CHAPTER 4

The wider context of the coastal archaeology of NE England

4.1 The Prehistoric Period [1]

4.1.1 Early Prehistory

Between *circa* 24000 and 13000 cal BC an ice sheet originating in southern Scotland and northern England spread south as far as the Midlands. If there has been any human settlement in the NE before this the ice sheets removed all evidence. This advance marked the maximum stage of the Last Glaciation, and is known as the Dimilington Stadial after a site in Holderness. The ice sheet reached its maximum extent *circa* 16000 cal BC but had mostly wasted away except from the extreme uplands by about 11000 cal BC. A return to cold conditions resumed between about 9000 and 8000 cal BC (Jones and Keen 1993, 171) but it is unlikely that much of NE England experienced glacial conditions at this time. The earliest unequivocal evidence for a human presence in the region comes with this melting of the ice.

This earliest evidence comes from a group of bone and antler tools found in Victoria Cave near Settle in North Yorkshire, several of which have been radiocarbon dated. It appears that small bands of hunters began to shelter in the cave from about 12,000 BC onwards, during the latter part of the Lateglacial Interstadial. This was not an isolated case but part of a wider movement, similar finds having been recovered from Kinsey and Kirkhead caves to the west while an antler spear point from Gransmoor to the east has also been dated to about 12,000 BC (Tolan-Smith, C. and Bonsall 1999). These hunters belonged to the Late Upper Palaeolithic and stone tools ascribed to this period have been found as far north as the valleys of the rivers Tees and Tyne. This extension of settlement towards the north was part of a movement taking place on a Continental scale, the spread of population in the British Isles being paralleled by similar movements in the Low Countries and Scandinavia. At this time the low sea levels of the Lateglacial meant that Britain remained joined to the Continent, the bed of the North Sea being a vast area of low lying ground consisting of gravel ridges, wide estuaries and salt marshes (Chapter 3 and Coles 1998). The discovery of an antler spear point similar to that from Gransmoor in the net of a trawler fishing on the Leman and Ower Bank documents the presence of humans and stresses the unity of this movement into the more northerly latitudes of western Europe.

In NE England the landscape at this time was mainly open, the pollen record being dominated by grasses and shrubs such as crowberry. In certain locations, such as on the modern coastal plains, around the margins of Lateglacial lakes and in sheltered valleys birch woodlands were becoming quite extensive.

The first arrivals moving into this landscape were pioneers in the true sense of the word moving into an unfamiliar world the opportunities and dangers of which had to be learnt about. Their impact on the landscape was slight and is likely to have been mainly in the

[1] This section is to a large extent based on Tolan-Smith 2006

temporary disturbance of game herds and the rather more long term disruption of vegetation in the vicinity of their campsites. The need for firewood to provide warmth, light and protection from predators was of paramount importance in determining where a band of hunters could halt and the exhaustion of supplies of firewood was a major incentive to move on. In the sparsely wooded landscape of the Lateglacial, human impact on the vegetation may not have been totally insignificant. We may be certain that areas with a good supply of firewood would become well known and would have quickly emerged as specific named 'places' to which groups would return at intervals. It is also likely that areas of disturbance would be recognisable to other groups and would have contributed towards the emergence of a proprietorial sense of territory.

4.1.2 The Mesolithic Period

The earliest securely dated evidence for a human presence in the NE comers from the Mesolithic site at Howick on the Northumberland coast which has been dated to *circa* 7800 cal BC. The evidence at Howick consisted of a large number of stone tools and traces of an oval hut. This site, and its relationship to the coastal landscape, is considered, in detail in Chapter 8.

The Mesolithic, or Middle Stone Age, people who settled at Howick were hunter-gatherers who had to adjust their economic strategy to the seasonal variability of resources. Whether this involved the degree of mobility once supposed, based on ethnographic parallels mostly derived from environments such as sub-Saharan Africa, Australia and the Arctic, is open to reconsideration. Conditions in temperate mid-latitude Europe may have allowed a greater degree of sedentism, particularly for those groups based on the coast, but demonstrating the year-round occupancy of a site is rarely possible. What is certain is that hunting and gathering 'task groups' roamed widely, foraging across territories that could be tens or hundreds of kilometers in extent.

An insight into the degree of mobility experienced by these hunter-gatherer task groups is provided by the distribution of raw materials. Over 70% of the raw material used for flint working on Mesolithic sites in the Wear Valley originated in the Yorkshire and Lincolnshire Wolds (Radley and Mellars 1964). Mesolithic flint scatter sites are evidence of a penetration of the uplands by groups from the coastal lowlands. Evidence of this deep penetration is provided by a number of sites at significantly higher levels such as Warcock Hill at 380m and Lominot at 426m, both in the Pennines west of Huddersfield. The finds from these high level sites are mostly of hunting equipment, or the debris produced in its manufacture. Given the hostility of the climate on such upland fells, and it would have been even more rigorous at times of low sea level, it is assumed that these sites were occupied during the summer by groups who spent other times of the year in the river valleys or by the coast.

Today, the uplands of the Pennines and North York Moors are characterized by openness where broad expanses of heather extend from horizon to horizon. They are regarded as 'areas of outstanding natural beauty' and have been formally designated as such where they lie outside the boundaries of the various National Parks. As landscapes they are certainly outstanding and in the eyes of many also beautiful but their status as 'natural' requires a closer look. At the time the Mesolithic hunter-gatherers were probing the uplands of Teesdale, Weardale and Tynedale these fells were less open than today and were being

aggressively colonized by scrub vegetation consisting mainly of hazel and birch. There is good evidence from the study of pollen cores from both the Pennines and from similar locations in the North York Moors, that steps were being taken to check this development and that hunter-gatherers were using fire to create and maintain clearings and suppress the tree line (Simmons 1996, 5). Although this may at first seem to be a rather destructive activity it is well established that vegetation quickly recovers after burning and that the fresh new growth is highly nutritious. Such areas of new growth would undoubtedly have been attractive to game and would also have facilitated both the search for and the pursuit of it. It is also the case that burning stimulates the hazelnut crop and hazelnuts are one of the few plant foods regularly recorded on Mesolithic sites.

In the uplands, as in the lowlands, the pattern of land use during the Mesolithic was one of the seasonal movement of hunter-gatherer task groups making tactical use of a range of resources as they became available. In both contexts landscape modification and manipulation was taking place but whereas in the lowlands the cycle of clearance was matched by one of regeneration, in the uplands, with their thin soils, clearance was followed by degeneration. In many of these areas once the tree cover had been removed it was unable to re-establish itself. Against a background of a generally deteriorating climate after about 8000 BC the long term trend was the development of heather-grass moorland on mor humus soils. These upland landscapes, so admired today for their openness, are partly artefacts of human endeavour.

4.1.3 The Neolithic and the Early Bronze Age

Two of the most significant developments that have affected the landscape over the past ten thousand years are the Industrial Revolution of the C18 and C19 and the adoption of farming, also regarded as a revolutionary change, during the fourth millennium BC. At 5000 BC England was a land of hunters and gatherers and had been so for at least seven thousand years. Over those millennia the landscape had evolved into a mosaic of open uplands, areas of secondary woodland regeneration and primeval wildwood, although by the end of the sixth millennium the latter may have been in rather short supply. Dotted across this landscape were clearings at various stages of regeneration, some freshly cleared others reverting to impenetrable scrub but all clearly bearing the signs of human activity. A view towards the horizon in any direction would have revealed columns of smoke, either from camp fires or from areas of woodland being cleared, perhaps for a second or third time. However, by recent standards, the population was sparse. Precise figures are unattainable but a reasonable estimate would place the population of the NE between 250 and 500 people living in groups of various sizes which probably fluctuated throughout the year (Smith 1992). By 4000 BC food production, or farming, had been adopted in many areas and the old symbiotic relationship of the hunter-gatherers and their landscape was to change for all time.

In British prehistory the introduction of farming is associated with the Neolithic period, or New Stone Age, and the transition between these two periods has for long been regarded as fundamental. Although the species of crops and domestic animals involved were not native to Britain and had to be introduced from outside, perhaps involving some limited immigration by colonists from Continental Europe, it is thought that this was a piecemeal process and that the spread of farming was mainly due to the selective adoption of novel resources and practices by indigenous Mesolithic communities. It is likely that some

population movement and displacement did occur as groups adopting Neolithic practices sought the most favourable land, but this was a gradual process spanning generations and the old rigid distinction between the hunter-gatherers of the Late Mesolithic and the farmers of the Neolithic can no longer be maintained. Hunting and gathering continued long after the end of the Mesolithic with some Late Mesolithic practices such as forest clearance, the stimulation of the hazelnut crop through burning and the selective culling of herds of herbivores, prefigured primitive farming in their impact of the landscape. As in the Mesolithic, sources of raw materials used in the Neolithic were widely scattered. For example, 45% of the stone axes found in Yorkshire are made from material quarried at Great Langdale in the Lake District while small numbers come from as far afield as North Wales and the Whin Sill in Northumberland. This period continues to be one of mobility, of communities continuing to hunt and gather but also beginning to practice some herding and possibly sowing a few crops in small clearings.

There is little direct evidence for farming practices in the NE during the Neolithic or even in the subsequent Early Bronze Age. Disturbance of the vegetation can be identified in some pollen profiles but it is not known whether this was to create primitive fields or simply a continuation of Mesolithic woodland management. It is also the case that the pollen profiles in question mainly come from upland locations which are unlikely to have been particularly attractive to early farmers. Woodland management or clearance is implied by the discovery of stone axes which, although also found in Mesolithic assemblages, are a key artefact type of the Neolithic. A study of the distribution of Neolithic stone axes from Northumberland and County Durham has revealed an interesting pattern (Burgess 1984, 133-7). Few finds have been made either on the heavy boulder clay soils of the coastal plain or in the uplands above 300m. The most favoured locations appear to have been the upland fringes around the 120m contour and the south facing slopes of the major river valleys. These axe finds may document the main areas of Neolithic agricultural activity.

An extensive programme of archaeological field survey in the Tyne Valley has documented widespread evidence for Late Mesolithic and Neolithic and Early Bronze Age activity (Tolan-Smith, C. 1996). While this evidence was widespread two interesting, albeit tentative, conclusions emerged from the analysis of these data. First, that whereas evidence for Mesolithic activity could be found almost anywhere evidence from the Neolithic and Early Bronze Age was more restricted. Typically, the *foci* of activity during these later periods tended to be in locations with a south easterly aspect situated at altitudes of between 100m and 130m above sea level and between 1.5km and 2.5km from the River Tyne. Secondly, there was found to be a less than expected degree of overlap between Mesolithic activity and that during the Neolithic. As communities began to invest an increasing amount of effort in food production they will have become more sedentary; crops take months to ripen and herds need to be closely controlled or confined for their own security. It is also the case that whereas during the Mesolithic it was possible to hunt and gather widely, some parts of the landscape, in terms of soil type, drainage and aspect, are more suited to farming than others. Areas in which the primeval wild wood had been replaced by impenetrable secondary scrub would be found to be particularly unattractive to early farmers. These factors can be held to account for the more concentrated nature of evidence for Neolithic and Early Bronze Age activity and for the lack of overlap with the Mesolithic.

Notwithstanding these distinctions, the landscape of the Neolithic differed little from that of the Late Mesolithic. With the exception of the uplands, which remained open, the landscape was still mainly wooded though most of this woodland was now secondary and some areas were probably choked with scrub. Inroads were also being made into the woods by the depredations of browsing and grazing livestock. Clearings were the main evidence for human activity and these were kept open for longer periods until soil exhaustion required an episode of abandonment. In some favoured areas clearings became more numerous and coalesced to form larger open spaces. Clearing land for cultivation involved an investment of labour that communities are unlikely to have wanted to squander, a concomitant of which will have been a growing proprietorial sense. Whereas hunter-gatherers world wide express a sense of identity with the landscape and see themselves as part of it, in the case of farmers this sense of identity manifests itself as territoriality. Farmers own land, hunter-gatherers dwell in it.

As we have seen, if it was simply a matter of reviewing landuse practices it would be difficult to draw a distinction between the landscapes of the Mesolithic and the Neolithic and Early Bronze Age. An exception might be granted in the case of the spread of cleared land, although in the NE clearance remained on a small scale until at least the later part of the Bronze Age. What does enable a clear distinction to be drawn is the construction of ritual or symbolic landscapes, a wholly new phenomenon. While we know that hunter-gatherers imbue their landscape with deep symbolic significance it is not until the Neolithic and Early Bronze Age that communities began to modify the meaning of their landscapes through the construction of ritual and symbolic monuments, sometimes on a vast scale.

Throughout the British Isles one of the defining components of the Neolithic and Early Bronze Age is the construction of burial monuments, initially to accommodate multiple burials but by the end of the third millennium often containing just a single interment, probably of a high status individual. In the NE the early stage in these developments is best represented by the earthen long barrows A recently investigated site of this type is that at Street House, Loftus in the former county of Cleveland, dated to *c.*3600 BC (Viner 1984). Further north, the stone built long cairns of Northumberland, such as the Devil's Lapfull at Kielder , are probably equivalent structures, though none of these have been studied in recent decades (Masters 1984).

Burial monuments were not the only artificial structures in the landscape of the fourth and third millennia BC. In southern and central England hill tops and promontories were enclosed by circuits of earthwork banks and discontinuous ditches known as causewayed enclosures. These sites were probably the scene of both secular and ritual activities and almost certainly functioned as central places to which communities were drawn from a wide area. No certain example of a causewayed enclosure has been identified in the NE, though two Neolithic ditch segments identified below the Roman fort at South Shields have been advanced as a possible candidate.

This is not the case with the second category of earthwork enclosure dated to the Neolithic and Early Bronze Age, henge monuments, and a major group of henge monuments has been identified in the Milfield Basin in Northumberland. Henge monuments consist of circular or oval enclosures surrounded by a bank and a ditch which is usually on the inside of the bank, indicating that a defensive function is unlikely. Henge monuments can have one or two entrances, in the latter case usually on opposite sides, and in their interior can include a

variety of structures in either stone or timber. Stonehenge is, of course, the most famous example though it is unique in the elaboration of its internal structures. Most henges incorporated simple circles of undressed stones, timbers or even pits. Their size varies enormously with diameters ranging from over 500m to a little over 10m and they are commonly associated with monuments of other kinds including burial mounds and the enigmatic cursuses, pairs of parallel ditches running for hundreds, and sometimes thousands, of metres across the landscape.

The Milfield Basin is about 35km^2 in extent and lies below the north east flank of the Cheviot hills in the north of Northumberland, 23km south of Berwick-upon-Tweed. It occupies the site of Lateglacial Lake Ewart and consists mainly of alluvial soils and gravel terraces. Research over more than a century has recorded, on the ground or from the air, traces of six henge monuments in a linear arrangement extending for 2.5km down the western side of the basin while a seventh example lies 2km to west in the valley of the River Glen at Yeavering (Harding 1981;Waddington 1999). These were all earthwork structures, now mainly ploughed flat, and incorporating arrangements of posts and pits within their interiors. They are also associated with other monuments including burial mounds, alignments of pits and a putative 'processional way' linking the henges. These henges vary in size with overall diameters ranging from 100m at Coupland to 35m at Milfield North. Numerous radiocarbon dates have been obtained and it appears that the complex was at its most developed between *circa* 2400-200 cal BC, though significantly earlier activity is reported from the Coupland henge. The extent and inter-related nature of the Milfield complex implies that these monuments were erected in an open landscape, a view supported by pollen analyses from the area. These data also testify to small scale clearance for agriculture taking place during the fourth millennium BC with a significant expansion out of basin into the surrounding uplands during the later third millennium when the monument complex was at its most fully developed.

As elsewhere in England the floruit of henge building had passed by the end of the third millennium and other, also probably ceremonial, structures had begun to take their place. The best known are the stone circles, some of which were erected within earlier henges. However, stone circles are rare in the NE with only one possible example recorded from County Durham. Northumberland is rather better served with several classic, albeit small, circles such as those at Threestone Burn and Duddo, both near Wooler with thirteen and five stones respectively. There are also several settings of just four stones such the Goatstones near Simonburn.

What the region lacks in stone circles is compensated for by the richness of its Neolithic and Bronze Age rock art. Throughout the sandstone areas of Northumberland numerous rock surfaces have been carved with groups of semi-circular hollows known as cup-marks which are often surrounded by one or more rings, giving rise to the term cup-and-ring marks. No convincing explanation has been suggested for the meaning of these carvings and in recent years research has tended to focus on their context within the landscape. It has been found that they are not randomly scattered but are usually sited at significant or prominent places such as on scarp lines, on cols or at locations where several valleys converge. They may have been territorial markers or recorded a mythological dimension to contemporary communities' experience of the landscape.

Round barrows or cairns of Early Bronze Age date are widespread in the NE, occurring singly or in cemetery groups. Size varies considerably, some being up to 20m across and incorporating numerous inhumations and cremations while others are tiny by comparison, such as the recently excavated ring cairn at Birkside Fell in the North Pennines which is only 4m in diameter and covered a single cremation in a pottery urn (Tolan-Smith, C. 2005). Evidence from buried soils and pollen analysis suggests that these barrows and cairns were erected in open country or at least in substantial clearings and they were often sited in prominent positions along the skyline. This latter observation emphasises the fact that they were intended to be seen from afar and became prominent features in the landscape.

The floruit of the great henge monuments occurred during the third millennium BC and by the middle of the second millennium most were in decline or had been abandoned to become overgrown by scrub. From this we can infer that the focus of spiritual activity had shifted, although we have little evidence as to where. There certainly seems to have been an increase in interest in natural places such as bogs and rivers as evidenced by finds of high status metalwork which are assumed to have been ritually deposited. However, the archaeological evidence for activity during this period, conventionally through the Middle and Late Bronze Age and into the Iron Age, consists of the remains of settlements and field systems marked out by permanent boundaries. Whereas during the Neolithic the landscape remained mainly open by the middle of the Bronze Age we have evidence for the beginnings of an enclosure movement.

Most of the available evidence comes from upland locations but we may safely assume that this is an accident of survival, similar evidence from low lying locations having been obliterated by later developments. Conditions for agriculture in the uplands remained good until the middle of the second millennium and the huts and fields we can see today, on the ground and in aerial photographs, mark the 'high-water' mark of prehistoric agricultural expansion. The huts survive as roughly circular banks of stone 3m to 8m in diameter, giving rise to the generic term 'hut-circles'. Numerous excavated examples have been shown to have originally been built in timber, the use of stone representing a rebuilding and perhaps implying a shortage of woodland resources once the initial phase of expansion had passed. They can occur singly or in groups of up to twenty and are found scattered on hillsides, within simple enclosures or contiguous with the enclosure walls. The enclosures within which hut-circles are situated, or onto which they open, can be regarded as farmyards within which livestock could be corralled and produce stored. Other enclosures make up the associated field systems, of which two types can be identified. In both, boundaries are made up of stones cleared from the surface of the fields, and in some cases these amount to little more than linear clearance heaps. In one type the fields are irregular in outline and the system as a whole appears to have grown in piecemeal fashion out from an original focus. In others the fields are more regular consisting of groups of oblong enclosures. It is usually assumed that the irregular fields were intended to accommodate livestock and that the shape did not matter whereas the more regular fields were given over to the cultivation of crops. As all allotment holders know, it is easier to dig over a patch of ground by working systematically in straight lines. Further evidence for crop cultivation is provided by the development of lynchets formed by soil creep around the down slope margins and by the recovery from excavated hut-circles of hand mills, or querns for grinding grain.

Few of these hut-circles and field systems have been directly dated and as a type they span a considerable period. The climate had begun to deteriorate by the middle of the second millennium and by its end temperature had fallen by 2°C, the growing season had contracted by five weeks and the altitudinal limit for crop ripening had been lowered 150m. Even in the absence of radiocarbon dates we can assume that many hut-circle settlements at higher altitudes, must date from before this deterioration for them to have been viable.

4.1.4 The Late Bronze Age and the Iron Age

The deterioration in the climate towards the end of the second millennium and early in the first has for long been considered to have had serious consequences for the prehistoric communities of the NE. At one time it was thought that there may have been a wholesale abandonment of the uplands and there is something of a hiatus in the settlement record of the uplands in the centuries on either side of 1000 BC. However, it is more likely that while there was some contraction of settlement, communities dealt with the changing conditions by modifying their patterns of economic activity and social organisation.

In the first place some of the higher level settlements were abandoned and the communities involved moved to lower and more sheltered locations. This is, after all, why the high level evidence survives, being above the limit reached by all subsequent developments. However, the high moors and fells probably continued to be used but for pasture rather than crop cultivation with flocks and herds being moved between lowlands and uplands on a seasonal basis. Such livestock management may provide a context for some of the extensive linear boundaries and cross-ridge dykes noted in the uplands.

There also seems to have been a move towards a greater nucleation of settlement with larger hut-circle settlements regularly found to be situated within substantial enclosures, some of which take on a defensive aspect and can be classified as hil lforts. The defences in question very often consisted initially of no more than one or two timber palisades. As time passed these were replaced, first by timber framed ramparts of earth and stone and later by substantial drystone walls or concentric banks of dump construction. Where ground conditions allowed ditches were included in the defensive circuits. The replacement of wooded structures by others built wholly of stone may be a further indication of dwindling supplies of suitable timber.

The NE has many classic hill forts and although these are conventionally dated to the late first millennium and attributed to the Iron Age, excavation and radiocarbon dating has shown the origins of a number to lie in the earlier part of the millennium and they can be regarded as initially Late Bronze Age sites, iron not being widely introduced until the 6th century BC. The hill fort at Easton Nab overlooking the Tees Valley began life as a small Bronze Age palisaded enclosure.

The development of these nucleated settlements during the later Bronze Age and into the Iron Age offers an insight into patterns of social development. The need for elaborate and extensive defences implies a level of social unrest not hitherto encountered and the construction of the defences themselves required a massive input of labour implying a level of social organisation only previously identified in the context of henge building two millennia earlier. The population of the hill forts is difficult to estimate and depends on

whether the hut-circles within were occupied contemporaneously. Also the sites themselves vary greatly in size. The multiple ramparts of the small hill fort at Dod Law West, near Wooler in Northumberland enclose an area about 60m across within which can be identified the traces of nine hut-circles of which six may have been occupied at any one time (Smith 1990). At the much larger, 5.2 ha site of Yeavering Bell 8km to the west a single stone wall encloses about 130 hut platforms.

We know from classical sources that society in the NE during immediately pre-Roman times was organised on tribal lines, dominated by a warrior elite and it was such high status individuals who could command the input of labour required for large scale building projects. We also know from the same sources the names of the tribes in question, the Parisi in East Yorkshire and the much larger grouping of the Brigantes to the west and north. With these names the region begins to emerge from the shadowy anonymity of prehistory.

Everybody did not live in hill forts and from the middle of the first millennium BC large numbers of smaller settlements begin to appear, usually referred to as farmsteads. These consist of groups of hut-circles within enclosures which can best be described as farmyards rather than defensive works. Many show development through time, often from initial timber phases to rebuildings in stone and usually involving an increase in the number of huts. Many of the stone built farmsteads have been found to have been occupied during to the earlier part of the Roman period though they are regarded as a late prehistoric type. Farmsteads are particularly numerous in Northumberland where two types have been identified (Burgess 1984, 164-73). In both, groups of usually from two to six hut-circles lie within stone built enclosures which are broadly rectilinear in the case of the so called 'North Tyne' type and curvilinear in the 'Cheviot' type. These differences in ground plan should not be overstressed and probably simply reflect the prevailing topographical circumstances. Farmsteads of the Cheviot Type are often built on hill sides into which the hut-circles have been terraced at the upslope end. This probably facilitated drainage. In both Cheviot and North Tyne types the dwellings were approached by a stone built causeway leading from a single simple entrance. On either side of the causeway lay sunken yards.

Farmsteads are often associated with field systems, many of which include terraces formed by substantial lynchets implying a return to crop cultivation at relatively high altitudes. A marked improvement in the climate occurred between about 200 BC and AD 500 and farming settlements appear in the Pennines up to about 300m while in the Cheviots there is evidence for crop cultivation up to 400m. This latter evidence takes the form of parcels of small parallel ridges known as 'cord-rig', usually no more than 1.4m apart and easily distinguished form later medieval 'ridge-and-furrow' (Topping 1989). These ridges probably imply hand cultivation with a spade whereas the lynchets of the larger terraced fields more likely reflect the use of the traction plough. Most dated examples of cord-rig have been found to belong to the immediately pre-Roman period but some, by association with other features, may be significantly earlier.

The field systems associated with terraces or cord-rig often extend over several hectares but are usually focused on one or more farmsteads. However, in the Tyne Valley evidence has recently come to light of much more extensive systems running to tens or even hundreds of hectares (Tolan-Smith, M. 1997). These systems are characterised by groups of parallel boundaries often extending for several kilometres oblivious of the terrain, up hill and down

dale, divided by shorter boundaries running at right-angles, giving rise to the term 'co-axial' field systems. The major boundaries are sometimes aligned on pre-existing features such as Bronze Age barrows and systems can incorporate both curvilinear and rectlinear farmsteads. The absence of evidence for crop cultivation suggests that these systems were designed with livestock management in mind. Co-axial field systems are generally dated to the latter part of the first millennium BC but many exhibit, through realignments and adjustments, a degree of chronological depth that could imply origins significantly earlier. In the Tyne Valley, in the area between Newcastle and Corbridge, parallel boundaries run upslope for about 3.5km from the edge of the valley to the upland fell while other boundaries running at right-angles sub-divide the area into a brick-like pattern. This system can be dated to the late first millennium BC by the fact that several farmsteads of Iron Age or Romano-British date have been built onto its main axes.

This evidence for the spread of field systems has major implications for our understanding of the later prehistoric landscape of the NE. Field systems and settlements imply widespread clearance and throughout the region pollen profiles document major inroads into the remaining woodland. For example, a profile from Roxby on the North York Moors has been interpreted to indicate that by the late Iron Age only 12% of the landscape remained wooded while profiles from Fellend and Steng Moss in the Pennines indicate massive clearance from the 1st century BC onwards. By the end of the first millennium BC many areas in the NE were as open as they are today.

Most of the evidence for the landscape of the later prehistoric period comes from the uplands, comparable evidence from the lowlands having been obliterated by subsequent developments although some farmstead sites and field systems have been identified as cropmarks on aerial photographs.

When the Roman legions marched into NE England in AD 60s and 70s they beheld a landscape that was mainly open. From the earliest prehistoric times human communities had made inroads into the natural woodlands that had mantled most of the region from early in the Postglacial period. These clearings were at first small and short lived. However, as woodland regeneration occurred this did not lead to a re-establishment of the primary native wildwood but to secondary woodland and scrub. As time passed areas were kept open for longer and adjacent clearings gradually coalesced to form wider open spaces. By the late Iron Age most of the lowlands were divided into small fields defined by ditches and earthwork banks which were probably surmounted by hedgerows. In the uplands the boundaries consisted of stone walls. There was still plenty of woodland, but this was on slopes that were too steep to clear and cultivate and in the damp valley bottoms. Most of it was managed as a source of raw materials, probably employing coppicing regimes, or as wood pasture for stock. Amongst the fields were farmsteads linked by drove ways along which livestock moved between pastures and areas of fallow. In most areas fields were grouped into a patchwork of enclosures focused on a farmstead or group of settlements but in some areas co-axial field systems indicate a more wide ranging degree of organisation. Whether such developments reflect the exercise of coercive authority or community effort is unknown, but in NE the Romans encountered a society rigidly structured on tribal lines and dominated by a warrior elite.

4.2 The Roman Period[2]

The Roman conquest of Britain had began a generation earlier in AD 43 when the legions of the Emperor Claudius stepped ashore on the south coast. Although most of lowland Britain was overrun within a few months no attempt was made at first to bring the uplands of the north within the realm of the empire. Instead, following a policy widely used elsewhere, military security was provided through a system of alliances with native leaders. In the case of the NE the alliance was with the Brigantes, and in particular with the matriarchal head of the royal family, Queen Cartimandua. For nearly three decades in the middle of the 1st century AD the Brigantes enjoyed both the continuation of their independence and many of the material benefits of peaceful relations with the empire.

Recent excavations at the great complex of earthworks at Stanwick in North Yorkshire have shed much light on this interesting period. This site underwent a major phase of development over several decades from *circa* AD 50. Around an early undefended Iron Age site an extensive 240 ha enclosure developed out of existing boundaries, with an inner area of about 52 ha enclosed by massive defences consisting of a rampart and ditch 12.2m wide and 4.8m deep. This inner area represented the main focus of settlement and finds from the excavations include numerous exotic trade goods from the Romanised parts of Britain and further afield in the Empire. Although only a small part of it has been examined it is clear that Stanwick should be regarded as a town, or *oppidum*, and as such is the only true example in the NE. It is also regarded as the Brigantian capital.

As the Roman authorities were well aware, alliances with fickle tribal leaders were fragile affairs and when the Roman army, led by the governor Petillius Cerialis, finally moved into the north this was provoked by the revolt of a faction of the Brigantes. The phase of conquest was relatively short lived with few implications for the landscape. As the legions advanced temporary marching camps were constructed by the digging of ditches and the throwing up of earthwork banks. These latter may have been surmounted by palisades which could have led to tree felling in the immediate vicinity though the legionaries may have carried timber stakes with them for this purpose. Except in upland areas, such marching camps leave few traces on the ground and examples continue to be discovered in the lowlands through aerial photography.

These camps were temporary features and control in the post-conquest period was maintained through a system of garrison forts. Most garrison forts were new constructions, sited according to strategic requirements rather than the tactical considerations of a military campaign. Most forts were built to a standard pattern to house units of between 500-1000 auxiliary troops. Each consisted of an oblong enclosure about two hectares in extent with gates on each side and rounded corners, giving rise to a standard 'playing-card' shape. The interiors were occupied by barrack blocks and stores, with stables in the case of cavalry units. Two important buildings lay in prominent places in the centre of each fort, a commanders house built on the lines of a civilian town house and a headquarters building from which the administration of the garrison was undertaken. Latrines were provided at suitable locations where the slope of the ground facilitated flushing. Bath blocks, which presented a fire

[2] This section is to a large extent based on Tolan-Smith 2006

hazard, were usually built outside the main area of the fort. Initially, these garrison forts were built of earth, turf and timber and the quantities required must have been considerable, while there was a continual demand for fuel for heating. By the 2nd century most of the forts which continued in use had been rebuilt in stone. This probably implies both a recognition of the need to maintain permanent garrisons in the Brigantian area and a diminution in available supplies of building timber.

Between AD 78-85, under the governorship of Julius Agricola, the Romans attempted the conquest of the rest of mainland Britain with the legions pushing into the far north of Scotland. Many of the garrison forts in the NE were first established at this time including the line of nine forts built in the Tyne-Solway gap. These formed a major strategic system extending from Corbridge in Northumberland to Kirkbride on the Solway shore and were linked by the Roman road known as the Stanegate. The conquest of Scotland was a failure and by the third decade of the 2nd century the decision had been taken to build a permanent frontier slightly to the north of the earlier Stanegate system. Construction of Hadrian's Wall began in AD 122, probably on the direct initiative of the Emperor, and although the frontier works underwent many developments over the following two-and-half centuries, the initial phase from coast to coast was completed by the time of his death in AD 138 (Johnson 1994).

The Hadrianic frontier consisted of a number of elements of which the wall itself was just one component. Immediately to the north of the wall, except where it followed the precipitous crags of the Whin Sill, there was a substantial ditch with the excavated material dumped as an irregular discontinuous mound to the north. Two techniques were used in the construction of the wall. East of the River Irthing, in Northumberland, the wall was built with a rubble core and stone facing which may have been rendered. It stood about four metres high and was probably surmounted by a wall walk and parapet. To the west, in Cumbria, the wall was initially built in turf, though it was later rebuilt in stone. Every Roman mile there were small fortlets known as milecastles which provided access through the wall and between each milecastle were two turrets. Although not part of the initial plan, from an early stage in the development of the system forts were added to the line of the wall at about 10 km intervals. To the south, the frontier zone was marked by the construction of the *vallum*, a deep flat bottomed ditch between parallel banks of upcast. The *vallum* is regarded more as a formal line of demarcation than a component in the defensive system. Nevertheless, it could only be crossed easily at a series of purpose built causeways protected by gates and giving access to each of the forts. The forts themselves were joined by a road known as the 'Military Way'. To the south, the Stanegate and its line of forts continued to provide defence in depth while a number of outpost forts were built on roads leading north such as those at Risingham and High Rochcester in Northumberland.

The construction of Hadrian's Wall was a massive undertaking comparable to the major civil engineering works of the present day and its impact on the landscape was similar. With the exception of the rocky central zone, in almost every case where excavations have been undertaken it has been established that the frontier works were built in a cleared and farmed landscape. Some of this evidence consists of actual plough marks found under the wall and associated earthwork features but the fact that for virtually half its length it could be built initially in turf implies vast extents of open pasture, a fact confirmed by pollen analysis. Many Romano-British farmers must have found their lands bisected by the frontier works

and faced difficulties over maintaining access. In the Tyne Valley, extensive co-axial field systems of late prehistoric date have been shown to have been completely disrupted by the building of the wall (Tolan-Smith, M. 1997). Even in the rocky central zone the impact must have been acute and the settlement at Milking Gap near the fort at Housesteads found itself hemmed in between the wall and the *vallum*.

While the impact of the frontier works on the pre-existing landscape was considerable, this impact must have been exacerbated by the construction works themselves and inparticular by the demand for timber, vast quantities of which was used in the forts, milecastles and turrets. Given the open nature of the landscape at the time some of this must have been imported but attrition of the local woods continued apace. A pollen profile from Fozy Moss near the Sewingshields milecastle documents rapid forest clearance and an almost totally deforested landscape at c. AD 130 (Dumayne and Barber 1994).

The landscape impact of Hadrian's Wall continued beyond the initial phase of disruption and construction. It has been estimated that when fully manned the frontier works may have housed up to 30,000 troops who would have consumed up to 10,000 tons of wheat a year. This is the yield of about 12,000 ha and when it is remembered that an army does not 'live by bread alone' it seems inconceivable that the garrison could have been kept supplied from within the immediate vicinity of the frontier zone, or even from within the region as a whole. Indeed, excavations at the fort at South Shields, which became a major supply base in the 3rd century, have recovered samples of wheat of Rhineland origin. In a short space of time most forts acquired civilian settlements outside their gates, the *vici*. While some of the residents of these *vici* were probably farmers others were merchants or worked in the service industries, such as bar and brothel keepers, adding to the non-productive part of the regional population, but part that still needed to be fed.

Hadrian's Wall continued to be occupied in one form or another until the final decades of the Roman occupation. Its impact on the landscape of the frontier zone, both at the time and in subsequent centuries, is difficult to over emphasise.

However, the Roman occupation of the NE was not an entirely military affair and a visitor from outside the Empire would probably have been as much impressed by the network of roads and the bustling civilian settlements as by the military works, although the frontier zone would always have been an exception. Two main roads traversed the region from south to north, both starting from the major Roman centre of Lincoln. The more easterly route, Ermine Street, headed almost directly north at first and crossed the Humber at Brough. It them turned northwest to run along the western flank of the Wolds and North York Moors reaching the Tyne at Newcastle. The other route, known as Dere Street beyond York, followed a northwesterly course from the outset and, skirting the eastern foothills of the Pennines for most of its route, reached the Tyne at Corbridge where it formed a junction with the Stanegate. Dere Street proceeded further north with the main line striking northwest into Scotland while a branch headed north east, the so called Devil's Causeway, towards the Northumberland coast. Small urban centres grew up at key locations such as road junctions and river crossings.

As in the frontier zone, the implications for the landscape of these developments were twofold. First, the building works involved produced a demand for raw materials. Building

stone had to be quarried and clay dug for floor and roofing tiles. Above all there must have been an almost insatiable demand for timber, both for construction works but also to fuel the hypocausts of the central heating systems and bath blocks. Fuel was also a requirement of industrial developments. Pollen profiles throughout the region document further major inroads into the remaining woodlands. Secondly, the growing urban communities and the military garrisons produced a demand for food which could only be met by an increase in production. Throughout most of the region the late prehistoric system of mixed farming remained unchanged during the Roman period, though the reorganisation of some field systems may have been in response to the increased demand. The relationship of the Romano-British subsistence farmers to the market economy of the empire is most clearly documented by discoveries of exotic trade goods such as pottery, beads and brooches, on native sites. These were presumably obtained through trade at the *vici* and small towns.

It would be a mistake to over emphasise the effect of the Roman period on the landscape beyond the environs of the small towns and within the frontier zone. Throughout much of the region the pattern of landscape development that had been taking place for millennia continued. Woodland was further reduced in extent and what remained was probably more intensively managed. Most of the population lived in farmsteads, which although sometimes grouped in loose clusters could not be described as villages in the sense in which that term is used in later periods. Some late prehistoric nucleated settlements continued to be occupied into the early decades of the Roman period such as the Dod Law West hill fort in Northumberland which was still occupied in the 2nd century AD (Smith 1990), but in most cases hill forts were abandoned and the population either moved into farmsteads or gravitated towards the proto-urban settlements outside the Roman forts.

The Roman period in Britain is conventionally regarded as having come to an end in AD 410 with the withdrawal of the garrisons to defend other parts of the Empire, but in reality the system had been in decline since the middle of the 4th century. This was due in part to the inroads of restless peoples from beyond the frontiers such as the great incursion of Picts, Saxons and Scots which overran most of northern Britain in AD 367. A phase of deteriorating climate in the C4, which made it difficult to sustain the levels of production that had been attained during the C2 and C3, must also have contributed to the decline. The affects of rising sea levels were felt far upstream in most river valleys. The landscape legacy of the three-and-a-half centuries of Roman occupation consists mainly of the towns, many of which have survived to the present day, and the road network which until the advent of motorways and by-passes provided the infrastructure of the region. In the frontier zone Hadrian's Wall and its associated features have continued to exercise an influence to the present day with the designation of the area as a World Heritage Site. In the landscape as a whole the Roman period can be seen as an interval during which the indigenous prehistoric system was brought, probably prematurely, within the realm of a 'global' market economy. When access to those markets was withdrawn production fell back to something approaching pre-Roman levels. Secondary woodland regenerated over Roman-British field systems in the Tyne Valley and seven centuries were to elapse before the relics of the these early fields emerged from the woods once more to provide the underlying structure to the medieval open field system (Tolan-Smith, M. 1997).

4.3 The Medieval Period[3]

In the first century-and-a-half of the post-Roman period the NE was divided between the kingdoms of Bernicia north of the Tees and Deira to the south. The capital of Bernicia lay at Bamburgh on the Northumberland coast while the royal palace lay at Yeavering on the northern flanks of the Cheviots. These two kingdoms became united as the Kingdom of Northumbria under Aethelfrith, King of Bernicia from AD 592-616 and this remained the *status quo* until the Viking invasions of the late C9.

Although the NE of England is famous for the Lindsifarne Gospels and Bede's *The Ecclesiastical History of the English People,* little is known of the landscape before the late C11. A principal reason for this being the omission of the region from the *Domesday Book*. What is certain is that the great majority of the population was engaged in farming and that the basic social unit was the township. What is unclear is whether settlement consisted mainly of dispersed farmsteads or nucleated villages. The former seems more likely given that the creation of planned villages was a major development of the late C11.

The excavations at Thirlings near Wooler in Northumberland provide examples of the type of buildings to be found on a C7 settlement. These were wholly timber structures, rectangular in plan and twice as long as they were broad. There were entrances in the centre of the long side and the interiors were mostly open or subdivided by light partitions. Of a later date the farmstead at Greenshield on Holy Island (Chapter 9.2.4), consisted of four buildings two of which were of long house type with humans and livestock sheltering under the same roof. However, one of the other buildings appears to have been a purpose built cow byre. These buildings had stone footings, though the upper sections of the walls may have been of turf and timber. Roofs were thatched. This site is dated by an assemblage of eleven C9 coins.

Another important development during this period was the establishment of monasteries following the spread of Christianity from the early C7. Several of the major foundations of this period - Lindisfarne, Tynemouth, Jarrow, Monwearmouth, Hartlepool and Whitby lie within the coastal zone. However, all of these establishments were subject to destruction by Viking raiders during the late C9 and surviving remains at the sites mainly date from later periods. The only complete example of an Anglos-Saxon church in the region is the tiny C7 building as Escomb in County Durham (Lomas and Muir 2006, 56 fig.4.3).

The Norman Conquest of 1066 and the devastation left by the 'Harrying of the North' in 1069-70, a response to rebellion, led to profound changes in the landscape of the NE. The most striking development was the establishment of planned villages, often at the centre of existing townships (Lomas 1996, 73). Planning usually took the form of one or more rows of farmsteads grouped in an orderly fashion around a village green. The villages were surrounded by areas of arable land farmed in strips and surviving today as patterns of ridge and furrow. Usually more than half a township's land was given over to pasture and woodland, both vital resources for the medieval economy. The layout of these planned villages can be best appreciated at sites which ultimately failed to thrive and became

[3] This section is to a large extent based on Lomas and Muir 2006

abandoned, the so called *deserted medieval villages (DMVs)* of archaeology. Successful villages underwent continual development and few traces of their original form can be observed today. This period also saw the establishment of boroughs, urban settlements with special privileges and responsibilities, examples including Hartlepool, Sunderland, Newcastle, Bamburgh, Alnwick and Berwick-upon-Tweed, although the latter was a Scottish foundation.

Most of the monasteries of the early Medieval period were re-established in the C12 and C13, often as daughter houses of the great Benedictine priory of Durham. By 1100 there were 130 parish churches to which were added about 169 'chapels of ease' without parochial status but designed to serve the growing population. The other striking feature of the Medieval landscape in the NE is the magnificent group of castles, twelve major examples being erected within in Northumberland, as opposed to two in Durham. In addition to these major fortifications the newly emergent boroughs of Hartlepool, Newcastle, Alnwick and Berwick-upon-Tweed acquired town walls.

The development of the Medieval landscape in the NE reached its high point in the late C13. The two centuries between the 'Harrying of the North' and 1286 was a period of unprecedented population growth and economic development. Farmland expanded and proto-urban settlements thrived. In terms of the history of the NE, much of this can be attributed to a period of nearly uninterrupted peace between England and Scotland. But in March 1286, Alexander III of Scotland fell off his horse and broke his neck, leaving the Scottish throne without a viable heir. Edward I of England seized the opportunity of trying to bring Scotland under his control and three centuries of warfare and border strife ensued (Fraser 1989, 20-25). To the political unrest of the C14 was added a period of deteriorating climate with reduced yields and the devastation of the population wrought by the Black Death in the late 1340s and early 1350s. By 1450 the population of the region had dropped by over 40% (Lomas and Muir 2006, 64). Settlement contracted, villages became abandoned and woodland and waste encroached on the once open arable fields.

While major military campaigns were mainly a feature of the C14 the Anglo-Scottish border remained an area of unrest until the Union of Crowns under James I and VI in 1603. The principal manifestations of this unrest are the peel towers and bastles of which hundreds survive throughout the region, dating mainly from the C15. The peel towers can be considered as small castles, usually consisting of a strongly defended tower of several floors surmounted by a battlemented parapet. Today they often stand alone but were more usually part of a complex of manorial buildings. The bastles were farmhouses in which the usual longhouse arrangement of people and livestock in adjoining bays was inverted, the stock being accommodated at ground level while the farmer and his family occupied an upper storey. The two levels were often separated by a stone, fireproof, vault and access to the domestic accommodation was at first floor level, gained by a ladder that could be withdrawn. These small castles and fortified farmhouses are an eloquent testimony to the anarchy that prevailed in the border zone.

The NE also featured in the civil wars of the C15 as the protagonists of the Lancastrian and Yorkist causes fought for supremacy. But these military campaigns had little impact on the landscape as a whole and mainly affected the strongholds of the nobility with only the occasional pitched battle, such as that at Hexham in May 1464 while Dunstanburgh Castle

changed hands several times before finally falling to the Yorkists in June of the same year, from whence it was allowed to fall into decay.

There are few archaeological traces of industry dating from the Medieval period in the NE although documentary sources indicate that coal was already being mined by the monks of Tynemouth in the C13 while there was a large scale production of salt on either side of the Tees estuary from the C12. Numerous salt mounds survive in the latter area and excavation at one site has produced C13 pottery.

4.4 The Early Post-Medieval Period

For the purposes of the NERCZA this period is defined as extending from the accession of Henry VIII in 1509 until the mid of the C18. Throughout the C16 and C17 the landscape of the NE remained very much as it had been in the Middle Ages. It was mainly a landscape of villages surrounded by open fields. The depopulation of the C14 had led to the abandonment of some settlements and the contraction of farmland but this had provided an opportunity for survivors to expand and consolidate their holdings. This consolidation led to the establishment of discrete holdings surrounded by enclosed fields and farmers preferred to move out of the villages and build farmsteads the centre of their holdings. This was a slow and diachronic process which nevertheless proceeded more rapidly in the south of the area than in the north, but even in Northumberland most of the farmland had been enclosed by 1750, leaving only the bleak moorlands as open waste. This dispersal of settlement led to the further abandonment of villages and those that survived provide the fabric of the landscape today.

This period saw the emergence of England as a nation state and against the background of gradual change in the landscape major events were taking place. Throughout the C16 the Anglo-Scottish border remained an area of conflict. This took two forms. Border raiding or reiving in which the peel towers and bastles of the C15 continued to play a part, indeed many of the latter being C16 structures, and a return to large scale military incursions similar to those experienced by the region in the C14. Of the latter, the invasion by James IV of Scotland in 1513 leading to his defeat and death at the Battle of Flodden on September 9th is the major example, while the Earl of Hertford's laying waste to much of southern Scotland in the final years of Henry's reign was more typical. The unsettled nature of relations between England and Scotland continued throughtout the C16 and it was the reign of Henry's daughter Elizabeth that saw the construction of the Spanish Battery at Tynemouth and the wholesale remodelling of the defences of Berwick-upon-Tweed to produce one of the finest renaissance fortifications in northern Europe. However, the accession of James VI of Scotland to the English throne, as James I, in 1603 marked the end of warfare between the two nations until the Jacobite uprisings of the C18. Peace between the nations did not immediately put an end to the anarchy of Border and raiding and reiving continued sometime after 1603. However, it is noteworthy that in 1612 there is a record of customs duties being paid on horse and cattle passing peacefully across the Border (Fraser 1989, 377). Times were changing, as evidenced by the replacement of the peel tower at Belsay in Northumberland by a fine Jacobean house in 1614, itself to be replaced in the early C19 by a Greek rival mansion.

Another major development in the C16 was the dissolution of the monasteries with the major religious houses of the region stripped of their assets and allowed to fall into decay to be used as quarries. Some experienced a change of use with claustral buildings being converted to domestic accommodation for the newly emerging nobility while the ruins of Lindisfarne Priory became a supply base for the Tudor navy.

As had been the case with the Wars of the Roses in the C15, the Civil War of the C17 had little overall impact on the landscape. Medieval strongholds were brought back into commission, defended, besieged, sacked and slighted as the fortunes of Parliament and the Crown waxed and waned. Newcastle was occupied by the Scottish Covenanter army in 1640 after having defeated royalist forces at Newburn. Hartlepool, while originally garrisoned for the King, was taken and held by a Scottish mercenary army on behalf of Parliament from 1645 to 1647.

While the mining for coal and the production of salt has already been noted for the Medieval period, the origins of two other major industries for which the NE became famous, lead mining and the production of alum are to be found in the Early Post-Medieval period. However, the large scale development of these industries, along with coal and iron production, is mainly a feature of the post-1750 period.

4.5 The Industrial Period

Coal mining has had a decisive impact on parts of the landscape of the NE. A mine is of itself ephemeral by nature. A shaft is sunk, the coal is extracted and the mine is abandoned while a new shaft is sunk elsewhere. The geology of the coal measures, dipping from west to east, gave a direction to this movement, the earliest mines extracting from seams near the surface lay in the west while the industry gradually migrated eastwards extracting coal from seams at ever deeper levels. The coal mines on the coast are mainly late features dating from the C19 and C20. When the Vane Tempest mine at Seaham closed in 1992 the miners were working four miles out under the North Sea. Coal mining in the NE was widespread and a mid C19 map of 'The Great Northern Coalfield' shows it extending from south of Barnard Castle in County Durham to Warkworth on the Northumberland coast (MacRaild and Purdue 2006, 91 figure 5.14) while outlying mines are recorded as far north as Scremerston near Berwick-upon-Tweed. Although lead mining had a more restricted geographical extent, being confined to the metalliferous deposits of the North Pennines, it had a symbiotic relationship with the coal industry, the production of which was needed for smelting. Lead mines and coal mines were linked to the smelters by horse drawn wagonways. Similar wagonways transported the coal to the coast where purpose built harbours and timber coal staithes facilitated the loading of colliers for transhipment elsewhere in the UK and the Empire.

The Stockton and Darlington Railway of 1825 was essentially a wagonway to which George Stephenson introduced a steam locomotive instead of a team of horses, thus giving birth to the railway age. In 1832 the Hartlepool Dock and Railway Company revived the fortunes of Hartlepool by turning it into a coal exporting port and by the mid C19 a spider's web of railways extended across the whole region, mainly developed to serve the coal industry and its ports. In the mid C20 Blyth was the largest coal shipping port in Europe (Linsley 2005,

165).

Two other major extractive industries have also left there mark on the landscape of the NERCZA project area; both to the south of the River Tees. Alum, from aluminium sulphate, is an important chemical in the tanning and dyeing industries. During the Middle Ages it was imported from the Continent but in 1607 a source was discovered at Guisborough in North Yorkshire and this gave rise to the North Yorkshire alum industry, which flourished into the late C19. This industry was mainly concentrated on the coast where the shale beds from which the alum was extracted are exposed in the cliff face. The decline of the industry came in the 1870s when it was found that alum could be extracted from colliery waste. The communities whose economic life depended on the alum industry nevertheless received something of a reprieve with the development of the ironstone industry which got underway in the 1850s with the extraction of the Main Seam of the Cleveland Ironstone. This resource was worked until the mid C20 and provided the basis for the Middlesborough and Redcar iron and steel industry.

As was the case with the coal and lead industries, the alum and ironstone industries required an infra-structure for the transport of fuel and finished products. In the C18 and early C19 this was also mainly in the form of wagonways, whereas by the late C19, as elsewhere, transport was provided by the growing railway network.

Vessels had been built on the NE coast from the Middle Ages but the proximity of the major rivers to readily available supplies of iron and coal and the demand for shipping, stimulated the development of major shipyards on the Tyne, the Wear, at Hartlepool and to a lesser extent on the Tees. These rivers also developed into major ports and the growth of mercantile traffic on the NE coast led to the construction of lighthouses, leading lights and navigation beacons to facilitate this trade, although the earliest examples date from C17.

An industry of great importance in the NE, but one that has left few archaeological traces, is the fishing industry. Throughout the length of the coastline fishing followed a similar pattern. In the winter the main quarry was white fish such as cod and haddock. Pots were set for crabs and lobsters while salmon and turbot were netted. But the main stay of the NE fisheries was the herring which arrived off the coast in the summer in vast migratory shoals. In the early C19 every beach and small haven provided a base for small vessels engaged in the herring fishery and shore facilities included net sheds, curing houses and smokeries, with the development of kippering in the 1840s. The dispersed nature of the herring fishery came to an end in the late C19 with the advent of the steam drifter and the industry became concentrated in a small number of major ports, most of which had been developed to serve other, more terrestrial, industries such as coal mining. Several NE ports including Whitby, North Shields and Berwick-upon-Tweed also supported whaling fleets. An adjunct to the NE fishery was the production of salt for the curing houses. Salterns are a feature of the NE coast from Teesmouth to Alnmouth, the former, as already noted, dating from the Middle Ages.

4.6 Military Archaeology of the C20

The NE of England has been the theatre of military operations from the earliest times. From the advance of the Roman legions through the campaigns, battles and sieges of the Middle Ages and down to the Civil War of the mid C17 the region has experienced the devastation wrought by advancing and retreating armies. But settlements burnt to the ground were rapidly rebuilt, perhaps to be burnt again the following year, and most permanent desertions can be attributed to economic rather than political factors. Apart from the construction of the Military Road along the line of Hadrian's Wall in 1749, to facilitate the east-west deployment of troops, the NE was barely affected by the Jacobite uprisings of the early C18 and from the middle of the century the military archaeology of the NE should be seen within the context of national defence.

Although coastal defences, initially constructed in the C16 and C17 to meet local needs were updated piecemeal to reflect advances in weaponry during the C18 and C19 the major developments belong to the C20. By the end of the C19 the concept of Defended Ports had emerged and the major ports of Teesmouth, Hartlepool, Sunderland and the River Tyne were protected by a series of coastal batteries, some of which had been established centuries before (Dobinson 2000a, 1-11) but mostly re-equipped with the newly developed breach loading guns. The bombardment on the 16th of December 1914 of several east coast towns, including Whitby and Hartlepool, by a squadron of German battle cruisers exposed weaknesses in the current provision and immediately a programme was put in place to establish a number of additional batteries. Examples of this development are the Coulson Battery at South Beach, Blyth which supplemented the defences of the Tyne but also provided some protection for the important coal port of Blyth itself and the Tyne Turrets. These latter consisted of 12 inch gun turrets removed from the battleship HMS *Illustrious* and mounted ashore at Marsden and Hartley, south and north of the Tyne respectively.

Aerial bombardment, although mainly a feature of WWII was also a threat in WWI. This threat was addressed by the provision of bases for squadrons of the Royal Flying Corps such as that at Marske and by a chain of early listening devices, of which the acoustic mirror at Boulby Barns is the only surviving example in the region.

In WWII the threat of invasion was added to those of coastal and aerial bombardment. The initial plan to deal with this threat was threefold. First, the enemy would be delayed on the beaches by a system of beach scaffolding, anti-tank obstacles such as concrete blocks or earthworks supported by pillboxes and by beach defence batteries mounting anti-tank guns. Second, once the enemy had broken through the beach defences they were to be 'corralled' by a series of anti-tank stop-lines improvised from existing features such as railway embankments, canals and rivers supplemented by earthworks and lines of concrete blocks. The stop-lines were to be complemented by pillboxes, weapons pits, barbed wire entanglements and mine fields (Brown *et al* 1996, 78). The third component was the creation of anti-tank islands in villages and other settlements within a stop-line. These might consist of camouflaged pillboxes or converted other buildings, weapons pits and spigot mortar emplacements positioned so as to provide intersecting fields of fire (Lowry 2004, 22-23). Once the enemy was delayed within this system and the direction of attack established, it was planned that reserve forces could be concentrated for a counter attack. The thinking

behind this essentially static approach owed much to the experience of the British generals on the Western Front during WWI and was less suited to a Panzer led *Blitzkrieg*. In the late summer of 1940 a change in tactical thinking led to more emphasis being placed on mobile reserves, although the construction of pillboxes and stop-lines continued into 1941, albeit at a slower pace (Lowry 2004, 12-13). While only isolated fragments of the major stop-lines now survive beach defences remain a conspicuous feature of the coastline throughout most of the NERCZA area. In addition to confronting sea borne landings the possibility of the enemy arriving by air, especially in gliders, had also to be addressed and suitable landing sites, especially those near the coast, were impeded with networks of anti-glider obstacles.

Most of the coastal defence batteries deployed in WWI were brought back into commission in WWII and several additional, Emergency Coastal Batteries, were established. The threat of aerial bombardment was addressed through the establishment of heavy anti-aircraft artillery batteries supported by searchlights. Such batteries were sited in an arc around each defended port and major industrial complex. Barrage balloons were used make enemy aircraft fly higher and towards the anti-aircraft batteries, and radar stations were established to detect the imminent arrival of bomber formations. Where these preparations failed it was hoped that enemy ordinance would be wasted on bombing decoy sites, designed to mimic port facilities and industrial plant.

Most of this WWII military archaeology is to be found in the coastal zone, though many other facilities such as airfields and army camps were scattered throughout the region. The build up to the D Day landings saw a great increase in the former as large numbers of British and Allied troops were assembled. Examples are the camp at Featherstone Castle in the Tyne Valley used by American troops and the concrete standings for tanks and other armoured fighting vehicles established in concealed locations such as Swarland and Long Framlington.

The NE of England has a rich archaeological heritage and the coast is no exception. However, while the uplands are famous for the upstanding remains of prehistory by far the most common features encountered on the coast relate to Medieval patterns of landuse in the form of ridge and furrow, industry and the need to defend the coastline, especially in the C20. Remains of all periods are, nevertheless, present and the following chapter provides a brief account of the kinds of archaeological features to be found on the coast and at risk from the processes of coastal erosion.