundary ditches, linear peat cuttings and drains; and linked to settlement in the valleys and surrounding lowlands by extensive converging trackways and 'invasive' areas of intake-land (also probably the product of peat cutting or paring and burning). The remaining blanket peat is typically vegetated by either species-poor *Calluna*, *Eriophorum vaginatum* or *Molinia* communities; whilst the overcut areas, where mineral soil has often been reached, stand out because they are largely dominated by *Nardus*. Relatively species-rich bog vegetation occurs where pot-pitting of the mire surface has led to the formation of bog pools and also where there has been partial cutting of minor topogenous bogs in hollows and valley bottoms.

11:3. EXTENT OF THE INDUSTRY

The research has shown that the impact of peat cutting, turf-getting and moss-gathering, on upland landscapes has been even greater than first suspected. The extent of well-defined peat cuttings alone, located around remaining areas of blanket mire, is considerable. However, shallow peat deposits on low level moors also appear to have been stripped away, and there has been extensive turf-cutting and paring and burning; in some areas leading to the creation of intake land. The shallow peat cutting, turf-cutting, and paring and burning appears to have taken place over the whole upland landscape, including the valley sides; thus linking the deeper peat workings on the high plateau to areas of cutting in the lowlands, affecting valley mires, raised bogs and fens. Moreover, the level of exploitation of the resources, and the widespread drainage and infrastructure, indicate that little if any of the surviving peat has been unaffected by the industry.

The widespread digging of both deep and shallow blanket mires and topogenous bogs; the turf-cutting; paring and burning; bog-moss gathering; cutting within ancient semi-natural woodland, on heaths and commons; as well as the considerable exploitation of lowland raised bogs, valley mires and fenland; indicate, just how much of the British landscape has been cut-over, disturbed, or influenced in some way by these related activities. The extent of these activities indicates a former British countryside which was characterised by widespread peatlands.

The inter-relationships between moorland and 'waste', heaths, commons, and 'greens', described in Chapter 5, suggests that although today there is a clear distinction between upland peatlands and those occurring in the lowlands, in the past this was not the case. If this is accepted, then the whole concept of upland and lowland Britain should be considered flawed and a product of former human land-use. This said, the complete extent of the peat cutting is unlikely to be determined because many areas have been fully improved and repeatedly ploughed. Where land has remained unimproved, the evidence may be lacking because the peat deposits exploited by the cutters were sometimes very thin and easily removed without leaving signs; also any surface features produced by the activity may be poorly preserved, or disguised by new peat, coarse vegetation, or re-deposited sediments.

The extent of recognisable peat cuttings so far identified in the Peak District is shown in Table 5.1. (Chapter 5). This gives the area of the individual workings, the overcutting in each of the seven regions, and a grand total for the whole of the district. The size difference in the peat workings is considerable; isolated pits may be just a few metres across; by contrast overcutting on Rushup Pasture (site 48 on the Western Moors) appears to have extended over at least 540 hectares. Overcutting around the Upper Derwent Valley has affected at least 1,838ha of the land surface, while recognisable peat cutting on the Western Moors extends over 1,837-2,996ha. In the White Peak, only 50.5ha of land was categorised as definite overcutting; but in excess of 2,800ha is thought to have been affected by localised exploitation of deep bogs and extensive shallow peat and turf cutting. In the Peak District as a whole, over 10,058ha, or 100 square kilometres, of the land surface has been overcut.

11:3:1. Levels of exploitation

Table 5.1. also shows the altitudinal range of the individual peat workings. From this it can be seen that cutting has occurred at many different altitudes. For instance, Peat Pits (site 10 in the White Peak) is located at c.225m OD, while Crookstone Out Moor (site 37 in the Upper Derwent) extends to 560m OD. At the start of the research, it was recognised that deep peat could be expected on moors above 370m OD, where there was a slope of less than about 1 in 10; while it was thought that below that level blanket peat depths probably fell away rapidly. The latter was an elusion caused by the general steeping of slopes and extensive overcutting below that altitude. Subsequent observations at many sites have shown that relatively deep blanket peat can extend onto much lower areas of moorland (Table 5.1.). The implication of this is that the volumes of peat removed from the largely unrecognisable cuttings on middle level moorland will have been collectively very great; extensive measuring of remaining peat deposits and G.I.S mapping of the records, should with time, allow this exploitation to be assessed.

At least 18 million cubic metres of peat appear to have been removed from the moors around the Upper Derwent Valley and at least a similar amount from the Western Moors. In total between 53 and 80 million cubic metres are estimated to have been removed from the Peak District as a whole; the actual figure is probably much higher. At the start of the research it was thought that at least 34 million cubic metres had been exploited, but that figure was based on estimates of the more obvious cuttings around the Upper Derwent Valley and on the Western Moors. Since the cutting which formed the Norfolk Broads accounted for an estimated 30 million cubic metres of peat, the significance of the Peak District industry is obvious. It is likely that amounts of peat exceeding the last figure have been removed from other upland areas in the UK, though, the high density of long-term settlement and industry around the Peak District may have resulted in unusually high levels of exploitation there.

11:4. DATING THE PEAT CUTTINGS

Although it has not been possible to establish a detailed chronology for the peat cuttings, it is considered that the majority of the larger workings have Late Medieval origins. This conclusion is based on both factual and circumstantial evidence. That the larger peat cuttings are of considerable antiquity is borne out by the advanced degradation of the working faces, the well-developed re-colonising vegetation, and the extent of the infrastructure. Since most of the opencast workings contain little or no re-formed peat deposits and there was a marked decline of peat-forming *Sphagnum* vegetation in the Peak District after AD 1300 (see 1:1. & 10.1.), the majority of the industrial-scale over cutting is likely to have taken place around or after that date. Moor-drainage associated with the peat cutting probably helped initiate the early decline of *Sphagnum* well before its retreat to clough bottoms and other refuges after the industrial revolution. This scenario accords with the AD 1300 date of *Sphagnum* reduction evidenced within the peat.

The range of evidence indicating that the most extensive peat cutting took place in the Peak District prior to the Post-Medieval Period, but perhaps in some situations continuing into the 16th century and beyond, includes:

1) abandoned peat cutting faces and areas of overcut ground are shown on the Senior Survey maps (1627) as boundaries and areas of land with non-peat cutting place-names (e.g. Ox Hey and Cow Hey; Fig. 6.15. & Glossary).

2) the stone circle on Hordren Edge which lies in a corner of a peat cutting was, according to documentation, already fully visible in 1574 and must therefore have been exposed prior to that date (6:67. p.100; Figs 9.2. & 10.2).

3) the five small (post-enclosure act) turbaries of the Graveship of Holme lie at the upper limit of extensively overcut moorland downslope, indicating that several centuries of previous cutting has taken place (5:1:5. p.74; Fig. 5.11.).

4) on Black Moor, near Glossop, where the overcut area extends to 100ha, there is just 2ha of post-enclosure act peat cutting (5:1:3. p.70).

5) the extensive peat cuttings on the Western Moors are linked to present day towns by well established routeways and are divided by parallel baulks into strip-holdings. These occur in low numbers suggesting village populations rather than post-industrial settlement at the time of cutting (5:1:3. p.70).

6) the village of Tideswell was able to take turves from the Forest of the Peak without license in 1251, but by the mid-seventeenth century was paying turbary-money (5:1:7. p.79). This suggests that the resource had been greatly reduced by the latter date.

7) the many large scale peat cuttings in the Upper Derwent Valley, and generally in the Peak District, are linked to long-standing settlements by extensive, deep braided hollow-ways that must have taken centuries to develope.

8) the occurrence, in Staffordshire, of a number of place-names which include the element 'pet'; these are located on what is now extensively improved farmland. In the 16th century the term *pettes* was used locally to describe peat or turf fuel (see Glossary).

Other evidence which shows that extensive peat cutting took place in the Late Medieval Period specifically is:

1) the presence of large scale peat cuttings in the Upper Derwent Valley linked to Late Medieval settlements (firmly identified by archival data, pottery scatters, and other artefact finds etc.) by extensive braided hollow-ways.
2) the frequent disputes over rights of turbary recorded between the inhabitants of a number of White Peak villages from 1278 until the 16th century (5:1:7. p.79).
3) the prosecutions for peat and turf cutting offences found within 14th century Baslow Court Rolls (5:1:6.; p.75).
4) the presence of extensively overcut moorland to the west of Buxton, a town of long-standing importance, which is known to have held free rights of turbary within the Peak Forest as early as 1251 (5:1:7. p.78).
5) the example of Chunal Moor on the Western Moors, where there is an extensive large-scale invasive peat cutting with access tracks showing a close association with a fossilised Medieval farming landscape (5:1:3. p.71 & Fig. 5.6.).
6) the Middle English origins of certain place-names of peat cutting significance included in the Senior Survey (1627) of the Upper Derwent, which can be directly associated with extensively overcut areas, for example "The Peate Ridge", and "Edward Halls Peat Ridge" (6:44.; p.106; see Glossary).

There are two items of place-name evidence which indicate that some peat cutting took place during the Early Medieval Period, these are:
1) the Old English origin of the place-name "turfmofs" which is shown on a Senior Survey (1627) map of the Upper Derwent and is identifiable with an extensively overcut area (6:51.; p.108; see Glossary).
2) the name of the village of Flagg in the White Peak, which is thought to derive from the Domesday *Flagun*, a "place where turfs were cut" (see Glossary).

Additional material testifies to a significant decline in peat cutting within the Peak District during Post-Medieval times, this is:
1) the infrequency of references to peat cutting contained within Post-Medieval documents relating to the area. This compares with a comparative high frequency of references within similar sources from other upland areas, for example the Yorkshire Dales.
2) the brevity of those references which do occur in Post-Medieval documents; for example, there is a scarcity of named peat cuttings on the 1627 Senior Survey maps and within the accompanying terrier.
3) the example of an 18th century letter of petition sent to the Duke of Devonshire from a group of his tenants living in the Upper Derwent, which hints at the unreliability at that time of peat fuel and the increasing economic importance of mineral coal (5:1:1. p.68).
4) frequent references to the increasing importance of mineral coal fuel, from the 16th century onwards. For example in c.1540 John Leland states that in Hallamshire at that time "ther is burned much se cole" (5:1:6. p.75).

5) the occurrence of only small-scale peat cuttings in the vicinity of Post-Medieval settlements on the Staffordshire Moors (5:1:4.; p.72).

6) the fact that various villages in the White Peak were, by the mid-seventeenth century, paying turbary-money to dig peat within the Forest of the Peak (5:1:7. p.79), suggests that the resource may, by then, have become a more valued commodity through depletion.

To summarise, the evidence indicates that there has been minor, localised peat and turf cutting in the Peak District from prehistory to about 1,000 AD. From Norman times the peat cutting became large scale, more organised, and often controlled. The activity was probably most intense within the Peak District between the early 13th and the end of the 15th century; afterwards rapidly declining, as mineral coal became more easily available. Peat usage, mainly for domestic fuel, seems to have been retained in Post-Medieval times only in the more isolated communities, especially those areas furthest from the coal-fields. Today, it continues on a very small-scale within the Graveship of Holme.

The longevity of activity on most peat cutting sites is problematical when trying to establish their age. Only intensive archive work, detailed follow-up field survey, looking closely at the relationships of archaeological features, and other studies (see 11:6.) will clarify the chronology.

11:5. EVOLUTION OF THE PEAT CUTTING HABITAT

Upland environments and landscapes are continuing to change; but no longer under the dominating influence of active peat cutting. Modern-day moorland land-uses such as sheep-grazing, grouse-shooting, and recreation, contribute to the process; but, the peat cut landscapes' also influence their own development to some extent. In essence, the vegetation of remaining blanket mires continues to change because the drains and linear cuttings still affect the hydrology; while in peat pits, linear cuttings, and on the overcut areas, secondary successions proceed. These vegetation changes will impact on animal communities and shape the appearance of the future landscape.

Indications of active change in the ecology of upland peat cuttings are difficult to see, but are more in evidence in the dynamic pit-pool environment than on the open peat cuttings. The bog pool environment is known to go through a rapid succession, from open water, to floating rafts of vegetation, to overgrown, and finally infilled. The interest of such features declines as a result; for instance, the number of dragonflies and damselflies will diminish with time, unless new open-water pools are created. The peat-pits in the Peak District, for example on Stanage Edge, are quite variable; possibly because of differences in depth, which has affected the rate of succession. All the above mentioned stages of succession can be observed at this site. Examples of change occurring within the upland bird population include increasing sparrowhawk (*Accipiter nisus*) predation on meadow pipit (*Anthus pratensis*), and goshawk (*Accipiter gentilis*) on red grouse (*Lagopus lagopus scoticus*). The broken overcut land surface appears to aid attacks by these typically woodland raptors, which use surprise and the lie-of-the-land when hunting.

Changes to fauna and flora are inevitable in any landscape, whether under the influence of peat cutting or not. So, while it is still possible to ascribe many changes in the uplands directly to peat cutting; in the fullness of time other human activities and natural processes will inevitably cloud the issue.

11:6. CONSERVATION AND MANAGEMENT

Since the extent of upland peat cutting described in this work has remained largely unrecognised, it has not been taken into consideration by conservationists and land managers. This situation needs to be urgently addressed. The recognition of hand-cut, lowland peatlands as an important part of our industrial heritage has been recently recognised and the Somerset Levels has been surveyed for its peat cutting archaeology by the Royal Commission on the Historical Monuments of England (Eversham *et al.* 1994). Also, the peat processing works at Fenn's and Whixall Mosses on the Welsh/English border has been left as a monument to the industry. However, these developments are very localised and confined to sites of former lowland peat cutting. There is a need for widespread survey of all peat cut landscapes, sympathetic management plans, and conservation and protection of at least some upland and lowland peat cut landscapes, important structures, and features. Any conservation work or site protection should consider all aspects of the peat cutting landscape, including the ecology, archaeology and the remaining peat resource.

11:6:1. The ecological interest

The research has confirmed that upland peat cuttings have a distinct natural history; not only has blanket bog vegetation been replaced by *Nardus* and dwarf shrub over wide areas, but localised pockets of species-rich, bog pool environment have been created. All this has benefited general upland diversity and broadened the food web. Clearly any upland management plan should seek to safeguard these habitats and communities. The long term preservation of water-logged peat pits would be a problem, but some might be maintained by a programme of dredging. While selected invertebrate groups have been studied there are opportunities to extend this type of work to give a rounded view of the food webs involved.

11:6:2. The peat resource

Since the exploitation of peat has been so widespread, involving shallow as well as deep deposits, and the peat cover has often been more or less completely removed, the remaining peat resource is even more diminished than previously perceived. The historical and ecological record preserved within the remaining peat deposits and buried tree remains, even if degraded, is of great value. The shallower blanket peat and topogenous deposits on middle and lower level moorlands are now the scarcest resource, but there is an urgent need to protect as many peatlands in general as possible and to conserve those that are deteriorating. On the upland moors the further deterioration of the remaining mires might be checked by blocking any drains which are still functioning; certainly no more should be dug. Furthermore, there should be no more conifer planting on upland peatlands (Fig. 11.5.) and recent moorland grassland improvement schemes where the surface of *Molinia* mire is being scarified to encourage colonisation by *Calluna* and palatable grass species (Fig. 11.6.), should be suspended.

11:6:3. The peat cut landscape

As peat cut landscapes in the uplands have remained largely unrecognised, they have received no particular protection; these special landscapes are certainly worthy of detailed study and conservation. Their preservation has up to now been fortuitous; often land improvement has been considered too problematical, and subsequent, relatively, non-damaging land-uses like sheep grazing and grouse shooting have found favour with the owners. The palimpsest of peat cutting and related archaeology not only testifies to these activities, but also provides information on a variety of natural processes, and a record of human history and endeavour. The archaeology of any large upland peat cutting is such a complicated palimpsest that simply recording the features is insufficient to record what has gone on; a full range of earth sciences and other fields need to be employed. Any activities which may damage or destroy the surface archaeology, or disturb the underlying deposits should be avoided. The recent land improvement schemes, mentioned above, which scarify the land surface, have taken place on overcut moorlands causing irreparable damage to subtle peat cutting features and related deposits.

11:7. FURTHER WORK

The scope for research under the general umbrella of upland peat cutting was recognised to be enormous from the outset. It was therefore decided to concentrate on the two most fundamental aspects only, namely the vegetation change and the peat cutting archaeology, and limit intensive studies to the Upper Derwent Valley. Aspects that were studied less intensively include the effect of peat cutting on hydrology, soils, moorland fires, and bracken spread. It was considered important to discuss these within this *corpus*. For the complete impact of upland peat cutting to be resolved these will all have to be fully researched.

The ecological research focused on the major vegetation changes resulting from the peat cutting, because they have influenced the general upland ecology and determined the present-day appearance of the landscape. The fauna received less attention. More intensive, follow-up studies of the relationship between mammals, birds, invertebrates, fungi, bryophytes, and the peat cutting, would be necessary to identify the full impact of the industry on the wildlife of the uplands. It would also be desirable to carry out additional botanical quadrat work on Upper Derwent peat cuttings that returned to *Molinia* and *Calluna* dominated communities and in different upland areas of Britain. Detailed studies of pot-pitted mires, including a programme of pitfall trapping, should establish the level of species diversity which that type of peat cutting habitat provides to upland ecosystems.

The archaeological work concentrated on the peat cuttings; identifying the various types of features related to the industry and establishing a classification for them. However, more accurate plotting of individual features at case-study sites is required, using E.D.M, or other surveying equipment. Also, a programme of soil coring across case sites would help to confirm details of the peat working methodology and identify any phases of peat re-formation and/or redeposition. Many other archaeological aspects were briefly considered, but not fully evaluated. Those which may repay fuller investigation include, the detail of peat-use in specific upland areas; the chronology of the different types of peat cutting, and the drainage features; the impact on lithics; the effect on the palaeo-environmental resource; and the influence of peat cutting on settlement location, 'intake-penetration' into peatlands, routeway distribution and development. Archive work proved too specialised for it to make a substantial contribution to an understanding of peat winning in the study area. Several aspects, such as, dating, ownership, and market, can only be taken forward by competant archive studies.

There are a number of other lines of research requiring further work; those considered of highest priority are:

1) Determination of the extent of peat cutting in all areas of upland Britain, utilising aerial photographic, field, and archive evidence.
2) Establishment of the relationship between peat thickness, altitude, degree of slope, and breadth of land surface; in order to identify depths of peat removal across overcut landscapes.
3) Establishment of the extent to which shallow blanket peat deposits were removed from middle and lower level moors and link this stripping to lowland exploitation.
4) Assessment of extent of the usage of peat in soil improvement schemes in the uplands; and possibly identification of levels of soil build-up through the process.
5) Identification of an effective 'fingerprint' for soils which have been stripped of their peat cover.

Worthwhile lines of research which are considered of lower priority include:

1) Identification of the full hydrological impact of peat cutting on upland hydrology; in particular its effect on water catchment.
2) Assessment of the full impact of peat cutting on bog degradation; in particular the probable decrease in bog types resulting from the industry.
3) Identification of the extent, location, and impacts of historical *Sphagnum* exploitation.
4) Further exploration the historical usage of peat; in particular its large-scale use in Medieval industry, land improvement, and for domestic purposes other than on the home-fire.

5) Fuller examination of relevant archives, to establish the history, economics and social aspects of peat cutting.
6) Continuation of research on place-names and word derivation of relevance to peat cutting.
7) Comparison of the ecological change in the various peat cut uplands.

11:8. FINAL SUMMARY

Peat cutting has been responsible for transforming the appearance of whole upland regions of Britain and controlling their subsequent land-use. It has created more varied landscapes, giving rise to communities, and encouraging certain species, which would not have naturally inhabited these areas. The activity has also influenced human settlement and driven local industry. Peat cutting and associated drainage, along with turf-cutting, paring and burning and moss-gathering, were so extensive across upland areas, that they cannot be separated from similar industries which affected the surrounding lowlands. The extent of this land-use has been fundamental in characterising much of the present-day British countryside. Such impact can be explained by at least eight hundred years of intense activity by a large proportion of the population, many of whom were totally dependant on the resource for their way of life and survival.

This research has clearly demonstrated the need for complete landscape analysis when studying any area of land to assess its environmental history. It has also shown that a fully integrated approach to conservation and management is required. Ecology, archaeology, history, geology, geography, soil science, hydrology, and other fields should all be taken into consideration by the future conservationists, politicians and land managers. At present, ecologists and archaeologists are learning to work together, for example within the Peak National Park's Archaeology and Ecology Service. There is an urgent need for others to join them.

GLOSSARY

The following glossary is not intended to be complete, but instead includes those words, place-names, and elements, which help to broaden or elucidate the history of upland peat cutting, as well as a number of colloquial, parochial, and technical words which have been used within the general text (not italicised). There are relevant simple definitions; names of proven or possible peat cutting significance; and word groups which identify basic commonalties in the language of different peatlands. The language of peat cutting is diverse and may differ between localities; there are many terms still applied to the different tools-of-the-trade and the features associated with the activity, although there are many others which have become obsolete.

acrotelm- the upper, less consolidated strata of a mire, through which water flows freely.

A.D.A.S.- Agricultural Development Advisory Service (of the Ministry of Agriculture, Fisheries, and Food).

bakestone- a round-shaped flagstone on which bread was baked; typically used over peat fires because of the steady heat generated by that form of fuel. There was a widespread bakestone quarrying and manufacturing industry in the Peak District.

bank- extant Scots term for "the place in a peat moss where peats are cut". 3.

black- a common and widespread place-name element in upland Britain; which sometimes alludes to peat.

black marl- Victorian term for peat.

black peat- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe "the lowest layer of peat, of well-humified swamp or fen peat. Describes the colour of the peat when dry". 5.

black wood- word for peat used on moorland Dartmoor. 18.

blade (flint)- an elongate flake of flint, typically at least one and half times as long as broad. Used during the Mesolithic Period in the manufacture of microliths.

blak- Middle English term meaning dark or black; derived from the Anglo-Saxon. 6.

blake- Middle English term meaning dark or black; derived from the Anglo-Saxon. 6.

bog-bodies- preserved human bodies which have been exposed in peat bogs, typically as a result of peat cutting operations.

brunt lands- Post-Medieval term for peatlands, mainly located in hollows; which were taken into cultivation by ploughing, piling up the turf, burning it, and then scattering the ashes on the land. 8.

car/carr- with respect to this research these words should be taken to mean wet, boggy woodland, generally with alder (*Alnus glutinosa*) or willow (*Salix* spp.)

car- derived from the Old Norse *kjarr* meaning "a marsh, wet moor, or boggy copse. 6.

carr- derived from the Old Norse *kjarr* meaning "a marsh, wet moor, or boggy copse. 6.

catotelm- the lower, more consolidated strata of a mire, where water is trapped.

clamp-kiln- a somewhat archaic term, used here to describe conical-shaped 'kilns', formed in the open by piling up the fuel (sometimes wood to be charred) and covering it with a seal of living turf or other green matter.

clod- extant northern Scots term for "a peat"; "especially one which is still earthy and friable", and to "pile up peats" in Galloway. 3.

clough- a deeply incised tributary valley within gritstone areas of the South Pennines. Frequently seen on O.S. maps of the area.

clutter- in terms of this research means, extensive concentrations of stones and boulders, brought together by natural forces.

coal- extant colloquialism used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe "the gyttia or lake deposits at the base of the peat". 5.

coal- term used for peat in a charter concerned with peat cutting rights on Dartmoor. 18.

col- Anglo-Saxon term for 'coal', meaning "wood for burning", or "charcoal". 6.

colliers- name variously applied to peat-getters, mineral-coal miners, and charcoal burners during the Late Medieval and Post-Medieval Periods. For instance used on Dartmoor during the 18th century to describe the people who cut and sold peat. 18.

coom- peat-coom is an extant Scots term for "peat dust, the crumbly remains of peat". 3.

core (flint or chert)- the remains of a piece of flint or chert left after knapping.

D.A.F.O.R. scale- used to assess the relative abundance of plant species. When a site is surveyed, each species is judged to be either dominant, abundant, frequent, occasional, or rare.

Dark Peak- the term used to describe the gritstone region of the Peak District.

delf- Old English noun meaning *digging*. 12.

deltoid-cone- a minor concentration of stones and earth deposited as a result of storm erosion.

delvare- Middle English noun meaning digger. 13.

delvynge- Middle English noun meaning digging. 13.

dikares- Middle English word meaning ditchers. 13.

drawdown- that part of the bed of a reservoir which is exposed by low water levels, particularly at the time of drought.

dwarf-shrub vegetation- low shrubby vegetation found on moorland and heath. In terms of this research, typically applied to areas where *Calluna vulgaris* is dominant, or co-dominant, with a combination of *Empetrum nigrum*, *Vaccinium vitis-idaea*, *V. myrtillus*, and *Erica tetralix*.

Ess- late eighteenth century fertiliser, produced by burning peat and mixing the product with lime. Apparently many parcels of moorland in the Peak District were enclosed as unofficial small holdings by squatters and the lands thus treated, then sown with oats and potatoes. 4.

flag- Old Norse word for a turf or sod. 7. and extant Scots term for a "piece of turf cut or pared from the surface; a sod". 3.

flagg- currently used White Peak place-name derived from Domesday *Flagun*, which may have been Old Norse for a "place where turfs were cut". 7.

flash- "swampy or waterlogged land". Derived from the Old Danish *flask*, or Middle English *flasshe*. 10.

flask- an Old Danish term meaning "swampy or waterlogged land". 10. Possibly later applied to ill-drained ground in both the uplands and lowlands; "grassland and moorland that is covered by water (often on a temporary basis immediately after a heavy storm). 9.

flaucher- extant Scots term meaning to "pare turf from the ground. 3.

fluvial clutter- in terms of this research means, gatherings of water-worn rocks and boulders found in incised valley bottoms, which were concentrated by peri-glacial river flow.

gata- Old Norse element meaning a way, path, road, or street. 9. One possible derivation of *gate*.

gate- obsolete term for a track, road or right of way. Common on O.S. maps of the Peak District. May be derived from Old Norse *gata*.

geat- Old English for *gate*. 9.

G.I.S.- Geographical Information System.

grange- "A Medieval monastic farm, usually referring to the farmstead itself but also 'interchangeable with the wider farmland. In the 19th century grange was also a popular suffix to new farm and cottage names, presumably to give them an air of antiquity and status". 20.

grave- used locally in recent times to mean to dig peat. Could be derived originally from one of a number of European sources (see below).

grave- a verb; Old English *grafan*, to dig or engrave; Old Low Frankish *gravan*, dig; Dutch *graven*, dig; Old High German *graban*, to dig or carve; German *graben*, dig; Old Norse grafa, to dig or bury; Goth, *graban*, dig. 15.

Graveship- ancient organisation administrating peat cutting and water rights. The Graveship of Holme still functions around the north-eastern boundary of the Peak District and may date back to the time of Domesday.

grey peat- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe "the intermediate peat layer of moderately humified bogmoss and other mire species. Describes the colour of the peat when dry". 5.

grey-slate- the traditional stone roofing flags of the Peak District, quarried from local sources.

ground truthing- the term used for the field work undertaken to check the validity of features found on aerial photographs, maps etc.

growing turf- with respect to this research, this term should be taken to mean the vegetation mat, comprising living foliage, stems, roots, and bound-up earth or peat.

hag- extant Scots term for "a hollow of marshy ground in a moor, e.g. where channels have been made or peats cut". 3.

hay- "a common prefix and terminal, from Anglo-Saxon *hege*", where g=y; meaning either "an enclosed place", or "a locality known by defined bounds, but not enclosed". "Forests were usually divided into hays for administrative purposes". "In Middle English *hege* becomes *heye, heie, haie, haye, hay,* and similar forms". 6.

heath- with respect to this research the word should be taken to mean lowland areas with dwarf-shrub vegetation, but little or no peat.

heye- Middle English form of "Anglo-Saxon *hege*", where g=y; meaning either "an enclosed place", or "a locality known by defined bounds, but not enclosed". "Forests were usually divided into hays for administrative purposes". "In Middle English *hege* becomes *heye, heie, haie, haye, hay,* and similar forms". 6.

hill- peat hill is a term still used in the Shetland and Orkney islands to mean "a peat-bog or peat-moor; the place where peats are dug". 3.

holme- derived from the Old Norse *holmr*, meaning a "water-meadow, riverside land, higher dry ground amid marshes". 10.

in-bye- a piece of reclaimed and enclosed land by a farmstead. From the point of view of this research the term may be synonymous with intake (see below) because, enclosures out-lying today, may have originally been created around abandoned dwellings, which are no longer visible in the field.

intake- a piece of reclaimed and enclosed land. 3.

knapping- a term typically applied to the manufacture of flint tools.

land- Old English for land or country. 12.

land- the word can (in Old English) signify a division of a strip within an open field system 10.

lead- extant Scots term meaning to "transport peat home from the moss". 3.

lift- term recorded in 1889 at Fenn's and Whixall Mosses on the English/ Welsh borders to describe "the upper layer of the peat". 5.

lithics- stone-made implements and the waste resulting from their manufacture.

lynchet- "an artificial bank formed by a build up or loss of soil against a field boundary, or deliberately produced as the downslope edge of a cultivation edge of a cultivation terrace along a slope". 20.

M.A.F.F.- Ministry of Agriculture, Fisheries, and Food.

microlith- tiny worked flint blades and flakes, used throughout the Mesolithic Period. 21.

moor- modern meaning: tract of open waste ground, esp. if covered with heather; from the Old English and Old Saxon *mor.* 1.

moor coal- 16th century term for peat. 16.

moorland- with respect to this research the word should be taken to mean hilly, unimproved land.

mor- Old English term for moor, marsh, or wasteland. 12.

mors- a volatile mix of fine peat and mineral sediment, which on drying can still be cut into blocks, obtained from the bottom of water-logged peat pits. 19.

morass-turf- term used in the 19th century for "the 'strata' of peat below the bog surface". 17.

morfa- Welsh noun meaning moor, fen, or marsh. 14.

mos- Old English term for marshy ground. 9. Source of modern word *moss.*

mose- Anglo-Saxon term for a moss or marsh. 6. Source of modern word *moss.*

moss- modern meaning of: wet spongy soil; peat-bog; kinds of small herbaceous cryptogamous plants; from the Germanic *mos*, cognate with the Old English *meos.* 1.

mossing- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe "the act of collecting bogmoss from the drains". 5.

mud bog- 19th century term for organic material dredged from the bottom of bogs. 17.

myrr- Old Norse term for marshy ground. 9.

opencast- in terms of this research, the word describes deep peat cuttings (typically in deposits of at least 1.5m depth), where the peat has been stripped away from the land surface, more or less down to mineral soil, by working an extensive cutting face. Akin to quarrying the peat.

overcut- in terms of this research, the word applies to land which has been subject to either extensive peat cutting, turf cutting, or paring and burning.

paring and burning- removal of the surface of the ground, with what may be growing upon it at the time; and reducing this by fire to a state of powder. 19.

peat- with respect to this research the word should be taken to mean the consolidated, black (or dark brown), organic part of a bog or mire, lying between the vegetation mat and the mineral soil. The partially humified preserved remains of plants accumulated under anaerobic conditions.

peat- one modern meaning: in the sense of: cut piece of; from the Middle English *pete* f. Celt. *pett.*1.

peat- extant Scots term for "a piece of the semi-carbonised decayed vegetable matter found under the surface of boggy moorland, usually cut into brick-shaped pieces, dried and burned as fuel". 3. The word, under this meaning is also still used in localised areas of England and Wales.

peat gate- track, road or right of way between turbary and settlement.

peat hill- peat hill is a term still used in the Shetland and Orkney islands to mean "a peat-bog or peat-moor; the place where peats are dug". 3.

pettes- 16th century Derbyshire term for peats; pieces of turf, cut with a special spade, used for fuel. 2.

peting- obsolete Scots word for "the action of getting peat; the right to cut, or the service of cutting peat. 3.

phase 1 survey- the initial stage of a botanical or archaeological field survey. For this research, the process involved walk-over of the sites and rough mapping of the vegetation or features.

pot- extant Scots term for "a pit from which peats have been dug". 3.

sheep-walk- a term used to describe the areas of hill top grazing particularly associated with the boom in sheep farming which occurred between the 14th and 16th centuries.

sleade- 16th century Derbyshire terms for sledge, much used on Derbyshire and Yorkshire farms for carrying hay, peat, stone or a plough to the field etc. 2.

sled- 16th century Derbyshire terms for sledge, much used on Derbyshire and Yorkshire farms for carrying hay, peat, stone or a plough to the field etc. 2.

sod- with respect to the general discussion within the thesis, this word should be taken to mean a piece of cut vegetation mat (see definition of turf).

soft bog- 19th century term for organic material dredged from the bottom of bogs. 17.

solifluction- the mass movements of soils on slopes in periglacial conditions.

S.S.S.I.- Site of Special Scientific Interest.

stead- extant northern Scots term for "a site, foundation, base of a peat-stack. 3.

steid- extant northern Scots term for "a site, foundation, base of a peat-stack. 3.

turbary- from the Middle English *turbarye,* meaning "land where turf or peat can be got". 10. A term generally applied to a legitimate, traditional, peat cutting area.

turbidus- Latin word for turbid. 11.

turf- modern meaning: surface earth filled with matted roots of grass etc.; piece of this cut from the ground; sod; from the Old English and Old Saxon *turf.* In Ireland turf= peat. Old Norse= *torf*(a); Middle Dutch= *torf.* 1.

turf/ turves- with respect to the general discussion within the thesis, these words should, unless there is qualification, be taken to mean either, a piece/pieces of cut peat or vegetation mat (see growing turf). Where the latter meaning has been applied, no distinction has been made between turf containing just peat and turf containing only mineral soil. This was because, both can be burnt or used for building material and no distinction has been identified in the documentation studied during the research.

vaghouse- name for the fuel storehouse which used to be in widespread use on Dartmoor. 18.

vags- dried slabs of heathery turf; one of the main sources of fuel used in Dartmoor up to World War 2. 18.

walk-over- survey achieved by walking to and fro across a site.

waste- obsolete term derived from the Old English *weste*; in some areas, e.g. Sheffield, was synonymous with moorland.

weste- an Old English word; the origin of the term *waste*. 10.

westen- Old English for *desert*, *wasteland*. 12.

White Peak- the term used to describe the limestone region of the Peak District.

White Wolds Flint- flint originating from the Yorkshire Wolds, which when found in the Peak District, is often associated with Early Mesolithic sites.

wild-fires- in this thesis, refers to fires that burn out of control on drought affected moorland, which typically destroy the roots of the vegetation and may even consume the underlying dried-out peat.

win- extant Scots term applied to cut peats etc., meaning, to "dry and make or become ready for storage by exposure to air and sun". 3.

win(d)-raw- extant central Scots term for "a row or line in which small piles of cut peats are set to dry". 3.

windrow- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe a row of cut peat blocks stood on edge to dry. 5.

windrowing- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe the indigenous "act of stacking cut peat blocks on edge in rows to dry". Also known as whinrowing. 5.

winn- Old English noun for war, battle, or strife. 12.

whinrowing- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe the indigenous "act of stacking cut peat blocks on edge in rows to dry". Also known as windrowing. 5.

white peat- extant term used at Fenn's and Whixall Mosses on the English/ Welsh borders to describe " the uppermost layer of peat comprising mostly little-humified Sphagnum moss. Describes the colour of the peat when dry". 5.

yate- place-name element derived from the Old English *geat*; meaning *gate*. 9.

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For further definition of the terms and words used in this thesis the reader is referred to the following:-

Archaeology: Adkins & Adkins (1992)

Birds: Cramp (1977)

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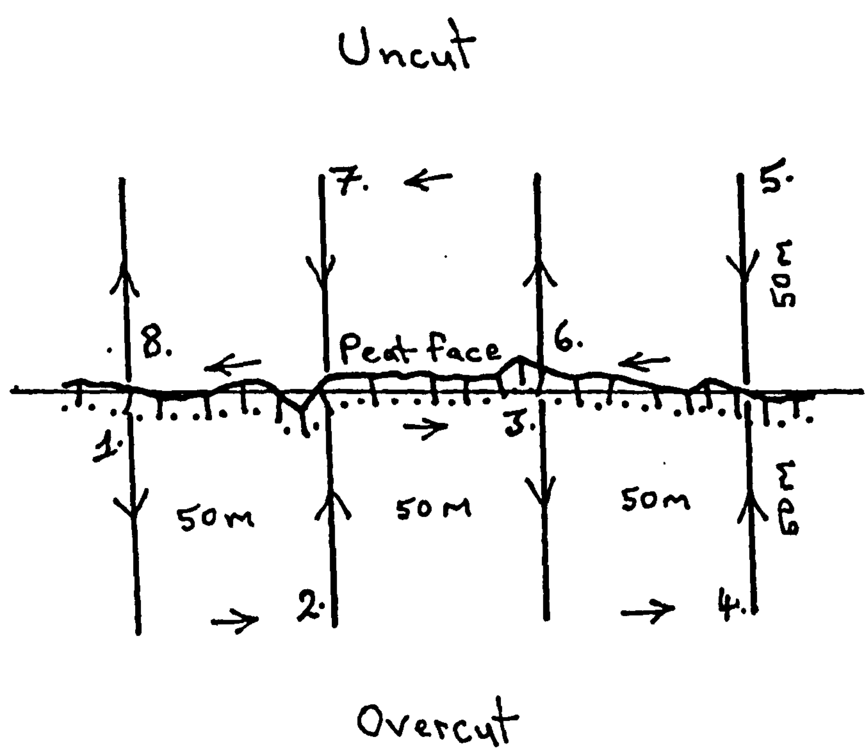
APPENDIX 1. CATALOGUE OF PEAK PARK AERIAL PHOTOGRAPHS

DATE	SUPPLIER	SCALE (approx)	EXTENT OF COVER	COLOUR	WHERE KEPT	FLIGHT PLAN
1953	RAF	1:10 000	Parts of northern moors	Monochrome	In drawers	In folder
1966-72	OS	Large	Almost complete coverage of the national park at various dates	Monochrome	In drawers	Overlay on 1" map
1966-72	OS	1: 2500	1.Hadfield, Glossop, Chunal, New Mills, Chinley and Chapel en le frith. 2. Bradfield area. 3. Grindlow, Longstone, Bakewell, Over Haddon, Stoney Middleton, Hassop, Padley, Baslow, Chatsworth, Beeley, East Moors. 4. Bonsall Moor.area.	Monochrome	In ecology map tank	In folder
1975	Cambridge University	1: 5 000	Goyt Coalfield	Monochrome	In envelope	In folder
1977	RAF		1 only around SK 172893	Monochrome	In ecology map tank	n/a
1976-78	OS	1:25 000	Complete coverage of the national park at various dates	Monochrome	In drawers	In folder
c.1980	Cambridge University	1:700	North Lees Estate	Monochrome	In ecology map tank	In folder
1980	Cambridge University	1:6 000 1:7 500	Hallam, Kinder. Harrop,Ormes,Binn (Wessenden)	False Colour Infra Red Monochrome	In orange package	In folder
1983	Cambridge University	1:5 000	Derbyshire Dales National Nature Reserve	Monochrome	English Nature (0629 815095)	In folder
1983	MAFF (ADAS)	1:25 000	1. Allgreave, Wildboarclough, Macclesfield Forest. 2. Harpur Hill, Brandside, Hollinsclough	False Color Infra Red	In envelope	In folder
1984	MAFF (ADAS)	1:14 000	Complete coverage of the national park	Monochrome	In large boxes	In folder and in boxes
1987	Cambridge University	1:10 000	East and west moorland fringes	False Colour Infra Red	English Nature (0629 815095)	In folder
1988	MAFF (ADAS)	1: 12 000	North Peak Environmentally Sensitive Area	False Colour Infra Red	MAFF	In folder
1989	MAFF (ADAS)	1: 20 000	Complete	Monochrome and non-metric colour	In boxes	In folder and in boxes
1989	Jasair	1:10 000	Greater Manchester	Colour	Oldham MBC?	In folder
1992	MAFF	1:14 000	SW Peak ESA area	Colour	MAFF	In folder
1995	RAF	1:25 000	Most of Park except east and west fringes	Monochrome (contact prints). See note in folder re. usage and copying	In box	In folder
1996	RCHME		Selected sites	Colour	In A4 ring binder	In folder
1997	EN	1:10 000	Eyam Moor and Eastern Moors	Colour	In envelope	In folder
1997	RCHME		Selected sites	Monochrome and colour	In box	In folder

APPENDIX 2. PLAN OF INVERTEBRATE SWEEP-NETTING GRID



Appendix 3. SUMMARY OF PEAT, TURF & BOG MOSS USE

	N&B	IA	RP	EM	LM	16C	17C	18C	19C	20C	PD
<u>MAJOR HISTORICAL</u>											
Domestic fuel	?	?	?	p	p	p	p	p	p	p	t?p
Industrial Fuel											
Iron smelting		?	?	?	?	?	?	p	?		
Iron smithing		?	?	?	?	?	?	?	p	p	
Lead smelting								?	p		
Tin smelting				?	p	p	p	p	?		
Pottery firing					p						
Lime burning					?	p	p	?	p		
Bird-lime manufacture									pt		
Building work											
In domiciles	?	t	?	?	t	t	t	t	?	p	
Roofing				?	t	?	t	?			
Roof insulation				?	m	?	?	?	p	?	
Civil eng.											
Boundary construction				pt	pt	t	t	t	t	t?	t?
Barrow construction	t										
As fertiliser											
Made ashes								?	pt	?	
Hearth ashes	?	?	?	?	?	pt	pt	pt	pt	?	?
As mulch											
Compost					?	?	?	?	p	?	
Old bedding	?	?	?	?	?	?	?	?	p	p	
Peat soot	?	?	?	?	?	?	?	?	pt	pt	
Burnt on land	p?						p				
Bedding/ Litter	?	?	?	?	?	?	?	?	p	p	p

	N&B	IA	RP	EM	LM	16C	17C	18C	19C	20C	PD
Fodder		?	?	?	?	?	?	?	p	p	p?
Source of tar?				?	?	?	?	?	p	p	
Within superstition		p	?	?	?	?	?	?	p	p	
<u>**LOCALISED HISTORICAL**</u>											
Industrial fuel											
Lead smelting								?	p		
Tin smelting				?	p	p	p	p	?		
Copper smelting						p					
Silver smelting						p					
Alum production						p					
Copperas production						p			p?		
Salt production				?	p						
Drying china-clay									p		
Ice production									p	p	
Cremation fuel					?						
Barrow construction	p										
As fertiliser											
'Dutch ashes'									p		
Peat & lime								p	?		
In whiskey making											
Fuel for distillation								?	?	p	?
Fuel for drying grain								?	?	p	p
Fish curing								?	p	p	?
<u>**MINOR HISTORICAL**</u>											
Fuel in field											
On sheepwalks					?	?	?	?	?		

	N&B	IA	RP	EM	LM	16C	17C	18C	19C	20C	PD
Building work											
In fortifications				?	t						
Wall insulation						?	?	?	?		
Industrial fuel											
Brick making					p						
Tile making					p						
Metal extraction											
'Tin-streaming'				t	t	t(E)	t				
'Washing gold'		t?	t(E)	t(E)	t(E)	t(E)					
In 'pochine' making								?	?	p	?
<u>MAJOR MODERN</u>											
Electricity generation										p	p
Bedding/ Litter					?	?	?	?	p	p	p
Plant compost											
In nurseries										p	p
In gardens										p	p
<u>LOCALISED MODERN</u>											
'Civil eng.'											
Embanking work									t		
As mulch											
'Black earth'									p/t?		
In whisky making											
Fuel for distillation								?	?	p	?
Fuel for drying grain								?	?	p	p
Fish curing											
Various								?	p	p	?

	N&B	IA	RP	EM	LM	16C	17C	18C	19C	20C	PD
Smoking haddock								?	p	p	?
<u>**MINOR MODERN**</u>											
Fuel in field											
In wartime trenches										p	
Industrial fuel											
Aluminium smelting										p	
Wax extraction									p		
Coal-gas production										p	
Building work											
Floor insulation										p(F)	
Floor covering										t	
'Civil eng.'											
Daming purposes									t	t	t?
Peat-made drains									p	?	
Making peat pipes									p	?	
As fertiliser											
'*Nitrogen*-fixing'										p	
Compound										p	?
Fodder		?	?	?	?	?	?	?	p	p	p?
Plant heating											
Commercial use										p	
Private greenhouses										t	t?
Metal extraction											
Magnesium extraction										p	
Source of distillation											
Benzinoids										p	
Paraffinoids									p	p	
Paraffin									p		

	N&B	IA	RP	EM	LM	16C	17C	18C	19C	20C	PD
Source of waxes											
In polish making									p		
In carbon paper									p		
In soap making									p		
Source of tar				?	?	?	?	?	p	p	
Source of naptha											
For candle making									p		
In mothballs									p		
In gas production									p	?	
In chemical making											
NH4 (ammonium)										p	
Pyrologenous acid										p	
Acetone										p	
Methylene alcohol										p	
In pochine making								?	?	p	?
Iron & steel industry											
Casting in iron										p	
Fuel in cutlery making										cp	
For tempering cutlery										cp	
In farming											
In cowsheds									?	t	
As a cure for scour									?	t	
'N-fixing' land										bp	
Medicinal uses											
As dressings										m	
Antiseptic/ deodoriser										pc	
In peat baths									p	p	

	N&B	IA	RP	EM	LM	16C	17C	18C	19C	20C	PD
Horticultural uses											
Packing										m	
Making plant pots										p	?
In hanging-baskets										m	m
Wreath making										m	m
Miscellaneous											
Packing										mp	
Packing munitions										p	
As insulation										p	
Filter making										p	
Oil spillage clean-up										p	p?
To make paper									p	?	
Dye production									?	p	
For artificial bird nests										t	t?
As a pipe-fuel									?	p	
Activated carbon										p	
Storing ice									p?	p?	
CONVERTED FORMS											
Charcoal					p	?	?	?	p	p	
Coke									p	?	
Compressed									p	?	
Briquettes									p		

KEY:

p - peat   t - turf   m - moss   pc - peat charcoal   cp - compressed peat
bc - 'bacterised peat'

? - probable usage   F - used in France   E - used in Europe

N&B - Neolithic Period & Bronze Age   **IA** - Iron Age   **RP** - Roman Period   **EM** - Early Medieval
LM - Late Medieval   **16C** - 16th Century   **17C** - 17th Century   **18C** - 18th Century
19C - 19th Century   **20C** - 20th Century   **PD** - Present Day

APPENDIX 4. OTHER SITES MENTIONED IN TEXT

THE WESTERN MOORS
KINDER RESERVOIR (SK 058882)
CROWDEN (SK 072992)
RUSHUP EDGE (SK 110834)

THE STAFFORDSHIRE MOORS
HIGHER PETHILLS (SK 941680; 300m OD)
LOWER PETHILLS (SK 941683; 275m OD)
PETHILLS FARM (SK 035655; 440m OD)
LOWER PETHILLS FARM (SK 036655; 430m OD).
PETHILLSHEAD FARM (SK 050528; 320m OD)
PETHILLSHEAD (SK 054527; c.325m OD)
PETHILLS BANK COTTAGE (SK 055528; 335m OD)
PETHILLS (SK 062522; 265m OD)

THE EASTERN MOORS
LOW BRADFIELD (SK 263918)
HIGH BRADFIELD (SK 268925)
LOXLEY VALLEY (SK 290902)
LOXLEY COMMON (SK 310911; 200-239m OD)
RIVELIN VALLEY (SK 2987)
RIVELIN HAGG (SK 278865; 180-250m OD)
RINGINGLOW BOG (SK260838)
KELLYS' (SK 278835; 400m OD)
ECCLESALL WOODS (SK 322825; 120-170m OD)
SHIREBROOK (SK 419843; c.70m OD)
CARBROOK (SK 393858; c.105m OD)
HOLBROOK (SK 446813; c.40m OD)
TOTLEY MOSS (SK264790)
BIG MOOR (SK 270765)
LUCAS MOSS (SK 264767; c.350m OD)
BASLOW (SK 252723)

THE WHITE PEAK
HASLEBACHE/ HAZLEBADGE HALL (SK 171800; 210m OD)
BRADWELL (SK 175811; 180m OD)

BRADWELL MOOR (SK 136802; -390-471m OD)

ELDON HILL, NORTH (SK 123819; 477m OD)

TIDESWELL (SK 153758;)

GREAT HUCKLOW (SK 178778)

FOOLOW (SK 192768)

EYAM (SK217765)

EYAM MOOR (SK 210795; -335-429m OD)

STONEY MIDDLETON (SK232755)

PEAK FOREST (SK 114793)

WARDLOW (SK 182748;281m OD)

LITTON (SK 165752)

COOMBS DALE site (SK 205741; 315m OD)

ASHFORD (SK195697)

BAKEWELL (SK 218685)

PEAT WELL (SK 221680; 120m OD)

MONYASH (SK152665)

FLAGG (SK 136684)

OVER HADDON (SK 206665)

SHELDON (SK 174688)

TADDINGTON (SK142712)

BUXTON (SK 060735)

PEAT PITS BROOK (SK309526- SK 340523)

PEAT LANE (SK 311518;)

ROWSLEY SIDINGS, NEAR MATLOCK (SK 2665; c.100m OD)

SOUTH PENNINES

SECKAR WOOD, NEAR WAKEFIELD (SE 3214; c. 65-90m OD)

APPENDIX 5. Quadrat survey (*Nardus* sites)

Sites: FS LH SS FN RM GH CE OH CW RM BH BM CM DM DE EC

Quadrats: oub oub oub o o oub oub oub oub oub oub oub oub oub oub oub

Species	
Flowering Plants:	
Calluna vulgaris	7 13 6 786 9x8 xx9 xxx
Empetrum nigrum	76 36 468 7 5 228 626 6
Erica tetralix	6 2 3
Vaccinium myrtilus	137 227 3 3 4 22 1 1 15 21 241 22415 37 24 113 2
V. vitis-idaea	5 12 2
Cerastium fontanum	2
Galium saxatile	1 3 1 2 3 2 3 3 3 2 23 1
Agrostis canina var. *montana*	3
Agrostis capillaris	3 4 1 2 2
Anthoxanthum odoratum	1 3
Deschampsia flexuosa	535 244 144 3 4 455 777 717 647 879 7 75 2 4 3 4 4 1 111
Festuca ovina	2 6 6 5 8 3 4 3
F. rubra	4
Molinia caerulea	2 98 488 4 7 22 983
Nardus stricta	x 2x 4 9 4 9 9 7 5 8 5x 8x 4 9 x 21
Poa annua	2
Carex nigra	3 2 311
Juncus effusus *	
J. squarrosus	1 5 4 2 6 25 1 1
Trichophorum caespitosum	2 2 1 23 1 2
Eriophorum angustifolium	41 86 72 3 2 24 4 3 2 2 43
E. vaginatum	78 8 95 1 1 83 88 98 96 52 4 12
Bryophytes:	
Sphagnum fimbriatum *	
S. palustre *	
S. papillosum *	
S. recurvum *	
S. subnitens	1 2 32
S. tenellum	33
Campylopus fragilis	1 1 2 2 2 42 22 2 3 1
C. introflexus	1 1 3 1
C. paradoxus	11 122 332 111
Dicranum scoparium	1 11 22 12 33 1 123 11 1 1
Pohlia nutans	1 1 2 1 2 111
Polytrichum commune	1 2 5 2
P. formosum	12 1
Drepanocladus fluitans *	
Eurynchium praelongum	2
Hypnum cupressiforme	325 424 3 3 3 3 2 3 4 4 325 324 7 2 1 115 11 633 132 111
Isopterygium elegans	1
Plagiothecium undulatum	2 2 1 31 2
Pleurozium schreberi	1
Rhytidiadelphus squarrosus	1
Barbilophozia floerkei	1 1 1 11
Calypogyia muellerana	43 2 11
Cephaloziella hampeana	1 22 22
Diplophyllum albicans	111
Gymnocolea inflata	11 2 31 1
Bryophytes cont.	
Lepidozea reptans	1 2
Lophocolea bidentata	2
Pteridophytes:	
Dryopteris dilatata	1
Lichens:	
Catillaria chalybia	1
Cladonia cervicornis	1
C. chlorophaea	1 1 1 2 21 2 11 22 1 1 1
C. coccifera	3 13 2 21 12 22 12 132 211 3 111
C. coniocraea	1 1 1
C. crispata	1
C. fimbriata	1
C. floerkeana	1 2 1 2 1 1 1 1 2 1
C. furcata	111
C. gracilis	1
C. macilenta *	
C. polydactyla	1 1
C. portentosa	1
C. ramulosa	2
C. squamosa	1
C. uncialis	1
Hypogymnia physodes *	
Lecanora conizaeoides	1 111
Lecidella scabra	1
Lepraria sp.	3
Micarea lignaria	2
M. turfosa	1
Parmelia saxatilis	1
Placynthiella icmalea	1
P. uliginosa	2 1
Porpidia crustulata	1
P. tuberculosa	2
Trapeliopsis granulosa	1 1 1
Fungi:	
Claviceps purpurea	+ + + + + + +
Cystocoleus amianthinum	+ + + +
Hygrocybe strangulata *	
Marasmius androsaceus	++
Mycena galopus	++ + ++ +
M. leucogala	+ + + + +
M. simia	+
Psilocybe semilanceata	+
Stropharia aeruginosa *	
S. semiglobata *	

Key:

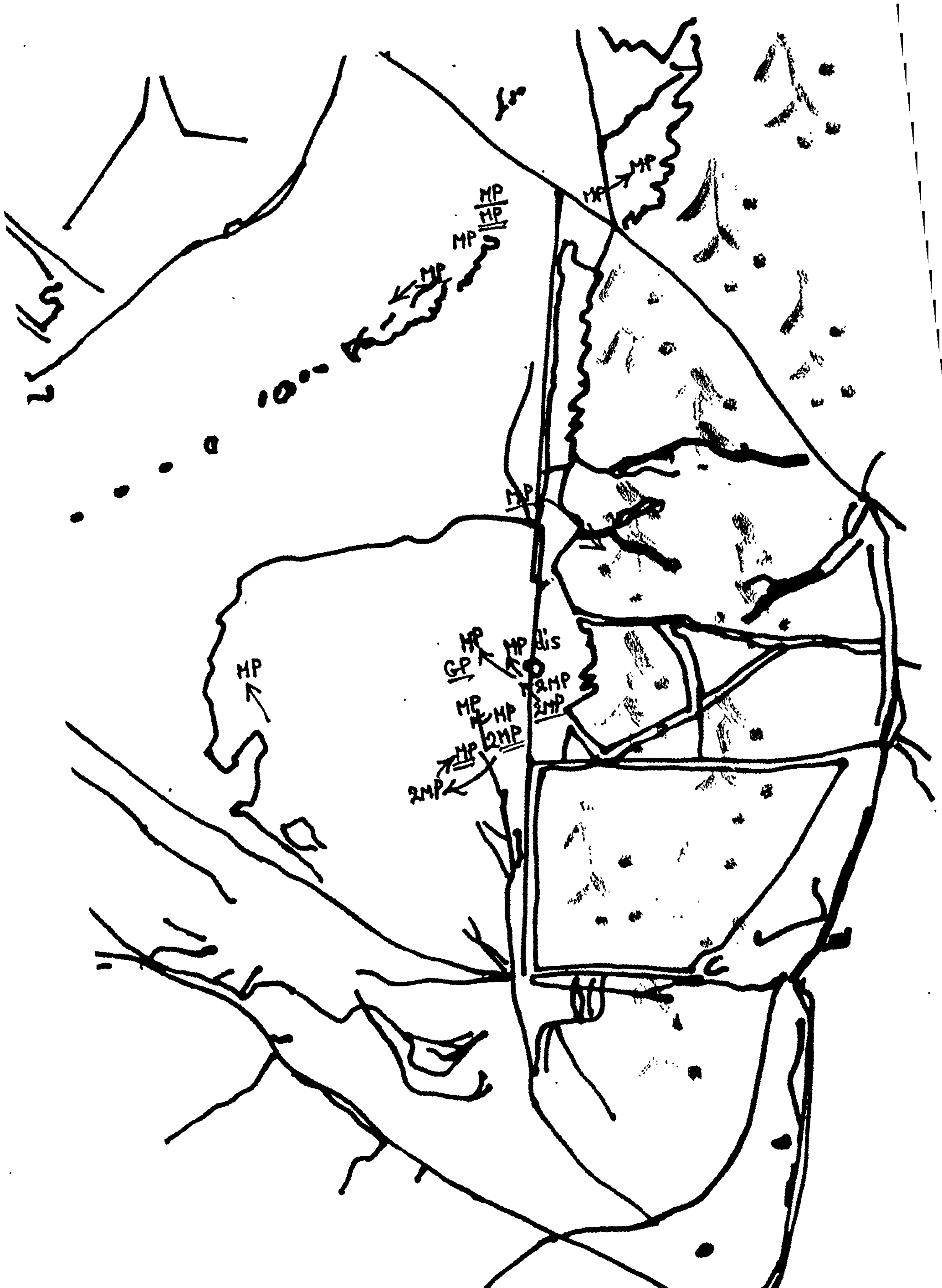
FS- Fagney Clough, south
LH- Lockerbrook Heights
SS- Swint Clough, south
FN- Fagney Clough, north
RM- Roych Moor
GH- Gores Heights
CE- Cow Hey, East
OH- Ox Hey
CW- Cow Hey, west
RM- Ridge Nether Moor
BH- Banktop Hey
BM- Black Moor
CM- Coldharbour Moor
DM- Derwent Moor
DE- Derwent Edge
EC- Esgair Celliog
o- overcut u- uncut
b- peat cutting bank
1,x (ten) etc.- 'Domin'
+- present
*- outside quadrats

Appendix 6. Beetle catches at Lockerbrook Heights; underlining shows ubiquitous species and those characteristic of the *Nardus* and the uncut blanket mire

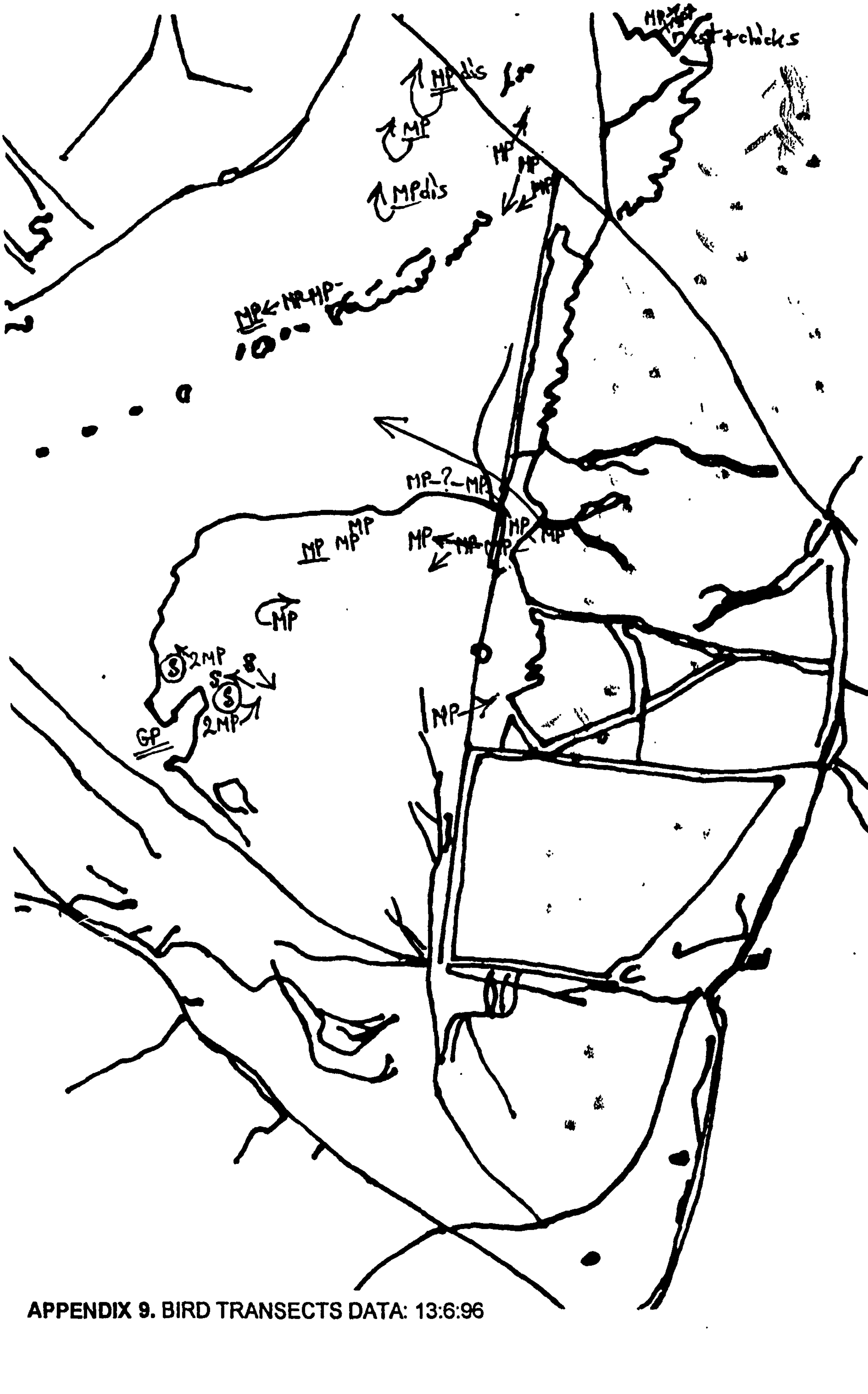
Trap line location	*Nardus*						Blanket					
Day	25	10	23	19	2	16	25	10	23	19	2	16
Month	6	7	7	9	10	10	6	7	7	9	10	10
	Number of individuals in each collection											
Byrrhidae (pill)												
Byrrhus pilula		1										
Simplocaria semistriata					1							
Cantharidae (soldier)												
Cantharis decipiens		2										
Cantharis paludosa							27	8				
Rhagonycna limbata		4	1									
Carabidae (ground)												
Agonum fuliginosum							3	1	2			
Amara lunicollis	1											
Amara communis	1											
Amara convexior	1											
Bradycellus harpalinus										1		
Calathus melanocephalus		1		1								
Carabus arvensis	20			2	1	1	1				1	1
Carabus problematicus	1	2	8					4	2	1		
Leistus rufescens					2	3			2	2		
Nebria salina								1			1	
Notiophilus aquaticus		1										
Notiophilus germinyi				1								
Patrobus assimilis			1				4	2	10	1		
Pterostichus diligens	25	20	8	5	2	2	9	1	4	1		2
Pterostichus madidus			1				2					
Pterostichus nigrita											1	
Pterostichus rhaeticus							15	6	5	1		1
Catopidae												
Ptomophagus subvillosus							1					
Coccinellidae (ladybirds)												
Coccinella magnifica										1		
Coccinella 7-punctata	1											
Curculionidae												
Sitona lepidus					2							
Elateridae (click)												
Ctenicera cuprea	7	2	1				1					
Denticollis linearis								1				
Dolopius marginatus	2	1	4									
Hypnoidus riperius	53	11	14				2		2			
Hydrophilidae												
Anacaena globulus							1	5	5	1	3	
Cercyon melanocephalus		1										
Hydroporus melanarius								3				
Megasternum boletophagum			1									
Leiodidae (fungus)												
Agatridium convexum			1	6	2	1						
Hydnobius punctatus						2						
Leiodes calcarata			1									
Necrophoridae (burying)												
Necrophorus vespilloides				1					1			
Scarabaeoidae (chafers)												
Aphodius contaminatus				1						1		
Aphodius lapponum		1										
Aphodius prodromus						1						
Staphylinidae (rove)												
Arpedium brachypterum			1	16	7	5						
Bolitobius analis	4		1	2		1				1		
Bolitobius cingulata	1	1						1				
Bryocharis analis			1									
Geostiba cercelaris			1									
Lathrobium brunnipes	17	8	6	1	1		2				1	
Lathrobium fulvipenne	3	1			1	1			1			
Leptacinus pusillus			1									
Lesteva heeri							7	10	8	1	12	1
Mycetoporus rufescens										3	1	
Olophrum fuscum						1				5	12	
Othius punctulatus		1										
Othius angustus		2	1		1							
Plataraea brunnea		1										
Quedius mollochinus	1	1	12	5		2		1				
Quedius schatzmayri				1		1						
Stenus brunnipes		1										
Tachinus laticollis						1						
Tachyporus dispar	2	6	5									

Appendix 7. Spider and harvestmen catches at Lockerbrook Heights; underlining shows ubiquitous species and those characteristic of the *Nardus* and the uncut blanket mire.

Trap line location	***Nardus***						**Blanket**					
Day	25	10	23	19	2	16	25	10	23	19	2	16
Month	6	7	7	9	10	10	6	7	7	9	10	10
	Number of individuals in each collection											
***Araneae* (spiders)**												
Clubionidae												
Agroeca proxima				25	6					16	4	
Clubiona brevipes	1						1					
Gnaphosidae												
Haplodrassus signifer	1											
***Linyphiidae* (money)**												
Agyneta decora	3		3									
Agyneta cauta	1											
Allomengea scopigera				2	4	2						
Bolyphantes luteolus										3		2
Centromerita concinna							3	1				
Centromerus dilutus	1											
Dicymbium nigrum	1											
Diplocentria bidentata			1						2			
Gonatium rubens				1		2						
Hypomma bituberculatum		1										
Lepthyphantes ericaeus							1					
Lepthyphantes mengei		1	2			2	8			1		
Lepthyphantes tenuis		1										
Lepthyphantes zimmermanii												1
Oedothorax retusus	2	1					1					
Pelecopsis mengei							4				2	
Pocadicnemis pumila		1					1					
Porrhamma pallidum	2											
Scotinotylus evansi						1						
Silometopus elegans	30		1				28		1			
Tapinopa longidens										1		2
Tiso vagans	3		2									
Walckenaeria acuminata	5	3	3	4	4	2	2		1		1	
Walckenaeria antica								1				
Walckenaeria cuspidata										1		
Walckenaeria nudipalpis									2	1	1	
Walckenaeria vigilax			5						1			
***Lycosidae* (wolf)**												
Alopecosa pulverulenta	54		3	3	1	1	12	1	3			
Pardosa pullata	98	27	119	26	10	5	86	9	38	5	1	5
Pardosa nigriceps	6		5				81	11	53	1	2	3
Pirata piraticus		1					26	15	36			
Trochosa terricola			1						1	1	1	
***Theridiidae* (comb-footed)**												
Robertus lividus	16	25	5					2				
***Thomisidae* (crab)**												
Xysticus cristatus							1					
***Opiliones* (harvestmen)**												
Nemastomatidae												
Nemastoma bimaculatum				1								
Phalangiidae												
Paroligolophus agrestis					2	5				1	8	5



APPENDIX 8. BIRD TRANSECT DATA: 4:5:96

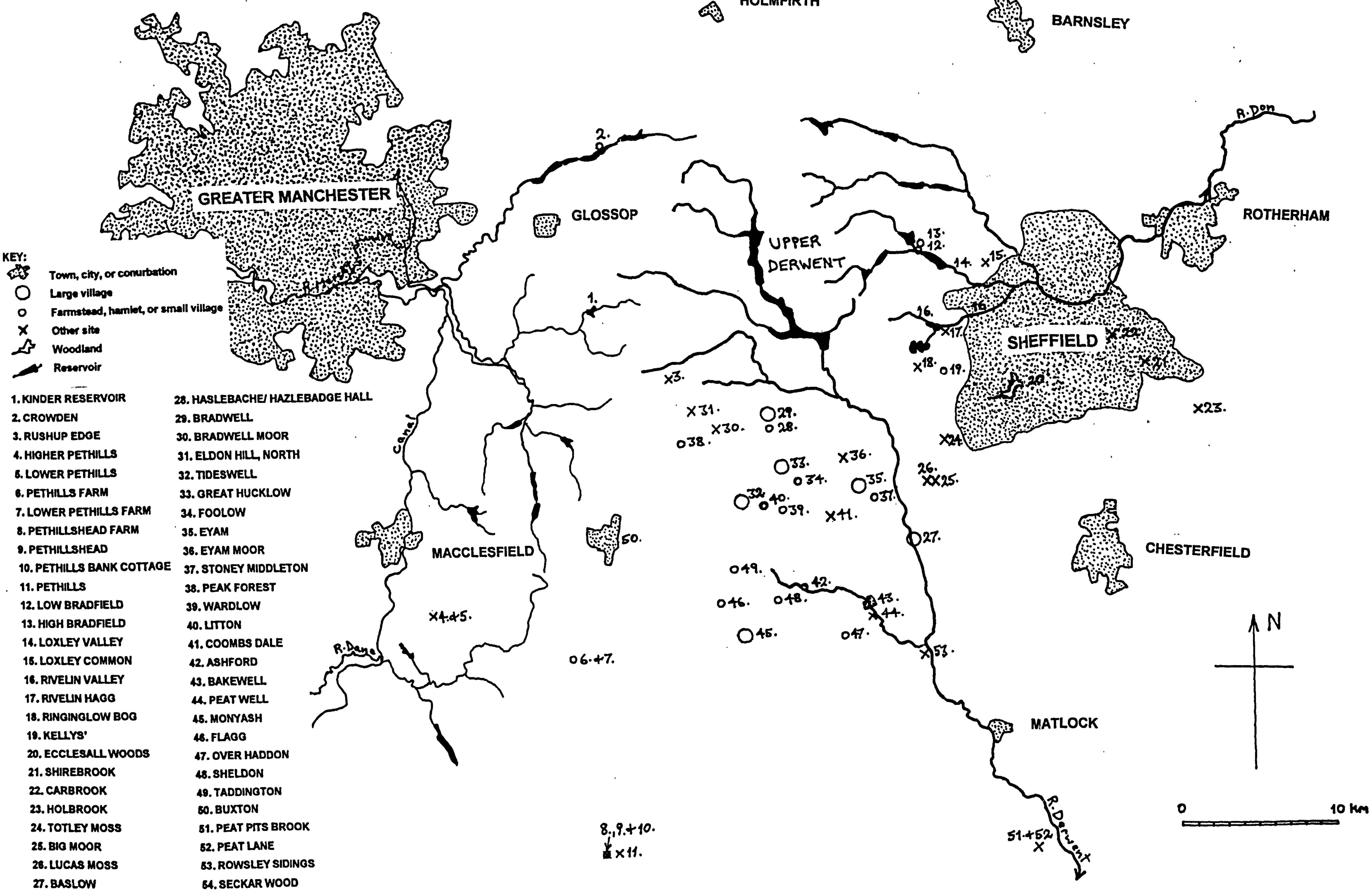


APPENDIX 9. BIRD TRANSECTS DATA: 13:6:96

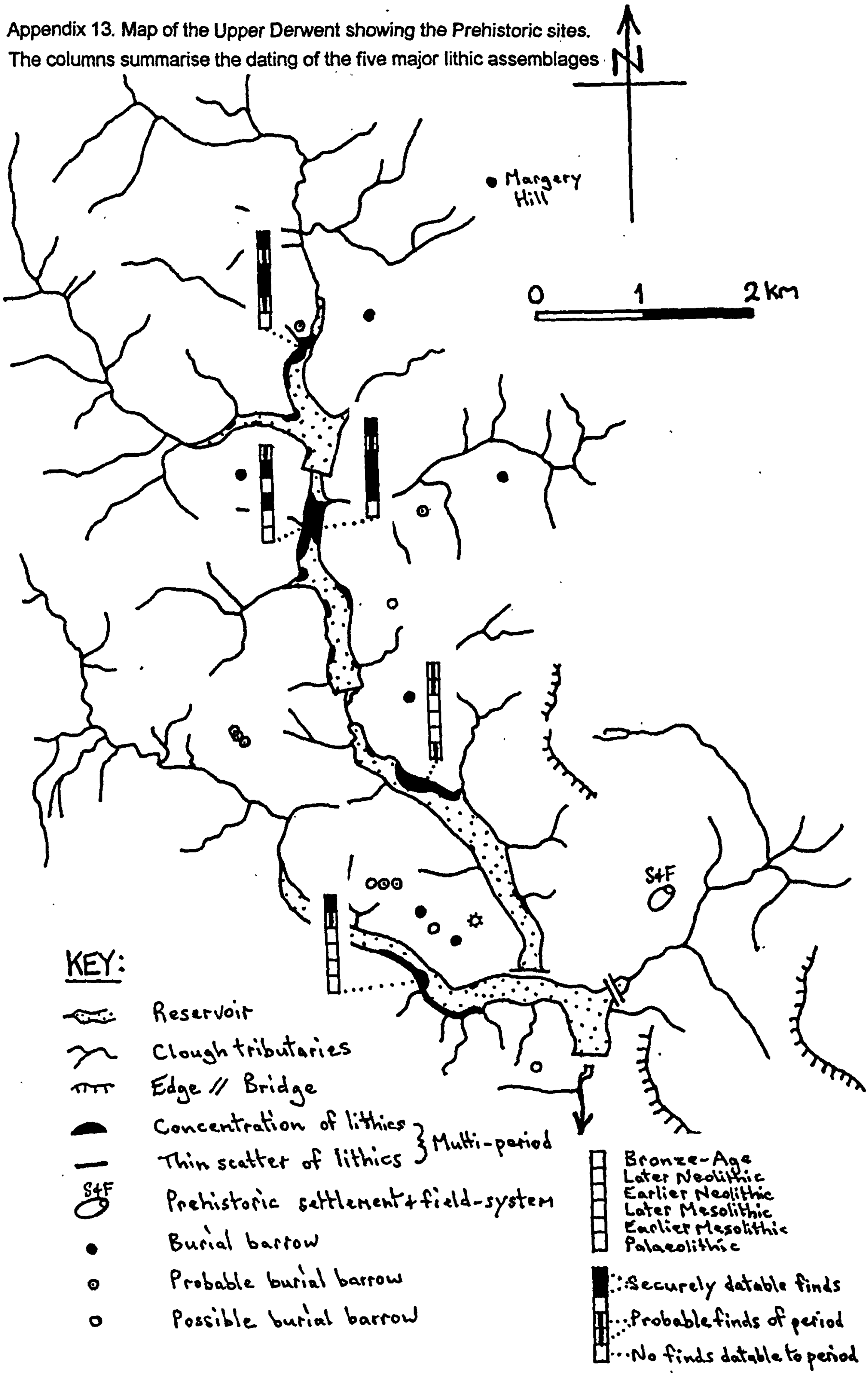
APPENDIX 10. BIRD TRANSECTS DATA: 25:6:96

APPENDIX 11. BIRD TRANSECTS DATA: 10:7:96

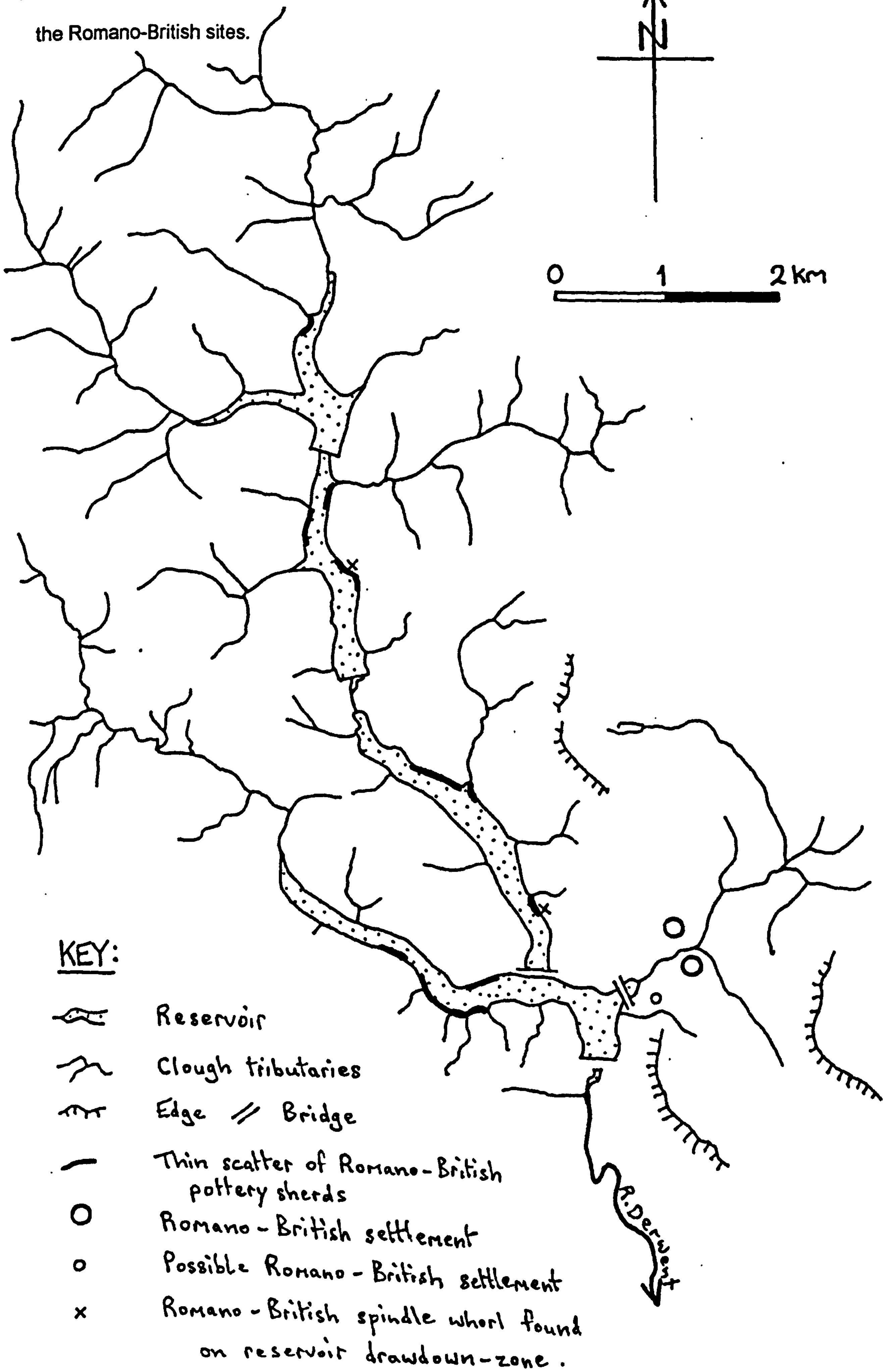
Appendix 12. Map showing the location of the South Pennine place-names cited in the text.



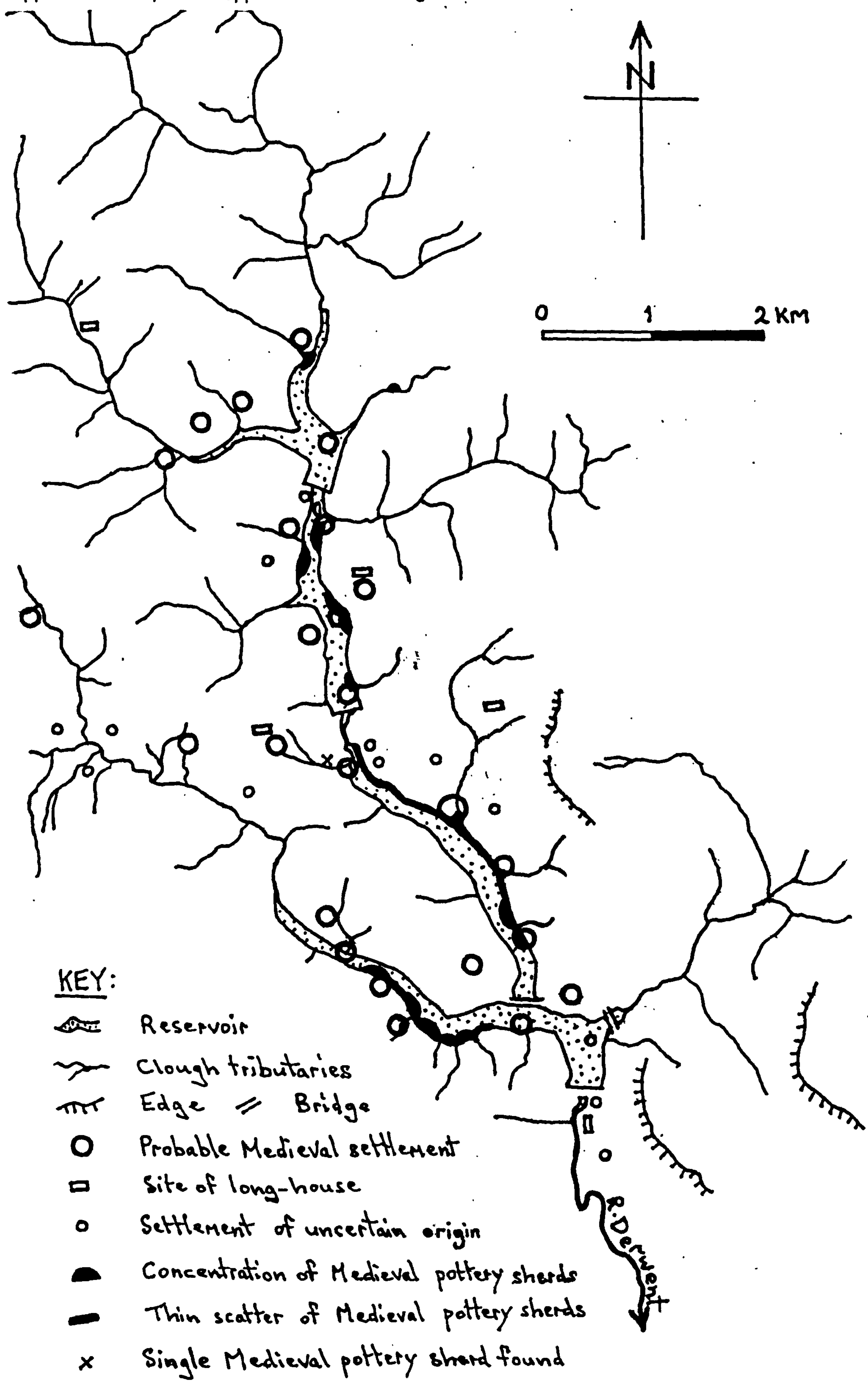
Appendix 13. Map of the Upper Derwent showing the Prehistoric sites. The columns summarise the dating of the five major lithic assemblages



Appendix 14. Map of the Upper Derwent showing the Romano-British sites.



Appendix 15. Map of the Upper Derwent showing the Medieval sites.



Appendix 16. Map of the Upper Derwent showing the Post-Medieval sites.