A landscape archaeological study of the Mesolithic Neolithic in the milfield basin, Northumberland

Waddington, Clive

A LANDSCAPE ARCHAEOLOGICAL STUDY OF THE MESOLITHIC-NEOLITHIC IN THE MILFIELD BASIN, NORTHUMBERLAND

Clive Waddington

Thesis Submitted for Degree of Doctor of Philosophy

University of Durham
Department of Archaeology

1998

Clive Waddington PhD Thesis

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ABSTRACT

The primary objective of this thesis is the construction of a landscape-scale synthesis of past human behaviour during the Mesolithic-Neolithic in the Milfield Basin, Northumberland. Previous archaeological studies in this area have been dominated by site-based research with little account taken of the wider landscape setting, settlement patterns and land-use strategies. To acquire the appropriate 'landscape' (off-site) data this study has included a fieldwork component consisting of a 7km sampling transect which extended across the interfluve from watershed to watershed and sampled all the different environmental zones of the basin. This area, of nearly 6 million square metres, was systematically fieldwalked, geomorphologically mapped and test-pitted. A total of 146 test pits were opened to sample the subsurface lithic content and sediment stratigraphy of each of the different geomorphological slope types. The subsequent data was analysed in a G.I.S. environment and interpreted in combination with published palynological data, existing site-based archaeological data including the author's recent excavations at the Coupland complex. The method of acquiring, analysing and interpreting the fieldwalking data is an innovative contribution to landscape archaeology techniques and includes a model of lithic scatter slope displacement and archaeological inference for ploughed slope environments. The study culminates in a diachronic synthesis of Mesolithic-Neolithic behaviour together with associated thematic discussion. Consequently, this thesis contributes towards two areas of research: landscape archaeological syntheses and methodological/taphonomic studies. The principal findings of this study include new models of prehistoric settlement and land-use for this area, a re-evaluation of the Mesolithic-Neolithic transition, a reconsideration of the late Neolithic 'ritual complex' and the identification of processes affecting surface lithic scatters and their implications for subsequent interpretation.

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Declaration

No material contained in this thesis has previously been submitted for a degree in this or any other University.

Statement of Copyright

ACKNOWLEDGEMENTS

During my first visit to the Milfield basin during early October 1990 I was immediately charmed by this landscape. Even after several years' part-time study, an MA research dissertation and a full-time three year doctoral research project I can still say in full honesty that this work has been a labour of love from start to finish. Over these last eight years I have been assisted with my Milfield work by a great many people and I offer my sincerest thanks to them all. However, I owe particular thanks to my friend Eric Montgomery who has been my partner in crime from the first day I arrived in Wooler and has spent very many weeks toiling in the wind, rain, snow and occasional sun, holding surveying staffs, providing transport, fieldwalking, excavating and helping me when ever I asked. In gratitude for this help I have dedicated this work to him. I must also make a special thank you to John Davies who helped on a prodigious scale in the latter years, particularly with the fieldwalking and drawing of lithics, and who has some of the keenest eyes for flint I know. My two supervisors, Anthony Harding and Dave Passmore, have been extremely supportive throughout, and have provided sound guidance and effectively handled an inter-disciplinary, inter-departmental and inter-university project. It is a pleasure to extend my thanks for their comments and discussions which have been of great benefit to this study. I am also grateful to Lindsay Allason-Jones for reading and commenting on a draft version of the thesis and to Colin Richards, who kindly passed on the stone axe he found in Ewart Park, and David Schofield for provenancing it. I would also like to record my thanks to Phil Howard and Martin Charlton who helped me tackle the many difficulties I ran into during my use of the surveying and G.I.S. software. I also owe my thanks to Sandra Rowntree, Anne Rooke, John Davies, Richard Parke and Andy McMaster for their help with the illustrations. I am also indebted to the many landowners and farmers on whose land I have carried out fieldwork, including John Fairbairn, the Armstrongs, Lord Joicey, Mr. Cleminson, Mr. Jeffries, Mr. Short and Mr. Reddihaugh. Organisations to whom I would like to extend my thanks include the British Academy for funding me as a research student and to John Chapman for supporting the grant application, and also for the contribution of funds and tools my thanks also goes to the Northumberland Archaeological Group, The Society of Antiquaries of Newcastle upon Tyne, The Archaeological Practice, Archaeological Services (University of Durham), the Youth Hostel Association, the University of Durham, the University of Newcastle upon Tyne, and also the Historic Buildings and Monuments Commission for their invaluable contribution of two radiocarbon dates, but more particularly Dave Phillips at the Tarmac quarry for assistance with backfilling. My family also deserves a special thank you for their unstinting encouragement to follow up my love of the past and for sharing in so many of the thrills and spills which have occurred during the course of this work. The last five years of my life have included rather more perturbations than normal and so I extend my thanks to all my corner who, from time to time, helped patch me up for the next round - you know who are you are and most of you are accustomed to a glass in the 'Hotspur'. Finally, I would like to extend my special thanks to all those who have helped and given so much time and effort in many different ways, sometimes over many years, and who together with those mentioned above are responsible for doing something a little bit special in the 'happy valley'. I have included their names in the list below. Any errors, omissions or misquotes are, of course, entirely my own.

Richard Aldous
Laura Allen
Lucy Allott
Iain Atkinson
Louise Barker
Jo Bell
Stan Beckensall
Holly Bennett
Paul Benyams
Nick Best
Alan Biggins
Chris Bond
Colin Burgess
Basil Butcher
Richard Carlton
Lorraine Carr
Jo Catling
Richard Chamberlain
John Chapman
Bob Coxon
Fay Davies
John Davies
Sheila Day
Barbara Esselmont
Ron Farquhar

Peter and Amanda Forrester
Gary Forster
Paul Frodsham
Paul Gething
Jim Gledhill and family
Johhny Godfrey
Iain Hedley
Alice Hiley
Nick Hodgson
Andy Hopkins
Phil Howard
Jaqui Huntley
Jaqui Hutton
Phil Jefferson
Rhodri Jones
Akiko Kino
Chris Lucas
Marcia
Helen McLeavy
Emily Mercer
Dave Milan
Gordon 'The Hawk' Moir
Eric Montgomery
Andy Moores
Emma Olivari

Toby Ouvry
Richard Parke
Robert Payton
Rob Peach
Sandra Robinson
Sandra Rowntree
Alan Rushworth
Kevin Sheehan
Kriss Strutt
Karl Taylor
Richard Tipping
Luke Waddington
Carolyn Ware
Joan Weyman (the late)
Rosie Whitbread
Jim Wigfield
Alan Williams
Jez Wiltshire
Rob Witcher
Phil Wood
Graeme Young

PREFACE

By undertaking my PhD research on the Milfield basin I add myself to a string of people who have cut their academic teeth on this landscape (e.g. Clapperton 1967; Payton 1988). In contrast to these previous studies, concerned with the evolution of the natural environment, this research deals with the post-glacial Stone-Age human inhabitants of the basin and the evolution of land-use, settlement, ideology and the changing nature of people's relationships with the natural world. During my pursuit of these aims a wide range of methodologies and fieldwork projects have been employed. Some of the techniques used were innovative while others drew on standard practices. The net result, I hope, has been a contribution to archaeological knowledge by way of new fieldwork practices, the development of an interpretative scheme for fieldwalking lithic data and the construction of a detailed synthesis for the Milfield basin. The synthesis departs from many previous studies by taking the rare step of focussing a large archaeological landscape study on an area of northern England.

Throughout the three years spent on this research I have attempted to maintain a truly multi-disciplinary stance in order to achieve my aim of a holistic archaeological landscape study. However, this approach has brought with it many unforeseen challenges, including the difficulties associated with reconciling cross-disciplinary theoretical, methodological and interpretative frameworks, and the straddling of the gap between different ways of writing and presenting information. A less tangible, but no less real, difficulty was coping with the different ways of discussing subjects as each discipline has its own preferred language and inherent suite of assumptions. There have, of course, been advantages too. The multi-disciplinary approach has allowed me to maintain a relatively fresh perspective unshackled by the potential narrowness frequently associated with the adoption of single and very specialist lines of enquiry. I have also benefited from the freedom which goes with being an intellectual interloper and this has added plenty of width, I believe, to my cerebral adventure.

This universalist approach to landscapes, and to knowledge in general, mirrors a key aim of this study which has been about bringing things together to make a whole, in this case a synthesis, rather than splitting and reducing into fragmented parts. The over-specialisation abroad in most academic disciplines today, together with the wider context of increasing social fragmentation and divisions across contemporary society, suggests that there is a responsibility to promote togetherness over and above that of difference. The driving force behind this study has, therefore, been the willingness to straddle disciplines in the pursuit of a common goal: that of understanding past human activity in relation to the land which people inhabited.

Chapter 1

View west across the Milfield plain from Doddington Moor

CHAPTER 1. INTRODUCTION

BACKGROUND TO THE MILFIELD BASIN ARCHAEOLOGICAL LANDSCAPE PROJECT

The Milfield Basin Archaeological Landscape Project (MALP) was established during 1993 as a part-time research project. In October 1995 the study was continued as a full-time doctoral research study based in the Department of Archaeology at the University of Durham and of Geography at the University of Newcastle. The principal objective of the study is the re-evaluation of the earlier prehistory (Mesolithic-Neolithic) of the study area in the light of a landscape archaeology approach. Chief among the questions being addressed are the nature and chronology of particular episodes of land-use, settlement, social organisation and ideological transformation. This study aims to build on previous environmental (Borek 1975; Clapperton 1967; 1970; 1971; *et al* 1971; Payton 1980; 1987; 1992; Tipping 1992; 1996; Davies and Turner 1979) and archaeological work (Burgess 1970; 1972; 1980; 1984; Harding 1981; Miket 1981; 1985; 1986; 1987) in the area and provide a framework for an integrated landscape study (Waddington 1995a). The starting point for this approach was the view that the study of early human populations in relation to the wider landscape, and not just specific 'sites', would provide the most appropriate framework for acquiring a representative view of past human behaviour.

The selective nature of site-based approaches means that primary data collection is usually undertaken on the basis of *a priori* assumptions, and the retrieval of archaeological data is structured so as to be confined both in time and space and thus divorced from the context of the wider landscape in which it is situated and intimately related. Moreover, using the site as the spatial unit to structure recovery confines data collection to just a small proportion of the total area exploited by earlier human groups and largely excludes the direct evidence for the interaction between people and their environment (Dunnell and Dancy 1983). These conceptual shortcomings do not make site-based fieldwork invalid, but rather demonstrate the necessity for both site-based and off-site research to be conducted under an overarching conceptual framework of the 'landscape' rather than that of the 'site'. The advantages of a landscape approach over that of the site have been summarised by Zvelebil *et al* (1992, 194-5) as (i) providing a more representative basis for the reconstruction of past human behaviour, (ii) allowing more accurate definition of artefact concentrations which may be representative of what are usually termed 'sites' and (iii) appreciating more fully off-site archaeological and palaeoenvironmental residues. Such a framework supports the view that human activity takes place across the landscape in a more or less continuous fashion, and this is particularly relevant for early human groups engaged in a mobile pattern of existence (Foley 1981) such as the hunter-gatherer, pastoralist and early farming communities which are the subject of this study.

THESIS STRUCTURE

This study has been set out in a conventional style beginning with a discussion of landscape archaeology in Chapter 1 before going on to outline the project design and the general objectives of the research. Chapter 2 considers earlier work conducted in the study area and sets the scene for outlining the specific aims of this study which are partly borne out of the results of previous work. Chapter 3 sets out the methodologies employed within the context of other related landscape studies which have taken place. The results section, Chapter 4, divides into three distinct sections: the first presents the raw data in tabular and map form with an accompanying text discussion which also relates the results to the recording strategies which have been employed; the second part of the chapter consists of an analysis section which is concerned with identifying trends in the data over time and space; the third section discusses and analyses the taphonomic data and sets out a model of inference derived from the data. A case study is provided in Chapter 5 of how this model can be applied to help interpret surface lithic data in the Milfield basin. The study then proceeds in Chapters 5-7 with a period by period discussion of past human activity in the Milfield basin. Each of these synchronic chapters follows a similar format which includes a background section, summary of the period-specific palaeoenvironmental data, period specific analysis and interpretation of the fieldwalking data and consideration of the wider archaeological evidence. The diachronic synthesis and thematic discussions take place in Chapter 8, which pulls the different interpretative aspects of the study together. This section provides an interpretative overview and considers questions such as demography, social structure and the Mesolithic-Neolithic transition while also placing the study in a wider archaeological context. The study closes with Chapter 9 which begins by taking an evaluative stance, discussing areas of difficulty and also the ways in which the study is believed to have contributed to research in archaeological and methodological fields. The next section provides a summary of the key findings of the study before progressing to the final short section which outlines trajectories for future work and research priorities related to the study.

Throughout this study radicarbon dates are given as calibrated dates rounded to the nearest 50 years. All dates used have been calibrated using the 'Oxcal' calibration software (Stuiver and Reimer 1986). A list of all radiocarbon dates together with their laboratory numbers and calibration results at 2 sigma (95.4%) are provided in Appendix 8. A further list of Neolithic radiocarbon dates specific to the Milfield basin is provided in Figure 7.2 (Chapter 7).

LANDSCAPE ARCHAEOLOGY AND THE THEORETICAL CONTEXT

The use of a landscape perspective to study past human behaviour has become widely adopted by archaeologists since the later 1970s (Darvill 1997, 1), though the precedent for such an approach had been established as early as the 1920's (Fox 1922; 1932). The concept of 'landscape' as a framework for studying the past is also employed by historical geographers (Roberts 1996; Wagstaff 1987) and landscape historians (Hoskins 1985; Reed 1997). However, the approaches of the latter two fields of study have often tended to view the landscape as 'object' in that it is usually considered merely a stage upon which human action is played out (Darvill 1997). The development of a distinct 'landscape archaeology' over the past three decades has promoted critique and re-evaluation of landscape studies in terms of both theory (Rossignol 1992; Stafford and Hajic 1992; Tilley 1994; Darvill 1997) and practice (Bintliff and Snodgrass 1988; Tolan-Smith 1997c; Zvelebil *et al* 1992). A key polemic resulting from this debate has been the extent to which landscapes are viewed as an external 'natural' phenomenon to which human behaviour adapts or as being a human construct borne out of the contingencies of social relations (Rossignol 1992). In the former view landscape is considered a theatre for human action which may undergo modification as a result of human intervention. Such geographical-economic approaches are usually concerned with the "reciprocity of relations between human societies and the biome" (Hawke-Smith 1979, 4) and are what Darvill has termed "landscape as subject" (Darvill 1997, 2). In the latter view landscape is considered not just an arena for human action but a recursive entity, and thus an *agency*, involved in constituting human action mediated through its engagement with the day-to-day behaviour of individuals and groups (e.g. Barrett 1994; Tilley 1994).

This schism in landscape perspectives in archaeology has resulted in very different types of archaeological fieldwork (contrast for example Zvelebil *et al* 1992 with Bradley 1997) and very different types of archaeological interpretations/models (contrast for example Tolan-Smith 1997b with Tilley 1994). One result of this divide is that semantics have become confused, while another is that the different types of landscape archaeology that are taking place in Britain are often at variance with the landscape archaeology practised in the U.S.A. (Rossignol 1992). For example, the landscape approach espoused primarily by American processualists is concerned with investigating past human behaviour at a landscape scale based on a systemic paradigm of which the chief concerns are the relationships between geomorphological, ecological and taphonomic studies (*ibid*). This latter framework, grounded in a systems approach which builds on Butzer's ecological paradigm (1982) and Foley's off-site model (1981), reduces the historical and social context of human action to a minor role in models of past land-use. In such an approach human action is considered as simply a response to the structure and distribution of the physical landscape and its resources. This view, then, characterises human behaviour as adaptive in a very strict sense. Indeed adaptation in this context has been rigidly defined as being simply, "*conformity* between the organism and its environment" (Rossignol 1992, 5), and by this admission it is clear that the approach ultimately derives from a deterministic argument. This is the more extreme end of a processual view which regards the landscape as an arena rather than an agency for human action.

This division between what are essentially environmentally oriented and socially oriented approaches to landscape studies of the past has polarised these fields of study. However, there are merits and limitations inherent in both approaches. The environmental based approach can be criticised for its often deterministic assumptions, its failure to acknowledge the social context of past human behaviour and its dismissal of the 'landscape' as an active *agent* in bringing about social reproduction in favour of the view of 'landscape' as *arena* only for social reproduction (Barrett *et al* 1991; Barrett 1994; Tilley 1994). The merits of this approach include the value placed on rigorous systematic studies of the morphogenesis of the physical landscape, its temporal development, the effect of geomorphic processes on archaeological residues and the changing sequence of vegetation cover and ecological resources over time. Such studies can, then, provide high quality empirically derived data sets (e.g. Butzer 1974; Bell 1983, Passmore and Macklin 1997) which can be used in subsequent interpretations of past human behaviour. Such studies also allow for comparative studies of artefact, monument, and settlement distributions which can be expressed according to similar quantitative scales. However, the linkage between the data and its subsequent *interpretation* remains problematic in this approach and is usually reliant on some form of middle range theory to reconstruct past human behaviour. Middle range theory is centred around the 'anthropo-archaeological' school of study (Binford and Binford 1968; Binford 1982; 1983) which seeks to identify universal laws of human behaviour under specified conditions. This deterministic approach is conceptually frail as it aggregates human behaviour so that the actions of individuals become irrelevant and, moreover, sees human behaviour as adaptive to a given environment with no appreciation of social context or historical contingency. Consequently, regardless of how detailed and accurate palaeoenvironmental reconstructions of a landscape may be, the interpretative framework that is usually adopted in conjunction with such approaches is often weak (e.g. Higgs and Jarman 1975; Hawke-Smith 1979), unless perhaps, the study is dealing with extremely gross spatio-temporal scales (Bailey and Sheridan 1981). It is this shortcoming of the environmental approach to landscape archaeology which has led many archaeologists, particularly in the U.K., to search for a different interpretative framework (e.g. Bender 1992; 1993; Tilley 1994), and in particular, one that acknowledges landscapes as culturally constituted value-laden entities and not environmentally prescribed 'givens'.

The social, or human, oriented approach to landscape has questioned more critically the ontological status of landscape, and as a result takes as its premise the view that landscape and past human behaviour is contextually constituted according to human experience, attachment, involvement and memory (Hodder 1987a, Barrett 1994, Tilley 1994, Thomas 1996). It is usually thought to be symbolically structured (Hodder 1987b), providing settings for involvement and creation of the meanings (Tilley 1994). This human engagement with landscape and the continual redefinition of meanings imbued in it both by individuals and successive generations means that landscape is considered as an active *agency* in the day-to-day praxis, or routine actions, of human behaviour. Two main lines of thought have come to prominence in this approach, these being the application of a contextual framework, which stresses the historical and social context of human action (Hodder 1986; 1987b), and the phenomenological framework, which emphasises the lived experience of individuals and their engagement with the landscape, structures and material culture in different settings (Barrett 1994; Tilley 1994; Darvill 1997; Thomas 1996). These approaches to landscape are valuable in that they represent a critical attempt to relate more complex understandings of the nature of human behaviour, as received from the work of social scientists and philosophers (particularly Bourdieu 1990; Giddens 1984; Heidegger 1962; 1971), to the use of landscape to understand past human groups.

The principal criticisms of these approaches are that not only do they often dismiss processual studies out of hand (Yoffee and Sherratt 1993), but practitioners usually do not demonstrate satisfactorily how such approaches can be integrated with the rigorous methods and data yielded by the environmental approach (e.g. Barrett 1994; Tilley 1994). The problem of differentiating between what are 'useful' or more 'accurate' interpretations, given the relativist nature of these approaches, together with the frequency of untestable conclusions is another weakness in many post-processual landscape studies. A corollary to this explanatory paralysis, engendered by adopting an extreme relativist position, has been the trend towards writing what has been termed 'archaeology by assertion' (Fleming 1995). In such instances the absence of confidence in any empirical knowledge is substituted by assertions which instead draw legitimacy only from an application of one or another line of philosophical or sociological thought (e.g. Tilley 1993; 1994; Thomas 1996). A further shortcoming includes the failure to flag the different evidential value of different evidence, some of which is usually more subjective, or indeed speculative, than others, and this has come under justified criticism (e.g. Fleming 1995). As Fleming notes, "it is important .... to be clear how the argument intersects with the data. Assertion, though unavoidable at times, is not a substitute for argument" (Fleming 1995, 1041). The consequence of this is that such studies are often relegated to the domain of 'a good idea' or an 'interesting concept' which come and go with fashionable thinking in the discipline. Although relativists would take the view that that is what all archaeological texts are anyway - a product of the social context at the time of their production - it fails to address the fundamental reality that some accounts of the past are more meaningful, accurate and less tendentious than others, and that some interpretations can, to some extent, be empirically tested or at least receive support through convergence of several different types of data or interpretations (Dark 1995).

The problem here, it would seem, is that in some cases philosophical and conceptual arguments have been followed through to their extreme conclusions to the point where they have lost sight of the critical part factors such as the spatial distribution and seasonal availability of resources, famine, warfare, invasion, natural catastrophe, population pressure, and so on, can have on people's lives. The primacy of the social above all else in all interpretations, at all periods, and all spatial and temporal scales is, in this way, as naive as giving primacy to the environment in all interpretations. The need, then, is to reconcile the tendencies of such 'environmental determinism' and 'social determinism' by adopting a less rigid notion of what motivates human action both in the *longue durée* and the shorter term.

The challenge, it seems, which faces landscape archaeology is in the development of framework/s where theory and practice complement each other and where systematically collected empirical data and interpretative frameworks, such as those emerging under the umbrella of 'cognitive' archaeology, can be integrated. As so much archaeological data is structured in respect to the landscape in which it was deployed, such as rock art, burial cairns, cursuses, avenues and so on, it is through the study of such features that the 'environmental' and 'social' approaches to landscape studies can be brought together. As Bradley has recently remarked with reference to prehistoric rock art, "In learning how to study it [rock art] we must reconsider the very foundations of landscape archaeology" (Bradley 1997, 216).

Areas of convergence between processual and post-processual scholars have begun to emerge. These can be seen, for instance, in the recognition that relationships between human groups and their landscape are historically as well as topographically situated (Tolan-Smith 1997a, 6; Tilley 1994), the importance of the ideological realm, or the *Annaliste 'mentalités'*, in explanations of social change (e.g. Hodder 1985; 1987b; Bintliff 1991a respectively) and the adoption by a wide spectrum of archaeologists of phenomenological frameworks for analysing Neolithic 'ritual landscapes' (e.g. Tilley 1994; Darvill 1997; Topping

1997b). Similarly, the inclusion by post-processual archaeologists of testable predictions within their landscape-based interpretations of British rock art (e.g. Waddington 1996c; 1998a; Bradley 1997) also demonstrates a willingness to adopt a more inclusive landscape approach. Thomas (1996) has recently acknowledged the need to keep tacking between interpretation (sprung from a phenomenological perspective) and the empirical data with which it seeks to interpret. Again, this is an admission of the need to keep theoretical interpretation explicitly linked to the data it seeks to interpret. Such developments are crucial if landscape archaeology is to progress as a coherent field of study. Moreover, it is in such a conceptual milieu that truly integrated landscape studies will develop which encourage both systematic and rigorous collection of environmental and archaeological data with sophisticated and critical interpretative frameworks that address more fully the complexity of the human lived world. It is in the spirit of a more consensus-based middle ground approach that this project has been undertaken. This is not to deny the value of continued plurality in approaches to landscape archaeology, and of course the necessity of continued polemic, but rather to promote an inclusive framework which facilitates integration of different types of data and different types of interpretative frames without entrenchment in one or other of the extreme positions, be it the scientific 'environmental' approach or the humanist 'social' approach.

APPROACH OF THIS STUDY

The theoretical stance from which the approach of this study stems lies partly in the use of a contextual framework as proposed by Hodder (1986; 1987b) and partly in the systemic paradigm proposed by Butzer (1982), which recognises the importance of understanding the taphonomic biases inherent in the formation of the archaeological record. The application of contextual approaches to landscape by different practitioners have emerged in recent works by Waddington (1996), Bradley (1997), and Darvill (1997). Darvill advocates 'time-space-action' models in which consideration is given to the temporal context, the spatial context and the social context of human action and the interconnections between the social constitution of those contexts and their recursive relationship with landscape. Cross-cultural links between space, place, landscape and social action are thought to be evident in the linkage between cosmologies and structure in the archaeological record as maintained by Hodder (1987) and in the recognition of 'nesting' in the categorization of space (Darvill 1997, 7). The latter term is used to refer to the way in which the structuring of space can apply simultaneously at several different levels, from the layout and decoration of a pot to the distribution of activities across the landscape. The contextualising of rock art in terms of landscape location, environmental setting, contemporary archaeology and its symbolic milieu have been considered during earlier research that contributes to this study (Waddington 1996c; 1998).

This study takes the view that landscapes are ultimately social constructs; however, it also acknowledges that the social construction of landscape is inextricably linked to the distribution of resources across the landscape and the natural topographic setting, that is, landscape as context. In this way the landscape is considered to have a recursive relationship with human landscape construction being at once context for and constitutive of human behaviour. Therefore, it is recognised that there is a need to reconstruct accurately the environmental history of the Milfield basin and its changing patterns of land-use over time using the full battery of palaeoenvironmental methods. However, the study has also sought to interpret past human behaviour with consideration for how the landscape is incorporated within and helps constitute human action through time. By looking at the intersection between human activities, as represented by the archaeological record, and their relationship with natural features, the interaction between people and the landscape can begin to be addressed. Particular emphasis is made throughout this study on the perceived relationship between people and their environment as a way of investigating how this recursive relationship has shaped past human behaviour (e.g. see Chapters 5-8 and references to Goatscrag, Roughting Lynn, the position of the Coupland Enclosure, cup and ring marks and henge monuments).

Spatial Scale

Landscape archaeology differs from other archaeological fields of analysis principally in its scale of analysis (Tolan-Smith 1997a). The broader scale of analysis of landscape archaeology has implications for both the spatial and temporal scales of such studies (*ibid*). The choice of the spatial and temporal scales adopted by this study are discussed below.

The study area was defined primarily on the basis of a 'topographical' approach (see Tolan-Smith 1997a, 2) whereby the area was defined according to significant natural features (Figure 1.1). The Milfield basin was selected as the spatial unit of analysis as it fulfilled both conceptual and practical requirements. First, this basin forms a geographically discrete area being physically demarcated by prominent natural features. The encircling hills of the Cheviots to the south and west and the sandstone escarpment to the north and east rise abruptly from the plain to form a massive natural amphitheatre. The plain itself forms the focus for this topographically contained area boasting not only the confluence of the Till and Glen but also the most fertile land in north Northumberland, the longest hours of sunlight and lowest annual rainfall (Payton 1980). Because this landscape is physically discrete it provides a unit of analysis at a sub-regional scale which is both a physically defined entity and a natural focus for the wider region.

Secondly, the defined nature of this landscape together with its diverse geomorphic character, the uneven distribution of ecological resources, and the differential land-use potential across the basin, mean that this landscape contains a wide range of environments sufficient to support the annual requirements of both mobile, semi-mobile and sedentary communities. As such it fulfils the requirements of 'autarkic' communities (Tolan-Smith 1997a, 2). It is satisfying this combination of criteria which lends support to the choice of this area as a unit of study. As Tolan-Smith has recently stated, "It is fundamental to landscape archaeology that the landscapes studied are defined in terms that are likely to have

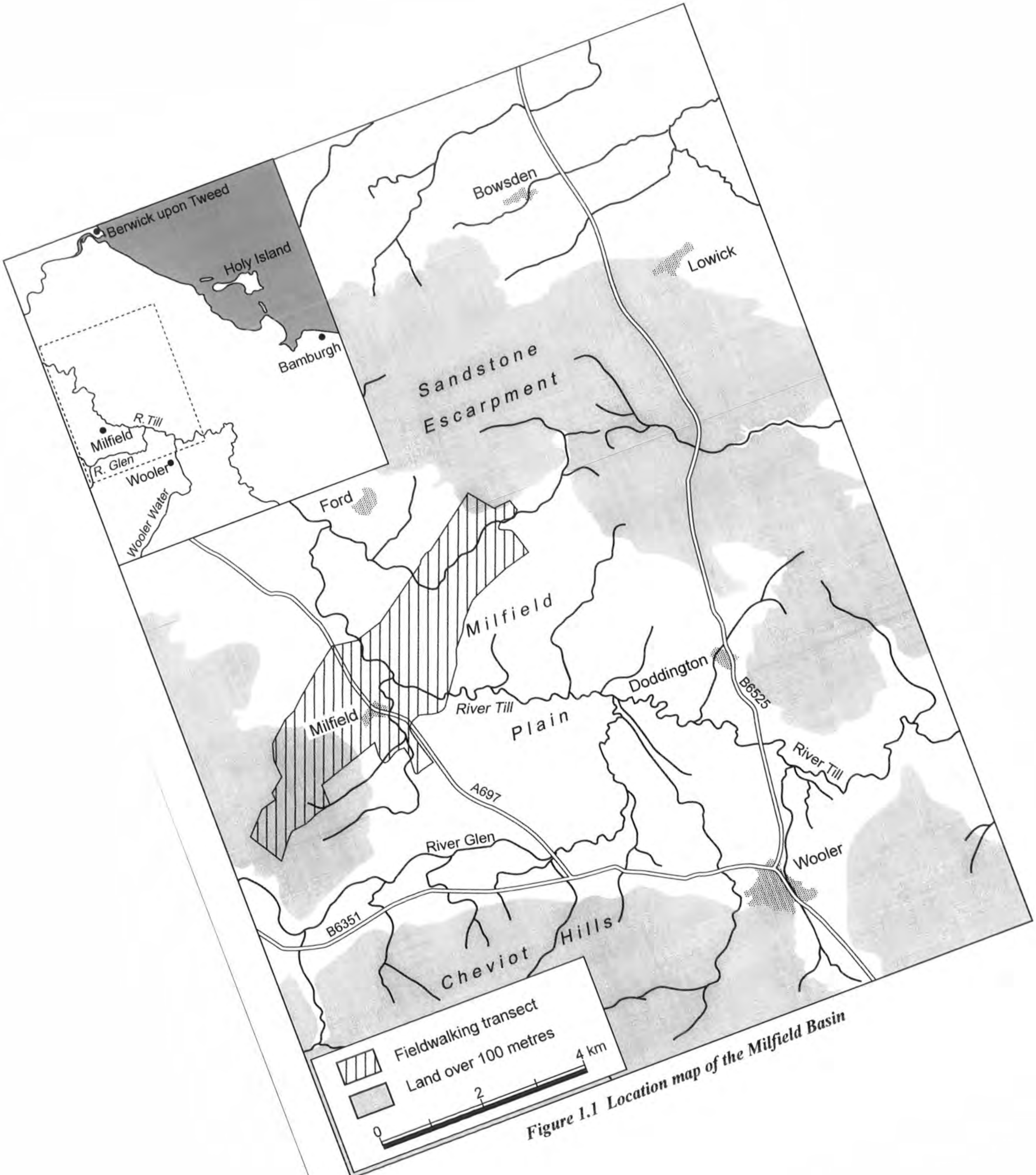


Figure 1.1 Location map of the Milfield Basin

meaning to the communities for whom the landscape was the theatre" (Tolan-Smith 1997a, 2). Landscapes have been defined as, "essentially land areas where these ecological factors ......are unevenly distributed" (Stafford and Hajic 1992, 138), though such ecological variability will have "differential effects on organisms at different scales". As the Milfield Basin contains the full range of environments which can be encountered in north Northumberland, with the exception of the coastal plain, it is maintained that this heterogeneous area conforms to a 'landscape', not only on the basis of Stafford and Hajic's definition but also when applied to the particularities of the ecological diversity encountered in this part of north Northumberland.

Thirdly, the cultural record for the Milfield Basin indicates that human communities have long conceptualised this area as a distinct landscape forming a focus for the wider region. Having the largest concentration of henge monuments between North Yorkshire and the Lothians, the Milfield plain was evidently marked out as special by Late Neolithic groups (Figure 1.2). The largest Iron Age-Romano-British hillfort and settlement in Northumberland is located on Yeavering Bell in the south part of the basin (Figure 1.2). This political centre was succeeded by the establishment of the Anglian palatial centre at nearby Old Yeavering, and later in the 9th century, the Anglian centre of the Bernicians was moved to the centre of the plain at Maelmin (modern Milfield) (Figure 1.2). It was only with the establishment of the 'English' nation that the importance of the Milfield basin as a heartland of ancient Northumbria was eclipsed. However, it remained regionally important with the building of impressive castles at Ford and Etal (Figure 1.2). Indeed the modern settlement pattern of north Northumberland shows the town of Wooler, located at the south end of the basin, to be the largest town between Alnwick and Berwick and the market and administrative centre for the surrounding landscape. Although not direct evidence, this historically attested notion of the Milfield basin as a regionally distinct place and human focus provides grounds for assuming that earlier human groups may have also conceptualised and exploited this area as a distinct 'landscape' entity. It is interesting to note that the Milfield basin as a discrete area does have a long-

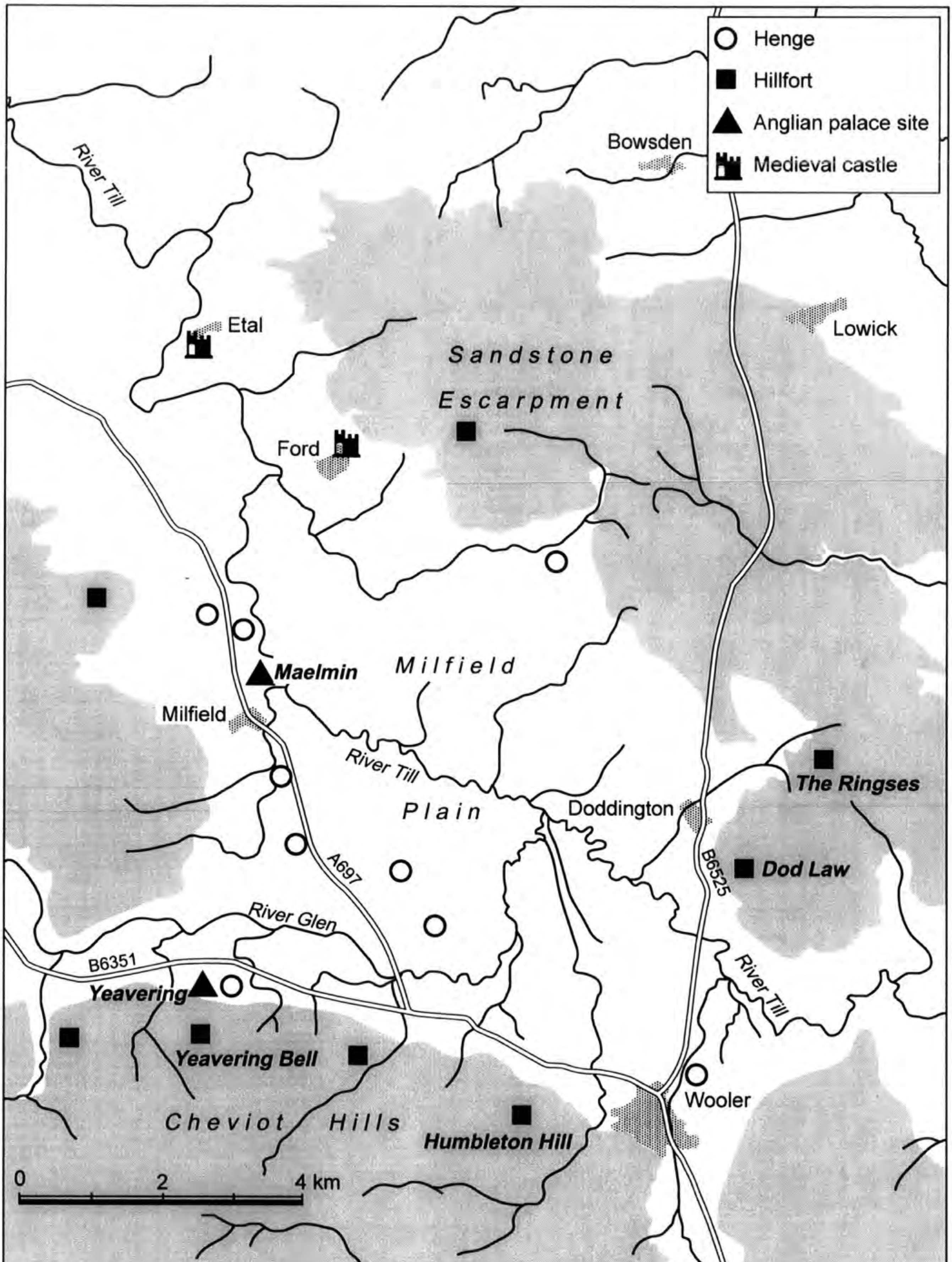


Figure 1.2 Historic centres of the Milfield Basin

standing generic name, 'Glendale', which is used by residents of the region. This name perhaps fossilizes the importance of the Yeavering area at the mouth of the Glen Valley as the historical focus of the basin with which people identified, rather than Milfield which lies at the geographic centre of the basin.

Thus, by selecting the Milfield basin on the basis of it being geographically discrete, the diversity of its internal ecological resources and its historically attested importance as a culturally distinct place, the limitations of using alternatives, such as the Ordnance Survey grid, to define a study region or 'landscape' is overcome. Such approaches have been successfully adopted in other geographically bounded areas such as Orkney (Fraser 1983), Hvar (Gaffney and Stançic 1991) and Weardale (Young 1987).

Chronological Scale

Like space, concepts of time are scale dependent, and as such this remains a problematic issue. Although discussion of the concept of time has received relatively scant attention in archaeological debate, important contributions by Bailey (1981; 1983; 1987), Fletcher (1977) and Thomas (1996) have helped clarify problem areas. Bailey contends that time has two aspects; one as objective process and the other as subjective representation (1987). With regard to subjective representation, as with the structuring of the spatial landscape, time can be structured to reflect a symbolic ordering sometimes tied to cosmological patterns (Darvill 1997). Thomas has also made the important point that time is embedded in social life and, therefore, in the creation and maintenance of identity (Thomas 1996, 53).

The emerging consensus among processual (e.g. Tolan-Smith 1997a) and post-processual archaeologists (e.g. Tilley 1994) of the importance of the historical context in the understanding of landscape evolution strengthens the argument for a diachronic approach in landscape studies. Tolan-Smith (1997, 6) has recently noted that "each phase of landscape development may be partly conditioned by, and contingent upon, what went before", while Tilley (1994, 27) states that, "their pasts as much as their spaces are crucially constitutive of their presents." In pursuit of such a diachronic appreciation of the development both of landscapes and human communities this study presents a diachronic interpretative synthesis in Chapter 8.

As the present archaeological record for the Milfield basin is for the most part temporally 'coarse-grained', and the ultimate objective of this study is a diachronic landscape study, it is the concern with trends evident during longer time scales that has predominantly driven the chronological resolution of this study. The 'domestic time-scale', measurable in terms of generations (Tolan-Smith 1997a, 7) has, therefore, been largely ignored in favour of the *longue durée* (Braudel 1989; Hodder 1987c; Bintliff 1991b; Knapp 1992), although, where appropriate, evidence of short term 'événements'(Bintliff 1991b, 6) will be considered in relation to change over time (as advocated by Febvre 1973). Although this means subjective decisions must be made with regard to the definition of the 'periods' under study this is not necessarily as problematic as it may seem (Tolan-Smith 1997a). As landscape evolution and patterns of human behaviour do not proceed at a constant rate, but rather, it is suggested, alternate between long periods of stability and rapid episodes of change (*ibid*), such distinctions between phases of landscape exploitation can be used to establish a temporal framework. On the basis of the broad outline of landscape development known from previous archaeological research in the British Isles (Evans 1975; Simmons and Tooley 1981), together with earlier work in the Milfield basin (Harding 1981; Miket 1981; 1985; 1987), the temporal framework adopted for this study has been divided into consideration of the Late Mesolithic, Neolithic Transition/Early Neolithic and Late Neolithic.

It has been argued that "the nature of social cause and effect operates differently at different scales of place and time" (Fletcher 1977, 53). The implication of this argument is that different "time-scales bring into focus different features of behaviour, requiring different sorts of explanatory principles" (Bailey 1981, 103). Indeed what "appears to be a cause at one time-scale may turn out to be an effect at another time-scale" (*ibid*, 107). It is not surprising that archaeologists concerned with the longer term have tended to favour environmental approaches while those concerned with shorter time-scales have tended to favour social approaches; hence the popularity of ecological approaches to the Palaeolithic and Mesolithic and of social and cognitive approaches to the Neolithic and Bronze Age (*ibid*, 112).

The approach adopted here will include both environmental and social perspectives based on the underlying assumption that although people's use and conception of the landscape is socially and historically constructed, a crucial input to that conception, particularly for earlier prehistoric non-literate societies, is the perceived relationship with the physical landscape, the spatial distribution of its resources and its seasonal rhythm of availability. This is not a veiled disguise for introducing environmental determinism, but rather, a frank statement of why detailed consideration of the environmental record is essential in developing a coherent understanding of the social context of landscape. The two are interlinked and the study of either in isolation will only allow a partial view of early human groups in the landscape.

RESEARCH DESIGN

The key objective of this study is the diachronic reconstruction of the early settlement of the Milfield Basin from the Mesolithic through to the end of the Neolithic. This study has, therefore, been designed around (1) the acquisition of systematically collected new data, particularly off-site data, and (2) the analysis and subsequent interpretation of that and existing data to formulate an interpretative synthesis. The fieldwork, data analysis and interpretation did not always take place in neat empirical steps; instead, the continual recursive shuttle between data and ideas, ideas and data, between deductive and inductive thought, led to new questions and re-evaluation throughout.

The acquisition of archaeological off-site data was centred around a large-scale fieldwalking exercise supported by a combination of test-pitting, morphometric mapping and sediment coring. To sample the different ecological and geomorphic zones of the basin a 7km study transect was defined which extended from the interfluve on the Cheviot Hills on the west side of the basin across the valley and up to the interfluve of the sandstone escarpment on the east side of the basin. The transect varied between 1km and 2km in width and sampled the full range of environments found across the basin (see below, Figures 3.1 and 4.1). Given the suitability of GIS for articulating landscape data (Zvelebil *et al* 1992), it was decided to structure the fieldwork so that all the results could be incorporated into a GIS environment.

This fieldwork has attempted a new way of recording fieldwalking data. The transect was fieldwalked and each artefact which was recovered was recorded as a point find using a total station. The transect was mapped in terms of geomorphic slope type (morphometric map), which allowed every lithic find to be positioned in a morphometric polygon. In addition, every type of geomorphic slope type (morphometric unit) was sampled by test-pitting to allow the geomorphic processes at work on lithics within each type of geomorphic unit to be assessed. The test-pitting also served the further purpose of relating the pattern of surface lithic distributions with sub-surface lithic distributions. Allied to this study, geomorphological work as part of the 'Milfield Basin Resource Management Study' (for English Heritage) was undertaken on the alluvial valley floor and included geomorphic mapping, systematic sediment coring and recording of river sections. This work involved assessing the depth, and where possible the age, of colluvial and alluvial deposits and the potential for archaeological remains within these sediments. The aim of this associated environmental work was to provide the information needed to gain an understanding of the taphonomic processes which have affected lithic scatters as well as to enable furture reconstructions of the Milfield environment during different periods of prehistory.

GISs are powerful tools for storing and analysing cultural and environmental data which have both spatial and descriptive attributes (Locke and Stançic 1995). The analytical capabilities allow for interrogation of results both in the search for patterning in the data and to answer specific queries (*ibid*). The value of this analytical framework lies not in its provision of 'objective interpretations' but rather in its ability to (i) test and/or develop existing models and (ii) perform exploratory data analysis. That is, rather than providing answers to questions *per se* it provides a powerful tool for searching for patterns or anomalies in the data by considering a large range of different variables which can then be used to formulate pertinent questions.

In addition to the fieldwalking programme, this landscape study has adopted a repertoire of other analytical techniques which provide further off-site and on-site data. A programme of geomorphic mapping of the whole of the valley floor and selective sediment coring and dating of Holocene alluvial deposits has been undertaken (Passmore and Waddington forthcoming). Pollen analyses carried out by Tipping (1992; 1996) in the Cheviots and parts of the valley floor have provided a partial pollen record for the basin and its upland border to the west. To provide a more complete picture of prehistoric vegetation change in the basin, the study of pollen cores from the hitherto neglected sandstone fells to the east and parts of the valley floor is being undertaken by P. Palmer-Moss as a PhD thesis. This is providing the necessary palynological data to reconstruct past land-use across the basin as well as addressing specific questions, such as the contentious issue of the environmental setting of the cup and ring marked rocks which are exclusive to the sandstone uplands (Waddington 1996c; 1998; Bradley 1997). However, as this associated PhD research is still in its early stages the palaeoenvironmental data discussed in this study relies on previously published data and analogy with adjacent studies, such as that carried out by Moores in Redesdale (Moores *et al* in press).

Excavation on the Coupland enclosure and associated droveway has also been undertaken (Waddington 1996b; 1997). This included an associated programme of geophysical survey and phosphate analysis (Mercer 1997). The Coupland enclosure, previously thought to be a typical class II henge monument (Atkinson 1950), and the associated linear feature previously thought to be an 'avenue' (Harding 1981), have been argued as both being different sorts of monuments, now thought to be concerned with stock-keeping strategies and dating to an earlier period (Waddington 1997a; 1998; Mercer 1997). This monument complex is crucial to the understanding of the land-use system of the basin by the Early Neolithic communities resident in the basin. This site-based work has helped to clarify the chronological sequence of the 'ritual complex' and the testing of interpretations regarding its roles and function/s (see below, Chapter 6).

GENERAL OBJECTIVES

The general objectives of the project can be summarised as:

(1) devising an integrated fieldwork strategy for collecting off-site archaeological data which can be understood in relation to the exploitation of different environmental zones in the basin as well as in relation to the geomorphic processes which have influenced the patterning of the archaeological record.

(2) the integration of environmental and archaeological data to produce a diachronic synthesis of land-use exploitation and past human behaviour from the Mesolithic to the end of the Neolithic.

(3) developing on from this, attempting to explain and interpret such patterns in relation to recent contextual, cognitive and phenomenological archaeological frameworks (e.g. Hodder 1987a; Tilley 1994; Thomas 1996).

(4) critically assessing the value of; (a) the interpretations, with regard to the extent to which they can be tested by the fieldwork data, (b) the integrated fieldwalking programme that was devised for this study as a method of conducting

landscape scale surveys, and (c) the contribution of this project in the light of wider archaeological research (see below, Chapter 9).

Chapter 2

View west across the river Till towards the Cheviots

CHAPTER 2 PREVIOUS RESEARCH AND SPECIFIC PROJECT AIMS

INTRODUCTION TO THE STUDY AREA

The Milfield basin study area is located in north Northumberland and is centred around the low-lying Milfield plain where the two main local rivers, the Glen and the Till, meet (see above, Figure 1.1). However, the Milfield basin does not just include the Milfield plain as some previous authors implicitly suggest (Miket 1981; Harding 1981), but encompasses the immediate surrounding catchment which includes the fringes of the north-east Cheviot massif and the Fellsandstone escarpment to the east. The gaps through this high ground which give access into the plain at Horton, Kirknewton, Pallinsburn and Castle Heaton mark the outer limits of the study area.

The Milfield basin comprises five distinct environmental zones; (1) the north-east range of the Cheviot massif to the south and west, (2) the Fellsandstone escarpments skirting the plain to the north and east, (3) an expanse of fluvio-glacial sand and gravel terraces extending across large areas of the plain, (4) an alluvial valley floor in the centre of the plain inset below the sand and gravel terraces, and (5) a band of discontinuous boulder clay slopes situated between the gravel terraces and the surrounding uplands. The main rivers are the Till, which flows from south-east to north-west, and the Glen which flows from west to east. Both rivers meander extensively and the Till, in particular, is prone to severe winter and spring flooding (Gibson 1986, 93; Archer 1992). The basin narrows at its northern end near Castle Heaton before opening out into the Tweed valley where the Till joins the Tweed at Twizel.

The physical geography of the basin is conditioned to a large extent by its glacial inheritance. The high Cheviot hills appear to have had their own ice-caps during the last glacial (Clapperton 1970) and the steep sided glacial valleys feeding into the Milfield plain from the south and west are testament to this. During the early post-glacial a vast lake occupied what is now the alluvial flood plain in the centre of the Milfield plain (Clapperton 1967; 1971). 'Lake Ewart', as this lake has been called (Butler 1907), would have contained several small islands at its northern end, and what are now the raised gravel terraces would have formed the early shoreline (Butler 1907). However, during the early Holocene this lake drained away when the sandstone escarpment was breached at Etal gorge and the rivers Till and Glen became established on their present axes (Clapperton 1967).

THE ARCHAEOLOGICAL LEGACY

The Milfield basin has long been recognised for its rich and diverse archaeological remains. Apart from early casual discoveries, such as the two Ewart Park swords found by Sir Horace St.Paul during 1814 (Miket 1987, 17), the earliest documented research into the antiquities of the area was that undertaken during the 1820s by David Smith, land commissioner for the then Duke of Northumberland (*ibid,* 18). His work included surface examination and the planning of monuments in the vicinity of Horton and Weetwood. By the second half of the 19th century, the excavation of cairns and the recording of cup and ring marks was also well under way (Tate 1865; Simpson 1865; MacLaughlan 1867; Greenwell 1868; Greenwell 1877). However, an important boost for archaeology in the area was the appointment by the 4th Duke of Northumberland of the highly experienced field surveyor Henry MacLaughlan to record and survey local antiquities (MacLaughlan 1864; 1867; 1922; Charlton and Day 1984).

The first investigative excavations to take place were Tate's 1858 excavations at Threestoneburn, Yeavering Bell and nearby cairns (1863) and Greenwell's 1858 excavations on two barrows at Ford (Greenwell 1863). Greenwell returned to the area in 1863 and 1865 to investigate other burial mounds on Ford Common, Etal Moor, Weetwood Moor and Doddington Moor (Greenwell 1868). However, investigative work on the archaeology of the Milfield basin went into abeyance after the 1860s and did not resume until the 1930s when the investigation of cairns

(Short 1931; Craw 1932), and the Duddo Stone Circle (Craw 1935) as well as a re-examination of Greenwell's Neolithic pottery from Broomridge (Newbigin 1935) took place.

By the late 1940s the Hoggs' systematic landscape study of Doddington and Horton Moors was published (1947) which set a new standard in the recording and interpretation of earthworks, and by the end of the decade Atkinson had made a contour survey of the Coupland 'henge' site (Atkinson 1950). From the 1940s onwards aerial photography over the region confirmed the status of the Milfield basin as one of the richest archaeological landscapes in the north. Flights by St.Joseph, and later by McCord, during the 1960s and 1970s and by Gates during the 1980s and 1990s, accumulated evidence for a large number of buried remains of different types on the gravel terraces of the valley floor, as well as features on the sandstone escarpment and Cheviot Hills.

The discovery from the air of large rectangular building remains at Old Yeavering during the summer of 1949, coupled with the threat of gravel extraction, prompted the excavations of the Anglian centre and some of the prehistoric remains, including work on the eastern interior of Yeavering Bell hillfort between 1952-62 (Hope-Taylor 1977). Although these excavations were published in an acclaimed monograph, which stands as a landmark in early medieval archaeology, the publication can, however, be criticised for not adequately reporting on the wealth of prehistoric material which was discovered during the excavations. For example, with reference to the presence of Mesolithic stone tools Hope-Taylor (1977, 194-6) remarked that "Struck flakes of flint (and occasionally of chert) occurred as strays in the overburden, some of them unmistakebly Mesolithic; but as there is a lack both of context and of specific forms it would be pointless to illustrate and discuss them here". Similarly, the long sequence of activity on the site represented by Early Neolithic, Later Neolithic and Early Bronze Age pottery is conflated into an appendix which simply describes the pottery with one summarising paragraph at the end. Indeed the need for a more in-depth assessment of the pottery prompted Ferrell's re-assesment of the ceramics (1990). The interpretation of the western ring-ditch as a stone circle (Hope-Taylor 1977, 115) is also open to question given the shallow depths of the holes (18cm below the surface of the subsoil) and the positioning of seven cremations within and immediately next to this feature. It seems more probable that this feature can be interpreted as an Early Bronze Age ring-ditch cremation cemetery. Furthermore, there is little detail given concerning the excavations in the interior of the Yeavering Bell hillfort.

The subsequent fieldwork programmes of Miket (1981; 1985) and Harding (1981) were similarly driven by the need to investigate features identified from aerial photographs by substantive excavation on the ground. The excavations on the important site at Thirlings, which began in 1973, uncovered multiple Neolithic occupations together with an extensive early medieval settlement, though it is only the latter material which has been published (O'Brien and Miket 1991). Subsequently, Miket excavated part of the Ewart 1 pit alignment (1981) and two circular ceremonial monuments at the foot of Whitton Hill (1985), though his excavations at Horsedean Plantation during the summers of 1985-6 are only published in interim form (Miket 1986; 1987).

Harding's excavations on the Neolithic ritual complex during the summers of 1975-78 included excavation of the henges at Milfield North, Milfield South and Yeavering, together with excavations of the Milfield North pit alignment and on the droveway which passed through the Coupland enclosure (Harding 1981). In addition to the Neolithic remains, early Anglian pagan burials were also found by Harding in the henge monuments at Milfield North and Milfield South (Scull and Harding 1990), and Anglian occupation and industrial features were found inside the Yeavering henge (Tinniswood and Harding 1991). In contrast to Miket and Harding, Burgess concentrated his excavations on the higher ground encircling the Milfield plain rather than the gravel terraces of the valley floor. This included excavation of the Mesolithic and Bronze Age remains at Goatscrag (Burgess 1972), the scooped Romano-British and earlier settlement at Hetha Burn (1970), the Bronze Age hut stances and cairns at Houseledge, Black Law (1980) and the Late Bronze Age-Iron Age defended farmstead at Fenton Hill (1984), though the latter two sites have not yet been published in full. Smith's two seasons of excavations on the sandstone escarpment at Dod Law West between 1984 and 1985, investigated the ramparts of the Iron Age hillfort in addition to uncovering some previously unrecorded cup and ring marks just outside the defences (Smith 1990). This revealed a three phase sequence for the defences which may have started as early as 500BC, with the second phase constructed by c.200BC and the third phase multivallation of the defences constructed sometime during the 2nd century BC.

Alongside these research-led excavations several rescue and evaluation projects have been undertaken by professional archaeological units. This has included the excavation of an Early Bronze Age round-house at Lookout Plantation (Monaghan 1994), together with evaluation trenches by Archaeological Services, University of Durham in Milfield village and at Woodbridge Farm adjacent to the disused airfield. An isolated Bronze Age cremation burial in a decorated vessel was found at the Woodbridge Farm site together with an area of probable early medieval rectangular buildings and an area of Roman Iron Age settlement (reports December 1992; June 1993; November 1996). More recently, work by Geoquest outside the Maxway factory on the old airfield site has uncovered a spread of ard marks with clear evidence of ploughing which has been radiocarbon dated to the medieval period (Geoquest pers. comm.).

Non-excavation work which has been undertaken includes intensive fieldwalking around the Thirlings site by Joan Weyman, which took place alongside Miket's excavations (unpublished report, Museum of Antiquities, Newcastle), surveys of the surrounding moorlands for cup and ring marks (Beckensall 1983; 1991; 1995; 1996), which also included two small excavations of cairns at Fowberry and Weetwood Moor (Beckensall 1983), the survey of Doddington and Horton Moors by Maddison and Sellars (1990), and topographic surveys of several hillforts and enclosures by Jobey (1965). An important programme of survey work, which paid particular attention to remains of prehistoric agriculture and their stratigraphic associations, was undertaken by Topping in the College Valley (1981) and near

Kirknewton (1983), together with detailed topographic surveys of Hethpool Stone Circle (1981b) and Black Hagg hillfort (1991). These surveys were able to reveal a relative chronology for some of the field systems on the basis of their stratigraphical associations, including a strong case for Early Bronze Age, and possibly Neolithic, agricultural remains (Topping 1981; 1983). This has been supported by recent excavations on cultivation terraces on Ingram Hill, 12km to the south, which have yielded a single radiocarbon date of 3240 +/-70 bc (A.S.U.D. 1997) from soil immediately below the stone facing of a cultivation terrace.

Specialist analyses of archaeological data from the Milfield basin include Gibson's work on pottery which included experimental bonfire firings at Black Law (Gibson 1981), while diatom analysis of natural clays and Neolithic pottery allowed him to conclude that Neolithic pottery was being made from local clay sources near the river Till (Gibson 1983; 1986). Ferrell's reassessment of the prehistoric pottery from Hope-Taylor's Yeavering excavations confirmed that multiple Neolithic and Bronze Age occupations took place at the site as well as establishing the presence of Grimston Ware, Peterborough Ware, Grooved Ware, Beaker and Cinerary Urns among the assemblage (Ferrell 1990).

PREVIOUS INTERPRETATIVE AND SYNTHETIC STUDIES

There have been markedly few attempts to synthesize the prehistoric archaeological evidence from the Milfield basin, despite the long history of fieldwork. This is, in part, due to factors such as delayed publication, the uneven pace of archaeological and palaeoenvironmental work in the area as well as their lack of integration, and probably most importantly, the continuation of site-based studies which fail to place sites satisfactorily in a broader landscape and historical context. The need for synthetic and critical 'archaeological histories' based on a detailed understanding of the area are vital to the reconstruction of past human behaviour in this landscape. The subsequent debate that such synthesis can create will, through considered critical discourse, serve to benefit understandings of the past while also facilitating the exploration and testing of new ideas and techniques which could shed new insights on to past land-use and society.

It was not until 1984 when Burgess presented his speculative survey of the settlement of Northumberland, based primarily on data from the Milfield basin, that a synthetic account of the prehistory of north Northumberland appeared (Burgess 1984; 1990). This important paper, which drew together environmental and archaeological evidence, documented a 'history' of the area from the Mesolithic through to the end of the Romano-British period. Although some of Burgess' conclusions have attracted much debate and criticism since then (e.g. Jobey 1985; Young and Simmonds 1995), those conclusions have still not been entirely superseded and, in fairness to Burgess, were explicitly speculative at the time. Moreover, as a work of synthesis it brought together a wide range of information and examples which, as well as creating a platform for future studies, served to highlight many of the problem areas which still need to be addressed. Higham's synthesis of northern England (1986) draws heavily on the Milfield basin for its account of the Neolithic, Bronze Age and early medieval periods in the north-east. However, it adds little to the account of the prehistory of the area than is contained in Burgess' paper (1984), and as a broad synthesis jumps from particular to generalized perspectives without considering the importance of regionality which is crucial to understanding northern landscapes and their settlement.

More recent attempts at synthesis or interpretation include the broad survey of northern England by Annable (1987), Miket's unpublished thesis (1987) and interpretative accounts by Bradley (1991; 1993), Richards (1996), and Waddington (1996; 1997).

Annable's three volume work of 1987 was published ten years after her actual survey, which was completed for the most part by 1977 (Burgess 1987, 105), and consequently her catalogue was grossly deficient as it failed to include the vast amount of archaeological fieldwork that was carried out during the late 1970's and early 1980's (e.g. Burgess 1980; 1984; Harding 1981; Miket 1981; 1985), and many of her conclusions were already outdated by the time the work was published (Burgess 1987). Sites were chosen selectively, even on the basis of evidence available from before 1977, for inclusion in this catalogue-style publication. In the case of the Milfield basin this meant a summary of the important Thirlings site was included, albeit in one small paragraph (Annable 1987, 96-7), but no mention was made of the Neolithic remains from Yeavering known at the time from the Hope-Taylor report (1977), or of the significant remains from Meldon Bridge in Teviotdale (Burgess 1976). Clearly, the research for this work was selective even when it was undertaken during the 1970's and as such it fails to provide a coherent regional survey, especially as the significance of certain sites, such as Thirlings for example, was evidently not grasped.

Miket's unpublished work (1987) was the first detailed work which dealt solely with the Milfield basin and attempted to bring together all the archaeological and environmental data then available to provide a descriptive narrative. The main value of this work lies in its utility as a gazetteer, with its documentation of the vast number of archaeological sites and finds known from the basin, and its attempt to put them into a chronological order related to the course of the prehistoric and early medieval periods elsewhere in Britain. Furthermore, as a corpus it also provides several ways into the data as it has a useful inventory listing sites and stray finds by O.S. sheet number while, throughout the text, there are numerous distribution maps and tables which also summarise the location and contextual details of many classes of sites and finds by period. The thesis, however, can be criticised for its lack of analytical work and critical appraisal of the evidence. There is little evaluation of the merits of other interpretations and those made by the author are mostly of a very general nature with little theoretical underpinning and hence the interpretative content of the thesis is both thin and not well substantiated. The result is that it serves as a useful compendium but as an archaeological synthesis it fails to identify and tackle key issues, such as those of process and explanation, and relies on extending interpretations made from southern English and Scottish data sets (e.g. Miket 1987, chapter 3).

Using the Milfield basin as a case-study, Bradley *et al* (1991) proposed a classification of cup and ring marks into 'simple' and 'complex' carvings, from which it was suggested that the complex designs had a positive relationship with areas of productive soils. Superficially this appears to be the case but a critical look at the methodology and underlying interpretations which they attempted to substantiate reveals that this relationship can be contested and that other explanations are possible. Bradley's experiments in locating the position of cup and ring marked outcrops on Doddington Moor and at Millstone Burn attempted to demonstrate that the selection of rock outcrops for the deployment of cup and ring marks was structured by a set of principles associated with topography, including the extent of views available from any given rock exposure (Bradley *et al* 1993). This novel approach to understanding cup and ring marks, though innovative is, however, to some extent flawed as it assumes the landscape was open, an argument which cannot be sustained given the present evidence from pollen diagrams (Waddington 1996; 1998). More recently Bradley has developed interpretive accounts for the Milfield basin concerning the re-use of ritual monuments over time (Bradley 1987a; 1993). This challenge to Hope-Taylor's simplistic model of long and continuous 'ritual continuity' attempts to replace it with one that recognises punctuation in its ritual use and takes account of different conceptions of time including 'ritual time'. These arguments remain important theoretical discussions but the extent to which the archaeological evidence intersects with the proposed interpretation can be called into question on many grounds, not least of which has been the demonstration that the droveway associated with the Coupland enclosure (see Harding 1981, 89-93) is of Neolithic date (Waddington 1997a) and not early medieval as has been argued previously (e.g. Bradley 1987a; 1993; Miket 1987).

A more speculative attempt at interpreting aspects of the Neolithic ritual complex in the Milfield plain is that recently undertaken by Richards (1996). Although a brave attempt to address a problematic issue, that of henges and their relationship with water, Richards' use of the Milfield basin as an example of henge monument architecture to embody a microcosm of landscape perception falls foul of many criticisms. In the case of the Milfield basin case study, these criticisms include the basic inaccuracies upon which his account is built, such as the wrong direction of water flow, the assertion that all the henges lie on knolls overlooking the rivers when the rivers actually remain invisible from every single henge site, and an incorrect understanding of the surrounding topography which the henges are supposed to mimic. However, this is not to say that the general interpretation does not hold some water, as it were, as the idea that henges conflate the cosmogonic order of the surrounding landscape into their design and layout remains appealing, particularly as it appears to work well for the Orkney case-study where this idea has it roots (see Richards 1996). The problem, then, with Richards' account is not so much the general principle, although this remains entirely subjective, but rather in the way it has been applied to the Milfield landscape with only a partial understanding of that landscape and the archaeological remains within it.

One of the greatest shortcomings of many previous studies, with the exception of Burgess' synthesis (1984), has been the failure to integrate the archaeological data with the wealth of environmental data known for the basin. The deglaciation and geomorphology of this region formed the PhD topic of Chalmers Clapperton (Clapperton 1967), who published extensively on the subject (Clapperton 1970; 1971; 1971b). The pedological framework has been established by Payton who embarked on a very detailed analysis of the soils of the basin (again as the subject of his PhD 1988) including the mapping of all soil types in the study area and wide dissemination of his findings (Payton 1980; 1987; 1992). In addition, the vegetational history of this north-eastern Cheviot area has been tackled by piecemeal studies of local pollen sites including Akeld Steads (Borek 1975) and Wooler Water (Clapperton *et al* 1971), together with Din Moss (Hibbert and Switsur 1976), Linton Loch (Mannion 1978), Swindon Hill (Tipping 1996), Sourhope (*ibid*) and Yetholm Loch (*ibid*) in the Bowmont Valley. To complement this work, Tipping has identified and attempted to correlate phases of sediment aggregation on the valley floors of the east Cheviot valleys with clearances in the pollen diagrams (Tipping 1992). The need to relate these high quality environmental and archaeological data sets remains a priority, as even Burgess' work (1984) only considered the then available pollen evidence. Given that human beings live out their physical lives in a spatial terrestrial universe (ie. the 'environment'), and are reliant on feeding and clothing themselves using resources from the land, an understanding of the environments with which they interact is an essential prerequisite of a regional archaeological study.

THE GLACIAL INHERITANCE

The dramatic scenery of the Milfield basin owes its general form to the effects of the last glacial episode which drew to a close c.10,000BP. The steep-sided U-shaped valleys of the Cheviot massif, the smooth rounded tops of the Cheviot hills and the heavily scoured sandstone escarpments are visible reminders of the passage of the ice sheets. Building on the work by Clough and Gunn (1895), Carruthers (1931) and Common (1953) among others, Clapperton (1967; 1970) established that the east Cheviot hills were affected by three different ice masses, including an ice-cap centred on The Cheviot itself. The ending of the Loch Lomond re-advance precipitated a complex pattern of ice-wastage in the east Cheviots which Clapperton (1971) has characterised as a four-stage deglaciation sequence:

1. ice-directed meltwater drainage
2. ice partition and formation of glacial lakes
3. reversal of meltwater drainage
4. final dissolution of the ice.

It is this deglaciation process which provides a key to understanding the development of the physical topography of the Milfield basin, particularly in the early post-glacial period (Clapperton 1971). Characterising the shaping of this landscape constitutes a vital step towards understanding its subsequent exploitation by human groups. However, the special conditions of the early post-glacial period in this area may have had a particularly influential effect on the regimes of early human groups colonising the area.

The principal features of the glacial legacy include:

1. the existence of a series of ice and/or moraine dammed lakes within the basin's catchment at Hedgeley, the Milfield plain and, possibly, one in the vicinity of Kirknewton,
2. the infilling of these lake beds with lacustrine deposits,
3. the formation of a gravel outwash delta spreading out across the Milfield plain from the mouth of the Glen valley, together with its subsequent dissection by meltwater streams,
4. the formation of an extensive tract of ice-contact landforms extending out from the north entrance to the Milfield plain at Etal gorge to the river Tweed beyond,
5. the draining of the lakes and the establishment of the courses of the Till, Glen and Wooler Water, the former debouching from the plain through the newly incised gorge at Etal.

Butler (1907) named the lake which covered the Milfield plain during the early post-glacial 'Lake Ewart' (Figure 2.1), and in his final presidential address to the Berwickshire Naturalist's Club described this post-glacial landscape as if on a prehistoric man's canoe journey across the lake. Clapperton (1967, 229) concluded that the water level of Lake Ewart lay approximately at the 43m contour on the basis that the escarpment dips to a low point of 43m between the Milfield plain and the Haydon Dean which Clapperton (1967), and Butler before him (1907), argued formed the initial outwash channel for the lake. If this was the level of the early lake surface, which there is no reason to doubt on present evidence, then an arc of small islands would have formed near to where Crookham and Ford Westfield now lie (Waddington 1995b). If humans were inhabiting the early post-glacial Milfield landscape then the small islands and the 43m shoreline may contain evidence, in the form of stone artefacts, of human

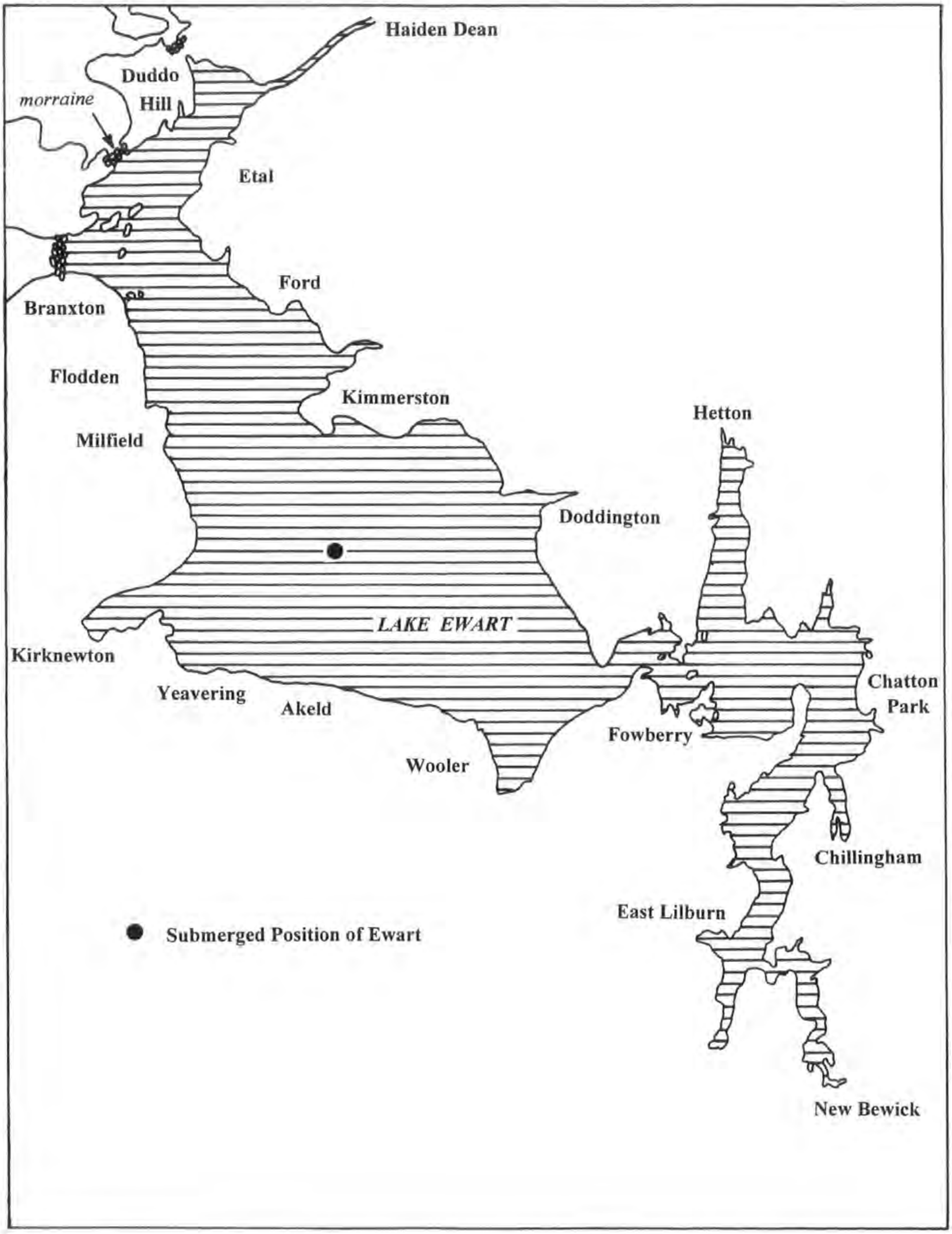


Figure 2.1 Extent of Lake Ewart (after Butler 1907)

activity. The relatively rapid lowering of the lake level to c.38m (Clapperton 1967, 229) would have produced a shoreline at this lower level with several enlarged islands and a gravel delta providing important new land surfaces attractive for human settlement. With the cutting through of Etal gorge the lake level dropped, causing incision by the water courses flowing over the gravel delta surface. This set the scene for the subsequent geomorphology and drainage regime which still persists today, though in modified form.

THE HOLOCENE LANDSCAPE

Principle modifications to the basin's landforms during the ensuing Holocene include:

1. development of the post-glacial alluvial valley floor along the axis of the main rivers with important episodes of stability, aggradation, incision and lateral channel migration, including the secondary reworking and deposition of flood plain deposits,
2. erosion on the valley sides by colluviation, rilling, gullying, and upland stream erosion with subsequent deposition further downslope, together with alluvial fan sedimentation on valley margins,
3. possible wind erosion on the relatively level and stable gravel terraces, though this is a question which is yet to be investigated.

Geology, Geomorphology and Soils

The Milfield basin comprises three distinct topographical zones; (1) the north-east range of the Cheviot massif to the south and west, (2) a central low lying plain which provides the focus of the basin and, (3) the Fellsandstone escarpments skirting the plain to the north and east (Figure 1.1).

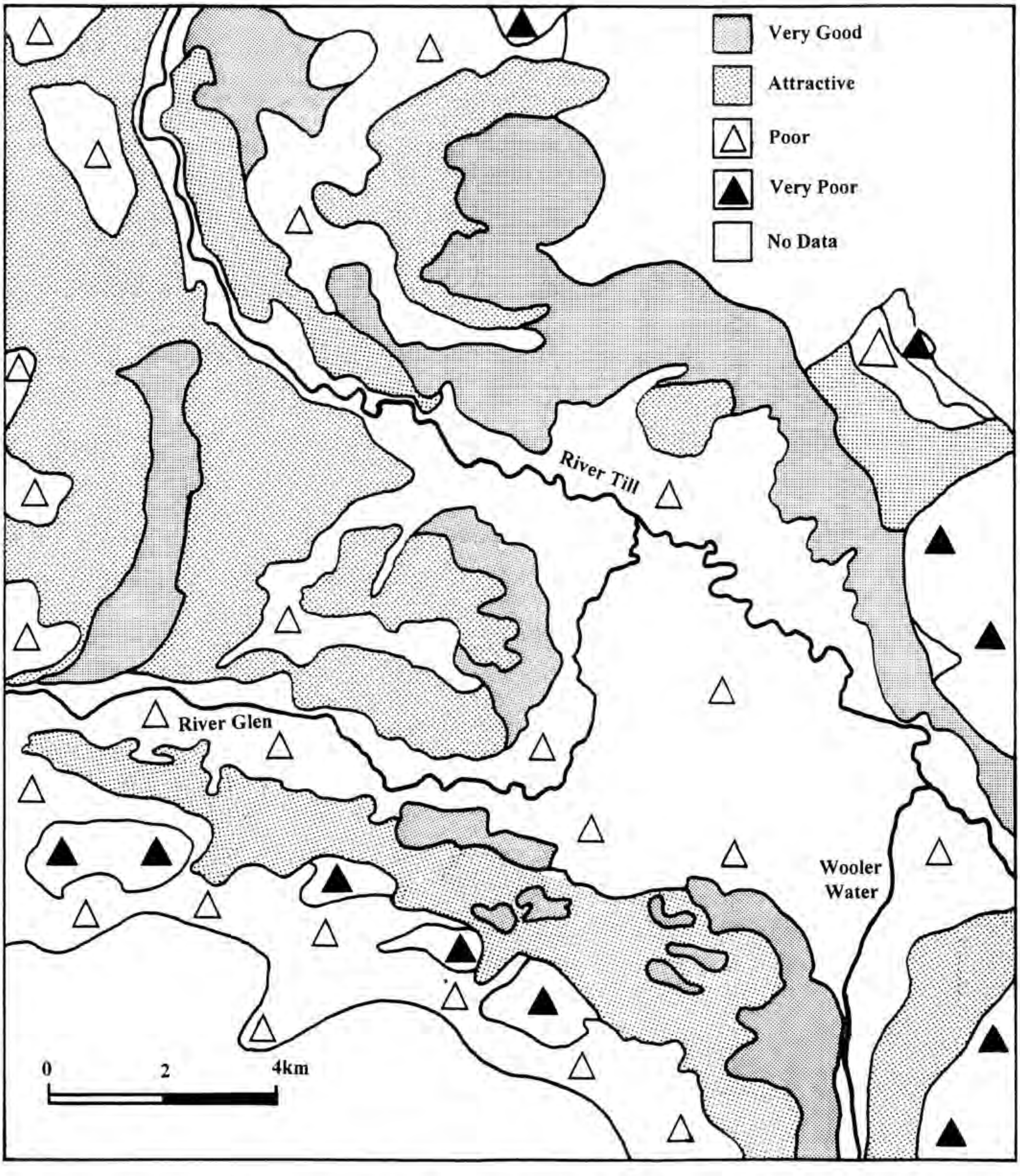


Figure 2.2 Simplified soil map of the Milfield Basin (abstracted from Payton 1988)

(1) The Cheviot hills rise very sharply from the Milfield plain on the south and west sides, their distinctive round and flat topped hills extending over 250 square miles (Clapperton 1967). The valleys are generally deep and steep sided with broad areas of plateau between. This igneous massif is composed of andesite surrounding a central granitic core which forms the highest point: The Cheviot, at 815m OD (Payton 1980). Outcropping bedrock is rare, occurring only occasionally as crags on the valley sides. Thin skeletal and acidic soils with limited agricultural potential are found on the steep slopes, whereas on the gentle slopes and areas of low plateau, deeper free draining typical brown earths overlying andesitic drift occur, which are favourable for agriculture including cereal cultivation (*ibid*). Tracts of high quality brown earths on the low plateau and gentle slopes such as at Whitton Hill, Flodden and Marden are soils well suited to early agriculture (*ibid*). Indeed, most of the soils best suited to agriculture in the Milfield basin are located on the Cheviot fringe (Figure 2.2). Podzols occur at higher altitudes where conditions are cooler and wetter and the leaching is more advanced producing poor nutrient deficient soils (*ibid*).

(2) The Milfield plain contains a complex sedimentary sequence overlying cementstone bedrock. Over 21m of glacio-lacustrine laminated silts and clays were deposited in 'Lake Ewart' over basal lodgement till during the late glacial (Clapperton 1967). Coarse-grained glacio-deltaic sands and gravels form an outwash delta fanning out from the Glen valley deposited during the early post-glacial. These raised free draining terraces provide an attractive location for settlement and early agriculture (Figure 2.3). However, the plain also includes large tracts of heavy alluvial deposits which are less free draining and at risk from perennial flooding (Payton 1980), making them unattractive to early settlement.

There is a wide variety of soil types over the plain which give rise to variation in its agricultural potential, thus mirroring the complex drift deposit parent materials (Payton 1980). The dominant soils of the attractive gravel terraces are varieties of brown earths and brown sands, some with fragipans (very compact layers, though uncemented, in contrast to iron pans) and argillic horizons (*ibid*, 20-21). These

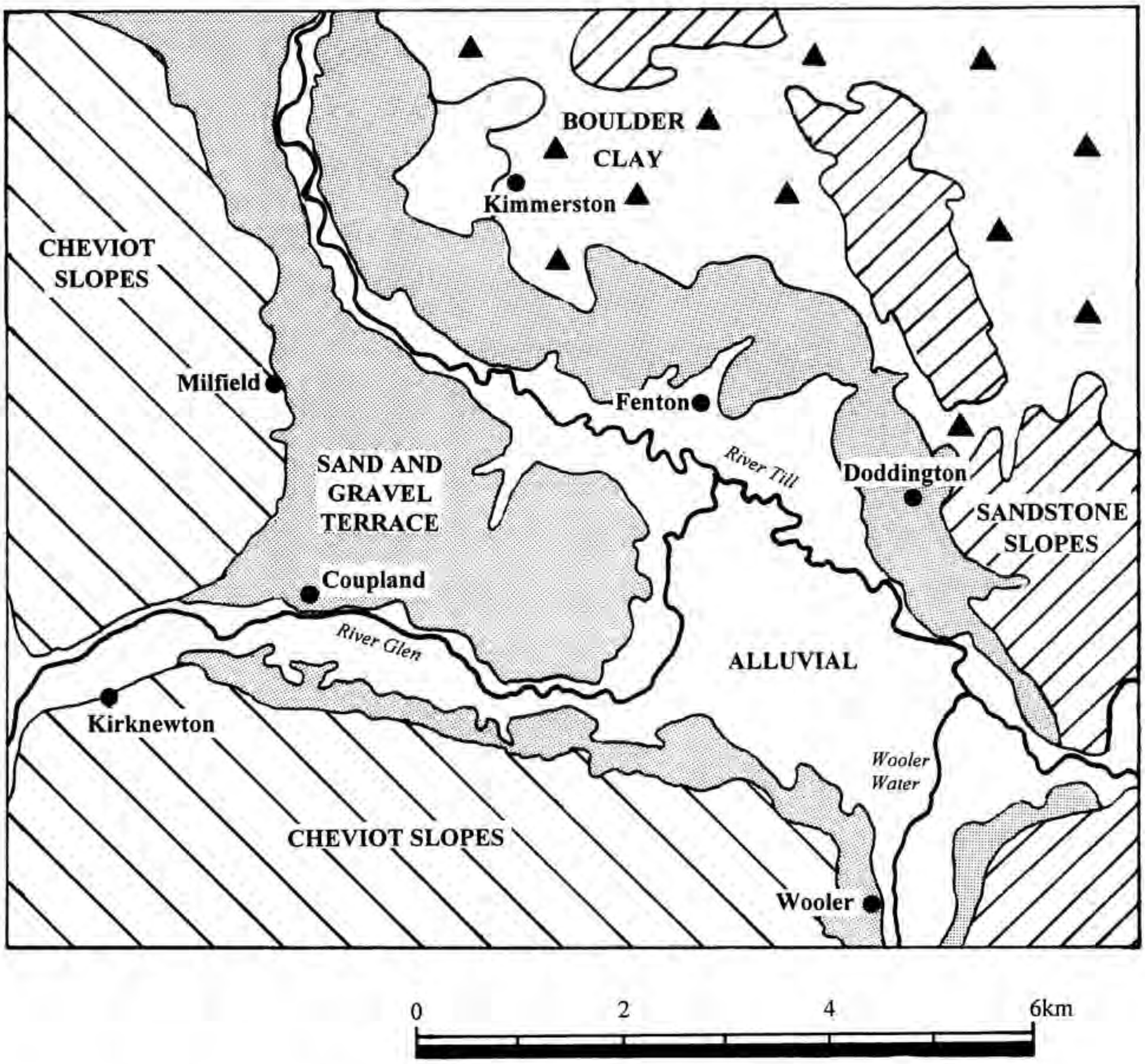


Figure 2.3 Simplified geological map of the Milfield Basin showing the 5 environmental zones

soils on the gravel terraces constitute one of the most attractive areas for early settlement in the Milfield basin. The alluvial and clay-silt soils of the Holocene alluvial valley floor account for over half the soils of the Milfield plain, and although there is considerable variation in the quality of the alluvial soils, properties such as compaction, structural deterioration, poor drainage and inundation by flood waters mean these areas were the areas most unsuited to early agriculture. It is only the massive drainage works, flood protection schemes and mass application of fertilizer which allow some of these soils to be used as arable land today (summarized from Payton 1980).

(3) The Fellsandstone uplands form a sweeping, almost continuous, escarpment to the north and east of the Milfield plain (Figure 1.1). The scarp slopes face west onto the plain with the dip slopes tailing out to the east. The escarpment averages a height of 150m OD, with the highest point at 200m on Dod Law. Glacial scouring has left the scarp slopes more pronounced and outcropping bedrock, horizontal with the ground surface, is common on higher parts of the dip slope. The cup and ring marks in the Milfield basin which occur on outcropping bedrock are all located on these sandstone exposures. The Fellsandstones produce acid soils which are particularly poor in terms of their agricultural potential. Where the sandstone lies at a shallow depth, particularly on the upper slopes and hilltop locations where the cup and ring marks are located, highly acidic podzolic rankers occur (Payton 1980, 32). This land is currently left as open moorland with its vegetation cover dominated by heather and bracken. Glacial till overlies large areas of the dip slope giving rise to the relatively poor and heavy stagnogley soils suitable for grazing but unattractive for early agriculture. A narrow band of thick, sandy, colluvial deposits occur at the base of the scarp slope in a narrow band adjacent to the Milfield plain giving rise to brown sand soils (*ibid*). However, these soils have probably formed since the Neolithic as substantial clearance would need to have taken place in order to create the conditions necessary for such colluviation to occur. During the Early Neolithic, the predominantly acidic soils of the sandstones and the heavy ill-draining clay soils of the boulder clays would have offered the least attractive area for initial agricultural exploitation.

Terrace sequences have been recorded in the north-east Cheviot river valleys by Tipping (1992; 1994) and phases of aggradation have been identified for the periods: (a) 2500-2000 BC, (b) 500 BC-100 AD, and (c) Post 1700 AD (Tipping 1994, 80).

Although this generalized sequence masks uncertainties as to the completeness of the record of alluviation due to the paucity of datable deposits in the stratified fills (Tipping in press). The cause of these aggradation events is a key question that has been addressed (Tipping 1992; 1996) in which an anthropogenic cause has been argued, though recently a more cautious stance has been adopted whereby the inherent deficiencies in dating control has been acknowledged (Tipping in press). The link between phases of upland clearance, subsequent flooding and the deposition of sediment, as evidenced in the valley deposits, has important implications for the dating and intensity of prehistoric clearance in the uplands by human populations. Moreover, the covering of land surfaces by these redeposited sediments means buried horizons likely to contain archaeological and environmental residues from past human occupations lie masked beneath the present surface. Such residues have significant potential for yielding datable off-site environmental data as well as the cultural artefacts of past human groups.

Recent radiocarbon dating of the valley floor peat bed at Akeld Steads has shown that the first phase of alluvial aggradation in this low-lying wetland fringe environment started around 5500BC and continued until 2000-1500BC (Tipping in press). Tipping has tentatively suggested that this earlier alluviation witnessed at Akeld Steads may be a localised phenomenon resulting from human disturbance at the wetland edge starting during the late Mesolithic. This cautious interpretation is advanced on the basis that the overbank sedimentation is localised and, therefore, less likely to be the result of climatic factors which could be expected to provide a catchment-wide signal. However, as Tipping notes, changes in the fluvial system may be expressed differently in different parts of the catchment. Consequently, the absence of catchment-wide sedimentation does not demonstrate that the localised nature of the Akeld Steads alluviation is necessarily the result of anthropogenic disturbance.

To summarise, the low slopes and plateaux of the Cheviots, together with the low gravel terraces of the plain offer, in general, the most attractive areas for early settlement and agriculture. The heavier, wetter soils of the flood plain, only recently drained, probably constituted an area of carr (Payton pers. comm.) where freshwater resources would be expected to proliferate. In contrast, the poorer acidic soils of the sandstone fells provide land better suited to browsing and grazing. All these areas are located within a few kilometres of each other (min.5km, max.10km), providing a wide range of resources over a relatively small area.

Vegetational History

The vegetational evidence for the Cheviot area of the Milfield basin consists of pollen diagrams from Sourhope, Swindon Hill and Yetholm Loch in the Bowmont Valley (Tipping 1996), together with one from the Wooler Water (Clapperton *et al.* 1971), and an undated one from Broad Moss (Davies and Turner 1979) further to the south (Figure 2.4). However, until recently the plain and the sandstone escarpment have not been studied in the same detail. This problem is now being addressed by an associated study by Palmer-Moss which forms part of the wider Milfield Basin Archaeological Landscape Project. The only diagram for the plain prior to the work of Palmer-Moss was that from Akeld Steads (Borek 1975), which has been recently re-dated and analysed by Tipping (in press) and is now being supplemented by the current analysis of cores from Doddington and Thirlings (Dave Passmore pers. comm). The vegetation sequence for the sandstone escarpment has previously been reliant on diagrams from sandstone fells adjacent to the basin, such as that from Camp Hill Moss (Davies and Turner 1979; Tipping 1992). However, the core taken from Ford Moss, as part of this project, has produced a diagram for the sandstones of the basin extending from the post-glacial to the present (Palmer-Moss pers. comm.).

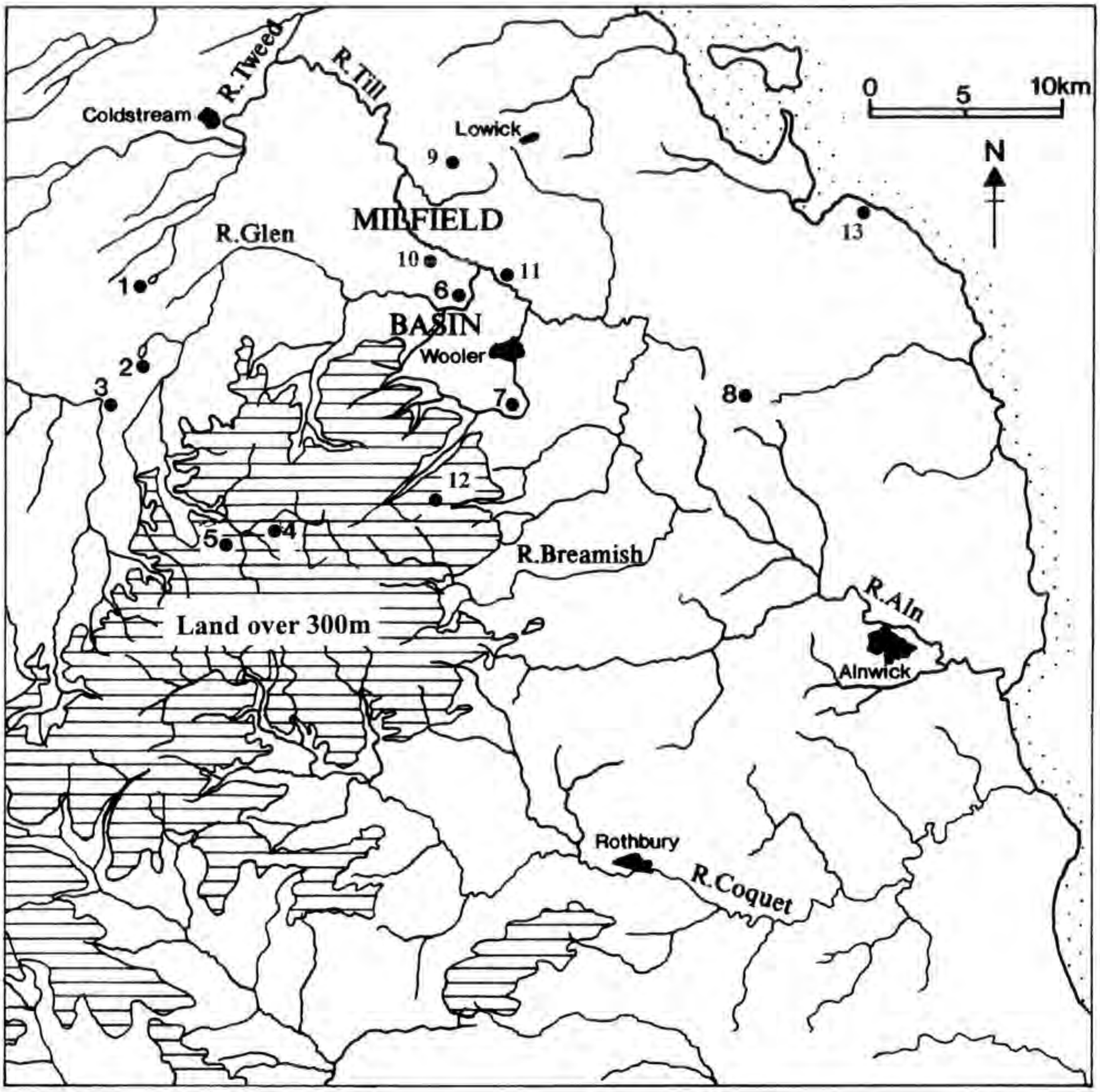
The pollen evidence for the late glacial and Mesolithic vegetation sequence in the basin is relatively understudied compared to later periods, though the sites in the Bowmont Valley provide some evidence and those at Whitlaw Moss, Dod and Bamburgh allow analogy with adjacent areas. The Loch Lomond stadial, represented at sites such as Dod (Innes and Shennan 1991), Din Moss (Hibbert and Switsur 1976) and Whitlaw Mosses (Webb and Moore 1982) indicate predominantly bare-ground communities including *Artemisia, Salix herbacea* and short turfs and occasional birch trees. By the end of the last glacial and the beginning of the Early Holocene c.10,000BC, the pioneer herbaceous late-glacial flora appears to have given way to post-glacial mixed woodland consisting of juniper and, increasingly, birch and hazel (Innes and Shennan 1991; Bartley 1966). Study of the early Mesolithic landscape has received relatively scant attention either by palynologists or archaeologists in this region although Innes and Shennan interpret phases of Mesolithic human disturbance, on the basis of charcoal presence, from the site at Dod to c.7500BC, c.7000BC and c.6000BC (Innes and Shennan 1991, 26). However, the extent to which the presence of charcoal in pollen samples represents autogenic or anthropogenic activity remains problematic (Brown 1997). It has been suggested that the role of natural clearance events, particularly wind throw, has been subordinated in favour of purposive human deforestation to explain clearance episodes in the pollen record of the British Isles (*ibid,* 143). The notion of environmental opportunism, which lies at the heart of Brown's argument, is an important issue which has no doubt been underestimated in past interpretations of pollen diagrams. Consequently the results, particularly from such regional diagrams, need to be handled with caution.

The replacement of the early Holocene tundra vegetation in the Milfield basin by increasingly deciduous taxa including, most notably, oak and elm but also pine, occurred from c.5600BC as indicated by the diagrams from Din Moss (Hibbert and Switsur 1978) and Linton Loch (Mannion 1978), which are situated in the

Bowmont Valley catchment of the basin. The more recent diagrams from the Bowmont Valley only contain evidence from the close of the Mesolithic onwards, though these demonstrate that all the major deciduous forest forming taxa had colonised the Cheviots by c.5000BC (Tipping 1996, 20). However, by c.4500BC increasing openness of both carr and 'dryland' woods particularly in the upper part of the valley, probably for graze and pasture, indicates an intensification of land-use during the latter stages of the Mesolithic (Tipping 1996), which conforms to a pattern previously identified for northern England in general (Simmons and Innes 1987). Tipping recognises these changes as being anthropogenically driven (Tipping 1996, 23), with the presence of *Melampyrum* in the Sourhope diagram suggesting fire as the method of clearance (*ibid*).

The pollen diagram from Wooler Water (Clapperton *et al* 1971) indicated that reed and sedge colonised the valley floor during the earliest Holocene before the colonisation of birch, usually dated to 9500-8750BC (Birks 1989). An alder carr environment formed by the later Mesolithic which is probably coeval with the alder rise noted in the diagram from Akeld Steads (Borek 1975) and recently radiocarbon dated by Tipping (in press) showing this rise to begin at the beginning of the late Mesolithic c.6300BC. The Akeld Steads site is probably a filled river cut-off located on a gravel terrace immediately adjacent to the alluvial flood plain of the river Glen in the heart of the Milfield plain. This location provides a local pollen sequence for the immediate wetland fringe at the interface of the alluvial floodplain and the raised gravel terraces of the valley floor. This sequence shows that from c.8000BC a wood-rich peat formed with willow, sedges and bog myrtle dominated the local environment. By about 6300BC alder percentages increase and an alder carr environment developed on the alluvial valley floor adjacent to the gravel terraces. However, probably the most significant feature of Tipping's re-evaluation has been the dating of the beginning of the first phase of overbank sedimentation to 5500BC (Tipping in press). From this time onwards alder frequencies decline and sediment instability takes place allowing periodic alluviation to continue until around 2000-1500BC when slope stability and possible woodland regeneration takes place. This sequence is important because if this disturbance at the wetland edge is the result of human manipulation, as Tipping cautiously suggests (in press), then it provides a proxy record of human exploitation strategies in this rich ecological zone by the late Mesolithic population.

The presence of Early Neolithic activity in the Milfield basin is attested in most of the dated pollen diagrams now available for this area (Tipping 1992; 1996). The Sourhope diagram contains evidence of Early Neolithic pastoral activity together with a single possible cereal grain dated to 3325BC (Tipping, 1996). The diagram from the Wooler Water also contains evidence for woodland clearance taking place in the fourth millennium BC (*ibid*). At Din Moss cereal type pollen grains are recorded around the period 3900BC (*ibid*). Although Edwards (1985) regards the occurrence of pre-elm decline cereal-type pollen as support for pre-elm decline arable cultivation this view has recently been questioned (Beug 1986; Brown 1997). Evidence for woodland disturbance and cereal cultivation, which included barley and probably wheat, in the period from 2800BC onwards has come from the Swindon Hill diagram (Tipping 1996). The only dated pollen evidence available for the Milfield plain consists of the core from Akeld Steads. Here the presence of the open ground herbs *Artemisia* and *Cruciferae* suggest clearance for crops between 4000 and 3000BC (*ibid*). The only pollen core from the nearby Fellsandstones, the area where cup and ring marks on outcrop bedrock exclusively occur, is that from Camp Hill Moss 14km away from the basin (Figure 2.4); this indicates that the site was surrounded by woodland between the elm decline (*c.*3200BC), when the moss started forming, and *c.*1800BC (Davies and Turner 1979). However, there are problems with the way this pollen data has been calculated and presented which may suppress earlier clearance activity (see below, Chapter 7). In summary, the pollen evidence for the Early Neolithic testifies to occupation of the plain and Cheviot slopes, with small-scale agriculture and clearance taking place. There is no evidence yet for clearances on the areas of sandstone until the Late Neolithic-Early Bronze Age *c.*1800BC.



1 Din Moss	8 Camp Hill Moss
2 Yetholm Loch	9 Ford Moss
3 Linton Loch	10 Thirlings
4 Sourhope	11 Doddington
5 Swindon Hill	12 Broad Moss
6 Akeld Steads	13 Bamburgh
7 Wooler Water	

Figure 2.4 Location of pollen sites in North Northumberland and the Borders

In contrast, the Late Neolithic witnesses a significant departure in terms of the scale of human intervention/exploitation of the landscape. The first major human impact on the Cheviot uplands in terms of large-scale clearance is considered by Tipping (1992, 119) to have taken place between c.2500 and 2000BC, and is recognised by an increase in pastoral indicator herbs at the radiocarbon dated pollen sites at Powburn, Halter Burn, Wooler Water, Swindon Hill and Sourhope (Tipping 1992, 119). Furthermore, catchment-wide evidence for sediment aggradations taking place in the period c.2500-2000BC has also been established (Tipping 1992; 1994). Tipping has argued that this phase of aggradation events is causally related to deliberate woodland clearance for farming (1992, 119). The lack of evidence for any climatic perturbations at both the global and local level during this period (Lamb 1977; Harding 1982) strengthens the claim for an anthropogenic cause (Tipping 1992). However, recent work by Barber and colleagues suggests that a climatic change to wetter conditions took place, at least in north-west England c.2500BC (Barber *et al* 1994). This was viewed as part of a cyclical oscillation between wetter and dryer conditions driven by ocean currents and, therefore, most relevant to areas susceptible to maritime climates, such as the area west of the Pennines. This study of macro-fossils from a peat core from Bolton Fell Moss, Cumbria, is from a part of Britain dominated by a maritime climate; eastern Britain is more heavily affected by continental climatic conditions. As such, this proposed 800 year cycle of wet and dry phases (noted by Barber *et al*) may not be relevant to north-east England. Furthermore, if such wet phases occur every 800 years, then why was it only in the period 2500-2000BC that soil erosion in the uplands around the Milfield basin took place and not before? The contention must be that a different regime of land-use prevailed during this period which entailed the destabilization of hillslope sediments, and the most likely of these regimes was more intensive clearance of the tree cover in the uplands and in slope situations. This is supported by Hunt's conclusion that, rather than the Late Neolithic of the borders being considered a period of reduced settlement, it should be seen as a phase of expansion and intensification (Hunt 1987).

The Early Bronze Age vegetation cover of both the English (Davies and Turner 1979) and Scottish (Innes and Shennan 1991) borders is characterised by woodlands dominated by oak, birch, hazel and, in damper areas, alder with very low frequencies of elm. A pattern of episodic clearances, predominantly for pasture but with cultivation also an important element, is envisaged (Davies and Turner 1979, 799; Innes and Shennan 1991, 30), with cleared areas thought to last for approximately 200 years (Davies and Turner 1979, 799). Increasing frequencies of grasses, ribwort plantain and docks indicate the anthropogenic management of open-ground (Davies and Turner 1979, 800). On the basis of the Camp Hill Moss diagram, Davies and Turner view the period from c.1800BC until c.1300BC as a time of cyclical woodland clearances with extensive penetration into the uplands also noted elsewhere (Innes and Shennan 1991).

Reconstructing vegetation sequences remains a difficult area of study with wide variation in survival rates and pollen production rates for different types of flora a major issue, notwithstanding the over-representation of arboreal pollen over non-arboreal pollen. However, with regard to the Milfield basin particular difficulties, such as the degree to which pollen sites are representative of the broader region or site-specific, come to the fore. Other problems occur when trying to integrate different pollen studies which have different sampling resolutions, different ways of calculating pollen values and different ways of presenting the data. To tie in the variations witnessed over the different ecozones in the surface lithic scatter, comparable palynological evidence specific to these different zones is ideally required. As most of the palynological evidence for the Milfield basin comes from the Cheviot valleys, it remains a priority for future studies to sample from sites representative of the sandstones, boulder clay and alluvial wetlands. As more of this data becomes available the lithic evidence should be able to be interpreted within the context of contemporary vegetation cover and land-use (see below, Chapters 5-7).

SPECIFIC PROJECT AIMS

As previous archaeological research in the study area has: (i) been largely site-based, (ii) lacked synthesis and (iii) included a number of unrelated interpretative accounts, the priority of this study is to produce a new synthetic account for the earlier prehistory of the Milfield basin grounded in a 'landscape archaeological' framework which draws on new systematically collected data. The intention is to make a comprehensive study of the existing archaeological and palaeoenvironmental data and relate the results from this earlier fieldwork with those from this project to present a series of new interpretations.

Given that the temporal resolution of both the archaeological and palaeoenvironmental records for the basin are, in general, 'coarse-grained', it is at the scale of the *longue durée* that this study is, for the most part, pitched. Hence, this study will focus on three broad periods; Mesolithic, Early Neolithic and Late Neolithic.

The specific aims of this study include:

- the acquisition of a representative sample of off-site archaeological data in the form of surface lithic scatters together with data concerning their related geoarchaeological context. This latter information can then be used to interpret the lithic data in the light of geomorphological processes which have affected the distribution of the lithic assemblage and search for relationships between lithic distribution and variables such as geomorphological slope-type, ecological zone, raw material, artefact type and chronological period.

- on the basis of this enhanced understanding of the 'structure' of lithic scatters to interpret the lithic distribution for each of the periods in relation to the vegetation sequence and the variation in land-use across the different ecological zones.

- recons~~ty~~ruct period specific accounts of past human settlement, land-use and behaviour, with the inclusion of previous site-based and artefactual data.

- place these interpretations in a diachronic framework which seeks to identify and account for changes and continuities over time.

Themes of particular interest to this study include:

- the transition from hunter-gatherer to pastoral-based society (ie. Mesolithic-Neolithic transition)

- the intensification and extension of settlement to include the uplands and the move towards more homogenous land-use.

- the nature of settlement and subsistence patterns through time

- the changing patterns in ritual, ideology and human - landscape relations over time

Chapter 3

The fieldwalking team in action

CHAPTER 3 FIELDWORK AND METHODOLOGY

INTRODUCTION

Underpinning the fieldwork strategy of this research was the committment to an integrated multi-disciplinary methodology. Given Renfrew's observation that "because archaeology recovers almost all of its basic data by excavation, every archaeological problem starts as a problem in geoarchaeology" (1976, 2), and given that the same is true for surface lithic collection (Waters 1992), a co-ordinated multi-disciplinary approach was regarded as essential. The starting point for the development of an integrated strategy was the orienting of archaeological and palaeoenvironmental work around a suite of broad problem-solving aims. These overarching aims included (1) understanding archaeological features/residues within their wider landscape and cultural context, (2) establishing an 'off-site' data set, both archaeological and environmental, for the basin during different phases of prehistory and (3) the examination of taphanomic processes which have conditioned the archaeological record visible today. The first of these aims has been tackled by 'on-site' excavations at the Coupland enclosure and droveway (Waddington 1996b; 1997), geophysics, geochemistry and excavation at another location across the droveway (Mercer 1997) and the relating of detailed geomorphic mapping of the valley floor with the position of archaeological features, such as the droveway and pit alignments. Other 'on-site' work has included topographic surveys of Humbleton Hill hillfort (Waddington 1998c) and the nearby Threestoneburn stone circle (Waddington *et al* forthcoming).

However, it was the acquisition of an off-site data set and the examination of taphonomic processes which formed the principal fieldwork element in this study. This was driven by a systematic fieldwalking transect which was established across the basin. The taphonomic filters affecting the patterning of the surface lithic material, and the relationship between surface lithic scatters and different environmental niches, was investigated through a programme of test-pitting and morphometric (slope type) and geomorphic (landform type) mapping. In addition, coring and dating of sediments was undertaken to provide a three-dimensional understanding of the sediment sequence in the transect, building on the earlier work of Payton (1988). Outside the study transect the rest of the basin was mapped in slightly less detail and peat samples for pollen analysis were also taken from a variety of locations within the basin. Some of the pollen samples were from within the study transect (e.g. Kimmerston bog, Redscar Bridge), while another was located immediately adjacent to it (e.g. Ford Moss), with the rest being taken from elsewhere in the broader study area (Palmer-Moss PhD thesis). The pollen sampling was organised so as to investigate particular problems allied to this study. These included the diachronic reconstruction of land-use on previously neglected areas; specifically the sandstone fells near the cup and ring marked outcrops and on the valley floor adjacent to the raised gravel terraces. In addition, issues such as the timing, nature and extent of clearance in these areas formed another strand of the palynological research. However, the pollen analysis is a recent study and results are still being collated. The recent doctoral research of Moores (1998) in the nearby North Tyne and Redesdale valleys does, however, provide comparative data which is referred to later in the study (see below, Chapters 5-7). Before discussing the specifics of the methodology it is first necessary to consider the current issues which have influenced how the aims and methods of this research have been structured.

METHODOLOGICAL ISSUES

Although a landscape archaeological approach overcomes many of the conceptual difficulties of site-based studies (Zvelebil *et al* 1992, 194), landscape studies also face methodological problems, some being common to both approaches and others being more acute in the landscape approach (*ibid,* 196). Zvelebil (1992, 196-7) has outlined major problem areas affecting landscape fieldwork studies including particularly those of chronological and spatial resolution, the need for integrated palaeoenvironmental work and the need to identify and account for the taphonomic processes which bias artefact distributions across the landscape. Consideration of the problems of chronological and spatial scale and the approaches to these problems adopted throughout this study have been outlined in Chapter 1. The need for in-depth palaeoenvironmental data has been addressed in this instance by installing palynological and geoarchaeological analyses as part of the overall archaeological research framework from the outset of the project. Furthermore, the adoption of a study transect which samples across all the different ecological zones encountered in the basin has allowed a window of detail to be created. This was designed to allow high resolution archaeological and palaeoenvironmental research to be carried out at a level not usually possible for archaeological landscape projects (Zvelebil 1992, 197). Moreover, this project has benefited from being able to dovetail aspects of its palaeoenvironmental work with that carried out previously by Payton (1980; 1987; 1988; 1992) and Tipping (1992; 1994; 1996; in press). The problem of modern land-use and its effect of dictating accessibility for research purposes has not been a particularly inhibiting factor for this research. As the fieldwalking programme has been carried out over a period of three years this has allowed access to ploughed fields on the watersheds of both sides of the valley including those fields which are usually used for pasture only. This has been possible due to the harrowing and re-seeding for grass on the upper slopes on a once in every ten year basis that, fortunately, fell within the three year fieldwalking slot. Access has also been made easier by maintaining good relations with landowners and farmers. The problems of taphonomy, however, pose a more difficult problem and it is to these issues that we now turn.

Taphonomy

An understanding of the environment occupies a fundamental part of any landscape archaeological study given the dynamic interaction that takes place between humans and environment (Butzer 1982). Any attempt to understand the genuine patterning of the archaeological record requires an appreciation of the processes which have affected these residues since their initial discard (Waters 1992). Consequently, gaining an understanding of the taphonomic context of archaeological remains is an integral component of landscape studies (Zvelebil *et al* 1992). It is only when the distorting effects of taphonomic processes have been accounted for that rigorous and meaningful interpretations can be made from archaeological landscape data. Indeed it has led Waters to remark that, "the archaeological record does not accurately reflect the complete pattern of human sites that once existed in a given region through time but instead reflects the biases of geological preservation" (1992, 102).

As the concept of archaeological sites has been redefined (eg Foley 1981; Shennan 1985; Dunnell 1992; Binford 1992; Tolan-Smith 1997a) the emphasis of archaeological research has shifted towards investigation of archaeological landscapes (e.g. Holgate 1985; Dockrill 1992; Zvelebil *et al* 1992). This has stimulated a new initiative in the use of archaeological fieldwalking survey as this is the principal method by which human activities across the landscape can be assessed at a regional scale. Analysis of site formation, artefact displacement and recovery and sampling distortions are, however, vital for the understanding and interpretation of artefact distributions (Allen 1991). Indeed, a reassessment of fieldwalking methodology, artefact taphonomy, human processes and quantitative approaches has taken place with the publication of numerous critiques, case-studies and analyses (e.g. Hinchliffe and Schadla-Hall 1980; Haselgrove *et al* 1985; Shennan 1985; Schofield *et al* 1991).

Despite this, with the notable exceptions of Bell (1983), Allen (1991), Gaffney *et al* (1991) and Zvelebil *et al.* (1992), there has been little attention given to the geoarchaeological setting and taphonomy of the landscape in relation to artefact scatters (Allen 1991, 39). These factors must have had a profound effect on the pattern of human activity across the landscape as well as the continued alteration of the landscape, involving erosion, deposition and the masking of geomorphic units (*ibid*). Most importantly, therefore, with regard to surface artefact scatters, it is geomorphic processes which have determined the modern-day distribution of surface artefacts. As Allen states (1991, 39), "before one can even attempt to interpret artefact distributions from surface collection, it is necessary to understand the nature and past history of the land surface. It is not sufficient to compare empirical data sets with lithology and soil maps."

Allen concluded in his survey that soil erosion plays a major factor in the redistribution of archaeological material, even on minor slopes (1991, 44). He proposed a general model for soil movement on slopes which posit an overall decrease in soil depth on hill crests and a relative increase of soil depth at footslopes which, he argues, results in an over-representation of the density of artefacts upslope and an under-representation of artefacts downslope as the ratio of artefacts to soil volume has changed (Allen 1991, 45-47). However, under more extreme erosion regimes, capable of moving artefacts as well as just soil, Allen's experiments demonstrated that thin and flat flints, and blade artefacts in particular, were vastly more susceptible to movement downslope than other types of flints; 87% of those moved after two small storm events were thin with flat surfaces and 94% of these were blade artefacts (*ibid*, 47). Furthermore, the experiments also showed that over just a few years, downslope movement of artefacts over large distances (50m + in 4 years) on an 11 degree slope took place (*ibid*). These conclusions from preliminary geoarchaeological approaches to field survey data have important implications for the archaeological interpretation of the pattern of surface artefact distributions. However, more fieldwork data is required that can be compared with Allen's early results and theoretical hypotheses, as well as from other parts of the country and areas with different geomorphological settings and histories. The test-pits excavated across the Milfield basin study transect were located so as to sample each of the different morphometric (slope) units encountered in this Northern England environment. The implementation of this strategy in conjunction with the fieldwalking allowed the different geomorphic processes at work in these different environments to be recognised.

As even steep slopes can remain relatively stable until they are disturbed and destabilised, it is necessary to gauge the nature and scale of any soil erosion that has taken place on slopes to gauge how soil and/or artefacts may be affected by slope processes in any particular place. The cause and timing of such processes is also significant as it may shed light on the nature and extent of particular land-use strategies through time, as Bell (1983) and Allen (1988) have demonstrated. In general, the work in southern England shows that hillslope deposits are directly or indirectly the result of human interference within the environment rather than a wholly natural phenomenon (Allen 1991, 49). In these studies on the chalk downs of southern England, the colluvial sediments investigated contained vast quantities of stratified artefacts which indicate not only prehistoric soil erosion but also prehistoric displacement of artefacts which would have required higher energy conditions to shift them, suggesting that the movement of these sediments, destabilized by human activity, were actually moved under extreme hillwash events (Bell 1983). These studies also show that, despite the variation in sedimentological processes involved, the artefact distributions retained good chronological sequence and integrity indicating that erosion and biotic activity do not necessarily disrupt the stratigraphic sequencing as might be expected (Allen 1991, 51). However, one of the major outstanding problems is that, with the exception of the work of Zvelebil *et al.* in southern Ireland (1992), there has been little work of this nature undertaken outside the flint rich areas of the chalk downlands of southern England and so it is not known how applicable these taphonomic patterns are to landscapes elsewhere in Britain.

Another important result of these investigations is that they have shown that soil erosion can completely obscure archaeological sites downslope on valley margins and bottoms (Bell 1983; Allen 1988). This means that such remains are undetectable by archaeological reconnaissance, and least of all as surface artefact distributions (Allen 1991). Again this poses important questions for the reconstruction of archaeological landscapes and the location and nature of human behaviour across them. Summing up Allen states that, "although colluvium may aid in the preservation of relict landscapes, it will also create archaeological 'blanks'." (1991, 54).

As any given landscape is composed of a multiplicity of landforms it is not credible to envisage all parts of a given landscape as being exploited in the same way or, indeed, to respond to the same land-use patterns in the same way. Thus, the investigation of the differential effects of geomorphic settings and land-use within any one landscape forms an essential component of this research programme. The division of the landscape into a scheme of geomorphic units which could be mapped at an appropriate scale and then related to an integrated programme of fieldwalking and test-pitting has, therefore, been adopted. A classification scheme for the slope units of the Milfield basin was established (see below) and the fieldwalking transect mapped according to this classification. This meant that each lithic find from the surface survey and test-pitting could be referenced in relation to the specific morphometric environment from which it was recovered. Consequently the geomorphic processes at work on each individual lithic and, more broadly, in each ecozone of the transect, could be identified and ultimately brought to bear on the interpretation of the surface lithic pattern.

Land-use change is increasingly recognised as a major control on erosion and subsequent deposition of sediments and cultural residues. An awareness of problems inherent in dating such events, and of the significance of thresholds in geomorphic systems, has shifted the research trajectory towards disentangling the effect of climate, land-use, agriculture and industrial practice, and the recognition that they often interact (Boardman and Bell 1992, 2). This has opened up some interesting issues such as the dispute as to whether modern farming practices increase the risk of extreme erosion (Boardman 1992) or whether erosion in the past was higher than in the present (Evans 1992). This debate, centred on research in southern England, has also brought into question the problems associated with the underlying uniformitarian assumption that modern process is an accurate analogue for past processes (Bell 1992b, 20). Furthermore, Bell (1983) has suggested that the creation of field systems may have been a mitigating response to soil depletion as opposed to explanations of their emergence as a product of social and ideological changes (e.g. Barker 1981, 6). Indeed it is difficult to deny the functional value of lynchets and cultivation terraces, parallel with the contours, for preventing soil erosion. The increasing number of dated sites demonstrate that the onset of colluviation is largely controlled by changes in land-use practice, particularly the effects of clearance and tillage, and that this is not necessarily contemporaneous either within or between catchments (Boardman and Bell 1992, 4).

The aim of the geomorphological component of this study is to establish the varying spatio-temporal geoarchaeological contexts of the study transect so that the processes affecting the patterning of surface lithic scatters can be identified. Recognition of such taphonomic influences will help overcome some of the inherent biases contained in the surface collection data. The end result, therefore, will be that a more accurate and reliable account of the archaeological data can be constructed, providing a more secure basis for the interpretation of past human behaviour in the study area.

THE STUDY TRANSECT

Unlike most extensive fieldwalking programmes, the unit of recording for this study was at the resolution of the individual point (ie. each find will have its own point co-ordinates), rather than at the more coarse resolution produced by area data (ie. where each find is located within a line or a box; e.g. Shennan 1985; Schofield 1991c; Zvelebil et al. 1992). The methodology for this study has been designed in this way to overcome the problems of accuracy which arise when fieldwalking data is collected on an area basis. This also means that subsequent analyses of the results are not constrained by coarse scale spatial referencing. Consequently, the unit of analysis becomes the artefact rather than an imposed geometric grid. This also means that patterning in the attributes of certain classes of finds can be linked to highly defined spatial data. As such, this high resolution spatial referencing provides a more sound methodological basis for conducting surface survey, especially as one of the key aims of the fieldwalking study was to match each find to specific ecological and morphometric units of the landscape.

Fieldwalking

Sampling Strategy

Mills (1985) has pointed out that regionally specific methodologies are required which take account of the regional and local factors which affect the density and distribution of surface lithic scatters, such as availability of raw materials and terrain. A specific methodology was, therefore, devised for this study which took account of the particularities of the Milfield landscape and the character of local surface lithic finds.

The Milfield basin study region extends over an area of 300 square km (Figure 1.1) and therefore it was not possible to sample all of this region due to its size, variations in current land-use practices across the area and the constraints imposed by the duration and resources of this study. To overcome these problems it was decided to sample the study region using an ecologically stratified survey which sampled across all the different ecological environments encountered within the basin. The sampling area was oriented as a large contiguous transect which cut across the five landscape zones, the aim of which was to retrieve a representative lithic sample from each of these distinct ecological environments. Both Clapham (1932) and Hasel (1938) have pointed out that the accuracy of sampling transects is increased by using this method. By maintaining the transect as a continuous stratum across the ecological zones it meant that interlinked land-use strategies which combined activities across these zones could, theoretically, be assessed. As the efficiency of a sampling strategy is directly related to the distribution of that which is being sampled the archaeologist is faced with a dilemma; the distribution of that which is being sampled remains unknown until it is sampled. This onerous "sampling paradox", as Mueller (1975, 37) has termed it, was thought to further justify the use of variation in ecological environments to structure what was to be sampled. Although this strategy could be criticised for using the environment to drive the archaeological sampling of past human behaviour, it is maintained that for the purposes of this research it is a legitimate way of characterising variation in human land-use which over the *longue durée* is more likely to represent interactions particular to different environmental resources. Moreover, the use of a single large sampling stratum was thought to be the most effective way of accomplishing a contiguous sample across the basin, given the time available. By systematically sampling known environmental zones, rather than subjectively sampling the unknown extent of human activity, the sampling paradox is to some extent circumvented as the extent of the environment is known before it is sampled. Although this means that data collection is environmentally driven it is maintained that this is a small sacrifice worth making so as to enable a way in to the archaeological data. As this was the first systematic sampling of this area ever to have taken place, and it was to be conducted within the time restraints of a PhD thesis, it was thought that this ecologically stratified 'big box' approach was the most suitable starting point. Future sampling programmes could augment this fieldwalking exercise now that this broad slice across the basin has been completed. The information produced by this study can be fed back to inform further sampling and therefore reduce the future burden of the 'onerous sampling strategy'.

The transect averages 1.5km in width by 7km in length running in a WSW to ENE direction (Figure 3.1). From the Cheviot summit of Coldside Hill in the west to the sandstone escarpment at Dove Crag in the east the transect extends over an area of 589ha. which constitutes c.2% of the total Milfield basin study region of 30,000 ha. Both ends of the study transect are watersheds on either side of the valley respectively. The different ecological zones constitute the following proportions of the Milfield basin study region:

Figure 3.2 Size of Ecological Zones in the Study Transect

Ecozone	**Hectares**	**% of study area**
Cheviot Slopes	224.86	38.2
Gravel Terraces	118.40	20.1
Alluvial Valley Floor/Wetland	47.55	8.1
Boulder Clay	110.94	18.8
Sandstone Slopes	87.33	14.8
Total	589.08	100

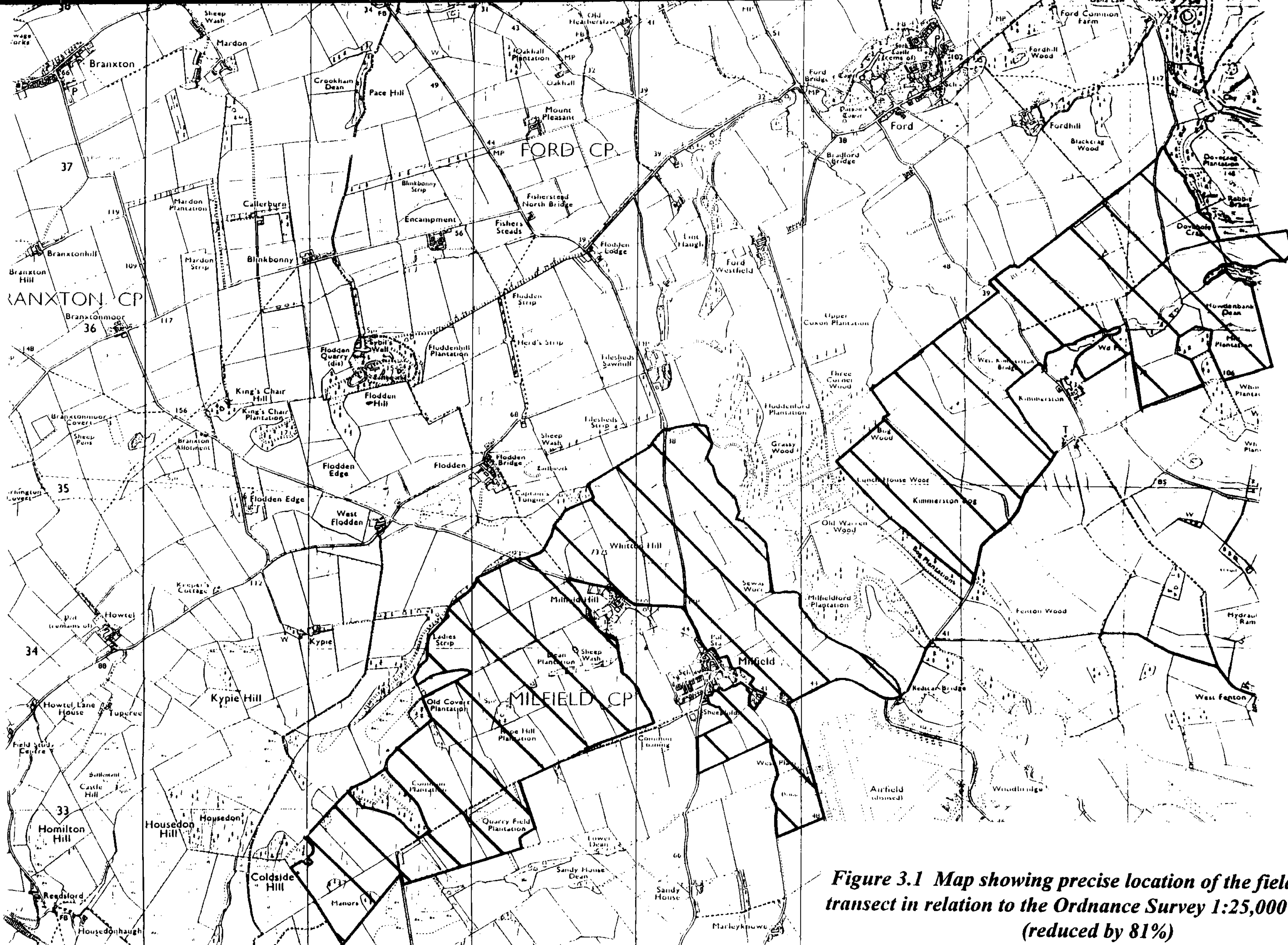


Figure 3.1 Map showing precise location of the fieldwalking transect in relation to the Ordnance Survey 1:25,000 coverage (reduced by 81%)

Due to differential access to ploughed land over the duration of the project unequal areas of the different ecozones were sampled. Not all the land within the transect was able to be walked due either to: certain fields not being ploughed during the time this study was undertaken or the occurrence of plantations, rivers, roads and buildings. For example, the alluvial valley floor immediately adjacent to the river axis was unable to be sampled directly as this land was never ploughed during the study period. However, an area of relict wetland elsewhere in the study transect (Kimmerston Bog) provided an analogous ecological area which was able to be sampled. It should be noted that even if the alluvial valley floor had been ploughed, the substantial depths of alluvium (up to 4m in places) would have masked the prehistoric archaeology in this depositional environment. This taphonomic bias meant that as the alluvial valley floor could not be adequately sampled by fieldwalking other means of sampling from this area were required. In this case extensive sediment coring was undertaken along the alluvial valley floor at Redscar Bridge, Thirlings and south-west of Doddington to locate buried organic horizons and in-filled palaeochannels which could be sampled for pollen analysis and dating (see below, Chapter 4).

The line-spacing interval for this study was established with reference to three primary determinants and a small pilot study:

(1) Overall density of lithic material in the study area.

Although flint pebbles can occasionally occur in the glacial outwash deposits in the Milfield area, the abundance of flint as a raw material does not compare with the volumes present in the flint-rich areas of East Yorkshire, Lincolnshire, East Anglia and southern England. This has meant that the overall density of lithic discard is much lower in regions of northern Britain than in eastern and southern counties. Furthermore, on the basis of the unpublished work of Weyman, it is known that there was an important reliance on a wide range of locally available raw materials, including agate, chert, chalcedony and quartz. The recognition of these stones and their identification as lithic tools is more difficult than the recognition of flint. Consequently, it was decided that the study area required a close-spaced fieldwalking programme given the relative under-representation of surface lithics compared with the more dense and easily recognised scatters in flint-rich areas of the U.K. As a result, the specific requirements of the Milfield basin study area necessitate a more closely spaced sampling strategy (see below) than the more widely-spaced linewalking commonly employed in regional studies elsewhere in the U.K., such as the fieldsurvey of the Great Ouse Valley (Woodward 1978), the Stonehenge Environs Project (Richards 1990) and the Abingdon Survey (Holgate 1985).

(2) Constraints imposed by the project.

This study was constrained by its 3-year framework and the demands of the other aspects of the research contained within it. Availability of financial resources were limited, which meant only a finite number of visits to the area could take place each season. Access to a pool of skilled volunteer fieldwalkers meant labour to carry out the work was generally not a problem. However, the number of people who could attend on any one occasion was limited by transport facilities which usually consisted of one or two cars. Permission from most landowners and tenants in the area was achieved with ease, but, considerable effort had to be made to regularly organise the fieldwalking outings, arrange permissions and keep landowners and tenants informed of results. Although time consuming, this was considered essential to the long-term success of the project and the prospects for future work in the area.

(3) Previous work in north-east England

The previous major regional fieldwalking surveys which have taken place in the north-east region include Young's study of Weardale (1987), The Durham Archaeological Survey (Haselgrove *et al.* 1988), and The Stone-age Tynedale Survey (Tolan-Smith 1996b; 1997). All these surveys have used the 10m linewalking interval as their basic sampling interval. This was deemed to be an important consideration as there would be advantages for comparison purposes if this survey was undertaken at a similar interval.

Pilot study.

A pilot study in the Spring of 1995 was conducted to establish a line walking interval which could reliably capture the pattern of surface lithic scatters while balancing this with the need for covering a sufficiently large representative sample of the study area. Furthermore, it would provide an indication of the size of area which could be covered in a day by a small group of people (averaging between 5 and 10). A field covering 6.3ha. (Field 2; see below Figure 4.1) in the study area was walked at 10m and 5m intervals by a team of 5 people and the total volume of lithics recorded for each walk was recorded. If the 10m interval was to prove sufficiently representative then it was initially expected that it would need to produce half the number of lithics as produced by the 5m walk.The two walks produced the following counts (Figure 3.3).

Figure 3.3 Pilot Study Lithic Counts

Line Interval	**No. Lithics**	**Time**
5m	27	3.2 hours
10m	9	1.5 hours

The field was initially walked at the 10m interval on a dull day under conditions of quite heavily sprouting crop. A total of 9 lithics were recovered. It was assumed that if the 10m interval was adequately capturing the surface lithic density the count of a walk at the 5m interval should produce around 18 lithics. On the second visit, however, the field boundaries on two sides had been removed and this increased the surface area of the field by 0.15ha and therefore the amount of area sampled. More significantly the field was walked under the best possible recovery conditions during the second walk as the field had a weathered, ploughed and harrowed surface, there had been a light rain the night before and the light conditions were bright but without glare. Given these exceptional visibility conditions on the second walk the recovery rate was anticipated as being greater than the first. In fact the second walk produced a total of 27 lithics which was exactly three times the count for the 10m walk. Although this count superficially suggests that the 10m interval does not express the surface lithic distribution as well as the 5m interval, this was not considered to be the case as the prevailing weather and ground conditions on the second walk were so good and the visibility conditions on the first walk so poor that a count of between two and three times higher for the 5m interval walk were considered acceptable.

It was unfortunate that the ground conditions and weather conditions could not be replicated for the two sampling exercises comprising this pilot study as it would have provided directly comparable data. However, because of the greatly enhanced visibility of the second walk it meant that the results were inherently skewed so as to a provide a higher lithic density across this field during the second walk than for the first walk. Putting a numerical value on the degree to which such dramatically improved visibility could enhance the recovery rate is fraught with difficulty and so an estimated range was adopted as a filter for interpreting the results. Taking these recovery biases into account, it was thought that the estimated range that 5m sampling should yield was between twice and three times as many lithics as 10m sampling if the proposition that the 10m interval was producing a representative sampling was to hold. As the 5m sampling fell within this range, producing exactly three times as many lithics from the field as the 10m sampling, it was considered that the 10m interval did adequately capture the surface lithic density. On the basis of this small pilot study it was concluded that the extra resolution of the 5m interval did not produce a significantly more accurate reflection of the pattern of surface lithic scatters than the 10m interval, and that a 10m interval was significantly more economical in terms of its demand on time which would, therefore, allow a larger area to be sampled in the time available. Furthermore, a similar study of fieldwalking data recovered from the Durham coast at Middle Warren (Waddington 1996a) showed that in most cases the 10m interval sampling resolution adequately reflected the relative surface densities of lithics in this area when compared to later 100% sampling.

On the basis of the three determinants and the pilot study a 10m line walking interval was adopted as it was considered to most closely satisfy the demands of the programme without compromising loss of detail which it was thought the 20m interval would incur. Adoption of the 10m interval can be considered as a 20% coverage rate (Tolan-Smith 1997a, 80) as it has been established that people generally observe the ground 1m either side of themselves. All walkers were asked to keep to this range of visibility to ensure consistency throughout the survey.

Recording Data in the Field

Each field had a base line set up parallel to its dominant axis and the field was then walked in lines set at 90 degrees to the base line. Each walker was equipped with a bundle of brightly painted bamboo rods which were inserted into the ground to tag finds when they were encountered. This allowed fields to be walked with considerable speed as the walkers did not have to bother with recording and bagging, and as a consequence their labour was maximised so more ground could be covered on each visit. Another member of the team operated a total station while the author operated the surveying prism. The field boundaries were also surveyed so that the survey could be tied in to the national grid; many of the field boundaries have changed in recent years making digitising from current Ordnance Survey maps inappropriate. When the walking commenced, the prism operator followed behind the walkers with bags and surveying prism. This meant that finds underwent an initial filtering in the field so that only genuine artefacts were surveyed, bagged and recorded. This meant that time was saved on two counts: first, the number of points to survey were kept to a minimum, and second, the number of finds to deal with in the processing stage was also kept to a minimum. The use of a total station to gather point data meant that each find was located to a unique national grid co-ordinate. The 'Leicapak 32' programme on a 'Psion Organiser' was used to capture data in the field and this was downloaded into the 'Liscad' surveying package on return to the office. Separate plots of the lithics, field boundaries and test-pits were made and each was saved as a .dxf (graphic) file. Each of these files were then transferred into the 'ARC/INFO' GIS and made into a separate coverage. Each find was bagged individually and given a unique number in a consecutive numbering sequence and this was replicated by the total station operator, to identify each find. The fieldwalking took place on a field by field basis so each fieldwalking event was recorded on a special Field Record Form (see Appendix 1 and Figure 3.4).

Figure 3.4 Information Categories Recorded on the Field Record Form

Field No.
NGR (approx. centre of field)
Date of Walk
Initials
Area of Field
Walk No.
No. Visits
Ground Conditions
Weather Conditions
Crop
Visibility
Transect Interval
No. Transects
Orientation
Survey Station
Description

It was deliberate policy not to pick up everything encountered during fieldwalking as the volume of post-modern and modern pottery on the fields would have significantly slowed down recovery and therefore restricted how many fields could have been walked in the time available. Consequently, the results are concerned only with lithic material as no prehistoric pottery or metalwork was picked up during the course of this work.

Finds Processing

After returning from the field the following procedure was followed:

1. All finds were washed, dried and labelled with their unique number.
2. Each find was inspected (second filtering) and non-finds discarded while actual finds were identified, sometimes with the aid of a microscope, and characterised according to a classificatory system devised for this study (Figure 3.5).

Non-Specific Category	Specific Category
unclassified tool	backed blade utilised blade serrated blade retouched blade utilised flake serrated flake retouched flake blunted tool unclassified tool
flake	flake trimming flake primary flake dressing chip rejuvenated flake rejuvenation flake struck flake (flake core) levallois flake
core	core rejuvenation flake single platform core opposed platform core bi-polar core pyramidal core utilised core (made into another tool) exhausted core core fragment rejuvenated core multi-platform core core
blade	blade
bladelet	bladelet microlithic bladelet
scraper	ovoid scraper thumbnail scraper side scraper end scraper tiny scraper (mesolithic) scraper
arrowhead	leaf-shaped arrowhead barbed and tanged arrowhead tranchet arrowhead chisel arrowhead oblique arrowhead arrowhead
microlith	microlith microlith point
knife	plano-convex knife knife blade knife tang
burin	burin micro-burin
sickle	sickle
borer	borer
point	point
rod	rod
axe	axe
test-piece	test-piece
bashed lump	bashed lump
gun flint	gun flint

Figure 3.5 Lithic Classification Scheme

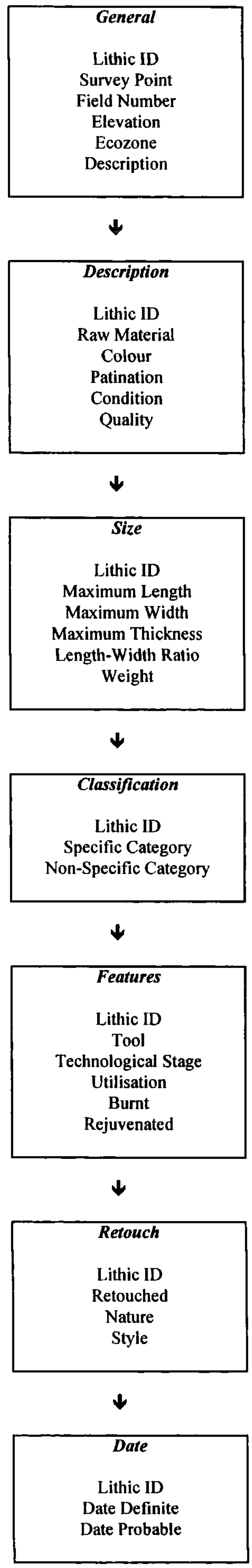


Figure 3.6 Fields and tables recorded on lithic data base

3. The data for each find was entered into a relational data base designed to incorporate all the variables to be recorded for each find. This relational data base ran on Microsoft 'Access' and was able to be keyed into the G.I.S by converting the tables into 'dbase' files.

The database was organised into seven tables all linked by the common lithic identification number. This identification number also corresponded to the survey point of that lithic recorded in the field survey, thus allowing the linkage to be made between the spatial and attribute data of each lithic (Figure 3.6).

All the coverages created in 'ARC/INFO' were transferred into the 'Arcview' package together with the attribute data. The lithic data base in 'Access' was transformed into a series of dbase files and these were then read into the 'Arcview' file and linked to the attribute data for the relevant coverages. This enabled the merging of all the spatial and non-spatial data relating to the lithic coverage, the test-pit coverage, the field boundary coverage, the morphometric map coverage and the ecozone coverage.

Figure 3.7 G.I.S. Coverages in Arcview

Field Boundaries Ecozones Morphometric Units Lithics Test-Pits

Test Pitting

The test pitting programme was aimed at investigating two specific taphonomic problems.

1) Calibration of surface patterning. Surface lithic scatters may not always be representative of the actual population contained within the rest of the ploughzone (Bell 1983; Allen 1991). One way of overcoming this problem is to check the ploughzone population by sampling through the full depth of the ploughzone by test-pitting. This sub-surface data will allow the surface scatter immediately above the pits to be understood in relation to the known quantities of material from the whole ploughzone below.

2. Identification of geomorphic processes. The geomorphic processes which operate on lithic distributions within different geomorphic environments need to be identified so that these taphonomic processes can be taken into account when interpreting the fieldwalking data. By systematically sampling each of the different types of morphometric units identified in the study transect (Figure 3.8) through test-pitting, the different geomorphic processes at work in each of these environments could be ascertained. This allowed the effects of different types of morphometric unit on surface lithic material to be assessed.

To address these problems it was decided that a programme of test-pitting would provide the least-cost and most flexible method for collecting the required data. Rather than employ an extensive strategy, which is unlikely to reflect low surface densities (Nance and Ball 1986), it was decided to deliberately target the test pitting at retrieving a representative sample from each category of morphometric unit at a locally intensive scale which related to the scale at which the fieldwalking was conducted. This cluster sampling strategy would allow those areas investigated to be sampled at sufficient resolution for the results to be meaningful (ie. whether the surface population accurately reflected the population of the rest of the ploughzone) while also producing a body of data which related to the specific processes taking place in these different geomorphic environments.

Methodology

Each morphometric unit selected for test pitting had usually five or ten test-pits located in them, laid out in lines at 10m intervals to correspond with the fieldwalking methodology and to permit comparison. The sandstone escarpment formed an area of particular interest, given the steep slopes and evidence of negative and positive lynchets. In this case test-pits were located in a cluster on different, though adjacent, morphometric units to provide a window of detail over this dynamic geomorphic area. Test pits were excavated as 1m squares down to the drift deposits below. At least one test-pit in each of the morphometric unit clusters was excavated deeply into the drift to confirm the sediment as the underlying drift and to provide a detailed sediment log. The depth of the ploughzone usually extended to between 30 and 40cm from the surface. Each pit was excavated in 10cm spits with the full contents of each spit being trowelled and then sieved through a 0.5cm mesh to achieve the target 100% recovery rate. All finds from each spit were bagged and labelled accordingly. This meant that each find was spatially located to within a 10cm spit of known depth in the ploughzone. Each of the 146 test-pits were surveyed using the same methodology as for the fieldwalking findspots. This allowed a G.I.S. coverage to be created containing all the test pit data, including the spatial location of each test pit and the depth at which each find was situated, together with the attribute data for each find stored on the same lithic attribute data base as that used for the fieldwalking data.

Morphometric Mapping

The topographical and associated geomorphological context was established by creating a detailed morphometric (slope) map of the study transect which divided the area into component slope units, characterised spatially as polygons. The mapping was conducted at a scale of 1:10,000. This meant that only geomorphic units of greater than 10m diameter were usually recorded as smaller units would not show adequately on the 1:10,000 base map. The assumption was made that in general units smaller than this would only exert a weak influence over the patterning of archaeological residues and were, therefore, omitted. However, when the occasional geomorphic feature of less than 10m diameter was encountered which could have influenced the archaeological patterning these areas were more accurately surveyed so as to ensure their inclusion on the morphometric plan. This flexible approach not only enabled the methodology to be responsive to idiosyncratic features across the landscape but also allowed the whole 7km transect to be mapped over a total of three weeks with the transformation of that hard data into a digital G.I.S. coverage taking a further week.

The different morphometric units were identified primarily using surface observation in the field, and to a lesser extent, aerial photographs and existing maps of the area. Each unit was then surveyed on the ground using the total station and tied in to the National Grid by recording points on the ground which corresponded to known points on the 1:10,000 base maps.

This mapping produced a series of contiguous polygons on 1:10,000 base maps which covered the study transect. These were then digitised and created into a polygon coverage as part of the project's G.I.S. data base. Each morphometric unit (polygon) was labelled according to its morphometric categorisation and this allowed the surface lithics from the fieldwalking to be analysed in relation to the morphometric unit within which they were retrieved. Figure 4.4 (Chapter 4) shows the morphometric characterisation of the transect.

The morphometric classification system (see table below) was designed to take account of the full range of geomorphological slope types encountered across the study transect during a series of reconnaissance visits. The level of detail required (ie. features of more than 10m diameter) determined the scale of the geomorphological classification. The classification was designed to take account of the full variability of landscape zones from hill-tops and slopes down to footslopes, valley floor and river channels. The categories of slopes were developed from Butzer's slope classification (1982, 58) and comprise a more detailed slope classification system designed to be applicable to the full range of topographic variability within the Milfield landscape.

Figure 3.8 Morphometric Classification System

Code	Title	Description
BGS	Gentle Slope	Gentle, 2-5 degrees
BMS	Moderate Slope	Moderate, 6-15 degrees
BSS	Steep Slope	Steep, 15-40 degrees
BXS	Hillside Depression	
DGU	Gully	
VPC	Palaeochannel	
ECF	Colluvial Footslope	
UFL	Upland Flat	< 2 degrees
FLF	Flat	< 2 degrees
RWT	Relict Wetland	
RFL	Relict Wetland Raised Terrace	
VAF	Valley Floor Alluviated Flat	
VTG	Valley Floor Gentle Slope	Gentle Terrace Scarp, 2-5 degrees
VTM	Valley Floor Moderate Slope	Moderate Terrace Scarp, 6-15 degrees
VTS	Valley Floor Steep Slope	Steep Terrace Scarp, 15-40 degrees
VTD	Valley Terrace Depression	Terrace Depression
PLT	Plantation	

The classification system is divided into six broad groups with the final group 'PLT' denoting areas disturbed by anthropogenic development, usually plantations. The six groups are sub-divided to account for variation within that category. This classification data was incorporated into the G.I.S. and thus linked to the spatial morphometric map data which was digitized. This allowed a coverage containing all the spatial and non-spatial attribute data of the geomorphic zoning to be created. This meant the coverage could be queried in relation to the other point and polygon coverages which contained the surface lithic data, the test-pit data, the field boundary data and the ecological zone data.

Morphometric zones which were of uncertain classification (usually where overlying deposits had accumulated) were cored using a sand or percussion corer, depending on the level of compaction of the material. These cores were taken to allow a three-dimensional view of the geomorphological unit under investigation. This meant that the sediment sequence of these units could be ascertained and on the basis of colour, texture, particle size and particle morphology the nature and genesis of the deposits could be confirmed and the appropriate morphometric classification ascribed.

GEOMORPHOLOGICAL EVALUATION

The valley floor of the Milfield plain was also mapped on the basis of geomorphological units. The partition of the landscape into such units differed in a subtle but important way from the morphometric mapping in that the emphasis was on the characterisation of discrete landforms rather than slope type. That is, processes and evolution of landform elements were being mapped rather than surface morphology *per se*. This mapping was conducted by D.Passmore and the author as part of a separate English Heritage/County Council funded project the 'Milfield Basin Resource Management Study', so the methodology and results are reported only briefly in this thesis (see below and Figure 6.15).

As the intention of the geomorphic mapping was to provide coverage of the physiography for the entire valley floor the resolution of this mapping, though detailed, was not conducted at the fine resolution of the morphometric mapping which was intended as a window of detail across the valley correlating with the sampling transect. However, the geomorphological mapping was also carried out at 1:10,000 scale and was manually plotted onto overlays attached to O.S. base maps.
The fieldwork was carried out using geoarchaeological techniques developed elsewhere in northern England (Macklin *et al* 1992a; 1992b Passmore *et al* 1992; Passmore and Macklin 1994).

Geomorphological features were identified on the ground through a combination of surface survey and aerial photograph transcription, together with sediment cores where necessary. Surface mapping, transect profiles and vertical coring combined to provide a three-dimensional conceptualisation of the landscape. This analysis allowed a model of late-glacial and Holocene valley floor development in the study area to be constructed providing a framework within which existing data on sedimentary sequences, landforms and palaeoecological resources could be effectively utilised (Passmore *et al* 1998). Sediment cores were taken and assessed using the standard methodology of Troels-Smith (Birks and Birks 1980) which describes three major properties of sediments; (1) physical characteristics, (2) degree of humification and (3) sediment composition. A sand auger and, in the case of more compacted sediments, a percussion corer, were used to collect sediment samples with results logged in the field. Record was also made of river cliff exposures and quarry sections where possible. Where organic horizons were encountered in the lithostratigraphy samples were taken so that radiocarbon dating, pollen and macro fossil analysis could take place if it was subsequently considered appropriate. Given the continual feedback which took place between fieldwork strategies, the on-going accumulation of results and hypothesis formulation, it was only after the complexities of landform progeny emerged that certain samples were then selected for dating and analysis. By dating organic residues from these samples the chronology of the lithostratigraphy, and therefore evolution of landform elements, could be ascertained, particularly across the alluvial valley floor.

A classification of landforms and sediments was developed which allowed the study area to be characterised according to the specific nature of its geomorphological elements. Overlays of the different geomorphic units through time were made at a scale of 1:10,000 which could be directly related to base maps of archaeological monument complexes derived from aerial photographs and surface remains. This allowed linkages between archaeological features and landform type to be considered in detail.

PALYNOLOGY

The anlaysis of the pollen was undertaken by P. Palmer-Moss as an allied PhD thesis to this research. It commenced in 1997 on a part-time basis and therefore not all the results of this research are yet available.

Reconstructing the past vegetation sequence for the Milfield basin is an important priority for any future archaeological studies. However, as discussed above (Chapter 2), palaeoecological study needs to be directed at elucidating specific outstanding questions. The principal areas of interest for palynological study which have been identified by the Milfield Basin Archaeological Landscape Project include:

(1) enhanced study of the largely neglected pollen sequence for the Fellsandstones, with particular emphasis on reconstructing the past terrestrial environment within which the cup and ring marked rocks were situated.
(2) enhanced study of the pollen sequence across the valley floor, with particular attention to questioning the notion of homogenous land-use across this area and temporal patterns of clearance, regeneration and stasis.
(3) integration of pollen sites with localised catchments with pollen sites providing a more regional signal (a potentially more accurate indicator of arable activities than regional diagrams which tend to underestimate arable activity).
(4) identification of pollen sequences relating to the five different ecological zones encountered across the valley.
(5) identification of the timing and character of hunter-gatherer intervention with the landscape, the onset and subsequent evolution of 'farming' (both pastoral and arable) and episodes of abandonment and regeneration across the different ecological zones in the basin.

By identifying these issues through the requirements of the archaeological study these cross-cutting research objectives serve to integrate fully this palaeoenvironmental study within the multi-disciplinary approach of this project.

The location of suitable sampling sites around the basin was undertaken by the author, D.Passmore and P.Palmer-Moss. Raised mires were examined and test-probed for their suitability, as were palaeochannel fills, peat beds located in ice-wastage features (e.g. kettle holes) and sediment profiles (see above). Samples were extracted using a 'russian' corer taking 0.5m samples from two alternate immediately adjacent holes. This was undertaken to prevent contamination and compression of successive samples which may take place when using a single sampling hole.

At the time of writing the radiocarbon dates on the first pollen profile from Ford Moss have not been returned. Consequently, all the results of this associated pollen study will be reported in a separate research study.

FIELDWORK EXECUTION

All the archaeological and morphometric fieldwork was undertaken by the author over a period of three years. However, given the labour intensive tasks involved volunteer and student labour were enlisted to accomplish the necessary fieldwalking coverage. All such labour was closely supervised, though most people who contributed to the fieldwork had considerable experience. More specifically, the fieldwalking employed a team of volunteers comprising students and members of the local amateur archaeological organisation, the Northumberland Archaeological Group (N.A.G.). The fieldwalking took place throughout the autumn and springs of 1995, 1996 and 1997. The test-pitting was undertaken over a two week period during the late summer of 1996 and again employed a mixture of students, graduates and volunteers from N.A.G. The total station survey which extended over the full 7km of the study transect and incorporated all the field boundaries, lithic findspots and test-pit locations was undertaken by the author with help from N.A.G. members, particularly E. Montgomery. The morphometric mapping was carried out by the author across the

7km and was completed by early 1997. The geomorphological evaluation, which is on-going, was undertaken by Dr. D. Passmore and the author with extra labour from students of the 'Geoarchaeology' course (Department of Geography, University of Newcastle upon Tyne). The identification and aquisition of organic samples for the pollen analysis was accomplished by the joint efforts of the author, D. Passmore, A. Stevenson, P. Palmer-Moss and A. Moores of the Department of Geography, University of Newcastle upon Tyne.

Chapter 4

A test pit showing the ploughzone overlying a thin subsoil and fine-grained colluvial deposits below

CHAPTER 4 RESULTS AND ANALYSIS

This section is concerned specifically with the new data acquired during the course of this study from the fieldwalking, test-pitting and morphometric mapping.

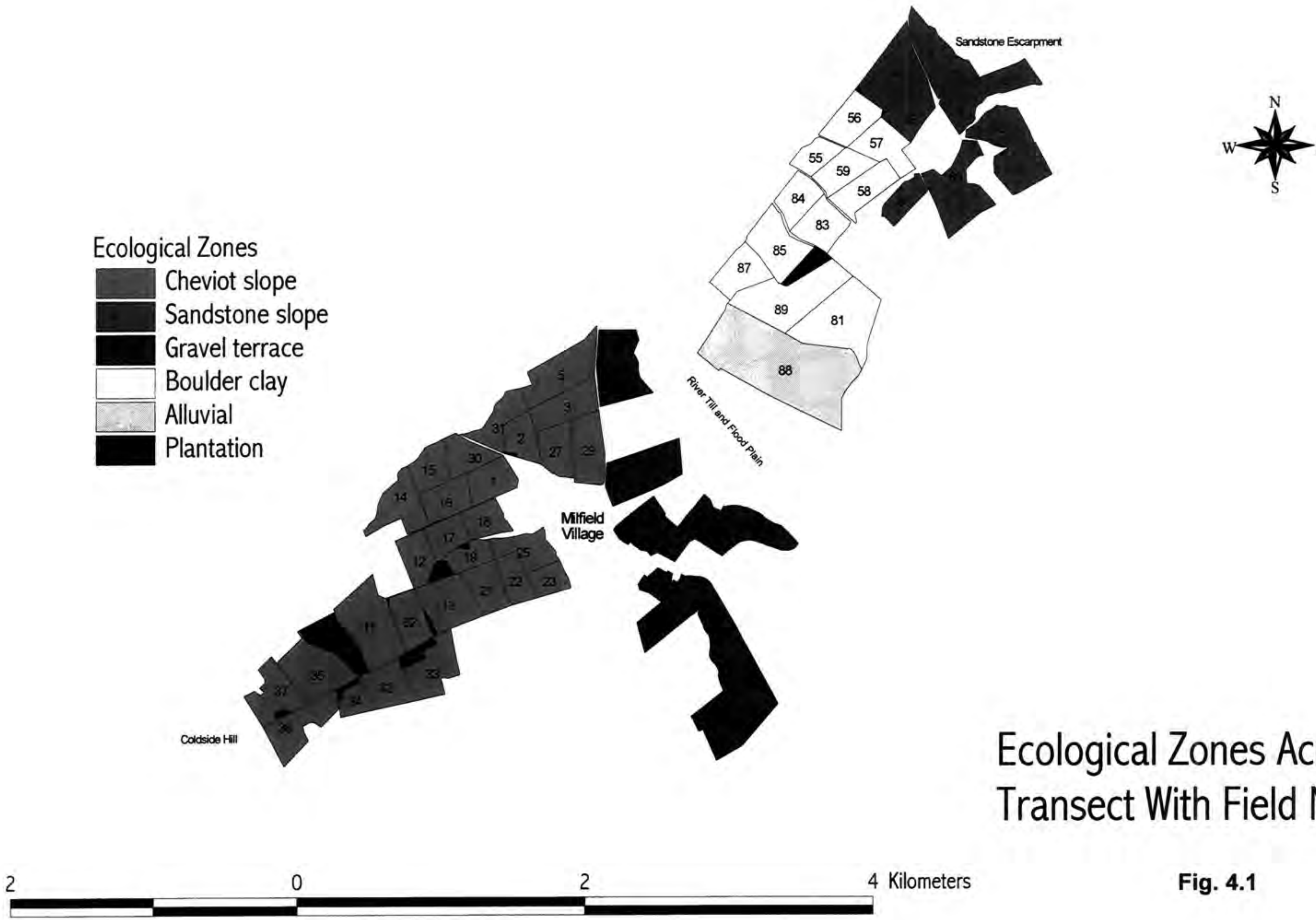
This chapter is divided into three distinct sections. The first section is concerned with presenting the results with accompanying descriptive discussion. The second section is concerned with an analytical overview of the lithic assemblage and identifies overall trends and patterning in the data. Further period-specific analysis and interpretation of the lithic assemblage takes place in the subsequent period by period chapters (5-7). The third section considers the issue of taphonomy and identifies the main issues with regard to the Milfield data set by integrating the fieldwalking, test-pit and morphometric studies. This section concentrates on the modification of lithic scatters by landforming processes and human action by reference to slope processes and surface to subsurface relationships. A lithic scatter displacement model is presented which is intended as a guiding framework, rather than a definitive statement, for subsequent interpretation of lithic data from the Milfield area.

SECTION 1 RECORDING STRATEGY AND RESULTS

Each field in the transect was numbered and assigned to the appropriate ecological zone within which it fell (Figure 4.1). All lithic findspots across the transect are displayed in Figure 4.2 while Figure 4.3 shows the location of each test-pit cluster within the transect. More detailed maps of each cluster are presented in the test-pit data section below. The morphometric mapping of the study area is presented in Figure 4.4.

Throughout the results section densities of lithics are usually standardised by mean density per hectare. Two density per hectare figures are given in each table. The first, the 'actual' density count is the raw density taken straight from the number of lithics recovered divided by the unit area. The second figure, the 'adjusted' density count, is the actual number of lithics recovered multiplied by five and then divided by the unit area. This allows the 'actual' figure from the 20% fieldwalking sampling to be adjusted into a 100% figure. Although the notional 100% figures could be misleading it is the broad pattern rather than the individual values which is the principal concern of this study. By presenting 100% density count per hectare, results from other fieldwalking surveys at different sampling scales can be compared (Tolan-Smith 1997c, 80). In all the results tables both the raw sampled (20%) density and the adjusted (100%) density are given, thereby ensuring all data is explicitly referenced to the original raw data.

The raw data from the study transect divide into three subsections: 1) fieldwalking data, 2) test-pit data, and 3) morphometric data. The results from each of these data sets will be presented and discussed in turn.

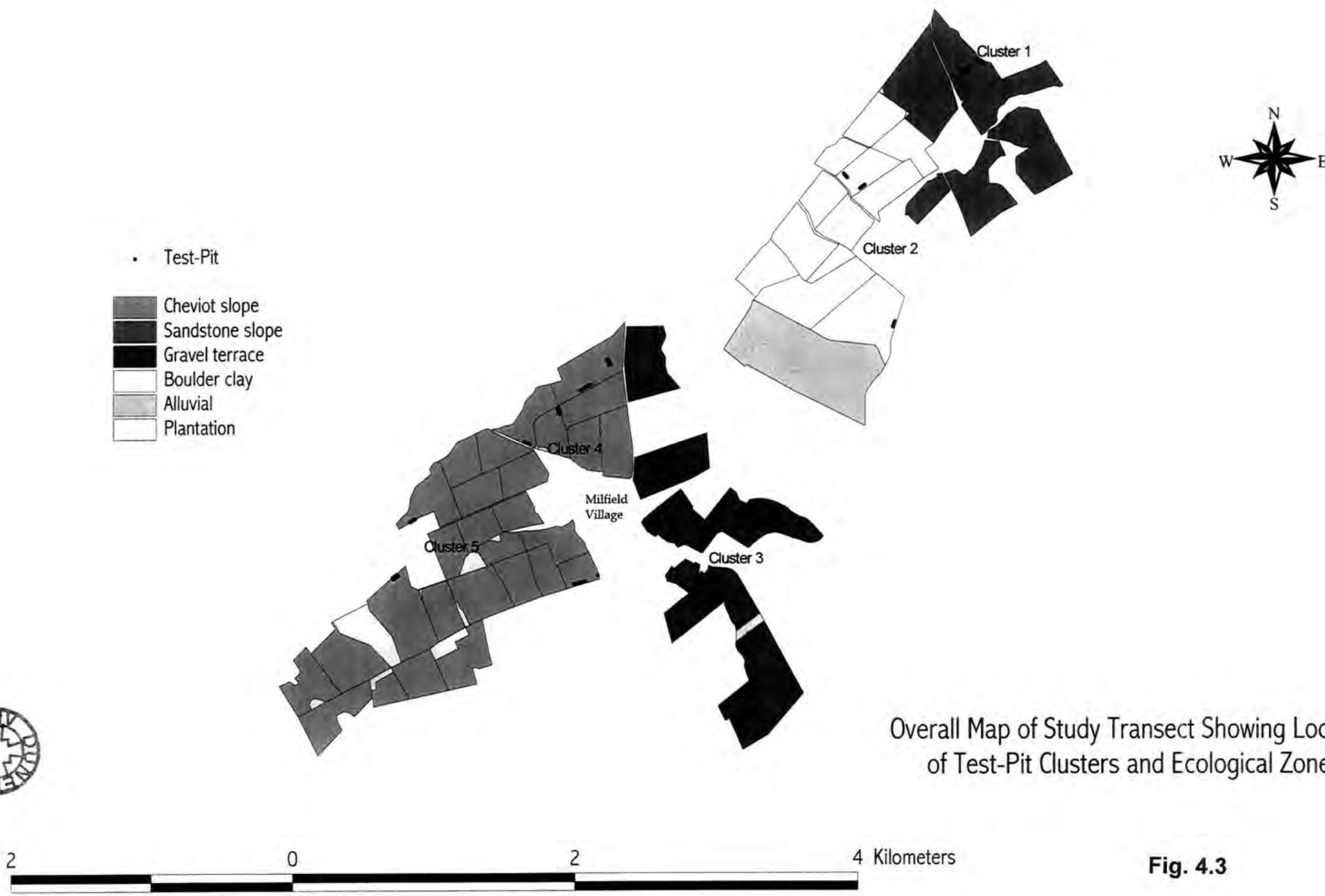


Ecological Zones Across The Transect With Field Numbers

Fig. 4.1

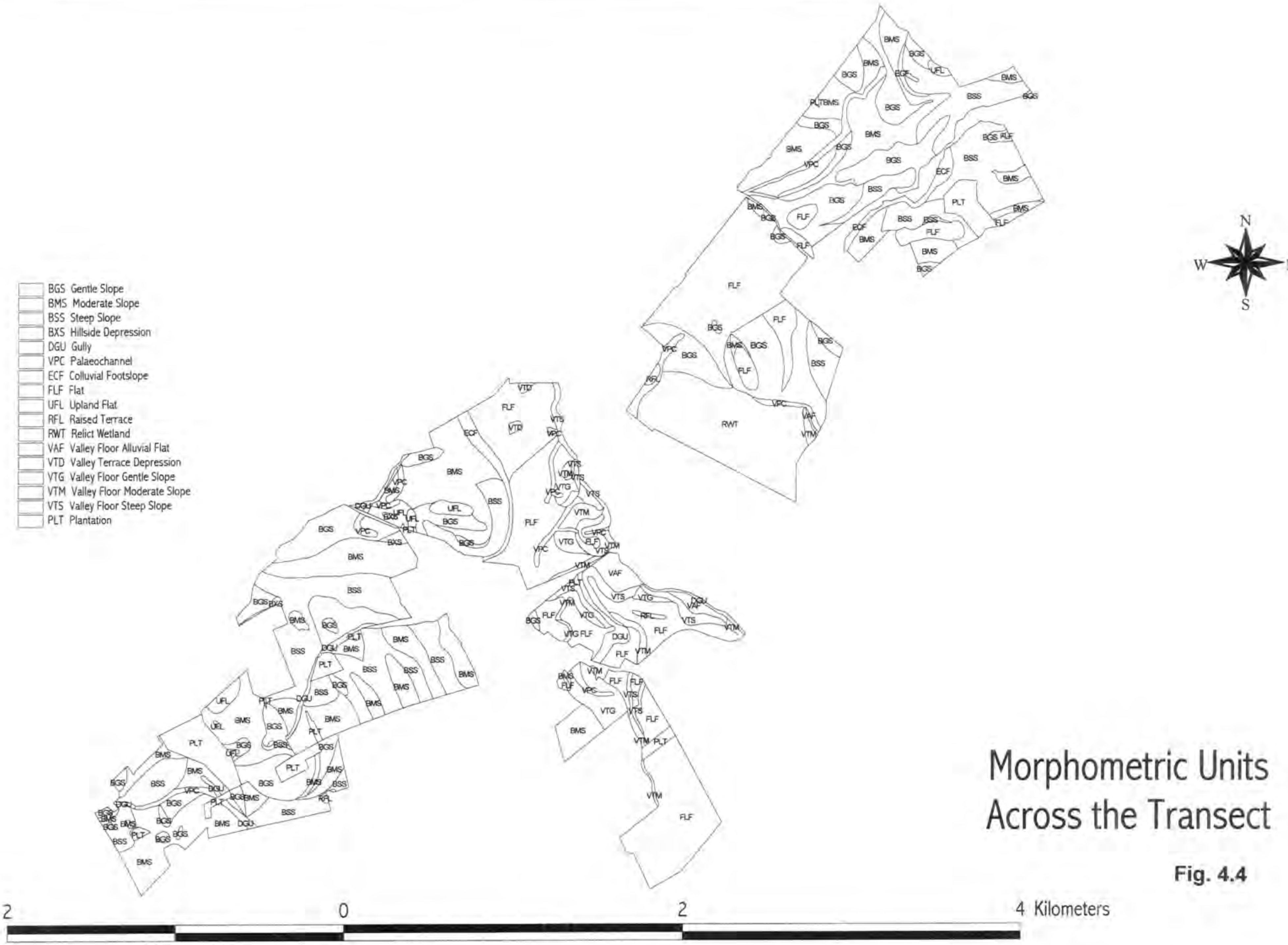
All Fieldwalking Findspots

Fig. 4.2



Overall Map of Study Transect Showing Location of Test-Pit Clusters and Ecological Zones

Fig. 4.3



Morphometric Units
Across the Transect

Fig. 4.4

FIELDWALKING DATA

General Information

The fieldwalking transect was walked over a period of three years from spring 1995 through to early summer 1997. It was fortunate that during this period the different farmers who manage the land on either side of the valley ploughed fields normally given over to pasture. These shallow ploughing episodes, only undertaken once a decade to replant grass seed, allowed fieldwalking to take place right up to the watershed on each side of the valley. As the valley floor is much narrower than the valley sides in the area of the study transect it was decided to extend the transect width on the valley floor to gain a more even coverage of the gravel terraces. In the event, however, the availability of fields for surface inspection meant that coverage for each of the different ecological zones could not be kept exactly the same. A total of 61 fields could be examined by fieldwalking. More or less even coverage for the gravel terraces, boulder clays and sandstones was achieved (Figure 4.5) while approximately half this was achieved for the alluvial environment and double for the Cheviot slopes (Figure 4.5). As no part of the Cheviot hills has ever been subjected to a programme of systematic fieldwalking before, it was thought vital that this zone was extensively sampled.

Figure 4.5 General Summary of Fieldwalking Data by Ecological Zone.
(The results in this table do not include the second walk of field 2 or the lithic data from the test-pits).

Ecozone	No. Fields	Total Area Sampled (ha.)	Total No. Lithics	Actual Density of Lithics per ha. (20%)	Adjusted No. Lithics (x5)	Adjusted density per ha. (100%)
Cheviot valley side	27	239.68	283	**1.18**	1280	5.9
Gravel terrace	11	108.40	203	**1.87**	1145	9.4
Alluvial	1	47.55	5	**0.11**	25	0.5
Boulder clay	11	116.21	47	**0.40**	240	2.0
Sandstone	11	87.33	128	**1.46**	640	7.3
Total	**61**	**599.17**	**666**			
Average Density for whole landscape				**1.1**		**5.6**

The fieldwalking transect measured 7.01km in length and varied in width from 3.019km to 0.553km with an average width of 1.3km (Figure 4.1). The total area of ground sampled by the transect was 599.17ha producing a total lithic count of 666 pieces. Each area was walked once at the 20% coverage rate (one person every 10m). If the second walk of field 2 is included, which was undertaken as part of the pilot-study (see above, Chapter 3), the total lithic count is 693. As the second walk on field 2 resampled an area already sampled at the standard coverage rate, the results from the secondary walk have not been included in subsequent density counts as this would over-represent the density count for this area. Consequently, the total lithic count of the 20% coverage (666 pieces) has been used in all subsequent density calculations. Four of the lithics from this fieldwalking total do not, however, have any data as they were unfortunately mislaid before analysis.

All lithics from the test-pits have been excluded from calculations of the fieldwalking lithics as these would also distort the pattern obtained from the surface survey. The 147 test-pits produced a total of 97 lithics. The total lithic count, therefore, from all the fieldwalking and test-pits combined is 790. From this total lithic count 57% (448) were deemed chronologically classifiable while 43% (342) remained unclassifiable. Overall, the lithic count for this large sampling area appears small when compared with flint-rich areas such as Hampshire (Schofield 1991b) and Lincolnshire (Phillips 1989). However, with an overall lithic density of 1.1 per ha. at the 20% coverage rate this registers as an average count compared with other parts of north-east England (Figure 4.6). However, as will be described below, this statistic for the Milfield data significantly under-represents the actual lithic values for this area.

Figure 4.6 Comparative Lithic Densities from Regions in North-East England

Location	Raw Density per ha. (20% coverage)	Reference
Milfield Basin	1.10	This Study
Wear Lowlands	0.05	Haselgrove and Healey 1992, 3
East Durham Plateau	0.11	Haselgrove and Healey 1992, 4
East Durham & Cleveland Coast	2.60	Haselgrove and Healey 1992, 6
Tees Lowlands	0.06	Haselgrove and Healey 1992, 13
Middle Tees Valley	0.61	Haselgrove and Healey 1992, 14
Lower Tyne Valley	2.00	(calculated from) Tolan-Smith 1997c, 82

Density and Under-Representation

Critical to the understanding of the Milfield basin data set is the degree to which the lithic population is under-represented in the visible surface sample. A series of influences can be identified which combine to create unique circumstances that inherently under-represent the lithic record in this area.

Firstly, the steep slopes and intense agricultural exploitation in the past of both the Cheviot Hills and sandstone escarpment mean that colluviation takes place on a larger scale in this landscape than in the lower reaches of the Tyne Valley or the north-east coastal plain, for example, where slopes are generally less steep. The result is that a very significant proportion of the lithics from these slope environments of the Milfield landscape have been dislodged, transported and ultimately buried in colluvial drapes and positive lynchets where they cannot be sampled by surface survey (see below, this Chapter).

Secondly, non-flint lithic material which includes agate, chert, volcanic material and quartz is difficult to recognise in the field, being less shiny than flint and less easy to recognise as having been worked. Furthermore, its wear and chipping signatures are also very difficult to detect with certainty. Given that these non-flint lithic materials account for precisely 40% of the Milfield lithic assemblage (flint lithics account for the other 60%) they form a significant component of the lithic population and probably remain significantly under-represented in the fieldwalking sample.

Thirdly, the excessively stony nature of the soils overlying the wide expanses of the gravel terraces and Cheviot slopes makes differentiation of any specific type of stone artefact extremely difficult. This problem is particularly acute in bright sunlight when all small faceted stones are shiny. Therefore, optimum results on the gravel terraces and steep Cheviot slopes were only achievable when these surfaces were walked after light rain in dull overcast conditions. However, as the fieldwalking programme was not able to be structured so as to respond to the best daily weather pattern many of the gravel terrace and Cheviot slope fields were walked under less than optimum conditions. The result is that the counts for the gravel terraces and Cheviot slopes are almost always under-representative of the actual surface population.

Fourthly, as the results described below will show, a marked frugality to lithic discard throughout the Mesolithic and Early Neolithic periods means that the original lithic population was always going to be smaller than in flint-rich areas where a more profligate attitude to lithic discard predominated, even if human population levels were the same. Furthermore, as a result of this discard reticence much material is reworked and ultimately pared down to a very small size before it is discarded, which again substantially hinders recognition in the field.

Different landscapes with differing access to raw materials encourage different strategies for coping with flint scarcity or abundance (Waddington in press a). Consequently, uncritical use of density counts as an indication of intensity and character of prehistoric settlement must be resisted as density counts are relative to the landscapes in which they are situated. Therefore, the character of lithic curation and discard and recovery biases must be assessed before an area is classified as being intensively or non-intensively settled during prehistory. Each landscape has its own threshold for lithic densities and these can only be established once all the different ecological areas of a given landscape have been sampled and recovery biases identified. In this case, the discussion above highlights the inherently low lithic density for the Milfield landscape in comparison to other flint-rich regions and other parts of north-east England. However, this does not mean that the Milfield area was any less densely settled during prehistory. For example, most of the lithic material from the higher density Durham coast assemblages which have been examined by the author (1996; 1998) represent the primary and secondary stages in the core reduction sequence, while the majority of the Milfield data represents the tertiary stage of the sequence (see below Figure 4.39). Therefore, considering Schofield's model of expected assemblage characteristics for different activities (1991, 119), which is reproduced below (Figure 4.7), it is suggested that the lithic data for the Milfield basin indicates an area of extensive prehistoric settlement while an area such as the Durham coastal strip appears to have been used predominantly as an extraction area with episodic visits for the acquisition of flint.

Figure 4.7 Schofield's 'Expected assemblage characteristics for domestic and industrial areas assuming a policy of extra-home range production' (ie.where flint is imported from a source area some distance from the main settlement area), (1991, 119).

Activity	**Density**	**Primary Waste**	**Tools**	**Cores**
Settlement	Low	Low	High	High
Industrial	High	High	Low	Low

Thus, although the overall surface density of the Milfield assemblage is lower than that for the Durham coast (see above Fig. 4.6), the Milfield area was probably more intensively occupied with a greater concentration of settlement throughout prehistory than the Durham coast where the 'extractive' activities in a flint-bearing area have resulted in a relative super-abundance of surface material. It is more important, therefore, for landscape studies to maintain internal consistency and only compare raw results with those from different areas when the character of the assemblages, availability of raw materials, distorting effects such as specific taphonomic processes or recovery bias' and attitudes to lithic discard have been accounted for in each assemblage. It is only then that meaningful comparison between different landscape data sets can be effectively undertaken. In this case although the density threshold of the Milfield data set is around the mean average for north-east England (Figure 4.6) the character of the assemblage suggests that it represents one of the most intensively settled areas of the north-east given the low density, low proportion of primary waste but high proportions of tools and cores.

Assemblage Chronology

The way a lithic data set is divided up chronologically makes implicit assumptions about changing patterns of past human behaviour. Another fieldwalking study in north-east England (Tolan-Smith 1997c, 82) has divided up the lithic material into (a) Mesolithic, (b) Neolithic and Bronze Age and (c) unclassified, and this framework has led the author to interpret the distinction between the patterning of group (a) and (b) lithics as representing the displacement of indigenous hunter-gatherer groups by incoming farming communities respectively (Tolan-Smith 1996a). This division of the lithic data may be considered as oversimplifying a complex set of data which does not actually stand up to such a stark division between just two periods. This model of explanation assumes there to be no overlap between Mesolithic and later flintwork and hence the twofold chronological classification. However, continuities between Late Mesolithic and Early Neolithic flintwork have long been recognised (Pitts and Jacobi 1979; Healy 1984b; Bradley 1987b; Edmonds 1995). In this case, by not recognising the continuity of narrow parallel-sided blade technology through the Late Mesolithic and into the Early Neolithic many potentially Early Neolithic flints are placed in the Mesolithic category under Tolan-Smith's classification. However, recent excavations on an Early Neolithic settlement site in Northumberland near Bolam Lake (Waddington and Davies 1998) produced lithics which would have been traditionally ascribed to the Mesolithic period under such a classification (see below Chapter 6, Figure 6.12) but in this case were recovered from Early Neolithic contexts containing Grimston Ware pottery and producing radiocarbon dates of 4910 +/-70bp and 4880 +/-80bp (Waddington in press), demonstrating that some Early Neolithic and Late Mesolithic flintwork is indistinguishable.

This is a key observation and it has important implications for the interpretation of surface lithic scatters. This problem has been dealt with here by creating a third category of lithics aimed at grouping together Early Neolithic material, which in this case meant that where chronologically indistinguishable narrow parallel-sided blade tools occurred these were placed in a 'Mesolithic-Neolithic Transition' category along with all the diagnostically Early Neolithic flints (see below). In this way the technological continuity between the Mesolithic and Early Neolithic is accounted for and the Early Neolithic period component, as often considered to be represented by leaf-shaped arrowheads only, prevented from being conflated into the Late Mesolithic. Thus, lithic pattern dislocations, potentially caused by subsuming Early Neolithic material into the Mesolithic by the use of an assumed twofold classification system, is averted. It is important to remind ourselves of the apposite observation made by Zvelebil *et al* that "links between changes in human behaviour and chronological frameworks have to be demonstrated not assumed" (1992, 202).

The lithic material for the basin does not divide up chronologically into traditional technological periods such as the 'Mesolithic', 'Neolithic' and 'Bronze Age' as advocated by Tolan-Smith (1997c). Rather, given the overlaps in manufacturing techniques recently identified between these periods (e.g. Pitts and Jacobi 1979; Healy 1984b; Bradley 1987b; Edmonds 1995; Waddington in press) the assemblage was considered to divide into four distinguishable categories; (1) Mesolithic, (2) Late Mesolithic-Early Neolithic transition, (3) Late Neolithic-Early Bronze Age, and (4) unclassified (for examples see Appendix 2). Given the overlap between the Late Mesolithic and Early Neolithic industries, which both rely on a narrow parallel-sided blade technology (Pitts and Jacobi 1979; Healy 1984b; Bradley 1987b; Edmonds 1995) and employ artefact types common to both periods (e.g. end-scrapers, serrated blades and other narrow-blade tools), such artefacts could not be legitimately ascribed to either the Mesolithic or Early

Neolithic. To overcome this problem it was decided to place tools that could not be definitely ascribed to one of the periods into a Mesolithic-Neolithic transition category. It was also decided to include the definite Early Neolithic material in this category, so that in chronological terms, it aimed to cover the period c.5000-3000BC. The Mesolithic category of material was used for all lithics with definite Mesolithic traits and in chronological terms most will date from before c.5000BC. The Late Neolithic-Early Bronze Age category was used for all lithics with later diagnostic characteristics such as barbed and tanged arrowheads, other tanged tools, side scrapers, invasively retouched tools (except leaf-shaped arrowheads), plano-convex knives and so on and that in chronological terms are generally thought to date from the Late Neolithic and Early Bronze Age c.3000-1400BC (Edmonds 1995). The chronological divisions employed during this study are summarised in Figure 4.9 below.

Figure 4.8 Chronological Divisions Used for the Lithic Assemblage

Period	**Suggested Date Range**
Mesolithic	8500-5000BC
Mesolithic-Neolithic Transition	5000-3000BC
Late Neolithic-Early Bronze Age	3000-1400BC
Unclassified	?

The lithics were categorised according to conventional typological schemes (see above Chapter 3, Figure 3.4) with reference to Clark (1932; 1934; 1971), Edmonds (1995), Green (1980), Healy (1984a), Jacobi (1978), Pitts (1978), Pitts and Jacobi (1979), Saville (1990) and Watson (1968). Discussion of aspects of the assemblage with local specialists Dr. Joan Weyman, John Davies, and Dr. Rob Young was undertaken as well as discussions with other lithic specialists including Dr. Joshua Pollard and Dr. Bill Finlayson. Illustrated examples of lithics categorised into their respective periods are provided in Appendix 2. The chronological classification of lithics remains a problematic area and re-evaluation of previous work and development of a new scheme was deemed beyond the scope of this study. However, with first-hand experience of excavating lithics from a variety of radiocarbon dated contexts in Northumberland (e.g. excavations at Coupland and Bolam Lake), and the re-examination of museum collections from the area (e.g. Museum of Antiquities, Newcastle upon Tyne, Sunderland Museum), familiarity with north-east lithic chronologies was gained.

Fieldwalking Results

The fieldwalking raw data is presented in a variety of ways to allow different trends to be distinguished. Figure 4.9 summarises the fieldwalking by individual field. Each field was given a unique number and that number relates to the numbering shown in Figure 4.1. The layout of these results is adapted from that used in the Durham Archaeological Survey (Haselgrove *et al* 1988) as it provides an easy-to-use reference chart for rapid characterisation of each field. Field 2 has two entries as this was the field where the pilot study took place (see above, Chapter 3), resulting in it being walked twice. Fields 15 and 30 were walked as separate entities during the fieldwork but since then the two fields have been joined into one and so the results for the two fields have been combined and entered as one entry. Particularly high values can be noted for fields 2, 3, 5, 7, 8, 19, 29, 31, 42, 49, 60 and 61 (Figure 4.5). It can be noted that the two fields with the highest densities (42 and 49) are both on the gravel terraces.

As each of the identified ecological zones contains its own unique topography, soil types, flora, and in some cases fauna, it was assumed that human activity across these different zones would vary and that these variations in exploitation of different niches in the landscape would change over time. Figure 4.10 summarises lithic densities in relation to the different ecological zones for each different chronological period and also as an aggregate for all periods. These tables are considered useful as they indicate in broad terms the level of activity in the different parts of the Milfield landscape through time. For each of the periods the ecological zones are ranked from highest to lowest density. Patterns and inferences identified in this data are described in the 'Analysis' section below.

Summary of Fieldwalking Results by Field

Field	NGR	Parish	Ecological Zone	Field Size (ha.)	Count per ha.(actual)	Count per ha. (adjusted)	Struck Pebbles	Cores	Flakes and Blades	Retouched/Utilised	Total
1	NT925343	Milfield	Cheviots	7.54	1.7	8.6		1	5	7	13
2	NT927345	Milfield	Cheviots	6.28	1.4	7.2		2	4	3	9
	2nd walk				(4.3) 2.2	10.7		2	5	20	27
3	NT930348	Milfield	Cheviots	9.66	4.5	22.3		3	16	24	43
4	NT940329	Ewart	Gravel Terrace	8.1	0.9	4.3		3		4	7
5	NT929350	Milfield	Cheviots	13.56	2.1	10.3		3	5	20	28
6	NT939334	Milfield	Gravel Terrace	8.42	1.2	5.9		1	2	7	10
7	NT964366	Ford	Sandstones	5.55	2.5	12.6		1	4	9	14
8	NT964369	Ford	Sandstones	7.47	2.1	10.7			4	12	16
9	NT965364	Ford	Sandstone	7.08	1	4.9		1	5	1	7
10	NT942339	Milfield	Gravel Terrace	13.26	0.5	2.6		1	3	3	7
11	NT917332	Milfield	Cheviots	17.56	0.7	3.4		1	3	8	12
12	NT920337	Milfield	Cheviots	6.99	0.9	4.3		1		5	6
13	NT923334	Milfield	Cheviots	11.85	1.2	5.9		3	1	10	14
14	NT919340	Milfield	Cheviots	10.25	0.1	0.5				1	1
16	NT922341	Milfield	Cheviots	7.86	1	5.1		2	3	3	8
17	NT922338	Milfield	Cheviots	6.08	0.5	2.5		1	2		3
18	NT925340	Milfield	Cheviots	6.21	1.1	5.6	1	2	2	2	7
19	NT924337	Milfield	Cheviots	5.05	3.2	15.8			9	7	16
21	NT925335	Milfield	Cheviots	7.67	0.4	2.0		1	1	1	3
22	NT927336	Milfield	Cheviots	6.05	1.3	6.6		3	2	3	8
23	NT929336	Milfield	Cheviots	4.82	0.0	0.0					0
25	NT928337	Milfield	Cheviots	7.83	0.4	1.9			3		3
27	NT929345	Milfield	Cheviots	7.63	1.2	5.9		1	1	7	9
29	NT932345	Milfield	Cheviots	10.23	2.1	10.3		6	5	10	21
15 and 30	NT923344	Milfield	Cheviots	13.89	0.5	2.5		3	1	3	7
31	NT925346	Milfield	Cheviots	7.62	2.9	14.4		2	5	15	22
32	NT919328	Milfield	Cheviots	8.37	0.7	3.6			2	4	6
33	NT923328	Milfield	Cheviots	10.47	0.3	1.4			1	2	3
34	NT917326	Milfield	Cheviots	3.99	1.0	5.0				4	4
35	NT914328	Milfield	Cheviots	13.78	0.7	3.3			4	5	9

Figure 4.9

36	NT912324	Milfield	Cheviots	10.92	0.6	3.2			2	5	7
37	NT911327	Milfield	Cheviots	9.72	0.9	4.6		1	2	6	9
39	NT960364	Ford	Sandstones	7.89	1.6	8.2		1		12	13
40	NT960367	Ford	Sandstones	14.47	0.6	2.8		2	1	5	8
41	NT933353	Milfield	Gravel Terrace	5.77	1.4	6.9		1	3	4	8
42	NT933350	Milfield	Gravel Terrace	8.93	6.8	34.2	(1 missing)	11	8	41	61
46	NT934343	Milfield	Gravel Terrace	7.44	2.4	12.1		3	4	11	18
47	NT937344	Milfield	Gravel Terrace	7.72	2.2	11.0	1	5	2	9	17
49	NT940340	Milfield	Gravel Terrace	4.68	5.3	26.7	2 (+1missing)	3	4	15	25
50	NT936341	Milfield	Gravel Terrace	12.5	1.8	9.2		7	6	10	23
52	NT936337	Milfield	Gravel Terrace	3.34	2.1	10.5		1	4	2	7
54	NT935334	Milfield	Gravel Terrace	9.11	2.2	11.0	1	2	4	13	20
55	NT953363	Ford	Boulder Clay	5.23	0.2	1.0			1		1
56	NT956364	Ford	Boulder Clay	8.84	0.7	3.4		1	3	2	6
57	NT958363	Ford	Boulder Clay	9.08	0.7	3.3	(1 gun flint)			5	6
58	NT956360	Ford	Boulder Clay	8.87	0.6	2.8		2	2	1	5
59	NT955362	Ford	Boulder Clay	7.6	0.3	1.3			2		2
60	NT962359	Ford	Sandstones	7.41	4.2	20.9		1	14	16	31
61	NT962357	Ford	Sandstones	8.08	2.1	10.5		1	6	10	17
62	NT967358	Ford	Sandstones	9.24	0.5	2.7	1			4	5
63	NT966362	Ford	Sandstones	8.96	0.7	3.3		1		5	6
67	NT967365	Ford	Sandstones	5.75	0.7	3.5			1	3	4
81	NT953352	Ford	Boulder Clay	20.28	0.7	3.5	1	1	2	10	14
82	NT920333	Milfield	Cheviots	7.81	1.5	7.7		3	1	8	12
83	NT953358	Ford	Boulder Clay	8.56	0.1	0.6				1	1
84	NT951360	Ford	Boulder Clay	7.2	0.1	0.7			1		1
85	NT949358	Ford	Boulder Clay	12.01	0.2	1.2		1		2	3
86	NT958358	Ford	Sandstones	5.45	1.5	7.3		2	4	2	8
87	NT946356	Ford	Boulder Clay	8.82	0.1	0.6			1		1
88	NT948349	Ford	Alluvial Wetland	47.55	0.1	0.5				5	5
89	NT950354	Ford	Boulder Clay	19.69	0.4	2.0		1	3	4	8
Total							**7 (+2 missing)**	**95**	**179**	**411**	**695**
This table includes lithics from the fieldwalking only (ie. excludes the test-pit data and 5 unprovenanced flints)											

Figure 4.9

Fieldwalking Densities by Ecological Zone

Ecological Zone	Total Area (ha.)	Total Lithic Count	Density per ha. (actual)	Density per ha. (adjusted)
Gravel Terrace	108.4	203	**1.87**	9.4
Sandstone Slope	87.33	128	**1.47**	7.3
Cheviot Slope	239.68	283	**1.18**	5.9
Boulder Clay	116.21	47	**0.40**	2.0
Alluvial	47.55	5	**0.11**	0.5

Lithic Densities by Period and Ecological Zone

Mesolithic

Ecological Zone	Total Area (ha.)	Total Mesolithic Finds	Density per ha. (actual)	Density per ha. (adjusted)
Gravel Terrace	108.4	65	**0.60**	3.0
Sandstone Slope	87.33	39	**0.45**	2.2
Cheviot Slope	239.68	65	**0.27**	1.4
Alluvial	47.55	3	**0.06**	0.3
Boulder Clay	116.21	6	**0.05**	0.3

Mesolithic-Neolithic Transition

Ecological Zone	Total Area (ha.)	Total M-N Transition Finds	Density per ha. (actual)	Density per ha. (adjusted)
Gravel Terrace	108.4	54	**0.50**	2.5
Cheviot Slope	239.68	78	**0.33**	1.6
Sandstone Slope	87.33	8	**0.09**	0.5
Alluvial	47.55	2	**0.04**	0.2
Boulder Clay	116.21	2	**0.02**	0.1

Late Neolithic-Early Bronze Age

Ecological Zone	Total Area (ha.)	Total Late Neo-BA Finds	Density per ha. (actual)	Density per ha. (adjusted)
Sandstone Slope	87.33	12	**0.14**	0.7
Cheviot Slope	239.68	23	**0.10**	0.5
Gravel Terrace	108.4	11	**0.10**	0.5
Boulder Clay	116.21	5	**0.04**	0.2
Alluvial	47.55	0	**0.00**	0.0

Unclassified

Ecological Zone	Total Area (ha.)	Total Late Neo-BA Finds	Density per ha. (actual)	Density per ha. (adjusted)
Sandstone Slope	87.33	69	**0.79**	4.0
Gravel Terrace	108.4	73	**0.67**	3.4
Cheviot Slope	239.68	117	**0.49**	2.4
Boulder Clay	116.21	34	**0.29**	1.5
Alluvial	47.55	0	**0.00**	0.0

This table includes lithics from the fieldwalking only (ie. excludes the test-pit data and two missing fieldwalking finds)

Each table is ranked with the ecozone of highest density first for each period

Figure 4.10

TEST PIT DATA

A total of 146 test-pits were excavated (see above, Figure 4.3) across the study transect. Each test-pit was recorded on a test-pit record sheet with an annotated sketch of the stratigraphic section together with details of all finds and the depth at which they were found.

The test-pit strategy was aimed at sampling from all the main types of morphometric (slope) units encountered on each side of the valley (see above, Chapter 3). The detailed maps (Figures 4.11 - 4.15) show the siting of each set of test-pits within a given morphometric unit together with the field in which this sampling took place. Each 'Test-Pit Cluster' referred to in each of these figures only refers to the cluster areas shown on the overall test-pit location map (Figure 4.3) where each individual test-pit location is obscured. The breakdown of lithic density by period and morphometric units and by period and ecological zones is given in Appendix 3.

Figure 4.16 summarises all of the data for each pit in numerical order from 10001-10146. This table provides a quick reference for where each test-pit was located, what was found and the spit level (depth) at which finds were located.

The sediment logs for the test-pits were found to be internally consistent for each group of test-pits dug within a given morphometric unit. That is, each pit within the same morphometric unit contained the same stratigraphic sequence and in nearly all cases the depth of each sediment was the same. A representative sediment profile for each of the sampled morphometric units is presented in the schematic sections of the valley (Figures 4.17 and 4.18). These schematic sections across the Till valley show the sandstone (east) valley side in Figure 4.17 and the Cheviot (west) valley side in Figure 4.18. These diagrams relate the test-pit sections to the morphometric units and the ecological zones in which they were excavated.

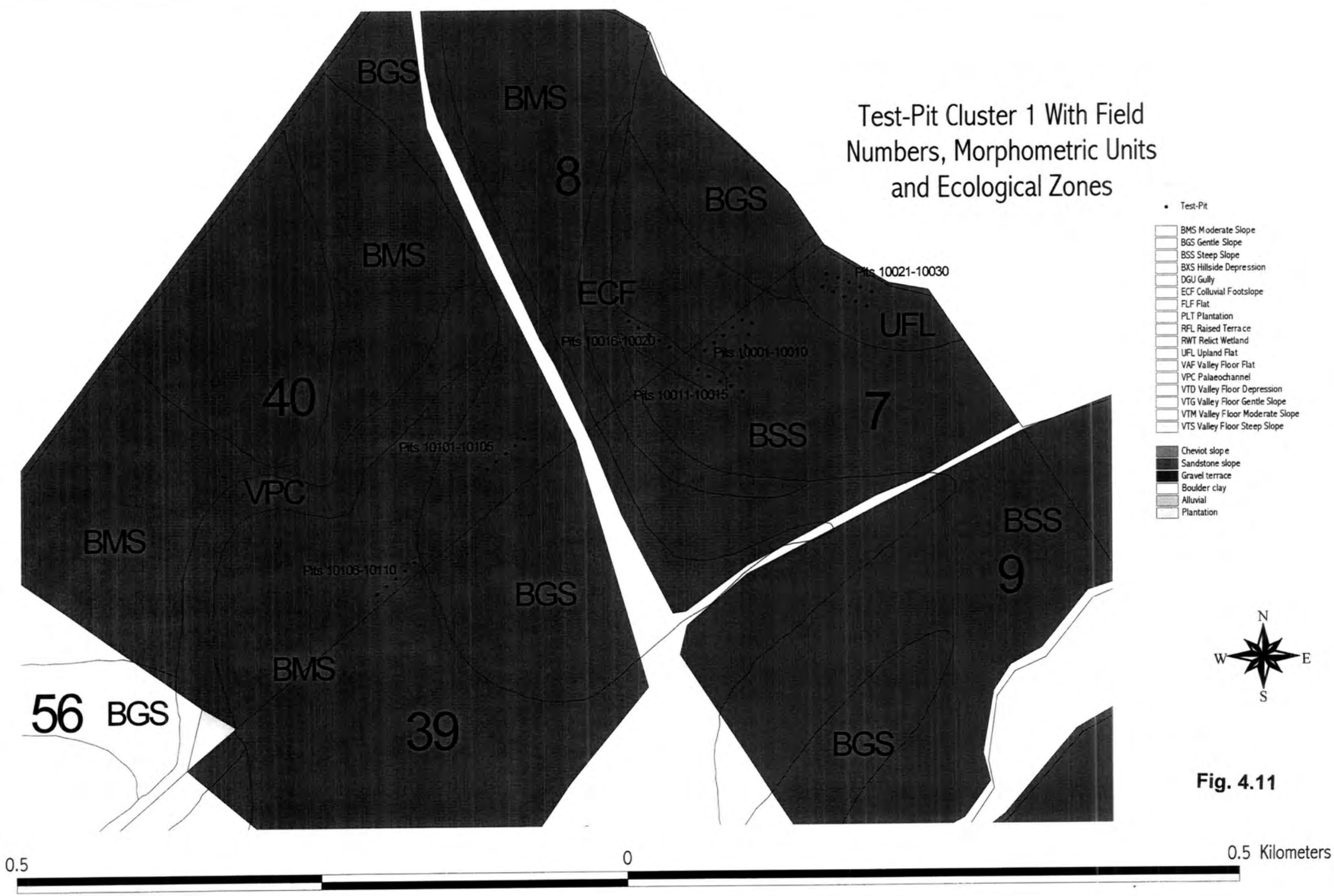
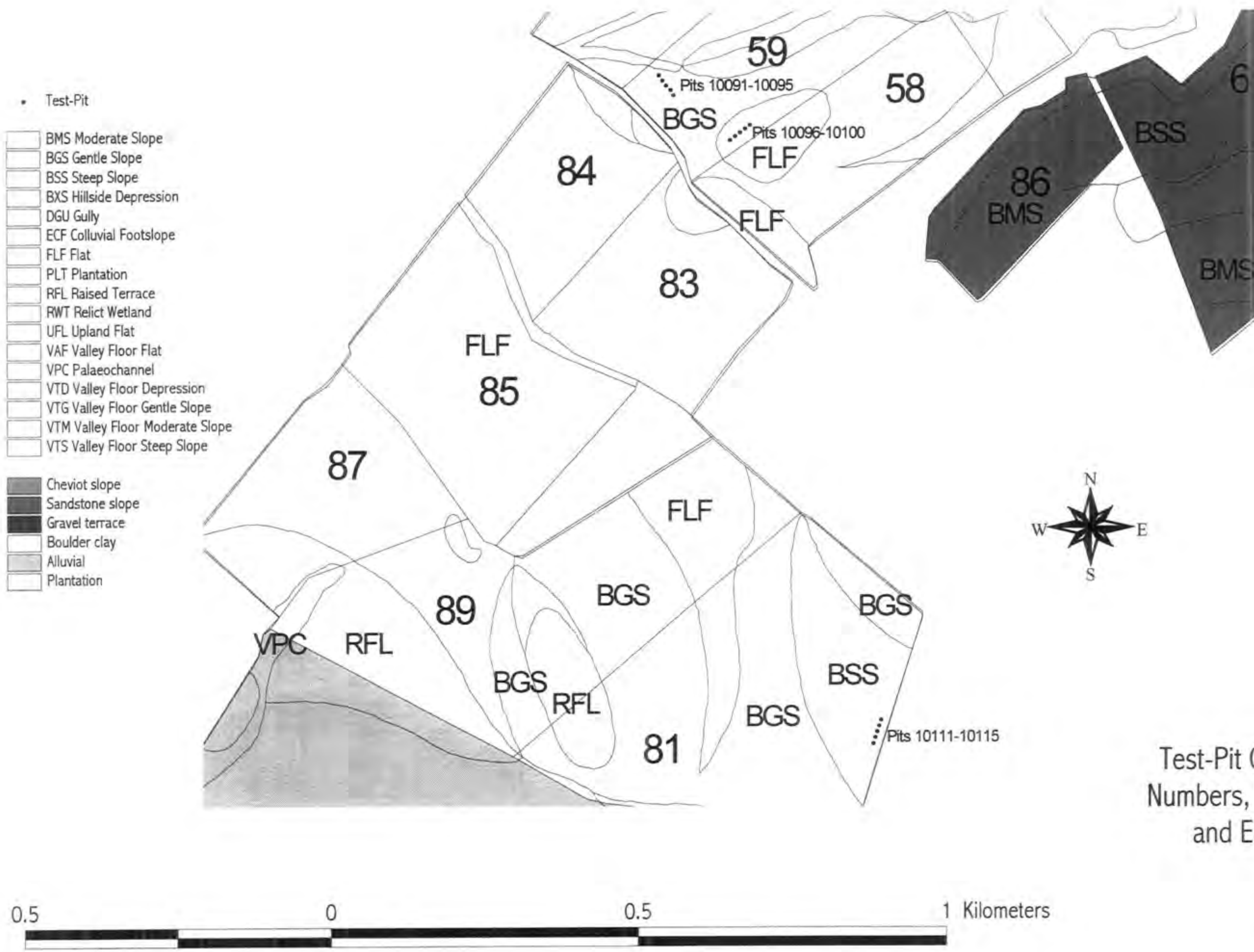
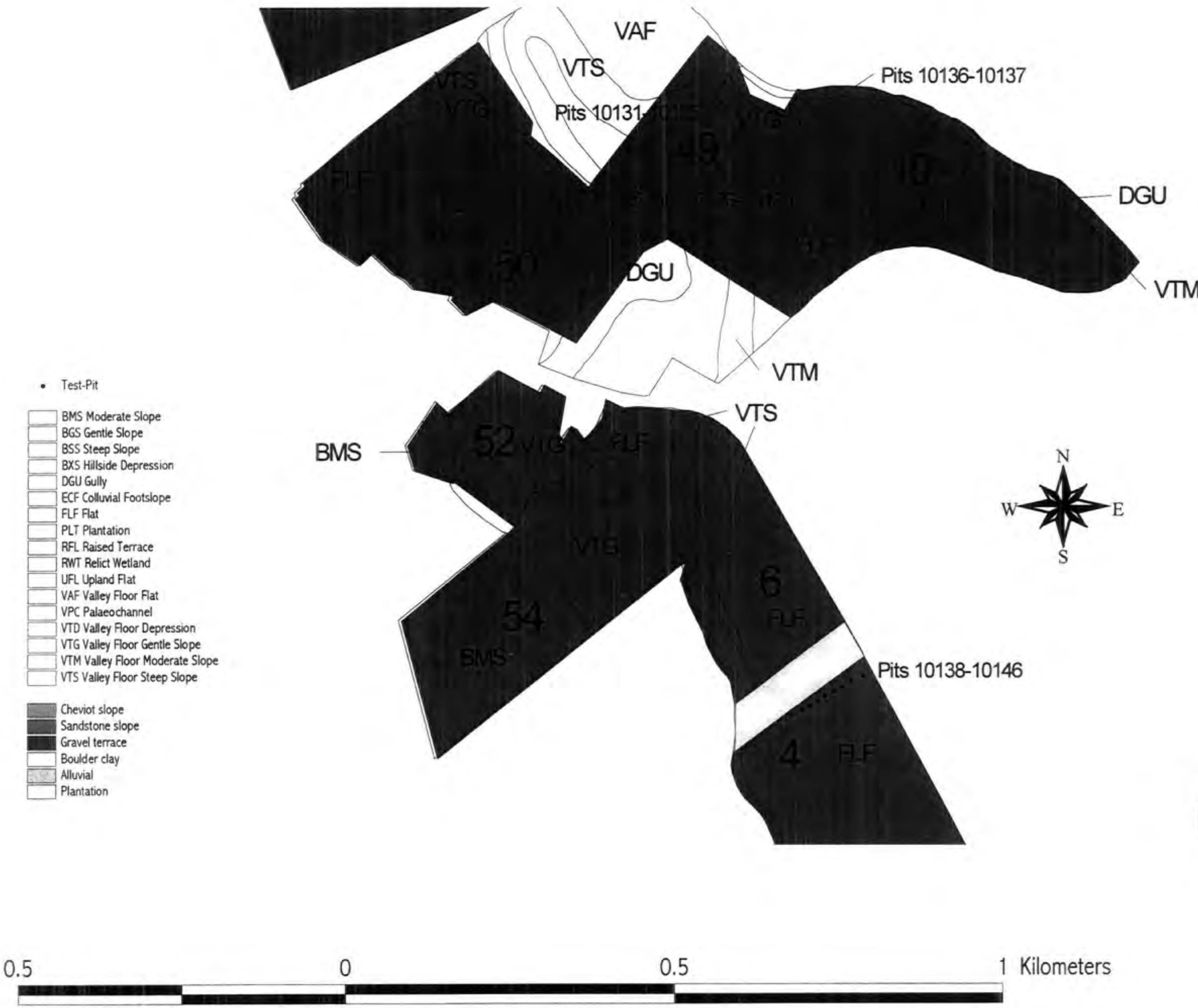

Test-Pit Cluster 1 With Field Numbers, Morphometric Units and Ecological Zones
Test-Pit
BMS Moderate Slope
BGS Gentle Slope
BSS Steep Slope
BXS Hillside Depression
DGU Gully
ECF Colluvial Footslope
FLF Flat
PLT Plantation
RFL Raised Terrace
RWT Relict Wetland
UFL Upland Flat
VAF Valley Floor Flat
VPC Palaeochannel
VTD Valley Floor Depression
VTG Valley Floor Gentle Slope
VTM Valley Floor Moderate Slope
VTS Valley Floor Steep Slope
Cheviot slope
Sandstone slope
Gravel terrace
Boulder clay
Alluvial
Plantation
BGS
BMS
8
BGS
BMS
ECF
Pits 10021-10030
UFL
Pits 10016-10020
Pits 10001-10010
Pits 10011-10015
40
7
BSS
Pits 10101-10105
VPC
BSS
BMS
9
Pits 10106-10110
BGS
BMS
56 BGS
39
BGS
N
W
E
S
0.5
0
0.5 Kilometers

Fig. 4.11



Test-Pit Cluster 2 With Field Numbers, Morphometric Units and Ecological Zones

Fig. 4.12

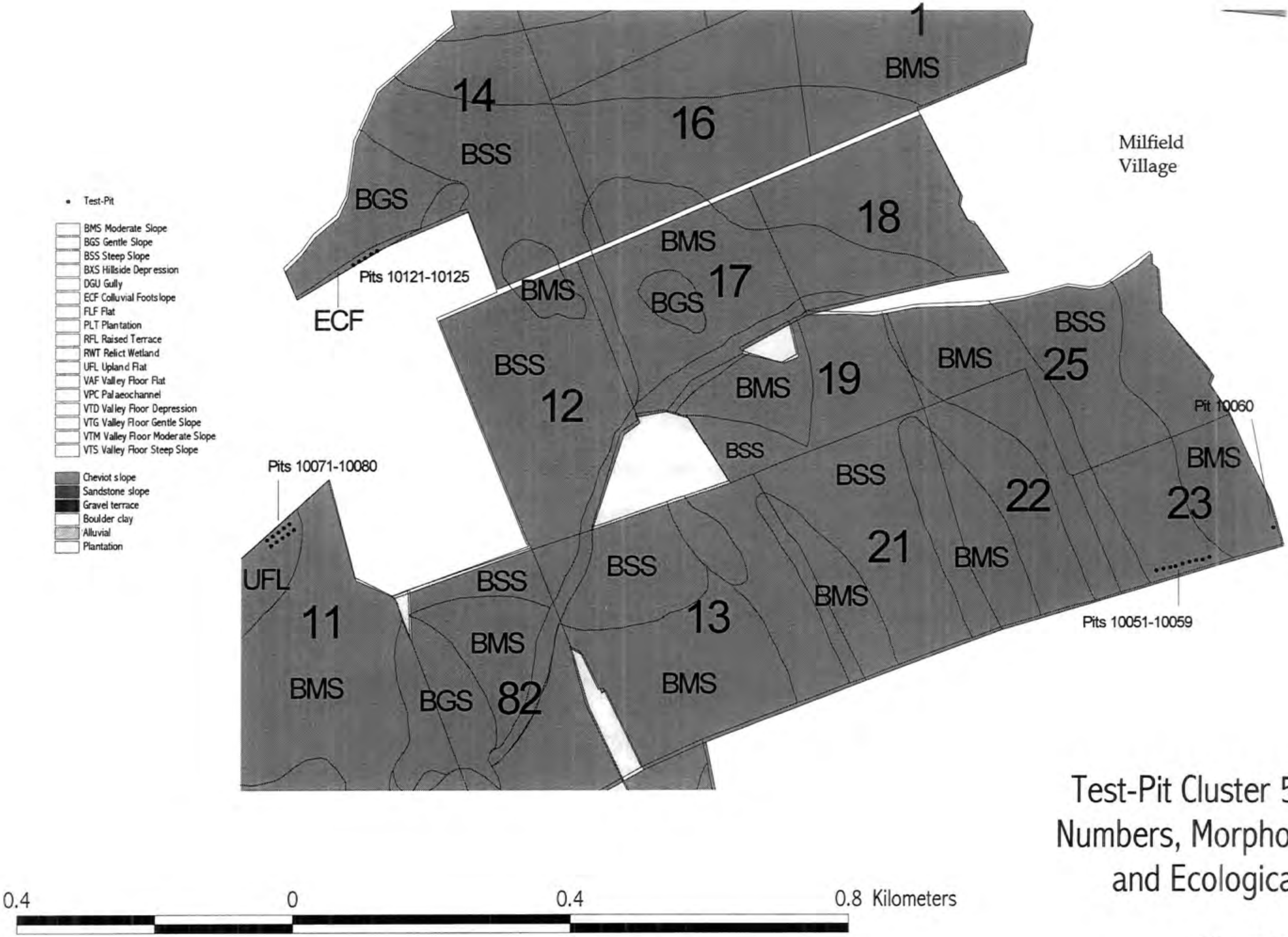


Test-Pit Cluster 3 With Field Numbers, Morphometric Units and Ecological Zones

Fig. 4.13

Fig. 4.14

Test-Pit Cluster 4 With Field Numbers, Morphometric Units and Ecological Zones



Test-Pit Cluster 5 With Field Numbers, Morphometric Units and Ecological Zones

Fig. 4.15

Test-Pit Raw Data by Pit								
Pit No.	**Morphometric Unit**	**Code**	**Ecological Zone**	**No.Lithics**	**Spit**	**Weight(g)**	**Lithic Type**	**Period**
10001	Steep Slope	BSS	Sandstone Slope	0				
10002	Steep Slope	BSS	Sandstone Slope	0				
10003	Steep Slope	BSS	Sandstone Slope	0				
10004	Steep Slope	BSS	Sandstone Slope	2	1	0.44	unclass tool	late mes
					2	0.45	flake	unclassified
10005	Steep Slope	BSS	Sandstone Slope	2	7	2.44	blade	late mes-early neo
					7	0.26	microlith	mesolithic
10006	Steep Slope	BSS	Sandstone Slope	1	7	0.6	unclass tool	late mesolithic
10007	Steep Slope	BSS	Sandstone Slope	2	1	0.32	unclass tool	late mesolithic
					3	1.59	unclass tool	mesolithic
10008	Steep Slope	BSS	Sandstone Slope	0				
10009	Steep Slope	BSS	Sandstone Slope	0				
10010	Steep Slope	BSS	Sandstone Slope	1	1	0.34	blade	late mes
10011	Footslope	ECF	Sandstone Slope	0				
10012	Footslope	ECF	Sandstone Slope	0				
10013	Footslope	ECF	Sandstone Slope	0				
10014	Footslope	ECF	Sandstone Slope	1	5	7.87	test-piece	unclassified
10015	Footslope	ECF	Sandstone Slope	0				
10016	Footslope	ECF	Sandstone Slope	1	4	3.51	flake	unclassified
10017	Footslope	ECF	Sandstone Slope	1	2	3.21	core	late mesolithic
10018	Footslope	ECF	Sandstone Slope	2	3	4.43	knife	unclassified
					7	7.52	scraper	late mes-early neo
10019	Footslope	ECF	Sandstone Slope	0				
10020	Footslope	ECF	Sandstone Slope	2	no data			
					no data			
10021	Upland Flat	UFL	Sandstone Slope	1	2	0.31	flake	unclassified
10022	Upland Flat	UFL	Sandstone Slope	0				
10023	Upland Flat	UFL	Sandstone Slope	0				
10024	Upland Flat	UFL	Sandstone Slope	0				
10025	Upland Flat	UFL	Sandstone Slope	0				
10026	Upland Flat	UFL	Sandstone Slope	2	1	0.11	unclass tool	unclassified
					3	0.31	flake	unclassified
10027	Upland Flat	UFL	Sandstone Slope	0				
10028	Upland Flat	UFL	Sandstone Slope	0				
10029	Upland Flat	UFL	Sandstone Slope	0				
10030	Upland Flat	UFL	Sandstone Slope	1	1	0.46	microlith	late mesolithic
10031	Moderate Slope	BMS	Cheviot Slope	1	4	2.26	flake	unclassified
10032	Moderate Slope	BMS	Cheviot Slope	3	2	6.87	sickle	unclassified
					3	1.67	flake	late mesolithic
					3	0.6	unclass tool	unclassified
10033	Moderate Slope	BMS	Cheviot Slope	2	1	0.17	flake	unclassified
					1	0.65	microlith	mesolithic
10034	Moderate Slope	BMS	Cheviot Slope	1	3	0.63	unclass tool	unclassified
10035	Moderate Slope	BMS	Cheviot Slope	0				
10036	Moderate Slope	BMS	Cheviot Slope	0				
10037	Moderate Slope	BMS	Cheviot Slope	0				
10038	Moderate Slope	BMS	Cheviot Slope	0				
10039	Moderate Slope	BMS	Cheviot Slope	1	2	0.4	blade	unclassified
10040	Moderate Slope	BMS	Cheviot Slope	0				
10041	Flat	FLF	Cheviot Slope	0				
10042	Flat	FLF	Cheviot Slope	2	0	1.33	unclass tool	unclassified
					0	1.16	unclass tool	late mes-early neo

Figure 4.16

10043	Flat	FLF	Cheviot Slope	0				
10044	Flat	FLF	Cheviot Slope	2	1	1.6	core	mesolithic
					3	6.52	burin	mesolithic
10045	Flat	FLF	Cheviot Slope	1	2	2.63	unclass tool	unclassified
10046	Flat	FLF	Cheviot Slope	2	1	1.18	microlith	mesolithic
					2	0.27	core	mesolithic
10047	Flat	FLF	Cheviot Slope	4	1	1.36	unclass tool	late mesolithic
					1	0.21	unclass tool	mesolithic
					1	0.1	blade	late mesolithic
					2	0.5	unclass tool	late mes-early neo
10048	Flat	FLF	Cheviot Slope	0				
10049	Flat	FLF	Cheviot Slope	0				
10050	Flat	FLF	Cheviot Slope	1	1	0.58	microlith	mesolithic
10051	Steep Slope	BSS	Cheviot Slope	0				
10052	Steep Slope	BSS	Cheviot Slope	0				
10053	Steep Slope	BSS	Cheviot Slope	1	3	0.36	unclass tool	unclassified
10054	Steep Slope	BSS	Cheviot Slope	0				
10055	Steep Slope	BSS	Cheviot Slope	0				
10056	Steep Slope	BSS	Cheviot Slope	1	2	2.46	core	mesolithic
10057	Steep Slope	BSS	Cheviot Slope	0				
10058	Steep Slope	BSS	Cheviot Slope	0				
10059	Steep Slope	BSS	Cheviot Slope	2	4	0.83	core	unclassified
					3	2.9	unclass tool	unclassified
10060	Footslope	ECF	Cheviot Slope	4	0	15.18	scraper	late mes-early neo
					2	0.19	unclass tool	late mesolithic
					8	0.57	core	late mesolithic
					9	1.76	unclass tool	unclassified
10061	Gentle Slope	BGS	Cheviot Slope	1	2	1.58	unclass tool	late mes-early neo
10062	Gentle Slope	BGS	Cheviot Slope	2	1	0.64	unclass tool	late mes-early neo
					2	3.22	unclass tool	neolithic
10063	Gentle Slope	BGS	Cheviot Slope	2	1	0.56	burin	mesolithic
					1	0.39	flake	unclassified
10064	Gentle Slope	BGS	Cheviot Slope	1	2	2.76	blade	mesolithic
10065	Gentle Slope	BGS	Cheviot Slope	1	4	0.4	burin	mesolithic
10066	Gentle Slope	BGS	Cheviot Slope	0				
10067	Gentle Slope	BGS	Cheviot Slope	1	3	0.9	blade	late mes-early neo
10068	Gentle Slope	BGS	Cheviot Slope	1	2	3.65	flake	mesolithic
10069	Gentle Slope	BGS	Cheviot Slope	0				
10070	Gentle Slope	BGS	Cheviot Slope	0				
10071	Upland Flat	UFL	Cheviot Slope	0				
10072	Upland Flat	UFL	Cheviot Slope	0				
10073	Upland Flat	UFL	Cheviot Slope	0				
10074	Upland Flat	UFL	Cheviot Slope	0				
10075	Upland Flat	UFL	Cheviot Slope	0				
10076	Upland Flat	UFL	Cheviot Slope	0				
10077	Upland Flat	UFL	Cheviot Slope	1	2	13.28	scraper	late neo-early ba
10078	Upland Flat	UFL	Cheviot Slope	0				
10079	Upland Flat	UFL	Cheviot Slope	0				
10080	Upland Flat	UFL	Cheviot Slope	0				
10081	Flat	FLF	Gravel Terrace	0				
10082	Flat	FLF	Gravel Terrace	1	3	1.93	unclass tool	late mes-early neo
10083	Flat	FLF	Gravel Terrace	0				
10084	Flat	FLF	Gravel Terrace	1	2	1.13	unclass tool	mesolithic
10085	Flat	FLF	Gravel Terrace	1	3	1.01	unclass tool	late mes-early neo
10086	Flat	FLF	Gravel Terrace	0				
10087	Flat	FLF	Gravel Terrace	1	1	1.81	flake	unclassified
10088	Flat	FLF	Gravel Terrace	0				

Figure 4.16

10089	Flat	FLF	Gravel Terrace	1	3	1.51	blade	unclassified
10090	Flat	FLF	Gravel Terrace	0				
10091	Gentle Slope	BGS	Boulder Clay	1	2	0.09	blade	mesolithic
10092	Gentle Slope	BGS	Boulder Clay	0				
10093	Gentle Slope	BGS	Boulder Clay	0				
10094	Gentle Slope	BGS	Boulder Clay	1	1	0.62	unclass tool	late mesolithic
10095	Gentle Slope	BGS	Boulder Clay	0				
10096	Flat	FLF	Boulder Clay	0				
10097	Flat	FLF	Boulder Clay	0				
10098	Flat	FLF	Boulder Clay	2	1	0.32	blade	mesolithic
					1	0.25	flake	unclassified
10099	Flat	FLF	Boulder Clay	0				
10100	Flat	FLF	Boulder Clay	0				
10101	Moderate Slope	BMS	Sandstone Slope	0				
10102	Moderate Slope	BMS	Sandstone Slope	1	1	0.5	flake	unclassified
10103	Moderate Slope	BMS	Sandstone Slope	0				
10104	Moderate Slope	BMS	Sandstone Slope	0				
10105	Moderate Slope	BMS	Sandstone Slope	0				
10106	Moderate Slope	BMS	Sandstone Slope	0				
10107	Moderate Slope	BMS	Sandstone Slope	1	1	0.74	flake	unclassified
10108	Moderate Slope	BMS	Sandstone Slope	1	1	2.12	unclass tool	unclassified
10109	Moderate Slope	BMS	Sandstone Slope	0				
10110	Moderate Slope	BMS	Sandstone Slope	0				
10111	Gentle Slope	BGS	Boulder Clay	1	2	0.98	flake	unclassified
10112	Gentle Slope	BGS	Boulder Clay	0				
10113	Gentle Slope	BGS	Boulder Clay	0				
10114	Gentle Slope	BGS	Boulder Clay	0				
10115	Gentle Slope	BGS	Boulder Clay	0				
10116	Flat	FLF	Cheviot Slope	0				
10117	Flat	FLF	Cheviot Slope	0				
10118	Flat	FLF	Cheviot Slope	2	2	0.37	unclass tool	late mes-early neo
					1	1.93	unclass tool	neolithic
10119	Flat	FLF	Cheviot Slope	1	4	0.49	flake	mesolithic
10120	Flat	FLF	Cheviot Slope	0				
10121	Footslope	ECF	Cheviot Slope	1	2	0.62	unclass tool	unclassified
10122	Footslope	ECF	Cheviot Slope	0				
10123	Footslope	ECF	Cheviot Slope	0				
10124	Footslope	ECF	Cheviot Slope	0				
10125	Footslope	ECF	Cheviot Slope	0				
10126	Valley Floor Moderate Slope	VTM	Gravel Terrace	0				
10127	Valley Floor Moderate Slope	VTM	Gravel Terrace	1	2	0.12	flake	unclassified
10128	Valley Floor Moderate Slope	VTM	Gravel Terrace	1	2	0.8	flake	unclassified
10129	Valley Floor Moderate Slope	VTM	Gravel Terrace	3	1	2.59	unclass tool	mesolithic
					1	0.47	flake	unclassified
					3	0.81	unclass tool	mesolithic
10130	Valley Floor Moderate Slope	VTM	Gravel Terrace	5	3	0.32	blade	late mes-early neo
					1	0.3	flake	unclassified
					1	1.49	microlith	mesolithic
					1	4.56	scraper	unclassified
					2	0.29	flake	unclassified
10131	Valley Floor Gentle Slope	VTG	Gravel Terrace	3	1	1.81	core	late mesolithic
					1	0.82	unclass tool	unclassified
					1	0.91	unclass tool	neolithic
10132	Valley Floor Gentle Slope	VTG	Gravel Terrace	0				
10133	Valley Floor Gentle Slope	VTG	Gravel Terrace	3	1	0.35	microlith	late mesolithic
					1	2.3	core	late mes-early neo
					2	0.28	core	late mesolithic

Figure 4.16

10134	Valley Floor Gentle Slope	VTG	Gravel Terrace	0				
10135	Valley Floor Gentle Slope	VTG	Gravel Terrace	1	3	2.1	unclass tool	unclassified
10136	Valley Floor Steep Slope	VTS	Gravel Terrace	3	1	0.83	unclass tool	unclassified
					1	2.61	core	late mesolithic
					3	0.81	microlith	late mesolithic
10137	Valley Floor Steep Slope	VTS	Gravel Terrace	1	1	0.6	unclass tool	late mesolithic
10138	Flat	FLF	Gravel Terrace	1	2	1.34	scraper	mesolithic
10139	Flat	FLF	Gravel Terrace	0				
10140	Flat	FLF	Gravel Terrace	0				
10141	Flat	FLF	Gravel Terrace	0				
10142	Flat	FLF	Gravel Terrace	0				
10143	Flat	FLF	Gravel Terrace	2	2	5.34	scraper	early neolithic
					4	0.37	microlith	late mesolithic
10144	Flat	FLF	Gravel Terrace	1	3	0.4	unclass tool	unclassified
10145	Flat	FLF	Gravel Terrace	0				
10146	Flat	FLF	Gravel Terrace	0				
Total			97 (+2 no data)			165.53		

Figure 4.16

Figure 4.17 Schematic section of Sandstone (east) valley side showing typical test-pit sediment logs for sampled morphometric units

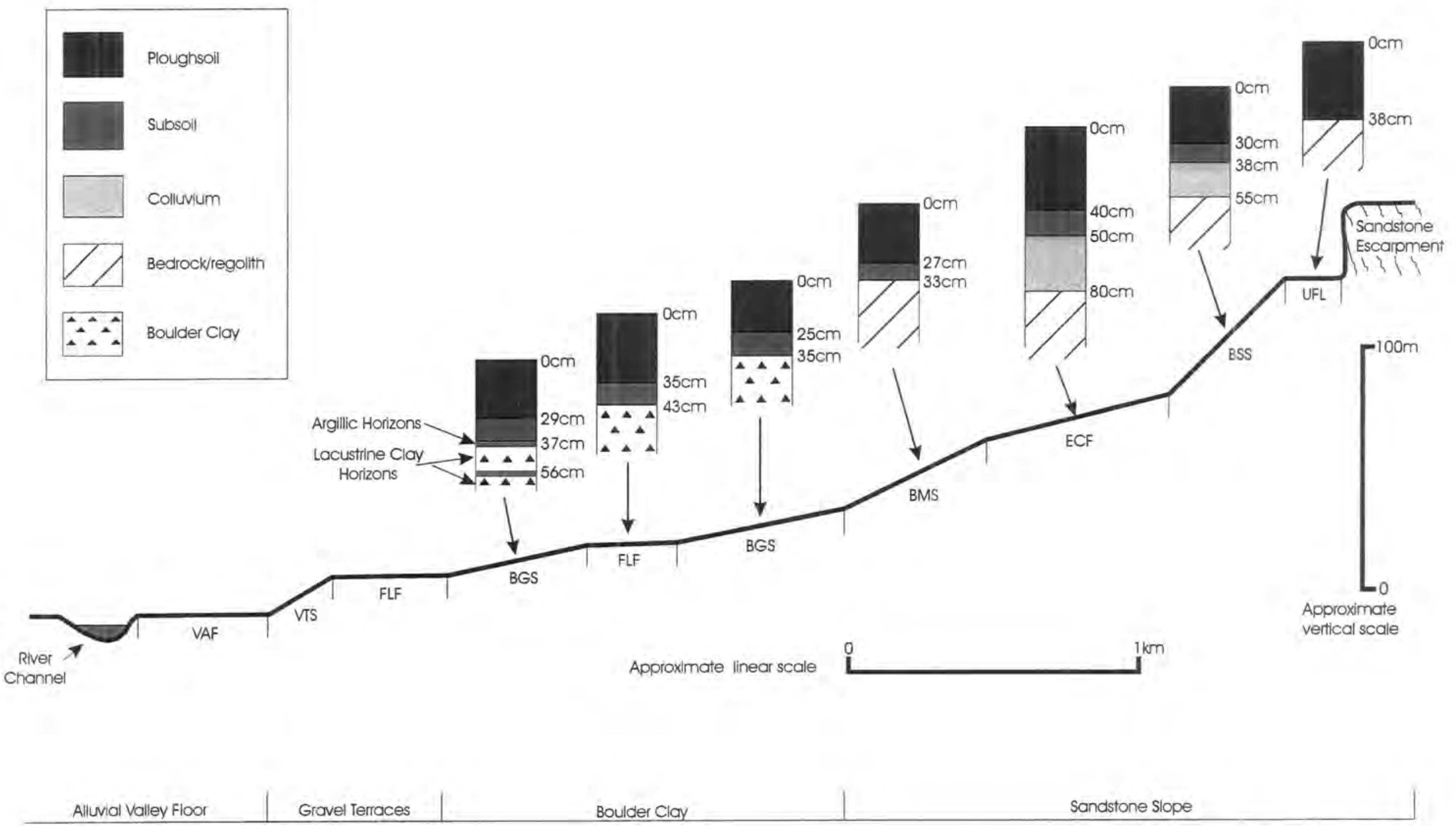
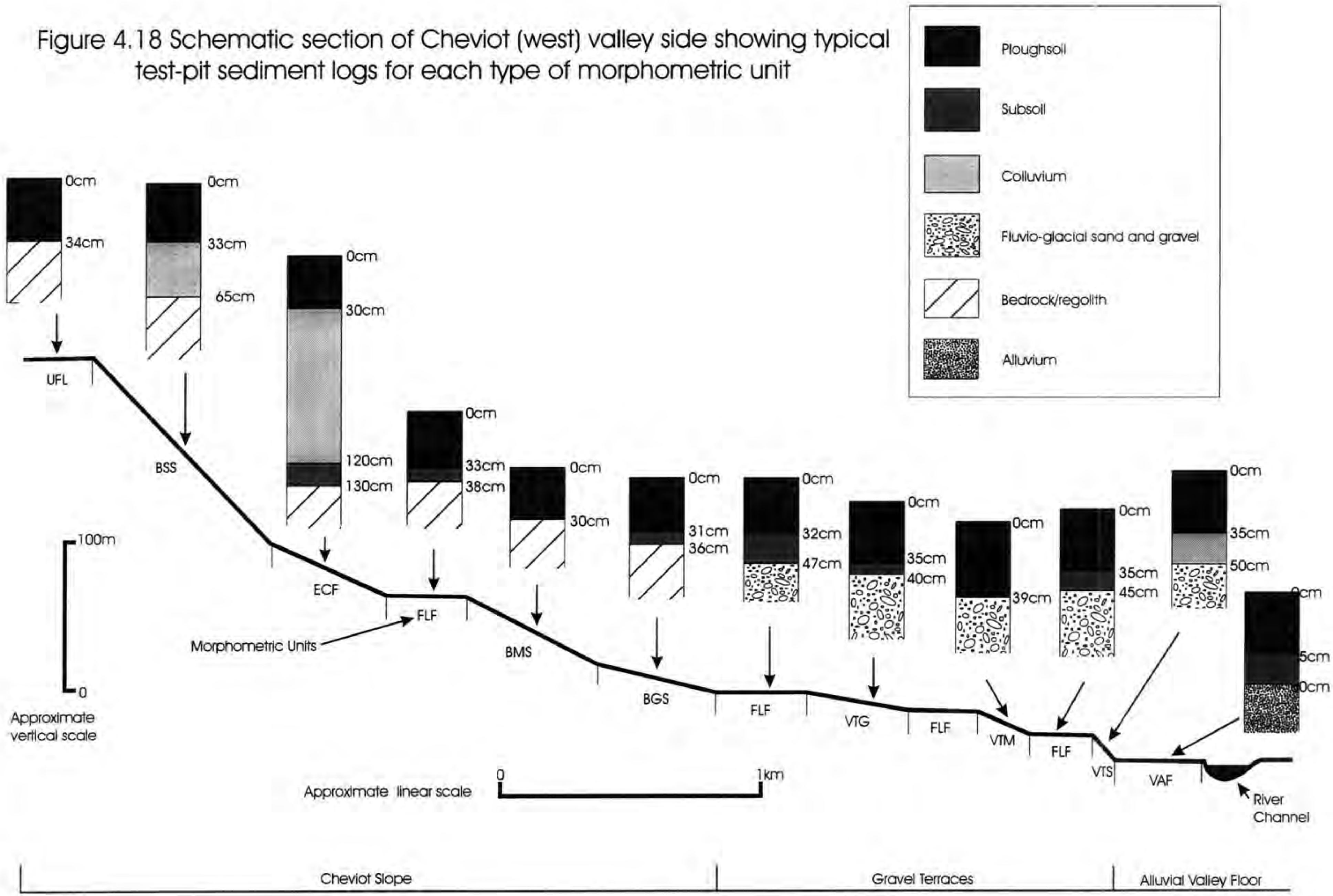


Figure 4.18 Schematic section of Cheviot (west) valley side showing typical test-pit sediment logs for each type of morphometric unit



MORPHOMETRIC DATA

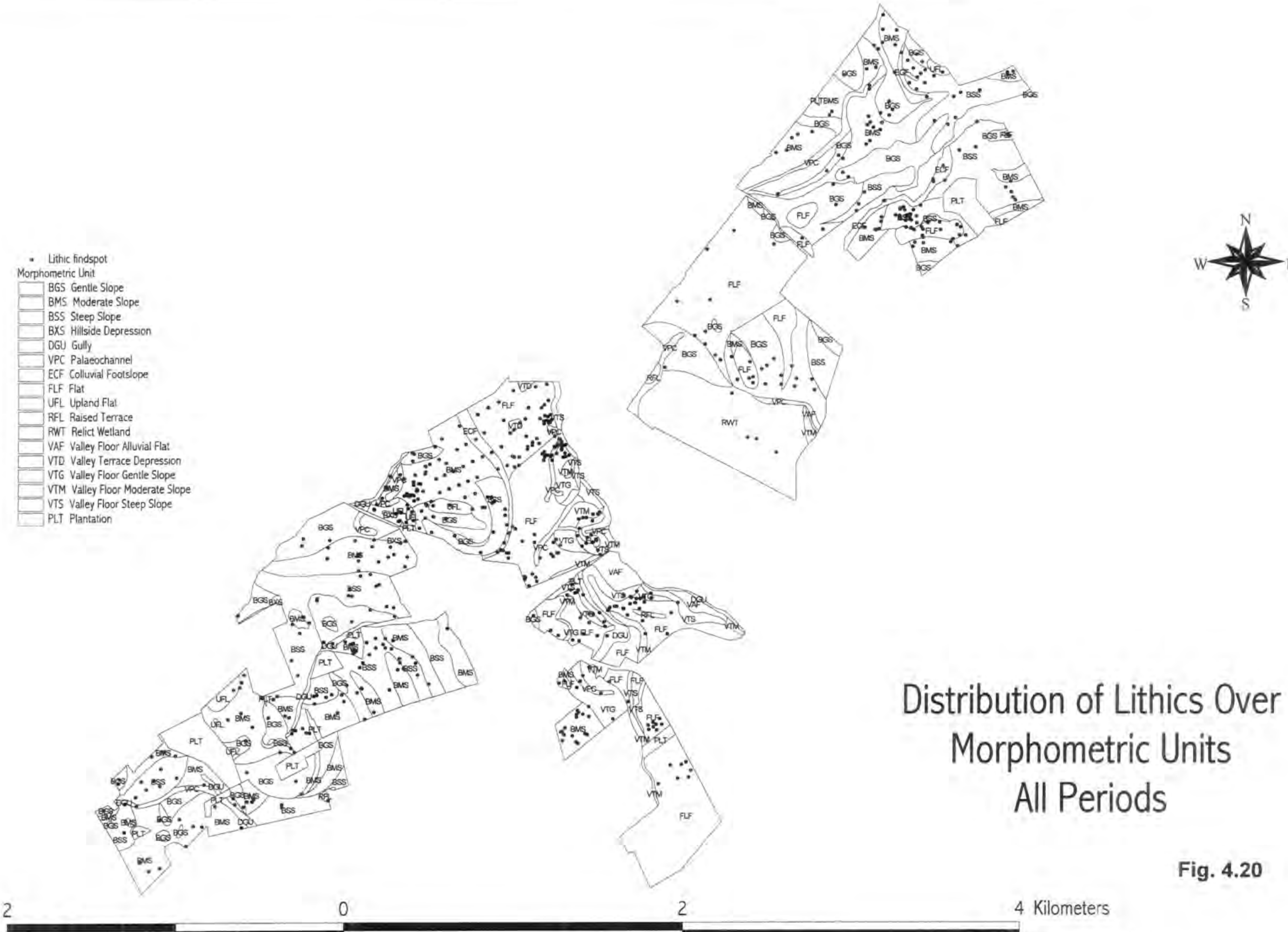
The morphometric results in the first instance consists of a map of different slope categories for the study transect (see above Figure 4.4). Each slope category has specific geomorphological processes associated with that particular slope unit. The premise behind this novel use of a morphometric map in association with lithic scatters was to ascertain the effects on lithic scatter distributions of particular slope environments (see above, Chapter 3). The character of slopes within the transect is represented in Figure 4.19 in which different morphometric units have been shaded according to the steepness of slope with dark being the steepest and light being the most gentle. This map is intended to convey, in detail, the nature of the relief across the study transect.

The relationship between the fieldwalking finds and the different morphometric units is presented both in overlay (Fig.4.20) and tabular form (Fig.4.21). Figure 4.21 provides the relative density of lithic finds for each type of slope unit. The slope (morphometric) units have been ranked in sequence from highest to lowest density. However, the first record, 'Valley Terrace Depression' was one very small isolated feature which did not allow statistical comparison with the other slope types. For this reason this particular type of slope will be ignored in the rest of the analyses as its tiny area (0.78 ha.) and relatively high finds count (2) skews the rest of the pattern.

Figure 4.22 presents the relationship between the test-pit lithic frequency and each type of morphometric unit sampled. The key statistic in this table is the '% Pits with Lithics' column which is an indicator of sub-surface lithic density in each of the different morphometric slope types.

Relief Map of Transect Showing
Steep (dark) to Gentle (light) Slopes

Fig. 4.19



Distribution of Lithics Over Morphometric Units All Periods

Fig. 4.20

Summary of Fieldwalking Results by Morphometric Unit

Morphometric Unit	Code	Total Area (ha.)	Total Lithic Count	Density per ha. (actual)	Density per ha. (adjusted)	Dominant Sediment Process
Valley Terrace Depression	VTD	0.78	2	**2.55**	12.75	Accumulation
Valley Floor Gentle Slope	VTG	12.94	32	**2.47**	12.37	Stability, some possible Accumulation
Colluvial Footslope	ECF	8.87	17	**1.92**	9.58	Accumulation and Burial
Valley Floor Steep Slope	VTS	13.39	23	**1.72**	8.59	Erosion
Upland Flat	UFL	7.22	11	**1.52**	7.61	Stability on area Set Back
						Erosion and Transportation on Shoulder
Moderate Slope	BMS	159.80	215	**1.35**	6.73	Erosion and Transportation
Steep Slope	BSS	113.32	120	**1.06**	5.29	Erosion and Transportation
Palaeochannel	VPC	14.92	15	**1.01**	5.03	Accumulation
Flat	FLF	145.45	146	**1.00**	5.02	Stability
Hillside Depression	BXS	1.12	1	**0.89**	4.46	Accumulation
Relict Wetland Raised Terrace	RFL	11.57	10	**0.86**	4.32	Stability
Valley Floor Moderate Slope	VTM	8.35	7	**0.84**	4.19	Erosion and Transportation
Gentle Slope	BGS	93.06	58	**0.62**	3.12	Stability
Gully	DGU	8.24	4	**0.49**	2.43	Accumulation
Relict Wetland	RWT	41.29	0	**0.00**	0.00	Burial
Valley Floor Alluviated Flat	VAF	6.70	0	**0.00**	0.00	Erosion, Transportation and Burial
Plantation	PLT	22.79				

This table includes lithics from the fieldwalking only (ie. excludes the test-pit data and the second walk of field 2) totalling 661 finds

Also excluded are 5 fieldwalking finds from unprovenanced morphometric units

Figure 4.21

Test-Pits Raw Data by Morphometric Unit

Morphometric Unit	Code	Ecological Zone	Pit No.s (& survey pt. No.)	Field	No.Pits	No.Pits with Lithics	% Pits with Lithics	Total No.Lithics
Upland Flat	UFL	Cheviot Slope	10,071-10,080	11	10	1	10%	1
Upland Flat	UFL	Sandstone Slope	10,021-10,030	7	10	3	30%	4
Steep Slope	BSS	Cheviot Slope	10,051-10,059	23	9	3	33%	4
Steep Slope	BSS	Sandstone Slope	10,001-10,010	7	10	5	50%	8
Valley Floor Steep Slope	VTS	Gravel Terrace	10,136-10,137	10	2	2	100%	4
Moderate Slope	BMS	Cheviot Slope	10,031-10,040	5	10	5	50%	8
Moderate Slope	BMS	Sandstone Slope	10,101-10,110	40	10	3	30%	3
Valley Floor Moderate Slope	VTM	Gravel Terrace	10,126-10,130	49	5	4	80%	10
Gentle Slope	BGS	Cheviot Slope	10,061-10,070	2	10	7	70%	9
Gentle Slope	BGS	Boulder Clay	10,111-10,115	81	5	1	20%	1
Gentle Slope	BGS	Boulder Clay	10,091-10,095	59	5	2	40%	2
Valley Floor Gentle Slope	VTG	Gravel Terrace	10,131-10,135	49	5	3	60%	7
Flat	FLF	Cheviot Slope	10,116-10,120	31	5	2	40%	3
Flat	FLF	Boulder Clay	10,096-10,100	59	5	1	20%	2
Flat	FLF	Gravel Terrace	10,138-10,146	4	9	3	33%	4
Flat	FLF	Gravel Terrace	10,041-10,050	5	10	5	50%	10
Flat	FLF	Gravel Terrace	10,081-10,090	46	10	4	40%	4
Non-Colluvial Footslope	ECF	Cheviots	10,121-10,125	14	5	1	20%	1
Colluvial Footslope	ECF	Sandstone Slope	10,016-10,020	8	5	4	80%	6
Non-Colluvial Footslope	ECF	Sandstone Slope	10,011-10,015	7	5	1	20%	1
Colluvial Footslope	ECF	Cheviots	10,060	23	1	1	100%	4
Total					**146**	**61**	**46% average**	**96**

Figure 4.22

SECTION 2 ANALYSIS

This section will provide an analytical overview of the lithic assemblage by identifying trends in the data over time and space. However, the interpretation of the lithic data on a period by period bais is presented in the subsequent chronologically ordered chapters below (chapters 5-7). In subsequent chapters the lithic data is integrated with excavation, survey, palynological and sedimentological information to provide a synthetic interpretation of past settlement for each period.

The first issue which is discussed in this analysis section is that of density. This is followed by thematic analyses of the assemblage, which includes discussion of characteristics such as raw materials, burning, rejuvenation and patination, tool type and stage in the core reduction sequence.

DENSITY

Figure 4.23 Lithic Densities per ha. by Ecological Zone (20% recovery) - All Periods

Ecological Zone	Mesolithic	Meso-Neo Transition	Late Neo-Early Bronze Age	Unclassified
Gravel Terraces	0.60	0.50	0.10	0.67
Sandstone Slope	0.45	0.09	0.14	0.79
Cheviot Slope	0.27	0.33	0.10	0.49
Boulder Clay	0.05	0.02	0.04	0.29
Alluvial	0.06	0.04	0.00	0.00

Although the density values in Figure 4.23 vary between each period, it is more important to note the pattern of relative lithic density across the different zones during each period than the density values between different periods. Accordingly, it has been recognised that different discard practices during different periods may in part dictate raw values (Healy 1987), and therefore it is the relative pattern evident during each period that is important. By using the relative densities as an index of intensity of land-use, the variation in land-use during each period can be broadly established. In this case activity during the Mesolithic is most concentrated on the gravel terraces and sandstone slopes. The next most intensively used area is the Cheviot slopes, though the under-representation of surface lithics in this zone, due to the taphonomic processes identified above, suggest that these areas were more intensively occupied than the surface value implies. Activity on the boulder clay slopes appears to be very restricted while the under-representation of the alluvial area, due to burial processes, probably under-estimates the level of Mesolithic activity in the latter zone.

Although the concentration of activity continues to be focused on the gravel terrace during the Neolithic transition, the activity on the sandstones appears to fall off dramatically, suggesting that some discrete change in land-use took place on the sandstones during this period. The density for the Cheviot slopes, however, indicates that these areas remained quite intensively settled. Given the under-representation of surface lithics on the Cheviot slopes (see above), it is likely that the Cheviot slopes may have, in fact, been settled during both the Mesolithic and Neolithic transition periods almost as intensely as the gravel terraces. The boulder clay areas continue to remain largely devoid of lithics, while the few finds in the alluvial context could be significant, given that the taphonomic processes operating here dictate that the majority of any early Holocene lithic material will remain deeply buried in this landscape context.

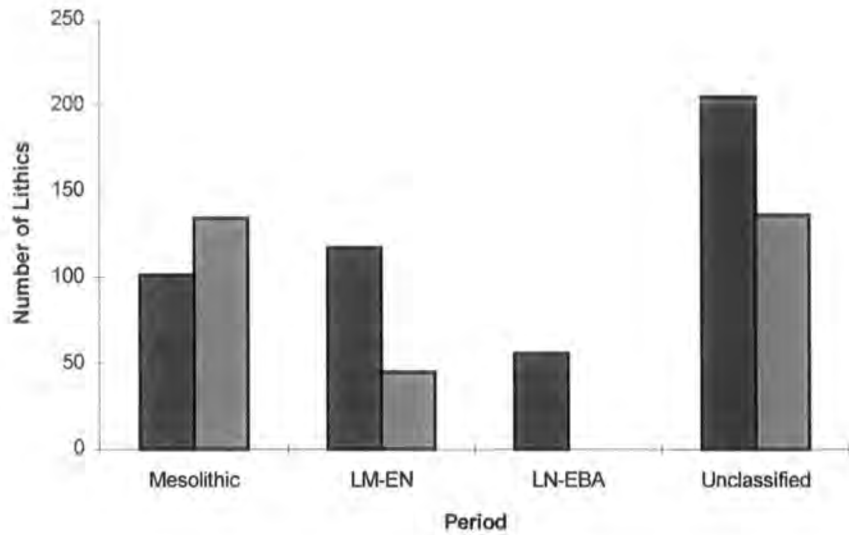
The raw density values are generally low for the Late Neolithic-Early Bronze Age period compared to the earlier periods. This is due to a paucity of unequivocally diagnostic finds, but is probably also related to the shorter time-span for the period compared with that for the Mesolithic. However, putting the raw density counts aside, the *pattern* of lithic discard for this period is very interesting. The primacy of the gravel terrace as the core settlement focus has been displaced with the sandstone slopes producing the highest raw density, again suggesting an important change in land-use in this zone between the Early Neolithic and Late Neolithic-Early Bronze Age when previously the sandstones had experienced only very limited localised activity. However, although the Cheviot slopes have the same raw density as the gravel terrace, the known under-representation of material on the Cheviot slopes during this period means that the actual density for the Cheviot slopes is in fact probably higher than for the gravel terraces and may, indeed, be the same as for the sandstone slopes. The gravel terraces, although not as intensively settled relative to the other zones in comparison to earlier periods, appear to remain intensively used along with the other 'emerging' areas. Furthermore, land-use on the boulder clays appears to increase relative to the other areas as the gap between the density of this zone and the other zones is much less than in previous periods. This is an important development given the notable lack of activity in this area which is suggested by the lithic pattern for earlier periods. The lack of information for the alluvial area remains largely a product of taphonomy and so remains simply an 'unknown' for this period until future intrusive sampling takes place. What is striking about the lithic densities across the different ecological zones for this Late Neolithic-Early Bronze Age period, then, is that there is a much closer density value across all of the zones (excluding the alluvial), suggesting that settlement was becoming more widely and evenly spread across the whole landscape, and that previous ecological distinctions in settlement/activity location were diminishing.

RAW MATERIALS

The thematic analyses derive from a consideration of all the lithics recovered from the sampling transect (including the second walk of field 2 and the test-pitting). The following table (Figure 4.24) provides the statistical breakdown of lithic material by period. The fall off in the use of non-flint lithics through time is particularly evident, with flint becoming relatively more important through time.

Figure 4.24 Number of flint and non-flint lithics by period

Dark columns = Flint raw material
Light columns = Non-flint raw material



The increasing use of flint as a proportion of the lithic assemblages through time implies a corresponding decrease in the use of local non-flint raw materials and the increasing reliance on imported flint material. Increasing reliance on higher quality imported material from the Neolithic transition onwards implies the progressive establishment of exchange networks so that, by the Late Neolithic-Early Bronze Age, the majority of all the identifiable material used during this period was imported from outside the area.

When the lithic material for each period is broken down in more detail (Figure 4.25), it can be observed that agate was by far the most widely used non-flint local raw material (Figure 4.25). However, chert, volcanic material and, to a lesser extent, quartz were also used (Figure 4.25). One of the problems with the non-flint lithics is that all are much harder to identify as being worked than is the case with flint. Secondly, worked agate is marginally easier to recognise than worked volcanic material and worked quartz and so the relative number of these tools is probably further under-represented in the assemblage.

Figure 4.25 Raw materials by period

Period	Flint	Agate	Volcanic	Chert	Quartz	Other	Total
Mesolithic	101	103	8	11	4	8	**235**
LM-EN	117	21	10	8	4	2	**162**
LN-EBA	56						**56**
Unclassified	205	80	24	13	9	10	**341**
Total	479	204	42	32	17	20	**794**

The source of the lithic material comprising the Milfield assemblage provides some interesting insights concerning stone tool acquisition and production startegies. All the non-flint lithic material, including agate, volcanic material and quartz, can all be found in the fluvio-glacial gravels, where they occur naturally as derived deposits (Miket 1987). Chert can also be found in these deposits, though it is possible that some of the chert and quartz could have been quarried from the area of Lower Carboniferous limestone that lies immediately below the surface around the north-east fringe of the basin, from Ford Common and Barmoor ridge northwards beyond Ancroft. Indeed, limestone artefacts have been recorded from the basin, including a limestone axe from Ewart Park (MacLaughlan 1864; 1867), as well as the large limestone standing stone known as the 'King's Stone' at Crookham Westfield (personal inspection), which has probably been moved at least 9km from its quarried source. The breakdown of raw materials by period and ecological zone (Appendix 4) shows that overall flint lithics form the majority of the assemblages from the Cheviots (66%), Sandstones (76%), Boulder Clay (64%) and Alluvium (60%) but form less than half the assemblage (41%) from the gravel terraces. This implies that the gravel terraces were the areas most proximal to the local lithic source given that 59% of lithics from the gravel terrace were non-flint lithics. The high non-flint lithic count from this area helps to confirm that this was the area which was predominantly used for the acquisition of agates, quartz and volcanic material.

The flint also reveals some patterning on the basis of raw material. Firstly, there is almost no beach pebble flint represented in the assemblage, even though such flint is available on the Northumberland coastline (only 14km away from the centre of the Milfield plain at its nearest point) and is evident in regional coastal assemblages in high proportions (personal inspection of the early collections of Trechman, Coupland and Dodds in Sunderland Museum, mostly from the Newbiggin area). The most common type of flint in the Milfield assemblage is light grey flint (43%), sometimes speckled, which has its closest affinities with the glacial flint deposits of north-east Yorkshire and which is thought to dominate the assemblages from other upland and upland fringe locations in the north-east, such as Weardale (Young 1987, 86). A dark grey, high quality, nodular flint, probably imported from the Yorkshire Wolds or even Lincolnshire, accounts for 19% of the flint assemblage, indicating exchange networks that allowed movement of materials over considerable distances. A further 16% of the flint assemblage was burnt white and so its original colour or type was unable to be determined. The remaining 22% of the flints comprised a mixture of generally good quality glacial, and occasional nodular, flint of varying colour, including most notably mottled grey, red, white and translucent types. Although much of the mottled grey and translucent material is probably of nodular origin, the more brightly coloured flints are probably from glacial sources, some of which could occur in localised situations in the glacially derived deposits in the basin, such as the gravel terraces or the boulder clays.

BURNT, REJUVENATED AND PATINATED LITHICS

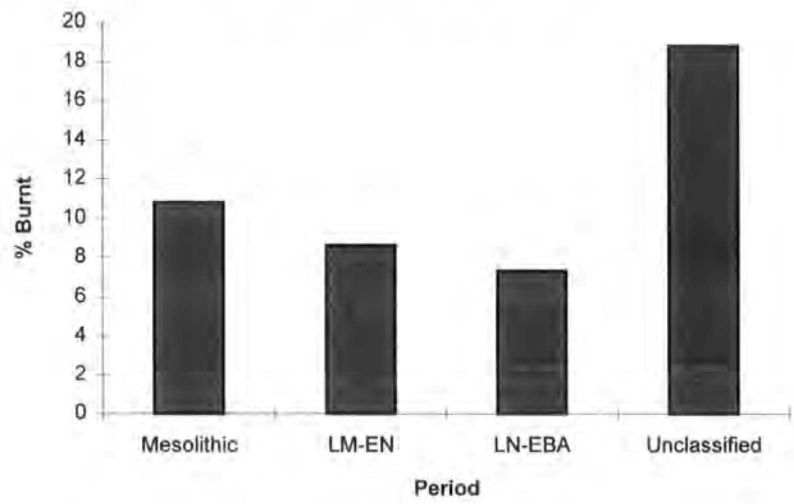
Figures 4.26-4.37 illustrate the percentages of burnt, rejuvenated and patinated lithics for each period. These results need to be interpreted with caution given the considerable number of unclassified lithics whose date range remains unknown. However, as the sampling has been undertaken at such an extensive scale across the basin it is thought that the overall pattern remains representative, particularly if it is assumed that the unclassified lithics contain more or less even numbers of lithics belonging to each of the chronological periods.

Figure 4.26 Percentages of burnt, rejuvenated and patinated lithics by period

Period	%Burnt	%Rejuvenated	%Patinated
Mesolithic	10.8	7.8	20.3
Mes-Neo Transition	8.6	6.1	3.1
Late Neo-Early B.A.	7.3	12.7	9.1
Unclass	18.8	3.5	5.6

Consideration of the proportion of burnt lithics during each period indicates a steady decline in this practice from the Mesolithic through to the Early Bronze Age. The deliberate burning of flint is usually taken to reflect a concern for altering the flaking and utilisation properties of lithics (Olausson 1983; Griffiths *et al* 1987). The high incidence of burnt lithics can probably be taken to indicate two things within the context of this assemblage: first, a response to the difficulties encountered with working non-flint lithics by improving fracturing control, and secondly, as a method of rejuvenating and curating small lithic tools so as to maximise the use-life of the flint.

Figure 4.27 Percentage of burnt lithics for each period



The declining trend in the burning of lithics over time is evident in Figure 4.27, which implies that the greatest concern for maximising lithic production from local raw materials and from imported flint took place during the Mesolithic. This frugal strategy to stone tool production and discard appears to have become increasingly relaxed during subsequent periods, a trend that corresponds with the diminishing use of locally available non-flint lithics after the Mesolithic (Figure 4.24), and the increasing importance and relative abundance of higher quality imported flint during later periods.

The percentage of burnt material varies across the different ecological zones with the boulder clay areas containing the highest percentage of burnt pieces in its assemblage (32%), while both the sandstone and alluvial areas contain 20%, the Cheviots 14% and the gravel terraces just 5% (see Appendix 5). This variation may be accounted for by distance from lithic source areas. In this case the gravel terraces are known acquisition areas for non-flint lithic material and so have a relative abundance of raw materials. Consequently it may have been easier simply to acquire a new nodule than to burn existing material so that it could be pared down further. Furthermore, the sandstone area is adjacent to the limestone hills of Barmoor, which may have been a chert acquisition area, while the Cheviot and alluvial areas abut directly on to the gravel terraces. In contrast, the boulder clay area is situated furthest from these two local resource areas and this may, therefore, account for the higher incidence of burnt lithic material in this area.

Figure 4.28 Percentage of rejuvenated lithics for each period

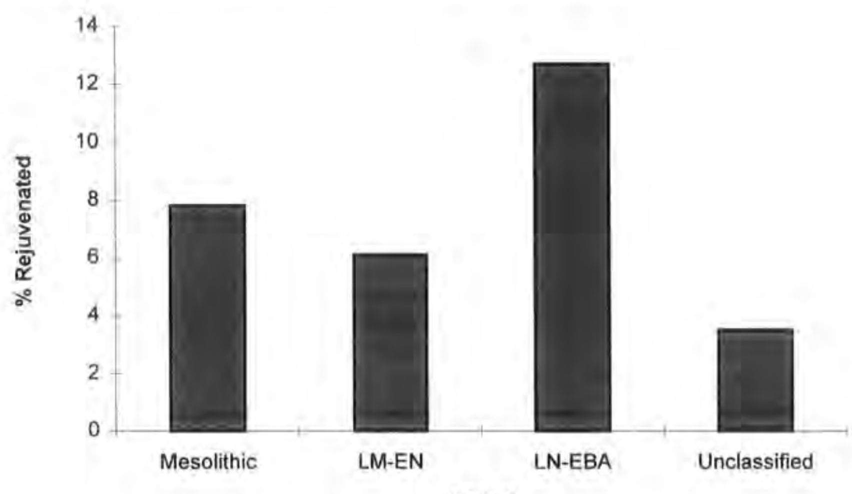
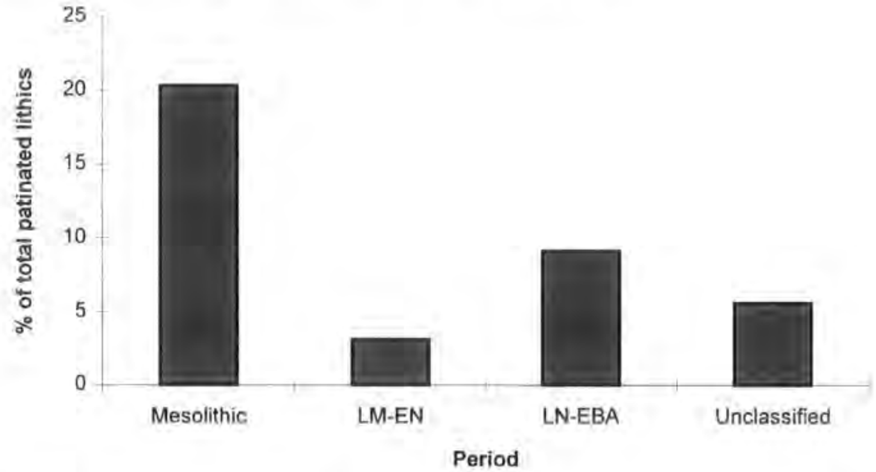


Figure 4.28 shows the proportion of the assemblage for each period which has been rejuvenated rather than the proportion of the rejuvenated total of the entire assemblage. The relatively high incidence of rejuvenation in the Mesolithic assemblage of nearly 8% (Figure 4.28) indicates that earlier Mesolithic material was being utilised during the later Mesolithic. Many rejuvenated pieces had significant patina development before they were restruck, suggesting that the time interval between their initial use and their re-use was quite protracted (see next paragraph). This implies that some of the Late Mesolithic rejuvenated artefacts may be made from discarded Early Mesolithic pieces. This would help contribute to the under-representation of Early Mesolithic material in surface fieldwalking assemblages, as well as forming a contributing factor in the difficulty of recognising of Early Mesolithic material in north-eastern assemblages, particularly those located in flint-scarce areas (ie. most landscapes situated away from the coastal plain). The high relative proportion of the Late Neolithic-Early Bronze Age material which has been recycled refers mostly to pieces of earlier flint that have been recycled for use during this period. The recycled tools belonging to this later period are generally crude, having been made with limited care using what are usually quite large pieces. Consequently, the reflaking of flints during the Later Neolithic-Early Bronze Age may be the result of casual opportunistic re-use. It is worth noting, on the basis of the palynological and sedimentological data (Chapters 2 and 7), that this is also the same period during which the first significant and permanent clearances take place in the basin and agriculture becomes more widely established (Tipping 1992; 1994; 1996). This could be significant as the breaking of the sod and disturbance of the soil are precisely the conditions necessary for modern surface lithic recovery to take place, while grassland and forested areas provide extremely limited opportunities for the recovery of discarded lithics. Therefore, the recycling of lithics during this period may relate to the markedly increased opportunity for picking up discarded lithics provided by the very significant extension of agriculture taking place. This manual tilling of the land, even with ox-drawn plough, would provide ample opportunities for 'pocketing' chance lithic finds to rework as and when necessary on a casual basis as a supplement to the better quality imported material which was arriving in the area.

Figure 4.29 Percentage of patinated lithics for each period



The graph showing the proportion of patinated lithics by period (Figure 4.29) demonstrates the high incidence of patination, or recortication, of Mesolithic pieces and the low incidence of patination on pieces belonging to subsequent periods. Furthermore, many of the patinated pieces belonging to the Late Neolithic-Early Bronze Age group are recycled lithics bearing patination flake scars made during earlier periods. This suggests that the relative frequency of patination on Mesolithic material is greater than Figure 4.29 appears to indicate and that the Late Neolithic-Early Bronze Age incidence of patination is exaggerated.

Although patination of struck lithics is a chemical process whereby water is reabsorbed into the skin of the lithic (Shepherd 1972), the factors affecting this process and the rate at which it happens remains very poorly understood. Attempts to use patination as a proxy means of dating artefacts is therefore a contentious issue. Different environmental and soil conditions will affect any chemical process and factors such as salt water spray from the sea, high phosphate levels, frequency of wetting and drying or freezing and thawing, may all play a part. However, of the datable lithic material from Milfield the majority of patinated lithics appear to date to the Mesolithic period. As such, the use of patina development as a crude indicator of chronology appears to hold true for the Milfield data set. Further research on the whole question of recortication is long overdue and these results serve as a reminder of the need to approach this topic from an open rather than a closed standpoint.

LITHIC TYPES

The lithic assemblage is broken down into component lithic types by period in Figure 4.30. This illustrates high frequencies of cores for both the Mesolithic and Neolithic transition in relation to the overall size of the assemblage for each period, and also high overall tool counts in relation to the frequency of primary and secondary material for all periods (Mesolithic 64%; Neo. Transition 79%; Late Neo-Early B.A. 95%). This trend assists interpretation by allowing a relatively high proportion of the lithics to be ascribed to a chronological period and also to a functional type. This is probably a result of the generally sparing attitude to lithic discard which has taken place in this flint-scarce landscape. Therefore, although the actual lithic counts for this landscape are low as a whole, when compared with other regions, the assemblage may be regarded as highly informative.

The breakdown of lithic types by period and ecological zone are provided in Appendix 6, which shows this information both by frequency and density. The large quantities of cores and scrapers, thought to be indicative of settlement/domestic activities (Schofield 1991b; Edmonds 1995; Tolan-Smith 1996b), on the gravel terraces and Cheviot slopes (all periods) indicate that over time these were the two most popular areas for settlement. Further reference will be made to the breakdown of lithic types for each ecological zone during each period in the proceeding period-specific chapters.

Breakdown of the assemblage by core reduction sequence demonstrates patterns in the lithic assemblage over time. Figure 4.31 shows that primary lithics are of

Figure 4.30 Table showing lithic types by period					
Lithic Type	**Mesolithic**	**LM-EN**	**LN-EBA**	**Unclassified**	**Total**
Bashed Lump	1			3	4
Test Piece				4	4
Flake	19	11	2	155	187
Blade	7	4		6	17
Bladelet	2	3		1	6
Core	56	16	1	32	105
Scraper	33	13	12	5	63
Arrowhead/Point	1	9	12	1	23
Microlith	45	2			47
Knife	1	3	2	3	9
Burin	5	3		1	9
Sickle (possible)			1	2	3
Borer	5	1	1	4	11
Axe	1	1			2
Unclassified Tool	58	97	24	122	301
Gun Flint				1	1
Total	234	163	55	340	795
This table contains data from the entire lithic assemblage including the test-pitting					
3 lithics have been excluded from this table for which there is no data					

such small quantities for each period that little can be stated about the trend except that primary working took place during each period on a very small scale. However, for secondary and tertiary material the counts unequivocally demonstrate a declining proportion of secondary lithics over time and a corresponding increase in the proportion of tertiary lithics. These two observations correlate with the analysis of raw material use (see above) in showing that systematic working of lithic sources (mostly the local material) diminished over time and, by the Late Neolithic-Early Bronze Age, less preparation of the higher quality imported material was necessary.

Figure 4.31 Percentage of lithics by period and core reduction sequence

Core Reduction Sequence	Mesolithic	LM-EN	LN-EBA	Unclassified
Primary	1.7%	0.6%	1.8%	7.6%
Secondary	35.3%	22.1%	3.6%	49.4%
Tertiary	62.9%	77.3%	94.5%	42.9%

Breakdown of the core reduction sequence by period and ecological zone is given as in Appendix 7. The trends revealed in this data appear to support the analysis of changing settlement patterns across the different ecological zones described above. The highest counts for tertiary lithics during the Mesolithic are for the Cheviot slopes (the greater sampling of the Cheviot area is probably off-set by the greater masking of lithics in colluvium in this environment) and gravel terraces and sandstones. However, during the Mesolithic-Neolithic transition the frequency of tertiary lithics remains high on the Cheviot slopes and gravel terraces but falls off significantly on the sandstone slopes. However, during the Late Neolithic-Early Bronze Age the distribution of lithics across the gravel terraces and boulder clays becomes more even, while tertiary lithics on the Cheviot slopes remains relatively very high. This pattern mirrors and affirms that provided by the surface density counts for the ecological zones by period given in Figure 4.23.

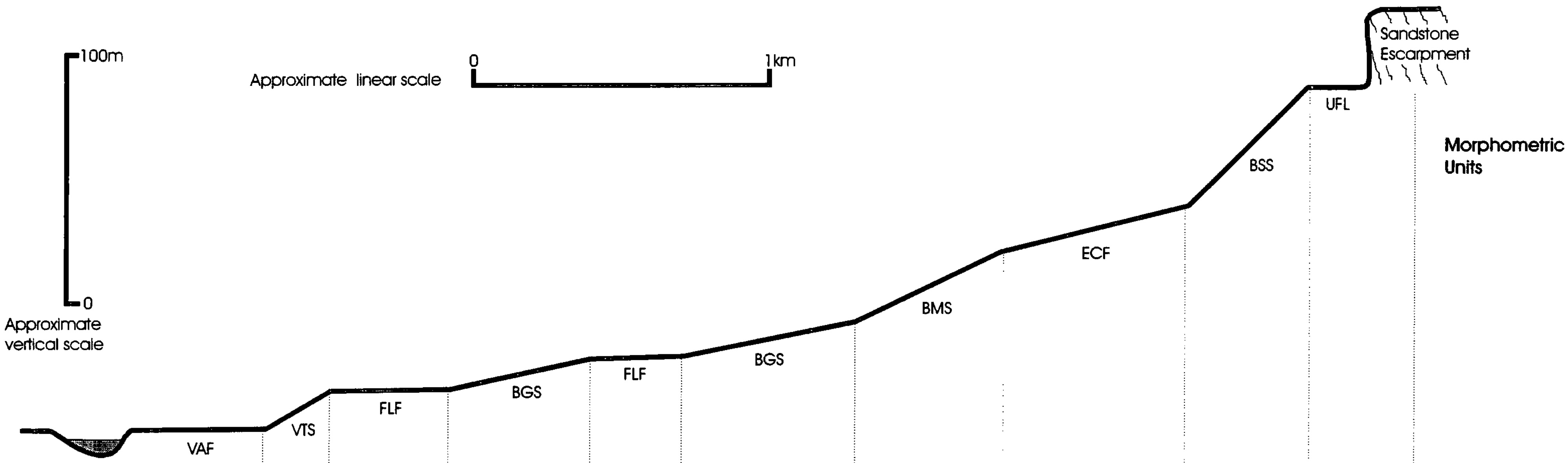
SECTION 3 TAPHONOMY

The major recovery biases affecting the Milfield lithic assemblage have been discussed above (this Chapter, Section 1 Results) in relation to their contribution to the overall under-representation of the lithic population. Therefore, the main themes which are discussed here are, firstly, the impact of *slope processes* on lithic scatters and their implications for subsequent interpretation, and, secondly, the issue of *surface-subsurface* relationships. It must be noted that the following discussion relates to slopes which have a history of ploughing and destabilisation and are, therefore, exposed to extreme effects which often take place on ploughed slopes (Boardman 1992; Zvelebil *et al* 1992; Boismier 1997). The discussion has limited relevance to stable slopes under grass or woodland where such slope processes may not apply at all, given the greater stability of slope environments under vegetation (Boardman 1992). In such cases there may be very little movement of sediment, even on very steep slopes, resulting in minimal relocation of lithic material. In such environments the slope processes referred to here in relation to the Milfield basin may not be applicable.

SLOPE PROCESSES

Using the different slope categories identified in the morphometric mapping process the dominant geomorphological slope process active on each of these land facies was identified through analysis of the test-pit sediment sections. The sediment logs associated with the different slope types across the valley are shown above in Figures 4.17 and 4.18. With reference to geoarchaeological reviews of slope processes in relation to archaeological residues (Butzer 1982; Waters 1992) and the author's observation of active processes (such as rilling, sheet-wash, local sediment fan formation and associated landforms such as lynchets) the dominant slope process associated with each type of slope type were identified. Figures 4.32 and 4.33 summarise the main slope processes identified on each of the different morphometric (slope) types mapped during this study. Figure 4.32 provides a

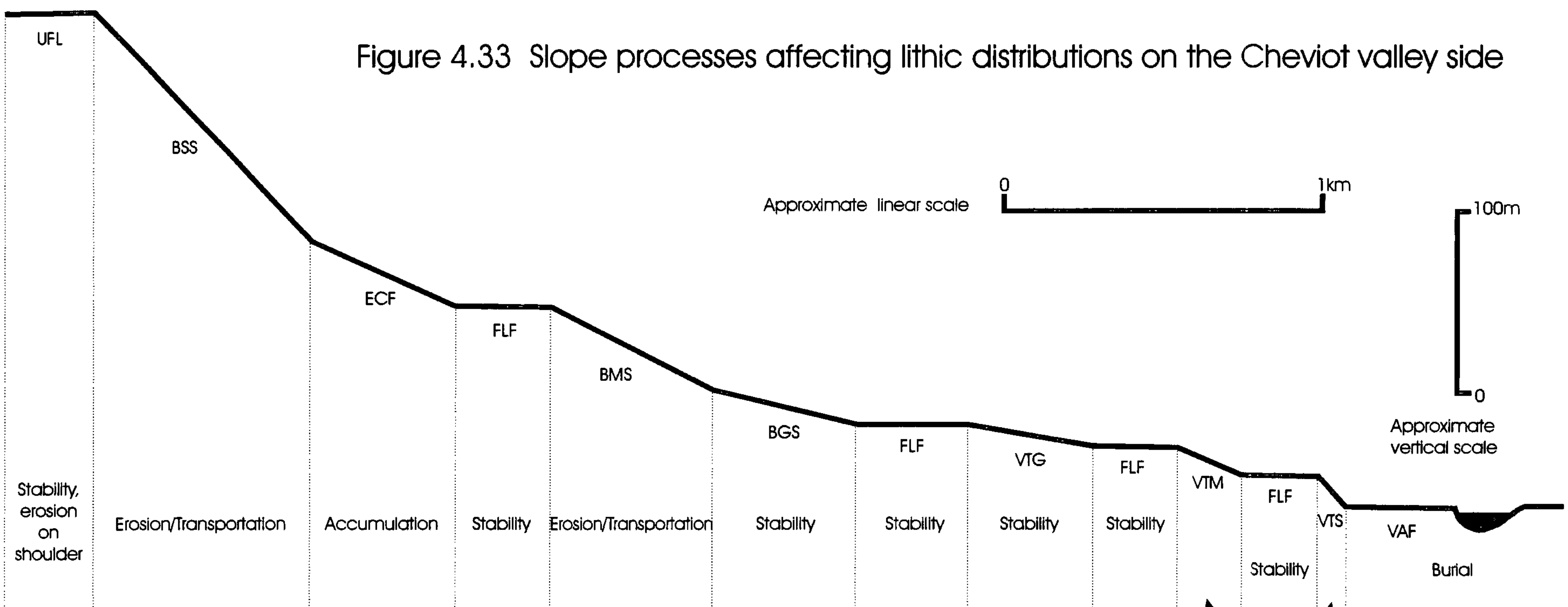
Figure 4.32 Slope processes affecting lithic distributions on the sandstone valley side



Morphometric Units	VAF	VTS	FLF	BGS	FLF	BGS	BMS	ECF	BSS	UFL
Dominant Slope Process	Burial	Erosion/ Transport-ation	Stability	Stability	Stability	Stability	Erosion/ Transportation	Accumulation	Erosion/ Transportation	Stability/ erosion on shoulder
Effects on Lithics	Burial of in-situ material by fine-grained alluvium. Minimal accumulation of derived lithics	Movement Downslope	Limited Disturbance	Limited Movement (some erosion and movement downslope)	Limited Disturbance	Limited Movement (some erosion and movement downslope)	Some Movement Downslope	Re-deposition on footslope. Subsequent burial. Potential for reversed stratigraphy	Movement Downslope	Limited disturbance (Some erosion near break of slope)
Surface Lithic Recovery Bias	Under-Representation Surface sampling inapplicable	Over Rep. Mixed systemic contexts	Representative	Representative	Representative	Representative	Over-Representation Mixed systemic contexts	Over-Representation Mixed systemic contexts	Over-Representation Mixed systemic contexts (under representation though after large-scale sediment removal)	Representative (over rep. on break of slope)

Alluvial Valley Floor	Gravel Terraces	Boulder Clay	Sandstone Slope

Figure 4.33 Slope processes affecting lithic distributions on the Cheviot valley side



Morphometric Units	UFL	BSS	ECF	FLF	BMS	BGS	FLF	VTG	FLF	VTM	FLF	VTS	VAF
Dominant Slope Processes	Stability, erosion on shoulder	Erosion/Transportation	Accumulation	Stability	Erosion/Transportation	Stability	Stability	Stability	Stability	Erosion/Transportation	Stability	Erosion/Transportation	Burial
Effects on Lithics	Limited disturbance (some erosion near break of slope)	Movement Downslope	Re-deposition on footslope. Subsequent burial. Potential for reversed stratigraphy	Limited disturbance (some erosion near break of slope)	Some Movement Downslope	Limited movement (some erosion and movement downslope)	Limited Disturbance	Limited movement (some erosion and movement downslope)	As for previous FLF	As for BMS	As for previous FLF	As for BSS	Burial of in-situ material by fine-grained alluvium. Minimal accumulation of derived lithics
Surface Lithic Recovery Bias	Representative (over rep. on break of slope)	Over-Representation (under representation though after large-scale sediment removal) Mixed systemic contexts	Over-Representation Mixed systemic contexts	Representative (under rep. on break of slope)	Over-Representation Mixed systemic contexts	Representative	Representative	Representative	As for previous FLF	As for BMS	As for previous FLF	As for BSS	Under-Representation Surface sampling inapplicable
	Cheviot Slope						Gravel Terraces					Alluvial Valley Floor	

schematic summary of the east side of the basin while Figure 4.33 provides a schematic summary of the west side of the basin. The following section discusses the main different slope types in turn. Where different slope types have the same processes at work on them they have been grouped together to save repetition.

Steep Slopes, Moderate Slopes and Breaks of Slope

Experiments by Allen (1991) have confirmed the downslope movement of lithics, particularly blade forms, on steep slopes, moderate slopes and from around break of slope situations. The test-pit logs for the Milfield slopes also demonstrate that erosion and movement of sediment took place on both the sandstone and Cheviot slopes, particularly in the case of steep slopes (see Figures 4.17 and 4.18, and note the presence of a fine-grained colluvial horizon on the steep slope profiles 'BSS'). The test-pits also demonstrated the downslope movement of lithics on these slope as many test-pits contained lithics within the fine-grained colluvial horizons (e.g. pits 10,005; 10,006).

Furthermore, personal observation by the author of ploughed surfaces on steep and moderate slopes during storm events in 1997 was able to reveal significant movement of sediments by rill action resulting in their deposition as a string of sediment fans at the base of these slopes. However, a more significant finding was the monitoring of the movement of a flint scraper situated in one of the rills. After tagging its position during an afternoon visit with a bamboo cane it was observed to have moved 2.4m during one overnight storm. Therefore, in conjunction with the test-pit data it can be concluded that erosion and transportation of lithics takes place on steep and moderate slopes in the Milfield basin.

As erosion of the soil matrix around surface lithics takes place they are more likely to become visible and identifiable during surface collection (Allen 1991). The high percentage of pits containing lithics on steep slopes (average 60%) and moderate slopes (average 53%) when compared with flat areas (average 32%), which are generally stable slopes (see below), provides further indication that lithic densities on these slope types may over-represent the original lithic population. Therefore, in general the surface lithic distribution on steep slopes, moderate slopes and around breaks in slope will normally over-represent the original lithic population due to their greater visibility (see Figures 4.32 and 4.33). Also, by erosion of the lithics out of the top of the ploughsoil and subsequent transportation across the surface, over-representation of the ploughsoil population will occur on the surface (see Figures 4.32 and 4.33). However, on areas of slopes, particularly steep slopes, that have previously experienced large-scale removal of lithics and sediments leaving only a thin ploughsoil, under-representation of the original lithic population can occur.

In such cases intensive ploughing and storm conditions over a long period of time may eventually result in the removal of a large proportion of the sediment and lithics from steep and moderate slope environments. Ultimately this can lead to the converse effect to that referred to above. In this situation under-representation would occur on these slopes as most of the lithic material will have been transported and buried in zones of accumulation (ie. colluvial situations) at the base of the slope (see Figures 4.32 and 4.33). It was concluded that such a situation obtained for some of the steep Cheviot slopes; for example, surface sampling in field 23 recovered no lithics (Figure 4.5) while a 1m square test-pit in the colluvial footslope at the base of the field produced four lithics (Figure 4.16, pit 10,060), without even bottoming the lynchet (as the lynchet was nearly 4m deep this provided a safety hazard). As there was a large proportion of lithics in the colluvial deposits within the lynchet at the foot of this field these lithics had evidently come from further upslope in the same field. However, surface sampling of the steep slopes of this field produced not a single lithic find. Moreover a further 9 test-pits across these steep slopes of the field produced only five lithics. Thus, the combined lithic count for the entire field from fieldwalking and nine test-pits, excluding the narrow area of lynchet, was five lithics compared to a total of four lithics from one test-pit that only went half-way into the lynchet.

Evidently, the surface lithic population on these intensively ploughed steep slopes in this case under represents the original lithic population.

Consequently, some caution is necessary when analysing whether a certain slope will over-represent or under-represent original lithic populations. An understanding of the intensity and duration of a field's ploughing history, and/or its systematic test-pitting and surface sampling, is therfore necessary before deciding what effect the slope processes have had on lithic visibility. In most cases it will probably be over-representation but in cases where there has been prolonged intensive agriculture, particularly on light non-clay soils, such as sandy soils or gravelly soils, the under-representation of lithics may occur. The processes taking place on these slope types are likely to most pronounced on steep slopes and around breaks in slope, though they are also important on moderate slopes.

Colluvial Footslopes

Previous experiments and fieldwork have shown that redeposition and subsequent burial of lithics takes place in colluvial situations where sediment accumulation is active (Butzer 1982; Waters 1992; Allen 1991). This study has shown this to have taken place on a significant scale within the Milfield landscape and this has also resulted in the over-representation of lithics in these colluvial zones.

By considering the percentage of pits from the major different slope types which produced lithics the main areas of over-representation can be recognised. With reference to Figure 4.34 it is clear that the colluvial footslope category (which also includes the lynchets) has a significantly higher percentage of pits with lithics (average 90%) than any of the other slope units implying the accumulation and corresponding over-representation of lithics in these environments. Moreover, given that most of the lithic material from these pits was situated within fine-grained colluvial sediment that had been transported downslope this lithic material is known to have accumulated after being eroded and transported from positions

Test-Pits Aggregate Data by Morphometric Unit

Aggregate Morphometric Units	No.Pits	No. Lithics	No.Pits Prod. Lithics	% Pits producing Lithics	Av. No. Lithics Per Pit
Colluvial Footslope	6	10	5	83%	1.7
Gentle Slope	25	19	13	52%	0.76
Steep Slope	21	16	10	48%	0.76
Moderate Slope	25	21	12	48%	0.84
Flat	39	23	15	38%	0.59
Upland Flat	20	5	4	20%	0.25
Non-Colluvial Footslope	10	2	2	20%	0.2
Total	146	96	61	av.42%	0.66

This table is ranked by % pits producing lithics

Test-Pits Aggregate Data by Ecological Zone

Ecological Zone	No.Pits	No. Lithics	No.Pits Prod Lithics	% Pits producing Lithics	Av. No. Lithics Per Pit
Gravel Terrace	41	39	21	51%	0.95
Cheviot Slope	50	30	20	40%	0.60
Sandstone Slope	40	22	16	40%	0.55
Boulder Clay	15	5	4	27%	0.33
Total	146	96	61	av.42%	0.66

This table is ranked by % pits producing lithics

Figure 4.34

further upslope. Reference to the test-pit data (Figure 4.16, spits greater than 4, ie. below the 40cm ploughzone) shows lithics situated within colluvial deposits in footslope locations (e.g. pits 10,014; 10,016; 10,017; 10,018; 10,020) and within positive lynchets (e.g. pit 10,060).

As many of the colluvial landforms in the Milfield basin are now stable footslopes or lynchets these colluvial environments are unlikely to experience further removal of sediment from the slope units. Being mostly stable environments, these slope units act as sediment traps which means lithic material accumulated within them is unlikely to be moved again (see Figures 4.32 and 4.33). However, this is not to say that occasional reworking of sediments at the distal margins of colluvial drapes will not occur but this is uncommon in the Milfield basin given that so many of the colluvial zones are buttressed by lynchets which mitigate against further movement.

As gravity ceases to move lithics any further once they reach the flat slopes of colluvial environments surface accumulation of derived lithic material will take place (Waters 1992). Although lithics will eventually become buried in these colluvial zones the continual deposition of transported lithics across the surface of these fans ensures that additions to the surface lithic assemblage are repeated. As a result over-representation of lithics will take place on these slope types during both surface sampling and sub-surface sampling. The over-representation during sub-surface sampling has already been referred to (see above, page 150) whereby an average 90% of test-pits on these slopes produced lithics compared to averages of 32% of test-pits on flat slopes, 60% on steep slopes and 53% on moderate slopes (Figure 4.22). Reference to Figure 4.21 shows that colluvial footslope environments had the second highest density per hectare than any other slope unit in the Milfield basin (excluding the valley terrace depression slope unit which was considered too small a sample to be meaningful). With only valley floor gentle slopes having a higher surface lithic density, probably because they were genuinely the most favoured settlement areas (see below, page 154), this suggests a relative over-representation of surface lithics in these zones relative to the original surface population.

Therefore, it can be concluded that, within the Milfield basin at least, colluvial slope units are the areas of greatest lithic over-representation and contain, for the most part, lithics in derived contexts (see Figures 4.32 and 4.33), both on the surface and within their colluvial horizons.

Flat and Gentle Slopes

Flat and gentle slopes are generally considered to be environments where little sediment loss or gain takes place (Waters 1992), although experiments by Allen (1991) have shown that some lithic movement may occasionally take place on gentle slopes. Areas of flat and gentle slopes where minimal erosion or accumulation of sediments could be observed were identified in the Milfield study transect.

The high percentage of lithic producing pits for gentle slope areas is probably not a product of slope process bias but rather a result of genuine lithic patterning, suggesting such areas were favoured locations for prehistoric activity. Given the advantages of a gentle slope for settlement location, (e.g. natural drainage takes place), this may be an important finding when considering the location of early prehistoric settlement.

The areas of flat and non-colluvial footslopes were shown by the test-pit logs (Figures 4.17 and 4.18) to be stable geomorphological areas with little sediment loss or gain over time. Colluvial horizons were absent from these sediment profiles, and the presence of subsoils, where deep ploughing had not truncated them, indicated soil development on these slopes. This is significant as soil development only takes place when sediments become stable and are no longer prone to erosion or sediment accumulation (Butzer 1982; Waters 1992). Furthermore, Payton's study of the argillic brown earth soils of the gravel terrace, which are generally on flat or gentle slopes, demonstrated fragipan formation which is thought to have originated under periglacial conditions (Payton 1992). In addition to the subsequent clay migration from lower horizons into the fragipan, this study demonstrates the presence of developed soil profiles on the flat and gentle slope units of the gravel areas in the Milfield plain. Therefore, it can be concluded that, although much disturbed by ploughing, these soils have remained relatively stable over a considerable period (see Figures 4.32 and 4.33). The result is that, apart from displacement by the plough, these areas should contain a representative surface lithic density relative to the original lithic population.

As flat and gentle slope environments can be shown to have experienced sediment stability with minimal erosion or burial taking place, the surface distribution of lithics should correspond closely with the initial discard pattern. In this way the lithic distribution on such slope types is thought, in general, to be representative of past human activities, although slight movement caused by plough action may take place. Indeed, studies by Redman and Watson (1970) and Crowther (1983, 32) have indicated that tillage-induced movement of lithics on flat and gentle slopes is minimal. This conclusion has been further attested during the author's fieldwork when an Early Neolithic settlement site was discovered immediately below an Early Neolithic flint scatter (Waddington and Davies 1998) implying that the ploughzone flints had moved very little since their initial discard and that their distribution remained broadly representative of their original location.

In summary, areas of flat, upland flat set back from the break in slope and gentle slope are stable environments where lithic density and distribution is likely to be representative of original discard patterns. This lack of disturbance gives these areas a particularly strong interpretative value

Alluvial Terraces

Only one relict alluvial area was sampled during this study, due to the lack of ploughing on these surfaces (field 88, Figure 4.1). No lithics were recovered from the alluvial areas of this very extensive field (although five lithics were recovered from raised gravel bars within this environment, see Figure 4.5). Test-pits were unable to be dug into this environment due to time constraints and crop cover. However, the complete lack of finds recorded from a surface area measuring 47.5 hectares is significant. Even with a very low density of past human activity, some flintwork would be expected over such a large surface area. As there was none at all this suggests that the alluvial veneer which covers this area has buried lithic material, with the result that any surface distribution of lithics is under-representative of the original lithic pattern in these locations. This finding is consistent with studies elsewhere which have demonstrated and discussed the burial of lithic scatters by alluvial sediments (e.g. Stevenson 1985; Gladfelter 1985; Waters 1992; Stafford 1995). Therefore, it is concluded that the dominant slope process affecting alluvial terraces is that of burial resulting in the under-representation of the original lithic population (see Figures 4.32 and 4.33). However, it should be noted that other processes can take place in these complex environments, such as the erosion of lithic scatter sites by meandering river channels, the transportation of lithics to new locations by floodwaters and ultimately their redeposition elsewhere in an alluvial environment. The alluvial environment is an area which requires further in-depth study to understand more fully the processes affecting lithic distributions in these areas.

Summary

In summary, areas of flat and gentle slope remain relatively stable while areas of moderate and steep slope experienced erosion and transportation of material. The dominant process on colluvial footslopes was the accumulation of material, though if this area is subsequently disturbed some further movement of material may be possible. On upland flats there was stability observed away from the break of slope whereas around the break of slope, significant erosion of material took place. In the flood plain proper, where overbank flow regularly occurred, the burial and movement of material by alluvial action are the inferred processes. Therefore, it can be postulated that the areas of flats, upland flats set back from the break in slope, non-colluvial footslopes and gentle slopes are the areas where the surface lithic population is most representative of past human activities. In contrast, areas of steep and moderate slopes and the slope shoulders above them over-represent the volume of the lithic population when sampled. Broadly speaking, the steeper the slope the more acute this over exposure of lithics will be. Conversely, when a steep slope has experienced extreme sediment loss over a long time period such slopes may become exhausted of both sediments and lithics resulting in potential under-representation in some cases. However, the areas where greatest over-representation usually occurs, both within the ploughsoil (Figure 4.22) and on the surface (Figure 4.21), are those of sediment accumulation, particularly colluvial footslopes (which included areas of lynchets). Under-representation of the lithic population will take place in environments where burial takes place, for example, over peat beds where earlier land surfaces may have been covered by rapidly forming peat or in alluvial environments where aggradation of the valley floor by alluvial sediments may mask earlier occupied surfaces, or occasionally on colluvial footslopes where sediments containing few lithics accumulate on the footslope surface.

INFERENCE

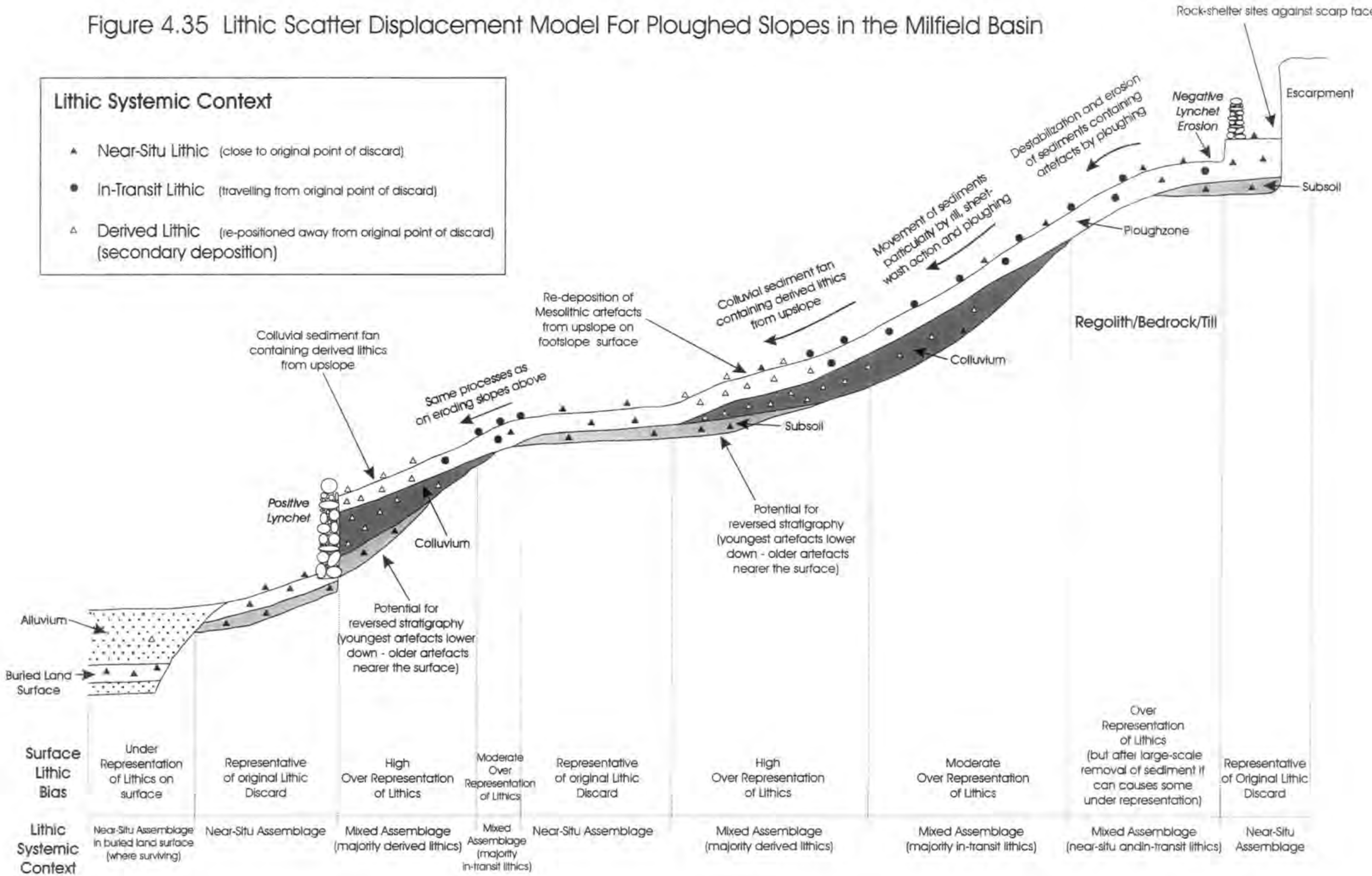
Model of Lithic Scatter Slope Displacement and Archaeological Inference

Given that slope type is a crucial influence on surface lithic distribution the implications for archaeological inference have to be identified to allow meaningful interpretation of the lithic scatter data. A simplified model of lithic scatter slope displacement and archaeological inference has been derived from the slope process data acquired from the Milfield basin in conjunction with the results from Allen's experimental data (1991) and the slope process models of Butzer (1982) and Waters (1992). It is presented here as a diagram (Figure 4.35) and a table (Figure 4.36). These two figures work in conjunction to provide a consistent framework for characterising the nature and derivation of lithic scatters from different slope locations. An essential caveat to the application of this model is that in its present form the model does not take into account the effect of different soil types, micro-topography and lithic size or shape - all of which can influence the extent and nature of lithic displacement (Allen 1991; Clark and Schofield 1991).

Three types of lithics are identified on the basis of their systemic context. First, there are those surface lithics which can be assumed to be close to their original discard location. As most surface lithic scatters are only visible because the ground is disturbed and the soil exposed, very few surface lithics are ever actually found *in situ*. However, even with centuries of ploughing lithic displacement in otherwise stable geomorphological environments, such as flat or gentle slopes for example, could be limited to within 10m of the original location (Roper 1976; Lewarch and O'Brien 1981; Clark and Schofield 1991). Lithics such as these, which have experienced minimal displacement, are classified here as 'near-situ' lithics. These types of surface lithics are suggested as being broadly representative of past human activity at the location in which they were found.

The second type of lithic which has been identified is the 'in-transit' lithic. This refers to lithics which are in the process of being eroded and moved and have not as yet come to rest in a new location where no foreseeable further movement will take place. Strictly speaking they are in a 'derived' context but for the purposes of this model they are termed 'in-transit' so that they can be differentiated from lithics which have come to more permanent rest in a sediment trap and which are here termed 'derived lithics' (see next paragraph). Such lithics will be found in most abundance on steep slopes but also on eroding slope shoulders, moderate slopes and to a lesser extent gentle slopes. However, such slopes will also contain

Figure 4.35 Lithic Scatter Displacement Model For Ploughed Slopes in the Milfield Basin



Main Slope Types	Description	Code (used in this study)	Systemic Context/s of Surface Lithics	Surface Density Bias	Interpretative Implications
Upland Flat	< 2 degrees	UFL	Near-Situ	Lithic distribution representative of past activity	Surface lithic distribution relates closely to past human activities. Stratified lithics may be encountered in-situ below peat beds. Erosion of lithics towards shoulder of slope resulting in over-representatation in surface scatter. However, this may be compensated for by substantial removal of material already having taken place.
Steep Slope	15-40 degrees	BSS; VTS	In-Transit Near-Situ (few)	Lithic distribution over-represents (moderate-high) extent of past activity	Surface lithic distribution, in general, representative of activities further upslope. Density of past activity exaggerated (high) on-slope though under-represented on slope shoulder where material eroded away. Lithics can be dislodged and moved quickly when on bare earth surface under storm conditions.
Moderate Slope	6-15 degrees	BMS; VTM	In-Transit	Lithic distribution over-represents (moderate) extent of past activity	Surface lithic distribution, in general, representative of activities further upslope. Density of past activity exaggerated (moderate) on-slope though under-represented on slope shoulder where material being eroded away.
Gentle Slope	2-5 degrees	BGS; VTG	Near-Situ In-Transit (few) Derived (few)	Lithic distribution representative (in general) of past activity	In general surface lithic distribution relates closely to past human activities although some (small and light) lithics will have travelled and been re-situated during storm conditions and plough disturbance.
Colluvial Footslope and Positive Lynchets	≥ 2 degrees	ECF	Derived Near-Situ (very few)	Lithic distribution over-represents (very high) extent of past activity	Represents aggregate of past human activity from the entire slope which feeds the colluvial footslope. As such, lithics from the footslope indicator a proxy indicator for past activity across the entire slope above. Possibility of reversed stratigraphy with older lithics overlying younger lithics. Very occasional near-situ material may exist on colluvial-sub-soil contact and would, therefore, represent past human behaviour at that point. Latter virtually impossible to demonstrate unless situated within a non-colluvial in-situ soil/sediment unit.
Flat	< 2 degrees	FLF	Near-Situ	Lithic distribution representative of past activity	Surface lithic distribution relates closely to past human activities.
Alluvial Flat	< 2 degrees (flood plain)	VAF; RWT	Near-Situ (buried) Derived (few)	Surface lithic distribution grossly under-represents extent of past activity	Alluvial terraces stable since prehistory may have near-situ lithics and would have the same interpretative implication as a "Flat". However, alluvial terraces which have aggraded since prehistory will have virtually no lithic material visible on the surface (whether ploughed or not). Lithic material discarded in this latter environment may remain near-situ or reworked into derived contexts during alluvial events but buried below the surface and out of range of surface sampling. If this buried material can be sampled its distribution may or may not relate closely to past human activity. Occasional lithics encountered within alluvium, and possible to be found on a disturbed surface, may be derived lithics washed in during overbank flows and will represent activities that took place further up the catchment, not on the alluvial surface. Their interpretative value is low.

Figure 4.36 Lithic Scatter Slope Inference Model

the occasional near-situ lithic which, given particular micro-topographies of any given slope, will not have moved very much. Similarly, such slopes will also contain occasional 'derived-lithics' which have come to rest in certain micro-topographical situations which mitigate any future movement of the lithic. As such, these slope environments will contain a mixture of all three lithic types, though the surface population will tend to be dominated by 'in-transit' lithics.

The third type of lithic, 'derived-lithics', is the term used to refer to those lithics that have been eroded from their original *in situ* context, transported and then redeposited in a derived context where they have finally come to rest and where no future movement of any note is likely to happen. These lithics, therefore, are situated in what can be described as derived contexts. Such locations identified in this study include most significantly colluvial footslopes and lynchets. The systematic surface and sub-surface sampling of these areas can provide a representative aggregate record for the entire slope area feeding the footslope. Although this proxy record does not have the spatial information of near-situ lithics, such assemblages of derived lithics can provide a useful broad brush characterisation of a particular source slope environment, as has been achieved by Bell, for example, on the South Downs (Bell 1983). Here the surface density will significantly over-represent the lithic population that was originally discarded in these locations and, as surface material is washed down slope and redeposited on existing sediments, it is possible for 'reversed stratigraphy' of lithics to take place (Butzer 1982).

The alluvial land unit in this study has been broadly categorised as a burial environment where under-representation of lithic populations will take place. At a general level this is thought to be valid; however, localised conditions will mean that near-situ and in-transit lithics can sometimes be encountered in alluvial environments. Indeed near-situ lithics were the only lithics which were recovered from the alluvial area sampled during this study. In this case all the lithics recovered from Kimmerston Bog (a drained area of land made up of fine-grained alluvial soils overlying organic rich horizons and with a string of gravel islands protruding above the relict alluvial surface) were located on the gravel islands. These gravel islands are almost certainly relict gravel bars which were once small 'islands' in an otherwise low energy riverine environment, although by the earlier Holocene this had possibly become a marshy backwater (Dave Passmore pers. comm.). Today, these small islands are barely visible on the surface to the untrained geomorphological eye. If the surface lithics were taken at face value it may have been thought that they were derived-lithics washed in by floodwaters. However, detailed geomorphic mapping of this area was able to highlight these features as old land-surfaces and instead these artefacts are almost certainly near-situ lithics which are, therefore, representative of the activities which once took place in these locations (see also below, Chapters 5 and 6).

SURFACE-SUBSURFACE RELATIONSHIPS

The issue of surface-subsurface relationships has been identified as a key consideration when interpreting surface lithic scatters (Bowden *et al* 1991; Clark and Schofield 1991; Zvelebil *et al* 1992). Figure 4.37 below shows the average weight of lithics at the surface, based on the fieldwalking data, and at different depths below the surface, based on the test-pit data. There is a clear fall-off in weight with increasing depth. The average weight of surface lithics (5.57g) is substantially higher than the next highest average weight (2.0g), being close to three times greater. This tendency for larger lithics to be over-represented on the surface, rather than being evenly spread throughout the soil, has been confirmed by other studies (e.g. Boismier 1997). This high incidence of larger lithics on the surface means that, in general, the surface lithic population will exaggerate the average size of lithics in the ploughsoil. The implication for the interpretation of surface scatters is that the surface assemblage is likely to over-represent larger lithic types such as cores, large flakes and large tools, whereas smaller artefacts, such as trimming flakes, chips (ie. debitage) and small tools, will be relatively under-represented. It will also have an effect on recovery bias as larger pieces are more likely to be noticed and picked up than smaller pieces. This patterning of the surface-subsurface assemblage is probably one of the factors responsible for the low percentage of debitage and waste material (2%) in the surface assemblage and the high percentage of utilised pieces (72.4% of the surface assemblage). Recycling and a parsimonious attitude to discard of waste material may also be important factors in the Milfield basin where flint is an imported material. As a result, the identification of flint-working areas within the study transect has been largely confined to the identification of cores (14.3%) as debitage is rare in the surface assemblage (2%).

Figure 4.37 Average weight of lithics at different depths

Spit (10cm unit)	**Total Lithics**	**Total Weight (g)**	**Average Weight (g)**
0 (surface fieldwalking data)	698	3858.0	**5.5**
1 (0-10cm)	37	37.04	**1.0**
2 (10-20cm)	26	53.14	**2.0**
3 (20-30cm)	18	28.8	**1.6**
4 (30-40cm)	6	8.36	**1.4**
Average			**2.3**

The total lithic counts from the 1m square test-pits at different depths is also revealing in that only three lithics were found on the surface of these 1m squares yet 37 were found in the 10cm immediately below them. Figure 4.38 shows the calculated percentage of the test-pit assemblage represented at different depths of the ploughsoil, which on average measured 40cm deep.

Figure 4.38 Lithic Frequency by Depth in Test-Pits

Spit (10cm unit)	**Total Lithics**	**% of Test-Pit Assemblage**
0 (surface)	3	3.3%
1 (0-10cm)	37	41.0%
2 (10-20cm)	26	28.9%
3 (20-30cm)	18	20.0%
4 (30-40cm)	6	6.7%
Total	90	

Figure 4.38 includes the spits which represent the ploughzone but excludes the lower spits which represent sub-soil and colluvial deposits. As only a limited number of pits were cut into areas with deeper deposits, the lithic frequency at lower depths than the ploughsoil will be low. Hence the statistics given in Figure 4.38 are restricted to the ploughzone (ie. the top 40cm of soil) of the test-pits. This table shows that only 3.3% of the ploughsoil lithic assemblage is represented on the surface, a statistic that compares very closely with Clark and Schofield's figure of 3.5%, based on their experiments at Park Farm, Wiltshire (Clark and Schofield 1991, 100). On the basis of the test-pit work undertaken in the study transect, it can be postulated that the vast majority of ploughsoil lithics (69.9%) are concentrated in the top 20cm of the ploughsoil, whereas lithics are least represented on the surface (3.3%) and in the basal 30-40cm (6.7%) of the ploughsoil. This study, therefore, adds to previous studies (Parker-Pearson 1981; Tingle 1987, 89; Clark and Schofield 1991, 100) in confirming that the surface lithic population represents between 2.0% and 3.5% of the total lithic population of the ploughsoil. Although use of a statistic such as this could be used for 'correcting' surface lithic assemblages, its value lies in its ability to indicate the extent to which the surface fieldwalking has actually sampled the lithic population of the ploughsoil. It therefore serves as a reminder that only a fraction of the lithic distribution is known. This reinforces the notion that it is the identification of recurring patterns in the spatial distribution of lithic type and chronology that is central to extracting understanding from surface lithic data (Schofield 1991c, 161-4), rather than the attempt to use them for locating specific 'sites' on the basis of density alone. The latter may be possible under certain conditions, such as where previous occupation will have been low and agricultural disturbance only limited (Clark and Schofield 1991, 95). In general, however, the identification of patterns in the assemblage from repeated human activities over the long-term allow surface lithic assemblages to be used for characterising past human behaviour across the landscape in a broad-brush way in regard to long-term episodes of repetitious human behaviour. Hence, the employment of the fieldwalking data in this study to help characterise past land-use across the different ecological zones of the basin and the concern for aggregate patterns of human behaviour over the *longue-durée* rather than the short term. With only this small scale sampling of the ploughzone population being possible by fieldwalking, and where intensively occupied habitation sites may, therefore, leave little record in the surface lithic assemblage (*ibid*), it is concluded that the fieldwalking assemblage in the Milfield basin broadly represents around a 3.3% sample of an aggregate account of past human behaviour in this landscape.

The question as to the extent the 3.3% surface sample is representative of the total ploughzone population is addressed in part by Figure 4.39, which shows the lithic density order of different ecological zones, both by fieldwalking and by test-pitting.

Figure 4.39 Rank Order of Ecological Zones by Lithic Density (highest first)

Fieldwalking	**Test-Pits**
Gravel Terrace	Gravel Terrace
Sandstone Slope	Cheviot Slope
Cheviot Slope	Sandstone Slope
Boulder Clay	Boulder Clay
Alluvial	Alluvial

The relative lithic densities of each of the different ecological zones is mirrored almost exactly when comparing the surface sampling (fieldwalking) with the sub-surface sampling (test-pits). The exception is the Cheviot slope and Sandstone slope which are in third and second place for the fieldwalking but in reversed order in the test-pits. What this table reveals is that, in broad terms, the surface sampling is generally representative of ploughzone density across the ecological zones, with the exception of the Cheviot slopes where surface survey under-represents the total ploughzone assemblage. With reference to the test-pit data (Figure 4.16, pit 10060) and the model of inference presented above (Figures 4.35 and 4.36), this can be accounted for as being a result of the generally steeper slope of the Cheviot hills, which are therefore more susceptible to the movement and redeposition of lithic material in sediment traps. The high number of lynchets noted on the Cheviot valley side, some up to 4m high, is testament to the substantial effect these processes have had on the surface lithic densities on these slopes. A large percentage of the lithic population of the Cheviot slopes remains, therefore, locked up in these lynchet locations and inaccessible by surface sampling. Any future research into the characterisation of past human behaviour on these Cheviot slopes should consider systematic excavation on a number of these lynchets - which in effect contain a proxy lithic record for the whole of the slope.

SUMMARY

This chapter and associated appendices have presented the raw data for the various fieldwork components, an analysis of the different data sets and their integration into a taphonomic slope inference model. The importance of understanding the taphonomic processes which affect lithic distributions in this area are further demonstrated by the consideration of surface to subsurface relationships. Analysis of the lithic assemblage has identified behavioural patterning in the data over time and considered some of these implications. The following chapters will seek to interpret these results and incorporate them with the wider corpus of archaeological and palaeoenvironmental information to produce period by period syntheses.

Chapter 5

View of Goatscrag looking to the north

CHAPTER 5 THE MESOLITHIC

This chapter begins with a brief consideration of the research context for Mesolithic work in the Milfield area. This is followed by a discussion of the currently available palaeoenvironmental data for the period. Attention then turns to an interpretation of the period-specific lithic data acquired from the study transect and its implications for Mesolithic activity. The following section attempts a reconstruction of Mesolithic settlement using the palaeoenvironmental and lithic data previously discussed. Included within this section is a case-study which employs the 'lithic scatter slope displacement model' described in the previous chapter (see Figures 4.35 and 4.36) to interpret Mesolithic activity around the sandstone cragline. The chapter concludes with a consideration of other potential Mesolithic archaeology in the basin and suggests how this can be interpreted to inform how the landscape was ordered and related to by humans. An interpretative synthetic overview of Mesolithic activity in the basin is presented later in this study as part of the discussion chapter (Chapter 8).

BACKGROUND

There has been little previous work on the Mesolithic period in the Milfield basin and this has, in part, been perpetuated by the misconception that the basin was largely devoid of Mesolithic activity (Weyman 1984). Indeed Weyman has commented (1984, 49), from her work around Thirlings, on "the sparsity of finds on the extensive gravel areas of the Milfield basin", and reflected that "one can only conclude that in the Mesolithic there were factors which made it less attractive". Elsewhere, the Mesolithic flintwork from the gravel terrace at Yeavering was dismissed by Hope-Taylor in a single reference (Hope-Taylor 1977, 194-6): "struck flakes of flint (and occasionally of chert) occurred as stray finds in the overburden, some of them unmistakably Mesolithic; but as there is a lack of context and of specific forms it would be pointless to illustrate and discuss them." Furthermore, it was noted by Burgess (1984, 129) that, "as yet no

Mesolithic sites are known in the Northumberland Cheviots", which includes the southern and western upland fringes of the Milfield basin. Therefore, the research context for understanding the Mesolithic in the basin is against a background of low expectations and existing notions of the relative unimportance of the area during the Mesolithic.

However, Weyman's systematic fieldwalking in the fields around the Thirlings Neolithic site (see unpublished report lodged with the Museum of Antiquities of Newcastle upon Tyne) has yielded an important collection of material which requires re-assessment, a priority of future research. Although Weyman noted only seven certain Mesolithic pieces in a total collection of over 500 pieces from a 0.5 mile radius around Thirlings, this apparent under-representation of Mesolithic lithics is argued here as being more apparent than real due to a range of factors, some of which have been discussed above (Chapter 4). In the report, Weyman acknowledged that many of the other pieces could belong to the Mesolithic period but the difficulty of fitting the non-flint lithics into the standard typologies accounts in part for the low count reported for Mesolithic pieces. Of the 500 pieces recovered, over 440 remained unclassified. Therefore, the view that the Mesolithic presence in the Milfield basin is slight is a somewhat premature conclusion. Instead, the Mesolithic could, potentially, be rather well represented on the gravel terraces but this indication is hindered by the generally small size of pieces and frequent use of non-flint lithics.

Unfortunately, Hope-Taylor did not view the lithics from his extensive excavations as worthy of reporting and recent attempts by the author to relocate this material for reassessment have been unsuccessful. The paucity of Mesolithic material from the Cheviot slopes noted by Burgess is, for the most part, a function of recovery biases caused by a lack of systematic fieldwalking of the Cheviot slopes which, in any case, are rarely ploughed. However, the collection of lithics from plantation furrows in the area around Threestoneburn by the forestry worker Fritz Berthele (Hewitt 1995), made clear that Mesolithic material could be found on these slopes. Recent excavations at Turf Knowe, also in the Cheviots, have produced a small amount of Mesolithic material from an area around an Early Bronze Age cairn (A.S.U.D. 1996b). Therefore, as work continues on the Cheviot slopes increasing evidence for Mesolithic exploitation of these hills is coming to light.

THE PALAEOENVIRONMENTAL RECORD

As palaeoenvironmental investigations in the basin are still on-going this discussion remains a provisional account. The main concern of this section is to provide a brief outline of the Mesolithic vegetation sequence that is presently known across the different ecological zones of the basin, and to suggest a broad pattern for the areas less well understood. Although the broad vegetational sequence for the basin is outlined in Chapter 2, this section is structured around understanding the different vegetational sequence across the different ecological zones during the Mesolithic. As with the rest of this chapter, this discussion will focus primarily on the later Mesolithic period.

The prevailing vegetation sequence known for each of the ecological zones is not yet evenly understood due to the uneven thrust of earlier fieldwork and the different time-spans covered by different pollen cores. Continuing palaeoenvironmental work aims to fill these gaps (Passmore pers comm; Palmer-Moss pers comm.).

Cheviot Slopes

Available evidence suggests that the Cheviot slopes were wooded throughout the Mesolithic, with oak and elm particularly important from c.5600BC (Hibbert and Switsur 1978; Mannion 1978), and with all the deciduous forest forming taxa having colonised the area by 5000BC (Tipping 1996, 20). However, by 4500BC the increasing occurrence of open ground within this wooded landscape has been noted with ground above 500m O.D. thought to have been more open (*ibid*, 20). Tipping recognises this change in the vegetation as being anthropogenically driven in an attempt to intensify land-use during the latter stages of the Mesolithic, a pattern noted elsewhere for uplands in northern England at this time (Simmons and Innes 1987; Simmons 1996). The use of fire to promote diversity and productivity in the woodland understorey is well known and is thought to be a plant promotion strategy (Zvelebil 1994) frequently employed during the Mesolithic for attracting wild ungulates, particularly deer and wild cattle (Mellars 1976; Simmons 1996).

Gravel Terraces and Alluvial Valley Floor

The gravel terrace and alluvial valley floor vegetation sequence is presently known from pollen cores taken from the interface between these two environments, where peats have accumulated, and from the alluvial floodplain proper. The Wooler Water (Clapperton *et al* 1971) and Akeld Steads (Borek 1975; Tipping in press) diagrams indicate that reed and sedge, together with willow and bog myrtle, colonised the alluvial valley floor during the early Mesolithic. However, by the later Mesolithic both diagrams attest to the increasing importance of alder in these wetland fringe environments with that at Akeld Steads dated to c.6300BC (Tipping in press). Thus, the late Mesolithic flood plain, particularly the wetter areas fringing the river channels, may be envisaged as an area of alder carr where peat formation continued to take place. Tipping's recent work at Akeld Steads has indicated episodes of overbank sedimentation starting from c.5500BC, which he cautiously suggests could be associated with Late Mesolithic disturbance at the wetland edge (Tipping in press). Currently little is known specifically about the vegetation sequence on the gravel terraces situated immediately above the alluvial flood plain. However, given the free draining nature of the gravels it can be inferred that the plant communities there would probably have supported vegetation similar to the deciduous woodland of the Cheviot slopes. As yet this possibility requires confirmation by palaeoenvironmental investigation.

Sandstone and Boulder Clay Slopes

Currently investigated pollen diagrams for the sandstones and boulder clay areas do not extend as far back as the Mesolithic, although recent cores from Ford Moss and the organic sediments from Kimmerston Bog should provide information on the Mesolithic environment in these areas. The occurrence of laminated clay horizons noted in various test-pits (see also Chapter 4) in the boulder clay area, particularly in low-lying hollows, is suggestive of areas of standing water within this ill-drained part of the landscape. This would suggest boggy ground with localised pools of standing water presumably supporting a wetland vegetation, unless the pools were only temporary features. However, it has not yet been possible to date these clay bands, though it is more likely that they date to the earlier Holocene (Mesolithic) than later periods (see also Payton 1988). By analogy with the nearby Cheviots and similar areas of upland northern England (Simmons 1996), the sandstone escarpment is likely to have supported a predominantly oak and elm woodland with other species such as pine, birch and hazel also important during the later Mesolithic.

THE LITHIC DATA

As very few lithics from the whole fieldwalking assemblage could be suggested as being of possible early Mesolithic date, this section is primarily concerned with understanding later Mesolithic settlement in the basin. The 'structure' of fieldwalking data for the most part represents a cumulative record of human activity rather than discrete temporally defined episodes (Schofield 1991c; Tolan-Smith 1997c). As such, the coarsegrain of much of the fieldwalking record necessitates that the sort of interpretative framework which is used to interpret this data is pitched at a similarly long-term perspective, hence the discussion of the

Mesolithic Findspots

Fig. 5.1

'later Mesolithic' throughout this chapter. The distribution of Mesolithic material from the fieldwalking transect is presented in Figure 5.1.

Density and Distribution

The small average size (av. weight 5.6g) and appreciable occurrence of rejuvenation (7.8% of the Mesolithic assemblage) imply that a parsimonious attitude to lithic discard obtained across the basin. Hence, the low density for the basin in general also appears to be affected by not only the difficulties of identifying small pieces, but also the effects of a distinct cultural attitude towards lithic discard in this flint-scarce area (see also above, Chapter 4). Consequently, as stone tools were being recycled by repeatedly paring them down until they finally became unusable (instead of immediate discard after initial blunting or breaking as previously mentioned in Chapter 4), the gross population of lithic tools in a flint-scarce landscape will always be significantly lower than in a flint-rich landscape. Therefore, it does not always follow that high lithic densities across a landscape necessarily demonstrate a high human population and low lithic densities a low human population (Schofield 1991b). Instead, densities across a given landscape need to be interpreted in relation to the local availability of raw materials, the type of raw materials, and the cultural attitudes obtaining towards lithic discard, as well as the type of human activities which are taking place there - some of which produce greater surface densities of lithics than others, even though settlement in these high lithic density areas may have been less intensive.

Taking into account these biasing factors which contribute to the under-representation of lithics and human activity in fieldwalking datasets for the Milfield basin, the notion of only limited Mesolithic activity on the basis of low lithic densities in the basin needs to be redressed. Density may be of some use in analyses as long as the density counts used are comparable and relate to each other. Therefore, the densities of lithics for each ecological zone within the same

Mesolithic Density Plot
By Field

Fig. 5.2

overall Milfield basin landscape are believed to be comparable (Figure 4.10) as the data relates to the same landscape.

The density counts for the Mesolithic material are presented as a field by field density plot (Figure 5.2) with the actual lithic counts and individual density counts given in Appendix 9. The density values for Mesolithic material from each ecological zone are reproduced here from Figure 4.10.

Figure 5.3 Density of Mesolithic material from each ecozone

Ecological Zone	Gravel Terrace	Sandstone Slopes	Cheviot Slopes	Boulder Clay	Alluvial
Adjusted Density per ha.	3.0	2.2	1.4	0.3	0.3

Both the lithic density plot (Figure 5.2) and table above (Fig 5.3) indicate that the raised fluvio-glacial gravel terraces of the valley floor formed the main focus for activity during the Mesolithic period (3.0 lithics per hectare), with the sandstone (2.2) and Cheviot (1.4) slopes forming the next most significant areas. As discussed in the results chapter, however, the count for the Cheviot slopes is probably significantly higher than the recorded statistic given the particularly acute effects of taphonomic processes and recovery in this zone. It is important to note the relative avoidance of the boulder clay areas (0.3) this is probably a real pattern as this is an area that has not been heavily affected by processes which encourage under-representation. Therefore, when the taphonomic biases are taken into account, these different ecological areas can be ranked in terms of their relative importance to Mesolithic groups. The raised gravel terraces form the principal focus for Mesolithic activity with the sandstone and Cheviot slopes forming probably equal areas of secondary importance. Boulder clays, by contrast, appear to have been used much less frequently by Mesolithic groups and, given the sharpness in fall-off of activity in this area, compared with the others, may have been intentionally avoided. If the area comprised damp, swampy ground with still and stagnating water, as is provisionally suggested by the occasional bands of laminated clay horizons encountered in the test-pits (pits 10091-10095, Figures 4.12 and 4.17), this area may have been regarded as unattractive by hunter-gatherer communities, especially as these areas would encourage mosquitoes and midges.

These areas remain a poorly drained part of the landscape even today. However, this interpretation only remains provisional and is being tested by on-going research.

The results for the alluvial wetlands (0.3) are certainly under-representative of past human activity (see above Chapter 4) as large tracts of these landscape areas are buried by Holocene alluvial sediments (Payton 1980; Tipping in press; Passmore *et al* 1998). Although this area is not, therefore, able to be surface sampled in the same way as the other zones, it can only be concluded at present that Mesolithic activity took place in this area, but its nature and scale are yet to be determined. What is worth noting, however, in relation to the alluvial environment is that, as much of the alluvial valley floor is consistently flooded both by winter and spring floods, the Mesolithic activity that took place on these surfaces must have been of a temporary nature, and, therefore, to some extent seasonal in nature so as to respect the winter-spring flooding cycle of the rivers.

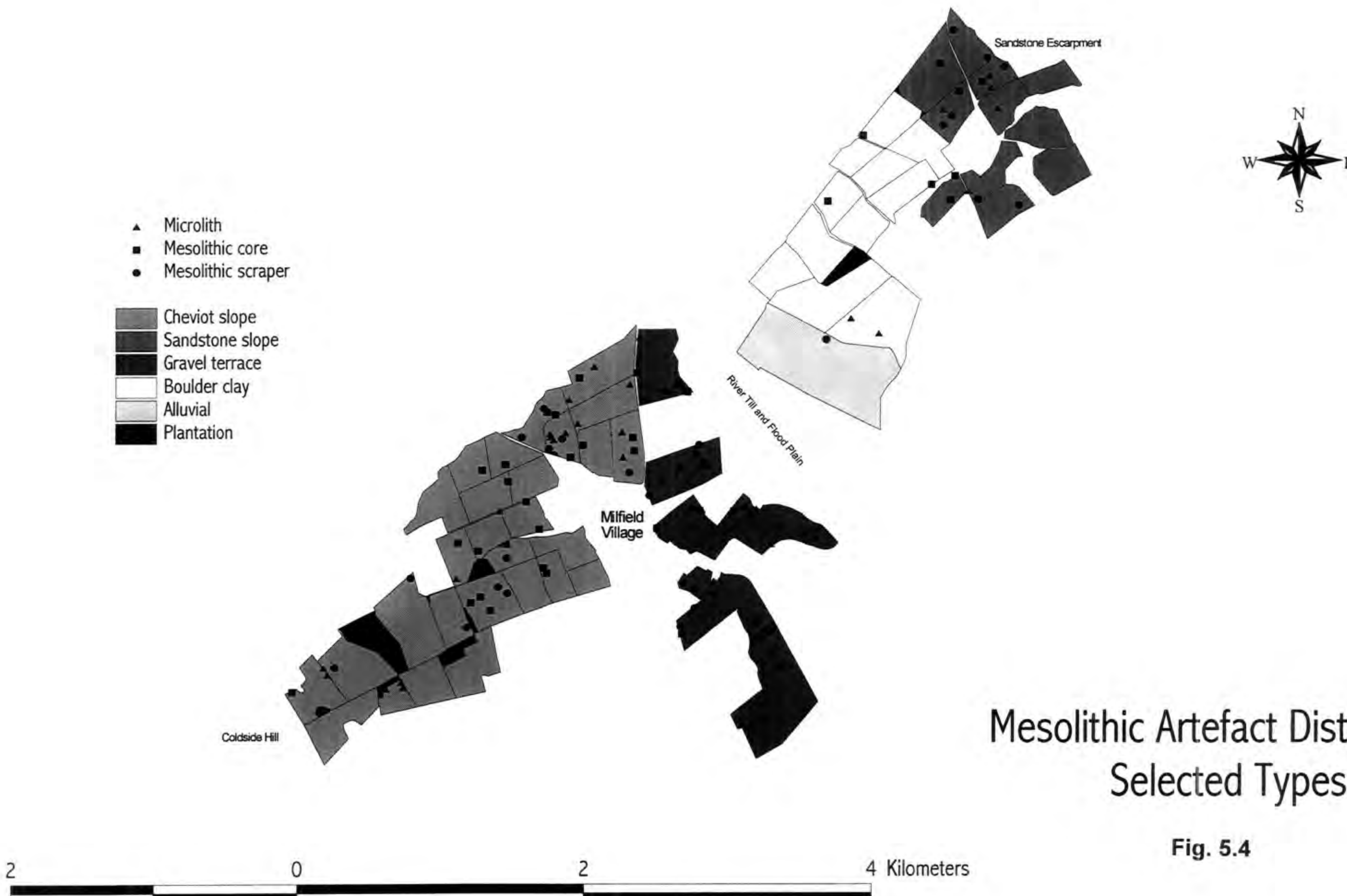
Character of the Assemblage

As noted previously in Chapter 4, the majority of the Mesolithic assemblage (62.9%) fits into the tertiary stage of the core reduction sequence, while 35.3% is characterised as secondary and only 1.7% as primary (Figure 4.39). The low incidence of primary waste indicates that only a few locations are likely to have been exploited as quarry areas. These included the distal edges of the raised gravel terraces, particularly in field 49, and also along either side of the steep-sided stream which runs through Dean Plantation on the Cheviot slopes west of Milfield village (fields 17, 18 and 19, see Figures 4.1 and 4.2). These locations for primary waste are probably significant, in that both locations are very close to steep-sided river channels which create natural sections through underlying sediments. These exposures provide ready access to the glacially derived gravels and Cheviot drift deposits respectively where agates, quartz and volcanic raw materials most frequently occur.

The distribution of Mesolithic secondary material, such as cores and unretouched flakes, is more evenly distributed with material spread across the flat areas of the gravel terraces and on the gently sloping areas of the lower Cheviot slopes, as well as on the sandstone slopes (Figure 5.4). The occasional piece is also found on the higher boulder clay slopes. This indicates that most processing of lithic materials took place away from the immediate procurement sites.

Tertiary material such as scrapers, blade tools, burins and borers are usually considered to be representative of activities associated with settlement sites (Schofield 1993; Edmonds 1995). The location of this sort of Mesolithic tertiary material (Figure 5.4) mirrors the distribution of the secondary material but in greater concentrations across the gravel terraces, on the low Cheviot slopes and along the sandstone slopes.

Tertiary material representing 'extractive' activities such as hunting (Tolan-Smith 1996b), which in this case includes microliths and points, tends to be located across the basin from one watershed to the other (Figure 5.4). However, this pattern is revealing in that it demonstrates preferences for the gravel terrace, including its edge overlooking the resource-rich alluvial wetland environment, the low Cheviot slopes and also the Cheviot hilltops (Figure 5.4). Similarly, microliths were also recovered from the higher sandstone slopes and particularly where the slopes overlook the steep-sided Broomridgedean Burn, which forms a natural routeway into the basin from the escarpment. The location of microliths on the boulder clay is distinct from the location of cores in this zone with microliths located on the lowest areas and the cores located on the upper slopes. Given that the upper slopes of the boulder clay areas would drain better, these locales would provide more attractive settlement prospects than the damper lower slopes.



Mesolithic Artefact Distribution
Selected Types

Fig. 5.4

However, these damp low slopes fringe the area of Kimmerston Bog, which initial palaeoenvironmental research suggests may have been a wetland during the earlier part of the Holocene (Passmore *et al* 1998). Such a wetland would provide similar resource opportunities to the wetland valley floor proper.

Excluding the 'extractive' tools in the assemblage, and the small percentage of primary waste, most of the other material recovered from this sampling falls into categories that are normally assumed to represent settlement activities such as cores and processing tools (Schofield 1993; Edmonds 1995; Tolan-Smith 1996b). As such, the majority of the Mesolithic assemblage is representative of prehistoric settlement rather than the acquisition of raw materials. Furthermore, it has been stated previously how the character of this assemblage conforms to Schofield's scheme for domestic (ie. settlement) assemblages where flint is imported to the area (see above Chapter 4, Figure 4.7).

Raw Materials

An important pattern is evident in that over 50% of the Mesolithic lithics are made from non-flint raw materials (see above Chapter 4, Figures 4.32; 4.33) - namely the locally available agate, chert and to a lesser extent, quartz and chalcedony. This is significant as it demonstrates that, although flint was being imported from elsewhere during the late Mesolithic, production was to a large extent oriented at the local level, which is suggestive of a largely self-sufficient community residing in the basin.

Furthermore, the absence of Northumberland coastal flint, which can be found in the boulder clays which mantle the north-east coastal strip as little as 15km to the east suggests that late Mesolithic groups in the Milfield basin did not follow a seasonal round which involved travelling to, and residing at, the coast for any considerable part of the year. Instead, the restricted distribution of local lithic raw materials in north-east assemblages are more suggestive of late Mesolithic communities with reduced seasonal mobility over relatively restricted areas (Waddington in press a). The flint that is utilised in the Milfield basin during the Mesolithic period is from a mixture of sources but the most common is a light grey glacial flint which almost certainly originates in the boulder clays of north-east Yorkshire. Therefore, it is suggested that inland exchange routes were well established to the extent that north-east Yorkshire flint appears to have travelled along inland routes via the Pennines (e.g. Weardale - Young 1987), northwards to the eastern Cheviot communities and on into south-eastern Scotland (Mulholland 1970). Thus, although the Yorkshire flint was from further afield, it may have been preferred to the poorer quality, but more proximal, north-east coastal flint.

Interestingly, the north-east coastal flint has three particularly distinct characteristics. Firstly, most of the chronologically classifiable pieces in the assemblages tend to be Mesolithic. Secondly, the spatial distribution of tools made from this flint is restricted almost exclusively to the coastal margin. Thirdly, although tertiary and secondary material does occur, much of the material belongs to the primary stages of the core reduction sequence. This implies that during the Mesolithic period there were coastal communities who relied on their own locally procured flint during their occupation of the coastal margin. As this coastal flint is rarely, if ever, encountered in assemblages further inland, such as at Milfield, it suggests that Mesolithic groups refrained from moving between the coast and inland areas on a regular basis. Therefore, it would seem that by the Late Mesolithic, at least, the groups occupying the Milfield basin had a reduced range of annual mobility that may have extended only as far as the edges of the basin itself. Similarly, coastal groups may have restricted their annual range to the coastal margin and low dip slopes of the sandstone fells. Such a pattern, with year-round settlement confined to restricted areas of discrete landscape, such as the Milfield basin or the coastal margin, is at variance with earlier models proposing annual rounds taking communities from the coastal margin further inland and ultimately, for some, to upland hunting camps (e.g. Clark 1954; Jacobi 1979; Young 1987). However, this is not to discount such strategies having taken place in the Milfield basin during the Early Mesolithic when more extensive strategies of resource procurement may have prevailed.

Technology

The high incidence of burnt lithics in the Mesolithic assemblage implies particular concern for maximising lithic production from both locally available and imported raw materials (see above Chapter 4, Figures 4.34; 4.35). This interpretation of the burnt lithic data is consistent with the operation of a frugal strategy with regard to stone-tool production and discard, as suggested earlier by small tool size and rejuvenation (see above). It is interesting to note the fall-off in the percentage of burnt flint during later periods, which suggests a decrease in concern for the conservation of stone tool raw materials. It was also noted in Chapter 4 that the variation in the proportion of lithics burnt in the different ecological zones also varied and that this may have reflected distance from lithic source areas. That is, the closer to a source of lithic material the lower the proportion of burnt material and the further away from the source the higher the proportion of burnt material.

As with the burnt material the incidence of rejuvenated pieces (7.8%) in the Mesolithic assemblage is also very significant. The consideration of the rejuvenated material in Chapter 4 showed a sparing attitude to stone-tool manufacture, curation and discard by the Mesolithic communities of the basin. Therefore, the concordance of trends witnessed in the data for raw materials, burnt lithics, rejuvenated lithics, small average size and utilisation of flakes which would normally be discarded leaves little doubt that a parsimonious attitude to lithic husbandry prevailed. Maximisation of the lithic resource through recycling and improvement of flaking properties featured as important components in the stone tool strategies of Mesolithic groups occupying the basin.

SETTLEMENT

This section aims to provide a reconstruction of the Mesolithic settlement pattern through the integration and interpretation of the existing palaeoenvironmental and archaeological data previously discussed.

The gravel terraces are free-draining and lie adjacent to the rich resource area of the alluvial floodplain and the river channels of the Till and the Glen. Available pollen evidence suggests that much of the flood plain may have been an area of alder carr during the late Mesolithic (Clapperton *et al* 1971; Borek 1975; Tipping in press). Such carr land would not only provide an important resource for fish and fowl, beaver and otter but also a culling area for animals drinking at the water's edge as well as a rich source of edible plant foods (Zvelebil 1994, 41), notwithstanding the importance of rushes for such uses as basketmaking and possibly thatch, furniture and clothing. Even today the Till remains famed for its seasonal stocks of salmon and sea trout, together with its attraction for migrating flocks of geese. Continuing palaeoenvironmental research will help to substantiate this initial interpretation and hopefully reveal some new insights (see also below).

The heavy concentration of cores and tertiary material, on the edge of the gravel terrace in field 42 most probably represents a settlement area (Figure 5.2). This positioning tells us much about the way in which settlement was structured. In this case the archaeological evidence reveals an occupation area situated on the freely draining gravel surface set up above the alluvial floodplain and, therefore, free from flood risk, but adjacent to the rich resources of the flood plain and its wetlands. Such a site could have been occupied on a year-round basis, including the winter months, when flooding elsewhere would be a problem, or just seasonally, before moving on. Although a site located in this resource-rich environment and within easy access of different environmental niches could potentially be occupied year-round, an immediate proximity to a damp riparian environment could have rendered the site uninhabitable during the summer months due to the presence of midges, mosquitoes and conditions promoting the spread of bacteria. However, this site is positioned at a place where the alluvial valley floor constricts and the channel butts up close to the raised gravel terraces; it thus occupies one of the few locations along the river Till's axis where tracts of marsh are unlikely to have bordered the channel. This suggests that this occupation area was sited so that it could remain habitable over the summer and, therefore, all year round if necessary.

The density of material found in field 42 implies either repeated visits over a sustained period or a large encampment occupied intensively over a shorter period. Given that the terrace edge in field 42 forms part of a historically attested fording area of the river Till (e.g. the placename of 'Milfieldford Plantation' for the woodland on the east bank of the river immediately opposite), at a natural pinch-point in the floodplain, it is likely that this site occupies an ancient crossing point of the river - whether by canoe, wading or bridge. This is in part confirmed by the location of an Early Neolithic fording point 150m to the north (Waddington 1998a; see below Chapter 6). It is likely, therefore, that this site was a place which was revisited on many occasions rather than a site occupied very intensively for just a short period, and probably represents a winter-spring, and possibly even year-round, base camp. The presence of leaf-shaped arrowheads in the assemblage from this field indicates that this area continued to be visited in subsequent periods. Its geographic location close to the water's edge, but free from flood risk and at a suitable crossing area of the river, imply that this 'place' provided not only access to the watercourse itself, but also access across the water to the sandstone escarpment beyond, as well as to the rich resources of the alluvial wetlands and the river itself.

The location of lithics thought to be indicative of settlement activity on the Cheviot and sandstone slopes, though not in concentrations as great as can be found on the gravel terraces, implies that smaller residential sites were located on the uplands fringing the valley. These upland fringe locations are usually situated near to fresh water supplies either in the form of springs, tributary streams or gullies. The smaller areal extent of these lithic spreads, and the fewer constituent pieces, suggest that these upland camps were occupied less intensively and by smaller groups than the encampments on the raised gravel terraces. Accordingly, it is suggested that these upland areas on either side of the valley, which include particularly the base of the cliff-line on the sandstone escarpment (see above Chapter 4) and the spring line and stream courses of the Cheviot slopes, formed the focus for smaller field camps situated away from the principal home-base area on the gravel terraces. The occurrence of microliths all across the basin, but also up on the watersheds of both the Cheviot slopes and sandstone escarpment, indicate that hunting activities took place both near base camps and field camps and also higher up on the hillsides and tops above the spring lines, where the tree canopy is thought to have thinned out (see above).

The few lithics so far recovered from the alluvial environment on the gravel bar 'islands' in Kimmerston Bog (see above Chapter 4) testify to some Mesolithic occupation within the alluvial zone at certain times of the year. Exploitation of resources in these areas when they were free from flood waters would, in general, be restricted to the summer-autumn months suggesting that activity in this zone was of a seasonal nature. Activities may have included only foraging/hunting/fishing episodes with minimal, if any, settlement in this area.

The use during the Mesolithic of rock shelter sites along the sandstone escarpment of north Northumberland (Weyman 1984), including those fringing the Milfield basin, has been confirmed by previous excavations (Burgess 1972; Beckensall 1976). These outcrops occupy ridge tops overlooking the steep-sided burns which form natural animal migration routes into the Milfield plain. These same routes continue to be used today by the roe deer which inhabit the modern tree plantations covering parts of the sandstone slopes. The implication is that the sandstone cliffs, with their fine views and opportunities for occupation, were utilised as upland temporary rock-shelter sites by small hunting parties engaged in the culling of wild ungulates. The quadruped (almost certainly deer) carvings in the Goatscrag rock-shelter site (van-Hoek and Smith 1988) may be of Mesolithic date and, if so, would not only indicate the importance of deer to the local

Mesolithic communities but also the deliberate symbolic referencing of one of the major prominent natural features of the basin - the Goatscrag rock outcrop (see below, page 191). However, to understand Mesolithic activity around these outcrops from a more critical position let us turn to an application of the 'Lithic Scatter Displacement Model' (see above, page 156) to aid the interpretation of the lithic data from around these crags.

Figure 4.11 (Chapter 4) shows the distribution of test-pits around the slopes immediately below Dovecrag - an exposed sandstone cliff on the escarpment. Reference to Figure 4.2 shows the surface lithic distribution in these fields (albeit at a reduced scale). The surface lithic scatter for this area showed only a few surface finds on the small eroding flat area at the top of the slope immediately below the foot of the crag. However, there were higher lithic counts on the steep slopes and footslopes below. Most of the lithic material from these fields was identified as Mesolithic and included a range of tools, including microliths, a spear point, and some processing tools.

Based on the surface distribution alone it would seem that Mesolithic activity concentrated on the slopes below the escarpment and may have included hunting and processing at small camps sheltered at the base of these slopes. However, the test-pit data from this area unequivocally demonstrated that lithic material was being moved downslope from the eroding slope shoulder at the foot of the escarpment and redeposited in a colluvial drape at the base of the slope below the escarpment (see above Chapter 4 Taphonomy section, Figure 4.16 pits 10011-10020). A negative lynchet immediately in front of the sandstone cliff testified to the source area for the sediment which had been transported downslope.

Using the model of inference an attempt can be made to reconstruct the original lithic patterning in a new light. As the area of upland flat had been substantially eroded away and redeposited downslope (as evidenced by the negative lynchet at the top of the fields and the colluvial deposits of the footslope), the surface assemblage will probably under-represent the original lithic density in this area (see also Figure 4.32 and accompanying discussion in Chapter 4). The lithics found on the upland flat can be considered as 'near-situ' and are therefore probably representative of the activities that took place there (Figures 4.35 and 4.36). The majority of the lithics recovered from the steep and moderate slopes below are probably 'in-transit' lithics and many will have come from upslope at the eroding foot of the escarpment. The existence of the negative lynchet immediately above the erosion area indicates that much of the 'in-transit' material will have come from this eroding upland flat at the immediate foot of the sandstone face. The majority of the lithics found at the base of the footslope are almost certainly 'derived-lithics' which have been redeposited from original locations further up the slope. Given this understanding of the systemic contexts of the lithic assemblage in this area it can be concluded that most of the material found in these fields away from the scarp face actually relates to activities that took place immediately next to the sandstone cliff face during the Mesolithic and do not relate to activities spread across the slopes below. Furthermore, given that previous excavations on this same sandstone escarpment 1.2km away at Goatscrag revealed two Mesolithic rock shelter sites positioned against the rock face (Burgess 1972), and that other rock shelter sites have been identified against the sandstone escarpment (e.g. Corby's Crags Beckensall 1976), the surface lithic scatter from these two fields is probably rather a record of the repeated use of the Dovecrag area of the sandstone cliffs above during the Mesolithic. Instead of small camps located in sheltered positions at the base of the slopes it seems rather that Mesolithic shelters were concentrated along the foot of the crag and that these places, with their expansive views across the plain and the natural routeways into it, served as upland hunting and foraging encampments. Thus, this case-study serves to demonstrate that interpreting the surface lithic distribution in isolation from a consideration of taphonomic processes can be misleading.

Summary

Overall, it appears the strategy of land-use exploitation in the Milfield basin was ordered around the core settlement area of the gravel terraces which may have provided a relatively permanent zone of occupation by the late Mesolithic. The surrounding uplands appear to have been used for temporary visits by small task groups with the aim of culling wild animals, with deer apparently important, and no doubt managing and collecting from the woodland plant community. This indicates an extensive system of land-use during the Late Mesolithic with only the highest hilltop locations, damp ill-drained areas of boulder clay and the marshy tracts of alluvial valley floor being demonstrably avoided for settlement purposes, though these areas do appear to have been visited on hunting and foraging excursions.

Given the remarkable ecological richness and diversity of the basin, and its commensurate potential to support continuous year-round occupation, it is proposed that the basin should be considered as being home to semi-mobile groups who occupied the valley on a year-round basis. Annual mobility patterns may have been structured around a core (but periodically shifting) settlement focus on the gravel terraces where, no doubt, seasonal aggregations of the wider group took place.

OTHER ARCHAEOLOGICAL CONSIDERATIONS

The lithics recovered by Weyman, Hope-Taylor and Harding were all recovered from the ploughzone and as such have no stratigraphic relations with other Mesolithic features. However, it is important to note that all these finds of Mesolithic tools are from the raised gravel terraces of the plain, the area which this fieldwalking programme confirms as the key focus for Mesolithic occupation in the basin. This is significant as other substantial excavation trenches have been opened in the Cheviots at Houseledge (Burgess 1984) and Hetha Burn (Burgess

1970), on the sandstone slopes at Fenton Hill (Burgess 1984), and Chatton Sandyford (Jobey 1968), and on the glacial till at Horsedean Plantation (Miket 1986), and yet none of these produced Mesolithic material. This is not to say that Mesolithic activity is not represented in these areas, but rather it confirms the general finding from the fieldwalking results of the importance of the gravel terraces.

The archaeological findings from Goatscrag are of considerable interest because they are the only excavated *in situ* Mesolithic material (Burgess 1972) and they are also associated with rock-carved animal motifs including deer-type carvings (van Hoek and Smith 1988) and hoofprint type carvings (Beckensall 1991). Indeed, the identification of potential Mesolithic carvings at this site is a finding of very great interest to Mesolithic research in Britain, though not yet widely acknowledged or in any way interpreted. Consequently, as no 'understanding' has yet been attached to these unusual (for Britain) motifs or this site more generally the following discussion will attempt an interpretation of this place, together with the nearby site of Roughting Lynn.

Goatscrag and Roughting Lynn

Goatscrag is the name given to a long prominent outcrop of Fellsandstone which forms part of the Broomridge spur overlooking the Milfield plain from the north-east. It is a distinct local landmark (Fig. 5.5) situated just 500m from the waterfall at Roughting Lynn (Figure 5.6). The outcrop and waterfall are two of the most prominent natural features in the basin and both have special natural qualities.

Goatscrag is one of the longest continuous stretches of outcropping bedrock to be found anywhere in the basin. It also forms the highest point along Broomridge and has views over the Milfield plain to the south and to the sea on the north-east. This is one of the few points along the sandstone escarpment that fringes the basin which affords views both of the plain and the North Sea.

Figure 5.5 View of Goatscrag from the south

Figure 5.6 View of Roughting Lynn waterfall

Roughting Lynn, in contrast, is situated in a cleft in the sandstone escarpment and is only accessible from below along a narrow deeply-cut gorge. From above there is little indication that it is there, with even the sound from the plunge-pool muffled by the gorge, although this effect is assisted by the dense tree cover around the gorge. However, the effect is entirely different when the waterfall is approached from below. Within the gorge the noise of the water is magnified and under spate conditions the place is a roaring torrent that drowns out speech. It is from this experience of the waterfall that it must have acquired its name of 'Roughting Lynn' which means the 'pool that bellows like a bull' (Tate 1868). It has also been observed that on the summer solstice the rising sun lights up the cleft all the way up to the waterfall (ref. Northumberland Archaeological Group members), although the author has not yet been able to confirm this. This is the only waterfall on the sandstone escarpment surrounding the basin.

Having these special and unique qualities it is suggested that these two landmarks were recognised as naturally occurring monuments, or what Tilley has called in relation to outcrops: 'non-cultural megaliths' (Tilley 1994,99). Assuming that the carvings at the Goatscrag site are Mesolithic (see below), then at least one of these non-cultural monuments was inscribed by human groups, which archaeologically, allows recognition of the transformation of a non-cultural monument into a humanised 'place'. Roughting Lynn is also suggested as a potential Mesolithic 'place' as areas of white water are often viewed by hunter-gatherer groups as liminal places where access to the spirit world can take place (Tilley 1994, 109). However, given the demonstrable appropriation of this natural 'place' during subsequent periods, as evidenced by the carving of the cup and ring marked rock, the construction of a multiple ring enclosure, which incorporates the waterfall within its circuit, and the erection of cairns, this locale clearly has a long history as a special 'place' during the prehistoric period. It is possible, then, that the antecedents for the significance of Roughting Lynn could lie in the Mesolithic but is manifested archaeologically only in later periods with the building of imposed human monuments and the carving of the rock. As Mesolithic groups do not appear to have ordered their world through imposed cultural monuments (Bradley

1998, Chapter 2; Tilley 1994), but instead appear to have used naturally occurring prominent features, it would seem likely that places such as Roughting Lynn and Goatscrag would have been acknowledged as special by Mesolithic communities.

In the case of the Goatscrag carvings, four 'quadrupeds' are located on the vertical rock face, facing west into the basin, inside what was a Mesolithic rock-shelter (van Hoek and Smith 1988). Excavations by Colin Burgess during 1967-8 at selected points along Goatscrag produced evidence for gullies, sockets and possibly dripways, as well as a number of Mesolithic flints from two sites which he called Goatscrag A and B. A series of Bronze Age cremations were also discovered. The carvings (Figure 5.7), later discovered by van Hoek, were located at the more westerly of the two sites inside the rock shelter site of Goatscrag B. Although van Hoek and Smith (1988) called the four animals 'quadrupeds' the presence of what appear to be antlers on two of the animals and their overall gracile form led them to regard the figures as probable representations of either deer or goats (Figure 5.8). The goat interpretation was included because of the place-name but on the basis of form these animals bear little resemblance to goats given the long necks, overall form and probable antlers on two of them. Therefore, these carvings are interpreted here as being those of deer and will be referred to as deer during the subsequent discussion. On the horizontal surface of the rock outcrop above the rock shelter a number of 'hoofprint' carvings are carved on the immediate edge of the outcrop (Beckensall 1991), which may also be a reference to deer.

Being representational rather than abstract carvings, these designs fit into the milieu of hunter-gatherer traditions such as the animal art of the Upper Palaeolithic north-west European cave painters (Bahn and Vertut 1988) and Scandinavian Mesolithic rock carvings (Tilley 1991), rather than Neolithic or Bronze Age traditions which tend to be dominated by abstract designs, such as cup and ring marks, passage grave art, and angular pottery decoration (Shee Twoig 1981; Bradley 1997; Waddington 1998a). Although very little is known of British hunter-gatherer art, the few examples that exist, such as the horse's head

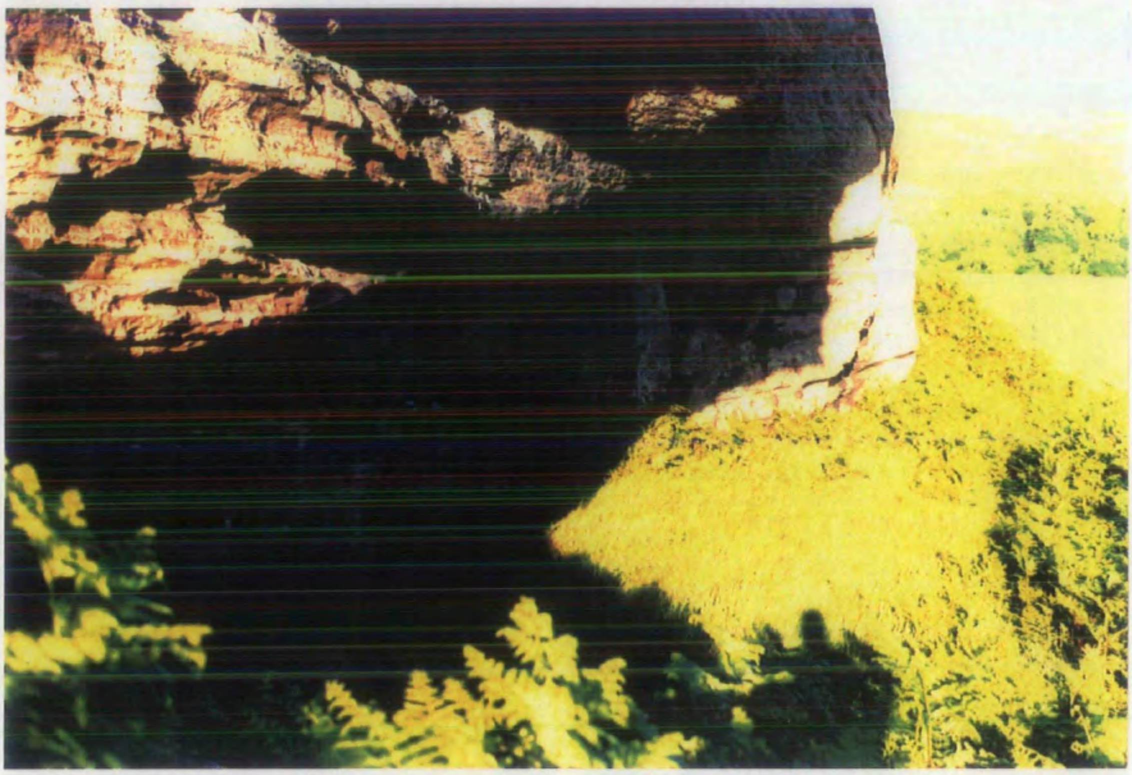


Figure 5.7 (a) Goatscrag Rock shelter, Site B

Figure 5.7 (b) The Goatscrag 'Deer' Carvings

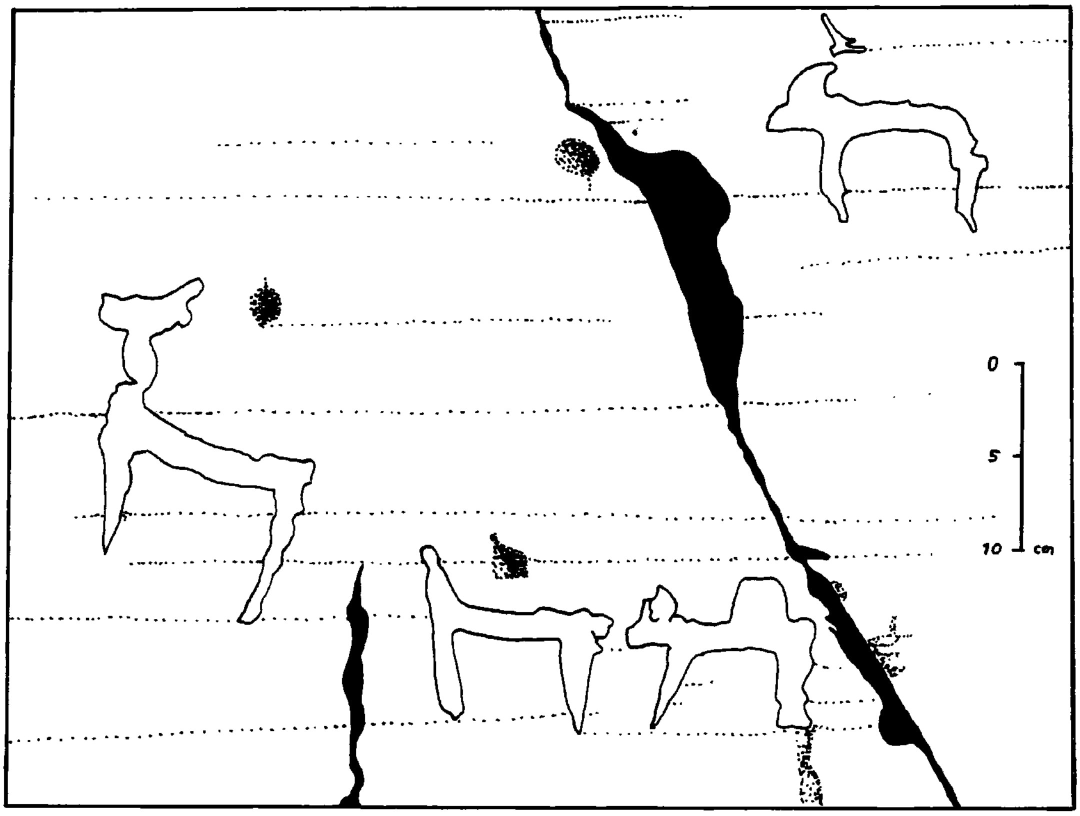


Figure 5.8 Drawing of the Goatscrag 'deer' carvings (redrawn from van Hoek and Smith 1988)

and anthropomorphic figure carved on bone from Cresswell Crags (see Smith 1992b, 87, plate xii), are representational animal images. However, the other indication that these carvings probably belong to the Mesolithic is their position inside and above a rock-shelter site. Although possibly coincidence, this seems unlikely. These carvings are, therefore, suggested as dating to the Mesolithic and will be referred to elsewhere in this study in relation to the Mesolithic settlement of the basin. It is acknowledged however, that this understanding of the carvings as depictions of deer made during the Mesolithic remains only an interpretation based on circumstantial arguments and is not a demonstrable conclusion.

If the context of the Goatscrag deer carvings is reconstructed on the basis of the currently available archaeological evidence, several points become clear. Firstly, as the rock shelter site produced extractive lithics, including a broken microlith and broken tool tip as well as a burin from Site A, and considering also the significant number of microliths and points (6) recovered from the fieldwalking transect further along the escarpment, it is appropriate to consider these crag-line sites as rock-shelters used on hunting expeditions. The small size of the rock shelters, enforced by the extent of the rock overhangs, indicates that these shelters were small and were, therefore, probably used by small groups. The presence of cores and debitage indicates that curation of tools also took place at these encampments. Being positioned on high ground with wide views, these sites are not well sheltered and so it is unlikely they were occupied throughout the year. On the basis of this information these crag-line rock shelters can be envisaged as the temporary hunting camps of small task groups who occupied the sandstone uplands for part of the year in locations well suited to monitoring the movements of animals around the basin.

Secondly, one of these rock shelter sites has depictions of what are thought to be deer carved on to the interior rock face. Assuming they are contemporary we have a situation where animal carvings are brought into the habitation site of these hunting groups. In this case the animal carving, the hunters, and possibly also elements of the animal carcass, will have all shared the same home.

Thirdly, as these carvings are representational they refer to the subject directly and not through metaphor, as would be the case if they were abstract and symbolic. In this case, although there could be many different layers of 'meaning' in the motifs, these depictions primarily refer in direct fashion to the natural world and to an animal source that, as the microliths suggest, formed important prey for these groups. In addition, by choosing the Goatscrag rock face as a 'place' to dwell in during seasonal visits, further reference is made to the 'natural' environment by the selection of a prominent natural landscape feature to utilise as a human residence.

Fourthly, given that such prey as deer were essential for sustaining human groups by way of their meat, antler, bone and skin, these animals may have been viewed as particularly significant with regard to their contribution to ensuring the continued survival and regeneration of human communities. Indeed, Bradley's recent discussion of the Mesolithic burial evidence from Denmark suggests that deer antler, often buried with Mesolithic interments, may have provided a powerful metaphor for fertility and regeneration, given the role of deer in relation to human groups, the fertility of the stag and the annual growth - regeneration - of antler (Bradley 1998, 24-5).

By drawing on these contextual circumstances a preliminary interpretation of Mesolithic ideology may be suggested, which in this case also draws on Bird-David's anthropological work on hunter-gatherer relationships with their environment (Bird-David 1990; 1996). Bird-David has suggested that hunter-gatherer societies may be defined through their perceived relationship with the 'natural' world, whereby respective groups around the world use metaphors for human-nature relatedness (Bird-David 1996). More specifically, though, Bird-David identifies hunter-gatherer people as being distinguished by their view of nature as an unconditional provider of food and resources which does not need to be asked for. This notion of nature as provider is termed the 'giving environment' (Bird-David 1990, 190). Furthermore, the study shows hunter-gatherer groups do not consider themselves to be an 'island of culture in a sea of nature', but rather as living *within* their environment (*ibid*, 190). As a result of this view of the world, such hunter-gatherer groups make offerings upon gathering, collecting or catching game. This contrasts with farmer-hunter groups who make offerings prior to the hunt or harvest as they are thought to view nature as yielding resources only in reciprocity for appropriate prior human conduct (*ibid*).

Bearing in mind the positioning of the Goatscrag carvings inside a temporary hunting camp, a place involved in the day-to-day hunting regime, these carvings appear to be physically situated within an active component of the game-catching routine. Viewed in this way, the Goatscrag carvings may be seen as pictoral offerings made during the course of hunting expeditions which, bearing in mind the anthropological analogy, would conform to hunter-gatherer practices associated with the notion of a 'giving environment'. By locating a human dwelling in an already extant natural 'place', and by incorporating images of nature within the dwelling space, in particular images of animals which may have just been culled and whose carcasses brought back to the dwelling site, such actions are consonant with groups who did not perceive themselves as an 'island of culture in a sea of nature' but rather as a group who perceived themselves as residing within nature and *vice versa*.

To bring this discussion together, then, it is suggested that Mesolithic groups used the Goatscrag rock shelter site as a temporary upland hunting camp within which they carved images during their hunting routine. The central point being made here is that, whether to invigorate the ground (rock), ensure continued fertility of the herds or as a symbol of regeneration, these pictoral etchings situated within the dwelling space of a Mesolithic hunting group which was occupied *during* the hunting routine, are understood to imply that human identity during the Mesolithic did not lie outside the natural world but rather as an intimate relation framed within it, as has been suggested more generally for the Mesolithic period on the basis of Danish burial evidence (Bradley 1988, Chapter 2).

Chapter 6

The Roughting Lynn cup and ring marked outcrop

CHAPTER 6 NEOLITHIC TRANSITION

This chapter starts by outlining previous approaches to work on the Neolithic transition in Northumberland. The subsequent discussion then turns to the palaeoenvironmental data, followed by a period specific discussion of the lithic data which builds on the results presented in Chapter 4. A consideration of stone axe manufacture is also included in this section. An interpretation of the settlement pattern is then presented drawing on the lithic scatter, palaeoenvironmental and excavated data from the sites at Thirlings, Yeavering, and the recent findings from the Bolam Lake site in mid-Northumberland. The chapter concludes with a consideration of other aspects of the Early Neolithic archaeology in the basin including the burial record, rock art and results of recent fieldwork at the Coupland complex.

BACKGROUND

Previous accounts of the Neolithic transition in Northumberland have envisaged Neolithic groups colonising the area from continental Europe (Burgess 1984; Tolan-Smith 1996b; 1996a), bringing with them a fully-developed farming package of cultigens and domesticated stock. These interpretations adopt the view of the Neolithic as a purely economic phenomenon introduced from outside and imposed on the Mesolithic indigenous population, who are usually thought to have retreated into the hills while the farmers occupied the valleys and lowlands (e.g. Burgess 1984, 132). This largely hypothetical model of the Neolithic transition is contested here because it fails to accomodate key aspects of the archaeological and palaeoenvironmental record yet at the same time relies on an assumed understanding of the Neolithic. There is currently no evidence for any direct contact between the Milfield basin and the continent during the Early Neolithic on the basis of artefact types or monuments, permanent year-round dwellings such as long houses, the adoption of intensive cereal cultivation or full mixed farming. There are no known Mesolithic sites from upland locations contemporary with lowland Neolithic settlements such as Burgess envisages. It is also of note that most of the 'Mesolithic' settlements in northern Britain, which have been radiocarbon dated to the period covered by the conventional Early Neolithic, are located in lowland positions on the coast, such as at Eskmeals in Cumbria (Bonsall *et al* 1985) and around Oban in Scotland (Mellars 1987; Bonsall and Smith 1989; Bonsall *et al* 1989), just the areas which Burgess envisages as having been home to incoming farming groups. These contradictions with the current data set, and the lack of appreciation of the many continuities apparent between the Mesolithic and Early Neolithic, require a re-examination of the whole question of the Neolithic transition to take into account the new data acquired during the course of this study (see below, Chapter 8 Mesolithic-Neolithic Transition section).

It is against the background of traditional interpretations that this study attempts to reconstruct a new interpretative scheme for the Neolithic transition in north Northumberland. In 1976 Miket, with regard to the Neolithic remains of the Milfield basin, stated that "perhaps the major constraint on any attempt at synthesis [is] the obvious and glaring incompleteness of the record" (Miket 1976, 124). However, twenty years on, subsequent excavations on other Neolithic remains by Miket (1985), Harding (1981) and Waddington (1995; 1997), together with the author's fieldwalking programme, new palaeoenvironmental data (Tipping 1992; in press; Passmore and Waddington) and a reinterpretation of the local prehistoric rock art sequence (Waddington 1998a) have provided a wider body of information from which to reconstruct an understanding of the Early Neolithic in the Milfield basin (see also Figure 6.1). Any new understanding should no longer be constrained by the borrowing of concepts and data generated from other areas of Britain or have to conform to traditional *a priori* views of what the Neolithic transition must have comprised (Thomas 1991, 7-10). The Milfield data can now stand for itself!

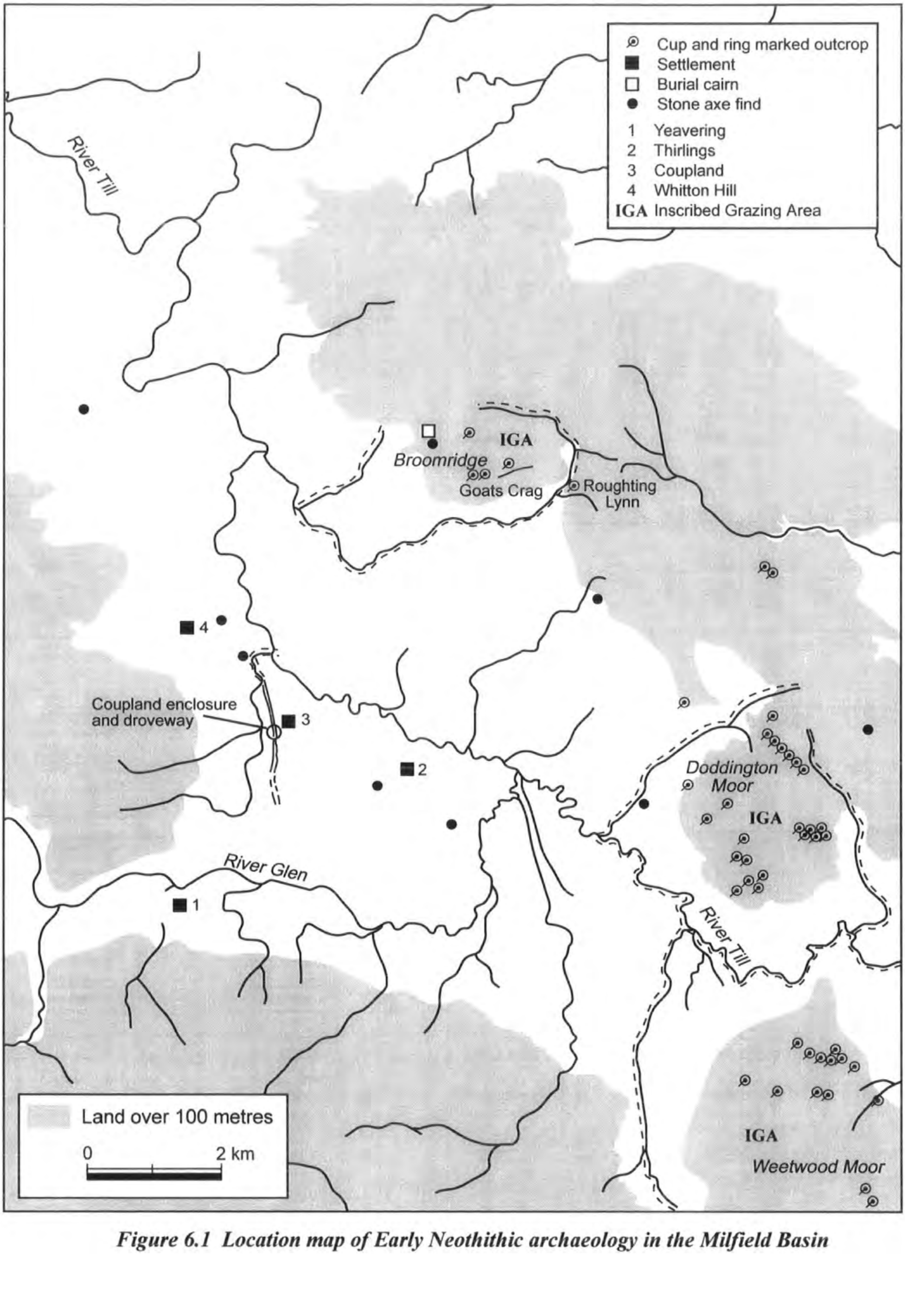


Figure 6.1 Location map of Early Neothithic archaeology in the Milfield Basin

THE PALAEOENVIRONMENTAL RECORD

Building on the review of the palaeoenvironmental data in Chapter 2, this discussion will consider the palynological data in relation to the different ecological zones identified in the basin. Tipping has recently studied the Mesolithic-Neolithic transition pollen data from the Cheviot hills (Tipping 1996), though all the sites which he uses to reconstruct this vegetational history are from upland mires that provide regional rather than local signals. Consequently, the diagrams from these sites are inherently dominated by tree pollen as a result of the greater frequency of wind blown tree pollen (Janssen 1973; 1986). This means that these diagrams probably under-represent clearance and cultivation, particularly when such activity is localised and likely to have been more common in lowland rather than upland settings. Recent work by Moores *et al* (in press; unpub. PhD thesis) has demonstrated cereal type pollen radiocarbon dated to c.3900BC from organic rich palaeochannel fills, which have a localised rather than regional catchment, on the valley floor of the river Rede near Otterburn, Northumberland. This finding provides a note of caution for the interpretation of the vegetational history of the Milfield landscape based on 'regional' diagrams alone as well as the need to study lowland pollen sites proximal to attractive settlement areas.

Cheviot Slopes

The main features of the Early Neolithic pollen diagrams for the north-east Cheviot hills are, firstly, the suggestion of continuity between late Mesolithic woodland disturbance and Neolithic clearance (Tipping 1996, 27) and, secondly, the indication of limited cereal cultivation recorded at Din Moss and the possible cereal grain radiocarbon dated to c.3325BC from Sourhope (*ibid*). The recent date of c.4000BC from burnt material below the stone-clad lynchet of a cultivation terrace near Brough Law in the Cheviots (A.S.U.D. 1997), adds further support to the hypothesis that Early Neolithic groups were practising some limited agriculture within the Cheviot hills. However, the burnt horizon on which this stone-clad wall sat may have been burnt at an earlier period than the construction of the wall, so further work is being undertaken to establish the dates for these cultivation terraces more securely (Peter Carne pers. comm.).

Gravel Terraces and Alluvial Valley Floor

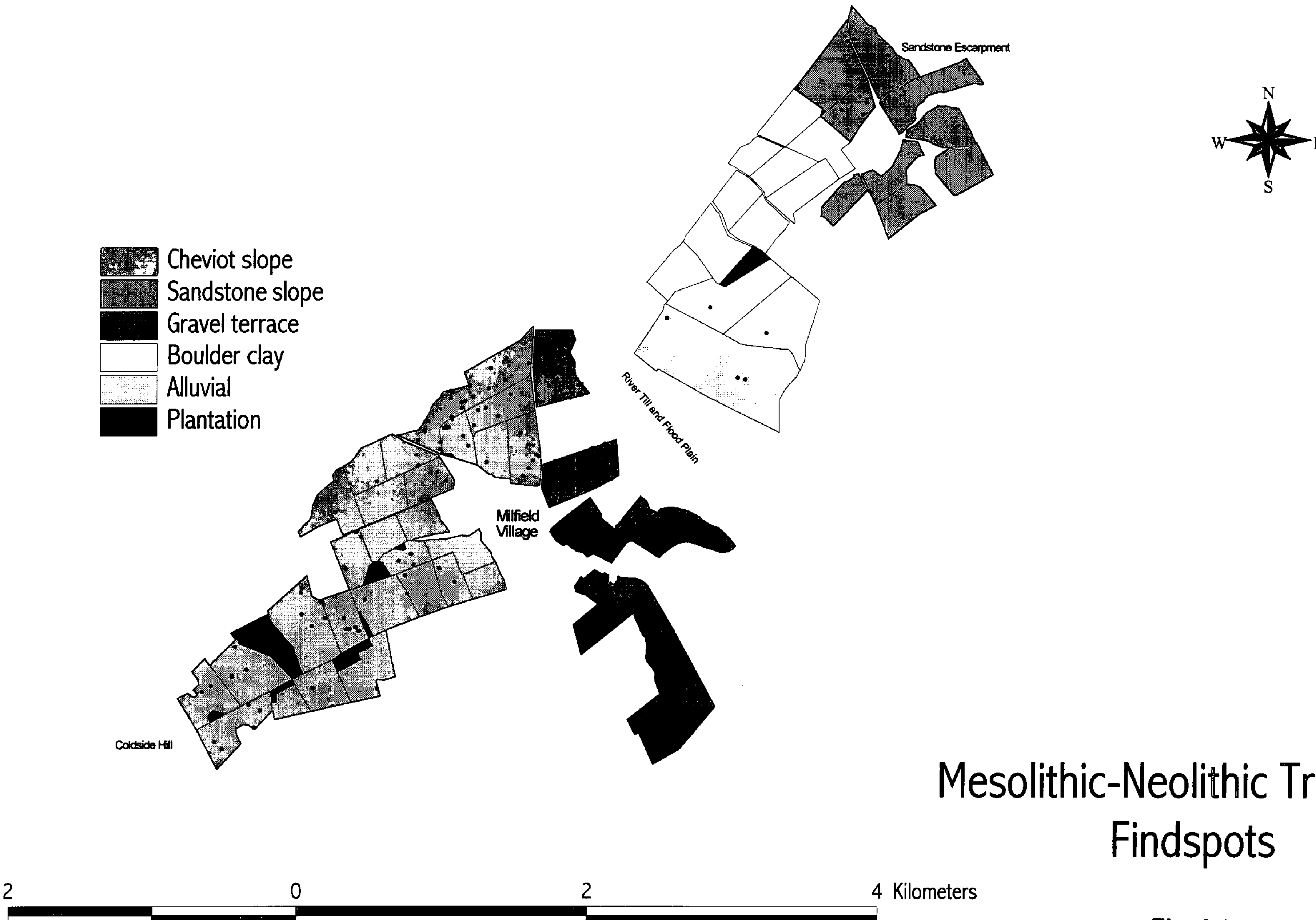
The valley floor, however, presents a different case. The reassessed pollen diagram from Akeld Steads (Borek 1975; Tipping 1996; Tipping in press), together with that from the Wooler Water (Clapperton *et al* 1971), indicate that clearance and probably cultivation took place during the Neolithic. The Akeld Steads diagram indicates woodland clearance, including taxa which suggest clearance for crops, dating to the earlier half of the 4th millennium BC (Tipping 1996, 28). Although the pollen stratigraphy from the Wooler Water diagram was not sampled in detail it agrees with the Akeld Steads diagram in showing woodland clearance near to c.4000BC (*ibid*). This gains further support from Moores' recent work in Redesdale (Moores *et al* in press), which has demonstrated clearance for crops, including cereals, adjacent to the valley floor dated to c.3900BC. Pollen analysis has also been undertaken on samples from the Milfield gravel terraces from the west droveway ditch fill at the Coupland Enclosure which are dated to c.3800BC (Waddington 1996b). These samples indicate a relatively open grass environment with sporadic tree cover comprising mostly alder and hazel, though birch, pine, oak and some elm are present (Fay Davies pers. comm.). However, domestic pits radiocarbon dated to c.3900BC at the Coupland Enclosure have been found to contain small quantities of grain including emmer wheat, barley and oats (Jacqui Huntley pers. comm.), indicating that limited cultivation of cereals took place in the vicinity of this site. Remains of gathered plant foods, such as hawthorn, were also identified. The importance of hazel stands on the gravel terraces, probably as a managed resource, is also indicated by the abundant charred hazelnut shells which were found in every Early Neolithic pit excavated at Coupland (Waddington 1996b) and many of the pits at

Thirlings (Miket 1987). The presence of high pollen counts for alder and aquatic sedges at Coupland no doubt reflects the proximity of this gravel terrace site to the adjacent alluvial valley floor and the Meldon Burn, which appear to have remained areas of wetland (Fay Davies pers. comm.). However, biases can easily be introduced into such culturally derived deposits by the selective nature of their accumulation and so this latter information is best viewed as a proxy indication until further work is undertaken. Overall, however, there is evidence for small-scale cultivation on the gravel terraces, which included cereal growing, although gathering of wild plant foods was also important.

Sandstone and Boulder Clay Slopes

The limited data so far available for the sandstone escarpments rests particularly on those from Camp Hill Moss and Steng Moss (Davies and Turner 1979) (see above, Figure 2.4). Both these diagrams show no indication of human activity during the Neolithic period, with the onset of the first clearances (visible in these 'regional' pollen records) dated to c.1800BC at Camp Hill Moss, near the Milfield basin, and c.1900BC at Steng Moss in Redesdale. Although these diagrams have coarse sampling intervals, remain poorly dated and, therefore, probably oversimplify the sequence, the overall suggestion is that the sandstone hills and their immediate hinterlands did not witness any significant human impact until the end of the Neolithic and the beginning of the Early Bronze Age. The present understanding, though inadequate and in need of further work, would suggest predominantly wooded slopes, no doubt with occasional clearings, but with no current evidence for cultivation during the Early Neolithic.

The vegetational history of the boulder clay slopes remain poorly understood though it is intended that future palaeoenvironmental work will address this problem (Passmore pers. comm.).



Mesolithic-Neolithic Transition Findspots

Fig. 6.2

THE LITHIC DATA

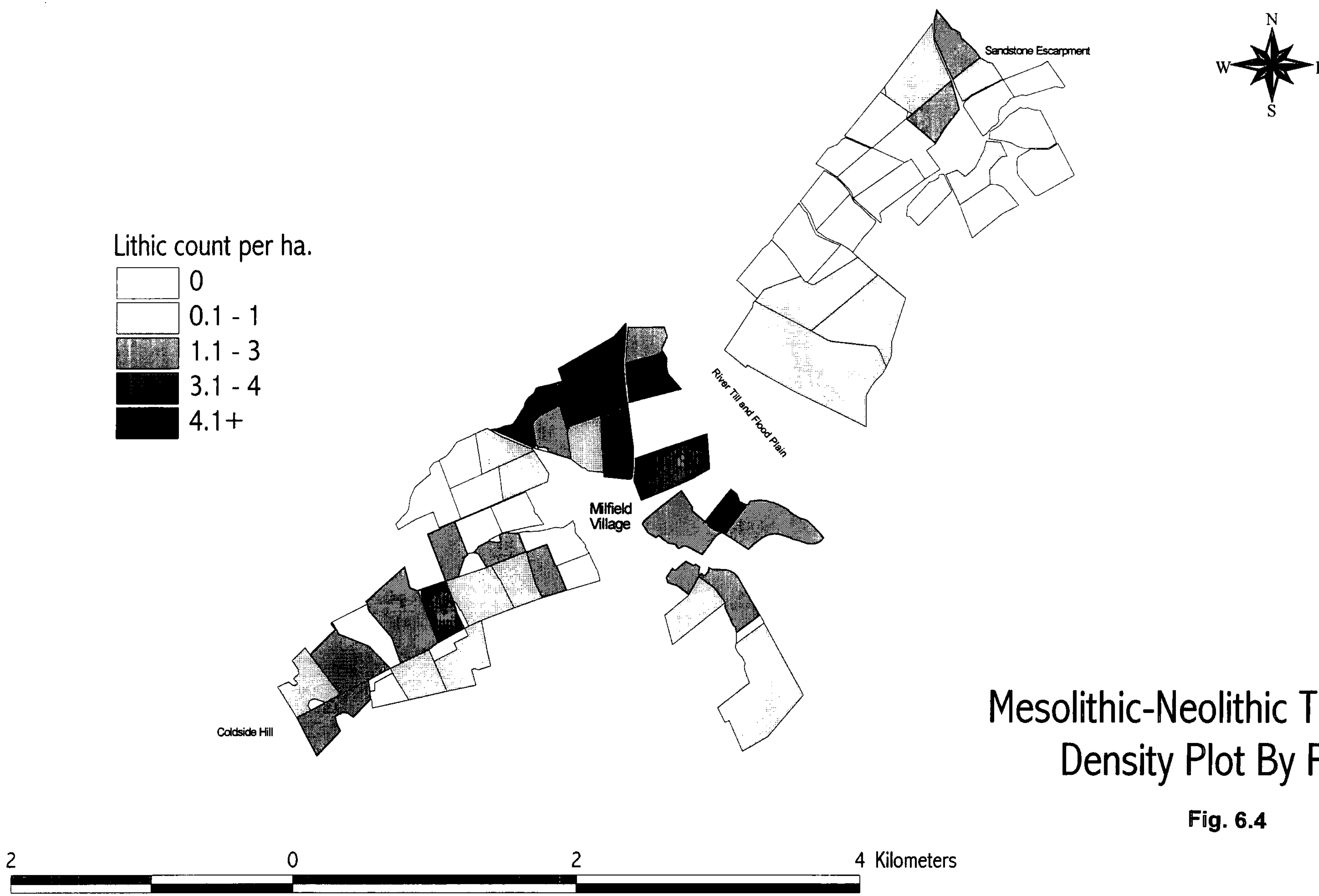
Density and Distribution

The distribution of the Neolithic transition lithics are presented in Figure 6.2, which shows that most finds cluster on the gravel terraces and the low slopes and plateau areas of the Cheviot slopes. This is confirmed by the density counts for the different ecological zones reproduced from Figure 4.10 in the table below (Fig 6.3)

Figure 6.3 Density of Neolithic Transition material from each ecozone

Ecological Zone	Gravel Terrace	Cheviot Slopes	Sandstone Slopes	Alluvial	Boulder Clay
Adjusted Lithic Density per ha.	2.5	1.6	0.5	0.2	0.1

The density counts by ecozone show that the gravel terraces form the main focus for Neolithic transition activity (2.5 lithics per ha.), with the Cheviot slopes probably equally as important, as the value of 1.6 lithics per ha. is certain to be under-representative, given the particularly acute effects of the taphanomic processes identified for this zone (see above, Chapter 4). It is important to note, however, that the concentrations of Early Neolithic material in the Cheviot zone tend to be located in areas of gentle slope and plateau on the low parts of the Cheviot hills and also around the spring heads and tributary streams on the higher ground. The lowest density of material is in the area of the boulder clays (0.1 lithics per ha.), where these slopes appear to have been largely avoided, although occasional flints can be noted from the low slopes near the wetland edge at Kimmerston bog, including a projectile point. Two further lithics were also recovered from the same gravel bars ('islands') in Kimmerston Bog as the Mesolithic finds. This relict alluvial area also has a low overall density (0.2 lithics per ha.) though the low density in this case is almost certainly as much a reflection of taphonomic bias (see above, Chapter 4) as of a low level of activity. A critical observation here is that the entire lithic distribution described above, in many respects mirrors closely that for the preceding Mesolithic. Compare, for example,



Mesolithic-Neolithic Transition
Density Plot By Field

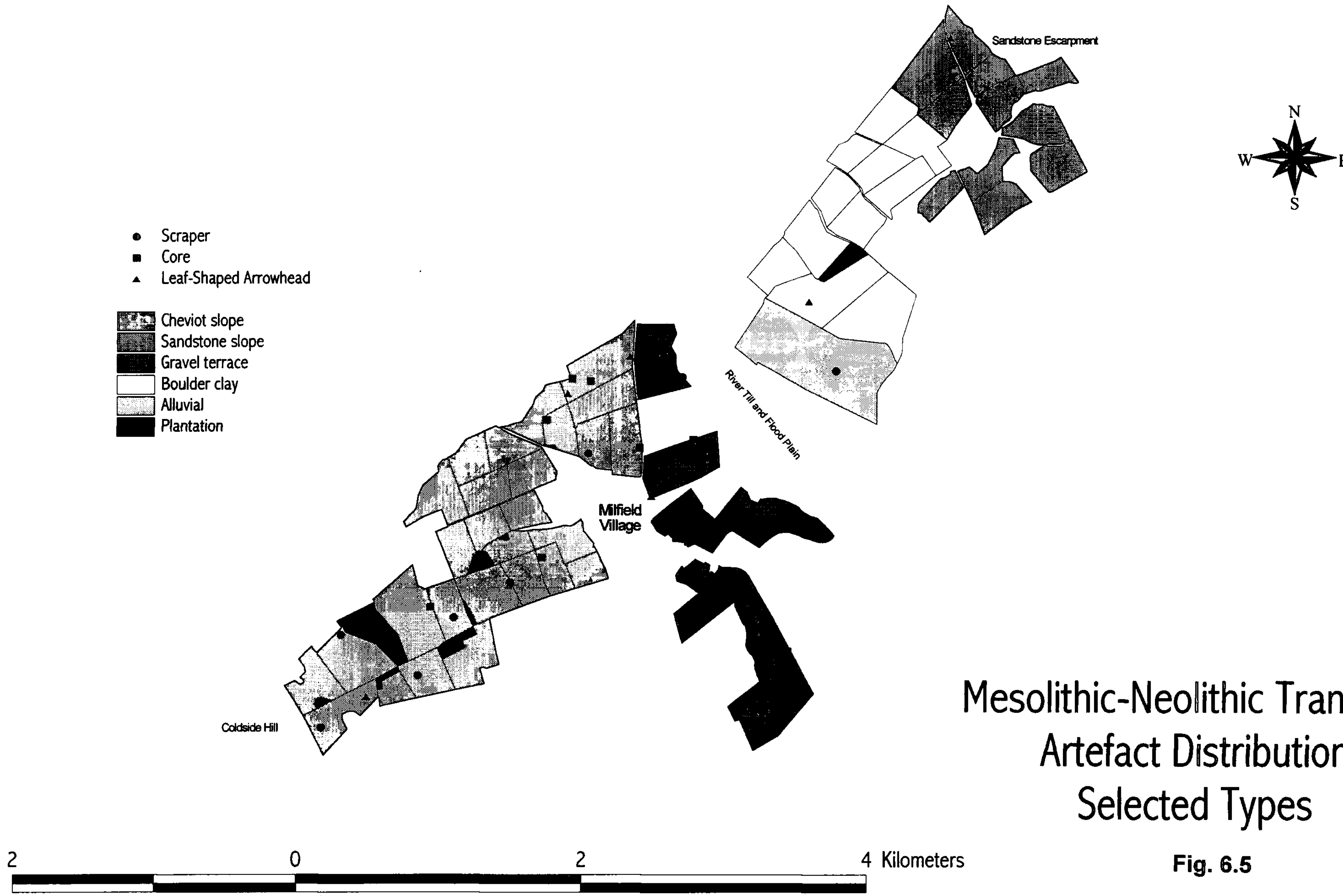
Fig. 6.4

the lithic density plot by field for the Neolithic transition period (Figure 6.4 and Figure 5.2). This has an important implication in terms of continuity of settlement pattern, mode of settlement (ie. whether transitory or sedentary) and associated land-use strategies.

However, the overall lithic distribution for the Neolithic transition period does differ from that for the Mesolithic with respect to the reduction in lithic density on the sandstone slopes. The key change in land-use appears to be in the manner and intensity with which the sandstone slopes were exploited. During the Neolithic transition the density falls off drastically (0.5 lithics per ha.) relative to the gravel terraces and Cheviot slopes, previously all exploited to a broadly similar level (see above, Chapter 5), though the gravel terraces appear to form the core area. The few finds that were recovered from the sandstone slopes tend to be small clusters of a few lithics (Figure 6.2), suggesting that lithic-producing activities were restricted in space to more specifically defined locales. All the tools were retouched blades and flakes, with the exception of one projectile point, suggesting that it was processing activities that took place at these locales - activities usually associated with settlement areas rather than hunting or industrial activities (Schofield 1993). The implications of this pattern are discussed below in the 'Settlement' section.

Character of the Assemblage

By far the largest proportion of the Neolithic transition assemblage fits into the tertiary stage of the core reduction sequence (77.3%), reflecting the large number of blades and flakes that have been utilised in addition to the more conventional retouched tools in the assemblage. The utilisation evidenced on most blade and flake edges suggests a maximising strategy towards the use of lithic material and, as noted for the Mesolithic period, a sparing cultural attitude to lithic discard prevailed. The incidence of secondary material is low (22.1%), even when the amount of secondary waste being utilised as tools is considered (therefore pushing them into the tertiary category). A point which may be of relevance here is the distinctive pattern of lithic discard which has been observed for Early Neolithic material (Healy 1987). After fieldwork at the Neolithic site at Spong Hill, Norfolk, and analogy with other sites (e.g. Tattershall Thorpe, Broome Heath and Bishopstone), Healy noted that Early Neolithic flintwork is commonly recovered from buried pit features while flintwork of other periods (in this case particularly Late Neolithic and Early Bronze Age) is most commonly found in the overlying ploughzone, suggesting that it was disposed of on the surface without any formal discard practice. This allowed her to conclude that particular discard practices obtained during the Early Neolithic, characterised by the deposition of lithics in sub-surface pits. Early Neolithic pits associated with settlement sites in Northumberland which contained lithics (Coupland, Sandyford Quarry, Thirlings) are dominated by lithic waste that falls into the secondary stage of the core reduction sequence, although some tertiary material does occur (Waddington in press; Miket 1987; Weyman unpub.). It seems, therefore, that a proportion of the discarded secondary material, which is for the most part debitage, was disposed of in pit features and so is under-represented in the surface assemblage. Indeed, Healy's conclusion that fieldwalking is unlikely to give an accurate impression of the location of Early Neolithic activity, due to the practice of discard in pits, sounds an important caution to the limitations of understanding the Early Neolithic settlement pattern without recourse to the excavated evidence (see below, Settlement section). However, this does not detract from the point that much of what would normally be considered to be secondary material in the surface assemblage was being utilised as tools, and this helps account for the relative over-abundance of tertiary material in the surface assemblage. Again, this indicates an economical approach to lithic husbandry. Only a very small proportion of the Neolithic transition assemblage comprises primary waste (0.6%), indicating that although local sources of material were still being utilised, the reliance on local raw material extraction was decreasing. It is also possible that the transect missed any Early Neolithic extraction ('quarry') areas, especially given the reduced counts of agates noted below. The amount of primary waste as a proportion of the assemblage during the Neolithic transition is approximately a



Mesolithic-Neolithic Transition
Artefact Distribution
Selected Types

Fig. 6.5

third of what it had been during the Mesolithic, providing a broadbrush indication of the scale of this decrease in local material exploitation.

The distribution of cores is notable (Figure 6.5) in that they are concentrated on the raised gravel terraces, often towards its edge (e.g. Fields 42, 47, 10), and the low Cheviot slopes (eg Fields 2, 5, 29) as well as further upslope next to a natural spring (Field 11). The location of other lithic types usually associated with settlement locations, such as scrapers, show a very similar distribution. In the case of scrapers they are also concentrated on the raised gravel terraces (often close to the edge, e.g. Fields 41, 42) and also on the Cheviot slopes next to gullies and small (1st order) tributary streams (e.g. Fields 32, 82). The core from the colluvial lynchet in Field 13 is a 'derived lithic' that must have come from further upslope, which would place it in the vicinity of the active gully at the top of the field. This distribution of material echoes that for the Mesolithic period with the exception of the sandstone slopes which appear to have been used in a different way to the Cheviot slopes.

Arrowheads, generally considered to be representative of hunting, an 'extractive' activity (Schofield 1993; Tolan-Smith 1996b), are distributed across the basin with examples recovered from close to the watersheds on both the sandstone and Cheviot fells. However, most of the leaf-shaped arrowheads are located on the raised gravel terraces (e.g. Fields 42, 46, 5) and low Cheviot slopes (Field 5). Furthermore, a leaf-shaped arrowhead was found on the low boulder clay slopes adjacent to the alluvial wetland of Kimmerston bog in Field 89 (see also above). This pattern for hunting activities again replicates the overall pattern observed for the Mesolithic distribution of points and microliths. Although the number of leaf-shaped arrowheads is smaller overall than the number of microliths and points, the relative reduction in frequency in the uplands, but continued strong presence on the valley floor adjacent to the wetland zone, is instructive. This is interpreted here as representing continuity of hunting practices, but with greater emphasis on taking prey from predictable resource areas (namely the resource-rich areas of the valley floor wetlands) near to the core area of settlement and less on chance encounters during forays into the surrounding uplands.

Raw Materials and Stone Axes

The utilisation of locally available lithic resources continues during the Neolithic transition, although increasing reliance on imported flint sources is evident. The proportion of non-flint lithics in the Neolithic transition assemblage (28%) is about half that recorded for the Mesolithic period (see above, Chapter 5), while the proportion of flint lithics in the assemblage (72%) is higher. This indicates that although the utilisation of non-flint lithics continues during the Neolithic transition, increasing reliance on imported flint takes place. Reference to Figures 4.32 and 4.33 (Chapter 4) indicates that the key shift which takes place is the reduced reliance on the locally available agate in favour of imported flint. This implies that exchange networks with neighbouring regions were well established and maintained throughout this period and that they were perceived as sufficiently stable for Early Neolithic groups to allow greater dependence on imported material. Light-grey flint remains the most common imported flint type (41%) while dark-grey flint, most of which is probably from nodular sources, is also important (21%). The nodular flint has probably travelled from further afield than the light grey material which is associated with the glacial flint resources of north-east Yorkshire (see above, Chapter 5), the former having possibly come from the Yorkshire Wolds or possibly further afield. The increased use of higher quality nodular flint during the Neolithic transition suggests exchange networks extended over larger areas, and that groups were able to cope with the movement of bulky materials, such as flint, on a larger scale, than during previous periods.

Continued use of local agate, chert, quartz and volcanic stone for making chipped tools is evident though the most striking characteristic is the relative decrease in the use of agate so that it appears to have been exploited only slightly more intensely than the other non-flint lithics (Figure 4.33). However, local lithic production remained important in another way, namely the production of ground and polished stone axes. Although Miket reported ten known stone-axes from the basin in his unpublished thesis (1987), two more have been discovered during the course of this fieldwork bringing the total to twelve. It is striking to note that although Group VI Langdale axes account for 53.8% of stone axe finds in north-eastern England (Cummins and Harding 1988, 79), there are no Group VI axes known from the basin, though two Group VI axes have been recovered nearby: one from Bowsden Moor and a possible one from Chatton (Allason-Jones pers. comm.). In contrast all the axes from the basin, with the exception of two made from flint, are of local material (Miket 1987, 68). This includes axes made from Cheviot andesite, Fellsandstone, limestone, Whinstone and Greywacke slate (Miket 1987, 68; Cummins and Harding 1988; McKClough and Cummins 1988, 228-230; Waddington and Schofield in press).

The use of Cheviot andesite and Fellsandstone as local stone-axe sources has been confirmed by geological analysis of two recent finds made during the course of this project (Waddington and Schofield in press). The Fellsandstone axe was discovered during fieldwalking over Kimmerston Bog while the andesite axe was discovered by Dr. Colin Richards of Glasgow University during a casual visit to the site of the Ewart henge. Geological examination of the andesite axe has revealed that the axe is made from Cheviot andesite with a source area probably in the Upper Ingram Valley area (Schofield and Waddington in press). Given that there are few areas of outcropping rock on the dome-shaped Cheviot hills, it is significant that it is on the north side of the Upper Ingram valley where the largest exposures of andesite are located. The nearest exposure is Cunyan Crags though the largest area of outcrops is centred 4km to the north on the watershed between the Upper Ingram valley and Harthope Burn, around Housey Crags and Langlee Crags (Figure 6.6, see next figure section below). These particularly prominent rock formations offer the most likely location for this previously unidentified 'axe-factory' area though this requires confirmation by future fieldwork. The use of a range of rock groups from the north-eastern region for axe production (groups XVIII and XXVII), together with as yet ungrouped rock sources common to this

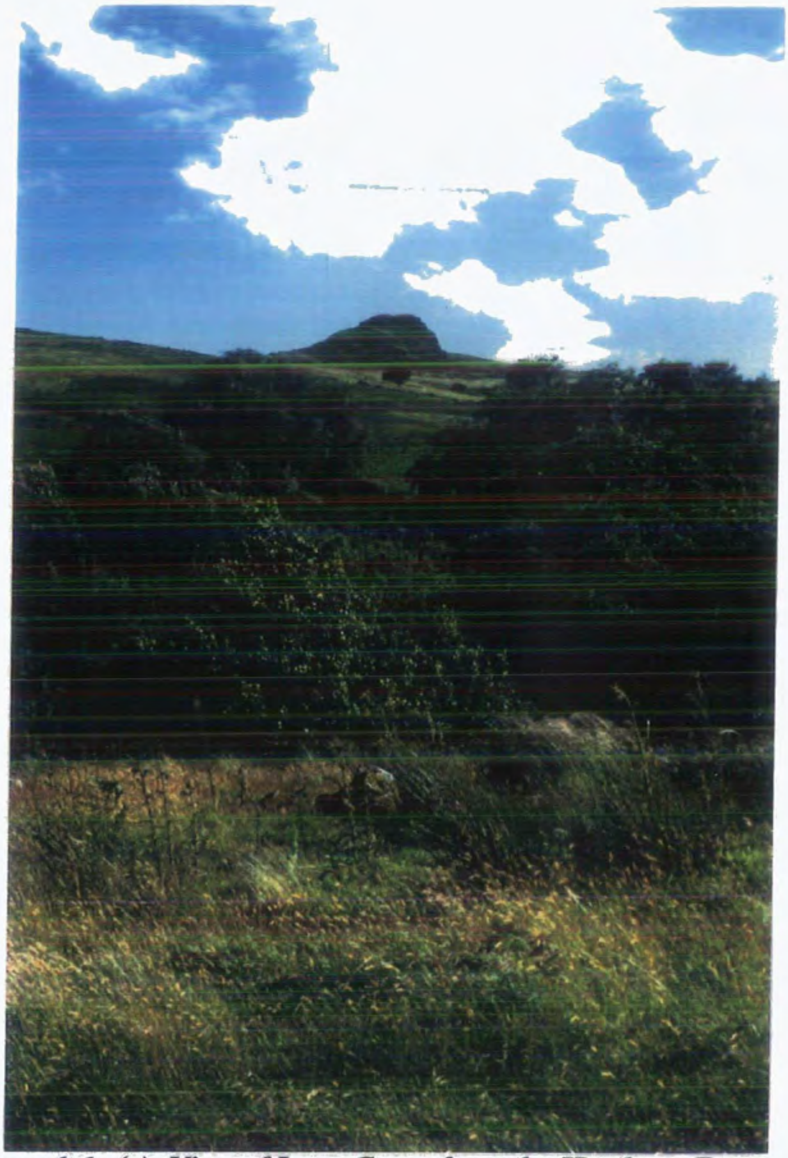


Figure 6.6 (a) View of Long Crags from the Harthope Burn

Figure 6.6 (b) View of Langlee Crags from the Harthope Burn

area (Cummins and Harding 1988, 78-84; McKClough and Cummins 1988, 228-230), indicate a high reliance on local stone-axe resources by the Neolithic communities of Northumberland.

Another recent find requiring mention is that of a pristine stone-axe miniature made from local Whinstone (Group XVIII, sourced by Dr.D. Schofield), discovered in a boggy area at Newstead Farm, Chathill, near Alnwick (Steve Speake pers. comm.). The lack of wear on the recently found Cheviot andesite axe from Ewart, and on the stone-axe miniature mentioned above, indicate that these axes probably had a non-utilitarian purpose rather than a functional one. However, the sandstone axe recently recovered was heavily used and therefore implies that local sources were used for the production of both functional and exotic axes. Given the undoubted importance of stone-axes to Neolithic communities (Bradley and Edmonds 1993; Edmonds 1995; Cooney 1998), the structuring of stone-axe production at the local level implies that the communities centred on the Milfield basin regarded their landscape as containing its own 'special', as well as more mundane, sources for stone-axe production.

Production of high quality distinctive stone axes from restricted resources may have made the Cheviot axes, in particular, highly prized objects. The 'value' of these axe sources may have been relatively long-lasting given that their supply would always remain restricted due to the very few outcrops of andesite which occur in the Cheviot massif. Production of stone axes from such special places would provide a commodity that could be used in exchange for imported flint and, therefore, it is possible that the increase in imported flint noted for this period (see above, page 135) was made possible by the exploitation of new local resources - distinctive rock types from remote areas that could be transformed into stone-axes.

The structuring of stone-axe production around a variety of local resources with few, if any, imports implies not only a largely self-sufficient production but also that differential significance and purposes may have been associated with axes made from different source materials. On the scant data so far available the

Whinstone and Cheviot andesite axes may have had greater symbolic associations than the rough and well utilised sandstone, limestone and Greywacke axes. The deep black colour of polished Whinstone and marble-like finish of the andesite axes may have been important in making such axes exotica simply on account of their colour and appearance, as has been suggested for the porphyritic andesite axes from Lambay, Ireland, the Langdale axes of the Lake District (Cooney 1998, 117), and the Type A dolerite axes from Plussulien in Brittany (Patton 1993, 26).

The importance of certain rock outcrops to Neolithic communities of the basin will have been enhanced, or indeed created, by their exploitation as axe quarries. The spectacular location of Housey Crags and Langlee Crags (Figure 6.6), together with the adjacent exposures of Long Crags and Tathy Crags, recalls that of the Langdale (Bradley and Edmonds 1993), Tievebulliagh and Killin (Cooney 1998) 'factories' and, as Bradley and Edmonds (1993) have pointed out, the remoteness of such spectacular places may have added to the significance and worth of objects made from these places. This notion of the context of production helping to establish the significance of the artefact may be particularly pertinent in the case of the north-eastern Cheviot hills where, as with Langdale, Tievebulliagh and Killin, this (suspected though not yet demonstrated) context is marked by a spectacular upland setting in an exposed location (Figure 6.6) but with relatively easy access from the adjacent lower lying area of the Harthope Burn. A recent discussion by Cooney has drawn attention to the way that the exploited rock at Langdale, Tievebulliagh and Killin occurs as a linear band (Cooney 1998, 112), and again this situation is replicated above the Harthope Burn where Langlee Crags, Housey Crags and Long Crags form a string of crags along the south-eastern crest of the valley (Figure 6.7). In this case the band of crags line one side of a dramatic glacially scoured valley which is flanked at its head by the two highest peaks of the Cheviot range, The Cheviot at 815m and Hedgehope at 714m. Such a context for the production of stone axes, together with the carving of cup and ring marks on outcropping sandstone bedrock, indicates that prominent natural places within this north Northumberland landscape were appropriated by Early Neolithic communities who physically altered them. Such impositions on

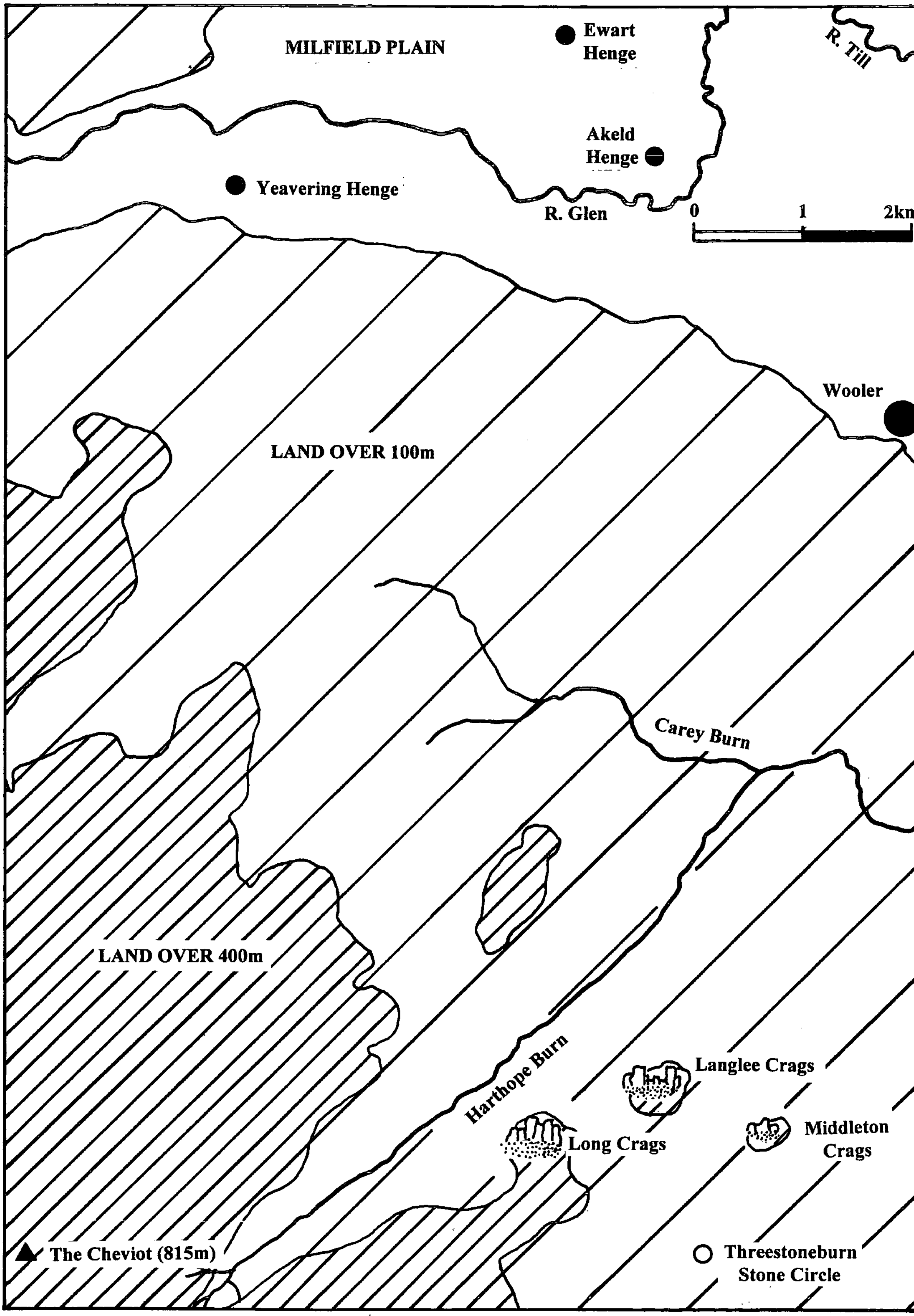


Figure 6.7 Location map showing andesite rock outcrops along Harthope Burn

the natural environment mark a departure from earlier Mesolithic practices, which rarely left any mark of permanence on the landscape and certainly no permanent man-made monuments. Therefore, although the Early Neolithic landscape appears to have continued to be structured to a large extent through prominent natural features, these once 'natural' features appear to have undergone a process of transformation enacted through physical alterations that would have encultured them. The transformation of natural features into culturally adapted landmarks and artefacts may represent the early stages of taming the landscape - perhaps a corollary to the initial stages of domestication taking place at this time in the production system.

Stone Tool Manufacture

The incidence of burnt lithics in the Neolithic transition assemblage of 8.6% (see above, Chapter 4, Figure 4.34) suggests that prodigality remained a significant part of the prevailing cultural attitude to lithic manufacture and discard during this period. Therefore, although flint was being imported on a greater scale than before, together with an increasing proportion of high quality nodular flint, the traces of a sparing attitude to lithic curation can still be glimpsed. Although there is not the same degree of frugality as witnessed for the Mesolithic period, the continuing concern for maximising the lithic resource, together with continued, albeit reduced, reliance on local lithic resources (see above), indicates that the wider and more productive exchange networks now in operation did not by any means provide the full requirement for lithic resources.

The continued, though reduced, practice of burning lithics is mirrored by the incidence for rejuvenated lithics (6.1%) which, although still significant, is not as frequent as during the Mesolithic period (7.8%). Access to greater quantities, higher quality and a wider variety of imported flint appears to have contributed to the relaxing of pressures for maintaining such prodigality in relation to lithic husbandry.

Lithics from radiocarbon dated Early Neolithic contexts, recovered during the author's excavations on the Coupland Enclosure and the Bolam Lake settlement, have demonstrated the continued use of Mesolithic blade-based manufacturing technology into the Early Neolithic (Figure 6.8). However, innovations in technology include the employment of invasive retouch on artefacts such as leaf-shaped arrowheads, though it is noticeable that some leaf-shaped arrowheads were made on adapted narrow blades with only limited retouch; see, for example, the Early Neolithic arrowheads in Appendix 2. This suggests that, to some extent, traditional flaking techniques continued in parallel with innovative forms. The other major changes include the discontinuation in the use of microliths in favour of leaf-shaped arrowheads and the adoption of ground and polished tools, in particular the polished stone-axe (see above). The changes and continuities in core types also reflect the discontinued production of microliths but the continued use of a blade-based technology.

It is, therefore, changes in the form of projectile points and stone axes which characterise the main changes in the tool kit from the previous Mesolithic period. This is significant as projectile points/arrowheads are known from ethnographic studies to have important symbolic connotations (Taçon 1991), and ground and polished stone-axes are also widely acknowledged to have been important symbolic and cult objects (e.g.Bradley and Edmonds 1993; Cooney 1998). Therefore, it is perhaps no surprise that it is these key *symbolic,* and not just functional, tool types which show the first changes in the tool kit. Moreover, it is a change in tool kit technology that involves removing any trace of the original natural lithic fractures which occur during this kind of tool production. As such there is rarely any evidence left on these 'tools' of how they were derived from the 'natural' world. All-over invasive retouch of leaf-shaped arrowheads and the grinding and polishing of stone-axes produces entirely man-made surfaces and thus completely acculturated objects. This serves to create a distinction between cultural and natural by divorcing the final form of certain special objects from their original (natural) appearance. It is suggested, therefore, that the key changes

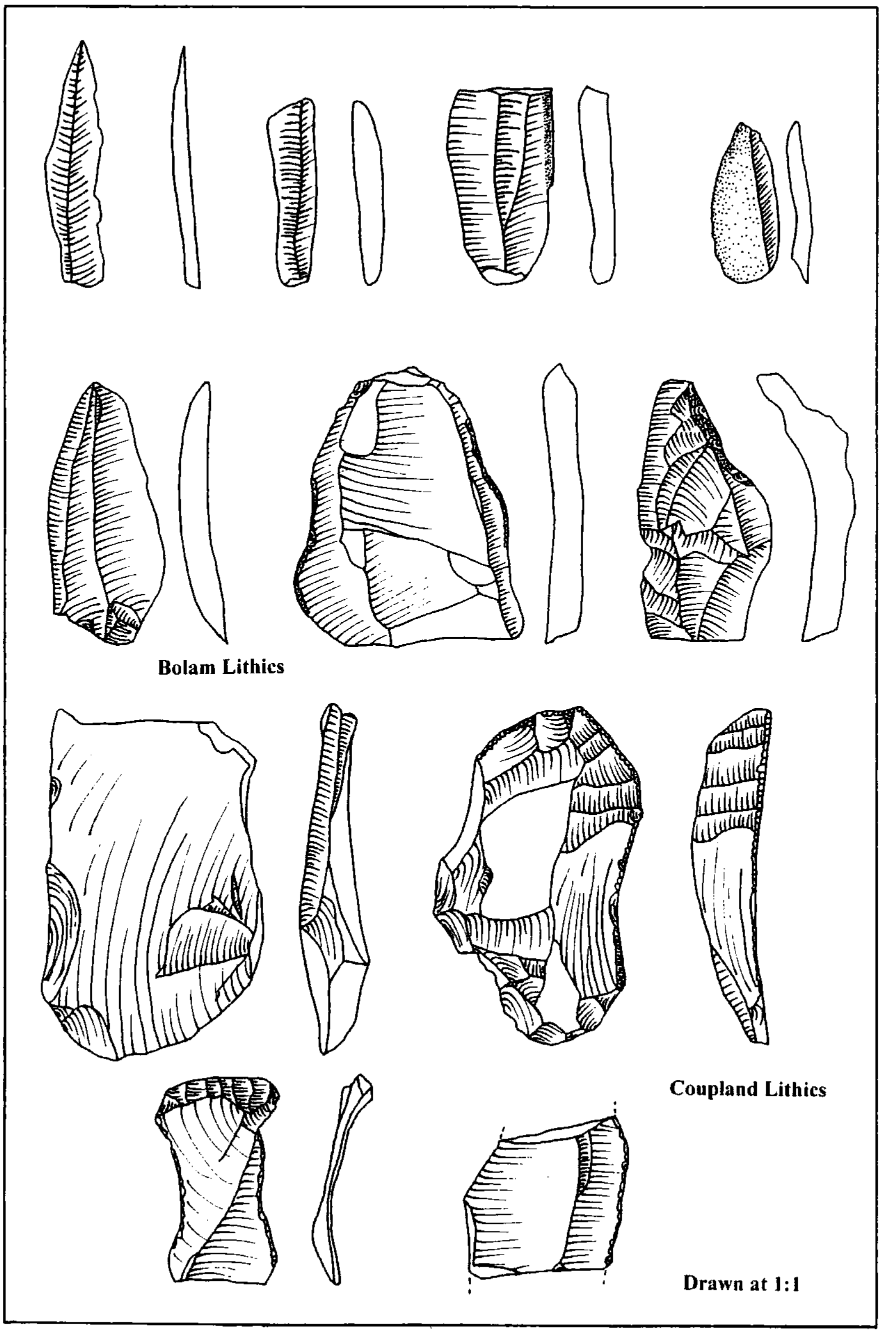


Figure 6.8 Blade-based tools from Early Neolithic excavations at Bolam Lake and Coupland

witnessed in the tool kit of the Neolithic transition are changes intimately associated with transfer of symbolic meaning and not just with modifying functionality. The manufacturing techniques of the everyday tool kit, however, appear to have experienced considerable overlap with the continued use of narrow parallel-sided blade-based tools, possibly reflecting the continuation of mobile lifestyles (Bradley 1987b).

SETTLEMENT

Given that large areas of the gravel terraces in the basin have been opened up for excavation over Early Neolithic sites and that no evidence for substantial permanent dwellings has yet been discovered, such as long-houses for example, there is as yet no basis on which to assume full sedentism during this period. The surface lithic data for Early Neolithic settlement reveals a pattern that to a large extent replicates the Mesolithic settlement pattern, with the exception of the exploitation of the sandstone slopes (see above). This is of interest because, if it were not for the excavated remains of pits, this data would provide the only indication of Early Neolithic settlement and as such there would be no reason, except on the basis of assumption, to view the Early Neolithic pattern of settlement as being any different from that of the preceding Mesolithic. However, the Early Neolithic pits do represent something new and so, in order to understand Early Neolithic settlement, it is necessary to review the excavated evidence so that it can be integrated with the lithic scatter evidence and the palaeoenvironmental data.

The pits, usually backfilled with 'domestic' waste such as broken pottery, charred wood, hazelnut shells and broken flint tools, have been located at Thirlings (Miket 1987), Yeavering (Harding 1981; Hope-Taylor 1977) and Coupland (Waddington 1996b). Indeed, one of the shallow pits at Thirlings contained over 400 broken sherds of Grimston Ware pottery representing a minimum of twelve vessels (Miket 1987, 39). However, the pits do take a variety of forms, including in particular those which can be associated with cooking, storage, structures and sometimes 'ritual' deposits. Some are clearly the truncated remains of 'oven-pits' (*contra* case study discussed by Thomas 1991, 59-64), such as those at Coupland, where *in situ* heating has fused the gravel surrounding the pits, and the contents included fire-cracked and reddened stones (Waddington 1996b). These pits appear to have been backfilled after cooking with associated domestic waste including charred hazelnut shells, charcoal, flints and broken, thick-walled, round-based pottery (*ibid*). Radiocarbon determinations taken from charred hazelnut shells for two of the Coupland pits centred on c.3900BC (Waddington 1998a), placing these features firmly in the Early Neolithic period. The thick-walled cooking pots, together with the backfilled oven-pits in which they were recovered, suggest that new cooking practices were introduced during the Early Neolithic. The presence of pottery in the cooking process implies that the preparation and storage of food in these places was not opportunistic but rather part of a planned and predictable routine, reflecting ideas of how food should be handled (Nielsen 1986, 242), which itself implies some degree of settled residence with the need to store food and ultimately prepare it in an appropriate way. The desire to bury rubbish below ground also implies that whether for reasons of culture (be they ritual or social protocols, see Thomas 1991, 59-64) or hygiene, or indeed both, the removal of waste from the above-ground dwelling area was considered important. Again this would make sense if residence in a particular spot was over a sustained duration of months or years, rather than days or weeks, so as to prevent the build-up of squalor.

Pits associated with storage also occur on these sites (*contra* Thomas 1991, 59-64), such as the lined rock-cut pit discovered in the Early Neolithic settlement near Bolam Lake (Waddington and Davies 1998). The fact that storage strategies were employed on some of these settlement sites implies that occupation took place over months, or more likely a whole year, as it is survival through the winter months which necessitates the greatest need for storage provision. The considerable number of pit features and gullies at the Thirlings site, together with the presence of a truncated pit containing over 400 sherds of Grimston Ware in its remaining fill (Miket 1987, 39), suggests that Early Neolithic occupation at any given phase was fairly extensive and may have consisted of more than just one dwelling.

The presence of structures on some of these sites is also evidenced by the pit features which, on excavation, turned out to be post-holes and post-pits. At Thirlings at least one such structure is known which had a trapezoidal shape, with sides 6.4m long and its ends 3m and 5m wide respectively (Miket 1987, 37-9). In the past such ephemeral structural remains have been interpreted as house-plans, being seen as analogues to the Central European long-house and, therefore, presumed to be permanent houses (e.g.Miket 1987). However, in the case of Thirlings, the 'house' simply comprises four small corner poles which would have been likely to stand no higher than 2m above ground. Clearly, they are not the sort of substantial posts which would normally be associated with sturdy permanent dwellings. Unfortunately, the Thirlings evidence has not been fully published and so little more is yet known from these excavations. However, recent excavation by the author of an Early Neolithic settlement elsewhere in Northumberland, near Bolam Lake (Figure 6.9), sheds a little more light on Early Neolithic settlement structures (Waddington and Davies 1998). In this case a triangular setting consisting of four post-holes was identified (Figure 6.10), all with the holes containing poles of around 12cm diameter (Figure 6.11) which probably varied in height so that the apex of the triangle used the highest post, c. 1.5-2m above ground, while the others were slightly lower, c.1-1.5m above ground. Around this structure on the west side were the remains of small depressions containing a number of stake-holes (Figure 6.12). With regard to this site it has been suggested that the structure was probably for a tent or turf dwelling rather than a 'house', and that the stake-holes were possibly 'tent-peg' holes for holding down guys or the sides of the structure (*ibid*). Rubbish pits and backfilled storage pits, containing exactly the same sort of material found at Thirlings, Yeavering and Coupland, were also found at this site immediately downwind of the structure, together with a cooking area and stake fence upwind near the stake-hole pits.

Figure 6.9 View of excavations at the Neolithic settlement near Bolam Lake

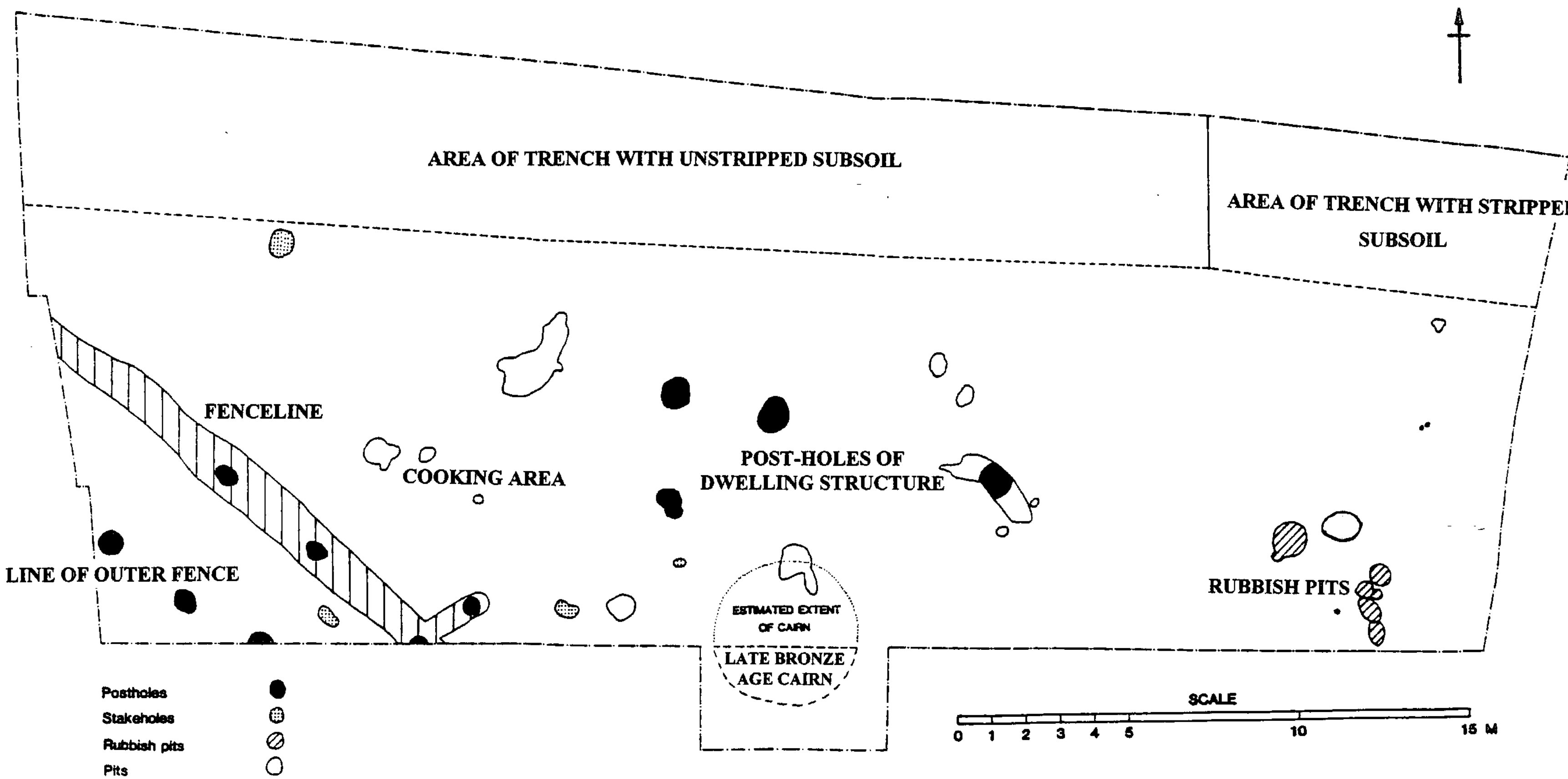


Figure 6.10 Plan of excavated features at the Early Neolithic settlement near Bolam Lake, Northumberland

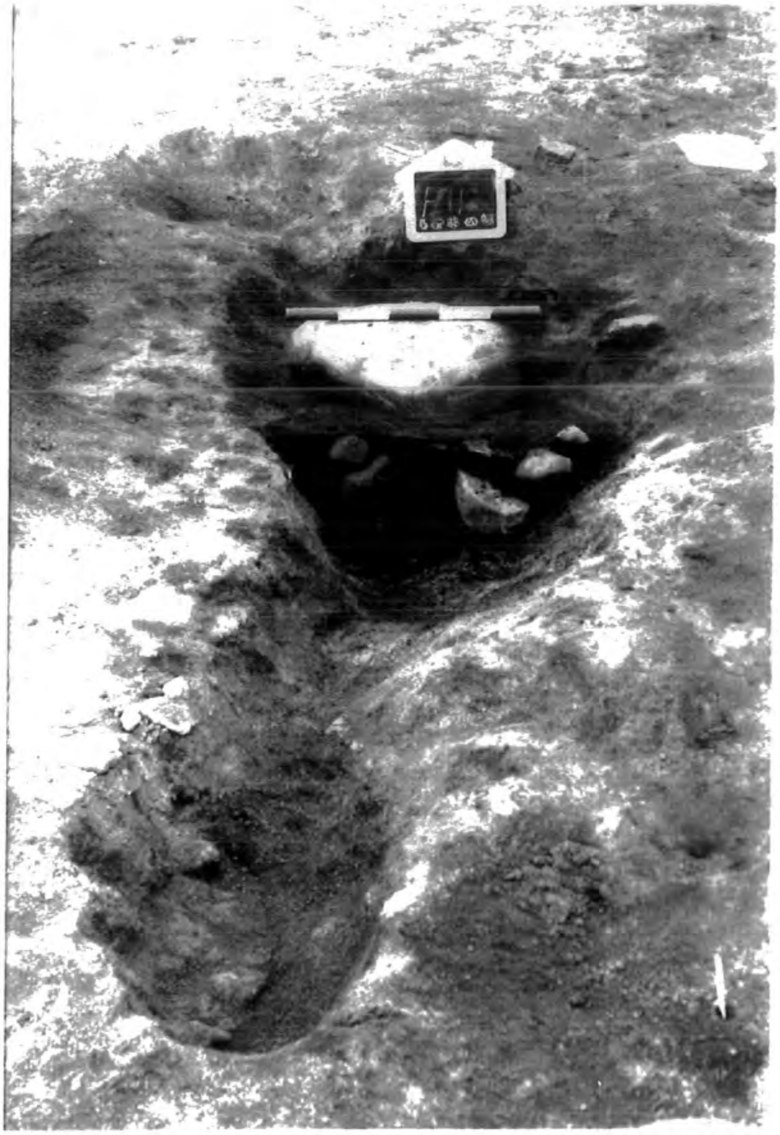


Figure 6.11(a) Ghost of post-pipe in post pit of structure at the Bolam Lake site

Figure 6.11(b) Excavators standing in triangular arrangement of post-holes comprising the dwelling structure

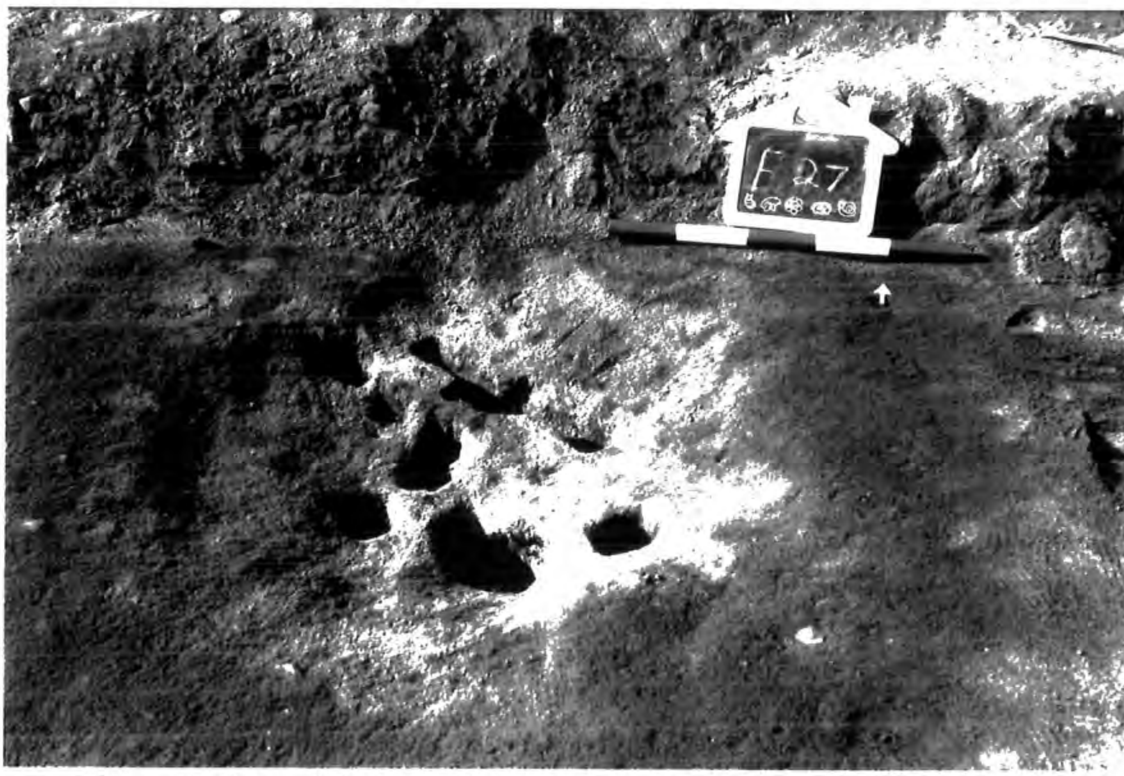


Figure 6.12 One of the 'stake-hole' features at the Bolam Lake site

Radiocarbon dates taken from charred hazelnut shells from two of the rubbish pits centred on c.3700BC (see Appendix 8). The structural remains at Thirlings, which are so similar to those found at the Bolam Lake site, are thus interpreted here as being more likely the remains of tent-like structures, or relatively ephemeral pole and hurdle dwellings, rather than as 'houses' associated with fully permanent settlements.

Reinterpreting the excavated Early Neolithic settlement evidence in this way we can now return to the lithic scatters to propose a settlement regime for the Early Neolithic period in the basin. The continued focus of settlements on the raised gravel terraces and low Cheviot slopes demonstrated by the lithic scatter data (see above), together with the position of the excavated remains of Early Neolithic settlements on the raised gravel terraces, indicates that this area remained the primary settlement focus during the period. The extensive character of these lithic scatters, although an aggregate record, remain suggestive of encampments of numerous dwellings rather than of single discrete dwellings, as does the extensive remains recorded at Thirlings. The excavated evidence from this area suggests that the settlements were occupied over months and years, rather than short seasonal stays (see above), and the numerous pits, post-holes and gullies at Thirlings and Yeavering suggest these settlements were occupied by more than one family group at a time. However, the remains are also thought not to indicate continuous permanent settlement over many years or a lifetime. Therefore, it is suggested that what is being indicated are 'home-base' type settlements, occupied probably for a year or two in the core settlement zone, which shifted periodically to new locations within that same zone. Such a pattern would conform to the 'short-term sedentism' envisaged by Whittle (1997, 21) for some Early Neolithic groups.

The clustering of lithics on the low plateau areas of the Cheviot slopes immediately above the gravel terraces, are of equal density to those on the terraces (Figure 6.4), suggesting that the core settlement area had become enlarged to include the low slopes of the Cheviot fringe, an area which contains the most fertile soils in the basin (Payton 1980). Such camps on the Cheviot slopes would allow for the continued culling of wild animals but may also have allowed for the seasonal tending of crops on the brown-earth dominated Cheviot slopes. Small-scale cultivation on the gravel terraces of this core area has been demonstrated by the recovery of cereal grains of emmer wheat, barley and oats from Early Neolithic pits at Coupland (Jacqui Huntley pers. comm., see above Palaeoenvironmental section). Bearing in mind the under-representation of cereal-type pollen in regional diagrams such as those from the Cheviot Hills, and also the new pollen data acquired by Moores from near Otterburn indicating cereal cultivation c.3900BC (Moores *et al* in press), both the low Cheviot slopes and gravel terraces may have supported more temporary clearings and cultivation plots than the present data suggests.

The pollen diagrams from Akeld Steads and Wooler Water indicate that small woodland clearances around the gravel terraces, probably for crops, took place in the early part of the 4th millennium BC (Tipping1996, 28; see above Palaeoenvironmental section). The high resolution pollen sequence recorded from a palaeochannel near Otterburn (Moores *et al* in press) shows that around c.3900BC the palaeochannel was set within an alder carr environment and that, set back from this on the higher terraces of the valley floor, there was clearance for cereal cultivation taking place in oak and elm dominated woodland (Moores *et al* in press). The similarity of dates and environmental setting, together with the geographic proximity to the Milfield basin, is striking and this provides further support, at the regional level, for this model of valley floor exploitation on the terraces above the floodplain. Furthermore, the presence of a shiny gloss on the serrated edge of a thin flint blade reaping tool, excavated from an Early Neolithic pit at Coupland (Waddington 1996b; 1998a) is a characteristic sometimes associated with the processing of plant material (Anderson 1980; Anderson-Gerfaud 1986). The presence of such a tool within this core settlement area provides further indication of cultivation and/or plant exploitation activities around the settlement sites of the raised terraces. At the same time as providing a base from which to maintain small agricultural plots and manage the surrounding woodland and wild resources (see above, Palaeoenvironmental section), these apparently semi-sedentary settlements on the gravel terraces would have also afforded continued exploitation of the rich riparian resources of the adjacent valley floor wetlands (see above, Chapter 5). The abundance of arrowheads on these terraces implies that culling animals near the water's edge remained an important activity. In addition to the Early Neolithic settlements recognised at Thirlings (Miket 1987), Yeavering (Hope-Taylor 1977; Harding 1981) and Coupland (Waddington 1996b; 1998a), another feature of note on the gravel terraces is a spread of burnt material at Miket's Whitton Hill Site 2. Dated to c.3600BC (Miket 1985, 144 and 147), this may represent activity associated with another Early Neolithic settlement, especially considering that five Early Neolithic flints were recovered from this same field during the fieldwalking programme. Ard marks discovered during evaluation trenching on the gravel terrace below the old airfield site adjacent to the Coupland enclosure are thought by the excavators to be the remains of very early ploughing (Geoquest pers. comm.) which, no doubt, relate to a nearby settlement such as that at Coupland, though as yet these ard marks have not been adequately dated.

The small clusters of Early Neolithic material higher up on the upper Cheviot slopes near gullies and springs are, by contrast, suggestive of smaller, less intensively occupied areas. Taking into account also the continued use of a light transportable tool kit (see above, Lithic section) and the continuation of hunting activities on these slopes (see above, Lithic section), it is suggested that these clusters represent small upland camps occupied on a seasonal or semi-sedentary basis. Tipping's palaeoenvironmental analysis has indicated continuity in the style of woodland management (clearance) between the Late Mesolithic and Early Neolithic periods (1992; 1996), which adds further to the case for settlement on the upper Cheviot slopes being of a similar transitory nature to the preceding Mesolithic.

Settlement on the boulder clay slope seems to have been largely avoided and this may have been for the same reasons as suggested for the Mesolithic (see above, Chapter 5 Palaeoenvironmental section). However, Early Neolithic material, including a stone-axe and fine retouched-blade tool, were found on the raised gravel 'islands' within the once alluvial wetland of Kimmerston Bog, indicating that at least certain areas on the alluvial fringe were occupied. However, the extent and nature of occupation within this zone cannot yet be determined due to the burial by alluvium of the Neolithic land-surface on many of the floodplain terraces, in addition to the lack of modern ploughing which could otherwise facilitate fieldwalking. Although areas within the contemporary floodplain are unlikely to have been utilised for settlement, given the risk of flood and the immediate proximity of more attractive drier surfaces, the possibility of flood-water farming or the growing of hay for winter fodder cannot yet be entirely discounted. Future pollen work on peat deposits from contemporary channel belts within the flood plain may allow this possibility to be studied.

Previous to the fieldwork carried out during this study, a case for Early Neolithic settlement on the sandstone slopes comprising seasonal upland herding settlements had been made, based on the environmental and archaeological data available at the time (Waddington 1996c). However, since the fieldwork on the Northumberland sandstones, including fieldwalking and excavation, has been able to provide new data which allows this earlier interpretation to be tested. Settlement on the sandstone slopes seems to have differed in character from that identified for the core area of the gravel terraces where semi-sedentary encampments have been identified and the low Cheviot slopes where the lithic scatters suggest similar settlements. Instead of extensive spreads of material, the pattern recognised on the sandstone slopes of small clusters comprising a handful of lithics within a limited spatial extent is most similar in nature to those recorded for the upper slopes of the Cheviots, where small temporary encampments are envisaged (see above). This spatial distribution of material may indicate that people repeatedly occupied relatively discrete dwelling spots. Although the paucity of material may be partly explained by the practice of burying discarded material in pits, this would still not account for the still higher densities on the low Cheviot slopes and gravel terraces, where burial of lithic material in pits certainly took place (see above). The implication is that the settlements on the sandstone slopes were genuinely small-scale and not for larger groupings, as suggested for the gravel terraces and low Cheviot slopes. The very occasional arrowhead implies some hunting continued to take place in these areas but this does not seem to have been a major activity. This hazy picture of settlement on the sandstone rim can, however, be fleshed out by returning to the Early Neolithic settlement excavated near Bolam Lake (Waddington and Davies 1998).

The Early Neolithic Settlement Near Bolam Lake

The 'Sandyford Quarry Field' settlement near Bolam Lake (Figure 6.7) is situated on the edge of the sandstone escarpment overlooking the fertile ground of the Wansbeck valley. In summary, this settlement consisted of several elements:

1. a single central structure, interpreted as a semi-permanent tent/turf covered dwelling (see above)
2. intercutting rubbish pits downwind of the dwelling
3. a cooking area to the west side of the dwelling
4. a multiphase fence made from posts conjoined by stakeholes forming part of what was thought to be a multiphase hurdle fence.

The site was initially located by the discovery of a small and discrete scatter of Early Neolithic lithics and pottery during fieldwalking (Waddington and Davies 1998). Although a substantial trench was opened (42m x 20m), on excavation the site was found to have been comprised of only a single dwelling although it is possible more could lie close by although, given the discrete nature of the surface scatter, this is unlikely. The presence of a single tent-like structure implies that residence was of a temporary nature with the site only occupied for certain times of the year by a single small group. The occurrence of inter-cutting rubbish pits and the multi-phase fence suggests that exactly the same site was returned to and re-used in the same way on a number of occasions. The employment of an easily constructed light fence around the settlement implies stock control was an important feature of this site. In combination, these lines of evidence point to an upland, temporary, stockherding settlement comprising a single dwelling for a small group and occupied in the years around 3700BC. Moreover, the original surface lithic pattern of a defined cluster of material, rather than extensive spreads across the landscape matches the pattern identified on the sandstones of the Milfield study transect. However, the higher numbers of lithics found in the discrete cluster above the Bolam Lake site is probably the result of the lack of earlier ploughing on this particular area of the sandstone slope.

The key to understanding the Early Neolithic settlements on the sandstone slopes would seem to be their use as stockherding residences, as suggested by the fencing. The current pollen data available for the sandstone escarpment (Camp Hill Moss) suggests that prior to c.1800BC mixed deciduous woodland was important in these areas (Davies and Turner 1979; Tipping 1992). With natural thinning out of the tree canopy in areas of tree throw, outcropping bedrock and thin soils, together with purposive woodland management, these areas would have provided ideal forest browsing and grazing areas (Waddington 1996c), particularly for cattle (both wild and domesticate) which by nature favour open woodland browsing rather than grazing on the open plain (Simmons and Tooley 1981; Smith 1992a, 63).

Therefore, on the basis of the lithic scatter pattern observed in the Milfield study transect, together with the excavated evidence from the site near Bolam Lake and the limited pollen data, settlement on the sandstone slopes is proposed as having been oriented around single temporary dwellings concerned, probably, with upland summer stockherding in a semi-open woodland environment. It is proposed, therefore, that these may have formed logistic seasonal herding settlements associated with the semi-sedentary settlements located in the core settlement area of the valley floor.

THE WIDER ARCHAEOLOGICAL RECORD

The intention of this section is to provide a review of the other Early Neolithic archaeological elements known, or understood to exist, in the basin, and augments the references made previously in Chapter 2.

Burial Monuments

A large, round, Early Neolithic burial cairn constructed over a burnt deposit containing 200 sherds of Grimston Ware pottery, a stone axe, flints and burnt human bone (including part of a child's skull), was located on Broomridge in the mid 19th century (Greenwell 1877; Miket 1987, 48-50). In contrast, the small low cairn excavated by Jobey (1968) on Chatton Sandyford Moor, with an Early Neolithic date of c.3650BC contained no recognisable grave-goods and, as such, differs both in form, size and contents to the Broomridge cairn. An unusual rather squat long mound has also been located to the south of the basin on Dod Hill (Gates 1982) which, although surveyed, has not yet experienced any excavation. At Yeavering the fragments of cremated bone found in a pit with a Grimston Ware pot (Hope-Taylor 1977, 345) may also represent another type of locally distinctive Early Neolithic burial. However, as Miket has pointed out the bone fragments may be from cooking debris (Miket 1987, 46) as the bone is not identified and Miket states that he found similar bone in like contexts at Thirlings. However, the Thirlings site remains unpublished so little further can be said regarding this matter, except that the bone excavated by Hope-Taylor *may* possibly represent an unusual Early Neolithic burial.

With three, possibly four, entirely different burial features, and bearing in mind the recent discovery of a fifth type, a chambered tomb, elsewhere in Northumberland at Dour Hill (Waddington *et al* forthcoming), it is apparent that eclectic burial traditions prevailed in north Northumberland during this period. Whether this relates to different valley communities with their own particular practices, or whether it represents different sorts of burial for different circumstances, or a mixture of these reasons, remains unknown. However, what is distinctive is that all the Early Neolithic burials (ie. excluding the chambered tomb which could be middle Neolithic) appear to be those of individuals and they are placed in situations which permanently remove the corpses from the living world. This can be juxtaposed with the probably slightly later chambered cairn where multiple individuals would be expected to be represented and access to the bones of the deceased is both possible and clearly permissable. Problematical as these heterogenous burial practices are, this tentative pattern could be explained by Bradley's suggestion that closed burials were associated with the separation of the individual from the lived world, while the open access burial structures were associated with ancestor rituals (1998, 62-3). The former tradition is thought to have grown out of the Mesolithic tradition of individual sealed graves, such as those found in southern Scandinavia, while it is not until the adoption of chambered tombs and their earth and timber counterparts (Kinnes 1992), with their intention for repeated access, that ancestor cults become adopted (Bradley 1998). If this is the case, the Early Neolithic burials around the Milfield basin and its fringes could be seen to have continuity with preceding Mesolithic traditions, even if this idea is based on burial evidence from elsewhere in north-west Europe, while it is not until later in the Neolithic that burial monuments become associated with ancestor cults and ideologies

That possible mortuary enclosures of the type discussed by Kinnes (1975; 1992) may also exist in the basin may be indicated by two trapezoidal enclosures, with circular enclosures at their southern ends, identified by crop marks from aerial photographs (Miket 1976, 128). However, neither of the sites, one of which is located to the west of Milfield village and the other near the Ewart Park henge, have been confirmed as such by excavation. The recovery of a polished Cheviot andesite stone axe by Colin Richards of Glasgow University from the ploughsoil over the Ewart enclosure, together with the positioning of the Ewart Park henge and pit alignments close by, suggests the feature to be of Neolithic origin.

Attention is, therefore, drawn to the need to investigate at least one of these plough-threatened features within any research framework for future work.

Cup and Ring Marks and Roughting Lynn

Cup and ring marks on outcropping bedrock are known to have been carved during the fourth millennium BC and are thought by some to originate during the Early Neolithic (Waddington 1998a), hence their inclusion in this section. The large quantity of cup and ring marked outcrops within the basin are located exclusively on the sandstone escarpment in three main concentrations: on Weetwood Moor, Doddington Moor and around Broomridge. It has been suggested elsewhere that during the Early Neolithic these carvings were associated with a pastoral transhumance cycle, whereby herds of cattle were taken to browse and graze on the wooded sandstone uplands (where the carvings are located) during the summer before being returned to the Milfield plain for overwintering in the Coupland Enclosure, situated within the core settlement belt (Waddington 1996c; 1998). At the same time their symbolic, cult and ideological properties have also been explored and thus the 'functional' and 'ritual' aspects of these motifs are far from being considered mutually exclusive. Rather, they are thought to be mutually binding by offering authority in a recursive fashion to each other.

Other recent commentators have offered alternative views of cup and ring marks in the Milfield basin, suggesting that they are located on viewpoints, to allow intervisibility between rock art sites and over the major routeways into the Milfield plain, and on trackways across the landscape (e.g. Bradley *et al* 1993; Bradley 1997). A division between 'complex' panels on the higher ground and 'simple' panels on the lower ground, nearer to the main settlement ('domestic') area of the basin has also been suggested with attendant implications for the encounters which took place at these sites. Although aspects of these interpretations are contested by the author an important point of convergence between these different understandings is the recognition of the location of carved outcrops on the margin of the main year-round settlement area, as Bradley has termed the valley floor (1993), but in an area that was probably used on a seasonal basis for purposes such as stockherding and hunting. This linkage between cup and ring marked outcrops and the herding regime draws further support from the recognition of an old trackway that leads directly from Roughting Lynn, the largest cup and ring marked outcrop in the basin, with the north entrance of the Coupland Enclosure (see below), an Early Neolithic monument that is thought to have been used, among other purposes, for the overwintering of stock (Waddington 1996c; 1998a).

Previous work has also drawn attention to the way in which these parts of the landscape are symbolically 'ordered' through the embellishment of already extant natural features (outcropping bedrock), or 'non-cultural megaliths' (see above Chapter 5), rather than imposed man-made monuments (Waddington 1998a). At the same time the interpretation is also advanced that the symbols used to adorn these outcrops are not only symbols which find their visual cues in patterns observable in the natural world, but the way in which they are applied to bedrock is in such a way as to take account of, and indeed enhance, the natural patterning of the rock surface. This deliberate use of natural landscape features, and the adoption of an aesthetic embedded in patterns common to the natural world so as to emulate rather than impose, has been taken to reflect a new ideological construction, based around people's perceived relationship with the natural world. It is thought these symbols helped to constitute the northern British 'Neolithic' world by the materialisation of those concepts through a new set of tangible and permanent symbols which by emulating the natural world serve to disguise the fundamental notion of separateness of culture and nature that is thought to emerge with the Neolithic (Whittle 1997, 360).

This discussion of Early Neolithic ideology goes on to suggest that the nature of tenure between people and the landscape was one of 'stewardship' rather than dominion (Waddington 1998a) and it is this relationship with the natural world which may be equated with Bird-David's notion of 'reciprocating environment' whereby semi-farming groups have to perform appropriate actions, usually in advance, if the land is to support them (Bird-David 1990). This change in the ideological relationship between humans and nature is understood here to be a defining characteristic of the change to the 'Neolithic'. It is proposed that a previous society which perceived itself as entirely embedded within nature (Mesolithic) transformed into one that perceived itself as being a little more distanced from nature (Early Neolithic), with humans tentatively conceiving themselves as separate living entities. However, the deliberate use of natural landscape features and designs which mimicked patterns in nature may have been an attempt to play down this fundamental ideological shift so as to reassure people of their place in the world and their relationship with nature. Perhaps sympathetic designs were felt to provide some guarantee in the face of ideological uncertainty.

The Coupland Complex (and Roughting Lynn again)

The Coupland Enclosure and 'droveway' were excavated by the author in September 1995 in an attempt to test an interpretation of Early Neolithic land-use in the basin (Waddington 1996b; 1996c; 1998a). It was suggested that the Coupland Enclosure was not a henge in the traditional sense (Waddington 1996c), even though it comprised the outer bank, inner ditch and opposed entrances normally associated with Class II henges. Instead, it was thought that it probably dated to the Early Neolithic period and served the wider community residing in the Milfield basin, both as a stock enclosure for overwintering and as a cult/religious centre around which year-round settlement was ordered (Waddington 1996c). It was also suggested that this enclosure was related to the seasonal use of the sandstone uplands as a transhumance area (*ibid*) where cup and ring marked outcrops are exclusively situated. The subsequent excavations (Figure 6.13) provided confirmative results including:

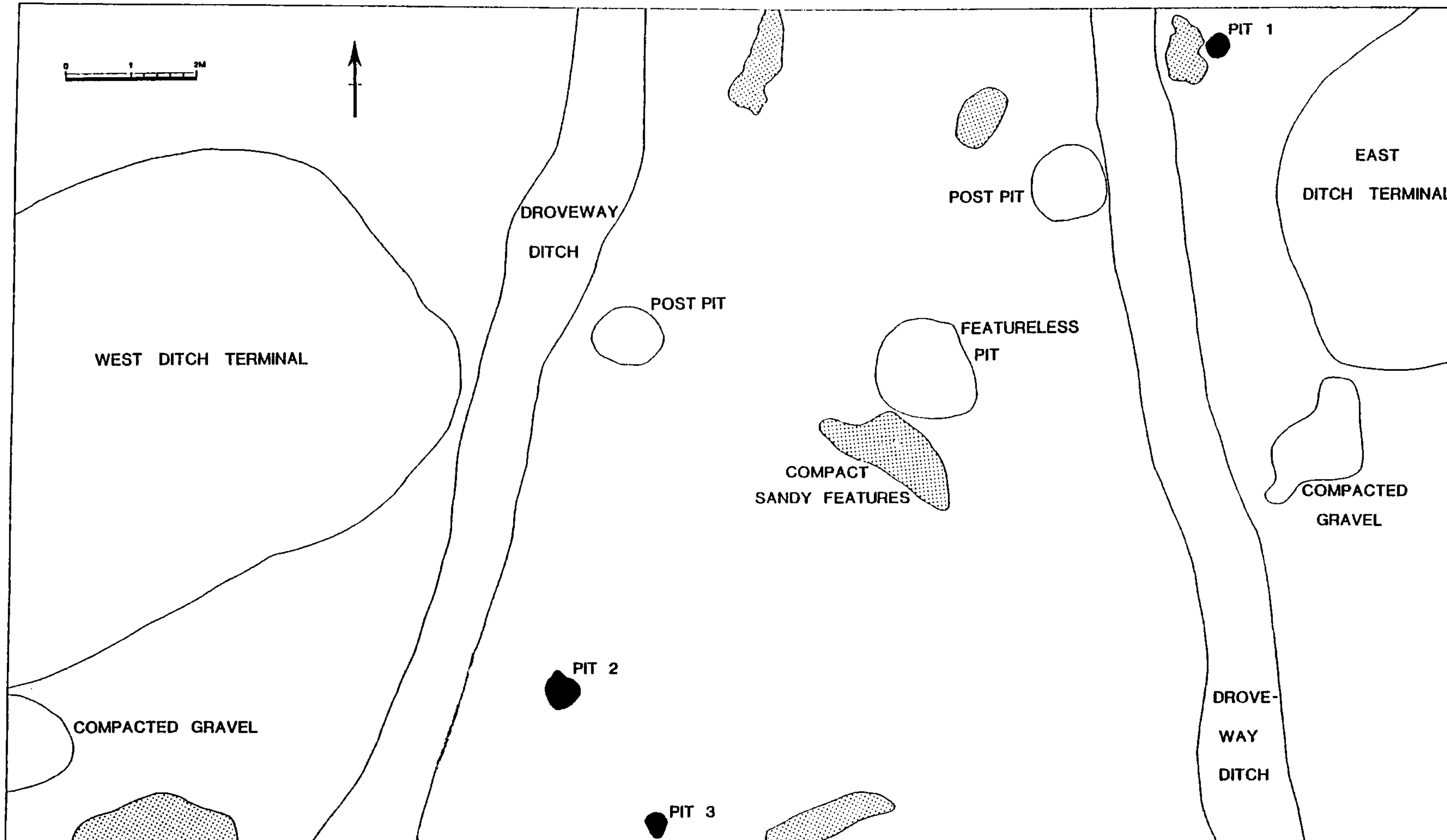


Figure 6.13 Plan of excavation trench over the north entrance of the Coupland Enclosure

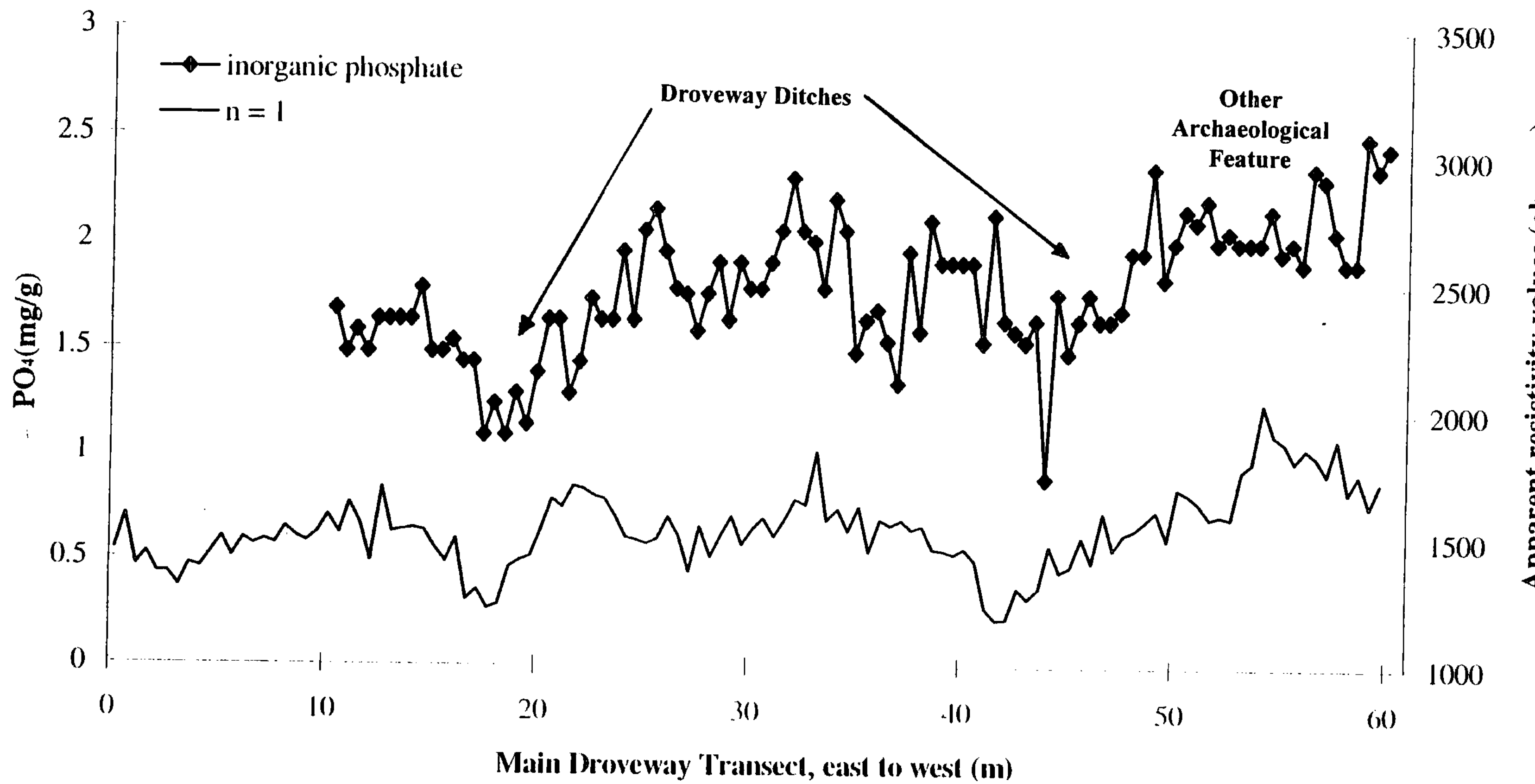
1. Early Neolithic radiocarbon dates for the construction of the droveway centred on c.3800BC (see appendix 8). As the droveway narrows to respect the entrances of the enclosure, the enclosure must be structurally earlier than the droveway and must, therefore, date either to the same time or earlier than the droveway.

2. Structural evidence for 'gateposts', standing c1.5m above ground and 35-40cm in diameter, were found in the entrance jamb of the north causeway into the enclosure, indicating structural features existed for controlling access. Similarly, the 'droveway' was shown to comprise a linear route defined by a low wooden fence on either side, which had stood in a stone-packed bedding trench and which probably stood about 1.5m above ground. Again, this is structural evidence consistent with its use as a stock barrier.

3. Phosphate analysis, geophysical recording and excavation of a transect across the droveway during 1997 by Emily Mercer of Bradford University, demonstrated a higher phosphate count within the confines of the droveway (Figure 6.14) than outside, in addition to a more compacted surface within the area of the droveway (Mercer 1997). Interpreted as representing a high incidence of faecal remains and trampling by stock respectively (*ibid*), this research provides further evidence to suggest the 'droveway' was indeed used for the movement of stock into and from the Coupland Enclosure.

4. By overlaying the aerial photograph transcription of the course of the 'droveway' on to a detailed geomorphological map of the basin (produced as part of the Milfield Basin Resource Management Study, Passmore and Waddington 1998), it is clear that the droveway uses a deep naturally incised gully at its northern end for the rest of its course, leading this proposed cattle route directly to the river's edge and an historically attested fording area of the River Till (Figure 6.15, see above Chapter 5 Settlement section). This appears to demonstrate the association of the Coupland Enclosure with land-use activities taking place on the other side of the river where the sandstone uplands are located. At its southern end the droveway leads to the wider, deeply inset Galewood Depression, which also

Figure 6.14 Phosphate and resistivity results across the Coupland droveway (after Mercer 1997, 55)



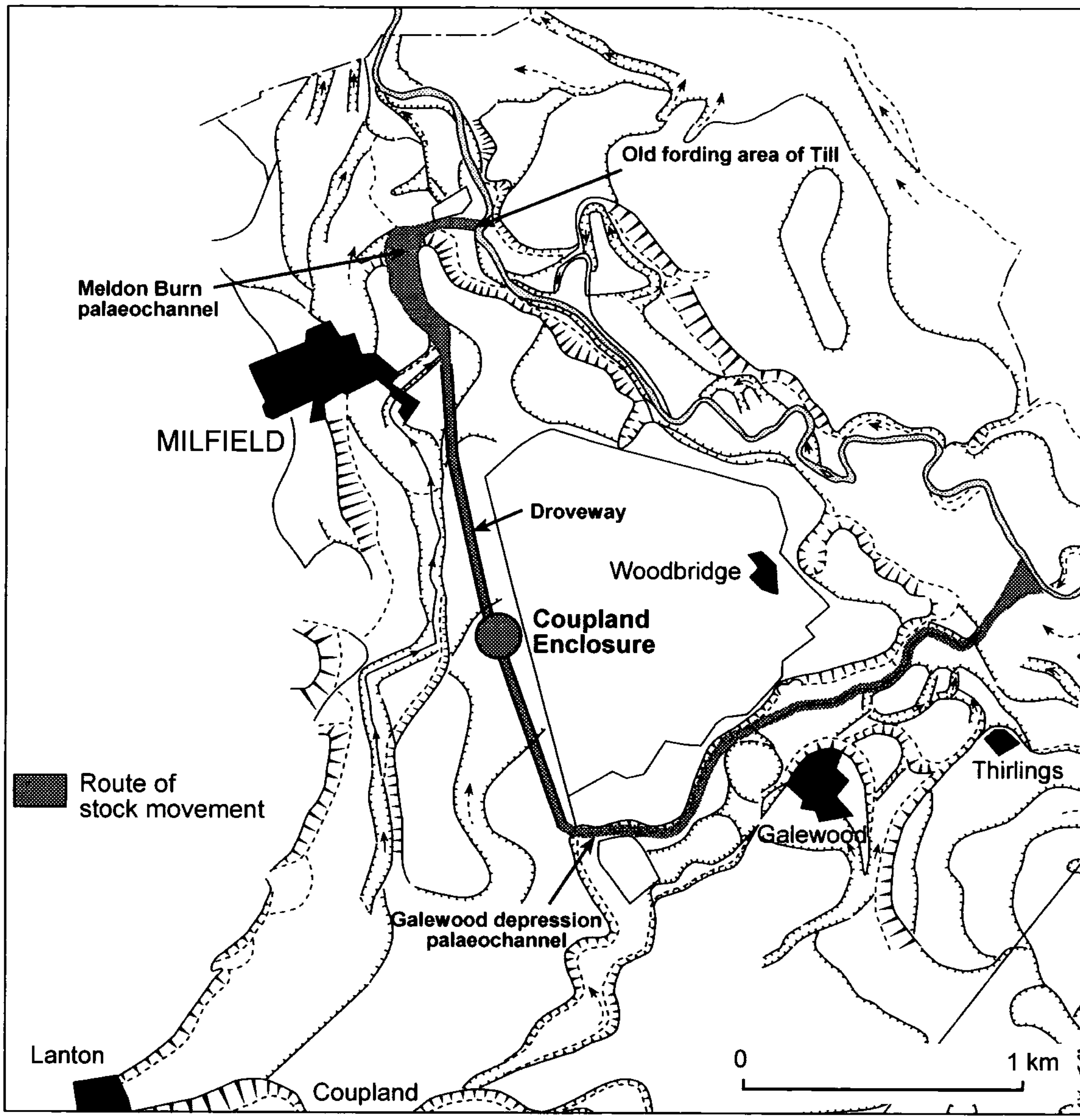


Figure 6.15 The Coupland Enclosure and droveway in relation to the geomorphological map of the basin. (taken from Passmore et al 1998)

leads to the river Till where it opens out into a wide, but contained, expanse. It is speculated that this southern course of the droveway may have been used for the daily requirement of watering stock where the natural confines of the gully open out to provide easy access for an entire herd at the river's edge.

5. Identification of an ancient, though undated, trackway (separate from the droveway) linking the carved rock at Roughting Lynn directly with the north entrance of the Coupland Enclosure, nearly 6km away, is also thought to confirm the link between the carved rocks and the enclosure (Figure 6.16). It is suggested that this route may be the fossilization in the landscape of an Early Neolithic routeway, possibly for movement of people (Waddington 1996c; 1998), between the largest carved outcrop in the landscape and the central focus of the settlement belt at the Coupland Enclosure. A plan of Roughting Lynn by George Tate, published in 1865 (Figure 6.17), shows that the carved rock was positioned inside an enclosure bank which is no longer visible on the ground (personal inspection). However, the three concentric banks visible today which do not include the carved rock in their defined area are also very unusual, and cannot be regarded as the remains of a hillfort as suggested by Jobey (1965). In particular, the presence of internal rather than external ditches (Figure 6.18), the grading of the banks downwards in height from the outside towards the inside (Figure 6.18), and the failure of the banks to join up adequately with the steep scarps that are used to define its western sides, point to the non-defensive nature of this monument. There is a pressing need to understand the chronology and nature of this earthwork as it is proposed that this may also date to the Early Neolithic and have been involved, possibly as an aggregation locale, in the seasonal movement of herds thought to have taken place on these uplands at this time. Although these results will never prove conclusively this particular role of the Coupland Enclosure and droveway, they provide a very strong indication that it served a functional, as well as presumed ceremonial (see below), purpose related to the stockherding regime of the basin (see artist's impression, Figure 6.19).

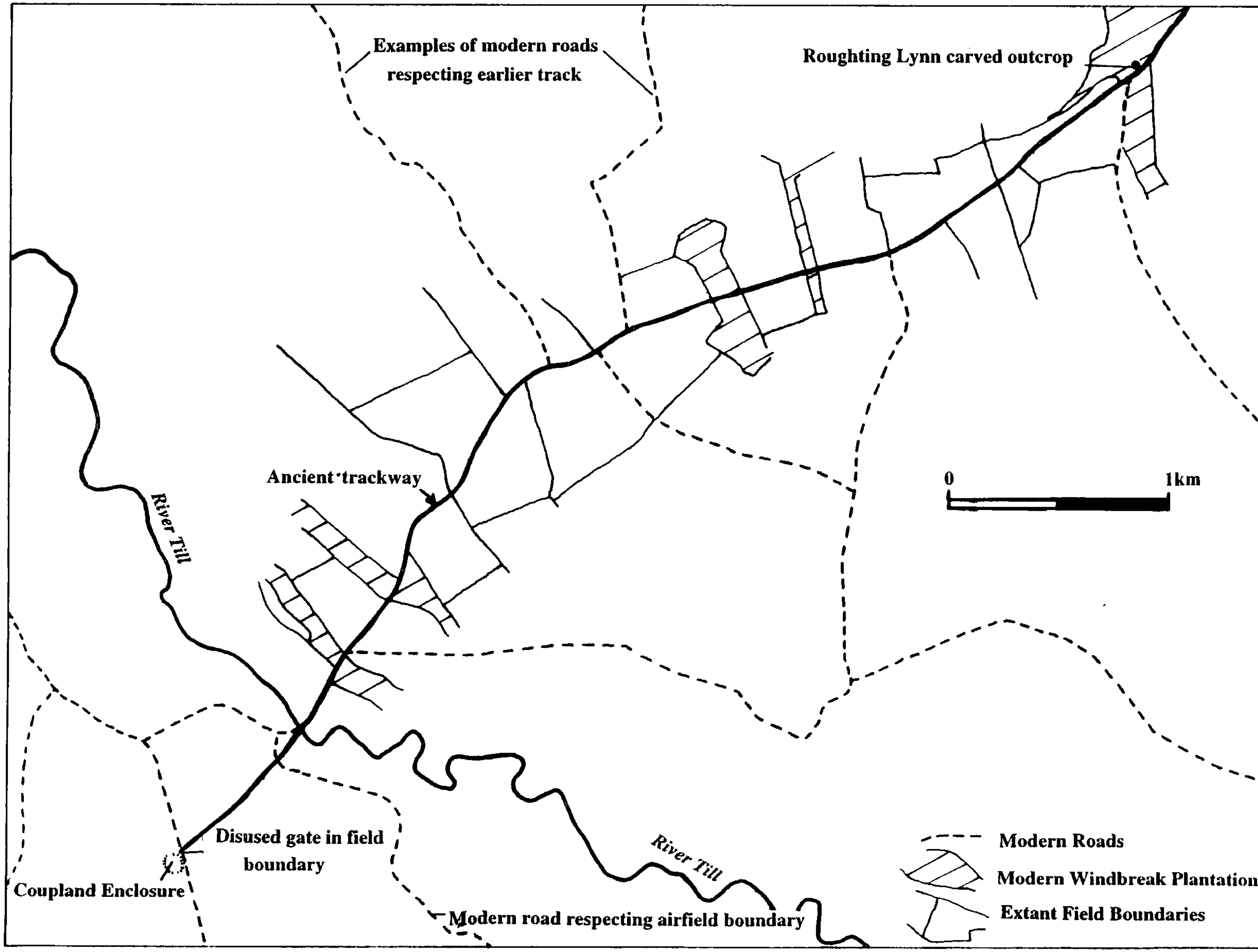


Figure 6.16 Ancient track linking Roughting Lynn and the Coupland Enclosure

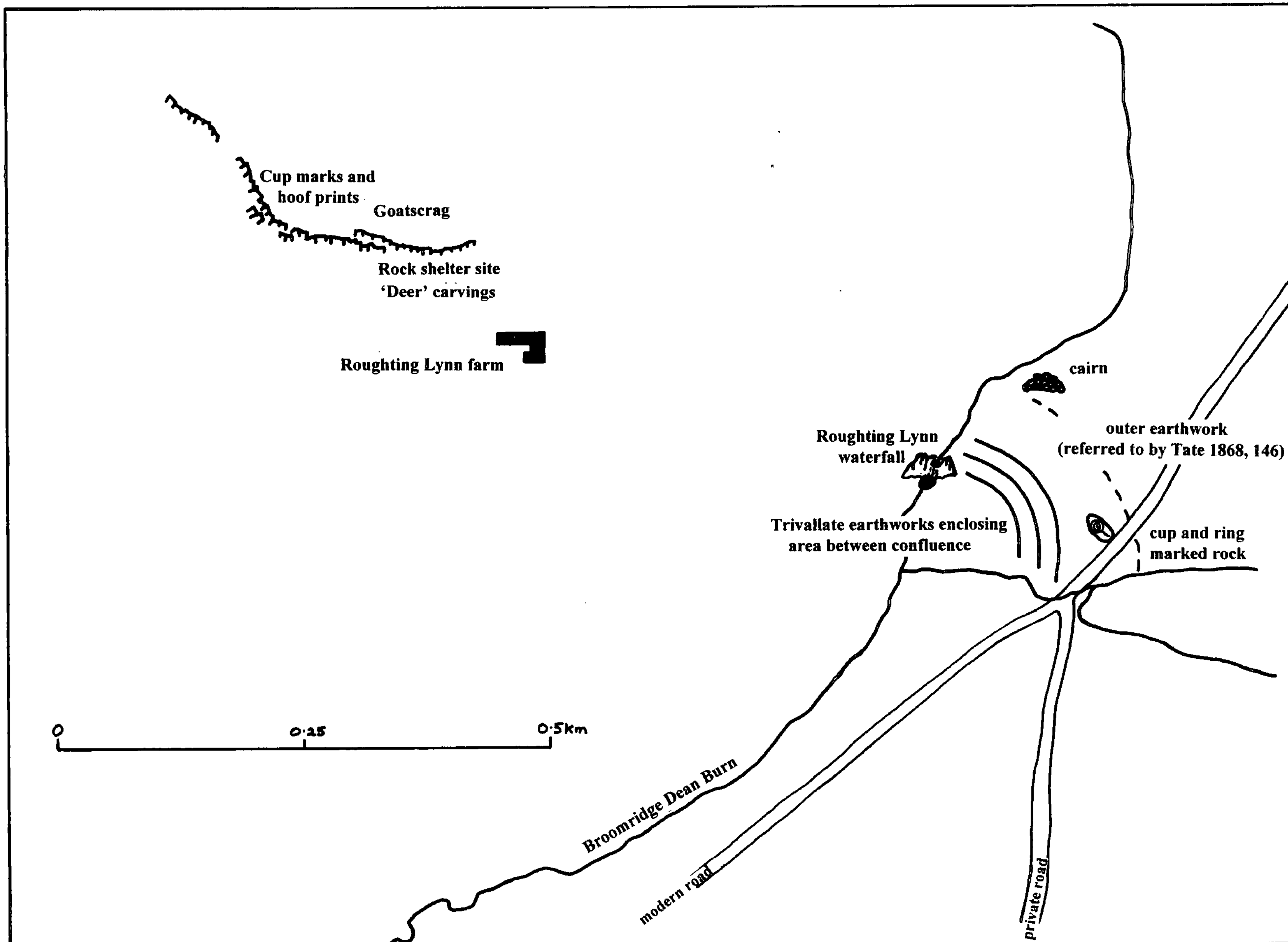


Figure 6.17 Plan of the Roughting Lynn Complex

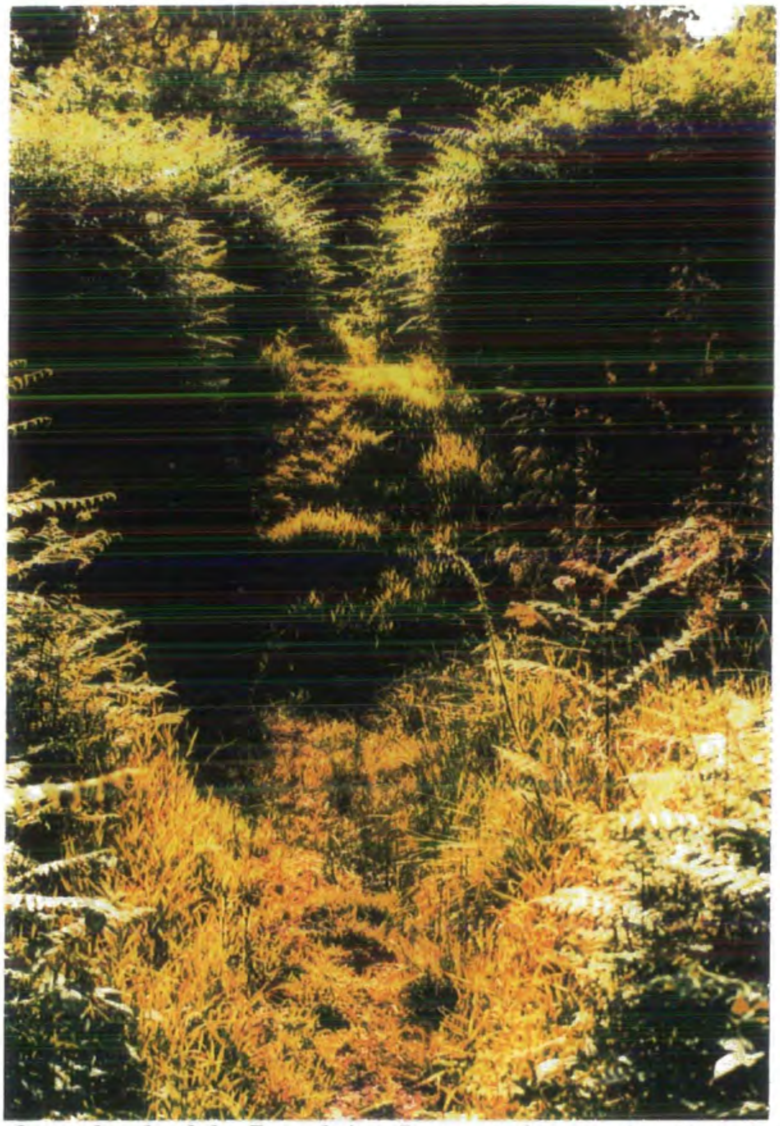


Figure 6.18 (a) Outer bank of the Roughting Lynn enclosure showing absence of outer ditch

Figure 6.18 (b) Banks of the Roughting Lynn enclosure grading down towards the inside

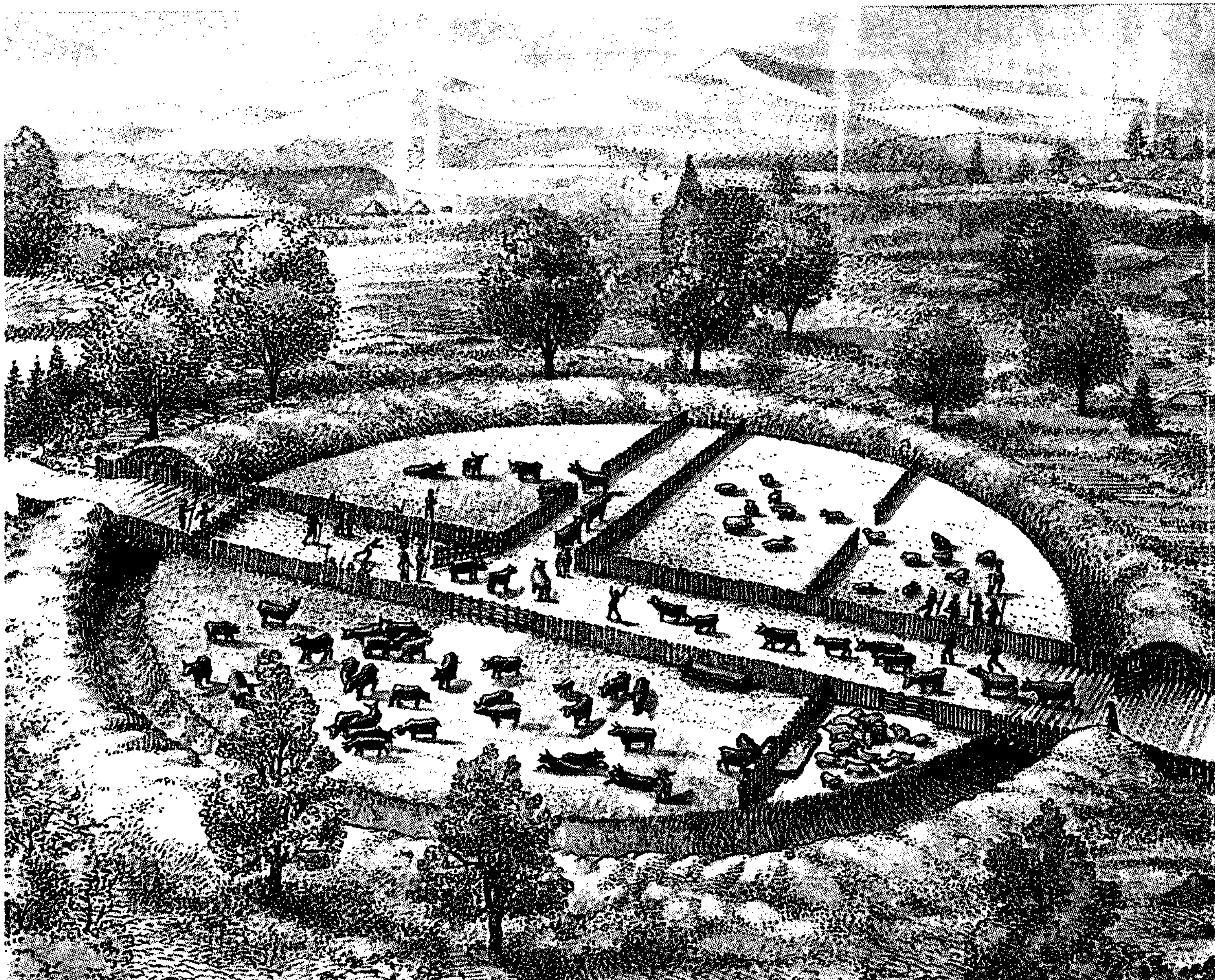


Figure 6.19 Artists impression of the Coupland Enclosure (courtesy 'Discover' magazine Jan. 1998)

The notion of northern England as an area generally devoid of Earlier Neolithic enclosures is a view often taken by prehistorians (Mercer 1980; 1990; Jan Harding pers. comm.). However, this view, usually predicated on the distribution pattern of causewayed enclosures (e.g. Harding 1997), is contested on account of the northern enclosures known at Coupland (Waddington 1997a), Harehaugh (Waddington *et al* 1998), Meldon Bridge (Burgess 1976) and Gardom's Edge (John Barnatt pers comm.), as well as the interrupted enclosures at Hastings Hill (Newman 1976), Sprouston (Smith 1991) and Howe Robin (RCHME unpublished report), and the earlier enclosure known at Long Meg (Soffe and Clare 1988). Other suggested Early Neolithic enclosure sites in the north include Shaftoe Crags (Waddington *et al* 1998), Roughting Lynn (see above), Heddon-on-the-Wall (Burgess 1984, 140), Thornborough South Henge (Harding 1998, 30), and Duggleby Howe (Bradley and Edmonds 1993, 160) as well as the pit-defined enclosure at Forteviot (St.Joseph 1976; Burgess 1976) and the unusual enclosure at Blackshouse Burn, Lanarkshire (RCAHM 1978, 78-80). The relative absence in northern England of the southern-type 'causewayed enclosure', which proliferates on the soft, easily dug, chalk downlands, does not mean that Earlier Neolithic enclosures did not exist in the north. Rather, as excavations and surveys of northern 'hillforts' and crop-mark sites are beginning to reveal, many Earlier Neolithic enclosures are beginning to emerge, but they take on a much more heterogeneous form than their southern counterparts and so are more difficult to recognise in the field and cannot be easily pigeon-holed into a neat typological classificatory scheme such as that of the 'causewayed camp' (Waddington *et al* 1998). Therefore, instead of trying to fit the Coupland Enclosure into existing interpretations of causewayed enclosures, or indeed henge monuments, this site, which has similarities with both, will be considered below in relation to its own particular setting from a fresh perspective rather than trying to shoehorn it into existing models developed in distant areas of Britain.

As the Coupland Enclosure occupies the central area of the most intensively settled part of the Early Neolithic Milfield landscape, the raised gravel terraces, and the area where small-scale horticulture appears to have been concentrated (see above), it is suggested that this monument served as the principal focus around which human use of the landscape was oriented. The aerial photographs of the droveway show that it consists of short sections built up to each other implying that this feature was constructed by a number of small work gangs, recalling the segmentary ditch digging often associated with causewayed enclosures (Edmonds 1993). This would further support the understanding of the enclosure and droveway as a communal monument complex, constructed through the efforts of collective labour to facilitate a communal stock-herding strategy with community-wide benefits. The building of corporate monuments such as this are frequently thought to have helped foster group identity and cohesion (Bradley 1998, 72).

The need to control stock in the main settlement area where crops are now known to have been grown (see above, Palaeoenvironmental section) is obvious, whereas the less intensely settled areas where there is no evidence for cultivation, such as the boulder clay slopes and sandstone uplands (see above), would not require such protection. This would explain why the droveway does not, as far as is currently known, continue on the east side of the river Till, where stock could, presumably, be driven more freely across the land.

Therefore, situated in the core settlement area where periodic shifting of settlement sites is thought to have taken place (see above), the Coupland Enclosure is viewed as forming a permanent anchor in the landscape around which the seasonal and yearly rhythms of Early Neolithic life were structured. By bounding a space in the landscape with a permanent monumental construction, a fixed humanised 'place' which could exclude the wild was created, and as a result this monument (and the activities and ceremonies which took place there) may have provided a focus through which people could understand their place in the world. By fastening this monument into the communal herding strategy of the basin this related 'functionality' would help reinforce, as well as create, its symbolic and cult power, which was geographically, functionally and cognitively central to people's lives. It is this combination of uses and associations which no doubt served to make Coupland such an important and powerful place.

Chapter 7

View south-west to Yeavering Bell from near the East Marleyknowe henge

CHAPTER 7. THE LATE NEOLITHIC

The Milfield basin has become well known as one of the most important Late Neolithic 'ritual landscapes' in the U.K. (Harding 1981; Miket 1981; Bradley 1993; Richards 1996) on account of the many and varied monuments situated in the basin. Figure 7.1 shows the location of the main Late Neolithic archaeology currently known. With the new fieldwalking and palaeoenvironmental data now available it is possible for these monuments to be interpreted within a wider archaeological context and in relation to patterns of land-use and settlement (see below).

This chapter begins with a review of previous syntheses for the Late Neolithic period in the Milfield basin and outlines the research context within which this work is set. Attention then turns to a consideration of the palaeoenvironmental data and the interpretative problems which have skewed earlier interpretations. The discussion then moves on to consider the lithic data recovered from the study transect. This is followed by a section dealing with the other Late Neolithic archaeological features of the basin including settlements, henges, pit alignments, stone circles and cup and ring marks. An overview of the Late Neolithic in the Milfield basin is included in the following chapter (8) in the diachronic synthesis section.

BACKGROUND

It was only with Burgess' (1984) speculative survey of prehistoric settlement that a Neolithic synthesis was proposed for this area. Burgess' main arguments were that there was a mid-Neolithic abandonment of the Milfield plain c.3600-2900BC (cal.), which coincided with a movement to the Fellsandstone uplands, and that after subsequent re-occupation of the plain in the Late Neolithic there was a second abandonment which took place in the Early Bronze Age. As a prelude to this postulated later abandonment Burgess interpreted the floruit of Late Neolithic

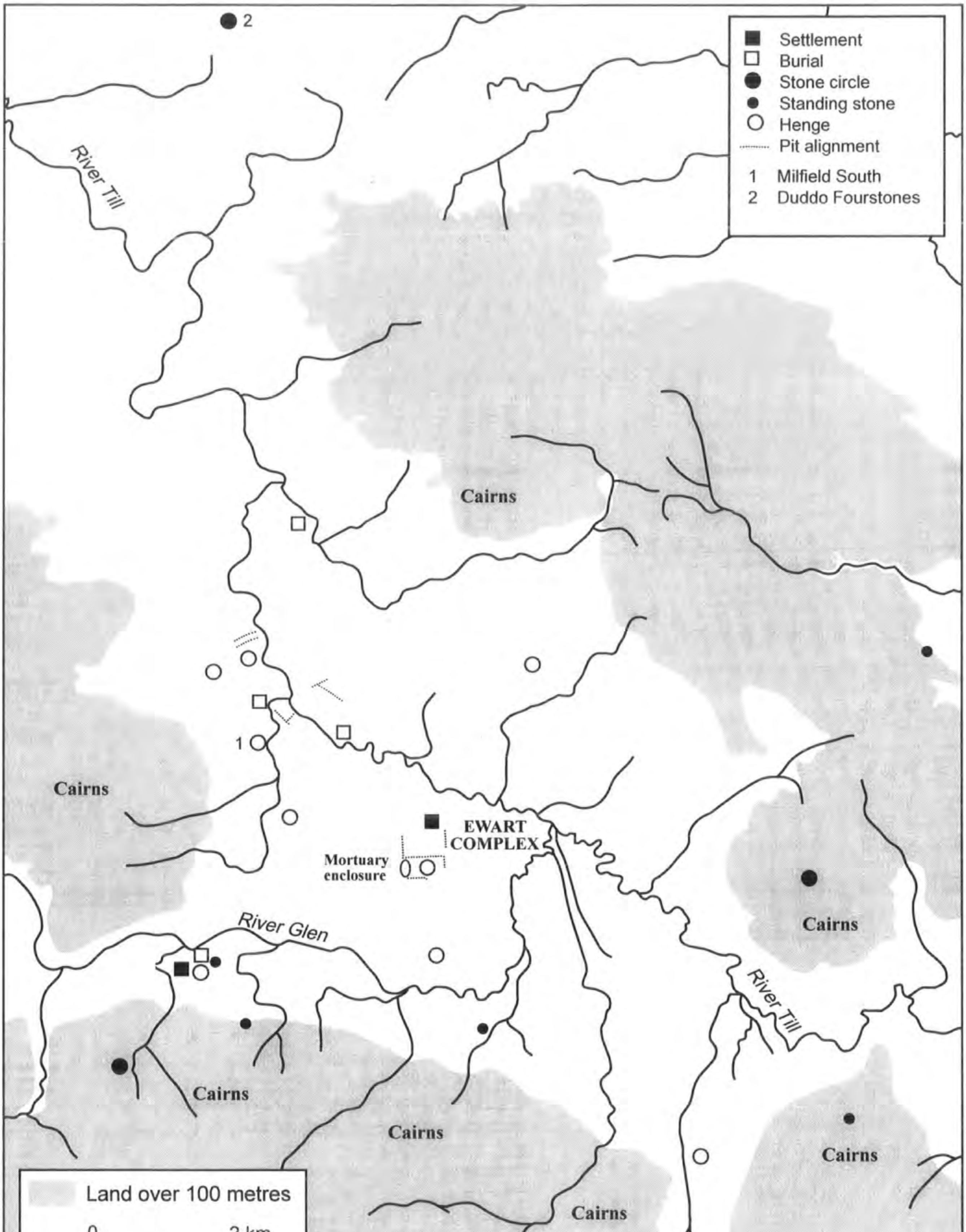


Figure 7.1 Location map of Late Neolithic archaeology in the Milfield Basin

ritual monuments as a spiritual response to mounting pressures on the land. In addition, the Late Neolithic pit alignments were viewed as a further attempt to counter such pressures through a system of rigidly defined land allotment (Burgess 1984, 142-3).

Although Burgess' survey was a wide-ranging and important synthesis, constructed from the data currently available at the time, his model is contested here in the light of new thinking about the period (e.g. Thomas 1991; 1996; Bradley and Edmonds 1993; Whittle 1996) and new data now available. Burgess relies on one date of c.3600BC from a small cairn on Chatton Sandyford Moor (Jobey 1968) to define a chronological bracket either side of this date during which his proposed mid-Neolithic occupation of the sandstone escarpment took place. The associated mid-Neolithic abandonment of the plain is justified by his recognition of two phases of settlement at Thirlings (Burgess 1984, 141) based on the two widely-spaced dates then available of c.4050BC and c.2600BC (*ibid*, 175) and by reference to Whittle's then popular model of mid-Neolithic abandonment based on regeneration phases noted in Neolithic pollen diagrams (Whittle 1978). However, this simple two phase occupation can no longer be sustained given that subsequent dates indicate this site to have been reoccupied on more than two occasions during the 4th and early 3rd millennia. These additional dates of c.3275BC and c.2700BC (Miket 1987, 57) both fall within the period of abandonment proposed by Burgess. The date for the Yeavering settlement of c.3650BC also places this site within the episode of proposed abandonment of the valley floor. Therefore it is clear that, on the basis of the radiocarbon dates now available, this model of mid-Neolithic abandonment, ultimately founded on Whittle's (1978) dated model, cannot be sustained. Rather, the excavated settlements in the basin now reveal an even spread of dates spanning the 4th through to the mid 3rd millennia BC (Fig 7.2). This settlement sequence runs through from c.4050BC (Thirlings), c.3850BC (Coupland), c.3650BC (Yeavering), c.3275BC (Thirlings), c.2700BC (Thirlings), to c.2600BC (Thirlings).

Figure 7.2 Radiocarbon dates for Neolithic settlement in the Milfield Basin (calibrated using the 'Oxcal' programme, Stuiver and Reimer 1986)

Radiocarbon Date (based on mid-point of 2 sigma (95.4%) probability range)	Type of Site	Name of Site	Location	Laboratory Number	Uncalibrated Radiocarbon Date BC
c.4050BC	Settlement	Thirlings	Gravel Terrace	HAR-877	3280 +/-150
c.3900BC	Settlement	Coupland	Gravel Terrace	OxA-6832	3140 +/-60
c.3850BC	Settlement	Coupland	Gravel Terrace	OxA-6833	3110 +/-60
c.3850BC	Droveway	Coupland	Gravel Terrace	Beta-96129	3090 +/-70
c.3800BC	Droveway	Coupland	Gravel Terrace	Beta-96130	3000 +/-70
c.3650BC	Settlement	Yeavering	Gravel Terrace	HAR-3063	2940 +/-90
c.3600BC	Cairn	Chatton Sandyford	Sandstone Fell	GaK-1507	2890 +/-90
c.3600BC	Possible Settlement	Whitton Hill	Gravel Terrace	BM-2203	2870 +/-80
c.3275BC	Settlement	Thirlings	Gravel Terrace	HAR-6658	2570 +/-120
c.2700BC	Settlement	Thirlings	Gravel Terrace	HAR-1450	2170 +/-100
c.2600BC	Settlement	Thirlings	Gravel Terrace	HAR-1451	2130 +/-130
c.2250BC	Pit Alignment	Milfield North	Gravel Terrace	BM-1652	1820 +/-50
c.2200BC	Pit Alignment	Milfield North	Gravel Terrace	BM-1650	1790 +/-50
c.1950BC	Pit Alignment	Milfield North	Gravel Terrace	BM-1653	1655 +/-80
c.2300BC	Henge	Milfield North	Gravel Terrace	BM-1150	1851 +/-62
c.2250BC	Henge	Milfield North	Gravel Terrace	BM-1149	1824 +/-39
c.2000BC	Henge	Milfield North	Gravel Terrace	HAR-1199	1800 +/-80
c.2400BC	Henge	Milfield South	Gravel Terrace	HAR-3071	1950 +/-110
c.2150BC	Henge	Milfield South	Gravel Terrace	HAR-3068	1740 +/-80
c.1900BC	Henge	Milfield South	Gravel Terrace	HAR-3040	1590 +/-100
c.2150BC	Hengiform Site 1	Whitton Hill	Gravel Terrace	BM-2206	1790 +/-50
c.2100BC	Hengiform Site 1	Whitton Hill	Gravel Terrace	BM-2265	1730 +/-80
c.2100BC	Hengiform Site 1	Whitton Hill	Gravel Terrace	BM-2266	1710 +/-50
c.1950BC	Hengiform Site 2	Whitton Hill	Gravel Terrace	BM-2205	1650 +/-45
c.1750BC	Enclosure Ditch 2dry	Coupland	Gravel Terrace	Beta-117294	1480 +/-60
c.1700BC	Settlement	Lookout Plantation	Gravel Terrace	HAR-4388	1460 +/-80
c.1700BC	Settlement	Lookout Plantation	Gravel Terrace	HAR-4385	1420 +/-80

The second argument that the plain was abandoned in the Early Bronze Age is also contested. The Early Bronze Age settlement excavated at Lookout Plantation, on the valley floor at 61m O.D., had its initial phase dated to c.1700BC (Monaghan 1994). Given that this site was originally mistaken for a ring-ditch (*ibid*, 29), it remains highly likely that many of the other 'ring-ditch' sites known from aerial photography on the gravel terraces may also turn out, on excavation, to be settlement sites. Therefore, to assume abandonment of the valley floor on the basis of there being few upstanding sites is somewhat premature. The occurrence of upstanding remains of Bronze Age houses in the uplands, but not on the valley floor, is more likely a result of preservation bias than a real pattern representating lowland abandonment. This is because the uplands have not experienced the same intensity of land-use over subsequent millenia as the lowlands, the latter having experienced the removal of most surface traces of archaeological monuments including the flattening of every henge site (Harding 1981; Tipping 1996). Furthermore, the recent excavation at the Coupland Enclosure on the valley floor (Waddington 1996b) demonstrated the re-use of the monument during the Early Bronze Age, radiocarbon dated to c.1750BC (see Figure 7.2 above), as evidenced by the cutting of pits in the silted-up ditches of the enclosure. This latest evidence, together with the significant number of Early Bronze Age burials recorded across the plain (see Miket 1987, 177), suggests that settlement, ritual and burial all remained important activities across the Milfield plain during the Early Bronze Age (*contra* Burgess 1984). Moreover, recent excavations on two burnt mounds to the south of the Milfield basin at Titlington have produced a series of radiocarbon determinations which demonstrate the continued use of these sites from the Late Neolithic through into the Early Bronze Age (Topping 1998b). The sites are situated between the 133m and 140m contours at an intermediate location between lowland and upland. Again, this does not appear to correspond to the settlement dislocation suggested by Burgess (1984; 1990b).

Further fieldwork is required to identify settlements with *in situ* archaeological residues contemporary with the floruit of Late Neolithic henge monuments. The identification of settlement sites dating to this period elsewhere in Britain has remained a problem, with only a few settlements known from this period (Simpson 1971; Gibson 1996). Indeed, the flimsy nature of the 'stakehole' Neolithic settlements known in Northumberland, and elsewhere, such as those at Trelystan, Powys (Gibson 1996), means that such ephemeral structures are difficult to locate by archaeological prospection. Given that all the Neolithic settlements currently known from the Milfield basin were found accidentally, it is surely only a matter of time before another settlement is fortuitously located that dates to the later centuries of the Neolithic contemporary with the ritual complex.

Indeed, the presence of Grooved Ware in pits at Thirlings (Miket 1987) may yet represent a phase of settlement contemporary with the pit alignments and henges which have also produced similar Grooved Ware pottery (Miket 1981; Harding 1981), although these Thirlings pits have, as yet, not been radiocarbon dated.

Grooved Ware at the site was found in a pit with a broken saddle quern, indicating that cereal processing took place during the same phase of occupation. Furthermore, some of the impressed (Peterborough) ware from the Thirlings site had close affinities with impressed ware found at the Whitton Hill hengiform site, dating to the main henge-building episode c.2100BC (Miket 1987, 67). If the pits containing these Late Neolithic pottery forms could be radiocarbon dated it is likely they would show that settlement at this site took place contemporaneously with the use of the henges and pit alignments. In the absence of any firmer excavated settlement evidence we must turn to the palaeoenvironmental record.

THE PALAEOENVIRONMENTAL RECORD

The palaeoenvironmental data for this period consists firstly of pollen and macro-fossil analyses, and secondly of the alluvial histories of regional rivers. The location of the pollen sites discussed in this section are presented in Figure 2.4 (see above, Chapter 2).

Palynological Data

Work by Tipping (1992; 1996) has demonstrated that the first large-scale clearances in the Cheviot Hills took place between c.2500-2000BC (Tipping 1992, 119; 1994). Elsewhere in the basin the Akeld Steads diagram adjacent to the raised gravel terraces is thought to indicate some limited woodland recovery during the later Neolithic (Tipping 1996, 28; in press). Following on from Burgess' (1984) model, Tipping suggests that the Late Neolithic regeneration which he interprets at Akeld, together with the clearances noted in diagrams for the uplands, implies settlement in the uplands and abandonment of the Milfield plain (Tipping 1996, 28-9). However, this interpretation can be challenged as pollen sites with very different catchments are being compared and the Akeld Steads diagram has a range of interpretive problems.

Given that the Akeld Steads site would have a restricted pollen rain catchment as a result of its small size (see Janssen 1973; 1986), the diagram from this site is likely to be more representative of local conditions than of the general pattern across the valley floor. Furthermore, it is contended that the widely-spaced samples taken from the Akeld Steads peat core (see Borek 1975; Tipping 1996; in press) do not provide the necessary detail for Tipping's interpretation of woodland regeneration across the entire valley floor, which led him to suggest that human groups abandoned this area (Tipping 1996, 29). Therefore, the pollen diagram has been constructed from a spatially and temporally confined data and thus it is not appropriate to employ it as a proxy vegetational record for the entire valley floor.

The interpretation of the Late Neolithic woodland regeneration recognised by Tipping at Akeld also requires further attention. The pollen core from Akeld was not sampled at close intervals (see Borek 1975; Tipping 1996) and therefore it remains difficult to determine whether wholesale woodland regeneration was taking place or whether the rises in tree pollen were due to a localised pollen source that disproportionately affected the pollen rain count over a short period. The principal tree species which declines during the Late Neolithic is alder, a tree characteristic of floodplain woodlands (Grime *et al* 1990, 52-3), suggesting that some terrestrialisation of this wetland area may have taken place during the period. The concomitant increase in grasses and sedges during this period indicate that the ground fringing the Akeld Steads site became more open (*contra* Tipping 1996; in press). Coupled with the archaeological evidence, which has revealed massive pit alignments extending across large tracts of the gravel terraces for hundreds of metres at this time (Miket 1981), these features suggest that large areas of the terraces were indeed relatively open at this time. It is only at the very end of the Neolithic, around c.2000BC, that the alder count rises again, probably as a result of a very localised alder stand near to the pollen site rather than widespread woodland regeneration across the valley floor. The other tree taxa show only a very slight rise while that for grasses and sedges shows a small decline.

Therefore, the 'woodland regeneration' noted by Tipping appears to be greatly overstated and it is suggested here that the alder regeneration around c.2000BC is more likely to be the result of there being a very localised pollen source (ie. alder trees growing in or very close to the Akeld peat bed) than a reconstitution of woodland across the entire valley floor, as proposed by Tipping (1996; in press). The otherwise very slight woodland recovery at c.2000BC appears to fall-off again soon after this date while grasses, sedge, polypody and alder pick up again. It is of further note that this vegetation pattern may have had as much to do with changing ground water levels, which can have important effects on the presence of certain tree types such as alder (Turner and Davies 1979; 800), as human activities around the site.

Overall, the Akeld Steads diagram from the valley floor shows high grass and fern counts during the Late Neolithic with other open ground species, such as ribwort plantain and buttercup indicating managed clearances around the site, though slight increases in tree pollen are noted towards the end of the period. The presence of a local alder source together with the coarse dating and sampling of the Akeld pollen stratigraphy, carried out during the early 1970's (Borek 1975), undoubtedly obscure much of the detail. Consequently, it is hoped that in the future a more detailed assessment of the Akeld Steads site will be undertaken so that a more secure understanding of the local vegetation sequence and its chronology can be acquired for this part of the valley floor.

The site at Yetholm Loch is more likely to provide a regional signal as it is fed by an in-flowing stream that carries pollen from a much wider catchment (see Peck 1973; Bonny 1976), so the clearances noted at this site during the Late Neolithic may represent land-use practices across the basin and not just on the low slopes around the 100m contour where the site is located. On the other hand the upland sites at Sourhope and Swindon Hill are relatively small peat beds and, like Akeld Steads, are likely to have a more restricted pollen catchment. The clearances evidenced around these latter sites for pasture, and also cultivation in the case of

Swindon Hill (Tipping 1996, 29), are probably localised activities which relate specifically to these upland Cheviot slope areas. Overall, the pollen evidence indicates that clearances for arable and pasture were taking place in the Cheviot uplands and valley floor fringe.

At Camp Hill Moss on the Fellsandstones minimal disturbance to the woodland cover has noted by Davies and Turner (1979) until the centuries around c.1800BC, when the first clearances for pastoral activities are thought to have taken place (*ibid*; Tipping 1992). However, tree taxa are over-represented in this diagram due to the pollen counts being determined as a percentage of total tree pollen rather than total land pollen (Davies and Turner 1979, 800-801). Bearing in mind that this representation style also has the effect of reducing the grass and heather values, which are apparent before large-scale clearances take place between the elm decline and c.1800BC, this diagram suggests rather that clearances, probably for pasture, were taking place on these sandstone uplands during the Later Neolithic prior to 1800BC (*contra* Davies and Turner 1979; Waddington 1996c). This would agree with the pattern emerging from the sandstone fells around Redesdale (Moores pers. comm.).

A recent palynological study in Upper Redesdale and North Tynedale on the south-west fringe of the Cheviot Hills by Moores (unpub. PhD) has demonstrated a distinct increase in open ground around c.2500-2000BC. In the uplands this is manifested by an increase in the proportion of *Calluna* to tree species, particularly hazel. It is thought that this represents the deliberate clearance of upland scrub woodland in order to facilitate grazing (Moores unpub. PhD). On the valley floors, increases in grasses and anthropogenic indicator taxa, including cereals, is demonstrative of an intensification of both arable and pastoral activity (Moores unpub PhD). As with the Milfield data the Redesdale/North Tynedale record demonstrates a marked intensification of land-use in the uplands, and on the valley floor, during the latter half of the third millennium BC, with evidence for both pastoral and arable activities.

In summary, the palaeoecological evidence for north Northumberland is thought to indicate a distinct intensification of clearance activities across the Cheviot upland, valley floors and the sandstone fells during the period c.2500-1800BC. These clearances appear to have been for both pastoral and arable purposes, in the case of the Cheviot hills and valley floors, whereas clearances on the sandstone slopes appear to have been predominantly for pastoral purposes.

Botanical Macro-Fossils

Excavations at several Late Neolithic sites in the Milfield basin have provided evidence for cultivation in the form of botanical macro-fossils preserved in archaeological deposits. The samples from the ritual/burial monument at Whitton Hill Site 1 demonstrated the presence of emmer wheat, barley and hazelnuts in contexts radiocarbon dated to c.2150BC (Miket 1985, 143). A grain impression of 6-row barley was found on a pottery sherd from the upper fill of the Yeavering henge ditch (Harding 1981, 133), while the Late Neolithic settlement at Yeavering (dated c.3200-2600BC), produced grains of 6-row barley, oats, hawthorn, bramble and hazelnut (Miket 1987, 57). This botanical evidence all comes from Late Neolithic sites situated in the area which has been suggested as having experienced woodland regeneration on the raised gravel terraces of the valley floor. Although the catchment from which these macro-fossil remains originated cannot be demonstrated with certainty, it is more likely than not that they came from the immediate vicinity of these sites. If this is the case then it implies that cultivation of wheat, barley and oats took place across the gravel terraces and, together with the large tracts of open ground implied by the pit alignments and the broken saddle quern from a Grooved Ware pit at Thirlings, suggests that this area continued to be a core area of settlement and land-use during the Late Neolithic (*contra* Tipping 1996, 29). Even if these macro-fossils came from further afield then these botanical residues at least demonstrate that cultivation of such crops was undertaken by the Late Neolithic communities inhabiting the basin in the environs of these sites. However, unlike pollen, cereal grains do not travel very far unless deliberately moved from one place to another making this scenario less likely.

Regional Alluvial Histories

Investigation of sedimentary sequences of alluvial valley fills can shed light on the nature and timing of past land-use practices. In particular, accelerated alluviation of river valley floors may be driven, at least in part, by anthropogenic disturbance of catchment vegetation and soil cover (e.g. Shotton 1978; Robinson and Lambrick 1984; Needham 1985; Needham and Macklin 1992). Recently, Tipping has investigated a number of sites around the Cheviot foothills and identified phases of significant overbank sedimentation dating to c.2500-2000BC which he considers to be a result of clearances in the upland by human action (Tipping 1992; 1994). It is important to note that Tipping's study suggests this to be a catchment-wide process that takes place synchronously across the basin at a time when no climatic perturbations are known for this area, and that recourse to an environmental cause for this phenomenon is an increasingly difficult explanation to maintain (Tipping 1992; see above Chapter 2).

Summary

In summary, the palaeoenvironmental data for intensification of land-use during the Late Neolithic period is particularly compelling, given that a marked increase in tree clearances is evidenced independently both by the pollen record and by the alluvial sedimentary record. Moreover, the pollen data indicates that clearances were made both for pasture and arable purposes with the macrofossils demonstrating the cultivation of wheat, barley and oats. Comparison with recent pollen studies from other valleys fringing the Cheviot Hills (Moores unpub. PhD) indicates that this marked intensification of land-use during the Late Neolithic is part of a wider trend in the borders region. This synchronous catchment-wide pattern of land-use makes any environment-driven explanation extremely unlikely (Tipping 1996) and adds further to the macro-fossil evidence which testifies to cultivation in the vicinity of the gravel terraces.

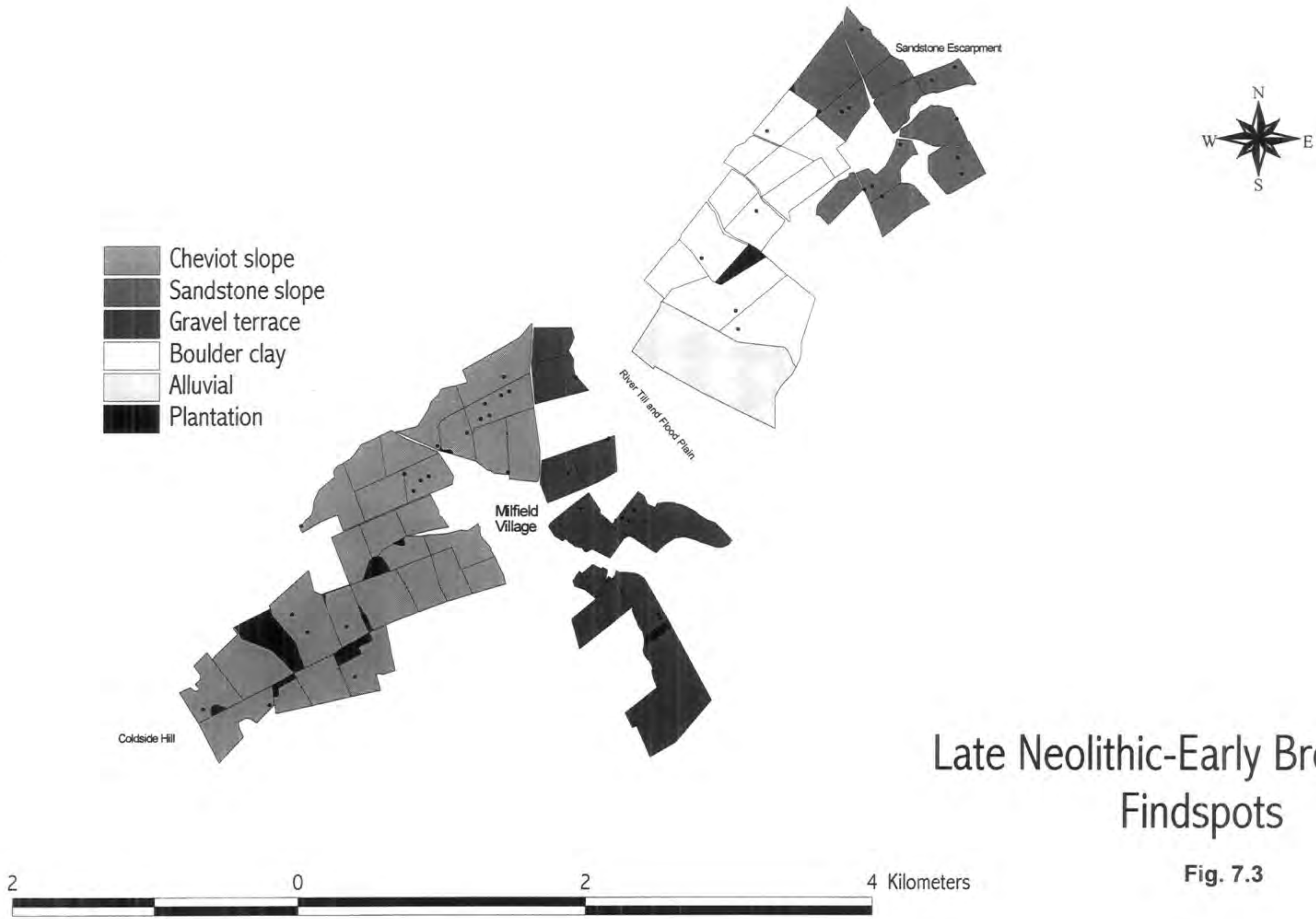
The areas of most intense land-use appear to be the raised gravel terraces and parts of the Cheviot Hills, although the sandstone uplands also witness clearance activity. A pressing area for further research is the need for a more detailed understanding of the exploitation of the sandstone escarpment around the Milfield basin. However, on the basis of the present data (Davies and Turner 1979) and by comparison with that from Redesdale (Moores in press; unpub. PhD), clearances on the sandstone fells and their use for predominately grazing purposes, also appears to have taken place during the later Neolithic. Little is yet known of the palaeoenvironmental data for the areas of boulder clay or the alluvial valley floor, though on-going work on organic-rich sediments from palaeochannels around Thirlings (Passmore and Waddington 1998) will help fill out this picture in due course.

THE LITHIC DATA

Only a small part of the overall fieldwalking and test-pit assemblage could be assigned to a Late Neolithic-Early Bronze Age date. Consequently, all inferences taken from this small data set (54 pieces) must be taken with a degree of caution, given the small sample involved. At the same time, however, this small assemblage has come from a very extensive sampling programme and so the broad pattern of activities represented is still likely to retain validity. The reasons for there being only a small quantity of finds dating to this period are several. Firstly, many of the unclassified lithics may belong to this period, particularly as flaking techniques became more varied and included rough working with little concern for maintaining particular diagnostic shapes during this period (Edmonds 1995). There are, therefore, fewer defining characteristics which allow the more mundane flakes and tools belonging to this period to be recognised and, as a result, many lithics belonging to this period may comprise the bulk of the chronologically unclassified lithics. Secondly, the cultural attitude to lithic discard, as with the preceding period, included the tendency to bury a proportion of the lithic material in pits, as evidenced at Thirlings (see Miket 1987), which effectively takes a certain proportion of these lithics out of the ploughzone. Thirdly, the timespan of the Late Neolithic-Early Bronze Age (c.1500 years) is much less than for the Mesolithic and also less than for the Mesolithic-Neolithic transition (as identified here) and so there was less time for lithic assemblages to accumulate.

Density and Distribution

Although the assemblage is small, the distribution of Late Neolithic-Early Bronze Age lithic material across the Milfield landscape (Figure 7.3) is relatively evenly distributed, suggesting that the sample is likely to represent activities across all environmental zones. Inspection of the density values across the different ecological zones is revealing (see above Chapter 4; Figure 4.31) as it shows that variation between the values is much less than in previous periods (Figure 7.4). This implies that settlement was becoming more widely and evenly distributed across the basin, with upland and valley floor becoming more equally settled. An alternative interpretation may be that it represents a low-level of 'background noise' (Gallant 1986) with no 'sites' encountered within the transect. This, however, is rejected as the view taken here is that no such thing as 'background noise' exists. Worked stone tools do not just happen to become spread across the landscape but occur rather as a result of purposive human action (although later taphonomic processes may skew that pattern). Furthermore, the interpretative stance that recognises 'background noise' assumes that sites exist as areas of high density, and that they are situated like islands within unoccupied areas of low lithic density. The shortcomings of such site-based approaches have been reviewed at length in recent publications (e.g. Dunnell 1992; Zvelebil *et al* 1992; Tolan-Smith 1997a) and the systematic exclusion of lower density lithic



Late Neolithic-Early Bronze Age Findspots

Fig. 7.3

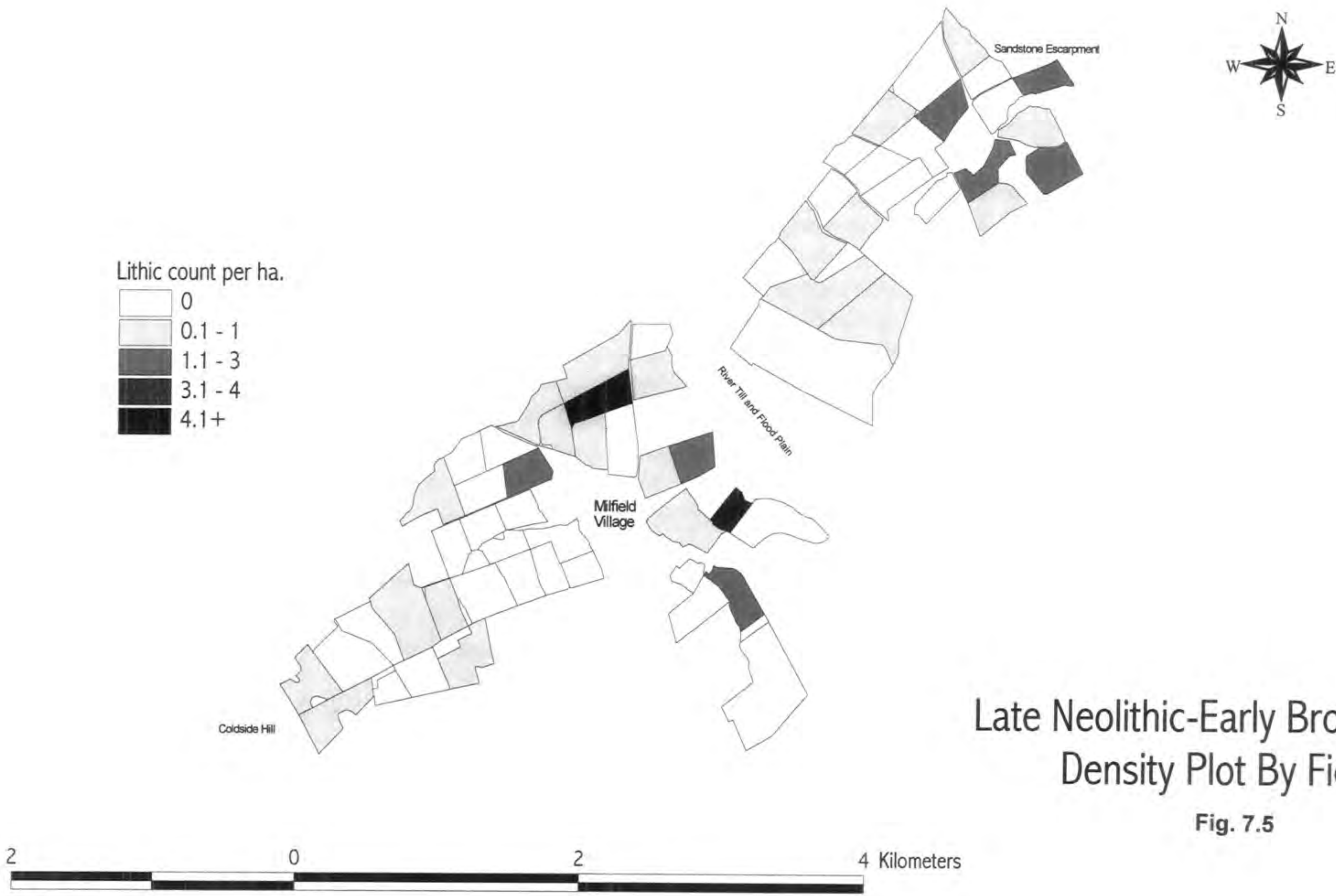
distributions is regarded as no longer valid. As Zvelebil *et al* (1992, 195) have noted, "it is the task of the archaeologist .... to interpret the density and character of the more or less continuous distribution of artefacts".

Figure 7.4 Density of Late Neolithic-Early Bronze Age material from each ecozone (taken from Figure 4.10)

Ecological Zone	Gravel Terrace	Sandstone Slopes	Cheviot Slopes	Boulder Clay	Alluvial
Adjusted Density of Lithics per ha.	0.5	0.7	0.5	0.2	0.0

It appears, therefore, that the gravel terraces of the valley floor were not abandoned during this period (*contra* Burgess 1984; Tipping 1996) but continued to be important areas of settlement. At the same time, however, settlement was extended into the Cheviot and sandstone uplands to a broadly similar intensity as the gravel terraces (Figures 7.4 and 7.5). Of further note is the extension of activities into the hitherto unsettled areas of boulder clay. No data is available for the alluvial areas for this period. Overall, then, a more homogeneous settlement pattern is evident, suggesting that less account was being taken of the distinctive ecological variation across the valley that appears to have had a strong influence over earlier settlement. This in-filling of the landscape suggests human occupation was becoming less concerned with the structuring of settlement around seasonally available resources and more concerned with neutralising the differences between ecological zones of the landscape so as to incorporate them into a system of more uniform land-use. An implication of this may be that population levels within the basin were also rising.

Consideration of the location of cores and scrapers (Figure 7.6) indicates that settlement activities were located across all ecological zones, usually on flat or gently sloping ground and close to fresh water sources. The extremely high proportion of tools belonging to the tertiary stage (94.5%), and very low proportion belonging to secondary stage (3.6%) of the core reduction sequence



Late Neolithic-Early Bronze Age
Density Plot By Field

Fig. 7.5

Late Neolithic-Early Bronze Age
Artefact Distribution
Selected Types

Fig. 7.6

suggests that this assemblage is largely indicative of activities usually associated with settlement sites (see Schofield 1991b; 1993; Tolan-Smith 1996b). As tertiary material is also generally associated with settlement activities (Schofield 1991b; 1993), the distribution map (Figure 7.3) and the density plot (Figure 7.2) provide a broad insight into the distribution of settlement across the valley during this period. The highest individual concentrations of material are on the gravel terraces and low Cheviot slopes (Figure 7.2), but the overall picture is one of areas of high density across all the ecological zones (with the exception of the alluvial area for which there is no data for this period).

Hunting, as evidenced by the arrowhead findspots, also appears to have taken place across all zones with the exception of the gravel terraces. However, a number of Late Neolithic-Early Bronze Age arrowheads have been found elsewhere on the gravel terraces around Thirlings and near Redscar Bridge (Weyman unpub. report, Museum of Antiquities) which suggests hunting activities also remained important in this area, particularly towards the distal terrace margins near to the flood plain. In summary, the data represents not only an extension of settlement across the basin but also probably an intensification of settlement and land-use, particularly in the surrounding uplands.

Character of the Assemblage

The percentage of burnt lithics in the Late Neolithic-Early Bronze Age assemblage (7.3%) is lower than for preceding periods, suggesting a reduced concern for altering the flaking properties of flint and, therefore, implying a less prodigal attitude to lithic husbandry. The recognition of such a cultural attitude implies that access to lithic raw materials was less of a problem than in previous periods. Therefore, together with the almost exclusive reliance on imported material, these patterns in the lithic data suggest that exchange networks were more reliable, extensive and on a larger scale than in previous periods.

The relatively high incidence of recycled lithics noted for this period (12.7%) has been discussed in Chapter 4 and is thought to be the result of opportunistic re-use of previously discarded lithics which were being turned up as a result of the increase in arable activities. Although the relatively high incidence of rejuvenation could be taken, conversely, to indicate a concern for a sparing attitude to lithic discard, the fact that much of this re-use is on material discarded during earlier periods suggests that this is not the case. Rather, what this suggests is that recycling was opportunistic rather than systematic and this would not be expected if a rigidly parsimonious attitude to lithic discard prevailed.

This habit of recycling previously discarded flints also explains the relatively frequent occurrence of patination noted for this assemblage (9.1%). In this case, the rejuvenation of lithics involves the re-chipping of earlier discarded artefacts which have since developed a patina. Therefore, in most cases the patina is not associated with the Late Neolithic-Early Bronze Age use of the artefact but, rather, a characteristic associated with the original phase of use. In some cases it was only by the chipping off of previously patinated surfaces that evidence for rejuvenation could be noted. Therefore, the occurrence of patina on Late Neolithic-Early Bronze Age lithics is very rare as the patina which is evident on these pieces relates to their earlier phase of use. This is significant, as it adds further to the observations made in Chapter 4 that patina development is associated with older material. Although contentious, this observation adds further substance to the view that, in the case of the Milfield data set at least, patina development can be used as a proxy indicator of age, albeit very loosely.

Raw Materials

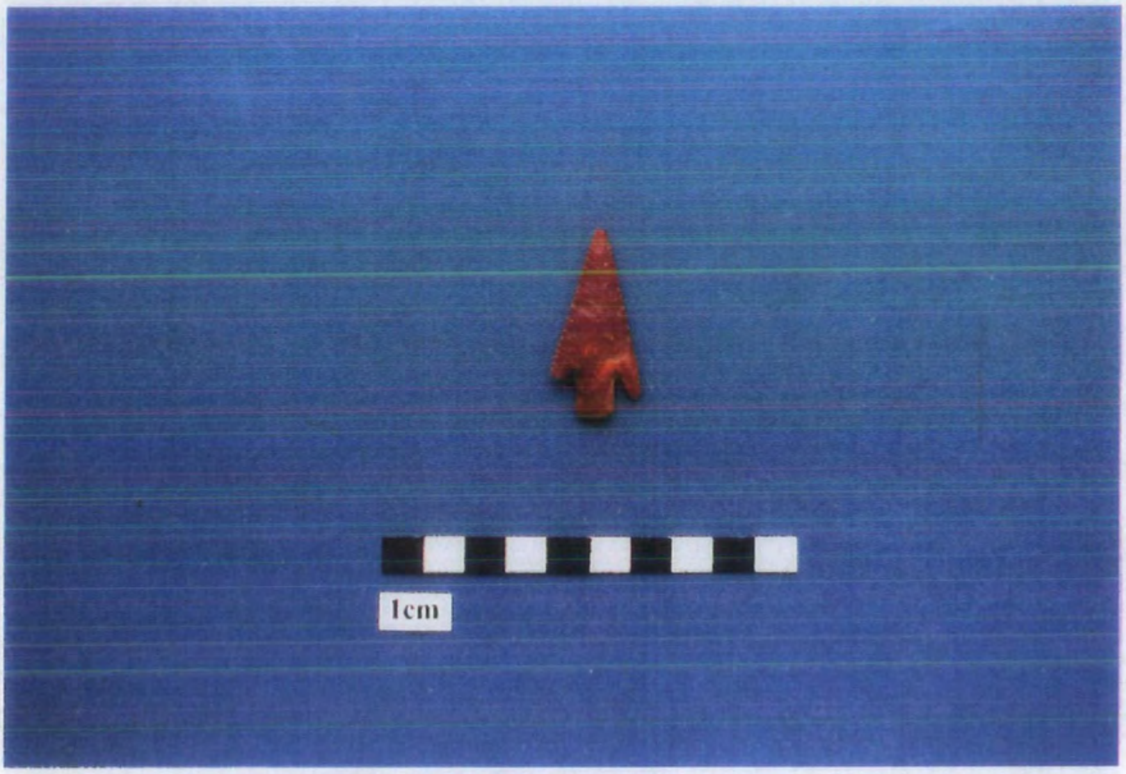
There is a marked contrast to earlier periods with regard to the choice of raw materials utilised during this period. The entire lithic assemblage for the Late Neolithic-Early Bronze Age is composed of artefacts made from flint with no non-flint lithic material identified (Chapter 4, Figures 4.32; 4.33). This indicates an abrupt decline in the reliance on local raw material sources and a switch towards exclusive reliance on imported flint. Furthermore, the quality of flint imported during this period is of a consistently high quality, with light grey flint still the most common source but dark grey and mottled grey nodular flint also important. The flint exchange network still appears to have remained most heavily dependent on the glacial flint sources thought to have come from north-east Yorkshire (light-grey, 42%), though nodular flint (dark and mottled grey) from further afield was also important (30%).

Occasional pieces of very high quality coloured flint of unknown provenance appear to have been selected for certain artefacts that may have had particular significance, such as a very fine red flint arrowhead (Figure 7.7) and a high quality dark flint arrowhead (Figure 7.7). This suggests that, as with some particular stone-axe types (see above, Chapter 6), certain visibly striking flint types may have been selected for use as symbolically charged artefact types. Arrowheads, in particular, are known from anthropological studies to have important symbolic connotations due to their killing, penetrative and blood drawing powers (Taçon 1991).

Mention has already been made in the previous chapter of stone-axe finds and, given the uncertain dating of these artefacts, the previous discussion is probably of equal relevance here. Indeed, the observation that imported lithic resources increase at the same time as local stone-axe production takes place is thought to be equally significant here and implies that stone axes may have formed part of the exchange package for imported flint.

Stone Tool Manufacture

Stone-tool working in the Late Neolithic-Early Bronze Age has long been recognised as being distinct from earlier periods (Clark 1932; 1934; Watson 1968; Healy 1984a; 1984b; Edmonds 1995) with invasive retouch, large irregular flakes



Flint No. 5088, Field 14

Flint No. 5670, Field 62

Figure 7.7 Fine barbed and tanged flint arrowheads with striking colours

and less concern for parallel sided blade production important features (Edmonds 1995). Although very rough flaking and lack of concern for a wasteful flaking strategy are common characteristics of assemblages of this period, so also is the production of some of the most exquisite flintwork. The rougher flaking practices may be,in part, a response to increased access to raw materials and, therefore, less concern for maintaining a more sparing blade-based technology, as well as a response to a reduction in mobility and reduced need for a light, mobile blade-based tool kit. However, the proliferation of lithic exotica, including such forms as barbed and tanged arrowheads, an array of transverse arrowheads, exotic knives, chisels, scrapers, perforated maceheads and carved stone balls, are testament to some of the highest standards of lithic craftsmanship.

Exotic Late Neolithic artefacts retrieved from the Milfield basin during this study include the two particularly fine barbed and tanged arrowheads, illustrated in Figure 7.7. Earlier work has documented six fine barbed and tanged arrowheads (five being of exactly the same type of honey-grey flint) recovered from pit VIII during excavations on the Milfield North henge (Harding 1981, 115), a perforated axe-hammer from near Coupland (Burgess *et al* 1981) and, on the fringe of the basin, a type 4a carved stone ball from Hetton North Farm, Lowick (Speak and Aylett 1996), a pestle macehead found at Twizel (Gibson 1980) and a circular pebble hammer from Belford (Gibson 1980).

The quantity of 'exotica' recovered during the course of this fieldwalking programme was small, probably as a result of the practice of discarding such artefacts in special locations, such as cairns, henges, and ring ditches, rather than casual discard on the ground surface. Therefore, the two fine arrowheads found during this fieldwalking survey in Fields 14 and 62 (Figure 7.7) are thought to have come from special deposits which had been disturbed. In particular, the fine red arrowhead from Field 14 is almost certainly a 'derived lithic' transported down from the steep slopes above (see Figure 4.1 field 14 and compare with slope map 4.20). At the top of this slope a cairn overlain by cord-rigg cultivation has recently been identified by the author and D. Passmore and this suggests that this arrowhead may have originated from a burial context located further upslope from its findspot from where it may have been dislodged by prehistoric cultivation.

The overall observation to be made is that the Milfield basin appears to have participated in the general trend witnessed across Britain for the particular exotic artefact forms which relied heavily on an invasive flaking technology, the grinding and polishing of stone and a frequent concern for symmetry of form. Furthermore, contact with north-east Scottish traditions (as evidenced by the carved stone ball) provide an important addition to the contacts with north Yorkshire evidenced by the continued use of light-grey flint.

OTHER LATE NEOLITHIC ARCHAEOLOGY

Aside from the lithic material from the fieldwalking, Late Neolithic remains from the basin include settlements at Yeavering and Thirlings (Hope-Taylor 1977; Harding 1981; Miket 1987), a complex of henge and henge-related monuments (Harding 1981; Miket 1985), single and double pit alignments (Miket 1981; Harding 1981), cup and ring marked stones including portables (Beckensall 1983; 1991; 1995; Harding 1981, 97), in addition to standing stones (Harding 1981), stone circles (Craw 1935; Topping 1981a; Harding 1981) and a number of cairns (none of which have been radiocarbon dated, but which probably date to this period, Miket 1987). It is also possible that some of the field systems which survive as upstanding remains on the Cheviot Hills may also date to the Late Neolithic-Early Bronze Age interface, given the stratigraphic relationships noted by Topping (1981; 1983) during his surveys of these features.

Settlement Sites

The evidence for Late Neolithic settlement consists of domestic-type pits found during excavations on the Yeavering palace site, some of which contained

Peterborough Ware sherds while others contained Grooved Ware (Hope-Taylor 1977). However, the main evidence for Late Neolithic settlement comes from Thirlings where a variety of pits, post-holes and gullies were found which produced considerable quantities of pottery, including primarily Grooved Ware but also Peterborough Ware (Miket 1987), together with three Later Neolithic radiocarbon determinations (Figure 7.2). However, it is only at Thirlings that structures can be recognised and, so far, the main structural feature noted by Miket is a triangular-shaped arrangement of small post-holes for poles rather than posts (Figure 7.8). It is striking how this arrangement corresponds with the triangular structure noted at the earlier Neolithic settlement near Bolam Lake (Waddington and Davies 1998, and see Figure 6.7) which has been interpreted as a temporary tent/turf settlement and not as a permanent robust dwelling. The other structural features which can be discerned from Miket's account include a right-angle arrangement of seven pits and a post-pit with 13 stakeholes around it (Miket 1987, 57-9). Although little can be adduced from this account until the plans are published with full descriptions, such features are consistent with the notion of semi-permanent dwellings, which may have been occupied over months or just a few years, rather than permanent 'houses' occupied over many years (see Whittle 1997). Further continuity in settlement organisation into the Late Neolithic is shown by the continuity in the type of storage pits at Thirlings, one of which had been lined with clay and then had Peterborough sherds pressed into this lining (Miket 1987, 57-9). As with the earlier Neolithic these later pits also contained broken pottery sherds, hazelnut shells, bone fragments and charcoal. The discovery of a saddle quern set upright at the inner edge of a pit testifies to grain processing activities at the settlement during this period. The botanical evidence from these pits indicates that arable plots for barley and oats were maintained around the settlement with hazel, bramble and hawthorn woodland nearby.

Overall, apart from the differences in pottery styles and the radiocarbon dates, the Late Neolithic settlement evidence so far available for the Milfield basin is no different in character to that for the Early Neolithic settlement so there is no reason to assume any dramatic change in the way residence was organised on the

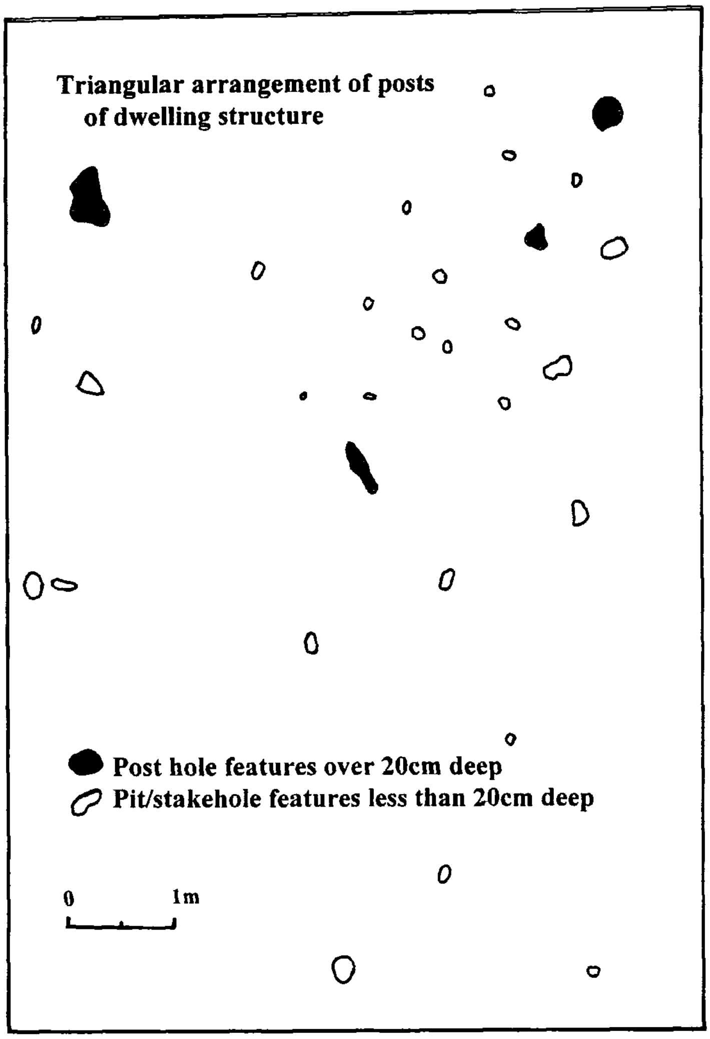


Figure 7.8 Settlement structure at Thirlings (redrawn from Miket 1987)

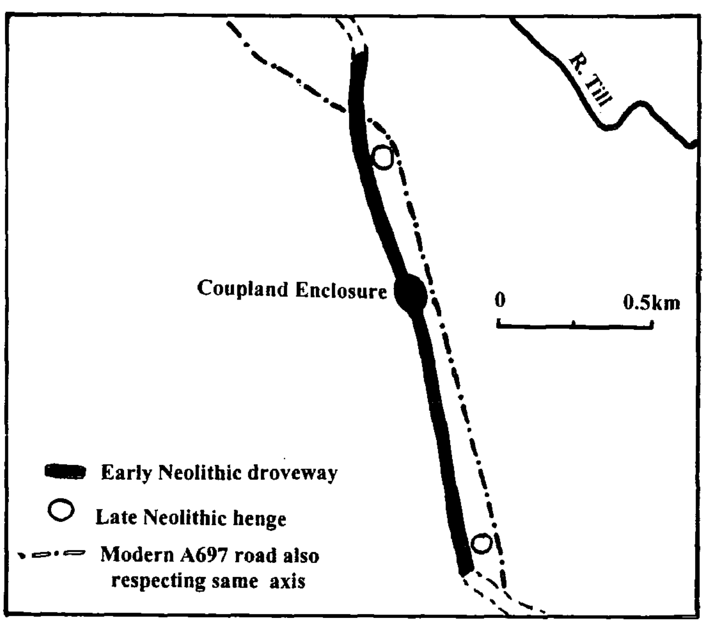


Figure 7.9 Late Neolithic henges along the axis of the Coupland Enclosure and droveway

valley floor. The continued tending of small horticultural plots around these semi-permanent settlements also continued. However, with more protracted and intensive agricultural activities taking place in the uplands than in previous periods, as evidenced by the pollen, sedimentary and lithic data (see above), it is possible that the type of settlements encountered at valley floor sites, such as Thirlings, may also exist in the uplands and, therefore, suggest a move away from the use of logistical upland camps which are thought to have been employed during the Early Neolithic (see above, Chapter 6 Settlement section). The recent discovery of a Peterborough Ware sherd on Wether Hill in the Cheviots (Topping 1998a) supplies further indication that this could be the case. Therefore, the chief distinction between Late Neolithic and Early Neolithic settlement patterns may have been in the character of the upland settlement where, although occasional semi-permanent settlements may have existed, the seasonally occupied logistical camps may have given way increasingly to semi-permanent camps of the type found on the raised gravel terraces of the valley floor. At the very end of the Neolithic and the beginning of the Early Bronze Age settlements may have become increasingly permanent, as suggested by the field systems and roundhouses at Houseledge (Burgess 1984) and the Early Bronze Age roundhouse at Lookout Plantation (Monaghan 1994).

Henges

Excluding the Coupland Enclosure, at least ten henge-related monuments are known in the Milfield basin (Figure 7.1). Excavations and surveys of these monuments have shown that they share very similar dimensions, with internal diameters averaging c.15-20m; with those at Akeld and Milfield South possibly slightly larger (Harding 1981, 130) and that at Whitton Hill Site I smaller at c.11m (Miket 1985, 138). The ditches at Milfield North, Milfield South, Whitton Hill Site I and East Marleyknowe are interrupted, while those at Akeld Steads, Yeavering and Ewart have two opposed entrances and those at Wooler Cricket Pitch, Fenton and Pallinsburn appear to have just one entrance. The latter three may, on excavation, prove to be slightly different forms of circular ceremonial monuments given their smaller size, single entrances and dispersed spatial location away from the ritual focus of the central gravel terrace.

A common feature of the excavated sites, and in some cases the crop-mark sites (e.g. Akeld Steads; Ewart), is the occurrence of an inner ring of pits/post-holes which may have been for upright timbers. Other internal pits have been found to contain human cremations, sometimes accompanied by pottery, charcoal, and Grooved Ware (Harding 1981; Miket 1985). At Milfield North and Whitton Hill Site I, the only two sites where the central areas have been excavated, the most prominent burial structures were located within the central area of these monuments (Harding 1981, 103; Miket 1985, 138), while the aerial photographs of Milfield South, Akeld Steads and Ewart also indicate central pits (Harding 1981, 130). The excavations and aerial photographs at Milfield North also indicate an outer ring of pits, some of which were thought to hold posts which were erected before the henge bank was thrown up over and/or around these features (Harding 1981, 101-5).

Harding noted the alignment of the henge entrances on prominent natural features, such as Yeavering Bell in the case of Milfield North and the prominent hill of Ross Castle in the case of the Yeavering Henge. These alignments were reinforced by the positioning of a post and double pit alignment terminal on the same axis as the main entrances of the Milfield North henge (Harding 1981, 102, 131), and by the position of the standing stone, grave-pit and Hope-Taylor's ring-ditch in relation to the Yeavering henge (*ibid*, 120-1). In the basin, henges at Milfield South and East Marleyknowe are positioned along the course of the earlier 'droveway' (see above, Chapter 6), implying that this axis retained a significance for the siting of these later ceremonial monuments (Figure 7.9). The henge builders appear to have constructed these public ceremonial monuments so as to respect both prominent natural features and earlier monument geographies, both of which may have retained their sacred associations. If this is the case, then the power of these earlier 'places' appears to have been appropriated through the incorporation of references to them in the new henge architecture.

Previous attempts have been made to interpret the henge monuments of the Milfield plain (Bradley 1987a; 1993; Richards 1996). Bradley's accounts have been concerned with the possible remodelling of these ritual sites through time and their re-use in the early Anglian period (Bradley 1987a; 1993). Richards' account, on the other hand, is of a synchronic nature and attempts to interpret the distribution and form of the Milfield henges as symbolic metaphors for the Late Neolithic cosmogonic perception of the landscape (Richards 1996). Richards perceives the position and morphology of the henges as mimicking elements of the surrounding landscape but although this interesting idea works well with the Orkney data, from which this interpretative model was originally derived, it is much less convincing with that from Milfield (see also Waddington 1998a, 43). In the case of Milfield, Richards makes several factual errors in his documentation of these monuments and their setting, notably with respect to the claims that the henge sites are on knolls overlooking the river channels, the direction of water flow, the geology and topography of the basin, and shows a lack of concern for change in river courses over time. Although the interpretation given here adopts a similarly synchronic approach, it differs in its attempts to explain the central henge complex as part of a processional route which respects earlier sacred places in the landscape. This interpretation takes as one of its cues the phenomenological study by Tilley (1994, 170-96), which sought to reconstruct the passage of movement along the Dorset Cursus.

Harding makes the important observation that the positioning of the henge sites, most of which are clustered in a restricted part of the plain, may be explained if they were linked by processional routes (Harding and Lee 1987, 34, 62-3). This is amplified by Loveday's recent argument (1998) that double entrance henges were designed for passage through them. Indeed, a closer look at the Milfield North complex provides further indication of how the henge monuments may have been experienced. The view of Yeavering Bell from the Milfield North henge can only

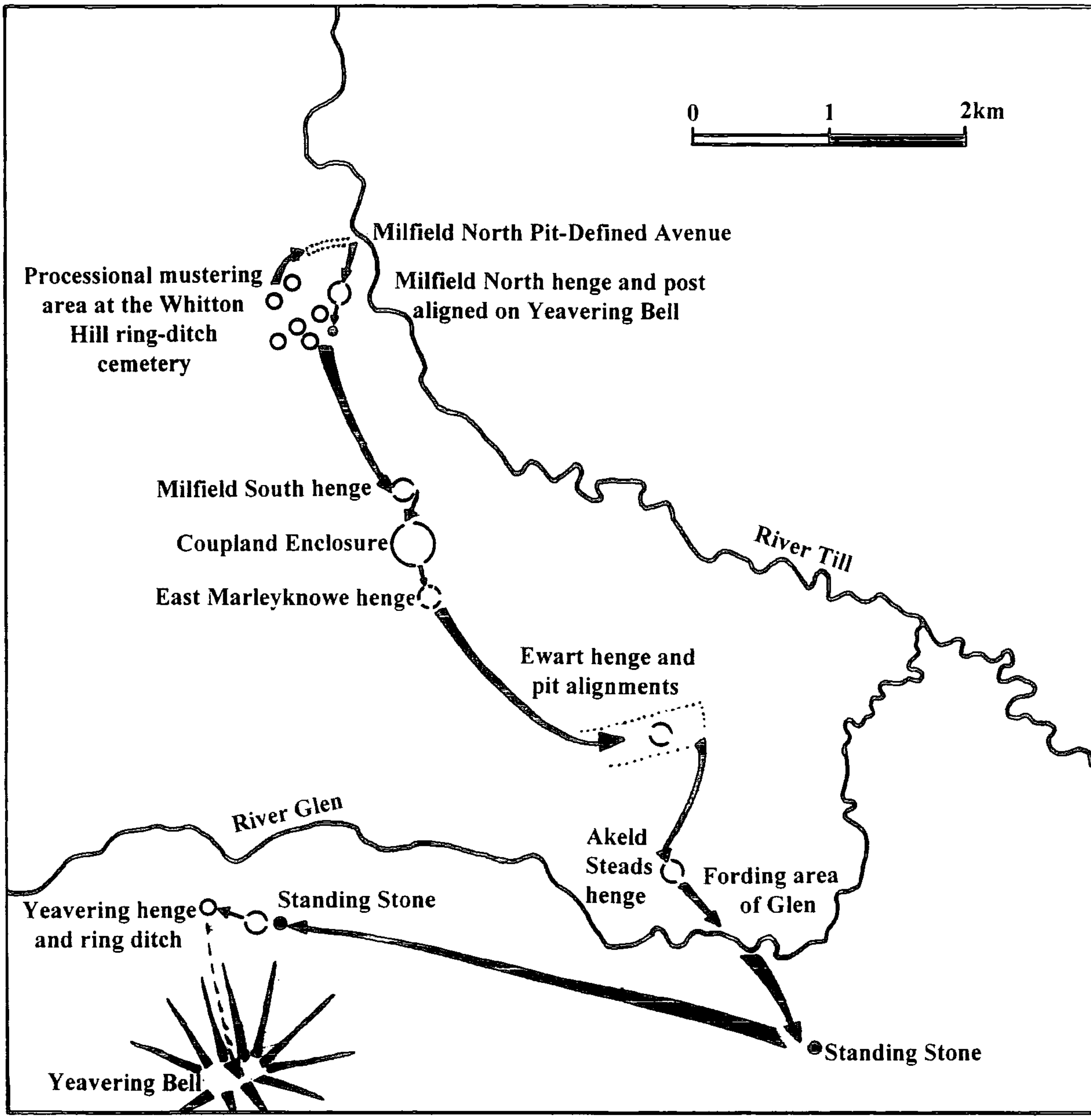


Figure 7.10 Processional route across the Milfield Plain

be seen when looking out of the southern entrance and this may imply that this point of access was designed to be used as an exit rather than an entrance. This provides us with a starting point for the overall direction of movement through the monument complex. However, we must retrace our footsteps from the henge a little further to the north and west to find our starting point for this passage. The start of the ceremonial route appears to be at the foot of Whitton Hill (Figure 7.10) where a ring-ditch burial complex is situated (Miket 1985). The ancestral links we would normally associate with a burial ground of this sort may have been responsible for this area being chosen as one of the terminals for the sacred route. Leading away from this burial ground the double pit alignment, which probably consisted of an avenue defined by wooden posts (Harding 1981), strikes eastwards towards the river Till. However, at its terminus, c.100m from the river channel, this avenue curves slightly to the south so that one's attention is automatically directed that way when one emerges from the avenue.

On turning south to take this view, participants would find themselves on an axis that was aligned to the entrance of the Milfield North henge, the exit of the Milfield North henge, a large upstanding wooden post beyond (as evidenced by the post-pit noted by Harding, 1981, 112) and the prominent eminence of Yeavering Bell behind (Fig.7.10). It is suggested that the processional way would then proceed from the eastern terminus of the double pit alignment to the northern entrance of the Milfield North henge. The sequence of perambulation around this henge can be proposed with some confidence, given the arrangement of internal settings revealed by Harding's excavations. Figure 7.11 reproduces the excavation plan together with the direction of movement suggested here. There appear to be two points of access into the central area defined by the pits: one slight splay near the south henge entrance (A) and one much more pronounced splay near the north henge entrance (B). Although this could work the other way round, the direction of movement suggested here is that on entering the enclosure through the north entrance participants would move to the right, so as to navigate around the central area until the small entrance (A) was reached. At this point the small aperture would admit people only in single file, making the transition into this innermost

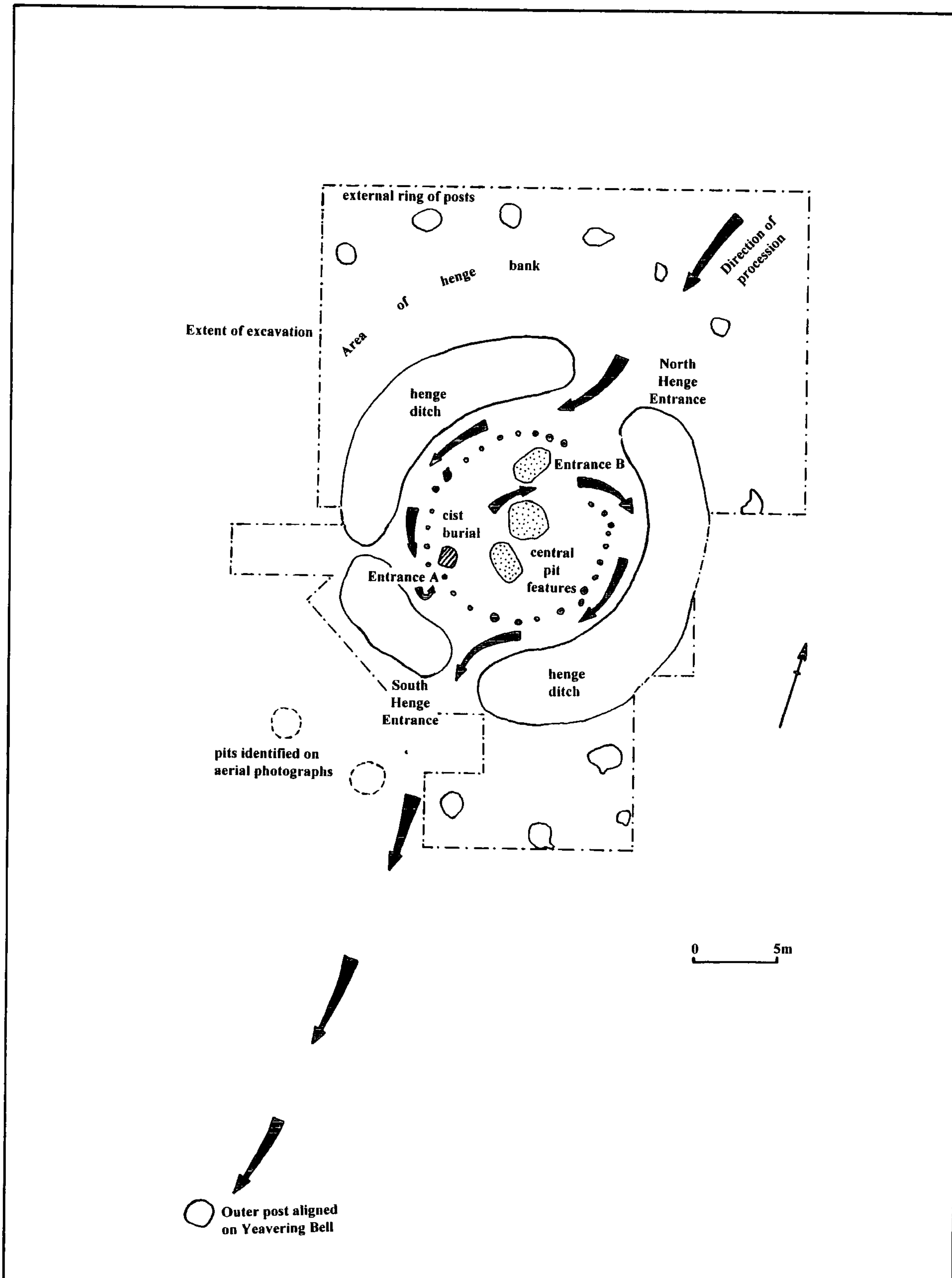


Figure 7.11 Processional route around the Milfield North henge (abstracted from Harding 1981)

sanctum a personal and individual experience. This physical and spiritual threshold is marked by the cist burial positioned immediately inside the entrance. Once the necessary ritual had been accomplished within this circular sanctum, exit would be channelled out of the larger entrance on the north side and then around the outer edge of the sanctum to the south entrance where the monument could be vacated. On leaving the henge, movement would have gone across the causeway, between the banks and through the outer ring of posts, to encounter once again the alignment of the outer post and Yeavering Bell beyond.

Whether the procession would proceed beyond the post is less certain. However, it seems quite probable that the procession could have continued to the Milfield South henge after picking up the course of the, by then, ancient 'droveway' (Chapter 6). The threshold of the east entanceway was marked by a possible dedicatory pit (Figure 7.12) but little more is known of the internal architecture of this henge. After leaving the henge the 'droveway' guides the route through the earlier monumental centre of the Coupland Enclosure and on to the East Marleyknowe henge. With the change in relief immediately to the south of the East Marleyknowe henge, attention may again have turned approximately ninety degrees to the east, where the ditch also has causeways, so as to link up with the Ewart henge whose approach from this direction is suggested by the apparent closing off of its three other sides by a massive pit alignment complex (Waddington 1998b; see also Figures 7.10 and 7.13). The next phase of the procession may have involved turning nearly due south after passing through the double entranced Ewart Henge which was aligned on the long axis of the pit alignments, so as to remain on the raised gravel terrace heading directly for the henge at Akeld Steads. On leaving this latter double entranced henge there is only a short distance to cover to the river Glen which lies to the south. The Glen can be forded at this stretch and after crossing this river the final destination may have been Yeavering itself, where standing stones at Bendor and Yeavering appear to have marked a Neolithic routeway to the site, now matched closely by the modern B6351 road.

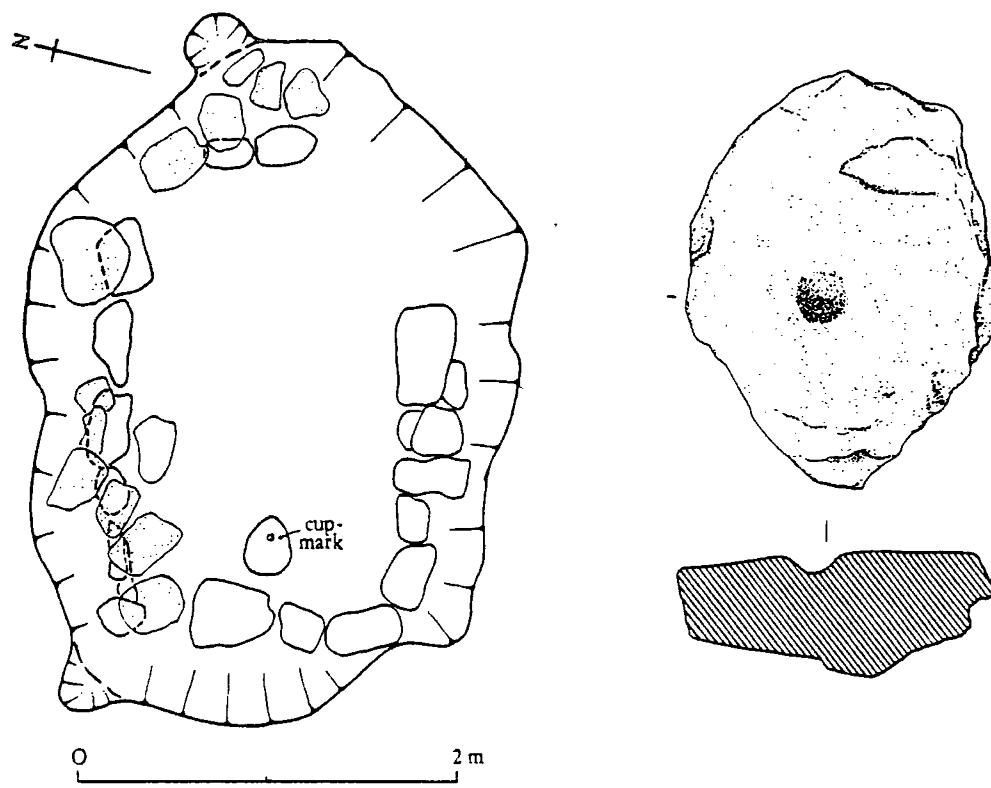


Figure 7.12 Cup-marked stone from Milfield South henge with plan of pit (courtesy A.F. Harding, copyright 1981)

On reaching the Yeavering henge at its east entrance by way of the standing stone on the terrace below, the viewers would find themselves, not only on the threshold of a ceremonial enclosure, but at the very foot of Yeavering Bell itself. This prominent, double mounded hilltop was first brought into specific view through the entrances of the first ceremonial enclosure at Milfield North and arrival at this destination was completed by moving through the henge. Only after passing through this monument and over the grave marking the exit from the west entrance does the archaeological evidence for this processional way appear to finish. However, a final ascent to the top of Yeavering Bell itself cannot be discounted. It is possible that this route may have been followed in the opposite direction but on account of attention being focused southwards from the Milfield North henge this may be considered the less likely option.

It is noticeable that all the henges which are passed through on this route are double or multiple entrance henges implying that movement through them was intended (see Loveday 1998). Furthermore, in all the excavated examples important thresholds, such as entrances and exits, are marked by dedicatory pits and/or graves (e.g. Milfield North, Milfield South, Yeavering) implying that these transitional, or 'liminal', areas had special provision to safeguard them. Another noticeable feature is the distribution of Grooved Ware found in the pits of the double pit alignment at Milfield North, within pits at the Milfield North henge, and in the pit outside the east entrance of the Yeavering henge (Harding 1981), as well as in the single pit alignment at Ewart I (Miket 1981). Again, this may represent acts of 'structured deposition' as noted elsewhere (Richards and Thomas 1984), particularly in the similar sized henge monuments of The Sanctuary and Woodhenge (Pollard 1992; 1995). However, in Northumberland the excavations of all but the Milfield North henge are incomplete and residues such as antler or unburnt bone do not survive in this environment; consequently, analysis in the same level of detail as has been attempted for The Sanctuary and Woodhenge (Pollard 1992; 1995) is not yet a realistic proposition with the Milfield henges.

Perhaps the crucial point to note is the combining of natural landscape features, such as hilltops and rivers, with imposed man-made monuments, such as henges, pit alignments and standing stones, into a related sacred geography. A sacred geography, that is, whose embedding in the immutable natural landscape acquired qualities which may have placed the religious/social order which it represented beyond question (see Tilley 1994, 205).

Pit Alignments

Discussion here will focus primarily on single pit-alignments as reference has already been made to the one example of a double pit alignment at Milfield North. Regardless of the original surface form (see discussion in Waddington 1998b), these linear markers may be viewed as components in a system of land demarcation laid out in a regular geometric manner. They are positioned for the most part on the raised gravel terraces which continued to constitute the core settlement and ceremonial area of the landscape (see above), and therefore, on what is likely to have been some of the most highly valued land and that most susceptible to dispute or encroachment. As there are interruptions along the course of these boundaries, the presence of such access points implies that movement across them was managed and that they bounded off areas into which access needed to be controlled.

The need to demarcate this core area of the landscape implies that there was increasing pressure on the land by the Late Neolithic and that intensified use and competition for land was being resolved by recourse to segregating certain parts of the plain using highly visible markers. Deployment of such unequivocal boundaries can be interpreted as a 'conflict minimizing device' (see Dark 1995, 134) which creates an incontrovertibly defined 'place' which limits opportunities for ambiguous interpretation. Many of the Late Neolithic ceremonial monuments, which are also concentrated on the gravel terraces of the plain, are located in or near to the pit alignment complexes which suggests that the henge complex was

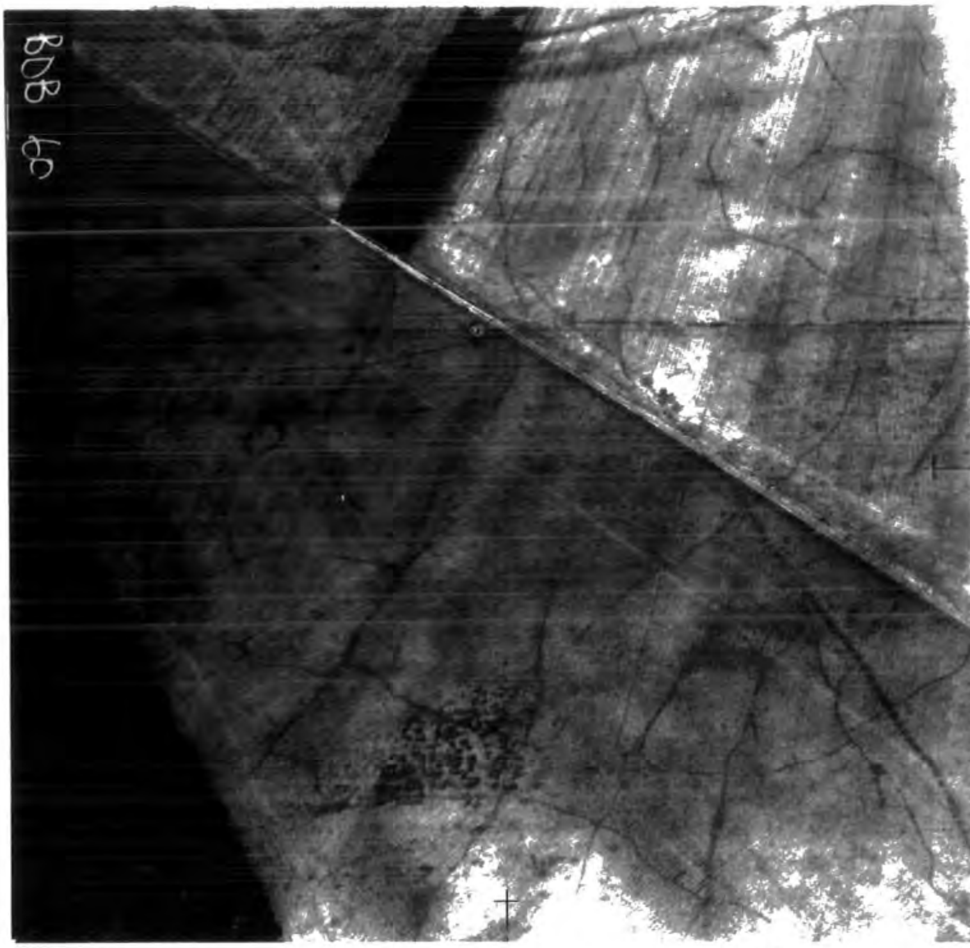


Figure 7.13 Air photograph of the Ewart monument complex. Pit alignment 1 runs from the bottom right to the lower end of the upper plantation, pit alignment 2 runs from the lower plantation up the left hand side of the picture, the henge is situated middle left with the suspected mortuary enclosure an ovoid shape and positioned above the henge to the left of the upper plantation.

(courtesy of Cambridge Univeristy Aerial Photograph Archive)

associated with the pit alignments in a common ordering of the landscape (Waddington 1998b).

Given the large extent of these land allotments (sometimes over 1100m long; Miket 1981, 137), it is unlikely that these alignments served as conventional 'field boundaries' (*contra* suggestion in Waddington 1996c, 152) as the size of the areas defined by these features would be huge. Rather, it seems more probable that, as substantial tracts of this land were being bounded off to physically incorporate contemporary ritual monuments, a 'ritually exclusive zone' was being defined (Waddington 1998b). It is suggested that as settlements associated with horticultural plots existed on the valley floor, each community may have had rights to certain plots of land, but ritual areas exempt from such claims may have been demarcated by the use of pit alignments for at least part of their prescribed perimeter to prevent encroachment on to this land. At the same time the orientation of the pit alignments could also have been laid out so as to prescribe the direction of approach and movement across these specially defined parts of the plain, as suggested in the case of Ewart (see above).

Indeed, at the Ewart complex an interesting pattern can be observed. Here, two roughly parallel pit alignments can be traced (Figure 7.13), the northern example of which has an almost right-angle turn at its eastern end (this turn is not visible on Figure 7.13 but see Figure 7.10). Unfortunately the modern plantation prevents observation as to whether this links the northern alignment to the southern alignment and, therefore, whether it closes off the eastern end. However, within this defined area the Ewart henge is located (Figure 7.13), with its two entrances aligned on the same long axis as the pit alignments, and to the west of this is a possible ovoid mortuary enclosure (Figure 7.13; Miket 1976, 128). It seems, then, that the henge in this case may have occupied a 'sacred' area bounded by pit alignments which served both to demarcate and regulate access to this place. Such a sacred area may have been demarcated so as to prevent shifting settlement and agriculture from extending into these ceremonial areas across an otherwise communally managed landscape.

This shift to a geometric ordering of the landscape, using an imposed cultural architecture, contrasts with the predominantly natural ordering of the landscape based around natural features (see above, Chapter 6), and this echoes the shift witnessed in the pottery and lithic record where ceramics are made in angular shapes with rigid geometric decoration and arrowheads are similarly fashioned in angular and geometrical shapes (see also Waddington 1998a, 45-9). This use of angular symbols in the later Neolithic, many of which are endogenous motifs created by the human mind (Dronfield 1995), can be juxtaposed with Early Neolithic symbolism, which often emulates shapes common to the natural world as seen, for example, in the cup and ring motif, the sinuous profile of round-based ceramics and the adoption of 'leaf-shaped' arrowheads (see also Waddington 1996c; 1998 for more in-depth discussion). This shift to an angular, symmetrical and more geometric ordering of the material world refers to shapes less common in the natural world but common to the 'minds-eye'. Such endogenous images (Dronfield 1995) are, by definition, an imposition on the natural world as they are essentially a human-created image. The use of these culturally derived images to order the natural world reflects the extension of abstracted human images to control how the natural world is ordered and understood. By imposing such a structure on to the landscape, controls over how the world is conceptualised and encountered emerge. Therefore, with a new emphasis on human logic, proportion and geometric structure, and the extension of this aesthetic to the structuring of the landscape, flint form, pottery form and its decoration, human control is being celebrated over and above that of the natural (see also Waddington 1998a). Thus, the new division of the landscape may be a further indication of the profound ideological shift thought to have taken place at the end of the Neolithic in this area (*ibid*; see also below Chapter 8).

Cup and Ring Marks

There has been much discussion regarding the date, setting, and significance of cup and ring marks in the Milfield basin in recent years (e.g. Beckensall 1991; 1996; Bradley 1991; 1992; 1993; 1997; Waddington 1996c; 1998). However, it is only in the published works of Bradley (1991; 1993; 1997) and Waddington (1995; 1996; 1998) that attempts have been made to interpret these features in the wider context of Neolithic and Early Bronze Age society. However, as the author's views on this subject have been published at length elsewhere (Waddington 1996c; 1998) only a concise account of the key interpretative findings, particularly in relation to the Late Neolithic period, are presented below.

The key interpretative conclusion advanced by this author is that three distinct periods can be recognised during which cup and ring marks were deployed in different contextual circumstances. It has been proposed that the initial phase (during the Early Neolithic) relates to the symbolic portrayal of ideological beliefs which helped constitute the 'Neolithic' (c.4000-3200 BC) when the motifs were first mapped onto the landscape via outcropping bedrock. During the second phase (c.3200-2000 BC) in the later Neolithic, the significance of this symbolism is thought to be appropriated, as it is reworked into 'man-made' megalithic constructions (such as henges, stone circles and standing stones). These monuments are thought to represent a new ordering of the landscape (see above) under the aegis of increasingly overt human control. By the third phase (c.2000-1800BC), during the early part of the Early Bronze Age, it is postulated that a disjuncture is apparent in both the function and meaning of the cup and ring tradition as these motifs are found in strict association with funerary contexts and are often broken or truncated when they are reused in such burial contexts. It is suggested that this new contextual association culminates in the tradition's 'expropriation' in order to sever the ideological associations linked to the symbols as their presence may have threatened new social and ideological orders. This final phase has been described previously as the 'laying to rest' of the cup and ring tradition (Waddington 1995c).

During the Late Neolithic, cup marks were incorporated into the new culturally constructed ceremonial monuments of the Milfield basin (ie. henges, stone circles) which dominate the focal area of the settled landscape (Harding 1981; Beckensall 1995). In this case, cup marks are found on the Duddo standing stones (Figure 7.15) and in a pit at the entrance of the Milfield South henge (Figure 7.12). This practice is demonstrated more widely throughout Northumberland where examples include the cup and ring marked standing stone at Swinburne, the cup marked standing stone at Matfen (Beckensall 1983), and a recently discovered cup marked standing stone at Dour Hill in Redesdale (personal observation). Elsewhere this practice is noted from the Peak District to north-east Scotland, with notable examples on Long Meg, Cumbria, (Beckensall 1992b) and on a number of the recumbent stone circles of Aberdeenshire (Morris 1989). The use of an apparently much older rock art tradition (see Waddington 1998a, 31-3) in the new ceremonial monuments of the Milfield basin is thought to represent an act of appropriation whereby an already ancient tradition was drawn on to lend authority and sanctity to the new ideological/social order embodied in these new monuments (*ibid*, 50). As with the siting of the henges to respect prominent natural features, the continued use of this symbolic tradition, albeit in new contexts, provides another mechanism by which Late Neolithic groups linked the present and the past, but this time by appropriating an ancient tradition into new structures.

Stone Circles

The five recorded examples of stone circles around the Milfield basin, in contrast to the distribution of henges and pit alignments, are all situated around the margins of the basin and are located so as to overlook the primary routes into or out of the basin (Figure 7.1).

Open Circles

The open stone circle at Hethpool is situated in the College Valley, a principal route up to The Cheviot itself which is in view from the circle (Topping 1981a; 1997b). This stone circle shares many similarities both in form and location to those at Threestoneburn (Waddington 1998 unpub.) and Hart Heugh Hill (Deakin pers. comm., personal inspection). All three are 'open circles', which Burl considered to be the earliest type of stone circle in Britain (1976), and are on routes up to The Cheviot. Given the proximity of the Threestoneburn and Hart Heugh sites to the proposed axe-factory sites of Long Crag and Langlee Crags (see above, Chapter 6), it is possible that both of these circles may have been involved in the stone-axe production and exchange sequence. An analogue with the scheme identified for the Lake District (Bradley and Edmonds 1993) would not seem inappropriate in this case, though in the case of the north-east Cheviots and the Milfield plain this would appear to have been on a smaller scale. Topping (1997b) has gone further by suggesting that the stone circle at Hethpool may have served to ritualize access to The Cheviot, which may have been considered, like Yeavering Bell, to be a sacred mountain. Could it be that the 'open circles', to use Burl's typological scheme (1976), at Hethpool, Threestoneburn and Hart Heugh provided as one of their roles the sacred space in which pieces of bedrock from these special volcanic hills were ritually transformed into humanised objects - axes - that could then be used as part of the paraphernalia so central to Neolithic life?

Plain Circles

The magnificent monument at Duddo is situated on a prominent knoll (Figure 7.14) which overlooks the Milfield basin to the south and the Tweed valley to the north from its vantage over the northern entrance to the basin. Cup marks have been identified on some of the orthostats (Figure 7.15; Beckensall 1995) and the 'fluting' evident on some of these stones is also thought to have been anthropogenically modified (Passmore pers. comm.). The other smaller 'plain circles' identified on Doddington Moor (Maddison and Sellars 1990) and at Torlee House in the Cheviots (Dodds 1935), although no longer visible as

Figure 7.14 The Duddo Fourstones stone circle situated on a local eminence

Figure 7.15 Cup marks on an orthostat in the Duddo stone circle

prominent upstanding features, also overlook routes into the basin at Horton and Glendale respectively, though they occupy higher positions than the open circles and focus attention on routes into the basin rather than routes up to the Cheviot.

Standing Stones

The Bendor Stone and the Yeavering Battle Stone on the south side of the plain (see Figure 7.10) have already been mentioned with regard to defining a prehistoric routeway along this margin of the Glen valley, and similarly the limestone pillar known as the King Stone at Pallinsburn is also situated on the northern route into the basin. On the dip slope of the sandstone escarpment the standing stones at Newtown near Lilburn Grange, Fowberry, Weetwood Moor and Hetton Law may mark another prehistoric route which, significantly, is mimicked by the course of the later Roman road known as the Devil's Causeway.

Discussion

There has been little archaeological investigation of these monuments, save for some early excavations at Duddo (Craw 1935) and surveys of Doddington (Hogg and Hogg 1956), Hethpool (Topping 1981a), Threestoneburn (Waddington *et al* 1998 unpub.) and Hart Heugh Hill (Deakin 1998 unpub.). Early excavations at Duddo (Craw 1935) indicated that a cremation burial was located within a large pit in the centre of the circle as well as socket holes for another two orthostats. There is also an unsubstantiated record of there having been a second outer circle (Craw 1935). Although there is not as much information available for interpretation as for the henge monuments, the sacred nature of these sites cannot be in doubt and it appears likely that, given the location of stone circles around the perimeter of the basin, and the concentration of henges towards its centre, these ceremonial monuments appear to have had a complimentary distribution. The association of the stone circle at Duddo with cup marks and a central cremation burial are features common to the henge monuments (Harding 1981) and this provides a further link between these sites and the henge complex.

The stone monuments positioned on the margins of the basin appear, therefore, to circumscribe the ritual henge complex situated at its centre. This suggests that the prevailing conceptual 'sacred geography' must have operated on a large landscape scale and recognised the Milfield basin not only as a topographically defined landscape or 'place', but also a culturally defined sacred place. Although incorporating prominent natural features within this sacred geography (e.g. Yeavering Bell, the rivers Till and Glen, natural routeways), the Milfield landscape appears to have been conceptually transformed by the Late Neolithic so that it became ordered primarily through imposed cultural monuments rather than around natural features. As Tilley (1994, 204) has noted, monuments serve to 'freeze perspective' and thus control how people perceive and experience the wider landscape at the same time as closing down alternative interpretations. This implies that significant ideological change took place in the Milfield basin during this Late Neolithic period, involving transformations of the relationship between people, the landscape and the natural world. However, these changes appear to have been enacted not so much by radical upheaval but rather through the sanction afforded by making explicit links with the past. The appropriated use of cup marks within both the stone circle and henge monuments (see above) and the respecting of the droveway axis by the position of the henges, together with the possible linkage with stone-axe sources and continued reference to prominent natural features, implies that this new monumentalized landscape maintained visible links with its earlier Neolithic, and possibly even Mesolithic, past.

It is a key observation that there is broad synchroneity between the changes noted in the context of the deployment of cup and ring marks, the adoption of a new repertoire of symbolic decoration and material culture forms, monumentalization of the landscape, and the extension and intensification of land-use for settlement and subsistence purposes at this time. This implies that ideological and land-use change are inter-related processes that took place together (Waddington 1998a). Changing beliefs concerned with human-nature relations may, therefore, have been fundamental to the increasingly intrusive exploitation of the landscape witnessed during the later Neolithic.

Chapter 8

Excavations in progress on the Coupland Enclosure (September 1995)

CHAPTER 8 DISCUSSION

INTRODUCTION

This chapter intends to widen the discussion of earlier sections and consider certain topics from a thematic perspective. It begins by presenting an interpretative overview for the Mesolithic and Neolithic periods based on the analyses presented in Chapters 5, 6 and 7. Reference is made to other studies in the British Isles in order to place this regional study in a wider context. The next section is concerned with tracing a broad demographic trend during the Mesolithic and Neolithic periods, based primarily on the settlement evidence. Discussion then turns to a consideration of social structure and organisation and identifies aspects of continuity and change through time. The final section of this chapter addresses the question of the Mesolithic-Neolithic transition from a macro perspective before considering how the record for the Milfield basin fits into this broader framework.

INTERPRETATIVE OVERVIEW

The text narratives work in conjunction with the annotated schematic diagrams for each period (Figures 8.1; 8.2; 8.3 respectively).

Mesolithic (Figure 8.1)

The core area of settlement was located on the raised gravel terraces of the valley floor providing easy access to a wide diversity of ecological zones (see above, Chapter 5). Home-bases are thought to have been situated in this area, particularly towards the edge of the terrace near the resource-rich wetland fringe close to the easiest crossing places of the rivers (Figure 8.1). This strategic positioning allows control, not only of the major crossing points, but also of access up and down

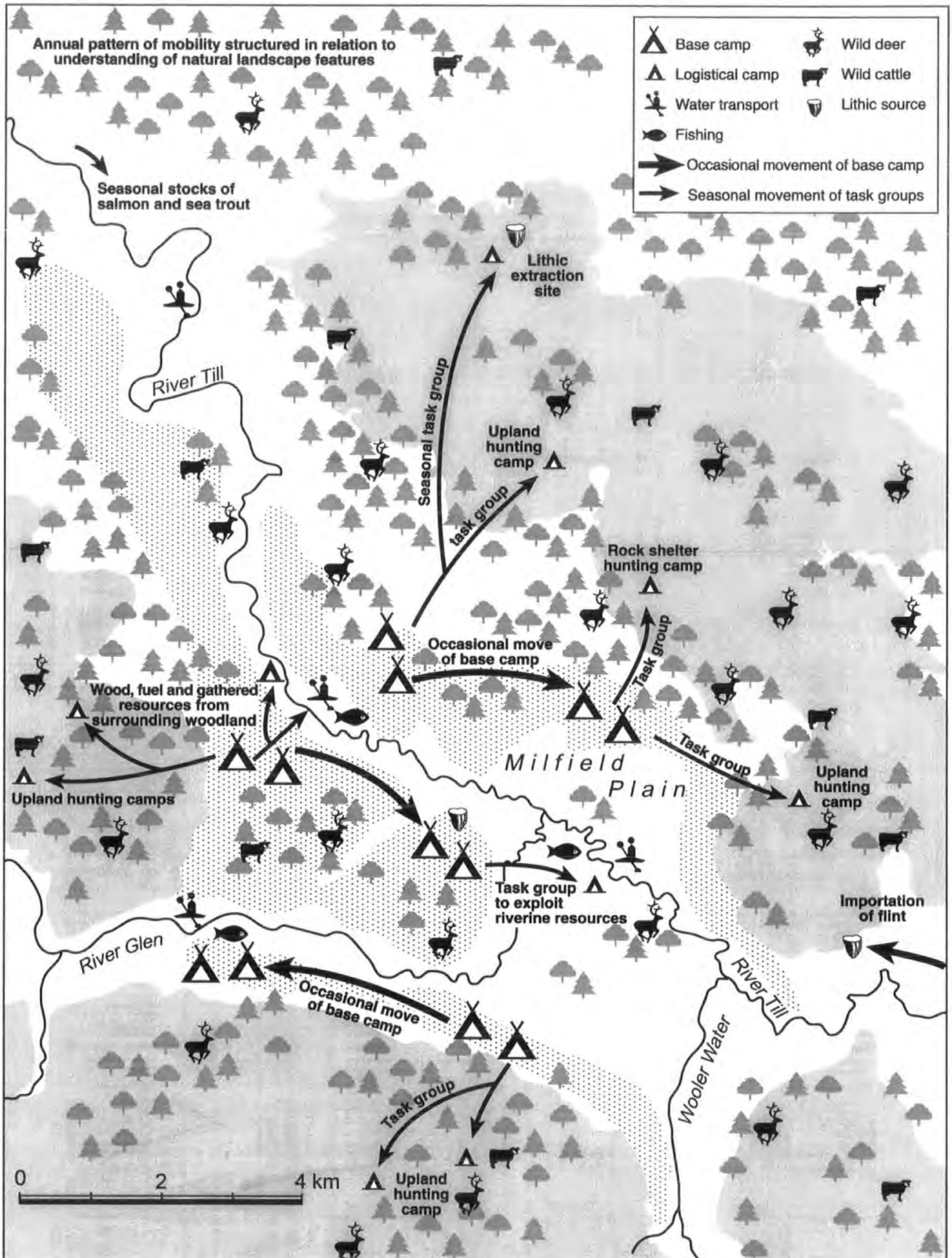


Figure 8.1 Schematic interpretation of Mesolithic settlement in the Milfield Basin

river by boat. These settlements may have been occupied year-round and then shifted from year to year to another part of the terrace, or alternatively they may have been shifted elsewhere on the terrace during the year. Assumed resources exploited near these camps include fish (salmon and sea trout), fowl, game watering at the river edge, plant foods, rushes (baskets, bedding), beaver, otter and possibly migrating geese flocks. Exposed gravel beds in stream and river sections would allow access to lithic materials including agates, chert, volcanic material and quartz.

Manipulation of the vegetation and tree cover at the water's edge within the alder carr environment, as cautiously suggested by Tipping (in press), implies that this riparian habitat was also being carefully managed by Late Mesolithic groups, presumably to promote and help regulate availability of selected resources. The occasional lithic finds, on what appear to have been gravel bars set within a wetland habitat at Kimmerston Bog (see above, Chapter 5), indicate that small activity areas were located on localised high points within the areas of carr. However, given the small size of these bars, these activity sites were probably only occupied on a temporary basis by small task groups for short-term foraging/hunting episodes.

Smaller camps were located in the uplands either side of the core settlement area on the Cheviot slopes and Sandstone escarpment (see above Chapter 5; Figure 8.1). These sites are usually located close to springs and tributary streams, often commanding wide views and, in the case of the sandstones, making use of the outcropping crag-line (Burgess 1972). These camps were for smaller groups than the home-bases, comprising perhaps just a few individuals and probably occupied for relatively short periods on a seasonal basis (see above, Chapter 5). Hunting of game, including deer but also wild cattle and boar and possibly bear, hare, fox and pine marten, was probably an important activity which may have been most common during the summer months in these upland locations. Acquisition of lithic materials, such as chert from the limestone area on the north-east side of the basin, may also have been obtained during residence at these logistical camps.

Selective burning of vegetation to attract animal herds appears to have been undertaken (Tipping 1996, 20-3), particularly on the higher slopes where the tree canopy naturally thinned out. This would provide some control over where herds would gravitate, allowing greater predictability to be built into the hunting routine. This careful and systematic management of the upland woods appears to have become more intensive by the latter part of the Late Mesolithic from c.5000BC onwards (Tipping 1996). The find of a Mesolithic tranchet axe (Figure 4.38 and Appendix 2) made of light grey flint, on the sandstone slopes indicates that woodland management in these areas did not consist solely of burning but rather may have included other activities, such as tree-felling and coppicing. The low lying boulder clay areas were less intensively exploited, possibly on account of the standing/stagnant water, damp environment and unhealthy conditions (see above, Chapter 5). However, some hunting of game near the interface with the riverine wetland seems to have taken place as evidenced by the occasional lithic find (Figure 5.4).

Most food and raw material acquisition seems to have been based at the local scale and suggests that Late Mesolithic groups were largely self-reliant. A sparing attitude to the manufacture of stone tools and their discard prevailed, with various strategies adopted for maximising lithic use. These strategies included recycling tools into new smaller ones, burning material to control fracturing properties, making deliberately small tools and utilising as much of the debitage as possible (see above, Chapter 5). Stone tools made from local lithic materials accounted for over 50% of production. Flint was, however, imported to the area. The flint which arrived did not come from the nearby glacial sources of the north-east coast but almost certainly from the boulder clays of north-east Yorkshire (see above, Chapter 5). The route the exchange network appears to have taken was through the upland spine of northern England running along the Pennines (see Young 1987) to the Cheviots (see Waddington in press d) and on to the Tweed valley (see Mulholland 1970). Although the Mesolithic groups occupying the coastal margin adjacent to the Milfield basin were probably separate groups to those occupying the basin itself, the preference for using places in the Milfield landscape where the sea could be observed (e.g. Goatscrag) indicates that the Mesolithic inhabitants of the basin maintained an interest in the coast. It seems probable, therefore, that occasional visits may have been made to the coast and this would provide a context for inter-group contact between the inland and coastal communities.

Although nothing is currently known about burial or ritual practices in the Milfield basin during the Mesolithic, some provisional comment can be made about the use and structuring of the landscape and the way people understood the world around them. The landscape is thought to have been understood in relation to the ordering of naturally occurring features (see also Tilley 1994). That is, the land was cognitively 'structured' through the use of natural prominent features, such as rock outcrops and probably waterfalls, prominent hilltops, rivers and so on. It was the social construction of a 'place' based around natural topography rather than imposed culturally constructed monuments that was significant. This is in contrast to later periods when landscapes are thought to have become understood through monumental places imposed by human endeavour, which served to control human perspective of the landscape (Tilley 1994, 204). Therefore, it seems that people recognised special qualities in the non-cultural landscape which allowed them to order their day-to-day routines within the naturally occurring structure of the world around them. This implies, as Bradley has recently suggested (1998, Chapter 2), that human identity during the Mesolithic was embedded within the natural world.

The inclusion of images of wild entities from the natural world (deer) within the dwelling space of a Mesolithic group (the rock-shelter site at Goatscrag) also implies a community that did not hold itself in fear of the natural world, as has been reported in the anthropological study by Bird-David for some cultivator groups (Bird-David 1990, 190), but rather one that accommodated nature within its home space, and in the case of Goatscrag, a temporary and annually renewable home which itself was inset within an already extant prominent *natural* feature (ie. the rock outcrop). Nature was referred to directly by zoomorphic rather than abstract symbolic metaphor (assuming the representational deer carvings at

Goatscrag are Mesolithic), again implying the oneness rather than separateness of the human and natural world. Ideologically, then, the Late Mesolithic groups of the Milfield basin seem to conform in a broad sense to Bird-David's view of hunter-gatherer societies who are thought to conceptually regard themselves as existing within an intimate human-nature relatedness whereby the natural landscape is perceived as a benevolent 'giving environment' that does not demand reciprocation for the food it yields.

The Mesolithic archaeology provides few marked departures from other regional syntheses, and the location of the settlements noted in the Milfield basin around watercourses, springs and the raised gravel terraces correspond with those identified in the adjacent Tweed basin (Mulholland 1970). Similarly, the palynological data (Tipping 1996) indicates the familiar management of upland woods during the Late Mesolithic by burning, presumably to increase biomass diversity and productivity (Mellars 1976). This is a pattern noted extensively across other parts of Northern England, including the Central Pennines (Williams 1985), North Pennines (Turner and Hodgson 1983), North Yorkshire Moors (Simmons 1995) and Redesdale/Upper North Tynedale, Northumberland (Moores Phd. unpub.) The potential Mesolithic carvings at Goatscrag represent one of the few, so far, unique features of the Milfield Mesolithic archaeological record and as such are an important asset, particularly as they have a context, that is, they are situated within what is thought to be a rock shelter dwelling.

In summary, the Late Mesolithic settlement of the Milfield basin is thought to have been of an extensive nature with diverse ecological zones used in different but complimentary ways. The central settlement focus was the raised gravel terraces around the rivers Till and Glen with the surrounding uplands used by small groups on a temporary, probably seasonal, basis. The alder carr of the alluvial valley floor was a rich resource area while the woodland fringe on the high upland slopes was apparently manipulated to attract browsing animals. The seasonal round is thought to have been largely restricted to the basin itself and did not involve any significant population movement to the coast, with movements around the basin scheduled to take advantage of seasonally available resources. Underpinning this way of life was an ideology which sanctioned access to the resources of the natural world. Perceived as a 'giving environment', people are thought to have framed their existence within 'nature' and not as detached creatures living beyond it.

Neolithic Transition (Figure 8.2)

During the Mesolithic-Neolithic transition the core area of settlement remained located on the raised gravel terraces and the fringing areas of low Cheviot slope (see above, Chapter 6). The settlements within this core area are thought to have been semi-sedentary and periodically shifting (see models in Whittle 1997, 21) and probably comprised a number of dwellings. Small-scale cultivation, exploitation of wetland resources, gathering of wild foodstuffs and hunting were undertaken around these settlements. The communal over-wintering of stock at the Coupland Enclosure, situated in the centre of the gravel terrace, is also thought to have taken place (Waddington 1996c; 1997; 1998). Small temporary stockherders' encampments are envisaged on the sandstone fells (see above, Chapter 6; Waddington and Davies 1998) from where occasional hunting, foraging and lithic acquisition activities may have also taken place. The driving of stock from these summer pastures across the river Till and down the droveway to the Coupland Enclosure is thought to have been an important annual activity. The unusual enclosure at Roughting Lynn is conjectured to have been a collection point for bringing the herds together before the big 'drive home' to the Coupland Enclosure. It is thought that the cup and ring marked outcrops on the sandstone fells formed important cult places and were most probably located in clearings/glades (Waddington 1998a). Cult activities at these ritual 'places' may have formed important elements in the yearly herding regime (*ibid*).

The low Cheviot slopes are thought to have been used in a similar manner to the raised gravel terraces, indicating an expansion of the core settlement area, while

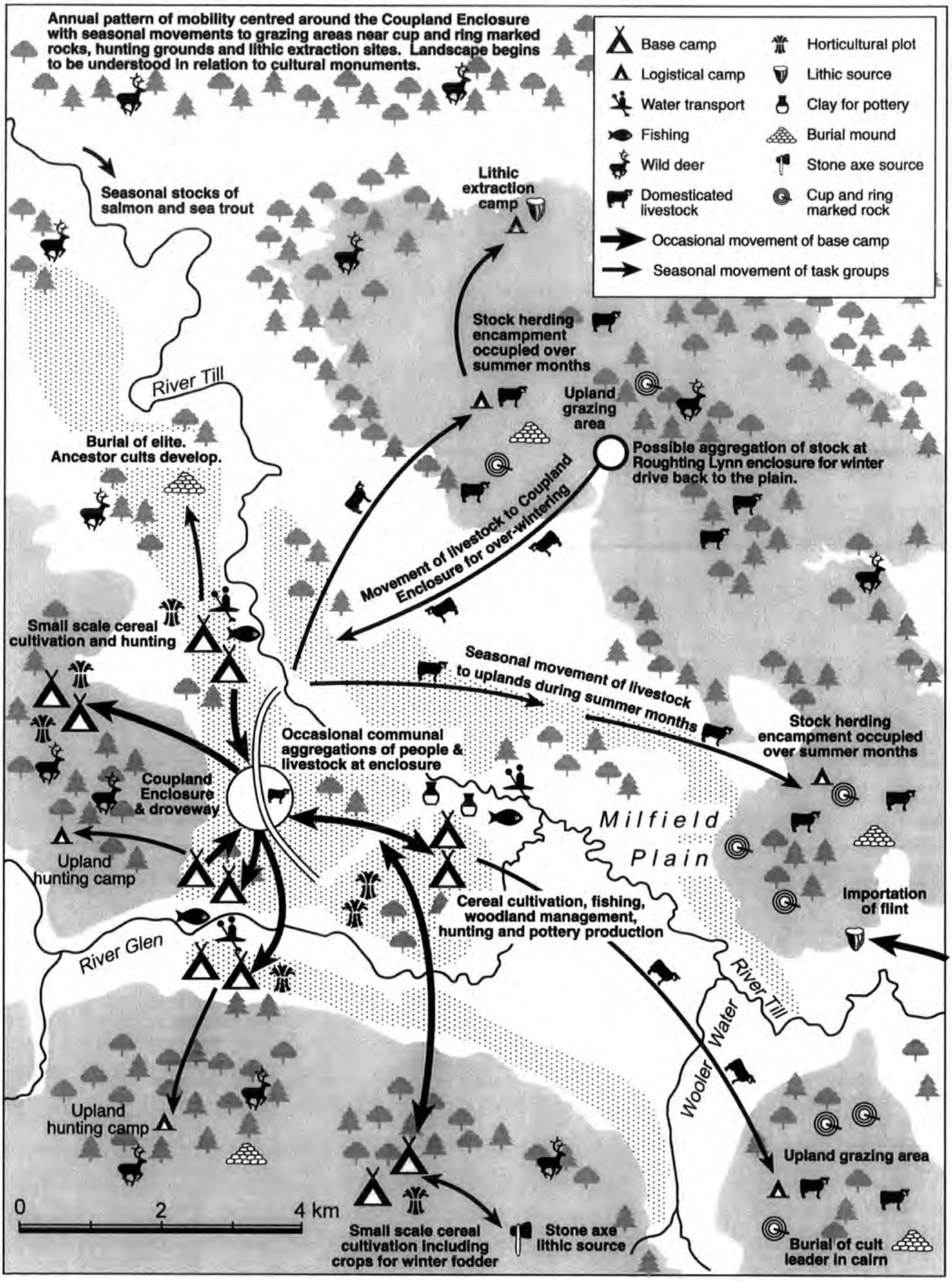


Figure 8.2 Schematic interpretation of Early Neolithic settlement in the Milfield Basin

the upper slopes are thought to have been occupied more sparsely, mostly on a seasonal basis, with hunting and possibly some limited cultivation at these higher altitudes. Preference for locations proximal to springs and streams is maintained (see above, Chapter 6). Evidence for activities on the boulder clay slopes remains scant with a hint that some hunting of wild resources continued on the low slopes near the alluvial wetland edge. Similarly, the alluvial valley floor might have been exploited for its rich resources in the same way as envisaged for the preceding Mesolithic, with the semi-sedentary core settlements frequently located proximal to the wetland edge, often near fording or river access points, such as is the case at Thirlings, Yeavering or Fields 42 and 47 (see above, Chapter 6).

Although exchange networks appear to have widened and grown, production was still structured around local resources. Gibson's analysis of diatoms in Grimston Ware pottery from Thirlings indicated that at least one of these pots had been made from clay acquired from a source at the nearby river Till (Gibson 1986). The frequent inclusion of crushed quartz and agate temper in the fabric of these pots is also indicative of local production (Miket 1987). Lithic materials, including agate, chert and quartz, continued to be exploited, though on a lesser scale than before. However, new sources of material for stone axes including Cheviot andesite, Whinstone, Fellsandstone and limestone began to be exploited.

The survival of burial evidence is remarkably scarce in the archaeological record of Milfield and in this way contrasts with other areas of Britain where burials constitute one of the richest sources of evidence for the Neolithic (Thomas 1991, 103). The only Neolithic cairn known within the basin proper is that on Broomridge comprising a large round cairn (Greenwell 1877). This kind of structure recalls the burial traditions of the Early Neolithic Yorkshire round mounds (see Kinnes 1979; Harding 1996). However, there is nothing in the Milfield area to compare with the long and chambered cairns at Dour Hill (Waddington *et al* in press), Bellshiel, Spithope and Devil's Lapful in Redesdale and North Tynedale in western Northumberland (Masters 1984). The long mound at Dod Hill (Gates 1982), to the immediate south of the basin, is short and squat and has few parallels among the cairns of Redesdale and Tynedale and, together with the possible cairn that existed at nearby Ewe Hill (Tate 1863b, 304), hints towards an as yet unrecognised eastern Northumberland tradition of long cairn construction. The tiny Early Neolithic cairn on Chatton Sandyford Moor (Jobey 1968) to the immediate south-east of the basin is probably more typical of Early Neolithic burial traditions in the area given the hundreds of tiny low cairns which litter the moors of north-eastern Northumberland. The possibility of turf and timber long mounds on the valley floor of the basin also appears to be a strong possibility given the crop marks noted by Miket (1976, 128), and so there may be an as yet unrecognised tradition of earthen long mound/mortuary enclosure construction in this area. Intensive agriculture on the Milfield valley floor has wrought considerable damage to previously upstanding archaeological remains, including the flattening of every single henge monument, and this may be a chief reason for the non-appearance of earthen long mounds in the archaeological record of the basin.

Given the prevalence of diverse burial structures, which include large round cairns, tiny round cairns, and possible long mounds/mortuary enclosures, together with the more favoured practice of cremation, the burial traditions apparent in the Milfield basin and its environs have more in common with those of Yorkshire (see Kinnes 1979; Vyner 1984; Manby 1970; 1988; Harding 1996) than with those west of the Cheviots (e.g. Piggott and Powell 1949; Masters 1973; 1984) and north of the Lothians (e.g. Piggott 1972). This implies that during the earlier Neolithic at least, the Milfield area, and for that matter the rest of eastern Northumberland and south-eastern Scotland, probably had closer cultural affinities with the other eastern communities of Durham, Yorkshire and Lincolnshire than with the communities to the west of the Cheviots/Pennines or to the north beyond the Lothians.

The Coupland Enclosure with associated droveway is, so far, a distinctive feature unique to this area, with the exception of a possibly similar monument in the Tweed valley (Tim Gates pers. comm.). Although it shares morphological similarities with later henge monuments (ie. internal ditch and external bank), its non-circular shape and the sinuous non-parallel sided droveway which passes through it are features not shared by other true henges. Nor, for that matter, are the early radiocarbon dates which place its construction around 3800BC. Therefore, on the basis of contemporaneity, it is probably most useful to compare this monument with the causewayed enclosures which proliferate in the Midlands and southern counties. Excavations on causewayed enclosures have repeatedly demonstrated the association of livestock, particularly cattle, with these monuments (Smith 1971; Legge 1981; Bradley 1984), while the excavators of the Staines enclosure (Robertson-Mackay 1987) suggest there is evidence for stock husbandry taking place there. Pryor also considers that the Etton enclosure may have been used for the overwintering of livestock (Pryor 1985, 306-7). Similarly, the author of a recent review of causewayed enclosures suggested that these monuments were embedded within cycles of movement probably associated with the movement of livestock (Edmonds 1993, 108).

The Coupland Enclosure, then, is understood to form a focus around which the settlement pattern, subsistence activities and ceremonial observance revolved. The uses of this permanent, culturally created place as both a functional, symbolic and ceremonial centre for the Early Neolithic community are not seen as incompatible roles, but rather as aspects of a related whole which would strengthen its presence in all these domains by virtue of it having relevance in others. The construction of the enclosure over an area already used for Early Neolithic settlement (Waddington 1998d) suggests that the construction of the enclosure was the culmination of an existing pattern of occupation at this site, and one which served to formalise that pattern by creating a circumscribed humanised 'place' separate from the untamed world beyond. The construction of the enclosure and associated droveway is thought to have been the result of a communal undertaking (see above, Chapter 6). The connection of the enclosure, via the droveway, with the east side of the valley and the sandstone escarpment is thought to both physically and symbolically unite the basin, otherwise divided by the river Till, in a common system of land-use which together supported the human way of life within a pattern of land-use that was basin-wide. In this way the river Till may have been regarded as a unifying rather than dividing landscape element.

In comparison with other Early Neolithic enclosures, Edmonds states that causewayed enclosures probably served a range of purposes at any one time and that their functions changed over time, while they also provided "for the integration of fragmentary social groups" (Edmonds 1993, 132). Within this broader milieu of Early Neolithic enclosures, then, the activities thought to have taken place at the Coupland site (see above and Chapter 6) appear much less anomalous and instead sit rather comfortably alongside the roles envisaged for some causewayed enclosures. The difficulty lies with the problem posed by its morphological form. In this respect it is essential to recall the observation that Early Neolithic enclosures in northern Britain include an extremely wide variety of constructional types, with causewayed enclosures only one of a number of styles of enclosure identified (see above, Chapter 6; Waddington *et al* 1998, 101-2). Against this background of regional diversity of form in the north, together with the greater isolation of communities in the area, as dictated by topographic constraints, the Coupland Enclosure is probably best seen as a unique regional variant of Early Neolithic enclosure construction borne out of local beliefs, needs and historical contingency.

The carving of cup and ring marks on natural rock outcrops are considered here to be a visual manifestation of the new relationship with the world that defines the Neolithic in this region (Waddington 1998a). As symbols these designs serve as metaphors for people's beliefs about the world they inhabit, which are thought here to be grounded in their perceived relationship with the natural world. The cup and ring marks, 'leaf-shaped' arrowhead form and the sinuous profiles of pottery vessels have been argued elsewhere as emulating patterns visible in the natural world and sharing a common aesthetic principle based on curvilinear and organic shapes (Waddington 1998a, 45-9). By taking their visual cues from the natural world it is thought that Early Neolithic groups were attempting to display a bond between themselves and the environment, which may have been a response to the strains put on that bond by the adoption of domestication, albeit restricted in scope, that is envisaged here. Therefore, by mimicking the 'natural', groups could draw comfort from believing that the bond remained intact. This period has been argued as being characterised by a sense of ideological 'ambiguity' during which new beliefs were being constituted and transformed (*ibid*, 51).

The long-term permanent places which were created in the landscape were not the dwellings used for everyday occupation, but rather formed the communal places essential to both the cult and subsistence cycle. These include, in particular, cup and ring marked rocks and communal enclosures such as Coupland. These places were, therefore, the permanent anchors which defined the temporal and spatial pattern of living. Their associations extended from their role the in practical routine activities which domesticated the environment, to their symbolic and ceremonial domains which placed them as culturally-created 'places' safe from the 'wild' outside environment.

Given that important continuities can be noted from the preceding Mesolithic (e.g. settlement pattern, extensive use of the landscape, lithic technology, and importance of natural 'places', see above Chapter 6), the Neolithic transition is envisaged as representing a period of ambiguities that witnessed the transformation of an existing Mesolithic way of life so as to accommodate new ways of living in the world. These relatively tentative shifts from the Mesolithic way of life are thought to include, at least in part, the authority to tame, and therefore control, plants and animals, and also to quarry bedrock, sculpt bedrock, dig pits and refashion clay into pots. The simultaneous emergence of permanent cult places, such as cup and ring marked rocks, built monuments and burial structures, serve as centres to negotiate this new way of being in the world. In this way the 'natural' world is thought to be conceived of as a 'reciprocating environment', as Bird-David (1990) and Gudeman (1986) suggest for neo-farming groups, whereby nature is seen as something to be feared, appeased and propitiated, usually via ancestors, so that it will relinquish its fruits for human consumption. In this sense the Neolithic differs from the preceding Mesolithic in the emergence of overt distinctions between humans on the one hand and the natural world on the other (see also discussion below).

Late Neolithic (Figure 8.3)

In the Late Neolithic settlement appears to have extended more evenly across diverse ecological areas than in previous periods (see above, Chapter 7). The distribution of settlement across the landscape becamee more homogeneous with less differentiation in the types of settlement. Residences are thought to have been of a semi-permanent nature in both lowland and upland settings (Figure 8.3). The density of settlement was more evenly spread than before with the Cheviot hills, gravel terraces and sandstone slopes more uniformly settled. The construction of large monument complexes in both lowland (henges, pit alignments, standing stones) and upland (stone circles, stone settings), together with palaeoenvironmental evidence for intensified food production (see Tipping 1996; Moores pers. comm.), suggest a population increase (see below, page 00). Settlement is thought to have been more intensive as well as extensive.

Hunting and gathering is seen to have continued, with the combination of hazelnut, hawthorn and bramble evidenced in the botanical record (Miket 1987) and arrowheads (Figure 7.6) distributed across the basin. However, more undispersed pastoral and agricultural production reduces previous distinctions between the ways in which different ecological zones were exploited. Clearance on a substantial scale took place in the uplands around the basin in addition to the continued opening-up of the valley floor (see above, Chapter 7). Some previously cleared areas may have experienced localised tree regeneration (e.g. Akeld Steads, see above Chapter 7). Overall, there appears to have been a shift to a reliance on a combination of food-production strategies, with cultivation becoming more important than before while stock-herding, gathering and hunting also continued.

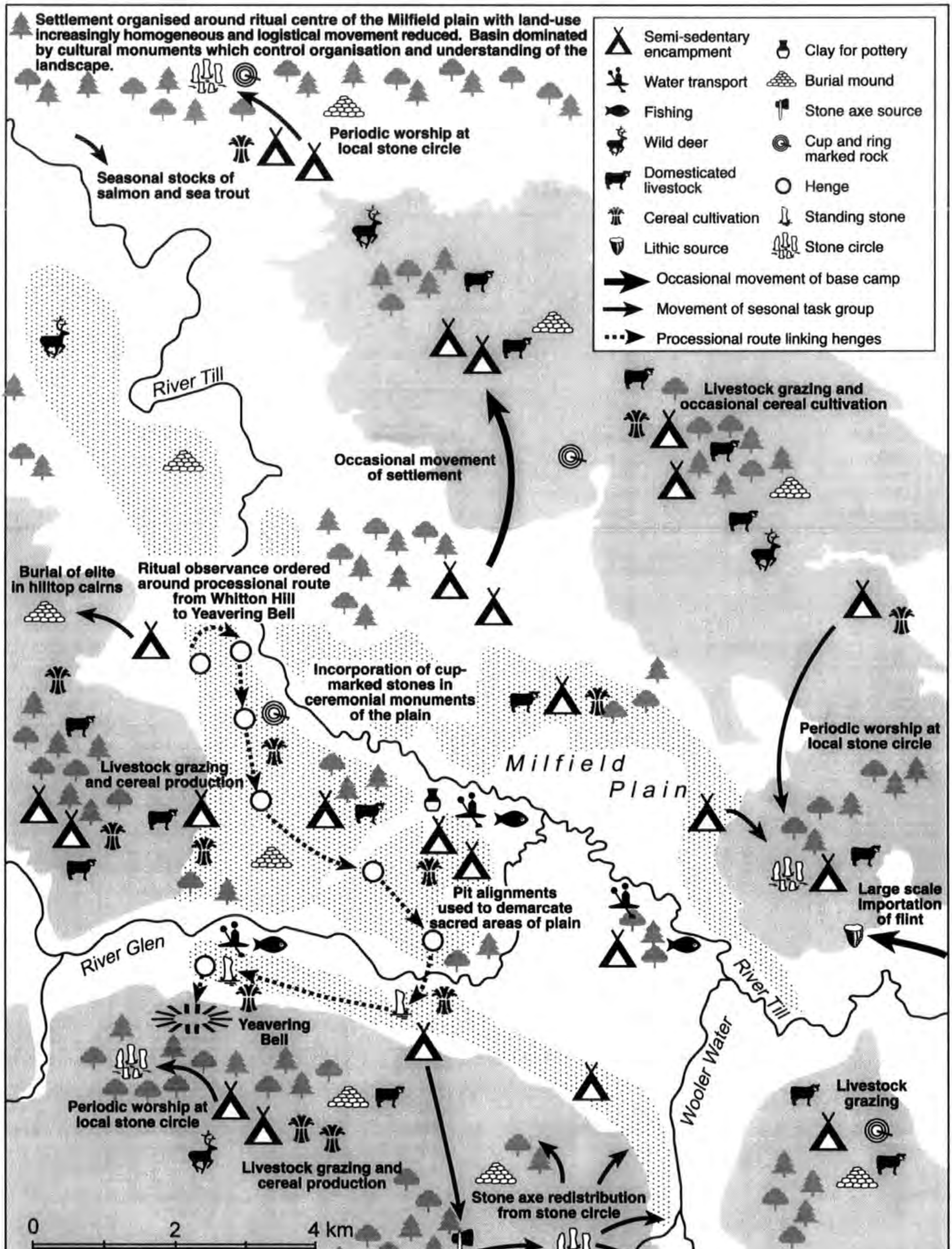


Figure 8.3 Schematic interpretation of Late Neolithic settlement in the Milfield Basin

Another particularly striking feature of the Late Neolithic in the Milfield basin is the timing and character of the extension of settlement into the uplands and the intensification of production across the entire landscape. Although some current models suggest large-scale land use intensification did not take place until the Middle Bronze Age (e.g. Barrett 1994; Bradley 1997; 1998), this is a model based mostly on evidence from central southern England and areas such as Cranborne Chase (Barrett *et al* 1991). This, however, does not concur with the evidence from the Milfield basin where both palynological, sedimentary and lithic scatter data indicate increasingly homogeneous land use with large-scale clearances taking place for more intensive pastoral and arable purposes during the Late Neolithic (see above, Chapter 7). Although the laying out of field boundaries and the emergence of full sedentary dwellings are not evident in the Milfield basin until the Early Bronze Age, the initial intensification of food production, spread of settlement and concomitant rise in population appears to have taken place in the preceding Late Neolithic c.2500-2000 BC.

Comparison with other areas of Britain suggests that the Milfield landscape is by no means alone in witnessing the intensification of settlement and production during this period. Gardiner has noted an extension of settlement on to the sandstone uplands of the Weald during the Late Neolithic-Early Bronze Age (Gardiner 1984, 36), while Barnatt suggests, on stratigraphic grounds, that Bronze Age field systems on the gritstone moors of the Peak District may have Late Neolithic origins (Barnatt 1987; 1996), and the recent palynological work of Moores has demonstrated extensive Late Neolithic clearances and intensification of land-use in Redesdale, Northumberland. Reporting on the Stonehenge Environs Project, Richards noted that during the Late Neolithic "Surface evidence .... seems to characterise broader areas of activity and suggests the establishment of an increased and more cohesive population" (Richards 1984, 186). Furthermore, in the Upper Thames Valley Holgate notes, on the basis of lithic scatter and excavated evidence, that, "in addition to the increased number of occupation sites, the Later Neolithic also saw an expansion of settlement into areas previously unoccupied" (Bradley and Holgate 1984, 114). It is a trend also evident in the Late

Neolithic-Early Bronze Age reorganisation of the landscape noted by Pryor during his excavations at Flag Fen (Pryor 1988; 1991) and noted more widely by Thomas with regard to settlement expansion on to the clays, gravels and greensands of Wessex (Thomas 1991, 18).

It is evident, then, that landscape studies elsewhere in Britain have also indicated settlement expansion and intensification of food production during the Late Neolithic period and, therefore, the conclusions drawn from the Milfield data set need not be seen as anomalous or, indeed, at variance with the wider picture. Instead, it adds further to the argument that large-scale food production and settlement expansion took place during the Late Neolithic within the existing social and economic frameworks of the Neolithic period. However, the shift to widespread field systems, permanent settlements, aggregation of settlements and further intensification of production do not appear to have taken place until the Early Bronze Age when corresponding changes in the social and ideological domain are thought to have taken place (Waddington 1996c; 1998).

Production appears to have remained structured predominantly at the local scale though exchange networks, particularly for flint raw material, became more important and more extensive. Contacts with areas such as north-east Scotland (e.g. carved stone ball from Hetton, Speak and Aylett 1996) and possibly Lincolnshire (nodular flint), as well as Yorkshire (light grey glacial flint), are evident (see above, Chapter 7). Importation of material appears to have been reliable over the long term although opportunistic recycling of previously discarded flint also took place.

The Late Neolithic witnesses a further departure from earlier periods in the overt monumentalization of the landscape. The complimentary distribution of henges, pit alignments, standing stones and stone circles, in addition to their various shared characteristics, implies that this monument complex was in contemporary use. The use of commanding monuments to control how people experienced and perceived the landscape are thought to indicate a transformation in the way people related to the natural world as well as more overt social control (see also below). Although linked to prominent natural features (Yeavering Bell in the case of the Milfield North henge), these new monuments are thought to have drawn deliberately on these links to provide continuity with previous beliefs about the world in an effort to sanction transformations of the ideological and social order. By designing the form and location of these monuments for processional activities, these 'public' monuments were capable of bringing the entire populace into the very centre of the ritual experience, albeit on an unequal basis (see below), and perhaps facilitated interaction between groups under the protection and protocols of ritual observance.

By the Late Neolithic similarities with much wider areas of Britain are apparent. The construction of an extensive complex of henge monuments close to major rivers/water bodies finds parallels with those found throughout Britain from Orkney to Somerset (Harding and Lee 1987). The distinction which has been drawn in the past regarding a prevalence of henge monuments on the east side of Britain and stone circles on the west (Burl 1976; 1991) is, however, called into question as it finds no support in the Milfield evidence. Located on the east side of Britain, the Milfield basin contains both henges and stone circles in abundance. The combination of the open circles that fringe the north-east Cheviot massif, the plain circles which overlook the entrances to the Milfield plain, and the numerous standing stones appear to be spatially linked to the henge complex within the ring formed by the stone circles (see above, Chapter 7). In the case of the Milfield basin, therefore, the east-west dichotomy of henges and stone circles bears no relevance to the situation in north Northumberland. Bearing in mind the important henge complex at Eamont Bridge in Cumbria, together with the south-western henge complexes at Priddy, Knowlton and Stanton Drew, the east-west distinction can be seen to break down across other areas of Britain too. Nevertheless, the exciting aspect of the Milfield monuments lies in the fact that an entire complex of henge and stone circle sites appear to be related to each other and to have operated in conjunction in the ritual ordering of the landscape and the shaping of ceremonial and cult practices. This provides great potential for further research into these monument types and their relationships to each other in Late Neolithic Britain. By having this spatial association, further research will be able to add a new dimension to the morphological distinctions, most recently considered by Bradley (1998, Chapter 8), regarding the visual permeability of stone circles and their contrast with the closing off from the surrounding environment in the case of henges.

The growth of a multiplicity of ritual centres in the basin, rather than one single central monument as in the earlier Neolithic (ie. Coupland), suggests that communities residing in this area had become more fragmented by the close of the Neolithic and that group distinctions had arisen. Together with the intensification of production taking place at this time (see above, Chapter 7), these characteristics may be understood as a move away from a communally managed landscape to one which was becoming increasingly managed by distinct and fragmented groups. This pressure for land, possibly caused by factors such as increasing population and the fragmentation of the wider community into distinct social groups, may have been one of the reasons for the construction of the single pit alignments, so as to create unequivocal boundaries around sacred areas where land encroachment was beyond question (see above, Chapter 7).

Ideological transformations are indicated by new forms and decoration of symbolic material culture such as arrowheads and pottery (see above, Chapter 7; Waddington 1998a). The adoption of geometric and angular designs, which are thought to have taken their visual cues from patterns associated with human mental imagery, are interpreted here as evoking notions of order and control (see above, Chapter 7; Waddington 1998b). This contrasts with the symbolic designs of the Early Neolithic which are concerned with patterns and shapes which find their visual cues most commonly in the 'natural' world (Waddington 1998a). Moreover, the monumentalization of the landscape through man-made constructions, and the change in the context of cup and ring mark deployment, add further to the evidence for important transformations in the pervading belief system. It is assumed here that the key issue underpinning prehistoric belief systems was the perceived relationship between people and the natural world. The elevation of human control over the environment, as evidenced by the intensification and homogenisation of land-use (see above, Chapter 7), together with the choice of new symbolic motifs (Waddington 1998a) and imposition of a grand cultural architecture over the landscape (Waddington 1998b), are thought to represent a belief system that was increasingly separating human from natural agency. Human control over the environment is thought to have become more overt, with the landscape monumentalized and large-scale land boundaries imposed (see above, Chapter 7). However, these new and evolving relations are thought to have gained acceptibility by making reference to the past through the appropriation of certain traditional elements, such as the continued use of the cup and ring tradition in selective contexts (Waddington 1998a), the use of the same alignment as the Coupland 'droveway' for the siting of henge monuments (Figure 7.9), and so on. Therefore, this Late Neolithic period is viewed as a period of ideological flux during which a new set of human-nature relations were being negotiated, thus producing the ambiguous and, to some extent paradoxical, ideological and social milieu observable during this period.

DEMOGRAPHY

Although detailed information relating to population structures is not yet available, mostly as a result of the transitory nature of settlement, a broad sketch of demographic patterns through time can, however, be attempted (Figure 8.4).

The lack of diagnostic Late Upper Palaeolithic and Early Mesolithic stone tool types known after this extensive fieldwalking programme, although not necessarily demonstrating an absence of people, does imply very low density population levels during these periods. This is consistent with the broader picture for Britain as a whole proposed by Smith (1992a) who also envisages low population levels at this time. By the Late Mesolithic, however, the relative wealth of stone tools implies population levels had risen considerably, with the basin

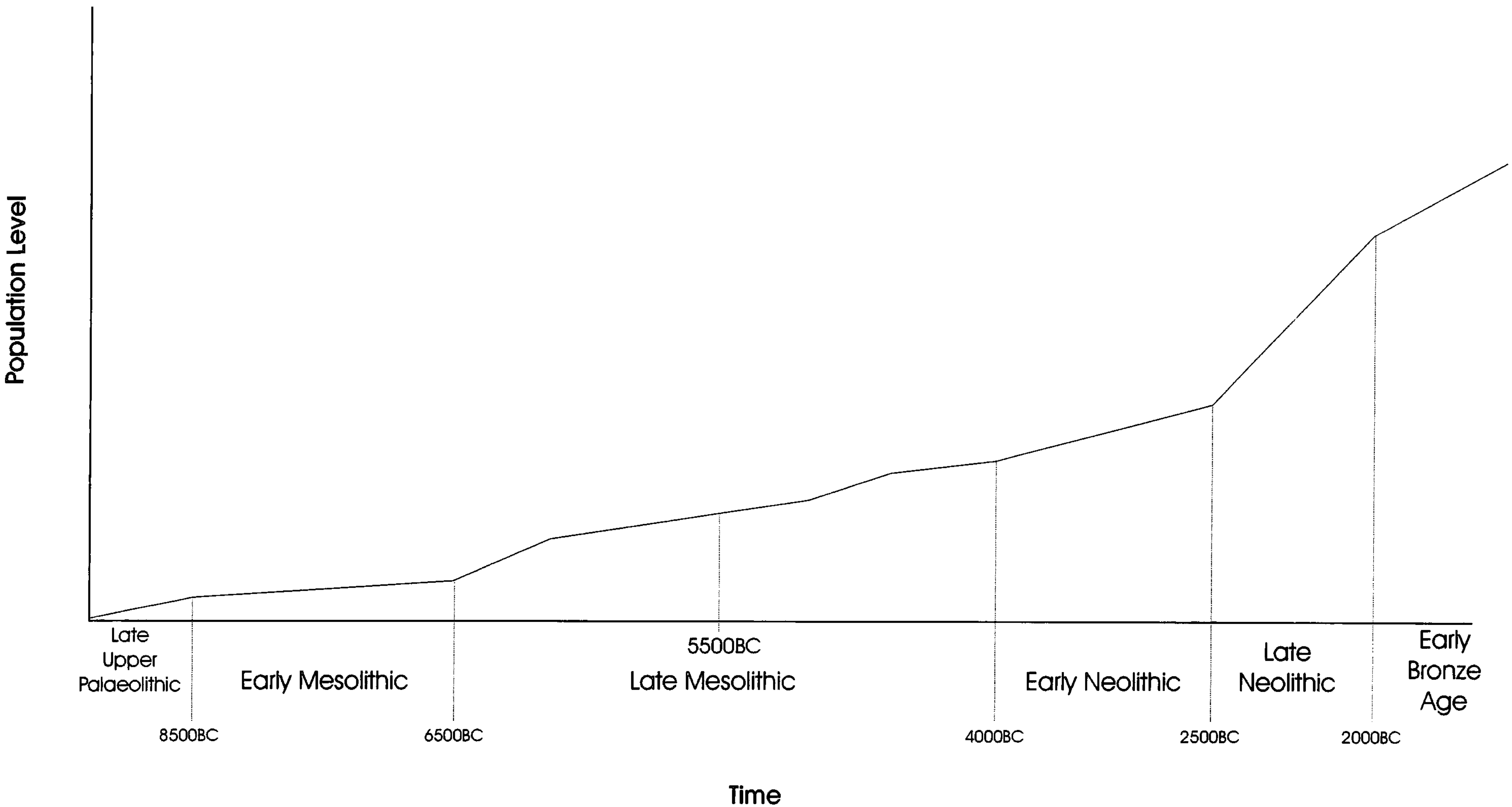


Figure 8.4 Suggested trend of relative population levels over time in the Milfield Basin

forming a focus for human occupation (Figure 8.4). This population increase is probably associated with the change to a more temperate climate and the spread of productive deciduous woodland and associated fauna (Smith 1992b). Another influence which may have had an important effect on raising population levels during the early-mid Holocene is the displacement of the populations who had inhabited the area of the North Sea lowlands by the rising sea levels which culminated in the complete separation of Britain from the Continent by c.6500BC (Smith 1992b, Chapter 9). Throughout the Late Mesolithic population levels may have risen gradually, with the more intensified land-use signalled by upland burning episodes in the Cheviot pollen diagrams (Tipping 1996) perhaps indicating slightly more dense settlement towards the end of the Mesolithic.

Although the construction of a very large corporate monument complex, comprising the Coupland Enclosure and droveway takes place during the Early Neolithic, there is little in the settlement record to suggest that populations were any higher than during the Late Mesolithic. Rather, settlement density, on the evidence of the lithic scatters, remains low with land-use strategies also structured around an extensive, periodically shifting, system of land-use. As the Coupland monument forms a focus for communities around the entire basin, this complex could have been constructed over one or a few seasons when groups came together for a certain period of the year. Instead of representing any major population increase the Coupland complex probably represents a new set of ideological beliefs and herding strategies which do not necessarily suggest any significant increase in population. Similarly, the pollen evidence does not indicate any sudden intensification of land-use or extension of settlement but rather modifications in land-use practices that represent an extension of vegetation interference already noted during the Late Mesolithic. Thus, the Late Mesolithic and Early Neolithic should be seen as a period of relatively stable population levels with the possibility of a gradual and steady increase over this time (Figure. 8.4).

With regard to population movement, it is considered unlikely that the onset of the Neolithic in this area witnessed colonisation or invasion by farming groups from elsewhere; firstly, there is no evidence to suggest a population increase or a marked increase in food production (rather, a broadening out of food production strategies), and secondly there are so many continuities apparent with the Late Mesolithic settlement of the basin in terms of location, density and pattern of distribution (see also the Mesolithic-Neolithic transition discussion below) that the arrival of newcomers, at least on any significant scale, cannot be supported by the current archaeological evidence. Instead it seems that the Late Mesolithic and Early Neolithic inhabitants of the basin were the same indigenous peoples.

A pattern of population stability or possibly gradual increase appears to hold true for the Middle Neolithic period. The recognition of long-term demographic continuity and stability is an important feature as it implies that throughout the Late Mesolithic-Middle Neolithic periods populations remained settled and able to reproduce themselves within a way of life that was both successful and sustainable.

By the Late Neolithic a different pattern emerges to suggest that the demographic character of the basin underwent considerable change (Figure 8.4). Both the pollen and sedimentary records indicate an extension of land-use and settlement across the basin (Tipping 1992; 1996), including the uplands, as well as an intensification of food production at this time. This pattern is also documented by the lithic scatter evidence which shows new areas, such as the boulder clay lands, were being occupied while the Cheviot and sandstone uplands were assuming a similar level of settlement as the gravel terraces of the valley floor. Furthermore, the explosion of monument building across the basin (including henges, stone circles and pit alignments and, probably, a significant number of the many hundreds of cairns still visible on these slopes) also suggests population levels increased significantly in the centuries c.2500-2000BC. However, population not only appears to have increased during this period but greater numbers of people appear to have occupied areas of higher ground around the basin on at least a semi-permanent basis.

Whether this population increase can be associated with internal mechanisms for population growth, and/or new incoming people, remains a question for further research. However, given the clear evidence for intensified land-use within an existing system of semi-sedentary settlement during this period, it is thought more likely the impetus for this increase in population came from within rather than as a result of any population influx. The population increase forms a step away from the trajectory of long-term stability of the preceding few millennia. This change in population levels and its distribution across the landscape provide an important addition to the ideological and social transformations associated with this period in the Milfield basin.

SOCIAL PERSPECTIVES

As with most other parts of Britain there is very little information available from which to embark on a study of social structure during the Mesolithic period as there is currently neither burial evidence nor built structures, only lithics, palaeoenvironmental data and the Goatscrag 'deer' carvings. However, to exclude this period from any further discussion is to give short shrift to an already neglected area of research. Therefore, although only a tentative argument can be offered at this stage, it can be suggested that the very muteness of the Mesolithic archaeological record in itself vouchsafes some important implications. The lack of any abiding built structures, together with the absence of any remains associated with a particular individual or grouping within society, is consistent with a social milieu that is relatively homogeneous and with little need for making statements of power either of humans over the landscape or of individuals or groups over others. A tantalising possibility is also shown by the importance that was attached to a natural landscape feature, such as provided by the 'deer' and 'hoof-print' carvings on Goatscrag. It may be speculated that these may have had a significance in relation to the definition of group identities and their association with certain places.

An indication of the organisation of social groups is provided by the settlement record in the form of lithic scatter patterns. Although settlement areas are generally larger on the valley floor than in the uplands, this probably has as much to do with the organisation of subsistence routines as it does with any form of settlement hierarchy. The large Mesolithic scatters on the gravel terraces, such as those in Fields 42 and 47, may be the result of repeated occupations over a sustained period, but equally they may also be indicative of a large and relatively intense settlement over a short period. Both scenarios imply that larger groups than normal were coming back to such places in the landscape at least for a certain part of the year. Such behaviour is consistent with the widely acknowledged ethnographic data for hunter-gatherer bands aggregating at certain times of the year (see Smith 1992b, 23). The relatively restricted extent of other lithic scatter sites across the basin suggests that at other times throughout the year the social unit of organisation was more likely that of the family or extended family, although smaller task groups of just a few individuals making logistical expeditions to places such as the sandstone crags are also in evidence. This sort of social structure, with the likelihood of a wider tribal affiliation, would approximate to the generalised model of North American Indian social structure presented by Smith (*ibid*) and reproduced below (Figure 8.5). Although caution is necessary when making parallels with ethnographic studies, the broad similarity suggested here is useful in that if nothing else, it provides a starting point for further study. This is not, however, to suggest that the Mesolithic inhabitants of the basin did not have complex social structures or that such structures remained fixed through time.

For the earlier Neolithic period there is some slightly firmer archaeological data with which to work. The segmented construction of the Coupland droveway, presumably by different work gangs (see above, Chapter 6), probably represents the construction of this feature as a corporate enterprise undertaken in a collective

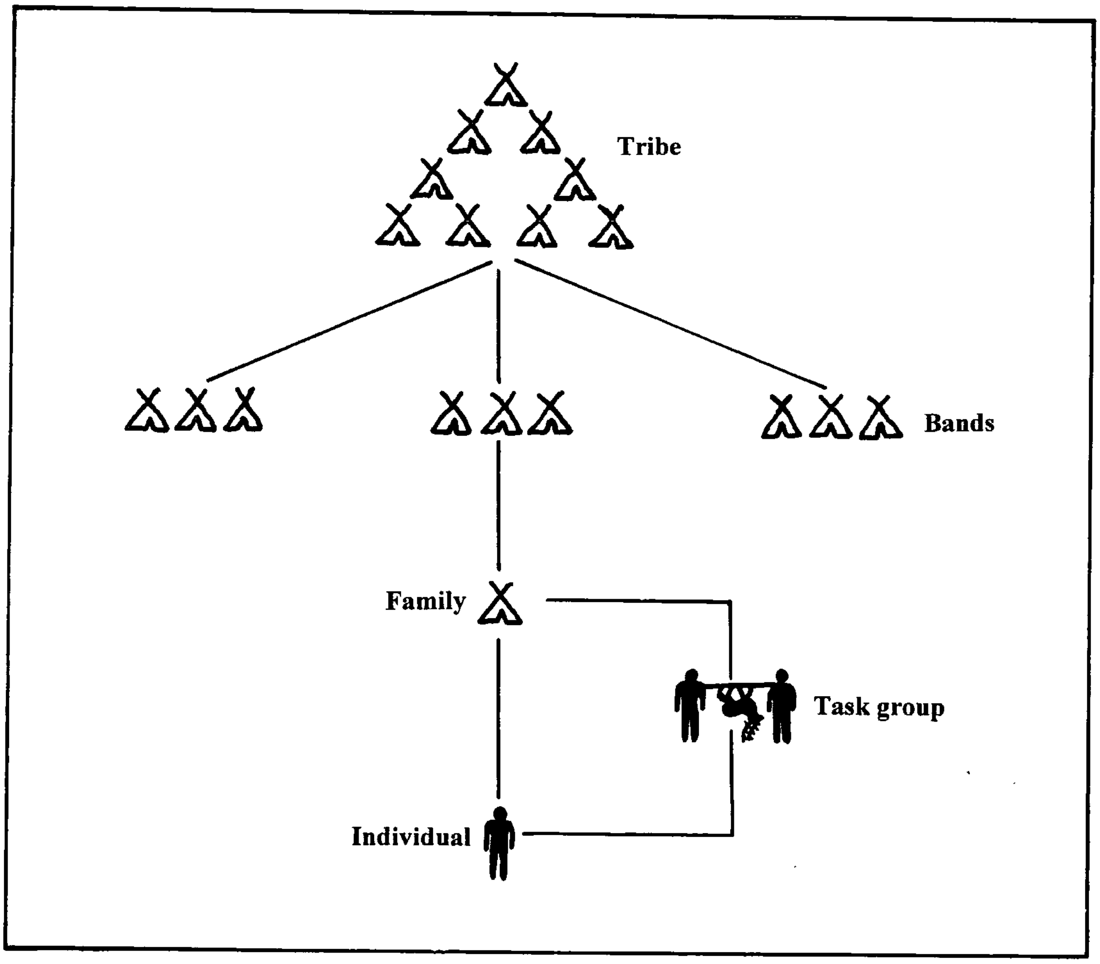


Figure 8.5 Mesolithic social structure based on American Indian data (redrawn from Smith 1992, 23)

rather than centrally controlled way. The construction of a single monumental focus of large proportions, as evidenced by the Coupland Enclosure, indicates that this site formed the focus for the inhabitants across the entire basin. Together, this suggests that the Early Neolithic groups resident in the basin shared a central meeting place which they may have all contributed in building. This implies a society that was organised both at a valley-wide scale (one monument for the valley) and also at a smaller scale, probably that of the extended family group (small work-gangs on the droveway), and in this way recalls the social structure suggested for the Late Mesolithic. The proposed use of the Coupland Enclosure for stockherding (Waddington 1996c; 1997; 1998) indicates that certain elements of the subsistence strategy were organised communally on a valley-wide scale, as indeed, would be the ceremonies enacted there. The control of space within the Coupland monument does not, on present evidence, appear to operate around any central focus but rather between different halves of the complex. This suggests that social segregation and the demarcation of arenas of power for a limited number of individuals was not a primary concern in the monument's design. Rather, this bilateral division of space echoes those identified by Pryor at the Etton causewayed enclosure, Cambridgeshire (Pryor 1987) and by Richards in the Neolithic houses of Orkney (1991), where distinctions between light and dark, night and day, and life and death may have been important.

The communal nature of ritual activities is also suggested by the deployment of cup and ring marks in areas of unrestricted access on outcropping bedrock. In such circumstances carved rocks could be visited and observed by all as there is no evidence that these places were ever circumscribed by any form of physical boundary. However, although access may have remained unrestricted, with the exception perhaps of protocols which came into place for the duration of ritual enactments, the understanding of these motifs may have been more carefully restricted. As symbols the cup and ring motufs comprise a set of metaphors, which by their nature conflate multiple meanings into simple designs (McMann 1980; Waddington 1998a), and in this case into a very restricted range of designs. Within such a symbolic system different levels of understanding can be attributed to these metaphors (Waddington 1995c unpub.; Bradley 1997). With these different levels of meaning in place, access to this knowledge is able to be controlled as it has to be mediated through someone able to 'interpret' the symbols. Such differentiation in the control over knowledge, whether spiritual or otherwise, indicates differences in social status between individuals and this has been suggested as resting upon distinctions such as age and sex (Waddington 1995c). As this potential differentiation lies in the domain of ritual and ideology, it seems that the status of individuals controlling the interpretation of these symbols to the wider group rested in their ritual authority rather than in lineage, wealth or other attributes such as hunting or warrior ability.

The burial record for the Early Neolithic, in contrast to many other areas of Britain, is notably scarce in the Milfield basin. This is a problematical issue which requires a greater study than possible here. However, what little evidence there is suggests a diverse range of burial practices including both multiple and individual burial, the practice of cremation and possibly inhumation, the erection of large cairns, tiny low round cairns and, possibly, unmarked burial pits. Some burials are associated with broken Grimston Ware pottery, stone axes and flints, while others have no accompanying material. Furthermore, as the chronology of the burial traditions remains poorly understood, this diversity cannot yet be explained as a product of changes through time. In general terms none of the burial places is particularly auspicious, in that the possible pit burial at Yeavering appears to have been unmarked, the cairn at Chatton Sandyford was extremely small and unprepossessing, and the cairns at Broomridge and Dod Hill were not on hilltops but on hillsides in positions to look from rather than look to (Waddington 1998a). In general, these burial traditions appear less likely to be associated with broadcasting the status of individuals across the landscape than with communities concerned with presencing ancestors in certain parts of the landscape. However, as Bradley has recently noted, the concern for ancestor cults may have been delayed during the earliest part of the Neolithic and may have occurred as a later development (Bradley 1998, chapter 4). However, it remains inescapable that the burial of certain individuals in the burial monuments in and around the Milfield basin means that some people held a different social status to others as, quite clearly, the majority of the population did not receive one of these few special or conspicuous burials.

In summary, it appears that social differentiation was emerging during the Early Neolithic though it may not have impinged greatly on daily life, being most noticeable in the ritual sphere. Herds appear to have been managed on a communal basis and the different groups around the basin appear to have been united in their common construction and use of the Coupland Enclosure complex. However, distinctions may have become important during ritualised events, such as ceremonies at rock art sites and in the death process of certain members of the community, when the duties and statuses of the deceased were redistributed among the living (Barrett 1994, 50). In this way the special status accorded to certain individuals and groups may have resided largely in the understanding and control of ritual rather than in the wielding of more earthly powers or, alternatively, on the basis of descent.

With regard to social organisation, the excavations of the ephemeral dwellings at Thirlings suggest that settlements remained organised at the scale of the family or extended family unit while larger gatherings took place at certain times of the year at places such as the Coupland Enclosure. Settlements remained dispersed with residential mobility also apparent. This implies that social structure operated in a similar way to that envisaged for the Mesolithic, especially as the location and extent of the lithic scatters remains similar during both periods.

Throughout most of the Neolithic period, then, there is little evidence to indicate any dramatic change in the way society organised and reproduced itself. This continuity over a period of c.1500 years implies that the social structure, apparently grounded in Mesolithic origins (see above), remained durable and strong and able to cope with the stresses which must have affected it over this lengthy timespan. It would seem that a successful period of relative social stability is in evidence which correlates with the stable population levels identified previously. However, it is with the closing centuries of the Neolithic , c.2500-2000 BC, that significant developments can be recognised in the archaeological record.

Although this period is characterised by the concern for monument building across the landscape, the plethora of relatively small public monuments can be juxtaposed onthe single larger public monument (Coupland Enclosure) of the preceding Neolithic. Multiple centres across the core settlement area implies the fragmentation of the valley-wide community into smaller social groups, each of which could be defined by association with a ceremonial centre. However, the linking of these centres by a processional route, as suggested above (Chapter 7), may have provided for the maintenance of inter-group participation in periodic ceremonial occasions, which served to tie these fragmented groups into a broader social grouping (Waddington 1998a). This suggests social organisation had evolved to include a stratum of group identities between that of the extended family and those of the 'band' - a grouping of extended families possibly forming a structure akin to that of the 'clan'. Furthermore, these groups may have become more closely associated with a particular area of the landscape given the multiplicity of permanent monuments situated across the landscape and the definition of space provided by the pit alignments.

The regulation of access into these ceremonial places, both by the suggested 'sacred precincts' created by the pit alignments (see above and Waddington 1998b) and by the way in which observers were allowed to approach, access, pass through and leave these monuments, implies a more rigid and centralised control. It is appropriate to recall the point Tilley has made about such monuments serving to control perspective and people's understanding of the world and their place within it, while at the same time closing down the options for questioning the prevailing order (1994, 204). Furthermore, the focus of these monuments on the central space, usually occupied by a dedicatory pit, and positioned within a defined inner arena of social and ritual action (see above Chapter 7), is an architecture that creates an effective stage for ceremonial duties which could only be orchestrated by a small number of individuals (Barrett 1994). Similarly the processions along prescribed routeways, such as the double pit alignment at Milfield North, would require some people to be leaders while others would be followers (*ibid*).

Applying Barrett's arguments to the Milfield ceremonial complex, it is suggested that the design and layout of these monuments indicates that certain individuals held considerable power over other members of the community, at least within the arenas of ritual. However, the power to build these centrally planned monuments and the power to position them across some of the most attractive settlement areas of the landscape suggests that this control extended well beyond the physical bounds of these monument complexes and, therefore, beyond the immediate ritual sphere. The burial of individuals at special places within these monuments, such as central points, thresholds and below the uprights demarcating the sacred areas, although of a more dedicatory rather than propitiatory nature, again demonstrates that certain individuals were singled out for special disposal while the majority were not.

A further indication that the social order was becoming more explicitly differentiated, and social power less evenly distributed, is evidenced by the new contexts of deployment of cup and ring marks. During this period cup marks are incorporated into the stone circle and henge monuments of the basin. By including these symbols within the built monuments, access to the designs became more regulated compared to the open access of carvings situated in outcrop locations. Moreover, the way in which these designs were experienced and understood was brought under more strict control, which again suggests an increase in social distinctions. The control of the cup and ring tradition appears to reach its peak in the Early Bronze Age when access to these carvings becomes more closed and they become incorporated, usually face-down, within funerary monuments while cairns themselves are occasionally constructed over carved outcrop panels (Waddington 1996c; 1998). Indeed, this wielding of sacred power has been suggested as laying to rest the entire tradition as these carved rocks are never found purposively used in the archaeological record again (*ibid*). Their association with the previous Neolithic world view may have been the crucial determinant that required them to be disposed of during the Early Bronze Age, when new ideological, social and subsistence practices may have necessitated a break with that past.

Overall, then, status during the Late Neolithic appears to have continued to reside in the control and orchestration of ritual, though ritual control itself appears to have become a more pervasive force than before, with a more overt distinction between those who controlled and those who were themselves controlled. However, what is seen in this Late Neolithic period appears to be more an intensification of the processes already emergent during the Early Neolithic, rather than any fundamental change in the wielding of social power. It is only with the Early Bronze Age that distinct shifts in ritual, land tenure and social organisation can be detected with the construction of permanent dwellings, field systems, individual burial monuments and the new deployment of cup and ring marks (see Waddington 1998a).

THE MESOLITHIC-NEOLITHIC TRANSITION REVISITED

In the preceding chapters ambiguities in the Milfield basin data have seen apparent in the various aspects of continuity and change which can be observed between the Mesolithic and Neolithic periods. For example, the continuities in settlement between the Mesolithic and Early Neolithic are, at one level, striking with settlement apparently organized on a similar scale around a seasonal/annual pattern of mobility with logistical camps in the surrounding uplands and with the gravel terraces used as the core area of settlement. The continued use of Mesolithic rock shelter sites during the Neolithic, as is apparent at Goatscrag, is a pattern noted elsewhere in Britain, such as at the High Rocks outcrop on the Sussex-Kent border (see Money 1960; 1962). However, the setting of post-holes, digging of pits and use of structures that impinged on the world by being dug into the ground, together with changes in cooking techniques, also indicates that significant changes also took place on both a physical (economic) and almost certainly an ideological level. Further examples can be noted in the stone tool kit where the basic manufacturing technique between the two periods remains essentially the same but the introduction of special forms, such as the leaf-shaped arrowhead and the physical alteration of special stone tools by grinding and polishing, denote not only new ways of forging objects but also the adoption of new forms of symbolic material culture. Ambiguities are also evident in the placing and choice of rock art where, at Goatscrag for example, possible Mesolithic zoomorphic images are apparently superseded in the Neolithic period by abstract cup marks while, at the same time, continuity is demonstrated by the choice of the same 'place' to be marked out as special by the carving of designs. Turning to production, it is immediately apparent that in both periods lithic production relied to a large extent on local raw materials and in the Early Neolithic pottery production also took place on a local scale. However, this continuity is to some extent contradicted by the distinct fall-off throughout the Neolithic in reliance on local lithic resources while at the same time a wide range of local stone is utilised for the production of ground and polished axes.

Another area where ambiguity is apparent is in the sphere of food production. Here the distribution of arrowheads between the two periods and the continuities evident in the pollen record indicate hunting and gathering continued in a similar way throughout the Early Neolithic as it had done in the Mesolithic. The crucial difference lay in the use of domesticated resources as the cereal grains from Coupland indicate. However, reliance on domesticated food resources was only partial as the continuation of hunting and gathering (as evidenced by the distribution of arrowheads and the wild plant foods from Coupland and Thirlings) indicates. Furthermore, the agriculture and livestock-keeping appears to have been on a small scale and practised in a non-intensive and extensive way, again echoing the extensive pattern of land-use of the Mesolithic.

Making sense of these ambiguities provides a starting point for understanding the Mesolithic transition in the Milfield basin. The very existence of these ambiguities means that some continuity of Mesolithic beliefs/practices took place, and this provides testament to the tenacity of Mesolithic traditions in this area. However, at the same time, the identification of new developments in the way people lived and symbolised their beliefs about the world indicates that important transformations were taking place in people's way of life. The existence of these threads of continuity and change are suggestive of societies in flux rather than incoming farming groups imposing themselves over the lands of indigenous hunter-gatherer groups. The close correlation in the structuring of settlement around the landscape between the two periods, and the correspondence in the spatial pattern of a non-intensive system of extensive and relatively mobile settlement, together contradict the earlier views of incoming, fully-fledged, Neolithic farming groups settling in the fertile valleys of Northumberland and displacing hunter-gatherer groups (*contra* Burgess 1984; Tolan-Smith 1996b; 1996a). Rather, these observations of continuity and change fit in well with wider syntheses for Britain and north-west Europe where Neolithic groups are viewed as descending from the indigenous Mesolithic population (Thomas 1991; Whittle 1996, 360; Bradley 1998) who gradually adapted existing ways of life into a Neolithic way of life. Furthermore, although as yet only a preliminary study, recent DNA analysis of past and present European populations suggest that most of the modern European population is genetically descended from their hunter-gatherer ancestors (Richards *et al* 1996; Eglinton *et al* 1998).

Another implication that can be drawn out of the nexus of continuities and changes evident in the Early Neolithic of the Milfield basin must be the pervading sense of uncertainty which is suggested by the cautious speed and extent of changes, as well as the ambiguous nature of those changes. Indeed, Whittle has suggested that the ideological shift associated with the Neolithic "may have been reinforced by guilt to do with the breaking of earlier bonds with nature" (1996, 360). Such a view would allow the Neolithic to be viewed as a period of continuing flux during which a profound uncertainty prevailed as communities grappled with the contradiction of physically impinging on the 'natural' world while simultaneously trying to maintain links with a world view grounded ultimately in Mesolithic beliefs. Although Whittle acknowledges that, "the beliefs and values of the Neolithic period are grounded in those of the Mesolithic" (Whittle 1996, 360), he goes on to say that "the Neolithic phenomenon was not so much the creation of new worlds as the prolongation of old ones". This view of Early Neolithic society as deeply rooted in its Mesolithic past helps to make sense of the ambiguities which have been identified.

The question of change is, however, a stark reminder that something very fundamental took place during this period which, with the advantage of hindsight, is known to have culminated in full sedentary mixed farming by the Bronze Age. Differences in the conceptual ordering of the world are marked out as one of the most, if not *the* most, significant of the changes which take place during this period (e.g. Thomas 1991; Bradley 1993; Whittle 1996). Whittle has recently categorised the Neolithic as a period of categorisations and separations when, "a sense of time and of beginnings had intervened" (Whittle 1996, 360). The Milfield data, and that for the rest of the British Isles, also indicates that whatever form the new beliefs and customs took at the beginning of the Neolithic, they were manifestly transformed by the end of the period. In this sense, the change from a landscape ordered through cup and ring marked outcrops and the Coupland Enclosure to one dominated by henge monuments, stone circles, standing stones and rigidly laid out pit alignments, indicates that people's beliefs about the world and their place within it were constantly renegotiated throughout this period. The way people thought at the beginning of the Neolithic was certainly different from the way people thought at the end of the period, and it is probably this feature of fluctuating beliefs which most aptly characterises the period. At no other time in prehistory can such an on-going ideological transformation, against a background of apparently stable settlement and subsistence practices, be so readily observed. Therefore, it is suggested here that the Neolithic was as much about coming to terms with the concepts of separation and impinging upon nature as it was about actually doing it.

The new ways of living, evidenced not just by domesticates but also by the grinding and polishing of stone axes and the construction of enclosures, are not considered here to have simply been passive aspects of an economic package selectively assimilated as a by-product of the adoption of new ideological beliefs. Rather, these activities and the material results themselves are viewed as the embodiment of the new beliefs that framed people's lives. In this sense many of the 'economic' changes normally associated with the Neolithic are as much metaphors for new beliefs about the world as they are the actual physical bringing about of those changes. Whittle also agrees with this point when he states that in relation to ideological change, "the real significance of domestication may have lain in this sphere" (1996, 370). Furthermore, the new material culture associated with these beliefs, such as rock art, certain pottery types and special lithic forms, provided a means by which transformations of those beliefs could be actively achieved through purposeful deployment in new contexts and social spheres. In this way the economic trappings of the Neolithic and the ideological trappings of the Neolithic are so intimately connected that each is in part constructed from the other. It is concluded that the Neolithic transition was not just about an economic change or just an ideological change but it was about new ways of dwelling in the world which were predicated on both of these inseparable aspects of life, aspects which together operated as a cognitive and physical agency bringing about manifest results which ultimately allowed a new kind of sense to be made of the world.

Chapter 9

The Cheviot from the Harthope Burn

CHAPTER 9 CONCLUSION

This chapter has been organised into three sections: an evaluation of the study, a summary of the key findings and a summary of future research priorities. A short endnote is also included. The evaluation section takes a critical stance in order to identify problematic areas and possible solutions as well as discussing how this study has contributed to archaeological research within the present intellectual climate. The section concerned with key findings comprises a point-by-point account of the principal conclusions reached as a result of this research, so as to provide a succinct summary of the study's conclusions. These are divided into methodological conclusions, associated with the fieldwork element of the project, and interpretative conclusions relating to the archaeological findings and landscape synthesis. The third section outlines future areas of research including priorities for fieldwork, desk-based analysis and interpretative studies.

EVALUATION OF THE STUDY

During this quest to integrate a wide range of new and diverse data, problematical areas have emerged. These have ranged from methodological issues to the identification of gaps in the archaeological and palaeoenvironmental records and the compatibility of different data sets to issues relating to interpretation. The following section discusses these various problem areas before considering the contribution made by this study to wider archaeological research.

An important problem to flag up with regard to the nature of the archaeological fieldwalking data is the generally low lithic totals from a survey of this size. Although such low numbers are accounted for on the basis of prevailing cultural attitudes to lithic husbandry, together with taphonomic and recovery biases (see above, Chapter 4), the problem persists in that the total numbers available for statistical analyses remains low. This problem is most acute for the Late Neolithic-Early Bronze Age period for which there are the fewest numbers of recognisable lithics. A solution to this problem may be for future studies to increase the coverage rate to 40% (one person every 5m) rather than the 20% used in this study so that more finds will be available for statistical analysis. However, an advantage of this assemblage is that, although it is small relative to some other areas of Britain, it is, in general, a very high quality data set. This results from one of the same reasons for the low overall totals, that is, a parsimonious attitude to lithic discard. As a result of this frugal use of lithics the resultant high ratio of utilised and retouched pieces ensures a much greater proportion of the lithic assemblage yields information relating to chronology and function than is often the case.

The study has identified other difficulties with the fieldwalking data, not least of which is the range of taphonomic processes which distort the surface pattern of lithic distribution as recorded by fieldwalking. These include primarily the erosion and transportation of lithics downslope in steep and moderate slope environments and the redeposition and burial of many of these lithics in colluvial and lynchet situations at the base of these slopes (see above, Chapter 4). Sampling these slopes by fieldwalking alone does not provide a representative sample of either the intensity or nature of past human activity in these areas. Therefore, if a similar fieldwalking study was undertaken again the sampling of colluvial drapes and lynchets by systematic hand-excavated trenches would be incorporated so that a more accurate estimation of past human activity on these slopes could be ascertained.

The fieldwork methodology that was devised for this study allowed an area of approximately six million square metres to be sampled by surface survey extending across the width of the basin. The combination of slope (morphometric) mapping, test-pitting and sediment coring to inform on taphonomic processes affecting surface lithic distributions is thought to have been generally successful, allowing an idealised model of lithic scatter interpretation to be constructed (see above, Chapter 4) which also drew on previous work by Allen (1991). However, as a model (Figures 4.35; 4.36) it is intended only as an abstract simplification of the 'real' pattern and, as such, its contribution is seen primarily as an interpretative device to aid the conceptual understanding and subsequent interpretation of lithic scatter distributions. Therefore, it is not definitive and it is liable to be modified in the light of further, more detailed, research. Although the model may have applicability to other geographic areas, ideally, this needs to be demonstrated rather than assumed.

Important gaps in the archaeological record for the Milfield basin include the lack of Mesolithic material from excavated *in situ* deposits. It may be possible to address this by surface examination and bysubsequent excavation of exposed peats in upland locations on both the sandstone and Cheviot hills. Recent work at Birkside Fell, Tynedale (Tolan-Smith 1997d) has shown that *in situ* artefacts and structural features can still be found in such situations. Similarly preserved *in situ* Mesolithic material may also await discovery below lithic scatters on the gravel terraces, at the foot of craglines and buried in alluvial sediments on the valley floor.

The current dearth of information concerning Neolithic burial practices (see above, Chapters 7 and 8) is another shortcoming of the current archaeological record for the basin, although this is an issue that can be addressed by future fieldwork at selected sites.

A potentially more difficult area is the limits of data compatibility with regard to the different palynological studies which have been undertaken over the past two decades with their different methods of counting pollen, dating sequences, sample resolution and presentation of the data. It is imperative that future palynological studies critically address such inconsistencies in addition to the acquisition of new data, particularly in parts of the basin where there are temporal and spatial gaps in the record, such as the sandstone uplands, and localised records for parts of the flood plain and raised gravel terraces.

Throughout this study attempts have been made to test results and interpretations, where possible, by reference to other independent data and by further testing in the field. This does not mean that the results and interpretations presented here are thought to be definitive or unequivocal but that by attempting to test and disprove them a greater level of confidence in the validity of some of the conclusions has been able to be acquired. For example, the view that the Coupland Enclosure dated to the Early Neolithic and was used contemporaneously with the droveway, and that the two were associated with stock herding has received confirmation by recent fieldwork. This included a suite of Early Neolithic radiocarbon dates (Waddington 1998d, see also Figure 7.2) and evidence in the form of phosphate analysis and geophysical results (Mercer 1997) to confirm the contemporary use of the enclosure and droveway and their involvement in a stock-herding regime (see above, Chapter 6). These field tests do not 'prove' the original interpretation but rather they were unable to disprove this view, while at the same time produced results which are positively consistent with this interpretation. In this way the fieldwork divulges a crucial level of support for this interpretation which allows it to supersede previous interpretations, based solely on observation, such as those that interpreted the monuments variously as a class II henge (Atkinson 1950), a Late Neolithic henge and ceremonial 'avenue' (Harding 1981) and early medieval avenue (Bradley 1993).

Another important conclusion which has gained support from external 'validation' is the recognition of the intensification of settlement and land-use in the uplands c.2500-2000BC. In this case both the regional pollen signals, alluvial sedimentary sequences, the relative lithic densities across the different ecological zones, and the evidence of the other archaeological remains (including the stone circles and the recent finds of Late Neolithic pottery from the Cheviot uplands at Wether Hill, see above Chapter 7) provide a range of independent support for this conclusion. This convergence of disparate data, which correlate both spatially and temporally, provides a set of independent 'checks', as it were, and in so doing endow this conclusion with a significant degree of support on the basis of the convergence of results.

The landscape approach adopted by this study has been centred around collecting high quality archaeological and palaeoenvironmental data appropriate to the landscape-scale of analysis together with its integration with more detailed site-based data. Inevitably, this landscape focus has meant that the study has not produced systematic site-by-site analyses or systematic analyses of different artefact types, but rather it has pitched the focus at a broader scale so as to be able to incorporate aspects of such smaller scale data, where appropriate, into a wider study of synthesis. The contribution of this study, then, has been to establish a broad archaeological background that will provide a framework to which future studies can relate. Similarly, if in the future the spatial scale is extended to a wider order of magnitude to that of the region, or indeed Britain as a whole, this landscape study will provide a body of synthetic data which can be easily incorporated into such generalised studies. It is hoped that by adopting this landscape-scale of analysis this research has provided a study at a much needed spatial scale within this part of the British Isles, and one that should, theoretically, replicate to some degree the spatial extent of past human activity around which most people inhabiting this area lived out their lives during the Mesolithic and Neolithic periods. However, now that information is available at a variety of spatial scales (ie. that of the artefact, site, landscape, and larger-scale studies) it should now be possible for research in this area to "tack back and forth" between different the scales of analysis so that each scale can be used to contextualise the other, as Thomas (1996, 98) has advocated.

It is hoped that this study has contributed to archaeological research in both methodological and interpretative spheres. Although not definitive, and no doubt open to revision, the model of lithic scatter displacement and its associated interpretative scheme add a new dimension to the way in which surface lithic scatters can be conceptualised, understood, and interpreted. There has been a general lack of studies in the field of artefact taphonomy in relation to surface scatters (notable exceptions being the contributions in Schofield 1991a and the study by Boismier 1997) and even fewer have attempted to provide an interpretative link with past human behaviour. The model generated by this research contributes a new approach to lithic scatter taphonomic studies and an interpretative framework to aid understanding of surface distributions on the basis of the type of slope on which they are found.

The methodology devised for the fieldwalking aspect of this research may also have wider applicability. Although the need for taking account of local factors will always mean that methodologies will vary across different landscapes, the broad approach employed by this study can be easily adapted for other areas. In short, this study has adopted a novel approach which comprised sampling the valley by means of a wide, almost continuous, transect across the entire width of the valley, the point recording of every lithic find, the slope mapping of the transect, and test-pitting within the different slope types identified within the transect. By employing a similar methodology, future landscape studies could generate their own interpretative lithic scatter displacement models specific to the particular landscapes under study.

Another area in which this study has made a contribution to the methodological sphere is in the use of a G.I.S. to integrate and analyse the fieldwalking data. In this case the G.I.S. was able to perform calculations and spatial analyses extremely rapidly, which allowed a multitude of different patterns in the data to be searched for during the analysis stage. It was also able to produce high quality hard output maps showing thematic data relatively quickly and accurately. It is hoped that this study has demonstrated how G.I.S. technology can be usefully integrated into landscape research projects and advantage taken of its utility, which over the extent of a research project of this size, ultimately saves considerable time and allows analyses to be undertaken which would otherwise be too time consuming if performed by hand.

A significant issue implicit throughout this research has been the need to look at upland and lowland together in order to more fully understand patterns of prehistoric behaviour in northern Britain. By employing a landscape approach this study has been able to address this issue by sampling across all the different topographic areas contained in this valley. By taking a holistic landscape stance it not only captures more accurately the spatial extent of past human ways of life (Zvelebil *et al* 1992) but it also takes account of the inter-dependency of upland and lowland systems of land-use which have so markedly characterised northern valley life until recent times. Therefore, it is important that future studies of discrete landscapes which have an upland and lowland component consider such landscapes in their entirety and not just from the perspective of lowland or upland settlement.

Archaeologically, this study has contributed a new interpretation for the Mesolithic settlement of the Milfield basin challenging previous assumptions that the basin was only sparsely settled during this period. The notion of incoming farmers colonising the valley during the Neolithic and displacing the Mesolithic population has also been challenged and an interpretation based on indigenous change proposed in its place. Models of settlement and land-use for the Late Mesolithic, Early Neolithic and Late Neolithic periods have been devised based on the new data acquired by this study and its integration with existing data. As simplified models the same caveats discussed above relating to the lithic interpretation model apply. Although simplified and open to re-evaluation these interpretations provide new frameworks for understanding prehistoric activity in the north-east region. The study has also contributed to wider discussions including those concerned with ideological change, the changing nature of relations between humans and the natural world, the form of Neolithic dwellings and the use of Late Neolithic henges and pit alignments. The notion of what the 'Neolithic' actually was has been addressed, and elements of continuity and change between the two periods have been discussed.

One of the more novel contributions made by this study has been the attempt to steer a 'middle way' between systematic data collection, ultimately grounded in processual perspectives, and the interpretation of that data, which has included both processual and post-processual approaches. With the modern discipline of archaeology becoming increasingly fractured between those practising processual archaeology and those practising post-processual archaeology, it has become more difficult to tack a course between these two poles. Both approaches have important contributions to offer archaeology but with the schisms running deep it is now easier to take one of these extreme positions and justify that stance by recourse to the standard theoretical canons of either school of thought. It is less common to attempt a middle way as this requires difficult approaches to be reconciled and opens a study up for criticism from both theoretical camps. Therefore, although unfashionable, it is hoped that this study has demonstrated that it is possible to combine processual and post-processual approaches and that landscape archaeology can benefit from adopting a moderate position.

This study has challenged a number of received views concerning the early prehistoric settlement of northern England. In particular, this includes the overturning of the view that Mesolithic settlement in inland regions of the north-east was sparse and less dense than other areas to the south. Instead this study has proposed that it is the nature of the lithic scatters themselves which is different (resulting from the differential availability of raw materials, cultural attitudes to lithic discard and taphonomic processes), rather than there being a relative absence of occupation. Moreover, continuities between the Mesolithic settlement in the area and Early Neolithic settlement in the area have also been established, a feature not previously identified in this region. This study has also attempted to address the issue of the nature of settlement systems and has proposed models of settlement with mobile components for each period. Again, this is an area of study which has received little mention in existing literature, although an important exception is the recent paper by Whittle (1997).

The interpretation of the Coupland complex, particularly the incorporation of a stock-herding function, is currently a unique contribution to Early Neolithic archaeology in Britain. There are few parallels for the form of this monument complex and previous interpretations have differed considerably (see above, Chapter 8). However, the field tests have tended to support this interpretation (see above) and its analogy with the causewayed enclosure phenomenon (see above, Chapter 8) has also placed the understanding of this monument on a new footing. Other interpretations which have been widely received by the archaeological community, and contested here, include Richards' interpretation of the Milfield henge complex and Bradley's interpretation of the cup and ring mark tradition. Attempting to replace either of these interpretative studies is difficult, given the difficulty of disproving largely theoretical arguments. However, it is thought that this study has succeeded in contributing alternative interpretations built on equally valid foundations while paying greater attention to the new and existing archaeological and palaeoenvironmental data. Consequently, this study contributes to the plurality of interpretations for this landscape, which is a feature central, though not altogether unique to, the post-modernist critique (Lyotard 1984).

Probably the most important contribution made by this study lies in its synthetic nature. Currently our understanding of the Mesolithic, and particularly the Neolithic, in England is centred around syntheses based on southern English data with occasional references to other areas such as East Anglia and Yorkshire. There have been very few detailed syntheses of northern landscapes and this study, it is hoped, has helped to redress this imbalance. As more landscape studies of northern valley communities such as this emerge it will not only add to a wider understanding of the prehistoric settlement of northern England, and northern Britain as a whole, but will also mean that future thematic syntheses will have the necessary information available with which to consider Britain as a whole, rather than from a southern perspective only. Bearing in mind that northern England is the geographic centre of Britain it is essential that landscape studies from this area are incorporated into thematic syntheses, particularly as it is home to a wealth of distinctive traditions, such as the large Neolithic round barrows, cup and ring carvings, an eclectic array of Early Neolithic enclosure types, distinctive pottery styles and so on. Finally, this study has identified a historical framework for the Mesolithic and Neolithic periods in the north-east region which can be used as a platform for future research. It is not considered to be definitive, and it will surely be modified with time, but it is hoped that this research has contributed a type of study that has been long overdue in the north.

SUMMARY OF KEY FINDINGS

This study has produced a series of conclusions regarding both methodological and interpretative issues and these are summarised below under their respective headings. These conclusions do not outline every single finding from the study but rather provide a summary of the key points concluded from this research.

Methodological Findings

- Although the Milfield surface lithic density is relatively low compared with some other areas of Britain this does not mean it was sparsely settled during the Mesolithic and Neolithic periods. Biasing factors have been identified which under-represent the volume of lithics recovered during fieldwalking.

- Larger lithics tend to be located on the surface while smaller lithics predominate in the ploughzone. Approximately 3.3% of the total lithic population of the ploughzone is located on the surface. The part of the ploughzone containing the highest percentage of lithic material is the top 10cm below the surface which accounts for 41%. The overall distribution of lithics recovered from the surface is broadly representative of the spatial sub-surface distribution when the results of different environmental zones are compared.

- Substantial quantities of lithics have been removed from slope environments and redeposited in colluvial and lynchet environments where they are unable to be sampled through surface survey alone. Excavation of trenches through these colluvial deposits are necessary to achieve a more representative lithic sample for these slopes.

● Different slope environments affect lithic distributions in different ways. This has allowed a model of inference to be constructed (Figure 4.35). This model has interpretative implications for lithics found on different types of slopes (Figure 4.36).

● A three-fold classification for the systemic context within which any surface lithic can be found has been advanced. This means that each individual lithic that is recorded can be interpreted in the light of the particular type of systemic context within which it occurs.

Interpretative Findings

● Late Mesolithic settlement of the basin was far more intensive than has previously been thought. Settlement was focused on the raised gravel terraces of the valley floor and a pattern of logistical activities are thought to have been structured around the base camps of this focal area. Craglines, spring heads and areas close to streams formed attractive upland locales for episodic visits.

● Mesolithic ideology is thought to be grounded in the way people related to the natural world. By ordering the landscape through reference to prominent natural places, such as Goatscrag, people are thought to have embedded their existence within the natural environment.

● The Mesolithic-Neolithic transition is characterised by a range of continuities and contrasts. The continuities evident in the pattern of settlement, extensive system of land-use, continued reliance on wild resources and the special attachment to the same prominent natural features of the landscape, are considered to indicate that the Neolithic population of the basin was descended from the Mesolithic population rather than colonisers from outside who displaced the indigenous hunter-gatherer groups. The changes occur most noticeably in the way people thought about the world and in their adoption of new physical routines and practices as evidenced by new burial traditions, the emergence of the cup and ring mark tradition, new forms of material culture, the construction of the monumental Coupland Enclosure and droveway, the herding of livestock and the growing of crops, all of which are thought to indicate an important transformation in the way people thought about and dwelled in the world.

- The Mesolithic-Neolithic transition, in the context of this study, is seen as a localised variation of the wider pattern of 'Neolithization' experienced elsewhere across Atlantic Europe.

- The notion of a mid-Neolithic abandonment of the Milfield plain for the sandstone escarpment has been rejected and that of an Early Bronze Age abandonment of the plain in favour of the surrounding hills has also been called into question. However, this latter question requires further archaeological and palaeoenvironmental investigation before it can be more satisfactorily resolved.

- During the Neolithic, settlement is thought to have retained a mobile basis with the raised gravel terraces and low Cheviot slopes fringing the terraces maintained as the settlement hub around which the residential, herding and cultivation strategies revolved. The Neolithic inhabitants of the basin appear to have been part of a valley-wide social grouping which undertook a communally-based stock-herding strategy and constructed and utilised a stock/ceremonial enclosure in the centre of the core settlement area. Small-scale cultivation of emmer wheat, barley and oats around the same settlement area, together with continued hunting and gathering across the valley, were also important activities.

- Ideology during the Neolithic is thought to have been characterised by the distancing of people from the natural world so that culture and nature became seen as increasingly separate entities. The Neolithic is considered to be a period of ideological flux as beliefs were continually transformed, as evidenced by modifications to ritual monuments, the changing deployment of rock art and other aspects of material culture and the construction of new monument types.

- An extension of settlement and intensification of land-use across all ecological areas of the basin occurred in the Late Neolithic, c.2500-2000 BC, with the landscape becoming utilised in a more homogeneous way than before. Population levels are thought to have risen and increasing social differentiation, thought to have been wielded largely through ritual status and power, occurs. This social differentiation on the basis of ritual authority is a process that appears to have its roots in the Early Neolithic but becomes more overt by the close of the Neolithic.

- Ideological transformation, as indicated by the construction of a new 'sacred geography' during the Late Neolithic, was organised at a large scale so as to define the basin as a ceremonial focus for the wider region. Increasing cognitive separation between humans and the 'natural' world is thought to have characterised ideological transformations throughout this period, with increasing controls over the way people were allowed to understand the world an important feature.

FURTHER WORK

As is frequently the case, this research has raised a multitude of new questions and many areas for further research have arisen. Future research trajectories include the need to systematically transcribe the wealth of crop and parch mark features in the basin from the extensive aerial photograph archive held by the Museum of Antiquities of Newcastle upon Tyne and in the NMR at Swindon. Ideally this would be followed up by selective excavations to help understand some of the less well understood features, such as the wide range of enclosures, linear ditches, pit alignments and ditched monuments. This is especially important as the intensive agricultural regime, including deep-ploughing for potatoes and carrots, continues to destroy these sites. The recording and understanding of these crop mark sites is, therefore, essential not only for future archaeological research in the basin but also as a management strategy for informing future conservation plans. This is now a particular concern given the threat from deep ploughing which is now taking place across the plain.

New fieldwork initiatives need to include a search for the Cheviot andesite stone axe source/s with Long Crag, Langlee Crags and Cunnion Crags forming good starting points. Survey and trial excavations at the Roughting Lynn complex would also help resolve the problems of chronology and function, particularly with regard to the multiple bank-and-ditch enclosure. Excavation at the intersection of early field boundaries associated with unenclosed settlements in the Cheviots would provide greater precision regarding the chronology of the first field systems, while excavation on the cultivation remains, such as the hillside terraces which in some cases appear to be stratigraphically earlier than the field systems, could help shed light on Neolithic agricultural practices. Further fieldwalking in areas that become available around the cup and ring marked rocks, on the alluvial valley floor and in the Cheviot uplands would help fill out the present picture of changing human behaviour across the landscape. In addition, trenches excavated by hand to sample systematically colluvial spreads and lynchets will help to give a more representative characterisation of the nature and chronology of past activities on the slopes above these sediment traps.

Palaeoenvironmental work needs to be focused on acquiring a continuous pollen record from the sandstone escarpment and also from localised sources on the alluvial valley floor, such as from the palaeochannel fills near Thirlings, and on the raised gravel terraces from areas such as Locked Bog near Lookout Plantation.

The priorities of future desk-based research should include a re-evaluation and publication of Weyman's lithic collection from Thirlings and also analysis and publication of Hope-Taylor's collection from Yeavering. In addition to this, the Thirlings and Horsedean Plantation excavations need publishing sooner rather than later as it is over twenty years since some of this fieldwork took place.

Priority questions which follow on from this study and need to be addressed in greater detail include the relationship between the henge complex and the encircling ring of stone circles, the potential for identifying traces of 'structured deposition' within the ceremonial monuments of the basin, the character and chronology of Neolithic burial practices and monuments and the nature and chronology of Early Neolithic enclosures throughout northern England generally. However, a fundamental question which also needs to be addressed is the scale and character of coastal settlement during these periods and the relationships between inland communities, such as those of the Milfield basin and those of the adjacent coastal communities, such as those known to have existed in the vicinity of Bamburgh and Lindisfarne (O'Sullivan and Young 1995; The Archaeological Practice 1996).

ENDNOTE

Over the years a succession of archaeologists have turned their hand to the prehistory of the Milfield basin including Burgess (1972, 1984), Harding (1981), Miket (1981, 1985, 1987), Bradley (1987, 1993, 1997), O'Brien (1991), Bradley *et al* (1993) and Richards (1996). It is hoped that this latest research has added a new dimension to these existing studies by providing the contextual landscape data which has hitherto been absent. By integrating the new landscape and environmental data with existing site-based and artefactual data this work has been able to present a much needed synthesis for the Stone-Age archaeology of this area. It is hoped that this work will be taken forward over the coming years and that it will spur others to attempt regional research studies elsewhere in northern England. Future archaeological work in the Milfield area now has a context within which to interpret individual and/or constellations of sites and the patterning of deposits within them. Exciting areas of future research will include the investigation of new types of sites in the basin including the suspected mortuary monuments, cultivation remains, and the myriad of poorly understood crop-mark features.

However, this research comes at a time when most of the archaeological remains discussed in this study continue to be heavily eroded as a result of modern land-use. As I write, the fourth consecutive deep-ploughing of the Coupland Enclosure (a Scheduled Ancient Monument) is imminent and this will further truncate the thin band of Early Neolithic archaeology situated immediately below the normal shallow ploughing horizon. Within a couple of years there is likely to be nothing left of most of the Early Neolithic features at this site, save for the enclosure ditch fills. However, this is symptomatic of the dire situation pertaining across the basin where recent deep ploughing, drainage projects, rationalisation of fields and further gravel extraction have continued unabated. Archaeology that takes place in advance of these works is usually reactionary and not part of any research strategy, sometimes performed to minimum rather than maximum standards and is rarely published in the public domain. This is not good enough, especially considering that so many of the archaeological remains of this valley are of national significance. It is a matter of urgency that appropriate conservation measures are taken on the basis of the Resource Management Study (Passmore, Waddington and Macklin 1998) recently submitted to English Heritage and the County Council. If a fraction of the current archaeological and palaeoenvironmental resource is to survive even the next five years, then fully resourced rescue measures need to be taken and a solution to the recent deep-ploughing practice needs to be implemented with immediate effect. The long-term impact of English Heritage's unwillingness to take appropriate action at a critical time (e.g. the case of the Coupland Enclosure), has meant that some of the most important archaeological remains in northern England have now been completely destroyed. As this research started prior to the deep-ploughing, I hope that, if nothing else, it will go some way towards providing an understanding of the rich Stone-Age past that once graced this landscape and leave a record, partial as it is, for future generations.

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APPENDICES

APPENDIX 1

Fieldwalking and test-pit record forms devised for this study

ARCHAEOLOGICAL PRACTICE FIELDWALKING RECORDING SHEET

Project		Code	Field No	NGR
Date	Initials	Field Area	No of Visits	Grnd Conds
Weather		Crop		Visibility
T'sect Interval	No of T'sects		Walk No	Orientation

Reference Points

Survey Station

Description

Find No	T'sect	Material	Artefact Type	Period	Other Info	Coords

M. A. L. P. TEST PIT RECORDING FORM				
Site Code	**Field**	**Pit No.**	**Geomorph. Unit**	
Drift	**Dimensions**	**Sieved**	**Date**	**Initials**

Description **Section Sketch**

Depth:
Soil
Texture
Colour
Visibility
Weather
Stratigraphy

Spits **No.**	**Finds** (lithics, pottery, other)
1....................	....
2....................	....
3....................	....
4....................	....
5....................	....
6....................	....
7....................	....
8....................	....
9....................	....
10....................	....
Total	

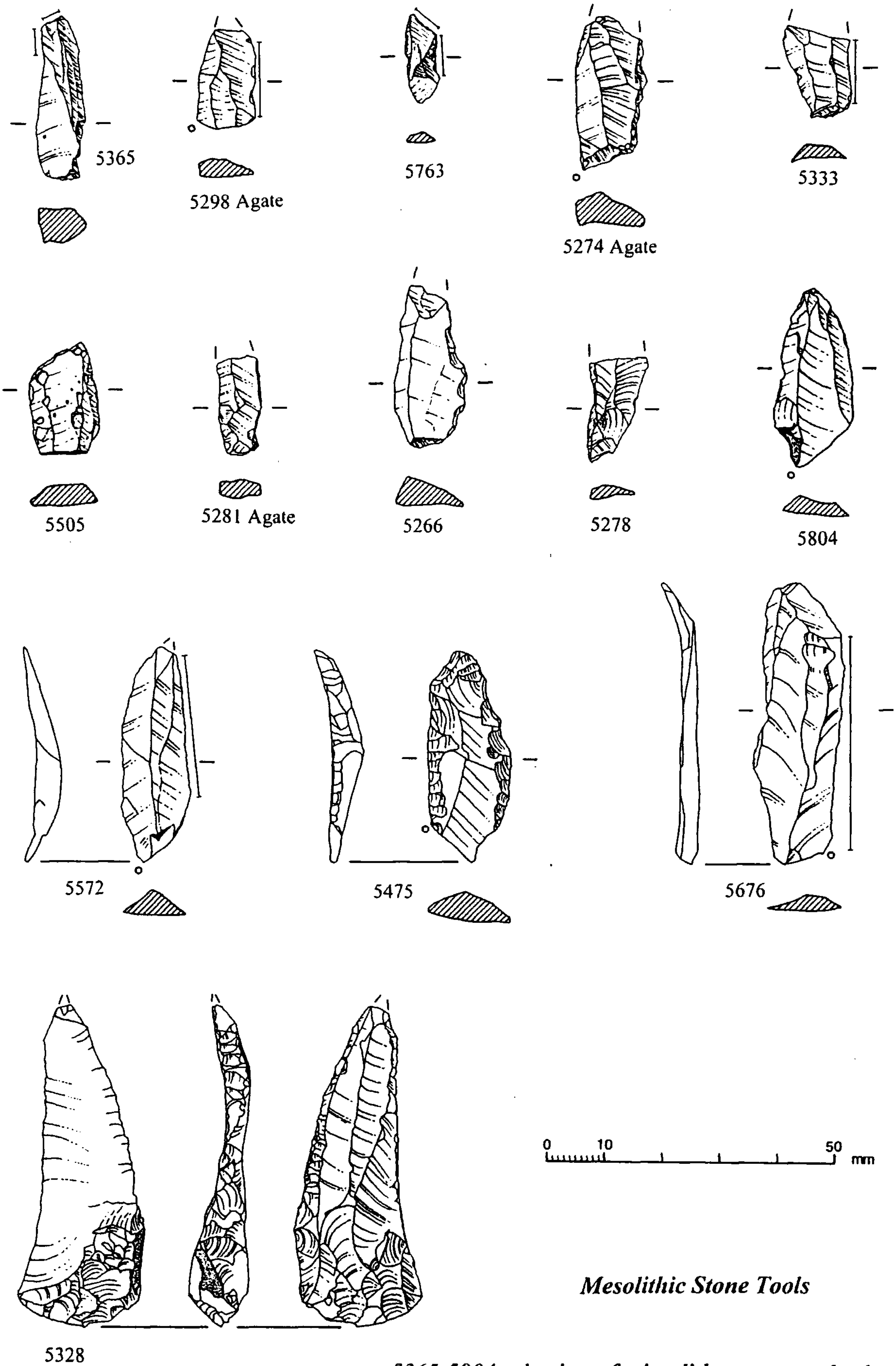
Geomorph. Description

Any Other Info

Checked By	**Date**

APPENDIX 2

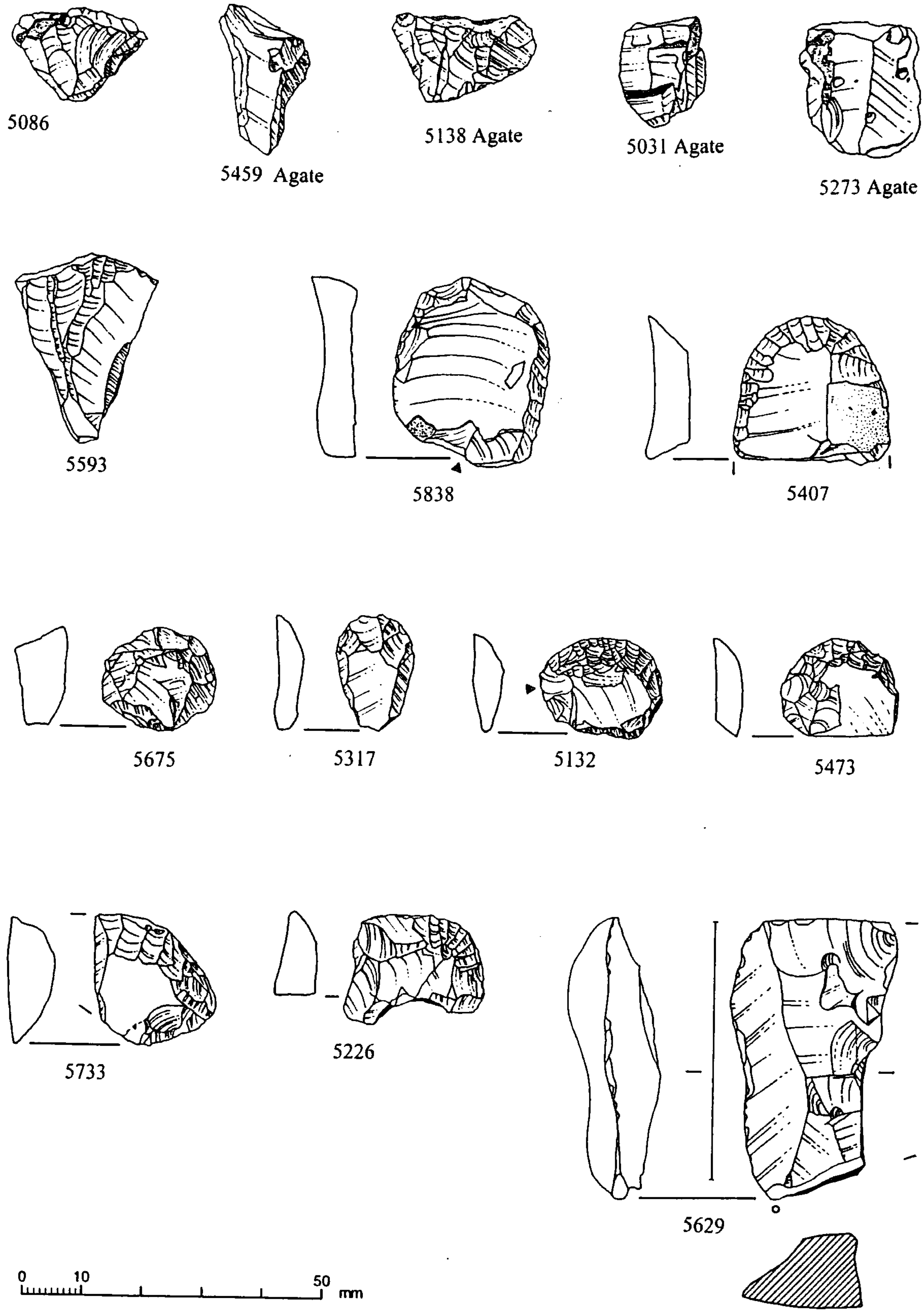
Illustrations of selected lithics of different periods recovered from the fieldwalking



Mesolithic Stone Tools

5365-5804 selection of microliths, most are broken

5572-5328 retouched and utilised blade tools

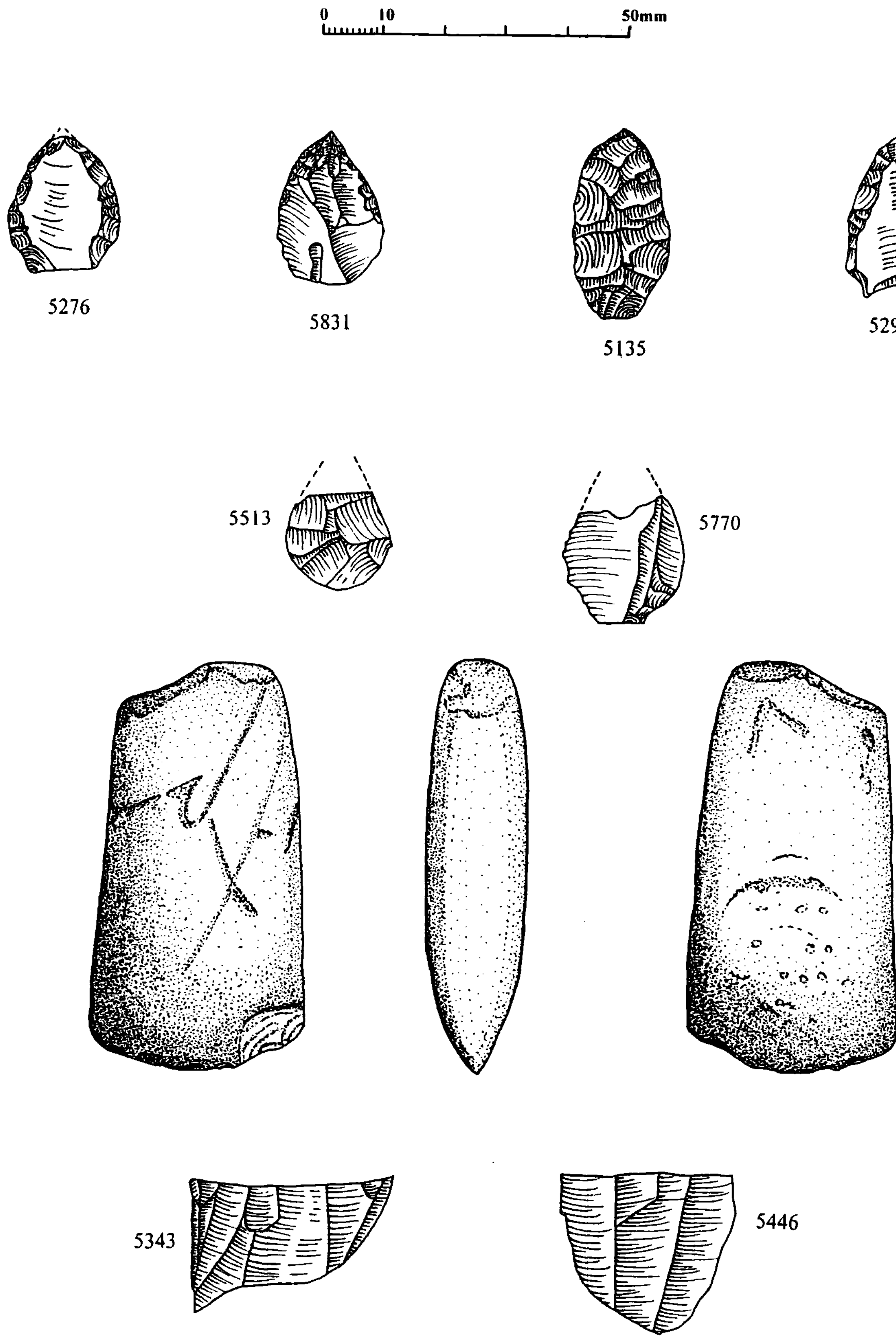


Mesolithic Stone Tools

5086-5593 selection of cores including pyramidal types

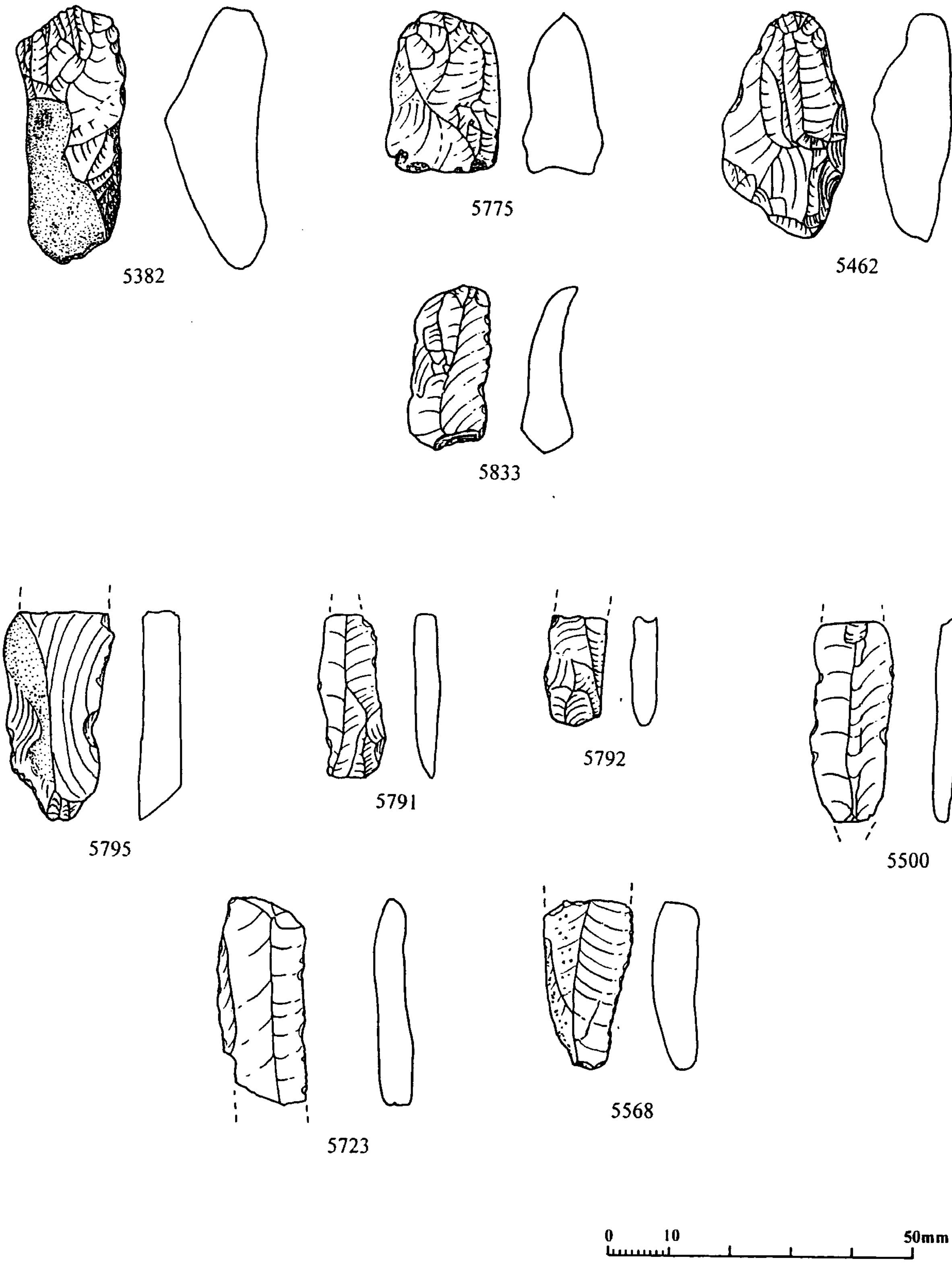
5838-5226 scrapers

5629 blade-end of a broken tranchet flint axe



Neolithic Transition Stone Tools

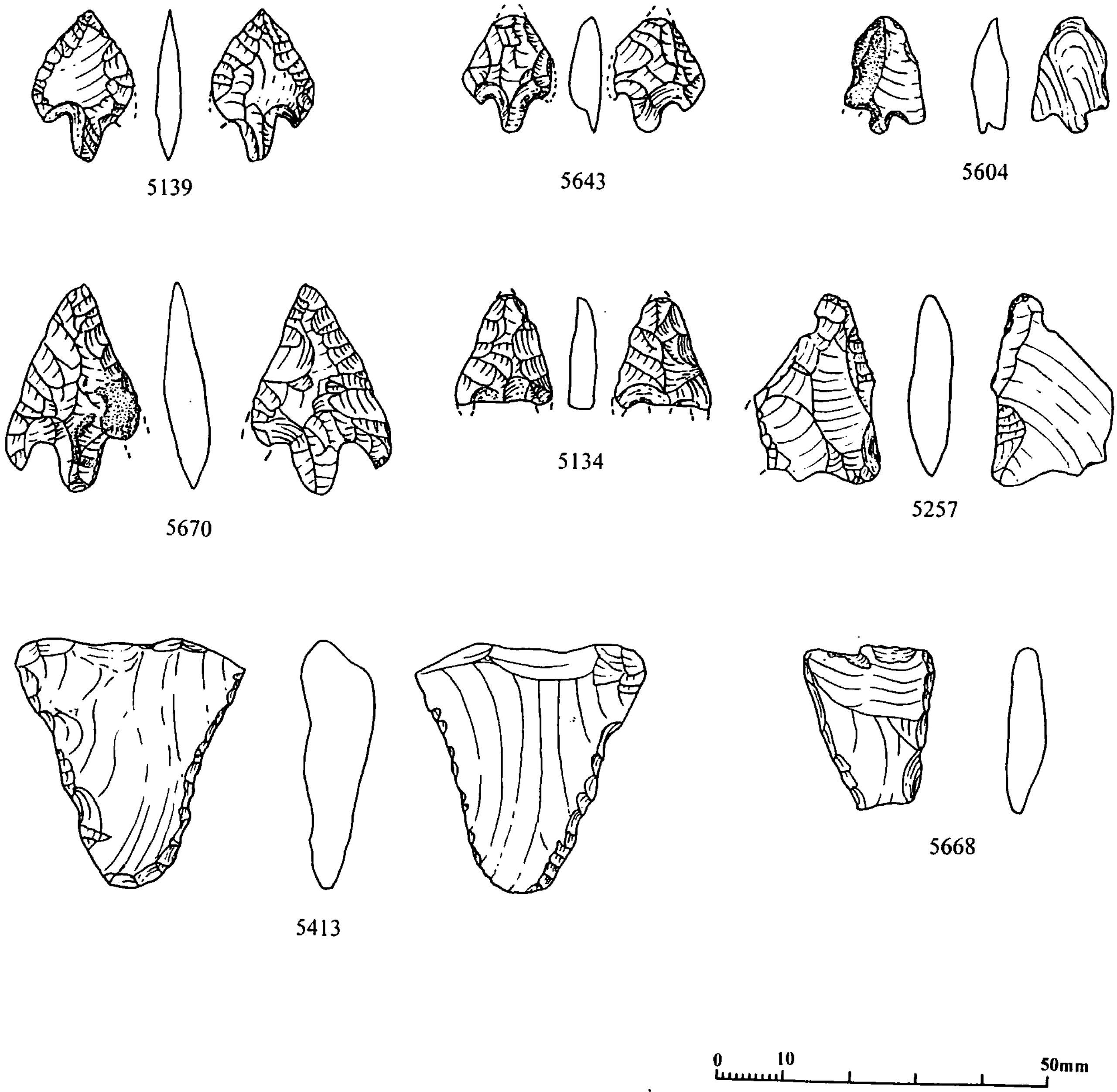
5276-5770 selection of leaf-shaped arrowheads
5343-5446 single platform cores
centre polished stone axe from Ewart made of Cheviot andesite



Neolithic Transition Stone Tools

5382-5833 end scrapers

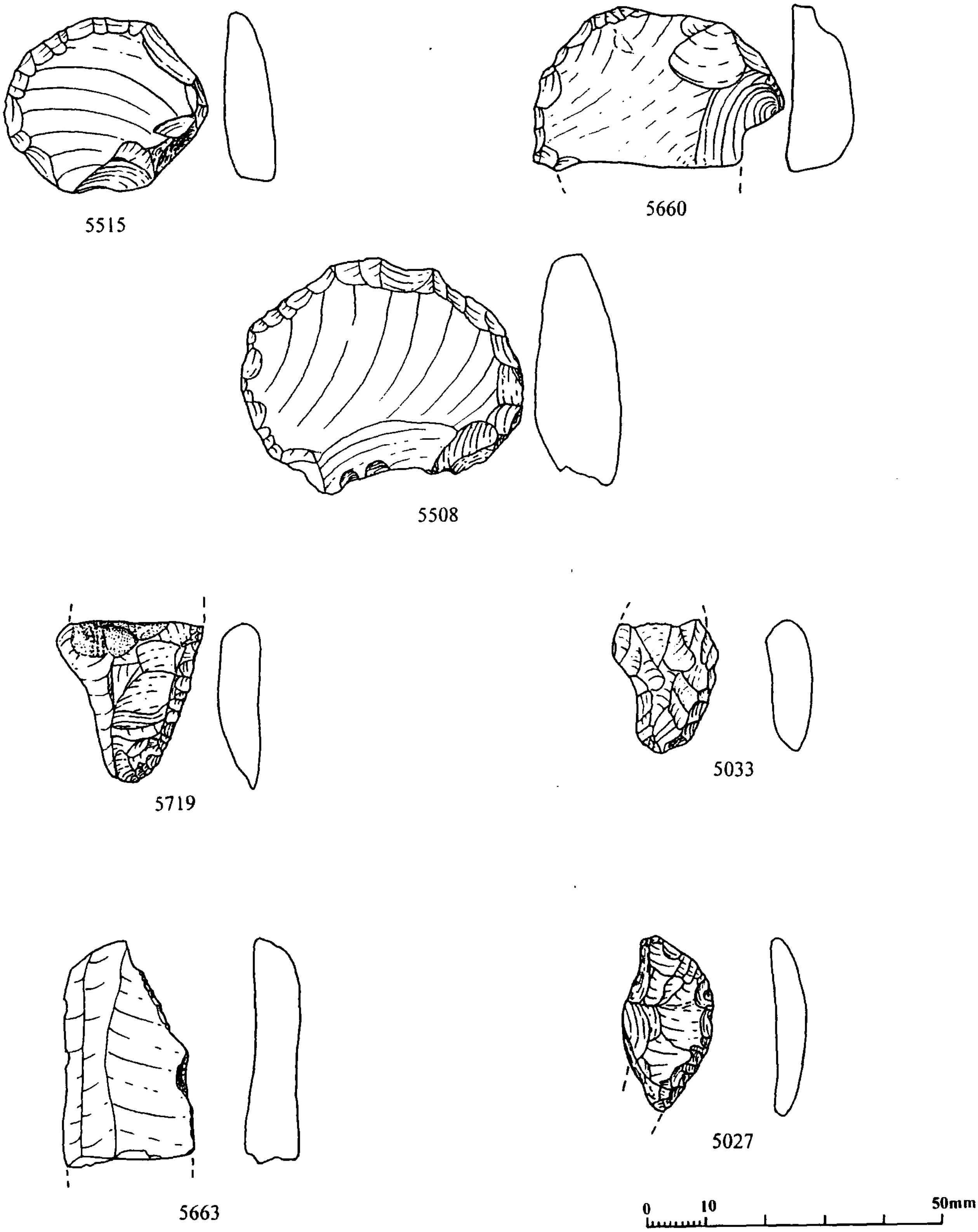
5795-5568 selection of utilised blade tools, all broken



Late Neolithic-Early Bronze Age Stone Tools

5139-5257 barbed and tanged arrowheads, most of which are broken

5413-5668 transverse arrowheads



Late Neolithic-Early Bronze Age Stone Tools

5515-5508 side scrapers
5719-5033 broken tanged tools
5663-5027 broken plano-convex knives

APPENDIX 3

Test-Pit Lithic Frequency By Period and Morphometric Unit

Period	No.Pits Represented	No.Lithics	UFL	BSS	VTS	BMS	VTM	BGS	VTG	FLF	ECF
Mesolithic	32	41	1	7	3	2	3	6	3	13	3
Late Mes-Early Neo	14	14		1			1	3	1	6	2
Late Neo-Early B.A.	4	4	1					1	1	1	
Unclassified	32	38	3	4	1	9	6	2	2	6	5
											(2 no data)
Total		**97**	**5**	**12**	**4**	**11**	**10**	**12**	**7**	**26**	**10**

Test-Pit Lithic Density By Period and Morphometric Unit

(No.of lithics divided by No.of pits for each morphometric unit)

Period	UFL	BSS	VTS	BMS	VTM	BGS	VTG	FLF	ECF
(No.Pits of Morpho Unit)	20	19	2	20	5	20	5	39	16
Mesolithic	0.05	0.37	1.50	0.10	0.60	0.30	0.60	0.33	0.19
Late Mes-Early Neo	0.00	0.05	0.00	0.00	0.20	0.15	0.20	0.15	0.13
Late Neo-Early B.A.	0.05	0.00	0.00	0.00	0.00	0.05	0.20	0.03	0.00
Unclassified	0.15	0.21	0.50	0.45	1.20	0.10	0.40	0.15	0.31
Total	**0.25**	**0.63**	**2.00**	**0.55**	**2.00**	**0.60**	**1.40**	**0.67**	**0.63**

Test-Pit Lithic Frequency By Period and Ecological Zone

Period	No.Pits	No.Lithics	Cheviot	Grav.T	S/S	B.Clay	Alluv.
Mesolithic	32	41	18	12	8	3	
Late Mes-Early Neo	14	14	7	5	2	0	
Late Neo-Early B.A.	4	4	3	1	0	0	
Unclassified	32	38	14	12	10	2	
Total		**97**	**42**	**30**	**20**	**5**	

Test-Pit Lithic Density By Period and Ecological Zone

No. of lithics divided by No. of pits for each ecological zone

Period	Cheviot	Grav.T	S/S	B.Clay	Alluv.
(No.Pits per Ecozone)	60	31	40	15	0
Mesolithic	0.30	0.39	0.20	0.20	
Late Mes-Early Neo	0.12	0.16	0.05	0.00	
Late Neo-Early B.A.	0.05	0.03	0.00	0.00	
Unclassified	0.23	0.39	0.25	0.13	
Average	**0.70**	**0.97**	**0.50**	**0.33**	

These tables exclude data for 2 lithics from pit 10020 on a colluvial footslope on the sandstone slope

Appendix 3

APPENDIX 4

Flint and Non-Flint Raw Materials By Period and Ecological Zone					
All Periods					
Ecological Zone	**Total Lithics**	**Flint Lithics**	**% Flint Lithics**	**Non-Flint Lithics**	**%Non-Flint Lithics**
Gravel Terrace	247	102	41%	145	**59%**
Alluvial	5	3	60%	2	**40%**
Boulder Clay	50	32	64%	18	**36%**
Cheviot Slope	340	225	66%	115	**34%**
Sandstone Slope	154	117	76%	37	**24%**
Total	544	374	av.60%	170	av.40%
Mesolithic					
Ecological Zone	**Total Lithics**	**Flint Lithics**	**% Flint Lithics**	**Non-Flint Lithics**	**%Non-Flint Lithics**
Gravel Terrace	87	19	22%	68	**78%**
Boulder Clay	7	3	43%	4	**57%**
Cheviot Slope	88	43	49%	45	**51%**
Alluvial	2	1	50%	1	**50%**
Sandstone Slope	50	34	68%	16	**32%**
Total	140	78	av.43%	62	av.57%
Mesolithic-Neolithic Transition					
Ecological Zone	**Total Lithics**	**Flint Lithics**	**% Flint Lithics**	**Non-Flint Lithics**	**%Non-Flint Lithics**
Boulder Clay	2	1	50%	1	**50%**
Gravel Terrace	61	39	64%	22	**36%**
Alluvial	3	2	67%	1	**33%**
Cheviot Slope	88	68	77%	20	**23%**
Sandstone Slope	10	9	90%	1	**10%**
Total	164	119	av.73%	45	av.27%
Late Neolithic-Early Bronze Age					
Ecological Zone	**Total Lithics**	**Flint Lithics**	**% Flint Lithics**	**Non-Flint Lithics**	**%Non-Flint Lithics**
Cheviot Slope	26	26	100%	0	**0%**
Gravel Terrace	12	12	100%	0	**0%**
Sandstone Slope	12	12	100%	0	**0%**
Boulder Clay	5	5	100%	0	**0%**
Alluvial	0	0	0%	0	**0%**
Total	55	55	av.100%	0	av.0%
Unclassified					
Ecological Zone	**Total Lithics**	**Flint Lithics**	**% Flint Lithics**	**Non-Flint Lithics**	**%Non-Flint Lithics**
Gravel Terrace	87	32	37%	55	**63%**
Cheviot Slope	138	88	64%	50	**36%**
Boulder Clay	36	23	64%	13	**36%**
Sandstone Slope	82	62	76%	20	**24%**
Alluvial	0	0	0%	0	**0%**
Total	343	205	av.60%	138	av.40%
These tables include data on all lithics from the fieldwalking transect including the test-pits					
The tables are ranked in order of highest % of non-flint raw materials first					

Appendix 4

APPENDIX 5

Burnt, Rejuvenated and Patinated Lithics By Period and Ecological Zone

All Periods							
Ecological Zone	**Total Lithics**	**Burnt Lithics**	**%Burnt Lithics**	**Rejuv. Lithics**	**%Rejuv. Lithics**	**Pat/d Lithics**	**%Pat/d Lithics**
Cheviot Slope	340	46	**14%**	20	**6%**	33	**10%**
Gravel Terrace	247	13	**5%**	15	**6%**	26	**11%**
Sandstone Slope	154	31	**20%**	11	**7%**	16	**10%**
Boulder Clay	50	16	**32%**	1	**2%**	1	**2%**
Alluvial	5	1	**20%**	0	**0%**	0	**0%**
Total	796	107	av.13%	47	av.6%	76	av.10%
Mesolithic							
Ecological Zone	**Total Lithics**	**Burnt Lithics**	**%Burnt Lithics**	**Rejuv. Lithics**	**%Rejuv. Lithics**	**Pat/d Lithics**	**%Pat/d Lithics**
Cheviot Slope	88	10	**11%**	9	**10%**	19	**22%**
Gravel Terrace	87	5	**6%**	5	**6%**	20	**23%**
Sandstone Slope	50	8	**16%**	4	**8%**	8	**16%**
Boulder Clay	7	1	**14%**	0	**0%**	0	**0%**
Alluvial	2	1	**50%**	0	**0%**	0	**0%**
Total	234	25	av.11%	18	av.8%	47	av.20%
Mesolithic-Neolithic Transition							
Ecological Zone	**Total Lithics**	**Burnt Lithics**	**%Burnt Lithics**	**Rejuv. Lithics**	**%Rejuv. Lithics**	**Pat/d Lithics**	**%Pat/d Lithics**
Cheviot Slope	88	11	**13%**	5	**6%**	4	**5%**
Gravel Terrace	61	2	**3%**	5	**8%**	1	**2%**
Sandstone Slope	10	1	**10%**	0	**0%**	0	**0%**
Boulder Clay	2	0	**0%**	0	**0%**	0	**0%**
Alluvial	3	0	**0%**	0	**0%**	0	**0%**
Total	164	14	av.9%	10	av.6%	5	av.3%
Late Neolithic-Early Bronze Age							
Ecological Zone	**Total Lithics**	**Burnt Lithics**	**%Burnt Lithics**	**Rejuv. Lithics**	**%Rejuv. Lithics**	**Pat/d Lithics**	**%Pat/d Lithics**
Cheviot Slope	26	1	**4%**	3	**12%**	3	**12%**
Gravel Terrace	12	1	**8%**	1	**8%**	1	**8%**
Sandstone Slope	12	1	**8%**	3	**25%**	1	**8%**
Boulder Clay	5	1	**20%**	0	**0%**	0	**0%**
Alluvial	0	0	**0%**	0	**0%**	0	**0%**
Total	55	4	av.7%	7	av.13%	5	av.9%
Unclassified							
Ecological Zone	**Total Lithics**	**Burnt Lithics**	**%Burnt Lithics**	**Rejuv. Lithics**	**%Rejuv. Lithics**	**Pat/d Lithics**	**%Pat/d Lithics**
Cheviot Slope	138	24	**17%**	3	**2%**	7	**5%**
Gravel Terrace	87	5	**6%**	4	**5%**	4	**5%**
Sandstone Slope	82	21	**26%**	4	**5%**	7	**9%**
Boulder Clay	36	14	**39%**	1	**3%**	1	**3%**
Alluvial	0	0	**0%**	0	**0%**	0	**0%**
Total	343	64	av.19%	12	av.3%	19	av.6%
These tables include data on all lithics from the fieldwalking transect including the test-pits							

Appendix 5

APPENDIX 6

Frequency of Lithic Types by Ecological Zone - All Periods

Type	Cheviot Slope	Gravel Terrace	Sandstone S	Boulder Clay	Alluvial
Bashed Lump		3		1	
Test Piece	1	1	2		
Flake	85	43	44	15	
Blade	4	6	5	2	
Bladelet	5		1		
Core	44	44	11	6	
Scraper	22	23	14	3	1
Arrowhead/Point	8	6	5	4	
Microlith	20	15	10	2	
Burin	5	4			
Knife	5	1	2	1	
Sickle	3				
Borer	5	2	4		
Rod				1	
Axe			1		1
Gun Flint				1	
Unclassified Tool	131	97	54	14	3
Total	338	245	153	50	5

Density of Lithic Types by Ecological Zone - All Periods (x1000)

Type	Cheviot Slope	Gravel Terrace	ndstone Slo	Boulder Clay	Alluvial
Bashed Lump	0.0	27.7	0.0	8.6	0.0
Test Piece	4.2	9.2	22.9	0.0	0.0
Flake	354.6	396.7	503.8	129.1	0.0
Blade	16.7	55.4	57.3	17.2	0.0
Bladelet	20.9	0.0	11.5	0.0	0.0
Core	183.6	405.9	126.0	51.6	0.0
Scraper	91.8	212.2	160.3	25.8	21.0
Arrowhead/Point	33.4	55.4	57.3	34.4	0.0
Microlith	83.4	138.4	114.5	17.2	0.0
Burin	20.9	36.9	0.0	0.0	0.0
Knife	20.9	9.2	22.9	8.6	0.0
Sickle	12.5	0.0	0.0	0.0	0.0
Borer	20.9	18.5	45.8	0.0	0.0
Rod	0.0	0.0	0.0	8.6	0.0
Axe	0.0	0.0	11.5	0.0	21.0
Gun Flint	0.0	0.0	0.0	8.6	0.0
Unclassified Tool	546.6	894.8	618.3	120.5	63.1
Total Density	**1410.2**	**2260.1**	**1752.0**	**430.3**	**105.2**

All these tables contain data of the entire lithic assemblage from the transect including the test-pitting

4 lithics have been excluded for which there is no data

Appendix 6

Frequency of Mesolithic Lithic Types by Ecological Zone

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial
Bashed Lump		1			
Test Piece					
Flake	8	6	5		
Blade	2	3	1	1	
Bladelet	1		1		
Core	22	25	6	3	
Scraper	11	14	7		1
Arrowhead/Point		1			
Microlith	18	15	10	2	
Burin	2	3			
Knife	1				
Sickle					
Borer	1	1	3		
Rod				1	
Axe			1		
Gun Flint					
Unclassified Tool	22	18	16		1
Total	88	87	50	7	2

Density of Mesolithic Lithic Types by Ecological Zone (x1000)

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial
Bashed Lump	0.0	9.2	0.0	0.0	0.0
Test Piece	0.0	0.0	0.0	0.0	0.0
Flake	33.4	55.4	57.3	0.0	0.0
Blade	8.3	27.7	11.5	8.6	0.0
Bladelet	4.2	0.0	11.5	0.0	0.0
Core	91.8	230.6	68.7	25.8	0.0
Scraper	45.9	129.2	80.2	0.0	21.0
Arrowhead/Point	0.0	9.2	0.0	0.0	0.0
Microlith	75.1	138.4	114.5	17.2	0.0
Burin	8.3	27.7	0.0	0.0	0.0
Knife	4.2	0.0	0.0	0.0	0.0
Sickle	0.0	0.0	0.0	0.0	0.0
Borer	4.2	9.2	34.4	0.0	0.0
Rod	0.0	0.0	0.0	8.6	0.0
Axe	0.0	0.0	11.5	0.0	0.0
Gun Flint	0.0	0.0	0.0	0.0	0.0
Unclassified Tool	91.8	166.1	183.2	0.0	21.0
Total Density	**367.2**	**802.6**	**572.5**	**60.2**	**42.1**

Appendix 6

Frequency of Late Mesolithic-Early Neolithic Lithic Types by Ecological Zone

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial		
Bashed Lump							
Test Piece							
Flake	9	2					
Blade	1	2	1				
Bladelet	3						
Core	6	10					
Scraper	7	5	1				
Arrowhead/Point	3	4	1	1			
Microlith	2						
Burin	2	1					
Knife	3						
Sickle							
Borer		1					
Rod							
Axe					1		
Gun Flint							
Unclassified Tool	51	36	7	1	2		
Total	87	61	10	2	3		

Density of Late Mes.-Early Neo. Lithic Types by Ecological Zone (x1000)

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial		
Bashed Lump	0.0	0.0	0.0	0.0	0.0		
Test Piece	0.0	0.0	0.0	0.0	0.0		
Flake	37.6	18.5	0.0	0.0	0.0		
Blade	4.2	18.5	11.5	0.0	0.0		
Bladelet	12.5	0.0	0.0	0.0	0.0		
Core	25.0	92.3	0.0	0.0	0.0		
Scraper	29.2	46.1	11.5	0.0	0.0		
Arrowhead/Point	12.5	36.9	11.5	8.6	0.0		
Microlith	8.3	0.0	0.0	0.0	0.0		
Burin	8.3	9.2	0.0	0.0	0.0		
Knife	12.5	0.0	0.0	0.0	0.0		
Sickle	0.0	0.0	0.0	0.0	0.0		
Borer	0.0	9.2	0.0	0.0	0.0		
Rod	0.0	0.0	0.0	0.0	0.0		
Axe	0.0	0.0	0.0	0.0	21.0		
Gun Flint	0.0	0.0	0.0	0.0	0.0		
Unclassified Tool	212.8	332.1	80.2	8.6	42.1		
Total Density	**363.0**	**562.7**	**114.5**	**17.2**	**63.1**		

Appendix 6

Frequency of Late Neolithic-Early Bronze-Age Lithic Types by Ecological Zone

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial
Bashed Lump					
Test Piece					
Flake		2			
Blade					
Bladelet					
Core	1				
Scraper	4	2	5	1	
Arrowhead/Point	5		4	3	
Microlith					
Burin					
Knife	1		1		
Sickle	1				
Borer	1				
Rod					
Axe					
Gun Flint					
Unclassified Tool	13	8	2	1	
Total	26	12	12	5	0

Density of Late Neo.-Early B.A. Lithic Types by Ecological Zone (x1000)

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial
Bashed Lump	0.0	0.0	0.0	0.0	0.0
Test Piece	0.0	0.0	0.0	0.0	0.0
Flake	0.0	18.5	0.0	0.0	0.0
Blade	0.0	0.0	0.0	0.0	0.0
Bladelet	0.0	0.0	0.0	0.0	0.0
Core	4.2	0.0	0.0	0.0	0.0
Scraper	16.7	18.5	57.3	8.6	0.0
Arrowhead/Point	20.9	0.0	45.8	25.8	0.0
Microlith	0.0	0.0	0.0	0.0	0.0
Burin	0.0	0.0	0.0	0.0	0.0
Knife	4.2	0.0	11.5	0.0	0.0
Sickle	0.0	0.0	0.0	0.0	0.0
Borer	4.2	0.0	0.0	0.0	0.0
Rod	0.0	0.0	0.0	0.0	0.0
Axe	0.0	0.0	0.0	0.0	0.0
Gun Flint	0.0	0.0	0.0	0.0	0.0
Unclassified Tool	54.2	73.8	22.9	8.6	0.0
Total Density	**104.3**	**110.7**	**137.4**	**43.0**	**0.0**

Frequency of Unclassified Period Lithic Types by Ecological Zone

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial
Bashed Lump		2		1	
Test Piece	1	1	2		
Flake	68	33	39	15	
Blade	1	1	3	1	
Bladelet	1				
Core	15	9	5	3	
Scraper		2	1	2	
Arrowhead/Point		1			
Microlith					
Burin	1				
Knife		1	1	1	
Sickle	2				
Borer	3		1		
Rod					
Axe					
Gun Flint				1	
Unclassified Tool	45	35	29	12	
Total	137	85	81	36	0

Density of Late Neo.-Early B.A. Lithic Types by Ecological Zone (x1000)

Type	Cheviot Slope	Gravel Terrace	Sandstone Slope	Boulder Clay	Alluvial
Bashed Lump	0.0	18.5	0.0	8.6	0.0
Test Piece	0.0	9.2	22.9	0.0	0.0
Flake	283.7	304.4	446.6	129.1	0.0
Blade	4.2	9.2	34.4	8.6	0.0
Bladelet	4.2	0.0	0.0	0.0	0.0
Core	62.6	83.0	57.3	25.8	0.0
Scraper	0.0	18.5	11.5	17.2	0.0
Arrowhead/Point	0.0	9.2	0.0	0.0	0.0
Microlith	0.0	0.0	0.0	0.0	0.0
Burin	4.2	0.0	0.0	0.0	0.0
Knife	0.0	9.2	11.5	8.6	0.0
Sickle	0.0	0.0	0.0	0.0	0.0
Borer	12.5	0.0	11.5	0.0	0.0
Rod	0.0	0.0	0.0	0.0	0.0
Axe	0.0	0.0	0.0	0.0	0.0
Gun Flint	0.0	0.0	0.0	8.6	0.0
Unclassified Tool	187.8	322.9	332.1	103.3	0.0
Total Density	**559.1**	**784.1**	**927.5**	**309.8**	**0.0**

Appendix 6

APPENDIX 7

Lithic Assemblage by Core Reduction Sequence and Ecological Zone

All Periods

Core Reduction Sequence	Cheviot Slope	Gravel Terrace	Sandstone	Boulder Clay	Alluvial	Total
Primary	14	12	3	3	0	32
Secondary	124	85	58	21	0	288
Tertiary	200	148	91	26	5	470
Total	**338**	**245**	**152**	**50**	**5**	**790**

Mesolithic

Core Reduction Sequence	Cheviot Slope	Gravel Terrace	Sandstone	Boulder Clay	Alluvial	Total
Primary	1	3	0	0	0	4
Secondary	35	32	11	4	0	82
Tertiary	52	52	37	3	2	146
Total	**88**	**87**	**48**	**7**	**2**	**232**

Mesolithic-Neolithic Transition

Core Reduction Sequence	Cheviot Slope	Gravel Terrace	Sandstone	Boulder Clay	Alluvial	Total
Primary	1	0	0	0	0	1
Secondary	20	15	1	0	0	36
Tertiary	66	46	9	2	3	126
Total	**87**	**61**	**10**	**2**	**3**	**163**

Late Neolithic-Early Bronze Age

Core Reduction Sequence	Cheviot Slope	Gravel Terrace	Sandstone	Boulder Clay	Alluvial	Total
Primary	0	1	0	0	0	1
Secondary	1	1	0	0	0	2
Tertiary	25	10	12	5	0	52
Total	**26**	**12**	**12**	**5**	**0**	**55**

Unclassified Period

Core Reduction Sequence	Cheviot Slope	Gravel Terrace	Sandstone	Boulder Clay	Alluvial	Total
Primary	12	8	3	3	0	26
Secondary	68	37	46	17	0	168
Tertiary	57	40	33	16	0	146
Total	**137**	**85**	**82**	**36**	**0**	**340**

These tables include information on the entire lithic assemblage from the transect including the test-pitting

5 lithics have been excluded as no data is available for them

Appendix 7

APPENDIX 8

Name of site	Type of site	Laboratory number	Uncalibrated date	Calibrated 2-sigma (95.4%)
Bolam Lake	domestic pit	Beta-117290	2960 +/-70bc	3940-3520 BC
Bolam Lake	domestic pit	Beta-117291	2930 +/-80bc	3950-3350 BC
Chatton Sandyford	cairn	GaK-1507	2890 +/-90bc	3900-3350 BC
Coupland Enclosure	domestic pit	OxA-6832	3140 +/-60bc	4000-3710 BC
Coupland Enclosure	domestic pit	OxA-6833	3110 +/-60bc	3990-3700 BC
Coupland West Droveway	ditch fill	Beta-96129	3090 +/-70bc	3990-3700 BC
Coupland West Droveway	ditch fill	Beta-96130	3000 +/-70bc	3960-3540 BC
Coupland Enclosure Ditch	2dry ditch fill	Beta-117294	1480 +/-60bc	1910-1530 BC
Harehaugh Enclosure	soil below enclosure dump	Beta-96128	2490 +/-60bc	3340-2920 BC
Ingram Hill	soil below lynchet	Beta-105611	3240 +/-70bc	4240-3790 BC
Lindisfarne, Marygate	stakeholes	Beta-96036	2820 +/-70bc	3700-3370 BC
Lookout Plantation	pit	HAR-4388	1460 +/-80bc	1920-1520 BC
Lookout Plantation	pit	HAR-4385	1420 +/-80bc	1890-1510 BC
Milfield North	pit alignment	BM-1652	1820 +/-50bc	2460-2030 BC
Milfield North	pit alignment	BM-1650	1790 +/-50bc	2340-1980 BC
Milfield North	pit alignment	BM-1653	1655 +/-80bc	2200-1740 BC
Milfield North	henge	BM-1150	1851 +/-62bc	2460-2040 BC
Milfield North	henge	BM-1149	1824 +/-39bc	2350-2040 BC
Milfield North	henge	HAR-1199	1800 +/-80bc	2460-1960 BC
Milfield South	henge	HAR-3071	1950 +/-110bc	2900-2000 BC
Milfield South	henge	HAR-3068	1740 +/-80bc	4730-4360 BC
Milfield South	henge	HAR-3040	1590 +/-100bc	2200-1600 BC
Thirlings	domestic pit	HAR-877	3280 +/-150bc	4400-3700 BC
Thirlings	domestic pit	HAR-6658	2570 +/-120bc	3650-2900 BC
Thirlings	domestic pit	HAR-1450	2170 +/-100bc	2920-2460 BC
Thirlings	domestic pit	HAR-1451	2130 +/-130bc	3050-2200 BC
Whitton Hill	burnt spread	BM-2203	2870 +/-80bc	3780-3370 BC
Whitton Hill	hengiform site 1	BM-2206	1790 +/-50bc	2340-1980 BC
Whitton Hill	hengiform site 1	BM-2265	1730 +/-80bc	2350-1800 BC
Whitton Hill	hengiform site 1	BM-2266	1710 +/-50bc	2200-1900 BC
Whitton Hill	ring ditch site 2	BM-2205	1650 +/-45	2140-1820 BC
Yeavering	domestic pit	HAR-3063	2940 +/-90bc	3950-3350 BC

Appendix 8 Summary of all radiocarbon dates referred to in the text (calibrated using Oxcal v.2.18 Stuiver and Reimer 1986)