Settlement and society in the later prehistory of North-East England

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(Two volumes)

Volume 1

Thesis submitted for the degree of Doctor of Philosophy
Department of Archaeology
University of Durham
1992

ABSTRACT

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This study examines the evidence for later prehistoric and Romano-British settlement in the four counties of north east England. The aim is to explore the ways in which landscape archaeology can be used to gain an understanding of social interaction.

The work is essentially a theoretical study although it derives from a comprehensive survey of the empirical evidence. It stresses the importance of the conceptual framework within which archaeological research is undertaken and aims to show that approaches currently employed in this area fail to explore the full potential of the existing data set. The survey therefore begins with a critical assessment of that data set and the factors both natural and anthropogenic which have affected the existing record.

Comprehending the use of space is seen as fundamental to understanding past society. An initial analysis of settlement morphology is developed into a series of studies examining spatial patterning on a variety of scales. Quantitative techniques for the analysis of patterning at inter and intra-site levels are introduced. The observed patterns are seen to relate to social organisation and different social formations across space and time are identified.

The idea that the environment and hence the economy, played a deterministic role in the settlement history of this area is rejected. The environmental background and its economic potential are examined in some detail and it is suggested that economic activity was directed by social relations. Observed differences in farming practice throughout the region are discussed in terms of social relations of production and the groupings which emerge show a strong correlation with the social formations identified by spatial analysis.

The results of this work serve to build up a picture of the organisation of social groups at the settlement level and their interaction with neighbouring groups. Possible directions for further work are suggested.

I, Gillian Ferrell, declare that no part of this material has previously been submitted by me for a degree in this or any other University.

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ACKNOWLEDGEMENTS

I would like to acknowledge assistance from the staff of the Department of Archaeology, University of Durham, throughout my research, in particular from my supervisor Colin Haselgrove whose constructive criticism and support have been greatly appreciated. The work was funded by a grant from the British Academy.

I am grateful to the keepers of the Sites and Monuments Records for the counties of Northumberland, Durham and Cleveland for their assistance in the compilation of a database. Any student of northern archaeology must also acknowledge indebtedness to the work of the late George Jobey. His work inspired my interest in archaeology and has been an invaluable source of reference throughout.

Colin Burgess, Robin Daniels, the Royal Commission on the Historical Monuments of England (Newcastle), the late Paul Sellers and Marijke van der Veen all allowed me access to the results of their research in advance of publication. This assistance is gratefully acknowledged. Thanks are also due to Lisa Regan who proof-read the text.

This work has benefitted greatly from discussion with and advice from, a number of friends and colleagues. In particular I would like to thank Ian Bailiff, John Chapman, JD Hill, Dr GAL Johnson, Bernice Kurchin and Pete Topping for their comments on various parts of the text.

I would especially like to thank my parents for their unfailing support and encouragment as ever. My greatest debt of gratitude is to Phil Clogg who has discussed the text with me, advised on the statistical analyses and been a source of inspiration throughout.

CHAPTER ONE

INTRODUCTION

This is a study of settlement and society in north east England during the later prehistoric period. At first sight this may seem to be an area and a subject matter which has already been covered almost to saturation point by archaeologists. A brief glance at a bibliography of the published works of George Jobey alone reveals the products of a lifetime of exemplary fieldwork. Burgess, writing in 1984, quotes from one of Jobey's earlier papers 'In both the pre-Roman and Roman distribution patterns there are some voids.' (Jobey 1970b p73) and goes on to say, 'What may seem a rather strange prefatory quote in the circumstances will make sense to those aware of just how few are the voids in Border field archaeology that George Jobey's indefatigable efforts have left others to explore.' (Burgess 1984 p126). North east England does indeed have one of the more complete records of later prehistoric settlement in the country thanks to the work of Professor Jobey and others such as Burgess, Coggins, Gates, Harding, Haselgrove, McCord, and Miket to name but a few. So what can another survey of the evidence at the present time hope to offer?

The present study is intentionally theoretical in its approach although it derives from a comprehensive survey of the empirical evidence. The starting point is the existing record of prehistoric and Romano-British settlement in the four counties of north east England. The aim is not expressly to refine chronologies or extend distributions but to explore the ways in which settlement and landscape archaeology can be used to gain a greater understanding of past society. The intention is thus to open up a discourse in which the past can be considered not in terms of settlement or artefact typologies but in terms of social organisation. This record is a text which if used in an appropriate manner can not only produce site types but can reveal details of how those sites functioned in the structuring and reproduction of social relations. Analysis of the settlement data will therefore be used to build up a picture of the type of social units who built and inhabited the sites and to examine how the groups were structured at the individual settlement level and how they interacted with neighbouring and more distant groups.

In order to achieve this aim and to write a social archaeology of this area, the reclassification of the data is however an essential first step. It is now 32 years since Jobey published the first of a series of seminal articles in which he listed, classified and discussed the later prehistoric settlements of Northumberland (Jobey 1960; 1962b; 1964; 1965a; 1972a). The fact that these gazetteers have never been surpassed, challenged or even comprehensively updated in print, testifies to the quality of his work but also reflects a certain intellectual stagnation in this area. Later work has almost invariably taken Jobey, rather than the data, as a starting point.

Most students of northern archaeology, if asked to define the greatest problem facing researchers in this area, would identify chronology as the major obstacle. Indeed it is almost obligatory for any thesis or published survey to include a plea for more excavation and better dating evidence (cf George 1976 p3; Smith 1990 p42; Young 1984b p280). Whilst recognising that the chronology for the area is far from perfect, the present work is based on the premise that attitudes to the data present a far more serious hindrance to research.

The tradition of empiricism in this area and the existence of a number of high quality surveys, has led to a situation where archaeologists are frequently uncritical of both their data and their own assumptions. In other words, we find what we expect to find. 'It is sometimes considered a paradox that the answer depends not only on the observations but on the question: it should be a platitude.' (Jeffreys 1961 pvii). It is the opinion of the present writer that more fieldwork will not greatly increase our understanding of the past in this area until we begin to ask a new set of questions.

The problem is to some extent that the archaeology of this area has traditionally been viewed as straightforward and hence critical analysis has been swamped by an overdose of "common sense". The past has been seen as a text in plain English with many missing pages. What survives is perfectly legible but it cannot be used to write history until we unearth more pages. The phenomenon, although particularly marked in this area, is not unique to it. Hill has drawn attention to the tendency to write the past as a pale reflection of the present, 'The picture painted contains little which is not immediately familiar to our own lived experience, or at least our recent rural forebears' (Hill forthcoming b).

Hill terms this 'archaeology as genealogy' and this form of archaeology is all too evident in this area eg. 'Thus the social *élite*, the potentates and ruling families that emerge only fully in the Early Historic period may be seen to have their roots much earlier in the landscape of the mid to first millennium BC. Accepting this view, it follows that the first millennium BC was nothing less than the gestation period for Early Historic Society;' (Smith 1990 p52).

If we are to move towards contextual, meaningful interpretation of the past then we must first question our assumptions about the past and make explicit the conceptual framework within which we operate. As Hingley states, 'Theory must take primacy of place over data in any coherent philosophy of archaeology' (1984a p72).

This is not to suggest that theory, any more than "common sense", should be *imposed* on the data, 'For on what procedures, other than the prior analysis of the archaeological record, its artefacts, features and their patternising in space and time are we to base our conceptualisation of the organisation of those past societies which generated particular segments of that record?' (Haselgrove 1986 p28).

Analysis of such space-time patterns does indeed form a major component of this work. An initial study of settlement morphology is developed into an investigation of spatial patterning on a variety of scales. The problem of chronology cannot be overlooked in such a study but investigation of the use of space does suggest social differences which may have chronological implications. It must be remembered that the quantitative techniques employed here provide descriptions rather than explanations. However an attempt has been made to interpret the observed patterns in terms of social organisation.

The philosophy behind the present work is discussed more fully in chapter two which is divided into three sections. Section 2.1 considers the archaeological data and the factors influencing preservation and recovery which have affected the existing record. A summary of past work in the area is given. Section 2.2 discusses in more detail the need for a coherent theoretical framework in archaeological research. Section 2.3 outlines the methods used for the initial classification and quantification of the data. The recorded sites are divided into three broad groups based on overall morphology. At this stage no assumptions are made regarding any functional or chronological similarity between sites of superficially similar form.

The next part of the work is concerned with the environmental background to the area. Chapter three discusses the topography of the region. Recent work on the geology of the area is discussed in some detail in order to illustrate the diversity which may occur within broad geological zones. A revised terminology, based on this recent work, is introduced since much of the terminology used in older works is based on formations found elsewhere in Britain which differ markedly from those found in north east England. Chapter four discusses the use of pollen analysis in archaeology (section 4.1) and considers the environmental history of the region as evidenced by palynological (section 4.2) and climatological (section 4.3) studies. This is followed up in appendix three which comprises a series of detailed case studies examining the relationship between environmental changes likely to have resulted from anthropogenic activity and known archaeological sites.

Chapters five, six and seven discuss each of the main morphological groups of archaeological sites. The chapters follow a fixed format, beginning with an analysis of the numbers and distribution of known sites, including an assessment of possible bias in the perceived patterns and a survey of previous work on the sites. This is followed by discussion of the structural components recorded on such sites and any structural evidence for agricultural activity. The agricultural potential of the site locations through time is scored. This enables comparisons to be made between groups in order to see whether the various morphological groups reached their optimum agricultural potential at different times, a point which may relate to the dating of the sites. Details of the method for assessing agricultural potential are given in appendix two. The morphology of the sites is considered in more detail and each of the major groups is broken down into a number of types defined by differences in the use of space on the sites. Finally, the dating evidence for each group and its relationship to the identified types is discussed.

Comprehending the use of space is seen here as fundamental to understanding past society and this topic is explored in chapters eight and nine. Social meaning is not added to spatial order, the two are indistinguishable from one another. Chapter eight looks at spatial patterning within the landscape and suggests a method, based on rank size analysis, for investigation of such patterns. The theoretical implications behind the rank size rule are explored and quantitative means of describing individual data sets and testing the representativity of data samples are introduced. A series of case studies then apply this method in different areas and an attempt is made to explain the observed differences through space and time in terms of social change. Chapter nine examines intra-site spatial patterning and considers how the nature of the built environment relates to the localised social formations suggested in the previous chapter. Quantitative analysis of the use of space on enclosed sites is used to identify social differences and the origins of enclosure and the changing role of the boundary through time are considered.

Chapter ten uses the broad outline of social organisation built up in the previous chapters to examine the relationship between spatial configuration and mode of production. Recent archaeobotanical work has highlighted differences in crop types and cultivation methods throughout the region (Van der Veen 1990; 1992). These differences are discussed in terms of social relations of production and the groupings which emerge are seen to show a strong correlation with the different social formations identified in the previous chapters.

Chapter eleven summarises the results of this work and the conclusions which have been drawn. These conclusions are by no means definitive or detailed; they provide only an outline for a new way of looking at north eastern prehistory and a few glimpses of the kind of societies such an approach reveals. We are fortunate in this area, in having a wealth of archaeological data, the potential of which is only beginning to be realised. If this study goes some way towards opening up new possibilities then it will have achieved its aim.

CHAPTER TWO

DATA, THEORY AND METHOD

This chapter seeks to outline the aims of this study and the theoretical and methodological framework within which it was undertaken and to demonstrate its relevance to the wider field of settlement studies. Section 2.1 considers the study as an exercise in landscape archaeology, 2.2 examines the theoretical considerations pertaining to such work and 2.3 outlines the basic methods used to quantify and analyse the data.

2.1 THE DATA

The raw data of this study are the existing records of prehistoric and Romano-British settlements in the counties of Northumberland, Durham, Tyne & Wear and Cleveland. These data have been collected in a variety of ways over a considerable period of time from the surveys of MacLaughlan almost a century and a half ago to the satellite photographs now used by the Royal Commission on the Historical Monuments of England (RCHME). Records of some 1489 sites are considered here, 1429 of which are extant as either earthworks or cropmarks at the time of writing. The sites cover the period from the early Bronze Age to the end of Romano-British times and in some cases, beyond.

The modern administrative boundaries have been selected as the limits of study in order to fulfil the objectives of a particular research design. It must be stressed that this is not a regional study in any other sense. The point is an obvious one and has been stated before, 'There are no obvious *a priori* grounds to justify the belief that modern political boundaries delimit spatial units appropriate to the study of archaeological phenomena' (Haselgrove 1978 p160).

Ever since Binford (1964) advocated the "regional approach" without specifying the nature of the expected relationship between 'regions' and 'cultural systems', archaeologists have bandied the term about loosely. The concept has however been the subject of much debate among geographers. As Grigg (1967 p464) states, 'There is no agreed definition of the term 'region' when it is used unqualified by an adjective'. Concepts employed by certain French geographers, notably Vidal de la Blanche, early this century may however be of use to archaeologists. This school produced a series of monographs on parts of France held to have a distinctive 'genre de vie'. The distinctions were based on more than a simple response to a particular environment, '..... the adjustment of each society to the peculiarities of the local physical environment, taking place over many centuries, produces local characteristics in that society which are not to be found elsewhere. Man and nature become moulded to one another over the years rather like a snail and its shell. Yet the connection is more intimate even than that, so that it is not possible to disentangle influences in one direction, of man on nature, from those in another, of nature on man' (Wrigley 1965 p8). The methods of the "Pays Concept" proved well suited to the study of localised, agrarian societies but inappropriate for the study of industrial society. Geographers have indeed been quicker than archaeologists to realise the inadequacy of making 'the natural region serve as the plastercast of a specific kind of human economy' (Kimble 1951 p153).

This study aims therefore to cut across a number of physical and conceptual boundaries and sample the data on either side. For this purpose, the existing records in each county constitutes the sample. The boundaries are the physical boundary between the upland and lowland zones; the political boundary between the historically attested tribes of the Votadini and the Brigantes; and the conceptual boundary between prehistoric and Roman archaeology. It would have been possible to analyse data from within an area defined by the National Grid or within more strict geographical zones but it was felt that settlements within the administrative counties ought to give a sufficiently representative comparative sample. Well defined topographic zones occur within the area as discussed in chapter three, thus environmental factors can be adequately assessed. The area is particularly interesting as it does represent a very closed regional unit in terms of academic influences. Put another way, how far has the "Jobey Factor" homogenised the picture?

The county of Northumberland is by far the most extensively surveyed of the four. The antiquarian tradition in this area produced a number of competent fieldworkers who left records of lasting value. Notable among early excavators are George Tate of the Berwickshire Naturalists Club and the Reverend George Rome-Hall, vicar of Birtley (not to be confused with the Birtley now in Tyne & Wear). At a time when treasure hunting was at its height, both Tate and Rome-Hall conducted excavations with sound academic motives on a variety of prehistoric settlements, making a number of astute observations, of which others in the course of the last century would have done well to take note. Some 25 years before Pitt-Rivers published his well known treatise on the importance of recording for posterity, Tate (1862a p293) quoted the words of Sir Thomas Browne 'Tis time to observe occurrences and let nothing remarkable escape us; the supinity of elder days hath left so much in silence, or time hath so martyred the records, that the most illustrious heads do find no easie work to erect a new Britannia'.

The most comprehensive and far reaching early contribution to settlement studies in this area was however made by Henry MacLaughlan whose work has recently been outlined in a biographical essay (Charlton & Day 1984). MacLaughlan was an employee of the Ordnance Survey who developed a keen interest in archaeology. His interest was matched by that of the fourth Duke of Northumberland, who employed him in 1848 to undertake a survey of earthworks between the Tees and the Swale. The relationship continued until the Duke's death in 1865 during which time MacLaughlan completed surveys of Watling Street from the Tees to the Scottish Border, the Roman Wall, the eastern branch of Watling Street and prehistoric settlements in the Cheviots. These works were published in the form of atlas volumes and memoirs, which included much perceptive comment (MacLaughlan 1852a,b; 1857; 1858; 1864a,b; 1866; 1867). Birley (1961) sums up the content of MacLaughlan's surveys when he praises him for his 'shrewd observations, careful measurements and methodical hearing of local evidence'. Both Tate and Rome-Hall appear to have profited from his acquaintance.

MacLaughlan's work remained the primary source for the area until the middle of this century. Hedley's (1924) "Early earthworks in Northumberland" was based on MacLaughlan as was Hogg's (1947) "New list of native sites of Northumberland" with the addition of some sites discovered by air photography. There was a dearth of excavation at this time as will be evident from the succeeding chapters; exceptions consist of limited excavations by Wake (1939) and Hogg (1942a,b).

This period of stagnation was brought to an end during the 1950s when George Jobey began a programme of research which formed the basis for all subsequent studies of the area. The debt owed by this thesis to his meticulous fieldwork will become more obvious with each succeeding chapter and it serves here merely to outline the scope of this work. His surveys of sites the length and breadth of

Northumberland equalled those of MacLaughlan and by 1966 he had already been referred to in print as 'virtually a commission in himself' (Stevens 1966 p116). This work was backed up by a series of excavations, some purely research and others taking advantage of rescue funding but all carried out to the same exacting standards. His methods always moved with the times although he was often limited by the fact that research funding did not; a single C14 date for the site at Huckhoe was obtained a decade after the initial excavations. Jobey (1968b) explains that at the time of the excavation, the cost of a C14 date was four times the expenditure on four seasons of excavation. Most importantly for other academics, his work has always been promptly published. He has produced seminal works on all types of prehistoric settlement and the discussions therein have fuelled most of the more fruitful research of the last decade.

The only other individual body which deserves to be singled out as having made a large scale contribution to fieldwork in the area is the RCHME. Between 1984 and 1989 a survey of 66 square kilometres around the Ingram Valley in north Northumberland was undertaken. Sites were plotted using satellite photographs and details were checked on the ground. The survey area is shown in fig 8.16. The gazetteer accompanying this thesis, based on RCHME data, records 172 sites in the survey area. This may be compared to 49 shown on the 1987 edition of the 1:50 000 OS map of the area. Whilst some sites had already been noted by other fieldworkers, particularly Gates (1983), the increase in site numbers is still considerable and serves to illustrate that even the intensively surveyed uplands of Northumberland still have further potential for site recognition. A similar phenomenon was noted by Young (1984b p21) upon resurveying areas of the Wear Valley.

The other parts of north east England have fared less well in terms of the efforts of active fieldworkers and the extent to which the distribution of known settlements reflects particular survey projects is far more marked. These are also the areas in which urban development and agriculture have had their greatest impact. Table 2.1 shows the amount of destroyed land in each of the four counties; these areas are mapped in figs 2.4-2.7. Known sites in Tyne & Wear were catalogued by Roger Miket (1984) as part of the SMR for the county. The evidence from this area consists mainly of finds discovered during urban development in the 19th century, supplemented to some extent by the aerial surveys of Norman McCord. Cleveland has suffered similarly although here aerial survey appears a little more promising as a means of yielding new information (Still *et al* 1989).

Air photography is responsible for most of the known sites in County Durham although a number of terrestrial surveys have taken place. The Durham Archaeological Survey (Haselgrove *et al* 1988) did not contribute markedly to knowledge of later prehistoric settlement in its study areas and Peter Fowler's (1986) Durham Parklands Survey has yet to be published in any readily accessible form. The work of Dennis Coggins (1986) has demonstrated the potential of the Pennine Uplands for site survival but fieldwork has been beset by environmental difficulties and publication delays.

If fieldwork has therefore been variable in distribution and quality, the studies making use of this data have been more uniformly dull. It is no exaggeration to say that recent writing on this area has been normative in the extreme. Jobey managed to combine positivism with intuition. His colleagues have fared less well. Earlier reference to the "Jobey Factor" implied criticism not of his own work but of blind acceptance and over extension of it. It is perhaps a reflection of his pre-eminence that others have not dared venture into the field of settlement studies.

Artefact catalogues abound; academics classify obsessively, putting off the day when they actually have to say something about the material. In the words of Kluckhohn, 'Proliferation of minutae is not its own justification' (1940 p42).

Do they perhaps feel there is nothing left to be said? Challis & Harding (1975) tell us this area has '..... the most complete record and provisional understanding of the 1st millennium BC and the Roman period in the whole of northern England'. Their summary, based on this, claims to give '....a synthesis of the whole range of evidence.....suggested explanations of apparent differences in cultural wealth, economy and environment......a view of the state of archaeological knowledge......and of the particular problems for present and future research which seem to be central to the character of each area' (Challis & Harding 1975 p180-82). However all we find is a further three and a half paragraphs on the significance of the presence or absence of odd sherds of pottery at four sites.

Of the other broad surveys of the area, Annable's (1987) "Later Prehistory of Northern England" is basically a catalogue of artefacts and burials which was already a decade out of date when it was published. It claims to be a survey of the evidence for later prehistoric settlement yet devotes barely fifteen and a half pages to discussion of the settlement evidence. In the words of one reviewer it is 'difficult to fathom what this enquiry was ever intended to achieve' (Burgess 1987 p106). Higham's (1986) synthesis deserves more serious consideration. It provides one of the most useful recent surveys of the evidence but is dominated by economic and environmental "explanations". The works of Burgess incorporate the concepts of process and change, accepting that settlement patterns are not a succession of isolated static units but he fails to go beyond an extreme form of environmental determinism. In his (1984) "speculative survey of the prehistoric settlement of Northumberland" we read of 'social, economic and environmental crisis at the end of the Mesolithic', 'major social and spiritual disruption' at the end of the Neolithic and 'widespread collapse of existing political, social and economic systems' in the middle Bronze Age. The situation at the start of the 1st millennium BC is 'easily explained in terms of social and economic collapse' and a 'protracted period of uncertainty and upheaval is implied' around the beginning of the Iron Age.

This is not to dismiss all the artefact studies and works of synthesis. All have their place and advances have been made in many areas. If one may single out a few works, Gates' (1983) work on unenclosed settlements provides a clear and useful account of recent fieldwork. Van der Veen's contributions to a number of excavation reports and the recent publication of her doctoral thesis, have been responsible for a re-appraisal of the economic base in the Iron Age. Topping's (1989a,b) study of cord rig cultivation has aroused much interest and has important implications for upland settlement and the excavations at Thorpe Thewles (Heslop 1987) highlight the importance of the lowland zone and show the potential of cropmark sites for structural survival. Further research would of course be greatly assisted by the publication of a number of important recent excavations in Northumberland and south east Scotland.

2.2 THE THEORY

We appear then to have a considerable body of empirical data, largely amassed in a theoretical vacuum. The situation is not peculiar to this area; landscape archaeology is still struggling to get beyond what Miles (1981 p11) aptly terms a 'train-spotting mentality'. In the words of Plog, 'we too frequently tend to work either principally with data, introducing theory only to the extent required to make the data seem sensible, or we work principally with theory, using data only to the extent necessary to make the theories seem supported' (Plog 1973 p657). Theory is not merely the provenance of those with no evidence. It is almost inconceivable that more profitable approaches can be brought to bear on the material of the Upper Palaeolithic than on the abundant settlement evidence of the Iron Age.

It could be argued that an absence of theory is no bad thing in relation to fieldwork. Fieldwork ought to be objective and lasting, not subservient to the latest conceptual fad. Reality, however is not so ideal. Every archaeological research design is a type fossil perpetuating the normative values of its age or reflecting the spread of a particular intellectual sub-culture. Recent criticism of that most "objective" body RCHME, as being 'trapped in an undefined and invisible cocoon of ageing attitudes' (Miles 1981 p11) illustrates this point exactly. The most prolific fieldworkers are in many cases the most reactionary. How many sampling designs or "key-site" excavations fail to reassert the perpetrator's previously stated views? This situation arises out of what Murphy has described as 'the wonderful capacity of the professional mind for absorbing the new into a prior order and context' (1972 p177). Evans states 'an entity is frequently "known" often by its "name" (ie. barrow, temple, settlement site) before its components are formally analysed and hence it is not surprising that most phenomena largely confirm their expectations' (1988 p66). In this light, it is astounding that in 1989, Hingley could find no better term for the majority of rural settlements in Roman Britain than 'non-villa' settlement. His comment, 'Non-villa settlements clearly formed the most common settlement type in the province and therefore constitute an important theme for research' (Hingley 1989 p23) must surely constitute one of the most inane remarks ever published on the subject.

So what has this study to offer and how will it cope with incomplete and not entirely objective data? The study aims to show that our current conceptual approaches are not getting the most out of the available data. The evidence surely tells us more than that people built settlements, produced food and died, carrying on a number of craft activities in between. It is no use postponing analysis until we have "better data", this merely perpetuates the collection of more data guided by the same unacknowledged, all-pervasive influences. One can but endorse the recently expressed views of Barrett and Hill regarding the state of theory in studies of later prehistory. There is a tendency to 'give economic processes a priority in historical explanations' (Barrett 1989a p1). More succinctly, 'The Iron Age is boring' (Hill 1989 p16).

The analysis of settlement patterns is of necessity an iterative process. Iteration as used in mathematics is a method whereby a result is required before a calculation can be performed. A result (hypothesis) is inserted into the formula and the calculation performed to produce another result. The new result is fed back in and the process continues, achieving a greater degree of accuracy each time. The method may be summed up as the use of successive approximations step by step to find better approximations (Bostock & Chandler 1979). In the study of settlement patterns one does indeed start with a result. The result is the archaeological record as we know it, any deficiencies or biases in this record being variables in the formula which must be quantified.

The study is not therefore a regional study in the accepted sense, it is an exercise in both landscape and social archaeology. It aims to show that whilst it is the case that 'other people's archaeology is often very little use' (Haselgrove 1978 p159), archaeologists just as often fail to make adequate use of the data available. By not asking the right questions we fail to stimulate improved fieldwork. It is to be hoped that besides gathering dust with a plethora of other gazetteers, the work may throw some light on a number of the seemingly insoluble problems of this area and be of use in the generation of future research designs.

Having criticised the lack of an explicit conceptual framework and the dangers of being trapped by concepts so familiar that they are accepted without question, it is necessary to outline the theoretical considerations influential in this study. The first is that archaeology is by its nature, a *social* science and should not lose sight of the fact that the study of past society is its legitimate and primary objective. Archaeological theorists are currently enacting a controversy over whether this is possible or even valid and indeed whether the controversy itself represents healthy discourse or stagnation (cf papers in Baker & Thomas 1990). It has already been accepted in this work that archaeological data are not objective and that individual interpretations of those data are conditioned by preconceptions and personal ideologies. The way forward then is surely examination of the data in the light of this new awareness not a retreat into reflexive self-consciousness which becomes increasingly nihilistic.

It is hardly stretching the bounds of credibility to suggest that we can identify the basic biological requirements of human beings. The rest, human behaviour, depends on the perception of oneself and one's interaction with the environment (in it s widest sense). 'Cultural groups' share perceptions as well as pots. It follows that these perceptions need to be expressed in order to be reinforced or altered and that we as archaeologists need to expand our own perceptions to find these expressions. Is it possible to be a positivist, contextual, post-processualist?

Young's statement that 'political content becomes the only way of assessing the acceptability of proffered archaeological interpretation' (1990 p81), is entirely misguided. Attempts to view the past in terms of "sound" (in this case left wing) ideologies may be every bit as irrelevant to the past as views which most would see as morally reprehensible. As Bintliff (1991 p277) points out, the 'racist' contribution of Pitt-Rivers to the discipline of archaeology can hardly be ignored. An understanding of society seen, for example, in terms of class struggle is blinkered to the fact that privilege in many societies is seen as bringing with it duty and obligation. You cannot *force* people to feel oppressed.

The iterative nature of archaeological reasoning has already been stressed, no-one can expect to have the final word on a subject, the value of any piece of work lies in whether or not it can add something to our understanding of the past and/or how we perceive it. It is for this reason that both the methodology and the theory behind any piece of work must be made explicit.

The not unpredictable reaction to the post modernist/processualist/structuralist trend is to view much of this discourse as 'abstraction for it's own sake' (Fleming 1990 p86). Bintliff (1991) lists Lyotard, Lacan, Derrida, Foucault, Heidegger, Habermas, Gadamer and Giddens as currently "fashionable" authors, none of whom 'have contributed anything in their writings to the discipline of archaeology' (*ibid* p275). Whilst accepting a number of his points, it may be said that in those terms, neither did Marx or Darwin. Reaction against the sometimes circular arguments within archaeology should not disguise the fact that there is a real need to keep pace with theoretical developments in the other social sciences. Work in fields such as anthropology, sociology and geography is highly relevant to archaeological thought. Without an awareness of this, we are in constant danger of re-inventing the wheel. There is therefore no apology made for the fact that the bibliographies for the main analytical chapters of this study are heavily biased towards recent geographical work (not to mention one or two items by those blacklisted above).

The second observation concerns the forming and testing of archaeological models once we have convinced ourselves we are dealing with acceptable empirical "facts". Archaeology is now very much science-based and rightly so. Both theory and analytical methods have advanced almost beyond recognition since the 1960s. However, the New Archaeology and its successors have as yet, dealt only with 'Old' science. Developments during the 1970s in the physical sciences, which are only just beginning to filter through to other academic communities, are bound to have far reaching implications. We are still "innocents" in some fields.

Archaeology is, in common with all other sciences, essentially reductionist. One of its most useful theoretical developments was the concept of process and the study of interactive "systems". This holistic approach is limited only by the need to define the limits of each system. Binford claimed 'processual change in one variable can then be shown to relate in a predictable and quantifiable way to changes in other variables, the latter changing in turn relative to changes in the structure of the system as a whole' (1962 p218). This is no longer considered true.

The new approach derives essentially from the study of non linear equations (ie. equations which are not solvable because they express relationships which are not strictly proportional) and more particularly, the non linear behaviour of systems. One discovery is the "sensitive dependence on initial conditions" of dynamic systems which shows that tiny differences in input to the system can quickly become overwhelming differences in output. This is better known as the "Butterfly Effect" after a paper given by meteorologist E N Lorenz in 1979 at the annual meeting of the American Association for the advancement of science entitled "Predictability: Does the flap of a butterfly's wings in Brazil set off a tornado in Texas?" The biologist May stated that 'we would all be better off if more people realised that simple non linear systems do not necessarily possess simple dynamical properties' (1976 p467).

Even apparently simple systems thus show themselves capable of complex behaviour which it is quite beyond the powers of the reductionist approach to predict. The most striking scientific and philosophical aspect of this work is however that analysis of this "chaos" reveals that complex systems which appear fundamentally different (eg. turbulent fluid flow, plant growth, the incidence of epidemics and cotton prices) actually obey the same (or a very similar) set of rules when considered from the chaotic point of view. This challenges accepted notions of what a scientific law actually is.

These ideas have found application in the fields of mathematics, physics, biology, meteorology, chemistry, economics and ecology to name but a few. With retrospect one can see the ideas behind the concepts beginning to emerge rather earlier in the writing of a number of geographers, '...it is becoming increasingly popular to ask what kinds of order are exhibited by geographical information and on what scales of space and time each operates' (Haggett & Chorley 1967 p20). 'That there is more order in the world than appears at first sight is not discovered till the order is looked for' (Sigwart quoted by Hanson 1958 p204). The need for a more "holistic" approach is now seen to be of fundamental importance in human geography, 'The same causal mechanisms and the same general social processes can lead to different forms of regional stasis or change, depending upon the pre-existing characteristics of regions and it is for this reason that regions are and must be 'chaotic conceptions'.' (Hudson 1990 p73).

The "geometry of nature" surely has implications for those of us who study the most complex system of all. In the most limited sense it must affect the way we deal with statistical data. The factors which are significant in the "Butterfly Effect" are those that have been regarded as insignificant or due to experimental error etc. Areas such as standard error and normal distribution of data must be reviewed as they are based on averages and elimination of 'randomness'. Economist and Nobel Laureate Wassily Leontief said of the bell-shaped curve, which represents Gaussian distribution eg. of randomly collected data, C14 dates etc, 'in no field of empirical inquiry has so massive and sophisticated a statistical machinery been used with such indifferent results' (quoted by Mandelbrot 1977 p423). Wobst (1978) and Root (1983) have levelled similar criticisms at archaeological studies of settlement patterning. Settlement patterns are the product of multiple axes of variability operating on a variety of scales, yet the pattern as constructed by the archaeologist, frequently represents the mean of a single axis of variability. 'Patterns, then, are the normative behaviours that archaeologists spatially and temporally bound. Thus, the continuum of spatial and temporal processes is fragmented, creating artificial homogeneity and pattern' (Root 1983 p197).

This is not to suggest that we turn our attention to the search for chaotic "laws" of human behaviour, nor is it intended merely to add to the spanners already interfering with the theoretical works. These developments are however of direct relevance to the search for order in the remains of the past. The theoretical implications of this work underline points which have already been made ie. the need for a more integrated "holistic" approach, a broader view of what may be relevant data and the need to determine at what scale each factor operates.

To return to the conceptual tools currently employed by archaeologists on the subject matter of this thesis, it is evident from a survey of literature pertaining to north east England, that environmental determinism is all-pervasive.

Environmental factors have sufficed as an explanation for the location, size, economy and movement of settlements e.g. 'I feel this survey should therefore begin by emphasising the importance of environmental changes in influencing the course of human settlement in the Border hills' (Burgess 1984 p126). The rejection of this mode of thought in geography has been discussed in the preceding section. Whilst environmental considerations have their place in this study, they should not be over emphasised. In the words of Reynolds 'But whether exploratory or responsive, actions for change bear no direct correlation with social or physical environmental conditions, because they are based on the variable intervening factor of the group's interpretation of its own relationship to others and to the environment. And the values and judgements which bear on this interpretation are themselves influenced by the existing social systems and by cultural adaptations to the system' (1973 p471).

The landscape of northern England is also curiously depopulated. It contains environmentally determined sites with economies but no social structure. Population is a "problem" but this has nothing to do with people. With regard to differences between sites, functionalism has become teleology. Consideration of the environmental background and techniques such as site catchment analysis may give useful parameters for the potential range and scope of economic activities within a limited area but to suggest that entire settlement patterns are *determined* by these factors is to wholly misinterpret the nature of human society. Discussions of subsistence strategies in this area have consistently failed to take into account the role of breeding networks (Wobst 1974; 1976) and of information as a critical resource (van der Leeuw 1981b; Moore 1983; Root 1983). The role of the rational, well-informed decision maker in developing optimising economic strategies is paramount. 'Omniscient decision-making models transform social relations into economic relations and limit our understanding of social process to an understanding of modern economics' (Moore 1983 p176). It is vital to consider not only the means of production but also the social relations of production. It will be suggested here that there are very few areas in North East England where the environment in later prehistory imposed *severe* constraints on human activity and even then, the use of and response to, marginal environments must be seen in social terms. 'Seasonality is an attribute of the ecosystem, but scheduling is a social phenomena' (sic) (*ibid* p187).

With regard to the primacy of economic and ecological consideration, the experience of anthropologist Nigel Barley in North Cameroon may serve as a cautionary tale - 'The basic truth about Dowayos is that they knew less about the animals of the African bush than I did. As trackers they could tell motorbike tracks from human footprints but that was about the pinnacle of their achievement. They believed, like most Africans, that chameleons were poisonous. They assured me that cobras were harmless. They did not know that caterpillars turn into butterflies. They could not tell one bird from another or be relied upon to identify trees accurately. .... As far as 'living in harmony with nature' is concerned, the Dowayos are non-starters. They reproached me for not bringing a machine gun from the land of the white men to enable them to finally eradicate the pathetic clusters of antelope that still persist in their country. When Dowayos began cultivating cotton for the government monopoly, amounts of pesticide were made available to them. Dowayos immediately adopted it for fishing purposes. They would fling it into the streams to be able to recover the poisoned fish that floated to the surface. This poison rapidly displaced the tree-bark they had traditionally used to suffocate fish. 'It's wonderful', they explained. 'You throw it in and it kills everything, small fish, big fish, for miles downstream.'' (Barley 1983 p95).

What is needed is an approach which can put people back into the landscape and allow them to interact and change on their own terms. In the words of Evans 'If prehistory is to be meaningful it must have social *content* not just a social *dynamic*' (1988 p67). Any attempt to put people back into the past cannot however hope to succeed unless we can first defamiliarise that past. The point has been made often by Barrett and more recently by Hill (1989). The past is not just a "foreign country", it is another planet. The fact that we are dealing with agrarian societies in the North exacerbates the idea that we know what we are dealing with. Preconceptions about farmers, economies, settlement hierarchies and core-periphery relations must be set aside. To speak of the "economy" in relation to subsistence, procurement and exchange in prehistory may be totally anachronistic. The rot that has set in to the Iron Age is also spreading to the northern Bronze Age: now that we have some excavated "farms" we can relax and relegate ritual to the odd clan gathering at the nearest henge. That activity on northern settlements is invariably viewed as domestic and functional merely illustrates our ignorance of site-formation processes. If Wessex had no pits it would have a similarly "boring" Iron Age.

2.3 THE METHOD

Considering the factors involved in this iterative analysis, there is no single obvious staring point. Every variable must be returned to over and over again to be viewed in relation to other variables. There are however certain basic steps which must be carried out in order for the process to get under way - namely, classification and quantification.

Some explanation of the terminology used is required here. A number of common terms employed in the text may be seen to have subjective implications. In the interest of producing a text which is readable and not unduly verbose, their use may be justified if they are explicitly defined. Settlement refers to any place of human habitation regardless of size or the likely duration or permanence of occupation. Hut refers to any circular structure regardless of possible function. Building and structure are similarly used; none of these terms pre-supposes the existence of a roof. House is avoided unless there is reason to believe the structure was primarily or partly a dwelling. The exception to this is when referring to published excavation reports eg. House 1 at Broxmouth (Hill 1982c). The present author may not necessarily agree with the interpretation but the published terminology is quoted to facilitate cross reference with the original report. Bearing in mind, the reservations expressed above about the way in which statistics are presently used, quantitative analysis poses something of a problem. The method adopted here has been to use currently accepted statistical techniques, distinguishing between raw and derived data, with the emphasis being on the identification of groups and differences between groups rather than on "averages".

Throughout this work illustrative maps generally show the area of study divided into the four administrative counties. The purpose of this is to allow the reproduction of the maps at a scale sufficient to show a reasonable amount of detail. Similarly, the presentation of statistics divided into the four county zones permits the identification of bias resulting from differences in land-use or research strategies in each area. The number of recorded sites in each of the four north east counties is shown in fig 2.1. Fig 2.2 shows the sites in each county as a percentage of the total known sites.

The deficiencies in the record resulting from modern land-use may be readily quantified. Land may be divided into those areas unlikely to be receptive to any method of survey ie. quarried, open-cast, urban or forested, those where appropriate survey methods have potential ie. cultivated land and those where rates of site survival and visibility are likely to be good ie. beyond the limits of modern agricultural, residential or industrial development. This applies specifically to the later prehistoric period and illustrates the fact that survey strategies must be to some extent period-oriented since activity of Neolithic and earlier date is mainly identified by cropmarks and surface finds in cultivated areas. The areas unlikely to reveal later prehistoric activity through field survey are marked as destroyed land on figs 2.4-2.7.

	Northumberland	Durham	Tyne & Wear	Cleveland
Size (sq km)	3650	2430	539	610
Destroyed land (sq km)	900	613	296	185
Destroyed land %	25%	25%	55%	30%
Density: 1 site per n sq km available land	2.4	6.6	6.2	15.7

Table 2.1 Area of county and density of sites

The area of each county is shown in table 2.1 which also shows the amount of destroyed land in each county. The density of recorded sites is given as 1 site per n sq km of available land. Figs 2.8-2.15 show the form of surviving monuments in each area and numbers of recorded sites now destroyed (the destroyed category does not include sites which have been partially damaged by excavation or other means). The effects of land-use are clearly illustrated by this exercise; 73% of known later prehistoric sites in Northumberland survive as earthworks whereas in Tyne & Wear, 74% of known prehistoric sites are cropmarks; the remainder having been destroyed since recording. This done, it is futile to speculate further about what has been lost in some areas before analysing what is actually there and how it came to be recorded. There has been a tendency to ponder about matters such as how differential preservation affects comparative population figures between two areas at a given time. This, (ignoring the blasé approach taken to the chronology of unexcavated sites) is before there has even been any meaningful qualitative analysis of differences between the areas. In the words of Flannery (1967 p.122) there is 'no consistent relationship between the usefulness of a given model and the absolute quantity of data on which it is based'.

The taxonomy of prehistoric settlements is an area which could well form the subject of a lengthy thesis; it is used here as a heuristic device not an end in itself. The aim of the work is to study the dynamics of change rather than to take a landscape frozen at a point in time and classify its component parts. To this end, the initial classification of settlements is effected using basic morphological criteria. Hingley has stated 'We must not adopt an approach to settlement-typology which is based on a whole set of unspecified assumptions about the significance of site form for such an approach will act to condition the process of research' (1984 p74). The circularity of "naming" a site prior to analysis of its components has already been stressed. As Hill & Evans point out, 'The types thus become, in essence, 'basic data' which do not often need to be questioned; the types are primary data, and only the inferences made from them (and subsequent to classification) are open to serious critique' (1972 p236). At this stage no assumption is made as to any meaningful similarity between sites of superficially similar form.

The sites listed in the gazetteer are classified in terms of morphology. The basic morphological distinction made in this work is between open settlements and those where the primary activity area is enclosed by a clearly defined boundary. Open settlements are not without boundaries, hence the rejection of the term unenclosed but they do not exhibit the same division between areas with and without circular structures. The enclosed sites are divided into those with curvilinear enclosures and those with rectilinear enclosures. Rebuilding phases which change the form of the settlement are noted separately regardless of the likely interval between phases, hence a settlement may be recorded in the gazetteer as both open and curvilinear. Only settlements which have been recorded by fieldworkers in such a way as to make classification at this level possible are used for analytical purposes. The presence of a small number of sites recorded as enclosed settlements where it has not been possible to obtain further information, is noted in the gazetteer but these sites have been excluded from the analyses.

This allows a comprehensive re-classification of known sites into very broad groups, using non-emotive terminology. However it is also necessary to establish a frame of reference within which to address assumptions inherent in earlier work. In order to examine some issues which have attracted much interest in the past, two further points have been noted in the gazetteer. The presence of a palisaded phase on a site has been recorded separately and the fact that a site has been referred to in one or more earlier sources as a hillfort is recorded; this is denoted by the suffix (HF). Two other categories of sites of possible prehistoric date are recorded, field systems and cairnfields. The term field *system* is not entirely satisfactory since some examples consist of only a single field. Possible agricultural features is rather more accurate but extremely cumbersome so the simpler term has been retained. Where possible, further information such as the presence of traces of cord-rig, has been noted. In some cases the cord-rig is not associated with definite boundaries. The number of recorded sites of each form is shown in figs 2.16-2.17

and the breakdown by county is given in figs 2.18-2.25 where they are given as absolute figures and as a percentage of the total for that county.

Following on from the initial classification, an attempt has been made to quantify the amount of on-site activity. For this purpose the number of structures visible or recorded during excavation has been taken as an indicator of the level of activity. Various problems inherent in this approach have been noted, especially the question of contemporaneity and the use to which the structure was put. These questions are addressed in chapter nine, suffice it here to say that structures are *not* taken as a direct indication of population. The approach should therefore prove useful if considered in relation to sufficient other variables. For instance, in enclosed settlements, the size of the enclosure bears a non linear relationship to the number of structures on the site. 'The amount of space used by people is surely a cultural as well as a geographic artifact' (Hole 1973 p27).

A frequency diagram of known hut numbers on all sites regardless of form was compiled (fig 2.26). To facilitate reproduction of the diagram at an appropriate scale, sites with more than 40 huts (two in all) have been excluded). Data on hut numbers were available for 329 sites (27% of the settlements). The frequency distribution was used as the basis for breaking the values into classes with the group boundaries being chosen by the natural break method. Clusters occurred in the following ranges

1 - 4 huts	=	AR 1
5 - 7 huts	=	AR 2
8 - 10 huts	=	AR 3
11 - 19huts	=	AR 4
20+ huts	=	AR 5

The settlement forms which occurred in each activity group were recorded. The effects of varying the class boundaries within the limitations of natural break were explored but did not appear to have any significant effect (although using groups of 1-3 huts, 4-9 huts, 10-19 huts and 20+ huts, slightly increased the number of open settlements in the second group). The sites in the gazetteer were thus given an activity rating denoted by the suffix AR. Where there are no structures visible or the data has not been recorded, the site is recorded merely as settlement. Figs 2.27-2.29 show the activity ratings of sites within each morphological group as a percentage of those with recorded huts.

The likelihood of classification error is also noted in the gazetteer. For instance, if there is some doubt about the quality of the original data record, a site may be recorded as - Curvilinear Settlement ? Where the nature of the site is not in doubt but there is some particular question about whether all structures have been recorded or whether all are contemporary, a site may be recorded as - Curvilinear Settlement AR 1 ?

Each morphological group is discussed in detail in a later chapter which consider numbers and distribution, how this is affected by land-use and previous survey work and the dating evidence for the sites. All radiocarbon dates mentioned in the text are quoted in radiocarbon years BP (where the present is defined as AD 1950). Calibrated dates are given in appendix 7. The components of each type are analysed in detail and, when viewed in conjunction with the dating evidence, these results allow the sites to be grouped into more meaningful categories on which to base an analysis of settlement patterns and what they reveal about society. The next two chapters are however concerned with the environmental setting of these sites. The idea of environmental *determinism* has already been rejected but this is not to understate the importance of environmental *potential.* These chapters therefore take a critical look at this potential and how it relates to the archaeological evidence.

CHAPTER THREE

GEOLOGY AND GEOMORPHOLOGY

Any study of settlement distribution must necessarily give some consideration to the way in which this distribution may have been influenced by geographical factors. In north east England, the archaeological picture is further complicated as a result of the complex interaction between various elements of the physical and human geography. The North East is an area where differences in the underlying geology have produced distinct topographic zones; one must consider not only how these zones determine land-use capability but also the economic geology of the region and the extent to which commercial exploitation of minerals has altered the landscape in modern times.

The modern administrative counties of Northumberland, Durham, Tyne & Wear and Cleveland are bounded by clear physical features. The Tweed Valley forms the boundary to the north with the Cheviot Hills and Bewcastle Fells on the north west and the scarp of the Pennine block forming the western perimeter. In the south, the boundary follows the Stainmore Pass and continues along the northern scarped face of the Cleveland Hills with a series of high cliffs facing the North Sea on the east. A number of natural routeways lead into the region, the major one leading north from the Vale of York between the Pennines and the Cleveland Hills. From the west, the Stainmore Gap links the upper Eden Valley with the Tees Lowlands and to the north of the Pennine block, the Tyne Gap links the Solway lowlands with the North Sea. The route north to Scotland follows the narrow coastal plain.

Solid geology is shown in figs 3.2-3.5. The terminology used here is that which is generally accepted in most recent published work and thus differs somewhat from that used in older geological maps of the area. Recent work is summarised in Robson (1980) and it is largely upon this synthesis and the fourth edition of the Institute of Geological Sciences' regional geology of northern England (1978) that the following discussion is based. Whilst the geology, as noted above, has tended to result in clearly defined topographic zones, it is hoped that consideration of the particular geological formations in some detail will illustrate the problems inherent in over generalising about conditions within a particular zone. The geological formations will be discussed here roughly in the order in which they outcrop on the surface from north to south, beginning with the Cheviot uplands, moving through the surrounding hills southwards to County Durham then east towards the coastal plain. It will be seen however that this sequence corresponds largely to the order in which they were laid down. Rocks of Lower Palaeozoic date do in fact underlie the entire region but they outcrop only in a small area of Upper Teesdale (fig 3.3).

The topography of Northumberland is dominated by the Cheviot massif, the remains of a volcano, believed to date to the Lower Devonian period, now deeply dissected by winding valleys (Robson 1976). The core of the massif is formed by a granite plug intruded into the volcano c.380 million years ago (the lavas themselves are estimated to be c.390 million years old). The granite occupies a roughly circular area, covering some 60 square km, its upper surface appears to be dome-shaped although much of the ground is peat covered and there are few surface outcrops. The major inclusions in the granite comprise large masses of metamorphosed lava, caught up at the time of intrusion, which often form prominent tors.

A series of lavas and tuffs covering some 600 square km dip gently away from the granite core. The main group of lavas is composed of andesite which generally appears purple or dark brown in colour except within c.1 km of the granite where metamorphism resulting from contact with the granite has caused them to appear dark grey. During the final stages of this period of vulcanicity, a series of dykes were intruded, traversing both lavas and granite.

The patch of basal conglomerate in the eastern Cheviots comprises coarse pebbles, up to 200mm across, mainly of Cheviot andesite, which were eroded from the volcano during the Early Carboniferous period and laid down in a gorge. The deposit is widely known as the Roddam Dene Conglomerate after the valley in which it accumulated.

The streams which dissect the Cheviot massif then flow eastwards across the Cementstone plain until most, save the rivers Coquet and Aln, are diverted north by the west facing scarp of the Fell Sandstones. The Cementstones themselves consist of a sequence of very thin beds of shale and impure limestone with sandstone beds appearing towards the top of the sequence. Like the Fell Sandstones, they were deposited during the Carboniferous period. Those in the north appear to have been deposited under estuarine or lagoonal conditions whereas the deposits take on more of a marine character further west. The Fell Sandstones form a barrier of crags facing the Cheviots with long dip slopes which descend gradually towards the sea. The group consists of fine to medium grained, generally greenish, sandstones with infrequent beds of red, purple or greenish grey silty mudstones. The outcrop forms barren, heathery moorland hills.

One of the most impressive topographic features of northern England is the Great Whin Sill which outcrops at intervals right across Northumberland and north east Cumbria, along the Pennine escarpment and in Teesdale. The igneous Whin Sill complex is formed by a series of sills and dykes of quartz dolerite intruded into the Carboniferous strata. Being far more resistant to erosion than the sedimentary rocks of the Carboniferous series, it has produced a number of notable features, many of which, because of their readily defensible nature have important historical associations. In the coastal zone it forms the high scar on which Bamburgh Castle is built, it then runs offshore to form the Farne Islands and appears on the coast again further south where it is crowned by Dunstanburgh Castle. It is responsible for the development of a number of waterfalls including High Force and Cauldron Snout in County Durham but by far its most dramatic manifestation is the succession of crags between the North and South Tyne surmounted by Hadrians Wall.

The composition of the Sill is relatively uniform; the main rock type is dark blue/grey quartz dolerite. The intrusion is dated, on stratigraphic and radiometric evidence, to the Late Carboniferous period and is estimated to be 295 $\pm$ 6 million years old (Fitch & Miller 1967). The intrusion has been identified in a number of boreholes from its western outcrops to the east coast and beyond, its total area being at least 5000 square km. The maximum recorded thickness is 73m at Burtree Pasture lead mine in Weardale, the average being of the order of 25-30m.

Deposits of the Carboniferous period underlie much of the region and as a result of their commercial mineral content, particularly coal and vein ores, they have been studied in great detail. The nature of these deposits is however, often less than clear to the non-geologist owing to the use on many geological maps of classifications based on deposits elsewhere which do not precisely describe the local situation. It is therefore worth looking more closely at the composition of these deposits and their origin.

The main Carboniferous rock types are limestone, shale, sandstone and coal, laid down in various sequences. Each sequence began with an abrupt change in sea level giving rise to marine or near marine conditions. The water became shallower as deposits built up and eventually coal-forests developed on newly formed land. Gradually the periods of marine inundation became shorter (Millstone Grit phase) and the resultant limestones thinner and finally, during the Coal Measures phase, marine incursions were rare and periods of coal formation much longer.

This sequence of events is particularly well marked in Lancashire and the southern Pennines where there are clear distinctions between the Lower Carboniferous, the Carboniferous Limestone phase, marked by massive marine limestones and the Upper Carboniferous, divided into the Millstone Grit series characterised by thick grits and the succeeding Coal Measures. The first two of these phases are far less well pronounced in north east England. Here the Carboniferous Limestone sequence is characterised by the absence of thick marine limestone and the presence of much sandstone and shale, the only substantial deposits of limestone occurring close to the junction with the Namurian series. The term Millstone Grit is avoided here and the international term Namurian preferred. The Namurian series is characterised by the thick Great Limestone at the base with thick grits being only pronounced near the top of the succession (Hull 1968).

The Coal Measures appear on the southern Northumberland coast, they cover most of Tyne & Wear and almost a third of County Durham. Their western edge is marked by a line drawn roughly between Amble in the north and Barnard Castle in the south. They dip gradually towards the coast and are known to continue beneath the North Sea for at least 10 km. The south eastern part of the coalfield lies beneath Permian strata however this has not inhibited their exploitation and the concealed Coal Measures have been worked to almost as great an extent as the exposed coalfield.

The Lower and Middle Coal Measures reach a thickness of some 900m with most of the commercially productive coals being concentrated in the middle of these strata. Massive sandstones are present above the High Main Seam. The Coal Measures or Westphalian deposits of north east England appear to have formed part of a continuous delta rather than having been deposited in separate basins. There is however little lateral continuity in the individual sediments, the sandstones occur as lenses and the coal seams can rarely be traced for more than 20 km without changing in character. Upper Coal Measures are present in only a few small areas, near Boldon, west of Sunderland and possibly near Killingworth. It is not yet known whether a full sequence of Upper Carboniferous deposits was ever present in this area although it is possible that they may have been removed by the severe erosion which took place in pre and Early Permian times. In south Durham up to 900m of Carboniferous beds are missing from the sequence.

Towards the end of the Carboniferous period northern England was uplifted and deeply eroded as a result of the Hercynian earth movements. The sub Permian surface was reddened by desert weathering and Permian and Triassic rocks were deposited on this surface. The Permian and Triassic rocks accumulated near the western margin of the North Sea sedimentary basin and comprise a series of marine limestones and dolomites outcropping as cliffs on the coasts of Tyne & Wear and Durham (Magraw 1975).

The Lower Magnesian Limestone is up to 73m thick in central east Durham but thins out towards Cleveland and south Durham where it is overlain by later strata and in Tyne & Wear where upper beds are largely absent. The Lower Magnesian Limestone sequence when complete consists of three main divisions, the lowest strata comprising fine grained, pale buff dolomite with localised shell inclusions, a middle unit of distinctively mottled grey/brown calcitic dolomite or dolomitic limestone, finer grained than the underlying beds and an upper layer of evenly bedded fine grained pale buff dolomite.

The Middle Magnesian Limestone is the most extensive of these formations outcropping in the North East. It consists of lagoonal and basin deposits separated by a barrier reef. The lagoonal beds occur to the west of the reef and are composed mainly of oolitic dolomite with few shells, whilst the basin beds are of fine grained dolomite which is interspersed with fans of reef detritus near the reef face. The reef itself extends for 32km and is generally less than 1km wide, it is largely composed of rock that has formed in situ thus entrapping contemporary debris.

The Middle Marls consist of barren sediments ranging from coarse breccias to mudstones. They exist only behind the line of the barrier reef with the breccia deposits occurring where they overlapped the old land surface.

The Upper Magnesian Limestone is a complex deposit which outcrops along the coastlines of Tyne & Wear and Durham. It is composed of four main formations, the Concretionary Limestone, the Hartlepool and Roker Dolomite, the Seaham Residue and the Seaham Formation; all but the latter being characterised by marked lateral variation (Smith 1971). The Concretionary Limestone forms most of the coastal cliffs and is particularly noted for the calcite concretions which occur in the middle strata of the formation.

The final deposits of relevance here are the Triassic sandstones and marls which occur in the south east of the area. The Sherwood Sandstone (formerly known as Bunter Sandstone) is fine to medium grained, brick red and micaceous and is only weakly cemented by calcite and iron oxides (Smith 1980). The nature of the sediments is consistent with their having been deposited by running or standing shallow water on a virtually flat fluvial outwash plain. The uniformity and great lateral extent of the deposits (they have equivalents further west) suggest that this plain must have covered most of the north of England. The deposits were probably grey or brown when they were first laid down but have reddened with age. The sandstone is known to be up to 210m thick but is exposed only at Hartlepool and in the Tees near Darlington.

The Sherwood Sandstone is overlain by Mercia Mudstones (formerly known as Keuper Marl). These sediments consist of grey/green and red/brown coarse grained sandstone and green and dark red/brown mudstone (Smith 1980). Small pebbles and dolomite are present in the mudstone and gypsum is present in both types of strata. The Mercia Mudstones are about 205m thick and outcrop widely in Cleveland. The precise nature of their depositional circumstances is uncertain. Fossils, burrows and roots are absent from the strata suggesting that the environment was hostile to most life forms and it appears that the surface underwent periods of exposure and desiccation and periods of inundation by saline water. The evidence is thus consistent with deposition on an extensive coastal plain only slightly above sea level. This period was followed by widespread inundation at the start of the Jurassic times giving rise to the shale, sandstone and limestone lias deposits which cover the east of Cleveland and continue into East Yorkshire and Lincolnshire

The history of landscape evolution in northern England from the deposition of the Mercia Mudstones until the beginning of the Quaternary era c. 1.6 million years ago is virtually unknown although it is believed that the main areas of highland and lowlands were as they are today and were to influence the glacial history of the region. The region was invaded by ice sheets several times during the Pleistocene epoch. The glacial periods alternated with temperate stages, the last glaciation occurring during the Late Devensian period only 10-18 000 years ago. It is the erosional and depositional processes at work during this time which are largely responsible for the shaping of the present landscape. The highland areas were subject to severe erosion both directly by the ice and as a result of meltwater flowing beneath and out of the ice. The lowlands suffered a certain amount of meltwater erosion but their character has largely been determined by the vast amount of debris carried by the glaciers and deposited in the valleys and coastal plains.

Little is known about the early stages of the glacial epoch. Lower and Middle Pleistocene deposits exist only as fragments in east Durham. The earliest of these are a series of breccias and clays near Blackhall Colliery, County Durham which were rammed into fissures in the Magnesian Limestone by a later ice sheet. The earlier part of the Upper Pleistocene is marked by deposits of so called 'Scandinavian Drift' in a buried valley at the mouth of Warren House Gill. This deposit, also known as the Warren House Till, is a grey sandy clay containing rounded Scandinavian erratics and sediments and Arctic shells probably from the North Sea. Boulders of larvikite and other Norwegian rocks lie on the beach nearby and a Scandinavian boulder was also found at Castle Eden Dene. The

Scandinavian ice sheet is thus believed to have penetrated only a short distance inland from the present Durham coast although it is possible that further traces of its presence may have been removed by subsequent erosion.

The 'Scandinavian Drift' is overlain by a thin brown silt interpreted as a loess. There is some controversy over the dating of this loess, some authorities believe it to belong to the Ipswichian interglacial phase whereas, in the absence of other local evidence of a temperate stage, others place it in the later Wolstonian or early to middle Devensian. Similarly the 'Easington raised beach', a deposit of gravel containing marine shells and lying on a rock platform at some 27m O.D. is of dubious interglacial status. A radiocarbon date of >38 000 years BP was obtained for the shells but its altitude makes an Ipswichian date questionable. However. Beaumont *et al* (1969), have identified rafts of peat exposed in a cutting at Hutton Henry as belonging to the Ipswichian interglacial particularly on account of the presence of large quantities of *Carpinus* (hornbeam) pollen considered to be characteristic of the later part of this stage. The Berwickshire coast exhibits a number of wave-cut rock platforms at 18-25m O.D. Their height suggests that land movements as well as erosion during interglacial phases was involved.

By contrast, that part of the Upper Devensian from c.18 500-10 300 years ago is represented by the great spreads of glacial material noted above resulting from a complex glacial episode which reached its maximum at c.18 000-17 000 B.P. Streams of ice emanating from several centres converged on the lowland zone, merging, deflecting or riding over one another. The area to the east of the Pennines was mainly a receiving area for ice and it was only on the Cheviot massif that an independent ice cap formed. The Cheviot ice flowed eastwards deflecting the Tweed Valley ice along the coastal belt whilst southern Scottish ice flowed through the Tyne Gap and ice from the Lake District along the Stainmore Pass.

The Tees lowlands thus received ice from the west, north west and north east. Erratics, particularly those of Cheviot lavas or igneous rocks from the Lake District are useful in tracing these movements.

Glacial drift deposits are found over most of northern England (figs 3.7-3.10). These deposits, known as tills, consist of material torn from the ground by moving ice sheets and deposited on lower ground when gradients and flow rates had decreased to the extent that the glacier was unable to transport the load. The tills vary in character from masses of unsorted stones to the common boulder clay. The boulder clay consists of a mixture of deposits, containing rocks of both local and more distant origin and takes its colour, usually red or grey/brown from the softer rocks over which it has travelled. These deposits are on average c.15m thick but may be far thicker in buried valleys, the maximum recorded depth being 92m near Sedgefield. Indeed many areas are only above sea level due to the build up of drift material, for instance the Tees estuary without glacial deposits would extend inland almost to Darlington.

Buried valleys are a feature of the drainage system, particularly in the south of the region. The Tyne, Wear, Derwent and Tees and their tributaries all have extensive buried valley systems. Many of these valleys, once believed to be features of an earlier landscape are now thought to have been cut by meltwater flowing beneath the ice sheet to be filled in later by tills and outwash materials. The Wear Valley system has been extensively studied, at Escomb the buried valley profile has been located at c.55m O.D., the present valley floor being at some 73m O.D. In the Shincliffe area the buried valley lies at 0-14m O.D., dropping to -21m at Cobden Bridge whereas the present valley floor is at c.12m O.D. Further north at its junction with the Chester Burn, the buried valley drops to -43m O.D. It has not been satisfactorily traced beyond this point. Some authorities believe it to join with the River Team, a misfit stream flowing through a greatly over-deepened valley, to join the Tyne at Newcastle, whilst others believe it to join the Tyne in the Jarrow area.

The drift deposits have generally had a 'smoothing' effect on the landscape, masking underlying features. However, drumlins were formed in a number of places, most notably the Tweed Valley, where the ice was confined and kame and kettle moraines occur in west and north west Durham and parts of Northumberland. In many parts of the lowlands of Northumberland and Durham, an upper and a lower till may be identified, separated by deposits of clay, sand and gravel.

Changes in the landscape during the latest Holocene or Flandrian era have largely been concerned with the change in sea level to its present state. The land, freed of the great mass of the overlying ice was subject to isostatic readjustment and uplifted from its Pleistocene level of 128m below O.D. whereas the sea received the huge volume of meltwater from the receding ice mass and inundated many land areas. This period is represented by the so called 'submerged forests', peat deposits containing tree trunks, occurring beneath the sea at a number of points along the north east coast. At Hartlepool the peat is known to reach a depth of at least 15m.

Other geological processes have left their mark including the development of blanket peat on the high, wet Border and Pennine fells and the formation of basin peat on poorly drained parts of the lowlands. The post glacial drainage pattern has matured, with each watercourse telling the history of its development in the form of waterfalls, terraces and flood-plains, all of which relate directly to the underlying geology.

In summary, the North East exhibits a landscape whose main features had developed by the end of the Tertiary era and which was subsequently modified as a result of glaciation. The region as a whole is roughly dissected by the Tyne Valley. Northumberland is dominated by the Cheviot uplands bordered by the Cementstone trough and the Fell Sandstone scarplands which lead gradually through a transitional plateau to the coastal plain. To the south, distinct zones are formed by the uplands of the Pennine block, the lowlands of the Wear and Tees, the latter being characterised by poorly drained carr land, the East Durham Plateau formed where the Magnesian Limestone outcrops in a marked escarpment and the rolling Cleveland Hills.

Whilst the solid geological deposits are responsible for the creation of the major topographic zones, it is to the glacial drift deposits we must look when considering the past environment and agricultural capability of a particular area in greater detail. There are few areas in north east England which are entirely free of drift deposits. Figs 3.7-3.10 use O.S. drift descriptions but it should be noted that areas mapped as having no drift deposits may in fact possess a thin covering of glacial material or indeed small pockets of drift - not large enough to be mapped at this scale but perhaps sufficiently large to turn a prehistoric homestead into a viable agricultural unit. Similarly, the varied nature of the Carboniferous strata in the region has been noted above and one must be extremely cautious when it comes to generalising about the micro-environment around a particular site. Thus, whilst the broad geological zones are used here in assessing the environmental potential of each group of sites, it should be noted that examination of the environment on a far smaller scale is appropriate where detailed analysis of a particular site is required. The soils of the region have been mapped at a macro level (figs 3.12-3.15). However, in the absence of any large scale recent soil survey of the area, they are not discussed in further detail here.

CHAPTER FOUR

ENVIRONMENT, CLIMATE AND THE EVIDENCE FOR LATER PREHISTORIC LAND-USE

This chapter is concerned with the environmental history of north east England as evidenced by a number of pollen diagrams from the region. Diagrams have been compiled at 80 locations within the area (table 4.1) but they vary greatly in terms of the methodology used in their compilation and in the date of the deposits. Consequently, their usefulness to a study attempting to identify localised patterns of land-use is often limited. Some diagrams, for reasons outlined below, can give only a general outline of large scale changes over long periods of time. However methodological advances made by palynologists such as Turner, working on more recent diagrams has facilitated the identification of specific and fairly precisely located, episodes of agricultural activity in a number of areas.

The first section discusses the nature of the evidence and how it has determined the approach taken in this study; it is followed by a brief synthesis of the evidence for major environmental and climatic change throughout the area in late prehistoric times. A series of case studies which examine the relationship between dated agricultural episodes and settlement types are discussed in depth in appendix three.

4.1 POLLEN ANALYSIS: PROBLEMS IN METHODOLOGY AND INTERPRETATION.

Palynological science has developed greatly throughout the course of this century, its techniques and limitations have been discussed in detail in a number of publications (cf Butzer 1964; Tooley 1981) and it serves here merely to summarise the more obvious problems which relate to the identification and dating of environmental changes and the recognition of anthropogenic influence.

The most basic problems concern the production and dispersal of pollen. Species may be over or under represented due to the amount of pollen they produce and its longevity in particular burial conditions. The arboreal species, which produce large quantities of pollen include *Corylus, Pinus, Alnus* and *Betula. Abies, Carpinus* and *Picea* produce what may be taken as an "average" amount of pollen and *Fagus, Quercus, Ulmus, Tilia* and *Salix* may be under represented due to low production or insect pollination. Species producing pollen which tends to decompose easily include *Populus, Fraxinus, Castanea* and *Juniperus*. In general pollen of arable crops and their associated weeds is likely to be under represented.

The problem of varying productivity must also be taken into consideration when using different species as indicators of the same phenomenon e.g. within the *Cerealia* group, rye produces far greater quantities of pollen than wheat or barley so that the effect of an increase in cereal cultivation could be greatly magnified by preferential growth of rye. These factors however introduce a systematic bias for which it should be possible to compensate.

Specific methodological factors which can cause interpretative difficulties include the way in which the sample is prepared, the identification of species and in particular the method of counting. Until recently, the usual method of compiling pollen diagrams was to identify a sample of 150 arboreal pollen grains and then plot each of the pollen taxa as a percentage of the total tree pollen (TTP). Such diagrams are not sensitive to small scale changes in forest composition and the occurrence of more than one change within a short period of time can cause complications in the interpretation of interdependent percentage curves. The move towards the use of absolute pollen diagrams has allowed far more detailed pictures of change to be built up. Using the absolute pollen deposition rates for each taxon, rather than a selected sum as a basis for calculating percentage figures, introduces more objectivity and thus facilitates comparison with other diagrams. Work on the use of three dimensional pollen diagrams is still in its infancy but the technique has been used increasingly since 1975 as a means of locating areas of forest clearance with some precision (Turner 1975).

In determining the nature of anthropogenic interference with the natural vegetation, certain species are taken as being indicative of particular activities. *Plantago lanceolata* and *Rumex acetosella* are commonly seen as evidence for pastoral farming and *Plantago major* and *media* and *Cerealia* are believed to be indicative of arable cultivation. Using such indicator species, Turner (1964) developed the idea of an Arable/Pastoral Index. Analysing pollen from modern deposits in Wales and East Anglia she demonstrated that the number of *Plantago* grains expressed as a percentage of the total number of *Plantago, Compositae, Cerealia, Cruciferae, Artemisia* and *Chenopodiaceae* grains was generally below 15% in the present arable region and above 50% in the pastoral region. The Arable/Pastoral Index is now widely used but Wilson (1983) urges caution in the use of indicator species and questions the validity of direct comparison of pollen counts from sites with diverse catchment areas. He notes that although *Plantago lanceolata* is used as a pastoral indicator species, it commonly occurs on trampled ground such as trackways through arable fields, and species of the *Rumex spp* and *Ranunculaceae* families also used as pastoral indicators, often occur as arable weeds. Fenton-Thomas (1990) notes certain other difficulties such as the inclusion of *Calluna* and other non agricultural types in the herb spectrum of many diagrams and advocates an Agricultural/Arable index which may go some way towards resolving these problems. The arable component of the index includes only cultivated crops and types such as *Chenopodiaceae* and *Artemisia* which are restricted in their habitats to disturbed ground as found in arable fields. To these are added the other agricultural indicators found in both arable and pastoral contexts to give some indication of the extent of agricultural land-use. The proportion of arable types within the total may thus be assessed without the need to place any reliance on the identification of purely pastoral types.

The palynologist shares in common with the archaeologist the problem of dating deposits. It is now widely accepted that Godwin's "pollen zones" (Godwin *et al* 1957) do not provide a sufficiently tight framework for the comparison of different diagrams for archaeological purposes. The zone boundaries (fig 4.4) represent major vegetational changes some of which may relate to a multiplicity of causal factors and which may not be contemporaneous even at a regional level. The most notable example is the boundary between zones VIIa and VIIb which is marked by a decrease in elm pollen and dated to the second half of the 4th millennium BC. The nature and possible causes of the "Elm Decline" lie beyond the scope of this study, suffice it to say that the phenomenon is now known to have been a lengthy and complex process with 'primary' and 'secondary' elm declines, often separated by some centuries, occurring in a number of places. It is thus only those diagrams where close interval sampling has been combined with radiocarbon determination which can hope to identify the kind of changes which are relevant to a detailed study of past land-use on a regional level. Extrapolation between C14 dates within a single core assuming a regular rate of deposition, as discussed in Annable (1987), may also be hazardous. Where determinations at close intervals have been made (eg. Turner 1975) rates of deposition have often been seen to vary greatly, the reasons for which may well be of archaeological interest.

Finally, the utilty of any dated pollen diagram varies with our knowledge of what area is represented by the pollen in the sample. The catchment areas of two sampled peat bogs could vary enormously depending on local topography and the size of the bog. It is this factor which is critical in the interpretation of a pollen diagram and which more than any other tends to lead to invalid assumptions being made. One such example is Annable's (1987) assumption that an arbitrary radius of 10km may be taken as the area most likely to be represented adequately in the pollen diagram. It cannot be stressed strongly enough that the catchment area of a particular site must be precisely determined before any interpretation of the scale of anthropogenic influence can be considered valid.

In this connection the work of Tauber on pollen transport is highly relevant. Tauber (1965; 1967) concluded that pollen reached the surface of a bog or lake in one of three ways. Some would be shed directly from the tree to fall to ground within a few hundred metres of the forest edge. Some, from a radius of c.10km, would be windborne and would reach the ground in a fairly even spread over the bog surface and some, from a wide area around the bog would be washed out of the atmosphere when it rained. Thus a pollen core taken from within a few hundred metres of the edge of a bog would contain mainly locally derived pollen ie. from within a few hundred metres of the forest edge, whereas a diagram from the centre of a large bog may give a picture of the vegetation on a regional scale.

The likely persistence of stands of trees on the immediate edges of bogs is also a factor worthy of note (Fenton-Thomas 1990).

4.2 SUMMARY OF THE ENVIRONMENTAL HISTORY OF NORTH EAST ENGLAND.

For the purpose of this general discussion, all of the pollen cores shown in figs 4.1-4.3 are considered. It may be seen that their distribution across the region is far from even and, since the primary object of their compilation has generally been botanical study, rarely corresponds to areas of intensive archaeological fieldwork. One exception is the area of Upper Teesdale which is extremely well represented due to interest in its relict glacial flora. Similarly, the chronological span represented in particular cores varies greatly with the later prehistoric period being present in approximately 50% of sites. For ease of comparison the evidence is discussed in terms of Godwin's pollen zones (Godwin *et al* 1957). Fig 4.4 illustrates how these zones compare to the available radiocarbon dates.

The late glacial period from c.10 000 BC, corresponding to the Older Dryas period (zone I) and the Allerod (zone II) is represented at very few sites in the North East. However it is believed that the situation was similar to that prevalent throughout Britain with the harsh glacial conditions giving rise to an unforested, although not altogether treeless, environment dominated by herbaceous species. *Juniperus* is present throughout the region and *Betula* occurs in low frequencies. An increase in *Juniperus* occurs in the south and east Durham sites in zone II although the presence of *Empetrum* and *Helianthemum* show that the scrub vegetation was not sufficiently dense to shade out these light demanding types. *Betula* appears to have been limited at this stage to low lying areas predominantly near the coast. At Thorpe Bulmer it declines slightly around the middle of zone II, the decline may have been caused by a cooling of the climate but in the absence of other evidence for such a change, it would appear that the species was unable to establish itself securely because it was growing close to its climatic limit here. It is notably absent from diagrams further inland. Similarly in Northumberland, *Betula* is present at Bradford Kaims, a coastal site at 45m OD but at nearby Longlee Moor, an increase in altitude to 106m OD proved sufficient to all but eliminate *Betula* and reduce *Juniperus* to very low values.

During zone III, corresponding to the Younger Dryas period, a cooling of the climate led to a marked change in the vegetation. Conditions were more severe than during the Older Dryas, possibly with less snow, and led to the establishment of a typical sedge tundra vegetation. In the south and east of County Durham, all tall trees and shrubs disappear to be replaced by some dwarf birch and willow. The evidence from Northumberland (Bartley 1966) suggests that the boundaries of the late glacial zones were not synchronous even over quite small areas. The effects of the climatic deterioration between zones II and III took effect first in areas of highest altitude and latitude so that although the warmest part of zone II was synchronous throughout the region, the entire zone was contracted in the uplands and in the north of the area. Conditions ameliorated towards the end of zone III and it is at this time that the palynological record in Upper Teesdale begins with the start of peat formation there. The situation there appears to be similar to that of the other upland areas, herbaceous species predominate and there are a variety of microhabitats represented. It is unlikely that there were any trees in the area, the low values of *Betula* and *Pinus* present probably having been blown in from the lowlands.

Zone IV, the pre-Boreal period, was marked by an increase in temperature which facilitated the spread of birch woodland in most areas. The diagrams from the

Durham Lowlands are dominated by *Betula* at the start of this zone but values drop c.9000 BP as *Ulmus* and *Corylus* increase. There was a hiatus in peat formation in Upper Teesdale during zones IV and V but the evidence from later deposits suggests that *Betula* and *Pinus* migrated into the area during this time, although not in very great quantities. The spread of *Betula* wood continued through north Durham and south Northumberland, at Cranberry Bog (Turner and Kershaw 1973) where zone IV begins with a dominance of *Juniperus*, trees rise to 70% by the end of the zone and *Betula* comprises 90% of the tree pollen. Further into Northumberland, the zone commences with a vegetation cover similar to that found at the end of zone II although some species eg. *Helianthemum* do not reappear. *Betula* is present throughout the zone rising to 70% at Embleton's Bog (Bartley 1966) and closed forest covers the lowlands by the middle of zone IV. The picture does however appear to have been rather different in the uplands. There is no evidence for the situation in the Cheviot massif as at Broad Moss, peat did not begin forming until zone VIIb but at Longlee Moor (*ibid*), the process of afforestation seems to have progressed very slowly. A change in deposits suggests less severe climatic conditions but open vegetation persists for much of zone IV and late glacial species exist in small numbers. Similarly at Broadgate Fell (Blackburn 1953) at 274m OD, all the recorded non arboreal pollens, heather, grass and sedge, peak during zone IV indicating wide open spaces in the *Betula* forest.

Zone V sees the spread of other arboreal types into the *Betula* woods. In south and east Durham (Bartley *et al* 1976) where *Ulmus* and *Corylus* were already established, *Quercus* began to increase. The increase is dated to c.8200 BP at Neasham Fen and rather earlier, c.8700 BP, at Mordon Carr with most of the other sites showing a similar picture. The exception to this general trend occurs at Bishop Middleham where *Pinus* values are high (c.50%) throughout the period. In north Durham and south Northumberland too, the *Betula* forests are colonised by *Corylus* and *Pinus* with *Corylus* rising from 0% to 300% at Cranberry Bog. The higher headlands of the coast remained free of vegetation cover although *Pinus* dominated woods were established around Druridge Bay, Howick Burn and south of the mouth of the Lyne. Further north, zone V is very much a transitional period with the relative frequencies of species, particularly *Betula* and *Pinus* depending on local topography. In general the more upland sites such as Broadgate Fell tend to favour *Pinus* whereas *Betula* predominates at sites such as Muckle Moss and Bradford Kaims. However there is a small peak of *Pinus* (47% of arboreal pollen) at Embleton's Bog during this zone.

Throughout zone VI the diversification of the forest types in the lowland zone continues. The sequence for Upper Teesdale recommences at this time with total tree pollen increasing at variable rates throughout the area. *Betula* and *Pinus* rise fairly steadily and there is a localised spread of *Alnus* around Foulmire Sike. *Corylus* is most abundant on the limestone. *Quercus* and *Ulmus* are represented in some diagrams but it is possible that pollen from these species may have blown in from further down the Tees Valley (Turner *et al* 1973). It does appear that arboreal species migrated mainly along the Tees Valley as maximum forest cover is reached along the valley and in more sheltered locations well before the exposed fell slopes.

Quercus, *Ulmus* and *Alnus* spread into north Durham and Northumberland at this time with *Quercus* frequencies generally falling off towards the north. This expansion is very late at Pow Hill (Turner & Hodgson 1981) where the diagram as a whole is somewhat unusual indicating a localised dominance of *Pinus* until the forest was destroyed in late prehistoric times. The evidence from the uplands of Northumberland is scant with Broadgate Fell showing a *Corylus* maximum followed by a localised fen phase and *Alnus-Betula* carr beginning to replace a *Pinus* dominated spectrum at Coom Rigg Moss. At Bradford Kaims and Longlee Moor, *Betula* and *Corylus* decline and *Ulmus* and *Quercus* increase (*Quercus* to 50%). The picture is one of mixed oak woodland with an unusually high proportion of *Quercus* at this latitude. This mixed woodland extends across south Northumberland with the main river valleys being particularly favoured by *Quercus*.

The main area of archaeological interest in the diagrams does not really begin until zone VII. The summary of earlier developments does however serve to highlight a number of points made in this and the preceding chapter. The first is the diversity to be found within the region. It has already been pointed out that the major geological strata are not homogenous formations and that small pockets of drift deposits can produce localised variations in soil type and hence agricultural capability. The importance of slope and aspect in determining vegetation has also been noted. The effects of these factors may be seen in the varied nature of the vegetation cover prior to the onset of marked anthropogenic influence.

Even allowing for this diversity, the diagrams also illustrate the localised catchment areas of many pollen core sites. The fact that particularly high *Pinus* values at Bishop Middleham throughout zone V are not reflected at Mordon Carr, a mere 5km away, stresses the need for caution in interpreting the results from small deposits.

Zone VII is divided into VIIa, the Atlantic period and VIIb, the sub-Boreal, the distinction being drawn at the level of the elm decline. The beginning of VIIa is marked in south and east Durham by a rise in *Alnus* and the first appearance of *Tilia*. *Pinus* persisted on the limestone although *Tilia* became more abundant there after c.6700 BP. As the Atlantic period became increasingly wet a number of lowland areas were flooded. The Nunstainton Channel, a continuation of the Bradbury/Mordon Carrs complex was inundated at this time but flooding did not extend as far as its northern extension, the Bishop Middleham Channel. The absence of Mesolithic material from the lowlands may reflect the inhospitable conditions of the dense woods and swamps.

In Upper Teesdale the forest maximum was reached during this period (c.8000-5000 BP) with tree pollen making up 30-50% of most diagrams. At this time the vegetation was least like either that of the late glacial period or of the present day although the forest cover was still far more open than in the lowlands with herbaceous species accounting for 30-40% of the total. *Pinus* frequencies are high throughout the area at the start of VIIa with *Alnus* and *Quercus* virtually absent. By the end of the zone though, *Pinus* has completely disappeared and *Quercus* and *Alnus* are well established. It appears that *Pinus* favoured the limestone areas and persisted there longer with the final decline occurring at the level of the elm decline. There was however a lack of peat growth in parts of Upper Teesdale during zone VIIa. Turner *et al* (1973) suggest that as this absence of peat is not peculiar to Teesdale but is also a feature of the southern Pennines, a climatic cause seems the most likely explanation. They suggest that peat was unable to form as the bog surfaces were being eroded during this period of increased precipitation.

Across north Durham and south Northumberland, *Betula-Corylus* scrub appears to have extended over the fell tops at the start of VIIa with large trees being rare, *Pinus* having all but disappeared. This period was short lived and by the middle of VIIa the fell tops are peat covered with much Alnus scrub indicative of a wet climate. *Betula-Corylus* woods remain on the better drained slopes with *Corylus* showing a rather late peak in mid VIIa. The deeper valleys were still able to provide a suitable habitat for mixed oak forest as illustrated by *Quercus* values of 50% at Muckle Moss in the broad valley of the South Tyne. The deep gullies cut by streams flowing down from the Whin Sill into the South Tyne Valley were favoured by *Corylus* with the *Corylus* maximum being once again unusually late, at the end of VIIa. Both Bradford Kaims and Longlee Moor reflect the wetter conditions in the rapid expansion of *Alnus* with *Tilia* and *Fraxinus* appearing in small amounts towards the end of the zone. The diagram from Wooler Water in the Milfield Basin (Clapperton *et al* 1971) shows once again a more varied spectrum in the lowlands, comprising 25% *Alnus* with *Betula, Ulmus, Quercus* and *Corylus* represented.

The elm decline is readily distinguishable on most of the diagrams from this region. Dates for the decline range from c.5800 BP-4500 BP with the average falling around 5100 BP. It is notable that the dates from the lowlands, particularly in Durham, tend to fall within the earlier part of the range. In south and east Durham there is little or no evidence for human activity immediately after the elm decline except for a slight increase in herbaceous types and a single occurrence of *Plantago lanceolata* at Hutton Henry. More certain and widespread evidence of clearance occurs after c.5000 BP albeit on a small and temporary scale. The level of activity increases at c.3660 BP, around the beginning of the Bronze Age. All tree types except *Betula* decline and the nature of the spectrum points to pasturing, possibly of a permanent nature. Cereal cultivation spreads towards the middle of the Bronze Age and the variation in the extent of clearance at this time is of interest, with Bishop Middleham in particular showing evidence of very extensive and lasting clearance. It appears that in general the East Durham Plateau was far more intensively farmed than the Tees Lowlands and though there was something of a recession of agriculture after c.3300 BP, parts of the Plateau were never again forested (Bartley *et al* 1976).

Peat formation recommenced in Upper Teesdale in zone VIIb and there is a great deal of local variety in the diagrams at this time. In general, the open woodland declined after 5000 BP, in the wetter areas it was replaced by blanket peat and in the better drained limestone areas by grassland. The relative dominance of woodland/grassland fluctuated throughout the period, the picture being reversed several times but the change from woodland to blanket peat was irreversible. Most of the present day blanket peat was already present by the end of the Bronze Age when alternating high and low *Plantago* and *Gramineae* frequencies begin to indicate episodes of human interference. Similar variations occur in three unpublished diagrams from Weardale (Turner *et al* 1973) suggesting the episodes were synchronous.

It is rather more difficult to determine general vegetation trends in Northumberland at this time as the warmer climate in zone VIIb caused the partial drying out of many upland peats thus conditions conducive to the preservation of pollen ceased and many pollen records end during the sub-Boreal. It appears that heather increased in the uplands and the drier conditions facilitated the replacement of *Alnus* by *Betula* and *Pinus*. The belt of coastal sand dunes probably also built up during this warm dry phase (Raistrick and Blackburn 1932). At Bradford Kaims and Longlee Moor (Bartley 1966), a very marked elm decline is accompanied by the appearance of *Plantago lanceolata* and an increase in non arboreal pollen but there is little indication of specific episodes of human activity. Similarly at Coom Rigg Moss (Chapman 1964), *Plantago lanceolata* appears a third of the way through zone VIIb at a time when herbaceous species increase in quantity. In the Milfield Basin, a rise in water levels has been suggested as a possible cause of the elm decline there as it is accompanied by a fen phase with an increase in sedges and ferns (Clapperton *et al* 1971). However, at Fellend, Steng and Camp Hill Mosses (Davies & Turner 1979), the use of radiocarbon dates has allowed a number of more specific clearances during the course of the Bronze Age to be identified. Each episode lasted c.200 years with the intensity of clearance falling off in south west Northumberland.

The history of the zone VIII, sub-Atlantic, vegetation is very much a series of episodes of clearance and cultivation and needs to be considered on a far more localised level to establish a pattern of events. However it is clear that by the later part of the pre Roman Iron Age, a large part of the Durham Lowlands was under arable cultivation although at Hallowell Moss (Donaldson & Turner 1977) there is evidence for only slight grazing during the Iron Age with sudden extensive clearance during Romano-British times resulting in a landscape as open as that of today . This agricultural episode appears to have continued until perhaps the end of the Roman occupation when a partial return to pasturing is suggested by the rise in grass pollen. The poorly drained areas of the Tees Lowlands appear to have been neglected until the early Mediaeval period with forest clearance commencing c. AD 700.

The return to wetter conditions during the sub-Atlantic period initiated most of the present bogs and mosses in the upland zone, many based on the older peats. In general the upland bogs contain little or no tree pollen, the tree line having descended the fell slopes as a result of the climatic deterioration. It would appear that in Northumberland, as in Durham, widespread clearance and cultivation took place during the latter part of the Iron Age, well before the Roman advance. Dates from Fellend and Steng Mosses (Davies & Turner 1979) coincide well with those from Thorpe Bulmer and Hutton Henry (Bartley *et al* 1976) and with Steward Shield Meadow in mid Weardale (Roberts *et al* 1973). This phase of activity appears to have continued for some time; dates for a recession of agriculture and regeneration of woodland all fall 100-200 years after the Roman withdrawal.

The palynological evidence is discussed further in appendix three which consists of a series of detailed case studies considering the relationship between dated agricultural episodes and known archaeological sites.

4.3 CLIMATE

Climatic change during later prehistory has been discussed in detail in a number of publications (cf Evans 1975; Turner in Simmons & Tooley 1981; Lamb 1981) and it suffices here merely to outline briefly the most widely accepted views on the nature and extent of the changes. The work of Manley and Lamb has been most influential in the reconstruction of the post-glacial climate. The implications for north east England have recently been summarised by Annable (1987).

The period of interest here commences with the beginning of the sub-Boreal phase c.5150 BP following on from the Atlantic phase climatic optimum. Temperatures during the sub-Boreal were higher than those of today although the precise magnitude of the difference remains open to question. Taylor (1975) suggests that temperatures were initially more than 2°C higher, with the difference later falling to 1-1.5°C, whereas Lamb (1963) believes average temperatures to have remained 2-3°C higher than the present during summer with winter differences being less marked. Taylor's figures would allow for a tree line some 200-300m higher than at present.

The amount of precipitation at this time is debatable but there is a certain amount of evidence to suggest a Continental type climate markedly drier than at present. There are likely to have been slight fluctuations in rainfall as peat bogs throughout the country exhibit hiatus stages where peat formation stopped as the surface of the bog dried out, alternating with periods of renewed growth known as recurrence surfaces. The most convincing evidence for dryness in Britain is provided by Cornwall's (1953) 'particle size analysis' work. He examined a number of Bronze Age soils and ditch deposits in Oxfordshire, Wiltshire, Dorset and Derbyshire, taking the relative proportions of gravel, sand, silt and clay in each deposit to be indicative of the environmental conditions under which the soil formed. The soils examined showed high concentrations of silt, indicative of wind transport in dry conditions.

It is generally agreed that conditions in the areas for which we have evidence favoured the potential expansion of settlement and agriculture to maximum elevations during the middle to late Neolithic and the early Bronze Age. There is also evidence of marine regression at this time, particularly in the Fens and the Somerset Levels. Tooley (1978), working on the evidence from north west England, has identified a phase of marine regression c.3700-3150 BP, thus coastal emergence and drier conditions would also have favoured the expansion of lowland settlement during the early Bronze Age.

Later in the sub-Boreal phase the climate began to deteriorate. Tinsley and Grigson (1981) suggest the deterioration may have begun as early as c.4350 BP and, on the evidence of C14 dates for recurrence surfaces in peat bogs in Ireland and north west Scotland, its effects may have been felt first in the west of Britain. It is suggested that the initial effects of the sub-Boreal deterioration may have been minimal in eastern Britain as there is little evidence for renewed growth of blanket peat on the North York Moors (Simmons & Cundill 1974) or in the east central Pennines (Tinsley 1973). Deterioration is likely to have been gradual and cyclical at first becoming very rapid during the early part of the 1st millennium BC Recurrence surfaces have been dated to 3390 $\pm$ 90 BP (GAK 2028) at Red Sike Moss and 3150 $\pm$ 100 BP (GAK 2913) at Weelhead Moss (Turner *et al* 1973) in the Pennine Uplands of County Durham. Lamb (1981) has estimated a decline in average temperatures of the order of 2°C between 1000 BC and 750 BC and suggests this would have shortened the growing season by more than five weeks.

Peat bog evidence suggests that precipitation began to increase more rapidly after 2800 BP with the climate reaching its wettest c.2600 BP (Turner 1981) ie. at the beginning of the Iron Age. This cool wet period was accompanied by widespread coastal inundation (Tooley 1978) and lasted until the start of the sub-Atlantic phase c.2450 BP. The early Iron Age is thus likely to have been an unfavourable time for settlement at both upland and lowland extremes. Lamb (1981) contrasts the evidence from Wales (Turner 1965) with that from Yorkshire and suggests there was a great predominance of westerly winds at the time, causing more extreme wetness in that part of the country.

The climate appears to have ameliorated to some degree during the latter half of the 1st millennium BC. Temperatures were close to the present day range by this time and precipitation decreased after the early Iron Age maximum. Lamb (1981) suggests there was a 'Little Optimum' from c.250 to 400 cal AD but Taylor (1975) favours the idea of a cooler phase during Romano-British times. Turner (1981) however takes the evidence for vine growing at that time and the slow rate of peat growth as indicative of a warmer and drier climate up to AD 450.

We can thus identify a number of broad climatic phases which are likely to have affected subsistence strategies in north east England. The first is the warm, dry Continental phase beginning c.5150 BP and, as there is no evidence for an early deterioration in the North East (Turner *et al* 1973), probably lasting till c.3350 BP, in other words covering the Neolithic and early Bronze Age periods. From c.3350 BP to c.2800 BP, the middle to late Bronze Age, there was a transitional phase with the climate undergoing cyclic decline becoming slightly cooler and wetter. From the end of the Bronze Age through the early Iron Age, c.2800-2350 BP, the climate was at its coolest and wettest with the potential for settlement in both the upland and the lowland zones at its minimum. After c.2350 BP, conditions became warmer and drier with the potential for settlement and agriculture similar to that of the present day. In considering climatic change on this scale one must however bear in mind the work of Taylor (1975) who emphasises the differences which can occur between macro, meso and micro climates. Of particular relevance to settlement and agricultural potential are the localised variations on the meso and micro scale due to factors such as altitude, aspect and ground conditions; this is discussed further in appendix two.

CHAPTER FIVE

OPEN SETTLEMENTS

5.1 INTRODUCTION

This group comprises settlements of circular buildings of timber or stone, frequently with associated fields and/or evidence of field clearance. The type includes settlements previously referred to as unenclosed settlements and unenclosed platform settlements. These terminologies have been rejected on the following grounds. To take the latter term first, neither platforms nor scoops are seen as a major characteristic feature of such sites. Secondly, although the houses often open directly onto fields, rather than being separated from them, the activities based around the settlement can often be seen to have taken place within an identifiable bounded area which may or may not be marked by some form of permanent structure.

Open sites are a fairly recent addition to the repertoire of prehistoric settlements in north east England. Of course "hut circles" have long been a noted feature of the upland landscape. The site of Debdon Whitefield was indeed excavated as long ago as 1901 by Lord Armstrong, although no report was published (Dippie-Dixon 1903). However by the mid 1970s the number and extent of these sites still remained unknown and it was generally accepted that most were of Romano-British date. Similar sites on scooped platforms were far more common in the Scottish Border counties and the excavation by Feachem of a hut platform on the site of

Green Knowe in Peeblesshire (Feachem 1961) established an early Iron Age date for that site on the basis of the so-called Flat Rimmed pottery recovered (although the possibility of a date during the late Bronze Age/early Iron Age transition was noted).

Archaeology is thus once again indebted to George Jobey who first investigated the possibility that these open sites might help to fill the settlement void of the 2nd millennium. His re-excavation of Green Knowe in 1977-78 (Jobey 1980d) overturned the current chronology by producing a series of C14 dates which could be calibrated to the second half of the 2nd millennium BC. In an 'excursion into the possibilities of settlement distribution' (Jobey 1980c) he paved the way for a whole new area of research and the rest, as they say, is prehistory. Work on this form of settlement is still very much in its infancy but already excavation has extended the distribution of open sites throughout the region (eg. Coggins & Fairless 1984) and shown the potential for the study of the agricultural regime (eg. Burgess 1980a,b; 1981a,b; 1982; Topping 1990). Survey work by Gates (1983) and RCHME (forthcoming) has greatly increased the numbers of known sites and the way is now open for a re-appraisal of many aspects of 2nd and 1st millennium settlement and economy.

Some caution has been employed here in accepting sites represented only by isolated huts on the grounds that such sites have frequently been misidentified in the past. Various modern agricultural features, sheep stells, sow kilns (constructed for the production of lime for agricultural purposes) and turf stacks (Jobey 1972a) have all been recorded as hut circles. Gates (1983 p107) alerts us to Dr Johnson's description of huts seen in the Highlands of Scotland in 1773 as being of 'loose stones ....with some tendency to circularity'. By way of contrast, a number of genuine open settlements including Linhope Burn and Ritto Hill are recorded as sheep stells on the O.S. First Edition 6 inch map published in 1866 (Topping 1990).

5.2 NUMBERS AND DISTRIBUTION

In the accompanying gazetteer (appendix 1), 178 open sites are recorded. They vary from sites with evidence of a single hut circle to over a dozen huts. Despite the recent increase in the number of known settlements, they remain very largely an upland phenomenon (fig 5.5), with 43% being situated at altitudes over 300m OD. Only 20% lie below 200m OD. This distribution seems likely to be very much a feature of differential survival, visibility and research. Some 92% of known sites exist as earthworks with 7% having been identified only from the air whilst 1% have been destroyed since recording. The Cheviot Hills in particular exhibit a remarkable array of early earthwork sites at a level above that reached by the limits of either Mediaeval or modern cultivation and are one of a very few areas where the remains of ephemeral timber structures leave traces visible at ground level. If one considers the full range of situations represented by the known sites, 15m OD to 427m OD, it is apparent that in the lowlands we have as yet only keyhole glimpses of the distribution of what may have been a ubiquitous and long-lived settlement form.

The distribution of open sites is shown in figs 5.1-5.4. The vast majority of sites lie in the Cheviot foothills of Northumberland and in absolute as well as relative terms, this area appears to have been heavily utilised by the builders of open settlements. Another cluster of sites occurs on the now barren Fell Sandstones to the east of the Cheviot Massif and there is a fairly even, if thinly spread, cover of sites across south Northumberland with a few examples in the Tweed Basin. The distribution of sites in County Durham reflects the results of recent field survey more obviously than in other areas. The position of the two distinct clusters of sites in Upper Teesdale (Coggins 1986) and around Pedam's Oak Farm (Fowler 1986; Ross 1987) is hardly coincidental. No open settlements, other than the possible example at Burradon, are known in Tyne & Wear and the sites of Catcote and Thorpe Thewles in Cleveland fall into a different class of open settlement to be discussed separately. Since fieldwork on open sites is such a recent development, it may be anticipated that the numbers of known sites will continue to increase in the coming years. Any increase in numbers is unlikely for the most part to significantly alter the present distribution due to considerations of modern land-use. However, the realisation that such sites do exist in the lowlands (Gates 1983) and are detectable by air photography, has been a significant step and it is to be hoped that further advances may be made in this area, particularly in County Durham.

5.3 COMPONENTS

The major structural component of an open settlement is the circular hut. Sites which can demonstrate the presence of one or more huts, not contained within a discrete enclosure, may be included in this group regardless of overall site morphology. Other structural components which may be present comprise platforms, banks, lynchets, terraces, dykes, cairns and ditches.

5.3.1 Buildings

The above definition may appear disarmingly simple but a glance through the literature will reveal a number of problems in determining what constitutes a hut and a morass of contradictions and misconceptions in the classification of hut types. Gates states that 'the following types of structure can nevertheless be plausibly interpreted as remains of unenclosed round houses; platforms, ring-grooves, ring-ditches and ringbanks' (1983 p107). This statement may be valid if one replaces 'types of structure' with 'features', deletes 'unenclosed', replaces 'houses' with 'huts' and adds 'stone walls'.

In all, a minimum of 328 possible huts, represented by the above features, have been recorded on open sites in north east England. It is perhaps worth presenting a breakdown of the "types" as recorded before going on to discuss how far the visible features relate to factors such as method of construction, cultural type or chronology. Some 118 huts have been recorded in SMRs or published literature as being of a particular type as follows - ringbanks 44, platforms 32, ring-grooves 12, ring-ditches 12, stone 48 (of these only 9 appear to be genuine stone-built huts, the other 39 must be considered as possible ringbanks). So far the only earthwork remains recorded in County Durham have been stone remains and platforms. The 87 recorded hut diameters range from c.2.7m to c.15.5m, these figures use the internal diameter whenever possible but in some cases it is impossible to determine which part of the feature the author has measured. The average diameter appears to be of the order of 8.1m with the statistical mode being 8m.

5.3.1.1 Platform Structures

The dangers inherent in equating huts with dwellings have already been noted (ch 2) but here one is faced with the additional problem of whether platforms or scoops necessarily relate to buildings at all. Guilbert (1981c) has suggested that some may be working platforms possibly with protective windbreaks in some cases. This argument does appear convincing but be that as it may, the few excavated platforms on open sites in north Britain have been shown to have held buildings. This evidence does however amount to only four excavated platforms at Green Knowe in Peeblesshire (Feacham 1961; Jobey 1980d) and, in the immediate area of interest, a single platform belonging to the earliest phase of the Hetha Burn settlement (Burgess 1970). Levelled platforms with no visible signs of structures on them do occur among the upstanding ringbanks at Houseledge West (fig 5.8).

Such platforms are generally seen as a response to a particular topographic situation. They are extremely common in the Scottish Border counties but less so in Northumberland where level ground for building is more readily available. There is evidence that the precise relationship between the platform and the structure of the building may vary. The buildings at Green Knowe and Hetha Burn are believed to have been free-standing structures of slightly smaller dimensions than the actual platform whereas a number of platforms on sites in southern England are taken to have been part of the building structure. Musson (1970) in re-examining the structures at Itford Hill and Amberley Mount, Sussex and Drewett (1979) in attempting an interpretation of the buildings at Black Patch, Sussex, both produce a reconstruction in which the scarp face of the platform forms the rear wall of the building (fig 5.6). Musson suggests a low stone wall along the top of the scarp provided support for the roof whilst Drewett's reconstruction shows the ends of the rafters embedded in post-holes along the top of the scarp. Both interpretations include a low front wall of stone.

Whilst there is no reason to doubt the reconstruction of the Green Knowe houses as being of ring-groove construction, it may be seen (Jobey 1980d) that in all cases the outer walls of the buildings lie very close to the edge of the platform and it may be that the roof rested on the platform in order to divert run-off water if not for support. It is difficult to envisage how else these structures would have avoided becoming waterlogged by trapping run-off from the roof and water running down the slope. The idea that they were occupied 'before any noticeable effects of climatic deterioration in the 1st millennium B.C.' (Jobey 1980d p94) is hardly an adequate solution.

5.3.1.2 Ring-groove Structures

A ring-groove is, as the name suggests, a narrow penannular depression. Such grooves have been found upon excavation to represent bedding trenches for walls of posts or planks or wattle screens. This method of construction appears, upon present excavated evidence, to have been the form most commonly used on open settlements, occurring at Hetha Burn (Burgess 1970), Houseledge (Burgess 1980a,b; 1981a,b; 1982), Standrop Rigg (Jobey 1983a) and Hallshill (Gates 1982a).

The ring-groove was generally employed in conjunction with an inner ring of individual posts which probably bore most of the weight of the roof. The lateral forces exerted by the rafters being converted into circumferential stresses by a ring-beam joining the tops of the posts. Such a structure is a fairly basic one and Coggins and Fairless (1984) in their reconstruction of the Bracken Rigg house probably overestimate the degree of carpentry skill required in its construction. Ethnographic parallels (Musson 1970) have shown that the beam need consist of no more than woven withies lashed to the top of the posts. Most houses thus appear to have been of the double-ring type discussed by Guilbert (1981a). The existence of an upper storey or at least a storage area, resting on the ring beam has been suggested in a number of speculative reconstructions of similar buildings (D.M. Reynolds 1982; P. Reynolds 1982; Kendrick 1982) and must be considered a reasonable possibility. Coggins and Fairless (1984) in discussing the Bracken Rigg House, make a valid point in questioning whether the evidence for cereal production is sufficient to imply that straw was necessarily used as a roofing material. They suggest turf, birchbark and ling as alternative possibilities. The ring-groove/post-ring form appears to have had a wide distribution and long currency being widely used in the Iron Age also (e.g. High Knowes, Jobey & Tait 1966).

5.3.1.3 Ring-ditch Structures

Ring-ditches, not to be confused with ring-grooves, are an internal feature of some round huts, not a construction technique. They occur in double and treble ring huts where the peripheral zone between the outer rings is sunk below the level of the central area. The sunken area may be paved as at Dryburn Bridge (Triscott 1982) or may be no more than a series of shallow scoops as at High Knowes (Jobey & Tait 1966). Differences in the depth of scoops or flooring material may suggest radial divisions in the manner of Scottish wheelhouses.

It must be stressed that the presence of huts with ring-ditches has yet to be proved by excavation on any open settlement in north east England. The 12 postulated examples having been identified from surface indications only. Huts with ring-ditches do occur at Dryburn Bridge (Triscott 1982) on an open settlement which overlies a palisaded enclosure and is dated to the middle of the first half of the 1st millennium BC. This date (see appendix 7) falls very late in the sequence of north eastern open sites.

There is some confusion over the use of terms such as "ring-ditch house". Macinnes states that 'a house whose dominant feature is a ring-ditch.......is already known from excavation at Burradon' (1982a p33) yet in the example of the central hut at Burradon (Jobey 1970a), the ring-ditch is a drain external to a building of individual post construction.

5.3.1.4 Ringbanks

The term ringbank has only recently been introduced into the repertoire of earthwork forms. Ringbanks appear as low penannular mounds of turf covered stones, up to 3m wide. They have been shown by excavation to mark the sites of circular buildings on open settlements, for example at Houseledge (Burgess 1980a,b; 1981a,b; 1982), Hallshill (Gates 1982a) and Standrop Rigg (Jobey 1983a) but as yet, the connection between the ringbank and the actual structure of the building remains unclear. In most cases the excavated banks have consisted of a loose jumble of stones in no way comparable with the walls of known stone-built huts. In many cases (e.g. Standrop Rigg, Jobey 1983a) the ringbanks are contiguous with linear clearance banks. It is thus widely believed that the banks are the result of field clearance, with stones, cleared from land in agricultural use, being piled around huts, possibly to provide insulation. The profile of an excavated ringbank at Houseledge West, described as steep on the inside and sloping on the outside, (Burgess 1980a,b) would seem to be entirely in keeping with the idea of the stones having been piled up against the wall of a timber building. However, after further excavation, the author is inclined to think the feature was constructed in a more deliberate manner (C. Burgess pers comm).

It should be noted that Reid's (1989) discussion of the use of space in such buildings is based on the misconception that the ringbank formed the outer wall. He is correct in stating that these buildings are a type of double-ring roundhouse but where preservation of timber features has allowed a clear plan to be derived (Hallshill, Gates 1982a; Standrop Rigg, Jobey 1983a), the double-ring building has been seen to be of post and ring-groove construction with a surrounding ringbank. Even if the ringbank were to serve a structural function, it is probable that some form of wattle screen would mark the limit of the occupied area.

However, the frequency with which this form of earthwork occurs on open settlements does perhaps suggest that a more specific function ought to be sought. The ringbank surrounding House A at Houseledge West was certainly far more regular than other excavated examples and appeared to have a post pipe within it

(C. Burgess pers comm). It may therefore be that, as Coggins and Fairless (1984) suggest, the ends of the main rafters were rammed in between the stones of the ringbank. This would not be essential in a building of ringbeam construction but would provide extra stability and protection from the elements. This of course cannot be the full explanantion as another excavated ringbank at Houseledge, narrower and less regular than that surrounding House A, did not appear to be a roofed structure at all. This ringbank could perhaps have formed a foundation for a turf-built enclosure.

One has also to consider the evidence that in a number of cases the land on which the huts were built had already been cleared for agricultural purposes. Some form of activity earlier than the excavated settlement is suggested at Standrop Rigg; earlier agricultural activity appears to have occurred at Hallshill and the field system associated with the Houseledge West settlement seems to have belonged to the third phase of agricultural activity on the site. In some cases therefore, the ringbanks could have been constructed in a single stage from pre-existing clearance cairns, rather than accumulating over a period of time. Certainly at Houseledge the cairns closest to the occupied area were apparently robbed for other building projects (Burgess 1984; see also fig 5.7). Conversely, it is suggested (Jobey 1983a) that at Standrop Rigg, field cleared stones continued to be added to the ringbanks around huts 2 and 4 after they went out of use, thus partly blocking the doorways. This may of course be simply the result of later collapse.

5.3.1.5 Stone-Built Structures

Very few of the known open settlements appear to include genuine stone built structures. The only excavated example to produce evidence of stone buildings is Linhope Burn (Topping 1990). Here, the main hut is described as having walls which were 'well built and double-faced on the west, south and east sides' (*ibid* p31), and an internal diameter of 8m. Gates (1983) notes that the buildings of the settlement at Long Crags have visible facing stones or orthostats. The presence of stone buildings may possibly have some chronological significance. Linhope Burn has not been radiocarbon dated but the site was shown to be stratigraphically later than an area of cord rig cultivation (for discussion of the dating of cord rig see ch 10). Double-walled stone huts of the type excavated at Dalruzion, Perthshire (Thorneycroft 1933) are unknown in this area.

Whilst all of the above features may be valid indicators of the former presence of a building, to speak of any of them as representing a "house type" is more problematic. All of the above features (with the exception of a stone building) could conceivably be combined in a single hut. The problem of house types has been discussed by Hill (1982b) and Macinnes (1982a) but as yet no satisfactory solution has evolved. If one considers the mode of construction to be representative of "type", then four variants emerge - post-built, ring-groove, platform (where this can be shown to have been an integral part of the structure) and stone-built. Both ring-groove and platform huts however often contain an element of individual post construction. Taking the null hypothesis that all of these building materials and methods of construction were available to the builders of open settlements, the obvious deciding factor in selecting one from another is expediency in that particular location. Locally available building materials were used and adaptations such as the construction of level platforms, adopted where necessary. Such a model of environmental determinism may be over-simplistic but there is little to suggest (ch 9) that these choices relate to status or function. Further work on chronology is of course necessary. It may be that elements such as ring-ditches (if their existence on open settlements in this area is proven) and ringbanks form a more interesting basis on which to group and perhaps date buildings. The significance of particular building forms must however be viewed in relation to the settlement as a whole.

Bearing in mind the above, it is noteworthy that less than 3% of sites are recorded as having more than one form of earthwork visible. The recorded combinations comprise - ring-ditches and ring-grooves, ring-grooves and platforms, ring-ditches and platforms and a ringbank and ring-groove. It has been shown that this need not represent any significant difference in building construction on the site and at this stage it would be unwise to make too many inferences about the chronological implications of the presence or absence of certain features. The only observed stratigraphic relationship between different forms of earthwork occurs at Cochrane Pike (Gates 1983) where a circular structure with a putative ring-ditch cuts the projected arc of a platform. The relationship is unlikely to have occurred by chance but in the absence of excavation, whether this represents building replacement after a period of unknown duration or the annexing by the hut builders of a pre-existing sheltered work area, is unclear.

That an apparent lack of different building features need not indicate a limited period of use, or a uniform set of building functions is demonstrated at Houseledge West (Burgess 1984) where a hut identified by a ringbank proved to be a house with three phases of construction and another, apparently similar, building proved to be an unroofed stock enclosure.

5.4 AGRICULTURAL REMAINS AND POTENTIAL

The agricultural regime associated with open settlements is discussed further in chapter ten but some description of the visible remains is necessary here. Some 38% of known sites are accompanied by evidence of field boundaries, lynchets or cord rig cultivation. These figures differ little from those produced by Gates (1983) based on a somewhat smaller sample (97 in all) but probably serve only to reflect the incidence of survival of such an ephemeral feature of the landscape.

The field plots are generally marked by low stone banks of an irregular and often disjointed nature. They are mostly sub-rectangular although a number of single plots are sub-circular. They often incorporate ringbanks without any obvious change in their course or character as at Standrop Rigg (Jobey 1983a). Some 10m of such a bank was excavated at Hallshill (Gates 1982a) and found to consist of loose stones, presumably the result of field clearance, dumped in a fairly random fashion. In some cases they consist of no more than strings of clearance of cairns. The evidence is thus often in keeping with the stones having been dumped around the periphery of an area in agricultural use as a matter of convenience rather than as an attempt to construct a physical barrier. However, as these sites are unlikely to have concentrated entirely on arable farming, some form of stock control would have been necessary and the presence of fences, hedges or turf walls in some cases must remain a possibility.

The plots are usually small with 0.2 ha being the average although sizes vary from 0.06 ha to over 2 ha. Individual settlements may have from one to over a dozen or so plots, those with multiple plots usually having a combination of large and small fields. Gates' figure of an average of 0.6 ha of "enclosed land" per extant *house* (author's punctuation & italics) may be misleading as it is a calculated average and ignores the fact that settlements with a greater number of buildings do not necessarily seem to exhibit a corresponding increase in the total amount of cleared land.

Evidence of clearance and agricultural activity frequently extends beyond the field plots in the form of dykes and clearance cairns. If one assumes that in many cases these may indeed be associated with the activities of the open settlement, the average amount of cleared land per settlement may be of the order of 3.5 ha. At Houseledge West where extensive survey work has been undertaken, agricultural remains apparently associated with the open settlement cover an area of almost one square km; those at Chesters Burn and Ewe Hill may be equally extensive. That outlying features may be missed in field survey is emphasised by Burgess' (1984 p150) observation that clearance cairns survive best on the fringes of settled areas at some distance from the buildings. Those in the focal area are more likely to have been robbed for other building projects. Indeed almost 70% of sites which have been the subject of extensive, detailed surveys exhibit clearance cairns in the vicinity whereas the figure falls to 30% of all recorded sites.

Using the criteria for assessing agricultural potential outlined in appendix two, the majority of known open sites lie in what would have been medium grade agricultural land throughout the prehistoric period (table a2.1). The locations favoured by the open sites are likely to have reached their optimum agricultural potential during the earliest phase considered here, lasting until the end of the early Bronze Age. It is worth noting that 67% of the medium grade locations fall in the upper end of this grade and thus allowing for micro considerations as discussed above (ch 4), it may be that a very high percentage of the sites were indeed able to exploit niches of good quality agricultural land. The figures for this phase are similar to those of the later Iron Age/Romano-British period but do not take into account the effects of human interference with the soil. It may be significant that many of the sites (34%) are situated on andesite. Weathered andesite may produce very fertile soils initially but their fertility is likely to be short lived and, as there is evidence for early Bronze Age cultivation of these soils, the potential of the areas during phase 4 is likely to have been rather poorer than is indicated here.

The middle/late Bronze Age climatic deterioration would appear to have had little in the way of immediate effect on land-use potential. There is a 25% increase in poor quality land but still 67% of the medium grade locations are in the upper end of the grade. It does indeed seem to have been something of a transitional period during which subsistence strategies could have been adapted to changing conditions rather than a sudden period of environmental crisis. This of course is not to understate the possible catastrophic consequences, on a localised scale, of a series of particularly bad years during this cyclic deterioration.

However, during the later Bronze Age/beginning of the Iron Age, the picture is very different. There is a further 16% increase in the amount of poor grade locations and even some of the locations previously scored as good are becoming more marginal. The reason for this is the large number of sites at situations over 300m OD, which, with the increase in precipitation and the shorter growing season caused by falling temperatures, were no longer favourable locations for agriculture.

The amelioration of conditions later in the Iron Age is unlikely to have greatly altered this picture. As stated above, the effects of early clearance and cultivation would have combined with the increase in precipitation to favour the growth of blanket peat at many upland locations and prevent a return to anything like the scale of potential for agriculture which existed in the earlier Bronze Age.

5.5 MORPHOLOGY AND ON-SITE ACTIVITY

The level of activity on open settlements as evidenced by the number of circular structures apparent relative to those on other types of prehistoric settlement is generally low (fig 2.27). Only 26% of those in the gazetteer have an unknown number of structures. Of those where the number of huts has been determined with reasonable certainty, 85% are of AR 1, having up to four huts, 13% are of AR 2 and just over 1% are of AR 3, whilst only a single example at Low House West falls into the AR 4 group. However, this latter site is known only from air photographs and its classification as an intensively used open settlement must therefore remain open to question.

There is great variety in the overall morphology of open settlements. The general impression is of settlements which have developed according to the needs of the inhabitants over time rather than as the product of a preconceived formal plan. This contrasts with the situation in the Scottish Borders where a particular type of situation and layout appears to have been favoured (although this may result partly from more limited fieldwork). The Scottish sites are commonly found to have huts sited along the contour, preferably on a natural terrace or break of slope and often fronting onto a stream. Burgess (1984) adds the availability of cultivable land as an important locational factor. Another difference between the sites of north east England and those of southern Scotland lies in the presence of cultivation traces. Field systems are very rarely found in close proximity to open settlements in southern Scotland. In Lanarkshire and Peeblesshire, where such sites have been the subject of extensive survey by the Royal Commission on the Historical Monuments of Scotland, the distributions of open sites and cairnfields seem to be mutually exclusive (Halliday 1985). However in Perthshire (Harris 1984), open settlements are once again frequently found in association with field systems and clearance cairns and in Roxburghshire a number of open settlements are associated with evidence of cord rig cultivation (P. Topping pers comm).

Any attempt to divide these settlements into "types" must necessarily bear in mind the limitations of topographical situation and imperfect preservation. However, within these constraints, a number of variations seem to emerge.

Type O1 consists of those sites exhibiting a linear plan similar to that found on many Scottish sites. Houseledge West (fig 5.8) occupies a position on a natural terrace at the break of slope, fronting onto a stream and settlements at Scaud Knowe, Rackside North and Barrow Burn display a row of buildings along a shelf. These sites do however appear to be the exception rather than a common type.

Type O2 consists of those settlements with a single irregular field. Buildings may be either within the field as at Hazeltonrig Hill 2 (fig 5.9) or external to it as at Dry Dean.

Type O3 settlements are those with multiple irregular fields. Buildings may be sited within the fields as at Langlee Crags, or more usually, a combination of buildings within and outside fields occurs and huts are frequently incorporated into the field boundaries as at Standrop Rigg (fig 5.10).

Kidlandlee Dean 1 (fig 5.11) and Todlaw Pike are representative of type O4 settlements where there are traces of more regular systems of rectangular fields suggestive of a more formal planned layout.

Type O5 settlements have a larger number of circular structures, usually fairly closely grouped. Evidence of field boundaries in the immediate vicinity is however, lacking. Examples include Long Crags and Tathey Crags (fig 5.12).

Type O6 are those settlements such as Thorpe Thewles and Catcote (discussed below) which have developed out of enclosed settlements and are of later date than the types discussed above.

5.6 DATE

As noted earlier, open settlements have recently aroused a certain amount of interest as possible contenders to fill the apparent settlement "void" of the 2nd and early 1st millennia BC. The first indications that this was indeed the case resulted from Jobey's work at Green Knowe in Peeblesshire. As yet few C14 dates have been produced for sites in north east England but the artefactual evidence available shows a remarkably consistent pattern of early and middle Bronze Age occupation. However, a brief examination of the evidence from across the Scottish Border will show that this may not reveal the whole picture.

The earliest consistent set of C14 dates yet derived come from unpublished excavations by J. Monaghan on an open hut at Lookout Plantation (Jobey 1985) in the Till Valley. Dates of 3410 $\pm$ 80 BP, 3370 $\pm$ 80 BP, 3230 $\pm$ 110 BP and 3090 $\pm$ 30 BP indicate an occupation during the first half of the 2nd millennium. The earlier date of 4020 $\pm$ 80 BP (HAR 3983) from Standrop Rigg (Jobey 1983a) represents no more than at *terminus post quem* for the main occupation of house 4 and it is probable that a date of 3000 $\pm$ 80 BP (HAR 3538) from an occupation layer relates to the use of building 2.

A similarly early date of 3180 ± 60 BP (HAR 2414) for Bracken Rigg (Coggins & Fairless 1984) was obtained from charcoal in one of the post-holes of the house. The site at Hallshill is as yet incompletely published (Gates 1982a) but the excavator suggests dates of 3130 ± 60 BP (HAR 8184) from a posthole and 2960 ± 60 BP (HAR 8183) from a pit (Walker *et al* 1990) antedate the construction of the timber building. Two late 2nd/early 1st millennium dates, 2780 ± 80 BP (HAR 4800) and 2710 ± 70 BP (HAR 8185), may be associated with the occupation of the building but the relationship is far from certain. The calibrated dates for all of the sites are shown in table a7.1.

The artefactual evidence would, on the whole, be in keeping with an early to middle Bronze Age date for most sites. Hallshill produced no pottery, the only finds being a few scraps of flint, some rubbed stone and a broken saddle quern. Bracken Rigg produced a minimum of six vessels, the only pot whose form could be completely reconstructed being a large, bucket shaped urn, decorated by a series of diagonal lines between two horizontal lines just below the rim. It has been suggested, (Gidney 1984) on account of the number of large sherds present, that this may have been one of the last vessels in use on the site and it may indeed represent (see below) occupation some centuries later than the C14 date would indicate. A total of 109 pieces of flint and chert were discovered, the majority of which were waste flakes and may be of middle Bronze Age date (Young 1984a). Other finds included spindle-whorls, a hammerstone, a hone and three curved fragments of jet, triangular in section.

Fragments of some 17 vessels were recovered at Standrop Rigg. Here again, crude barrel or bucket shaped urns are represented and slashed diagonal lines or zig-zags between horizontal lines on the upper part of the vessel is a recurring decorative feature. A number of the vessels appear to have cordons. Other finds include stone pounders and rubbers, 3 fragments of saddle querns and a small quantity of waste flint.

The settlement at Houseledge remains incompletely published and has not been C14 dated but verbal description of the finds (Burgess 1981b) suggests a date in the early Bronze Age, perhaps on a par with the occupation of Lookout Plantation. Cord ornamented sherds, both whipped and twisted, are abundant and there is little evidence to suggest that this form of decoration continued in use much beyond the first quarter of the 2nd millennium. A single comb ornamented sherd, believed to be from a Beaker, was recovered from the farmyard area. The bulk of the finds appear to have come from a field, farmyard and stock enclosures and thus the decorated sherd may not have been among the latest ceramic forms in use on the site. However, the material is not presently accessible for study and in advance of the full publication, an occupation extending only as far as the beginning of the middle Bronze Age appears a possibility. Flint finds were abundant and include a plano-convex knife and finds of jet/shale include a fragment either of a rim or of "napkin ring" form. Jet objects of a form similar to modern napkin rings, having a constricted waist, do occur in Scottish contexts but more local parallels appear to be miniature jet cups such as that found with a burial at High Knowes, Alnham (Jobey & Tait 1966) and examples of unknown provenance from the Hepburn Moor area of Northumberland (Newbigin 1941).

A detailed study of Bronze Age domestic ceramics is beyond the scope of this thesis but it would appear that variants seem to be emerging in the 'chronologically insensitive' forms of the 2nd and early 1st millennia and the day may not be too far removed when we can begin to build up a typological sequence. That the blanket term 'Flat Rimmed wares' is inadequate and often inappropriate has been recognised for some time (Hedges 1975) and recent excavation has produced a body of material and related C14 dates with which one can begin to pick out recurring, chronologically separate forms. The early Bronze Age cord decorated wares are in themselves distinctive and continue in use to the end of the first quarter of the 2nd millennium. Preliminary observations by the author would suggest that "middle" and "later" types (although presently without precise chronological limits) can be differentiated. The middle varieties consist of bucket and barrel shaped urns exhibiting cordons and finger-grooving (a phenomenon noted by Halliday, 1985, in considering the eastern Scottish material) and slashed decoration on the upper part of the vessel. The later types are more generally barrel shaped, are often better fired and exhibit rims with an internal bevel, sometimes sufficiently pronounced to have formed a lid-seating but often perhaps more appropriate to a vessel designed to contain liquid. In this connection Halliday's (1988) observation, regarding the pottery from a stone hut circle at Ormiston, Fife, that more care appeared to have been taken in finishing the inside of the vessels, is of some interest. Finger-impressed decoration probably develops during the span of this "phase". These forms continue for an as yet undetermined period stretching into the 1st millennium and probably overlap with early Iron Age forms.

It would appear from the excavated evidence that open settlements in north east England may have a currency of up to a millennium, lasting until the end of the middle Bronze Age, although activity around the turn of the 1st millennium is testified only at Hallshill. The likely contemporaneity of closely spaced sites in the uplands of Northumberland thus has interesting implications for estimates of Bronze Age population but on consideration of undated sites and examples from outside the region, it becomes immediately apparent that the picture may in reality be far more complicated and that the choice of examples for excavation may have inadvertently produced an unduly compressed chronology. In this connection, the final report on Linhope Burn with its stone-built structures will be of great interest.

One has only to look as far as the excavated sites at Burradon (Jobey 1970a), Hartburn (Jobey 1973a) and Chester House (Holbrook 1988) for indications of an extended chronology. Burradon and Hartburn are both rectilinear settlements with a double perimeter (ch 7), containing timber huts which were rebuilt on a number of occasions and in both cases the excavated evidence permits a choice of two alternative structural reconstructions. The first, favoured by the excavator, is that in each case a large enclosure was succeeded by a smaller enclosure. The second is that an open settlement was succeeded by a settlement with a double perimeter. This second interpretation is favoured by Gates (1983) who does indeed include Burradon and Hartburn in his list of unenclosed settlements. Jobey is however correct in stating that the evidence is insufficient to claim a *definite* open phase of settlement and the sites are included as possible open settlements in the accompanying gazetteer. Similarly, at Chester House (Holbrook 1988), the open phase is not proven but the position of three superimposed timber buildings within the ditched enclosure makes it most unlikely they could have been contemporary with this feature.

In view of the recently extended distribution of known sites, the possibility that these examples are indeed open settlements raises interesting questions. Jobey dates the foundation of the settlements at Burradon and Hartburn to the 5th or 6th century BC at the earliest, albeit on the evidence of imperfectly understood pottery types. It is therefore unlikely, given the topography around the sites, that two groups of settlers of the 6th century BC would chance to reoccupy the sites of 2nd millennium timber buildings, yet Lookout Plantation demonstrates that open settlements in the lowlands need not be late in date. To these examples may be added the site of West Whelpington (discussed below) where there appears to be a relationship between an open settlement and a rectilinear settlement although, once again, the nature of the relationship is far from clear and the cropmark sites at Ravensworth Castle and Stella, both in Tyne & Wear, where there are indications of circular structures both within and outside rectilinear enclosures. It may be worth noting at this point that a number of buildings associated with the curvilinear palisaded settlement of High Knowes B (Jobey & Tait 1966) do not, on plan or on the ground, appear to fit readily within the circuit of the palisade; it is also possible that some of the circular structures recorded at the High Knowes cairnfield are ring-ditch houses (P. Topping pers comm).

The site of Hetha Burn poses a number of questions of chronology and continuity. Here, an open ring-groove house was succeeded at some point by an enclosed stone-built settlement. Re-examination of the site in the light of more recent work has also revealed that a ringbank lies on the slope above the site (C. Burgess pers comm). Burgess suggests a sequence of reoccupation rather than continuity, believing the ringbank to represent the typical 2nd millennium form of open settlement but dating the ring-groove house some centuries later on the basis of pottery (which although fairly undiagnostic in itself, did not appear to be of 2nd millennium form) from within the ring-groove. The evidence as it stands is hardly conclusive although re-use of the levelled area would not be such a remarkable coincidence in this case. It is notable that during the excavation, the site hut had to be positioned on one of the building platforms, this being the only level ground in the vicinity.

Across the Border, the picture is rather different. To complement Green Knowe with its C14 dates covering the second half of the 2nd millennium BC, there are a number of open settlements which have shown evidence of 1st millennium foundation and occupation. At Douglasmuir, Angus (Kendrick 1982) a group of six huts gave a set of dates towards the middle of the 1st millennium BC. It is worth noting that these buildings all incorporated ring-ditches, their outer ring of posts being set in the ring-ditch with no evidence of a separate outer ring-groove. At present these are among the earliest dates available for ring-ditches.

The settlement at Saint Germains, East Lothian (Watkins 1982) has a complex history, including phases of open settlement which is difficult to parallel elsewhere. The earliest finds on the site include Beakers and material of early Bronze Age date but this material cannot be related to any structures. During the first structural phase, the settlement consisted of a single ring-groove hut. This was succeeded by a similar building within a polygonal enclosure with internal subdivisions. The next phase saw the construction of a large curvilinear enclosure with an imposing rampart and ditch, sufficient to justify the term fortified, yet still surrounding a single building. The final phase of settlement was again open. A number of buildings, identified only by scoops in the ground, spread beyond the denuded fortifications, blocking the old approach road. The site is presently published only in interim form where the excavator has stated his belief that the initial ring-groove house is of Iron Age date.

To summarise the above, the known open settlements in north east England survive largely in the upland zone. They appear to be of early 2nd millennium through to late 2nd/early 1st millennium date and although many show evidence of development and rebuilding, the only known examples of an open settlement being succeeded (whether directly or not) by a settlement of different form occur at Hetha Burn and Murton High Crags (with the possible exceptions of Burradon, Hartburn and Chester House). There are however certain settlements of decidedly later date which are known to have had open phases and these are discussed separately below.

5.7 LATER SETTLEMENTS WITH OPEN PHASES

These settlements are of different character and date to those discussed above. They can be seen to have developed out of certain enclosed settlements when, at some stage in their history, the settlement boundary was found to inhibit further building development. The group is exemplified in north east England by the extensively excavated site at Thorpe Thewles (Heslop 1987), where a small enclosed settlement gradually expanded with buildings outlying the bank and ditch until a large, open, nucleated settlement developed. The buildings were of double-ring post and ring-groove construction with external drainage ditches. The expansion beyond the initial enclosure probably took place between the 4th and 2nd centuries BC on the evidence of TL dates.

It seems likely that a similar sequence of development took place at the nearby settlement of Catcote (Long 1988; Vyner & Daniels 1991). Excavations here were more limited in scope but the earliest phase of settlement apparently consisted of a single building within a ditched enclosure. Subsequent phases of settlement were of the open, nucleated form seen at Thorpe Thewles. Catcote is of slightly later date than Thorpe Thewles as evidenced by the pottery assemblage and a series of TL dates for the earliest area of open settlement centering on the 4th century BC. Buildings here were of individual post construction, once again illustrating the difficulty of defining the chronological limits of building forms. Allowing for the fact that no certain overall boundary was discovered and that the site may have developed at a time when Thorpe Thewles was already of open form, it could well be that Catcote was open throughout its history.

At both sites there was emphasis on the division of space within the occupied area. A series of gullies partitioned the excavated areas and at Thorpe Thewles they can be seen to relate to functional differences in the activities carried on in each area. The site has produced some of the best evidence currently available for the economy of its inhabitants. Thorpe Thewles and Catcote represent a particular element in the settlement hierarchy which developed during the late Iron Age, in the richer farming land of the region. Their situation means we are unlikely ever to have a very full idea of the numbers of such settlements but can suggest that their distribution is likely to have been limited to fertile, low-lying areas. It may be that the settlers who constructed the complex sequence of ditched fields at Ingleby Barwick (Heslop 1984) occupied a similar open settlement although no trace of the occupation area was discovered in excavation.

This form of open settlement is paralleled at the site of Dryburn Bridge, East Lothian (Triscott 1982). Excavation on the site revealed a curvilinear palisaded enclosure with buildings of individual post construction which was succeeded by an open group of huts with ring-ditches, one of which was of double ring-groove construction. C14 dates for this building (table a7.3) suggest it was constructed towards the middle of the first half of the 1st millennium BC. Similarly, the final phase at Saint Germains (see above) may belong to this class of settlement. Neither site produced such a rich array of artefactual material as Thorpe Thewles but the quantity of finds was still well in excess of that recovered on smaller settlements of the period and both are situated on the fertile East Lothian coastal plain.

One other possible example of an enclosed settlement developing into an open settlement occurs at West Whelpington (Jarrett & Evans 1989). The site comprises a large, curvilinear, palisaded enclosure with no coherent internal structures and, to the east of this, a smaller rectilinear palisaded enclosure with two circular ring-groove structures. In addition, there are at least two circular structures which do not fit readily into the eastern enclosure. The excavators' suggested sequence of events is that the curvilinear enclosure was succeeded by the rectilinear enclosure which was in turn succeeded by an open settlement. Dating evidence is extremely poor in all areas and the open houses are taken to be the latest buildings on the grounds that there is stone tumble in their vicinity, thus a progression from timber to stone buildings is assumed. However, building IV, which lay well outside the palisade, also produced evidence of a ring-groove and internal posts and it was indeed suggested that the stone may have been 'no more than extra support for the wall timbers'. The possibility of a timber structure with a ringbank cannot therefore be ruled out. From the published plan, ring-groove hut IIa does not fit comfortably into the rectilinear palisaded enclosure with which it is allegedly associated. A fragment of rotary quern was recovered from its construction trench but it is admitted that this may relate to building IIb which cut the ring-groove. The precise sequence of events on this site thus remains unclear. It does not appear to develop into a large, nucleated open settlement and is perhaps best placed in the Burradon/Hartburn group of rectilinear sites possibly succeeding open settlements.

CHAPTER SIX

CURVILINEAR SETTLEMENTS

6.1 INTRODUCTION

This group comprises settlements within a clearly defined enclosure of curvilinear form ie. circular, sub circular, oval or irregular. The enclosure boundary may consist of one or more perimeter lines which may be of stone, timber or earth, the type being defined on purely morphological grounds. Included are settlements previously referred to as scooped settlements (where the basic form is curvilinear), native settlements, Cheviot type settlements, forecourt settlements (where the forecourt is curvilinear), camps, hill settlements, palisaded enclosures, stockaded enclosures, defended settlements, promontory forts, contour forts and hillforts.

Since the majority of the sites under consideration survive as earthworks, they have been recognised and studied for some centuries. The Rev Rome-Hall was characteristically ahead of his time in noting, with regard to 'the upland or hill fortresses of the district', that 'These are characterised by a greater elevation of site rather than by any constructive peculiarities' (Rome-Hall 1876). An Iron Age or Romano-British context for most sites was accepted although those which had been "scooped" to provide a level surface for building, were, until Jobey's (1962b) re-assessment, widely held to be of 15th to 16th century date on the basis of late Mediaeval finds from excavations on similar sites in Peeblesshire (Stevenson 1941).

The first comprehensive gazetteer of sites was A.H.A. Hogg's (1947) 'List of Native sites of Northumberland'. A great deal of survey and recording work has since been carried out in Northumberland by Professor Jobey (1962b; 1964; 1965a; 1966a; 1970b; 1983b) complemented by the recent work of RCHME (forthcoming). Present knowledge of sites in the south of the region is largely due to the work of Dennis Coggins in Upper Teesdale (Coggins 1986). It is unfortunate that this excellent survey work has not been complemented by a programme of excavation. Jobey, writing in 1965, bemoaned the fact that only four recorded and very limited excavations had taken place on hillforts and hill settlements in Northumberland this century. Since then, research has been advanced only by his own work at Brough Law and Ingram Hill (Jobey 1971) and at High Knowes (Jobey & Tait 1966) and excavations at West Dod Law (Smith 1990) supplemented by the inconclusive excavation of a palisaded enclosure discovered during the excavation of the Mediaeval village at West Whelpington (Jarrett & Evans 1989) and incompletely published excavations at Fenton Hill (Burgess 1972b; 1984) and Horsedean Plantation (Miket 1989).

6.2 THE NATURE OF "HILLFORTS"

Curvilinear sites is no doubt the most controversial of the groupings proposed in this thesis in that it seeks to encompass within this general heading, the sites previously known as hillforts. It therefore seems worth briefly digressing to justify this system of classification before discussing the group as a whole.

The abandonment of the "hillfort" as a clearly distinct class of site is bound to give rise to contention for although the inadequacy of the term has long been recognised, it is as securely entrenched in archaeological thought as the Three Age System and is as difficult to replace. It thus appears at first sight to have some value in that everyone knows what types of site are referred to in this way and discussion can centre around the nature and duration of activity on the sites and regional differences, avoiding more fundamental issues of classification. Basic assumptions are, that the sites belong to a particular period in prehistory, that they are large, often in absolute terms but more particularly relative to other prehistoric settlements and, that they are defended (whether against direct assault or for more nebulous reasons) by perimeters on a scale in excess of those found on "normal" domestic settlements. Implied are concepts of centrality, territoriality, corporate involvement and social and economic stress. A brief glance through the literature though reveals no general agreement as to precisely what criteria a site needs to fulfil in order to warrant inclusion in this group. Hogg's (1975) definition of hillforts includes Little Woodbury yet excludes palisaded sites. Collis (1981) would however include palisaded sites in his definition.

One is left therefore with a set of poorly defined assumptions and the only way forward is to question these assumptions at the regional level. It is necessary to ascertain whether at a particular time there appears to be a development (or a quantum change) in the pattern of settlement, resulting in the appearance of sites that are in some way different, be it in terms of size, distribution, status, function or economy, to seek to understand this change in regional terms and then to consider whether the phenomenon is paralleled in other areas. It is futile to start by looking at regional differences between sites whose nature, function and distribution are undefined.

This study commenced by listing all curvilinear enclosed sites as they had been recorded by previous fieldworkers and testing the null hypothesis that, within the broad framework of this classificatory system, no group of sites stood out as being so significantly different as to warrant separate classification. It was revealed that whilst the group of curvilinear sites could be more readily split into distinct types than could the open or rectilinear settlements, these types did not necessarily correspond to the way in which sites had been recorded in the past and that certain assumptions about the pattern of settlement in the Iron Age would have to be challenged.

In all, 241 sites in the four north east counties had been recorded as hillforts. These sites were compared to the 316 which fell into the general curvilinear category. The distribution of both groups was strongly biased in favour of Northumberland where the hillforts showed a more even distribution than the closely grouped curvilinear sites and spread into the east of the area from which other curvilinear sites were virtually absent (fig 6.2). In terms of altitude, recorded hillforts range from 15 to 396m OD, 34% lie below 100m OD and 77% lie below 200m OD. Other curvilinear sites range from 9 to over 500m OD, 23% lie below 100m OD 48% lie below 200m OD and 36% are situated at altitudes in excess of 300m OD (fig 6.6-6.7). As Jobey (1965a) points out, within this distribution, the "hillforts" are not always located in positions of outstanding natural defence.

The internal areas of 109 recorded hillfort sites were plotted. They ranged from 0.12 ha to 5.2 ha. It is salutary to observe that the most frequent size of enclosed area within a "hillfort" is slightly less than that of the average rectilinear "homestead" (ch 7); 32% enclosed an area of 0.2 - 0.29 ha and a further 13% covered a mere 0.1 - 0.19 ha. The 99 curvilinear sites measured ranged from 0.01 - 1.77 ha, the largest group was in the 0.1 - 0.19 ha range (27%), whilst 15% were of 0.2 - 0.29 ha in extent. The overlap is considerable bearing in mind that, by implication, the larger sites are more likely to be recorded as hillforts. Similarly, sites with more than one perimeter line are more likely to have been classed under this heading; 43% of recorded hillforts have a single line of "defence" and 57% have two or more. The internal areas of 63 "hillforts" with a single perimeter and 63 with two or more perimeters were compared and showed no significant difference (fig 6.8). They also shared the same pattern of distribution. It is thus interesting to note the difference between the internal area of these multivallate sites (the term is used for convenience) and the total area enclosed by the extra boundary. The total area ranges from 1.4 to 9 times the size of the internal area with the majority being over twice as large (the same goes for the multivallate curvilinear sites, although fewer have been recorded) and begs the question why was there a desire to create such a greatly increased area ? It does not appear from surface observation that the size of the enclosed area was ever decreased by the addition of the inner enclosure.

In summary, these sites have not been subject to any coherent system of classification and it is not possible to uphold the distinction between hillfort and curvilinear settlement as recorded on the basis of size, morphology or distribution. What is clear is that we are dealing with enclosed sites which appear to be largely confined to the uplands and the group needs to be looked at as a whole in order to identify differences relating to chronology, social organisation and economy.

6.3 NUMBERS AND DISTRIBUTION

A total of 557 sites are recorded in the accompanying gazetteer (appendix 1). Those sites recorded by previous workers as hillforts are identified by the suffix (HF). Some 69% of sites survive as earthworks, 28% have been identified from air photographs and 3% are known to have been destroyed since recording.

As already noted, the vast majority of sites are situated in north Northumberland and they are largely an upland phenomenon (figs 6.1-6.5). Their distribution complements that of rectilinear sites. The largest cluster of sites occurs in the Cheviot foothills. The sites avoid the granite core but group closely together in the valleys which dissect the massif. There is a reasonably dense spread of sites across the Cementstone plain surrounding the massif with further concentrations on the limestone to the north and along the Fell Sandstone ridge. A number of cropmark sites occur in the Tweed Basin and there is a thin scatter of sites across south Northumberland. A few isolated cropmark sites are recorded in Tyne & Wear, Cleveland and East Durham. The distribution in County Durham is otherwise confined to the areas of the Wear Valley survey (Young 1984b) and the Upper Tees Valley survey (Coggins 1986).

It is likely that the present distribution of sites in the uplands reflects the original pattern, although many more sites surely await discovery in the Durham Pennines. Although there are distinct types within the upland curvilinear settlements, it will be suggested later that the almost mutually exclusive distributions of small curvilinear sites and rectilinear sites is a genuine phenomenon representing differences in a contemporary settlement pattern. It will also be argued that the cropmark sites include settlements of a different order again. The recent discovery of a series of curvilinear enclosures in the Lower Tees Valley (Still & Vyner 1986) suggests that the distribution of known cropmarks is still far from representative. Sites encompassed in this catch-all heading may hold the answers to many questions concerning Neolithic and Bronze Age exploitation of the area.

6.4 COMPONENTS

The principal structural component of this group is the curvilinear enclosure. Other components comprise sunken yards, gateways, internal divisions and circular structures. Since a number of sites are known to have had timber-built internal structures, the remains of which are visible at ground level only under certain conditions, visible internal features are not a prerequisite for inclusion in this group. Similarly with cropmark sites, all those curvilinear enclosures which do not appear to represent the remains of henges, sepulchral monuments or causewayed enclosures are noted as possible settlements.

6.4.1 Enclosures

6.4.1.1 Stone-Built Enclosures

Only enclosures entirely of drystone construction are discussed here; the use of stone revetment in conjunction with earthen banks is discussed below.

Stone-built enclosures make up 44% of all known curvilinear sites. They occur on only 14% of the sites previously recorded as hillforts yet on 58% of other curvilinear sites. Although virtually all of the very small enclosures (0.01 - 0.09 ha in area) are stone-built, there is considerable overlap with other forms of perimeter at the upper end of the scale. The distribution of stone enclosures is limited to upland areas. Whilst this may be readily related to the availability of building materials, the likely degree of differential survival is difficult to assess.

The enclosure walls on the smaller sites, those less than 0.09 ha in extent, average 2m in width. The walls are generally well-built and survive to a height of c.1m. It is difficult to envisage their ever having achieved any great height. A maximum of 2m as proposed for the walls around rectilinear settlements (ch 7) appears a reasonable estimate. These enclosures, unlike comparable rectilinear sites, tend not to have surrounding ditches.

More substantial walls occur on the sites towards the middle of the size range such as that at East Mellwaters Farm, near Bowes (Laurie 1984). Here, a settlement of 0.17 ha (well within the "hillfort" range) was enclosed by a wall of orthostatic construction, 3.5m wide at the base. Laurie calculates that the stone tumble remaining on the site is sufficient to have carried the wall to a height of 2m but the site is known to have been extensively robbed so this is probably an under estimation of the original height. There is the suggestion of a very slight outer ditch around the enclosure. This site, although not in a good strategic location, is as well "defended" as many larger sites, its enclosing wall being on a par with those at Yeavering Bell (5.3 ha in extent) or Humbleton Hill (3.6 ha in extent), where part of the enclosure is in fact, far less substantial than this. Whilst the nature of the stone used will affect the height which can be attained by a wall of a certain width, the comparison is worth bearing in mind.

The site of Eston Nab, Cleveland, (Vyner 1988) was surrounded by a single free-standing stone wall at one stage in the complex history of enclosure on the site. The wall probably enclosed most of the 1.1 ha maximum area attained by the enclosure circuit, with one side of the circuit being formed by the scarp face of a sandstone cliff. Although severely damaged by robbing in places, the lowest course of the wall remained, showing it to have been up to 5m wide. It survived to a maximum height of 1.5m at the outer face where it had been protected by the later rampart. Well-defined faces were present at both front and rear, except in an area to the west where substantial post-holes along the inner face of the wall suggest it may have been timber revetted. The wall appears to have been constructed by laying out a "grid" of large rectangular boulders then filling in these boxes with smaller stones. The stones used were mostly well weathered indicating they had probably been collected from the sloped below the cliff face. The section furthest from the scarp was constructed of notably smaller stones. This "box" construction is paralleled at the small settlement site of Forcegarth Pasture North (Coggins & Fairless 1980). It seems likely that such a substantial wall would have stood to some considerable height. The earthen rampart still achieved a height of 2m when excavated during the 1960s. Vyner (1988) states the wall must have stood higher than this on account of the amount of rubble eroded into the outer ditch and suggests an original height of 3m or more.

Few examples of more elaborate construction techniques are known from surface observation. One exception occurs at Brough Law where a double faced stone rampart of the type believed to be the *murus duplex* noted by Caesar in Gaul, encloses an area of 0.25 ha. This massive wall is unusual for the area and its superficial resemblance to Scottish duns was noted by Jobey (1971) who undertook a small scale excavation of the ramparts. This rampart proved to be 5m wide, reaching a maximum extant height of 1.5m. Large stones had been used to give stability to the base of the structure and a second retaining face stood c.1m inside the sheer outer face, the space between being filled with rubble. Hogg (1975) suggests this is such an obvious technique to reduce the risk of collapse that it is unnecessary to seek an intrusive origin for its occurrence in Britain and cites its use in many Neolithic and Bronze Age burial cairns. Jobey (1965a), writing prior to his excavation of the site suggested the technique may have served to prevent slippage down the steep incline. One is reminded of the *murus duplex* perimeter created by the strengthening of the lower wall of the Hetha Burn East settlement and the phenomenon has been noted elsewhere on settlements in the College Valley (Burgess 1984). Brough Law exhibited no sign of structural transverse walling such as Tate suggested may have occurred at Greaves Ash (Tate 1862a) but it must be remembered that the excavated trench was only 3m wide.

A number of stone-walled enclosures, usually those in the medium to large size range, exhibit more than one line of enclosure. These additional lines generally appear to be secondary and to have been constructed with the intention of increasing the enclosed area rather than making the site more readily defensible. Yeavering Bell has two clear "annexes" and at Brough Law the outer perimeter does not extend right round the inner. At Humbleton Hill, an enclosure of 0.4 ha has two annexes increasing the enclosed area 9 times to a total of 3.6 ha which makes it one of the largest sites in the area. Both annexes contain evidence of circular structures and the largest is enclosed by a wall far slighter than the 3.6m wide wall of the inner enclosure. At Great Hetha the inner and outer enclosures are almost concentric but the total enclosed area is increased 3.5 times by the outer wall. The two lines diverge at the entrance which runs in a straight line through the two perimeters.

6.4.1.2 Ditched and Banked Enclosures

Ditched and banked enclosures make up 45% of all known curvilinear sites. They comprise 82% of all recorded "hillforts" and only 29% of other sites. Most of the curvilinear cropmark sites are of course ditched enclosures. Within the cropmark group there is a marked tendency for fieldworkers in Northumberland to record curvilinear cropmarks as ? hillfort or ? defended settlement whereas in the rest of the region they are recorded merely as enclosures. These sites tend to fall into the medium/large size range in terms of area with the proportions of the cropmark sites generally being greater than those of the "average hillfort".

A simple form of ditched enclosure is found at Witchy Neuk (Wake 1939) where a single ditch and bank encloses an area of some 0.4 ha. The enclosing circuit is semi-circular with the north edge of the site being formed by a steep scarp. The excavated rampart proved to be of simple dump construction (except in the region of the western entrance, see below) with stones included in a haphazard fashion. It stood to a height of 1.37 - 2.6m and showed no trace of any surmounting breastwork. The front of the rampart formed a continuous slope to the base of the ditch which was 1.8m deep and 6.5m wide. This simple method of construction is the only form apparent from field survey and appears to have been used in univallate and multivallate sites alike. The perimeters of multivallate sites are frequently more closely concentric with one another than is the case in the stone-built enclosures. This may suggest they were deliberately planned this way as it does not reflect a desire to increase the usable space within the enclosed area.

No evidence for timber lacing has been noted in field survey. However, at Fenton Hill on the edge of the Milfield Basin (Burgess 1984), excavation, as yet published only in summary form, has produced evidence of a timber-framed box rampart. The timbers were set in individual post-holes and a ditch lay outside the rampart. The area enclosed was just over 0.3 ha. This in turn was replaced by another box rampart with timbers set in bedding trenches, later replaced by three concentric dump ramparts with ditches of increased width.

The recently excavated site at West Dod Law (Smith 1990) is fairly unusual in form and, so far as present knowledge extends, in its method of construction. The site comprises an enclosure of 0.24 ha surrounded by a double rampart with an annexe of similar size to the north enclosed by a single rampart. Excavations on a very small scale were carried out on the ramparts in 1984 and 1985.

The eastern part of the outer rampart proved to be of two phase construction. In phase I, a bed of stones, 2m wide and a single stone in depth, was laid on the old ground surface. Along the inner edge of this stone platform was a palisade slot c.0.4m deep showing traces of posts c.0.3m in diameter. The excavator suggests that, considering the large dimensions of the posts compared to the shallow depth of the trench, the palisade could not have been free-standing and must have served merely to revet the dump rampart which was piled up against its outer face. No trace of timber lacing was noted, although the excavated trench was only 2m wide, so the inherent instability of this structure remains problematic. A line of boulders along the inner face of the palisade may have provided some support. The outer face of the rampart merely sloped down to ground level.

At some time after apparent occupation deposits had built up against the foot of the palisade, this structure was replaced by a stone retaining wall c.1m high and 1m wide. Where the wall met the rampart there were traces of another palisade forming a breastwork along the top. However, in the excavated western part of the outer rampart, no trace of the stone bed or timber revetment was found. This area was on a steeper slope and the stone revetment had been replaced three times due to collapse of the rampart downhill.

The inner rampart proved to be a simpler construction. Two retaining walls, 2m apart, had been constructed and the intervening space filled with rubble. There was evidence of transverse walling. The *terminus post quem* for the building of this rampart is almost statistically identical to the *terminus ante quem* for that of phase II of the outer rampart indicating that the inner is the later of the two. Whether the two were ever in contemporary use is unclear but the evident problems of collapse suggest the inner rampart may have replaced the earlier structure. The annexe rampart consisted of a simple bank with an outer face of large, earthfast boulders. The bank had been robbed and remained to only a single course.

6.4.1.3 Timber Enclosures

Timber enclosures make up 11% of known curvilinear sites. They occur on 4% of sites recorded as "hillforts" and on 13% of other sites. They are of course likely to be under represented as surface remains and a number have been revealed in excavation beneath later enclosures. They tend to be amongst the small to medium curvilinear sites in terms of area and exhibit considerable variation in the number of visible structures in the interior.

The most extensively excavated palisaded settlements are those of High Knowes A and B (Jobey & Tait 1966). High Knowes A, the smaller of the two, consisted of a circular enclosure of 0.16 ha surrounded by double palisades, 3m apart. The palisade trenches were 0.38m wide and 0.5m in depth and appeared to have held closely set timbers of c.0.2m diameter. High Knowes B, situated some 90m east of the latter site, comprised a pear-shaped enclosure, 0.23 ha in extent. It too had a double-palisaded perimeter, the trenches being 1.5m apart and 0.45m in width and depth.

Excavations at Ingram Hill (Hogg 1942b; 1956; Jobey 1971), a circular settlement enclosing 0.16 ha in its final form, revealed three palisade trenches beneath the later banked and ditched enclosure. Two of them could not have been contemporary but the limited excavations were unable to determine any relationship or sequence of events. Similarly at Murton High Crags (Jobey & Jobey 1987) stretches of three palisade trenches were excavated but no sequence was evident. The 10m gap between the inner and middle circuits suggests the two were not built as a double palisade and the outer trench may represent an unfinished structure.

At Bishop Rigg (Jobey 1979), two curvilinear palisades were partly excavated in advance of road construction. The two ran parallel to one another with the maximum distance between them not exceeding 0.8m. It appears unlikely that they were used in conjunction with one another and the outer trench showed some evidence of having been delibarately backfilled. Air photographs of the site indicate the total enclosed area was c.0.4 ha. The cropmarks also show the two trenches to be more widely spaced in the southern part of the site with a third trench at least 25m beyond the inner. The site has however been almost obliterated by quarrying, probably during the Roman period.

At Huckhoe (Jobey 1959), three palisade trenches were again recorded. The inner, enclosing an area of c.0.6 ha was c.0.3m in width and depth. Packing stones showed there had been posts at intervals of 2.4m. There was no evidence that this palisade was used in conjunction with an earthen rampart, Jobey therefore suggests that these posts represent cross bracing to the more substantial palisade 1.8m beyond this. The second trench was 0.45 - 0.6m wide and 0.6m deep, a large number of packing stones in this trench indicated a palisade of closely set uprights up to 0.3m in diameter. This outer trench turned in towards the inner at the east-facing entrance. Two trenches ran out for 3.5m at right angles to the palisade on the south side of the gateway (the north side was unexcavated). The course of these trenches was interrupted by later quarrying but the two were of similar dimensions to the main palisade trenches and the larger trench was clearly secondary. Although the two palisades were not of contemporary construction, Jobey suggests they were in contemporary use at some stage on account of the inturn of the outer palisade at the entrance. The suggestion of cross-bracing is not entirely convincing, the original palisade may have simply been of fairly light construction with more substantial posts at 2.4m intervals. Evidence of a third palisade was found 12 - 15m beyond this. It appears to have had an entrance in line with the inner palisades. Whether this palisade co-existed with any of the others is unclear but it is suggested that the transverse trenches leading out from the entrance may have served to connect the two, producing a stock corral. Both of the inner stockades were eventually destroyed by fire.

A simple free-standing curvilinear palisade underlay the banked and ditched enclosure at Witchy Neuk (Wake 1939) and another was discovered during the excavation of a deserted Mediaeval village at West Whelpington (Jarrett & Evans 1989). The West Whelpington example is unusual in many respects. It enclosed an area of some 0.4 ha but was situated at the bottom of a steep slope. A number of post-holes were found on the enclosed hilltop but there was no clear evidence of habitation. The precise dimensions of the trench are not published but it is said to have been irregular in section with post-packing present and fragments of burnt daub in the fill. The fill apparently bore impressions of both vertical and horizontal wattles, some as small as 0.03m in diameter. Presumably this served as a screen between larger uprights.

The largest known palisaded enclosure in the area is that at Harter Fell, Upper Teesdale (Coggins 1986), covering an area of c.1.5 ha. This site is known from surface observation only. Coggins notes the presence of a low inner bank and probable circular structures. It overlies a ditched and banked rectilinear enclosure of 0.2 ha and its prehistoric date must remain speculative.

6.4.2 Yards

Sunken or scooped yards are a feature of the smaller, stone-built curvilinear settlements and those larger settlements which appear to have developed as an agglomeration of small units. As with the rectilinear settlements, buildings are usually situated to the rear of the enclosure facing onto the yard but in this case the yards tend to take up a far greater proportion of the enclosed area with little or no space between the buildings and the rear wall of the enclosure.

The yards are generally levelled into the hillslope and may be up to 2m below the level of the buildings. Tate (1862a) recorded the presence of steps leading up to the buildings in his excavations at Greaves Ash but no other examples are known from survey. Jobey (1964) records that probing in a number of yards suggests they may be cobbled; the yard at Hetha Burn (Burgess 1970) was paved. The regular paired yards of the rectilinear sites do not occur so frequently on curvilinear sites. Where the yards are divided, Jobey (1964) suggests they are separated by walls rather than the paved causeways common on rectilinear sites but this observation has yet to be tested by excavation.

6.4.3 Gateways

Since excavated evidence is so limited for these sites, little is known of the detail of gateway structures. For the most part, sites with a single boundary perimeter appear to have had simple entrance arrangements. Those on the smaller sites range from 1.8 - 3m in width and are often flanked by large orthostats. The excavated example at Forcegarth Pasture North (Coggins & Fairless 1980) was 2.6m wide and had a cobbled surface. No traces of timber features were recovered but the area was somewhat disturbed. It is possible that many entrances were simply closed off by a movable hurdle as required, although the fencing necessary to close off the larger entrances would have been rather heavy and unwieldy. The only recorded pivot stone comes from the stone phase at Huckhoe (Jobey 1959) where it appears the 3m wide gateway was closed by a single gate which opened inwards and was hung on the north side.

The entrances at Witchy Neuk (Wake 1939) exhibit a slightly more complex arrangement. This univallate earthwork with a natural scarp to the north, has entrances on both east and west sides. On the south side of each entrance, stretches of rampart and ditch curve outwards for 15m and 9m respectively, flanking the gateway. That on the west side is clearly secondary and that on the east, probably so. The eastern entrance is approached by a hollow way. The original rampart on the west was revetted on the outside by a stone wall on the south side of the gateway. The area was too disturbed for excavation to determine whether this wall continued round into the entrance passage. The flanking mound was only 0.6m high as excavated, less than half the height of the rampart and its associated ditch was 0.45m deep compared to the 1.8m of the main ditch. The excavator believes that these features would not have been of substantially greater proportions in their original form.

The western passage, which was 2.6m wide, was crossed by a stone-filled trench c.0.45m in width and depth. No post-holes were found and it is suggested that the gate was closed by a hurdle placed in the trench. Again the problem of handling a hurdle of this size arises. It would also appear to be incompatible with such a complex arrangement. Indeed the whole design of these gateways raises questions since the flanking mounds are hardly defensive and would appear to add little to the visual impact of the structure. One alternative may be to see the successive modifications as repairs whereby the rampart was allowed to fall into disrepair with a short stretch of revetment built to keep the western gateway clear. The flanking mounds and ditches may thus have been dug later, on the upslope side of the gates, to divert run-off water. Such an explanation is of course purely conjectural.

Excavation of the entrance of the twin palisaded enclosure at High Knowes A (Jobey & Tait 1966) revealed that the palisade trenches terminated in post-holes in the manner of those at West Brandon (Jobey 1962a). The entrance was some 2.5m wide by just over 3m deep. Shallow transverse depressions between the two palisades are thought to mark the position of hurdles used to close off the gaps between the palisades. That on the southern side is set back slightly, leading Jobey to suggest that the main gate was hung on this side. The necessity of closing the gap between the palisades implies that animals were driven through the gateway. One may conclude that either the animals were sufficiently small to necessitate closing off the 50cm gap that would be left by a single gate hung on the south side or a double gate was in fact used.

The entrances to other sites with more than one perimeter are generally fairly simple and frequently consist of only a straight passage through the multivallate works as at Colwell Hill (Jobey 1965a). Often however the entrances run obliquely through the ramparts or are distinctly staggered. Whilst this would impede the passage of intruders, it also, as Jobey (1965a) notes, generally reduces the steepness of the approach. At Brough Law, where the outer enclosure forms a broad annexe to the main enclosure, both gateways have been excavated (Jobey 1971). The outer gateway had been damaged by stone robbing and was marked only by two post-holes, 2.5m apart. The inner gateway, slightly to the north of this, was better preserved. It had an overall depth of almost 6m and was marked by four pairs of post-holes, two pairs at the front of the rampart and two pairs 4m further back. Excavation gave no clue as to whether this pairing represented a replacement of the structure or whether all eight posts were in contemporary use. The excavator suggests that the posts would have been capable of supporting a timber walkway over the entrance. At some time after the timber structure went out of use, the entrance way was re-surfaced by a path of small stones overlying a certain amount of rampart tumble.

6.4.4 *Buildings*

The number of buildings which could have co-existed at some time on curvilinear sites varies from 2 to at least 130. Both stone and timber structures are known, with timber structures likely to be under represented in field survey. Palisaded enclosures appear to be exclusively associated with timber buildings but it would be naive to draw any straightforward chronological inference from this observation.

6.4.4.1 *Structures of Individual Post Construction*

There is no unequivocal evidence for structures of individual post construction on curvilinear sites. One indication of such buildings comes from Eston Nab (Vyner 1988) where excavation in the interior, in an area within the limits of all of the enclosure boundaries revealed a series of rock-cut post-holes. The post-holes did not form any coherent configurations but serve at least to indicate that this method of construction was probably also used on the site. Another possible but disturbed example is known at Murton High Crags (Jobey & Jobey 1987) and numerous post-holes underlay the stone buildings at Huckhoe (Jobey 1959).

6.4.4.2 *Ring-Groove Structures*

Ring-groove buildings are known mainly on palisaded sites such as Trows law (Topping 1989a) and Hosedon Linn (Jobey 1972a), which also appears to have buildings of double ring-groove construction. Jobey (1962b; 1964) has noted the presence of levelled platforms with no obvious trace of stone buildings on some stone-built sites and tentatively suggested they may have held timber buildings. However, he also notes that many sites have been extensively robbed and, as Burgess (1984) points out, the configuration of the platforms is such that they are likely to catch soil eroding downslope causing a build up of deposits capable of masking even stone structures. It may also be that not all of the platforms were necessarily designed to carry buildings (see ch 5 for alternative interpretations).

The only excavated evidence for a ring-groove structure preceding a stone building on one of the smaller sites comes from Forcegarth Pasture South, a stone-built enclosure in Upper Teesdale (Coggins & Fairless 1986). Here a ring-groove hut of just under 5m internal diameter underlay the cobbled floor of a stone structure. The doorway was situated on the east side and was 1m wide. The ring-groove had been turned out at this point and twin post-holes on either side suggested the presence of a porch.

At the site of High Knowes A (Jobey & Tait 1966) the double palisaded enclosure contained two large ring-ditch structures and two smaller ring-groove structures. One of the ring-groove structures was partly excavated. It proved to be 7.9m in diameter with a wall trench 0.3m wide and 0.15m deep. A ring of shallow post-holes lay c.1.8m inside the wall trench and concentric to it. These would have served as the main roof supports. Evidence of four posts was recovered in the excavated area, the full complement is believed to have been eight. The wall trench terminated in a pair of more substantial post-holes marking the position of a doorway 1m wide facing south east.

Evidence of up to 10 ring-groove structures was recovered at Murton High Crags (Jobey & Jobey 1987). All lay within the circuit of the innermost palisade trench. Two sizes of building were noted, one group with internal diameters of 5.5 - 6m and another with diameters of 7.5 - 9m. The larger buildings appeared to have at least one ring of internal post-holes for roof supports. Most buildings exhibited only partial survival.

Two circular buildings were excavated at Witchy Neuk (Wake 1939). Hut 1 was 5.8m in diameter and was marked by a shallow trench containing smallish stones. There were indications of a hearth on the west side. Hut 2 was 7.3m in diameter and its wall trench was marked by a double line of closely set stones. Wake records that the stones could not have served as a foundation for a stone wall and suggests the actual wall was of timber. Both buildings thus appear to have been ring-groove structures. The floor of hut 2 was flagged in places. The position of the entrance has a somewhat unusual north east facing aspect. A line of stones running diagonally for 3.3m from the north side of the entrance may mark the position of a windbreak.

6.4.4.3 Ring-Ditch Structures

A definition of the use of the term ring-ditch structure is given in chapter five. The type has been identified from surface observation on a number of palisaded settlements but to date, the only excavated evidence for a building of ring-ditch form in north east England is that from High Knowes A. The building in question had a diameter of 14.6m The position of the external wall was marked by a ring-groove 0.35m wide and 0.3 - 0.45m deep. A considerable number of stones had been used to pack the wall timbers in position. The south east facing doorway was 2.5m wide. The wall trench terminated in two substantial post-holes at this point but there was no evidence for any form of porch.

The "ditch" proved to be no more than two concentric rings of scoops having a maximum depth of 0.3m, the inner scoops being shallower than the outer. The deepest parts of the individual scoops were aligned with each other and on the centre of the building. Between the two series of scoops lay a concentric ring of post-holes 1.5m inside the wall trench. A further five post-holes formed an oval in the central area, 4 - 5m inside the wall trench. On the west side of the inner ring of posts was a shallow pit which may have been a hearth although only isolated smears of charcoal were recovered. There is no reason to suppose that the various components represent anything other than a single phase of construction.

The structure thus finds its closest parallels in the ring-ditch buildings of south east Scotland such as those excavated at Braidwood, Dryburn Bridge, Douglasmuir and Broxmouth. The ring-ditch is far less pronounced than in the Dryburn Bridge (Triscott 1982), Broxmouth (Hill 1982c) and Douglasmuir (Kendrick 1982) examples which were continuous and at least partly paved. However, the three concentric rings of structural timbers and the absence of any unequivocal evidence for a hearth is common to all of the structures. D.M. Reynolds (1982) and Kendrick (1982) both envisage reconstructions of these buildings in which the inner ring of posts supports the joists for an upper floor accessed by means of a ladder. The scoops at High Knowes A are more akin to those of Hut 1 at Braidwood (Stevenson 1949) in which the scoops were thought to be external to the building until reconsidered in the light of Jobey's work.

The function of such ditches or scoops is still a matter of much debate. One obvious reason for their construction would be the desire to create extra headroom beneath the eaves although this would appear incompatible with the deliberate rubble infilling of some of the Dryburn Bridge examples. Jobey suggests that the stalling of cattle and subsequent "mucking out" could have created the scoops at High Knowes, in which case the rubble fill at Dryburn Bridge may have served a drainage function.

Certain design differences are evident, for example in building 2 at Broxmouth and House 2 at Dryburn Bridge, the middle ring of timbers consisted of a continuous wall rather than a ring of posts so that access to the outer ring was only possible at the doorway. The configuration of the scoops at High Knowes A however, makes it clear that refuse was swept from the outer ring towards the centre of the hut, thus precluding the presence of any continuous wall or screen. D.M. Reynolds (1982) argues that the difficulty of access to the outer rings in some cases is not commensurate with domestic activity. Similarly, doorways of 2.5m as at High Knowes and Broxmouth are excessively large for structures for human habitation. Reynolds suggests that the lower floors were used exclusively for the stalling of cattle and estimates a building of 14 - 15m diameter would hold c.30 head of cattle. According to this model, the upper floor would be used for human habitation or for storage. The calculated storage space would hold c.50 tons of hay ie. sufficient for the overwintering of 30 cattle.

Reid (1989), however explains the form of these buildings in terms of the functional division of domestic space and cites the saddle querns in the rubble infill of the Dryburn Bridge ditches as evidence of cereal processing in these areas. In view of the range of contexts in which re-used querns may be found, this does not necessarily follow, particularly as the greatest number were found in House 2 at Dryburn Bridge where it is difficult to envisage anyone carrying out this work in the 1.5m space between two solid concentric walls. It is evident that further work, particularly in the field of phosphate analysis, is necessary.

6.4.4.4 Stone-Built Structures

Buildings of stone construction are the commonest form of structure on curvilinear sites. They range in size from 3 - 8m in diameter with the average being c.6m. Such buildings are traditionally assumed to represent secondary occupation on the "hillfort" sites. Smith (1990) claims that his recent work at West Dod Law found no evidence either to support or refute this hypothesis but excavations were very limited and did not involve examination of the actual buildings.

At Murton High Crags (Jobey & Jobey 1987), remains of 9 or 10 stone-built houses were excavated but each house was represented at most by only short arcs of single course walling. In three cases the presence of buildings was deduced from robber trenches and disturbed rubble. The buildings had estimated internal diameters of 5 - 8m. The walls were generally c.1m wide and consisted of earth and rubble cores between sandstone facing blocks. Doorways appeared to be in the south/south-east quadrants and were represented in some cases by two post-holes for the door posts and a sandstone threshold. Floors were paved where the sandstone did not outcrop naturally. Three rectangular hearths built of stones placed on edge were recovered. No post-holes for roof supports were noted in any of the buildings. In one case three building replacements on the same spot were evident. The first hut had a diameter of 7.5 - 8m, the second 6m and the third, not more than 5m.

The buildings at Huckhoe (Jobey 1959) had suffered similarly from robbing and one example was identified only by the post-holes for the door posts and the line of a wattle screen within the wall. Scraps of daub were associated with the screen. The most complete hut, 7.5m in diameter, had walls with well constructed faces and a rubble core and showed evidence of internal partitions. A wall at the rear connected the hut to the enclosure wall and the building possessed a walled "courtyard" to the front.

The only other stone buildings to have been excavated on sites of this form recently are those at Forcegarth Pasture North and South (Coggins & Fairless 1980, 1986) and Dubby Sike (Coggins and Gidney 1988), all in Upper Teesdale. The site of Forcegarth Pasture South is in overall form the most similar to the bulk of the Northumberland sites, comprising a circular enclosure containing five huts.

Dubby Sike produced evidence of a boat shaped stone structure 6m x 4m and both this site and Forcegarth Pasture North exhibited a complex of foundations which were difficult to interpret but appeared to form curvilinear buildings with more than one room. It is suggested at Forcegarth Pasture North that structural timbers were incorporated into the stone walling. However, the precise nature of these buildings is difficult to determine from the published plans.

On the whole there is no reason to doubt that the majority of stone buildings on curvilinear sites are similar to those on rectilinear sites. Records of early excavations (Tate 1862a,b) indicate that the same repertoire of internal features - paving, stone thresholds, benches and internal divisions are present.

6.5 AGRICULTURAL REMAINS AND POTENTIAL

The total evidence for the agricultural regime associated with curvilinear settlements is discussed in chapter ten; only visible remains and environmental potential are described here. Extant traces of agricultural activity which can definitely be associated with these forms of settlement have until recently been scarce but recent survey work by RCHME in Northumberland has extended the number and range of known cultivation traces.

Radial field systems are known around the sites of Prendwick Chesters, Ward Law and High Knowes B. At Prendwick Chesters, an enclosed area of 0.4 ha is increased to a total of 1.76 ha by the outer rampart with a radial field system extending beyond this. At High Knowes B, a curvilinear bank encloses the area around the palisaded settlement. This area is subdivided by a series of radial field boundaries and includes an area of cord rig covering some 3.9 ha. (Topping 1989a). This evidence, taken in conjunction with Halliday's (1982) work on field boundaries around "hillforts" in South East Scotland demands a re-appraisal of the development and economic base of these sites.

Evidence of cord rig cultivation has also been found adjacent to palisaded settlements on Gibbs Hill and Old Fawdon Hill. Any straightforward association is denied though by the example of Trows Law (Topping 1989a) where cord rig overlies the palisaded settlement. The subject of cord rig cultivation is discussed more fully in chapter ten. It appears to be a technique of arable cultivation with a long currency from the 2nd millennium onwards, however, its presence at an altitude of 420m OD at Trows Law has interesting implications for the agricultural potential of the upland zone some time after the climatic optimum.

At Brands Hill North, fragmentary field boundaries have been recorded over an area of some 25 ha. Whilst Gates (1982b) relates these to the rectilinear settlement of Brands Hill North, they may equally well be associated with the numerous curvilinear or open sites in the vicinity. Brands Hill 7 (Jobey 1964) provides a more certain association between fields and settlement. Here a system of fields marked by low stone walls clearly respects the layout of the curvilinear settlement complex.

At Forcegarth Pasture, a complex of rectilinear and curvilinear fields covers an area of over 27 ha to the north and east of Forcegarth Pasture North and South. A number of boundaries abut the enclosure walls but the possibility of some later elements in the system cannot be entirely ruled out. Winch Bridge, County Durham (Coggins 1987), has a square field and a number of irregular strip fields and clearance cairns associated with the curvilinear settlement.

In the South East Whitehall area of the College Valley (Topping 1981) a field system of c.18.5 ha is associated with a series of curvilinear settlements. The irregular fields, which overlie earlier terraces, contain numerous clearance cairns. Cord rig has been recorded in association with stone-built settlements at Barracker Rigg, which has a clear system of irregular fields and Hartside Hill where the associated field system is more fragmentary. Once again the complexity of the situation is illustrated by the example of Elsdon Burn where cord rig is demonstrably later than terraces which may be related to a settlement of this form (P. Topping pers comm).

At Coldberry Hill (Gates 1982b) two small curvilinear sites are associated with a field system. The system comprises one irregular and two rectangular fields covering a total area of 3.97 ha, a further rectangular field can be only partly traced. A walled trackway leads from an apparently empty enclosure round the edge of the field system. Gates suggests such trackways served to give access to the area beyond the fields, presumably for the grazing of stock. The implication is thus that the fields were under arable cultivation and Gates notes faint striations, possibly cord rig, aligned with the long field boundaries on air photographs of Coldberry Hill. Two similar trackways approach the 0.3 ha site at Lordenshaws. One leads to a former spring and the other through two small dykes which Hogg (1975) relates to the control of stock.

Using the criteria for assessing agricultural potential outlined in appendix two, the majority of known curvilinear sites lie in what would have been good to medium grade agricultural land from the 2nd millennium until Roman times (see table a2.1). This is somewhat surprising at first sight and serves to illustrate the value of using a site-based "scoring" system rather than trying to generalise about broad zones. The latter method would necessarily give undue prominence to the upland location of the sites whereas more detailed consideration shows the sites to have taken advantage of sheltered hollows and valley sides within the broad "upland zone" as well as favouring small areas of drift deposits.

Not surprisingly the majority of these locations would have been most favourable for agriculture during phase 1, the climatic optimum. This phase however lasted only until the end of the early Bronze Age and there is at present no evidence for occupation of any of these sites during this period. The climatic deterioration which began during the middle Bronze Age was certainly felt in upland areas and 6% of the more marginal locations rate as poor quality land during phase 2. Some 56% of locations still score as "good" and 78% of the medium quality land falls into the upper end of this grade.

Phase 3, the late Bronze Age/early Iron Age sees the biggest shift across the locations as a whole with a 13% drop in good quality locations. To pre-empt the discussion of the dating evidence, it is during this phase that the earliest known curvilinear sites appear. There may thus be a case for associating the development of this form of settlement with increased pressure on land. This however is not to propose an environmental crisis. It must be remembered that 43% of the locations still score as good with 88% of the medium grade locations still in the upper half of that range. This amounts to a far greater agricultural potential than that associated with the earlier open settlements. The critical factor in determining the extent of this pressure will therefore be what happens to population figures during the "vacuum" of the middle Bronze Age.

The amelioration of conditions from the middle Iron Age onwards meant that it was once again possible to find locations in the uplands which met the conditions necessary for viable agriculture. The change would have been gradual and conditions never quite returned to the phase 1 potential. Although there remained 56% good quality locations, these include areas such as the Milfield Basin, the Tweed Basin and the coastal plain which would not have declined to any great extent. In contrast the medium locations suffered more long term decline and during phase 4 only 71% fell into the upper end of that range compared to 81% during phase 1. It is during this phase that curvilinear sites appear to achieve their greatest numbers and their greatest altitudes and it may be that the occupants of some sites were exploiting land at a distance from these settlements.

6.6 MORPHOLOGY AND ON-SITE ACTIVITY

The level of activity on curvilinear settlements as evidenced by the number of visible circular structures compared to those on other prehistoric sites can often be extremely high (fig 2.28). The number of known circular structures has been recorded for 107 sites (19% of known sites). Of these, 56% rate as AR 1, having up to four huts, 16% are of AR 2, 10% are of AR 3, 14% are of AR 4 and 4% are of AR 5. In comparison, AR 3 settlements make up only 5% of rectilinear sites and 1% of open sites and AR 4 settlements are unknown in the rectilinear group whilst there is only a single example of dubious status in the open group. Settlements rating as AR 5 are known only in the curvilinear group. Two other points are worthy of note. Firstly, there are a greater number of known curvilinear settlements so these figures are greater in absolute as well as relative terms. Secondly, the more intensively utilised sites are probably under represented in this sample. Stone structures are readily identifiable on the ground but many of the most densely occupied/utilised sites appear to have had only timber buildings which are not readily visible as surface features. Similarly, it is only the main enclosure boundaries which tend to show up on air photographs.

This group exhibits more distinct variations in surface morphology than do the open or rectilinear sites. Reasons for this are discussed in chapter nine where it is proposed that the curvilinear enclosure has an extended chronology which spans a period during which notable changes in social organisation took place. The major "types" are outlined below, the order in which they are discussed having no chronological significance.

Type C1 is the discrete curvilinear enclosure, usually stone-built, not exceeding AR 2 in terms of number of internal structures. The type is represented by sites such as Coppath Burn, East Mellwaters Farm (fig 6.9) and Forcegarth Pasture South.

Type C2 sites, represented by examples such as Middle Hartside Hill (fig 6.10), Knock Hill and Haystack Hill, are those which appear to have grown in an agglomerative fashion out of a number of type C1 units. They are generally of AR 3 or larger. In distinguishing between types C1 & C2 one has to decide how far removed enclosures need to be before they may be taken to have functioned as separate units. The matter is further complicated by the question of contemporaneity. In order to resolve this, only where there is a direct link between the units or where they are separated by less than c.20m have sites been assigned to type C2. Thus at Brands Hill a number of separate units are recorded.

Type C3 is the discrete curvilinear enclosure, usually with a single perimeter, having a dense concentration of internal circular structures which appear to be contemporary with the visible enclosure circuit and which could have been contemporary with one another. The group may be divided into C3a, those with a palisaded perimeter and C3b, those with an earthwork boundary. Examples include Yeavering Bell, High Knowes B (fig 6.11), Hosedon Linn and Wether Hill.

Type C4 is the discrete curvilinear enclosure with a single perimeter of earth or stone exhibiting few or no visible traces of internal structures which appear to be contemporary with the enclosure circuit. Examples include Witchy Neuk and Eston Nab (fig 6.12).

Type C5 sites are those where the curvilinear enclosure (usually but not always consisting of a single perimeter) has one or more substantial annexes which greatly increase the size of the enclosed area. Visible structures may or may not be contemporary with the first phase of enclosure. This group is typified by Humbleton Hill (fig 6.13), other examples include Weetwood Moor (fig 6.14), Greaves Ash (fig 6.15) and West Hill.

Type C6 are those sites with multivallate enclosures where the boundaries are closely concentric with one another and may have been planned as a whole. Visible remains of internal structures are generally few and may or may not be contemporary with the multivallate enclosure. This type is seen at Colwell Hill (fig 6.16), Clinch Castle and Roughting Linn.

As with rectilinear settlements, the limitations of a typology based on surface morphology must be recognised. The greatest problem is of course the unequal state of preservation of the sites and the fact that timber structures must surely be greatly under-represented in the sample which comprises the present state of knowledge. The typology thus gives greater import to the visible internal structures in some types whilst others are based solely on the boundary form. This dual system of classification provides the best fit for the available evidence. The problem of early phases on some sites being obliterated by later activity may in many cases only be resolved by excavation. However, the types are discussed more fully in chapter nine and it is argued there that some types are more likely than others to have had more than one phase of activity.

The difficulties of classification are, as ever, more apparent in the cropmark sites but using the criteria laid above it should be broadly possible to fit cropmarks into these groups where appropriate. It must be stressed though that it is not always appropriate to attempt to fit any curvilinear cropmark into the above repertoire of forms. Cropmarks are by nature largely confined to lowland areas whereas the sites discussed above represent an upland phenomenon.

Type C1 & C2 are believed to be confined to upland areas and their present distribution is likely to be fairly complete. Type C3 settlements include the majority of palisaded enclosures therefore, since it is possible to distinguish palisade trenches from ditches on air photographs, small to medium palisaded enclosures may be tentatively assigned to this group. Type C4 settlements are likely to be the most difficult to identify as cropmarks and confusion with other types of site remains a possibility. Type C5 settlements, it will be argued, are also likely to be an upland phenomenon but in any case should be readily distinguishable as cropmarks. Type C6 settlements should also be easy to identify in this way.

It is to be expected though that many lowland cropmark sites will not belong to any of these groups and many may be of forms previously unrecognised in this area. That our knowledge of settlement forms in these areas, which may have been in the mainstream of economic developments and external contacts, is sadly lacking, is illustrated by the case studies in land-use discussed in appendix three. The lack of pre Iron Age settlement in the lowlands is not compatible with either the palynological evidence or the evidence of stray finds and non settlement sites. Whilst all curvilinear cropmarks which are not obviously henges, sepulchral monuments or causewayed enclosures are considered as possible settlements in this thesis, sites such as Meldon Bridge and Thwing must have their equivalents in the intervening area. However, a northern Flag Fen or Runnymede may also await discovery.

6.7 DATE

The limited excavations which have taken place on settlements within curvilinear enclosures have produced evidence that these forms spanned a considerable period of time. The earliest C14 dates available, those for Fenton Hill (Burgess 1984), have a large error margin but suggest that the site could have been in existence early in the 1st millennium BC. At Huckhoe (Jobey 1959) where the sequence begins with a similar palisaded enclosure, occupation may have continued until the 6th century AD. Few sites have been C14 dated and TL dating has not been applied on any site of this form. Artefactual material is scarce, this scarcity perhaps compounded by the tendency of excavations to concentrate on the perimeters of the sites. Many sites exhibit a complex stratigraphic sequence usually with only approximate upper and lower limits and estimation of the duration of particular phases is difficult.

The earliest activity on this form of site is dated to the late Bronze Age and in all cases, late Bronze Age activity appears to be associated with palisaded enclosures. Where palisaded enclosures occur in a stratigraphic relationship with other forms of perimeter, they invariably constitute the earlier boundary but the late Bronze Age date is certainly not universally applicable. At Fenton Hill (Burgess 1984) a curvilinear palisade with a double perimeter except on its west side, enclosed an area of 0.09 ha. A date of 2640 $\pm$ 100 BP (HAR 825) was obtained from this perimeter. This palisade was succeeded by a single palisade enclosing an area of 0.3 ha. The second palisade was not C14 dated but the dating of phase III suggests phase II must belong to the late Bronze Age or very early Iron Age.

Late Bronze Age occupation was also discovered at Eston Nab (Vyner 1988). This occupation was associated with two phases of palisaded perimeter. Neither was traced for its complete circuit but the maximum enclosed area of each is unlikely to have greatly exceeded 0.3 ha. Vyner assigns these phases to the period between the 8th and 5th centuries BC on the basis of pottery recovered. The earlier date is suggested by small vessels with a carination at the shoulder dated by Challis and Harding (1975) to the 8th and 7th centuries BC. A similar date had already been proposed by Hawkes (1971) for material from Elgee's excavations on the site during the 1920s (Elgee 1930). Continuation until around the 5th century BC is indicated by a number of vessels with finger-tip decoration. This activity was also associated with probable buildings of individual post construction within the enclosure.

The second palisade was replaced by the boulder wall, enclosing an area almost twice as large. This wall is not directly datable. Vyner concludes that the two palisades could not have spanned more than a century between them without refurbishment and suggests the boulder wall may have been in place by the 7th century BC. He also suggests that the area of occupation was not extended and that some of the post-holes and late Bronze Age pottery in the interior may be associated with this phase.

The earliest enclosure at Huckhoe (Jobey 1959) was of palisaded form. Three palisade trenches were recovered in excavation. The smallest palisaded enclosure can not have covered an area much less than the 0.6 ha of the later enclosure. Jobey takes the view that the inner and middle palisades may have formed a double perimeter at some stage although they are unlikely to be of contemporary construction. The outermost palisade lay some 12 - 15m beyond the inner, its relationship to the others was unclear. The palisades were originally dated by pottery from the trenches and associated upcast. Only one of the sherds was from the rim of a vessel but the fabric of the material finds its closest affinities in Bronze Age ceramics. This evidence was corroborated by a C14 date obtained subsequent to the main excavation (Jobey 1968b). A sample from one of the uprights of the middle palisade yielded a date of 2460 $\pm$ 40 BP (GaK 1388) One of the interior post-holes contained a plano-convex flint knife. The palisades at Bishop Rigg (Jobey 1979) are undated save that they are cut by quarries of probable Roman date. It is also significant that none of the 900 Roman sherds from the small excavations around the site (believed to be mostly debris from the fort at Corbridge) had found their way into the palisade trenches.

The period from the mid 1st millennium onwards, ie. the early Iron Age exhibits greater diversification in the range of structural forms. At Fenton Hill, the phase II palisade was replaced by a timber framed box rampart covering a similar area. The construction of this rampart is dated to 2400 $\pm$ 110 BP (HAR 866).

At Eston Nab (Vyner 1988), the boulder wall was succeeded by a bank and ditch lying just outside it. The bank incorporated burnt timbers which provided C14 dates of 2410 $\pm$ 100 BP (HAR 8750) and 2310 $\pm$ 70 BP (HAR 8751). This site thus appears to have reached its final form by the mid 1st millennium BC. Vyner takes the absence of pottery which can be readily dated to the middle to late Iron

Age to indicate that the site ceased to serve a settlement function soon after this. It must however be remembered that excavation was focused on the boundaries and that in fact no certain internal buildings were recovered at all.

The stone wall at Huckhoe apparently came into being around the middle of the 1st millennium BC. The burnt palisades were uprooted in order to facilitate construction of the wall so the C14 date for the palisade gives a *terminus post quem* for the wall. The nature of internal occupation at this period is still unclear as the earliest stone buildings were not constructed before Roman times.

A single C14 date from Ingram Hill (Jobey 1971) suggests that the final phase of embanked palisade was constructed around the turn of the 3rd century BC. The precise sequence of events on this site is far from clear but the embanked palisade appears to have been preceded by at least one, possibly two earlier palisades. The implication is thus that this 0.16 ha site began life during the earlier part of the Iron Age.

At West Dod Law (Smith 1990), a C14 date of 2265 $\pm$ 35 BP (GrN 15677) from occupation deposits built up against the foot of the phase II outer rampart gives a *terminus ante quem* in the 3rd to 4th century cal BC for the first two construction phases. The excavator has likened this rampart with its surmounting breastwork to the embanked palisade at Ingram Hill. He suggests that despite the unusual form, both phases of the outer rampart should be regarded as primarily palisaded works and that the evidence for refurbishment is entirely in keeping with a date of around 500 BC for the original construction.

The origins of the enclosures on Murton High Crags (Jobey & Jobey 1987) remain somewhat obscure. Evidence of three palisaded perimeters was recovered, all of which clearly post-dated an open settlement. Whether or not a double palisade stood at any time is uncertain but this appears unlikely in view of the distance between the trenches. A single date of 2130 ± 80 BP (HAR 6202) was obtained from burnt timber in the inner palisade trench. This date seems extremely late in comparison with those from other palisaded enclosures. The only other dating evidence, a *terminus post quem* of 2960 ± 80 BP (HAR 6201) for a burnt patch cut by the palisade trench is of little help.

By the middle of the Iron Age, the box rampart at Fenton Hill had been replaced by another box rampart of similar size but slightly different construction. Dates of 2170 ± 60 BP (HAR 326) and 2150 ± 100 BP (HAR 2811) relate to the construction of this second rampart. At West Dod Law also, the much repaired phase II rampart was replaced by another enclosing a smaller area (but on less of a steep gradient) during the middle Iron Age. Dates of 2235 ± 35 BP (GrN 15674) and 2215 ± 35 BP (GrN 15675) from charcoal beneath the inner rampart give a *terminus post quem* for its construction. A similar date has been obtained for the initial construction of the enclosure at Brough Law (Jobey 1971). This site produced no evidence of any enclosure preceding the stone-built perimeter and material from beneath the stone wall gave a *terminus post quem* of 2195 ± 90 BP (I 5315) for its construction.

There is no clear excavated evidence for construction work during the later part of the pre Roman Iron Age. Most of the sites discussed above appear to have reached their final form by this period. At Fenton Hill the second box rampart was replaced by a multivallate enclosure. The construction of the latest enclosure is undated but judging by the lifespan of the earlier perimeters it may have been in place towards the end of the middle Iron Age. The final phases of enclosure at Ingram Hill and Murton High Crags, marked by the construction of stone walls, are also undated. Continuity is suggested at both sites by the similarity in size and layout of the succeeding boundaries. The enclosing walls may thus be substantially earlier than the Romano-British stone buildings on both sites. Rotary querns in the wall tumble at Murton may represent repairs to the structure.

The paucity of recognisable late Iron Age activity is contrasted by the appearance of numerous stone buildings on the sites after the late 1st century AD. At Murton High Crags a rotary quern was found beneath one hut and others were incorporated into floors and paved areas. Pottery of 2nd century AD manufacture was sealed beneath a number of buildings. None of the buildings appear to be earlier than the late 1st or early 2nd century AD. At West Dod Law excavation outside some of the buildings in the annexe area produced material of late 1st or early 2nd century date.

The only type C1 settlements to have been excavated are those at Forcegarth Pasture North and South. Both are claimed to be entirely of Romano-British date but on rather limited evidence. At Forcegarth Pasture North (Coggins & Fairless 1980) charcoal from a hearth in a building gave a date of 1810 $\pm$ 70 BP (HAR 864) but Roman or Romanised material was absent from the site. A re-used saddle quern in the floor of a building suggests a rather earlier date for the initial occupation. At Forcegarth Pasture South (Coggins & Fairless 1986) a date of 1740 $\pm$ 90 BP (HAR 1447) was obtained for the earliest house, of ring-groove construction. This appears on present knowledge to be unusually late for this form of construction and Roman pottery in the ring-groove is noted in the excavation report as possibly intrusive. Pottery of 2nd century AD manufacture was recovered from among the wall tumble at the rear of building C. The report goes so far as to suggest that the vessel or vessels had been displayed on a dresser on the rear wall.

At Huckhoe the earliest stone-built hut in the settlement was not constructed before the early 2nd century AD, another group of huts have a *terminus post quem* in the later 2nd or early 3rd century and another was probably occupied until the 4th century AD. A sherd of 4th century material beneath the tumble of the enclosure wall indicates that this feature stood until late in the Roman period. A piece of glass of the 3rd century AD from Witchy Neuk indicates Romano-British activity on a site which produced no other small finds except for a saddle quern in the make-up of the phase II rampart. Finally at Ingram Hill and Huckhoe the presence of rectangular buildings hints at continuity of occupation into the post-Roman period. At Huckhoe material of the 5th and possibly 6th centuries AD was associated with these buildings. Such continuity may be more frequent than is yet apparent. Although the rectangular buildings at Huckhoe were noted by Hodgson and MacLaughlan, they were no longer visible in 1955 and were recovered only by excavation.

The primacy of palisaded enclosures on these sites is striking. Fenton Hill in fact exhibits the classic "Hownam sequence" (Piggott 1948). It is thus unfortunate that the palisaded enclosures at High Knowes A and B produced no finds at all. At present therefore the picture appears to be one of palisaded enclosures appearing during the late Bronze Age/early Iron Age. Towards the middle of the Iron Age there is another phase of building activity which involves both refurbishment/extension of earlier sites and the construction of new sites. The next major phase of activity occurs during the Romano-British period when type C1 settlements begin to appear and stone buildings appear on older sites. The evidence is consistent but extremely limited.

Type C6 multivallate sites appear to be late in the sequence as at sites such as Hownam Rings (Piggott 1948) and Traprain Law (Jobey 1976). West Dod Law however illustrates the problems of identifying what at first appears to be the most obvious class of site. Originally classed as a multivallate "fort", it would in the above system of classification have more affinity with the type C5 settlements on account of its large annexe. Whilst the type C5 appellation still stands, its multivallate "defences" represent two phases of fairly flimsy (one may go so far as to say ill-conceived) palisade structures followed by a stone wall.

Continuity represents as great a problem as contemporaneity. This may in part result from too much emphasis being placed on refurbishment of the enclosure boundary as evidence for lengthy occupation. It is quite possible that sites were occupied during phases when the perimeter was allowed to fall into disrepair. Examination of one palisade post from Huckhoe by Dr Kathleen Blackburn (Jobey 1959) indicated that it had partly rotted before being destroyed by fire. Further work on the interiors of the sites is necessary to answer such questions.

CHAPTER SEVEN

RECTILINEAR SETTLEMENTS

7.1 INTRODUCTION

This group comprises settlements within a clearly defined enclosure whose form exhibits some degree of rectilinearity. The enclosure boundary may consist of one or more perimeter lines which may be of stone, timber or earth, the type being defined on purely morphological grounds. Included are settlements previously referred to as sub-rectangular enclosures, polygonal enclosures, trapezoidal enclosures, scooped settlements (where the basic form is rectilinear), native settlements, North Tynedale type settlements and forecourt settlements (where the forecourt is rectilinear).

The settlements surviving as earthworks have been known for some time, the regular outline of many being attributed to Roman influence. Indeed when Jobey (1960) prepared his synthesis of the rectilinear earthwork sites in Northumberland, he remarked that 'Almost as striking as the restricted distribution of these settlements is the comparative scarcity in the same area of sites that, on present knowledge, might be considered from surface plan to have possible pre-Roman Iron Age contexts'. The words of the Rev Rome-Hall (1880 p369) thus appear particularly far-sighted 'There seems no reason to disbelieve, however, that the first builders and occupants of these very ancient towns and dwellings were of the Celtic race, living in pre-Roman times'.

The 'restricted distribution' of these settlements was extended by the aerial surveys of Professors McCord, Harding and St Joseph in the late 1960s to 1970s and numbers have continued to increase ever since. Excavation of a number of such sites by Professor Jobey during the 1970s and 1980s has established a date firmly within the Iron Age for the foundation of many such settlements. The largely cropmark evidence from the south of the region was first brought together in a synthetic survey by Haselgrove (1982).

The form of these settlements has been a source of confusion in the past with a number of the multiple-ditched enclosures, most notably Hartburn (Jobey 1973a) and Apperley Dene (Hildyard 1952; Greene 1978) having been identified as Roman military sites. Apperley Dene indeed remained a "Fortlet" for almost 25 years after Hildyards initial excavations which concentrated on the ditches and recovered only Roman material. It is still often difficult to distinguish between the two types of site from surface indications alone.

7.2 NUMBERS AND DISTRIBUTION

There are 488 rectilinear settlements recorded in the accompanying gazetteer (appendix 1). Their largely lowland distribution (figs 7.1-7.4) is reflected in the poor incidence of earthwork survival, 56% of known sites survive only as cropmarks whilst 39% are extant earthworks and 5% have been destroyed since recording. Some 19% of sites lie at altitudes below 50m OD, while a further 24% lie below 100m OD (fig 7.5). In all 78% are situated below 200m OD with only 4% above 300m OD, these examples being located in the Pennine Uplands.

Although the distribution of rectilinear sites has now been extended throughout the four counties of the North East, they still appear to occupy a restricted range of locations favouring river valleys and the coastal plain. In Northumberland there are concentrations of sites in the Tweed Basin and the Till Valley with a low density of sites around the Cheviot foothills. A few sites are known on the coastal plain, their scarcity probably reflecting a lack of aerial survey in this area. Sites are more numerous in south Northumberland, with large concentrations in the valleys of the Rede and the North Tyne. The construction of the Kielder Reservoir occasioned the rescue excavation of three of the North Tyne Valley sites by Professor Jobey.

The coastal area of Tyne & Wear as well as much of the Tyne Valley, is covered by large conurbations resulting in poor archaeological survival but a number of rectilinear cropmarks are known, particularly in the valleys of the Tyne's tributaries. Further south, in Durham and Cleveland, the concentration of known sites is heavily biased towards the east of the area with a few sites surviving in Upper Teesdale. Their present distribution in this area has been greatly influenced by the incidence of fieldwork such as the Tees Valley surveys (Still & Vyner 1986, Coggins 1986) and Haselgrove (1980) has pointed out that the extensive Boulder Clay deposits in this area may prove more conducive to cropmark formation than is generally believed.

7.3 COMPONENTS

The principal distinctive component of this group is the rectilinear enclosure. Other components comprise gateways, sunken or paved yards, circular structures, pathways and internal divisions. Since many of the known sites exist only as cropmarks and excavation has shown that a lack of visible cropmark features within the enclosure need not represent a lack of occupation evidence, internal features are not a prerequisite for inclusion in this group. All recorded rectilinear enclosures are included unless there is good reason to assume the site is a Roman military work or is of post-Roman date.

7.3.1 Enclosures

7.3.1.1 Stone-Built Enclosures

Stone-built enclosure walls are found on 35% of known sites. Their distribution is limited to upland areas, whilst this may be readily related to the availability of building materials, a certain amount of differential survival is implied by the excavated evidence. They make up 51% of recorded sites in Northumberland yet only 11% in County Durham.

The walls are generally in the region of 2m wide and are of orthostatic construction. The excavated perimeter at Bridge House (Jobey 1960) is typical of the type, being 2m wide and composed of two sets of orthostatic facing stones with a rubble core. It is not possible to estimate with accuracy the original height of the walls as many sites have suffered extensive stone robbing. Using the rough 2:3 formula ie. that the maximum height which could be supported by this form of construction approximates to 3m for every 2m of width, a height of up to 3m is a possibility. However, considering their non-defensive positioning and the absence of large quantities of stone tumble in the vicinity of known sites, a lower perimeter can probably be envisaged. Jobey (1973b) suggests a maximum height of 2m for the wall at Tower Knowe.

Ditches are associated with many stone-built sites and appear to serve a drainage function. They are situated close to the wall and are often fairly slight. The excavated example at Riding Wood (Jobey 1960) lay immediately beyond the circuit of the wall and was 2m wide, achieving a maximum depth of 1m. It is notable that settlements in situations where the bedrock lies close to the surface, are without such ditches as at West Gunnar Peak (Hogg 1942a) and Middle Gunnar Peak (I. Jobey 1981), where the excavator records that the excavation was hindered by extensive flooding. That drainage may have been a problem on many sites is suggested by the regular occurrence of paving and of drainage ditches around buildings. The site of Milking Gap is without an external ditch and Kilbride-Jones (1938) noted that water was apt to collect in the courtyard, providing a reason for the construction of a drain secondary to the main phase of building.

7.3.1.2 Ditched and Banked Enclosures

The majority of known rectilinear sites are recognised only by the cropmarks produced by their ditches. Ditched enclosures make up 59% of all recorded sites, this breaks down to 41% of sites in Northumberland, 87% in Durham, 88% in Tyne & Wear and 100% in Cleveland. It is possible that some of these sites may have had stone walls which have been entirely destroyed by robbing and ploughing.

The size of these ditches corresponds well with the recorded dimensions of those around stone-built enclosures. The ditch at West Brandon (Jobey 1962a) was rock-cut and averaged 3-4m in width by 1-2m deep. No trace of a bank remained but an internal bank was postulated in view of the nature of the ditch fill. Similarly at Doubstead (Jobey 1982a) the ditch was 1.42m deep with a probable original width averaging 3m and no remaining trace of a bank. At Coxhoe West House (Haselgrove & Allon 1982) the ditch measured only 2m wide by 1m deep but is assumed to have been somewhat eroded. The fill of the ditch suggested that material had washed in from upcast banks on either side. This double bank and medial ditch arrangement is paralleled in extant earthwork sites on Cockfield Fell (Roberts 1975). The banks are thus unlikely ever to have reached any great height.

Although the suggested mode of bank construction is based largely on negative evidence from plough-damaged sites, it would appear that they were usually of simple dump construction as no trace of timber or stone revetment has been recorded.

Double-ditched enclosures make up 7% of all recorded sites. However, it has been demonstrated in excavation that the two ditches may not necessarily be contemporary. At Hartburn (Jobey 1973a), an outer ditch 5m wide x 1.6m deep, lay 14m outside the inner ditch which measured 3m in width x 1.3m deep. Both are assumed to have had an internal bank. The placing of circular structures within the inner enclosure makes it clear that not all are associated with this enclosure and the excavator suggests that the larger enclosure was succeeded by the smaller. Their lack of contemporaneity is also suggested by the site plan, the inner enclosure is of a more regular rectangular shape than the very rounded outer enclosure and the two entrances are not precisely aligned. A similar sequence of events is envisaged at Burradon (Jobey 1970a) although here the two enclosures are more concentric with one another and have aligned entrances. The inner ditch is the more substantial of the two measuring 4.5 - 5m in width by 2.25m deep. The outer ditch lies 18-25m beyond this and measures 3m wide x 1.25m deep. For discussion of the possibility of open phases on these sites see ch 5.

A somewhat different interpretation has been proposed for the triple-ditched enclosure at Apperley Dene (Greene 1978). The excavator suggests that in this case a double-ditched enclosure was succeeded after an abandonment of over a century by a single-ditched enclosure, its ditch lying within the "main" (the inner) ditch of the phase I enclosure. The evidence supporting this interpretation is less than clear from Greene's report which does not permit a comparison of ditch sizes, fills or layout. The outer ditch was not sampled at all during the course of this excavation yet it is stated that 'The outermost ditch would also seem likely to have belonged to this phase' (*ibid* p47) ie. phase I. No coherent structures were recorded in the interior (see below for discussion of the "round-house"). Needless to say, various other interpretations are possible, including three phases of rectilinear enclosure, a situation paralleled on other sites.

In the majority of other known double-ditched cropmark sites, the ditches are generally 10 - 20m apart. Recorded exceptions occur at East Chevington, Northumberland, where the ditches are 25 - 40m apart and Bewick Hill, Northumberland, where they are 40m apart but neither of these sites has been tested by excavation. At Billy Law West, Northumberland, the outer ditch is 20m from the inner on the west side but 60m from it on the east, suggesting non-contemporaneity if the site is a genuine rectilinear settlement.

7.3.1.3 Timber Enclosures

Only 6% of known sites show evidence of a timber boundary at some stage in their development. This figure is however likely to be an under-representation as most known examples were only revealed during the course of excavations on stone or ditched enclosures. Some palisaded sites are however known from air photographs eg. Pig Hill, County Durham. Excavated timber perimeters have invariably proven to be the earliest form of boundary on each site.

The simplest recorded wooden perimeter was excavated at Belling Law (Jobey 1977) where the earliest boundary on the site was marked by a series of post-holes 0.5m apart. These are believed to have supported a post and rail type fence which may have had some form of wattle screen between the uprights. This was replaced by a palisade proper with the uprights set in a continuous trench and then by a ditched and banked enclosure.

At Tower Knowe (Jobey 1973b) the stone perimeter wall was underlain by a palisade slot which followed the circuit of the later wall precisely. The palisade trench was 0.3 - 0.4m wide and 0.3m deep. The disturbance of some of the packing stones within the palisade trench was taken to suggest that the posts had been deliberately removed, presumably to facilitate the construction of the wall. At Kennel Hall Knowe (Jobey 1978), a series of three palisaded enclosures, each larger than the former, preceded the stone-built enclosure which was in turn, larger than the phase III palisaded enclosure. The presence of an earlier palisaded enclosure at Coxhoe West House (Haselgrove & Allon 1982) remains a possibility although here the palisaded enclosure would have had to have been on a different alignment to the ditched enclosure. The only evidence for such a feature consists of short stretches of gully within and adjacent to the central building. The features were fairly insubstantial and could equally well relate to the internal division of the enclosed area, thus the site is not included in the gazetteer as a palisaded enclosure.

The ditched enclosure at West Brandon (Jobey 1962a) proved upon excavation to have been preceded by a double-palisaded perimeter with its entrance slightly to the south of the later entrance. The two palisade lines followed one another closely at a consistent distance of 2m. The outer palisade trench was 0.5m wide and 0.5 - 0.75m deep, whereas the inner slot was 0.5m wide with a maximum depth of 0.5m. Once again, the packing of the palisade trenches suggested that the posts may have been deliberately withdrawn.

7.3.2 Yards

A number of earthwork sites may be seen to have had one or two sunken yards, these negative features often being visible when no other internal structural remains are extant. The yards are always situated at the front of the site ie. between any buildings and the entrance. They generally cover about half of the enclosed area although in the final phase at Kennel Hall Knowe, the buildings were situated two thirds of the way back in the enclosure. The degree to which the yards are sunk below the ground surface varies from a few centimetres to 2m. Excavated examples include Hartburn, where the yard was 0.3 - 0.4m in depth and Riding Wood, where the yard was 1.5m below the level of the door of its associated building, necessitating the construction of a flight of stone steps. The yard at Hartburn (Jobey 1973a) was located in the south-east corner of the inner enclosure. Patches of stone, perhaps representing a partner to it, were found in the south-west corner but in this case there was no difference in ground level. At Hetha Burn East (Burgess 1970), the steepness of slope eventually resulted in the construction of an elaborate series of stone-faced terraces, the lowest of which appears to have been a surfaced yard at one stage.

The surface of the yard is frequently cobbled as at Bridge House (Jobey 1960; Charlton & Day 1974), Riding Wood (Jobey 1960) and Hartburn where the abrupt edge of the cobbles provides additional evidence for the presence of a bank inside the ditch. At Tower Knowe, the yard consisted of solid bedrock making any form of paving unnecessary. Limited excavation of the yard at Doubstead (Jobey 1982a) indicated that it did not have a deliberately laid surface but that cobbles and domestic refuse had been tipped so as to level a worn, muddy area, perhaps on more than one occasion. Paired yards may be apparently unenclosed, may be separated by a dividing wall as at Woolaw (Charlton & Day 1978) or may be completely enclosed as at Riding Wood. Here a central pathway led to the rear of the site whilst each yard was completely walled and had its own entrance. The yard at Hartburn may also have been walled, if so, the limited excavation in this area did not reveal the entrance.

Pathways across the sites are a common feature of the settlements. In many cases they take the form of raised "causeways". At Riding Wood the central causeway appears to have been constructed of the upcast from levelling the yards. Here, as at Bridge House, additional paths of flagstones laid directly onto the cobbles led across the yards from entrance to buildings.

The nature of features in the frontal area of sites which exist only as cropmarks remains uncertain. At Coxhoe West House and West Brandon excavation in the interior was limited to the central area (and to the south of the house at West Brandon). Burradon produced no evidence of a yard or any internal subdivision of the site although the interior of the inner enclosure was extensively excavated. To what extent features not cut deeply into the subsoil would survive the erosion undergone by the lowland sites is of course a matter for conjecture.

7.3.3 Gateways

The majority of known sites have east facing entrances, a feature common to prehistoric sites of all periods. The excavated gateway structures appear to have been fairly simple constructions in all cases. At Coxhoe West House (Haselgrove & Allon 1982) a gap of 5m between the squared butt ends of the ditches was reduced to 3m by a pair of posts, presumably situated at the bank terminals, which bore the weight of the gate. The arrangement at Doubstead (Jobey 1982a) may have been similar. The gap in the ditch measured 6m but the only structural traces behind this comprised three small post-holes, measuring only 0.15m diameter x 0.2m in depth and containing no evidence of packing. At Tower Knowe (Jobey 1973b) an entrance approximately 2m in width was marked only by a rock-cut pivot hole on the north side. It is suggested that some form of timber framework may have been incorporated into the stone wall. Similarly, at Middle Gunnar Peak (I. Jobey 1981) the entrance was 2m wide but no traces of the gate structure were recovered. At Milking Gap (Kilbride-Jones 1938) an entrance only c.1.2m wide was marked by two post-holes and a pivot stone.

At Hartburn (Jobey 1973a) the inner gateway was marked by a gap of 5m in the course of the ditch. This was reduced to c.2.7m by a group of three post-holes with one outlier in front of the group on each side of the gate. One post-hole in each group had been blocked with a stone and the two outliers had been filled with clay. At least one replacement of the structure is therefore certain, four phases are possible if the gate was of the simple type used at Coxhoe. The inner gateway, some 2.5m wide, at Apperley Dene (Greene 1978) proved to have four post-holes on the north side and eight on the south side. The structure was compared by the excavator to that at Hartburn but here it is suggested that three posts formed a revetment for the bank whilst the fourth supported the gate, thus the south side had been replaced once. This does not appear from the published plan to be feasible and seems to be an attempt to fit the observed features into what is probably an unduly compressed chronology. Other features occur between the inner and middle ditches and there appears no reason to associate all of the post holes with the latest gate.

At West Brandon (Jobey 1962a) the palisaded perimeters ended in substantial terminal posts. The gap in the outer fence was 2.6m wide and that in the inner was reduced to 2.1m. A pair of post-holes were found immediately behind the outer terminals. However, as Jobey points out, a single gate hung on these posts would hit the inner palisade when opening inwards (it could not open outwards). A double gate which opened in the middle would clear the palisades and would enable the gap between the two perimeters to be closed off. As no evidence of a central stop was found, this reconstruction must remain hypothetical. The gateway of the ditched enclosure was 4m wide and marked by four substantial post-holes with a drop trench for the gate between the two outer posts.

Burradon (Jobey 1970a) exhibits a slightly more complex arrangement whereby in both the larger and smaller enclosures, a gap of c.7m in the ditch was reduced to 2m by short stretches of timber fencing. The end posts of the fence were the most substantial and appear to have borne the weight of the gate. A line of grey silt on the line of the inner gate is believed to represent a drop trench. Both fences must have stood on the forward edge of any internal bank and are thus believed to have been free-standing rather than a continuation of some form of breastwork surmounting the bank. This arrangement is paralleled at Marden (Jobey 1963). At Chester House (Holbrook 1988) a gap of 11.4m in the ditch was crossed by a palisade trench. No clear evidence of a gateway was found but the excavator takes the feature to represent a structure similar to those above rather than a separate phase of enclosure.

A number of the stone-built enclosures have paired groups of buildings and yards, each with its own entrance. The discovery of an *in situ* pivot stone at Riding Wood (Jobey 1960) confirms that gates were present here also.

7.3.4 Buildings

The number of buildings which could have co-existed at some time on rectilinear sites varies from 2 to 10. Various methods of construction are represented. The construction technique appears to have some chronological significance in that stone-built huts have proven upon excavation to be invariably later than timber buildings. The timber buildings are substantially larger than those of stone, a phenomenon discussed further in appendix six. Even on sites such as Hartburn with evidence for a large number of timber buildings, only three could have co-existed at any one time whereas groups of 5 or more huts are common on the stone-built sites. At Middle Gunnar Peak (I. Jobey 1981) it is conceivable that 10 stone buildings co-existed.

7.3.4.1 Structures of Individual Post Construction

The simplest building form represented on rectilinear sites is the hut of individual post construction. Five of the phase I structures at Burradon appeared to consist of a single ring of posts including one with evidence of internal posts and a hearth. All were surrounded by drainage gullies. At 5 - 7m in diameter these are among the smallest recorded timber buildings although a possible structure of individual post construction at Hartburn had a diameter of only 4.5m.

The post-built "house" at Apperley Dene does not appear convincing and there seems to be some discrepancy between the two published plans as to the placing of features (Greene 1978). It is however possible to join other groups of 5 - 6 post-holes on the plan with circles of 10 - 11m diameter so presumably buildings of individual post construction were present on the site.

The central building of the phase II enclosure at Burradon comprised a building of individual post construction surrounded by a substantial drainage gully, 2m wide x 1m deep with an internal diameter of 13.5m. This is not, as is often stated, a ring-ditch house. The term ring-ditch house applies to a specific group of buildings in northern Britain and cannot be loosely applied to external drainage features in the manner in which the term is often used in southern England. Two interpretations of the structure of this building are possible. The first is that it was a complex structure with four rings of posts, comparable to the house at West Brandon. The second and more likely interpretation is that two phases of building are represented, a double-ring hut of 10m and another of 12m diameter. This would account for the large number of post-holes in the central area and the presence of four hearths.

The central area of the enclosure at West Brandon was found to contain a complex array of post-holes which the excavator interpreted as the remains of two buildings, both c.15m in diameter. The first was entirely of individual post construction and was represented by four rings of posts, the outermost ring marking external eaves supports. The existence of a porch is possible but not certain. The second building, which was demonstrably the later of the two, was also marked by four concentric rings but here the outer wall of the building was of ring-groove construction with a ring of eaves supports external to this. The construction trench was projected outwards at the doorway indicating the presence of a porch. It is difficult to parallel this degree of structural complexity elsewhere in the region but the evidence does not appear to permit any other interpretation. From the plans alone, it is possible to construct an alternative sequence of three double-ring structures but here the provision of doorways in the two post-built huts would be problematic. The large size of the buildings perhaps explains the need for extra roof supports. The buildings excavated by Bersu (1948) at Scotstarvit, Fife are suggested to parallel these structures. However, here, huts of 16.8 and 18.3m diameter were of the more common double ring-groove construction having an additional internal post ring but no evidence for external roof supports.

7.3.4.2 Ring-Groove Structures

The most common form of timber building appears to have been that of ring-groove construction, whereby the wall timbers are set in a continuous trench. Evidence of 36 ring-groove structures was discovered at Hartburn, representing a minimum of 12 building replacements. The buildings ranged from 7 to 16m in diameter and some showed evidence of internal posts, indicating the kind of double-ring huts which have a currency reaching back to the early Bronze Age in this area.

Tower Knowe, Belling Law, Kennel Hall Knowe and Bridge House all proved to have buildings of ring-groove construction in their earliest phases. A ring-groove hut of only 5m diameter was excavated at Marden and there remains some doubt as to whether this represents a free-standing structure or was internal to a stone building (see below). The large central house at Coxhoe, with a diameter of some 13m was probably of double ring-groove construction.

7.3.4.3 Stone-Built Structures

Stone buildings are a common feature of the extant earthwork sites and are probably under-represented elsewhere due to later robbing and plough damage. They are generally smaller than the known timber buildings (see appendix 6). Circular stone structures of only 3m diameter are known at Blakehope and Blakemans Law. However, stone-built settlements usually possess a range of circular structures of differing sizes. Middle Gunnar Peak has structures ranging from 4.5m to 10m in diameter.

The walls of the buildings are usually c.1m thick and of orthostatic construction having two lines of facing stones with a rubble core between. Some of the huts at Milking Gap (Kilbride-Jones 1938) were more crudely constructed having areas composed of a single line of stones, the gaps being filled in with turf and rubble. Evidence of a centrally placed timber roof support was found at Carry House (Rome-Hall 1880) and West Gunnar Peak (Rome-Hall 1884).

Excavation in a number of stone huts has revealed the presence of a groove following the line of the wall on the inside. Jobey (1960) noted this feature at

Bridge House and suggested it was some sort of drainage channel. However, Charlton and Day (1978) excavated a similar charcoal filled groove at Woolaw and demonstrated it to have held a wattle screen, which in this case had been destroyed by fire. The "ditch" within the main house at Milking Gap is more problematic. At its maximum it reached a depth of 0.5m x 1m wide and had been deliberately infilled with stone and paved over. This may perhaps have allowed water to drain away readily.

A number of other internal features have been regularly recorded in stone huts; neuks in the walls, presumably for storage; raised stone thresholds, sometimes with post-holes for a door frame; pivot-stones in the doorway and hearths formed of stone slabs. Two of the huts at Bridge House (Jobey 1960) had "benches" inside, one of stone, butting onto the hut wall, the other produced by cutting back into the sloping floor to leave a raised platform. A stone "dais" is recorded in a hut at Blue Crag (Jobey 1960) and at West Gunnar Peak (Rome-Hall 1884) three huts seemed to have had areas partitioned off by lines of stones. All four of the excavated huts at Bridge House proved to have stone "basins" set into the floor. Stone slabs had been bedded into clay to produce a watertight hollow c.0.5m in diameter and less than 0.2m deep. Three were situated on the south side of east facing doorways and the fourth on the east side of the south facing doorway. Finally, at West Longlee (Jobey 1960) and Bridge House (Charlton & Day 1974) the base stones of rotary querns were found set into the floor where they had obviously been used *in situ*. At Bridge House the broken iron spindle was still in place.

7.4 AGRICULTURAL REMAINS AND POTENTIAL

The overall evidence for the agricultural regime associated with rectilinear settlements is discussed in chapter ten thus only extant remains and environmental potential are considered here. Extant traces of agricultural activity which can definitely be associated with this form of settlement are however extremely scarce and present knowledge is largely based on palynological and environmental evidence. The difficulty of dating earthwork remains which have no actual physical relationship with nearby settlements should not be understated yet this is a point which is frequently overlooked eg. 'Clearance cairns and field banks close to many of the enclosed settlements would suggest the presence of arable or pasture in company with them' (Smith 1990 p65). The known earthwork remains have been treated fully by Gates (1982b) and Topping (1989 a,b).

Of Gates' (1982b) 20 examples of Romano-British fields in Northumberland, 11 could possibly be associated with rectilinear settlements. The best known example occurs at Tower Knowe where an L-shaped area just over 0.5ha in extent, demarcated by banks of field cleared stones, almost abutted the settlement. A number of clearance cairns lay within this field. One cairn was excavated but no trace of underlying plough marks was revealed. Two small rectangular buildings also lay within the area and in this case one must take Jobey's (1973b) view that an association between field and settlement could not be proven.

Similarly, many of the other associations are not beyond doubt. Gates also cites the example of Sweethope Crags where he suggests 3 or 4 phases of clearance and enclosure have taken place. He associates the second phase fields, defined by linear banks and strings of clearance cairns, with the nearby rectilinear enclosure at Plashetts, although stating 'any physical contact there may have been between these fields and what seems to have been a settlement has been obscured by subsequent rigg ploughing.' (Gates 1982b p25). There is thus no clear association and this episode could equally well relate to activity on the nearby open settlement of Sweethope Crags. The first phase of banks and lynchets are almost certainly associated with this settlement and Houseledge provides a comparable example of an open settlement clearly exhibiting a sequence of agricultural phases. Kidlandlee Dean and Todlaw Pike illustrate that field systems associated with open settlements need not necessarily lack regularity.

At Brands Hill North fragmentary field boundaries have been discovered over an area of around 25 ha. The rectilinear settlement at Brands Hill North is however only one of some 16 settlements in close proximity to one another and the fields can hardly be identified as positively relating to this site rather than any of the curvilinear or open settlements in the vicinity. Likewise, there are a number of prehistoric settlements in the Yeavering area and to positively identify the field system there with the occupation of Worm Law West would perhaps stretch the evidence a little too far.

The largest remaining field system surrounds the three rectilinear settlements at The Butts, Redesdale, where Gates records a minimum of 15 sub-rectangular fields giving a total enclosed area of 19.8 ha. Other possibilities remain at Netherhouses East & West, Jennys Lantern, Blakemans Law, Sunnyside, Plashetts North and Quarry House. Gates' contention that the fields are generally sub-rectangular with the long axis in the direction of slope may well prove correct as may his estimated average size of 0.5 to 1.75 ha, somewhat larger than the fields associated with open settlements. However, considering the size of the sample and the uncertainty of many associations, it would appear unwise to make too many generalisations in the present state of knowledge, One can cite examples of triangular "fields" at Little Crag and Jennys Lantern although these may be the result of adding on additional land to pre-existing rectangular boundaries. It is notable that no ditched field boundaries, other than those at Yeavering (Hope-Taylor 1977), have been recorded in Northumberland.

The lowlands and south of the region have proved even less conducive to the preservation of agricultural remains. The most extensive field system known is the complex of ditched fields at Ingleby Barwick (Heslop 1984). The system has been shown to have a phase of Iron Age use, marked by curvilinear boundaries, followed by a series of rectangular boundaries of Romano-British date but the settlement with which it was associated has not yet been identified. A number of other possible systems of rectangular fields are known from air photographs but hard evidence is lacking. Indeed excavation has served only to highlight the difficulties involved in identifying such features from the air. At both Strawberry Hill (Haselgrove 1980) and Coxhoe West House (Haselgrove & Allon 1982), air photographs showed a series of linear and rectangular features in the proximity of rectilinear enclosures (those at Coxhoe could clearly not have been contemporary with the enclosure). Whilst excavation demonstrated that both of the rectilinear enclosures were genuine archaeological features (although limited excavation of Strawberry Hill failed to produce direct dating evidence), the "field boundaries" turned out to be geological in origin.

The recent identification of cord rig cultivation does however provide further corroboration of a prehistoric date for some of the above remains and has extended the distribution of sites showing evidence of agricultural activity. In his survey of the evidence, Gates (1982b) suggested that faint striations, possibly relating to cultivation, could be identified within field boundaries on a number of air photographs. Recent work by RCHME has indeed shown that these areas of cord rig represent the remains of prehistoric cultivation and this work is discussed more fully in chapter ten. Suffice it here to say that cord rig is representative of arable cultivation but has a long currency from the 2nd millennium onwards. Topping (1989a) however, claims that cord rig cultivation may have died out by Hadrianic times. This has interesting implications for the economy of rectilinear sites as many did not develop in their final form (see below) until the 2nd century AD.

Areas of cord rig have been noted in association with fields recorded by Gates at Netherhouses East & West, The Butts and Blakemans Law and have also been identified close to rectilinear sites at Woolaw, Woolaw East, Fairney Cleugh 2, Rattenraw, Buteland, Blakehope, Belling Law (also noted by Jobey 1977), Ottercops Burn and Meadowhaugh.

Leaving aside direct evidence for cultivation, it should not be assumed that all of the fields were necessarily associated with arable production. A good case has been made for the keeping of stock in the frontal yards of these sites (Jobey 1960) thus some provision of pasture would also have been necessary. Gates (1982b) suggests that at The Butts, Brands Hill and possibly Quarry House, trackways lead from the enclosures to pasture land beyond the enclosed fields. Enclosures showing no evidence of having contained buildings such as that within the settlement complex at Rattenraw must also be considered as possible stock enclosures.

Using the criteria for assessing agricultural potential outlines in appendix two. the majority of known rectilinear sites lie in what would have been good quality land throughout later prehistoric and Romano-British times (table a2.1). This is, on the whole, unsurprising and accords well with available environmental evidence from such sites.

During climatic phases 1 & 2, 77% of the locations score as good quality land relative to other settlement locations. There is however, no evidence for the development of rectilinear sites at this period.

The earliest known rectilinear sites develop around the end of phase 3. At this time only 52% of the locations score as good. This is due to the amount of very low lying situations which would have been less favourable during this wet period. These locations are still more favourable than those of the open or curvilinear sites. Only 3% rate as poor quality situations and 91% of the medium grade locations fall at the upper end of the grade.

By phase 4 conditions had returned to a state similar to that prevailing during the 2nd millennium climatic optimum. A total of 77% of the locations are rated good during this phase and 86% of the medium rated locations are in the upper end of that grade. This is because few situations are at sufficiently high altitudes to have suffered long term decline as a result of the climatic deterioration or earlier agricultural activities.

7.5 MORPHOLOGY AND ON-SITE ACTIVITY

The amount of on-site activity on rectilinear settlements as evidenced by the number of circular structures compared to those on other prehistoric sites, appears to be generally fairly low (fig 2.29). Circular structures have been recorded on 91 known sites. This represents a 23% sample of known sites. Of these, 81% rate as AR 1 having up to four huts, 14% are of AR 2 and 5% are of AR 3. This evidence cannot necessarily be taken at face value however since the majority of known sites exist only as cropmarks and an apparent absence of internal features on air photographs has been shown to be of little significance. Thorpe Thewles and Burradon appeared to have only a single internal building and Hartburn showed no evidence of the 36 huts discovered in excavation. However, despite the number of structures on these sites, both Burradon and Hartburn could only ever have rated as AR 1 settlements at any particular stage in their development.

The size of the enclosed area was recorded for a 38% sample of sites and found to range from 0.02 ha to 1.25 ha. Some 79% of sites had an enclosed area of less than 0.5 ha and there is a marked cluster at around 0.3 ha. This cluster is not particular to any localised group of sites, it represents the most common size of site throughout the region. Most of the numerous North Tynedale and Redesdale examples are of approximately this size and the same phenomenon was noted by Haselgrove (1982) some years ago in considering a group of 50 sites between the Tyne and the Tees. However the smaller cluster at around 0.6 ha noted by Haselgrove is not apparent in the larger sample.

Slight variations in the morphology of the enclosure circuit do not appear to be particularly significant. It is perhaps tempting to subdivide cropmark sites on this basis in the absence of other distinguishing features but earthwork and excavated evidence does not uphold any valid distinction between sites which are sub-rectangular, polygonal or trapezoidal. Rede Bridge is polygonal in shape but the use of space within the enclosure follows exactly the pattern of that in the more strictly rectangular enclosures. Similarly, the excavated site at Riding Wood (Jobey 1960) is trapezoidal yet again has the same internal layout. The palisaded settlements are often more strictly rectangular, as might be expected, whereas ditched enclosures often have bowed sides and/or rounded corners. Few would question the inclusion of Gubeon Cottage (Jobey 1957) into this group of settlements yet its enclosing perimeter is so rounded as to be almost circular.

The adoption of rectilinear forms for the perimeters has been the subject of much debate. Functionalist arguments such as the form resulting from insertion into an earlier field system (as noted by Bradley 1978 in later Bronze Age contexts) range against those who would see one facet of Romanization in these sites. Whilst a pre-Roman context is assured for the initial development of the rectilinear form, the latter case still has many adherents. Haselgrove (1982) states that acculturation remains a possible explanation for those sites occupied exclusively after the Roman occupation. It will be argued in chapter nine that whilst acculturation may possibly have led to the construction of sites in stone, the overall form reflects the needs of a specific social group and is a deliberate attempt to portray a particular image, with deviation from the preferred form being a late rather than an early trait.

To return to the purely structural elements with which this chapter is concerned, the use of space within the enclosure would appear to be a more legitimate basis on which to subdivide sites than the form of the enclosure. A number of variants seem to emerge bearing in mind that the evidence from excavated lowland sites is often imperfectly preserved. The significance of these variations in terms of economy and social unit is discussed in chapters nine and ten. It is worth noting at the outset that the size of the enclosed area cannot be taken as an indication of the likely number of structures within the area. A large enclosed area does not necessarily correspond to a large number of buildings. Indeed, the reverse appears to be the case.

The first "type" (the order in which these types are discussed having no chronological significance), R1, is the enclosure containing a single known, usually centrally placed, building, such as Burradon phase II, West Brandon (fig 7.6) and Coxhoe West House. Excavation on these sites has shown no trace of subsidiary structures or yards but there is a possibility that shallower features, paths etc have been destroyed by ploughing. The group may be divided into R1a, those sites having a palisaded perimeter and R1b, those with a ditched perimeter. The ditched sites are known only from relatively low lying areas.

Type R2 sites, represented by Bridge House (fig 7.7), Sidwood (fig 7.8) and Tower Knowe (fig 7.9) exhibit a greater variety of structures such as yards and buildings, there does however appear to be some emphasis upon a particular building. The building is often centrally placed and somewhat larger than other structures and is approached by its own causeway. This type may be under represented in the lowlands due to differential survival/visibility. Thorpe Thewles phase II belongs to this type as may other sites provisionally classed as type 1 or unclassified.

Woolaw (fig 7.10), Woolaw East and Blakehope are representative of type R3; a group of sites apparently divided into two equal units with each half of the site having a yard, path, entrance and a generally equal number of circular structures. These sites occur in the upland margins.

Finally there are the type R4 settlements which seem to have developed out of types R2 & R3 above. These are sites which show evidence of expansion in an agglomerative fashion, resulting in an overall plan which is far less regular than usual. Jennys Lantern and Rattenraw (fig 7.11) appear to exhibit such development as do, to a lesser extent, Milking Gap and the settlements on Gunnar Peak although these sites have only a single enclosure. Only sites where expansion has led to a change in overall form are included in this group. Type R2 & R3 settlements may also show evidence of expansion but the basic division of space remains the same, thus additional buildings may be added in the rear of the enclosure. At Stirks Cleugh the desire to adhere to the planned layout appears to have been sufficiently strong as to lead to an extension of the enclosed area to allow the construction of two secondary buildings at the rear, resulting in an enclosure twice as long as it is wide. Sites of type R4 may develop so far as to blur even the basic distinction between curvilinear and rectilinear forms. This problem is illustrated at Uplaw Knowe South (fig 7.12). The settlement is recorded in the gazetteer as being of overall curvilinear form and does indeed appear to have more affinity with this group of sites in the use of space. It is however possible to identify two basically rectilinear units within the AR 4 complex and one could make a case for the site having developed from these units, making it a type R4 rectilinear settlement. It is significant that these sites are distributed in areas where the curvilinear settlement form is the more common of the two.

7.6 DATE

The rectilinear form has been shown in excavation to have its origins firmly within the early Iron Age and to continue in use until at least the 3rd century AD. However neither the upper nor lower limit of this date range is secure and many other questions of continuity and contemporaneity remain unanswered. Few sites have been C14 or TL dated, the dating rests largely on the artefactual evidence which is notably scarce on such sites. Even where a complex sequence of building replacements is evident, the material evidence is usually insufficient to give any indication of the period of use of particular buildings and the overall dating of the site is frequently based upon the excavator's assessment of the probable lifespan of timber buildings.

So far only three sites have produced material which can clearly be dated to an early stage in the Iron Age. At Burradon and Hartburn, pottery with finger-tip decoration was taken to represent the earliest occupation of the sites and a foundation date in the 5th or 6th century BC was suggested by the excavator. Burradon showed evidence for at least 5 building replacements and Hartburn at least 12, yet this early foundation date was seen as somewhat problematic in view of material of 3rd century AD date at Hartburn and 2nd century AD material at Burradon. Comparison with the material from Thorpe Thewles would suggest that a 5th to 6th century foundation date may yet prove too conservative and it may be that the generally accepted 25 - 50 year estimation of the lifespan of a timber building is at fault. Thorpe Thewles also produced early Iron Age material. Mean TL dates for phase II, the settlement within the rectilinear enclosure, centre at around 500 BC. Two points are worthy of note. Firstly, this produces a considerably longer chronology for phase II than the excavator would have suggested on the structural evidence. Secondly, finger-tip decorated pottery makes up a very small part of the large assemblage (12 sherds out of 1522). Whilst we cannot, on present knowledge, rule out the possibility that this form served a particular purpose for which few vessels were required at Thorpe Thewles, it may be that the currency of the form was ending by c.500 BC.

West Brandon (Jobey 1962)a and Coxhoe West House (Haselgrove & Allon 1982) have produced material of an earlier date than the bulk of the finds from excavated rectilinear sites but in neither case can the duration or the chronological limits of occupation be determined. Only 15 sherds of pottery were discovered at West Brandon and whilst they are said to resemble early Iron Age sherds from other sites in the Tyne-Forth province, none can be securely dated. The only other finds were a number of objects of stone including 4 saddle querns thus the site is assumed to have been abandoned before the introduction of rotary querns to this area in the 2nd century BC. An occupation of c.100 years in the 2nd or 3rd century BC is tentatively suggested for the phase II ditched enclosure. If correct, this would imply an occupation during the middle Iron Age for the phase I palisaded enclosure but an earlier date for both phases is equally possible.

The finds from Coxhoe West House are particularly enigmatic. All of the pottery was Mediaeval or post Mediaeval; fragments of 2 saddle querns and 1 possible rotary quern were recovered; other finds included 5 pieces of flint, a glass bead unparalleled in prehistoric or Roman contexts and a fragment of a shale bracelet. The bead does not appear to be of Mediaeval manufacture and a more recent origin, although stratigraphically unlikely, remains a possibility. The shale bracelet would be more readily paralleled in Bronze Age contexts in this region.

The most one can say therefore is that the occupation of the site probably spanned the transition from the use of saddle querns to rotary querns and even the identification of the rotary quern fragment is not beyond doubt. The saddle querns came from a context which pre-dated the central building and may therefore relate to the earlier phase of activity on the site. The form of the site in this phase is unclear (see above for discussion of the possible palisaded enclosure) but magnetic susceptibility suggests the site saw more intensive use at this time.

The majority of datable finds from rectilinear settlements are of the late 1st/early 2nd century AD. The emphasis here is on the word *datable*. Roman products of this period can be readily identified and one must beware of placing too much emphasis on this visible, durable and datable material. The dangers of misinterpreting negative evidence cannot be over-stressed. We know next to nothing about the patterns of artefact discard on these sites, although sufficient to suggest that refuse was probably discarded beyond the immediate area of habitation. Whether it was simply left in midden heaps or used to manure arable fields is a matter for further research. The "kitchen midden" found some 12m outside the entrance at West Gunnar Peak (Rome-Hall 1884) may relate to the use of that settlement.

It is interesting to contrast the general level of occupation debris found on rectilinear sites with that found at Thorpe Thewles. Although this site may have been particularly "successful" owing to its location in an especially fertile arable area, its position on a poorly drained subsoil necessitated the digging of numerous drainage features which acted as Heslop (1987 p110) states, as 'artefact and biofact receptacles beneath the threshold of plough erosion'. Whilst the sites in more upland locations have not suffered greatly from plough damage, they do not exhibit a great number of subsoil features which were exposed for any length of time. The finds from most excavated sites cannot be taken as representative of "normal" domestic refuse; broken querns are frequently re-used as post-packing or walling, recovered pottery is only that surviving fraction which has escaped normal disposal and luxury items, jewellery etc have either been lost or have been discarded for whatever reason prior to abandonment of the site eg. the Carry House sword (Rome-Hall 1880) found on the floor of a hut. An absence of finds cannot therefore in itself be taken to represent a limited period of occupation.

The paucity of the artefactual record is inevitably stressed in any discussion of northern Britain yet the paucity of our understanding of site formation processes is perhaps a more significant factor. Hill (forthcoming a) has calculated that even on sites with apparently large assemblages, the total quantities of material deposited each year were surprisingly low. For example, one pit became available for infilling approximately every five years at middle Iron Age Gussage All Saints. Hill states, 'Deposition within archaeologically recoverable contexts was neither a daily nor an annual event.' (*ibid* p20).

Be that as it may, occupation appears to have flourished on many rectilinear sites during the 1st and 2nd centuries AD even though we cannot establish how long before or after this period it extended. At Tower Knowe (Jobey 1973b) excavation has revealed a sequence of events whereby the earliest settlement comprised a palisaded enclosure with a single central hut. The hut was replaced, first by another of similar size, then by 2 smaller huts. At some stage the palisade was replaced by a stone wall and the 2 timber huts were replaced by 3 stone huts. Both the horizontal and vertical stratigraphy suggest continuity of settlement. Finds were once again few but Samian in the construction trench of one of the 2 timber huts suggests the pair were not built before the early 2nd century AD and Antonine material beneath the wall of one of the stone huts gives a mid 2nd century AD *terminus post quem* for its construction. Jobey calculates that allowing for 'the timbers to decay to such an extent that complete replacement was required, there would seem to be no reason to place the initial foundation back beyond the 1st century AD' (*ibid* p76).

A similar sequence of events took place at Belling Law (Jobey 1977). There a fenced enclosure was replaced by a palisaded enclosure. Four superimposed timber huts lay within the enclosed are, only one of which could have existed at any time. The palisaded enclosure was in turn replaced by a ditched and banked enclosure with 2 stone huts. Once again the stratigraphic evidence suggests continuity and the stone huts appear not to have been constructed before the early 2nd century AD. There was again no material of a date later than the 2nd century AD. The excavator states that on the balance of the structural evidence he would not have dated the beginning of the occupation before the Roman period, however a single C14 date obtained from the wall timbers of the earliest house suggests it may have been constructed in pre-Roman times. The date of 2110 $\pm$ 80 BP (HAR 1394) would fall within the late Iron Age even allowing for the age of the timbers used in construction but obviously one cannot lend too much weight to the evidence of a single C14 date. Carbonized wood from one of a scatter of post-holes in the rear of the enclosure was also subjected to radiocarbon determination and yielded a date of 1670 $\pm$ 70 BP (HAR 1393) thus timber structures may have been used in conjunction with the stone buildings.

Kennel Hall Knowe (Jobey 1978) produced an even more complex sequence of rebuilding with 3 palisaded enclosures, apparently each with a single timber hut, followed by a ditched and banked enclosure with 3 stone huts. The construction of the stone huts is dated to the 2nd century AD on the strength of 2 sherds of Roman coarse pot and a C14 date of 1680 $\pm$ 80 BP (HAR 1938) from the fill of the phase III palisade trench, taken as a *terminus ante quem* for the abandonment of the phase III enclosure. The earlier phases rely on single C14 dates, charcoal from the wall of the earliest hut (probably destroyed by fire) gave a date of 2050 $\pm$ 90 BP (HAR 1943) and the latest timber house yielded a date of 1920 $\pm$ 110 BP (HAR 1941). A pit predating the stone houses gave a date of 1970 $\pm$ 70 BP (HAR 1937). The earliest excavated house overlay the phase I enclosure so the two dates relate to phases II and III respectively.

Despite the limitations of individual dates, there remains a remarkably consistent pattern of rebuilding in stone during the 2nd century AD. To the above examples may be added the evidence from Woolaw (Charlton & Day 1978) and Bridge House (Jobey 1960). There is stratigraphic evidence to suggest that this rebuilding was not always necessitated by the condition of the palisades and must have been prompted by some other motive. The late 1st/early 2nd century AD may also have been marked by an overall increase in the number of rectilinear settlements. Middle Gunnar Peak (Jobey 1981), which had no preceding timber phase, appears to have developed during the late 1st or early 2nd century AD. A single large hut of this period was replaced by a number of smaller huts by the mid 2nd century AD. Other apparently single phase sites in the lowlands such as Doubstead (Jobey 1982a) and Marden (Jobey 1963) were probably constructed at this time.

The date of the decline of this form of settlement is as uncertain as that of its development. To date only Hartburn has produced Roman pottery which may belong to the 3rd century AD but, as discussed above, this in itself is hardly conclusive. On structural evidence alone it might be assumed that stone buildings constructed in the mid 2nd century AD would be habitable/usable well into the 3rd century. Consideration of the economic base of these settlements and their role in the settlement hierarchy as a whole may serve to give an indication of their likely currency.

CHAPTER EIGHT

A SPACE IN TIME

8.1 INTRODUCTION

This study has so far dealt with a sample of data from a large area. Observed patterns have been discussed largely in terms of the database as a sample greatly affected by differential preservation and, in part, created by those who study it. Attempts have been made to deconstruct a number of deeply entrenched assumptions about the past in this area. Any attempt to seek meaning from these data must now involve more rigorous examination of differences between sites and areas.

Observations need to be tested in a mathematically acceptable manner but what is required must go beyond mere quantification into the realm of anthropocentric, contextual, time-space geography. Hoekveld (1990 p13) states that 'Regional geography is about places, which means areas; it is not about objects which have spatial attributes'. The same may be said of settlement archaeology. The concept of "place" as opposed to "site" is one which will be returned to later. The point to be made here is that it is not enough to quantify spatial attributes then look for deterministic causal factors. We must realise that we are looking at what Soja (1985) has termed 'the spatiality of society'.

The concepts employed in the following chapters make use of both the time geography of Hägerstrand (cf 1970) and Giddens' structuration theory (cf 1984) in attempting to elucidate the relationships between spatial pattern and social structure. The key factors involved are system, agency and structure. Daily life consists of spatio-temporal activity patterns, (the actions of human agents) which have a systemic character. Structure exists outside time and space and comprises an idealised order or the "rules" of social interaction. These factors have a reflexive relationship with one another but all actions are necessarily contextual, 'context thus connects the most intimate and detailed components of interaction to much broader properties of the institutionalization of social life' (Giddens 1984 p119). Settlements are considered here as the settings for interaction which reproduces or reconstructs structure being themselves influenced by, and helping to create, this structure.

8.2 SPACE AND PLACE

The study however is not only about settlements, it is about *places*. So-called landscape archaeology is too often concerned with only the visible traces of human manipulation of the environment rather than with the experience of that environment as a whole. The advice of Strabo (Book 11, ch 5, section 17) to geographers should perhaps be noted by archaeologists 'Since different places exhibit different good and bad attributes, as also the advantages and inconveniences that result therefrom, some due to nature and some resulting from human design, the geographer should mention those which are due to nature, for they are permanent, whereas the adventitious attributes undergo changes. And also of the latter attributes he should indicate such as cannot persist and yet somehow possess a certain distinction and fame, which by enduring to later times make a work of man, even when it no longer exists, a kind of natural attribute of a place'.

The relationship between landscape and culture is a complex one as embodied in the Pays concept of Vidal de la Blanche (ch 2). Lawrence Durrell (1969 p157) makes a humorous case for environmental determinism 'I believe you could exterminate the French at one blow and resettle the country with Tartars, and within two generations discover to your astonishment that the national characteristics were back at norm - the restless metaphysical curiosity, the tenderness for good living and the passionate individualism: even though their noses were flat. This is the invisible constant in a place'. Culture requires a spatial dimension yet spatial perception is culturally determined. Fig 8.1 gives a hypothetical structure to space and lists some of the possible types of space which may exist at a particular level.

This chapter is concerned with the first three levels of existential space or as Relph (1976 p12) has termed it 'lived space'. This is the space which people experience at first hand and which they define and interpret according to their cultural perceptions. This cultural variation in meaning maybe seen in Rapoport's (1972 p4) description of the different way in which Aborigines and Europeans see the landscape of North West Australia. 'Many Europeans have spoken of the uniformity and featurelessness of the Australian landscape. The Aborigines, however, see the landscape in a totally different way. Every feature of the landscape is known and has meaning - they then perceive differences which the European cannot see. These differences may be in terms of detail or in terms of a magical and invisible landscape, the symbolic landscape being even more varied than the perceived physical space.' Such a relationship between physical and symbolic features is illustrated in fig 8.2.

Archaeologists thus cannot afford to ignore the setting of a particular site and the possible relevance of both natural features and previous activity. A useful concept may be that of 'imageability' (Relph 1976) or places which stand out because of exceptional structures, natural features or association with significant events. 'Imageability is not a fixed or absolute feature and the significant places of former times may be overwhelmed by larger forms or lose their significance .... public places with high imageability do nevertheless tend to persist and to form an ongoing focus for common experience - Red Square in Moscow, Niagara Falls, the Acropolis have all attracted public attention through many changes in fashion and political systems and beliefs' (*ibid* p35).

High imageability is certainly a feature of many Iron Age sites in this area yet one which has been consistently overlooked due to a preoccupation with considerations of defence. This preoccupation has persisted despite widespread recognition that of the Iron Age sites in north east England 'the so-called "hillforts" of the area are not always in positions of outstanding natural defence' (Jobey 1965a p22). The phenomenon of enclosed settlement is discussed further in chapter nine where reasons other than defence are proposed for the construction of boundaries around settlements. The perspective of the discussion is widened when the sites are considered in their overall setting bearing in mind the role of an elaborate boundary in contributing to imageability.

The best such example is Roughting Linn in north Northumberland. The site is situated on a low-lying spur formed by the Roughting Linn stream which flows round the site from a waterfall (haunted according to local legend) on the north side. The neck of the spur is cut off by four lines of rampart, accounting for its classification as a multivallate promontory fort. The site is overlooked on all sides, the most readily defensible location in the vicinity being Goatscrag, 500m north west of the promontory. Goatscrag itself is a rock shelter site which has produced evidence of Mesolithic activity, early Bronze Age sepulchral activity and rock carvings of putatively prehistoric date (Burgess 1972a; Hoek & Smith 1988). From the top of the crag there is a clear view to Yeavering Bell, Eildon Hill and, more distantly, to the Firth of Forth and Traprain Law. The site of a barrow is recorded to the north of Roughting Linn and immediately beyond the ramparts to the east is the largest example of prehistoric rock art in northern England (Twohig 1988). Verbal description cannot do justice to the impact of this setting. The visitor is immediately filled with a sense of entering a significant place.

Associations between Iron Age bounded sites and prominent examples of rock art are also seen at Old Bewick, Dod Law and Lordenshaws, with a lesser example at Jenny's Lantern. A large number of cup marked rocks were recovered from a small ditch section at Eston Nab, Cleveland (Vyner 1988). The largest prehistoric site in the region, Yeavering Bell, is situated on the most prominent landmark in the area in a place which had been a focus of ritual activity from the Neolithic onwards (Ferrell 1990) and which continued to be of importance during the early Mediaeval period.

This is not intended as an exhaustive study of ritual in the Iron Age, the intention is merely to introduce a new dimension into the contextual appraisal of "sites". Iron Age sites were constructed with an awareness of individual locations as "places" given an identity by past activity there. Whether continuity of activity exists or is "created" (cf Bradley 1987) does not detract from that awareness which may have developed in a time space framework very different to our own. Many societies studied by ethnographers do not exhibit a developed sense of directional time. In Aboriginal thought time is observed as cosmogenic rather than astronomic or cyclical (Tuan 1977 p132). Trees present at the creation may have stood within living memory yet topographic features document the actions of the ancestors. The Hopi (*ibid* p132) do not abstract time from distance hence the possibility of simultaneous action does not occur. They do not ask whether events in a distant village occur at the same time as in their own since what happens elsewhere can be known here only later. Increasing distance eventually borders the mythical and timeless past. It is not therefore reasonable to assume that repeated activity on sites with high imageability represents any form of structural continuity but it is important to realise that at any point in time, such places would be meaningful contexts whose identity would structure further activity there.

8.3 SPACE AND TIME

One of the greatest problems in archaeology, particularly in north east England, is how to relate the spatial and temporal dimensions of human activity. Chapters five to seven illustrate how imperfect are both absolute and relative chronologies for this area although certain broad patterns do emerge. There are some 37 instances known from fieldwork and/or excavation where sites of different form occur in direct stratigraphic association. The stratigraphic associations of palisaded settlements are known mainly from excavation but whilst they are under represented in numbers, the pattern is consistent. The curvilinear and rectilinear "traditions" appear fairly distinct. The curvilinear settlements of the Iron Age (type C4-C6), are associated with earlier curvilinear palisades and later curvilinear stone-built settlements whilst there is a high incidence of early rectilinear settlements continuing to develop in rectilinear form. Where there is overlap between the two groups it is often the case that the rectilinear settlement involved has greater affinity in internal arrangement with the curvilinear group. These stratigraphic associations may be expressed in the form of a matrix (fig 8.3).

This is not to suggest that all sites of similar form are contemporary and indeed one may cite examples from immediately beyond the region which show different patterns of development eg. St Germains, East Lothian, (Watkins 1982) where a rectilinear enclosure was replaced by a curvilinear enclosure described as 'fortified'. However, this relative sequence remains valid for all known sites within the area of study.

This matrix may thus form a general basis for the consideration of time-space relationships. Each of the broad groups represented in the matrix may be considered (still without specific chronological implication) as a particular phase of activity. For this purpose no distinction is made between curvilinear and rectilinear forms. These phases have been mapped out in order to see whether one may identify "core areas" of settlement ie. places which have attracted settlements of a number of different phases. The areas were divided into 1 km squares and those squares with settlements of three or more phases are plotted in figs 8.14-8.15. The results at first appear unsurprising seeming only to state only obvious facts about site survival and visibility ie. more phases, particularly of earlier periods, may be recognised in the upland zone. Elsewhere, the only evidence for multi-phase activity comes from excavated sites. However this in itself may represent a significant difference. Within the upland zone we can identify a number of kilometre squares showing sites of different form in close proximity whereas elsewhere we are looking at sites of different form rebuilt on the same spot. This immediately raises the possibility of differences in stability, economy and land-holding which will be the subject of further investigation.

8.4 SPATIAL HIERARCHIES

A technique which may prove extremely useful in looking at patterns of settlement and particularly the problem of contemporaneity of sites, has been developed for this study using the procedure of rank size analysis as its basis. Rank size analysis is a technique commonly used in geography (Zipf 1949; Berry 1961; Haggett 1965) which has become familiar to archaeologists largely through the work of Johnson (1972; 1980a,b). It provides a means of analysing regional hierarchies of settlement. Settlements are rank ordered from largest to smallest with the largest settlement being ranked number one. The relationship between rank and size is then graphed as a bivariate plot with the logarithm of the rank as the x axis and the logarithm of the size as the y axis. The technique has traditionally been used in conjunction with assumptions based on Central Place Theory and the empirical plots interpreted in terms of the rank size rule. The rank size rule predicts that settlement size should be proportional to the settlement's rank and to the size of the largest settlement in the region.

The rule is expressed by the formula

$$Sn = S1\ (n)^{-1}$$

whereby Sn = size of the nth ranked place and S1 = size of the largest settlement. The figure -1 is assumed to be a constant. In other words the plot is expected to be a straight line with a slope of -1. This rule is believed to apply when all sites are equally well integrated into a single settlement system.

Various problems may be anticipated in attempting to apply this model directly to archaeological settlement systems, deriving both from the model itself and the way in which it is used. The rank size rule is, as Stewart (1958 p222) noted, an empirical finding rather than a theoretical or logical proposition. It has nevertheless been used as a hypothetical norm and little attempt has been made to examine the characteristics which cause an area to follow this empirical rule. This question was however addressed in a rarely cited paper by Vapnarsky (1969) in which he introduces two important concepts.

Vapnarsky considered settlement systems from an ecological viewpoint taking their main defining characteristics to be *closure* and *interdependence*. Closure is the proportion of all existing interactions beginning or terminating within a particular system which are also completed within the same system, i.e. closure is at its highest if no interaction occurs between the system and the outside world and at its lowest if all interactions are initiated or completed outside the system. Interdependence is the amount of interaction which takes place between the units within the system. Thus, low interdependence indicates relative isolation of the units from each other. High interdependence is necessarily more likely to give a pattern approximating to the rank size rule since a high level of interaction between units is required for a well developed settlement hierarchy.

Four possible patterns may be defined according to the relationship between closure and interdependence:

1. High closure and low interdependence, this would characterize an area isolated from the external world with no settlements of appreciable size and no well defined hierarchy.

2. Low closure and low interdependence, this would indicate the presence of one major settlement forming the link with the outside world. The rest of the distribution would exhibit no well defined pattern.

3. Low closure and high interdependence, the largest settlement would exhibit a high degree of primacy but the remainder of sites would be organised into a hierarchy approximating to the rank size rule.

4. High closure and high interdependence, this constitutes the hypothetical condition necessary for fulfilment of the rank size rule.

Vapnarsky's work provides a much needed theoretical basis for this form of analysis. The concepts may prove valuable in archaeology as a means of integrating artefactual evidence, particularly from systematic surface collection, into predictive models of settlement hierarchies to be tested against plots of the kind outlined below.

Thus whilst the rank size rule may be a logical proposition in the case of a complete, well integrated settlement system, the formula, $Sn = S1\ (n)^{-1}$, cannot be said to be universally applicable. The figure -1 is not a constant, it is a parameter which varies for each data set. Since archaeologists frequently deal with partial data sets or underdeveloped systems, a different approach is needed. Hodder, (1977 p255) in a brief survey of the possible usefulness of rank size analysis in archaeology, did suggest that the reasons for the variation of this parameter may be of interest but follow up work has been lacking. Empirical plots of archaeological data sets (cf Johnson 1980a; Paynter 1982; 1983) have been compared to plots fulfilling the rank size rule by non-quantitative "eyeballing" methods. The only attempt to describe the distribution numerically, Johnson's (1980b) rank size index, still uses deviation of the observed distribution from a linear distribution of slope -1 in order to calculate the index. What is required is clearly a quantitative means of describing each individual data set.

The technique adopted in this study has been to produce bivariate plots using the method described above, then to use least squares regression to calculate and plot the line of best fit for the data. The slope and intercept of this line is recorded for each example and provides the basic quantitative measure for comparison between data sets. However, in order for the comparison to be meaningful, one must first have some idea of how well these statistics actually describe the data in question ie. how close are the actual values to those predicted by the regression line?

The correlation coefficient, r, may be used as a measure of the extent to which the data values are scattered around the regression line. The coefficient is calculated using the formula:

$$r = \frac{\Sigma(xi - x)\ \ (yi - y)}{\sqrt{[\Sigma(xi - x)^2\ \Sigma(yi - y)^2]}}$$

xi = the actual x value of point i
yi = the actual y value of point i

The maximum value r can reach is 1 when there is perfect correlation between x and y and it follows that when the two variables are entirely independent of one another, r will have a value of 0. In the examples considered here, r will have a value between 0 and -1 since the correlation is negative (y decreases as x increases).

More readily comprehensible for comparative purposes is the squared value of r, known as the coefficient of determination. This effectively measures the amount of variation in the data which is accounted for or "explained" by the regression. The value may be multiplied by 100 and expressed as a percentage. Thus a value of 0.85 for r^2 means that the regression line has reduced the original variation in the data by 85%, or alternatively, only 15% remains as variation around the regression line. This figure is less ambiguous than r since an r value of 0.6 might seem to imply a reasonably strong relationship between the two variables whereas r^2 shows that 64% of the variation is still unaccounted for; only 36% of the variation in one variable is related to the other.

One other statistic which is therefore required for comparative purposes is a quantitative measure of the variance in the data. This may be achieved by calculating the variance or standard deviation around the regression line using the formula -

$$S^2y - y = \frac{\Sigma(yi - yi)^2}{n}$$

$S^2y - y$ = the variance of the distribution around the regression line
yi = the actual y value at the ith point
yi = the estimated y value at the ith point
n = the number of observations

The square root of the result is the standard deviation of the distribution known as the standard error of the regression. This figure is of use in two ways, it acts as a measure of variance and it also provides a means of examining the distribution of residuals.

The statistics discussed so far suffer from the limitation that they merely summarise the linear relationship between the variables x and y. It would however be wrong to assume that the relationship is necessarily a linear one. Simply calculating the correlation coefficient of the regression can suggest a strong linear trend whereas more detailed examination of the plot may reveal that this is an unsatisfactory description of the relationship. It is also necessary to consider the distribution of residuals in order to gain a complete picture. The validity of regression analysis depends on the assumption that the residuals are normally distributed (ie. 68% fall within 1 standard deviation of the mean), that variation around the line is homoscedastic (ie. that the amount of variation around the line is the same at all points along it) and that residuals are uncorrelated (grouped patterns of positive and negative residuals also indicate a non linear relationship). In the examples considered in this study, deviations from the straightforward linear relationship may reveal interesting characteristics of the settlement pattern under consideration.

The data selected as a test of the usefulness of this technique comprised the settlements within an area of 100 square kilometres around the Breamish Valley in Northumberland (fig 8.16). This area (area N1) was selected because it has almost no destroyed land (fig 2.4) and has been surveyed archaeologically to the highest standard currently available, mainly by the RCHME, with site dimensions being accurately recorded. The area has not been regarded as a complete settlement system rather as one which ought to give a representative pattern. This form of analysis would be most seriously hampered by failure to include sites at the upper end of the size range in the data set. Here we can be as certain as is reasonably possible that no large sites have been missed or destroyed without recording. One other possibility to be considered is that this area was part of a settlement system which included much larger sites outside the sample zone. This possibility will be discussed further later but on the whole, the range of site sizes for all periods appears to be typical of the wider region.

Sites were divided into broad phases according to the matrix shown above. Palisaded sites were initially classified separately because of the difficulties in dating this form of construction. The descriptive statistics for each graph may be found in table a4.2.

One of the most interesting patterns to emerge is that for the Iron Age, represented in this area by site types C4-C6. The plot, shown in fig 8.18, has a barely perceptible slope of -0.32 with a close fit between the data and the regression line. The standard error is extremely low at 0.05 and 73% of the residuals lie within 1 standard deviation of the line with 100% within 2 standard deviations. Although the fit is extremely close, the figures for r and r^2 are lower than might be expected because of the slight range of site sizes. Sites of different rank are of virtually the same size. In Vapnarsky's (1969) terms this would characterize an area of high closure and low interdependence. In other words, there appears to be a non-hierarchical pattern of settlement at this period. No major centre is evident, the largest sites being somewhat smaller than regression analysis would predict for this pattern, whilst the medium to small settlements are generally larger. This suggests a structure of isolated but fairly large, social units. The plot comprises all sites of this period but the pattern is such that contemporaneity of sites is not a significant question. The range of sizes is so slight that one could take any sample of sites and reproduce the same pattern.

This plot may be contrasted with that for the Romano-British sites in the area, represented mainly by types C1 and C2 (fig 8.19). Here the problem of contemporaneity of sites is particularly marked as large numbers of small sites are frequently found in close proximity to one another. This problem was discussed in chapter two and the approach adopted was to record sites separated by more than c.20m as separate units.

The pattern for this period is distinctly different to that for the Iron Age with the regression line having a slope of -1.0. The standard error of the regression is fairly high at 0.19 but the value for r^2 is correspondingly high at 89%. This plot indicates a move towards a more developed structure with greater settlement

Fig 8.18 Area N1: Iron Age sites

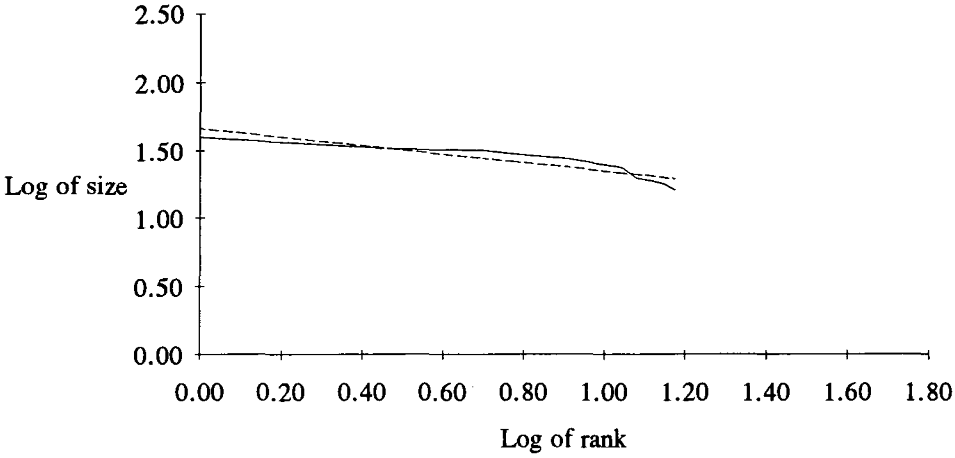


Fig 8.19 Area N1: Romano-British sites

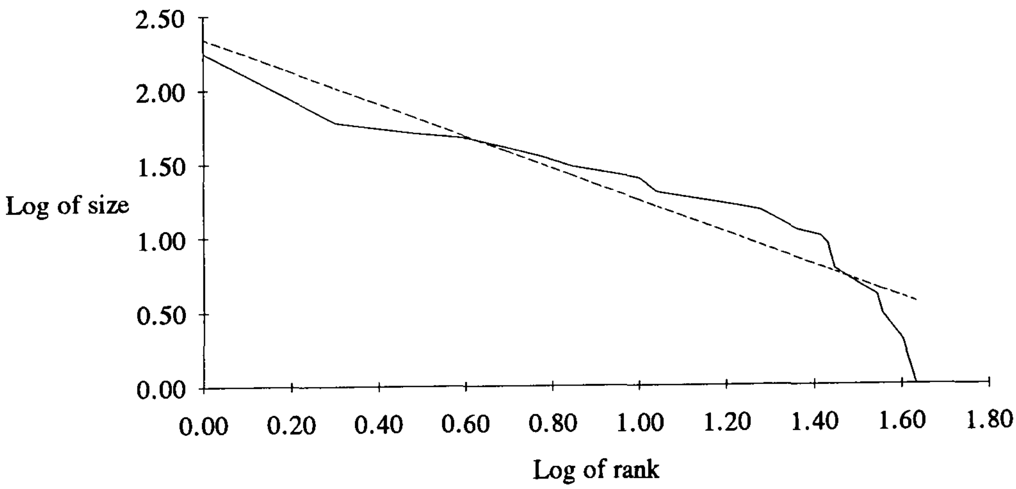


Fig 8.20 Area N1: R-B sites 20% sample no.1

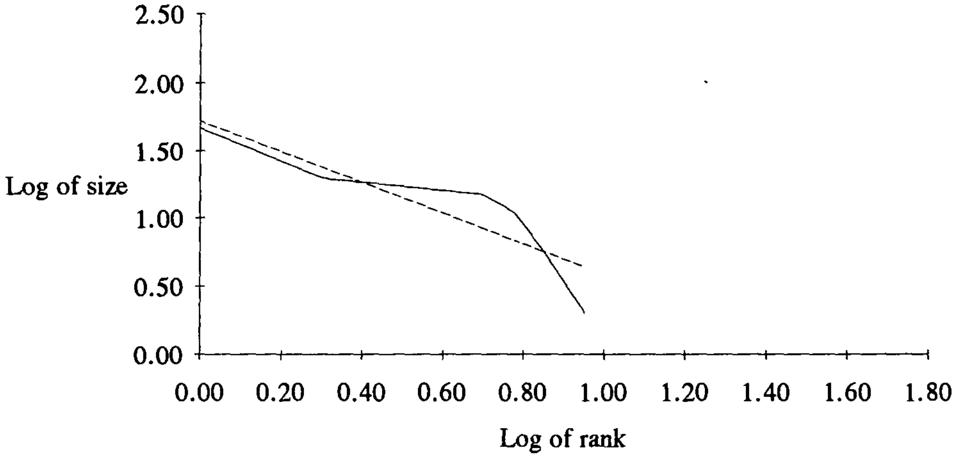


Fig 8.21 Area N1: R-B sites 20% sample no.2

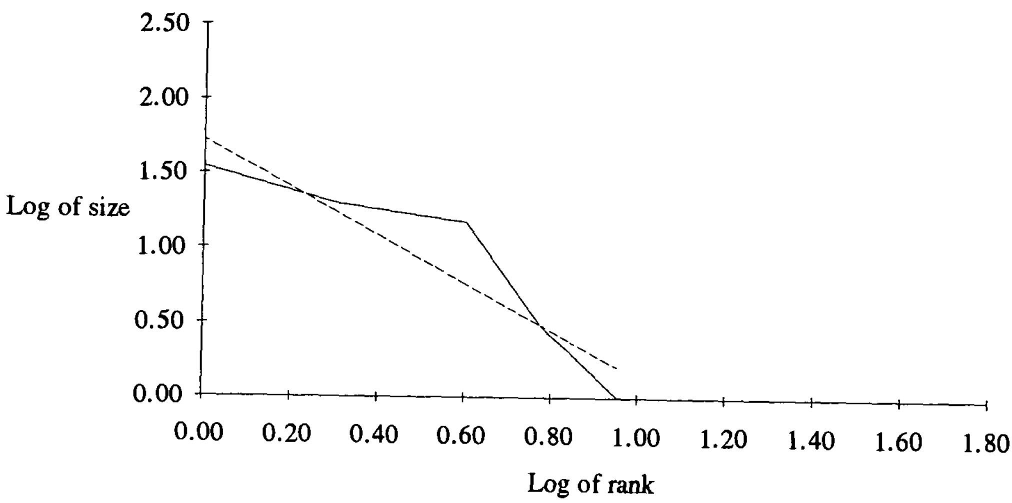


Fig 8.22 Area N1: R-B sites 20% sample no.3

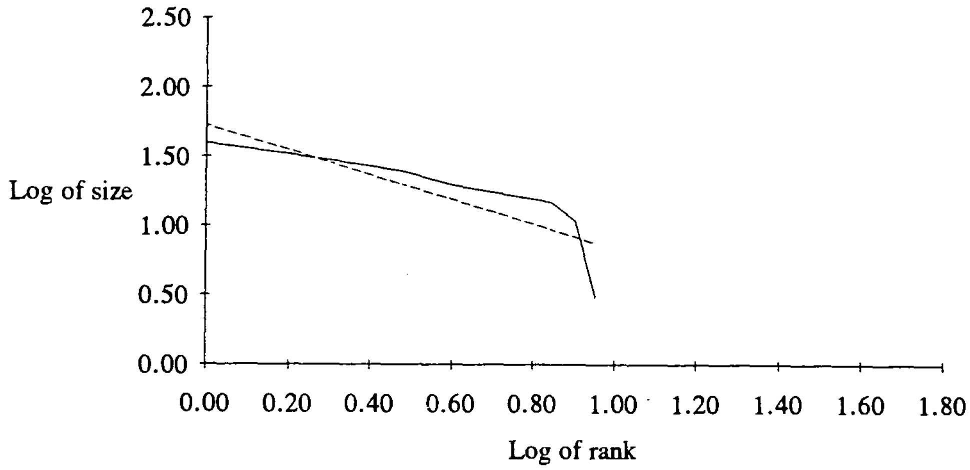
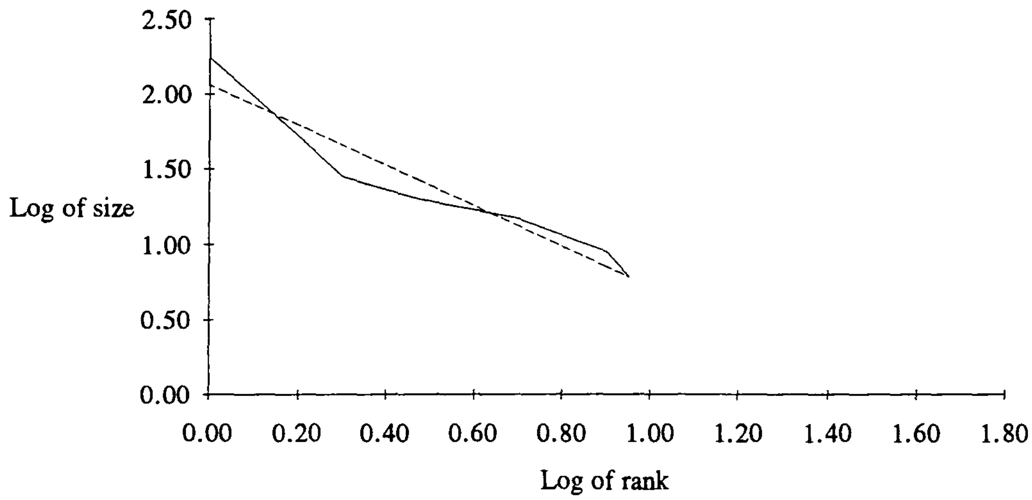


Fig 8.23 Area N1: R-B sites 20% sample no.4



integration. Relics of the earlier pattern do however remain in that the largest sites still fall below the expected size for this distribution and the medium to small sites are still larger than predicted. The absence of any marked primate settlement would suggest that this pattern arose out of internal developments in the relationships between sites rather than as a result of external contacts.

One very interesting aspect of this plot is the situation at the lowest end of the size range. There is a suggestion of heteroscedacity with high negative residuals marking a cut-off point where the smallest settlements drop sharply away from the regression line. This may be taken as a clear indication that the groups of small settlements in this area are contemporary structures, since individually, they are too small to be economically viable within this settlement pattern.

8.4.1 Sampling Space

The above results suggest that, if used in an appropriate manner, this technique may shed new light on issues which have long appeared as insoluble problems in the archaeology of this area. There remains however the need to define what constitutes an appropriate data set. One major question is that of scale and there can be no hard and fast rule as to the optimum scale on which to consider past settlement patterns. This must be partly determined by the questions being asked. A study such as this needs to be able to pick out localised detail as well as general trends. To this end, it is necessary to consider the same data at various scales in order to pick out one from the other.

Further problems derive from determining the quality and representivity of the data available. It has already been stated that archaeologists have tended to use rank size analysis somewhat uncritically and indeed many seem to be equally undiscriminating about their data. The technique was developed solely for the analysis of complete systems yet has been applied unquestioningly to the far from complete results of archaeological surveys. Initially there must be a critical examination of the way in which the data have been collected and the likelihood of sites having been missed or destroyed. This achieved, it may be possible to appraise objectively the quality of the resulting sample. The data from the Breamish Valley area constitute to the best of our knowledge, a rare example of a fairly complete data set and as such, provide a valuable opportunity to test out sampling procedures.

For this purpose, the data for the Romano-British period were used. Random samples of varying sizes were taken from these data and plotted using the technique given above to see how the resulting patterns differed from that for the data set as a whole.

Samples of 50% consistently gave a close approximation to the original plot both in terms of the slope of the graph and the fit of the data to this line. However, with sample sizes of around 20% (the figure most often taken as statistically acceptable) greater differences began to appear. Figs 8.20-8.23 show the results of four random 20% samples. The slopes of these graphs vary from -0.89 to -1.59. The second graph is furthest from the original in terms of slope and intercept and is also the example in which the data fits the regression line least well having a high standard error of 0.21. Samples 1 and 3 are nearest to the original slope and follow the regression line fairly closely. In both cases their r^2 values are lowered by the high negative residuals of the smallest settlements which are also a feature of the original graph.

Both the fit between the data and the regression line and relative standard error are therefore factors which must be taken into consideration when we know we are forced to deal with fairly small samples. When the data fits well there are at least some grounds for believing that we have a reasonably representative sample. When the fit is poor, this may be due to some genuine feature of the data but one must first investigate the possibility that this particular set of data constitutes a poor sample.

8.5 CASE STUDIES

Having demonstrated the value of this technique and established certain criteria for its use and interpretation, it should now be possible to compare settlement patterns in suitable areas. Five study areas have been selected for this purpose, three to the north of the Tyne and two to the south (figs 8.16-8.17). The areas vary in size and each is representative of a particular environmental zone with a particular range of site types. The largest area, N2, covers the overlap between the known upland and lowland site types. In all cases, the attempt was made to select areas where the nature and extent of previous archaeological fieldwork was well documented, in order that any possible bias in the data might be identified. The number of known sites in each area and the sample used in the analysis is shown in table a4.1. The sample of sites with accurately recorded dimensions is noticeably lower to the south of the Tyne, reflecting the great amount of work still to be done in rectifying and plotting AP sites. The descriptive statistics for each graph and the original data are given in appendix four.

8.5.1 Area N1 Breamish Valley

To return to the Breamish Valley area, this study area of 100 sq km (SW corner of study area NT 95 10; NE corner NU 05 20) covers the south east quadrant of the Cheviot massif. It is an area of high to very high rainfall with most of the land over 200m OD. Only 4% of the area consists of destroyed land, with afforestation accounting for this destruction.

Initial results gave a picture of a non-hierarchical pattern of isolated units during the Iron Age, leading, as a result of local developments, to a more integrated system by Romano-British times. One may first ask how and when the pattern typical of the Iron Age began to occur and here the evidence is less clear cut. The earliest known settlements which may be said to form a coherent group are the open settlements of the earlier Bronze Age. Such sites are numerous in this area but direct comparison with later sites is difficult since one cannot measure a clearly defined enclosed area. In this case it must suffice to take the number of recorded structures as indicative of size in order to see whether any clear pattern emerges.

The resulting graph (fig 8.24), is remarkably similar to that for the Iron Age. The slope of -0.65 indicates that once again there is very little differentiation in site size. Direct comparison between the two periods is difficult since different criteria are being used but the impression remains one of autonomous groups. There is a fall off at the lower end of the graph possibly associated with the problems of interpreting sites represented by single structures (see ch 5). It may be that some such sites represent partially destroyed or seasonal/temporary settlements.

Fig 8.24 Area N1: open sites

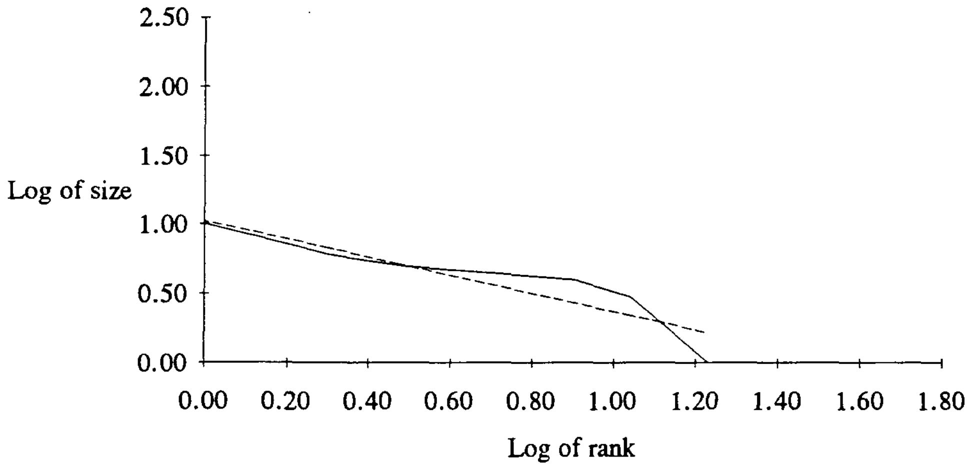
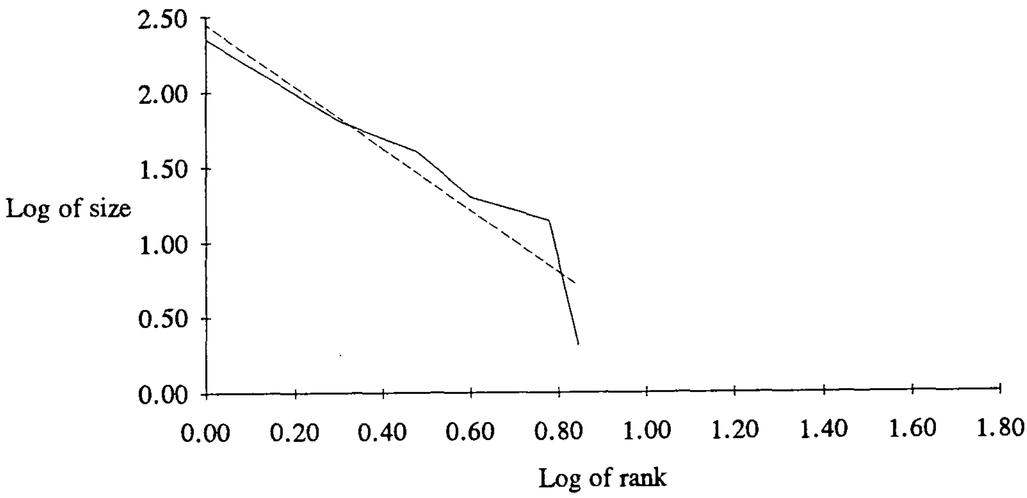


Fig 8.25 Area N1: palisaded sites



On present evidence however, there remains a span of a millennium or more between this pattern and that of the Iron Age. Currently the only contenders to fill this gap are the enigmatic palisaded sites. A glance at the plot for these sites (fig 8.25) confirms the impression that the known sites do not on their own form a coherent phase of settlement. They exhibit a wide range of sizes, the graph having a slope of -2.06 with a high standard error of 0.22. The intercept of 2.45 indicates that the largest site greatly exceeds the largest site in the Iron Age plot but there is still no suggestion of a primate centre. Various possibilities remain:

1. that the sites belong to a number of different periods

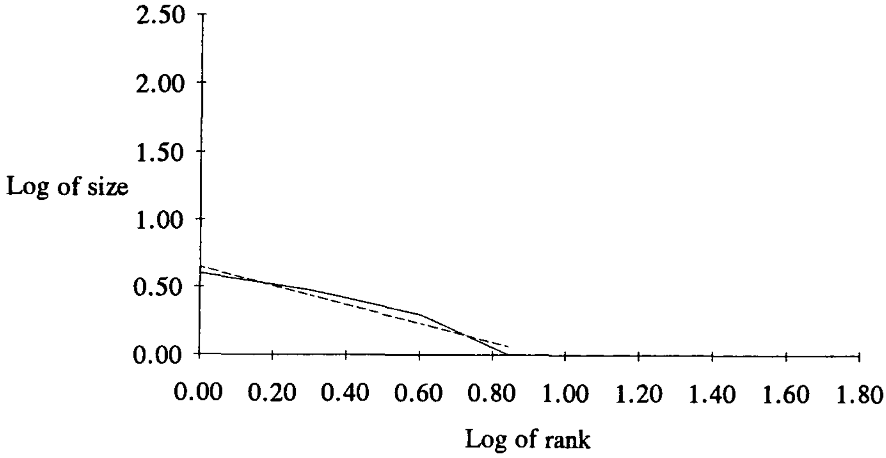
2. that the known sites represent a very small sample with many more sites beneath later settlements

3. that the sites fulfilled one or more specific functions within a settlement system mainly composed of other types of site

4. that the sites represent a short lived phenomenon with a differential rate of uptake

None of these possibilities need preclude all, or indeed any, of the others and it seems likely that a number of factors may have combined to give the existing picture.

Fig 8.26 Area N2: open sites



8.5.2 Area N2 South Rothbury

This area comprises 400 sq km (SW corner of study area NY 90 80, NE corner NZ 10 00) to the south of the town of Rothbury. The landscape is gently undulating with most of the land at 200-300m OD. Rainfall is high over most of the area, falling to moderate in the extreme east of the study area. Some 15% of the area (fig 2.4) is unlikely to be receptive to any form of archaeological survey with Harwood Forest accounting for most of this total. The area has not in itself been the subject of any comprehensive field survey but fieldworkers have been active in this area for many years (cf Davies & Davidson 1990; Gates 1982b; 1983; Jarrett & Evans 1989; Jobey 1959; 1960; 1965a; 1973a) and it is unlikely that any large sites have been destroyed without record or remain undiscovered.

The earliest known sites in this area are once again open settlements. The plot of these sites (fig 8.26), has a slope of -0.69, closely resembling that of area N1 and the two graphs are very similar in form. The largest site is rather smaller than that in area N1 however it would be unwise to infer too much from this since the plot is based on a relatively small number of sites, although it does have an extremely low standard error and a value for r^2 of 94%. The general similarity of form between the two data sets would appear to be more significant than minor differences in detail. Only three curvilinear palisaded sites are known in this area hence these sites have not been plotted.

Most striking of all is the similarity between the data sets for areas N1 & N2 from the Iron Age onwards. The Iron Age sites (represented in this area by types C4-C6 & R1b) are shown in fig 8.27. The slope of -0.55 is only marginally steeper than that for area N1 and is indicative of a similarly non-hierarchical pattern of settlement. Once again the standard error is only 0.05 and the fit exhibits almost perfect correlation with an r value of 0.97 (r^2 = 94%).

The move towards greater settlement interdependence during the Romano-British period is also evident (fig 8.28) although here it is not so marked. The graph has a slope of -0.95 indicating less of a pronounced change from the Iron Age pattern. In this case the intercept for the Romano-British plot is lower than that for the Iron Age whereas in area N1 the reverse is the case. Values for r^2 are identical at 89% but the N2 plot has a lower standard error of 0.11 It is interesting to note that this possible indication of lower interdependence occurs in an area where both curvilinear and rectilinear settlements are well represented. One possibility to be investigated is that economic interaction between sites of different form was not so well developed as that between sites of similar form.

Fig 8.27 Area N2: Iron Age sites

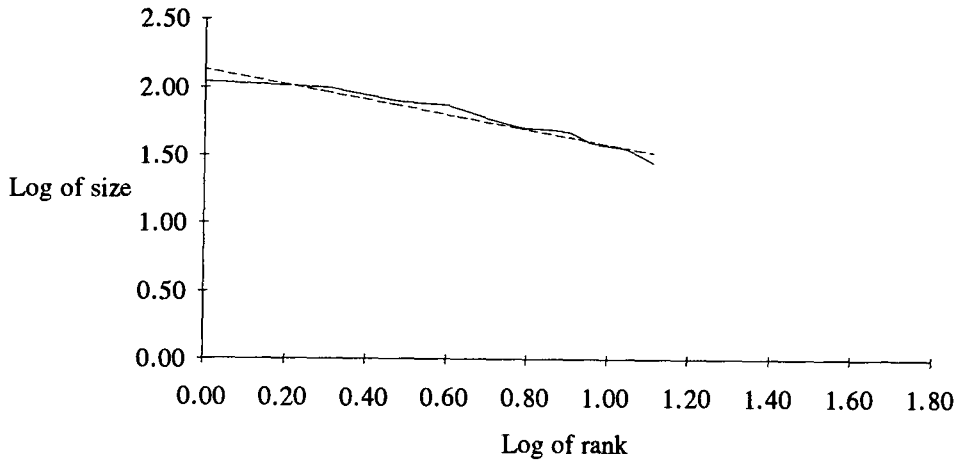


Fig 8.28 Area N2: Romano-British sites

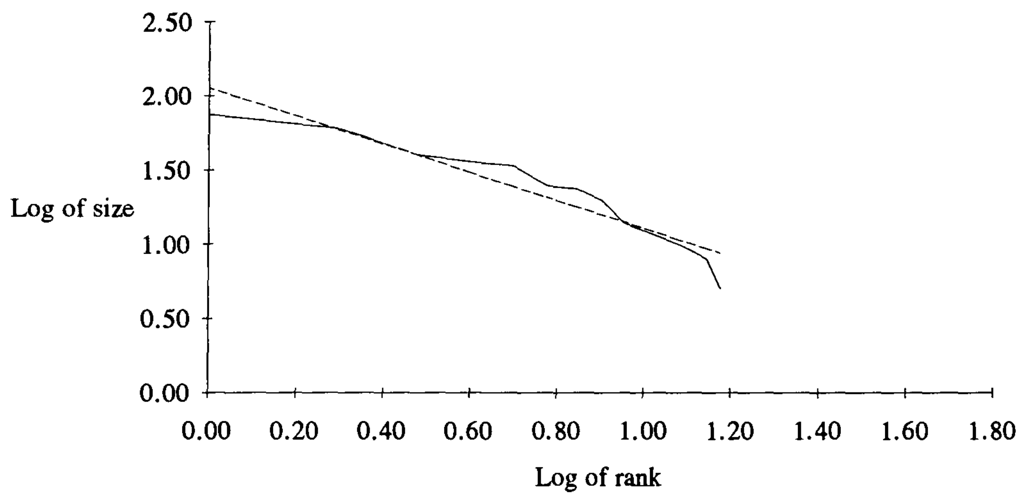
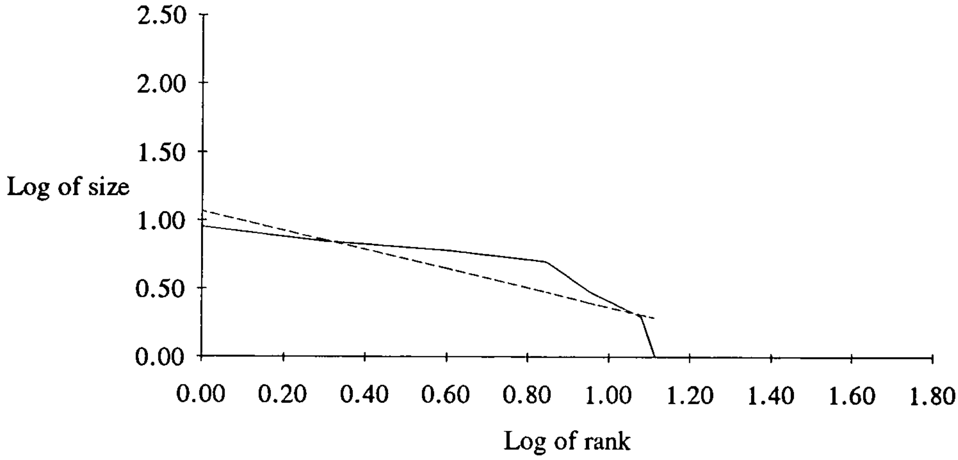


Fig 8.29 Area N3: open sites



8.5.3 Area N3 Yeavering

This area encompasses 100 sq km (SW corner of study area NT 90 20, NE corner NU 00 30) of the northern part of the Cheviot massif. The land lies at over 200m OD with the south west quadrant being mainly over 300m OD. The only low lying land occurs in the north east corner which includes a small area of the Milfield Basin. Rainfall is high to very high over the area. This area provides an interesting comparison with Area N1, exhibiting similar environmental conditions, also having only 4% destroyed land (fig 2.4) and having been an area of considerable interest to archaeological fieldworkers for some time (cf Burgess 1980a,b; 1981a,b; 1982; Hope-Taylor 1977; Jobey 1960; 1964; 1965a; MacLaughlan 1867; Tate 1862b) without having been the subject of any comprehensive field survey.

The sample of open settlements in this area is larger than in any of the other areas yet exhibits little more differentiation in site size, the graph having a slope of -0.7

(fig 8.29). The largest ranking settlement is marginally smaller than that in area N1 and the plot exhibits a similar profile with the medium ranked settlements considerably larger than predicted and a very sharp fall-off at the lower end of the scale. The standard error is higher than in the other areas at 0.16 and r^2 is only 75%. Only two curvilinear palisaded sites are known in this area; these sites have not been plotted.

The plot for the Iron Age in this area (fig 8.30) is the only graph to show any degree of primacy. This configuration is readily explained by the presence of Yeavering Bell within the study area. Indeed, considering the relatively small size of the study area, the degree of primacy is not so great as might be expected, the regression line having a slope of -1.33 with standard error only 0.16 and r^2 at 85%. The remaining sites once again even out into a fairly gradual slope showing no sign of a rapid fall-off at the lower end of the scale.

This area exhibits the greatest change between the Iron Age and Romano-British patterns. The plot of Romano-British sites (fig 8.31) has a slope of -0.91 and a configuration similar to that of areas N1 and N2. The highest ranking settlement in this group is however notably smaller than in either of the other two areas. The intercept of this plot is 1.68 compared to 2.34 and 2.05 in areas N1 and N2 respectively. This may suggest that the site of Yeavering Bell survived the transition to a more interdependent system whilst perhaps retaining some centralised functions which inhibited the development of other sites for some time.

Fig 8.30 Area N3: Iron Age sites

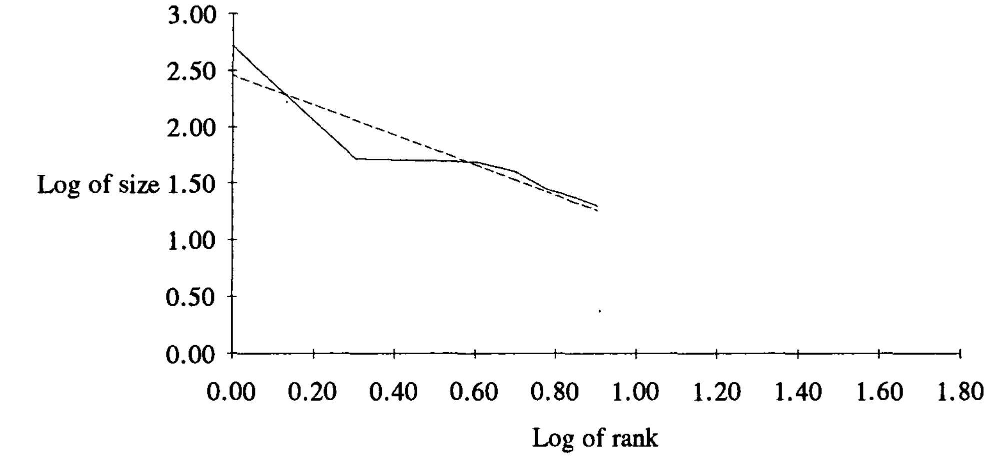


Fig 8.31 Area N3: Romano-British sites

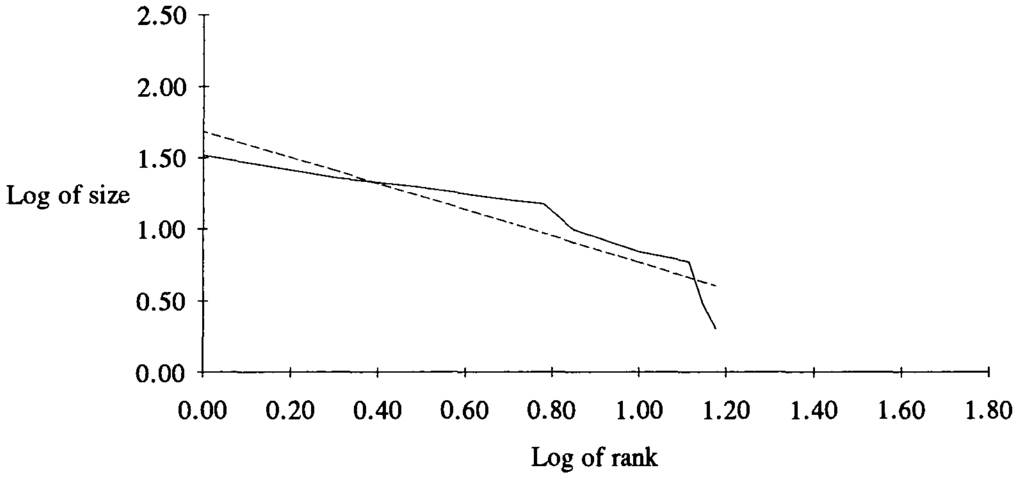
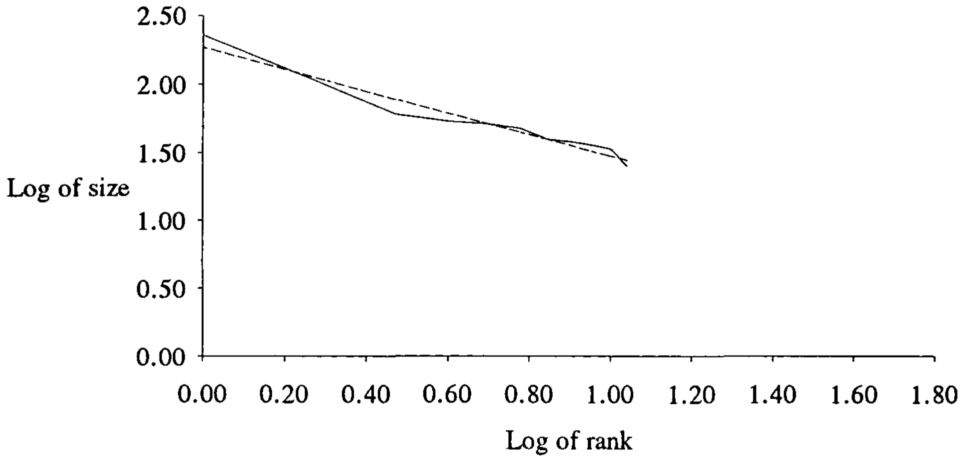


Fig 8.32 Area S1: Iron Age sites



8.5.4 Area S1 North East Durham

This study area comprises 225 sq km of north eastern County Durham (SW corner of study area NZ 20 35; NE corner NZ 35 50) encompassing a small area of Tyne & Wear. The area includes part of the East Durham Plateau, at an average height of c.100m OD, as well as an area of the Wear Lowlands. Rainfall is low across the entire area. This part of the region has suffered greatly from extractive industry and urban development and some 36% of the study area is classed as destroyed land (fig 2.5). The northern and eastern sections of the study area correspond to part of the Durham Archaeological Survey's study areas 2 and 3 (Haselgrove *et al* 1988) otherwise fieldwork has mainly taken the form of aerial survey (cf Harding 1979) with some excavation (Haselgrove 1980; Haselgrove & Allon 1982; Jobey 1962).

Only two possible open settlements are known in this area, the earliest phase at West Brandon (Jobey 1962a) and a site identified from the air at Picktree. There is thus insufficient data to allow any consideration of patterning. The existence of these sites does however suggest that the apparent lack of open settlements is probably a feature of site survival and visibility. No curvilinear palisaded sites are known in this area.

A fuller data set is available for the Iron Age, represented in this area mainly by site type R1b, although the few known curvilinear ditched enclosures have been tentatively assigned to this period. The sample of accurately measured sites is however, disappointingly small, comprising only 24% of known sites, thus any interpretation of perceived patterns must be viewed as provisional. The plot (fig 8.32) has a slope of -0.79. The intercept of 2.27 indicates that the largest site is comparable to those in the northern areas yet the range of site sizes is appreciably greater. The very close fit between the data and the regression line, indicated by a standard error of only 0.06 and a value of 95% for r^2, suggests that the pattern has not arisen simply as the result of a poor sample. The implication is thus that this area had already developed a highly integrated settlement system by the pre-Roman Iron Age. It is perhaps unfortunate that sites of demonstrably Romano-British date are lacking in this area but this in itself may be a feature of the stability of the settlement pattern.

8.5.5 Area S2 Upper Teesdale

This comprises an area of 150 sq km forming a transect across the Upper Tees Valley (SW corner of study area NY 85 20, NE corner NY 95 35). The area is amongst the highest land in the north east region with most of the area over 300m OD and much of the northern third of the transect over 600m OD. Average rainfall is also the highest recorded in the region (a2.1). Some 11% of the area consists of destroyed land (fig 2.5) although peat growth may impair archaeological visibility over a further 29% of the area. The known sites represent the field activity of Dennis Coggins over a number of years (Coggins 1987) and some excavation has taken place (Coggins & Fairless 1980, 1984, 1986; Coggins & Gidney 1988) although the area cannot be said to have been comprehensively investigated as yet.

A number of open settlements have been recorded in the area, however the range of known sizes is extremely limited. The highest ranking site has two huts whilst the remainder exhibit only a single structure. The plot for these sites is shown in fig 8.33. The data and regression line match exactly therefore only a single line is visible. It follows that standard error is 0 and r^2 is equal to 100%. This situation cannot have arisen simply from the misinterpretation of single structure sites, the excavated site of Bracken Rigg (Coggins & Gidney 1988) indicates that many, if not all, are indeed genuine. The absence of more substantial sites is thus a phenomenon worthy of further investigation. It may be that further fieldwork will reveal such sites, the RCHME survey in Northumberland discussed earlier, has illustrated the potential for further discovery even in intensively studied upland areas and the problems posed by peat growth have already been mentioned. However, there are other indications that the known sites do form a representative sample. Pollen analysis (Turner *et al* 1973) has shown that peat formation was already underway by the time human activity made any impact on the vegetation of this area (ch 4) and it may be that the harsh environmental conditions prevented anything other than seasonal exploitation of resources.

A similar explanation must be proposed for the lack of recognisable Iron Age settlements in the area. Only three possible Iron Age sites and a single undated curvilinear palisade are known. These sites have not been plotted. This hypothesis does find some corroboration in the plot of the settlements of probable Romano-British date (fig 8.34). The graph has a slope of only -0.52 and the intercept of

Fig 8.33 Area S2: open sites

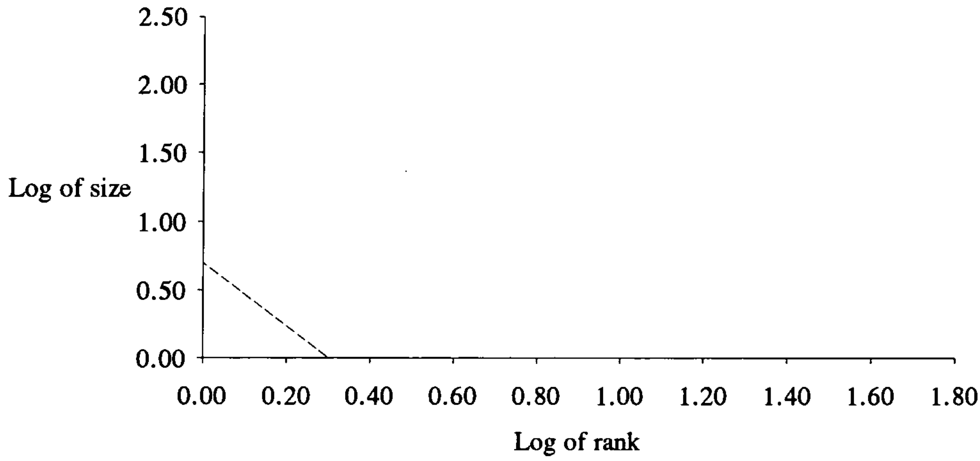
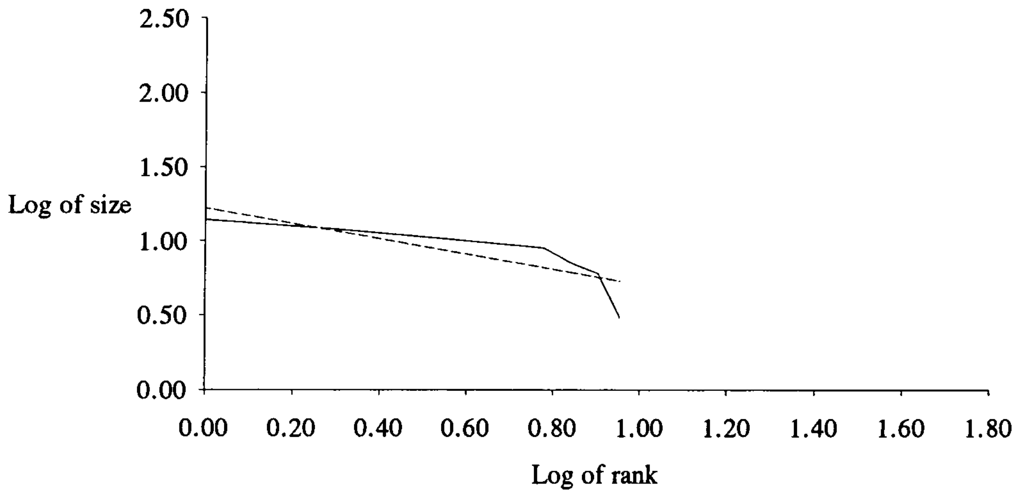


Fig 8.34 Area S2: Romano-British sites



1.22 shows that the largest ranking site is far smaller than those in the other study areas. High closure and low interdependence is again indicated and r^2 has a value of only 67%. In other words, at a time when all other areas show a move towards greater integration, the pattern here remains one of small, isolated units. The area appears to have remained on the extreme periphery of a settlement system throughout its history, with exploitation, probably of a short-lived or seasonal nature, occurring only when conditions were particularly favourable.

8.6 SUMMARY

The above case studies thus suggest differences between areas and through time. The results show that this technique, when used in an appropriate manner and with suitable data, can prove a powerful tool in the forming and testing of models. Particularly encouraging is the similarity in results between areas N1 and N3, two areas of equal size having similar environmental conditions and an identical amount of destroyed land. Area N1 has been intensively surveyed whilst Area N3 has been studied in a haphazard fashion over a long period. Although Area N1 has a greater number of known sites, the range of types and sizes in the two areas correspond well and produce very similar plots, proving that more data is not necessarily better data. In all cases, testing of the fit between data and regression line suggested it was valid to assume that the samples being used were representative. This assumption is further supported by the fact that none of the plots exhibited concave configurations which would suggest that the area selected was too small to be of relevance to the settlement pattern under study (Johnson 1977 p496-499).

It now remains to compare the results of the case studies to the wider regional picture in order to gain a view of how the various areas were integrated with one another. For this purpose the region has been divided into two areas broadly separated by the Tyne Valley. In order to achieve areas of roughly equal size, the administrative counties have been used. The northern area therefore corresponds to Northumberland (3650 sq km in total; 2750 sq km available land) and the southern area to Durham, Tyne & Wear and Cleveland (3579 sq km in total; 2485 sq km available land). The sample of sites used in the northern area is three times that from the southern. However, that both samples are sufficient to give a detailed picture of the settlement pattern is illustrated by comparison with similar work in other areas. The best known example of this type of analysis is the survey carried out by Johnson (1980a,b) in the Warka area of southern Iraq. The Warka survey covered an area of 3600 sq km and averaged one site per 100 sq km. In this case, the northern area averages one site per 9 sq km (or per 7 sq km of available land) and the southern area, one site per 29 sq km (or per 20 sq km of available land).

8.6.1 North Tyne Area

The known open settlements in this area are plotted in fig 8.35. The resulting graph is little different to those for the individual areas although its slope of -0.59 is rather less pronounced. The intercept of 1.23 indicates that slightly larger settlements than those recorded in the study areas are known to exist. Standard error is low at 0.08 and correlation extremely high with a value of 94% for r^2. Thus, even at the regional level there is no well defined settlement hierarchy and the level of interdependence is probably even less than on the local scale. It may be that the lack of evidence from the lowlands has distorted the regional picture but the pattern is consistent in all other areas.

Fig 8.35 North of Tyne: open sites

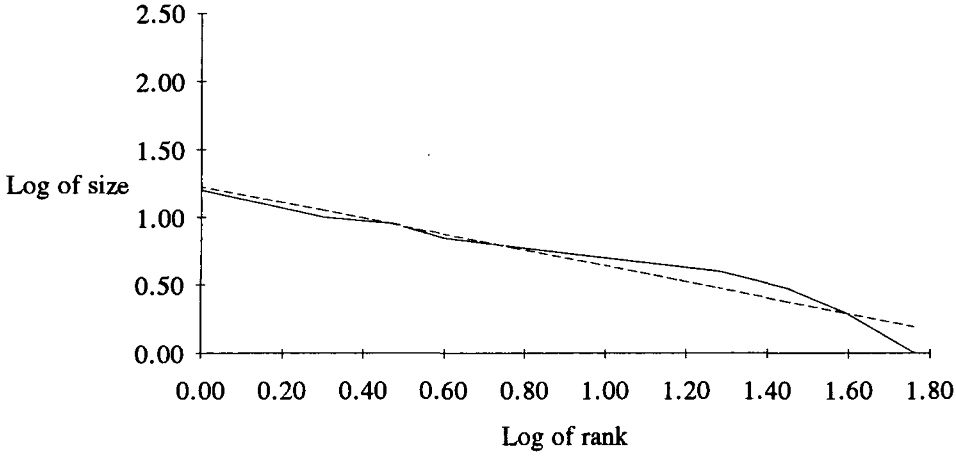
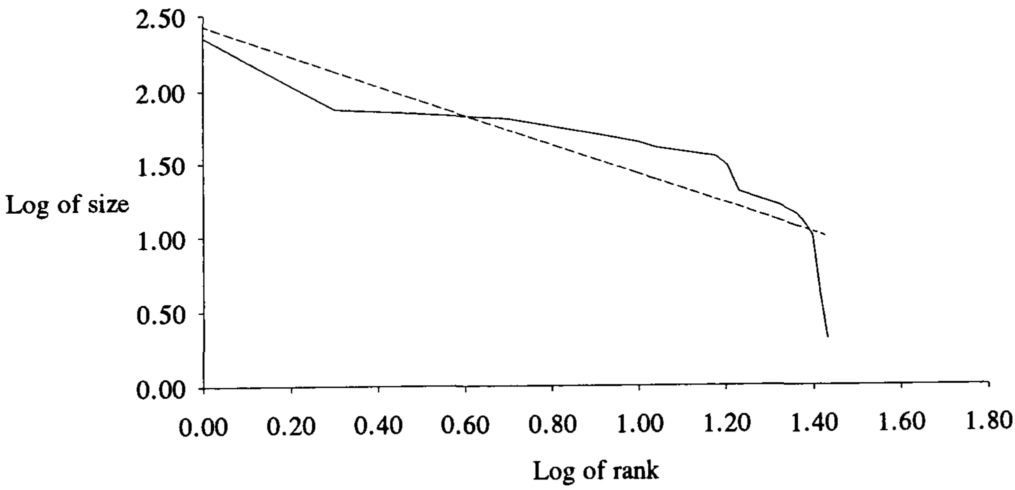


Fig 8.36 North of Tyne: palisaded sites



The known curvilinear palisaded sites in the area are plotted in fig 8.36. At first sight the plot appears very different to that for area N1, the only one of the study areas to contain a number of such sites, since in this case the graph has a slope of exactly -1. Examination of the remaining statistics for this graph shows however that the regression line gives a rather poor description of the data. This plot has the highest standard error of any of those considered here and examination of the residuals shows that the relationship is not in fact a linear one as a correlated pattern of high positive and negative residuals occurs. The plot indicates the presence of a few very large sites, the majority of sites are relatively large compared to those of the Iron Age and Romano-British periods and there are a few very small sites marked by a sharp fall-off at the lower end of the graph. The small sites are widely separated and there is no question of their being related interdependent sites as seen in a number of the Romano-British plots. This would appear to confirm the suggestion made earlier that a number of different phenomena are being considered here. Certain of the upland sites show internal similarities which are discussed further in the following chapter where a model for their development is proposed but work on the lowland sites is urgently required to determine whether or not these sites represent related developments.

The plot for the Iron Age sites is shown in fig 8.37. The graph has a slope of -0.61 with a low standard error of 0.07 and a value of 0.98 for r indicating almost perfect correlation (r^2 = 96%). The largest site, Yeavering Bell, is larger than is predicted by the regression but there is very little indication of primacy in the distribution. Neither does the plot display any hint of convexity which might suggest the study area encompasses more than a single settlement system.

Examination of the residuals shows a similarly close fit, 71% lie within one standard deviation and 95% within two standard deviations. Yeavering itself, with

Fig 8.37 North of Tyne: Iron Age sites

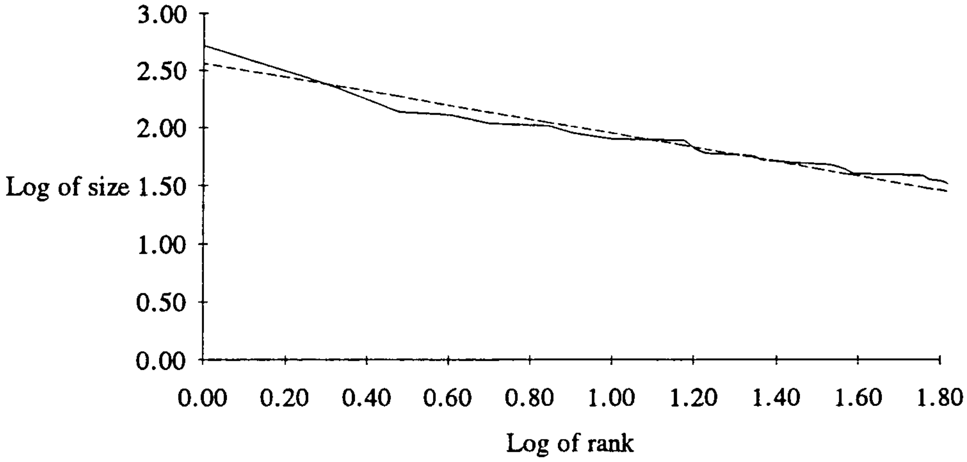
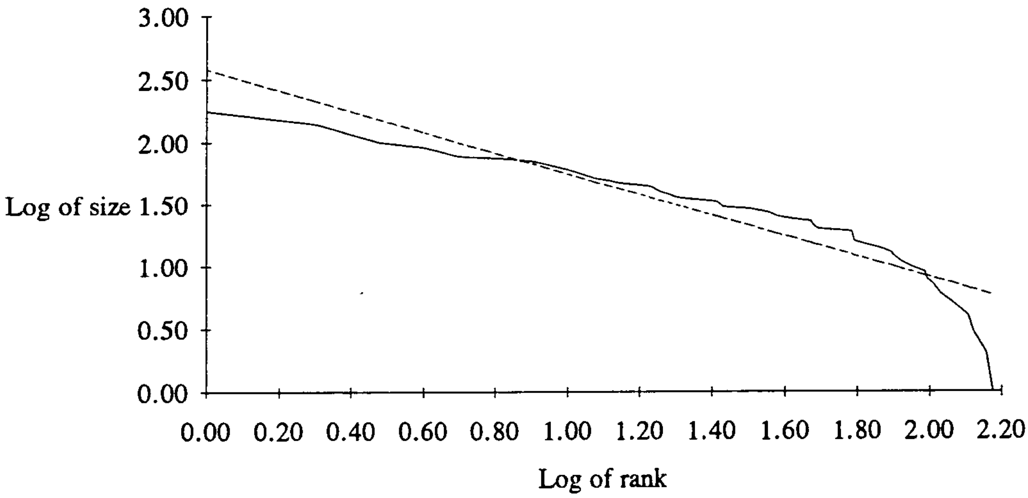


Fig 8.38 North of Tyne: Romano-British sites



a residual value of 0.15, lies just outside these limits but the next ranking settlements although displaying a negative pattern, do not have particularly high residual values. There is simply one relatively large site in an otherwise non hierarchical pattern. Whatever the status of Yeavering Bell, it would seem that its existence had little effect in economic terms at this period. It appears neither to have prevented the growth of other settlements nor to have stimulated the development of minor centres. The picture is one of autonomous groups arriving at a similar optimum settlement size, whether for social or economic reasons, independently of surrounding sites. This pattern has been analysed further using the nearest neighbour method (appendix 5) with the results leading to similar conclusions.

This picture is similar to that proposed by Therkorn (1987), for part of the Netherlands which lacks evidence of a clear settlement hierarchy during the Iron Age, 'If a distinction between social levels was recognized in Noord-Holland, it may have involved quantitative variation within one broad socio-economic category, rather than an absolute distinction based on relations of dependence' (*ibid* p105).

The plot of Romano-British sites is shown in fig 8.38 and, surprisingly, the regional picture shows less integration than any of the case study plots. The graph has a slope of only -0.83. The residuals are grouped with all of the highest ranking sites falling below the regression line and the medium to small sites above it, though not sufficiently so to display any marked convexity. This configuration is certainly affected by the fall-off of very small sites evident in all of the plots for this period but is deserving of further investigation. If the site types are split into their two main groups, indications of two slightly different patterns appear.

Fig 8.39 shows the curvilinear sites in the area and fig 8.40, the rectilinear sites. The two graphs display very similar configurations and are virtually identical in terms of intercept, standard error and values for r. However, the plot of rectilinear sites exhibits a slope of only -0.87 whereas the curvilinear sites produce a slope of -1.00. The curvilinear sites fit the regression slightly more closely with 83% of residuals within 1 standard deviation and 97% within two standard deviations as compared to 76% and 94% for the rectilinear sites. It may therefore be that the sites in the upland zone, whether for social or economic reasons, were more closely integrated with one another at this time. This is surprising in view of the evidence for an integrated system among the rectilinear sites of East Durham beginning to develop as early as the Iron Age. One possibility is that the lowland pattern is showing the effects of greater self-sufficiency and direct economic contact with Roman forts and *vici*. The upland pattern need not be taken as evidence of a particularly flourishing economy, the level of integration may reflect the presence of a redistributive hierarchy, supplying sites which were no longer economically independent. The apparent difference between the two patterns is not great but should be borne in mind when considering other forms of evidence.

Fig 8.39 North of Tyne: curvilinear Romano-British sites

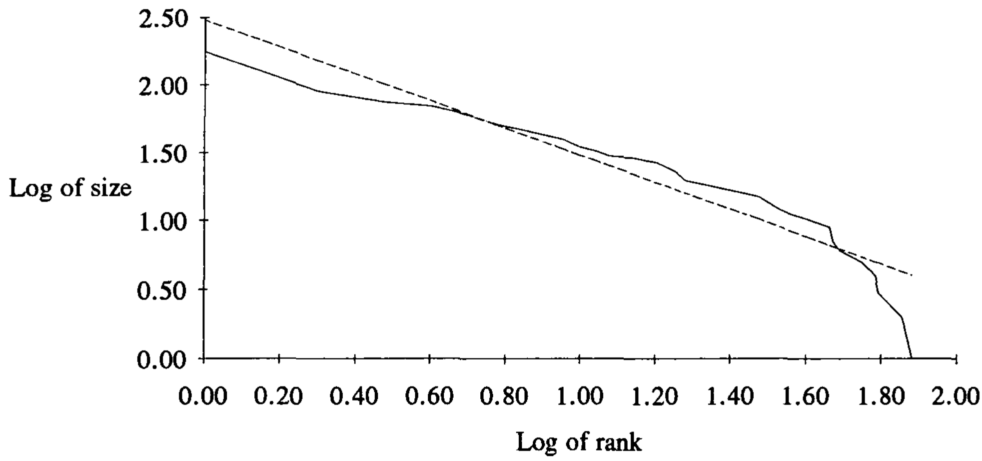


Fig 8.40 North of Tyne: rectilinear Romano-British sites

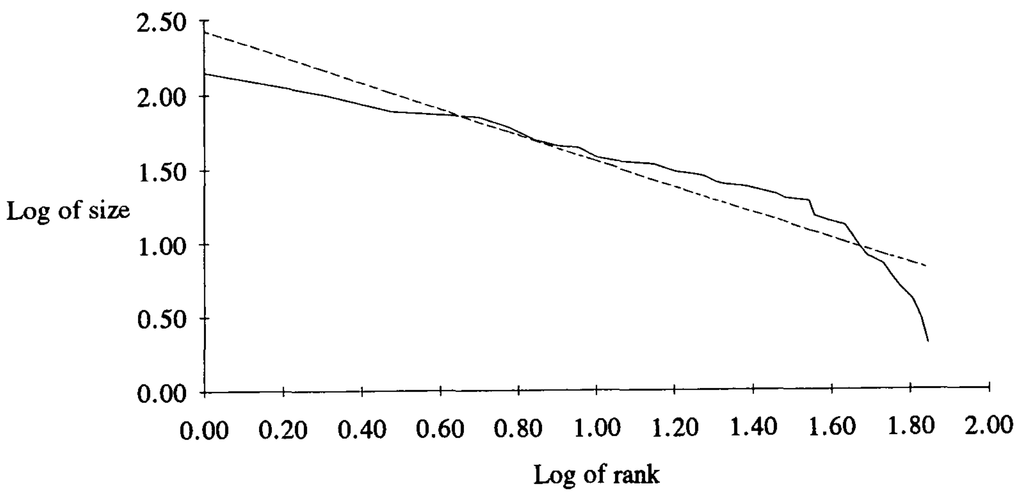
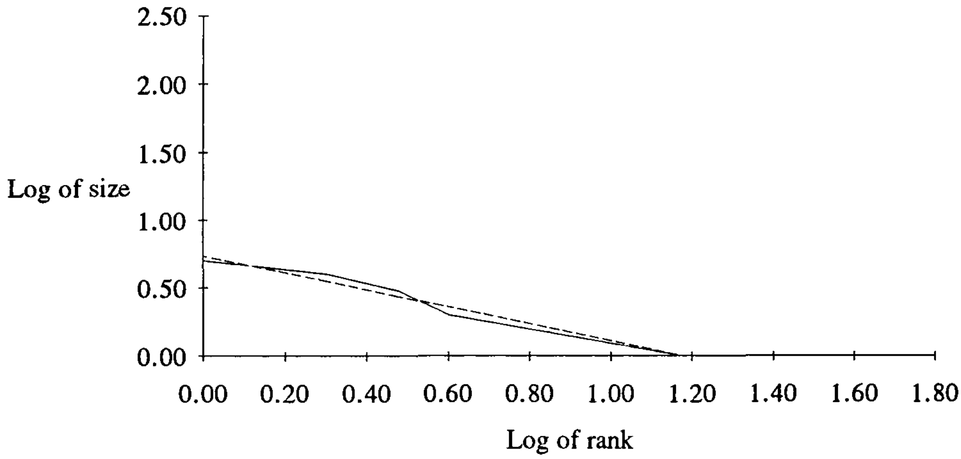


Fig 8.41 South of Tyne: open sites



8.6.2 South Tyne Area

The open settlements in this area are shown in fig 8.41. The plot is based on a rather small group of sites, 33 in all and it would be unwise base any firm conclusions on this limited evidence. Suffice it to say that the graph in general resembles the others for this phase of settlement and has a slope of -0.62 although displaying a lower intercept than the graphs for the northern area. The data is consistent and has an extremely low standard error of 0.04 and a value of 98% for r^2.

The plot for the Iron Age across the area (fig 8.42) exhibits a rather different character to that for East Durham area. The impression is again one of a non hierarchical pattern more akin to that in the northern area with the slope of -0.67 being only slightly more marked. This result may throw some doubt on the interpretation of the East Durham plot given that it was based on a fairly small sample. The fit of plot S1 is however rather better than that of the regional plot

Fig 8.42 South of Tyne: Iron Age sites

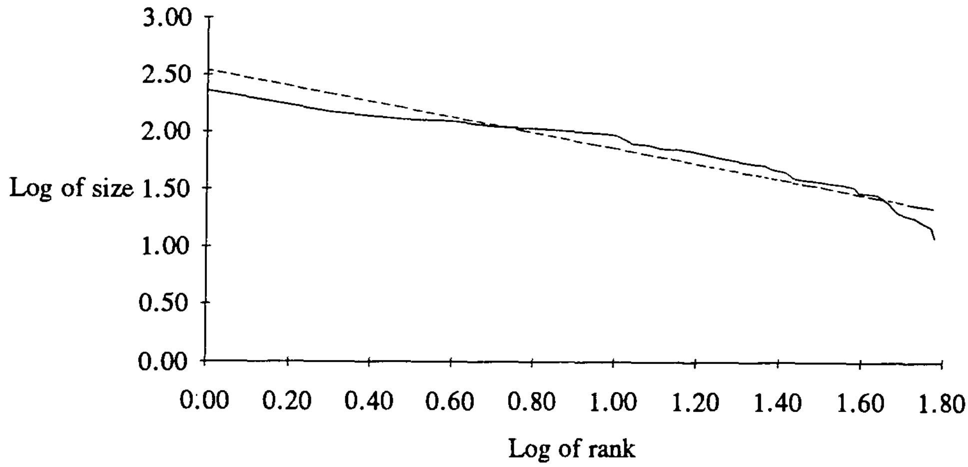
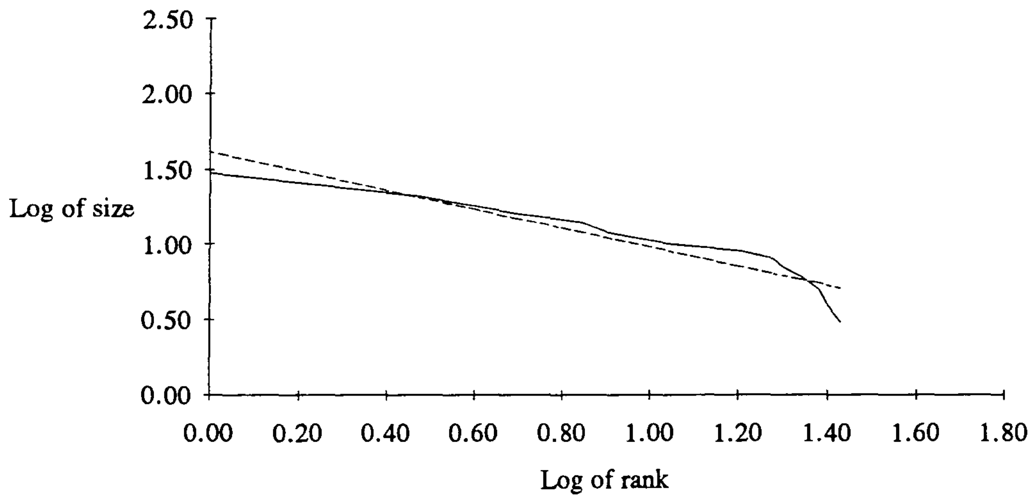


Fig 8.43 South of Tyne: Romano-British sites



which has a standard error of 0.10. The pattern was analysed further using the nearest neighbour method. The results are given in appendix five. Once again the outcome was not entirely conclusive but there was a suggestion that the larger sites may be more regularly spaced than the medium and small sites. There thus appears no reason to reject the hypothesis that whilst the area as a whole exhibited a low degree of integration, favourable areas may, presumably for economic reasons, have already begun to arrive at a more developed system. More complex political and economic development in those parts of Britain without "hillforts" has been proposed by Collis, '... the development of centralized states and of urbanism appears to have nothing to do with hill-forts' (1981 p75). In this connection it must be remembered that although Stanwick lies outside the strict geographical limits of this study, the East Durham area probably lay within its sphere of influence.

The plot for the known Romano-British sites in the area (fig 8.43) sheds little light on the matter. The graph shows little differentiation in site size having a slope of only -0.64. The sample of sites on which it is based is however small and the majority of these sites are situated in the western uplands of the area whilst the Iron Age sites are concentrated in the east. It is difficult to escape the conclusion that it is partly the stability of the settlement system in the eastern area which has led to problems in identifying sites of Romano-British date from the air alone.

The results of the case studies are extremely encouraging and suggest that the technique developed here may be of real value in settlement analysis particularly since it provides a means by which to assess the representativity of the data sample used. Vapnarsky's (1969) work on the theoretical implications of the rank size rule is a useful base for this type of study and one which could profitably be developed further by comparative studies and model testing. In particular it would be interesting to compare artefactual evidence from systematic surface collection to plots of the type used here in order to see how the two forms of evidence for closure and interdependence compare.

The case studies have been used to place the recorded settlements into a social context and to explore the meaning of the observed patterns in terms of the relationships between people. They have built up a picture of small, isolated groups in the Bronze Age developing into larger units during the Iron Age yet retaining their autonomy to a considerable extent. Only in East Durham is there the suggestion of a settlement, and hence a social, hierarchy at this time. The level of inter-site integration and social distinction appears to increase during Romano-British times although the changes cannot be precisely dated. Chapter nine now compares this general picture to the evidence for social organisation at the intra-site level.

CHAPTER NINE

SPACE AND SOCIETY

9.1 INTRODUCTION

Having considered changes in inter-site spatial patterning across space and time and the relationship of "site" to the wider context of "place", this chapter now turns to focus on patterning at the individual settlement level in order to look in more detail at the relationship between social structure and the built environment. A social theory of space, Hillier & Hanson (1984 p29) point out, 'cannot help being rooted in a spatial theory of society'. However, as they go on to add, no such theory yet exists. The basic approaches currently employed can be split into those which merely describe the built environment then relate it to use (cf Reid 1989) and the semiotic models which aim to show how the built environment expresses social meaning in a symbolic manner (cf Hingley 1990a). The way in which space is structured is more than, as Fletcher (1977 p48) has suggested 'an adaptive mechanism for coping with the environment' and social meaning is not merely something which is added to spatial order. Spatial and social order are inextricably linked. 'Different types of social formation, it would appear, require a characteristic spatial order, just as different types of spatial order require a particular social formation to sustain them' (Hillier & Hanson 1984 p27), '....... through it s ordering of space the man-made physical world is already a social behaviour. It constitutes (not merely represents) a form of order in itself: one which is created for social purposes, whether by design or accumulatively, and through which society is both constrained and recognisable' (*ibid* p9).

Past attempts to look at intra-site patterning in north east England have failed to surmount the obstacles of an imaginary, environmentally determined rationale behind the form of the built environment, the problem of chronology and the failure of excavation to produce artefacts bearing clear gender/status related labels with which to elaborate on functionalist interpretations. The first point has already been addressed; one cannot *assume* prior dependence on external variables and then explain observed patterns in these terms. Descriptive autonomy is a prerequisite for meaningful analysis. 'Taking the body of evidence as a whole, therefore, it seems impossible to follow the common practice when faced with an individual case of assuming architectural and spatial form to be only a *by-product* of some extraneous determinative factor, such as climate, topography, technology or ecology. At the very least space seems to defy explanation in terms of simple external causes' (Hillier & Hanson 1984 p4).

The problem of chronology is a serious one but it is to be hoped the previous chapter has shown it is one on which fruitful new approaches may be brought to bear. At the level of the individual settlement the problem is certainly not insurmountable if the site is viewed as a structured deposit. We are dealing with a primary context; ditches, walls and buildings stand where they were intentionally placed. The question of contemporaneity has, to some extent, been overstressed, particularly in the case of stone-built settlements. Many of the stone-built sites have large numbers of *extant* huts. It therefore follows that there was a point in the site's history when all of the structures existed, in one form or another, at the same time. Excavation has revealed a high incidence of timber structures being replaced on the same spot. Murton High Crags (Jobey & Jobey 1987) produced evidence of a stone hut rebuilt three times. The onus is on those who see the numbers of stone buildings as a "problem" to explain why these structures were not removed or re-used once they ceased to serve their original function. The approach taken here is to consider the built environment in terms of all those structures which, on stratigraphic grounds, could have been contemporary.

The basic distinction between open and enclosed settlements is maintained and analysis is mainly concerned with the latter group. The data on open settlements is not yet sufficient to permit any detailed analysis; a few tentative suggestions are offered below.

9.2 OPEN SETTLEMENTS

This section is concerned with settlement types O1-O5, the open settlements of early to middle Bronze Age date. The sites are not entirely "unenclosed": the concept of positive and negative space as outlined by Chapman (1989) is of value here. Positive space is space which has been deliberately enclosed whereas negative space is that surrounding structures. Chapman states 'Most settlement forms are characterised by distinctive use of positive and/or negative space and this can have behavioural significance, especially with regard to the potential for settlement expansion' (*ibid* p34). He develops the ideas in relation to the main settled areas of Balkan Neolithic village sites and positive space in this definition excludes farmland, which in any case was not characterised by clearly defined field systems. However, with regard to the sites under consideration here, it is argued that any area enclosed or otherwise demarcated may be described as a valid area of positive space. The incorporation of living structures into field walls illustrates a lack of distinction between the two types of land which may in itself be significant.

The available evidence suggests the majority of these sites are unlikely to have housed a group larger than the extended family and most must be considered as single residence units. There is little evidence of formal planning. The stratigraphic relationships of buildings and agricultural land emphasise the one to one relationship between the inhabitants and the land they farmed, without necessarily introducing the concept of ownership of that land. The sites appear to have developed in a piecemeal fashion according to the needs of the inhabitants for some time. Black Law, Todlaw Pike, Staniel Heugh and possible Dry Dean and Langlee Crags have one or more burial monuments situated at the limits of the demarcated positive space. This further emphasises the distinction between familiar space and the "other" and may thus have eventually limited expansion.

The question of contemporaneity of structures is perhaps more marked in these dispersed, irregular layouts, since an abandoned hut would not pose an immediate obstacle to movement around the site. However at both Black Law and Standrop Rigg there is evidence of buildings being reconstructed on the same spot, the implication is once again that more buildings were constructed because more were required.

The spatial configurations at both settlement and local levels (ch 8) indicates small group size and a low level of interaction between groups. Group identity and status is not deliberately manifest in the settlement structure. The evidence fits Fried's (1960) and Binford's (1962) criteria for a society with an egalitarian system of status grading. Egalitarian systems generally recognise certain age and sex distinctions whilst ranked systems frequently depend on hereditary principles. However, since the social unit is likely to be a single kin group, the difference between the two systems would not be great in this situation. The frequent presence of high status objects with early Bronze Age burials in the region also remains to be explained. The evidence is not entirely incompatible with egalitarian status grading since, in such systems, status positions (which would effectively be open to all members of the group within certain limitations concerning age and sex) would be manifest by the possession of status symbols (Binford's (1962) socio-technic artefacts). The maintenance of the egalitarian system thus requires that an individual's symbols of status be destroyed at death. The abundant early Bronze Age burial evidence from this area would therefore seem to meet this criterion. The fact remains though that, however achieved, status differences did occur and that the status goods accompanying early Bronze Age burials are evidently, as McKay (1988) points out, only an index of a social phenomenon which already existed. The possible origins and nature of this hierarchy are explored further in chapter ten. The point here is that in north east England, certainly in the upland zone, status appears to have been conferred on individuals and settlement units appear to have had equal access to status positions within the existing system of stratification.

The group of O5 type settlements stand out from the rest in having a group of circular structures surrounded by apparently negative space. No example of this group has been excavated but field survey has failed to reveal any area of positively demarcated space in the vicinity of the known sites. This suggestion of a separation between settlement and farmland is particularly interesting in view of the comparatively greater numbers of huts on these sites. Tathey Crags (fig 5.12) has a total of ten extant huts which could have been contemporary, suggesting the possibility of a social unit larger than the extended family. A recent survey of Chesters Burn (RCHME unpublished) suggests it too may belong to this group having a cluster of circular structures situated to the south of the enclosures originally recorded by Gates (1983)). In the absence of dating evidence one can only tentatively suggest that in this group we may see the beginnings of a move towards larger communities, centralisation of some activities and the recognition of a distinction between the settlement and its associated land. In this light it is interesting to see the presence of such a group at High Knowes and consequently tempting, to view the undated palisaded enclosure of High Knowes B, with its suggestion of underlying open huts, as the immediate successor to a settlement of this type.

9.3 ENCLOSED SETTLEMENTS

9.3.1 The Origins of Enclosure

Enclosed settlement was the norm throughout most of the later prehistory of northern England. The origins of this phenomenon appear at present to date to the later part of the Bronze Age although the evidence of open settlements of the type discussed above continuing beyond the middle Bronze Age is slight. It is only recently that the phenomenon of enclosure has been deemed worthy of consideration which goes beyond mere rehearsal of functionalist explanations. Boundary markers have long been viewed as artefacts upon which social meaning acts as a veneer rather than the critical element structuring form. Papers by Bowden & McOmish (1987), Hill (forthcoming a) and Hingley (1984; 1990a) have now introduced the themes of social exclusion, status and ritual significance into the discussion.

All of the above tend, however, to stress social exclusion at the expense of the more fundamental point of corporate identity. It is not possible to define who is *excluded* prior to having made a positive statement as to who is *included*. The boundary first and foremost identifies a common link between those on the inside. The initial move towards enclosure may therefore represent the emergence of new social groups needing to express a corporate identity which did not previously exist.

Various arguments may be put forward to counter the suggestion that such groups necessarily came about for defensive purposes. Chapman (1988) has elaborated the social and economic advantages of dispersed, small-scale settlement. Settlement dispersal may in itself be a form of defence in preventing the accumulation of wealth on a scale likely to provoke attacks capable of disrupting the social equilibrium. Even endemic warfare such as that between the Nuer and Dinka (Evans-Pritchard 1940) may be an acceptable part of the social balance.

Such a spatial configuration would also foster the fluidity of information flow necessary for the maintenance of a relatively egalitarian society (cf Root 1983, noting that in Root's (p 203) definition, ranking may exist in egalitarian societies). O'Shea (1981) makes the point that a dispersed settlement pattern gives the greatest potential for economic diversification. Periodic shortages may thus have been countered by cross-cutting ties of reciprocity and social obligation. The social and spatial structure evident in the early to middle Bronze Age may therefore have been viable in terms of both social and economic reproduction and capable of maintaining an equilibrium disrupted but not altered, by small-scale raiding. The advantages to such a society of increased settlement nucleation should perhaps be seen rather in terms of the increased productivity possible in larger groups (cf Chapman 1988) and, for some, the increased opportunities for personal aggrandisement.

In the absence of clear dating evidence, one can only speculate that the large scale and sometimes regular, field systems such as those at Todlaw Pike and Kidlandlee Dean (fig 5.11) and the larger groups of huts such as those at Tathey Crags (fig

5.12) suggests that during the 2nd millennium climatic optimum, some groups at least, chose to intensify production by increasing the size of the social unit, thus causing increased differentiation in social ranking. The first enclosed settlements appear to be associated with the climatic decline of the later Bronze Age. It has already been stated (ch 4) that this decline is unlikely to have been sudden or catastrophic. Communities would be faced with a *social* choice between responding by nucleation and intensification or dispersal and diversification. The decision perhaps only reflected the fact that social processes which could be more easily intensified than reversed, had already begun.

The use of the term nucleation requires some qualification here. Renfrew & Poston's (1979) definition of villages of 50-1000 inhabitants as marking the midpoint between nucleated and dispersed settlement has been widely accepted. It would however be stretching the imagination to envisage groups as large as 50 existing in the open settlements of north east England. Nucleation is here used in relative terms. It suggests the coming together of people who would not previously have formed a single residence unit whether or not they recognised kinship ties. The necessity of maintaining a viable breeding network may suggest that the inhabitants of the open settlements recognised a small number of direct kin. The formation of a new corporate unit would thus create the need to express group identity in a new way, hence the demarcation of a boundary around the unified group.

The earliest known enclosed settlements in this area are curvilinear palisaded sites. The evidence for their primacy is, as already stated, consistent, where a stratigraphic relationship occurs, but limited. The group of type C3a sites, those having a dense concentration of possibly contemporary structures (e.g. High Knowes B (fig 6.11); Hosedon Linn; Old Fawdon Hill), are particularly enigmatic and cannot be dated on stratigraphic grounds. It has been shown in the previous chapter that the sites do not on their own appear to form a coherent or viable settlement phase. It is proposed here that these sites belong to an early stage in the move towards enclosed settlement and are the product of profound social change.

The formation of the new type of social unit discussed above would require more than simply an expression of corporate identity, it would demand a re-ordering of social relations. Johnson (1982) relates group size and organisational level to information processing requirements and suggests that communications stress occurs when a system is composed of too many units. His analyses, based on ethnographic data, show that hierarchical organisation of decision making is necessary when group size exceeds six individuals. Hence, nuclear families of up to c.6 individuals themselves become basal units. When the number of these units becomes too great (again six units appears to be a maximum figure), the extended family may act as the basal unit of organisation. Thus, an essentially egalitarian or horizontal social organisation may be elaborated into what Johnson terms a sequential hierarchy. However, Johnson himself (*ibid* p403) expresses uncertainty about just how such a hierarchy functions in practice.

A number of ethnographic studies have noted the phenomenon of dispersed populations gathering in larger groups on a seasonal basis. The phase of settlement nucleation is marked by high levels of conflict and dispute which can often only be settled by dispersal. Lee's (1972) study of the !Kung Bushmen describes such a state and similar occurrences have been noted in studies of Aborigines (Stanner 1965) and Eskimos (Mauss 1904). Lee (1972) mentions one instance of a group of over 100 !Kung living together in relative amity for most of the year. In this instance, disputes were settled by arbitrators from the neighbouring Hetero tribe. Such studies, it should be remembered, relate to interpersonal relations at the settlement level, the development of "tribal groups" or "cultures" is, as Orme (1981 p162) points out, 'bounded by different parameters.'

The works discussed above suggest that, while Johnson's (1982) empirical figures concerning the levels at which an organisational change is required, may be accepted, the precise mechanism of such a change may not be exactly straightforward. The enclosed settlements of the later Bronze Age would have brought together individuals with equal claims to status who would need to compete for positions in the more structured hierarchy necessary to order the new groups.

The very frequency with which the type C3 sites fail to develop succeeding phases of settlement argues for their position as a social "experiment". It will be suggested later that their internal structure violates a proxemic order (cf Fletcher 1977; 1984) and that many would have been bound to fail. Such sites make sense if viewed as early attempts to form single residence units or basal units into larger groups, perhaps initially on a seasonal basis. The re-ordering of social relations necessary to structure such groups is unlikely to have been achieved without some degree of turmoil and may have necessitated an increase in the maximum size of the exogamous breeding group. Perhaps the special status of Yeavering Bell reflects, in part, the ability of the community there to maintain stability during a period of social change. Stress between residence units, in the absence of an established system of mediation and authority would have led to the abandonment of many sites. The change may have been prolonged and possibly cyclical but the processes set in motion at this time would eventually lead to the reorganisation of society into the larger bounded units characteristic of the Iron Age settlement pattern in this area.

This model may be criticised on the grounds that it places the impetus of a major social change in an area which in the environment/economy derived models of the region has traditionally been viewed as marginal to the mainstream of human activity. Such views may be challenged on a number of grounds. There is abundant evidence that from the Neolithic onwards (cf Harding 1981; Miket 1985; Ferrell 1990), sites in the northern upland zone kept pace with social developments elsewhere, albeit on a smaller scale. Finds of exceptional artefacts such as the gold earring of early 2nd millennium type from Kirkhaugh, Northumberland (Maryon 1936; Taylor 1985) and jet cups of a type only otherwise found in Wessex Culture burials in Britain (Newbigin 1941; Jobey & Tait 1966) hint at the presence of individuals with a knowledge of and the ability to obtain, *current* prestige symbols. Shepherd (1985 p216) says of the jet objects 'the distribution of these products bear witness to large scale exchange networks whose operation and *raison d'être* are still imperfectly understood'. During the 2nd millennium climatic optimum communities in the uplands, as in the lowlands, are likely to have been constrained not by the productive capacity of their environment but by their ability to mobilise a labour force. It follows that if these communities were the first to feel the effects of climatic deterioration, they would have been capable of initiating change to combat declining yields perhaps by merely amplifying changes which had already begun. This model provides a coherent framework for the development of the observed Iron Age settlement pattern in the upland zone without recourse to determinism in any of its forms. It rejects the notion that the area has to be viewed as "marginal" as this inhibits objective, contextual appraisal of local developments.

The pre-Iron Age settlement pattern in the lowlands is not yet sufficiently well understood to be able to relate developments here to the broader pattern in any detail. Parallel forces may have been at work, if so we have yet to find convincing evidence of settlement nucleation. The current picture is one of social stability.

Sites such as Burradon, Hartburn and Chester House suggest that the familiar rectilinear settlement form may have been the immediate successor to open settlements. Both Burradon and Hartburn have a larger enclosed area and more huts during their first enclosed phase; at Coxhoe West House, magnetic susceptibility suggests an early, intensive phase of activity, but whether the impetus to enclose on any of these sites was the presence of one or more new residence units is unclear. The chronology is hazy and the social importance of the group expressing its identity in this way may already have been well established by the time these sites came into being.

9.3.2 The Boundary

The settlement boundary, as discussed above, is viewed here as primarily defining the identity and status of those within the enclosure and its origins have been discussed in terms of increasing social complexity and changing relations of production. With the demarcation of a new type of social arena, there may be anticipated an increase in the amount of social activity taking place at the settlement level ie. the wider social group would call for a greater amount of ceremonial and ritual activity. 'Passive stylistic signalling of individual subgroup affiliations, etc, may reduce the active communications load associated with larger aggregations. Participation in ceremony that prescribes patterns of behaviour and interaction may reduce required integrative decision making, and ceremony may provide a social context for organisations that have nonceremonial integrative functions' (Johnson 1982 p405).

The enclosure, as the physical manifestation of group unity, is likely to have been one focus of ritual on a community scale. 'All material boundaries, including walls, ditches fences, thresholds, gateways, are 'sacred'.' (Leach 1977 p170). Even in recent western society rituals associated with boundaries are commonplace (eg. first-footing, carrying the bride over the threshold & beating the bounds) and the doorway into another world has never ceased to be an element of popular legend and fantasy tales.

Elaboration of the boundary is also likely to have enhanced the status of those within and features such as multivallation and emphasis of the entrance way must also be considered in these terms. It was shown in chapter six that multivallate sites are on average no larger and no more likely to have been "central places" than any other sites. However a number of "special" sites eg. Roughting Linn and Old Bewick were deemed worthy of elaboration in this manner. This section considers the evidence for non-functional activity associated with settlement boundaries in north east England.

The need for a re-assessment of the material remains associated with settlement enclosures is best expressed by Hill (1989; forthcoming a,b) in his work on site formation processes and his vision of a 'boundary obsessed' Iron Age society (forthcoming a). He has shown that even the apparently rich artefactual assemblages from settlement sites in Wessex represent deposition only on rare occasions. We cannot escape the conclusion that deposition of material in archaeologically recoverable contexts on settlement sites was not part of normal domestic activity. The apparent paucity of the artefact record from northern England has already been discussed in these terms (ch 7). It is therefore surprising that the few "exceptional" deposits recorded on such sites has not previously occasioned comment.

This discussion is based on a very limited amount of excavated evidence. Few curvilinear sites have been excavated this century (and even fewer published); Jobey provided a "template" for the positioning of trenches on rectilinear settlements which other excavators have followed to the letter (the exceptions being his own area excavations in the interiors of the sites at Burradon and Hartburn). The approach has been to section the enclosure boundary to examine its construction and usually, but not always, to examine the immediate entrance area. No enclosure ditch has ever been fully excavated.

The first example of unusual activity associated with a boundary occurs at Eston Nab. Vyner (1988) records the presence of burnt timbers within the clay rampart. He states 'The timber must have been fired whilst the bank was under construction, or immediately after it had been built, since the embanked material had clearly been burnt *in situ* .....The fact that the burnt feature extended the full height of the surviving rampart suggests that it was fired after this defence had been constructed' (*ibid* p71-72). No reason is given for dating the firing to immediately after construction rather than at some later date. The only clue to this interpretation lies in the claim that 'The burnt revetting may represent an attempt to strengthen the rampart, in a similar manner to the use of vitrification frequently noted in stone forts in Scotland' (*ibid* p72). It is questionable whether or not the burning of a clay rampart is in any way comparable to vitrification in dry stone walling and indeed whether it would contribute at all to the strengthening of the rampart.

Bowden & McOmish (1987) have considered the phenomenon of vitrification in Scotland. They point out that vitrification can generally be shown to date to the end of an occupation sequence and that comparatively few unburnt timber-framed ramparts are known. Both observations are supported in Mackie's (1976) comprehensive study of such sites 'The stratification observed in every excavated vitrified fort, and the finds made in them, make it perfectly clear that burning and vitrification have always occurred at the end of the use of the fort' (*ibid* p209). Bowden & McOmish conclude it is 'quite possible that this deliberate destruction marks the ritualised abandonment of the site' (1987 p79). Vyner himself (1988 p72) states 'Locally, the burning of timber into deep post sockets is well evidenced in the considerably earlier context of Neolithic mortuary structures.' The burnt timbers from Eston Nab produced C14 dates of 2410 $\pm$ 100 BP (HAR 8750) and 2310 $\pm$ 70 BP (HAR 8751). Since pottery of certain middle to late Iron Age date is absent from the site, there is every reason to associate the burning of the rampart here with the end of occupation on the site and the possibility of ritual activity cannot be ruled out.

Unusual deposits from ditched enclosures include a Neolithic polished axe from the phase II ditch at Burradon (Jobey 1970a). It is described as coming from the lowest fill and must have come from one of the ditch terminals, these being the only sections excavated. Jobey (*ibid* p82) describes it as 'presumably a stray' yet remarks that it is the only recorded find of a Neolithic axe from south east Northumberland. At Coxhoe West House (Haselgrove & Allon 1982) the enclosure ditch was sectioned in six small areas and produced a relatively large quantity of animal bone compared to other sites in the area. The presence of a disturbed horse burial in the northern ditch terminal must surely be regarded as somewhat unusual and, in a report on the bone, Rackham (*ibid* p44) notes that 'the proportions of these domestic species vary markedly in each section of the enclosure ditch excavated'. That special deposits associated with enclosures continued into the Romano-British period is illustrated at Doubstead (Jobey 1982a) where the northern ditch terminal produced a hinged bronze bracelet with a broken pin and a complete bronze spiral finger ring (only eight prehistoric/native sites in the area under consideration have produced any form of bronze object). Jobey (*ibid* p15) states of the bracelet 'It had most probably been deposited with domestic refuse from the occupation of the site, though the reason for discarding what might seem to be a repairable item of jewellery is unknown'.

9.3.3 Built and Unbuilt Space

Hall (1966) has shown that in all societies people recognise characteristic optimum distances for interpersonal spacing on particular occasions. These regularities may occur without conscious recognition of order. The spacings are produced simply by visual estimation and the amount of variation increases with increasing distance. The construction of a physical boundary around a settlement area therefore demands the formalisation of both functional requirements and proxemic order in the settlement structure.

Detailed proxemic analysis of the type carried out by Fletcher (cf 1977; 1984) is not feasible for the sites under consideration here owing to a lack of precise information about building function and interior features. Differences in the use of space within enclosures of various types are however apparent. These differences are analysed here in terms of the ratio of built to unbuilt space (BUB) within the enclosure, which represents, in Chapman's words 'a primary definition of the built environment' (1989 p35).

The BUB ratios of forty five sites whose plans permit accurate estimation are shown in table 9.1. The ratios span a wide range from 1:2 (High Knowes B) to 1:62 (Burradon phase 1, based on calculation of the maximum possible built area). There are no instances where the built space exceeds the area of unbuilt space. When the ratios are plotted against site size (fig 9.1) we see the emergence of distinct groupings which clearly relate to the morphological divisions already proposed in chapters five to seven.

These relationships are expressed in fig 9.2 which shows the mean BUB ratio for each morphological type. The small sample size means that standard error is inevitably high but the broad divisions remain valid. There is a clear distinction

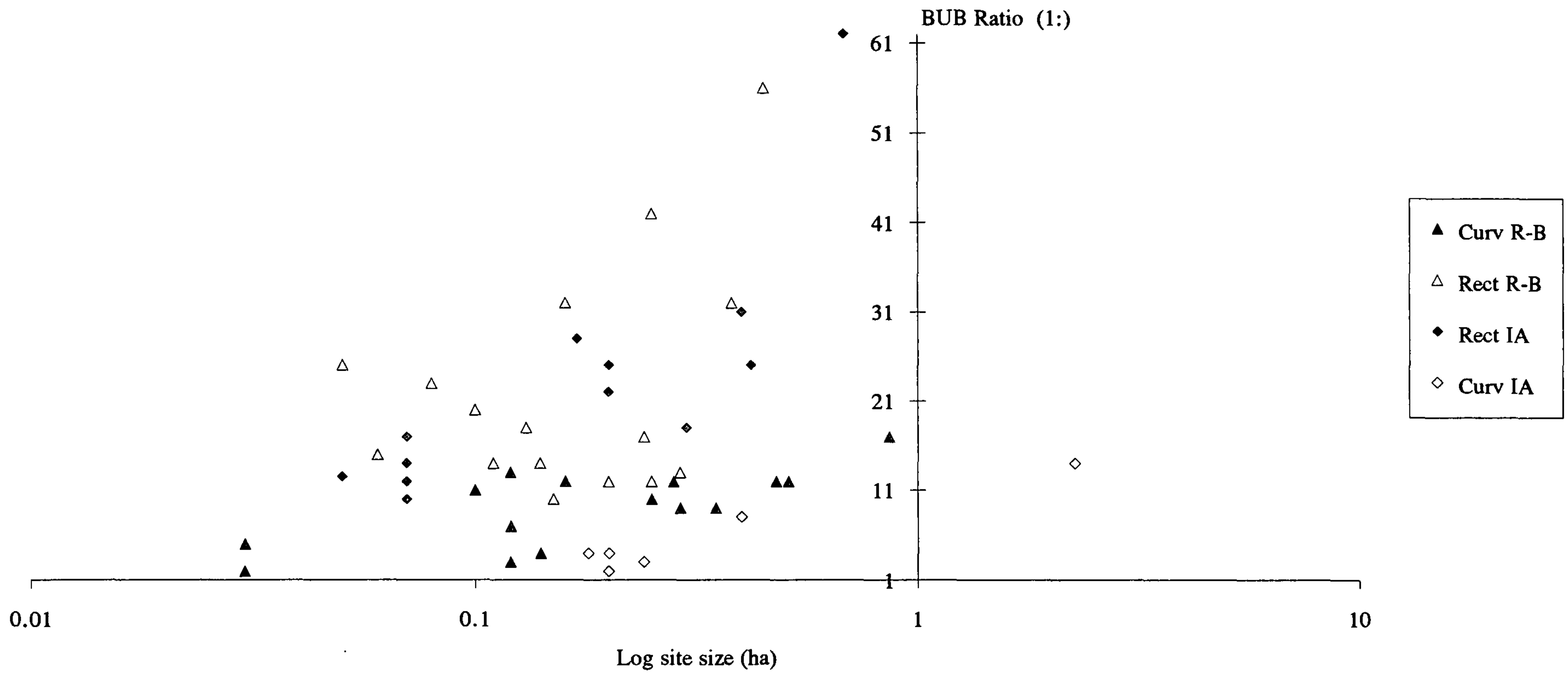
SITE	PHASE	TYPE	SIZE (ha)	BUB RATIO
Belling Law	1a	R1a	0.07	1:14
Belling Law	1b	R1a	0.07	1:10
Belling Law	1c	R1a	0.07	1:12
Belling Law	1d	R1a	0.07	1:17
Belling Law	2	R3	0.16	1:32
Blakehope		R3	0.15	1:10
Brands Hill 2		C2	0.16	1:12
Bridge House		R2	0.25	1:12
Burradon	1	R1b	0.68	1:62
Burradon	2	R1b	0.16	1:23
Cats Elbow		R3	0.10	1:20
Cochrane Pike West		C3b	0.18	1:04
Coppath Burn		C1	0.12	1:03
Coxhoe West House		R1b	0.40	1:31
Doubstead		R2	0.20	1:25
East Mellwaters Farm		C1	0.12	1:07
Forcegarth Pasture North		C1	0.10	1:11
Forcegarth Pasture South		C1	0.12	1:13
Girsonfield		C1	0.03	1:05
Greaves Ash	2	C2	0.86	1:17
Greaves Ash East		C2	0.28	1:12
Gunnar Peak Middle		R4	0.20	1:12
Hartside Hill Middle		C2	0.35	1:09
Haystack Hill		C2	0.51	1:12
High Knowes A		C1	0.14	1:04
High Knowes B		C3a	0.20	1:02
Hosedon Linn		C3a	0.20	1:04

Table 9.1 BUB Ratios

SITE	PHASE	TYPE	SIZE (ha)	BUB RATIO
Humbleton Hill	1	C3b	0.40	1:08
Kennel Hall Knowe	1	R1a	0.05	1:12
Kennel Hall Knowe	2	R1a	0.17	1:28
Kennel Hall Knowe	3	R1a	0.20	1:22
Kennel Hall Knowe	4	R2	0.45	1:56
Knock Hill North East		C2	0.25	1:10
Little Crag		R2	0.08	1:27
Meadowhaugh		R3	0.08	1:23
Milking Gap		R4	0.06	1:15
Netherhouses West		R3	0.05	1:25
Northfieldhead Hill		C3a	0.20	1:04
Old Fawdon Hill		C3a	2.27	1:14
Rattenraw		R4	0.29	1:13
Rede Bridge		R2?	0.25	1:42
Redeswood Law Fell		R2?	0.24	1:17
Riding Wood		R2	0.15	1:10
Ripley Plantation		R2	0.38	1:32
Sidwood		R2	0.11	1:14
Southern Knowe		C2	0.03	1:02
Staw Hill		C2	0.29	1:09
Tower Knowe		R2	0.13	1:18
Uplaw South		C2?	0.47	1:12
West Brandon	1	R1a	0.30	1:18
West Brandon	2	R1b	0.42	1:25
West Dod Law	2	C2	0.48	1:12
Wether Hill		C3b	0.24	1:03
Woolaw		R3	0.14	1:14

Table 9.1 contd

Fig 9.1 BUB Ratios of curvilinear & rectilinear sites



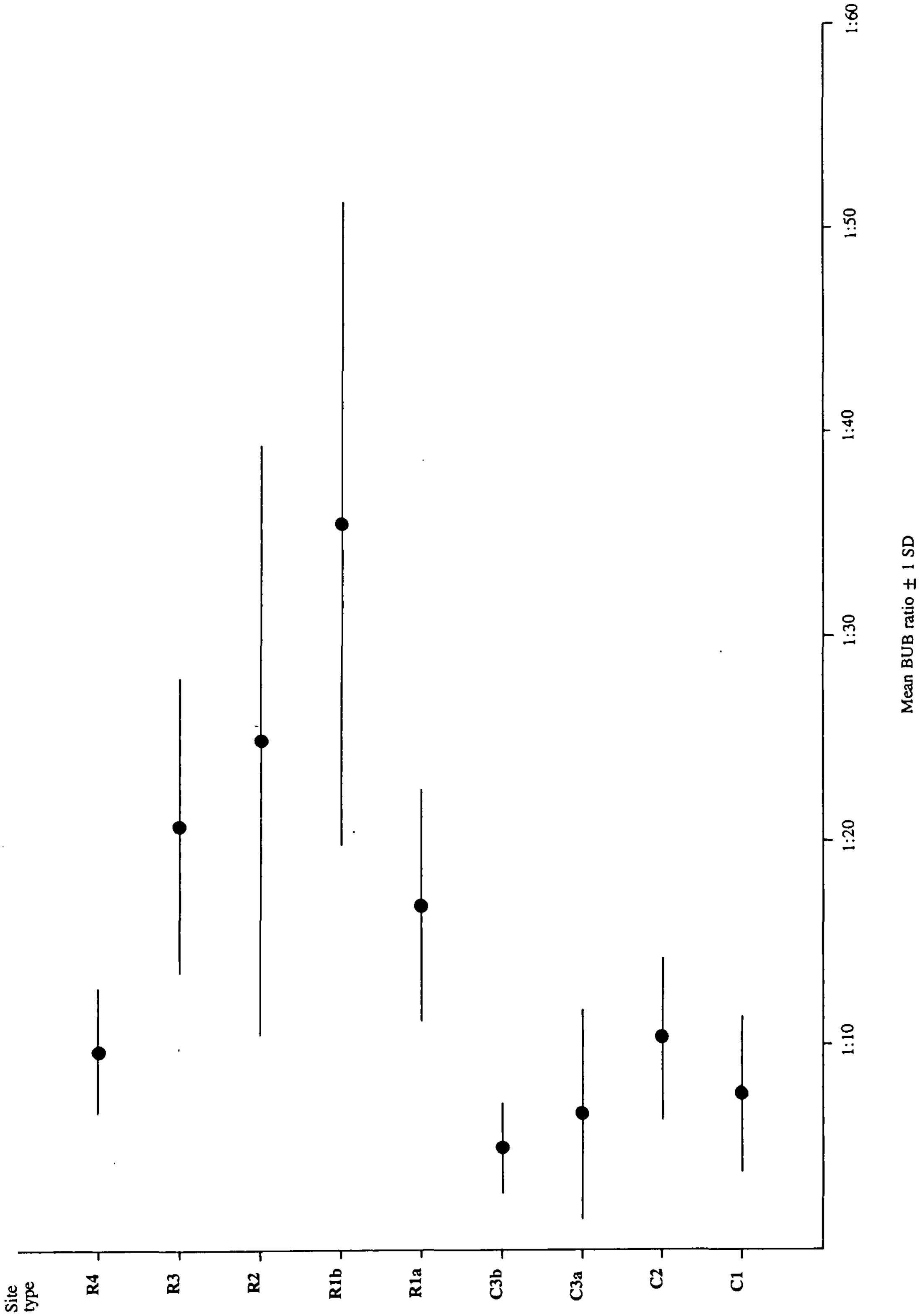


Fig 9.2 BUB Ratio and site type

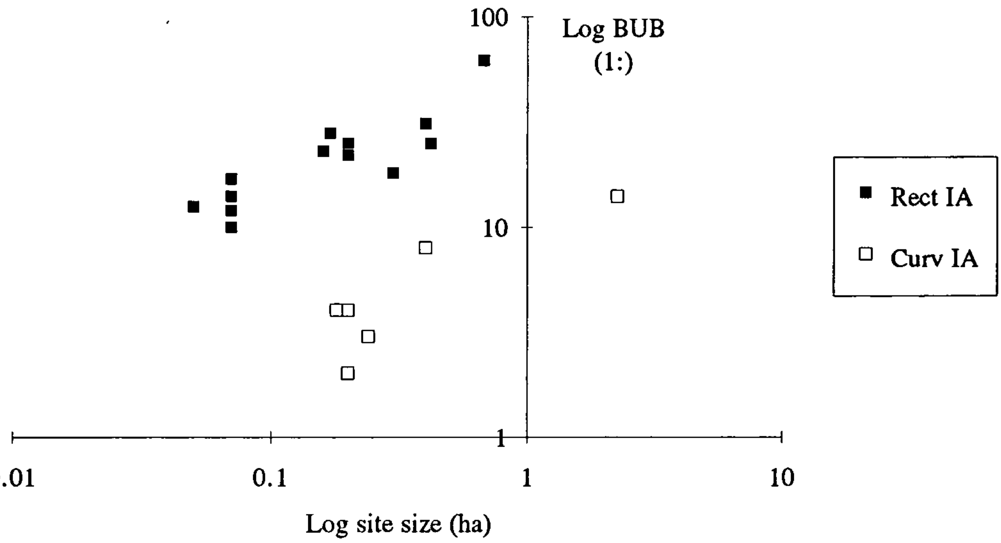
between the curvilinear and rectilinear forms except in the case of type R4 sites which had already been considered (ch 7) to have greater affinity in the use of space with the curvilinear group. The type R1a ditched enclosures stand out as having an extremely high proportion of unbuilt space whilst type C3 sites have the densest concentration of buildings. These results are discussed in more detail in the period based analysis below.

9.3.3.1 Iron Age Sites

The most prominent feature of sites of this period is the, apparently ubiquitous, boundary, discussed above. Available evidence permits little in the way of analysis of the interiors. Type C4-C6 sites, as already stated, can only be defined in terms of enclosure morphology. Limited excavations such as those at Witchy Neuk have shown that timber buildings are present on such sites. The presence of buildings is confirmed by surface indications on a number of other sites such as Ring Chesters, Brough Law, Colwell Hill, Gleadscleugh, Clinch Castle and Great Hetha but it is not possible to estimate the total density or spatial distribution of structures.

BUB ratios of curvilinear and rectilinear Iron Age sites are shown in fig 9.3 and a clear division between the two groups is apparent. The curvilinear sites shown are of type C3, both the palisaded and earthwork forms are represented although there may eventually prove to be a chronological distinction between the two. As the earliest and most intensive form of enclosed settlement in the upland zone, these sites represent a major dislocation in the settlement record. Open dispersed settlements were replaced by bounded sites with BUB ratios as high as 1:2. It has been suggested that the spatial configuration of these sites was in many cases not socially tenable.

Fig 9.3 BUB Ratios of Iron Age sites



In the developed settlement patterns of later periods it is possible to identify a basic requirement of space per residence unit (see below) which varies from area to area. Table 9.2 considers the number of residence units, based in Johnson's (1982) figs, which may have occupied type C3 sites. Figures are calculated both on the assumption of a single hut per nuclear family (parallelled in other Iron Age contexts eg. West Brandon) and two huts per nuclear family (apparently the usual complement on Romano-British sites in the area). At Old Fawdon Hill, even allowing for four huts per nuclear family (or alternatively assuming only 25% of the huts were in contemporary use), three second order organisational units or extended families would be represented. The figures are conjectural in view of the lack of detailed information about building function (although use as an animal shelter can be ruled out for most on logistical grounds) but they serve to illustrate the need for a restructuring of social relationships on these sites.

Site	No of Huts	Excluded Relationships	Max contemp huts	Huts per basal unit	1st order organisational units	2nd order organisational units	3rd order organisational units
High Knowes B	21	7	14				
				1	14	3	0
				2	7	2	0
Wether Hill	13-15	0	15				
				1	15	3	0
				2	8	2	0
Old Fawdon Hill	69	8	61				
				1	61	11	2
				2	31	6	1
				4	16	3	0
Hosedon Linn	9	0	9				
				1	9	2	0
				2	5	0	0
Humbleton Hill	12	0	12				
Phase 1				1	12	2	0
				2	6	1	0
Cochrane Pike West	10	0	10				
				1	10	2	0
				2	5	0	0
Northfieldhead Hill	20	4	16				
				1	16	3	0
				2	8	2	0

Table 9.2 Possible organisational level of type C3 sites

The possibly high numbers of residence units and the need for social organisation is at odds with the lack of spatial order apparent in the settlements. Whether the extant patterns were present from an early stage or are the product of cumulative development, they signify a lack of social order. In some cases this may have been overcome and the site redeveloped as may have occurred at Humbleton Hill (fig 6.13), in other cases the site would have simply been abandoned as appears to have happened to many of the palisaded sites. Further work is necessary on the interiors of type C4-C6 sites but at present it seems significant that these sites are more numerous and often show signs of major rebuilding phases which would be consistent with lengthier occupation, yet none show signs of dense, unstructured concentrations of timber buildings. The implication is, that the process of settlement nucleation, probably dating back as far as the middle Bronze Age, culminated eventually in the appearance of an optimum social unit size of perhaps a single extended family. The appearance of new sites and refurbishment of existing sites during the middle Iron Age (ch 6) suggests that stability had been achieved by this time.

The significance of settlement boundaries has been discussed and it has been suggested that the most productive line of study to pursue is how the boundary expresses the unity of what is on the inside. Nowhere is this more evident than in the curvilinear Iron Age sites. None show evidence of contemporary internal partitioning. Slight stake-built fences would leave no surface traces had they existed but the emphasis is most definitely on the unity of the settlement as a whole rather than divisions between groups within the settlement. This "communal" aspect argues further for kinship ties between the inhabitants. The lack of division obviously also has implications in terms of economic relationships and "property ownership", an area discussed in chapter ten which considers production and consumption.

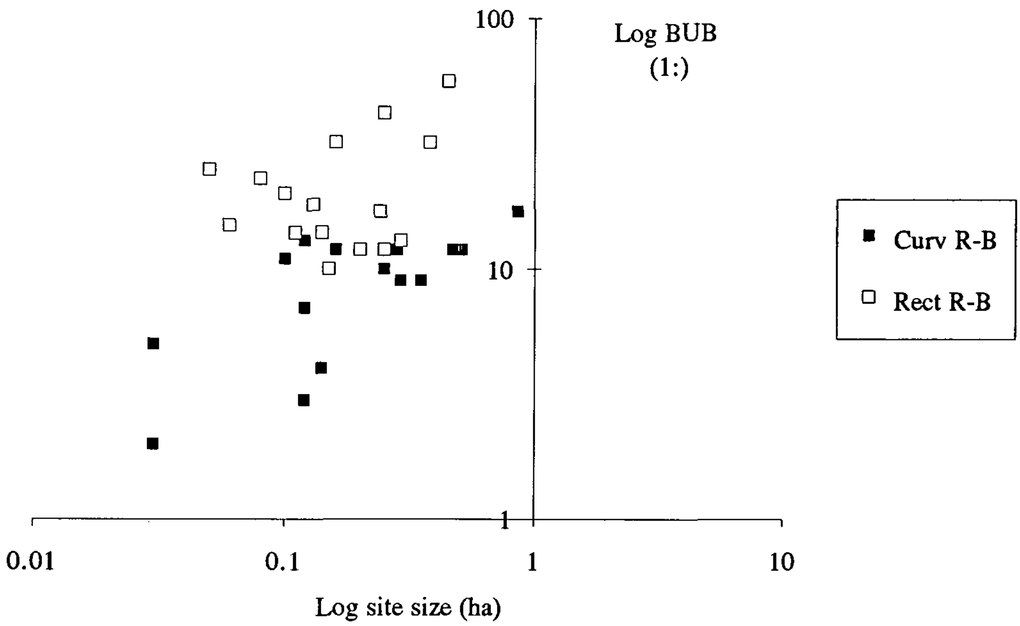
The lowland Iron Age sites thus appear very different. They have the lowest BUB ratios of any of the site types considered here, many have only a single circular structure, presumably representing a single residence unit, yet they are frequently larger than their curvilinear counterparts. Evidently these communities had very different spatial requirements. The expression of identity is less important to an indivisible unit although status may be equally important. Another consideration more evident in the case of a single unit, is that the residents are enclosing something they *own,* hence storage may be a factor in the large enclosed area. This indication of a different mode of production is discussed further in chapter ten. The evidence would seem consistent with that for a more integrated economic system already seen in chapter eight.

9.3.3.2 Romano-British Sites

The internal patterning of Romano-British sites shows a rather different picture. BUB ratios of both curvilinear and rectilinear sites are shown in fig 9.4. Whilst the sites fall into clear curvilinear and rectilinear groups, there is for the first time, a certain amount of overlap between the two. This similarity is also manifest in the site plans. It is possible to identify a basic component of all sites - the minimum requirement for a residence unit, which consists of two huts (or occasionally one) and an enclosed area of positive space in front of the huts.

The single residence unit is now the prime feature of all sites and this change is illustrated by a difference in the way in which boundary markers are used. The boundary no longer expresses the corporate unity of a larger whole, it now subdivides the component parts to express the autonomy and status of individual family units.

Fig 9.4 BUB Ratios of Romano-British sites



The change is best illustrated in the upland zone where the boundary walls of this period frequently overlie and slight those of the corporate Iron Age groups eg. Weetwood Moor (fig 6.14). Similarly at Thorpe Thewles the "open" phase of settlement is marked by increased emphasis on demarcation and partitioning between structures.

Although the basic requirements of all residence units are similar with little apparent difference in building form or size (5m is the modal hut diameter on curvilinear sites compared to 6m on rectilinear sites - see (appendix 6), certain differences are apparent. Despite the slight overlap, rectilinear sites still have consistently lower BUB ratios than curvilinear sites ie. as well as the basic two huts and an enclosed yard, the inhabitants of rectilinear sites have an additional spatial requirement. This usually takes the form of space within the enclosure to the rear of the buildings. There are indications on a number of sites eg. Woolaw (fig 7.10) of partitions controlling access to these areas. This suggests provision for some activity which is not usually carried out by individual residence units on curvilinear sites.

The desire to maintain spatial order is clearly apparent on rectilinear sites. At Stirks Cleugh the enclosure was extended to allow the construction of secondary buildings whilst still adhering to the planned layout. At both Middle Gunnar Peak and Milking Gap it became necessary to add buildings outside the enclosure circuit. The interiors of these sites have BUB ratios of 1:12 and 1:15 respectively, both are thus close to the upper limit for Romano-British settlement forms. The construction of the extra buildings inside the enclosure would have increased the BUB ratios to 1:7 and 1:9 respectively thus violating the proxemic order within the settlements.

It is suggested in appendix six that too much emphasis has been placed on numbers of stone buildings as an indicator of overall population increase. It is true that many sites show evidence of expansion but this does not necessarily amount to an increase in the number of residence units on the site. Rectilinear sites are still predominantly the abodes of single or dual residence units and even in the type C2 complexes, there are indications that the level of social organisation effectively limits the size of individual settlements. Type C2 sites (ch 6) are those sites made up of a number of smaller units, generally exhibiting a fairly informal layout. The results of the analyses in chapter eight give every reason to suppose that the component units are contemporary. It is therefore interesting to note that the number of individual units rarely exceeds six, the figure already identified (after Johnson 1982) as the level at which an organisational change is necessary. Table 9.3 shows the numbers of residence units represented on type C2 sites. The sites used are those where plans may be taken as reasonably complete and accurate and calculations are based on the criteria outlined above of at least two huts and a

Site	No. of huts	Residence Units
Brands Hill 2	7	3
Brands Hill 7	12	5
Corbie Crag East	9	4?
Greaves Ash	32\37	11\13
Greaves Ash East	13	4
Hartside Hill Middle	15	6
Hartside Lower East	18?	5?
Haystack Hill	14	6
Haystack Hill North	18	6?
Knock Hill North East	14	5\6
Meggrims Knowe	18	7?
Southern Knowe	10	3?
Staw Hill	9?	4
Uplaw Knowe South	18	8
Weetwood Moor	18?	5\6?
West Dod Law	12\13	3?

Table 9.3 Residence units on type C2 sites

separate yard per residence unit. Six units appears to be the optimum figure with only Greaves Ash exceeding this figure by any appreciable amount (the mean figure is 5.5 units; standard deviation = 2.2). The single extended family appears therefore to mark the upper size limit of a residence group.

9.4 SUMMARY

The results of the intra-site spatial analyses accord well with those of the inter-site analyses discussed in the preceding chapter and appendix five and the two combine to give a clearer picture of the nature of the societies who built and used the sites. Localised differences are apparent and these may be seen as the result of internal developments rather than changes imposed from outside or determined by external factors.

The small, isolated groups of the early Bronze Age gradually began to increase in size, perhaps from the middle Bronze Age onwards. In the upland zone there was an acceleration in the rate of nucleation from the later Bronze Age. This led to a period of social transformation during which new settlement forms appeared and a number of sites failed before stability was achieved. The reorganisation saw the emergence of a larger corporate body, presumably the extended family, as the optimum unit of organisation at the settlement level. The settlement became the means of expressing the unity and status of the community as seen in the elaboration of settlement boundaries and an increase in the amount of ritual activity taking place on site. The form of social organisation appears to have inhibited settlement integration with the units remaining highly autonomous and showing no evidence of hierarchical development. The site of Yeavering Bell stands out from this pattern as having some kind of special status. It may have served as a focal point for the conceptual integration of the autonomous groups into a wider "tribal" system but there is at present little evidence that it had any practical effect on surrounding settlements at this time.

In the lowland zone there was a far greater level of settlement continuity and the size of the social unit appears to have varied little over time. There was however a higher degree of settlement integration and during the Iron Age certain areas developed a more markedly regular and hierarchical settlement pattern.

There thus appear to have been two different social formations in the area under study. The groups relate to the two basic principles of social cohesion distinguished by Durkheim (1964), organic and mechanical solidarity. Organic solidarity is based on interdependence through differences such as those resulting from division of labour whereas mechanical solidarity is based on integration through similarities such as belief. These principles relate directly to the spatial organisation of the group. The fundamental link between social and spatial formations, as stressed by Hillier & Hanson (1984), has already been discussed. Organic solidarity requires co-residence, or at least close proximity, whereas mechanical solidarity is necessarily associated with dispersal. In the upland zone we may therefore expect to find functional specialisation and intra-site integration with mechanical solidarity at the regional level. The lowland communities on the other hand, represent non spatial sodalities who are integrated into a wider system by beliefs and a recognition of identity which cross-cuts spatial divisions.

At some point, certainly by the early Roman period, there was a transformation in the upland sites and the "communal" aspect was replaced by an emphasis on individual residence units. There was a greater degree of settlement integration and the settlement pattern became more hierarchical although settlement size was apparently still limited by the organisational structure which rarely exceeded the extended family level.

These social/spatial frameworks have of course economic implications. This study has criticised the primacy accorded to economic considerations in much archaeological work and has tried to introduce new perspectives. The resulting social theory may now form the basis for consideration of how production and consumption at the settlement level was articulated into a broader economy.

CHAPTER TEN

PRODUCTION AND CONSUMPTION

10.1 INTRODUCTION

It has been demonstrated in the preceding chapters that later prehistoric societies in north east England exhibited changes in spatial configuration across space and time. These differences have been related to differences in social structure. This chapter now seeks to examine how each type of spatial configuration relates to the prevalent mode of production. The study is necessarily concerned primarily with agricultural production, this being the dominant subsistence activity throughout the period in question.

The archaeological evidence for agricultural production occurs in three main forms, palynological evidence, visible traces of agricultural activity and botanical and faunal remains recovered from archaeological sites. The first two forms of evidence have been discussed in earlier chapters. Chapter four questioned the way in which palynological evidence has been used in much work on this area and the case studies in appendix three suggest that the results so far mainly serve to highlight the gaps in our knowledge. Visible traces of agricultural activity associated with various forms of settlement are discussed in chapters five to seven (figs 10.1-10.7). In spite of the difficulties of establishing relationships on the basis of association alone, recurring patterns do seem to emerge.

The third type of evidence, faunal and botanical remains from archaeological excavations, is extremely limited in this area. The acid soils over much of the region are not conducive to the preservation of bone. However, the paucity of remains may have been exaggerated due to the lack of knowledge concerning discard patterns on these sites. Excavation has tended to focus on those parts of the settlement (buildings, gateways) where large dumps of material would be unlikely to occur under normal circumstances. Environmental sampling programmes have, until recently, also been sadly lacking from excavation strategies. Systematic sampling for botanical remains was not introduced to this area until October 1981 when Marijke van der Veen began a programme of research into arable farming in the region (Van der Veen 1990; 1992). All sampling carried out since that date has been directly connected with Dr van der Veen's research. We are thus fortunate that the evidence, although limited, has been recovered as part of a coherent project, subject to the most exacting standards.

The use of the terms relations of production and exchange, rather than economy, is deliberate. The inadequacy of transferring modern economic relations to past society has been discussed in chapter two. 'When for example, we speak quite neutrally about"pre-capitalist" society we isolate out economic practice as it is found in our own society and study the other society in those terms, comparatively. Because capitalism depends on relations of production, materials of production, capital and so forth we look for the precursors or analogues of these in what we have been pleased to acknowledge as precapitalist. But this cannot be an accurate reflection of how the society in question theorized or practiced, because for them capitalism was a future and an unknown. Their way of making a living had to be framed in terms of the past and the present' (Wilson 1988 p10).

Even such an economic rationalist as Adam Smith was prepared to suggest that the translation of the process of material production into *social* assets through the medium of respect was a prime motivating force. 'The desire of becoming proper objects of this respect, of deserving and obtaining this credit and rank among our equals is perhaps the strongest of all our desires, and our anxiety to obtain the advantages of fortune is accordingly much more excited and initiated by this desire, than by that of supplying all the necessities and conveniences of the body' (Smith [1759] 1976, 212-213).

Polanyi, in an influential piece of social theory, identified the concept of economic rationale as the essential difference between modern and traditional societies. 'The outstanding discovery of recent historical and anthropological research is that man's economy, as a rule, is submerged in his social relationships. He does not act so as to safeguard his individual interest in the possession of material goods; he acts so as to safeguard his social standing, his social claims, his social assets. He values material goods only in so far as they serve this end. Neither the process of production nor that of distribution is linked to specific economic interests attached to the possession of goods; but every single step in that process is geared to a number of social interests .... the economic system will be run on noneconomic motives' (Polanyi 1957 p46).

Despite widespread recognition that the social and economic spheres are inextricably linked, the debate over property relations versus kinship as the major structuring principle, is still central to much recent "Marxist" writing in archaeology and anthropology (cf Copans & Seddon 1978; Gregory 1984; Hill forthcoming a). It is only when society is considered in its spatial framework that the social "whole" becomes apparent. This is the basic approach taken by Hingley (cf 1984) , although his published work suffers as a result of preconceived notions about the structure of "Celtic" society and the failure to provide quantitative supporting evidence for his discussions of inter or intra-site spatial patterning (cf 1984; 1986a; 1989). Hingley states (1984 p76) that 'a start can be made to the analysis of social relations of production within Iron Age society through the study of corporate scales of social organisation'. He goes on to define a corporate social grouping as one symbolised through the creation and maintenance of a boundary which divides the group from others.

A critique of this semiotic approach has already been presented in chapter. The basic premise of Hingley's work is accepted here, on the understanding that corporate social groups can only be identified as a result of rigorous spatial analysis on a variety of scales. For instance, it is argued here that the residence units making up type C2 settlements formed a corporate group in spite of the presence of boundary divisions within the settlement and indeed Hingley's own large corporate groups of the Oxford clay vale are identified only by using 'an arbitrary 150 metre division' (1984 p78) to isolate individual settlements from each other.

The effect of living in settlements with fixed boundaries on social relations of production is discussed in general terms by Wilson (1988). He suggests that the introduction of the boundary concept forms the major difference between hunter-gatherer social relations and those of sedentary societies. In hunter-gatherer societies, there is a strong relationship between people and landscape or territory, particularly in terms of identifying with features in that landscape (see ch 8). This relationship is however based on a sense of "identity" rather than "ownership" or "tenure". The emphasis is on foci rather than boundaries. The idea of association with a piece of land which does not involve ownership or exclusion has been encountered in a number of ethnographic studies (cf Bird 1983; Riches 1982) and may be seen in Turnbull's work on the Mbuti Pygmies who see their territory as the place where they belong rather than the place which belongs to them (Turnbull 1966 p176).

Wilson (1988) argues that the unboundedness of hunter-gatherer societies is reflected in the fluid kinship relations of these societies. 'The kinship concept is isomorphic with the territory concept' (*ibid* p34). To a certain extent in all hunter-gatherer societies, obligations exist between people rather than between their positions, hence the difficulties encountered by anthropologists in describing kinship relations and the tendency to view them in negative terms. It is therefore significant that the process of *sharing* is also ubiquitous in hunter-gatherer societies (cf Marshall 1976; Silberbauer 1981; Shostak 1983). The pattern varies but the sharing of raw meat appears to be a universal rule. This cannot be seen as a purely economic activity. 'In the dispersal of meat and the downplaying of the success of the hunter there seems to be a conscious attempt to resist a convergence of possibilities that would introduce boundaries to the community' (Wilson 1988 p38). The fact that the meat is distributed raw further distances the hunter from the consumed product, 'The idea of a donor or distributor of the feast is a performance of status in itself' (*ibid* p39).

These open societies may be contrasted with those societies having a permanent built environment. The separation of public and private space leads to tendencies to conceal and opportunities to display, it requires the institutionalisation of the concepts of hospitality and neigbourliness and promotes the display of wealth and power. The significance of this in terms of production and consumption will be discussed further later. Suffice it to stress here that reality consistently denies the separation of the spatial, social and economic.

The previous chapters have tried to build up a picture of a dynamic past society through its spatial relationships. In the following section, an attempt is made to relate this picture to the archaeological evidence for production and consumption.

10.2 THE BRONZE AGE

Bronze Age settlement in the area is represented by open sites (types O1-O5); the visible agricultural traces associated with these sites are discussed in chapter five. Known sites are largely confined to upland areas and, using the criteria for assessing agricultural potential outlined in appendix two, may be seen to have reached their optimum potential during the earlier part of the 2nd millennium BC (a date which corresponds well with the artefactual material from excavated sites). Palynological evidence for the upland zone (ch 4) suggests that small scale clearances took place during the 2nd millennium BC. Despite intensive survey work, this area has produced no evidence of large scale land divisions of Bronze Age date as seen in many other upland areas (cf Barrett *et al* 1976; Fleming 1978; Bowen & Fowler (eds) 1978). Clearly defined field plots associated with these sites are usually small and often irregular, although the area of cleared land in the vicinity of some sites may be quite extensive as at Houseledge West (fig 5.7).

The recent recognition of plots of cord rig cultivation associated with a number of these sites (Topping 1989a,b) demanded a re-appraisal of production on these sites, the implications of which are only now beginning to be explored. Topping has argued convincingly that this phenomenon represents an artificially created arable surface. Whether the implement used was the hoe, spade or ard is unclear, the latter two seeming the most likely possibilities.

The only site of this type to have produced archaeobotanical evidence for arable cultivation is Hallshill (Gates 1982a; Van der Veen 1990). The site, which overlooks the Rede Valley at 230m OD, consists of a single timber building with surrounding ringbank and a field plot of c.0.6 ha marked by a low bank (ch 5). C14 dates for the site (table a7.1) place it in the middle to late Bronze Age, rather later than the other excavated sites. It is thus unfortunate that artefactual material, which may have improved our understanding of the material culture of this shadowy period, was not recovered in the course of excavation.

The archaeobotanical samples from the site were dominated by cereal chaff. Both emmer (*Triticum dicoccum*) and spelt (*Triticum spelta*) wheat were present along with small quantities of barley (*Hordeum vulgare*) and flax (*Linum usitatissimum*). Van der Veen (*ibid*) sees Hallshill as a small scale producer site. The weed assemblage indicates high levels of nitrogen and of soil disturbance, presumably representing a labour intensive mode of production with regular manuring and hoeing. The most remarkable aspect of the assemblage as a whole is the presence of spelt wheat in a context dated to the very beginning of the 1st millennium BC (Van der Veen 1992). Although emmer is numerically the most important form of wheat, the presence of spelt at a date similar to that for its introduction into the south of England runs contrary to the idea that the north showed considerable backwardness with regard to agricultural innovations (Jones 1981). Both naked and hulled barley are present with the hulled form being dominant. The change from naked to hulled barley is seen in a number of European countries during the early part of the 1st millennium BC. The dates for Hallshill are thus once again early for this phenomenon. Van der Veen (1992 p75) observes that this change may represent increased emphasis on the use of barley as animal fodder.

Aside from Van der Veen's work, the only attempt to assess the implications of this evidence in social terms is Topping's (1989b) socio-economic model for Northumberland. This model, 'based purely upon a survey of the cord rig sites of Northumberland' (*ibid* p149), proposes that small scale plots of cord rig, mainly associated with open settlements, are representative of 'a group of foragers/pastoralists reliant on the exploitation of wild resources and pastoralism, with only a limited interest in small-scale cultivation and following a more migratory life-style' (*ibid* p150). The more regular field systems associated with enclosed stone-built settlements and "forts" on the other hand, are taken to represent 'a group of predominantly sedentary cultivators who may also have been stockbreeders' (*ibid* p150).

The dangers of basing a model purely on association with what is in Topping's own words 'a form of agriculture which was fairly universal in application and which potentially had a considerable chronological currency' (1989a p171), are obvious. The chronological sequence proposed in chapter eight is one in which there is assumed to have been considerable overlap between different forms of settlement. However, to propose 'symbiotic interdependency' (Topping 1989b p154) between open settlements, which present evidence can barely extend into the middle Bronze Age, and sites such as Woolaw, where the second phase has a *terminus post quem* in the 2nd century AD and the alignment of earlier features suggests direct continuity with phase I, would appear to be beyond the bounds of feasibility.

The surface remains and archaeobotanical results are nonetheless entirely compatible with the indications of small scale, isolated and largely autonomous groups suggested by the spatial analyses in chapter eight. Barrett (1980) discusses the existence of small plots and poorly defined field systems in the earlier Bronze Age of southern Britain. He relates this evidence to Goody's (1976) system of 'hoe agriculture' and suggests that this represents 'a low level of productive investment in the agrarian economy' (Barrett 1980 p80). This is not necessarily the case in the sites under consideration here if one takes into account the role of labour as an investment in itself. It is difficult to imagine that the inhabitants of Hallshill had access to information about, and the means to acquire, new crop types, yet lacked the capacity to produce an ard. Similarly, mixed farming settlements might be expected to possess, if not oxen, at least bullocks, which could be harnessed as traction animals. The sheer investment of human labour involved may have given cereal production a perceived value beyond its worth as a staple food. It has already been suggested (ch 9) that the ability to mobilise a labour force, rather than the availability of land, was the major factor limiting production in the upland zone during the early Bronze Age.

Barrett (1980) goes on to identify core zones (represented by Wessex type artefactual material) and buffer zones (represented by Deverel-Rimbury type artefactual material) in southern England. The buffer zones, although containing the best agricultural land, exhibit a type of agriculture similar to that discussed above and show a close relationship between settlements and cemeteries. The core zones have organised field systems with burials situated on their peripheries. This is strongly reminiscent of the difference between societies having foci and those emphasising boundaries as outlined above and it is not therefore surprising to note that the core areas showed evidence of a far more tightly ranked society.

The early Bronze Age picture in the upland zone of north east England is thus one which continues the Neolithic tradition of emphasising focal points in the landscape (cf Harding 1981) with rock art possibly continuing the ritual expression of this tradition. A case has already been made (ch 9) for society being only loosely ranked or having an egalitarian system of status grading (cf Fried 1960; Binford

1962). Whilst labour may have been at a premium, land was not, and status was not, as Fried puts it, used to 'convey any privileged claim to the strategic resources on which a society is based' (1967 p110). The scale of the productive units in this area means that marriage would necessarily have been exogamous and it follows that, in order to maintain a degree of stability, any inheritance of property or rights must have been unilineal.

If control of, or preferential access to, territory was not a factor (other than in the general sense of identifying with a home area) then the prime motivating force behind social activity was presumably the procurement of suitable mates and hence the increase of the labour force. In Chagnon's words 'out of reproductive inequalities also come economic inequalities.' (1979 p378). The creation and maintenance of marriage alliance networks is the key feature of Rowlands' (1980) "prestige goods" model of Bronze Age society and it appears likely that similar forces were operative in this area.

In Rowlands' model, personal prestige (the product largely of wealth and ancestry) determines success in the forging of suitable marriage alliances. These alliances are established and maintained through the exchange of prestige items according to prescribed social rules. In Rowlands' words, 'Relations of dominance and hierarchy depend directly on the manipulation of relations of circulation and exchange and not on control of production per se.' (1980 p46). He identifies food and prestige goods as different spheres of exchange which are articulated but separate, 'so that wealth from one cannot easily be converted into prestige in the other' (*ibid*). However, the mechanisms by which this process occurs are not made clear since it is also stated that 'Households with most extensive alliance networks are able to benefit not only from increased amounts of bridewealth being paid to them but also from the extra labour power contributed by outsiders to the group who stand in relations of obligation to it ....Hence, since group size determines productivity, larger households will dominate smaller ones through their ability to accumulate more wealth and surplus labour product than they would have to expend to meet their exchange obligations' (*ibid* p19). A direct relationship between the two spheres is thus implied.

It will be argued here that there was indeed a direct relationship between the various spheres of exchange and that the control of information flows was the key factor in the establishment of social hierarchies at this time. Information is, as Moore (1983) and Root (1983) have pointed out, a critical subsistence resource, which mediates the social relations of production. A characteristic feature of the open hunter-gatherer societies discussed above is not only the sharing of material goods but also the free flow of information across the landscape, promoted by the fluidity of group structures. The existence of permanent settlements with a stable population not only creates the conditions for the accumulation and display of wealth, it also results in the structuring of information flows, which will, as van der Leeuw (1981b) points out, be channelled through institutionalised social relationships. Moore states 'information is not free in terms of acquisition costs, it is not distributed evenly over the social or physical environment, nor can it be obtained without creating constraints on the range of future actions.' (Moore 1983 p178).

The way in which information processing requirements regulate group size and the empirical evidence for this as seen in the intra-site patterning of Iron Age and Romano-British settlements, has been discussed in chapter nine. At the simpler, single residence unit level considered here, the centralisation of information in a single social status may from the basis for social inequality. The possession of information necessary for subsistence production and reproduction (eg.the location of groups who could provide suitable mates) may be sufficient to give one group member a senior social position. Exchange of information will then take place with others holding this position to produce the necessary conditions for reproduction. In order for this to take place, those controlling the information must be clearly identified, hence, the role of material culture. Material culture serves as a means of expressing social identity (cf Wobst 1977; Plog 1980) and legitimises an individual's right to carry and transmit that information. As Moore puts it, 'Once an information flow is structured, much of the information concerning distribution of energy and consumers becomes unobtainable unless indexing information - information about the location of information - is distributed.' (Moore 1983 p187). Prestige goods, emphasising an individual's status and contacts, therefore acts as indexing information and competition for these goods is escalated without direct control of production or raw materials having been involved.

The above suggests a means whereby the small early Bronze Age groups of the upland zone, who did not reflect status in the settlement structure and were apparently not competing for land, could give rise to the prestige goods discussed in chapter nine. One further point is worthy of note. A *direct* relationship between various spheres of exchange was claimed earlier. By this it is proposed that, contrary to Rowlands' (1980) model, food was central to the creation and maintenance of prestige. This is a point which will be elaborated later, suffice it to say that even in Rowlands' model "guest-friendship" figures largely. Hospitality and feasting appear as a universal aspect of social relations in sedentary societies. Social status validated by possession of prestige goods would have to be maintained and increased through participation in relations of hospitality between peers.

The range of goods found in early Bronze Age burials in this area and the evidence for the rapid transmission of agricultural innovations in the later Bronze Age, suggests the possibility of far reaching contacts beyond the scope of this thesis to explore. The potential for marked social differentiation between groups however could not be fully realised without a notable increase in group size. This appears to have been attempted during the later part of the Bronze Age as discussed in chapter nine but the existing hierarchical distinctions were not sufficiently great to make the restructuring of groups a straightforward process.

10.3 THE IRON AGE

Iron Age settlement in the area is represented by both curvilinear and rectilinear sites (types C3 - C6 & R1 - R2). Certain associations between field systems and settlements of this period are virtually unknown. The traditional view of Iron Age semi-nomadic pastoralists, epitomised by Piggott's classic description of 'Celtic cowboys' (1958 p25) has died hard in this area. It is now becoming clear that arable cultivation played a significant role during this period.

Palynological evidence (ch 4) shows that by the later Iron Age considerable areas of the Durham lowlands were under arable cultivation and Topping (1989a,b) has indicated a number of cases where traces of cord rig cultivation may be contemporary with Iron Age sites. Consideration of the agricultural potential of the known site locations suggests that even in the upland zone, sites tend to occupy niches favourable for agriculture.

The most detailed look at the nature of and differences in arable farming at this time is however, once again Van der Veen's (1992) study. Van der Veen analysed environmental samples from Murton High Crags, West Dod Law, Chester House and Thorpe Thewles, as well as from Stanwick and Rock Castle, both situated in North Yorkshire just beyond the southern limit of this study. At Murton High Crags, West Dod Law and Chester House six row barley (*Hordeum vulgare*) dominated the cereal record. The majority of this appeared to be hulled barley although the naked variety was probably present in small quantities on all three sites. Both emmer (*Triticum dicoccum*) and spelt (*Triticum spelta*) wheat were present on these sites with emmer being the dominant variety in all cases. Thorpe Thewles however showed a rather different picture. Here, the barley recorded was entirely of the hulled variety and spelt was the only wheat present. This pattern was repeated at both Stanwick and the rectilinear ditched site of Rock Castle.

The differences apparent in these assemblages are particularly significant since there is reasonable certainty that the samples analysed represent contemporary late Iron Age deposits on these sites. Their contemporaneity is not beyond doubt since the estimated likelihood of a pre-Roman date for each context (*ibid* p64) is based on the median probability distribution of the calibrated radiocarbon age. The use of median probability with regard to non Gaussian distributions is criticised in appendix seven but the assumption of a broadly late Iron Age date for the samples does seem valid.

Given the probable contemporaneity of the assemblages, Van der Veen investigated the possibility that environmental conditions could explain the observed differences. After a detailed examination of each location in terms of climate, altitude, length of growing season and soils, she concludes 'neither climatic nor soil conditions, so far as we can assess them from present day conditions, can explain much of the differences in crop type and weed assemblage between the two groups of sites' (*ibid* p150).

What the two types of assemblage do appear to represent are differences in the scale and techniques of crop husbandry. At Murton High Crags, West Dod Law and Chester House (Van der Veen's Group A sites) the evidence is consistent with small scale crop production with soil fertility being maintained by regular soil disturbance and manuring. At the Group B sites (Thorpe Thewles, Stanwick and Rock Castle) however, Van der Veen suggests intensive cropping took place without replacement of nutrients. These conclusions are based not only on the evidence of the crop plants but also on the weed assemblages with Group A sites having high levels of annuals capable of tolerating soil disturbance whilst the Group B assemblages were dominated by perennials. These differences appear to apply only to the wheat fields. The barley fields of Group A sites seem to have received far lower levels of labour input. Van der Veen suggests this reflects its different status as a crop. This evidence may support her suggestion that hulled barley was used as animal fodder. Once again, the role of labour input appears to be a significant factor with the low input, Group B sites seen as representing arable expansion and the Group A sites as maintaining small-scale, labour intensive, conservative practices. This conservatism is further emphasised by the dominance of emmer wheat in the Group A assemblages and the presence of traces of naked barley.

One of the most striking aspects of this work is the distinct correlation between the geographical distribution of Van der Veen's Group A and B sites and the areas of non-hierarchical and developed settlement patterns identified in chapter eight. Although two of Van der Veen's Group B sites lie outside the area under consideration here, it has already been suggested that Thorpe Thewles lay at the heart of a highly integrated, developed settlement system within the hinterland of the Stanwick *oppidum*. Murton High Crags and West Dod Law on the other hand, are typical of the isolated sites of the North Tyne area.

The apparent backwardness of the northern group is however all the more surprising in view of the results from Hallshill discussed above. It is clear that spelt had been introduced to the North Tyne area very early during the 1st millennium BC and that the change from naked to hulled barley was beginning at a similarly early date. Yet in the Tees Lowlands, spelt had entirely replaced emmer wheat by c.300 BC (Van der Veen 1992 p74) whereas emmer was still dominant on the other sites. The absence of comparable assemblages dated to the middle part of the 1st millennium BC prevents any detailed assessment of these developments but the difference between the two areas is nonetheless great and cannot be explained by any advantages of emmer over spelt in the particular environmental conditions.

The spatial diffusion of innovations has formed a major theme of Hägerstrand's work (cf 1967, 1978). He studied the development of new agricultural practices during the first half of this century in Sweden and identified two processes involved; the *dissemination of information* about the innovation and the *adoption* of the innovation. The first process appears to be largely a function of social communication with the effects of the mass media being negligible. Hägerstrand states 'The talking and listening individual is part of a huge world-embracing network of links. Many observations suggest that this network has a definite spatial structure which probably is rather stable, that is, the links connect different places with probabilities which presumably change only slowly and thus are to some extent predictable. For the interpretation of areal differentiation within the anthroposphere, it is a first order necessity to inquire into this field' (1978 p183). The adoption of the innovation depended not only on receiving information about it but on the number of times this information was heard and how the recipient regarded the informant/s. There are thus obvious parallels with the discussion on information flow in the previous section. Further work in this field on a broader scale (Bradford & Kent 1977) also suggested a hierarchical element to the diffusion process with major innovations being accepted first in major centres and then moving down the settlement hierarchy. Hägerstrand's model thus anticipates precisely the response to innovation in the Iron Age settlements of this area. Innovation spreads rapidly in the areas with a highly integrated, hierarchical settlement pattern but far more slowly in the non-hierarchical areas with a low level of settlement integration.

The difference lies not only in the nature of the settlement pattern but also in the nature of the residence groups on individual sites and their social relations of production. The lowland area has been shown to have small, stable population groups and a great deal of continuity with sites being rebuilt on the same spot, all of which connotes ideas of ownership and inheritance. The upland sites on the other hand, have larger residence groups with a far more "communal" aspect. The emphasis is on group identity without any obvious attempt to subdivide this whole. Associated enclosures are likewise on a large scale rather than small plots associated with individual units. It was suggested in chapter nine that this socio-spatial organisation represented a form of organic solidarity (cf Durkheim 1964) based on interdependence, possibly through the division of labour. These differences obviously have implications for the system of tenure in the two areas. Striking parallels may be drawn with Hingley's work in the Upper Thames Valley (1984; 1986a). Hingley identified two distinct spatial formations in his study area which he related to the prevalent mode of production in each. One he identified as individualistic and progressive whereas the other, formed of large corporate groups was rather more "backward" that is to say development was constrained by the interdependence of the members of the community.

It may be jumping onto something of a theoretical bandwaggon to identify the socio-spatial formations in north east England with one or other of the modes of production outlined by Marx. Nevertheless, these modes as abstract concepts, have proved useful heuristic tools in much recent work and form a valid base for broad comparisons. The possible existence of an Asiatic mode of production (Marx 1959; 1964; 1973) is a matter which has been the subject of much debate within Marxism (cf Hindess & Hirst 1975; Gledhill 1984). This mode is characterised by possession rather than ownership. Lands are held in common by extended family or village groups and the major part of production is for direct use. 'In the ancient Asiatic and other ancient modes of production, we find that the conversion of products into commodities and therefore the conversion of men into producers of commodities holds a subordinate place' (Marx 1967 p334). The system is thus based on division of labour with craft workers producing directly for their own community and being maintained by it. This provides a possible model for the "communal" sites of the upland zone.

In this mode, as outlined by Marx, there is no land-owning class distinct from the state, which is able to appropriate surplus from the producers. In this case it is not proposed that the land is 'state property' (as in Hindess & Hirst 1975 p184) nor that any tribute given to a leader is necessarily a form of tax or rent (*ibid* p194). The concept of gift exchange which enhances the prestige of the giver is a possible alternative. We may therefore have room for social and political hierarchy without (as in the earlier model for the Bronze Age) direct control of subsistence production being a prerequisite for power. In this way, isolated settlements could satisfy their own needs and even maintain a centre such as Yeavering Bell, without being integrated into any more developed hierarchy with their immediate neighbours. This form of organisation is a possible "solution" to the problem suggested in chapter nine of households with equal claims to status (which was not based on landholding) residing together in larger groups. The residence group may have held property in common whilst still having an accepted leader and owing allegiance to a wider state/tribe. Competition for prestige between settlements may have been detrimental rather than stimulating (possibly resulting in conflict), leading to a situation which was essentially unstable but static.

The contrast in the lowland zone therefore depends on the relationship between individual households and the community or society. Here, I would follow Hill (forthcoming a) in suggesting that the Germanic mode of production (cf Marx 1964; 1973) is most relevant to individualistic, progressive societies (*contra* Hingley 1984). In this mode, individual households form complete and independent productive units who own the means of production. They therefore exist separately from the community, indeed the community only exists as a result of the participation of individuals in shared activities. The model thus fits the idea of non-spatial sodalities who are integrated by their recognition of shared identity and who combine for ritual activity etc.

That the difference between the two modes of production should not be viewed in any clear cut and simplistic way, is illustrated by the case of Chester House, a rectilinear settlement on the coastal plain. This site was identified by Van der Veen (1992) as having a Group A crop assemblage but a weed assemblage more characteristic of Group B. In spatial terms, the above model would anticipate Chester House being one of the independent household sites. Van der Veen however notes that the number of seeds from this site was fairly small and states that the presence of naked barley is *possible* rather than certain and that emmer is *probably* the more abundant form of wheat. The results are thus not entirely conclusive although the method of cultivation nevertheless appeared to be the less intensive Group B type of cultivation. The structural evidence (ch 7) suggests a small group inhabiting (inheriting?) the site over a period of time. The site on the whole thus bears a greater resemblance to the sites of the Tees Lowlands. Van der Veen (*ibid* p151) suggests it may have been a 'pioneer' site in the process of moving from a Group A to a Group B type of cultivation regime whilst retaining the more 'traditional' range of crops.

10.4 THE ROMANO-BRITISH PERIOD

Romano-British settlement in this area is represented by site types C1 - C2 and R3 - R4. The agricultural regime associated with these sites is being revealed only gradually. The available palynological results can do little more than support the increasing evidence (cf Van der Veen 1983; 1985; 1987a,b) that the major changes in the north eastern landscape and the introduction and spread of new crop types took place well before the Roman occupation. Such evidence as there is for the later recession of agriculture and regeneration of woodland in certain areas is dated to the early Mediaeval period (ch 4). The evidence dating most of Gates' (1982b) Romano-British fields to this period is purely circumstantial, although Topping's (1989a,b) work on cord rig lends weight to the argument. Smith's statement that 'In view of the general absence of storage-pits it seems unlikely that the scope of agriculture exceeded that of subsistence' (1990 p67) can be said only to reflect the ignorance of site formation processes discussed in chapters two and seven.

Van der Veen has carried out only a limited amount of work on sites of this period. She has analysed a number of samples from Thornbrough Scar (Van der Veen 1992). This site (Clack 1984) is probably a rectilinear settlement of Romano-British date with possible Iron Age activity as well. Unfortunately the precise nature of the site is unclear since the excavators had difficulty in distinguishing between archaeological and natural features and little information about the work has yet been published. The archaeobotanical assemblage (dated to the later Roman period) was dominated by cereal grains and chaff with few weed seeds. Four crop plants were present, six row hulled barley (*Hordeum vulgare*), spelt wheat (*Triticum spelta*), rye (*Secale cereale*) and flax (*Linum cf. usitatissimum*). This assemblage could not be compared directly with the late Iron Age assemblages discussed above since they represented a different stage in the crop processing sequence. It did however appear that although the rye (the first record of this crop in the region) was probably produced by the inhabitants of the site, the spelt wheat and barley may have been imported from elsewhere (Van der Veen 1992 p99). The spelt appears to have been produced by the non-intensive method characteristic of the Group B sites discussed above.

Both inter and intra site spatial analyses (chs 8 & 9) suggest a major change in the upland zone between late Iron Age and Romano-British times. The extended family retains its importance as a residence group but the emphasis is now on independent but related units rather than "communal" organisation and the overall settlement pattern is more markedly hierarchical. It is perhaps at this period when the lack of precision in the chronological framework becomes most problematic. The uncertainty about precisely when the change in the upland zone took place, the proximity of the Roman conquest and the difficulty of clearly identifying Romano-British occupation in the lowland zone, make analysis of these developments particularly difficult.

Van der Veen suggests that the similarity between the archaeobotanical assemblage from Thornbrough Scar and those of the late Iron Age Group B sites may indicate that little change in arable farming took place during the Roman period (*ibid* p155). The fact that a site was importing quantities of staple foods does however suggest a departure from the earlier picture. Topping, in discussing arable production in Northumberland, states 'Chronologically cord rig appears to have ended as an arable system on or before the development of the Hadrianic frontier' (1989a p171). This statement is difficult to substantiate since it apparently rests on the relationship between traces of cord rig and Roman military works. The appropriation of land by the Roman army would necessarily put an end to farming in that place and the time lag between the requisitioning of land and actual construction would allow for the build up of wind blown deposits between the two phases of activity. The evidence, however widespread, of the abandonment of arable fields some time prior to building by the military is thus not in itself indicative of the general situation. If however the abandonment of cord rig systems did occur at this time it would certainly have implications for production on the stone-built sites since many apparently did not reach their final form until the 2nd century AD.

This study has so far concerned itself with production in general and arable production in particular; the role of stock breeding has not been singled out for specific attention. One side-effect of the demise of the Celtic cowboy and the importance of Van der Veen's and Topping's work has been a marked shift in emphasis towards discussion of arable farming. This has, to some extent, been matched by a lack of critical assessment of the role of stockbreeding. It is nonetheless probable that mixed farming, with a strong emphasis on the pastoral side, was the main subsistence activity throughout later prehistory in this area. Whatever the relative importance of meat and cereals in the staple diet, there are perhaps additional social aspects to meat production.

Numerous ethnographic studies have documented the esteem in which pastoralists hold their animals (cf Ekvall 1968; Evans-Pritchard 1940; Gulliver 1965; Lewis 1965; Stenning 1965). Most pastoralists do in fact grow crops but regard arable farming as low status work. True mixed farmers may likewise place greater emphasis on one aspect of their lifestyle. The size of herds provides a readily visible measure of wealth and animals may provide a suitable medium of exchange for the fulfilment of social obligations (e.g. payment of bridewealth). Hingley may be stretching the evidence in suggesting that the Irish practice of cattle clientage possibly existed in the Upper Thames Valley during the Iron Age (1984 p82) but parallels for the importance of animals are not hard to find. The "Horned God" of the Brigantes (Hartley & Fitts 1988 p59; Ross 1961) may indeed be one such example. The predominance of hulled barley (probably used for animal fodder) in archaeobotanical assemblages from this area (Van der Veen 1992), is another.

Livestock was presumably of great importance for a variety of reasons throughout later prehistory but it is perhaps during the Romano-British period when this is most evident in the settlement record. There is a great deal of basic similarity between all known Romano-British sites in this area, permitting the identification of a minimum requirement per residence unit of 1 - 2 huts and an enclosed yard, common to all sites (ch 9). A good case has been made by Jobey (1960) for the keeping of stock in these yards and this hypothesis appears to be supported by the preliminary results of phosphate analysis on such sites (Clogg & Ferrell forthcoming). The implication is thus that each residence unit had its own livestock.

The spatial organisation of the settlements serves to emphasise this aspect. The yards are always at the front of the site so that any visitor would have to pass through the yard to reach the buildings. The approach to any site is crucial in creating an impression. Here, the elaborate boundaries of the Iron Age communal sites are replaced by an approach which emphasises individual wealth in the size of the herd. In many rectilinear sites, the main house is entered by means of a raised causeway through the yard. Expansion and further building takes place at the rear of the enclosure and does not interfere with the visual impact of the facade.

This represents a great change in the upland zone and suggests that the previous emphasis on group property was replaced by a system whereby individual residence units *owned* stock. The extended family as a residence group however seems to survive and a degree of interdependence between units is implied (chs 8 & 9). The difference between this mode of production and the independent mode of the lowlands is perhaps revealed in the different spatial requirements on these sites. Rectilinear sites in the lowlands (and those known in the upland zone) have, as well as the basic requirements discussed above, an enclosed area to the rear of the site. This suggests provision for an activity not carried out on the curvilinear sites. This may be some form of horticulture but could equally well be the processing and/or storage of crops. There is evidence for arable cultivation in association with curvilinear Romano-British sites (Gates 1982b; Topping 1989a,b) but it may be that possession of land and arable farming remained in the hands of the community rather than individual households, on these sites.

A further blurring in the distinction between modes of production may have resulted from sites no longer producing all or most of their subsistence requirements themselves. The evidence for this is not great but the indications of a greater level of inter-site integration (ch 8) and the possibility that Thornbrough Scar imported staple foods (see above) may point this way. Such reliance on external exchange would of course imply greater confidence in the political stability of the region.

10.4.1 The impact of Rome

The majority of the previous chapters have been concerned with the visible settlement evidence and the observed changes could not be directly attributed to Roman influence. The Roman/native interface in this area remains a twilight zone where tangible evidence is lacking. Such evidence as there is consists of a thin scatter of Roman goods on native sites and it is through the aspects of production and consumption that the question of Roman/native relations has often been addressed.

The starting point for much of this work has been to try to calculate the size of the Roman army present in this area at a particular time, to estimate its material requirements and consider whether or not these requirements could have been met by local production. It is not intended here to repeat those arguments (cf Breeze 1982; 1984; 1989; Manning 1975; Scott 1983). Suffice it to say that Millett's (1984; 1990) view that local production could readily have met the demands of the army, is now widely accepted and is supported to some extent by Van der Veen's (1990; 1992) analysis of grain samples from a granary in the Roman fort of Arbeia at South Shields.

There is thus no *a priori* reason why the Roman presence should have had a sudden and overwhelming effect on native production and the indications are that the major changes in the scale and nature of food production took place well before this time (see above). There is likewise no evidence for a move towards a market economy or the use of coinage as a medium of exchange. This is perhaps rather more surprising and begs the question of how Roman tax demands were met. Taxation in kind, the *annona militaris*, was probably not officially introduced until the 3rd century AD (Breeze 1984; Millett 1990). However Breeze (1984), Fulford (1981; 1985) and Higham (1986) suggest that taxation in kind probably took place in this area from a far earlier date. Breeze and Higham draw parallels with the Frisii who were assessed for taxation purposes in ox hides (Tacitus, Annals, IV, 72).

There remains the question of to what extent acculturation affected the indigenes of north east England? Romanization has been universally declared a failure in this area. Roman goods are few, the known villas and single town hardly constitute a trend and a case has been made that *vici* were built by the military (Casey 1982) and failed to attract inhabitants from among the indigenous population (Higham 1986).

Perhaps the problem is that to some extent both the pre-existing situation *and* the response to the Roman presence have been attributed, somewhat uncritically, with an excessive degree of uniformity. This study has so far been concerned with localised differences in society and the fact that we are now concerned with a ubiquitous phenomenon, the Roman occupation, and two generalised social groups, the Votadini and the Brigantes, should not be allowed to blur these differences. Broad tribal groupings have not been discussed previously since the evidence for these peoples is literary and epigraphic (and entirely Roman in date). It appears that in eastern England, Hadrian's Wall lay close to, but inside, the northern limit of Brigantia (Hartley & Fitts 1988; *contra* Maxwell (1980) who sees the Tyne as marking their northern boundary), dividing the Brigantes from the philo-Roman Votadini. The Brigantes are generally accepted as representing at most a loose confederation of tribes, and epigraphic evidence (Hartley & Fitts 1988; Higham 1986) hints at similar diversity north of the Wall. This would be entirely in keeping with the settlement evidence. Such diversity goes a long way towards explaining Rome's failure to govern through a system of native civil administration. In Millett's words, 'Rome had reached the limit of the type of social organisation which she could incorporate.' (1990 p100). Nevertheless, it would seem that, whatever broad affiliations these groups had, their response to the Roman presence may be expected to vary in an archaeologically detectable manner.

It is unfortunate that knowledge of pre-Roman settlement in the immediate area of Hadrian's Wall is virtually non existent, but in those areas where the settlement pattern is known in detail (ch 8) a number of surprises occur. The most obvious of these is in East Durham and the Tees Lowlands. During the later Iron Age, this was an area with a well developed political hierarchy, an integrated settlement structure and an expansive economy. In other words, precisely the sort of area where Romanization might be expected to succeed (*contra* Higham (1986) who suggests the *élite* of Northumberland had a suitable resource base from which to develop villas). Yet Stanwick failed to become an urban centre and villa development was almost non-existent. The thriving Iron Age settlement at Thorpe Thewles came to an end, probably during the 2nd century AD. Heslop's (1987) suggestion, that lack of a water supply made the location less than ideal and that the site was eventually relocated nearby, is possible but not altogether satisfactory. The period when the site was redeveloped and expanded during the later Iron Age would seem a more appropriate time for relocation.

In considering the Iron Age in the region (see above), parallels were drawn with Hingley's (1984; 1986a) work in the Upper Thames Valley. The situation in East Durham and the Tees Lowlands was likened to Hingley's individualistic, progressive society, whereas the Northumbrian uplands resembled his communal, backward groups. In a further paper (Hingley 1988), considering the influence of Rome on these social groups, Hingley demonstrates that Romanization in the Upper Thames Valley followed the pattern predicted above. That is to say the area of individualistic sites went on to develop a large number of villas whilst the communal sites showed little evidence of Romanization. Hingley blames the failure of Romanization in the latter zone on the communal division of territory which prevented the accumulation of capital and also on social constraints which may have prohibited the display of wealth in this manner.

The situation in the lowlands of north east England thus becomes particularly dificult to explain. As Millett states 'The answer does not lie simply in native organisation' (1990 p99). It is difficult to escape Millett's conclusion that on the whole, the prolonged military occupation had a detrimental effect on this area (although this effect would not be anticipated as early as the 1st century AD). His contention (*ibid* p100) that the military presence undermined the emergence of civil authority amongst the native *élite*, appears the most likely explanation for the apparent stagnation in this area. The precise mechanisms by which this took place are therefore an important area for future research.

To the north of Hadrian's Wall, the picture is rather different. There is a marked change in the overall settlement pattern (chs 8 & 9) and on present evidence, whilst compulsion or coercion seem unlikely, it is not possible to entirely exclude the Roman presence as a stimulus for change.

The minimalist view of Roman influence is currently fashionable and leads to the assumption that the change in settlement in the upland zone (or the abandonment of hillforts in conventional terms) probably took place prior to the military occupation. There is no real evidence either to support or deny this hypothesis. What evidence there is, suggests that the excavated stone-built sites typical of this period, were not constructed before the 2nd century AD. Furthermore, the frequent association of communal and stone-built settlements may hint at some form of continuity. There is thus a real possibility that communal sites remained in use until Roman times and the converse is particularly difficult to disprove. It has already been argued that the middle to late Iron Age settlement pattern in this area was essentially unstable so the frequent abandonment of sites may be anticipated (the contemporary occupation of all known sites would produce ludicrously high population figures for the area). In this situation, even excavated evidence for the abandonment of many sites during the Iron Age would not confirm that the overall change took place before Roman times.

The nature of this change (ch 8 and above) has been seen in terms of intra-site social relations. It has been suggested that it represents the increased independence of individual households and specifically that livestock was held by households rather than the community. In the absence of evidence it could be argued that the demands of Roman taxation in kind (or the avoidance thereof) may have prompted a change, or that the opportunities provided by the *pax Romana* and a military market for leather, stimulated production. The above suggestions are offered merely as bait; it is clear that far more work on stone-built sites is required. Furthermore, it is not enough to acquire a few dates for the demise of communal sites, we need to be able to see patterns in the development of typical Romano-British sites.

One further aspect of "Romanization" deserving of mention is the consumption of Romanized goods. These goods appear in small quantities on all excavated sites of Romano-British date and are generally of two types, fine ware vessels and personal ornaments. In other words goods associated with feasting/hospitality and goods which might conceivably be exchanged as gifts. The ornaments are mainly glass bangles and beads (forms which occur in various media from the Bronze Age onwards). Tate (1862a) observed that the beads usually occur singly (unlike the jet beads common in Bronze Age burials) and suggested they were amulets rather than simply ornaments. A notable exception to the general pattern is of course Stanwick (where the presence of high status goods in the 1st century BC reflects the importance of external contacts in the maintenance of the more marked social hierarchy noted in chapter eight).

The occurrence of such goods cannot therefore be directly equated with the adoption of Romanized values. The nature of the goods supports the earlier contention that production and consumption were directed towards social rather than economic ends. The goods are part of a social discourse, their procurement was not an end in itself. The new spatial order, most particularly the redefinition of boundaries, would necessitate the renegotiation of social relations. The move towards increased independence of residence units at this time may have prompted an increase in gift exchange and conspicuous hospitality in order to maintain social ties which would otherwise have been endangered by the changes.

This study has emphasised throughout the importance of social considerations in directing "economic" activity. It has examined the link between social organisation and relations of production and considered the role of material culture in articulating the spheres of production and social prestige. It has been suggested that political authority did not derive from direct control of production. Perhaps part of the reason for the changes during the Roman period lay in the difficulty of adapting these relationships to a market type of economy. The demise of the Brigantian *élite* may, as Collis (1984) has suggested, have related to their inability to shift their power base (heavily reliant on the domination of external contacts) to control of land.

CHAPTER ELEVEN

SUMMARY AND CONCLUSIONS

The stated aim of this study has been to produce a comprehensive reappraisal of the prehistoric settlement evidence for north east England. In a wider sense it is an exploration of the ways in which settlement archaeology can be used to write social archaeology and hence to broaden the scope of discourse about the past. It is hoped that viewing the data from a new perspective has helped to throw some light on areas where something of a stalemate situation has long since been reached.

The work started from the premise that attitudes to the data represent one of the greatest problems in this area and that the collection of more data will not significantly advance our understanding of the past until we are both conscious and critical of the conceptual framework in which we place those data. The study has therefore been based entirely on the re-examination of the existing data set.

The first stage in this process was a critical assessment of that data set and the way in which it came into being (ch 2). The factors both natural and anthropogenic which have conditioned site survival and visibility can generally be identified and taken into account when designing research strategies or evaluating their results. More difficult to define, and consequently more of an obstacle to progress, is the way in which our theoretical outlook conditions what is recorded and how it is perceived. The evidence suggests that we tend to find what we expect to find. As our understanding of a particular area, site type or period "progresses", interpretation is based more and more on previous assumptions and becomes further removed from actual evaluation of the data. Hence sites are "named" in advance of any formal analysis of their components. This is illustrated in the high incidence of low lying, circular cropmarks in Northumberland which have been recorded as possible hillforts or defended settlements. The circularity of the argument is compounded by the lack of any satisfactory definition of what constitutes a "hillfort".

Progress will only be made if we can accept that fieldwork is never entirely objective and learn to make explicit the conceptual framework in which we operate. Of relevance to the search for order in the remains of the past is the need to take a broader view of what factors may be involved and on what scale each operates. This can only be achieved by a more integrated approach and hence attention has been drawn to the need to keep pace with developments in other fields. Recent developments in the physical sciences have been noted as being of direct significance to the study of pattern and order. Chaos theory in particular has profound philosophical implications and marks a move away from traditional reductionist approaches towards a new form of holistic science. It ought therefore to be of value in interpreting the space/time patterns found in archaeology. However, the signs are, that as with the quantitative revolution of the New Archaeology, description is already being mistaken for interpretation and the 'geometry of nature' is being used to paint a deterministic/nihilistic picture of human behaviour. Going, in considering the relevance of chaos theory to economic cycles, states 'history, to a significant degree, is a record of human responses to the non-linear behaviour of certain time dynamic systems' (1992 p110) We must not lose sight of the fact that chaos is a mathematical science; it is based on the description of quantifiable phenomena and as such cannot be used to place a control on human experience. The primacy accorded to economic motives in much recent archaeological work has been rejected here and an attempt has been made to envisage a past where people are not merely helpless pawns in an economic cycle.

Many of the deeply entrenched views about the past in north east England are based on assumptions about the environment in this area and its economic potential. This study therefore, whilst rejecting any idea of environmental determinism, sought to take an equally critical look at environmental potential. The factors affecting environmental potential were identified and examined in some depth. Recent work on the geology of the region (ch 3) has illustrated both the diversity to be found within single geological zones and the inadequacy of applying descriptive terminologies based on formations found elsewhere in Britain which may differ markedly from those found in this area. This work, when viewed in conjunction with studies of vegetation and climate (ch 4), highlights the dangers of generalising about broad environmental zones.

A system of assessing environmental potential by scoring individual locations was therefore devised (appendix 2). Above all, this indicates that settlements in the upland zone were generally situated in locations of greater agricultural potential than had previously been thought and that the environment was rarely likely to have imposed severe constraints on human activity. Again this indicates that we should look to social relations of production for an understanding of economic activity. Throughout the Bronze Age the ability to mobilise a labour force appears to have been the major factor limiting productive capacity. In general the analysis also showed a broad correlation between the periods when site locations reached their optimum agricultural potential and the estimated date of those sites.

The initial classification of sites for the purposes of this study was effected on basic morphological grounds recognising that 'the types discerned at the classification stage can sometimes be carbonised into eternal truths and so become the concrete data of the analysis stage which they were never intended to be' (Hayes 1981 p110). It was thus clearly necessary to identify differences which are significant in social terms. Whilst the link between spatial and social order has been stressed throughout this work it is accepted that a wide range of variation around a perceived ideal may be tolerated (cf Fletcher 1977) and it was intended to avoid turning down what Chapman has aptly termed 'the proxemic cul-de-sac' (1988 p29). The plethora of names for site "types" to be found in the published literature e.g. scooped settlement, North Tynedale type settlement etc. do not appear to express any meaningful distinctions between forms.

The open sites (ch 5) are the group on which least archaeological work has been carried out. The distribution and likely currency of these sites has only started to become apparent during the last decade. Traditionally the sites were assumed to be of Romano-British date but investigation has revealed that this form of settlement dates back to the 2nd millennium BC. The distribution of known sites shows a marked bias towards the uplands of Northumberland which is likely to be largely a feature of site survival and visibility.

Various building forms are present on these sites although it is only rarely that different forms are mixed on a single site. In the present state of knowledge it is not possible to identify the significance of the use of one form as opposed to another although some chronological distinction seems likely. A reappraisal of the scale and nature of Bronze Age agriculture in this area is also required since a number of the sites have extensive field systems with evidence for arable cultivation. These sites cannot be so readily split into types as the curvilinear or rectilinear groups but some sites give the impression of having a more formal, planned layout than others and some show a greater distinction between the settled area and its associated fields.

The excavated sites such as Houseledge West and Bracken Rigg show a consistent pattern of early Bronze Age occupation indicated by both C14 dates and artefactual evidence. It may however be that the choice of examples for excavation has inadvertently produced an unduly compressed chronology. Indications from undated sites such as the possible open phases at Burradon and Hartburn and similar sites outside the area of study such as Douglasmuir, suggest that this form of settlement may have continued at least until the early 1st millennium BC. One group of open sites is of demonstrably later date and different character to the rest. These are settlements such as Thorpe Thewles which developed out of enclosed settlements of Iron Age date and this group has been discussed separately.

The group of curvilinear sites exhibit a greater variety of forms (ch 6) although their distribution is once again concentrated in upland areas. This term encompasses the sites recorded previously as "hillforts". The inadequacy of the term hillfort as applied in this area was explored. An examination of the sites so classified failed to reveal any meaningful criteria for inclusion in this group or any significant differences between these sites and many other curvilinear settlements. It was concluded that the term hillfort brought with it a number of untested assumptions and inhibited critical, meaningful analysis.

Although the curvilinear sites form the most numerous group in this area, very few excavations have taken place on sites of this form and all of these have been of limited extent. Work has concentrated on the enclosure boundaries and we know little of the internal layout of many of the sites. It is only relatively recently that fieldworkers have looked for traces of agricultural activity associated with these sites and although the evidence is limited it appears that the scale of arable cultivation was more significant than has generally been thought. A number of site types have been identified with the most significant distinction occurring between those sites having a "communal" aspect and those composed of individual units.

This group of sites covers a lengthy time span from the late Bronze Age through probably as far as the early Mediaeval period. The various forms seem to have some chronological significance: palisaded sites appear to be the earliest form, succeeded first by earth or stone sites of communal aspect, then stone-built sites composed of separate units. It is not however, possible to define the precise limits of any of the forms.

Rectilinear sites form the group on which most archaeological work has been carried out. Sites of this form are known throughout the region but their main concentration occurs in river valleys and in the coastal zone. Excavation has once again tended to focus on the settlement boundaries but some area excavations have taken place in the interiors. These sites tend on the whole to have fewer buildings than their curvilinear counterparts and a proportionately greater enclosed area per building. Extant traces of agricultural activity associated with rectilinear settlements are again scarce but there is a growing body of environmental evidence relating to production on these sites.

A number of types have been identified but unlike the curvilinear sites, these settlements do not exhibit any major change in spatial configuration through time. The rectilinear form appears to have been established by the early Iron Age and to have continued in use until at least the 3rd century AD with the only major structural change being a move towards building in stone during the Roman period.

In the introduction to this work, chronology was identified as the factor generally perceived as the greatest problem in the archaeology of this region. Whilst there is no immediate solution to the lack of datable occupation material on settlement sites, examination of the evidence suggests some new approaches which may be of value and urges caution with regard to some of the material we use as chronological indicators.

Pottery is, not surprisingly, the commonest find on settlement sites in this area and the 'chronological insensitivity' of northern ceramic material is often bemoaned. Although there are indications that middle and later Bronze Age material may be more diagnostic than has previously been thought (ch 5), little such pottery has been recovered from settlement sites. Material which can be roughly dated to the Iron Age is rather more abundant but still cannot be dated with any precision. It is hardly surprising therefore that the durable and readily visible pieces of Roman pottery have tended to assume undue prominence as chronological indicators. Two points are worthy of note: firstly the material recovered from excavation cannot be taken as generally representative of normal occupation debris and secondly an absence of Roman pottery need not mean lack of contemporary activity on a site.

To deal with the second point first, most of the datable finds from north east England are of late 1st or early 2nd century date. The virtual absence of recognisably later material does not indicate an abrupt change in the settlement pattern after this period. Going has drawn attention to the cyclic nature of Roman pottery production and states, 'Taken as a whole, the evidence suggests that pottery supplies to Highland Zone sites were not particularly constant and that at times the populace of quite large tracts of the Province may have been unable to obtain pottery for their domestic needs' (Going 1992 p94).

The first point is one which has been made throughout this work, that as yet we still have a very poor understanding of site formation processes. Domestic sites in this area have almost invariably been viewed as straightforward, the homes of people who, although they dressed and spoke differently, were basically "people like us". Material recovered from such sites is thus the debris of normal daily life. The evidence however suggests the contrary, that deposition in archaeologically recoverable contexts was an infrequent occurrence and that the remains we excavate were deliberate, structured deposits (chs 2,7 & 9).

The paucity of material from excavated sites ought to suggest as much. To take as an example rectilinear sites (the only group to have been investigated in any numbers), most of the material recovered has come from the boundary ditches and in particular the ditch terminals. Ritual activity associated with boundaries is well attested both anthropologically and archaeologically yet the material has never been viewed in this light. The material will remain an enigma until an attempt is made to interpret its presence and absence in terms of an act of intentional deposition.

It has been evident for some time that occupation debris is rarely recovered from those areas which usually attract the excavators' attention. The virtual existence of a standard "template" for the positioning of excavation trenches has already been noted (ch 7). Rome-Hall's (1884) discovery of a 'kitchen midden' outside the entrance at West Gunnar Peak ought to have alerted excavators to the possibility of activity beyond the settlement boundary but this has never been followed up.

The approach taken in this study was not to understate the paucity of the dating evidence but to attempt to demonstrate that the relative chronology is not so poor as to entirely inhibit the study of broad processes of change. Indeed the reverse proved to be the case in that an overall view of the evidence revealed patterns and anomalies in clearer definition. The initial approach was to map out the existence of different phases of settlement and also use these phases to construct a matrix of stratigraphic relationships thus giving a three dimensional picture of those relationships (ch 8). Although the relative chronology could not be placed within absolute time limits, the patterns within it were remarkably consistent. These phases of activity also revealed a considerable difference between sites in the upland and lowland parts of the region. The upland zone showed a high level of settlement mobility whereas the lowland zone sites often exhibited a long history of rebuilding on the same spot. This pointed the way for further investigation into what this might mean in social terms such as the degree of potential stability and differences in systems of land tenure.

A basic premise of this work has been that spatial and social order are inextricably linked and that a study of spatial relationships provides the most effective means of gaining an understanding of social organisation. Such relationships need to be viewed on a variety of scales to give a total picture of the structure of society and to this end spatial patterning was examined at both inter-site and intra-site levels.

Sites were first considered as "places" within a landscape looking at examples of the way in which activity in a location gives that location an identity. It then becomes a place and as such it is a meaningful context whose identity structures future activity there.

Whilst it has already been stated that description is not explanation, spatial patterns are phenomena which readily lend themselves to quantification and some form of descriptive autonomy is required before such phenomena can be compared and analysed in any meaningful way. For the purpose of comparing patterns in the landscape, a technique based on rank size analysis was developed and then applied in a series of case studies.

The results were considered in terms of the relative chronology discussed above in phases corresponding roughly to the Bronze Age, Iron Age and Romano-British periods. The data for the Bronze Age could not be directly compared with that for the later periods since different criteria were being measured. The general picture however was one of small scale, autonomous social groups with a low level of inter settlement integration. This pattern was consistent throughout all of the areas examined although all were in the upland zone and comparative evidence for the low lying parts of the region was lacking.

A much fuller data set is available for the Iron Age and analysis of this evidence revealed considerable differences throughout the region. In the upland zone, the picture remained one of highly autonomous, isolated groups with a low level of interdependence and integration. There is little differentiation in site size and no evidence for any form of settlement hierarchy. Such evidence demands a reappraisal of the traditional view of Iron Age settlement in this area which sees "hillforts" as relating to the centralisation of authority and the control of territory, albeit on a relatively small scale. This view is expounded by Smith, who states, 'The inception of the hillforts marks a clear step towards the emergence of an hierarchical society and one more closely geared to resource management, land allotment and territoriality at a regional level' (Smith 1990 p45). He also states that these sites were 'the primary centres in a hierarchy of settlement types disposed about their hinterland and dependent on them' (*ibid* p61). The implication is rather that these sites represent the farms of extended family groups and that any display of status or small scale raiding took place between peers without altering the balance of power. Only Yeavering Bell stands out as having any kind of special status and even this does not appear to have been based on actual control of resources.

There are however indications of a rather different situation in the eastern part of County Durham. A greater range of site sizes is evident here and locational analysis hints at regularities in the spacing of sites. The results suggest that a hierarchical system was developing at this time with a higher level of inter-site integration and interdependence. These developments have been linked to the rise of Stanwick as a seat of power by the 1st century BC and the emergence of successful rural settlements such as Thorpe Thewles with a network of external contacts.

The Romano-British period sees considerable changes across the region and it is unfortunate that these cannot be precisely dated. Developments in the area to the north of the Tyne resulted in a settlement pattern which was markedly more hierarchical in character although still retaining some of the characteristics of the earlier configuration. The largest sites in the region are still smaller than would be predicted in such a pattern. The absence of any new primate centre suggests that these changes arose out of developments in the internal relations between sites rather than as a result of external contacts. There are however hints that Yeavering Bell may have continued to maintain a special position in the settlement hierarchy. These results have a direct bearing on the question of contemporaneity of sites. The evidence suggests that the numerous small sites were in contemporary use since individually they are too small to be viable within that settlement pattern.

If the north Tyne area is split into its upland and lowland zones, marked by the predominance of curvilinear and rectilinear sites respectively, then slight differences in the overall pattern are apparent. The lowland sites have less of a hierarchical configuration implying greater independence whereas with the upland sites, the distinction in settlement sizes is far greater. The precise reasons for the greater interdependence of sites are unclear but it may be that settlements were no longer producing all of their subsistence requirements themselves relying instead on exchange to meet their needs.

To the south of the Tyne there are again indications of local differences but here the evidence is far less substantial. In the Pennine uplands there is no sign of the increase in settlement integration seen elsewhere in the region. The pattern remains one of small, isolated units which appear to have existed on the periphery of a settlement system. In the lowlands of this area the evidence is insufficient to define all the elements of the contemporary settlement pattern. The implication of this is either that many earlier sites continued in use without major structural alterations or that many stone built sites similar to those in Northumberland have been destroyed by later activity.

One group of sites formed an anomaly in the observed patterns. The known palisaded sites do not on their own form a coherent phase of settlement. They exhibit a wide range of sizes without there being any question of either a primate centre or interdependence of smaller sites suggesting that they represent a number of different phenomena. Certain of the sites may be seen to have internal similarities and a model for the development of this group has been proposed (ch 9) but further work on palisaded sites as a whole should be seen as an important research priority.

Having analysed the broad changes in the landscape through time, the study then focused on intra-site patterning in order to take a more detailed look at the relationship between social organisation and the built environment (ch 9). It has been suggested that the morphology of the social landscape altered over a lengthy period with the initial emphasis on focal points in the landscape gradually giving way to an emphasis on boundaries. The concept of positive and negative space was introduced in relation to open settlements and it was suggested that the distinction between different types of space increased during the course of the Bronze Age.

The origins of enclosed settlement were considered and it was proposed that their development relates to changing social organisation and the need to express the corporate identity of newly formed social groups. The change appears to have involved an increase in the size of the group resident on an individual settlement. Such a change would have necessitated a re-ordering of social relations in order to structure these groups and the possible mechanisms whereby this might have taken place were examined.

The creation of a marked boundary formed an essential part of the definition of a new type of social arena. Attention has been drawn to the ritual associations of boundaries and the existence of probable ritual deposits associated with settlement boundaries in north east England. The existence of a boundary demands the formalisation of proxemic order within the settled area and hence differences in the use of space within the enclosed area may reveal much about social order.

Enclosed settlements were examined in terms of their ratio of built to unbuilt space (BUB). This information was plotted out and the sites could be seen to form distinct groups which clearly related to the morphological divisions proposed earlier in this work. The type C3 palisaded sites were identified as representing a major dislocation in the settlement record and it was proposed that in many cases their spatial configuration was not socially tenable and the sites were short lived.

The occupants of curvilinear and rectilinear sites were seen to have different spatial requirements and the desire to maintain spatial order was a recurring feature on rectilinear sites. Whilst the layout of curvilinear sites was less formal, there still appeared to be some factor limiting the number of residence units per settlement. This was related to the level of social organisation necessary to structure the group and it was suggested that the single extended family usually marked the upper size limit of a residence group. The two different social formations in the area, represented by their particular spatial configurations, were related to the cohesive principles of organic and mechanical solidarity. The groups inhabiting curvilinear sites were structured according the principle of organic solidarity based on co-residence and the division of labour whereas those on rectilinear sites were integrated by cross cutting ties of belief and a recognition of shared identity.

The inadequacy of attempting to view society as a product of its economy has already been stressed in this work. The spatial analyses outlined above combine to give a picture of social organisation which may then be used as a basis for further investigation into aspects of those societies. This approach was illustrated by an examination of "economic" activity in terms of the social relations of production (ch 10).

The social groups identified by spatial analysis were compared to the different modes of production proposed in recent archaeobotanical work. The importance of marriage partners and information as critical resources were stressed. It was suggested that the control of information flows was of vital importance in the creation and maintenance of social hierarchies during the Bronze Age. Information flow was seen as the key factor articulating the spheres of subsistence production and exchange of prestige goods to create the circumstances necessary for hierarchical distinctions.

The archaeobotanical record for the Iron Age in north east England (Van der Veen 1992) revealed two major forms of arable cultivation in contemporary use. One was seen as a progressive, expansive mode of production whilst the other maintained labour intensive, conservative practices. The spatial distribution of these progressive and conservative groups matches that of the different social formations already identified in this study.

The conservative regime was associated with the extended family groups of the curvilinear sites. These groups appear to have held property in common and their mode of production may be seen to resemble the Asiatic mode outlined by Marx (1959; 1964; 1973). In contrast, the independent settlements of the rectilinear group resemble Marx's Germanic mode of production (Marx 1964; 1973) in which single households form individual productive units who own their means of production.

The change in spatial configuration during Romano-British times appears to be matched by the spread of a regime more akin to the Germanic mode of production into the upland zone. The importance of stock breeding at this time is emphasised in the settlement form. Although the extended family survives as a residence group, it appears that livestock was owned by individual households rather than the community. There is still a high degree of interdependence between the units and it may be that land was still held in common.

The role played by the Roman presence in these developments is obviously a matter of great interest and here the lack of definite dates for the observed changes does present an obstacle to detailed analysis. It is accepted that there is no *a priori* reason why the demands of Rome should have necessitated major changes in the native pattern of production but the current tendency is perhaps to understate the effects of the Roman occupation. The title of Higham's (1986) chapter on the period: 'The Roman interlude', illustrates this trend well. It has been demonstrated that the native societies of this period exhibited a great deal of localised variation. Their response to Rome and its archaeologically detectable effects might therefore be expected to show similar variation. A blanket response tantamount to over three centuries of apathy cannot be the whole story.

This study has attempted to analyse social landscapes over a lengthy period of time. Critical examination of the data set and the research strategies which gave rise to it form an essential part of this work. The fact that the areas selected as having suitable data sets for spatial analysis (ch 8) exclude the known *vici* is coincidental yet the present distributions must surely reflect to some extent the dichotomy between prehistoric and Roman archaeology. Combined research strategies are needed if we are to build a complete picture of social interaction. Only then may we be able to adequately evalute claims that the *vici* were simply imposed on these landscapes and failed to play any meaningful part in their development (cf Casey 1982; Higham 1986).

The Roman/native interface is an area which has often been treated in a rather simplistic way. Either societies became Romanized or they did not. 'Rome, or her agents, are seen as the donors of a culture which is represented in its purist form at the core of the empire. That culture is then spread with varying degrees of success, into newly dominated regions' (Barrett 1989b p235). A critical examination of the evidence suggests that contact with Rome did result in profound change in the native societies of this area but that current acculturation-based theory is inadequate to analyse this relationship in a meaningful way.

It would appear that in the south and east of the region the military presence, rather than reinforcing the position of the native *élite* and fostering a system of civil administration, actually undermined a well developed social hierarchy and led to the stagnation of a flourishing economy. The mechanisms whereby this took place form an important theme for future research not only to aid the understanding of the archaeology of this area but also to broaden our whole perspective on the field of culture contact.

In contrast, the construction of the Hadrianic frontier may have had less of a detrimental effect on those to the north of the boundary. In this area the settlement pattern became more hierarchical, there was a greater degree of inter-site integration and individual households became independent, property owning units. The available dating evidence points to the Roman presence as a catalyst for change yet it is still nonetheless difficult to view these changes under the heading of Romanization. The villas, towns and outward trappings of Romanized society seen in southern England are absent from this area and the observed developments do not appear to relate in any way to the adoption of Roman values. The procurement and use of Roman goods seems rather to have taken place within the existing cultural framework. The goods formed part of the discourse whereby social relations were renegotiated as an ongoing part of the structural change.

The present study has attempted to put people into the later prehistoric landscapes of north east England. It has emphasised the importance of the theoretical background to any archaeological study and has tried to envisage a past which is not simply a pale reflection of the present. It is hoped the work has shown that settlement morphology is a valid base for the study of social interaction. An initial study of settlement morphology has been developed into a study of spatial patterning on a variety of scales and these patterns have been shown to relate to the organisation of society. The economy of these settlements has been considered not as an extraneous force but in terms of social relations of production. It has thus been possible to sketch a broad outline of the different social formations in the region and their development through time.

The picture is as yet no more than an outline though the gaps in it serve to highlight areas where further work might be productive. The specific areas where knowledge is lacking, particularly in terms of details of form and chronology, have been noted already (chs 4,5,6,7,8 & 9) and will not be repeated here. There are however some broader issues which need to be addressed if advances are to be made. These all relate to the construction of a sound theoretical framework for future study. We must dispel the myth of objective fieldwork and produce research strategies in which both the methodology and the conceptual background are made explicit. We must likewise realise that the construction of settlement or artefact typologies is not an end in itself and should only serve as a means to understanding social behaviour. Everything from pottery forms to pit fills requires social theory to place it in a meaningful context and such theory must allow for a past world-view which may be far removed from our own experience.

Whether the approaches used in this study are seen in time to be fruitful new directions or mere cul-de-sacs, they may at least be of some value in introducing a note of optimism to research in north east England. We have in this area a remarkable data set whose possibilities are by no means exhausted. It offers a unique opportunity to those with the vision to interpret it.

'What I resent is that the range of your vision should pretend to be the limit of my action.'

(Henry James, Roderick Hudson)

LIST OF ABBREVIATIONS

AA	Archaeologia Aeliana
BAR	British Archaeological Reports British series
BAR IS	British Archaeological Reports International series
CBA	Council for British Archaeology
DAJ	Durham Archaeological Journal
HBNC	History of the Berwickshire Naturalists Field Club
PPS	Proceedings of the Prehistoric Society
PSAN	Proceedings of the Society of Antiquities of Newcastle
PSAS	Proceedings of the Society of Antiquaries of Scotland
TAASDN	Transactions of the Architectural and Archaeological Society of Durham and Northumberland

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