

CASTLE PARK DUNBAR

Two Thousand Years on a
Fortified Headland

DAVID R PERRY

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FOREWORD

Professor G W S Barrow

A warm welcome must be offered to the report of the Scottish Urban Archaeological Trust Ltd, under its Director David Bowler, on the archaeological excavation and investigation carried out by the Trust at the Castle Park site in Dunbar. As David Perry writes in his Introduction, Dunbar possessed strategic importance in the conflicts between Scotland and England. Long before the centuries of border warfare, Dunbar – ‘the fortress on the rocky hill’ – had been chosen as a strongpoint by the tribe known to the Romans as the Votadini and to later Welsh writers as the Gododdin. On the knob of volcanic rock jutting into the North Sea, the tribal chiefs or kings had built their defensive stronghold. From this vantage point they could dominate an area of country between St Abb’s Head to the south and Tantallon to the north. Their organized lordship, doubtless with a harbour and with outlying dependencies to produce food and drink, passed under the control of Angles pushing their settlement up the coast in the 6th and 7th centuries. It would be almost four hundred years before the kings of Scotland established their rule at Dunbar and longer still before they made it the headquarters of an earldom which endured until the mid 15th century.

David Perry and his colleagues have established definitively the true location of the Iron Age and Northumbrian fortress at Dunbar and have been able to put forward convincing estimates of its significance, especially in the Anglian period. Smaller and less important than Edinburgh or Bamburgh, Dunbar nevertheless occupied a key position in the Votadinian and Bernician pattern of settlement and lordship. Everyone interested in the early history of Scotland will learn much from this book.

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Pottery

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Artefacts

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Animal Bone

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FOREIGN LANGUAGE SUMMARIES

Résumé

Sur la côte est écossaise, des fouilles effectuées entre 1987 et 1991 ont révélé un important patrimoine de fortifications installées sur un promontoire rocheux, perché au-dessus du port de Dunbar. C'est là que les membres de la tribu celtique connue sous le nom de Votadini ont construit un fort avancé quelque part pendant l'âge de fer. Au début, une simple douve interdisait l'accès au promontoire et plus tard deux autres lignes de douves furent ajoutées (les remparts les accompagnant n'ont pas survécu). Le fort fut remplacé par au moins deux communautés sans défense entre le premier et le cinquième siècle après J.C. Les habitants pratiquaient la polyculture et le bétail était deux fois plus nombreux que les moutons et les chèvres. On a démontré l'existence du tissage et du travail de l'os et du merrain mais aucune structure domestique certaine n'a été identifiée. A cette époque Dunbar (*Dynbaer*, fort sur le sommet) était considéré comme une colonie d'importance mineure soumise au bastion tribal de Traprain Law, situé à un kilomètre.

Un dépôt de terre d'une épaisseur de 0,4 m a séparé les couches sédimentaires issues de l'âge de fer des couches successives sous l'occupation des Angles. La plaine de Lothian, y compris Dunbar, fut conquise par les Angles, envahisseurs venus de Northumberland pendant la première moitié du septième siècle, déplaçant ainsi le pouvoir tribal en place (les Votadinis étaient alors connus sous le nom de Gododdin). Les Angles contruisirent un nouveau fort à Dunbar qui devint le siège du pouvoir royal. C'est là que St Wilfrid fut emprisonné en 680, comme attesté par Eddius Stephanus qui décrit Dunbar comme un *urbis regis*. La colonie des Angles à Castle Park était entourée de remparts et de palissades et s'étendait sur 0,47 hectares. Plus tard elle occupa 0,56 hectares et fut entourée d'une douve. Une construction en pierre et, curieusement, en mortier pourrait être le château royal ou une église, mais le château royal est ici la thèse préférée. La découverte d'un tonneau à mortier, le troisième seulement à avoir été découvert en Grande Bretagne, souligne le statut très important de cette colonie. D'autres bâtiments comportent des constructions rectangulaires en bois et une 'Grubenhäuser' où le matériel nécessaire au tissage était fabriqué et où on pratiquait le tissage en lui-même. Plus tard les bâtiments en bois furent remplacés par des constructions en bois installées sur des empattements en pierre. Il y avait également ce qui semblait être des cours pavées. Les fabrications artisanales comprennent: un fragment de croix en or incrustée de grenats, deux pièces du neuvième siècle en provenance de Northumberland (stycas), un penny danois en argent du huitième siècle, des épingles en os, un petit outil de tissage en os et un peigne en merrain. Sur place, la ferronnerie fut signalée par la présence de débris d'alliage de plomb et de cuivre et on travaillait l'os et le merrain. Il y avait une large quantité d'os d'animaux (bétail, moutons, chèvres et des cochons) dans les couches sédimentaires issues de l'occupation des Angles. Il s'agit peut-être des restes de festins lors de visites royales pendant lesquelles la population se serait 'goinfriée' en compagnie de la cour du roi. Les convives consommèrent de l'orge, de l'avoine et du blé.

A l'extérieur la colonie comprenait un cimetière de 'long cists' (longs parallélépipèdes en pierre pour défunt allongé) et de tombes. Au moins 26 'long cists' et 21 tombes furent trouvés mais cela ne représentait qu'une partie du cimetière à l'origine. La plupart des enterrés étaient des hommes et des femmes adultes, mais des enfants furent également trouvés. Il n'y avait aucun objet funéraire (objet appartenant au défunt et placé dans la tombe). On ne sait pas quand le cimetière fut fondé mais les datations au carbone 14 de deux squelettes montrent qu'il continua d'être utilisé jusqu'au treizième siècle.

Les ruines de remparts de part et d'autre du promontoire faisaient très certainement partie du système de défense du château de Castle Park qui fut détruit en 1488. Deux constructions, l'une en pierre et l'autre en bois sur empattements de pierre, furent adjointes au château reconstruit en 1497, et il y avait des traces de ferronnerie sur le promontoire pendant cette période.

On a enregistré la construction et la destruction d'un fort français, sur une période courte, à Castle Park en 1560. Les vestiges de ce fort ont été fouillés. Du matériel militaire a survécu tels que: des fragments de cotte de maille, des outils, un fer à cheval et des objets personnels. Toutefois l'ensemble ne contient pas d'objet apparemment français.

Les vestiges de deux constructions et d'un possible four à chaux sont situés entre le seizième et le dix-neuvième siècle mais ne peuvent être datés précisément. Un nombre important de pipes en glaise a pu être daté appartenant au dix-septième siècle. Au dix-neuvième siècle, Castle Park fit partie à nouveau d'une caserne et une batterie fut construite pour entraîner la milice locale. La plate-forme en béton de la batterie et d'autres traces d'activité militaire ont été découvertes pendant les fouilles.



Zusammenfassung

Auf einer felsigen Klippe, hoch über dem Hafen von Dunbar an der schottischen Küste, haben Ausgrabungen in den Jahren 1987-91 eine lange Geschichte von Befestigungen enthüllt. Mitglieder eines keltischen Stammes, der als die Votadini bekannt ist, bauten hier während der Eisenzeit eine Halbinselbefestigung. Anfangs versperrte ein einzelner Graben den Zugang zur Halbinsel, und später wurden noch zwei weitere Gräben zugefügt (die damit verbundenen Wälle sind nicht erhalten). Das Fort wurde zwischen dem ersten und fünften Jahrhundert AD mindestens zweimal durch unbefestigte Niederlassungen ersetzt. Die Bewohner übten gemischte Landwirtschaft aus. Es gab doppelt so viele Rinder wie Schafe oder Ziegen. Man fand Anzeichen für Webhandwerk sowie für Knochen- und Geweihbearbeitung, aber spezifisch häusliche Strukturen wurden nicht identifiziert. Während dieses Zeitabschnitts wird Dunbar (*Dynbaer*, Gipfel Befestigung) als weniger bedeutende Niederlassung angesehen, die der Hochburg des Stammes, Traprain Law, einen Kilometer entfernt gelegen, untergeordnet war.

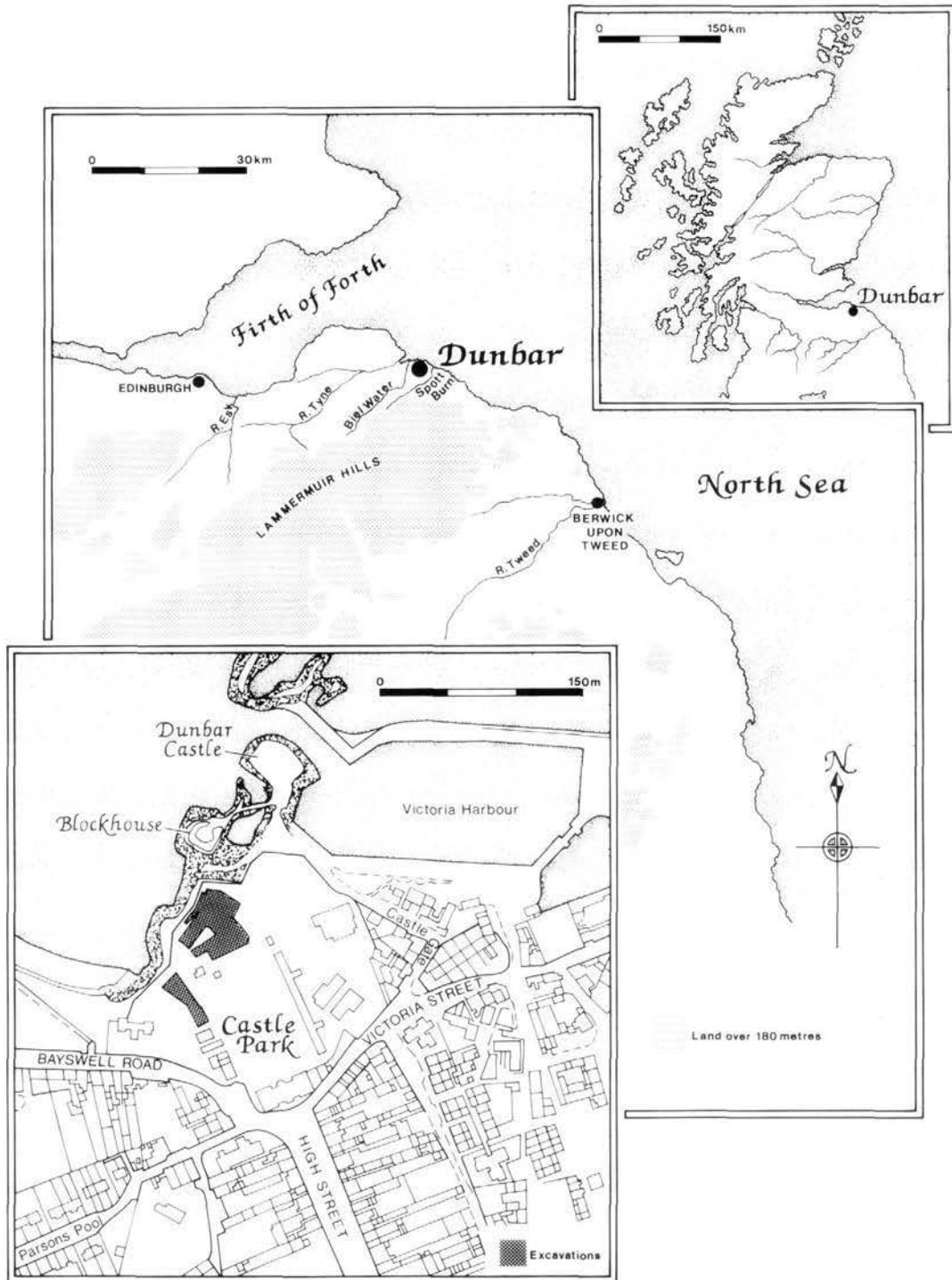
Eine Erdablagerung von 0.4m Dicke teilt die Eisenzeitschicht von der späteren Schicht aus der Zeit der Besetzung durch die Angeln. Die Bewohner der Lothian Ebene, einschliesslich Dunbar, wurden von den eindringenden Angeln aus Northumberland in der ersten Hälfte des siebten Jahrhunderts übermannt. Dadurch wurden die bestehenden Stammesformationen verdrängt – inzwischen waren die Votadini als Gododdin bekannt geworden. Die Angeln bauten eine neue Befestigung bei Dunbar und machten sie zum Zentrum der königlichen Macht. Hier wurde Sankt Wilfried im Jahre 680 gefangen gehalten (Erwähnt von Eddius Stephanus, der Dunbar als eine *urbs regis* beschreibt. Die englische Niederlassung bei Castel Park war von Wällen und Palisaden umschlossen. Sie hatte eine Fläche von 0.47 Hektar. Später wurde sie auf 0.56 Hektar vergrössert und von einem Graben umschlossen. Ein ungewöhnliches gemörteltes Steingebäude könnte entweder die königliche Halle oder eine Kirche gewesen sein, wobei die Auslegung 'königliche Halle' hier bevorzugt wird. Die Entdeckung eines Mörtelmischers, erst der dritte, der je in Grossbritannien gefunden wurde, verstärkt den Eindruck des hohen Entwicklungsstandes dieser englischen Niederlassung. Andere Gebäude schliessen rechteckige Holzstrukturen ein sowie ein Grubenhaus, in dem Webgewichte hergestellt wurden und offensichtlich auch das Webhandwerk ausgeübt wurde. Die Holzbauten wurden später durch Holzstrukturen auf Steinsockeln ersetzt. Offene Flächen mit Fliesen- oder Kopfsteinpflaster waren vorhanden, die wahrscheinlich als Hofräume genutzt wurden. Unter den Kunstgegenständen wurden unter anderem das Fragment eines goldenen, mit Granaten besetzten Kreuzes, zwei aus dem neunten Jahrhundert stammende Münzen (*stycas*) aus Northumberland, ein dänischer Silberpfennig aus dem achten Jahrhundert, goldene Nadeln, ein dekoriertes Webkamm, und ein Hornkamm. Metallbearbeitung an dieser Stelle ist angedeutet durch Blei- und Kupferverbindungsreste. Auch Knochen und Geweihe wurden hier bearbeitet. Eine grosse Ansammlung von Tierknochen (Rind, Schaf, Ziege und Schwein) fand sich in der englischen Schicht, vermutlich Abfälle der Feste während königlichen Besuchen, wenn die Bevölkerung des Dorfes durch das Königsfolge anwuchs. Offensichtlich wurden daneben hauptsächlich Gerste, Hafer und Weizen verzehrt.

Ausserhalb des Dorfes befand sich ein Friedhof. Die Toten waren in langen Steinkisten oder Grubengräbern beerdigt. Mindestens 26 Steinsarge und 21 Erdgräber wurden entdeckt. Dies war jedoch nur ein Teil des originalen Friedhofs. Die Mehrzahl der hier Bestatteten waren erwachsene Männern und Frauen, jedoch wurden auch Kinder vorgefunden. Es gab keine Grabbeigaben. Das Datum der Friedhofsgründung ist unbekannt, aber die 14C-Datierung zweier Skelette deutet an, dass er weiterhin benutzt wurde, möglicherweise bis ins 13. Jahrhundert hinein.

Die Überreste eines mittelalterlichen Zwischenwalls quer über die Halbinsel waren wahrscheinlich ein Teil der Befestigung der Burg auf Castle Rock, die 1488 zerstört wurde. Zwei Gebäude, eines aus Stein und das andere, aus Holz auf Steinfundamenten, werden mit der rekonstruierten Burg von 1497 verbunden. Ausserdem gibt es Spuren von Metallarbeit auf der Halbinsel während diesem Zeitabschnitt.

Der Aufbau und die Zerstörung eines kurzlebigen französischen Forts im Castle Park wird der Jahreszahl 1560 zugeordnet. Spuren dieses Forts wurden ausgegraben. Militärische Ausrüstungen, in Form von Kettenrüstung, Werkzeug, einem Hufeisen und persönlichen Gegenständen haben überlebt, jedoch fand sich nichts aus einem deutlich französischem Ursprung der Ansammlung.

Spuren von zwei Gebäuden und, wahrscheinlich, einem Kalbrennofen gehören zu dem Zeitabschnitt zwischen dem 16. und 19. Jahrhundert, können aber nicht genau datiert werden. Eine gut erhaltene Serie von Lehmpeifen konnte ins 17. Jahrhundert datiert werden. Im 19. Jahrhundert war Castle Rock wiederum ein Teil einer militärischen Kaserne. Eine Übungsbatterie wurde aufgebaut, um die örtliche Artilleriebürgerwehr auszubilden. Die Betonplattform der Batterie und andere Spuren militärischer Betätigung wurden während der Ausgrabungen entdeckt.



Illus 1
Site location.

INTRODUCTION

David Perry

Dunbar is situated in East Lothian, some 45km east of Edinburgh and some 48km north of Berwick-upon-Tweed (illus 1). A small coastal town, it was a royal burgh from 1445 until local government

reorganization in 1975, a status it shared with North Berwick and Haddington. In 1370 it had been created a burgh in barony in favour of the earl of March.

GEOLOGY AND TOPOGRAPHY

The area around Dunbar is characterized by two contrasting physical landscapes. To the south are the high Lammermuirs, which overlook a gently undulating, narrow coastal strip extending westwards and southwards from Dunbar. These landscapes are the local representations of the Southern Uplands and the Central Lowlands respectively, which dominate the physical geography of southern Scotland. The hills mainly support sheep grazing, while the lower ground is extensively cultivated for arable farming. The area is drained by the Biel Water and the Spott Burn, which drain into the North Sea to the west and east of Dunbar respectively.

The divide between these two contrasting landscapes is marked by the Lammermuir Fault, the north-eastern end of the Southern Upland Fault. The geology of the Lammermuirs comprises indurated and intensely folded and faulted Ordovician and Silurian greywackes and shales and Lower Devonian greywacke conglomerate. The coastal strip comprises less resistant drift-covered sediments of Devonian-Carboniferous and Carboniferous age (Davies *et al* 1986, 1).

In Dunbar itself, Castle Rock, where the ruins of the medieval castle are situated, is largely a bassanite intrusion, although the eastern side is a softer conglomerate. The stack occupied by the French artillery blockhouse is also part of the bassanite intrusion, as is the western cliff of the headland of Castle Park. The underlying geology of the rest of Castle Park consists of red sandstone sedimentary rock of Upper Old Red Sandstone/Devono-

Carboniferous age. Above the bedrocks are glacial meltwater deposits of sand and gravel with associated deposits of laminated silt and clay.

Immediately south of Dunbar are brown forest soils with gleying and some noncalcareous and humic gleys supporting arable and permanent pastures as well as rush pastures and sedge mires on undulating lowlands with gentle and strong slopes (SS 1982a). This soil is defined as Class 2, 'capable of producing a wide range of crops and . . . flexible in its use with only few difficulties encountered' (Brown & Shipley 1982, 137). These difficulties include slight workability or wetness problems, slightly unfavourable soil structure or texture, moderate slopes or slightly unfavourable climate. Nevertheless, 'limitations are always minor in their effects and land in this class is highly productive' (SS 1982b). Class 2 soils extend south-westwards of Dunbar along the valley of the Biel and the Tyne.

South-eastwards of Dunbar, along the coast, there are fluvio-glacial sands and gravels derived from Upper Old Red Sandstone sediments. Above that subsoil there are brown forest soils with some non-calcareous gleys and humic gleys on mounds and terraces with gentle and strong slopes (SS 1982a). This soil is Class 3.1, 'capable of producing consistently high yields of a narrow range of crops (principally cereals and grass)' (SS 1982b). In summary, the soil in the vicinity of Dunbar is good farmland, supporting both arable and pastoral farming.

THE SITE

In the medieval period, its location on the main east coast land route between Scotland and England made Dunbar of strategic importance in the conflicts between these rival kingdoms. In the late 19th and early 20th centuries, with the prospect of possible Russian, French or German incursions into the Firth of Forth, it was chosen as one of a series of sites for practice batteries for local artillery volunteers as part of a programme to improve Britain's coastal defences. The ruins of the medieval castle on Castle Rock reflect the earlier military role of Dunbar, the former army barracks on the headland at Castle Park the later one.

In the 20th century, Dunbar was an important seaside holiday resort, with an outdoor swimming pool and several hotels for golfers at the local golf course. The closure of the pool and some of the hotels reflected a decline in the town's status as a resort. To reverse this decline, East Lothian District Council, as part of its Dunbar Initiative, proposed to redevelop the barracks site at Castle Park, closed as a result of defence economies in the 1950s. The

proposals included the construction of a leisure pool on the headland, opposite the ruins of the castle, with housing and a car park elsewhere on the site. It was these development proposals that led to the excavations and other fieldwork undertaken by The Scottish Urban Archaeological Trust Ltd between 1987 and 1993 which form the subject of this report.

Prior to the excavations at Castle Park, the only other archaeological excavation in Dunbar was at the site of the Trinitarian Friary by the Urban Archaeology Unit, the predecessor of the Trust, in 1981 when foundations of the friary and a cemetery were found (Wordsworth 1983). In 1987 trial excavations near the site of that excavation were undertaken by the Trust, when a possible western limit to the cemetery was located (Hall 1987). In January 1988, after the initial trial excavation at Castle Park, but before the start of the first phase of full excavation, trial excavation at the former Stark's Garage at the south end of High Street located medieval hill-wash and backland deposits and post-medieval buildings outside the southern town defences (Bowler 1989).

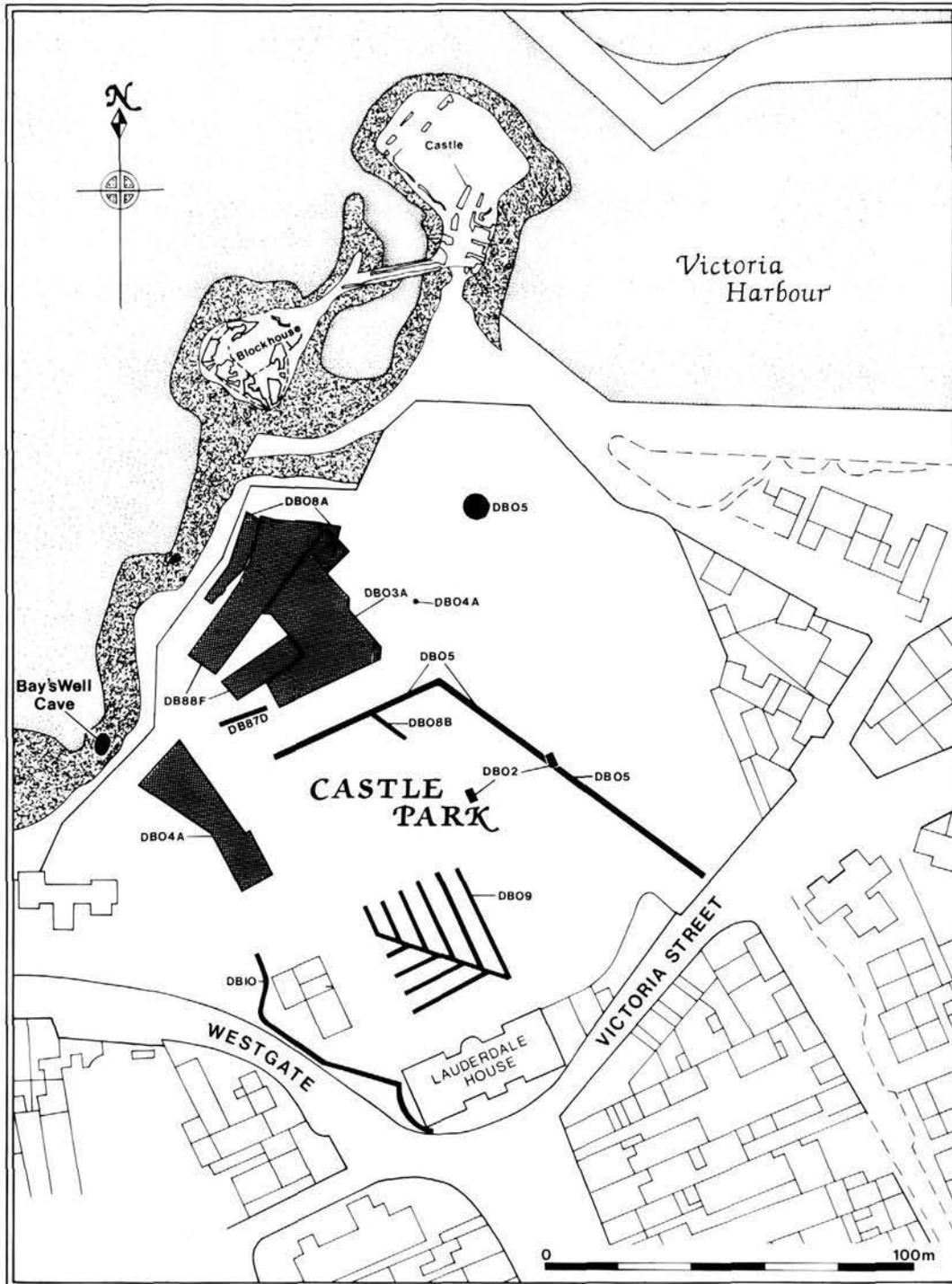
THE EXCAVATIONS

(illus 2)

The excavations at Dunbar took place under the direction of Philip Holdsworth. Four trial trenches (DB87A-D) were excavated by machine by Derek Hall in December 1987, with funding from East Lothian District Council (only Trench D is illustrated, the other three being within the areas of later excavations). These were intended to locate a mid 16th-century French fort, remains of which were thought to be still in existence in the 19th century. No definite trace of the fort was found, although a ditch and stone foundations were uncovered near the tip of the headland. (These later proved to belong to an Iron Age promontory fort and a medieval curtain wall respectively.)

The results of the trial work were considered sufficiently rewarding to merit an extended excavation from March 1988 to March 1989, supervised by Derek Hall and funded by the Scottish Development Department (Historic Buildings and Monuments Division) and the National Museums of Scotland. The results of this first phase of excavation (DB88F), with the discovery of Dark Age and earlier

remains, led to a second phase of excavation (DB03A) directed by Philip Holdsworth and supervised by Don Stewart, between March and December 1989 and in February 1990, funded by the Scottish Development Department (Historic Buildings and Monuments Division) and East Lothian District Council. These took place immediately to the south of the previous excavations. Subsequently, proposals to erect housing on the western side of Castle Park led to a third phase of excavation between December 1990 and March 1991 (DB04A), supervised by Richard Sermon and funded by Historic Scotland. These located the continuation of an Anglian ditch found in 1989 and the ditch of the French fort. The final phase of excavation, supervised by Colm Moloney and funded by Historic Scotland and East Lothian Community Development Trust, took place in November and December 1991 (DB08A), along the edge of the headland in advance of landscaping, immediately to the north-east and north-west of the first phase of excavation.



Illus 2
Location of trenches.

In addition to the excavations, several watching briefs were conducted on the site, funded by Historic Scotland and its predecessors. Derek Hall monitored the engineers' test pits in February 1989 (DB02), and Ray Cachart the service trenches and other works for the leisure pool between May and August 1991 (DB05). The former located a deep feature,

possibly part of the ditch of the French fort. The latter located three human skeletons and various disarticulated human bones, probably part of a cemetery originally discovered in 1801 and rediscovered in 1993, as well as other features of unknown date and purpose. While the third phase of excavation was being undertaken, a stone-lined

well was uncovered in January 1991 during building operations elsewhere on the site. During the final phase of excavation, a watching brief was maintained in November 1991 on a service trench in front of the swimming pool, then under construction (DB08B).

In February and March 1993, during the cutting of drainage trenches in front of Lauderdale House,

an extended watching brief, supervised by David Perry (DB09), recovered the remains of a long cist cemetery. Subsequently, in April 1993, another watching brief by Tom Cromwell, on the digging of a service trench by Scottish Power in Bayswell Road (DB10), located more human skeletal remains and a possible cist.

POST-EXCAVATION

The drawing together of the results of each of these different pieces of fieldwork into a coherent whole was, naturally, a long and complicated process. Not only had three adjoining sites (DB88F, DB03A and DB08A) to be tied together, but the DB03A excavation itself was physically divided into three parts by two modern army intrusions (gun emplacements and a slit trench, the former on top of a medieval trench). The separate DB04A excavation had also to be linked to the main excavation. Post-excavation analysis was begun under Philip Holdsworth, who published an interim report on the Iron Age and Anglian period (1993). Following his departure to Cambridge in 1992, interpretation was continued and completed by David Perry. Some twenty-five

stratigraphic phases were identified from natural (Phase 1) to the present day (Phase 25), from five broad periods of occupation (Iron Age, Northumbrian, Medieval, Post-medieval and Modern), to tie the excavations together (illus 10). This report presents only the archaeological evidence of these five periods. Isolated features, which could neither be interpreted nor definitely assigned to a single phase or period, have not been included. The cemetery cannot be tied directly into this chronology and has therefore been dealt with separately. A full stratigraphic account of all contexts and features will be deposited with the National Monuments Record of Scotland, Royal Commission on the Ancient and Historical Monuments of Scotland.

HISTORICAL BACKGROUND

David Perry

PREHISTORY

(illus 3)

In AD 680 Ecgfrith, King of Northumbria, imprisoned Wilfrid, Bishop of York, at *Dynbaer* at the mouth of the Firth of Forth. The record of this event in *The Life of Wilfrid* by Eddius Stephanus (Webb 1986b, 145) is the only notice of Dunbar having been a royal stronghold in the Anglian period. The place-name means 'summit fort' and reveals Dunbar to have been the site of an earlier British fortification (Holdsworth 1993, 31).

The date of the earliest settlement in the vicinity of Dunbar is unknown, but discoveries of short cists on the golf course at the southern end of the town (Callander 1922, 33) and of Beaker sherds at Kirkhill Braes (Calder & Feachem 1951) suggest that people were living in the area during the Early Bronze Age at the latest (*c* 2400-1500 BC). The finding of a copper flat axe at Doune Hill (Doon Hill) (Anon 1934) as well as the presence of a number of standing stones in this area of East Lothian, including one at Easter Broomhouse just south of Dunbar, also indicate habitation at this date (Baldwin 1985, 164-5). Continuity of settlement into later periods

cannot be proved, but the availability of good arable land and pasture must have made the area attractive to early settlers.

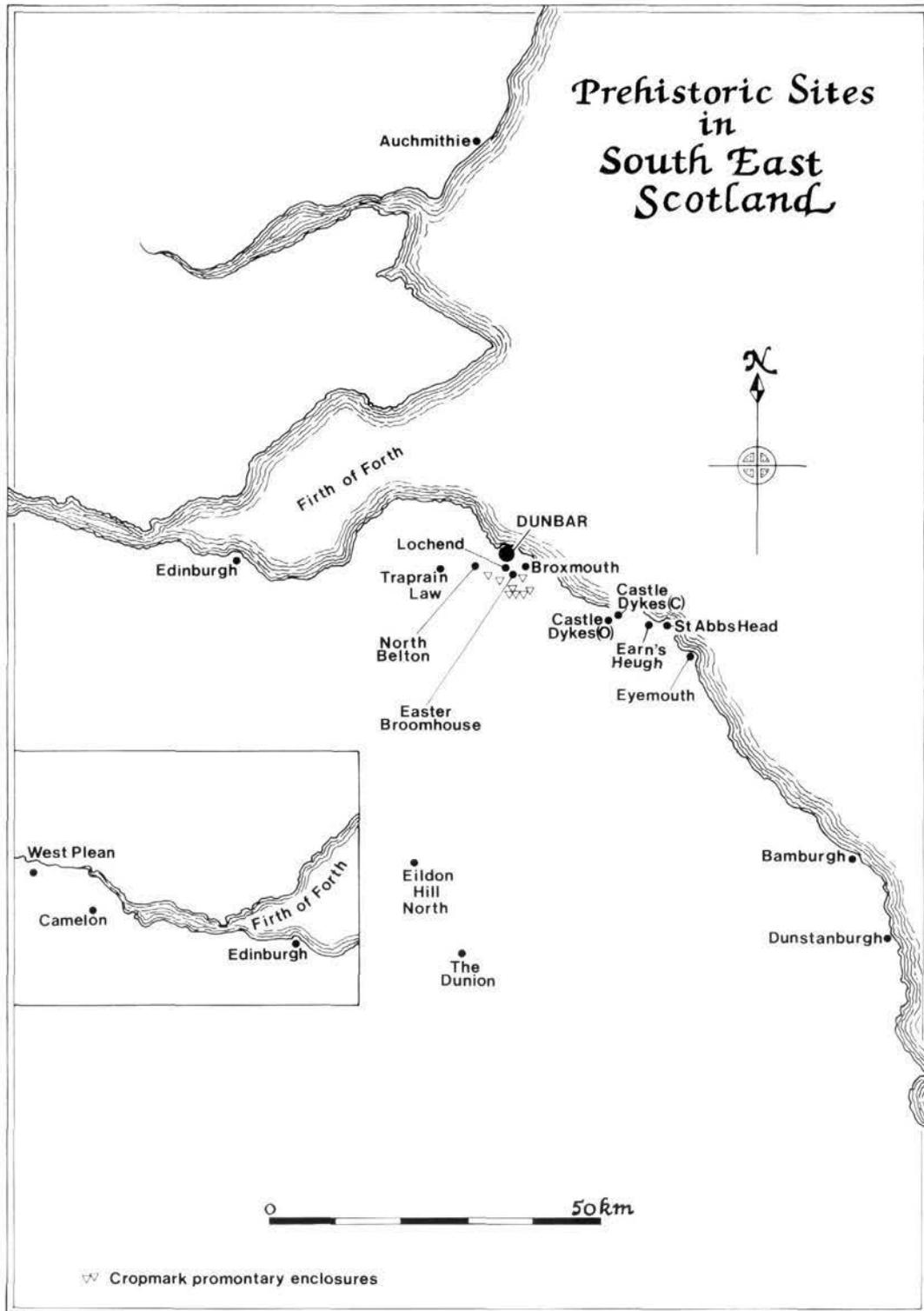
Excavations at the nearby hillfort of Broxmouth have revealed a sequence of occupation phases from a palisaded enclosure, through several successive defended earthworks to a post-defensive settlement of stone-walled houses (Hill 1982b). Broxmouth was occupied throughout most of the first millennium BC, with the defences being abandoned about 200 BC (Halliday 1995, 34). This occupation sequence can be paralleled at other hillfort sites in south-east Scotland. Presumably Broxmouth and the area of Dunbar were dependent on the major *oppidum* of Traprain Law, where excavations between 1914 and 1923 revealed Late Bronze Age and Iron Age settlement extending from about the 7th century BC into the Roman period. The abandonment of defences at Broxmouth and elsewhere indicates a return to a more peaceful community, although the reasons both for the need for defensive settlements and for their abandonment are not clear.

THE VOTADINI AND THE ROMANS

At the time of the Roman invasion of southern Scotland in AD 79, the area between the Tyne and the Forth was occupied by the Votadini (later known as the Gododdin), whose tribal centre was at Traprain Law. As no Roman sites are known in the coastal plain between Berwick and Inveresk, presumably this area posed little or no threat to the advancing Roman legions during the successive incursions of Agricola in AD 79-83, Antoninus Pius in the mid 2nd century AD and Septimius Severus in AD 209-11. It is possible the Votadini were a client-state under the latter's son, Caracalla, as they

apparently were later (Burley 1956, 141).

The presence of Roman coins and the hoard of early 5th-century Roman silverware at Traprain, as well as occasional Roman finds at other sites in south-east Scotland, indicate contacts between the Votadini and the Romans, although the nature of the contacts is unclear. The hoard was possibly a diplomatic gift or subsidy rather than loot (Alcock & Alcock 1990, 121). The Roman arrival in southern Scotland must have had a considerable impact on the native population, not just in military action but in opportunities



Illus 3
Prehistoric sites in south-east Scotland mentioned in the text (O—Oldhamstocks, C—Cockburnspath).

for commerce and the Roman need for food supplies (Keppie 1995, 48; Morris 1995, 54). Settlement in or near Dunbar at this time is shown in the discovery of two drystone masonry cists containing multiple burials at Lochend and North Belton, the former

containing remains of at least 21 skeletons (Longworth *et al* 1966, 184), the latter two skeletons. These cists are of Iron Age date, that at North Belton being dated by radiocarbon analysis to between the 1st and 3rd centuries AD (Crone 1992, 164-5).

Occupation at Traprain is generally considered to have ended in the 5th century, but finds there have comparisons with Viking (Burley 1956, 167, No 91; 202, No 400; 216, No 521), Merovingian (*ibid*,

183-4, No 261) and Dark Age and Anglo-Saxon objects (*ibid*, 202, Nos 397-8). Occupation, at least sporadically, seems to have continued after the supposed abandonment in the 5th century.

THE NORTHUMBRIAN KINGDOM

(illus 4)

It is not clear when Anglian occupation of Lothian took place. The traditional view is that, after Ida seized Bamburgh in 547 and established the royal house of Bernicia (Sherley-Price 1970, 333), the Angles were effectively confined there until the reign of Ethelfrith after 593 when massive expansion took place.

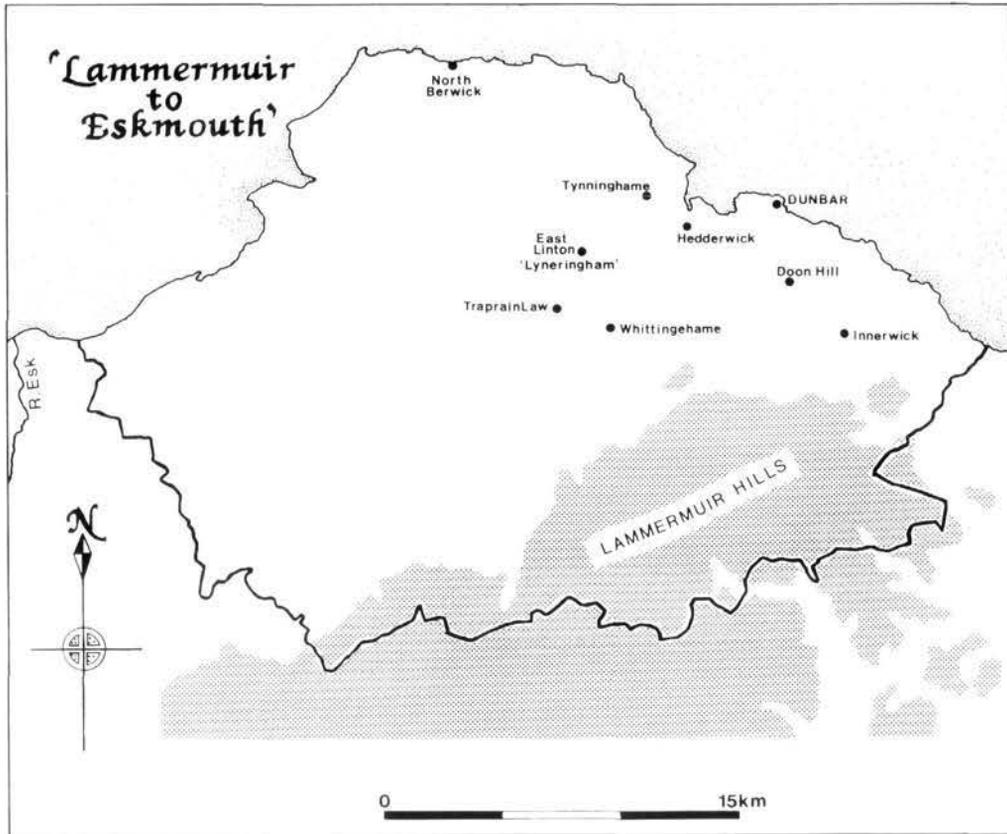
Certainly Ethelfrith defeated at Catterick, Yorkshire, an incursion into Bernicia by the Gododdin about 600. He also defeated Aedan, King of Dalriada at the unidentified site of Degsastan in 603. It was after these northern victories that Ethelfrith turned his attention south and conquered Deira which he is unlikely to have done unless his northern frontier was secure (Aliaga-Kelly 1986, 241-2). Bede describes Ethelfrith as 'a very powerful and ambitious king . . . [who] ravaged the Britons more cruelly than all other English leaders . . . [and] overran a greater area than any other king or ealdorman, exterminating or enslaving the inhabitants, making their lands either tributary to the English or ready for English settlement' (Sherley-Price 1970, 92). It is probable that Lothian was at least tributary, if not 'ready for English settlement', before Ethelfrith's death in 616/7. The conquest was completed with the capture of Edinburgh in 638, if the *obsesio Etin* in the *Annals of Ulster* for that year (Anderson 1922, i, 164) records its capture by Oswald, King of Northumbria (634-42).

Eddius Stephanus describes Dunbar as an *urbs regis*. Several other sites styled *urbs* in Bede and Eddius are known, eg Coldingham, *urbs Coludi*; *urbs Giudi/Iudeu*, unidentified but possibly Stirling, Inveresk or, in the light of recent excavations there, Edinburgh; Bamburgh, *urbs Bebbae* (Barrow 1973, 66). These were, probably, already existing British tribal or royal centres taken over by the Angles. These sites formed centres with a territory dependent on them, known as multiple estates (see Chapter 11). It has been suggested that the area administered by Dunbar extended 'from Lammermuir even to Eskmouth' from at least Anglian times (Aliaga-Kelly 1986, 416). This may also have been the area dependent on

Traprain, transferred to Dunbar as a more convenient and accessible centre for commerce through its natural haven (Alcock & Alcock 1990, 121). The area corresponds to the former county of East Lothian and was the territory recorded in the *Historia de S Cuthberto* (probably written in the first quarter of the 12th century) as having been granted, presumably as a spiritual or ecclesiastical jurisdiction, to the monastery of St Baldred (died 756) at Tynninghame. Subsequently it formed part of the possessions of the church of Lindisfarne (Anderson 1908, 60 n 8). However, it seems to be too large to have formed a shire, and the shire of Dunbar is likely to have covered a smaller area. Nevertheless, that Lammermuir was an important boundary is confirmed by the fact that, during the reign of Alexander I (1107-24), it formed the division between Alexander's lands to the north and his younger brother David's to the south (Barrow 1973, 151).

After the conquest of the Picts by Kenneth MacAlpin in 843, he and his successors turned their attention south of the Forth (*ibid*, 151-2). Kenneth seized and burned Dunbar and Melrose before his death in 858 (Anderson 1922, i, 288). His successors raided Northumbria, no doubt taking advantage of its weakness through the establishment of a Viking kingdom at York. It is even possible that Anglian earls at Bamburgh acknowledged Scottish overlordship. When Ealdred of Bamburgh was forced into exile by King Ronald of York, he took refuge with Constantine II (900-943), King of Scots. Constantine's army, sent to restore Ealdred, was defeated by Ronald at Corbridge (Anderson 1908, 64). Constantine's continued intervention led to Athelstan of Wessex's invasion of Scotland in 934. (During this invasion a curious incident is recorded: as a sign of his conquest of the Scots, Athelstan drew his sword and cleft a rock near Dunbar (*ibid*, 69n).) Constantine's attempt to throw off English overlordship in a coalition with other enemies of Athelstan failed at Brunanburh in 937 (*ibid*, 69-73).

Nevertheless, Scottish pressure on Lothian was maintained and, in the reign of Indulf (954-62),



Illus 4
'Lammermuir to Eskmouth'.

Edinburgh was abandoned by the Northumbrians. As his son Culen (966-71) was slain in Lothian by the king of Strathclyde, it is possible that the Scots had already conquered Lothian. The grant of Lothian by Edgar of England, in 973, to Kenneth II (971-95), in return for the latter's recognition of English overlordship (*ibid*, 77; Barrow 1973, 153), was probably the acceptance of a *fait accompli*. If the Scots had acquired Lothian, which included Berwickshire (RCAHMS 1924, xiii), before the end of the 10th century, it could explain the presence near Dunbar of the place-name Pitcox. The name means 'share of the fifth part' (Nicolaisen 1976, 152) or 'share of five' (ie consisting of five households,

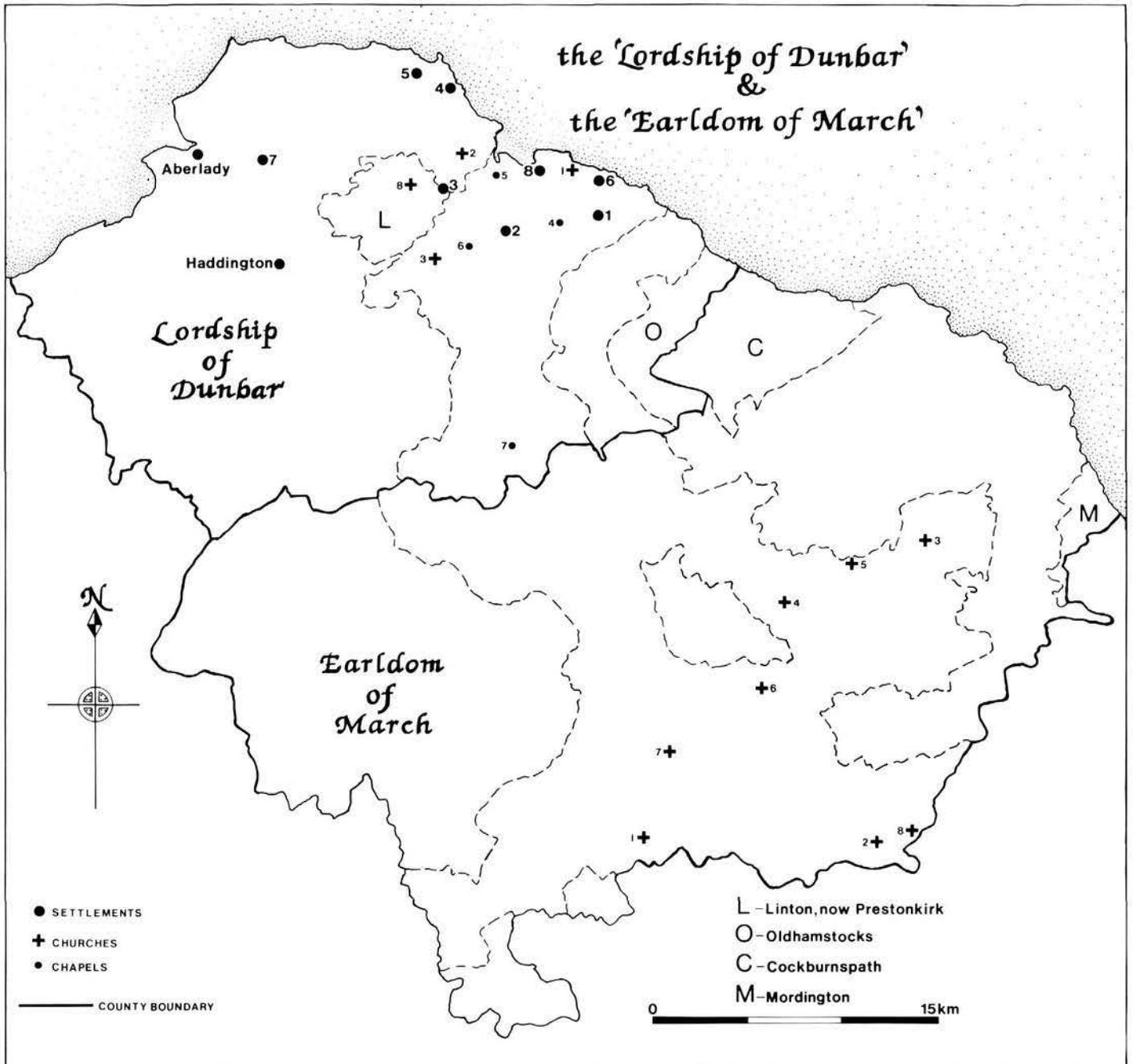
where 20 households = one davoch or ploughgate; Goodare 1993, 397) (Barrow pers comm) and is a hybrid Pictish-Gaelic word implying Scottish settlement in the 10th or 11th century. It would also explain the acceptance by the bishops of Durham, in the early 12th century, of the loss of their lands north of the Tweed to the bishop of St Andrews when they resisted the loss of Teviotdale to the diocese of Glasgow (Anderson 1908, 129n1, 133n3, 163-4). The defeat of Malcolm II (1005-34) at the siege of Durham in 1006 may have jeopardized Scottish rule between the Tweed and Forth, but his victory over the earl of Northumbria at Carham in 1018 secured it (*ibid*, 80-1).

THE LORDSHIP OF DUNBAR

(illus 5)

Malcolm II's victory at Carham ensured that East Lothian and Berwickshire were incorporated into the kingdom of Scotland. It was possibly after this, if not

before, that the status of Dunbar changed. Its earlier status as an *urbs regis* with administrative jurisdiction over a wide area 'from Lammermuir even to



Illus 5

Lordship of Dunbar and Earldom of March. Settlements: 1 Pinkerton; 2 Pitcox; 3 Knowes; 4 Scoughall; 5 Auldhame; 6 Broxmouth; 7 Drem; 8 Belhaven; churches and chapels (Dunbar): 1 Dunbar; 2 Tynninghame; 3 Whittingehame; 4 Spott; 5 Hedderwick; 6 Stenton; 7 Penshiel; 8 Linton (Prestonkirk); churches (March): 1 Hume; 2 Hirsell; 3 Chirnside; 4 Duns; 5 Edrom; 6 Fogo; 7 Greenlaw; 8 Lennel.

Eskmouth' seems to have been lost. It is Haddington which emerges in the 12th century as a royal centre, an early royal burgh, but without a royal castle (Duncan 1975, 162), as the seat of the sheriffdom, later constabulary, later again sheriffdom of Haddington or East Lothian.

In the 11th and 12th centuries, Dunbar was probably still a shire centre (Barrow 1973, 66-7), but had in

1072 been granted by Malcolm III (1058-93) to his cousin, Cospatic, who had been deprived by William the Conqueror of the earldom of Northumbria (Anderson 1908, 96). The grant seems to have been intended as a temporary measure until Cospatic could regain his earldom. However, despite being granted lands in Northumberland (CDS, ii, 42; iii, 15), neither he nor his descendants ever recovered the earldom of Northumbria. Dunbar

became the stronghold from which Cospatrick's descendants took their name and, initially, their commonest title. It is not clear when Cospatrick's descendants were granted the title of earl, but it does not seem to have been until the mid 12th century. His grandson, also Cospatrick, the third earl (the numbering used here is that in Balfour Paul 1906), was the first to have definitely used the title of earl (of Lothian) in his lifetime. The second earl was not styled earl until after his death in 1138, although he was at least once styled Cospatrick of Dunbar (*ibid*, 247, 249-50).

Neither the terms nor the extent of the estate granted to Cospatrick are known, but, if it was just Dunbar, it was probably no more than the present parishes of Dunbar, Spott, Stenton and Whittinghame (the extent of the former medieval parish of Dunbar). These parishes, except the lands of Hedderwick and Broxmouth, made up the lordship of Dunbar. The parish of Prestonkirk, which also belonged to the earls, may have formed part of the lordship as well. From at least the early 12th century Cospatrick's descendants held, in addition to the lordship of Dunbar, Oldhamstocks (and part of Drem, Barrow 1960, 170) in East Lothian, together with the lordship of Cockburnspath and a great swathe of territory in Berwickshire from Cranston in the north to Hume in the south and from Earlston in the west to Chirnside in the east. In addition, the earl held the barony of Mordington (*RMS*, i, No 521). It was this Berwickshire land which was to provide the earls of Dunbar with their new title, that of earls of March, from the late 13th century. It is, therefore, clear that, if East Lothian 'from Lammermuir even to Eskmouth' had been the extent of the estate attached to Dunbar since the 7th century, it had ceased to be

so by the 12th century.

The lordship of Dunbar was the feudal successor of the earlier shire, although many of the rights and obligations of the latter would have continued to be exacted in the new feudal system. Its centre was the earl's hall or castle at Dunbar, outside or near which a settlement had developed by the mid 12th century when the monks of the Isle of May were granted a toft in it (Barrow 1960, 280) at Belhaven (Stuart 1868, cxiii). Beyond that were a number of outlying settlements, dependent on the earl's castle and paying rents and services to it. These settlements would have been primarily agricultural communities or touns, although that at Dunbar was probably a fishing community as well. The farming was arable in the fertile Lothian coastal plain and pastoral with summer shielings in the Lammermuirs to the south. The economy would have been largely subsistence, with tenants' crops providing for their own needs with enough to pay rent to the lord. There is little evidence of widespread trade before the development of burghs in the 12th century. Such trade as existed before then was probably in luxuries for the king, nobles and higher churchmen.

The rentals of the earldom of March survive from the mid 15th century and show that in 1503 the crops grown were wheat, barley, oats and peas (*ERS*, xii, 345 n). Rents were also being paid in peppercorns (presumably imported) and salmon (*ibid*, xii, 72). Livestock are revealed in the customars' accounts for the port of Dunbar at Belhaven to have been primarily sheep, with cattle trailing as a poor second. From the mid 15th century, rabbits were reared (*ibid*, vi, 258), in warrens on the East and West Links.

THE BURGH

(illus 152)

The crown encouraged the growth of burghs as trading centres from at least the time of David I (1124-53), if not before as Alexander I (1107-24) had granted the canons of Scone the right of a ship at Perth. This encouragement was probably as much for the crown's benefit, as a source of revenue, as for the well-being of its subjects. The trading monopolies granted to royal burghs, over both internal trade in their hinterland and external trade, would have enabled the crown to control trade and the revenues to be derived from it, as well as, initially at least, encouraging burghs to develop by concentrating

economic activity in them. The king's burgh of Haddington, with its port at Aberlady (Gourlay & Turner 1977, 5), was the economic centre for East Lothian but private ports and burghs for nobles and churchmen were not discouraged. The earls of Dunbar had a port before 1164 (Barrow 1960, 280) when the monks of the Isle of May were granted access for one ship to the harbour of Dunbar, which was at Belhaven.

Dunbar itself did not achieve burghal status until 8th February 1370 when David II (1329-71) erected it

into a burgh of barony in favour of George, 10th Earl of March, with a weekly market on Monday and with a free port at Belhaven (*RMS*, i, No 340). Its trading area was the earldom of March and there were reciprocal arrangements for the burgesses of Dunbar and Haddington to trade in each other's trading area. Before then Dunbar had been a toun (Easson 1939, 92). Bower's reference to it as a burgh in 1216, when King John of England burned it, is anachronistic (Watt 1990, 82). James II (1437-60) created the burgh a royal burgh on 16th August 1445, with the additional provision that the burgesses could trade in the baronies of Coldingham, Mordington, Bunkle, Langton, Innerwick and Stenton until the recovery of Berwick and the castle of Roxburgh from English hands (*RMS*, vi, No 1418). In 1555 the market day was changed from Monday to Friday and the burgh was granted the right to hold an annual fair at

Martinmas (*ibid*, iv, No 999). In 1603 James VI (1567-1625) granted the burgh an additional fair on 8th September, the Latter-Lady-Day-in-harvest, and made the provost and bailies into sheriff principal and sheriffs depute within the burgh (*ibid*, vi, No 1418). It is unlikely that the inhabitants of the burgh derived their livelihood solely from commerce and trade. The large amount of common ground around the burgh, defined in 1569 (SRO, 'Register of Acts and Decrees of the Lords of Council and Session', CS7/42, fo. 473r-483r), seems to have been used as grazing and arable. In addition, in 1618, James VI granted the burgh rights of pasture on Dunbar Common in the Lammermuirs, together with the right to take heather, fuel, fall and divot from it (*RMS*, vii, No 1921). Despite its burghal status, Dunbar was probably still largely a farming and fishing community (Brown 1978, 165).

THE CASTLE

The story of Dunbar Castle from its first to its last appearance in historical record, though bound up with the story of Scotland, is, nevertheless, far from glorious. Indeed the castle's reputation was such that, in the mid 15th century, it provoked the chronicler of the *Liber Pluscardensis* to observe 'Therefore no one need wonder that the said castle and domain are confiscated in the king's hands, for many evils have been wrought by this castle' (Skene 1880, ii, 113); and he was writing before Albany's treasons under James III, the French occupations in the 16th century and Bothwell's abduction of Queen Mary in 1567.

Dunbar Castle was strategically important in the medieval period, being the only major stronghold commanding the route between Berwick and Edinburgh: both Dirlerton and Tantallon Castles lie off that route. It was along this route that invading English armies approached Edinburgh, two major battles being fought near Dunbar in 1296 and 1650 when Edward I of England and Oliver Cromwell respectively defeated Scottish armies. Dunbar town itself was burned by the English, amongst other occasions in 1216, 1544 and 1548. This strategic importance led to the determined English siege in 1338.

The first definite date for the castle is 1296. However, it has been suggested that the heavy burden of £25-16s-11d (*CDS*, iii, 323-4) for the castle guard (the obligation on a knight to provide a garrison in the king's or a lord's castle) for Dunbar Castle in the 14th century indicates that the service of guarding the castle formed part of the tenure of some Anglian

landholders in the 11th century (Duncan 1975, 384). Before 1296, reference to the castle cannot be said to be conclusive proof of its existence. King John of England is said to have captured the castle in 1216 in a contemporary Norman chronicle (Anderson 1922, ii, 409) but the Scottish sources, the *Chronicle of Melrose* (*ibid*, 407) followed by Fordun (Skene 1872, ii, 279) and Bower (Watt 1990, 83), merely state that he burned the town of Dunbar. Bower has a story that Thomas the Rhymer prophesied the death of Alexander III to the earl of March in the castle on the night before that king rode to his death at Kinghorn in 1286, but there is no earlier source for that story (*ibid*, 429, 510-1).

In 1296 the castle of Dunbar was twice besieged, first by the Scots because Patrick, 8th Earl of March, was pro-English. The English then besieged it, the keeper, Richard Siward, surrendering to Edward I of England and betraying the Scots who had taken refuge in the castle after the Battle of Dunbar. Thereafter, Dunbar played little role in the Wars of Independence other than as a staging post for English munitions (*CDS*, ii, 313 and 315). As the earl was pro-English, this area of south-east Scotland provided little trouble to Edward and the earl seems to have spent much of the period 1301-7 in command of the English garrison at Ayr (*ibid*, 317, 335, 515). His son and successor, Patrick, 9th earl, maintained the pro-English policy of his father. It was to this castle that Edward II of England fled after Bannockburn in 1314 and from which he continued his flight to England. It was after this that the earl changed sides and became a supporter of

Robert I (1306-29), and presumably the castle was demolished about this time (Skene 1880, ii, 203).

Robert's struggle to ensure Scotland's independence was virtually undone soon after his death in 1329. Edward III of England took advantage of the minority of David II (1329-71) to seek control of Scotland by installing Edward Balliol as King of Scots. After the earl of March was captured in Berwick Castle in 1333, Edward III ordered him to rebuild Dunbar Castle at the king's expense (Nicholson 1974, 136). The earl, however, soon returned to his Scottish allegiance and it was during this period that the castle had its greatest moment of glory, the successful defence by his wife, Agnes Randolph, Countess of March, against William Montagu, Earl of Salisbury. The English forces under Salisbury besieged the castle from 13th January until 16th June 1338 (Skene 1872, ii, 354). The tactics of Black Agnes, as she was called, involved what nowadays would be called psychological warfare, as much to demoralise the besiegers, as to raise the morale of the besieged. The most striking example of this was her reaction to the English siege artillery. She caused the walls, where stones struck, to be wiped with a cloth. As Wyntoun puts it (Laing 1879, ii, 432),

Wyth a towalle a damyselle
 Arayid jolyly and welle
 Wipyt the wall, that thai [the English] mycht se,
 To gere thaim mare anoyid be

The siege was conducted by sea as well as by land, but Alexander Ramsay managed to evade the English ships and bring a supply of provisions from the Bass Rock, presumably solan geese and other sea birds nesting there (*RPC*, iii, 624). Agnes then gathered together a feast of supplies and sent it out to Salisbury, explaining that after such a long siege his supplies must be running out!

Although Agnes successfully repulsed all the attacks, it was more luck than Scots military prowess that prevented the fall of the castle. In effect, Edward III became bored with Scotland after six years of warfare, which had not given him any permanent advantage. He turned his attentions to the richer pickings of France and recalled Salisbury from Dunbar.

Wyntoun relates a later incident concerning Dunbar Castle (Laing 1879, iii, 19-20). When war with England was renewed in 1384, George, 10th Earl of March, defeated at Benrig an English force under the baron of Greystoke sent to relieve the garrison at Roxburgh. Along with Greystoke, his baggage train

was captured, the latter being despatched to Dunbar. Greystoke was conveyed to the castle, where he was served a meal in the castle hall, whose walls were now decorated with his own hangings. His own vessels were used to serve him,

Bot than his wessayle noucht war thai
 For thai before had chawngyd fay.

In 1400, the earl quarrelled with Robert III (1390-1406) over a slight he had suffered when the king's elder son and heir, David, Duke of Rothesay, broke his betrothal to the earl's daughter and married instead a daughter of the earl of Douglas. March fled to England and his castle of Dunbar and the earldom of March were forfeited. It would seem that, somewhat ironically, they were bestowed on Rothesay, as James I (1406-37) apparently based his claim to the earldom in 1435 as heir to his brother, who had died 'vested and seised in fee' in the earldom of March (*ERS*, vi, 55). March was restored to his earldom in 1409 although the earl of Douglas had to be compensated with some of March's estates. That he had to be compensated implies he had some right over the March estates, possibly as brother of the widowed duchess of Rothesay.

With the forfeiture of the earldom of March in 1435, the castle of Dunbar became crown property, but it still proved a source of trouble. In 1445, the government besieged Joan Beaufort, widow of James I, and her supporters in the castle when they rebelled (McGladdery 1990, 36). It was almost immediately after this siege that Dunbar was created a royal burgh, possibly as a reward to the inhabitants for their support. A year later, Patrick Hepburn, younger of Hailes, seized the castle, but was quickly dealt with by the government (*ibid*, 39, 40). On the death of the keeper, James Crichton, in 1454, the castle was withheld from the king for a time (*ibid*, 84). It may have been an attempt to emphasize royal control of the castle that prompted James II (1437-60) to confer the earldom of March on his infant son, Alexander.

It was Alexander, also Duke of Albany, who caused his brother, James III (1460-88), considerable trouble. A brief siege of Albany in Dunbar Castle by James in 1479 ended after Albany fled to France. With English aid he returned to Scotland and was reconciled with James in 1482, although relations between the brothers soon broke down and Albany invited an English garrison into Dunbar before fleeing again in 1483 (Macdougall 1982, 188). It was not until December 1485 that James successfully recaptured the castle (*ERS*, ix, 433).

It was, doubtless, these recent troubles that prompted

Parliament in 1488 to agree with the Pluscarden chronicler of some 30 years before. It ordered the demolition of the castle 'be caus it hes done gret scaith in tyme bygane and war gret danger to the realm and it wer negligently kept or reparalit agane' (*APS*, ii, 211). The act was quickly carried out (*TA*, i, 91).

That the castle's demolition might have been a mistake was soon apparent when the threat of war with England loomed in 1496. With the loss of Berwick in 1482 and the demolition of Dunbar Castle, there was now no stronghold between the Tweed and Edinburgh to counter any English invasion. That neither Berwick nor Dunbar, when they were in Scots hands, had ever prevented the English from bypassing them seems to have been forgotten. Therefore, the castle was rebuilt between 1497 and 1501 with Sir Andrew Wood of Largo as keeper (*TA*, i and ii, *ad indices*). Wood had apparently been involved in successfully repulsing an English invasion by land and sea to besiege Dunbar Castle (*RMS*, ii, No 2775). When this invasion took place is not clear. It may have happened in 1481-2 (*ibid*, No 1563) or in 1490 (Nicholson 1974, 549). Even as building was proceeding artillery was being made for the castle, including three serpentines in 1497 and four brasses in 1498 (*TA*, i, 334, 388). In addition to artillery, the king's bows were kept at Dunbar (*ibid*, 345).

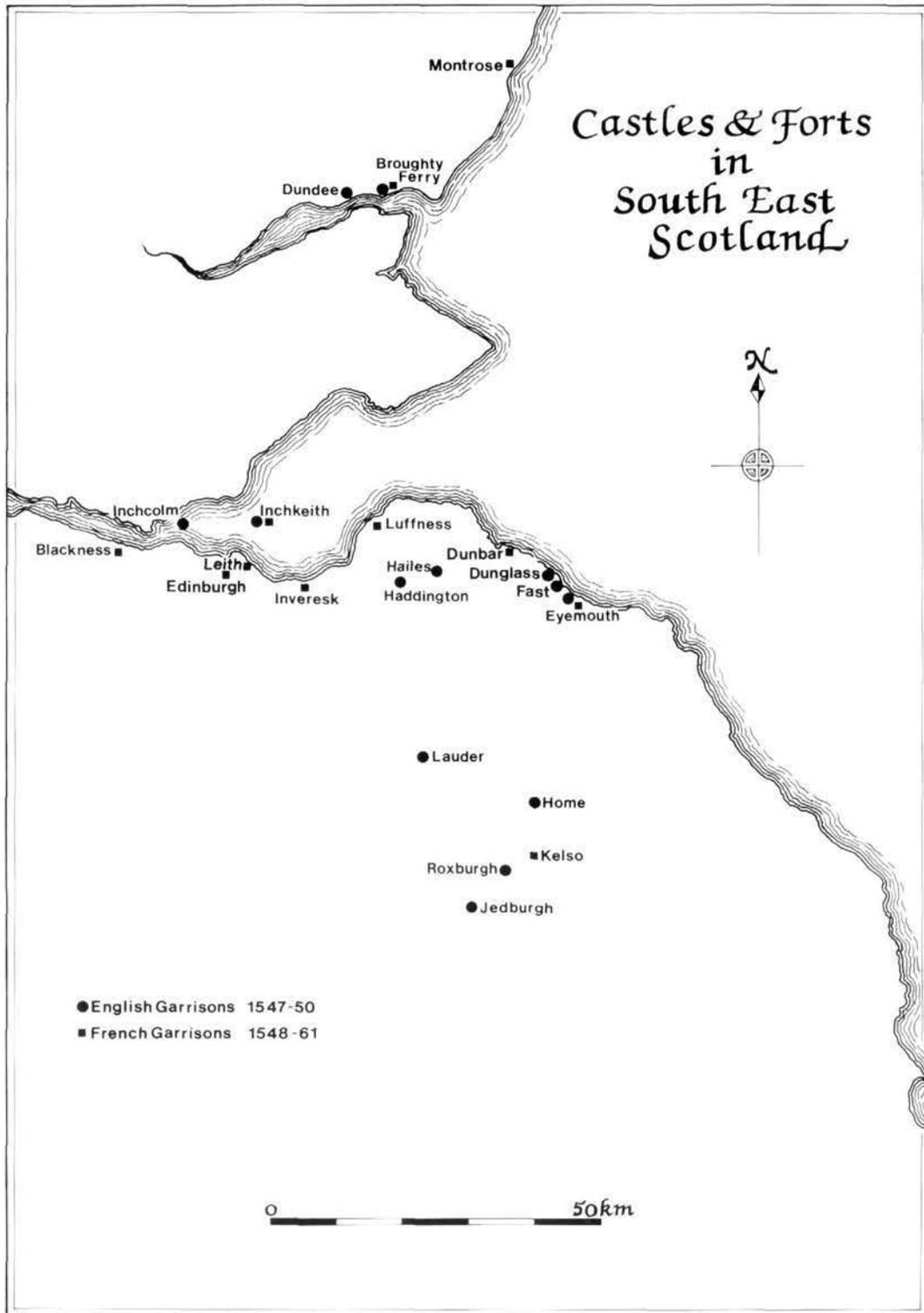
The marriage in 1503 of James IV (1488-1513) with Margaret, daughter of Henry VII of England, and the conclusion of a 'perpetual peace' between Scotland and England removed, temporarily at least, the military need for the castle of Dunbar. It may well have been this which led to Wood's replacement as keeper by Andrew Forman, Bishop of Moray in September 1503 (*RSS*, i, No 978). No further expenditure on the castle is recorded thereafter except for the painting of St John's Chapel in 1505 (*TA*, iii, 158). As part of the marriage settlement, Margaret's dower lands included the earldom of March and lordships of Dunbar and Cockburnspath (*RMS*, ii, No 2721), although the castle and royal burgh remained in the king's hands.

The perpetual peace lasted 10 years and ended with the disastrous Flodden campaign and the death in battle of James IV in 1513. In the ensuing minority of the infant James V (1513-42), the Governor, or regent, was the king's cousin and heir, the French-born John, Duke of Albany, son of the forfeited Alexander. Albany made Dunbar Castle his power base, securing it in December 1514 (Hannay 1932, 27) before his arrival in Scotland in 1515. He installed a French garrison and strengthened the

castle by constructing an artillery blockhouse at the tip of the headland. It had two levels of guns and was connected to the main castle by a walled passage which, regrettably, finally collapsed in the winter of 1993-4. A ditch in front of the blockhouse separated it from the rest of the headland. The castle held both garrison artillery for its own defence and field artillery for use elsewhere (MacIvor 1981, 116). This was not the first French military presence in Dunbar. In 1385, a French expedition had landed at Dunbar and Leith to assist the Scots in the renewal of the war against England (Nicholson 1974, 196), although, unlike the later French forces, this force was not a permanent garrison.

Although Albany finally left Scotland in 1524, a French garrison remained in Dunbar until 1537, after the marriage of James V to Madeleine, daughter of Francis I of France. What is surprising (or perhaps not!) is the almost complete absence from the *Exchequer Rolls* and *Treasurer's Accounts* of payments to the French captain and garrison at Dunbar after Albany's departure. Payments for the castle do not regularly appear until after the departure of the French garrison in October 1537 (*TA*, vi, 363).

James V was succeeded in 1542 by his infant daughter, Mary (1542-67). Henry VIII of England sought, first by diplomacy, the marriage of Mary to his young son, the Prince of Wales, later Edward VI. With the failure of the negotiations, Henry resorted to military pressure, embarking on a series of raids into Scotland, which became known as the 'Rough Wooing'. These only succeeded in driving the Scots into a closer alliance with France. The death of Henry VIII and accession of his son, Edward VI, in 1547 led to a change of tactics by the English. Instead of raiding, they seized strong points in southern Scotland to control the area (illus 6). The English regarded Dunbar Castle as one of the major Scottish strongholds to secure, although they do not seem to have made any military attempts to do so, presumably because it was impregnable (*Hamilton Papers*, ii, 5, 8, 98, 105, 288, 459-60). Instead a fort at Eyemouth was constructed in 1547-8. Others followed, including Haddington which was occupied and fortified in 1548. As this change of tactics was too much for the Scots to counter on their own, they turned to their old ally, France. The French king, Henry II, demanded various strongholds including Dunbar, in return for sending troops (*CSP Scot M*, i, 111). French aid arrived in June 1548, their fleet being anchored off Dunbar on 12th June when it was reported that Dunbar burned 'handsomely' as a result of an English raid (*ibid*, 119). The troops, about 10,000 by their own estimate, landed at Leith on the 16th and on the 22nd a French garrison, under



Illus 6
Castles and forts in south-east Scotland.

Captain Kronan or Carouan (probably Corronant, see below), took over at Dunbar, no Scotsman being left in the castle (*ibid*, 122, 125; Teulet 1860, i, 671, 678). It appears that the French immediately began

defensive measures at Dunbar under Piero Strozzi, an Italian military engineer in French service. Strozzi was responsible for the construction by September 1548 of a 'motte' in front of the castle, 'capable of

receiving a great number of men' (*ibid*, i, 690). However, the original intention of at least some of the French officials to fortify the burgh of Dunbar was not carried out, despite the willingness of the inhabitants to assist (*ibid*, i, 690-1). In August 1548 an English report, presumably a false rumour, said that 500-600 French troops were coming to fortify Dunbar (*CSP Scot*, i, 94), but it is unlikely that so many troops were ever permanently based there. In 1549 there were some 240 Frenchmen there when rivalry between different units nearly led to bloodshed (Wood 1925, 50). The effects of the war are evident in the crown's remission of its rents from the lordship of Dunbar in 1548, 1549 and 1550 because the lordship and lands were wasted by the 'old enemies of England' (*ERS*, xviii, 218). The effects of the war were still felt a year later (*ibid*, 219).

It was largely as a result of French aid that the English were eventually driven from Scotland and peace was concluded in 1550 by the Treaty of Boulogne. Despite peace, the Scottish authorities requested that French troops remain at Dunbar and elsewhere (*RPC*, i, 90), although the garrison was reduced. In 1553 it amounted to 90 foot soldiers (pikemen and hagbutters), five officers, two sergeants, a fyffer and a drummer under the command of Captain Corronant (Rait 1904).

After Mary of Guise became regent in 1554, Frenchmen were appointed to offices of state and French troops used in internal policing. In August 1554, the captain of Dunbar, Sarlabos, with his hagbutters, was in Dunstaffnage Castle, Argyll, on the eve of accompanying the earl of Argyll to Mull (Cameron 1927, 389). This use of Frenchmen by a French regent led certain Scots to conclude that Scotland was to become a province of France. Therefore, anti-French feeling arose and, with the spread of Protestant ideas, became part of an anti-Catholic feeling.

The accession of Elizabeth I to the English throne in 1558 led the Scots reformers to look to England for aid. In 1559, their leaders, the Lords of the Congregation, rose in rebellion against Mary of Guise and advanced on Edinburgh. The regent withdrew to Dunbar but, when her position was more secure, advanced on the rebels who fled. The rebels secured English help by the Treaty of Berwick in February 1560. This led to armed English intervention which was to succeed in forcing the French to leave.

An English military assessment of Scotland in 1558 had noted that the castle of Dunbar was weak, being old, full of old buildings and easy to assault (*CSP Scot M*, i, 206, 208). It was, doubtless, this which

caused the French to build a fort at Dunbar. It was under construction by 27th March 1560 (*CSP Scot*, i, 137) but its demolition was ordered in the Treaty of Edinburgh concluded on 6th July 1560. By the terms of the treaty (Keith 1844, 291-6), both English and French forces were to withdraw from Scotland and the French forts of Leith and Eyemouth were to be dismantled. A certain number of French troops, to be agreed between the French and Scots, were to remain in the castle of Dunbar and fort of Inchkeith. A separate agreement (*ibid*, 296-306) between the French envoys and the Lords of the Congregation provided that Dunbar and Inchkeith were to be garrisoned by a maximum of 120 soldiers, of whom 60 were to be stationed at Dunbar. The following provisions give a telling account of the behaviour of the French troops previously. They were not to receive any fugitive from justice; they were not to interfere in Scottish domestic affairs; they were to be subject to Scots law; they were to be paid regularly each month to prevent them levying forced loans; they were to be subject to inspection to ensure the correct numbers in the garrison; and they were to pay for their victuals, 'at least they shall not take them against the good-will and consent of those to whom they belong'. Four commissioners, two French and two Scots, were to visit Dunbar to report on the castle. Provision was made that 'such new works as have been added to it [Dunbar] since the beginning of these troubles, together with such as may serve to enlarge the fortification, and render it capable to receive soldiers, shall all be thrown down three days after that Leith begins to be demolished'.

The commissioners visited Dunbar speedily. Their report was ready a week after the treaty. They reported that the new fortification made the place 'more ample by the dowbill then it was off before' and capable of holding at least 500 more men than the castle could previously contain (*CSP Scot M*, i, 448). Significantly, one of the Scots commissioners was Robert Hamilton of Briggs, who had been captain of Dunbar before the arrival of the French in 1548 (*ERS*, xviii, 218, 391, 396).

The French captain, Sarlabos, proved obstructive in the demolition of the fort. Indeed, he was reported to have restored a 'cave' in the new fortification and filled it with victuals (*CSP Scot M*, i, 457). It is not clear what is meant by 'cave', but it is possibly a reference to the underground, stone-lined passages and cistern which were discovered in 1989 (not as part of the excavation) extending under the northern end of Castle Park, near Victoria Harbour (Punton unpublished). A directive of the Lords, detailing local lairds to dismantle specific parts of the defences, proved ineffective (*CSP Scot M*, i, 453-4).

Eventually the government sent down a team of 100 pioneers under a captain to effect the work, although Sarlabos would not let them demolish a munition house (*ibid*, 462, 481). The French garrison remained at Dunbar until August 1561 when a series of appointments of Scotsmen to positions in the castle reveal that the French had left (*RSS*, v, Nos 829-32).

With the return of Dunbar to Scots control, the castle resumed its position as a defensive strength and a storehouse for field artillery. Following the murder of David Rizzio on 9th March 1566, Mary fled to Dunbar, gathered her forces and advanced on Edinburgh, routing the murderers. On 24th March, she appointed the earl of Bothwell to be hereditary captain and keeper of the castle of Dunbar (*ibid*, No 2717). It was to Dunbar that Bothwell abducted Mary in April 1567 and it was from there that she entered Edinburgh for her marriage to Bothwell (*TA*, xii, 53). After Mary's overthrow and Bothwell's flight, Dunbar Castle held out for a time against the new Regent, Moray, but surrendered on 1st October (*Diurnal*, 125). On 9th October Moray appointed William Boncle, burgess of Dunbar, as the keeper of the castle. He was the last keeper and was still in office on 31st May 1568 (*TA*, xii, 95, 120, 128). Following the capture of the castle, Parliament ordered the castle's demolition, ostensibly because it would be too costly to repair (*APS*, iii, 33).

The traditional enmity between Scotland and England had abated to some extent, at least among the political and religious establishments, after

1560 when the Scottish reformers looked to England for support. Outside the establishment, however, animosity lingered. In 1570 the inhabitants of East Lothian were enjoined to provide lodgings and provisions for an English army coming to assist the Regent at the siege of Edinburgh Castle and not to 'molest, invaid or trubill' it under penalty of death (*TA*, xii, 202). The strategic importance of Dunbar Castle had, therefore, reduced as the prospect of English invasions receded, and its demolition would not affect the security of southern Scotland.

As compensation for his expenses in the demolition, Boncle was granted, in 1569, a feu of the 'lands and place within the old foreworks at the castle, with the garden at the gate of the said castle . . . with the ditches or *fousseis* around the said foreworks (bordering the walls of the said castle to the north)' (*RMS*, iv, No 1873). In 1576, other parts of the 'landis, yairdis and boundis foreanent and about the sumtyme castell of Dunbar, occupiit of befor owtir be Franche or Scottis capitannis or suddartis betuix the auld castell sait or new forth [ie fort] on the west, the commoun of Dunbar on the south and eist and the sey on the north partis, togidder with the castell fowsyis, roume and boundis thairof' were leased for nine years to William Maislet, burgess of Dunbar, in return for the payment each year of 'caill and herbis quhen his majestie makis residence at Dunbar' (*RSS*, vii, No 639). But the king never did reside at Dunbar, or at least not at the castle. A proposal in 1597 that the castle be rebuilt so that the king could live in it 'as in an ordinar palace' came to naught (*Border Papers*, ii, 370-1).

THE HARBOUR

It is unlikely that trade was ever very extensive at Dunbar. As recorded in the *Exchequer Rolls*, the number of ships calling at Belhaven was limited, rarely reaching double figures where specified. The only recorded exports were raw materials, overwhelmingly wool and woolfells and, to a much lesser extent, hides. Rabbit skins and woollen cloth appear for a short time as exports in the late 15th century (*ERS*, vii, 510, 582; viii, 188, 459). Herring was being exported from 1476-7 (*ibid*, 459) and indeed took over from wool and hides in amount of customs levied to such an extent that Dunbar was presumably a herring port after 1492. The teinds of the fish, both herring and white fish, taken between the mouth of the water of Tyne and Skailraw Burn (ie off the coast of the parish of Dunbar) pertained to the archpriest of Dunbar (NRAS, 'Rental of the Arch Preistrie Teynds of Dunbar 1740', Roxburghe Muniments,

Survey 1100, Bundle 1158). The archpriest had the cure of souls of the parish of Dunbar and the right to the parochial teinds, except those of Whittinghame and of wool, sheep and lambs, after the foundation of the collegiate church of Dunbar in 1342 (Easson 1939, 92). In 1575 it was recorded that 'at the plesour of God thair is a benefite and commoditie of hering fischeing within the Firth of Forth upoun the south coist thairof toward Dunbar and boundis adjacent thairto' (*RSS*, vii, No 245). By 1616, fishermen from Dunbar and elsewhere on the Forth were sailing to the northern and western isles (*RMS*, vii, No 1448).

Throughout the 17th century and into the 18th century, the herring industry was important to the economy of Dunbar (Brown 1978, 165, 227, 232; Mitchell & Clark 1908, 112). Associated with the

fishing was the salt trade. Indeed, such was the importance of salt for the herring industry that the burgh petitioned parliament against the Treaty of Union in 1706 on the grounds that the proposed duties on salt would affect the fishing industry (SRO, 'Signed petition to Parliament by Council, burgesses and inhabitants opposing union . . . 27 Nov 1706', B18/41/7/13).

What is startling is the decline of the wool trade from Dunbar. Until about 1415, customs from Dunbar harbour were generally over £200 a year, occasionally over £300. Thereafter, the customs declined to under £200 and after 1424 to under £100. From 1447 they amounted to under £20 a year. War occasionally interrupted trade as in 1401-4 (*ERS*, iv, 6), but that cannot account for the seemingly almost total collapse of trade at the harbour of Dunbar. References to the port of Leith (*ibid*, v, 369, 420; vi, 492) may imply that goods were customed there on being transferred from Dunbar.

The complete absence of Dunbar from the customs records after 1509, except for the period 1589-92, is

hard to explain. It does not mean that Dunbar ceased to be a port since a second haven, to the east of the castle at Lamerhaven, appears in 1555 (*RMS*, iv, No 999). It is not certain when the second harbour was first used, but ships had presumably always been able to land at or near the castle. In the siege of 1338, Alexander Ramsay had landed at the castle. It is possible that the need to supply the French garrison at Dunbar led to the development of this second harbour. (A Frenchman had noted in 1548 that a harbour could easily be built at Dunbar (Graham 1967, 174).) Lamerhaven was a natural haven not provided with a harbour until 1574, when the burgh was granted revenues from imported goods arriving there, particularly specifying Norwegian timber, to build one (*RSS*, vi, No 2732). (There was a pier at the haven of Belhaven (SRO, 'Register of Acts and Decrees of the Lords of Council and Session', CS7/42, fo. 473v).) The harbour was repaired after storms in 1655 (Graham 1967, 175). The construction of the entrance to the new Victoria Harbour in 1842 led to the destruction of part of the castle (Turner Simpson & Stevenson 1981, 7, 23).



Illus 7
Dunbar Castle, by J M W Turner from Sir Walter Scott's *Provincial Antiquities of Scotland*, 1826, before the construction of the entrance to the new harbour removed the rock and structures to the right (Crown Copyright: Royal Commission on the Ancient and Historical Monuments of Scotland).



Illus 8
Dunbar area on General Roy's map (Maps C9b,
Roy's Military Survey, Sheet 9, 2/1)
(Reproduced by permission of The British Library).

CASTLE PARK

The area from, and including, Lauderdale House as far as the cliff edge, opposite the blockhouse, was originally three distinct parcels of land.

The site of Lauderdale House, formerly Dunbar House, was, until 1732, five separate burgage tenements, bounded between others to east and west, similar to those on each side of the High Street. In that year Charles Fall, who had acquired the plots separately, converted them into 'one large house fronting the Street, Dovecoat, Officehouses and garden' (NRAS, 'Extract Instrument of Sasine in favour of Charles Fall In the sundry Tenements & yards within written Dated & Reg^d 4 Febr^y 1732', Lauderdale Muniments, Survey 832, 49/12/1). These tenements were situated at the west [sic], north or causeway end of the burgh and bounded on their northern edge by Fishergate. This road no longer exists where it crossed Castle Park on the northern side of Lauderdale House, although it appears on Roy's Military Survey of 1747-55 (illus 8). It led from the harbour at Lamerhaven to Belhaven. The land to the east of these tenements was acquired by Charles' nephew and heir, Robert, in 1775. It is this land which is described as lying at the Sea Port of Dunbar (NRAS, 'Instrument of Sasine In favours of Patrick Inglis and Christian Wilson his Spouse of a tenement of Land at the Sea port of Dunbar . . . 10th September 1743'; 'Disposition George Inglis To Mr Robert Fall of the Houses and yard at the Sea-port of Dunbar 1775', Survey 832, 49/12/3 and 4). That port was not on the High Street on the southern side of Lauderdale House (Turner Simpson and Stevenson 1981, 15 and Map 3). None of the

tenements, on which the house was built, is described as at the Sea Port, only that to the east of the house. That tenement was bounded on its eastern side by a back row which led to the old castle (NRAS, 'Descriptions copied from Record 1794', Survey 832, 49/26).

The land on the northern side of Fishergate as far as the 'lands called Forth on the north' had been part of the common of Dunbar until acquired by the Fall brothers, Charles, William and James before 1745 (NRAS, 'Extract Instrument of Sasine in favor of George & Robert Falls of the Lands & others within mentioned. Dated & Reg^d 19th June 1745', Survey 832, 49/31/1).

Both the burgage tenements and the former common land formed part of the liberty of the burgh and were held by burgage tenure (NRAS, 'Descriptions copied from Record 1794', Survey 832, 49/26; this document gives the description from the sasines of various Lauderdale properties in Dunbar, including Castle Park and Lauderdale House, with marginal annotations 'burgage' or 'not burgage'). A charter of James VI in favour of the burgh, dated 1st March 1603, confirmed a decret of the lords of council and session delivered on 21st June 1569 which defined the boundaries of the burgh. (There are differences between the decret and the confirmation.) The boundary at the northern end of the burgh was defined as 'passing from Lamerhaven to Sanct-Bais-wall, leaving the full seas and castle forth upon the north' (RMS, vi, No 1418). 'Sanct-Bais-wall' is, in fact, a misreading of 'sanct beyis well' in the

original decret (SRO, 'Register of Acts and Decrets of the Lords of Council and Session', CS7/42, fo. 479v). Bays Well cave is on the cliff to the west of Castle Park.

The area to the north of the burgh boundary was the former castle precinct and site of the French fort of 1560. Following the demolition of the castle in 1567, this precinct ceased to have any military significance for Dunbar. Later military installations were established elsewhere: a battery was erected at the harbour in 1781, following a raid by an American ship (Graham 1967, 188); and as a result of an invasion scare in the early 19th century during the French revolutionary wars, infantry and artillery barracks were built at Heugh Head, west of Castle Park, and cavalry barracks at Belhaven (Miller 1830, 172; NSA, ii, 75).

In 1587 the castle precinct was granted by James VI to his chancellor and secretary, Sir John Maitland of Thirlestane, as part of 'the place and site, area and rock and whole precinct on which the castle of Dunbar with foreworks and pendicles was situated' (RMS, v, No 1392). Somehow George Home, Earl of Dunbar, one of James' ministers, had acquired the 'lands and site on which the old castle of Dunbar was situated, with the precinct, foreworks, *fourtis*, *castelsteid*, houses, gardens and pieces of land customarily pertaining to the said castle' by July 1606 (*ibid*, vi, No 1773). They were confirmed to his daughter, Lady Anne Home in 1613 (*ibid*, vii, No 963). From her and her husband they were appraised, first by James Boswell of Pittedie in 1616, then by Sir James Baillie of Lochend in 1617 (*ibid*, vii, Nos 1499 and 1808; see also NRAS, no title, no date, Roxburghe Muniments, Survey 1100, Bundle 1157,



Illus 9

Aerial view of Castle Park during the excavation, with the French artillery blockhouse in the left foreground and Lauderdale House in the right background (*Crown Copyright*: Royal Commission on the Ancient and Historical Monuments of Scotland).

(‘Notes of teinds etc’)). But in 1653 they were appraised from John, Earl of Lauderdale, grandson of Maitland of Thirlestane, James VI’s chancellor, and he was confirmed in them in 1661 (*RMS*, x, No 225; xi, No 50). The site of the castle and fort was to remain with the earls of Lauderdale, although in 1711 they feued it to William Fall (NRAS, ‘Instrument of Sasine In favour of William Fall of The Lands within written. Dated 26th December 1711’, Survey 832, 49/12/12). The Falls retained the site of the fort, incorporating it into their other lands to the south as Castle Park, but disposed of the castle rock to Hamilton of Bangour (NRAS, ‘Disposition Charles Fall To Robert Fall 1773’, Survey 832, 49/12/20; ‘Descriptions copied from Record 1794’, Survey 832, 49/26).

In 1788 the Falls went bankrupt and their lands and mansion at Castle Park were acquired by James, Earl of Lauderdale to further his political ambitions. Dunbar was one of a group of royal burghs in south-east Scotland, the others being Haddington, North Berwick, Lauder and Jedburgh, which returned one member to the House of Commons. Lauderdale already had influence in Lauder, where Thirlestane Castle is situated, and in Haddington, where he had land. By acquiring the Falls’ lands in Dunbar, he would have influence in three of the five burghs in the constituency. Having acquired Castle Park, the earl commissioned Robert Adam to build extensions to Lauderdale House, the two wings on each side and the portico on the northern side which became the new entrance to the house (RCAHMS, NMRS, ELO/37/6; original in the Soane Museum, London, vol 48, No 53) (illus 9).

In 1855, the earl of Lauderdale sold Castle Park to the War Office (SRO, Sasines, Haddingtonshire, 1855, No 624), which converted the house into barracks and enclosed part of the ground as a barracks square. The acquisition was part of the government’s plan to upgrade the coastal defences of the country, which were almost non-existent, by establishing a chain of coastal practice batteries (Smith 1985, 90). The pressing need at that time was to counter any Russian reprisals in response to the Royal Navy’s activities in the Baltic during the

Crimean War (1854–6). But with peace the pressure abated and part of Castle Park was handed over to the burgh for the use of the inhabitants with provision for the army to repossess it when necessary (SRO, ‘Council minutes and papers: Papers relating to the base of Castle Park, granted by the Government for use as a public park’, B18/41/15/1). That need arose in 1858 after the Orsini bomb plot (SRO, ‘Council minutes and papers . . . relating to . . . Castle Park . . .’, B18/41/15/2.). This attempt by an Italian to assassinate the Emperor Napoleon III of France led to the fall of Lord Palmerston’s government in 1858 and fear of war with France. It was for these same reasons that other practice batteries were installed about this time at Kirkhill in St Andrews and Broughty Castle near Dundee.

The barracks, with its battery of rifled muzzle-loading guns, became the training ground for the Haddington, Berwick, Linlithgow and Peebles artillery militias which became the South-East of Scotland Artillery, Southern Division, Royal Artillery by 1897 (McDonald 1897, 19; RCAHMS, NMRS, B55360 P.O.). The regiment trained at Castle Park annually during the summer and were followed by the Fife Artillery Militia. Also based at Castle Park were the Lothian and Berwickshire Yeomanry, a county cavalry militia unit, which was, after 1908, the Lothian and Borders Horse in the Territorial Army (Mileham 1994, 99).

During the Second World War, Castle Park became an officer training base, at first 165 Officer Cadet Training Unit, later 165 OTU (SRO, ‘Castlepark Barracks 1944–1947’, B18/20/30). After the war, tanks of the Lothian and Borders Horse were based at Castle Park, although their training ground was at Hedderwick (SRO, ‘Castlepark Barracks. Proposed new entrance for tanks 1948–1949’, B18/20/31).

As a result of defence cut backs in the 1950s, the barracks were declared surplus to requirement and sold to East Lothian County Council for development (SRO, ‘Castlepark Development Plan 1955–1966’, B18/20/32), the army retaining only the building on Bayswell Road, now used by the local cadets of the Army Cadet Force.

ARCHAEOLOGICAL SEQUENCE

David Perry

with contributions by D W Hall, P E Holdsworth, R Sermon and C J Moloney

The excavated evidence will be described in chronological order from Phase 1 to Phase 25 (illus 10), and each phase or series of

related phases will be discussed separately.

THE NATURAL SUBSOIL (Phase 1) (not illustrated)

Natural subsoil on the site comprised red sand with gravel and boulders and sandstone fragments varying in size from small to large. These were layered in bands of different consistencies, colours and thicknesses and resembled the natural visible in the

sandstone cliffs in the area. Bands and patches of charcoal powder were also present. Green clay occurred at the southern end of the DB04A excavation.

THE IRON AGE: PROMONTORY FORT (Phases 2 and 3)

(illus 11-16)

PHASE 2: THE DITCHES (illus 11-13)

The earliest occupation on the site seems to have been a promontory fort formed by three curvilinear ditches cutting off the headland in front of the blockhouse stack. The ditches were concentric but were irregularly spaced, the Outer Ditch being some 3-6m from the Middle Ditch, which in turn was some 5-9m from the Inner Ditch.

Only the Inner Ditch was almost completely excavated along its length (illus 12). It proved to be the shallowest (up to 0.90m deep). The Middle Ditch was bottomed in a trench cut across its eastern excavated end and proved to be 1.5m deep. Three other trenches across it did not reach its base. The Outer Ditch had two trenches cut across its western excavated part establishing that it was up to 1.7m deep. All three ditches were flat-bottomed with sloping sides (illus 13).

There was no evidence of any palisade or rampart on the edges of the ditches, although several possible turves were found in the fill of the Outer Ditch, indicating that a turf rampart may have been part at least of the outer defence. The fills of all three ditches were largely sandy or silty clays with patches and lenses of redeposited natural (red sand and sandstone fragments). The central portion of the Middle Ditch also contained an abundance of charcoal and orange-red burnt daub, probably related to the burning of Fence 1 (Phase 3). The multiplicity of fills may indicate that, at least towards the end of their use, the ditches were allowed to silt up gradually without being regularly cleaned out. Had they been deliberately infilled, a homogeneous fill would have been present.

As there was no stratigraphic relationship between the ditches, it is impossible to be certain of their sequence or even if they were contemporary. Moreover, as each ditch was cut through earlier

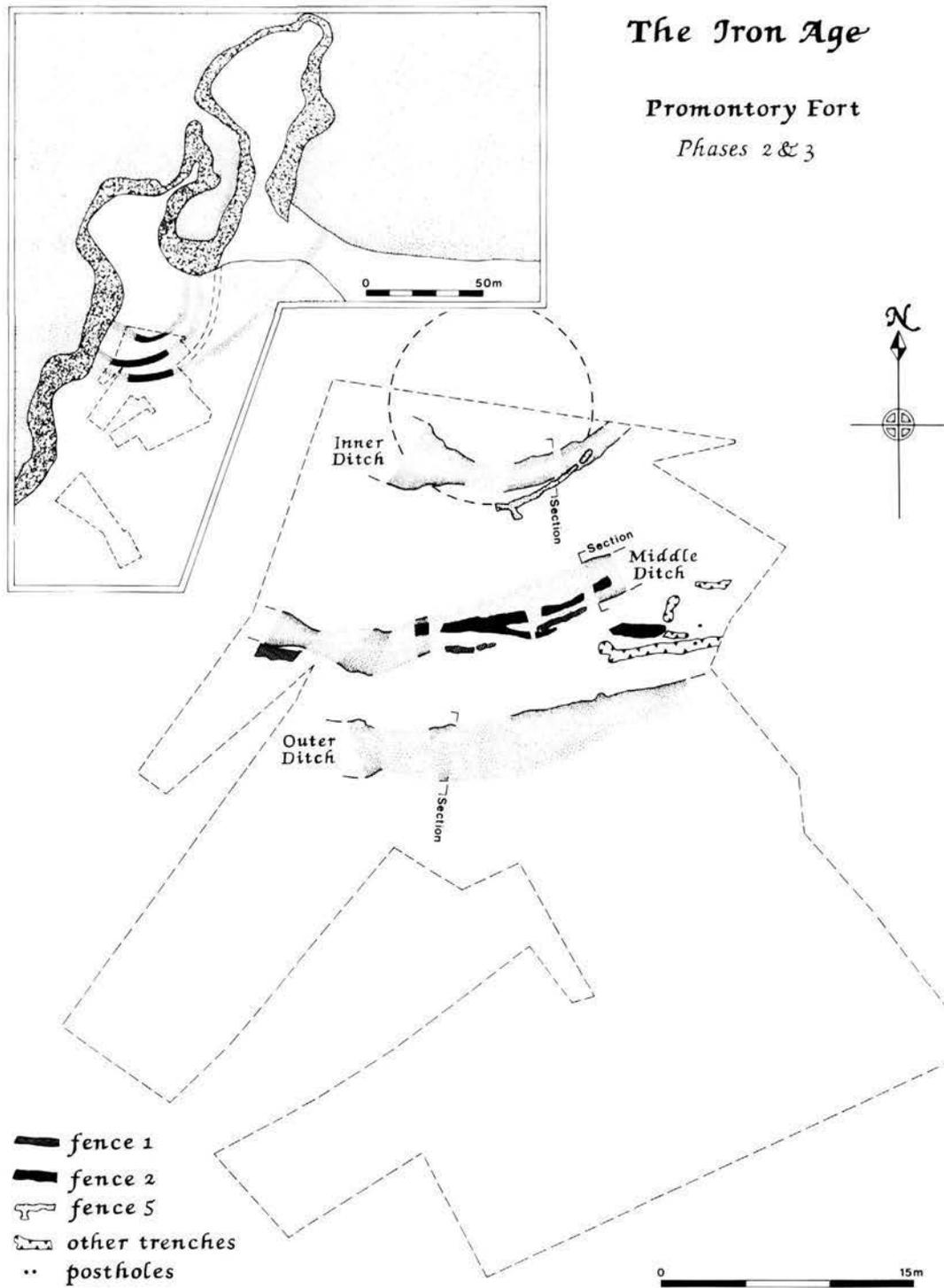
deposits and features, it is possible that there may have been occupation pre-dating the promontory fort.

The Inner Ditch was cut into a short length of a trench which was not planned as it was only found on the last day of the DB88F excavation.

The Middle Ditch was cut through a sequence of features and deposits between it and the Outer Ditch. Cut into natural was a stone-packed trench, 0.35m deep, on an E-W alignment. Some of the stones were set on edge and appeared to outline sockets for timber posts, but the others had been disturbed, presumably when the posts were removed (illus 14). At the western end of the trench was an irregularly-shaped, stone-packed posthole, 0.32m deep. The trench was sealed by dark brown, sandy loam into which were cut a small, vertical-sided slot, 0.21m deep, and a charcoal-filled posthole, 0.04m deep. Nearby was a charcoal-filled stakehole, 0.07m deep, whose base tapered to a point. The slot was sealed by a charcoal deposit, from which was obtained a radiocarbon date of 1810 ± 50 BP (GU- 2991; Table 28). This charcoal was identified as heather and hazel, possibly the remains of a roof of heather thatching on a framework of hazel. The slot and postholes may thus have been part of a roofed structure. They were sealed by another brown sandy loam into which was cut an irregular vertical-sided feature, 0.20m deep, on a N-S alignment. At its base were three depressions: two possible post-impressions on either side of a vertical plank socket. East of this feature was another trench on an E-W alignment, 0.22m deep, with a stone packing of cobbles, boulders and flat slabs. All these features, which formed no recognizable pattern, were then sealed by an extensive deposit of dark brown, silty, clay loam, much disturbed by later intrusions. The Middle Ditch was cut into its northern side. This layer extended as far as the unexcavated part of the Outer Ditch,

Period	Phase	Description						
Modern	25	TOP SOIL - UNSTRATIFIED						
	24	Army			Army			
Post-Medieval	23	Levelling/ Landscaping						
	22	B16	B15		Kiln			
Medieval	21	French Fort, Courtyard 9			Courtyards 11, 13 & 14, B13	B14		
	20	Courtyard 4			Courtyard 10	B10	B12, Soil 4	
	19	Levelling			Soil 6		Levelling	
	18	Courtyard 8, Curtain Wall			Trenches			
	17	Courtyard 12						
	16	Miscellaneous						
	15	Post Pits					Hearth	B11
Interface	14	Soil 3					Drain & Levelling	
Northumbrian	13	B9		B8			Ditch	
	12	Soil 2						
	11	Courtyard 3						
	10	Mortar Mixer				Levelling		
	9	Courtyard 2				Courtyard 6	Courtyard 7	
	8	B3, B17 & B18			Soil 5	B4, Rampart & Palisade		
	7	B1, B2, Enclosure & drain			B5	Courtyard 5		
Interface	6	Soil 1						
Iron Age	5	Postholes, Slots & Fence 4						
	4	Destruction Courtyard 1			Features	Levelling		
	3	Outer Ditch	Fences 1-3	Fence 5	Huts & Slots			
			Middle Ditch	Inner Ditch				
	2	Pre- outer Ditch	Pre- middle Ditch	Pre- inner Ditch				
1	NATURAL							

Illus 10
Phase chart.



Illus 11
The Iron Age promontory fort, Phases 2 and 3.



Illus 12
The excavated Inner Ditch, looking eastwards.

although no stratigraphic relationship between them was recorded. Further west, the Middle Ditch was cut through a thick (0.28m) layer of brown, sandy, silty loam.

The Outer Ditch was cut into a surface of yellow-brown clay, possibly the base of the turf rampart mentioned above.

PHASE 3: FENCE 1 (illus 15)

The Middle Ditch was replaced by Fence 1. This consisted of two sections of a curvilinear foundation trench, 0.20m deep, for a timber wall or fence. There was some evidence of packing stones in it. At the base of the trench were eight postholes, 0.10m-0.20m deep, each containing charcoal in its fill. At the western end of the trench were the remains of burnt wood. Between the two sections of the trench was orange-red, burnt clay/daub while on the northern side of, and continuing eastwards of, the eastern end of the trench was a spread of charcoal.

A circular posthole, 0.15m deep, north-east of the eastern end of

the fence, may not have been part of the fence itself (although it had charcoal in its fill) but the remains of a structure enclosed by it and, perhaps, destroyed at the same time. Further to the west, in the DB08A excavation, a possible continuation trench, 0.29m deep, was cut into natural.

Sealing the course of Fence 1 and levelling up the Middle Ditch was a number of soil dumps which contained charcoal and orange-red burnt clay/daub. This burnt material was derived either from the destruction of the fence itself or from the clearance of any structures enclosed by it.

PHASE 3: FENCE 2 (illus 15)

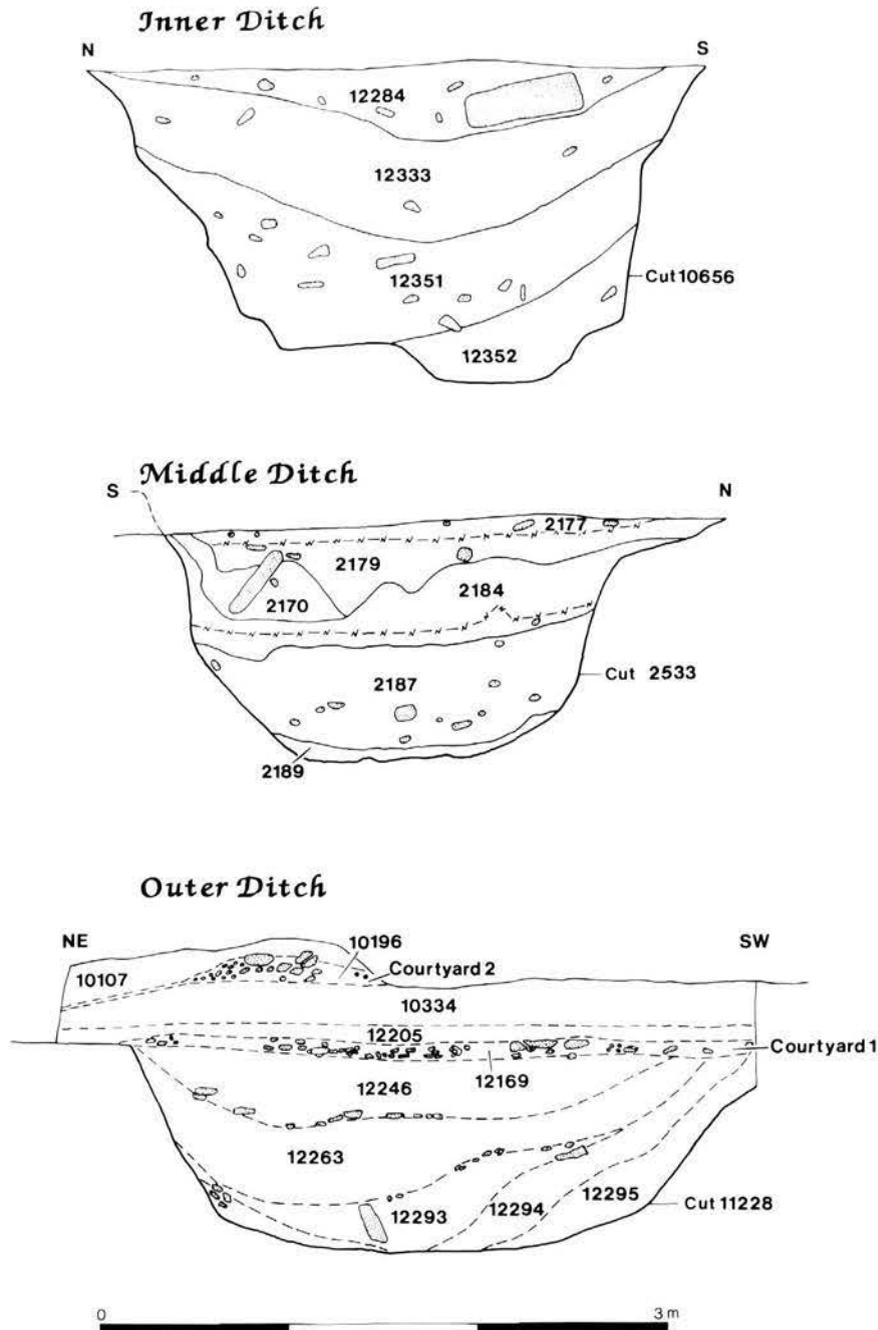
Cut into these levelling deposits was Fence 2. This was a more substantial feature than its predecessor, being in a wider trench with more pronounced stone packing. For part of its course it was a double fence.

The northern section was fairly straight and 0.30m deep. It contained much orange-red burnt clay/daub and charcoal derived from the earlier fire destruction. At the base of its eastern end was a large sub-rectangular depression, 0.22m deep, filled with more

burnt clay/daub and medium to large packing stones.

Cutting across the western end of the northern trench was a curvilinear trench whose depth varied from 0.03m to 0.33m. Its eastern end contained more daub and charcoal while its western end contained medium to large packing stones. There were two postholes at the junction of the two trenches, one in each trench, presumably to provide strengthening at a weak point. The eastern posthole was oval and 0.75m deep, the western sub-rectangular

Iron Age Ditches Phase 2



Illus 13
Sections of the Iron Age ditches (Phase 2).

and 0.30m deep. This latter posthole also contained burnt daub and charcoal.

At the eastern end of the southern trench, between it and the northern trench, was a sub-triangular posthole, 0.15m deep. West of it was a circular posthole, 0.12m deep. The position of these postholes on the southern edge of the northern trench indicates

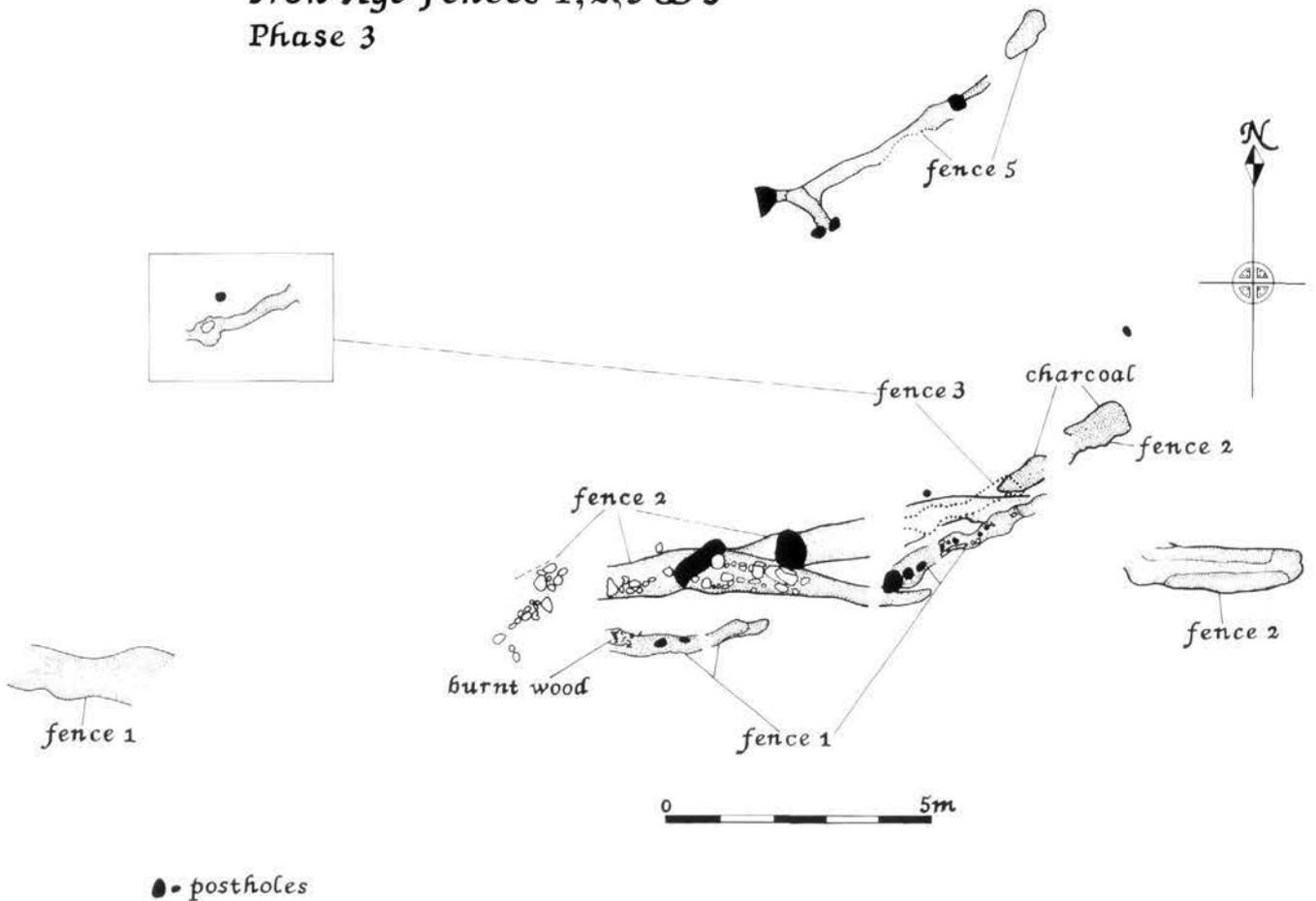
that they may have held supports for it.

Some 2-3m east of the southern trench was a possible continuation, 0.48m deep. At its base were two parallel slots, packed with cobbles and boulders. (It is possible that the southern slot was really part of the earlier slot in Phase 2.) The gap between the trenches may have been an entrance.



Illus 14
Stone packing in the foundation trench outlined the positions of timber posts (towards the east).

Iron Age Fences 1, 2, 3 & 5 Phase 3



Illus 15
Iron Age fences 1, 2, 3 and 5 (Phase 3).



Illus 16
Packing stones for Fence 5 (towards the west).

PHASE 3: FENCE 3 (illus 15)

Partially overlying the northern edge of the eastern end of the northern section of Fence 2 was a short and narrow trench, 0.17m deep. At its base was a posthole, 0.21m deep. To the north was a circular posthole, 0.15m deep, for a buttress. Although there were

large stones in the trench, there were too many to have been packing for the posts as they extended beyond the sides of the trench. They may, therefore, have been dumped as further levelling above the underlying Middle Ditch.

PHASE 3: FENCE 5 (illus 15-16)

Cut into the southern edge of the Inner Ditch was Fence 5. This was a narrow curvilinear slot, 0.13m deep, with packing stones. Its western end was truncated by Trial Trench C, but a semicircular, stone-packed posthole, 0.33m deep survived. Near its eastern end was a shallow post impression, 0.05m deep. Projecting southward from near its western end was a short slot, 0.40m deep, terminated at its southern end by an oval posthole, 0.10m deep. Adjacent to this posthole was another oval posthole,

0.15m deep, which contained packing stones. These features were cut into natural. The slot and its associated features were sealed by a soil deposit which contained frequent stones, possibly disturbed during the dismantling of Fence 5.

Further east was a stone-packed sub-rectangular slot, 0.20m deep, which was probably a continuation of the main slot, although it was slightly wider.

DISCUSSION

The discovery of a coastal promontory fort at Castle Park doubles the number of this type of defensive earthwork known in East Lothian. The only other example recorded is at Castle Dykes in the parish of Oldhamstocks (RCAHMS 1924, xxxvii, 76). The absence of suitable coastal promontories is doubtless the reason for the scarcity of coastal forts. Nevertheless, several suitable inland promontories are occupied by univallate or multivallate forts (illus 3).

As already mentioned, the ditch sequence is unknown and there is even the possibility of pre-fort occupation. No datable objects were recovered from Phases 2 and 3 for comparisons to be made with other excavated sites. Therefore, the chronology of the fort is dependent on the radiocarbon date obtained from the charcoal deposit pre-dating the Middle Ditch and from analogies with other defensive sites, particularly nearby Broxmouth. Unfortunately, these two dating

methods are contradictory as far as Castle Park are concerned.

The calibrated (at two times standard deviation, as are all calibrations from Castle Park, Table 28) radiocarbon date of AD 85–380 from the charcoal (GU-2991) pre-dating the Middle Ditch, coupled with the calibrated date of AD 125–495 from charred timbers (GU-2582, GU-2583, GU-2584) overlying Courtyard 1 (Phase 4), which sealed the Middle Ditch (and the other two ditches), places the Middle Ditch firmly within the Roman period (late 1st to early 5th centuries). But this defended settlement at Castle Park during the Roman period effectively defies the generally accepted view that, before or during the Roman occupation of southern Scotland, defended settlements had been succeeded by undefended settlements (Hill 1982a, 8; Macinnes 1982, 67). This move is usually attributed to the Pax Romana and the assumed friendly relations between the Votadini and the Romans, although recent excavations at other sites have led to the conclusion that it may have occurred much earlier, in that no evidence of refortification has been found in the last two centuries of the pre-Roman Iron Age (Hill 1982a, 9). Moreover, at Broxmouth the defences had been abandoned in the late first millennium BC to be succeeded by an undefended occupation, possibly continuing into the fourth century AD (Hill 1982b, 188).

Reconciling this contradiction is difficult. Indeed, the need for such a reconciliation may be questioned. First, evidence of occupation of hillforts in the Roman period has been found at Edinburgh Castle (Driscoll & Yeoman 1997, 223–6) and Eildon Hill North (Owen 1992, 69), as well as Traprain, although the relationship between such occupation and the defences is unclear. Therefore, a defended settlement at Dunbar in the Roman period need not be a problem. Moreover, Broxmouth reveals occupation extending throughout the first millennium BC into the first two centuries AD or later (Hill 1982b, 184, 188). Castle Park, on the other hand, reveals evidence of occupation from the Roman era virtually to the present day. That may, in fact, be the cause of the problem, for Castle Park has been occupied, in one form or another for some 2,000 years, while Broxmouth has been abandoned for almost as long, and comparable sites for even longer. Consequently, any pre-Roman occupation at Castle Park may have been destroyed by later occupation. A better comparison for Castle Park, as regards length of occupation obscuring, if not obliterating, earlier remains, might be Edinburgh Castle, Stirling Castle or Dumbarton Castle.

Two alternative scenarios may be put forward, one accepting a pre-Roman date for the promontory fort at Castle Park, the other a Roman date.

In the first scenario, an Early Iron Age promontory fort behind the Inner Ditch is succeeded in the late first millennium BC by an unenclosed settlement, which extends beyond the earlier defence line. Subsequently, in the Roman period, the defences are renewed, with the construction of the Middle Ditch, and, possibly, the Outer Ditch. This renewal may have been an initial response to the Romans by the Votadini, or to the incursions of the Caledonians and Picts from the north. After all, if the Picts were raiding the Roman province south of Hadrian's Wall, what were they doing to the Votadini between the Firth of Forth and the Wall?

The alternative scenario has several variations. Occupation begins in the Roman period, to exploit the natural haven to the east of Castle Park. The Romans may have seen trade as a means of maintaining informal control north of the formal frontier. That initial settlement may have been unenclosed, with the ditches being later additions as a result of incursions from the north. Or there may have been a small settlement outwith the initial Inner Ditch, with the other ditches being added later. Or the whole initial settlement may have been enclosed within the Outer Ditch, the Middle Ditch being a later addition for reasons of defence. In the last case, the Inner Ditch may have been a private enclosure for a chief's house, the space between the Middle and Outer Ditches being used for subsidiary buildings or corralling animals.

It must be said, however, that not only is there no definite evidence for a pre-Roman settlement here, but there is also no definite evidence of Roman contacts with Dunbar at this time. However, three sherds of Samian ware were found in later phases: two from the Anglian period (Phases 7 and 12) and one from the modern period (Phase 24) (Chapter 4). While the sherd from the modern context could have come from anywhere as a result of landscaping by the army, the other two sherds are less likely to have been brought onto the site, but were probably disturbed from earlier occupation at Castle Park.

The areas available for occupation were some 0.3 hectares behind the Outer Ditch and some 0.17 hectares behind the Inner Ditch. It is presumed that the ditches were associated with ramparts or banks formed from the upcast of the ditches, although no trace of them was found apart from possible turves in the Outer Ditch and the possible rampart base on its edge.

The course of the Inner Ditch indicates that settlement was confined to the headland terminating in the rock stack where the early 16th-century blockhouse now stands rather than on Castle Rock itself. (The ditch separating the blockhouse from Castle Park dates from the construction of the blockhouse.) The Outer Ditch could have extended to include the Castle Rock in the area of settlement as it was on a different course. However, there are two drawbacks to this. First, there was no direct link between the blockhouse stack and Castle Rock, and anyone wanting to move between them would have had to descend a slope from one then ascend a slope to the other. Second, defensive earthworks tend to follow contours not descend or ascend slopes. It is, therefore, probable that the settlement was always confined to the blockhouse stack and adjacent headland.

Fences 1 and 2 were clearly replacements for the Middle Ditch whose course they largely followed. Fence 1 was destroyed *in situ* by fire, and the abundance of charcoal and burnt clay/daub already noted in the upper fills of the Middle Ditch (Phase 2), to the west of the surviving limit of the trench, is probably derived from the destruction of this fence. The fence may have been a defensive palisade, although, as the burnt wood appeared to be wattle

rather than large posts, it could have been a boundary. Alternatively the presence of burnt clay/daub along its course suggests weather-proofing. The burnt material may, therefore, have been discarded debris from a burnt structure enclosed by the fence. Its replacement was more substantial, possibly for defensive reasons, if the burning of its predecessor was the result of an attack. Fence 3 was presumably a repair to Fence 2.

There were no stratigraphic links between these fences and the Outer Ditch, which may have continued in use, or Fence 5, which replaced the Inner Ditch. However, as the fences were set some distance from the Outer Ditch rather than on its inner edge, that ditch may have ceased to have any defensive role. The absence of any certain evidence for the burning of Fence 5 indicates that it is unlikely to be contemporary with Fence 1. It may have been a boundary within the area enclosed by Fence 2, allowing animals to be corralled between these fence lines with dwelling huts situated on the northern side of Fence 5. Alternatively, Fence 5 may have been part of a round house some 12m in diameter. The posthole at the surviving west end may have been a door jamb with the southward projection forming one side of a porch as in House II at West Plean, Stirlingshire (Steer 1956, 233).

THE IRON AGE: COURTYARD AND FENCE (Phases 4 and 5)

(illus 17-19)

PHASE 4: COURTYARD 1 (illus 17)

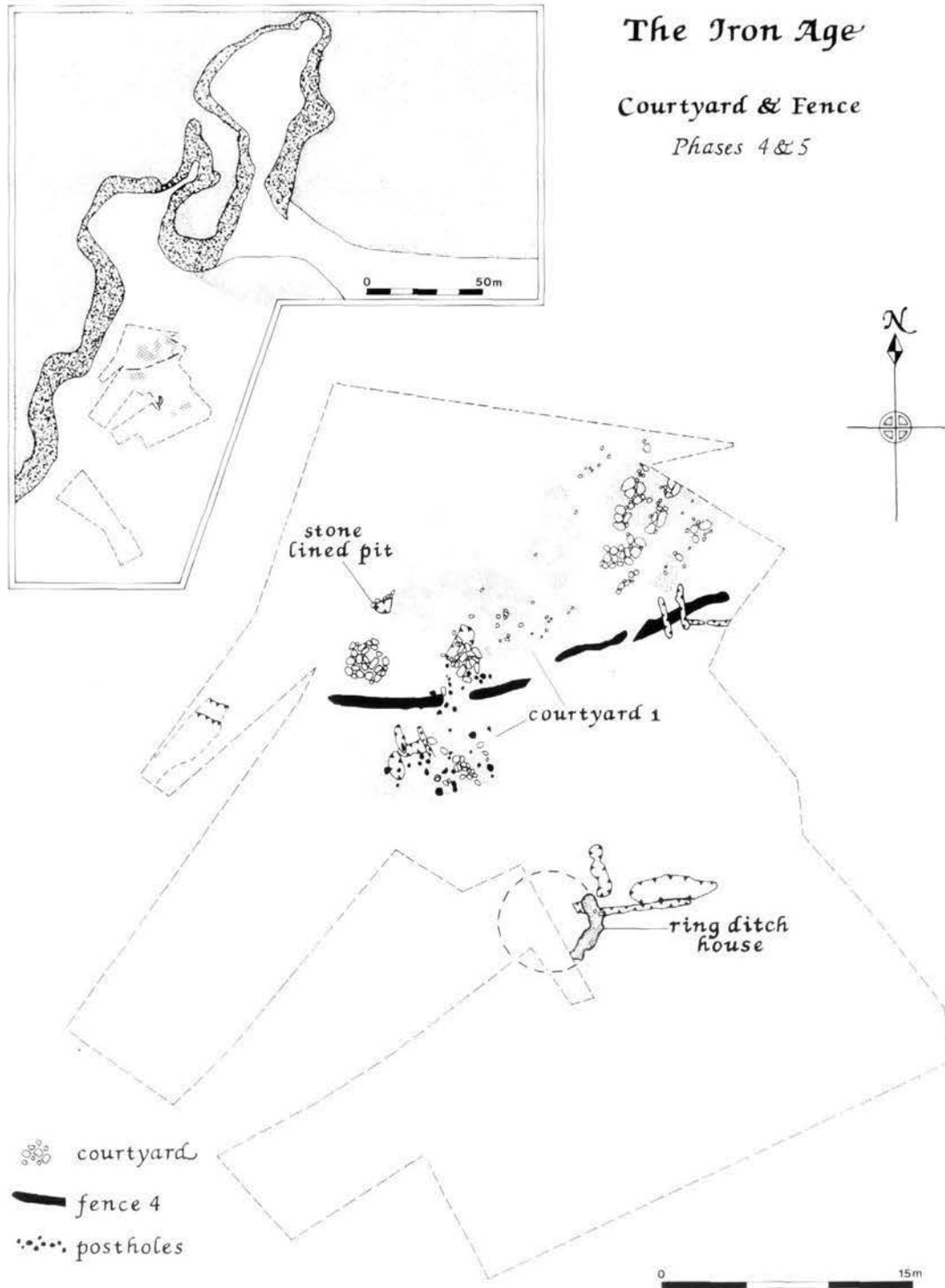
The courses of Fences 2 and 3 and the Middle Ditch were levelled up with various deposits which included pebbles, cobbles, boulders and sandstone fragments to the east and orange-red, burnt clay/daub and charcoal to the west. Cut into the latter was a partially excavated pit, 0.13m deep, lined with stone slabs around its edges, possibly a storage pit.

Above the levelling and covering much of the northern end of the site was a courtyard composed of pebbles, cobbles and sandstone fragments, much disturbed by later intrusions. This surface sealed the earlier ditches and fences and formed part of an unenclosed settlement. Set into the courtyard were several areas of large flat stones whose purpose is unclear.

At the south-western end of the courtyard were several postholes and slots. Two lines of postholes are apparent, forming almost a right angle (illus 18). One comprised a line of six postholes on an E-W alignment, 0.07m-0.55m deep, cut into soil which had accumulated above the courtyard and in which was found an unidentified sherd of pottery (Chapter 4, Context 12113). However, one of the postholes, towards the western end, was within a large pit whose stone packing clearly outlined it. This post pit was sealed by the courtyard. It is, therefore, probable that the erection of the post alignments predates the soil in which they

appeared, being contemporary with the laying down of the courtyard. The postholes were sockets of decayed or removed posts which predate the deposition of the soil. At one point along the alignment there was a pair of postholes, one on each side for supporting posts, that to the south being a double posthole, 0.20m and 0.25m deep. The posthole on the other side of the alignment was 0.15m deep. At almost right angles to the E-W alignment was a N-S alignment of eight postholes, 0.06m-0.36m deep, cut into natural. This also had a pair of postholes, 0.27m and 0.35m deep, for supporting posts, one on each side. The corner of the alignments was composed of two postholes, 0.37m and 0.29m deep, each terminating its own alignment. Both these corner postholes were sealed by charcoal.

Within the angle of the alignments were two parallel slots on a N-S alignment. The eastern slot, 0.25m deep, had possible packing stones set centrally along it and was terminated to the south by the E-W posthole alignment. The western slot, 0.17m deep, was filled with ash and contained a rectangular slot, 0.10m deep, for an upright plank at its southern end and a semicircular posthole, 0.27m deep, at its northern end, which was truncated by a later intrusion. Between these slots was another ash-filled slot, 0.04m deep.



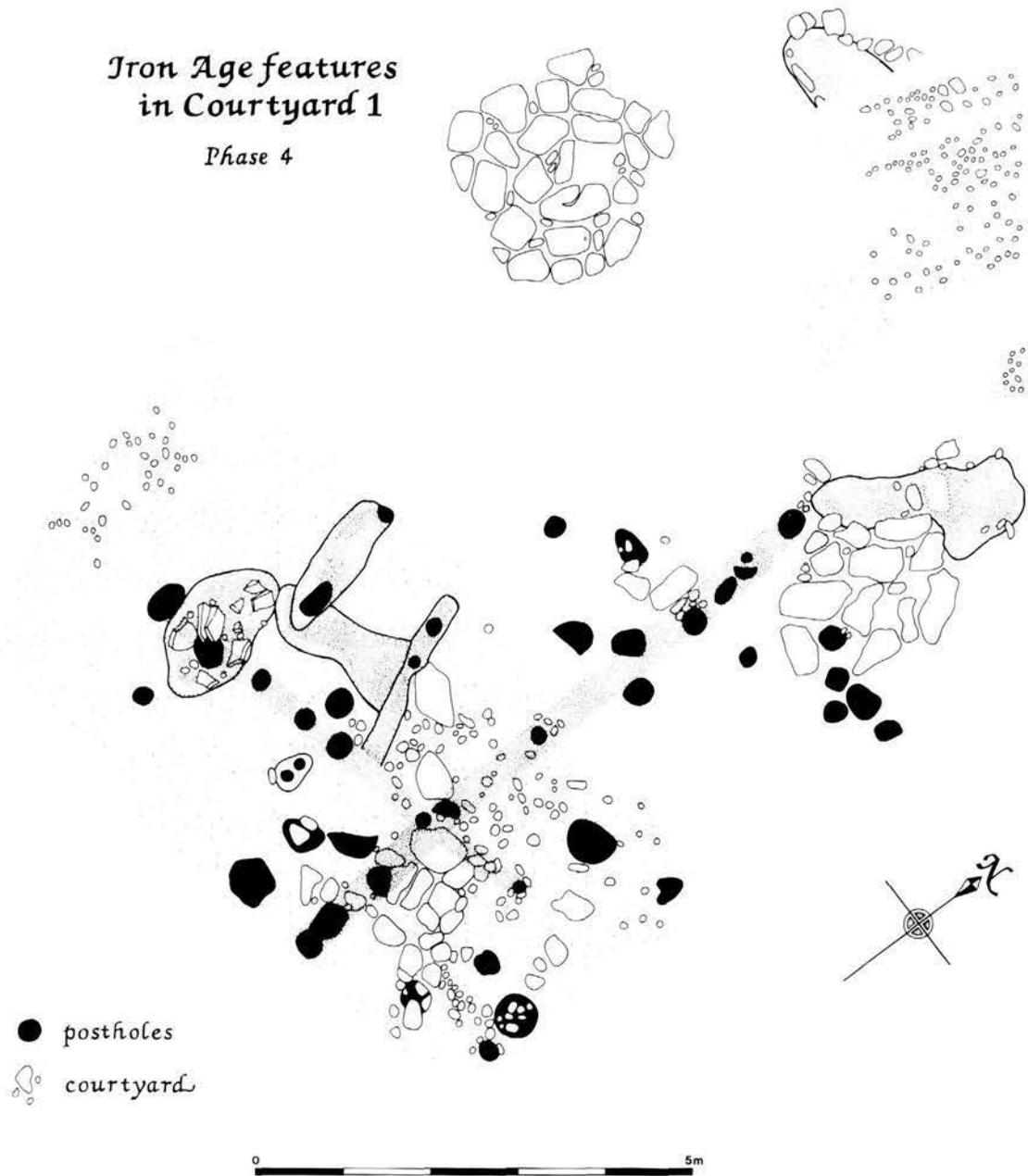
Illus 17
Iron Age Courtyard 1 and Fence 4 (Phases 4 and 5).

Little can be made of the other postholes in this area, although some appear to continue the alignments of postholes southwards and eastwards of the corner postholes.

At the eastern end of the courtyard was an extensive and thick deposit of soil with much orange-red burnt clay/daub and charcoal, some in the form of large fragments of burnt wood including birch, hazel, ash, willow and alder. From these were obtained three

radiocarbon dates: 1700 ± 50 BP, 1750 ± 50 BP and 1740 ± 50 BP (GU-2582, GU-2583 and GU-2584 respectively).

South of Courtyard 1 was a group of intercutting features and deposits which may relate to the unenclosed settlement. Little can be made of them, although a linear slot, 0.50m deep, may have been a boundary. Part of a curvilinear trench, up to 0.4 m deep, with a rounded terminal was cut through the slot. It had gently



Illus 18
Iron Age features in Courtyard 1 (Phase 4).

sloping but irregular edges. The rounded terminal had an arrangement of flat stones and boulders. The trench may have formed part of a ring-ditch house, some 6m in diameter.

Much farther to the south, above natural, was a surface of pebbles and cobbles which may have been contemporary with the Courtyard 1.

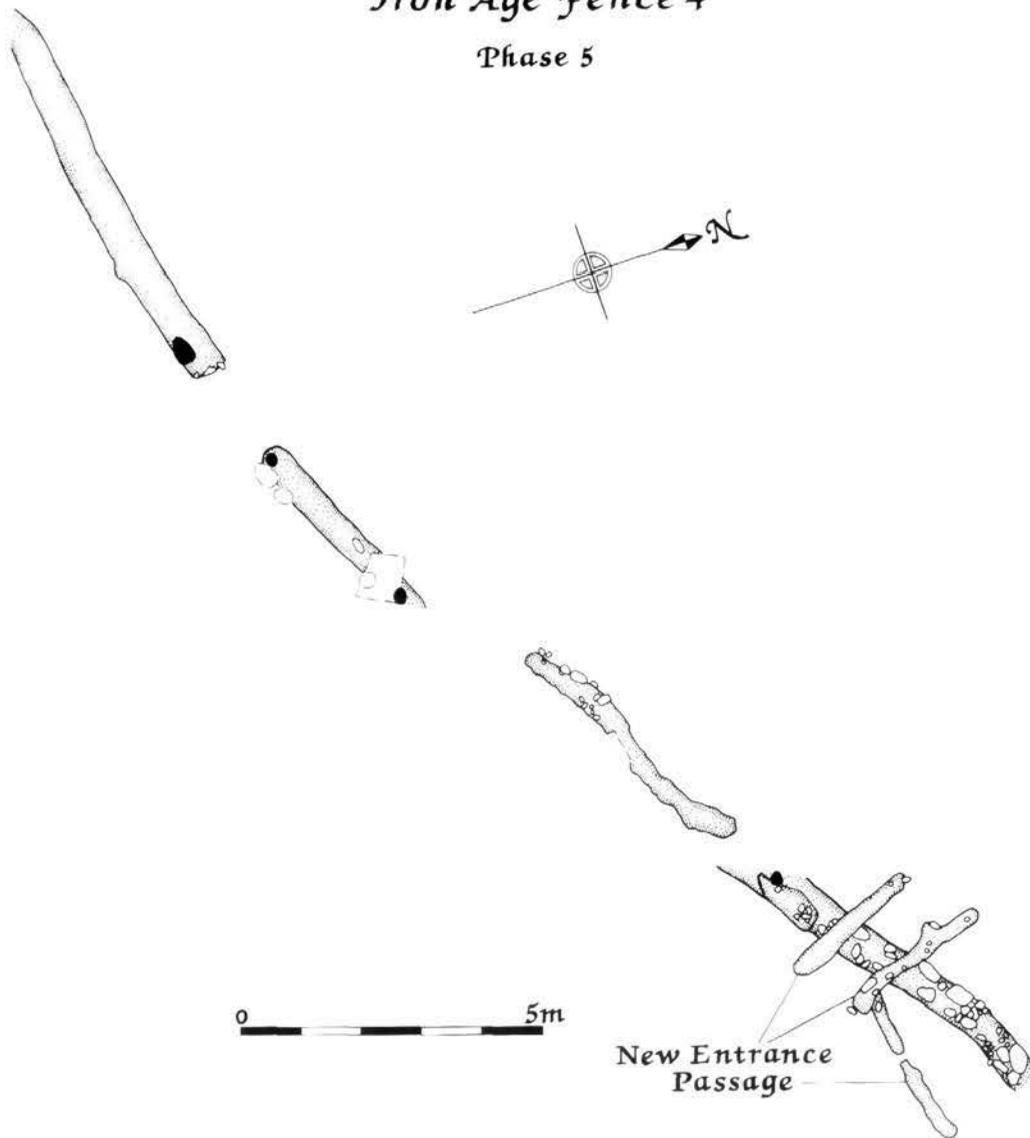
At the western end of the site, in the DB08A excavation, was found the stepped northern edge of a wide flat-bottomed feature, 0.60m deep, cut into natural. Unfortunately this was only uncovered at the end of the excavation and only a narrow slot was excavated across it to establish its base and edge. It may have been a structure with a floor of yellow clay above a levelling deposit. On the clay

surface was a mixed occupation deposit of charcoal, red and white sand and blue-grey clay. Two loomweights were found in this feature, one above the clay floor, the other under it (nos 568 and 569 respectively).

Immediately to the north of this feature was a stone-packed trench, 0.47m deep, at whose base were two circular post impressions. It was cut into natural and may have contained a fence enclosing the sunken feature. Both of these features, as well as the trench which may have been the continuation of Fence 1 (Phase 3), were sealed by a levelling deposit, whose charcoal and burnt clay/daub may link it with burnt material above the eastern and western ends of the courtyard.

Iron Age Fence 4

Phase 5



Illus 19
Iron Age Fence 4 (Phase 5).

PHASE 5: FENCE 4 (illus 19)

Four stone-packed trenches, 0.35m-0.50m deep, on an E-W alignment may have contained another fence enclosing the headland. This new fence was situated between the earlier Outer and Middle Ditches. The two western trenches were cut into natural, while the easternmost trench was cut into burnt patches, which probably formed part of the burning above the eastern end of Courtyard 1. Three of the trenches contained post or upright plank impressions and the two western trenches had opposing butt ends, the gap between being an entrance.

The easternmost trench was subsequently replaced by an arrangement of slots which formed a renewal of this part of the fence, with a new narrow entrance passage about 1m wide. Two short stone-packed slots, 0.15m and 0.16m deep, contained the replacement fence. The western one adjoined, at almost right angles, a N-S stone-packed slot, 0.14m deep, which formed one side of the entrance passage. A similar and parallel slot, 0.15m deep, formed the other side of the passage. The entrance walls projected in front of the fence. No structures were found within the enclosure.

DISCUSSION

Courtyard 1 extended across the courses of the ditches and fences which had enclosed the earlier settlement. If there had been any ramparts or banks associated with the ditches, they must have been levelled to the ground. This replacement of an enclosed settlement by an unenclosed settlement has been noted elsewhere (Hill 1982a, 8; Macinnes 1982, 67) and usually attributed to the Romans (see above). Certainly such a notion is not inconsistent with the radiocarbon dates from the burnt timbers lying on the courtyard which give a calibrated date range of AD 125-495. These timbers, from their species, were presumably part of a stake and wattle structure at or beyond the eastern end of the site.

Only one possible structure can be identified within the courtyard. The two posthole alignments, with associated slots, may have formed part of a roofed building or an enclosure in whose corner some activity took place. The corner posts and paired posts may have supported a flat or lean-to roof over the slotted feature. There is nothing to suggest what the purpose of such a structure could have been.

It is unclear what was the stepped feature at the western end of the site. The fact that it contained two loomweights and a deposit of yellow clay may suggest a *Grubenhaus*, for which there was good evidence in Phase 7 (Building 5). However, this feature in Phase 4 was sealed by two soil deposits from the earliest Anglian structures (Buildings 1 and 2, Phase 7) and was, therefore, almost certainly pre-Anglian. More to the point, this feature overlay the course of the Outer Ditch of the Iron Age promontory fort (see Phase 2). Herein may lie its explanation, namely that it was either levelling above, or indeed the top fills of, that ditch, which was not observed in the haste of the last morning's excavation.

The stone settings in the courtyard may have been the remains of the floors of huts arranged around it (Holdsworth 1993, 33-4). In that case their small areas (the largest was less than 3m across) imply that only part of the interior of the huts had been paved (itself not unusual) as there was only one instance of possible stone ghosts, that is, where stones had been removed. Also given the abundance of postholes, slots and trenches on the site, it is surprising that any walls associated with these stone floors left no trace at all. It is, therefore, unlikely that the stone areas were floors. It is equally unlikely that they were

simply part of the courtyard as, although some were closely packed like carefully laid paving, no attempt was made to create a large concentrated area of paving as opposed to the several small paved patches scattered across the courtyard. The stones may have formed the bases of staddles where corn, harvested in fields attached to the settlement at Dunbar, was stacked.

The courtyard itself, extending across such a wide area, was probably an assembly point for military mustering, or civil assemblies or trading. As such it was the forerunner of similar Anglian and medieval courtyards (see Phases 9, 11, 17, 18 and 20). That the Votadini and other British tribes in southern Scotland had a need for tribal centres or hosting-places is evident from the place-names *Corda* or *Coria/Curia* recorded by Ptolemy the geographer in the 2nd century AD (Rivet & Smith 1981, 316-20). The *Curia* of the Votadini has been tentatively identified with the Roman fort of Inveresk, the name *Curia* having been transferred from a native meeting-place which it controlled (*ibid*, 320). Dunbar was presumably a subordinate meeting-place to *Curia*.

The group of features to the south of Courtyard 1 cannot be accurately dated and their purpose is unknown, although they pre-date the *Grubenhaus* of Phase 7. The curvilinear trench with the stones at its terminal may have been the remains of a ring-ditch house. It could have pre-dated the promontory fort, as such houses were current from the middle of the first millennium BC (Hill 1982a, 12; Reynolds 1982, 48). If that is so, even earlier settlement at Dunbar is indicated as the ring-ditch was cut through an earlier feature.

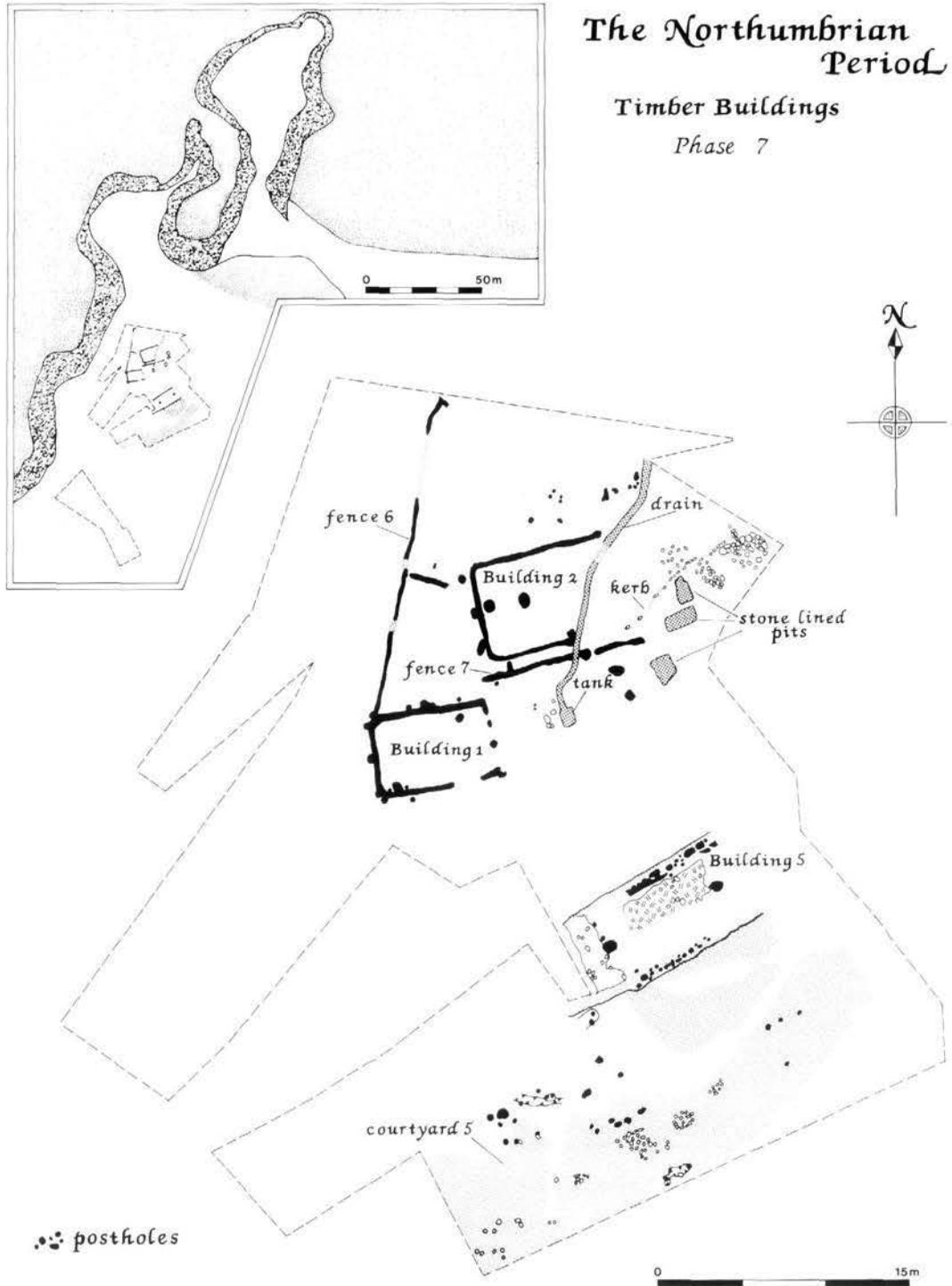
This phase of occupation was ended by fire. This is evident from the burning above the eastern and south-western ends of the courtyard and, possibly, from the burning above the stepped feature at the western end of the site. It cannot, however, be determined whether the fire was accidental or deliberate.

The unenclosed settlement based on Courtyard 1 was replaced by a new settlement enclosed by Fence 4. In the absence of any defensive earthworks, like a ditch or rampart, the new fence was probably a boundary fence rather than a defensive palisade. It enclosed a yard, with any houses being beyond the excavated areas.

PHASE 6: SOIL 1 (not illustrated)

Extending across much of the northern end of the site was a thick deposit (up to 0.4m) of brown soil. It sealed all the earlier fence

and ditch lines. It contained an unidentified pottery sherd (Chapter 4, Context 10479).



Illus 20
 Northumbrian period, timber buildings (Phase 7).

DISCUSSION

At first glance this thick soil deposit appears to represent abandonment of the headland as a centre of occupation. This is strengthened by its being the interface between the Iron Age and Anglian period: the native Britons may have fled the Angles advancing from Northumbria into Lothian. However, it is possible that the soil was a dump

imported to level the site prior to the construction of the Anglian structures of Phase 7. Another possibility is that it was a windblown deposit. Given Castle Park's exposed position this is not unlikely. During the excavation *c.* 0.3m of soil accumulated over a three-week period at the eastern end of the site where no work was taking place.

THE NORTHUMBRIAN PERIOD: TIMBER BUILDINGS (Phase 7)

(illus 20-36)

PHASE 7: BUILDING 1 (illus 21, 22, 41)

Three sides of this trench-built building were recovered. It measured some 6.6m by 4.2m internally. The eastern side was largely destroyed by the construction of Building 3 (Phase 8). Enough of the building remained for the method of construction to be determined, as the three wall lines were distinct from the foundation trenches.

The north and south walls were constructed differently. The north wall was set within a flat-bottomed trench, 0.6m wide and up to 0.82m deep, while the south wall was set against the outer face of a stepped trench, 0.33m deep to the step. The wall itself was 0.70m deep. The west wall was of similar construction to the south wall; the step was 0.29m deep, the wall itself being 0.74m deep (illus 24). All three wall lines were about 0.3m wide.

Visible along the northern wall line were seven sub-rectangular sockets for upright planks, 0.12m-0.4m apart, of which four, 0.07m-0.20m deep, were only visible in natural at the base of the trench; the other three, 0.29m-0.40m deep, were seen within the fill of the trench (illus 23 and 24). No post or plank impressions were visible in the west and south walls. At the eastern end of the wall was a posthole, 0.18m deep, too shallow for a primary post, but presumably for a secondary corner post replacing the original. It was filled with charcoal from a burnt timber above it. A large oval pit, possibly a posthole, 0.30m deep, was cut into the southern edge of the foundation trench for this wall. It may have contained a post to support the roof or wall.

Only the west and south walls showed convincing evidence of stone packing, the stones being in the wall slots, not on the shallower steps. A single large stone near the eastern end of the north wall slot, on its southern side, indicates that there may have been stone packing in it. A gap, 1.68m wide, in the south wall was probably an entrance.

The north wall was much disturbed by a number of intrusions, probably pits dug to remove timbers for re-use. Of these robbing features, two were notable for their depth and shape: sub-rectangular pits, 0.40m and 0.62m deep, set almost centrally in the wall line. These probably held vertical timbers serving as door jambs for a doorway set centrally in the wall. Between them was another pit, 0.57m deep, probably for a post supporting a threshold timber. Immediately south of the eastern jamb was a posthole, 0.54m deep, either for a post associated with the entrance, or for a cruck timber.

The east wall survived only as a short trench, 0.4m wide and 0.59m deep, extending southwards from the north wall. It contained a single large stone in its western side. Cut into the trench was a

posthole, 0.36m deep. As it was not deep enough to rest on the base of the trench, it must have contained a secondary post. The rest of the wall was disturbed by the construction of Building 3, although the inner edge at least of a wall trench should have survived. As no such edge was evident, the east wall must have been of posthole construction. The truncated remains of two postholes, 0.40m and 0.45m deep, one of which had been robbed by a pit 0.15m deep, marked its course.

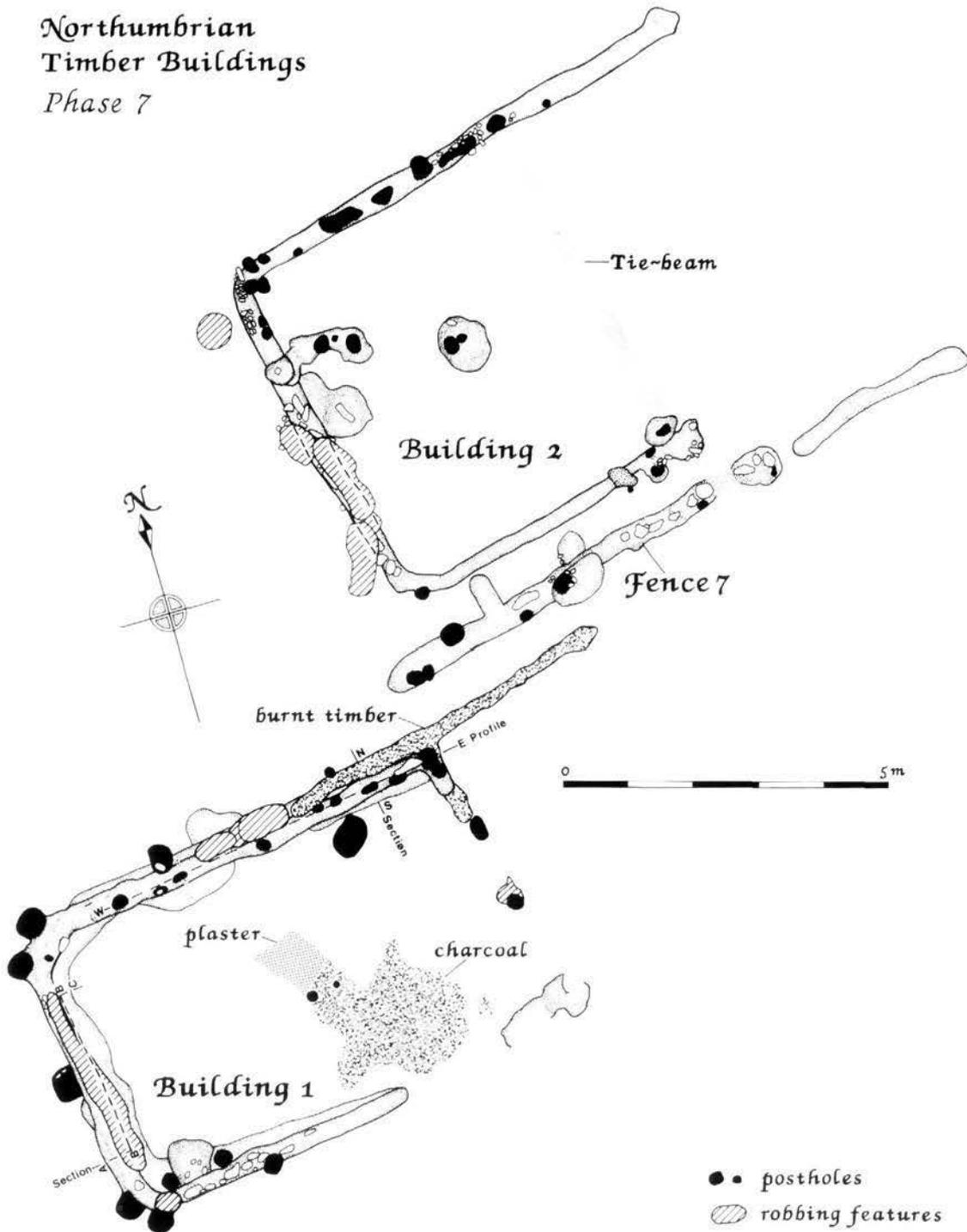
Both the north-western and south-western corners were rounded and each had a pair of postholes on the outside. The north-eastern corner was squared and had no corner postholes while the south-eastern corner was disturbed by later intrusions but may have had at least one external posthole.

Cut into the foundation trench for the south wall was a squarish pit, 0.22m deep, containing ash, charcoal and orange-red burnt clay/daub. It could not have been a hearth as it was too close to the wall, but it was too shallow to have been a rubbish pit. It may have been a storage pit filled, when no longer needed, with material from the fire clearance of the structure. On either side of it were two postholes, 0.35m and 0.20m deep, the former having a large stone at its base and containing flecks of possible plaster. These were either associated with the pit or supports for the wall or roof.

Covering the western and northern interior of the building and overlying the western and southern construction trenches was a layer of dark brown, silty clay with patches of loose, dark grey and black ash and some small to medium charcoal flecks. Above it was light red-brown sandy clay. These were occupation deposits. Cut into them were two postholes, 0.07m and 0.16m deep, the former having a large flat stone at its base.

As the double corner posts at the western corners were not repeated at the north-eastern corner, they cannot have supported a framework of wall plates to hold together the walls and roof at eaves level. Presumably, they were simply corner supports for the western end of the building, the roof being supported by other means. Situated centrally along the west gable was a posthole, 0.20m deep, for a post to support one end of a ridge pole whose other support at the eastern gable was destroyed in the construction of Building 3. Some 1.86m along the outside of the south wall from the south-western corner was a posthole, 0.37m deep, with a single large packing stone. A corresponding posthole, 0.48m deep, along the northern wall, some 2.2m from the north-western corner also contained a single large packing stone. Situated centrally along the outside of this wall was a posthole, 0.35m deep. These held posts for the roof or walls. Some 1.5m from the north-eastern corner was a posthole, 0.18m deep, on the edge of

Northumbrian
Timber Buildings
Phase 7

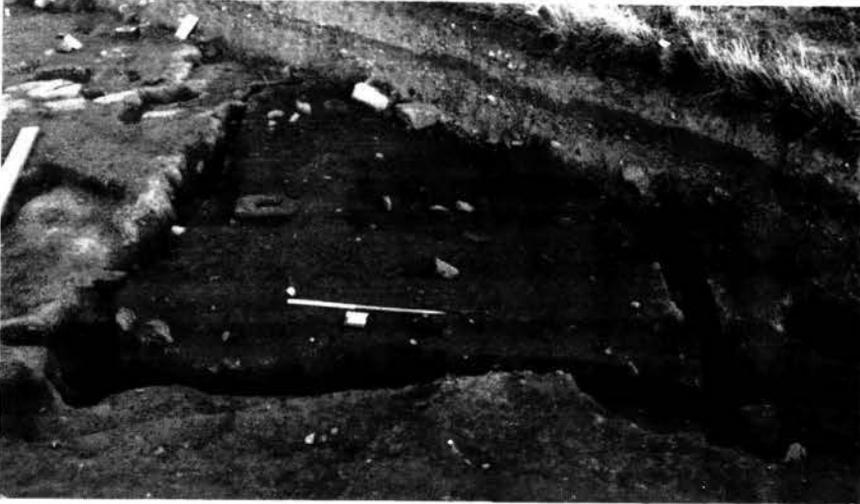


Illus 21
Northumbrian period, Buildings 1 and 2 (Phase 7).

the northern wall's foundation trench. As it was very shallow, it was probably for a secondary post, or, more likely, as it cut a charcoal-filled gully, for the clearance of the burnt stump of a buttress.

In addition to the robbed doorway of the north wall, there was other evidence of robbing. A robber trench, 0.33 m deep, removed most of the west wall. An unidentified sherd of pottery was

recovered from its fill and two other unidentified sherds were found in the wall line itself (see Chapter 4, Contexts 10947 and 12039 respectively). At the north-western corner were two robber pits, 0.43m and 0.41m deep (not illustrated). The former had an oval depression, 0.13m deep, at its base – the socket of the robbed northern corner post. The other pit robbed a post within the wall line at the corner. A similar pit, 0.10m deep, at the south-western corner robbed the southern corner post.



Illus 22
Building 1, towards the east.

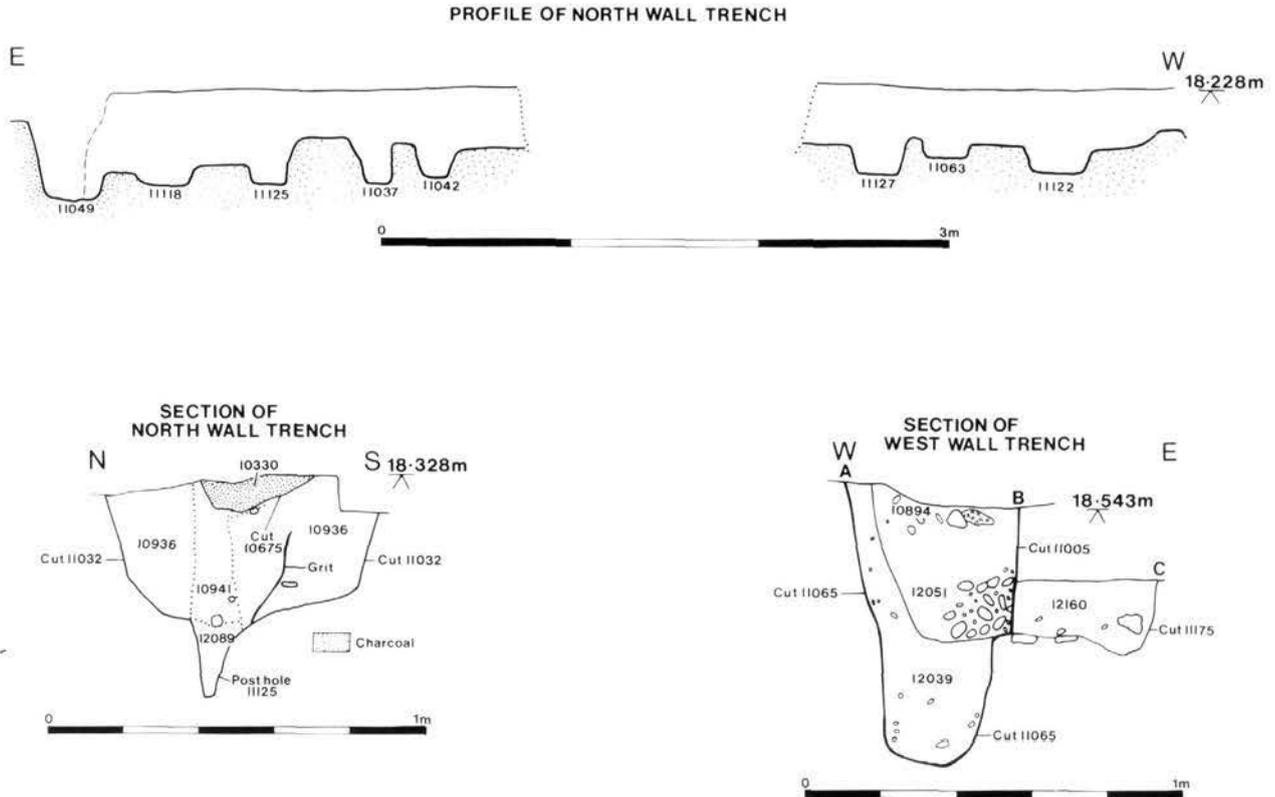
The secondary corner posthole at the north-eastern corner was filled with charcoal from a shallow charcoal-filled gully, 0.13m deep. This gully was T-shaped and partially followed the northern and eastern wall lines but also extended beyond them. It cannot, therefore, represent the destruction *in situ* of these walls. Instead it may have been the remains of burnt T-jointed timbers from the building, possibly a plate or purlin and attached post or rafter. Its long arm was too long to have been the tie beam across the gable end (making the short arm the top of a post), while its short arm was too long to have been a horizontal plank between two verticals in the wall (making the long arm a fallen post). The fact that the charcoal filled part of the wall lines as well as an underlying posthole shows that the building had been dismantled, exposing

the wall trenches into which the timber fell. As there were other charcoal spreads above the interior of the building, it is evident that material, which could not be re-used, was burnt to clear the site prior to the construction of Building 3. A radiocarbon date of 1620 ± 80 BP (GU-2989) was obtained for charcoal (identified as hazel and birch) from the destruction above the interior. Above the charcoal were traces of possible plaster (illus 25). With similar traces in one of the postholes at the inside of the south-western corner, this may indicate that the walls of the building were covered in a lime wash as decoration or weather proofing. Such a wall coating is known in Buildings A2 and A4 at Yeavering (Hope-Taylor 1977, 53, 61, 140, 161, 235, 316).



Illus 23
Plank slots in the north wall trench of
Building 1, looking west.

BUILDING 1 Phase 7 Construction Details



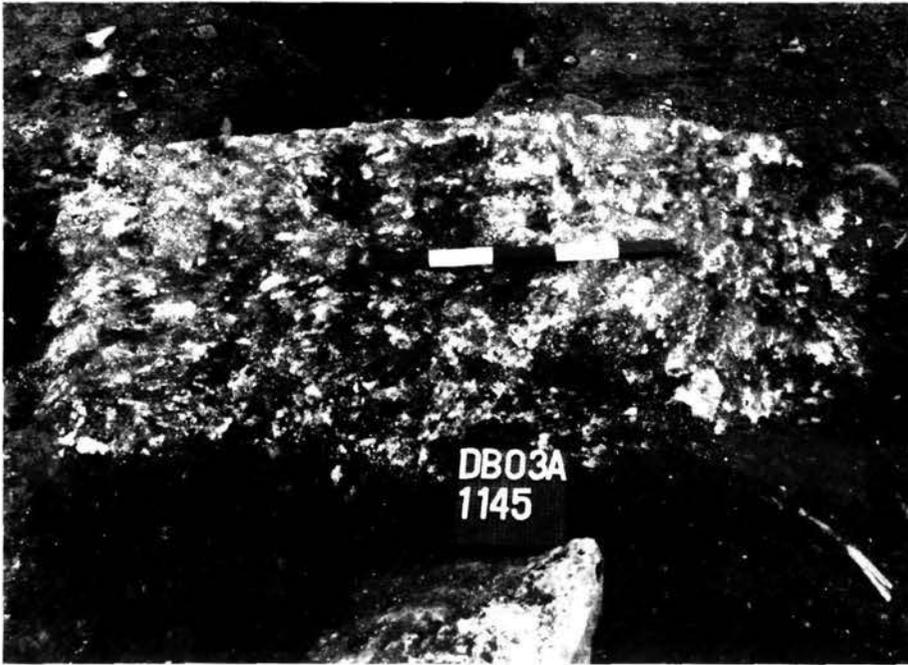
Illus 24
Sections of construction details of Building 1.

PHASE 7: BUILDING 2 (illus 21, 26)

Another trench-built structure lay north-east of, and parallel to, Building 1. Again only three sides of it survived. This structure was only observed cut into Courtyard 1 (Phase 4) although the northern trench had in fact been incompletely excavated as a trench cut into Soil 6 (Phase 5). Therefore, the depths of the western and southern trenches are incomplete.

The northern and southern trenches, both 0.40m deep, were of unequal lengths, but both had flat bases and expanded terminals for posts at their eastern ends; both these terminals were adjacent to a stone drain, which crossed the area to the east of the building and with which the building was presumably associated. In the south wall a sequence of postholes and plank sockets was noted at the eastern end. These may be interpreted as a post pit, 0.40m deep, with a post socket at the southern side of its base. Set into the northern side of the pit were a stone-packed posthole, 0.3m deep, and a plank slot, 0.35m deep. East of this group was the expanded terminal, 0.20m deep, with stone packing on its eastern and southern sides, while to the west was another post pit, 0.40m deep, with a plank slot on its northern side. To the south of this pit was a circular posthole, 0.10m deep. To the north of the terminal was a posthole, 0.70m deep. It contained large packing stones at its base, seemingly clay-bonded, and the slot, 0.42m deep, of an upright plank. This group represents a terminal wall post, with associated buttressing for the wall or roof, either one side of an entrance, of which the other side did not survive, or the end of the wall. The two plank slots in the trench formed part of the line of the wall on the northern side of the trench.

The western trench was stepped (max depth 0.35m), the deeper wall line being set against the inner (eastern) edge of the trench. There were packing stones, some on edge, on the step. At the north-western corner, in the trench, was a square posthole, 0.30m deep, for a corner post with a packing stone set on edge to the west. Adjacent to it, in the angle of the corner, was a posthole 0.20m deep, for a wall or roof support. At both the south-western and north-western corners were two postholes, 0.23m and 0.20m respectively, projecting slightly from the wall line. These may have contained corner buttressing. There were two other adjacent postholes, 0.25m and 0.24m deep, apparent in the fills of the western trench towards its northern end. They were situated along the course of the deeper wall slot. Also in the western trench were two large postholes, 0.32m and 0.41m deep, some 1m and 1.2m from the south-western and north-western corners respectively. The former had a plank impression at its base, in line with the course of the deeper wall slot. Both these postholes represent robbing of timbers in the west wall. Adjacent to the northern of these postholes, within the building, was a group of continuous postholes forming a partition. A short trench, 0.25m deep, had a posthole, 0.10m deep, at its base. At each end of this trench was a posthole, 0.27m and 0.28m deep. Between the western of these postholes and the west wall itself was another posthole, 0.25m deep, which contained flecks of crushed lime or plaster in its fill. Further robbing of the west wall is shown by a linear intrusion, 0.25m deep, into the top of the trench.



Illus 25
Plaster within Building 1,
towards the north-west.

The fill of the northern trench contained eight irregular postholes, 0.12m-0.35m deep and 0.1m-0.6m apart (illus 27). Cut into the top of the trench and directly above one of the postholes was an almost circular posthole, 0.21m wide, with a central post pipe, 0.24m deep, set within it. The latter represents a secondary timber replacing a primary one which had rotted. Both of these secondary features contained traces of white crushed lime or plaster. With similar traces in the partition against the west wall, these indicate that the walls may have been covered in lime or plaster as in Building 1. There was no trace whatever of an east wall, nor for any continuation of the north and south walls beyond their expanded terminals. So presumably they were indeed terminals, ie, there was no east wall as this was an open-sided structure or

the east wall was constructed of flimsy stake and wattle which left no impression in the ground.

In addition the roof cannot have been pitched as a pitched roof requires a central ridge pole supported on large uprights at each end: there was no central posthole at the eastern end of the building. That the building was roofed is confirmed by the strengthening given to the west wall probably to compensate for the lack of, or weakness in, the east wall. Situated almost centrally along it were two postholes, one on the outside, 0.47m deep, the other on the inside, 0.35m deep. Also outside the west wall, between the central posthole and each corner were two other postholes, 0.1m and 0.35m deep, to the south and north respectively. It seems that the



Illus 26
Building 2, towards the west.



Illus 27
Plank shots in the north wall trench of Building 2, looking west.

roof was pyramidal, with a post set almost centrally within the building as its focus: in the centre was a post pit, 0.50m deep, containing a post impression, 0.06m deep, at its base and an adjacent post pipe, 0.24m deep, visible in its fills. Hip timbers stretching from each corner to the central post would have supported the roof. The eastern section of the roof would have been based on a tie beam supported by the arrangement of posts already noted at the end of the south wall and by a large upright plank contained in the second posthole from the east in the north

wall. The eastward continuation of the north wall was an enclosure fence. The roofed area was some 4.5m east to west by 5.4m north to south internally.

Three structures with this type of roof have been found at North Elmham, Norfolk. The earliest was a bakehouse dated to the late 8th to early 9th century, the others two successive houses of 'a rather poor family' dating to the 11th century (Wade-Martins 1980, 73, 157-9, 172).

PHASE 7: FENCE 6 (illus 20)

Attached to the north-western corner of Building 1 was a trench, 0.27m deep, for a fence on approximately a north/south alignment. Extending eastwards from it, about half way along its course, was another trench, 0.23m deep, with a posthole, 0.13m deep, at its eastern end. At the junction of the trenches was a posthole, 0.25m deep. On the western side of the longer trench were a number of

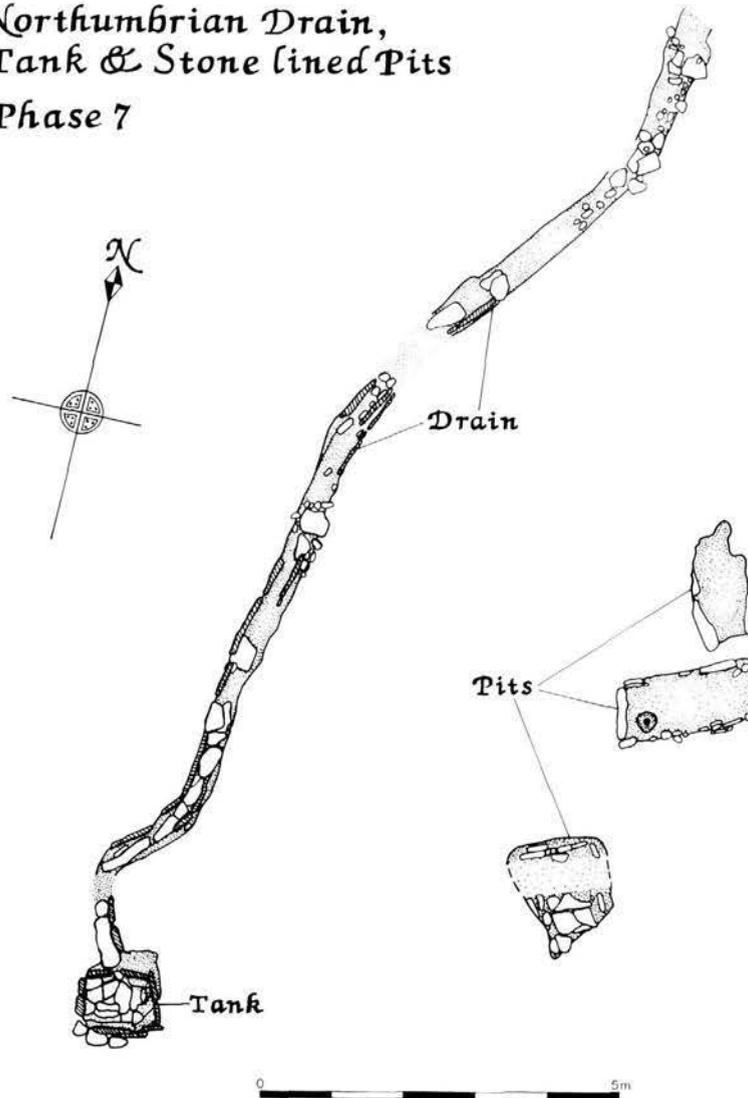
postholes, 0.04m-0.27m deep, for posts to support it. As the trench did not continue southwards beyond the building, the fence presumably formed an enclosure attached to Building 1. The fill of this trench contained a gilded copper buckle plate (no 8) identified as coming from a 7th-century Anglo-Saxon buckle.

PHASE 7: FENCE 7 (illus 21)

Between Buildings 1 and 2, and almost parallel to them, was a trench, 0.70 m deep, for a wooden fence. At its eastern end were two deeper impressions on either side of the position where a stone drain crossed the fence (see below). The trench contained stone packing, arranged in groups of two or three stones varying in size from 0.10m by 0.10m by 0.20m to 0.40m by 0.30m by 0.10m. The eastern end had an expanded terminal which contained two small postholes, 0.15m and 0.25m deep, the former with two

packing stones on its southern side. Almost centrally along the trench was a posthole, 0.25m deep. At its north-western corner was a shallow, stone-lined depression, 0.04m deep, filled with charcoal, probably the remains of a burnt post. On the northern side of the trench were two postholes for supporting posts for the fence. The eastern of these was 0.58m deep and lined on the northern side with a large igneous rock and large sandstone fragments. The other one may have contained a post forming part

Northumbrian Drain, Tank & Stone lined Pits Phase 7



Illus 28
Northumbrian period, drain, tank and stone-lined pits (Phase 7).

of a barrier blocking the gap between the fence and Building 2. The western part of the trench contained three postholes, up to 0.92m deep, of which two were on the southern side of the trench.

These last, with two other post impressions visible at the base of the trench, reveal that the fence was set against that side of the trench.

PHASE 7: STONE DRAIN AND TANK (illus 28)

East of Buildings 1 and 2, and cutting across the line of Fence 7, was a stone drain. It comprised a curvilinear trench, vertical-sided and 0.40m deep, on an approximately north-east/south-west alignment (illus 29 and 30). Its flat base sloped south-westwards into a stone-lined tank (illus 31). Extending for some 5m along the base of the drain from the tank were eight large (c 0.70m by 0.20m) sandstone slabs. These were thicker (0.05m at the entrance to the tank, becoming thinner (0.02m) away from it). At the curves of the drain it was apparent that the base stones extended under the large (c 0.80m by 0.30m by 0.05m) yellow-white sandstone slabs which were set on edge to line the sides. For the most part these side stones were evenly split with smooth faces, although some were roughly finished. There were two layers of

discontinuous sandstone slabs forming the capstones of the drain, separated by loose brown silty clay loam. The drain was filled with various brown silty deposits, which showed evidence of animal burrowing towards the tank. Where the drain was cut by Building 3 (Phase 8), the base, sides and capstones were all missing.

The tank into which the drain flowed was 0.35m deep with vertical sides. A large flat stone slab, 0.08m thick, lay at the base. It underlay a base stone of the drain at the entry to the tank. The southern, eastern, western and north-eastern sides of the tank were lined with four other stone slabs set on edge (illus 31). Like the drain, the tank had two layers of capstones, the lower one comprising three large slabs, 0.35m-0.60m long and 0.04m thick.



Illus 29
Stone drain and tank, general
view towards the south-east.

The upper capstones formed a square composed of two large slabs with vesicles on their under surface, surrounded by smaller slabs. Between the capstones was loose dark brown-black sandy loam

with much charcoal. The silty fills of the tank contained much charcoal (identified as oak) from some of which was obtained a radiocarbon date of 1640 ± 50 BP (GU-2990; Table 28).

PHASE 7: MISCELLANEOUS FEATURES (illus 20, 28)

East of the drain were three almost vertical-sided stone-lined pits. The most southerly was a trapezoidal pit, 0.22m deep. Its base sloped down towards the north and was covered with large sandstone slabs, possibly clay-bonded, varying from 0.20m by 0.10m to 0.60m by 0.80m. They were 0.09m thick. Around the northern, eastern and western sides were four large sandstone slabs set on edge (up to 1.10m by 0.40m by 0.09m). Behind the side slabs and under the base slabs was a fill of hard red sandy clay as levelling and packing. The fill of the pit was brown sandy silty loam with patches of blue clay and large fragments of burnt clay or daub and plaster. Above that was a patch of charcoal with some plaster fragments.

North of that pit was a rectangular pit, 0.34m deep, lined on its western side by a single large flat stone slab set on edge. The northern and southern sides were lined with smaller slabs and cobbles, the slabs being heavily split and eroded (illus 32). At the base was loose, fine charcoal powder with small charcoal fragments. The primary fills were black-brown sandy silty loam with charcoal flecks, above which was a patch of hard, red-brown, clay loam. At the south-western corner was a stone-packed posthole, 0.12m deep, in which was a circular post pipe, 0.40m deep. Above the posthole, and filling the upper part of the pit, were flat stone fragments in mid-brown silty loam with a single large boulder rising above the flat stones, which represented a boulder thrown onto, and shattering, a capstone.

North of that pit was another sub-rectangular pit, 0.20m deep, with a keyhole extension on its northern side. The base sloped slightly towards the north. At the southern end of both the eastern and western sides were two sandstone slabs set on edge, both roughly squared. At the base was hard yellow-brown clay with

some brown silty loam, fragments of probable burnt clay or daub, and, at the northern end, some cobbles which showed evidence of advanced weathering. Above the clay were small fragments of red and white sandstone. These may have been a shattered capstone.

East of the drain, between it and the stone-lined pits, was a slightly curvilinear trench, 0.19m deep, on an east to west alignment, which may have been a continuation of Fence 7.

East of the northern pit was a surface of roughly squared and eroded red and white sandstone slabs, bounded on its northern edge by a curving line of sandstone slabs set on edge. These kerbstones were 0.20m-0.65m long and 0.10m-0.20m high. They continued westwards beyond the surface and were irregularly spaced. None of them appeared to have been worked. At the eastern end of the kerb, on the northern side of the stone surface, were two parallel sandstone slabs set on edge, 0.10m apart. Leaning against them was a third sandstone slab and two other slabs lay beyond sloping in the opposite direction. South-west of the stone surface, and bounded by the kerb to the north, was an area of small sandstone fragments, mostly eroded but some worked. These were set on a patchy bed of grey clay. South of them was another area of stones containing three large flat slabs, four smaller stones and cobbles. On the northern side of the kerb was an area of cobbles, boulders and small sandstone fragments.

Various postholes occurred at the northern and eastern end of the site, but again they formed no recognizable pattern. There was also an animal burrow. East of Building 1 was a group of seven stakeholes and postholes, 0.015m-0.22m deep, whose purpose is unknown, and two larger postholes, both 0.18m deep. These were cut into a levelling dump above the course of the Outer Ditch.



Illus 30
Stone drain, towards the north-east.



Illus 31
Stone tank, towards the east.



Illus 32
Stone-lined pit, towards the south-west.

PHASE 7: BUILDING 5 (illus 33)

South of Buildings 1 and 2 was a structure largely destroyed by later intrusions. Nevertheless, sufficient of it survived to allow its recognition as one of the two most significant buildings recovered at Dunbar, an Anglo-Saxon sunken feature building or *Grubenhaus*. Unfortunately this recognition only occurred at the end of the DB03A excavation in 1989 when loomweights were found in it. To clarify it, a few days of excavation in February 1990 were undertaken. This led to the discovery that the southern edge was some 4.3m longer than had been previously excavated. There is no record of any similar extension to the northern edge.

Two parallel edges, 5.8m apart, of a pit were 0.8m deep on the north, and 0.66m deep on the south. (The latter edge was, however, disturbed by a medieval trench of Phase 18 almost coincident with it.) Neither the eastern nor western limits of the structure were recovered, the former being cut by the Building 13 (Phase 21), the latter lying outwith the excavated area. The interior was also disturbed by a post-medieval kiln (Phase 22), which divided the structure in two. The northern edge was at least 10.6m long (it extended into the limit of excavation), the southern edge at least 13.5m long (it also extended into a limit of excavation). Along the base of each edge were lines of postholes, up to 0.29m deep on the northern side and 0.33m on the southern. Along part of the edge of the latter was a band of charcoal, although only one of its postholes was filled with charcoal from the burning of the building. In another of the southern postholes was found a clay loomweight (no 544). The fill of the edge above the same line of postholes produced a clay disc (no 571).

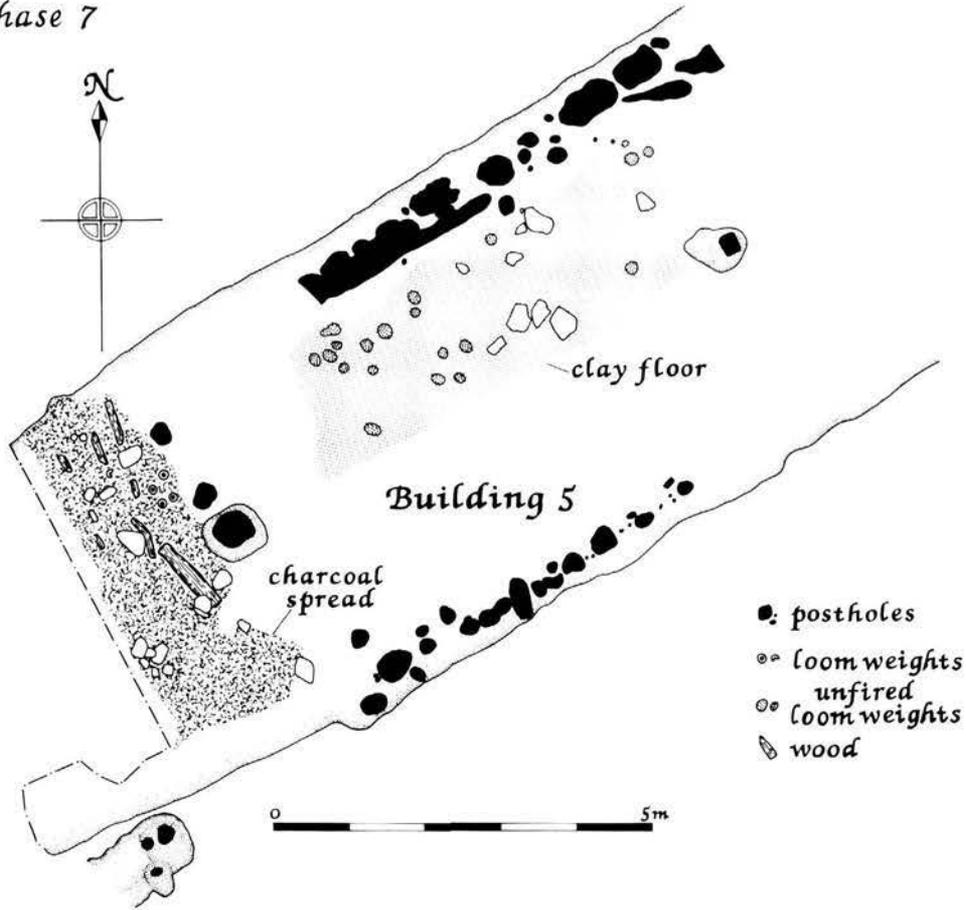
A single large posthole, 0.70m deep, with a square post impression at its base, may have held a post to support the eastern end of a ridge pole. Its fill contained charcoal and possible plaster. Over

6.5m to the west was a similar posthole, 0.90m deep, for a post which may have held the western end of the ridge pole. However, the northern edge of the *Grubenhaus* extended westwards of it, as did the southern edge as re-excavated. It is, therefore, possible that this posthole contained an internal roof support. There is also the possibility that this posthole was in fact part of a later posthole of similar size and depth, which intruded into it from above. (If this later posthole was in fact a robbing pit to remove the post from the earlier posthole, the latter could have been part of the *Grubenhaus*; presumably the charred stump of the post was being removed.)

North of this internal posthole were two smaller postholes, 0.15m and 0.20m deep, but truncated by the post-medieval kiln. These may have formed part of a screen across the building.

The northern side of the base of the pit, to the east of the intrusive kiln, was covered in a patchy spread of thin (0.01m or less) brown clay loam. Above that was light yellow-brown clay, 0.05m thick, on whose surface were four loomweights (nos 547-550), several lumps of clay of unfired loomweights and a burnt timber (illus 34). To the west was more brown clay loam. On its surface lay 14 fired and unfired clay loomweights (nos 554-567), the latter underneath stones or on parts not covered by charcoal, the former on the surface. There were also two clay discs (nos 573 and 574). Above it was a burnt deposit of loose charcoal powder and orange sand with large stones and burnt timbers. The burnt timbers lay parallel to each other. The base of the deposit was formed by a jumbled mass of burnt twigs. Charcoal identified as oak from this burnt deposit produced a radiocarbon date of 1650 ± 50 BP (GU-2992). Above the burning was a patchy deposit of charcoal powder, grey, orange and white sand and grey-blue, sandy clay

**Northumbrian
Timber Buildings**
Phase 7



Illus 33
Northumbrian period, Building 5 (Phase 7).

with loose, dark brown, sandy loam, which was probably silting after the destruction of the building. It contained another clay loomweight (no 552).

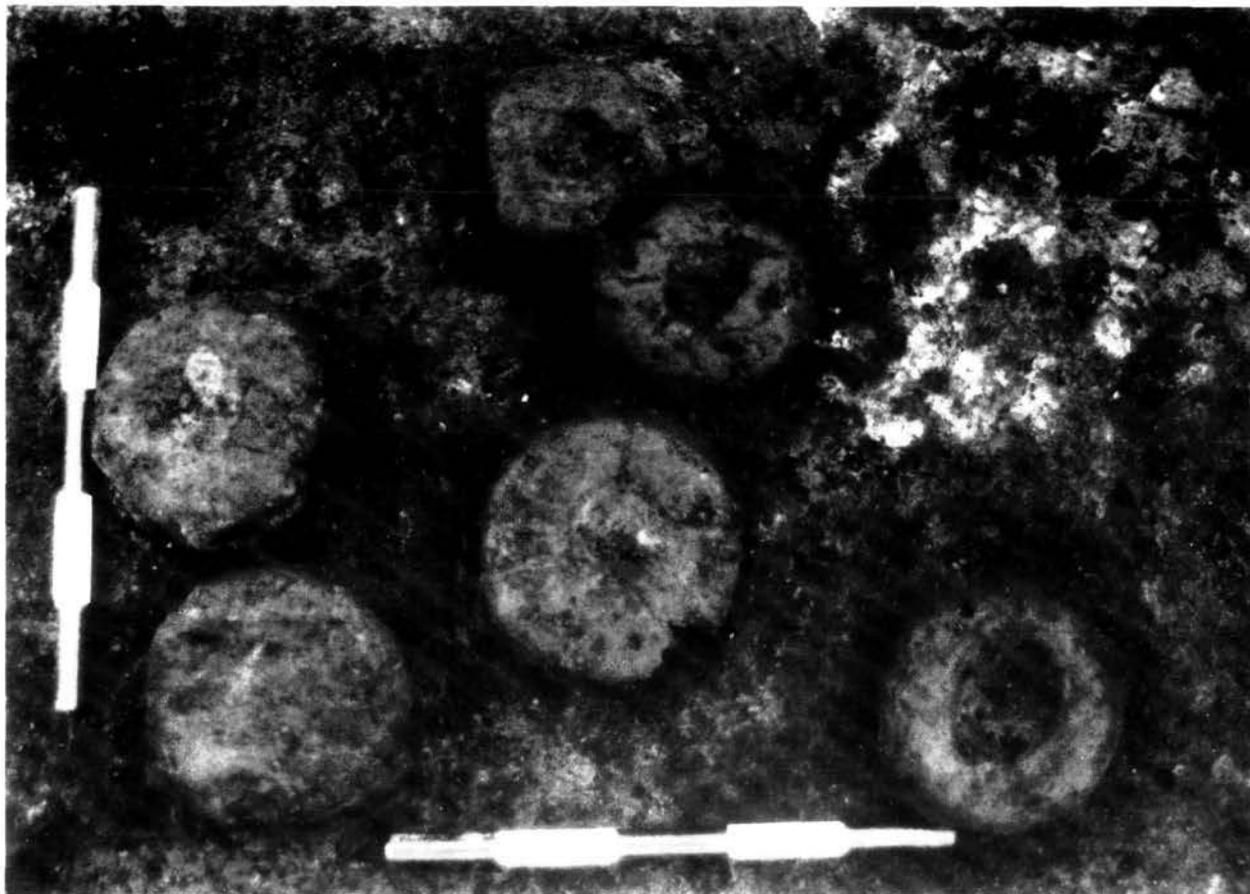
South of the *Grubenhaus* was a rectangular post pit or trench 0.30m deep, with a subrectangular posthole, 0.20m deep, at its eastern end. The posthole had the impression of two posts at its base and

contained a loomweight (no 536). On the southern edge of the post pit, and cutting the posthole, was another posthole, 0.23m deep, oval in shape and stone-packed, with a post impression at its base. These features may have been contemporary with the *Grubenhaus*.

PHASE 7: COURTYARD 5 (illus 20)

South of Building 5 was a surface of sandstone fragments, of various sizes, and gravel. Two animal bones (cannon bones of cattle) found on its surface gave radiocarbon dates of 1540 ± 50 BP (GU-2994) and 1500 ± 50 BP (GU-2995). On part of the courtyard surface some light red sandy loam had accumulated. Cut into this and into the courtyard itself were various postholes and features which formed no recognizable pattern. Set into the

courtyard were four circular areas of red and white sandstone fragments, one of which was partially edged by similar stones set on edge (illus 35). They appeared to form an east/west alignment, possibly of post pads. Sealing all these features was a grey-brown sandy silty loam with charcoal patches, possibly a natural accumulation. There was also a shell midden area composed of flecks of shell with pebbles and a few sandstone fragments.



Illus 34
Clay discs and unfinished loomweights in Building 5, looking south-west.

DISCUSSION

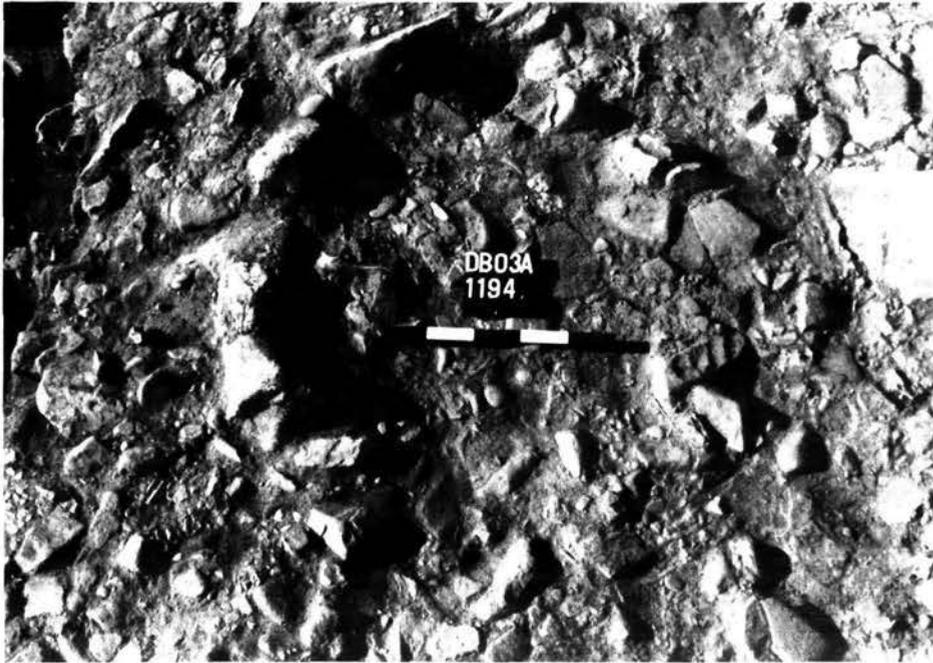
The presence of a 7th-century Anglo-Saxon buckle plate fragment in the trench of Fence 6, together with the discovery of a *Grubenhäus* (Building 5) show that the Angles of Northumbria had now reached Dunbar. Their settlement covered the greatest extent so far at Castle Park, comprising three structures and other features.

The two trench-built structures with their different ground plans served different purposes. There was no stratigraphic relationship between them, but they are assumed to have been contemporary. (Building 3 was later than both Building 1 and the stone drain which seems to have been contemporary with Building 2.)

It is possible that Building 1 was a two-room structure, each room being served by a different entrance and the rooms being separated by a flimsy partition, presumably of stake and wattle, which has left no impression on the ground. The larger room to the west had trench-built walls and corner

buttressing and a well-constructed narrow entrance with door jambs and threshold timber. The doorway was set centrally within the wall line, as in Anglo-Saxon buildings at Chalton (Welch 1992, 17) and Cowdery's Down (Millet 1983), Hants, Whithorn (Hill 1997, 139 and fig 4.3), Yeavinger (Hope-Taylor 1977, 150) and Hartlepool (Daniels 1988, 203). Unlike most of the buildings at these sites, which had paired opposite doorways (except Hartlepool, where single doorways were the norm), Building 1 at Dunbar had offset opposite doorways. The plaster found inside this room, presumably from decorated or weather-proofed walls, suggests a domestic use, possibly a dwelling house. The smaller room to the east was less well constructed: a post-in-the-ground gable end and a wider entrance without either threshold timber or obvious door jambs. It may have served as a byre for animals or as a store room.

On the northern side of the building was a yard enclosed on its western side by Fence 6. The yard was divided by a cross fence into an inner area



Illus 35
Circular stone setting in Courtyard 5, towards the south-west.

adjacent to Building 1 and an outer one beyond Building 2. There were postholes in the outer yard but no pattern can be discerned. A gate between the north-eastern corner of Building 1 and the western end of Fence 7 and another between the cross fence and Building 2 would have controlled access to the inner yard. Fence 7 separated Building 1 from Building 2. The area west of Fence 6 was left as an access to the headland. It is possible that, to the north of the excavated area, there stood the hall of the king of Northumbria's *praefectus* or thane or sheriff (Webb 1986b, 145). If this was so, it would mean that the earliest excavated Anglian settlement at Dunbar developed beside the approach to the principal residence of the Northumbrian kings and their representatives.

As Building 2 was apparently open-ended (however unbelievable that may be given the windy conditions at Dunbar), it clearly was not a dwelling or probably even a stable or byre. A stake and wattle screen across the eastern side is not impossible or even unlikely, although no evidence of supporting posts for such a fence was found. It was probably a store shed for the products connected with the stone drain and stone-lined pits.

Instead of being constructed in a straight line to ease the flow of water, the drain had four bends along its course which took it towards the ends of both the north and south walls of Building 2. The drain cut

across the trench of Fence 7 which was thus either shortened or taken down completely, if they were not contemporary. That they were contemporary is suggested by the apparent strengthening given to the fence where the drain crossed it, evident in the deeper impressions at the base of the trench on either side of the drain. It is, however, puzzling that the drain was not inserted in the gap between Fence 7 and its eastward continuation. The tank into which the drain flowed may have served both a domestic and an industrial purpose. The three stone-lined pits east of the drain were used for steeping some material, eg tanning pits for leather working. The presence of a posthole within the backfill of one is puzzling as it was underneath the shattered capstone of the pit and must, therefore, have been contemporary with it; perhaps it contained a post supporting the capstone.

The pits were probably contemporary with the drain, although the latter was recorded as cut through a layer of dark grey-brown, sandy loam which sealed the pits and nearby stone surfaces. The soil had probably accumulated over and against these features, including the drain.

Building 5, the *Grubenhäus*, to the south of Buildings 1 and 2 presents several problems. As recorded in the excavation, it was cut through both Building 4 and Courtyard 6 (Phases 8 and 9 respectively) to the south. The calibrated carbon date from the *Grubenhäus* gives a date range of AD 240-555

(GU-2992), which is slightly earlier than the calibrated dates for either Building 4 (AD 340-610, GU-2993) or Courtyard 5 (AD 405-625, GU-2994, and AD 430-655, GU-2995). It is possible, if not probable, that the date for Building 5 is misleading. The charcoal sample from the *Grubenhäuser* was from oak timbers burnt in the destruction of the building and presumably part of its fabric. Therefore, as oak is a hardwood and generally more durable than softwood such as birch, the *Grubenhäuser* may have incorporated timbers re-used from earlier structures. If so, this raises the question of the nature of the Anglian arrival at Dunbar. Had there been a violent sacking and burning of the settlement of the Votadini/Gododdin, there would not have been much timber left to re-use. Alternatively, it is possible that the carbon sample came from the heartwood (inner rings) of the timber rather than the sapwood (outer rings) which would have produced a later carbon date. Either possibility could explain the difficulty of the earlier carbon date coming from a feature stratified later than the earlier features producing later carbon dates. The samples from Building 4 and Courtyard 5 were of animal bone found in or on them, and chosen because they were unabraded and, therefore, unlikely to have been residual from an earlier period.

However, the southern edge of the *Grubenhäuser* virtually coincided with the southern edge of a medieval trench of Phase 18 cut into it. It is possible that the recorded stratigraphy cannot be relied on and should, therefore, be disregarded. The *Grubenhäuser*, which would otherwise have been placed in Phase 10, has been placed in Phase 7 on the assumption that, as its carbon date is contemporary with those from Building 1 (AD 230-620, GU-2989) and the stone tank (AD 240-590, GU-2990), it belongs to the earliest possible Anglian presence in Dunbar. There is nothing inherently wrong with the presence of a *Grubenhäuser* in Phase 10 (late 8th to early 9th century). Such structures have been dated later than that at London (see below) and Northampton (Williams *et al* 1985, 26-7), but it merely magnifies the problem of the carbon date.

In addition to any stratigraphic problems relating to the date of Building 5, there is the striking fact that the carbon date, if accepted at face value, is remarkably early for Anglian settlement at Dunbar, as early as the traditional date of AD 547 recorded by Bede (Sherley-Price 1970, 333) for the arrival at Bamburgh of Ida, the founder of the Bernician, later Northumbrian dynasty. This in itself, however, need not be impossible. If Ida and his Angles arrived at Bamburgh by sea, possibly from Lincolnshire

(Myers 1986, 199), there is nothing to stop them arriving at Dunbar as well. Anglian settlement in Northumbria in the 6th century was essentially coastal, around Bamburgh and around the mouth of the Tyne (Hope-Taylor 1977, 303). Settlement at Dunbar would not conflict with that pattern.

This is especially so given the other calibrated carbon dates for Phase 7: AD 230-620 from the destruction of Building 1 and AD 240-590 from the stone tank. The charcoal of the former was hazel and birch, possibly from the wattle fill between the upright planks or posts of the walls, or from a roof frame work. It is, therefore, unlikely to have been re-used. The oak charcoal in the stone tank is earlier than might be expected, but not impossibly so given the points made about the oak charcoal in the *Grubenhäuser*. All in all, a mid to late 6th-century date for the beginning of Phase 7 is possible, occupation lasting into the early 7th century on the basis of the gilded buckle plate (no 8) from Fence 6.

The length of the *Grubenhäuser* is uncertain because of later intrusions. Even the smallest length of some 8m across the two large postholes is rather larger than other excavated *Grubenhäuser* in England which range in size from 1.8m by 1.5m to 9.1m by 5.5m, with an average of 3m by 2m (Rahtz 1976a, 75). However, the maximum length of 13.5+m is not impossible. An aisled *Grubenhäuser* (Building D3) at Yeavinger was *c* 11.9m long and dated to Phases II(b)-IIIC, late 6th century to AD 632-633 (Hope-Taylor 1977, 313; Figs 41, 48, 72). It was regarded as a kitchen area (*ibid*, 108). Two sunken-floored buildings at Watling Court, London (WAT2 and WAT3) were *c* 12.7m and 13.4m long respectively. The latter was 2.3m deep, the former at least 0.7m (Horsman *et al* 1988, 56-7). These, however, were very much later, 11th century (*ibid*, 26), than the Dunbar example and in an urban setting. They are, therefore, not comparable with the Dunbar *Grubenhäuser*.

The presence of some 20 loomweights and clay discs in it compares with loomweights found in *Grubenhäuser* elsewhere (Rahtz 1976a, 76; Yeavinger Building C1, Hope-Taylor 1977, 91). This has led to the conclusion that such structures were used as weaving sheds. A damp atmosphere, such as produced in a *Grubenhäuser*, would have made weaving easier, especially in producing linen from flax (Welch 1992, 28). (Could the stone-lined pits at Dunbar have been used for retting flax?) However, this has been questioned as a result of excavations at West Heslerton, North Yorkshire, where it was suggested that the *Grubenhäuser* may have been grain stores (Wainwright 1989, 35). But there is no more



Illus 36
Artist's reconstruction of Northumbrian buildings, Phase 7.

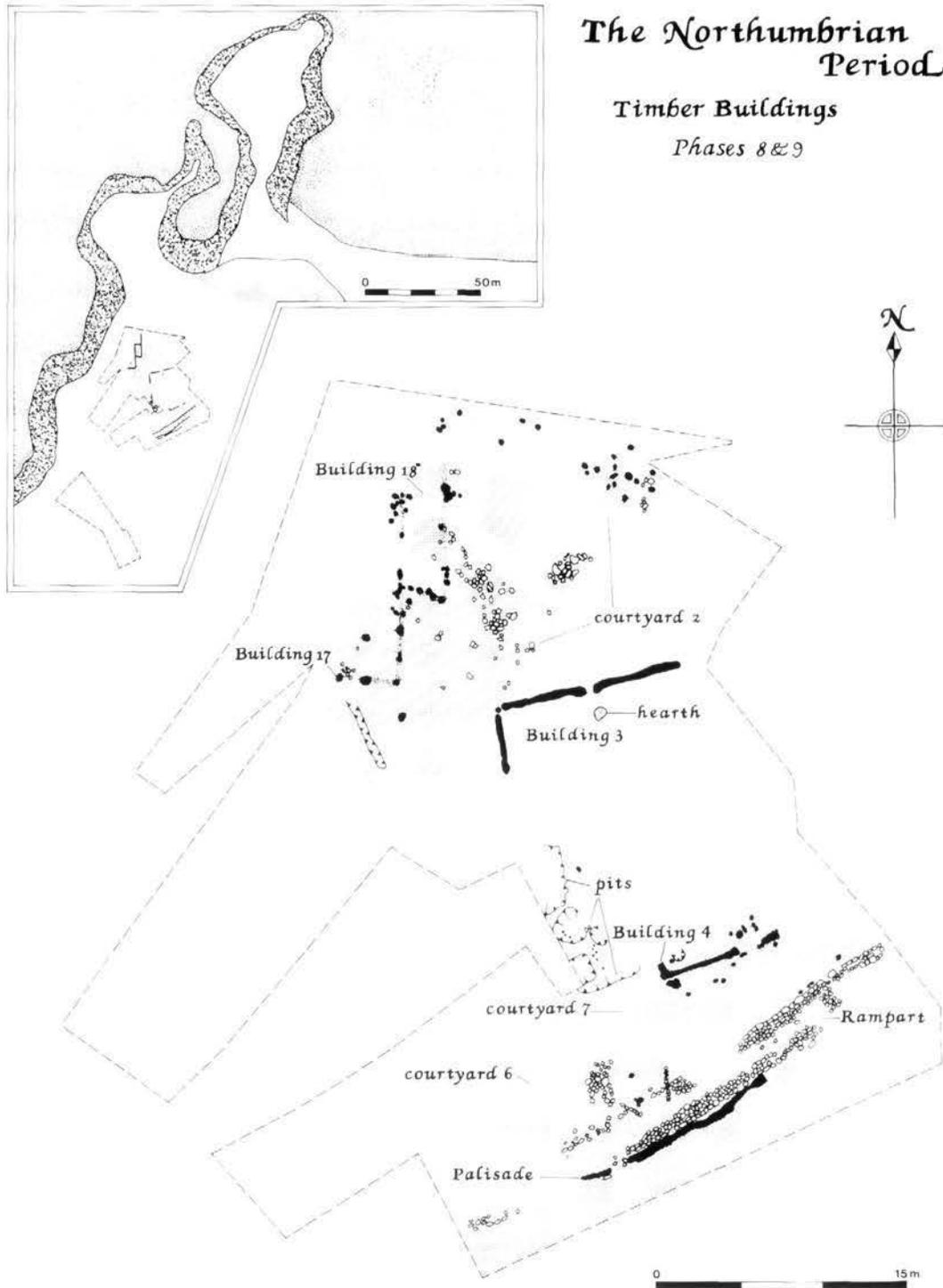
reason to suppose that every *Grubenhaus* or sunken-featured building served the same purpose than to suppose that every upstanding building served or serves the same purpose. *Grubenhäuser* probably had many different purposes at different sites, as well as different purposes on the same site. A single *Grubenhaus* may even have had more than one use,

especially the larger type as at Dunbar. The presence of incompletely formed loomweights and clay discs reveals that the yellow clay at the base of Building 5 was the source from which they were made, ie, the *Grubenhaus* was a loomweight manufactory (cf Rahtz 1976a, 76). The clay did not occur under the charcoal deposits to the west but was confined to the

eastern part of the building. Equally significantly, except for one piece of burnt timber and some charcoal flecks, the charred deposits and timbers did not occur above the clay. Therefore, it can be concluded that the loomweights were made at one end of the building and stacked or used at the other.

It is not clear if the charred timbers at the west of

Building 5 were fallen wall planks as at Yeavinger's Building C1 (Hope-Taylor 1977, 90) or a collapsed timber floor which spanned the pit. Such floors have been claimed at West Stow (Rahtz 1976a, 76) and suggested for Upton, Northants (ibid, 76) and West Heslerton (Wainwright 1989, 35). However, the use of the yellow clay for manufacturing the loomweights precludes the presence of a timber floor at least from



Illus 37
Northumbrian period timber buildings, Phases 8 and 9.

the eastern end of the Dunbar building. However, there is no reason why the western end of the building could not have had a timber floor at ground level, supported by the posts of the central partition.

No evidence for a roof was found apart from the postholes for ridge posts. As the pit for the *Grubenhäuser* extended beyond the eastern posthole, that end of the building must have had a hipped roof. It is not possible to reconstruct the western end of the structure. Postholes found outside Building 5 on its southern side were not repeated on its northern side. Therefore, it is unlikely that they were for roof rafters set into the ground (Hope-Taylor 1977, 240) and they probably relate to Building 4 (Phase 8). The roof of the *Grubenhäuser* was, therefore, supported by the ridge poles and by posts in or behind the side walls. The north wall, especially, appears in plan to have comprised a series of larger posts behind a plank or stake and wattle screen, though no such pattern can be discerned in the south wall. There the postholes resemble small stakeholes between larger postholes. There was no obvious doorway into the *Grubenhäuser*.

Courtyard 5 was outside Building 5 to the south. The postholes and features in it make little sense, though they may have been part of a defensive palisade or boundary fence enclosing this phase of the Anglian settlement. They approximately followed the course of the later rampart and palisade (Phase 8). The

circular stone settings on its surface, if not post pads, may have been further examples of corn staddles as in Courtyard 1 (Phase 4).

Phase 7 has so far provided the most extensive evidence of settlement at Dunbar. Not only did that settlement cover the greatest area so far, but it produced ground plans of three timber buildings, each of a different construction and function. In addition there is evidence of industrial activity and, possibly, of agricultural activity, if the stone settings in Courtyard 5 were corn staddles.

However, as only one of the structures may possibly have been a dwelling, that settlement cannot have been a large one unless it was dispersed over a wide area as at Yeavinger (Hope-Taylor 1977) and Cowdery's Down, Hampshire (Millet 1983). The probability, therefore, is that the settlement relates to a royal hall on the headland: the industrial activity involving processing of produce paid by tenants as rent in kind to the king, and the corn staddles being for grain rents. Building 1 housed the family and livestock of the artisan involved in the industrial activity. Building 2 was a store or work shed connected with that activity. Building 5 was a weaving shed for either the domestic use of that artisan and his family or for the weaving of wool or linen from sheep or flax paid to the king or his steward as rent (illus 36).



Illus 38
Outlines of Buildings 1, 2
and 3, towards the south-east.

THE NORTHUMBRIAN PERIOD: TIMBER BUILDINGS (Phases 8 and 9)

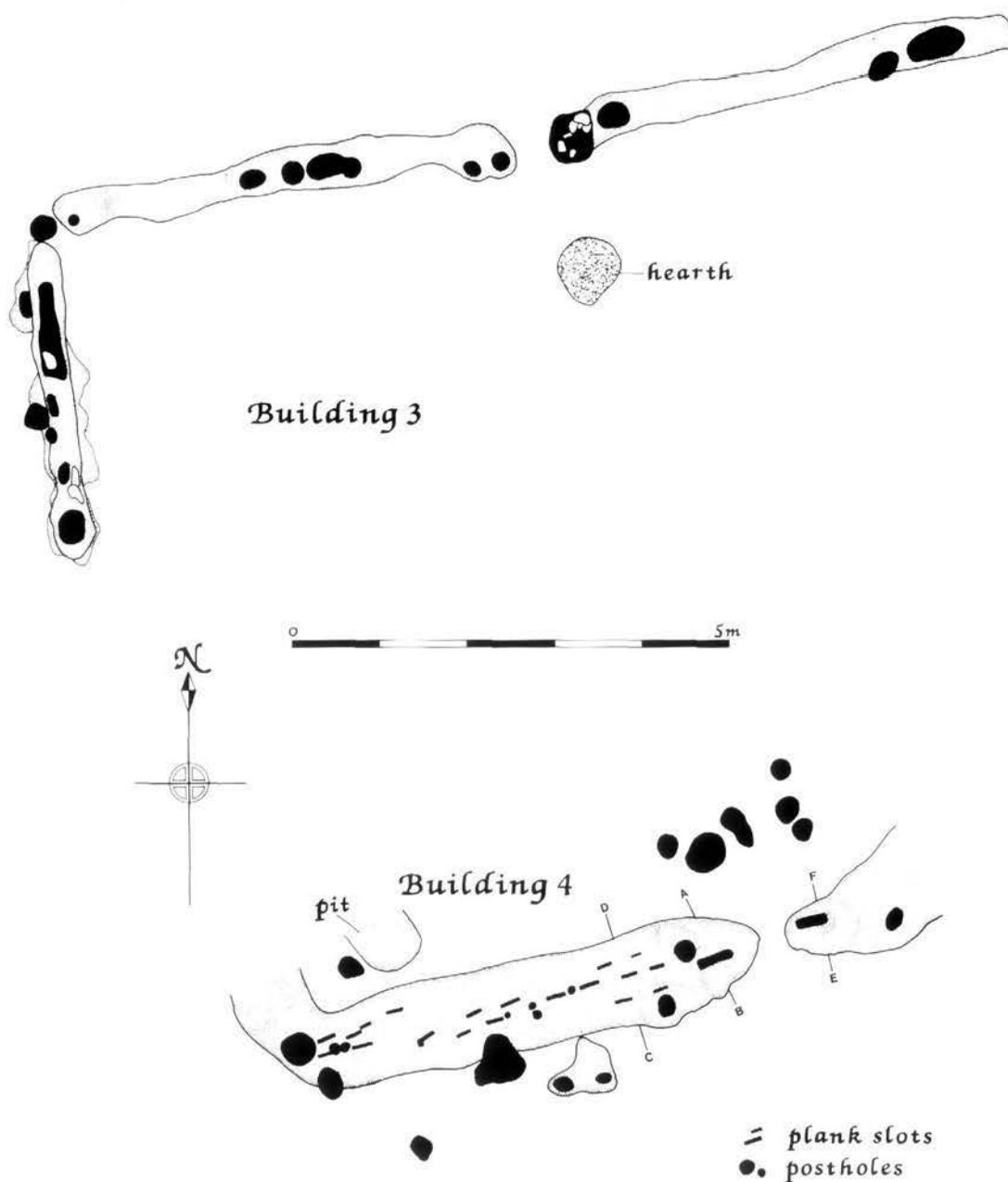
(illus 37-49)

PHASE 8: BUILDING 3 (illus 38-40)

A new and longer trench-built structure replaced Building 1 and the stone drain. The south and east walls of this building were destroyed by a medieval trench of Phase 18, but its internal dimensions were at least 11m by 3.75m.

The north wall comprised two trenches, up to 0.57m deep, each having opposed expanded terminals. The terminal at the end of the western trench was deeper than the trench itself. A narrow gap between these terminals was an entrance to the building. That to

Northumbrian Timber Buildings Phase 8



Illus 39
Northumbrian period, Buildings 3 and 4 (Phase 8).



Illus 40
Building 3 (partially excavated)
and Building 1, towards the east.

the east was 0.37m deep and stone-packed, that to the west was 0.29m deep and contained, at its base, two circular postholes, 0.10m and 0.35m deep. The door, therefore, probably hung on the jamb in the eastern terminal. The width of the doorway between the stone packing on one side and the eastern of the two postholes on the western side was 0.64m. Above the eastern terminal and the nearby posthole to the east was an ash deposit with some fragments of slag. The eastern trench contained, at its base, three postholes, 0.09m-0.40m deep. Fragments of possible plaster and burnt clay or daub were found in this trench and its postholes. The base of the western trench was uneven: shallow steps, of some 0.18m at the western end and of some 0.11m about midway along the trench, led down to a deeper section covering much of the western half of the trench. The western of these steps had a posthole, 0.03m deep, at its base, while the eastern step had four postholes at its base, 0.12m-0.35m deep. (One of these last may have been robbed, if the robber pit was not itself incompletely excavated but part of the posthole underneath.) No postholes were visible at the base of the deeper part of the trench and the reason for the deeper step is not clear. At the corner between the north wall and the west wall was a posthole, 0.18m deep, for a corner post.

The west wall comprised a vertical-sided trench, 0.75m deep,

which contained, in its fill, eight postholes, 0.25m-0.66m deep (illus 41). Of these, five formed a wall line on the eastern side of the trench, the other three on the western side of the trench being roof posts, two towards the north, one in the centre. The two northern postholes comprised the socket of an upright plank which had replaced an earlier post. Along the top edges of the trench were shallow indentations where the posts and planks had been levered into or out of the trench.

To the south of the eastern door jamb was a hearth pit, 0.18m deep, containing burnt clay and charcoal. From the presence of slag in the fill, it may have been used as a metalworking area.

A number of deposits of ash, charcoal and burnt clay in the area of the building indicate that the building was either destroyed by fire, or dismantled with the unwanted timbers and thatch being burned. As slag and ash had apparently entered a depression above the posthole for the eastern jamb from the metalworking in the building, the post had presumably been robbed leaving a depression. Therefore, dismantling is more likely.

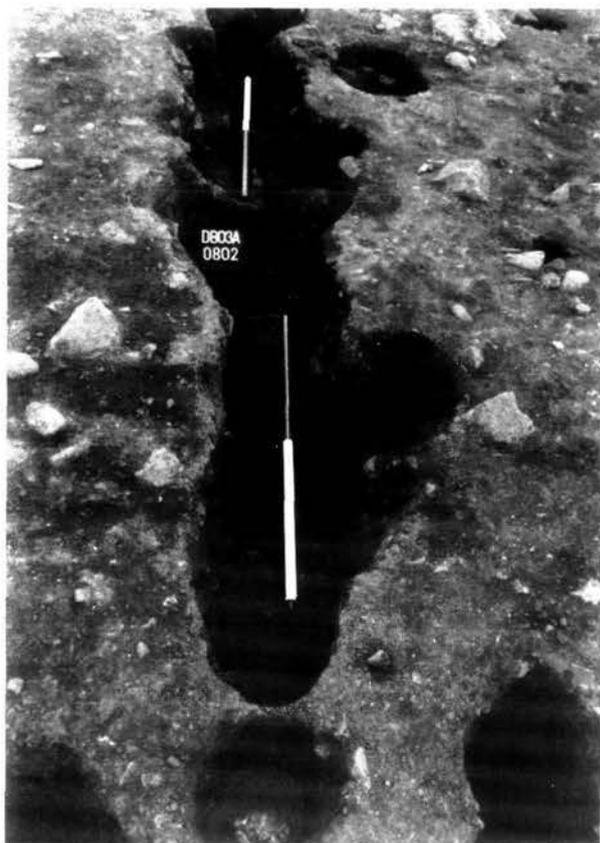
The presence of possible plaster in the north wall trench suggests that the walls of Building 3, like those of Buildings 1 and 2, may have been coated in a lime wash.

PHASE 8: BUILDING 4 (illus 39)

South of, and presumably cut into, Building 5 (although the relationship was destroyed by a medieval trench) was the south wall and the south-western corner of a trench-built structure. It comprised two trenches, the western one, 0.83m deep, the eastern, 0.60m deep. The gap between them was an entrance flanked by deeper post pits, 1.08m deep to the west, 0.28m deep (but truncated), to the east. Each contained a large slot for a vertical plank, 0.76m and 0.20m deep to west and east respectively. These were door jambs, 0.8m apart.

Both trenches had vertical sides and a flat base. All that survived

of the west wall was a short northward return with a shallower base stepped up some 0.20m from the south wall trench. No north wall was found either within the northern undisturbed half of the *Grubenhaus* or cut into the ground surface to the north of that structure. Although the trench of Building 4 and the pit for the *Grubenhaus* were of similar depth, any north wall of Building 4 should have been visible in the backfill in the northern side of the *Grubenhaus*. Therefore, any trace of the northern wall must have been removed by the medieval trench cut through Building 5. The width of Building 4 was thus less than 6m across the wall trench. Its length, assuming the eastern part of the south wall was of similar



Illus 41
Postholes in west wall trench of
Building 3, towards the south.

length to the western part, was some 10.3m from corner to projected corner.

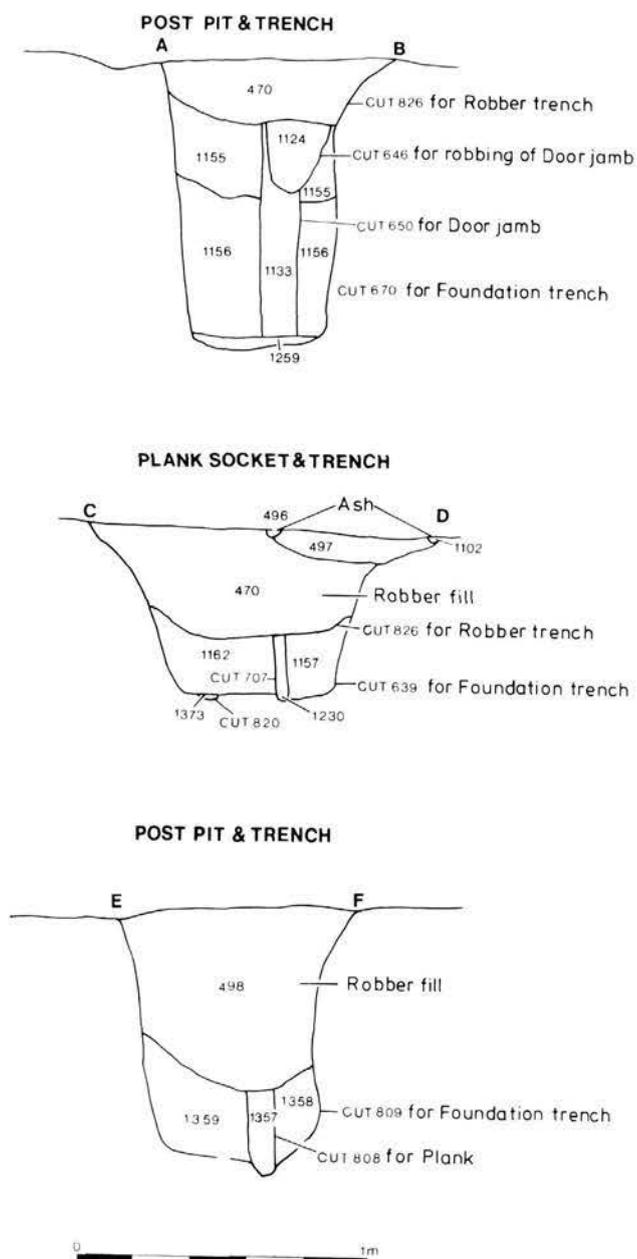
The fills of the western trench of the south wall contained 21 postholes for upright planks and round stakes or posts, 0.03m-0.23m deep (illus 42). Five other plank slots, 0.04m-0.07m deep, were visible in natural at the base of the trench. These were terminated at the eastern end by a large circular posthole, 0.16m deep. Because of the irregular alignment of these planks and posts, it is not possible to be certain about the construction of the wall contained in the trench. The majority of the features appear to form two lines of alternately spaced planks with stake- or postholes in between, as in Buildings C7 and C12 at Cowdery's Down,

Hampshire (Millet 1983, figs 44, 45). However, the plank alignments at Dunbar seemed to form two distinct groups to the east and west of a pair of planks separated by a posthole, and the stake- or postholes were in line with the southern line of planks, not forming a separate line between the lines of planks as at Cowdery's Down. As well as these differences, on the southern side of the trench at its eastern end, there were two more spaced planks, not related to the others. In addition, the arrangement at the western end of the trench was quite different, suggesting two lines of spaced and paired planks with postholes in between the plank lines. No such plank slots or stake- or postholes were found in the eastern trench because of the speed with which it was excavated.



Illus 42
Plank slots and postholes in wall trench of
Building 4, towards the south-east.

BUILDING 4 Sections Phase 8



Illus 43
Sections to show construction and robbing details of
Building 4 (Phase 8).

At the western corner was a post pit, 0.61m deep, with a circular post pipe, 0.35m deep, for a corner post.

The timbers in the trenches were robbed for re-use: cutting both sets of trenches and door jambs were robber trenches almost mirroring the construction trenches, 0.60 m and 0.50 m deep to west and east respectively (illus 43).

The eastern robber trench contained a solitary posthole, 0.13m deep, on its southern side. The western trench contained two postholes, one at each end, 0.22m deep to the west, and 0.06m with a post pipe, 0.25m deep, to the east. The latter was filled with ash as was the upper part of the western trench. Above the western door jamb socket was a semicircular robber pit, 0.35m deep,

partially filled with ash; its northern edge coincided with that of the plank socket. There were two other postholes, 0.12m and 0.15m deep, situated centrally along the southern edge of the western robber trench. These, with the other two postholes, held roof posts for the wall. Nearby were two other postholes, 0.13m and 0.25m deep, of which one contained the impressions of two posts at its base. These may have held angled buttresses between the roof posts.

Within the area enclosed by Building 4 were several postholes, 0.08m-0.33m deep, forming no obvious pattern. Near the south-western corner was a pit, 0.32m deep, containing ash and slag. Slag was also found in one of the interior postholes. This suggests metalworking took place within Building 4.



Illus 44

Views of the south end of the site with the Anglian ditch (phase 13) in the foreground, rampart base in the middle distance and ash from the destruction of Building 4 in the far distance, looking towards the north-west.

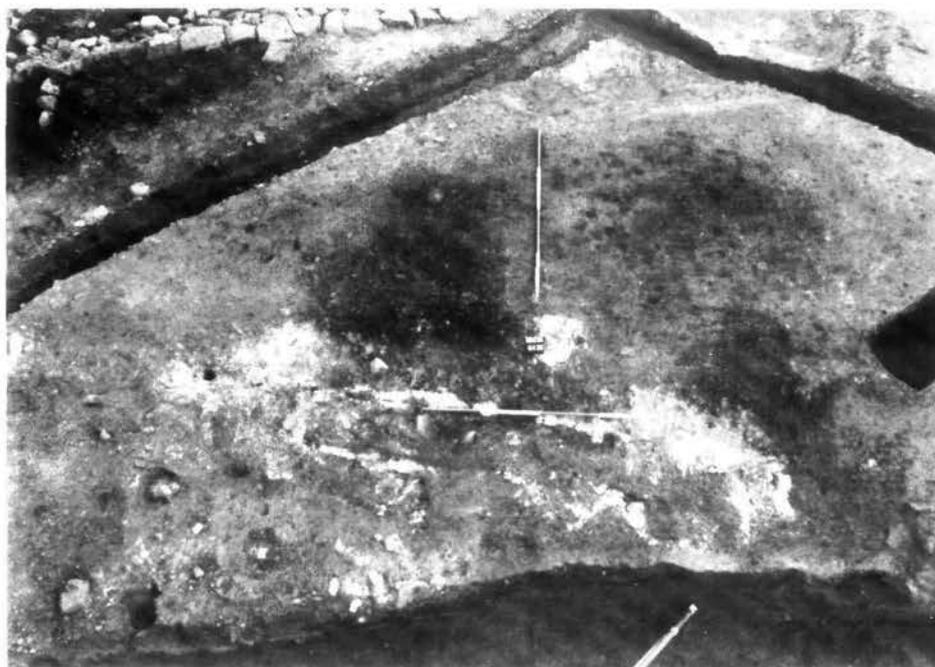
The robber trenches and internal postholes were covered by ash from the clearance of the site (illus 44 and 45).

A radiocarbon date of 1590 ± 50 BP (GU-2993) was obtained from a cattle cannon bone found in the western foundation trench for the south wall.

PHASE 8: BUILDING 17 (illus 46)

A number of postholes, 0.12m-0.40m deep, may have formed the south-eastern corner of this building which replaced Fence 6. Some of the postholes had packing stones. The east wall was at least 5.7m across the postholes before the line becomes indistinguishable from Building 18, the south wall at least 4m before entering a baulk. The two postholes of the south wall were stratified earlier

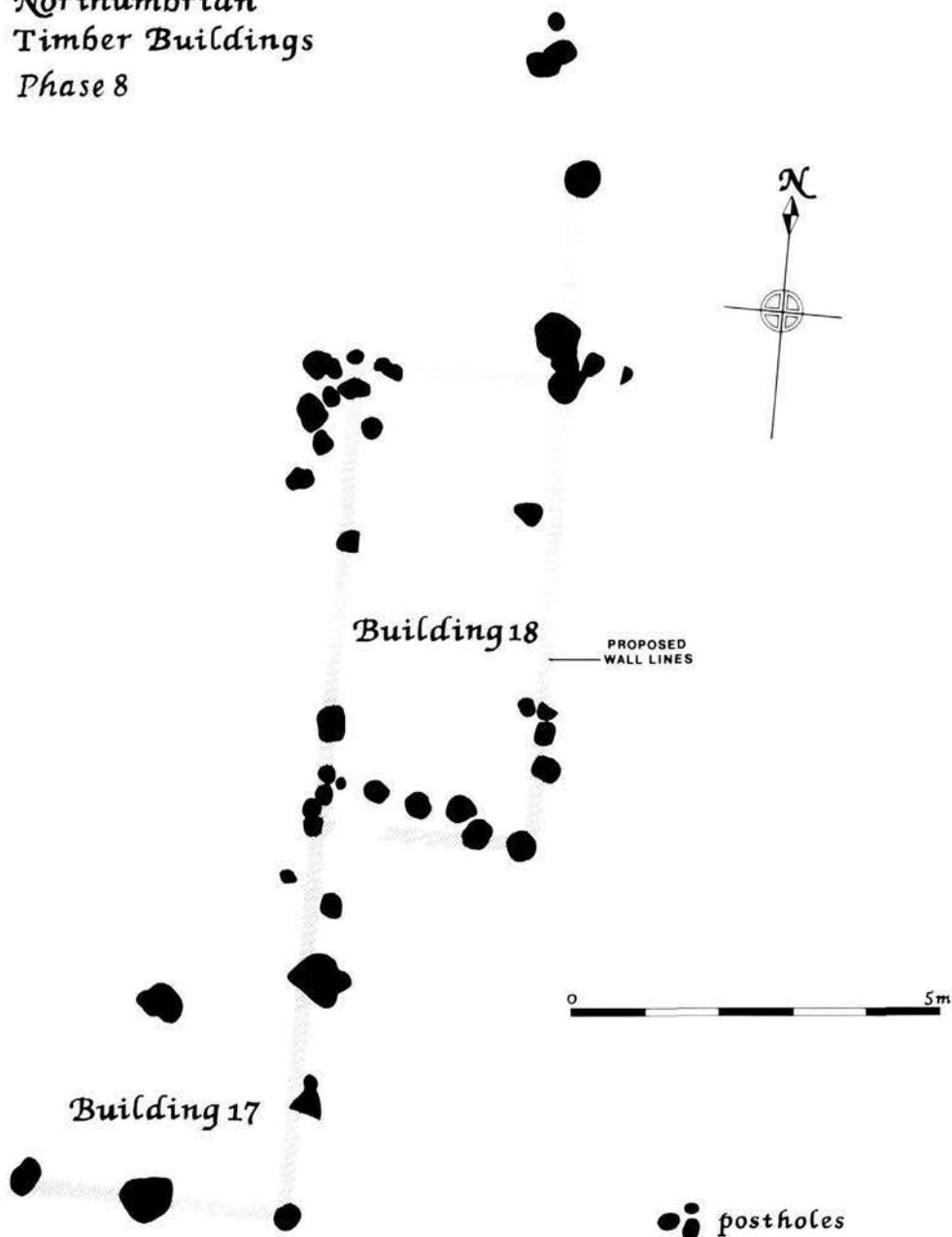
than the rest but appear to form a corner with the rest. They were both filled with charcoal, indicating the structure had been burned. A single posthole, some 2.2m from the south wall and 1.5m from the east wall, suggests that the building may have been aisled, although along which wall is unknown.



Illus 45

Ash from the burning of Building 4, towards the south-east.

*Northumbrian
Timber Buildings
Phase 8*



Illus 46
Northumbrian period, Buildings 17 and 18 (Phase 8).

PHASE 8: BUILDING 18 (illus 46)

Adjacent to the excavated north-eastern limit of Building 17 was a cluster of postholes. These seem to have formed the south-western corner of a building, some 6.5m long and some 3-4m across. The other corners were also formed by clusters of postholes. A further cluster to the north of the north-eastern corner indicates this structure may have extended into the limit of excavation, giving a length of over 11.5m. The postholes at the north-western corner were only noticed in the natural subsoil, but they appear to have belonged to this structure. Some may even have formed part of Building 17, but it is not possible to separate them.

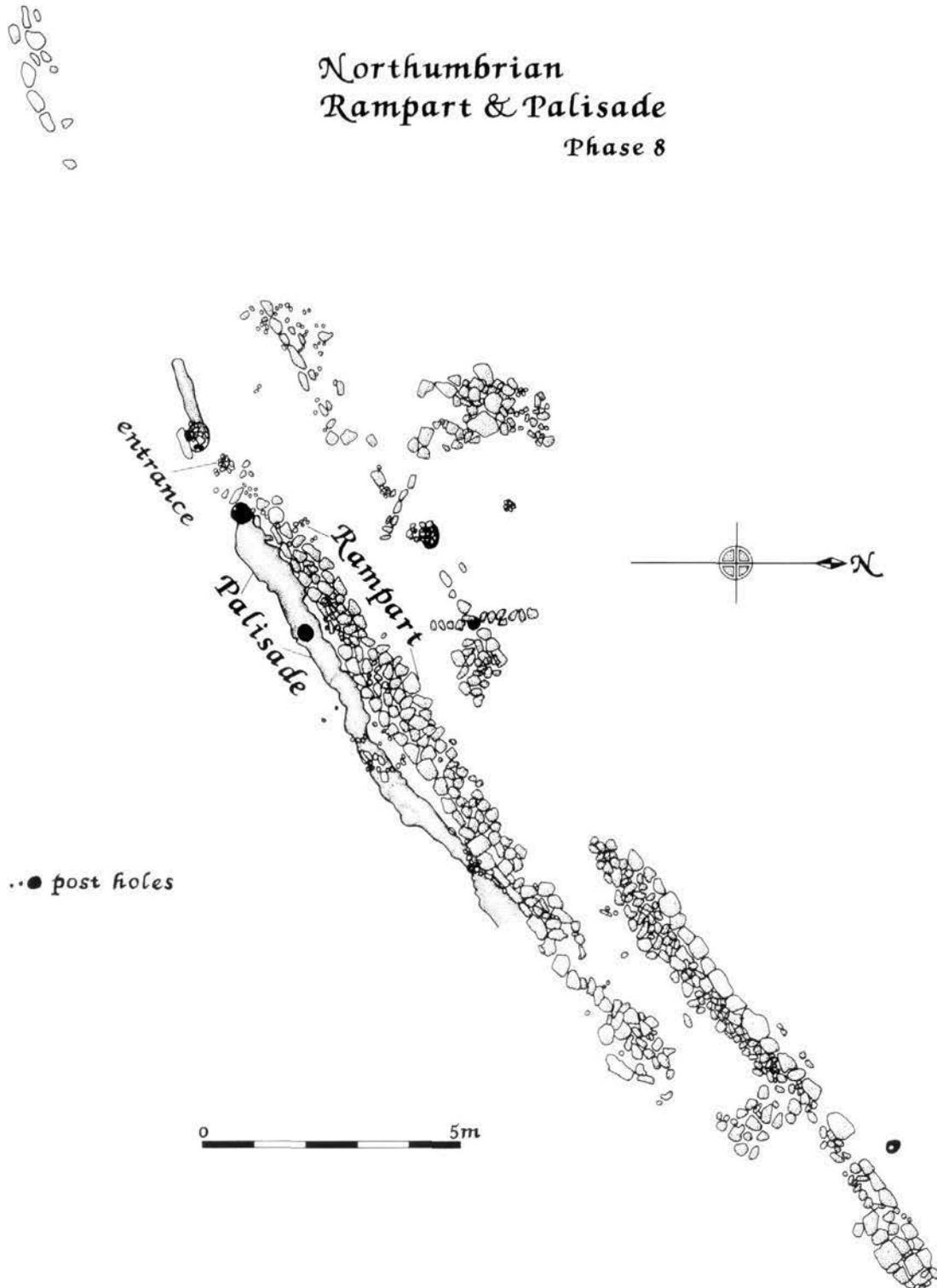
Such an arrangement of posthole clusters was not observed

elsewhere on the site, despite the number of postholes excavated. They presumably belong to a series of temporary structures put up and taken down when needed. Collectively they have been called Building 18 as they cannot be separated into their various individual structures. It is even possible that, as there was a greater concentration of postholes at the north-eastern and north-western corners, there were in fact two series of structures, one to the south, the other to the north, though whether contemporary or alternating is unknown. Between the south-western and south-eastern corners was a line of six postholes, 0.16m-0.44m deep, forming the south wall of the building. Two of them were stone-packed.

PHASE 8: RAMPART AND PALISADE (illus 44, 47)

South of Building 4 was the stone base of a rampart on approximately a north-east/south-west alignment. In front of, but of uncertain relationship to, it were two stone-packed trenches up to 0.44m deep. These contained either a timber revetment for the

rampart, or, more likely, an earlier palisade replaced by the rampart, as is recorded at Bamburgh in a late interpolation in the Anglo-Saxon Chronicle (Garmonsway 1972, 16) and as was found at Kirk Hill, St Abb's Head (Alcock *et al* 1986, 273). On the surface



Illus 47
Northumbrian period, rampart and palisade (Phase 8).

of the trenches was a line of boulders and sandstone fragments. Between the trenches was an entrance gap, c 1m wide, flanked on each side by a post pit which terminated each trench. That to the east was 0.30m deep, that to the west, 0.35m deep with two post pipes, 0.13m and 0.35m deep. These post pits would have held gate posts on either side of the entrance.

On the northern side of the trenches were the fragmentary remains of a stone-based rampart. This consisted of two lines of roughly-squared and rectangular blocks of red and white sandstone, one course high (0.16m) on each side of a core of sandstone blocks and boulders. The northern line of facing stones was some 20m long, the southern line some 24m long. The width of the rampart across the facing stones was some 2.8m. Crossing the line of the northern facing stones were two single lines of sandstone boulders and blocks, one course high, one on approximately a north/south alignment, the other on approximately a north-west/south-east alignment.

To the north of the rampart was a stone area composed of large stone blocks with some boulders. A socketed stone was found among them (no 366). These stones were in line with the entrance gap in the trenches and were probably a roadway through the rampart into the settlement. However, because of the disturbance to the rampart itself, it is not absolutely certain that there was an entrance, but it may be significant that the eastern side of the entrance through the palisade also marks a break in the stone foundations of the rampart.

In the absence of large amounts of rubble strewn across this feature and adjacent deposits, it is more likely to have been a stone-faced, turf or earth rampart on stone foundations rather than a stone-built rampart. A possible revetment for the inner face of the rampart may have been formed by some postholes, including some recorded as cut into Courtyard 5, as they were in line with the inner face.

PHASE 8: MISCELLANEOUS FEATURES (illus 37)

The depression left by the *Grubenhäuser* was filled with various deposits, from one of which were recovered several sherds of a bucket-shaped vessel (Chapter 4, Context 2164). Cut into these levelling deposits was a sequence of pits and postholes. Related to

these features were other features and deposits to the north of Building 5. These features lay to the west and north of Building 4 and may have been associated with it.

PHASE 9: COURTYARD 2 (illus 37)

Covering much of the northern end of the excavated area was an extensive surface of cobbles and pebbles, but with some sandstone slabs. Above the course of the former Middle Ditch, where one of those areas of sandstone had slumped, were some levelling deposits for a cobble patching with some larger stones. Also in that area was a patch of mortar or plaster. A sherd of unidentified pottery was found in the courtyard (Chapter 4, Context 10273).

Near the south-western edge of the courtyard was a trench, 0.35m deep, on an approximately north-west/south-east alignment, possibly for a boundary wall, although whether of wood or stone is unclear. Cut into the northern end of the courtyard were several postholes, 0.05m-0.33m deep, and two plank slots, 0.05m and

0.16m deep. One of the postholes had four wedge-shaped stones lining its sides, their narrowest points being driven into the ground. There was also a hearth containing burnt clay and charcoal. No structures can be made of any of these features.

Above the courtyard were several brown silty clay deposits and some burnt deposits comprising black and orange-red burnt clay, light yellow-brown ash and charcoal. The silts may have been natural accumulation, but the burnt deposits must have been of human deposition. In one of the silts were found an unidentified sherd of pottery (Chapter 4, Context 10195) and a Wodin/monster type 'seeat', the latter dated to the early 8th century (no 580).

PHASE 9: COURTYARDS 6 AND 7 (illus 37, 48)

These gravel courtyards really formed one surface separated by a modern army slit trench of Phase 24. They were composed of pebbles and cobbles with brown sandy loam. They were some 19m south of Courtyard 2 and sealed the rampart and Building 4. In the northern of these areas, the stones were mixed with loose white ash, which was probably churned up from the fire clearance of Building 4 underneath. On its surface were five large sandstone

slabs and two patches of brown, sandy loam truncated by machining prior to excavation. South of the slit trench, the gravel was covered by red-brown silty loam which in turn was covered by a layer of crushed white sandstone with flecks of plaster or mortar. The latter surface was probably a resurfacing of the earlier gravel courtyard.

DISCUSSION

The Anglian settlement was reorganized in Phase 8 behind a defensive enclosure (illus 49). The industrial activities of Phase 7 either ceased or were carried on elsewhere. New structures at the north of the site replaced the earlier ones and encroached on

the earlier access to the headland, being arranged on the west and south sides of an open yard. The south and east walls of Building 3 were destroyed by a medieval trench, and it is not possible to attempt a reconstruction for this structure. Nevertheless, the



Illus 48
Courtyards 6 and 7 above
the rampart and Building 4,
towards the north-west.

larger postholes in the trench for the west wall, outside the actual wall line, were probably roof supports, the central one being for a ridge post (central because it was situated centrally along the trench, both ends of which were recovered). The presence of slag in the hearth in the building and above the robbed eastern door jamb indicate its use as a workshop.

Buildings 17 and 18 were of posthole construction, the wall panelling between the postholes being of stake and wattle as no impression on the ground survived. This flimsier construction contrasts with the trench-built structures elsewhere on the site. Possibly Building 17 was a byre or stable and should be compared with the posthole construction of the eastern end of Building 1, interpreted as a byre for animals at one end of a house.

Building 18 was probably several huts of a temporary nature, constructed and taken down on several occasions to account for the regular clusters of postholes at its corners. It was attached to, and presumably used in connection with, Building 17. Such temporary structures have been found at Yeaving (Hope-Taylor 1977, 100-2), although the Yeaving huts were smaller and related to Building D2, interpreted as a temple. The larger Dunbar huts may have been storage sheds or byres erected to shelter rents paid in kind – grain or livestock – when payment was rendered to the king of Northumbria.

Farther south were the truncated remains of Building 4. Its wall trench was the deepest from the Anglian structures, implying a well-constructed sturdy structure, although no sense can be made of the pattern of post and plank-holes in the trench. The western trench for an end wall was not as deep as the southern trench for a side wall. This is the reverse of Buildings A2 and A4 at Yeaving (*ibid*, 51, 61). The presence of slag in an ash-filled pit and in a posthole in the interior of the building again may indicate its use as a workshop, although the robustness of the construction suggests other uses, possibly even a dwelling.

The settlement was enclosed by a stone-founded rampart, which probably replaced an earlier palisade. It is not clear why the earlier undefended Anglian settlement of Phase 7 now needed to be defended at a time long after Anglian control had been established, and presumably well into the 7th century. The calibrated radiocarbon date of AD 340-610 (GU-2993) for the animal bone in the trench of Building 4 has been disregarded for dating purposes as that building is stratified later than Courtyard 5 which gave calibrated dates of AD 405-625 (GU-2994) and AD 430-655 (GU-2995). The defences of Dunbar may have been reviewed following Penda of Mercia's raids into Northumbria before and after 651, on one occasion chasing Oswy of Northumbria, possibly as far as Stirling if the latter is correctly identified as *urbs Iudeu* (Jackson 1963, 36-8). Alternatively the rampart may date to the time



Illus 49
Artist's reconstruction of the Northumbrian buildings, Phase 8.

after the Pictish defeat of Ecgfrith of Northumbria at Dunnichen or Nechtansmere in 685 when Northumbrian control north of the Forth was lost, and possibly over part of Lothian west of Edinburgh as well. After the battle, Trumwine, Bishop of Abercorn, fled; it is not known if his see was restored, but Anglian sculpture of the eighth century has been

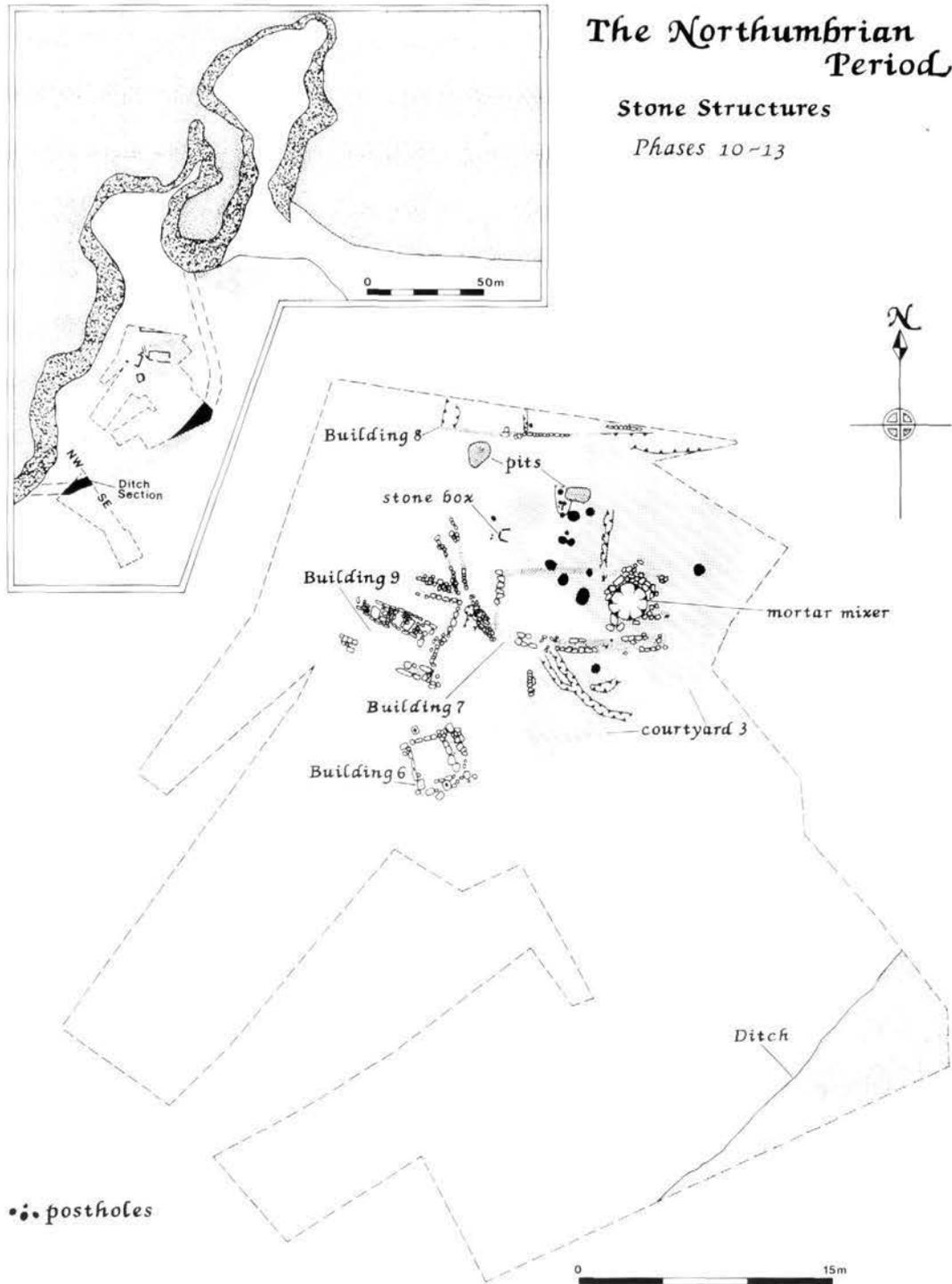
found there, suggesting that it continued as a religious centre.

The courtyards replaced the structures and defences of Phase 8. The settlement had, therefore, been shifted away beyond the excavated area and defence was no longer a priority. The traces of possible

plaster found on both the northern and southern courtyards are probably remains of wall finishes from timber buildings nearby. The courtyard and absence of buildings on the site do not imply abandonment of the site, merely a change of use.

The courtyards can be seen as places of assembly in front of the presumed king's hall on the headland to

the north, though whether for civil or military purposes cannot be determined, but possibly both. The trampling and churning up of the ash from the clearance of Building 4 underneath was presumably the result of livestock rather than human activity. This part of the courtyard may have been a collection point for livestock presented as food renders or offered for sale at a market. Indeed, as regards the



Illus 50
Northumbrian period, stone structures, Phases 10-13.

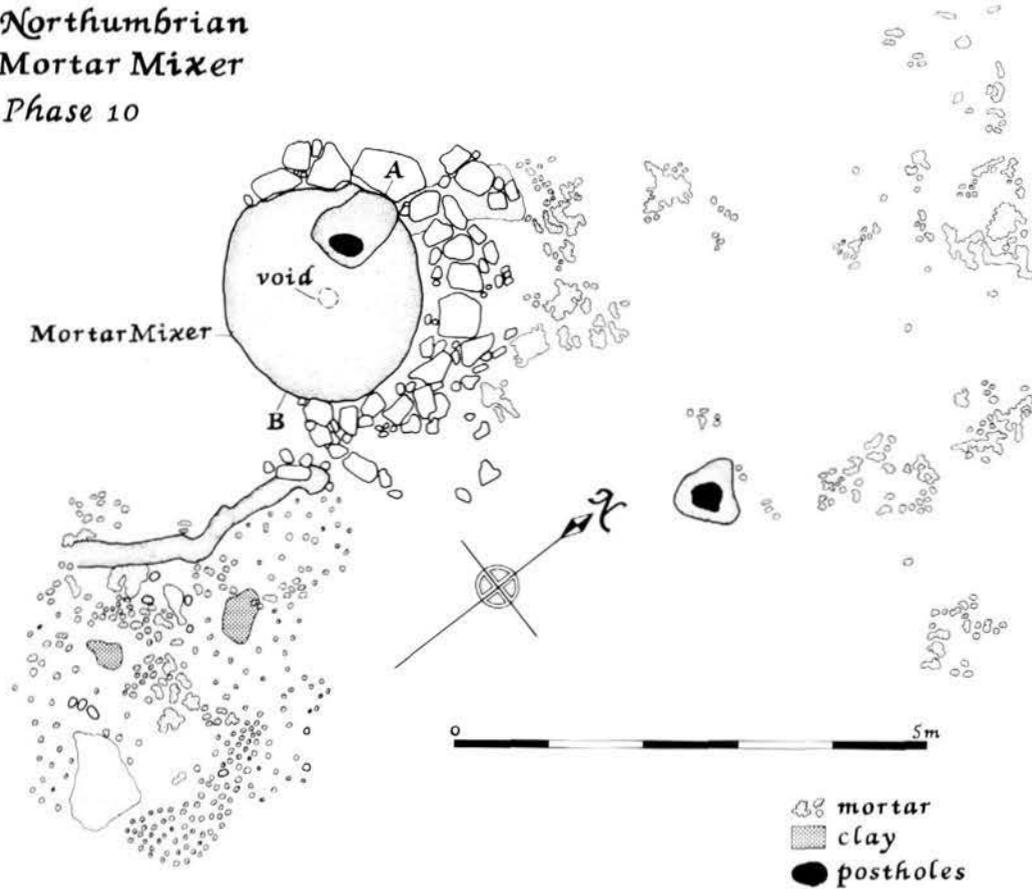
traffic across the courtyards, whether of humans or livestock, it is remarkable that the great majority of finds recovered from the courtyards came from the gravel deposits themselves, not from the soil accumulation on them. The gravels when deposited would have been clean, ie, they would have contained few if any finds. The finds recovered from the gravel were presumably discarded refuse trampled down into it, although little if any of the animal bone from

the courtyards showed evidence of abrasion or weathering. The soil deposits above the gravel produced fewer finds and are therefore more likely to have been the result of natural silting on the courtyard than of human deposition.

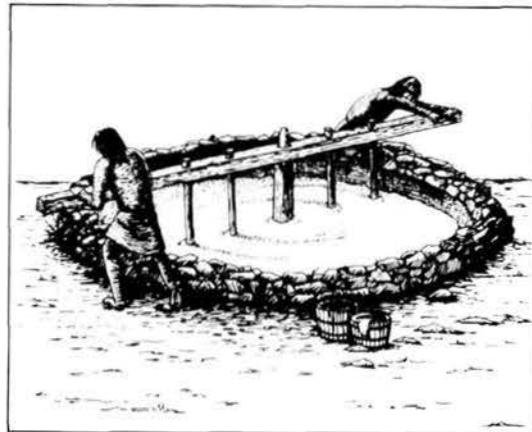
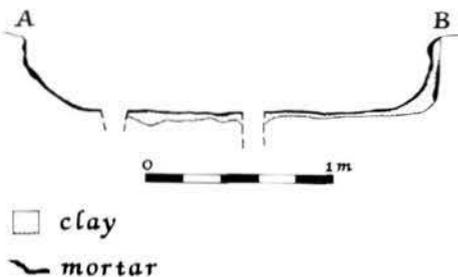
The only dating evidence for the courtyards is the early 8th-century sceat which showed little evidence of usage. It was, therefore, lost soon after minting,

Northumbrian Mortar Mixer

Phase 10



Section of Mortar Mixer



Illus 51
Northumbrian period, mortar-mixer (Phase 10).

in a soil deposit on the surface of Courtyard 2. This same deposit also produced an unidentified sherd (Chapter 4, Context 10195).

THE NORTHUMBRIAN PERIOD: STONE STRUCTURES (Phases 10-13)

(illus 50-65)

PHASE 10: MORTAR-MIXER (illus 51, 52)

Set into the soil, which had accumulated above Courtyard 2, was a mortar-mixer. It comprised a roughly circular pit, 0.45m deep and c 2.1m diameter, with vertical sides and a concave base. At the base of the pit were several voids, not all of which were vertical, extending into the underlying deposits for up to 0.20m; these voids were presumably formed by the decay of wood discarded into the pit after its use had ended. On the ground surface at the top of the pit, and extending over half way round its circumference, were roughly-worked, red and white sandstone blocks, from 0.15m by 0.10m by 0.07m to 0.60m by 0.45m by 0.15m. These were either the foundations of a wall or bank enclosing the mixer, or a walkway for animals or men mixing the mortar. There were also three dressed slabs, c 0.20m by 0.10m by 0.03m, and some apparently burnt stones.

Around the side of the pit, extending from some 0.04m above its base for a height of 0.20m was a thin (0.03m) deposit of brown sandy clay loam with some mortar flecks and fragments. All around the sides and base of the pit and sealing the brown sandy clay loam was a lining of hard brown and blue-grey clay, 0.06m thick, which

was thicker at the junction of the base and sides. Sealing the clay around the sides and base was light yellow-brown mortar, 0.02m thick. It was continuous up the sides for a height of 0.12m, thereafter patchy, although it reached as far as the enclosing stones at the surface.

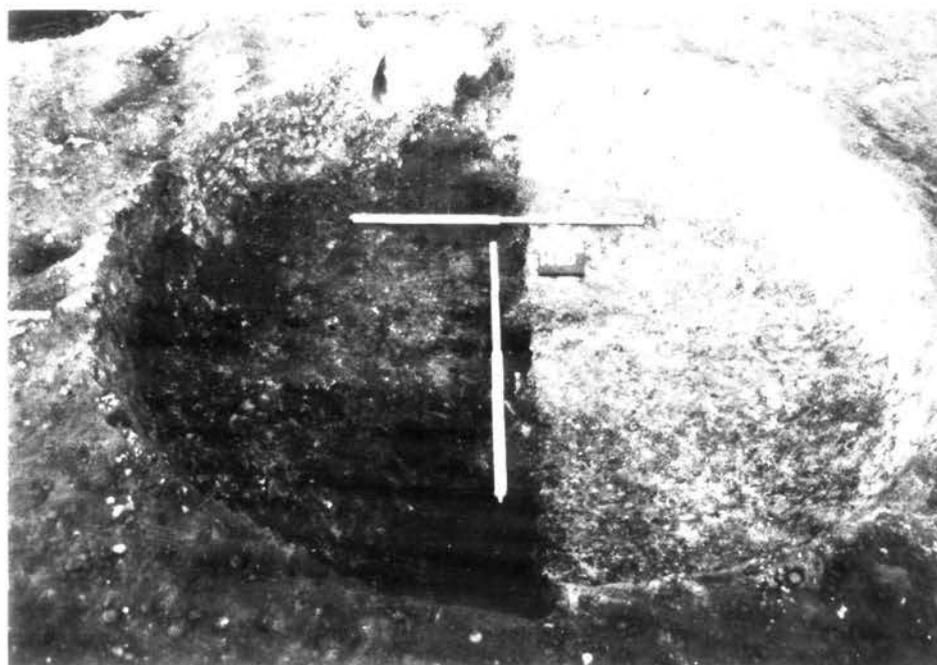
Filling the pit were mixed deposits of mortar, clay, sand and loam with pebbles, cobbles and boulders. Situated centrally within the fills of the pit, and extending through them all, was a void, 0.08m diameter and 0.75m deep, probably for the pivot. Intruding into the fills at the northern edge of the pit was a stone-packed posthole, 0.86m deep.

Nearby were various patches of yellow and white mortar and/or crushed white lime, derived from the mixer. There was also a posthole, 0.78m deep. Extending south from the mixer was a slightly curvilinear trench, 0.18m deep, in whose fill were traces of white mortar. It was too close to the wall around the mixer to have held a fence to enclose it and probably post-dated it.

PHASE 11: COURTYARD 3 (illus 50)

Covering most of the north-eastern part of the site was a courtyard surface made up of crushed red sandstone. This surface extended over the stones surrounding the mortar-mixer, but not over its fills.

Above the fills was a shallow pit, 0.16m deep, or perhaps a shallow depression had formed above its settled fills. Its fill contained many small fragments of shell and occasional flecks of red and white



Illus 52
Anglian mortar-mixer,
towards north-west.



Illus 53
Stone-lined feature in Courtyard 3, towards west.

sandstone. These were probably building debris swept into the pit. On the courtyard surface was other evidence of building work: mortar patches, a patch of shell fragments and some large red sandstone blocks, some of which had mortar adhering to them.

Cut through the courtyard were four postholes 0.13m-0.59m deep. Also set into it was a stone feature of three large sandstone slabs set on edge to form the north, south and west sides of a box (illus 53). No cut for this feature was found nor was its fill separable from the courtyard itself. It may have been a post socket.

Two curvilinear trenches were cut into the surface. One, 0.13m deep, divided into two branches half way along its surviving length. The other, 0.16m deep, may in fact have been the continuation of one of the branches of the other trench. They may have held a fence and its replacement enclosing part of the courtyard.

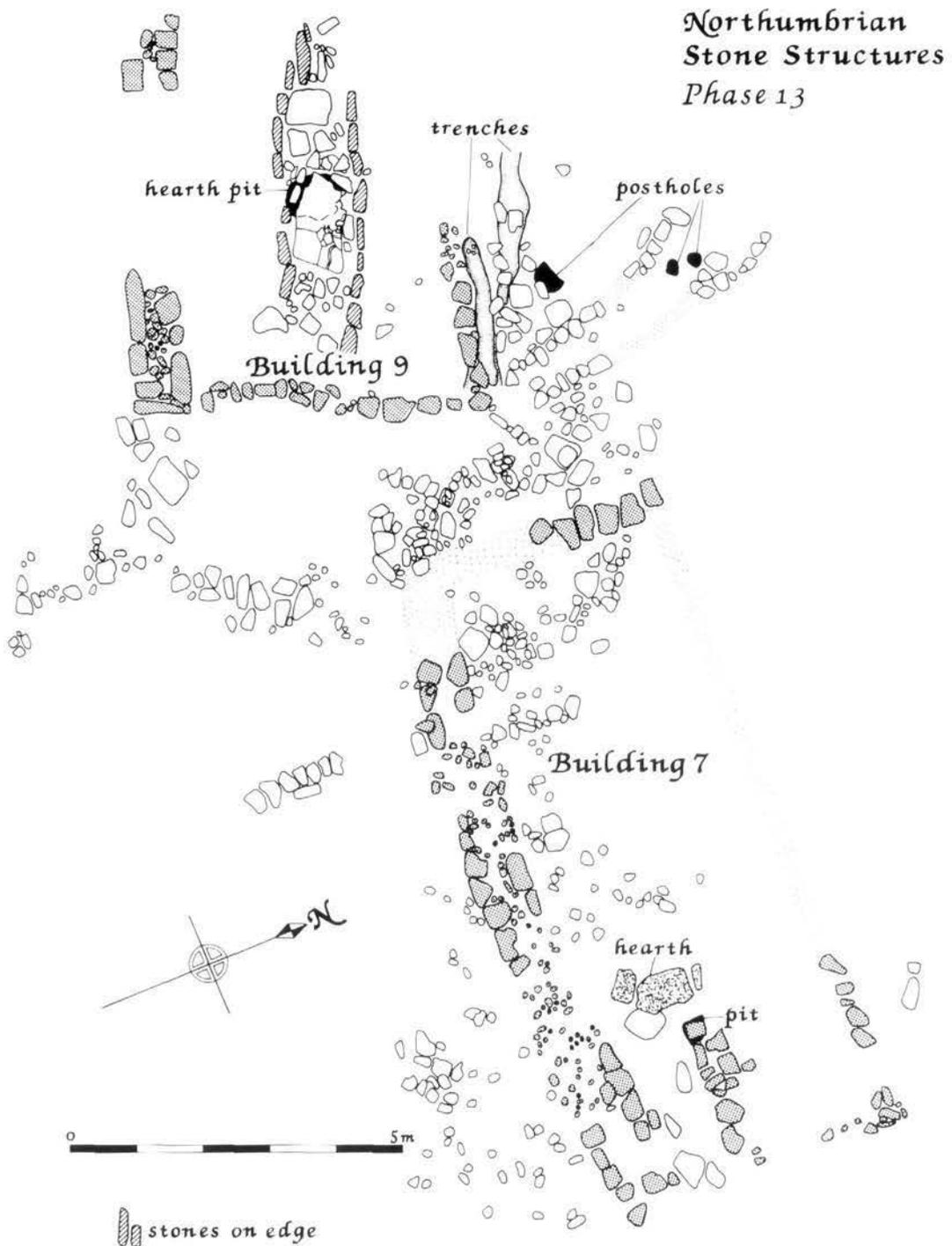
Near the courtyard, but not cut into it, was a group of intercutting features with flecks and fragments of crushed white lime or mortar. These features seem to have formed a foundation trench, 0.23m deep, with two adjacent postholes in it, 0.49m and 0.75m deep. A robbing trench, 0.32m deep, was cut into the postholes.



Illus 54
Building 6, towards north.

PHASE 12: SOIL 2 (not illustrated)

Above Courtyard 3 and extending as far as Building 6 was a thick (up to 0.25m) deposit of brown soil with sandstone fragments, mortar flecks and a shell midden, the latter some 6.4m by 5.6m.



Illus 55
Northumbrian period, Buildings 7 and 9 (Phase 13).

PHASE 13: BUILDING 6 (illus 54, 65)

Above Soil 2 was a trapezoidal building whose four wall foundations were of stone, one course high (0.50m to the east, 0.30m to the south, 0.25m to the west and 0.32m to the north). It was some 1.8m-2.2m east/west and 2.4m north/south. The walls comprised roughly-worked blocks of red and white sandstone with no bonding material. Three of the walls were single lines of stones, dressed on their inner face. The fourth wall was composed of two lines of large facing blocks with a core of smaller stones. This was the only wall of the building where mortar was noted, but this may have been intrusive. There were three socket stones in the walls: at the north-eastern corner, about midway along the south wall and slightly west of centre in the north wall. This last was 0.35m in height and contained in a pit, 0.23m deep. The socket in it was 0.20m deep. Although this socket stone was part of this structure, the pit into which it was set was not clearly visible until after the

excavation of the occupation levels in Building 1 (Phase 7). There was no gap in the walls for an entrance and no occupation levels were found in the building.

The stones would have been footings for timber-framed walls of which no trace survived, with the socket stones for uprights for the roof. A horizontal timber sill laid on top of the stones would have held a wooden wall of upright planks or stake and wattle construction. Because of the irregularity of the walls, it is unlikely that they supported a pitched roof. Instead, the structure probably had a lean-to roof. If the socket stone at the north-eastern corner was repeated at the other corners, together they would have provided supports for corner posts to hold wall plates or ties along the east and west walls.

PHASE 13: BUILDING 7 (illus 55, 56)

Some 6m to the north-east of Building 6 were the fragmentary remains of Building 7, also set on Soil 2. It was at least 10m long (the east wall was not found). The south wall was certainly bowed, but insufficient of the north wall survived to ascertain if it was also bowed. The width of the building was some 3.3m-3.6m internally. The north and west walls comprised single lines of roughly-worked red and white sandstone blocks, one course high to the north (0.17m) and west (0.20m). The south wall, 0.26m high, contained two lines of facing stones which were not parallel, but widened from 0.8m at the western end to 1m at the eastern end. The fill between the stones was not recorded. The stones were roughly dressed on their internal edge and contained no bonding material. The south wall continued westwards towards, but did not reach

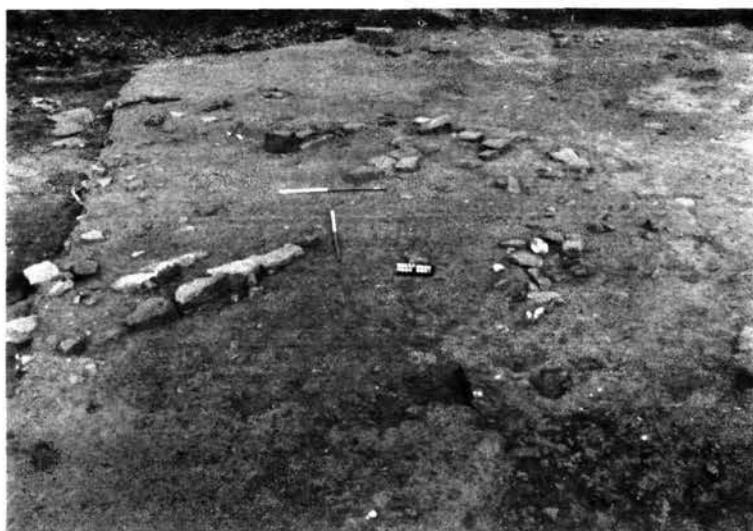
Building 9, the gap possibly being an entrance passage through to a yard between Buildings 7 and 8. Parallel to, and approximately 1.8m from, the north wall and 1 m from the south wall was a stone wall (0.60m high) for a partition at the eastern end of the structure. One of the stones of this partition was a large, red sandstone block (0.30m by 0.26m by 0.59m) set into a pit, 0.27m deep, the east and west sides of which were lined with sandstone slabs.

These stone walls were foundations for timber walls similar to those in Building 6. There were no occupation levels within the building, but there may have been a hearth consisting of a large white sandstone slab between two smaller red sandstone slabs. Black and orange burnt material was associated with the hearth.

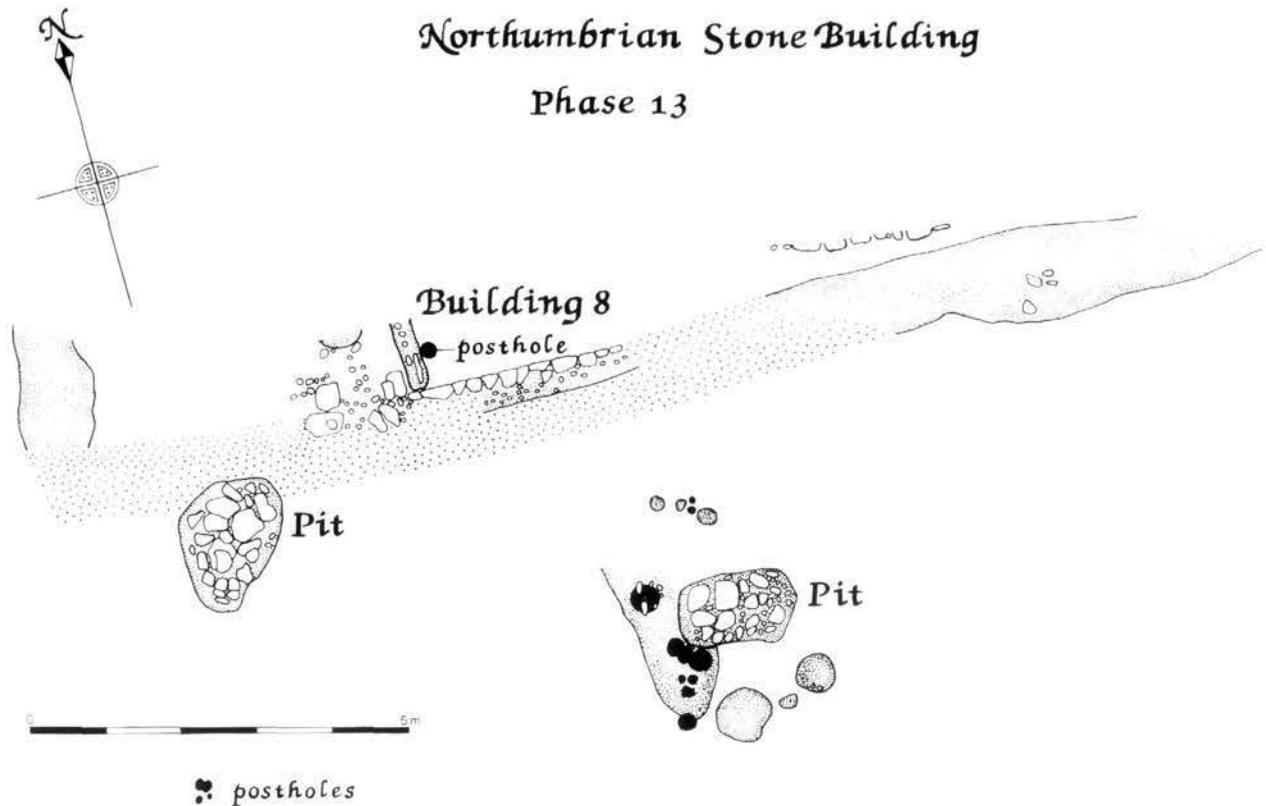
PHASE 13: BUILDING 8 (illus 57-9)

Only the south wall and part of the west wall survived of this structure, together with a floor and some destruction deposits. The importance of this building lies in the fact that it was clearly a stone-built structure, the earliest such surviving at Dunbar. It is regrettable, therefore, that so little of it could be excavated. Constructed on top of Courtyard 3, it was at least 15m long. It

lay north of, and parallel to, Building 7. The south wall survived in two parts. The eastern part was a robber trench, 0.34m deep and 0.9m-1.2m wide on an east to west alignment. The fill contained stone fragments of varying sizes, traces of yellow mortar and lumps of plaster. At the base of the trench and appearing to line it was hard, light green-brown, sandy clay, bedding for the



Illus 56
South end of Building 7, towards north-east.



Illus 57
Northumbrian period, Building 8 (Phase 13).

robbed out stones. To the north of the trench, just appearing in the side of the excavation, was the edge of a stone floor, 0.12m thick.

Farther west, the south wall comprised a single line of blocks of stone, one course high, faced on their internal edge (illus 58, 59). It rested on a bedding of crushed red sandstone and grey-green clay. The rest of the wall was removed by the construction of the medieval Curtain Wall of Phase 18.

A robber trench, 0.12m deep and 1m wide, marked the course of the west wall. It contained ash and burnt clay from the destruction of the building. Some 3.7m east of this wall was a narrow trench, 0.24m wide and 0.19m deep, for a partition wall, presumably of timber. It contained a thin stone slab set on edge, 0.42m long and 0.06m thick (illus 59). Beside it, on its eastern edge, was a posthole, 0.06m deep. West of the partition was the southern edge of a cut,

0.23m deep, extending into the limit of excavation. Also on the western side, adjacent to the south wall, was a faced stone at right angles to, and displaced from, that wall.

The area between the facing stones of the south wall and the limit of excavation contained crushed white mortar and red sandstone fragments. These overlay the robber trench of the west wall and therefore belong to the robbing and destruction of the building.

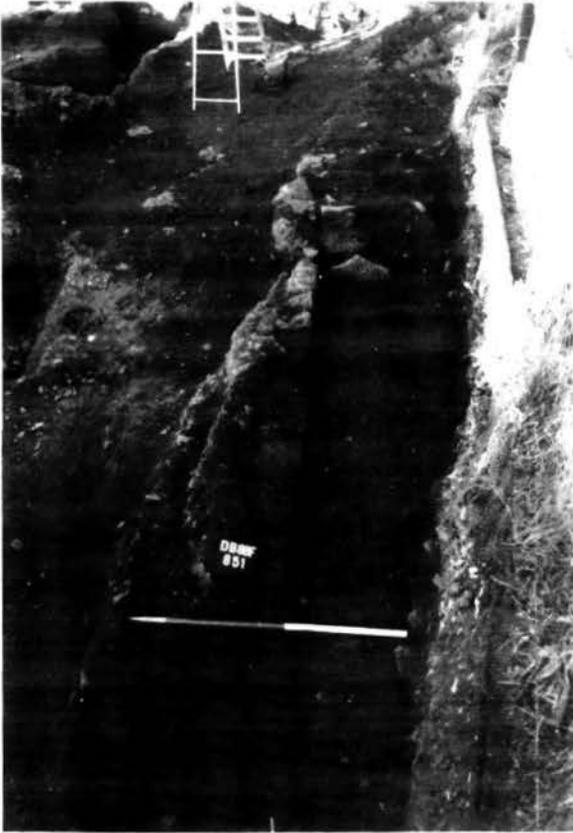
The narrow width of the robber trenches, about 1 m, need not imply low walls. The 7th- or 8th-century Church of St John at Escomb, Co. Durham, has walls 0.72m thick which stand some 7m to the eaves and some 10.5m to the ridge (Ferne 1983, 53, 55-6) and which support a slate roof.

PHASE 13: BUILDING 9 (illus 55, 60)

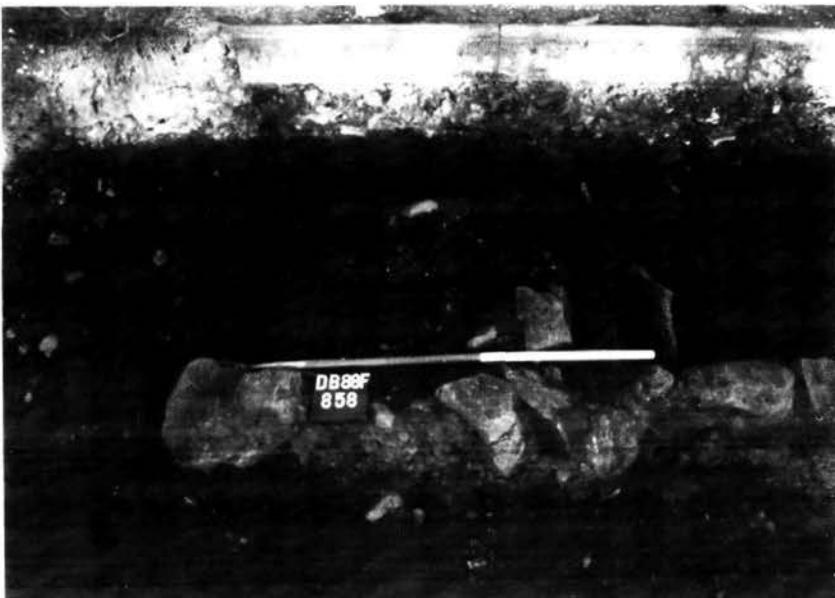
Above Soil 2, to the north of Building 6 and west of Building 7, were three sides of another stone-footed structure. The east and north walls comprised single lines of sandstone blocks, one course high, 0.12m for the east wall, 0.14m for the north wall. The south wall was in two parts, some 2.5m apart, and was composed of two lines of sandstone facing blocks, up to 0.31m high, with a core of smaller stones. No bonding material was found in any of the walls. The north wall was set in a shallow trench, 0.05m deep. Immediately adjacent to the external face of the north wall was a shallow trench, 0.15m deep. This may have been a drip trench, but it was so close to the wall that the roof could not have overhung.

Within the building was a paved feature, 4m long. It consisted of

a line of large flat sandstone slabs, some shattered, bordered on both sides, but not at the ends, by other sandstone slabs set on edge. This resembles Norse long hearths found at Brough of Birsay, Orkney (Hunter 1986, 124, 127) and Jarlshof, Shetland (Hamilton 1956, 110, 111). The central stone was cracked, possibly from heat. Underneath it was a hearth pit, 0.16m deep, filled with ash and burnt clay. Slag and fragments of copper alloy and lead were found in it, indicating that the structure was a smithy. Two deposits of brown silty clay with ash and a few shell fragments may have been occupation layers inside the building or rubbish dumped after it went out of use. Above the eastern end of the kerbed feature was a dump of sandstone fragments, possibly from the destruction of the building.



Illus 58
South wall of Building 8, towards west.



Illus 59
Internal features in Building 8, towards north.



Illus 60
Building 9, towards north-west.

PHASE 13: MISCELLANEOUS FEATURES (illus 53, 54)

Between Buildings 7 and 9 were two other single lines of sandstone blocks, one course high on a north/south alignment. They were not parallel but widened towards the northern end. At their narrowest point they were some 0.4m wide. They may have been the remains either of stone walls bordering a pathway into a yard between Buildings 7 and 8 or of other structures. A scatter of stones led from the south-western corner of Building 7 towards the east wall of the pathway without reaching it. Between the walls bordering the pathway was a linear depression suggesting the path was well used. Two postholes, 0.23m and 0.27m deep, were situated at a wider part of the pathway and may have held gate posts. South of Building 7 was a line of red and white flat sandstone slabs on a north/south alignment, another wall foundation. To the north of Building 9 was a trench, 0.23m deep, for a fence. Beside it, to the north, was another posthole, 0.16m deep.

Cut into Soil 2 and Courtyard 3, between Buildings 7 and 8, were a number of features, two of which were filled with burnt material. One of the latter was a pit, 0.56m deep, containing ash, burnt clay and charcoal. It also contained an ashlar block (0.24m by 0.12m-0.24m by 0.11m) and a charred timber (0.20m by 0.09m by 0.07m). The other was a truncated pit also filled with burnt clay, ash and charcoal. At its base and in its fills were seven postholes, 0.06m-0.33m deep, also containing ash and charcoal, with an eighth on the southern edge of the pit (illus 57). The pit was too large to have been a foundation trench for the postholes. With a single exception on the west edge, these postholes formed a distinctly tapering pattern of three, two and one pointing towards the posthole on the southern edge of the pit. The purpose of the pit and postholes is unknown. An unidentified sherd of pottery was found in the posthole on the west edge of the pit (Chapter 4, Context 10920). Various ash deposits were associated with these burnt pits.

Seven postholes, including a group of three postholes, of differing sizes and depths, some stone-packed, were cut into Courtyard 3,

forming an L-shaped alignment. Two of them were filled with ash and the group was probably associated with the two burnt features. Within the angle formed by this group were several small stake or postholes, 0.02m-0.10m deep (not illustrated), and a large posthole, 0.29m deep. An unidentified potsherd was found in the corner posthole (Chapter 4, Context 10898).

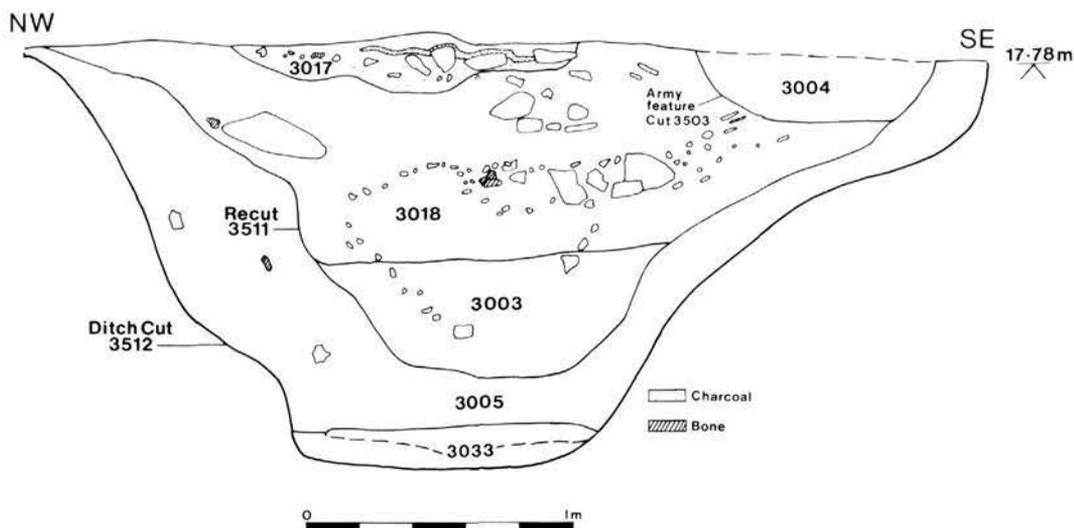
Between the two burnt pits was a trench, 0.10m deep, for a fence on a north/south alignment. On its western side it contained the impression of five posts. There were two postholes at its southern end.

Cut into the second of the ash-filled pits was a sub-rectangular pit, 0.56m deep (illus 57). At its base was a carefully laid floor of large stones with smaller stones wedged into the east side. Above that was a moderate to hard fill of dark grey-brown silty clay on top of which was another stone floor. Above that were two more fills of dark grey-brown silty clay.

Some 5m north-west of that pit was another pit, 1.10m deep (illus 57). The lower part was filled with two layers of redeposited natural (orange-brown crushed sandstone) separated by dark brown silty clay. Above that was a layer of roughly-laid large stones. There then followed a layer of dark grey silty clay above which was a better laid floor of large stones. These were under layers of broken stone fragments and dark grey-brown silty clay. Above the latter was a carefully laid floor of large stones. On top of that were loosely-packed sandstone fragments and boulders with a little dark grey-brown silty clay. The topmost fill was dark grey-brown silty clay.

This second pit was cut into natural at the base of the Curtain Wall (Phase 18) which had thus destroyed its stratigraphic relationships. The similarity of its stone floors to those in the other pit indicates they may have been contemporary. They were not rubbish pits, nor were they post pits: there were no post pipes and

Northumbrian Ditch Section Phase 13



Illus 61
Section of Northumbrian ditch (Phase 13).

the stones were continuous across the pit. There was also no evidence of burning to suggest that the floors were hearths. They may have been pits to hold a container or for storage. The redeposited natural, probably slumping from the sides, at the base of the second pit shows that it had been open and empty for some time.

South of the first stone pit and cutting one of the postholes of the L-alignment was an oval pit, 0.22m deep, with ash in its fill, possibly derived from the other burnt features. Above it was a paved area of sandstone slabs with more stones lying on top of the paving.

PHASE 13: DITCH (illus 42, 61)

At the extreme southern end of the excavation was the northern edge of a ditch, 1.5m deep, on a north-east/south-west alignment. The southern edge was only visible at the south-eastern corner of the excavation. The excavated sides were generally smooth and even, but at the western end the side was steeper. The lower fills at the eastern end contained yellow-brown cess-like material with large and medium sandstone fragments. At the centre and western end, there was some cess-like material, but the fills were primarily red-brown sandy loam. Above that were red sandy clay loam with more sandstone fragments, and loose yellow sandy clay. The topmost fill was light brown sandy loam with a few large and medium sandstone fragments. Pushed into it was a line of seven upright animal long bones, split cattle metapodials (illus 62). It also contained an antler comb of Scandinavian type (no 381) (illus 63).

In the north-eastern corner of the DB04A excavation was found the apparent continuation of the ditch from the main excavation area. It was cut into natural sand and was 1.7m deep, with smooth, concave sides tapering to a flat base, the northern side being steeper and the southern side becoming more convex with depth. The ditch widened from 3.4m to 3.8m towards the west, where it may have turned towards the cliff edge. At the base of the ditch was a hard-packed red-brown loamy sand, on top of which was a patch of loose light brown sandy loam. The uppermost fill was red-brown sand with sandstone fragments of varying sizes, boulders, pebbles

and small fragments of mortar. Within it was a lens of grey-brown loamy sand, also with mortar fragments.

Cut into the fills of that ditch was a recut, 1.26m deep and 3m wide, widening to 3.9m at the west, where it may also have turned towards the cliff top. Smooth sides sloped at a gradient of 1:1 or 1:2 on to a vertical-sided flat-bottomed slot, 0.49m deep and 0.80m wide at the base. This slot was filled with grey loamy sand. Above that was loose light orange-brown loamy sand with a few sandstone fragments of varying sizes. Along its southern side was a thin, but continuous, spread of pebbles. The topmost fill was loose brown loamy sand with a few dressed and mortared stones. Mortar was found in all fills of the recut, which contained vast quantities of animal bone (over 30kg) and winkle shells (7.8kg).

Many problems occurred in the excavation of both sections of this ditch. In the DB04A excavation, the difficulty was distinguishing the redeposited (slumped) natural sand in the ditches from undisturbed natural sand. In the main area of excavation, three sections were cut across it, at the western end, in the centre and at the eastern end. Because of the line of the excavation boundary, the western end did not reveal a complete profile. The central section proved deeper than could safely be excavated, because of the rubble in the top of the backfill in the excavation boundary. The eastern end lay beneath a complex series of layers slumped over the ditch. Only a narrow section was cut through the ditch



Illus 62
Upright split cattle metapodials *in situ* in Anglian ditch.



Illus 63
Antler comb *in situ* in
Anglian ditch.

fills at this point, but sufficient to reveal both north and south sides and the base. However, the base was shallower than, and the profile different from, the western end. Also the revealed southern edge should have been visible in the central section. In addition the fills at the eastern end appeared to tip from north to south, while in

the centre and at the western end they appeared to tip from east to west. This raises the possibility that there may have been two different features, one on a north/south alignment and the other east/west.

DISCUSSION

While Phases 10-13 can be regarded as successive phases, it is possible that they form sub-phases within a single phase centred on Building 8. This was clearly a prestigious, stone-built structure with plaster-coated walls, with a yard on its south side. There were at least two phases to the yard, but their stratigraphic relationship is uncertain: presumably Building 7 was later than the postholes and other features.

The problem is the relation between the mortar-mixer, Courtyard 3 and Building 8. The former obviously belongs to the construction phase of a stone-built structure. None was found stratified contemporary with it. (There may have been one beyond the excavated area.) The stones that enclosed the mixer were *under* Courtyard 3, *above* which was Building 8. Therefore, by strict interpretation of the stratigraphy, the mixer cannot have been used in the construction of Building 8. However, an alternative interpretation is possible.

Part of a crushed sandstone surface was laid down as a levelling deposit on which Building 8 was constructed using mortar from the mixer. On the completion of the building, the mixer was no longer needed and was filled in. The crushed sandstone surface was then extended over a wider area to form a courtyard in front of the building. Various features were cut into the courtyard and occupation debris, including Soil 2, accumulated on and beyond it. The abundance of finds in Soil 2 indicates that it is likely to have been of human rather than natural deposition.

Then the courtyard layout was altered. Building 7 was erected and closed one side of an open yard in front of Building 8. It may have been a subsidiary hall for retainers, or a store or a stable. To the west of it was a possible entrance into the yard. Outside the yard were two more structures, Buildings 6 and 9, the former presumably a shed from its size, the latter a workshop. At the end of the phase, the buildings were demolished and robbed: above Building 6 and extending across the area between it and Buildings 7 and 9 and into the pathway was a considerable spread of rubble and soil in which were found an unidentified pottery sherd (Chapter 4, Context 10238) and a styca of King Eanred of Northumbria (c 810-41) dated to c 837-41 (no 578). The coin was lost when almost new which suggests that Phase 13 was terminated by Kenneth MacAlpin's sack of Dunbar between 843 and 858 (Anderson 1922, i, 288). If this explanation is

acceptable, it avoids the implication that, if the mixer was not related to Building 8, then there must have been two successive stone buildings at Dunbar. While not impossible, this would be unusual.

The mixer was probably the most significant feature (other than buildings) found at Dunbar. Only two other sites in Britain are known to have produced a mortar-mixer datable to the Anglo-Saxon period. Five mixers were found at Northampton in association with an early 9th-century Mercian royal hall and stone church (Williams *et al* 1985, 36-7, fig 10). Another mixer was found at the monastery of Monkwearmouth, Tyne and Wear (Cramp 1969, 34-6). That monastery was founded by St Benedict Biscop, who sent to Gaul for masons to build him a stone church in 675 (Farmer 1986a, 189). The mixers were of a type which dates to the Carolingian era (Williams *et al* 1985, 36; Hodges 1989, 132) and the presence of a Carolingian-type mortar-mixer at Dunbar is not as unlikely as it might appear. Contact between the Frankish court and Northumbria was maintained by Alcuin of York after his invitation to serve at Charlemagne's court. More to the point, King Eardwulf of Northumbria (796-806, 808-c 810), after his deposition and exile in 806, visited the imperial court and secured Charlemagne's diplomatic support for his restoration (Higham 1993, 149). It is, therefore, quite feasible for Carolingian ideas or even masons to have returned with him to Northumbria for use in a royal building programme such as is evident at Dunbar.

However, the mixer found at Monkwearmouth pre-dates the Carolingian era by about a century (Williams *et al* 1985, 36-7). Other stone churches were built about this time by St Wilfrid at Hexham and Ripon (Webb 1986b, 128, 179). That a stone-building tradition was maintained in Northumbria is suggested by Bede in his account of Nechtan, King of the Picts sending to Abbot Ceolfrid of Monkwearmouth for architects to build a stone church for him about 710 (Sherley-Price 1970, 315). It is, therefore, possible that Northumbrian kings adapted a local tradition of church building for building royal halls for themselves.

The function of Building 8 is unclear. As Dunbar was an *urbs regis*, it could have been a royal hall, replacing the earlier timber one(s), assumed to have stood somewhere nearby in Phases 7-9, and possibly being replaced itself by another timber hall in Phase 15 (see below). Only one Anglo-Saxon stone hall has been excavated in England, at Northampton, and few



Illus 64
Artist's reconstruction of Northumbrian buildings, Phase 13.

secular stone buildings of this period are known (Williams *et al* 1985, 31). No stone buildings of this date in Scotland are known. As only the south and part of the west walls of Building 8 were recovered, its width and length are unknown. To the north of the building, the existing edge of the headland is only some 3 or 4m from the edge of the excavation,

although the cutting of the ditch between the headland and the artillery blockhouse about 1520 (see Phase 21) has altered this edge to an unknown degree. (There has been little natural erosion to the coast since the last Ice Age.) Some 7 or 8m to the east of the eastern end of the building the ground slopes steeply down to the former shore, now the

harbour. The Northampton hall was a large structure, 37.5m by 11m. This is clearly too large for the available space at Dunbar, even allowing for the alterations to this end of the headland in the 16th, 19th and 20th centuries (see Phases 24 and 25). If the Dunbar building was a royal hall, it was smaller than the one at Northampton. The stone hall at Northampton replaced a timber hall on the same site. The excavated timber structures of Phases 7 and 8 at Dunbar appear to form the west and south sides of an open space in front of an assumed royal hall to the north, roughly on the site of Building 8, which itself had stone-footed timber structures to its south and west. Thus it is possible that, as at Northampton, a stone hall replaced a timber one on the same site.

Alternatively, Building 8 could have been a church as it was aligned east/west: the Northumbrian kings had churches at their royal centres of Bamburgh and Yeavering, the latter of timber and surrounded by burials (Hope-Taylor 1977, 73). There was also a church with burials at the estate centre of Sprouston (Smith 1991, 280-1). However, no burials were found on the southern side of Building 8, and the later (10th to early 14th centuries) cemetery of cist and non-cist burials lay over 100m to the south (Chapter 9). (The shortening of the headland to the north may have resulted in the removal of a small graveyard on the north side of the building.) As already mentioned the width of the walls is comparable to those of the Anglo-Saxon church at Escomb, which has a nave some 14.5m by 6m across the walls, with a chancel to the east. The Dunbar building was at least 15m long, and, allowing for the reduction of the northern edge of the headland when the ditch was cut in front of the blockhouse, there would have been sufficient space for a church of similar size to that at Escomb.

Much further to the south from the stone-built and stone-footed buildings, the settlement was enclosed by a ditch, which was recut after it had silted up (illus 64). After it was no longer needed (presumably after Kenneth MacAlpin's sack of the settlement), it was filled with rubbish including building debris. The presence of mortar and mortared stones in its fill links it to the stone-building phase. Although the ditch extended much farther west to enclose the largest area of settlement hitherto at Dunbar, some 0.56 hectares, nothing relating to this phase was found between the buildings at the northern end and the ditch at the southern end of the site.

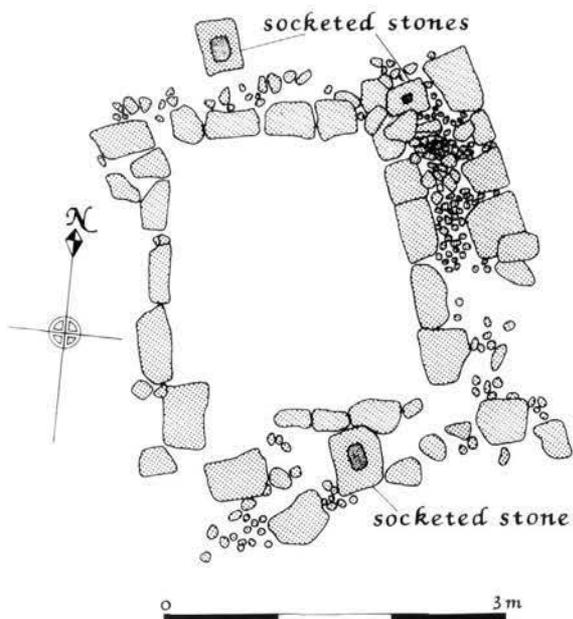
The presence of the Viking comb (no 381) in the ditch and an apparent Norse 'long hearth' in Building 9 at Dunbar is puzzling in the absence of any known Viking presence here. While the comb may have

reached Dunbar by trade, the building would indicate a Norse presence.

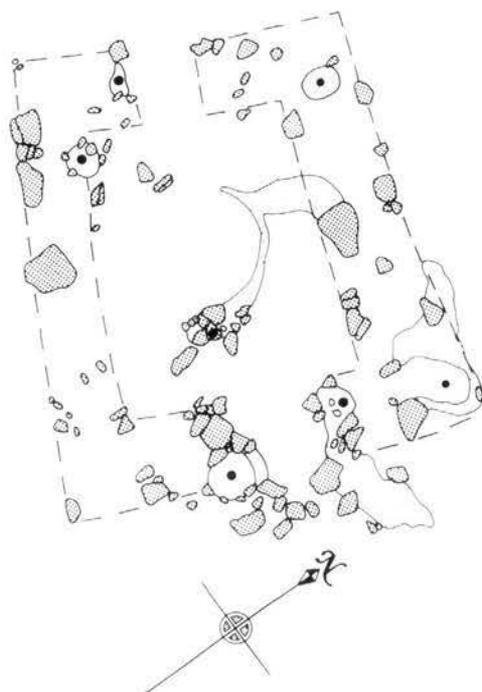
A Viking kingdom was set up by the Danes after they captured York in 866 and they were able to establish control over Bernicia (and presumably Dunbar) for a short time in 875-7 (Higham 1993, 178-9). But on the death of their leader Healfdene in 877, a native Northumbrian dynasty re-established itself at Bamburgh and successfully kept the Vikings of York out of Bernicia (*ibid*, 180-1, 195). The only recorded presence of Vikings near Dunbar is the sack of the monasteries of Tynninghame in 941 by Danes from Dublin (Anderson 1908, 73) and of Coldingham in 870 (*ibid*, 61). Other possible Norse/Viking evidence in the area are hogback monuments at Old Cambus and Tynninghame, but the former are of the 11th century, the latter 10th century (Laing 1974, 231, 233). Nor is place-name evidence satisfactory. The only place-names entirely of Scandinavian origin, thus indicating Scandinavian settlement, are in Humber parish at the opposite end of East Lothian from Dunbar. Other place-names with Scandinavian elements in south-east Scotland are more likely to be late and anglicised (Nicolaisen 1976, 113-14, 119).

All these events and evidence are too late to be related to a possible Viking presence at Dunbar, which on the basis of the Northumbrian styca (no 578), was presumably over by the mid 9th century. The Dunbar 'long hearth' is compatible with the Birsay and Jarlshof hearths. The Norse arrival at Birsay seems to have been in the early 9th century (Hunter 1986, 105) and the long hearths at Jarlshof seem to belong to the initial Norse settlement there, before the mid ninth century (Hamilton 1956, 130, 157). However, one Norse-style hearth does not make a Norse settlement and the Dunbar example must be seen in both its immediate and its broader contexts, which are that of a local royal estate centre within the Anglian kingdom of Northumbria.

The only aspect which is characteristically Norse about this hearth is its length. Kerbed hearths themselves date from the Neolithic period onwards, and at Dunbar in the 16th century (Phase 21), the kerb simply preventing ash and cinders spilling onto the floor. A kerbed hearth was found at the monastic site of Whitby in a stone-footed building (Peers & Radford 1943, 31). That monastery was destroyed by the Danes in 867 (*ibid*, 30). A kerbed hearth was also found in a putative structure of 7th- or 8th-century date at Clatchard Craig, near Newburgh, Fife (Close-Brooks 1986, 143, 147). A 'long hearth' similar to the one at Dunbar was found in a structure dated to the 7th or 8th century at Hoddom, Dumfriesshire (Lowe 1991, 16-7, fig 2).



Building 6
Phase 13 Castle Park
Dunbar



Building VII
Period 2 Church Close
Hartlepool

• post positions

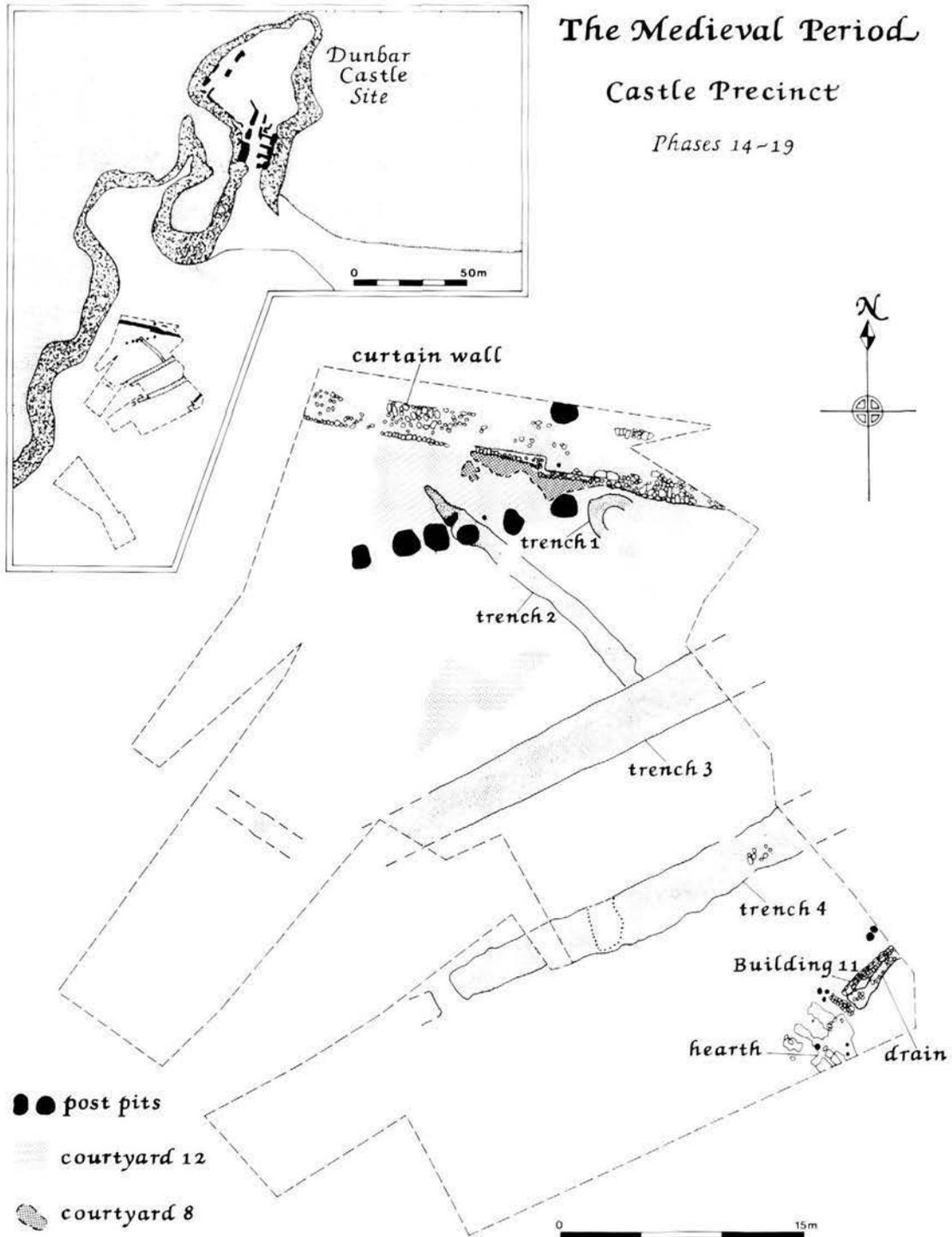
Illus 65
 Northumbrian period
 Building 6 (Phase 13)
 and comparison with
 Building VII at Hartlepool.

The Dunbar hearth is in a building whose setting is outside a Northumbrian royal hall. So far as this setting can be dated, it post-dates the mortar-mixer, but pre-dates the almost mint Northumbrian stycas of 837-41. These time limits are too early for the known beginning of Danish/Viking settlement at York in 866.

Moreover, southern, rather than northern, influence at Dunbar is clearly demonstrated by Building 6.

This was an almost exact replica, in size and shape, of a stone-footed structure, Building VII, at the monastic site of Hartlepool, Cleveland (Daniels 1988, 179) (illus 65). The stone-footed structures at Hartlepool were dated to the 8th century, replacing 7th-century timber buildings (*ibid*, 175).

Beneath the 'long hearth' was a metalworking pit, presumably of a royal blacksmith such as were mentioned as being at Dunbar during Wilfrid's

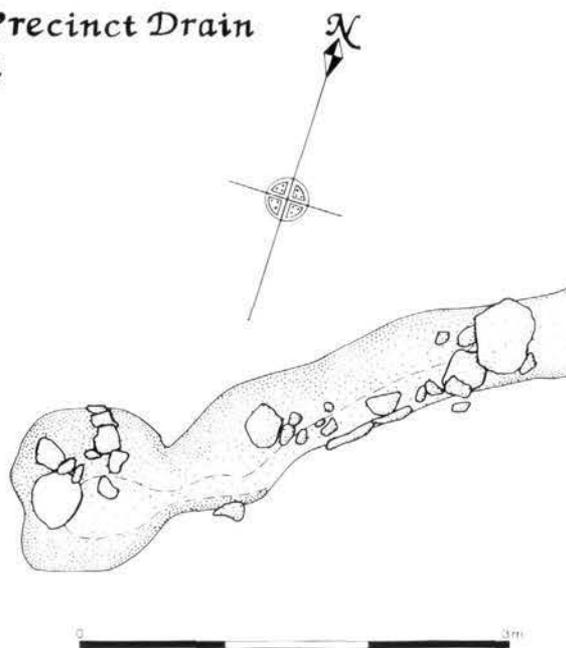


Illus 66
Medieval period, Castle Precinct, Phases 14-19.

imprisonment at Dunbar in 680 (Webb 1986b, 145). While admittedly the pit need not have been part of Building 9, its presence suggests that the long hearth

may have been part of a Northumbrian industrial workshop situated at a distance from the royal hall for safety reasons.

Castle Precinct Drain Phase 14



Illus 67
Medieval period, drain (Phase 14).

THE MEDIEVAL PERIOD: CASTLE PRECINCT (Phases 14-19)

(illus 66-73)

PHASE 14: SOIL 3 (not illustrated)

Covering much of the northern end of the site were thick deposits (up to 0.45m) of brown soil with sandstone fragments of varying sizes.

PHASE 14: DRAIN (illus 67)

At the south-eastern corner of the excavation were levelling deposits of red and brown soil above the fills of the Anglian ditch. Cut into them was a drainage channel, 0.24m deep, parallel to the ditch. It was lined on its south side and base with sandstone slabs. Above, and filling, the drain were deposits of light yellow-green cess material, at the base of which were large and medium sandstone slabs. The drain was excavated in heavy rain and poor

light, making clarification of its edges difficult. The cess layers may have filled the drain, but were perhaps dumped above it, the stones within them possibly being collapsed side stones or capstones. At the western end of the drain was a semicircular pit, 0.25m deep, forming a tank or sump. It was filled with dark red-brown clay loam and contained two large sandstone blocks, neither of which showed signs of working.

PHASE 15: BUILDING 11 (illus 68-9)

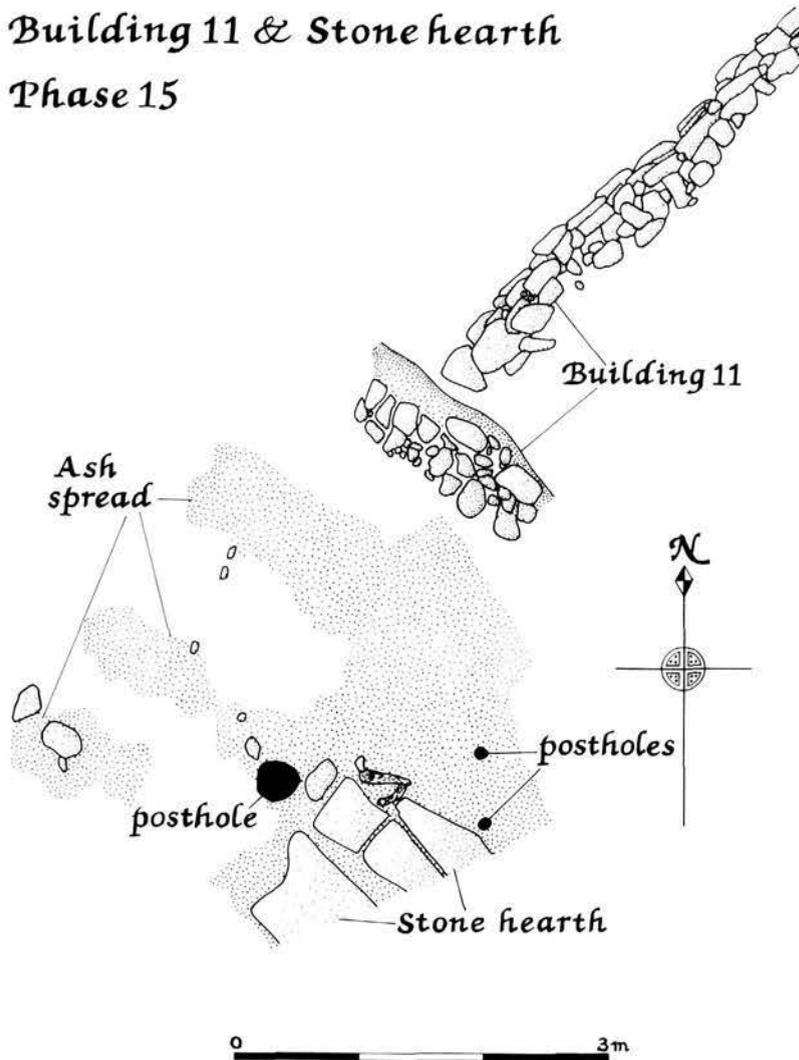
This structure, if such it was, lay at the south-eastern corner of the excavation, above the Anglian ditch and the drain of Phase 14. The walls were of drystone construction, consisting of both roughly-squared blocks and undressed sandstone and volcanic blocks, three courses high for both the west wall (0.45m) and the north wall (0.59m). The former was set in a foundation trench, 0.24m deep, and continued beyond the line of the north wall. No facing stones in it were apparent. The north wall was one course wide and faced on its northern side, but there was a batter on that face and the coursing of the stones was haphazard (illus 70). The

stones varied from being very closely jointed at the eastern end to having joints up to 0.10m wide at the western end, all being filled with brown soil. The north wall was set on a foundation course, 0.20m high, of roughly-squared sandstone blocks, again faced on the northern side. In places there were gaps up to 0.13m between the foundation course and the wall proper. These were filled with the adjacent soil. Above the northern end of the west wall was dark red clay loam with a few large sandstone fragments and volcanic and sandstone boulders. These were probably from demolition of the walls. Enclosed within the walls were levelling dumps of ash

The Medieval Period

Building 11 & Stone hearth

Phase 15



Illus 68
Medieval period, Building 11 and stone hearth (Phase 15).

and soil containing more sandstone fragments. On the northern side of the north wall were other levelling soils which contained traces of mortar.

The west wall was stratified later than the north wall, but this may be an error caused by the slumping over the Anglian ditch. It appeared to be wider than the north wall, which was only one course wide and may, therefore, have supported a timber wall similar to those of Buildings 6, 7 and 9 (Phase 13). It is possible that some of the stones may have been dislodged from the west wall during dismantling of the building, thereby giving a false

width, and that, instead, the west wall may also have been only one course wide. Alternatively the north wall was merely a partition wall between two rooms, and the west wall continued farther north to adjoin another wall, no trace of which remained. There is always the possibility that the two walls were not related, or did not form a structure, but were instead revetting the depression (ie, there was no cut) over the ditch to form a stone-lined pit. However, the north wall was not built against the edge of the slope, but was free-standing and faced on its northern side which was, therefore, intended to be seen, not hidden.

PHASE 15: HEARTH (illus 68)

Some 2m south-west of Building 11 was a paved area of three large sandstone slabs with a fourth in the southern limit of excavation. They were not burnt, but the layer underneath appeared burnt and there were several deposits of ash, charcoal and burnt organic material around and above them. The stones

may, therefore, have been a hearth. No structural remains were found to indicate that the feature was within a building, although the burnt organic material resembled thatch. Five small postholes, 0.02m-0.12m deep, were found nearby, four of which contained ash and charcoal connecting them to the other burnt material. One



Illus 69
Building 11, towards
north-west.

of the postholes was contained inside another but was too small to have been a post pipe within it. They may have held successive posts or stakes of a windbreak or a framework over the hearth for

suspending pots or cauldrons. Mortar was found under the hearth linking it with Building 11.

PHASE 15: POST PITS (illus 71-2)

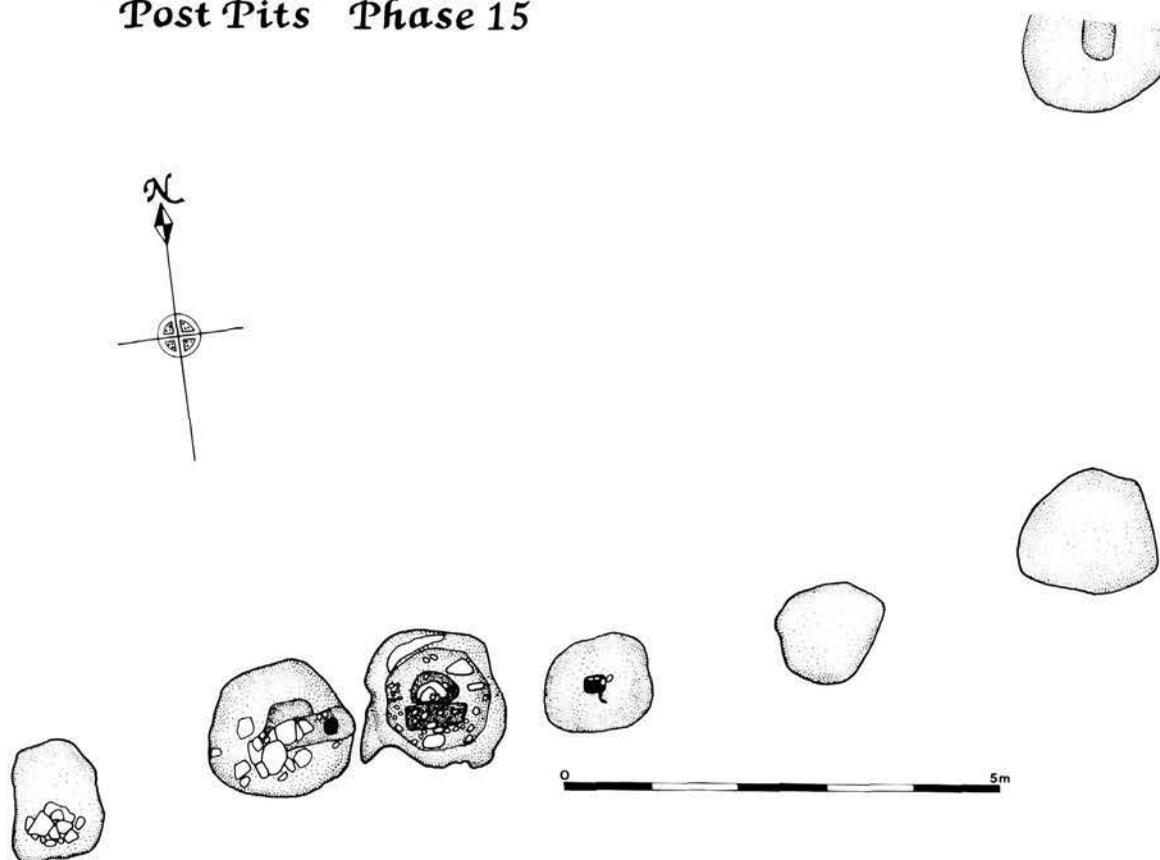
At the northern end of the site was a line of six large stone-packed post pits, 1.03m-1.43m deep, on an almost east/west alignment, with a seventh, at roughly right angles to that line, extending into the northern limit of excavation. The pit at the western end was only 0.57m deep, but it was only observed after the excavation of Soil 1 (Phase 6) and was probably cut from a higher level. The pits were not evenly spaced, being 0.6m-1.5m apart with a group of three almost adjacent. The pit at the northern edge of the site was some 4m from the corner pit. Post pipes were found in six of the seven pits (although only five were planned). One pit (third from the west) contained two pipes side by side, a semicircular

one, 0.09m deep, and a rectangular one, 0.40m deep. From the basal fill of this pit was recovered a sherd of unidentified pottery (Chapter 4, Context 12347). The adjacent pit (second from the west) showed clear evidence of replacement of the original post. There, a post pipe, 1.10m deep, for the earlier post was succeeded by a linear slot, 0.31m deep, which had a posthole at each end, 0.59m deep to the west and 0.70m deep to the east. In only two of the pits did the post appear to have been robbed, the pipe containing more than one fill. In the others, the pipes had a uniform fairly stone-free fill, possibly the rotted post.



Illus 70
North wall of Building 11,
towards south-east.

The Medieval Period Post Pits Phase 15



Illus 71
Medieval period, post pits (Phase 15).

PHASE 16: MISCELLANEOUS FEATURES (illus 66)

At the northern end of the site, cut into Soil 3 was a semicircular trench, 0.15m deep, with a depression at the end of each arm. The fill was dark brown silty clay with charcoal and shell fragments. Above the feature and extending eastwards from it were deposits of brown soil with sandstone blocks and slabs, some of which appeared to form a roughly-paved surface. There was also a lot of

charcoal.

Above one of the large post pits was a trench, 0.45m deep, on approximately a north-west/south-east alignment. It was filled with brown silty clay loam. It was truncated at both ends by later intrusions. A pit, 0.48m deep, was cut into it.

PHASE 17: COURTYARD 12 (illus 66)

At the northern end of the site, above the post pits of Phase 15 and the linear trench of Phase 16 was a courtyard of three successive stone surfaces. The earliest was a pebble surface, above which was a surface of broken red and white sandstone fragments, with some pebbles. The topmost of the surfaces was composed of

pebbles. Traces of mortar were found in the sandstone surface. Some 8m south of these surfaces, above a levelling deposit of dark brown sandy clay, was another stone surface, composed of cobbles and sandstone fragments.

PHASE 18: CURTAIN WALL (illus 73)

Cut into Courtyard 12 was the foundation trench, up to 0.55m deep, for a stone wall on an almost east/west alignment. The eastern half of its southern edge projected southward some 0.7m. Only

two courses of stones survived in places. A foundation course, some 2.5m-3.4m wide, comprised roughly-worked red sandstone blocks, bonded for the most part with yellow mortar, although



Illus 72
Line of post pits, towards east.

some were unmortared. The western end of the wall was not excavated. Here it was noted that the mortar had inclusions of pebbles, shell, tile and bone and was flush with the outer face of the stones, although some of the stones did have mortar splashed on them. For most of its length the foundation course was edged on its southern side by a line of facing stones which formed an offset. Only a few facing stones survived on the northern side of the foundation.

East of the projection, above the foundation course, but set some 0.25m-0.50m from the outer edge of the facing stones, were two large dressed blocks of sandstone with a chamfered edge.

Continuing westwards from these chamfered stones was a distinct line of mortar extending as far as Trial Trench C. This marked the actual face of the wall, giving a width of some 2m-2.9m. Filling the southern side of the trench, between its edge and the facing stones, was brown, sandy clay with pebbles, mortar and shell fragments. The wall was heavily disturbed by later robbing which took place on at least two occasions, in the 16th century, when some of the chamfered stones were re-used in a hearth (Phase 21), and in the 19th century (Phase 24). In places above the stones were sandstone fragments, either from the wall core or from the robbing, and small pieces of rounded grit.

PHASE 18: COURTYARD 8 (illus 66)

Above Courtyard 12 and overlying the facing stones of the foundation course of the curtain wall, but respecting the mortar line of the actual wall face, was an area of red sandstone fragments. This was possibly construction debris from the wall, crushed and laid down as a courtyard surface. Cut into it was a posthole, 0.11m deep, with a stepped base. Above that and the sandstone surface was a layer of cobbles, cut through which was a pit, 0.25m deep, filled with brown, silty clay and containing a dump of large stones.

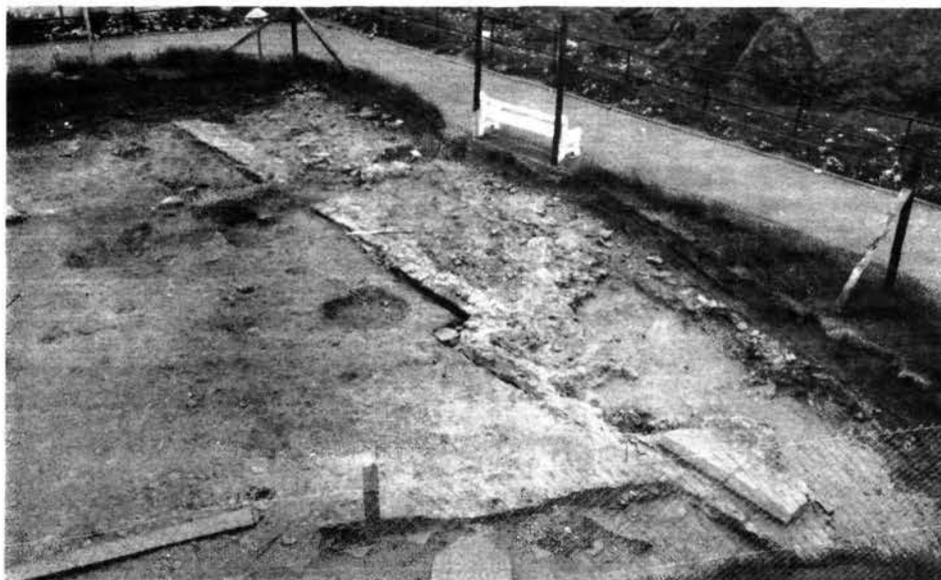
Between the pit and the wall was a depression, 0.13m deep, whose gently sloping side dipped towards the wall. It was levelled up with sand and pebbles.

Some 7m south of the wall, above the site of Building 9 (Phase 13), was an extensive layer of dark brown silty clay with blocks of sandstone and boulders of varying sizes, possibly derived from the curtain's demolition.

PHASE 18: TRENCHES (illus 66)

South of the wall were two parallel lines of trenches, some 8m apart, on an approximately north-east/south-west alignment. The northern trench was 1.21m deep and some 3.5m wide. It was filled with loose light brown to dark grey sandy loam with some cobbles

and sandstone fragments. From the fill was recovered a cut halfpenny of David I (no 581). Some 11m to the west was a possible continuation of this trench. However, it was aligned north-west/south-east and narrower (only 1.4m wide), although it



Illus 73
Curtain Wall, towards
north-west.

was of comparable depth (1.3m). It was only found in a machine-cut trench at the western end of the site. Its fill was grey-brown sandy clay with a band of redeposited natural (orange-red sandstone fragments and gravel).

The southern line comprised at least two trenches, separated by a gap of some 1.4m, and possibly as many as four. The main trench was 3m wide and 1.10m deep. At its base, at the eastern end, were some roughly-dressed red and white sandstone blocks. No facing stones or bonding were evident. Above that were several fills containing much sandstone rubble and many clay patches. There

were also traces of mortar. The western end of the trench was destroyed by the post-medieval kiln of Phase 22, on the other side of which the trench continued, much shallower (0.22m) but the same width, with rubble in its fill. The western end of this trench lay in an unexcavated baulk, on the other side of which it was narrower (2m) and 0.41m deep, terminating in a butt-end forming one side of a causeway. Its fill was light brown sandy clay, above which was a linear dump of stones not bonded together. On the other side of the causeway was an edge of another trench, 0.30m deep and 1.8m wide, extending into an unexcavated baulk. Its fill was light brown sandy clay.

PHASE 19: LEVELLING (not illustrated)

At the south-eastern corner of the site was a circular stone-packed posthole, 0.25m deep. Around it were some large sandstone fragments. Above it and above Building 11 and the stone hearth of Phase 15 were various levelling dumps which included large sandstone blocks and boulders and traces of mortar. Cut into them were four postholes, 0.07m-0.125m deep, which formed no pattern. One of them was stone-packed. There were also two stakeholes, 0.07m and 0.08m deep.

In the area between the two trench alignments of Phase 18, and partially overlying the northern one, was a layer of mid-brown, silty clay loam with a few stones including large sandstone

fragments. Above it was a thick (up to 0.43m) deposit of dark brown clay loam. These were excavated as spits and no features were found in them. Above the western end of the southern trench alignment were layers of ashy clay and very dark grey-brown silty clay.

Overlying the north-eastern edge of the curtain wall were several brown silty deposits, some of which contained traces of mortar. There was also a linear deposit of loose yellow-white sand which was banked against the stones of the curtain, becoming thinner away from them.

DISCUSSION

PHASE 14

The stone hall and other buildings of Phase 13 were not rebuilt. The site was not abandoned completely, for the quantity of finds in Soil 3 indicates that rubbish was being discarded, presumably from a

more restricted settlement on the headland or elsewhere beyond the excavation. Some of the finds were probably intrusive from later occupation, including medieval pottery. The apparent abandon-

ment of the site in the mid 9th century may have been due to raiding by an aggressive Scottish ruler, Kenneth MacAlpin, who had already subdued the

Picts and was now turning his attentions further south.

PHASE 15

The dating of Building 11 is as much a problem as its structure. Under it was the antler comb (no 381) of late 9th- to mid 10th-century date, found in the uppermost fill of the Anglian ditch, and above it was Building 12 (Phase 20). It cannot, therefore, be dated more closely than between the 10th and 15th centuries. Its function cannot be ascertained, but its construction techniques, whether stone-built or stone-footed are paralleled in Phases 13 and 20 at Dunbar. The nearby stone hearth may have been associated with it, either in another structure or in a yard beside it. Burnt barley, wheat and oats were found above the hearth as were flax seeds (Chapter 8). The cereals suggest that the hearth may have been for domestic use in a building.

It is not clear if the post pits belong to a timber hall or to a defensive palisade cutting off the headland. The infilling of the wall between the posts left no trace on the ground. It is, therefore, likely to have been either of stake and wattle construction set into the ground, or of upright planks or stake and wattle set in timber sill beams either laid directly on the ground or on robbed stone footings. The infill may even have been of stone (Ewart and Triscott unpubl, 6), in which case a building is more probable than a palisade.

A building would have been at least 13m by 6.6m across the pits. The substantial depth of the pits (at over 1m, the deepest structural features excavated at Dunbar, except for the Iron Age, Anglian and French ditches of Phases 2, 13 and 21) points to a strongly-built and impressive structure, possibly another royal hall. The semicircular post pipe paired with a wall upright, in the third pit from the west, could have been one side of a cruck. The date of this building is uncertain, between the end of the Northumbrian stone buildings (Phase 13) in the mid 9th century and the Curtain Wall (Phase 18), in existence by 1338, if not by 1296. A styca of Æthelred II of Northumbria (841-3/4, 843/4-9), dated c 844 (no 579), was found in the top fill of the second post pit from the east and an unidentified sherd (Chapter 4, Context 12347) was found in the fill of the pit at the western end. The other finds from the pits fit comfortably into a Dark Age group. This may indicate a late Northumbrian (mid 9th to 10th century) date or an early Scottish (late 10th-late 13th

century) date. However, it is possible that the finds were residual, for the styca, almost new when lost, is very close in date to that found in the demolition rubble of the stone-footed buildings of Phase 13. Also the depths of the pits mean that they disturbed earlier occupation deposits and the finds in them. But the absence of any 12th-century or later finds, especially pottery, is more likely to imply a pre- or very early 12th-century date for construction.

Given Dunbar's importance as a royal centre, a hall of this size is not out of place in the 11th or 12th centuries. Timber halls have been found elsewhere, dating from c 1080 at Goltho, Lincolnshire to c 1400 at Bolingbroke, Lincolnshire (Kenyon 1990, 109). An 11th-century Saxon hall at Goltho measured 11.4m by 7.2m, had post pits 0.9m deep and seems to have been an imposing stave-built structure (*ibid*, 103).

That a timber hall should have succeeded a stone-built hall at Dunbar implies that stone-building techniques were lacking or not customary. It could, therefore, date from after the Scottish conquest of Lothian, recognized by King Edgar of England's grant of Lothian to Kenneth II in 975 (Anderson 1908, 77). Unfortunately knowledge of Scottish architecture before the 12th century is limited, and no secular structures of the period are known. The round towers of Abernethy and Brechin are usually dated to the 10th or 11th centuries, and various other church towers (St Rule's at St Andrews, Restenneth), as well as St Margaret's Chapel in Edinburgh Castle are claimed to pre-date the 12th century, although this has recently been questioned (Ferne 1986, 393). Only the stone foundations of a two-phased church under the nave of Dunfermline Abbey possibly date to the 11th century (Fawcett 1990, 4), although the Forteviot arch is probably from a mortared stone church of mid to late 9th-century date (Alcock & Alcock 1992, 226). But, whatever their date, these are ecclesiastical not secular buildings. Nevertheless, stone building for churches and timber building for secular use are not incompatible building traditions. A timber hall and stone church co-existed in Period 2 at Cheddar, Somerset (Rahtz 1979, 53). But the replacement of a stone-building tradition by timber-building is unusual.

PHASE 16

The semicircular and curvilinear trenches were of unknown purpose. The latter was certainly later than the post pits of Phase 15, but the former, apparently for a stone wall from the amount of stones around it, is only assumed to have been later than them. With an internal space of only 1.5m between the arms it cannot have been more than a shelter possibly enclosing a hearth or some such feature. The other

trench may have been for a wall enclosing the headland, although it did not turn towards the cliff top at the eastern end. As no mortar or other building debris was found in it, it may have held posts. The pit cut into it was possibly a posthole as its northern edge sloped more gradually than the other sides. The post may have been levered in or out at that side.

PHASE 17

The trenches were succeeded by Courtyard 12. No features or buildings were found on or near it to which it could be related. Presumably, as in the case of the earlier courtyards (Phase 9 and 11) which covered a wider extent at the northern end of the excavation, this courtyard was for military, economic

or civic purposes associated with a hall situated near the blockhouse stack. It predates the Curtain Wall of Phase 18 and was the surface on which the latter was constructed, and the mortar found in it was probably derived from the curtain.

PHASE 18

The Curtain Wall, fronted by a courtyard, was constructed to block the approach to the headland, now occupied by the blockhouse, overlooking Castle Rock. In 1523, Lord Dacre, an English commander, wrote to Cardinal Wolsey about Dunbar Castle and the newly built blockhouse that '... if the said Bulwerk [blockhouse] could be won I think there is no doubt but the castell might be won semblably be reason that the said castell stands low upon a crag and the erth without it is hygh about it, and so there could nothing stirr within it but the ordnance that were without the castell shulde bete it.' (quoted in MacIvor 1981, 111). The need to keep besieging enemies off this strategic viewpoint was equally important before 1523, certainly after the introduction of gunpowder in the 14th century, if not before in the era of the bow and arrow.

The width of the wall (2m-2.9m) is less than the 14th-century curtain at Tantallon Castle (3.7m), but the latter had mural chambers and stairs and is about 15m high (*ibid*, 122). It is greater than the 15th-century curtain at Innerwick (0.38m-1.2m) and about the same size as those at Hailes (1.8m-2.7m, 13th century) and Yester (1.8m-2.4m, early 15th century) (RCAHMS 1924, 53-4, 93-4, 146-7). The Tantallon curtain had flanking towers at each end at the cliff top edge. The Dunbar curtain may have had a flanking tower at its western end, but the main problem with this curtain, as with the ditches and

rampart of the Iron Age and Northumbrian forts of Phases 2, 8 and 13, is the relation to Castle Rock. For it is there that the surviving ruins of the rebuilt castle of 1497 are situated. These incorporate remains of the earlier castle which survived the demolition ordered by parliament in 1488 (RCAHMS 1924, 27-8). Indeed, it is probable that the curtain was part of the castle demolished in 1488. The rubble observed to the south of the curtain was possibly part of the demolition, spread over the headland as levelling material.

The apparent northward return of the 19th-century robber trench at the eastern end of the Curtain Wall (Phase 24) suggests that the curtain may have turned towards the cliff top at this point. That still does not explain the relation to Castle Rock, for, if the curtain did turn towards the cliff top, either the castle was on the headland rather than Castle Rock or it had two centres, one on the headland and the other on Castle Rock. These two focal points would still have been linked by a curtain strong enough to withstand sieges in 1338 and 1483-4 and to necessitate sieges in 1445 and 1485. The problem is unresolved.

The sieges are important for the dating of the curtain, for the failures of the 1338 and 1483-4 sieges indicate that the besiegers were kept off the strategic headland. The successful sieges of 1445 and 1485 probably owe as much to the morale, or lack of it, of

the besieged after the death in the castle of Queen Joan Beaufort in the former instance and the failure of Henry VII of England to support the English garrison in the latter. It is quite possible that the surviving foundations were of the wall from which Black Agnes taunted Salisbury in 1338. Agnes' husband, Patrick, 9th Earl of March, was captured at Berwick in 1333 and compelled to rebuild Dunbar Castle 'which had previously been battered to pieces' (Skene 1880, ii, 203). The rebuilding was at the expense of Edward III of England (Nicholson 1974, 136). It is clear neither when this battering took place nor how extensive it was. Robert I may have compelled the earl to slight his castle after his submission in the aftermath of Bannockburn in 1314. The king's policy was to destroy captured castles to prevent their re-occupation by the English. Alternatively, the castle may have been damaged since the previous year when Edward Balliol invaded Scotland, with English support, to regain his father's throne.

The area in front of the curtain probably served as the castle bailey as it was on higher ground than the

ground at the foot of Castle Rock. From at least 1569 this area was described variously as the 'forework' or as part of the castle precinct or as the 'castle forth' [ie, fort] (*RMS* iv, No1873; v, No 1392; vi, No 1418) as no doubt it always had been.

The two trench alignments may have been for forward defences related to the curtain and enclosing this precinct. They were too wide to have been robber trenches of ordinary boundary walls. The presence of rubble, mortar and clay in its fills suggests that at least the southern alignment contained, or was designed to contain a wall, or have a wall on one or other of its edges. However, its fill also contained a comb fragment of Dark Age type (no 382), probably from the *Grubenhäuser* (Phase 7) or its backfill. This suggests that the trench was backfilled with its own upcast, which had been left on the edge of the trench as an earthen bank or rampart. It may, therefore, be that the trenches were hastily dug either as defensive measures during, or in expectation of, a siege or as siege-works themselves to prevent supplies reaching the castle, and then backfilled at the end of the siege.

PHASE 19

The deposits and features of Phase 19 post-date the demolition of the medieval castle ordered in 1488. The rubble was used as levelling material at the southern end of the site above the course of the Northumbrian ditch of Phase 8. The soil may have

been largely wind-blown, as was certainly the sand observed banked against the northern side of the curtain wall. The wall must have been almost totally razed as its foundation course was partially covered by the soil deposits.

THE MEDIEVAL CASTLE: CASTLE PRECINCT (Phase 20)

(illus 74-77)

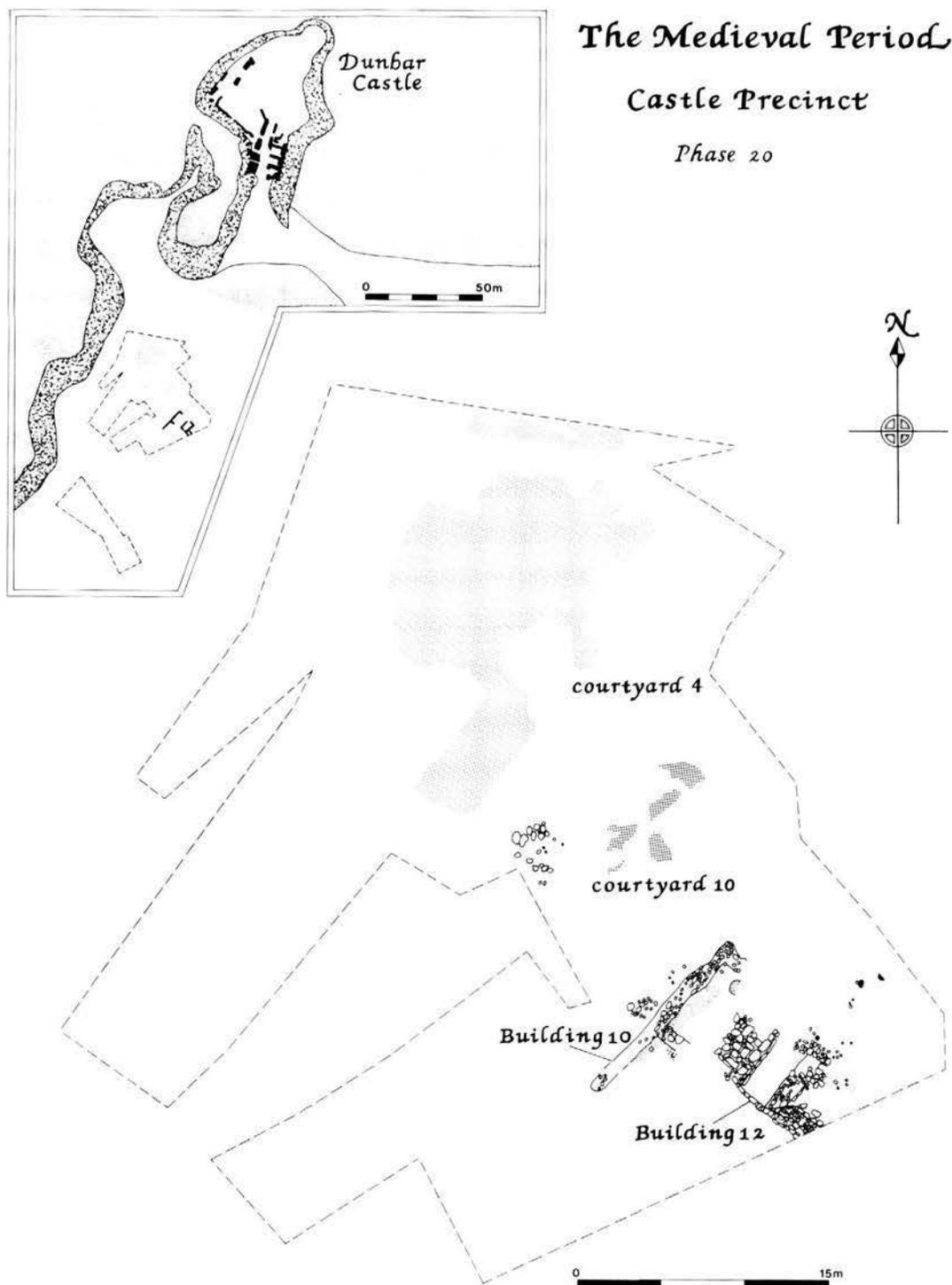
PHASE 20: BUILDING 10 (illus 75)

Above Courtyard 6 (Phase 9) were several patches of soil with cobbles, pebbles, sandstone fragments and traces and patches of mortar. There was also a pit, 0.20m deep. At its base was charcoal above which was loose brown sandy silt loam with sandstone fragments and traces of mortar. These were construction deposits for a mortared stone building. Patches of mortar on the southern side of the army slit trench (Phase 24) may also have been part of the construction.

Of this building there survived a wall on a NE/SW alignment with a return wall at its northern end and an internal wall dividing the interior into two rooms. The walls were set into foundation trenches of similar width, 0.8m, 0.7m and 0.6m for the west, north and internal walls respectively. The surviving lengths of the

external walls were 1.2m and 2m for the west and north walls respectively. The wall foundations were 0.35m high and comprised roughly-worked sandstone fragments and boulders. No bonding material was found, but between the stones was loose mid-brown loamy sand with some traces of yellow-white coarse sandy mortar and a few pebbles. These mortar traces, together with those found in the construction deposits, show that the walls above foundation level were mortared. No other walls of this building were found. Each room had a floor deposit of light brown, sandy loam with pebbles and sandstone fragments.

Above the west wall were sandstone fragments and some cobbles in loose dark brown sandy loam, possibly from the demolition of the building.



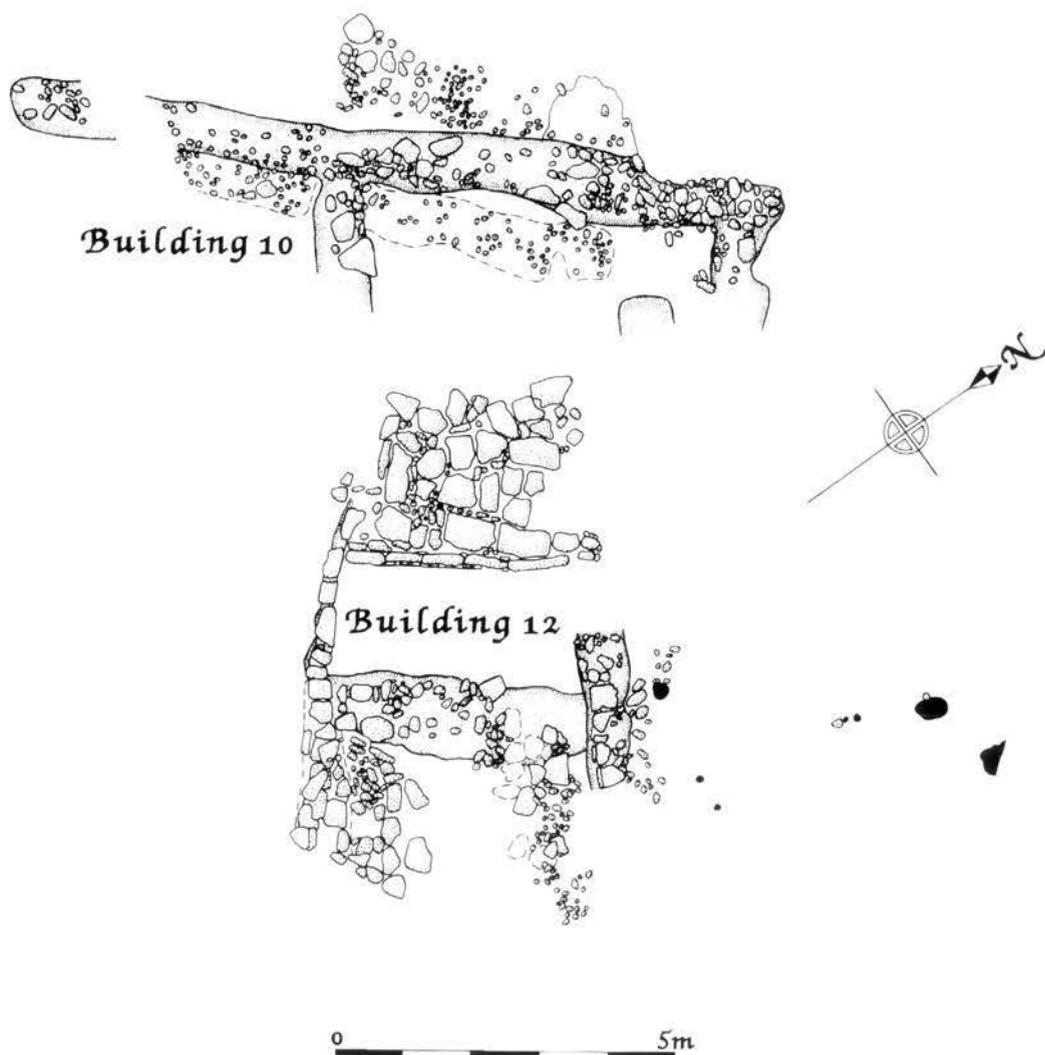
Illus 74
Medieval period, Castle Precinct (Phase 20).

PHASE 20: BUILDING 12 (illus 75)

South-east of Building 10, and of uncertain relationship to it, because of an intervening modern army slit trench and over-machining prior to the start of excavation, was another building constructed over the course of the underlying Northumbrian ditch of Phase 8. Two possible construction phases for it can be identified.

The south and north walls comprised single lines of roughly-worked sandstone blocks, the former wall appearing bow-shaped. No west wall for the first phase was found and the east wall lay beyond the excavated area. The south wall was set in a trench and stood four courses high (0.60m), the two lower courses being wider (c 0.15m) than the upper two (c 0.10m). No trench for the north

Medieval Buildings Phase 20



Illus 75
Medieval period, Building 10 and 12 (Phase 20).

wall was found. It stood two courses high (0.48m). No bonding material was found in either wall, the stones in the south wall being closely set (*c* 2mm apart) while in the north wall they were up to 0.04m apart.

In the interior of the building, parallel to the south wall, were two lines of roughly-worked, sandstone blocks set on edge, 0.5m apart and one course high (0.40m) (illus 76). No bonding material was found. They may have formed a stone-lined pit or drain, although no capstones were found. Filling this feature were large roughly-dressed sandstone fragments and cobbles in dark brown sandy clay. Some 0.25m from the north wall was a roughly-paved area of sandstone slabs, and again no bonding was found.

The south wall continued beyond the line of the later west wall

towards a paved area of red and grey sandstone slabs with cobbles packed between the joints (illus 77). The paving was truncated by the army slit trench and did not occur on the other side of it. This continuation was set in a vertical-sided and flat-bottomed trench, 0.15m deep. It comprised one course of roughly-squared large sandstone blocks, 0.20m high. Although the joints were up to 0.06m wide, no bonding was found. At a right angle to this wall and edging the paved area was a kerb or step. This consisted of a single line of well-squared, sandstone blocks, one course high (0.30m), set in a vertical-sided trench, 0.15m deep. The stones were closely set end to end and had cobbles and smaller fragments wedged between them and the edge of the trench. East of the kerb and north of the continuation of the south wall was a gravel surface.

In the second phase, the interior of the building was levelled up



Illus 76
Possible drain in Building 12, towards south-east.

with dumps of dark brown, sandy clay with some sandstone fragments, and mid-brown sandy loam with cobbles and boulders. Cut through this levelling was a foundation trench on a NE/SW alignment, 0.25m deep, probably for a new west wall. It was butt-ended at both ends and contained a stone wall. This wall comprised sandstone blocks, some worked, three courses high

(0.30m). It was much wider (c 0.50m) than either of the other walls and faced on both sides. Filling the gaps between the stones was loose dark brown sandy loam with some fine pebbles and occasional patches of light brown clay. This wall was not bonded to either the north or south walls.



Illus 77
Paving in front of Building 12, towards north-east.

After the building went out of use, its site was covered in rubble which extended onto the paved area outside.

South-west of the building was a yard composed of two successive layers of red-brown sandy silty loam.

PHASE 20: COURTYARD 4 (illus 74)

Overlying the chamfered stones of the Curtain Wall and covering much of the northern end of the excavation was a courtyard surface of red and white, small and medium sandstone fragments in orange, red-brown and yellow-white sand. Some of the stone fragments were roof tiles (no 355). Above it were several areas of patching with more stones. Various patches of brown sandy and silty clay lay on its surface or intervened between the successive patchings of the courtyard. Traces of mortar were found

throughout the courtyard, the patchings and occupation deposits. In the DB08A excavation, on top of the carefully laid surface of flat and rounded, mainly red, sandstone fragments was another, more uneven surface of broken, largely white or light grey, sandstone fragments, some of which were part of roof tiles. Two stone-packed postholes were cut into the courtyard, 0.13m and 0.14m deep. The latter had four stones set on edge, one on each side, outlining a post pipe, 0.09m deep.

PHASE 20: COURTYARD 10 (illus 74)

South-east of Courtyard 4, and separated from it by a concrete platform (Phase 24), were some patchy stone surfaces above the levelling of Phase 19. These consisted of cobbles, red and white

sandstone fragments and pebbles. There was also an area of large sandstone slabs.

DISCUSSION

This phase relates to the reconstructed castle of 1497 and later. The two buildings were of strikingly dissimilar construction and they need not have been contemporary, especially as they were so close to each other.

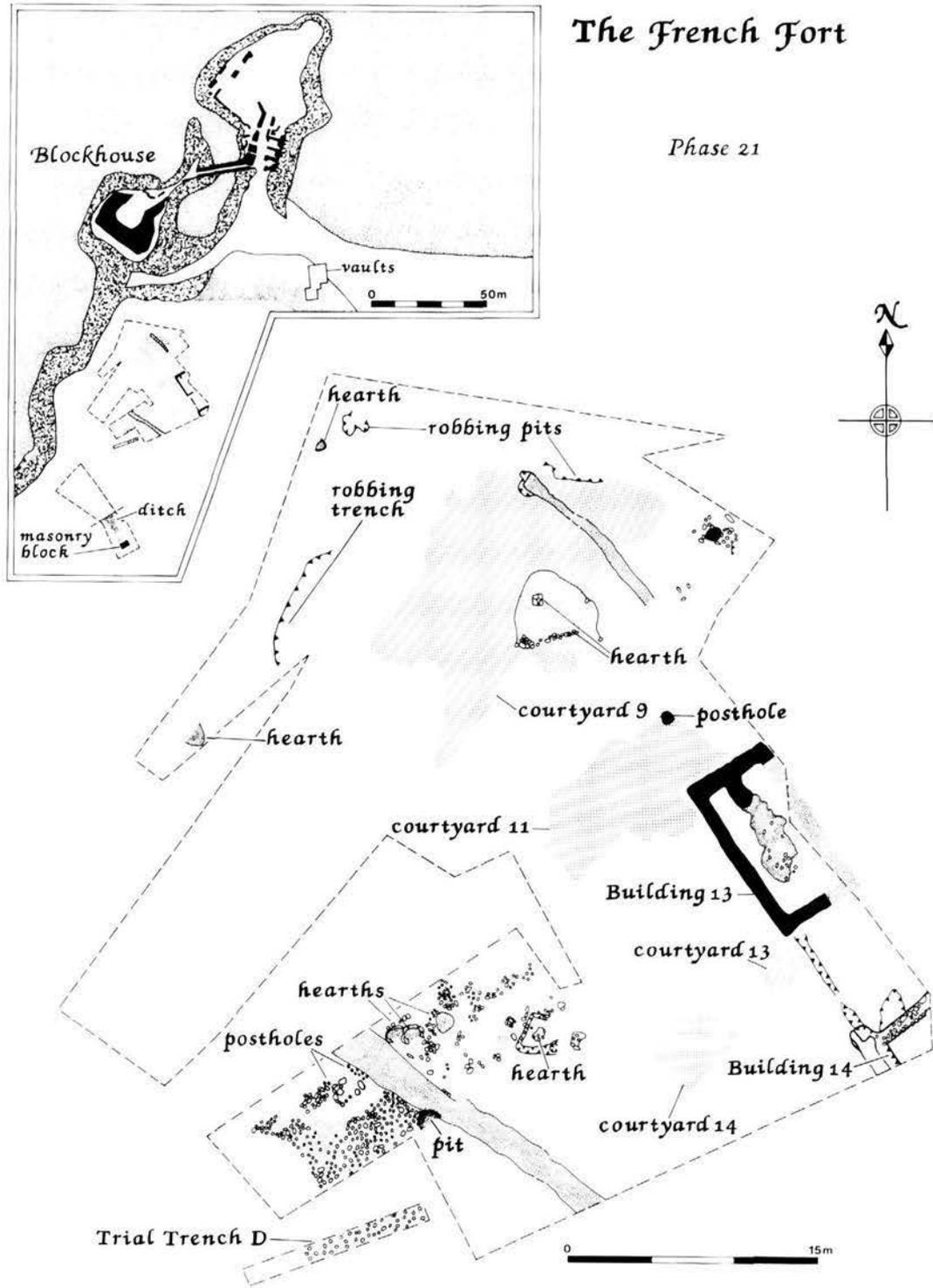
Building 10 has been dated to Phase 20 on the basis that mortar deposits around and under it were construction deposits of this building. These deposits were earlier than the enclosure wall linking Buildings 13 and 14 in Phase 21, although there was no direct relationship between Building 10 and Building 13. If these deposits were not associated with Building 10, the latter could have been later than Building 13. They are unlikely to have been contemporary as they were on different alignments and virtually adjacent.

Building 10 was a stone-built structure while Building 12 had stone footings for wooden walls similar to Buildings 6, 7 and 9 in Phase 13 and Building 11 in Phase 15. Although such building techniques were being used in the 9th century at Dunbar and earlier elsewhere, eg, Whithorn (Hill 1997, 151), they were still being practised in the later medieval period. Two such structures have been excavated at sites in Perth and dated to *c* 1300-30

(Murray unpublished) and the 14th century (Blanchard 1987, 35-42, 43). Three others were found in Aberdeen, dated to the 13th and 14th centuries (Murray 1984, 306, 309).

Because of the scanty survival of Building 10, little can be made of it. Building 12, however, had some pretensions, with a paved approach leading via a step to a gravel forecourt in front of the west wall. If the north wall had continued towards the paving, this forecourt could have been a porch. The interior of the building in its earlier phase seems to have been paved and it contained a stone-lined pit or drain. The stone courses of the south wall appeared to have acted as a revetting for a depression, possibly caused by the slumping of the underlying Northumbrian ditch. Water accumulating in this depression may have made a drain necessary. In its later phase, a new west wall was inserted between the south and north walls.

The relation of these buildings to the rebuilt castle and its environs cannot be determined. The courtyard at the northern end of the site demarcated that area as part of the castle precinct. The buildings were probably ancillary to the castle.



Illus 78
Medieval period, French Fort (Phase 21).

THE FRENCH FORT (Phase 21)

(illus 78-83)

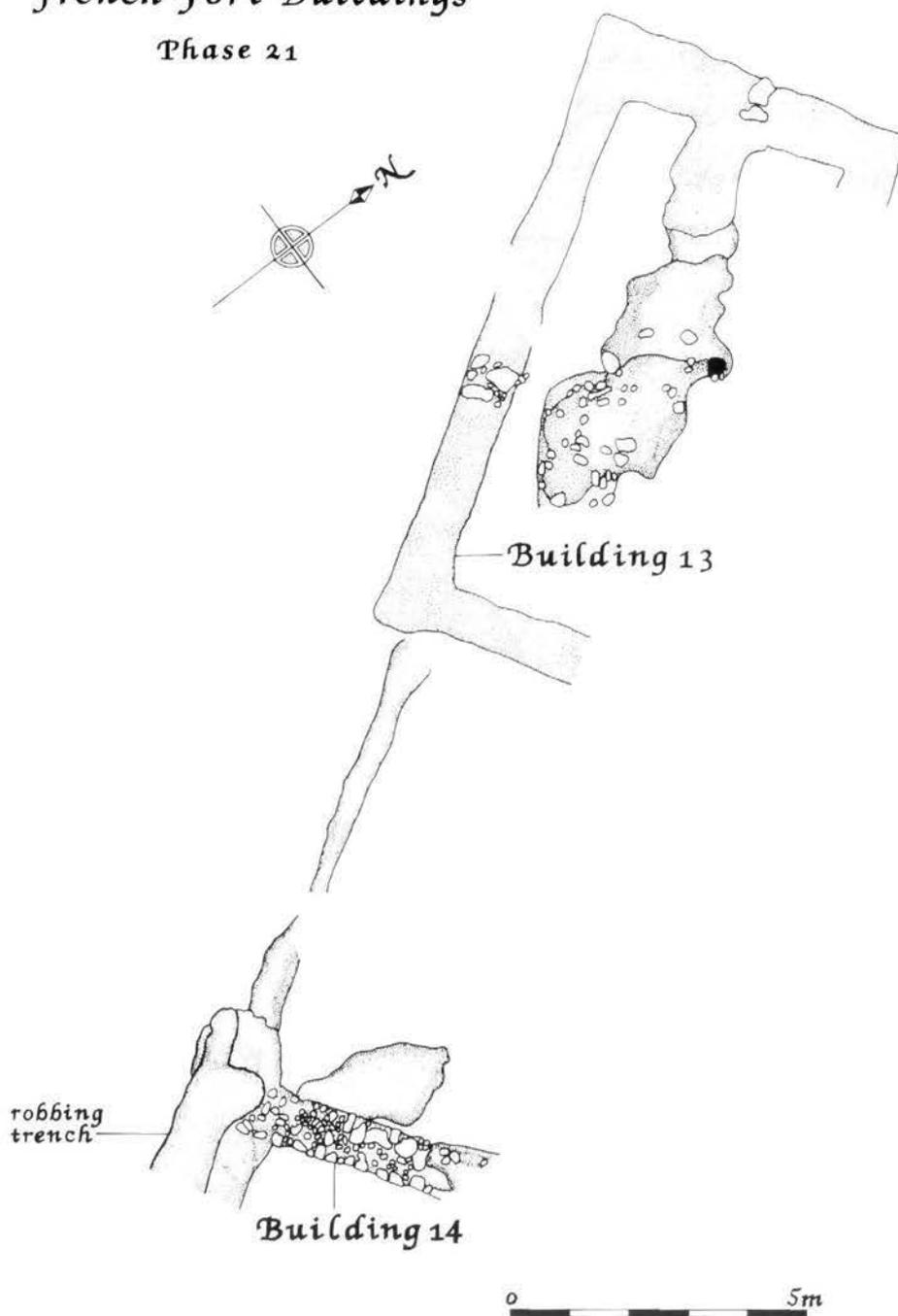
PHASE 21: BUILDING 13 (illus 79)

Cut through the eastern end of the southern trench alignment of Phase 18 was a rectangular building, some 9m by 4m, whose walls had been almost totally robbed. A continuous, vertical-sided and flat-bottomed foundation trench was 1.25m deep and 0.8m-1m

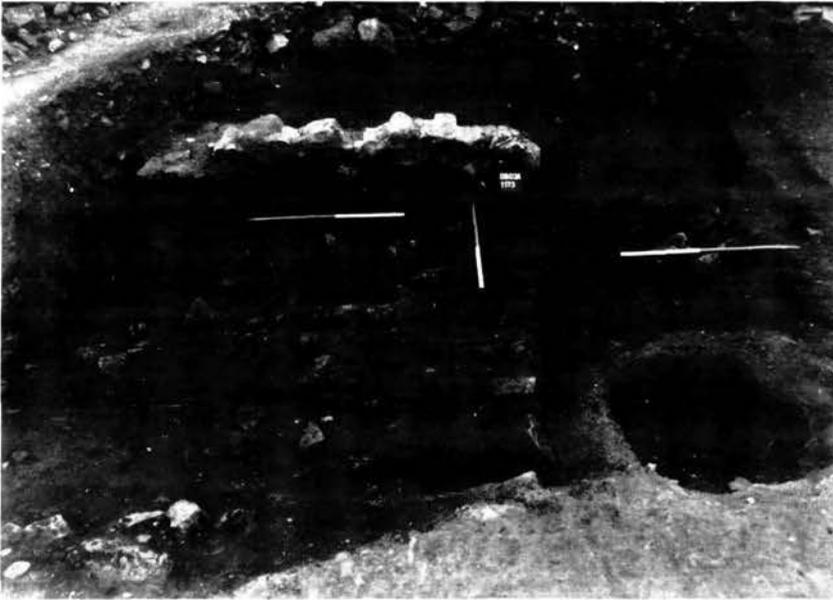
wide. Two large red sandstone blocks at the base of the northern trench and four large sandstone blocks and several smaller fragments at the base of the western trench were all that survived of the walls. They reveal that the north and west walls were at least

French Fort Buildings

Phase 21



Illus 79
Medieval period, Buildings 13 and 14 (Phase 21).



Illus 80
Building 14, towards south-east.

0.7m and 0.8m wide respectively. Both groups of stones were bonded with yellow clay. Filling the lower part of the trenches was loose dark brown silty loam with some large fragments of basalt and large quantities of mollusc shells. This deposit was probably the backfill of the trench after the foundations had been laid. The surviving stones of the north wall were 0.06m and 0.40m from the northern and southern edges of the trench respectively.

Extending south from the northern trench was a shallow trench, 0.50m deep, for a partition wall. It contained mid-brown and yellow sandy clay with sandstone fragments. Towards the southern end of the building were areas of crushed red sandstone, and hard yellow silty clay loam with sandstone fragments, some of which resembled broken roof slabs. These were probably the remains of the floor. Within the building was a curvilinear trench, 0.31m deep, filled with sandstone rubble in mixed dark brown silty loam and hard yellow clay. It contained a posthole, 0.22m deep. The purpose

of this feature is unknown.

Following the course of the foundation trenches were robber trenches, 0.95m deep. They contained mixed light brown sandy silty loam and hard yellow silty clay loam with occasional flecks of sandstone and chalk (possibly lime or plaster), the fill extending over much of the interior of the building. Above that, but confined to the robber trench, were deposits of dark brown clay loam with frequent sandstone fragments and a little hard yellow clay.

The partition wall had also been robbed in a trench which was 0.35m deep and filled with large, white sandstone rubble in loose brown silty clay and yellow sandy clay loam with occasional smaller red sandstone rubble. The interior of the building was covered in substantial quantities of rubble and patches of yellow clay with dark brown soil.

PHASE 21: BUILDING 14 (illus 79-80)

At the south-eastern corner of the site were parts of two sides of a building, probably similar to Building 13. A foundation trench, 0.32m deep, contained the north wall. That was composed of roughly-worked sandstone blocks bonded with yellow clay, three courses high (0.36m) on the northern side, but only one course survived on the southern side. Extending southwards from the western end of the north wall was the eastern side of the foundation trench of the west wall. It was 0.35m deep and filled with mixed hard yellow clay and red-brown sandy silty loam with some sandstone fragments. No internal features were recovered from this building owing to the small area excavated.

This building was also almost completely robbed out. At the eastern end of the north wall was the edge of a robber cut, 0.35m deep, extending into the limit of excavation. It was filled with mixed hard yellow clay and loose red-brown sandy clay loam with some sandstone fragments and two large sandstone blocks. Above that and the surviving edge of the foundation trench for the west wall

and covering the interior of the building was yellow-brown silty clay loam with large red and white sandstone rubble and traces of mortar, above which was loose, orange-brown, sandy loam with more rubble. Above that were more deposits of rubble, soil, mortar and yellow clay. Three successive robber trenches, 0.40 m, 1.05m and 0.34m deep, were recorded for the west wall, cut through this rubble, but they were probably all part of a single feature. They contained more yellow clay, rubble, soil and traces of mortar.

Linking the south-western corner of Building 13 and the north-western corner of Building 14 was a trench, 0.17m deep. It contained loose mid-brown sandy clay loam with some sandstone fragments and hard dark yellow sandy clay with small sandstone fragments and traces of mortar. Levelling the depression above this trench and the robber trench for the west wall of Building 14 was a strip of hard grey-brown clay with some boulders and occasional flecks of chalk (possibly lime or plaster).

PHASE 21: COURTYARD 9 (illus 78)

At the northern end of the site, above Courtyard 4, was another courtyard surface of broken red sandstone fragments with a few white fragments. Cut into the northern edge of the courtyard was the southern edge of a robber trench, 0.10m deep, for facing stones of the Curtain Wall of Phase 18. The edge of the trench coincided with the mortar line of the face of the curtain. At the western end of the wall was another robber pit, 0.17m deep. Both contained rubble, mortar and sand.

Cut into the courtyard was a large irregular depression, 0.35m deep, lined on the southern side by a drystone wall composed of sandstone blocks, one course high (0.16m). Two stones (one of which was retained: no 289) in this wall had chamfered edges, similar to those in the Curtain Wall. At the base of the depression was a square pit, 0.12m deep, containing a group of closely set red sandstone blocks, in the centre of which was a bowl-shaped depression with a groove leading into it from one side. One of these stones also had a chamfered edge (no 300). Filling the narrow space between the edge of the pit and the stones was grey-brown ashy clay with charcoal. Around the pit were spreads of ash and

charcoal. Elsewhere at the base of the depression was a dump of winkle shells. Filling the depression was brown silty clay loam with rubble.

Various other features were cut into the courtyard, including four postholes, 0.09m-0.29m deep. A slightly curvilinear trench on a north-west/south-east alignment, 0.20m deep and 0.7m wide, contained orange-brown gritty sand with traces of mortar, above which was rubble in brown, clay loam. It may have been a robber trench for a boundary wall in the courtyard. The trench cut a circular pit, 1.30m deep, filled with grey-brown silty clay and dark brown sandy clay.

To the east of the southern end of the curvilinear trench were three large red sandstone blocks set on edge, forming three sides of a rectangle, but not set into a pit or other feature. Farther east was a hearth pit, 0.32m deep, filled with charcoal. It had a kerb of three large sandstone blocks set on edge. A fourth block was displaced nearby. These two features were set into Soil 3 of Phase 14 but probably date to this occupation phase.

PHASE 21: COURTYARD 11 (illus 78)

South of Courtyard 9, and separated from it by the concrete platform of Phase 24, was a cobble surface laid on a levelling deposit of mid-brown clay loam. Nearby were two successive

patches of pebbles under red sandstone fragments. Cut through them was a posthole, 0.22m deep.

PHASE 21: COURTYARD 13 (illus 78)

At the south-western corner of Building 13 was an area of hard orange-brown sand with pebbles and cobbles. This slightly overlay

the robber trench of the link wall between Buildings 13 and 14 but this was possibly the result of disturbance during the robbing.

PHASE 21: COURTYARD 14 (illus 78)

South-west of Courtyard 13 was an area of pebbles with a few large sandstone slabs in loose brown sandy loam. This overlay a mortar-mixing pit. This sub-rectangular pit was 0.62m deep. At

its base was hard white sandy mortar with inclusions of sand, stone and pebbles. The backfill was light brown sandy loam.

PHASE 21: MISCELLANEOUS FEATURES (illus 78, 81)

Near the south-western corner of the excavation was the robber trench of a stone wall on an approximately north-west/south-east alignment. It was some 1.6m-2m wide and 0.50m deep. It was filled with rubble, brown loamy sand and traces of mortar.

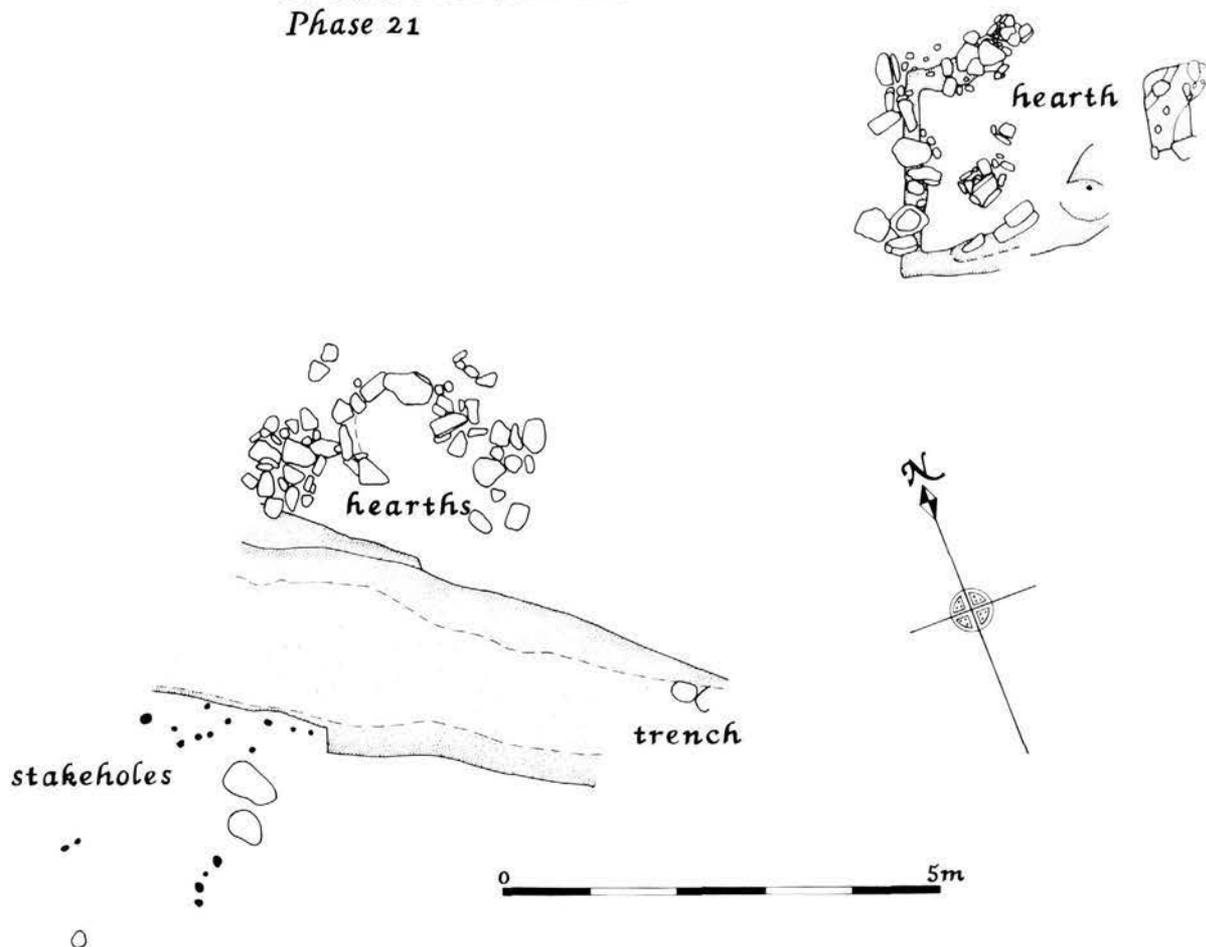
East of this robber trench were four hearths (illus 81). The most impressive of them comprised two broken sandstone slabs with a kerb of similar slabs set on edge on three sides. Above the stones was orange, black and white ash with another patch of ash nearby. This hearth was enclosed on three sides by a trench, up to 0.47m deep, filled with sand, ash and stone blocks. It contained two rectangular postholes, 0.03m and 0.07m deep, filled with charcoal. One of them sloped at an angle of approximately 45°. The trench widened towards the south-eastern corner.

Two other hearth pits, both 0.29m deep, were partially enclosed by curvilinear kerbs. The fourth hearth pit, 0.35m deep, had no kerb. They were filled with sand, ash and charcoal.

On the western edge of the robber trench was a line of postholes, 0.05m-0.10m deep. Two other postholes nearby were not part of this fence line. Above these last two postholes and covering the area west of the trench was a spread of rubble which was also found in Trial Trench D prior to the excavation. Cut through the stones was the edge of a pit, 0.36m deep, filled with dark brown sandy clay. Sealing the rubble and hearths was a thick (0.20m) layer of dark brown sandy clay. It was through this soil that the robber trench was cut.

At the north-western end of the site was the western edge of a linear cut, possibly a robber trench, 0.30m deep and some 7m long. Filling it and extending beyond its edge was a thick layer of rubble in dark brown silty loam with traces of mortar. On the surface of this fill was a group of red and white sandstone blocks, of which the two red blocks were worked. There was also a spread of red and white sandstone fragments in dark grey-brown sandy silt with traces of mortar.

The French Fort Trench & hearths Phase 21



Illus 81
The French fort, trench and hearths (Phase 21).

North of this trench, was a hearth or oven pit, 0.20m deep, filled with red-brown sandy loam above which was yellow-orange clay with traces of mortar. Nearby was a similar patch of clay. The clay may have been a collapsed dome over the hearth.

South-west of the trench was a levelling deposit of rubble and light

brown sandy silty loam. Cut into it was a semi-circular hearth pit, 0.35m deep, extending into the limit of excavation. It was filled with burnt sand and ash. The fill contained iron slag. Copper slag was found in both the underlying levelling and in the overlying light brown sandy silty loam with some small rubble and traces of mortar. The slag indicates the hearth was used in metalworking.

PHASE 21: FRENCH DITCH (illus 82-3)

In the DB04A excavation, the northern side of a very wide (at least 15.7m) and very deep (over 3.71m) ditch was cut into natural sand. The side was not even or regular, having different gradients and two flat broad steps, from the lower of which it fell more steeply under a massive block of masonry, some 2.40m by 1.30m by 1.31m. The block comprised roughly-shaped red sandstone blocks bonded with a creamy sandy mortar. No ashlar stones were visible. This masonry was not a wall *in situ*. Around it were some sandy deposits with mortar inclusions.

The side of the ditch was covered in various thin sand and sandy clay layers and a deposit of green pure clay. Above these were various dark brown and dark grey sandy silty loam layers, all of which slumped southwards from the northern edge of the ditch. Only one fill, a thick (0.60m) layer of rubble, some mortared, in loose brown sandy silt, dipped from the south, and that was so truncated by the post-medieval Building 16 of Phase 22 as to resemble little more than a narrow bank, 1m wide.



Illus 82
French fort ditch, towards west.

DISCUSSION

The features in this phase belong to the 16th-century castle precinct and the French fort of 1560. The latter was under construction by 27 March 1560 (*CSP Scot*, i, 137) and its demolition was ordered in the Treaty of Edinburgh, 6 July 1560. During the negotiations for the treaty in May 1560, it was reported that the fort at Dunbar had been under construction for six months (Teulet 1860, i, 586, 590), which would imply that construction had begun in late 1559. Much of its construction would, therefore, have been of earth, very quick and cheap to build, and which could be done by the soldiers themselves. The burgh of Haddington was enclosed by defensive earthworks by its English garrison in some three months in 1548 (RCAHMS 1924, xxix). The relation of this fort to the 'motte' constructed by Strozzi in 1548 in front of the castle is unclear (Teulet 1860, i, 690). From the details available, 'rampire, counterscarp, great platfourme, flanker, blockhowse' (RCAHMS 1924, 27), it would appear to have been of *trace italienne* style (Merriman 1988, 145), which was virtually impregnable in the mid 16th century. Haddington withstood direct assault in July 1548 and only surrendered in September 1549 after starvation and plague (RCAHMS 1924, xxx-xxxii).

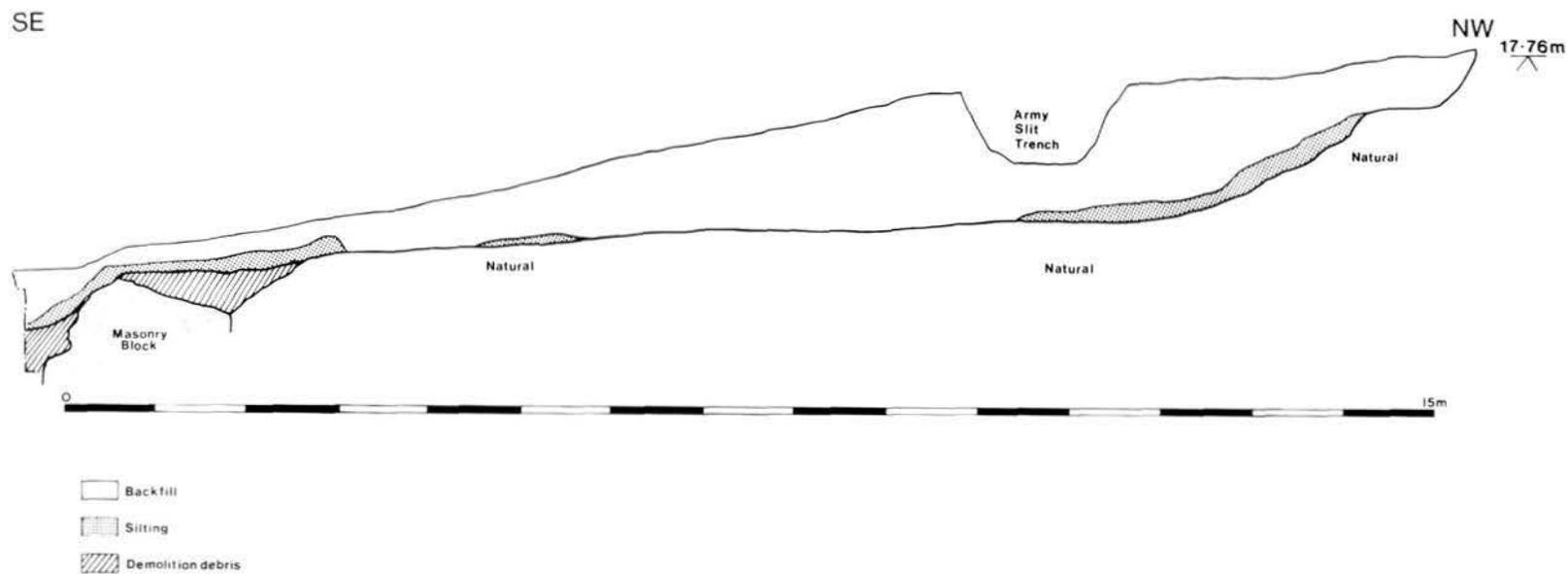
Of the fortifications at Dunbar, only the northern side of the ditch was found in the DB04A excavation.

The other side was indicated only by one northward tipping fill. The masonry block at the base reveals that the rampart or counterscarp was probably, at least partially, built or faced in stone. The sandy and clay deposits along the side were natural silting before the deliberate backfilling of the ditch.

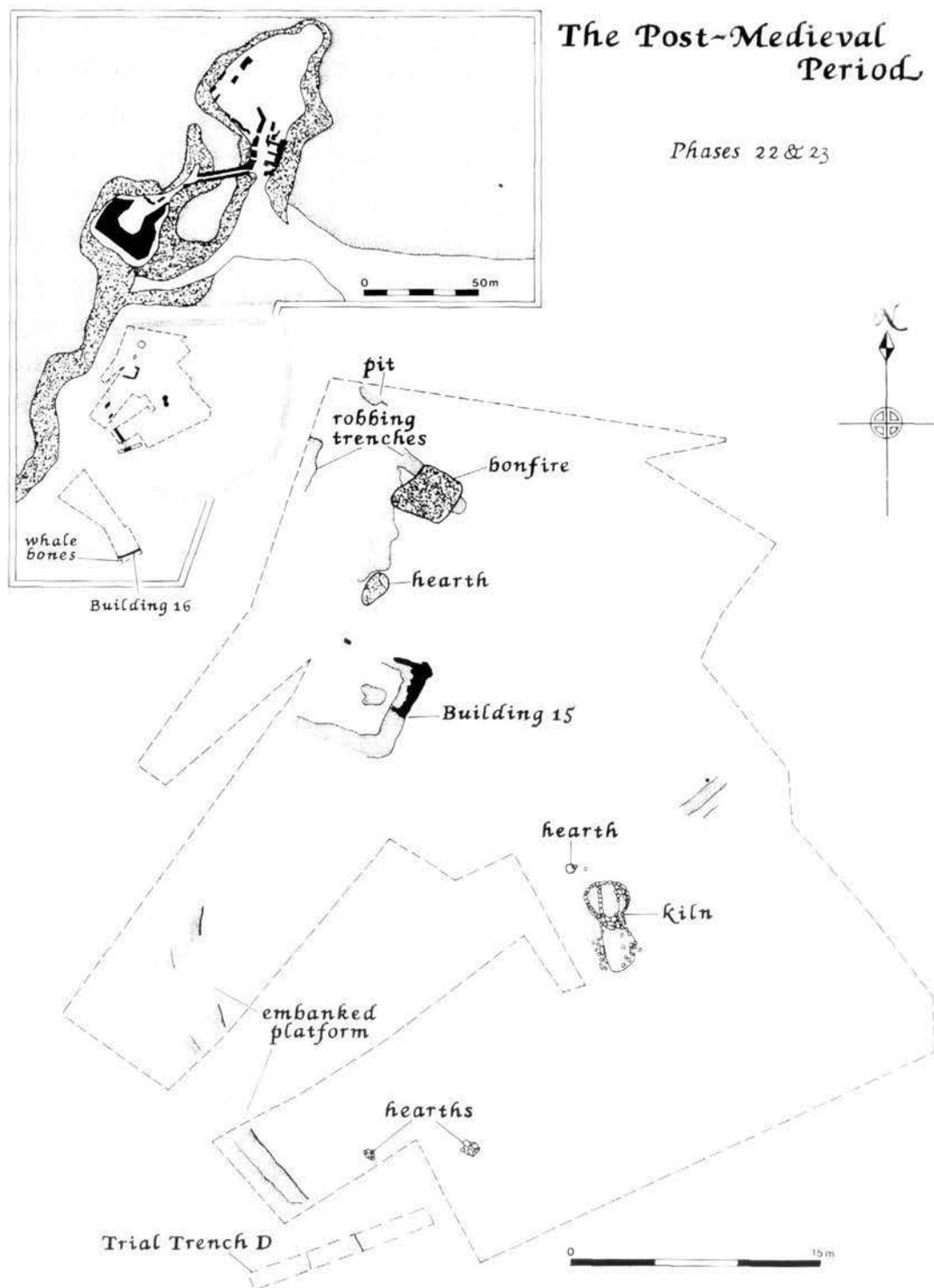
The robbed out walls at the SW and NW ends of the site may have been defensive masonry walls enclosing the castle precinct prior to the construction of the fort. Each countered potential weaknesses of the site. The former offered protection against bombardment from the cliff top on the other side of the inlet to the west of Castle Park, the latter against naval bombardment. Both threats were evident elsewhere. The English fort on its promontory at Eyemouth, Berwickshire, constructed in 1547-8, was overlooked by another headland to its NW, to counter which an earthen curtain was constructed on that side of the fort (Merriman 1988, 149). An English fleet off Leith on 17 April 1560 'gave the town so hot an alarm by sea that the cry was heard in Edinburgh' (Dickinson 1942, 121n).

The need for additional defences at Dunbar had been apparent before 1560. Bulwarks were ordered to be constructed at the burgh in 1533 (*TA*, vi, 129). A reference in 1569 to 'Wolfis-balk' (*RMS*, vi, No 1418) may be to Master Wolf, a gunner at Dunbar

Section of French Fort Ditch Phase 21



Illus 83
Section of French fort ditch (Phase 21).



Illus 84
Post-Medieval period (Phases 22 and 23).

from at least 1532 to 1543 (*TA*, vi, 40 and viii, 226). The repair and building of a fort at Dunbar had been ordered in 1550 (*RPC*, i, 111).

The two buildings at the SE end of the site, linked by an enclosure wall, may have provided extra

accommodation for an enlarged garrison. English intelligence had been aware of reinforcements from France in August 1548, and their arrival in two 'bootes of laders' at Dunbar in January 1549 took the number of French troops there to 500 (*CSP Scot*, i, 94; *Hamilton Papers*, ii, 623). From the

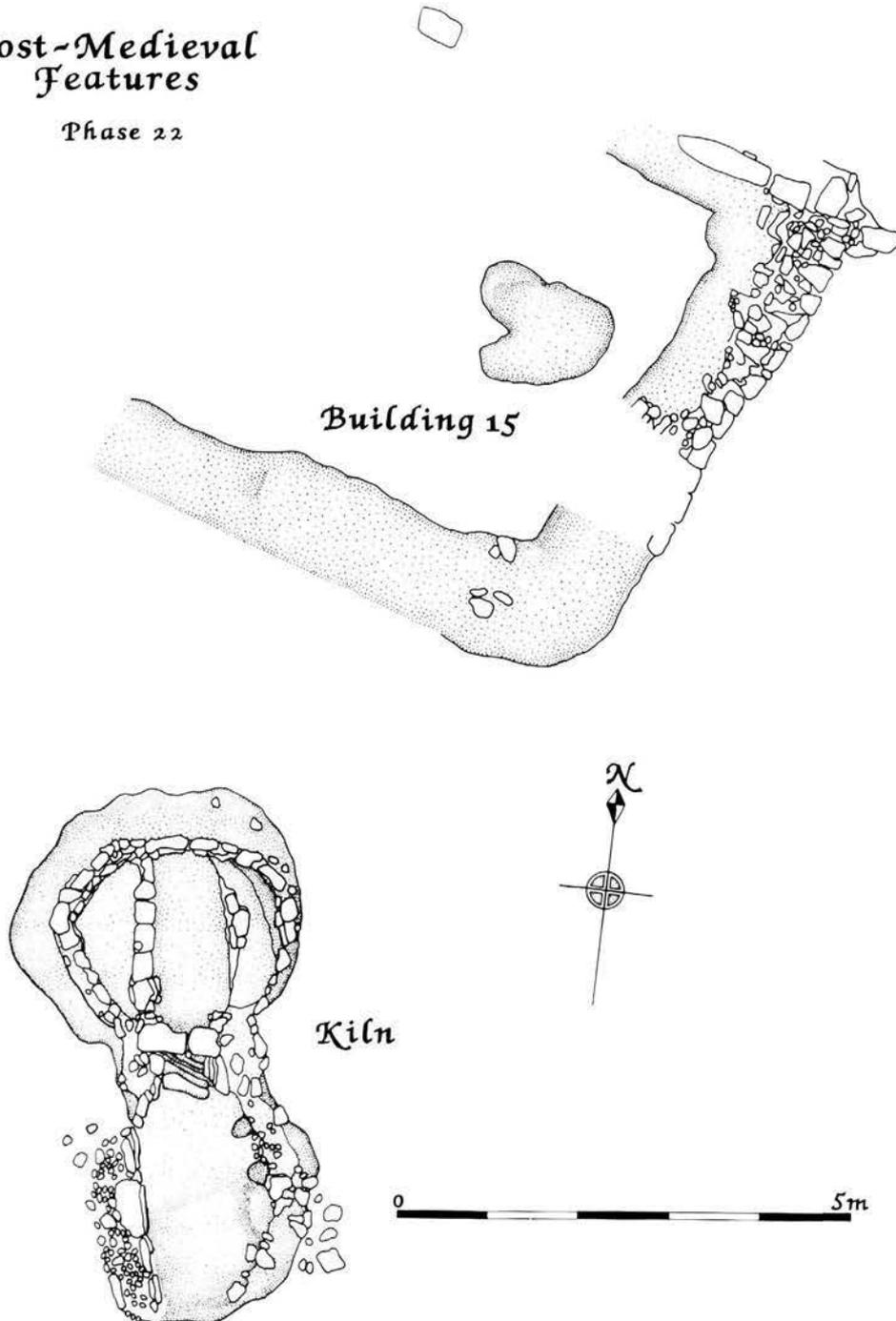
considerable quantities of yellow clay, the buildings seem to have been largely clay-bonded, at least at foundation level, but traces of mortar found within Building 14 show that the upper parts of the walls may have been mortared. The mortar-mixer may have been used in their construction or in that of the defensive walls, after which it was backfilled and a courtyard laid down. The systematic way in which they were almost totally robbed out is testimony to the thoroughness with which the French fort was

slighted after 1560.

Most of the hearths may have been camp fires, for cooking or warmth, of the garrison or of any of the troops who were mustered at Dunbar. In 1544 the Governor, Arran, led 7000 troops with artillery from Dunbar on an unsuccessful attack on an English force at Coldingham, in 1559 the Queen Regent with about 1000 French and Scottish troops advanced from Dunbar to Leith, and in 1567 Mary, Queen

Post-Medieval Features

Phase 22



Illus 85
Post-Medieval period, Building 15 and kiln (Phase 22).

of Scots led her troops from Dunbar to Carberry (*Diurnal*, 36, 269 and 114). Only the stone hearth within the pit at the north-eastern end of the site and the open hearth at the north-western end of the site may have had a military purpose. Evidence of metalworking in the form of copper and iron slag was associated with the latter hearth. The former

seems to have been enclosed within a possible workshop with a sunken floor, in which a horseshoe (no 185) and a fragment of iron mail (no 203) were found. Re-used within the surviving wall and in the hearth itself were chamfered stones robbed from the Curtain Wall (Phase 18).

THE POST-MEDIEVAL PERIOD (Phases 22 and 23)

(illus 84-88)

PHASE 22: BUILDING 15 (illus 85-6)

The remains of this structure were substantially robbed. The west wall was not found. The south wall was completely robbed out in a trench, 0.10m deep. It was 1.2m wide where both sides of the trench were evident. The east wall was also substantially robbed at its southern end and along its inner (western) face, in a trench 0.48m deep and c 1.2m wide. The outer face of this wall survived. This comprised an unmortared foundation of sandstone blocks and boulders, 0.26m high, for a mortared wall, surviving to a height of 0.19m. There was no foundation trench, although mortar was found in the soil packed around the foundations. At its northern end, this wall butted against, but was not bonded to, the outer face of the south wall of Building 9 (Phase 13). Running parallel to this face for 1.4m was the edge of a robber trench, 0.30m deep and

0.5m wide. If the earlier wall face was incorporated into this structure, the width of the north-east wall would have been 0.7m. The robber trenches were filled with small sandstone rubble and mortar in brown soil.

A patch of brown sandy clay with some fine pebbles may have been the remains of a floor. Above it was light brown silty clay with some cobbles. Cut through that, and set centrally between the side walls, was a pit, 0.34m deep, filled with mixed dark brown silty clay and yellow-brown clay. Above the interior of the building was small sandstone rubble, mortar and grey-brown sandy clay. It contained a clay pipe stem, a screw and some glass.

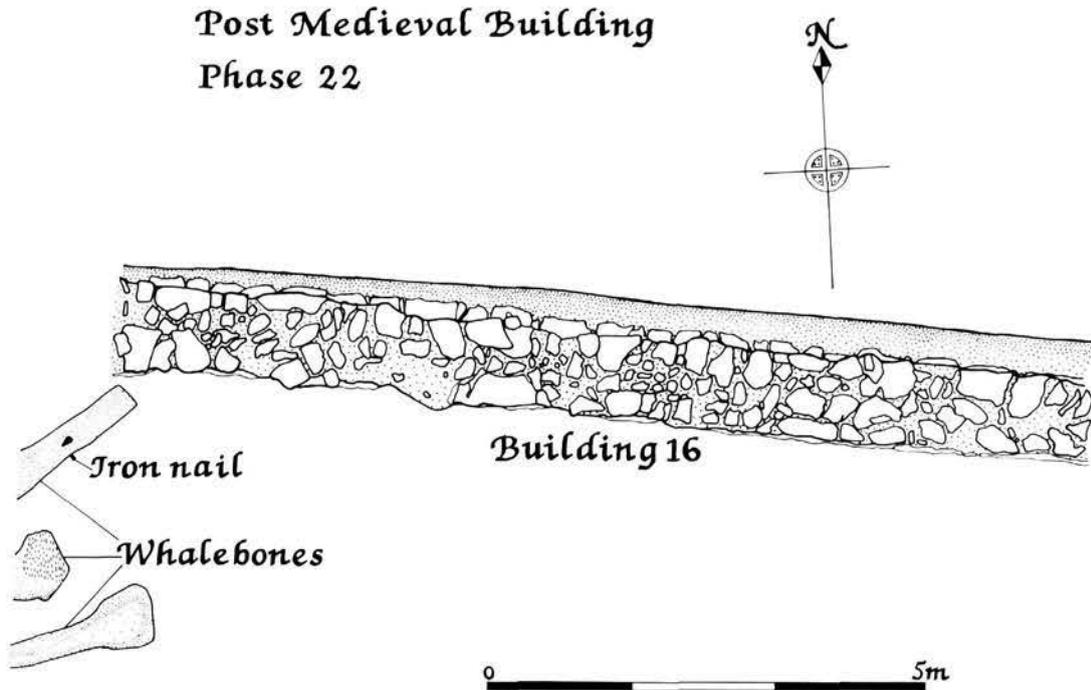
PHASE 22: BUILDING 16 (illus 87)

This building was constructed in the backfill of the French fort ditch. Only its north wall was found. It comprised sandstone facing blocks with a rubble core bonded with clay, five courses high (0.97m). Some of the stones had mortar patches on them. There

was an offset, about 0.20m wide, on the outside (northern) face. The inner face of the wall was grouted with a coarse yellow-white sandy mortar. Because of the unevenness of the stone face, the grouting was extensive, almost completely covering some of the



Illus 86
Building 15, towards
north-west.



Illus 87
Post-Medieval period, Building 16 (Phase 22).

smaller stones. The upper reaches of the mortar were covered in a patchy plaster. A fragment of a pantile was pressed flat against the mortar and covered by this plaster. The wall was set in a trench, 1.30m deep, at the base of which, adjacent to the wall, were flat stones. It was filled with brown sandy loam with much mortar, some sandstone rubble, including mortared stones, and a few pantile fragments. As only the northern side of the trench existed, the interior of the building must have been below ground level.

At the base of the interior and extending under the wall was dark brown sandy silty loam. Above that, but bounded by the wall, were deposits of light brown-grey silty loam with traces of mortar under loose grey-brown silty loam. Both these layers formed level surfaces, the lower one presumably a levelling deposit for the earthen floor, for the plaster on the wall face ceased below the surface of the earthen floors.

Extending above the foundation trench, wall and interior were two rubble deposits. These comprised sandstone rubble, including mortared stones, and mortar in brown sandy clay loam under more sandstone rubble (some mortared) with pieces of brick, slate and pantile in loose grey-brown loamy sand with some white powdered mortar and a little powdered charcoal. Clean, red sand near the base of the lower rubble adjacent to the wall may have been a floor surface. Three large pieces from the jaw bone of a Greenland Right whale were found in the upper rubble, one piece having a nail it (Chapter 7).

Outside the building, to the north, was a layer of loose dark brown silty clay with a few small sandstone fragments, fine pebbles and patches of clay. Pantile and slate fragments indicate that it was probably contemporary with the construction or demolition of this building.

PHASE 22: KILN (illus 85, 88)

The kiln was cut through Building 5 (Phase 7) and the southern trench alignment of Phase 18. It comprised an oval chamber (2.2m by 1.8m) linked by a narrow neck to the flue at the southern end. The latter was cut by a drainpipe trench.

The pit, 1.55m deep, was lined with roughly-faced sandstone blocks and boulders, up to six courses high (0.60m) in the chamber and four courses high (0.70m) in the flue. The facing stones on the eastern side of the latter had been robbed, leaving only a rubble core. In the chamber, the stones were bonded with a white and very sandy mortar with occasional, very fine pebbles; while in the flue a red sandy mortar with pebbles of varying sizes was used. On the face of the stones of the chamber was a white deposit, possibly lime. In the chamber were two partition walls, one course wide, of sandstone blocks surviving to a height of three courses (0.30m) and two courses (0.20m) to west and east respectively. The west wall was bonded with red and very sandy mortar with

no pebbles, the east with white mortar with no pebbles. The west wall extended across the chamber between its north and south lining. The east wall was fragmentary.

The neck between the chamber and flue was lined with five courses (0.52m high) of roughly-squared sandstone blocks bonded with white mortar with occasional charcoal flecks. This stone lining was bonded to the lining of the chamber. Resting on top of, and linking the two sides of, the neck were two roughly-dressed sandstone slabs, 0.38m thick, which may have originally been a single slab subsequently split. This covering was bonded to the stones underneath and to the south-western end of the chamber lining with white and very sandy mortar with occasional very fine pebbles. Another slab lying on the ground may have been a roofing slab for the neck. Beneath the roof, the neck was blocked with rubble.

The floor of the chamber was covered in ash which extended into



Illus 88
Kiln, towards north.

the neck, and above which were deposits of sandstone rubble, sand, burnt mortar and brown sandy loam. The floor of the flue was covered in loose, white-grey coarse sand with rubble, mortar and occasional pieces of charcoal, extending under the linings on each side. Presumably this was a levelling deposit. Filling the flue was

more sandstone rubble and sandy loam with some pieces of burnt wood.

Near the kiln was an area of roughly-dressed sandstone slabs, possibly demolition from it.

PHASE 22: HEARTHES (illus 84)

To the north of the kiln was a hearth pit, 0.22m deep, lined with hard orange burnt clay above which was hard mid-orange clay with some mid-brown sandy clay and a little grey-green clay. Nearby was another hearth pit, 0.05m deep, filled with loose dark

brown black and orange sandy loam. At the south-western end of the excavation were two hearths composed of hard orange-red burnt clay and flat stone slabs.

PHASE 23: MISCELLANEOUS FEATURES (illus 84)

At the western end of the site was the eastern edge of a linear cut, 0.90m deep, probably part of an embanked platform shown on an army plan of 1857 (SRO, 'Plan of Castle Park in . . . Dunbar', RHP 32549). This seems to have been an 18th-century pentagonal garden feature, embanked on four sides and ditched on the northern side opposite the blockhouse, with causeways at the north-western and north-eastern corners. It was probably one of two artificial mounds levelled by the army before 1857 (SRO, a cutting from *The Scotsman* 1957 '100 Years Ago' column dated Friday May 29, 1857, B18/20/31). The fills contained clay pipes, glass and post-medieval pottery. This feature was also picked up in Trial Trench D before the excavation.

There were various features at the northern part of the site. The

east edge of a shallow cut of unknown purpose, 0.06m deep, was filled with dark grey silty clay. Above that, and covering the site of the curtain wall and the northern part of Courtyard 9 was a levelling soil with traces of mortar. Clay pipes and glass were found in it. Cut into that was a robber trench on an approximately north-west/south-east alignment, 0.40m deep. Its fill contained some stone rubble, including a dressed sandstone block. A clay pipe fragment was found in the fill. Cut into it was a posthole, 0.30m deep (not illustrated). Above this robber trench was a large amorphous depression, 0.20m deep, at the base of which were charcoal and burnt wood. This was the site of a bonfire. West of these and also cut into the levelling was an oval pit, 0.21m deep (not illustrated), filled with dark brown sandy clay, stones and traces of mortar. Some of

the stones were mortared. This may have been a pit to bury rubble.

Above the robber trench was another levelling soil with traces of mortar. Another robber trench of a wall was cut through it near the cliff top. It was 0.28m deep and filled with sandstone rubble. It was covered by more sandstone rubble, possibly from the demolition of a circular tower. This tower possibly appears on the headland opposite the blockhouse in a view by Robert Adam of his additions to Lauderdale House in 1790-1 (RCAHMS, NMR, EL.O/37/2; original in the Soane Museum, London, vol 48, No 49) (illus 144). (If Adam's drawing does show the tower, he has taken artistic licence with its location. In the drawing, the west gable of Lauderdale House is clearly visible, a view which should exclude the tower.) The tower is visible on an engraving of a painting of Dunbar Castle by Turner (illus 7) (Scott 1826, ii). On the army map of 1857 mentioned above, it is described as a 'summer house'. It may have been an 18th-century folly for Castle

Park. Cut through this rubble was a semi-circular pit, 0.13m deep, extending into the limit of excavation. It contained dark grey-brown sandy loam with few stones. Its purpose is unclear.

South-west of these features, extending into the limit of excavation near the cliff top were more levelling dumps of soil, mortar and sandstone rubble. Farther south was an ill-defined pit, some 0.50m deep, filled with garden soil. A posthole, 0.03m deep, was cut into it.

Above Building 16, and levelling up the slumping fills of the French fort ditch, were further levelling dumps of soil, sandstone rubble, slates, pantiles, brick and mortar. Some redeposited human bones were found in them. These may have come from the levelling operation in front of Lauderdale House in 1801 when a cemetery was uncovered (Miller 1830, 6). This was the long cist cemetery (Chapter 9).

DISCUSSION

The uses of Buildings 15 and 16, both stone-built structures, are unclear. The presence of glass in the rubble of the demolition of the former suggests it had glazed windows. The odd nature of the north wall, which incorporated only one face of a much earlier Anglian stone-footed building, is striking. The pit within the building may have been a robbed posthole. The absence of slates or pantiles from the rubble contrasts with Building 16 and indicates that a thatched roof may have been used. Building 15 may have been a workshop or dwelling related to Dunbar House (now Lauderdale House) and its garden and parkland. It may equally, perhaps more likely, have been demolished when the parkland was laid out. Buildings are evident on Castle Park in a late 18th-century engraving (Grose 1789, Dunbar Castle, Plate II) and this may have been one of them.

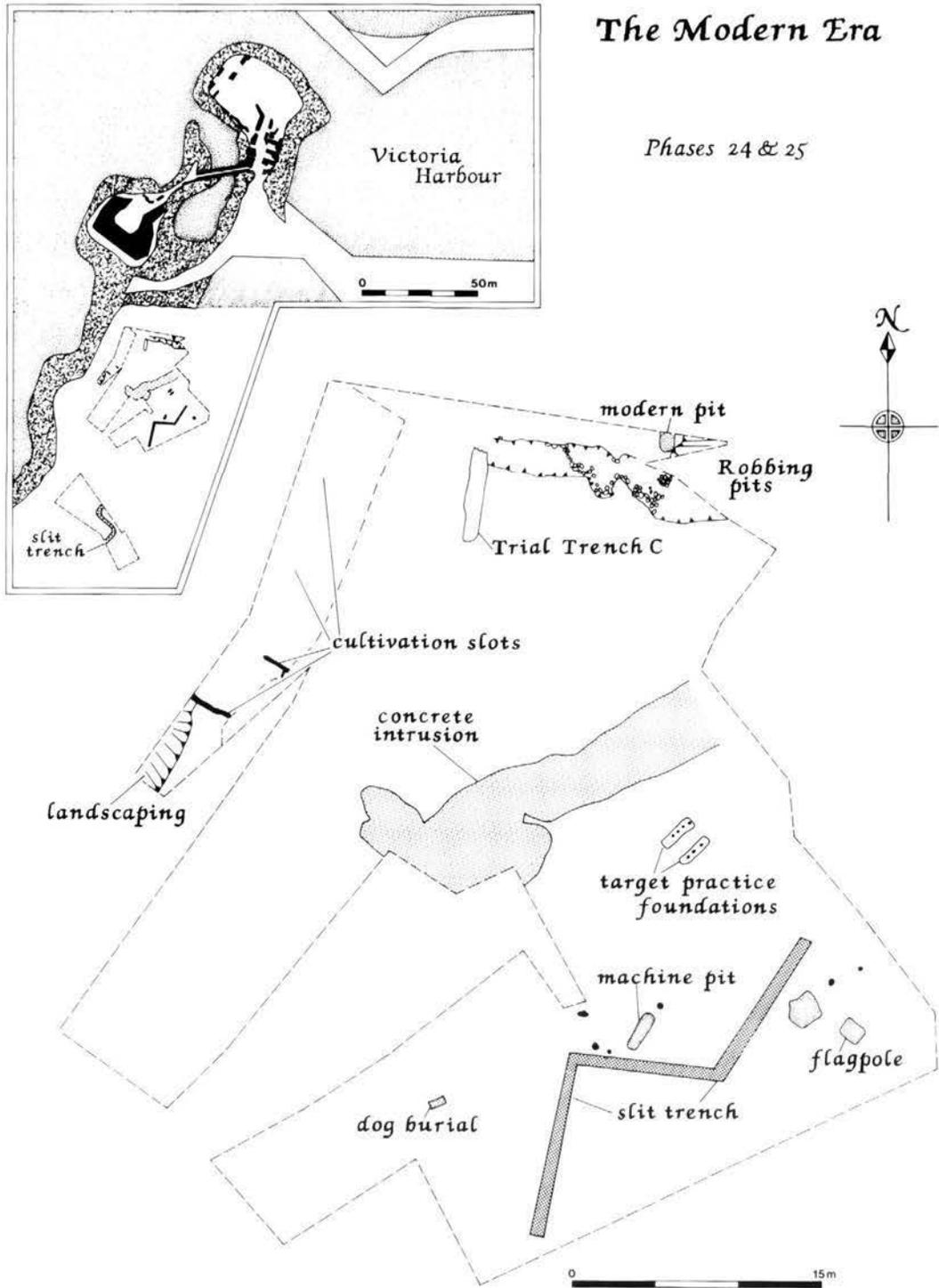
Although Building 16 had a clay-bonded foundation, the mortar from its demolition reveals that the upper parts of the walls were mortar-bonded. The wall incorporated re-used mortared stones in its foundation. The care taken over the inner face of the wall and the evidence for a slate and/or tile roof suggest that this may have been a dwelling house.

The presence of whale bones in the demolition of the building does not mean that it was a workshop of the whale processing industry, for such processing would have taken place down by the harbour. That one of the bones had a nail in it suggests that the whale bones may have been structural, possibly a whale bone arch in Castle Park. Robert Fall, who owned Dunbar House and the park, was instrumental in founding, in 1751, the East Lothian and Merse Whale Fishing Company which operated out of Dunbar (Jackson 1976, 507). The lack of success of the whalers may have contributed to the bankruptcy

of the Falls in 1788. The whaling company paid no dividend after 1785 and was dissolved in 1804 (Miller 1830, 243). The quantity of sheep metapodials with worn ends found in the rubble of the building may have been more relevant to its use (Chapter 7).

The kiln was unsealed and consequently not well stratified. It could, therefore, have been earlier or later than Phase 22. It cannot be earlier than Phase 18 as it was cut through the southern trench alignment of that phase, and it is unlikely to be a feature of the army in Phase 24, or of the landscaping of the grounds for parkland in Phase 23.

The kiln was similar to four examples found at Chapelton near Inverkeilor in Angus (Pollock 1985, 363-7) and one at North Berwick (Cromwell 1993, 56), all dated to the medieval period. However, these kilns were floored with clay or flagstones, while at Dunbar no floor other than natural was evident. Also the Dunbar kiln had internal walls for drying racks, which were not present in the other kilns. The Chapelton and North Berwick kilns were corn-drying kilns and this may have been the function of the Dunbar kiln although no charred grain was found in it. If the white substance found on its walls was lime, it may have been a limekiln, but there was no evidence of burning on its stones or on the floor of the flue where the fire would have been lit. There were kilns at East Barns, Catcraig and Oxwell Mains (south-east of Dunbar) for burning limeshells, and in 1663 a confirmation to John Cant of land in Innerwick included the privilege of burning limestone (Miller 1830, 222). As Dunbar was an important fishing port, the kiln may have been used for drying herring. In the 18th century the Falls owned a red herring house as well as Castle Barns at



Illus 89
Modern Era (Phases 24 and 25).

the foot of the castle with a kiln and well (NRAS, 'Descriptions copied from Record 1794', Survey 832, 49/26), but it seems odd to carry fish up to Castle Park from the harbour when it could easily

have been processed at the harbour.

The hearths seem to have been campfires, not part of a building or workshop. The clay-lined hearth may have been an oven with a collapsed clay roof.



Illus 90
Iron holdfast for a rifled muzzle loading gun.

THE MODERN ERA (Phases 24 and 25)

(illus 89-91)

PHASE 24

The army's occupation of Castle Park produced two features which did greatest damage to the stratigraphy of the site: the foundation of a concrete platform for a Victorian practice battery and a practice slit trench from World War I. Two other concrete platforms were observed outwith the excavated areas, one at the western part of the DB88F excavation, the other at the north-western corner of the DB04A excavation. The former contained at least one iron holdfast for a rifled muzzle loading gun (illus 90), several of which, set on individual emplacements, appear in late 19th- or very early 20th- century views of Castle Park (Anon, n d; ECI., Negative Nos 92052/18/9, /17, /18; ELC, AM 532, AM 1222, AM 1404, AM 2623, AM 7037) (illus back cover). Some of these guns were 64 pounders (Nigel Ruckley, pers comm). Seven mounds are also visible on the cliff top at Castle Park, possible gun emplacements, in two views of Dunbar Castle from the west by George Washington Wilson in the 1880s (RCAHMS, NMR, EL/5097, 5099). These concrete platforms were not for the four 25 pound howitzers which decorated the headland before the excavation. These had only occupied that position since the 1970s, before which they had been positioned along the eastern side of the barrack square (compare photographs in RCAHMS, NMR, EL/5385 and 5387 dated 1971 and EL/3938 dated 1978).

Further robbing of the site of the Curtain Wall took place, for glass and clay pipe fragments were recovered from a trench cutting its foundation. At the eastern end, this robbing took a northward return into the limit of excavation, but it is not certain if this was merely an irregularity in the robbing or an indication that the curtain turned towards the cliff top. Above this end of the robber trench was a layer of dark brown sand with traces of mortar and crushed shell, some of the latter with mortar adhering. These traces were presumably derived from the curtain. This robbing was sealed by a levelling dump of soil.

Elsewhere there were the foundations of possible targets: two wooden sill beams, each with angled postholes on either side of an upright posthole. There were also a posthole for a flagpole with a metal-tipped base, a wooden box containing a dog burial (a mascot or a pet), and various pits and trenches containing bullets, milk bottles, barbed wire, rotted wood fragments and NAAFI crockery.

On the cliff top were levelling dumps of soil and rubble, possibly levelling up of a former trackway below the cliff edge. This trackway appears on late Victorian or Edwardian photographs (ELC, AM 1404, AM 2623) (illus 91). Above that and covering much of the northern end of the site were levelling soil dumps, from which a Samian sherd was recovered (Chapter 4, Context 10102). At the cliff top were several parallel cultivation slots, probably of a wartime 'digging for victory' campaign (not illustrated).

In the DB04A excavation were the edge of a sunken rectilinear fenced enclosure and a system of field drains, both of which appear on an army plan of 1929 (SRO, 'Map: Castle Park Barracks and New Inn Barracks. Skeleton Record Plan. Ground Floor Plan', B18/20/32). On the levelled ground above the sunken enclosure were three postholes, 0.17m-0.37m deep, and two trenches, 0.25m and 0.33m deep, for temporary army structures.

In a watching brief on an electricity cable being dug by Scottish Power in Bayswell Road, the foundations of a sandstone and brick wall were found. This was the former boundary wall for the barracks, demolished in road widening in the late 19th century when the road was widened by some 3m (SRO, 'Plan of widening of road at Castle Park Barracks', RHP 32579).



Illus 91

The cliff top at Castle Park in 1905. (Reproduced by permission of East Lothian Council Library Service.)

PHASE 25

Recent activity on the site included the cliff top path laid out by Dunbar Town Council after the War Office sold Castle Park to East Lothian County Council in December 1962 (SRO, Sasines, East Lothian, 1963, No 12). There were also three machine-cut trenches, one of which was in the DB04A excavation, trial pits and trample from a barrow run.

A sub-rectangular pit, 0.15 m deep, filled with dark grey-brown sandy loam with flecks of possible mortar, may have been overcut or it may have been two separate features. As recorded, its fill overlay a modern drain pipe.

THE POTTERY

D W Hall

METHODOLOGY

The excavations produced 2960 sherds of pottery. The stratified wares were examined by x20 binocular microscope and then divided into fabric groups (Table 1). Each group is identified, where possible, by its common name then described and commented on. Colour descriptions are approximations. Descriptions of frequency and size of inclusions use

the following terms for frequency: occasional (less than 5 per 25mm²), moderate (5 to 15 per 25mm²), and abundant (over 15 per 25mm²); for size: small (up to 0.1mm), medium (0.1mm to 0.75mm), and large (over 0.75mm). Hardness is based on the Moh scale. This study has been undertaken without the benefit of petrological analysis.

ROMAN POTTERY

P Cheer

The excavations produced three sherds of Samian ware from vessels produced in Southern Gaul: a rim sherd and a bodysherd from a Drag. 33 (Webster 1987, 20) and a body sherd from a Drag. 37 (Webster 1987, 32). They came from Contexts

10312 (Phase 12), 10102 (Phase 24) and 1454 (Phase 7) respectively and are all residual in context. These forms date to the early to mid 2nd century AD.

EARLY HISTORIC MATERIAL

Extensive analysis of pottery assemblages of comparative date has been largely unsuccessful in finding parallels for some of this material. All the material was also examined by Trevor Cowie at the National Museum of Scotland and he was unable to offer any parallels. Of most interest is the virtually

complete vessel from Context 2164 which may be a new vessel type (Cowie, pers comm). All these sherds are, therefore, described in this report as unidentified but a full fabric description is given to aid future identification.

UNIDENTIFIED FABRICS

Context 12113, Phase 4
Bodysherd with black external surface, brown internal surface and black core.

Context 10479, Phase 6
Bodysherd with vegetable-tempered, grey internal surface, grey-black external surface and black core.

Context 10947, Phase 7
Bodysherd with black external surface, red-brown internal surface and black core.

Context 12039, Phase 7
Two bodysherds with red-brown internal surface, burnished brown external surface and brown core.

Context 2164, Phase 8

Forty-two joining sherds from virtually complete, hand built, squat, bucket-shaped vessel with a beaded rim. Vegetable-tempered fabric, light brown in colour both internally and externally with a grey core.

Context 10273, Phase 9

Bodysherd with vegetable-tempered, grey internal surface, grey-black external surface and black core.

Context 10195, Phase 9

Rimsherd in pink-red fabric, external and internal surface brown.

Context 10898, Phase 13

Bodysherd with black internal and external surfaces and brown

core. Heavily tempered with quartz (?) grits.

Context 10238, Phase 13

Bodysherd with black-brown external surface, grey-black internal surface and grey-black core.

Context 10920, Phase 13

Bodysherd with vegetable-tempered, grey internal surface, grey-black external surface and black core.

Context 12347, Phase 15

Rimsherd in pink-red fabric, external and internal surfaces covered with a cream-brown wash.

MEDIEVAL POTTERY

SCOTTISH WHITE GRITTY WARE

This fabric type is the largest represented in this assemblage. Recent work has identified three potential production centres for this fabric in Lothian, Borders and Fife (Haggarty 1980; Hall 1996). It has been found in Perth in association with 12th-century fabrics and appears to predate the East Coast Redware industry. It seems to cease production by the 15th century. This fabric is most commonly highly fired to a white or grey colour and contains quartz inclusions.

The sherds of gritty ware from this excavation are almost certainly products of the Colstoun kilns that lie some 15km west of Dunbar, to the south of Haddington (Brooks 1980). The assemblage is largely made up of small bodysherds, most of which appear to be from undecorated jugs. There is a single frilled rimsherd (Context 10100, Phase 24) that may be a product of the Fife White Gritty industry (Hall 1996).

YORKSHIRE TYPE WARE

Vessels in these distinctively glazed fabrics are the most common imports in the east coast burghs in the 13th and 14th centuries (McCarthy & Brooks 1988). The sherds of this fabric represent the second largest

group from these excavations. Most are small bodysherds, a large number of which were found on the surface of Courtyard 9 (Context 10120) in Phase 21.

REDUCED GREYWARES

This fabric type has long been identified as a late medieval Scottish tradition dating from the late 15th/early 16th century (Haggarty 1980). There are

66 sherds in this assemblage, all of which come from phases related to the 16th-century French military fortification.

POST-MEDIEVAL POTTERY

The excavations produced badly abraded sherds from a number of post-medieval vessels, principally

from Context 3034 (Phase 21), the uppermost fill of the French fort ditch.

WERRA AND WESER TYPE WARES

These slipware sherds were all from open forms and match published descriptions of Werra and Weser wares (Jennings 1981, 78, 82) but, since similar wares are known to have been produced in North Holland (Lindsay 1983, 573; Hurst *et al* 1986, 248), these identifications cannot be definite. Various slip decorated earthen wares were produced at a number

of places in northern Holland and Germany during the late 16th and 17th century (Lindsay 1983, 571, 573). Similar slipwares have been found in Scotland during excavations at Scalloway (Lindsay 1983, 573) and Kirkwall (MacAskill 1982), and they are not uncommon at sites on the east coast of England.

CHINESE PORCELAIN

There was a small amount of Chinese porcelain of the late 17th or early 18th century, which had probably passed through the hands of an English or Dutch intermediary before reaching Scotland

(Vanker 1991, 152, 153). Given the poor condition of the European slipwares and the contexts in which they were found, these fabrics may only have become associated at the time of final deposition.

DISCUSSION

The pottery assemblage from Dunbar is a fairly small one given the multi-period nature of the site. Of most interest are the Early Historic fabrics from Phases 4, 6, 7, 8, 9, 12 and 13, for limited amount of work has been carried out on pottery of this date from Lothian, and indeed, Scotland as a whole. Positive identification of fabrics is difficult and this small group from Dunbar may have to await further excavations in the area before anything useful can be said. The virtually complete vessel from Phase 8 appears to be the first example of this vessel form and as such is important.

The medieval pottery is all from those phases of the site which related to the occupation of Dunbar Castle and its associated defensive outworks. This small

group is dominated by the local White Gritty ware fabric and the very popular Yorkshire wares. The pottery from the phases apparently relating to the French military fortification is virtually indistinguishable from that from the medieval phases relating to the castle apart from a group of 16th/17th-century pottery from the backfilled defensive ditch. No pottery with a French provenance was recovered from any of the phases associated with the fort.

On such a complicated site the main use of the pottery has been to identify where the Early Historic phases stop and the medieval ones begin. During the excavation it was very noticeable that there was very little pottery present prior to Phase 12.

POTTERY CATALOGUE (illus 92-3)

SCOTTISH WHITE GRITTY WARE

1. Rimsherd.
Context 1121; Phase 18

2. Basesherd from cooking pot with applied raised strip.
Context 202; Phase 20

3. Rimsherd from jug. Glazed green.
Context 10133; Phase 20

4. Fragment from facemask.
Context 252; Phase 21

5. Rimsherd from straight-sided cooking pot.
Context 108; Phase 22

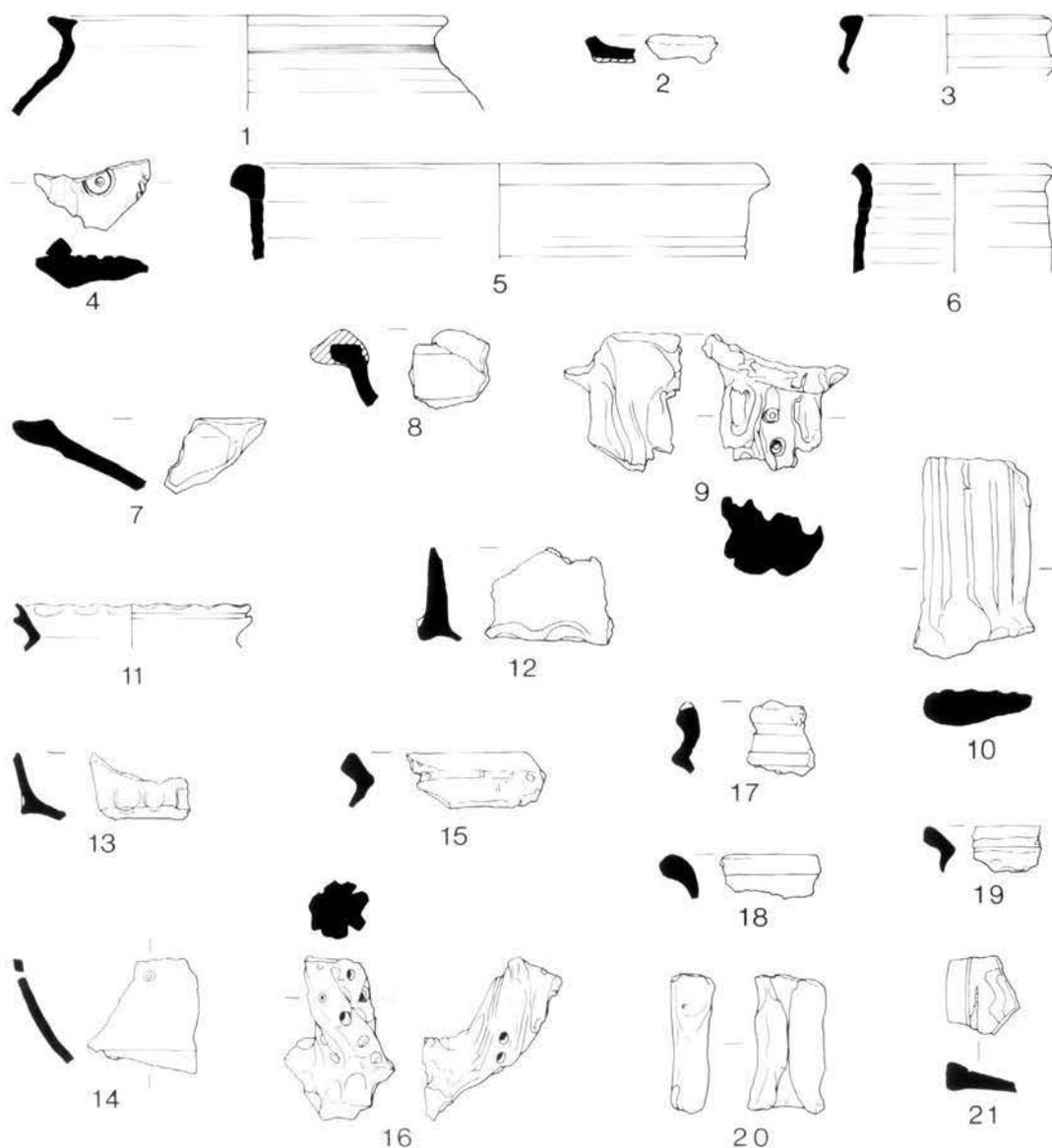
6. Rimsherd from straight-sided cooking pot.
Context 5054; Phase 23

7. Rimsherd from dish.
Context 5048; Phase 23

8. Rimsherd from skillet with handle junction.
Context 5049; Phase 23

9. Rimsherd with twisted rod handle junction.
Context 10101; Phase 24

10. Strap handle. Glazed green.
Context 10100; Phase 24



Illus 92
Medieval pottery (Cat nos 1-21). Scale 1:4.

11. Frilled rim from cooking pot.
Context 10100; Phase 24.

12. Frilled base from jug. Glazed green.
Context 5000; Phase 24.

13. Thumbed base from cooking pot.
Context 10101; Phase 24.

14. Bodysherd from cooking pot with hole drilled through it.
Context 5020; Phase 24.

15. Rimsherd. Glazed light green.
Context 400; Phase 25.

16. Twisted rod handle with stabbed holes. Glazed green.
Context 400; Phase 25.

YORKSHIRE TYPE WARE

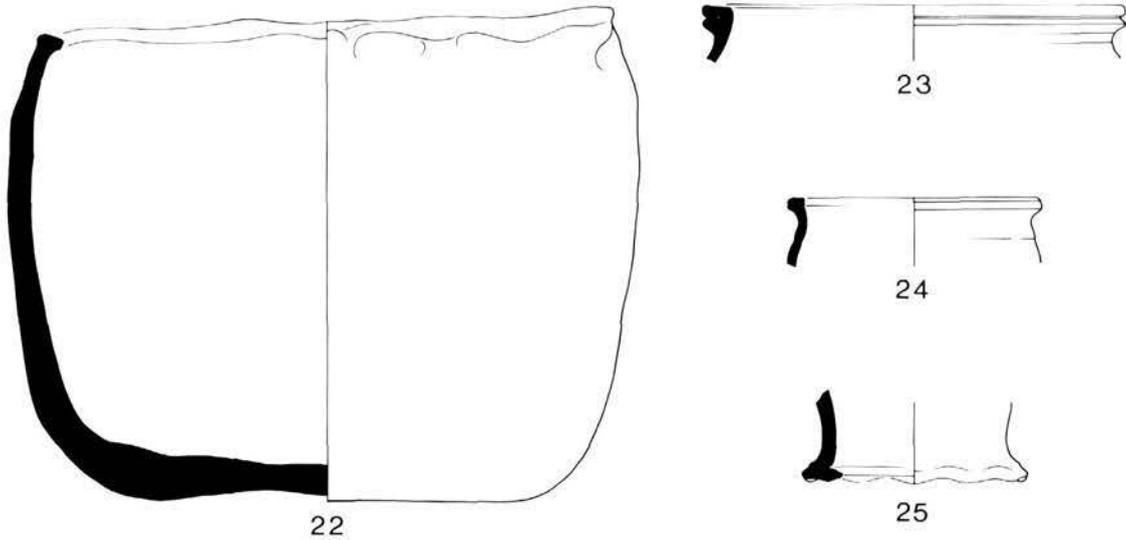
17. Rimsherd. Glazed lustrous green.
Context 400; Phase 25.

18. Rimsherd from cooking pot.
Context 108; Phase 22.

19. Rimsherd.
Context 400; Phase 25.

REDWARE

20. Folded strap handle from skillet.
Context 5000; Phase 24.



Illus 93
Early Historic and medieval pottery (Cat nos 22-25). Scale 1:4.

WESER SLIPWARE

21. Rimsherd. Glazed yellow with wavy brown line decoration.
Context 3034; Phase 21

UNIDENTIFIED (EARLY HISTORIC AND MEDIEVAL)

22. Forty-two joining sherds from a virtually complete, hand built, squat, bucket-shaped vessel with a beaded rim. Vegetable tempered fabric, light brown in colour both internally and externally with a grey core.
Context 2164; Phase 8

23. Rimsherd from cooking pot covered with white wash that covers one of broken edges.
Context 259; Phase 21

24. Rimsherd from jar.
Context 12347; Phase 15

25. Frilled base from jug. Glazed green-brown.
Context 5059; Phase 23

TABLE 1: POTTERY FABRIC BY PHASE

Phase	Sam	EarH	WG	Yo	ECR	LCR	RG	Stn	Sp	Ch	Un
4	0	1	1	0	0	0	0	0	0	0	0
6	0	1	0	0	0	0	0	0	0	0	0
7	1	3	0	0	0	0	0	0	0	0	0
8	0	42	5	5	0	0	0	0	0	0	2
9	0	2	0	0	0	0	0	0	0	0	1
12	1	0	0	0	0	0	0	0	0	0	0
13	0	3	11	0	0	0	0	0	0	1	7
14	0	0	49	6	0	0	0	0	0	0	3
15	0	1	0	0	0	0	0	0	0	0	2
16	0	0	3	1	0	0	0	0	0	0	1
17	0	0	4	1	0	0	0	0	0	0	0
18	0	0	15	1	0	0	0	0	0	0	9
19	0	0	22	0	0	0	0	0	0	0	1
20	0	0	157	32	1	0	0	1	0	1	224
21	0	0	685	122	16	1	14	2	16	1	88
22	0	0	62	6	3	0	16	0	0	2	2
23	0	0	423	63	8	2	30	6	0	58	20
24	1	0	511	55	22	0	6	1	0	66	14
25	0	0	0	0	0	0	0	0	0	1	0
0	0	0	12	0	0	0	0	0	0	0	3
Total	3	53	1960	292	50	3	66	10	16	130	377

Grand Total 2960

Key	Sam	Samian ware	RG	Reduced greyware
	EarH	Early Historic	Stn	Stoneware
	WG	White Gritty ware	Sp	Slipwares
	Yo	Yorkshire ware	Ch	China
	ECR	East Coast redware	Un	Unidentified
	LCR	Low Countries redware		

THE ARTEFACTS

Adrian Cox

INTRODUCTION

The finds report is divided into two sections. The first is a detailed catalogue, organized by material type and within this by artefact type, context number and find number. Discussions are included of each artefact category represented within the assemblage. The second section, which is organized by phase, presents an analysis of the artefact assemblages and

of their functional characteristics.

In the catalogue, some finds have been grouped together within functional categories (for example, horse equipment) to aid discussion and enable greater ease of reference (Table 5).

GOLD OBJECTS

(with S La Niece) (illus 94)

An artefact interpreted as a fragment from the arm of a pectoral cross, made from gold leaf and set/inlaid with garnets (no 1) is thought to have been recovered from a gravel surface assigned to Phase 7, although it was technically unstratified. The fragment consists of a number of gold components, joined with gold solder. A sheet of gold, exhibiting a join near to the broken end, forms the back-plate, and onto this has been soldered a series of strips of gold, forming a network of cells. Each cell contains a piece of red garnet inlay, laid onto a sheet of gold foil.

S La Niece undertook a scientific examination of the constructional features of this piece, and comments as follows.

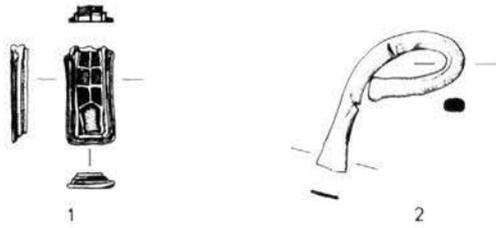
For such a tiny item, the cross arm has a remarkable number of separate gold components, all joined with gold solder. The back appears to be a single undecorated sheet of gold, but in fact, towards the broken end, there is a join. The sheet has been badly soldered to another section of the cross with a simple denticulate join. It is surprising that the cross back-plate was not cut from a single sheet of gold, and this perhaps indicates a shortage of gold.

The main walls of the cross are each formed from

two strips of gold, one set vertical to the back-plate and the other soldered to the top of and at right angles to the first (and parallel to the base plate) to give a box structure. This gives the illusion of greater solidity to the gold. Around the outside edge are two rows of beaded wire. Each cell wall for the garnet inlay is made of a separate sheet of gold, soldered to the back plate. The top of the cell walls are burred over to hold in the garnets. The garnets are backed with foils of simple pointillé patterning.

X-ray diffraction (XRF) analysis of a cream-coloured material found behind the garnet foils identified calcite. Analysis of the soil adhering to the beaded wire did not find calcite, so it is reasonable to deduce that the calcite formed part of the backing-paste to support the garnets. Calcite is commonly found in garnet cells (Arrhenius 1985).

Crosses such as that represented by this fragment are known from the Anglo-Saxon world. The most striking parallel for the Dunbar fragment is the pectoral cross of St Cuthbert, discovered during the excavation of his tomb in 1827 and now in the care of Durham Cathedral Museum. Constructionally, the goldsmith has used a very similar technique in



Illus 94
Gold pectoral cross (no 1) and
gold wire (no 2) scale 1:1
(photograph *Crown Copyright*;
reproduced by permission of the
Trustees of the National
Museums of Scotland).

manufacturing the Dunbar piece to that utilised in the Durham cross. It seems possible (L Webster pers comm) that these two pieces are part of a regional tradition.

The pectoral cross of St Cuthbert is a gold cross with arms of equal length, which was twice broken and twice repaired before it passed into his grave. It differs in shape, style of ornament and in certain constructional features from its counterparts from southern England, the Ixworth and Wilton cloisonné pectoral crosses (Newman 1981, 168, 328). Battiscombe (1956) notes that the form and characteristics of St Cuthbert's cross indicate that it is not a southern product but was probably manufactured in a Northumbrian workshop, between AD 640 and 670.

Another gold object (no 2) was recovered from the fill of a foundation trench for a timber fence in Phase 5. It is a short curved length of gold wire, slightly thickened and shaped at one end and apparently beaten flat at the other, giving this end a chisel-like appearance. A possible interpretation of this artefact is that it may represent the end of a longer piece of

wire used to manufacture gold leaf, by beating the end to the required thickness on a suitably hard and smooth surface. In common with the cross fragment (no 1), this object represents an accidental loss. It is indicative of the presence of a goldsmith or jeweller working on the site in the latter part of its pre-Anglian occupation, possibly contemporary with the Phase 5 structures. The object may, however, be residual in this phase, given that the foundation trench in which it was found was dug into earlier deposits.

1. Cross fragment. Length 13mm; max. width 6mm; thickness 2mm

Fragment interpreted as a terminal from a cross arm, consisting of a number of separate gold components set on a plain gold sheet base and joined with gold solder. Strips of gold have been used to form a number of cells, seven of which survive. Each cell contains a piece of red garnet inlay, laid onto a sheet of gold foil. Two rows of beaded gold wire are set around the upper, outside edge of the fragment.

Find No 00132; Unstratified

2. Wire. Length 25mm; max. width 5mm; thickness 3mm

Fragment of gold wire, roughly oval in cross-section, folded over about a point approximately one third of the way along its length. One end is slightly thickened and has been beaten to form a rectangular cross-section. The other end has been beaten flat and has a chisel-like terminal.

Context 2139; Find No 00532; Phase 5

COPPER ALLOY OBJECTS

(illus 95-6)

BELT FITTINGS

Components of six buckles recovered from the excavations represent a variety of forms. No 3, a buckle frame with internal lugs, has been cast, with its rough edges subsequently filed smooth. The file marks concentrate on the external surfaces of the frame and do not appear on its internal surfaces, giving an insight into the extent to which such artefacts were finished. This basic form of buckle frame was in use over a long period, both medieval and post-medieval examples being known.

No 4 is a small D-shaped strap end buckle with a plain buckle plate. More highly decorated examples of this form are known, for example from Kings Lynn (Geddes & Carter 1977, 289, no 9). No 5 is possibly part of a buckle frame with a pointed terminal. A post-medieval or early modern frame from a curving, double-looped buckle (no 6) bears file marks, in common with no 3. Part of a plain buckle plate (no 7) was also recovered.

Conjoining components of a buckle plate (no 8) have been identified by Leslie Webster as coming from an Anglo-Saxon buckle of early 7th-century date. Areas of gilding survive on both the upper and lower surfaces of the buckle plate, but on the lower surface it occurs only along a narrow ridge which would, like the upper surface, have been part of the external (visible) surface of the object when in use. The buckle plate was found in the foundation trench for a fence attached to Building 1.

A decorated strap end (no 9) was recovered from a gully cutting into Courtyard 9 (Phase 21). It is an elongated form and would have been held in place by two circular rivets at its open end. Punched decoration appears on one face.

3. Belt fitting. Length 31mm; width 19mm; thickness 4mm
Belt or harness fitting, consisting of a roughly rectangular frame with two small, inward projections or lugs. There are file marks on the frame. (Not illustrated)
Find No 00016; Unstratified

4. Buckle. Length 28mm; width 19mm; thickness 5mm
Strap end buckle with a broken, D-shaped frame and a buckle plate attached. The buckle frame incorporates a circular recess to accommodate the missing buckle pin and is secured by two circular cross-sectioned rivets. Mineralized fragments of leather survive within the buckle plate.
Context 0258; Find No 00233; Phase 19

5. Buckle frame? Length 27mm; width 9mm; thickness 2mm
Possible buckle frame fragment with a pointed terminal and a small indentation in which the tip of the buckle pin may have rested. The object is broken at both ends. (Not illustrated)
Context 10238; Find No 50194; Phase 13

6. Buckle frame. Length 33mm; width 25mm; thickness 4mm
Buckle frame of curving, double-looped form. The central bar is missing but appears to have been held in place by two iron pins, traces of which remain. There are file marks on the frame, particularly on the underside. (Not illustrated)
Find No 00015; Unstratified

7. Buckle plate. Length 26mm; width 19mm; thickness 1mm
Buckle plate fragment with a roughly rectangular recess at one end to accommodate a buckle pin. It has broken across this end. Near to the opposite end it was secured by an iron rivet, traces of which remain. (Not illustrated)
Context 10101; Find No 50035; Phase 24

8. Buckle plate. Length 23mm; width *c* 33mm; thickness 6mm
Component of a gilded buckle plate, in two conjoining fragments. The buckle plate originally held a leather strap between two component parts, of which this is one. There are three circular rivet holes of *c* 2mm diameter, which would have housed rivets connecting the two components of the buckle plate and holding the strap in position. The larger of the surviving fragments has a semi-circular cross-sectioned channel and two loops at one side, to accommodate the swivelling bar of the buckle frame.

A further seven rivet holes of *c* 1mm diameter are arranged symmetrically on the upper face of the buckle plate. These would have secured a mount to this face. The outline of this missing mount is roughly indicated by the limits of the gilding on the upper face of the buckle plate. The gilding was subjected to XRF analysis, which revealed that it contains gold and silver, while mercury was not detected. The base metal of the object is a copper alloy containing zinc, lead and tin.
Context 10341; Find No 50161; Phase 7

9. Strap end. Length 39mm; width 10mm; thickness 3mm
Strap end, tapering from the centre towards both ends, bifurcating and perforated at one end to receive a strap or belt. One face is decorated by a punched and possibly incised design, central to which is an 'X' formed by punched squares. Regularly-spaced nicks occur on the long edges of the object.
Context 0267; Find No 00137; Phase 21

BUTTONS

A total of ten buttons was recovered. Nos 10, 11, 14 and 15 each have a central recess, perforated by four holes. No 16 is of a slightly different form, having flat surfaces. All are of 19th- or 20th-century date. Nos 12, 13 and 19 are of so-called Sanders construction, a type first manufactured in 1802 (Peacock 1978, 69), and are probably of First World War date. Nos 17 and 18 probably pre-date the others but were both unstratified.

10. Button. Diameter 17mm; thickness 3mm
Circular button with a central recess, perforated by four circular holes. On the reverse, around the border, is stamped 'H · GILL · BIRMM'. (Not illustrated)
Context 0101; Find No 00021; Phase 24

11. Button. Diameter 17mm; thickness 3mm
Circular button with a central recess, perforated by four circular holes. On the reverse, around the border, is stamped 'SMITH & WRIGHT LIMD · BHAM'. (Not illustrated)
Context 0102; Find No 00022; Phase 24

12. Button. Diameter 23mm; thickness 10mm
Three-piece, circular button with a convex face bearing an embossed design of a coat of arms. The reverse plate is plain. The face of the button is dented and the eye has been forced out of position. (Not illustrated)
Context 0102; Find No 00023; Phase 24

13. Button. Diameter 21mm; thickness 13mm
Three-piece circular button with a convex face bearing embossed decoration of a field gun with a crown above. A circular eye is inserted through the reverse plate. On the reverse plate, encircling the eye, are the stamped words 'S · B · LTD · ENGLAND'. (Not illustrated)
Context 5000; Find No 90091; Phase 24

14. Button. Diameter 17mm; thickness 2mm
Circular button with a central recess, perforated by four circular holes. On the reverse, around the border, is stamped 'SUTTONS LTD · BIRMM'. (Not illustrated)
Context 5000; Find No 90092; Phase 24

15. Button. Diameter 17mm; thickness 3 mm
Circular button with a central recess, perforated by four circular holes. On the reverse, around the border, is stamped 'FIRMIN ★ LONDON ★'. (Not illustrated)
Context 5000; Find No 90093; Phase 24

16. Button. Diameter 16mm; thickness 1mm
Circular button, perforated by four circular holes which are bordered by a ring of raised pellets. This ring is encircled by the words 'SOLID ★ RING EDGE ★' in relief. (Not illustrated)
Context 10131; Find No 50362; Phase 22

17. Button. Diameter 16mm; thickness 5mm
Bi-convex button with a hollow interior and a circular hole in the centre of the upper surface. The circumference is decorated by closely spaced dots or milling. Heavily corroded. (Not illustrated)
Find No 00002; Unstratified

18. Button. Diameter 30mm; thickness 3mm
Circular button with a plain face. The shank of the eye survives on the reverse. (Not illustrated)
Find No 00004; Unstratified

19. Button. Diameter 22mm; thickness 8mm
Three-piece, circular button with a convex face bearing embossed decoration of a field gun with a crown above. An eye is inserted through the reverse plate. On the reverse plate, encircling the eye, are the stamped words 'SMITH & BRIGHT LTD · BIRMINGHAM'. The face of the button is dented and the eye has been forced out of position. (Not illustrated)
Find No 00010; Unstratified

CHAIN OR MAIL

No 20, comprising six links, is a short length of chain or a fragment of mail. Each link has been formed using a tiny rivet to secure the overlapping ends, a technique commonly used in the manufacture of medieval mail.

20. Chain or mail. Length of conjoined links 22mm; diameter of wire 0.7mm

Chain or mail fragment, comprising six links, five of which are linked together. Each link consists of a length of wire forming a roughly oval loop, with the ends hammered flat and overlapping. On one link the ends are perforated by a small rivet which secures them. On each of the remaining links the securing rivet is missing but the rivet holes are evident.
Context 0215; Find No 00283; Phase 14

LACE TAGS

Lace tags were used to terminate laces or thongs from garments or shoes. Three complete examples (nos 24-6), one nearly complete example (no 21) and two fragments (nos 22 and 23) were recovered. Among the lace tags found at Leicester, none was associated with the large number of laced shoe fragments found

there, suggesting that the tags were used on clothing laces rather than specifically with shoes (Clay 1981, 137).

No 24 has a small transverse hole at its open end to accommodate a rivet which would have secured the

lace or thong. This type of lace tag corresponds with the Type 1 tags identified by Oakley (1979a, 262-3) at Northampton.

21. Lace tag. Length 28mm; max. diameter 2mm
Lace tag, made from a tightly rolled sheet. A small fragment of leather or textile survives within it. The tip of the tag is probably missing. An XRF analysis revealed that the object is of brass with some tin and lead.
Context 0159; Find No 00148; Phase 21

22. Lace tag. Length 11mm; max. diameter 2mm
Lace tag fragment, made from a tightly rolled sheet. (Not illustrated)
Context 0259; Find No 00279; Phase 21

23. Lace tag. Length 8mm; max. diameter 2mm
Lace tag fragment, made from a tightly rolled sheet. (Not

illustrated)
Context 0326; Find No 00514; Phase 25

24. Lace tag. Length 29mm; max. diameter 3mm
Complete lace tag, made from a tightly rolled sheet. There is a small rivet hole through the tag near to its wider end. The narrower end is closed by pinching the end of the sheet. (Not illustrated)
Context 3026; Find No 80312; Phase 23

25. Lace tag. Length 20mm; max. diameter 3mm
Complete lace tag, made from a tightly rolled sheet. (Not illustrated)
Context 5020; Find No 90013; Phase 24

26. Lace tag. Length 29mm; max. diameter 3mm
Complete lace tag, made from a tightly rolled sheet. (Not illustrated)
Context 10100; Find No 50005; Phase 24

MOUNTS

No 27 is a mount or badge, the form and condition of which are indicative of a fairly recent date. It was recovered from an unstratified context. No 28, from Courtyard 9 (Phase 21), is a decorative mount, possibly from a box or casket.

27. Mount or badge. Length 16mm; width 13mm; thickness 5mm

Mount or badge consisting of a plain, roughly figure-of-8 shaped plate, rivetted to a smaller strip on the reverse. (Not illustrated)
Find No 00003; Unstratified

28. Mount. Length 41mm; width 11mm; thickness 1mm
Fragment of a decorative mount in the form of a strip with three semicircular arcs. On the upper surface, one edge is bevelled. The lower surface is flat and bears file marks. (Not illustrated)
Context 10120; Find No 50112; Phase 21

NEEDLES

Seven needles were recovered, all but one from modern or unstratified contexts. A variety of forms and sizes of needle is represented by the group. Nos 30 and 33 are short broad needles, possibly intended for stitching through leather or for use with coarsely-woven fabrics or netting. No 33 was found in the fill of a robber trench associated with the French fort. Nos 30, 33 and 35 were each made from a tightly folded or rolled sheet, the line of overlap being visible on their shafts.

Nos 29 and 31, both from Phase 24, are needles of similar type and dimensions, No 31 being slightly broader at the eye. No 32, also from Phase 24, is possibly part of a needle of similar type, exhibiting vestiges of a countersunk eye despite its very fragmentary condition. No 34, a needle of probable early 20th-century date from an unstratified context, has a slender shaft and an elongated eye. It contrasts greatly in size with no 35, a much larger needle which could only have been used on coarser fabrics.

29. Needle. Length 52mm; width at eye 3mm
Complete needle with a circular cross-sectioned shaft and a nearly circular eye. The shaft is widest at its middle.
Context 0150; Find No 00048; Phase 24

30. Needle. Length 28mm; width at eye 2mm
Complete needle with a roughly circular cross-sectioned shaft and a circular eye. Probably made from a rolled sheet.
Context 0259; Find No 00289; Phase 21

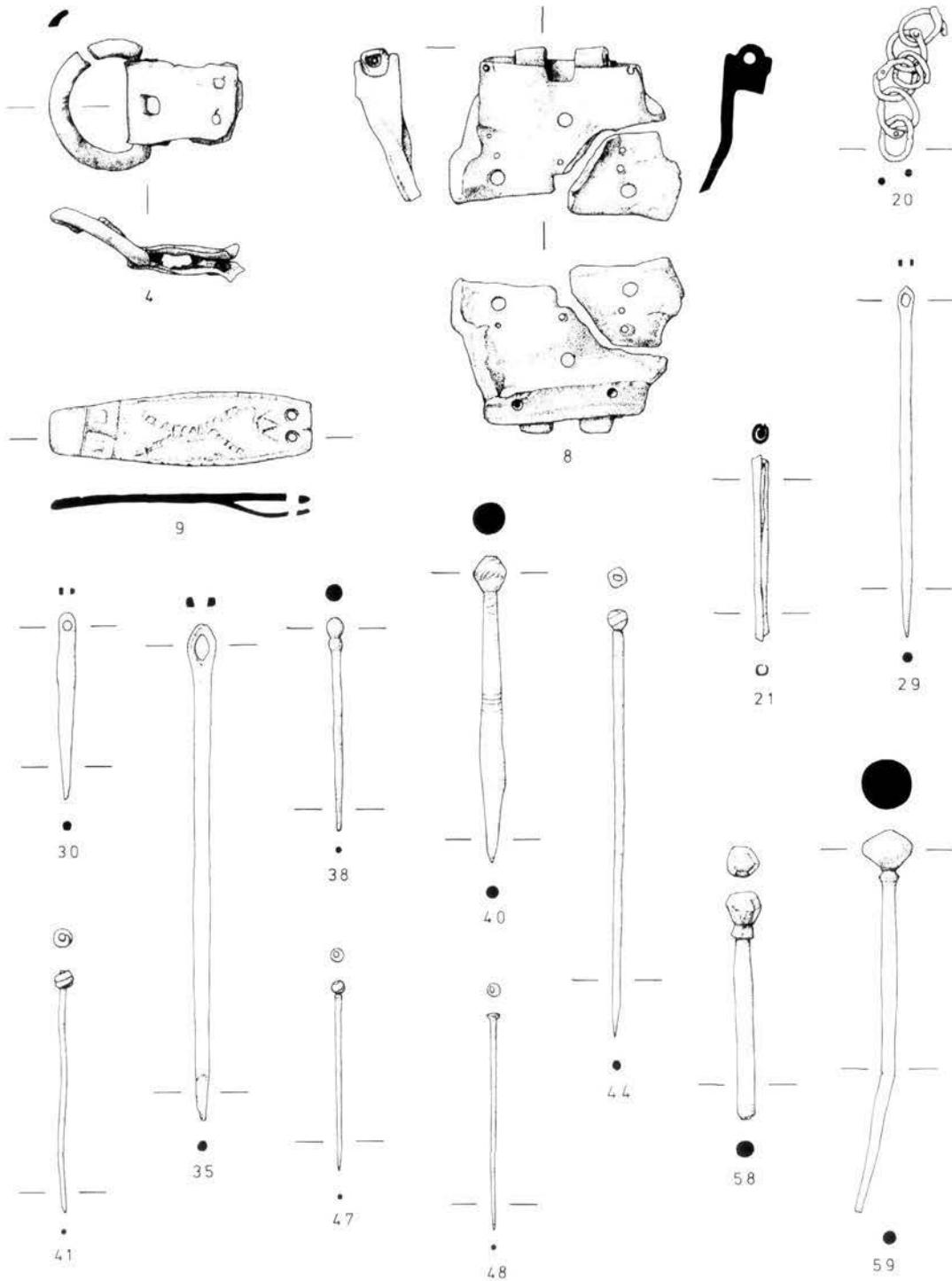
31. Needle. Length 46mm; width at eye 3mm
Needle with an oval cross-sectioned shaft, broken across the eye and at the point. (Not illustrated)
Context 10100; Find No 50006; Phase 24

32. Needle? Length 17mm; max. width 2mm
Possible needle fragment, roughly circular in cross-section and broken at both ends. The fragment widens at one end, possibly to accommodate an eye. (Not illustrated)
Context 10105; Find No 50004; Phase 24

33. Needle. Length 20mm; width at eye 3mm
Complete needle with an oval cross-sectioned shaft and a circular eye. The eye is set within a countersunk groove on one side. Probably made from a rolled sheet. (Not illustrated)
Find No 00033; Unstratified

34. Needle. Length 17mm; width at eye 1mm
Needle with a circular cross-sectioned shaft and a narrow diamond-shaped eye. The point is missing. (Not illustrated)
Find No 00034; Unstratified

35. Needle. Length 74mm; width at eye 4mm
Needle with a circular cross-sectioned shaft and a broad, oval eye. Slightly broken at the point.
Find No 00179; Unstratified



Illus 95

Copper alloy belt-fittings (nos 4, 8, 9), chain or mail (no 20), lace tag (no 21), needles (nos 29, 30, 35), pins (nos 38, 40, 41, 44, 47, 48, 58, 59). Scale: 1:1.

PINS

A total of 28 pins and pin fragments was recovered from a range of contexts, spanning the period from Phases 7 to 25. Those from the earlier contexts

are among the most substantial in terms of their length, shaft diameter and head size, and they are also the most highly decorated. The more modern

pins from Phases 24 and 25 are the smallest and most uniform in type.

The earliest of the more complete pins were found in contexts assigned to Phase 9 and are probably of 8th- to early 9th-century date. No 38, recovered from the make-up of Courtyard 7, has a bulb-shaped head with a shoulder below it. Its shaft appears to have a slight central expansion, although the lower part is missing. No 40, from Courtyard 6, also has this central expansion to its shaft. The head of this example is roughly rhomboid in form with a flat top and is decorated by incised and possibly moulded lines.

A pin with a faceted head (no 58) was recovered from an extensive soil deposit in Phase 14. The top of its head is seven-sided, and there is asymmetrical facetting below this. Once again, this pin has a central expansion to its shaft, which is broken.

No 59, from Courtyard 9 (Phase 21), has a dome-shaped head, possibly applied, with a small shoulder below it. A pin shaft from an earlier context (no 43) may be from a similar type of pin, as the top of the shaft also has this small shoulder, above which the shaft tapers to a point, perhaps to receive an applied head. The shaft lengths of nos 43 and 59 are also nearly identical. Although unabraded, it is possible that no 59 was residual in its Phase 21 context.

The largest typological group of pins from the excavations consists of those with heads formed by twisting a short length of wire roughly twice around the top of the shaft. The head is affixed to the top of the shaft by an adhesive substance, by pinching, or by soldering. Nos 36, 37, 39, 41, 44-7, 51, 55, 57 and possibly 61 fall within this group. Such pins are known from other sites, for example Southampton (Harvey 1975, 264) and Hereford (Shoosmith 1985, 11), where they date from the period AD 1550-1750, and London, where this basic type of pin appears to have been introduced by the 14th century (Egan & Pritchard 1991, 299-301). A degree of variation exists within this broad type. The tops of the heads of nos 39 and 57 (among the earlier pins of this type) have been filed flat, a modification not apparent on the other examples. The pinching of the head is less apparent in examples from earlier contexts, such as nos 36 and 39, but can clearly be seen on the remainder of the pins of this type on which the head survives.

Small one-piece pins with conical heads were recovered from contexts in Phases 24 and 25. This type of pin is represented by nos 48, 49, 52-4 and 56. The type first appeared in the 19th century, when

the manufacture of pins became fully automated (Tylecote 1972). No 50, recovered from a levelling or consolidation feature in Phase 24, may be included in this general grouping but differs in having the top of the shaft exposed at the top of its head, suggesting that the head may be applied rather than made in one piece with the shaft.

36. Pin. Length 37mm; width at head 3mm; diameter of shaft 1mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. (Not illustrated)
Context 0155; Find No 00170; Phase 21

37. Pin. Length 26mm; diameter of shaft 0.9mm
Pin shaft fragment, including point. Circular in cross-section. (Not illustrated)
Context 0159; Find No 00045; Phase 21

38. Pin. Length 32mm; width at head 2mm; diameter of shaft 1mm
Pin with a bulb-shaped head and a circular cross-sectioned shaft. The shaft widens at the top to form a shoulder below the head. The shaft has a central expansion and is broken.
Context 0189; Find No 00298; Phase 9

39. Pin. Length 33mm; width at head 2mm; diameter of shaft 0.7mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. The top of the head has been filed flat. A small area of white metal plating is visible just below the head. XRF analysis revealed that the plating metal is lead-rich and may also contain some tin. The base metal is a copper and zinc alloy with some tin. (Not illustrated)
Context 0256; Find No 00181; Phase 14

40. Pin. Length 45mm; width at head 5mm; diameter of shaft 3mm
Complete pin with a head of rhomboid form with a flat top. The shaft is circular in cross-section and is waisted. Two incised lines encircle the top of the head, and below these is a series of diagonal notches, decorating the widest part of the head. The shaft is encircled by four parallel lines at mid-shaft.
Context 0317; Find No 00308; Phase 9

41. Pin. Length 37mm; width at head 3mm; diameter of shaft 1mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft.
Context 0408; Find No 00307; Phase 21

42. Pin? Length 55mm; diameter of shaft 3mm
Possible pin or needle shaft, broken and slightly bent at the wider end. (Not illustrated)
Context 0424; Find No 00357; Phase 18

43. Pin. Length 54mm; diameter of shaft 2mm
Pin shaft only. It is bent and the pin head is missing. The top of the shaft tapers sharply, terminating in a point. (Not illustrated)
Context 1247; Find No 00486; Phase 7

44. Pin. Length 63mm; width at head 3mm; diameter of shaft 1mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. A groove encircles the shaft immediately below the head. White metal plating survives on the upper part of the shaft. This was revealed by XRF analysis to be tin. The base metal is brass.
Context 3026; Find No 80009; Phase 23

45. Pin. Length 32mm; width at head 2mm; diameter of shaft 0.9mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. It is plated with a white metal, possibly tin. (Not illustrated)
Context 3030; Find No 80011; Phase 22

46. Pin. Length 27mm; width at head 2mm; diameter of shaft 0.7mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. (Not illustrated)
Context 3036; Find No 80012; Phase 22
47. Pin. Length 28mm; width at head 2mm; diameter of shaft 0.8mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. The head has been compressed to form a sphere.
Context 3036; Find No 80333; Phase 22
48. Pin. Length 32mm; width at head 2mm; diameter of shaft 0.9mm
Complete pin with an elliptical head and a circular cross-sectioned shaft.
Context 5011; Find No 90071; Phase 24
49. Pin. Length 34mm; width at head 2mm; diameter of shaft 1mm
Complete pin with a conical head and a circular cross-sectioned shaft. (Not illustrated)
Context 5020; Find No 90014; Phase 24
50. Pin. Length 39mm; width at head 3mm; diameter of shaft 1mm
Complete pin with a conical head and a circular cross-sectioned shaft. (Not illustrated)
Context 5029; Find No 90006; Phase 24
51. Pin. Length 26mm; width at head 2mm; diameter of shaft 0.9mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. (Not illustrated)
Context 5029; Find No 90007; Phase 24
52. Pin. Length 41mm; width at head 2mm; diameter of shaft 1mm
Complete pin with a conical head and a circular cross-sectioned shaft. (Not illustrated)
Context 5029; Find No 90008; Phase 24
53. Pin. Length 35mm; width at head 2mm; diameter of shaft 1mm
Complete pin with a conical head and a circular cross-sectioned shaft. (Not illustrated)
Context 5029; Find No 90009; Phase 24
54. Pin. Length 37mm; width at head 2mm; diameter of shaft 0.9mm
Complete pin with a conical head and a circular cross-sectioned shaft. (Not illustrated)
Context 5029; Find No 90010; Phase 24
55. Pin. Length 28mm; width at head 2mm; diameter of shaft 0.8mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. (Not illustrated)
Context 5029; Find No 90011; Phase 24
56. Pin. Length 34mm; width at head 2mm; diameter of shaft 0.8mm
Complete pin with a conical head and a circular cross-sectioned shaft. (Not illustrated)
Context 5045; Find No 90015; Phase 24
57. Pin. Length 28mm; width at head 2mm; diameter of shaft 0.8mm
Complete pin with a wire-wound head and a circular cross-sectioned shaft. The top of the head has been filed flat. The shaft is bent. (Not illustrated)
Context 10102; Find No 50014; Phase 24
58. Pin. Length 34mm; width at head 5mm; diameter of shaft 3mm
Pin with an irregularly faceted head and a broken, circular cross-sectioned shaft. The flat top of the head is bordered by seven facets and below these are others. The shaft has a central expansion.
Context 10107; Find No 50140; Phase 14
59. Pin. Length 57mm; width at head 7mm; diameter of shaft 2mm
Pin with a rounded and slightly domed head and a circular cross-sectioned shaft. There is a shoulder at the top of the shaft which narrows slightly then widens to form the head. The shaft has a central expansion. The point is missing.
Context 10120; Find No 50569; Phase 21
60. Pin. Length 28mm; diameter of shaft 0.7mm
Pin shaft fragment, including point. Circular in cross-section. (Not illustrated)
Context 10188; Find No 50084; Phase 21
61. Pin? Length 13mm; diameter of shaft 0.5mm
Probable pin shaft fragment, broken at both ends and bent. (Not illustrated)
Context 10215; Find No 50131; Phase 14
62. Pin? Length 25mm; diameter of shaft 2mm
Possible pin shaft fragment, broken at both ends. Three shallow, possibly incised grooves encircle the wider end. (Not illustrated)
Context 10244; Find No 50209; Phase 13
63. Pin? Length 16mm; diameter of shaft 1mm
Possible pin shaft fragment, ending in a point. (Not illustrated)
Context 10478; Find No 50296; Phase 7

RINGS

Two finger rings were found. No 64 came from the fill of a robber trench associated with the mid 16th-century French fort buildings and is a plain ring of D-shaped cross-section. No 65, from a levelling deposit in Phase 23, is decorated by ridges and grooves and has a flat bezel which may have accommodated a stone or glass element, attached by an adhesive substance.

64. Ring. External diameter 21mm; internal diameter 18mm; thickness 3mm
Probable finger ring, consisting of a plain band of D-shaped cross-section and uniform thickness.
Context 0259; Find No 00294; Phase 21
65. Ring. External diameter 20mm; internal diameter 17mm; thickness 3mm
Finger ring, consisting of a band of D-shaped cross-section, tapering in thickness toward a flat, elliptical bezel. The exterior surface of the ring is decorated by closely spaced, transverse ridges and grooves, now partially obscured due to the corroded condition of the object.
Context 10119; Find No 50113; Phase 23

RIVETS

No 66 is possibly a fragment of a paperclip rivet, a type used in the repair of sheet metal objects such as vessels. No 118, a sheet fragment possibly representing part of a repair patch, is perforated by another paperclip rivet. No 67, recovered from one of the foundation trenches for Building 4 (Phase 8) is a rivet or stud with a domed circular head. A cattle bone from the same deposit as no 67 provided a radiocarbon date of cal AD 335-610.

66. Rivet? Length 13mm; width 8mm; thickness 6mm
Possible fragment of a paperclip rivet, consisting of a folded sheet. The sheet from which it was made may have been diamond-shaped.
Context 0267; Find No 00140; Phase 21

67. Rivet. Length 9mm; diameter of head 3mm
Rivet with a domed circular head and a roughly circular cross-sectioned shaft. (Not illustrated)
Context 1136; Find No 00448; Phase 8

STUDS

Three small circular-headed studs (nos 68-70) were found. No 69 is the most complete, with a small expansion at the end of its shank to secure it, perhaps to a belt or other clothing. No 70 has traces of possible gilding on its head and, of the three, was stratified earliest, coming from a clay layer overlying Courtyard 4 (Phase 20).

68. Stud. Length 4mm; width of head 9mm
Stud with a roughly circular head and a circular cross-sectioned

shank. The shank is broken. (Not illustrated)
Context 0266; Find No 00138; Phase 23

69. Stud. Length 4mm; width of head 10mm
Stud with a roughly circular head and a circular cross-sectioned shank with an expanded end. (Not illustrated)
Context 10101; Find No 50147; Phase 24

70. Stud. Length 5mm; width of head 9mm
Stud with a roughly circular head and a circular cross-sectioned, tapering shank. The shank is bent. Possible traces of gilding are visible on the head. (Not illustrated)
Context 10145; Find No 50159; Phase 20

VESSEL

No 71 may be a fragment from the rim of a copper alloy vessel. Being a very small fragment, little of the original form of the object is revealed. It was found in a levelling deposit in Phase 23.

71. Vessel? Length 18mm; width 16mm; thickness 2mm
Probable vessel rim fragment. Part of the rim itself survives; the other edges are broken. This fragment suggests a rim diameter of c 60mm. (Not illustrated)
Context 5048; Find No 90070; Phase 23

WASTE

Two small pieces of once-molten copper alloy, nos 72 and 73, were found. These may have derived either from the melting of copper alloys for artefact production, or from the effects of high temperatures upon artefacts, for example in a hearth or as a result of a fire.

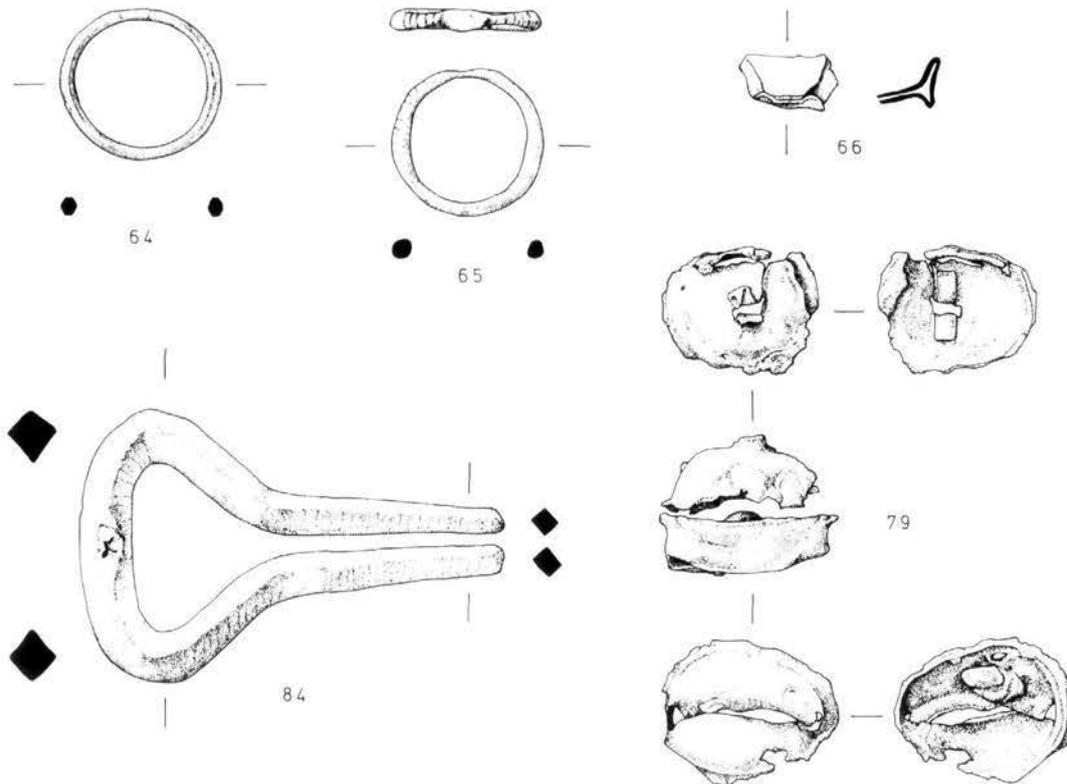
72. Waste. Length 25mm; width 18mm; thickness 8mm
Piece of once-molten waste. (Not illustrated)
Context 0307; Find No 00242; Phase 20

73. Waste. Length 20mm; width 8mm; thickness 6mm
Piece of once-molten waste. (Not illustrated)
Context 1147; Find No 00446; Phase 9

WIRES

Circular cross-sectioned wire was used in the manufacture of such articles as pins and chain links. Only a small number of fragments was recovered

and there were no concentrations of wire-working debris.



Illus 96
Copper alloy rings (nos 64, 65), rivet (no 66), bell (no 79), and jew's harp (no 84). Scale 1:1.

74. Wire. Length 31mm; max. diameter 1mm
Wire fragment, circular in cross-section. (Not illustrated)
Context 0346; Find No 00335; Phase 19

75. Wire. Length 29mm; max. diameter 1mm
Wire fragment, roughly circular in cross-section, bent over twice at one end. (Not illustrated)
Context 5044; Find No 90083; Phase 24

76. Wire. Length 12mm; max. diameter 0.8mm
Two conjoining wire fragments, roughly circular in cross-section. (Not illustrated)
Context 10119; Find No 50146; Phase 23

77. Wire. Length 8mm; max. diameter 0.8mm
Wire fragment, roughly oval in cross-section. (Not illustrated)
Context 10330; Find No 50248; Phase 7

MISCELLANEOUS

Small rumbler bells like no 79 occur as early as the late 13th century and continue almost unchanged to the present day (Goodall, I H 1981, 70). They were fitted to the collars of domestic animals such as cows, goats and sheep, used as items of personal dress, being sewn onto clothing or hung from belts, and were also used on horse trappings. The shell of no 79 is of copper alloy, while the clapper or pea it encloses is made of iron, possibly selected for its density. The suspension loop, now missing, was made from a strip of metal with its ends inserted through the aperture at the apex of the bell. Such an arrangement can also be seen on an example from Exeter (Goodall, A R 1984a, 341, fig 191, no 140). No 79 was found in topsoil (Phase 24) and is of

post-medieval or early modern date.

No 80 is possibly a penannular brooch, heavily corroded and missing its pin. It was found in Soil 3 (Phase 14). No 81 may be a fragment of a similar brooch.

No 84 is a jew's harp, a small musical instrument held in the mouth. This example, which was unstratified, has a complete frame but the central reed is missing. A scar on the frame indicates where the reed was attached.

A key escutcheon (no 85) was found in a levelling deposit overlying the demolition debris of Building

16. The lower part of the key aperture is broken, but its projected dimensions indicate that a key with a bit depth of c 19mm would have been inserted. The absence of increased abrasion around the edges of the key aperture may indicate that the escutcheon had not been in prolonged or frequent use.

Nos 86-90 are loops of varying size, to which definite functions cannot be ascribed. The broken loop (no 86) may possibly represent a plain finger ring but is more likely to have performed some other function. No 87, from Courtyard 4 in Phase 20, may possibly be from a plain annular brooch, of the kind worn at the neck to close a tunic or on the shoulder to fasten a cloak. There is no evidence, however, of a brooch pin and no trace of a recess or mark on the frame where the tip of a pin could be expected to have rested.

78. Bar or frame? Length 103mm; width 6mm; thickness 3mm
Roughly rectangular cross-sectioned bar with a series of undulations along one face and a small projection approximately half way along the opposite face. The projection may once have formed a suspension loop. The object is distorted, hence its original form is uncertain.
Find No 00006; Unstratified

79. Bell. Length 22mm; width 19mm; thickness 16mm
Rumbler bell, originally spherical in form, now broken into two conjoining fragments. Both are damaged and distorted. The upper fragment has a rectangular hole at its apex for suspension. Fragments of strip are attached to the interior surface on either side of this hole. The lower fragment of the bell has a dumbbell-shaped slit in it and contains a heavily corroded iron clapper.
Context 10101; Find No 50009; Phase 24

80. Brooch? Length 30mm; width 29mm; thickness 3mm
Probable penannular brooch with expanded terminals of unequal size. Worn areas on the circumference may indicate the position of the missing pin. XRF analysis revealed tin-rich areas on the surface of the object, suggesting that it was either tin plated or made from a very high tin bronze. The object is very heavily corroded. (Not illustrated)
Context 0215; Find No 00282; Phase 14

81. Brooch fragment? Length 36mm; width 6mm; thickness 4mm
Possible fragment of a penannular brooch, curving and thickening towards an expanded broken terminal. There is a slight recess in the outer edge, which may have accommodated the hinge of a pin. (Not illustrated)
Context 10158; Find No 50097; Phase 18

82. Disc. Max. diameter 16mm; thickness 1mm
Nearly circular disc. One face appears to be more smoothly

finished than the other. (Not illustrated)
Context 5049; Find No 90017; Phase 23

83. Ferrule. Length 31mm; width 19mm; thickness 13mm
Possible ferrule, partially crushed but originally of hollow form and circular cross-section. It has been made from a single sheet, with slits cut into one edge to allow it to be folded to form a closed terminal. (Not illustrated)
Context 0259; Find No 00143; Phase 21

84. Jew's harp. Length 55mm; width 35mm; thickness 7mm
Frame of a Jew's harp, made from a single piece of metal. The central reed is missing. There are file marks on all surfaces of the frame.
Find No 50108; Unstratified

85. Key escutcheon. Length 79mm; width 29mm; thickness 2mm
Decorative key escutcheon with a central keyhole. The object tapers towards pointed terminals with projections above and below, and it is decorated on its upper surface by an incised or moulded pattern of flowers and circles. There are three circular rivet holes for attachment. (Not illustrated)
Context 3022; Find No 80305; Phase 23

86. Loop. Diameter 19mm; max. thickness 3mm
Loop or possible plain finger ring, broken at one point in its circumference. It is made from a sub-rectangular cross-sectioned strip, which widens slightly opposite the position of the break. (Not illustrated)
Context 10107; Find No 50095; Phase 14

87. Loop. Diameter 23mm; thickness 2mm
Circular loop or annular brooch frame, of circular cross-section. The ends narrow sharply at the break. (Not illustrated)
Context 10150; Find No 50102; Phase 20

88. Loop. Diameter 23mm; thickness 2mm
Circular loop made from circular cross-sectioned wire. The ends almost meet but do not overlap. (Not illustrated)
Context 10461; Find No 50545; Unphased

89. Loop. Diameter 8mm; thickness 0.8mm
Two conjoining fragments of a circular loop, convex on one surface and flat on the other. (Not illustrated)
Context 3022; Find No 80307; Phase 23

90. Loop. Diameter 15mm; thickness 3mm
Part of a circular loop made from circular cross-sectioned wire. (Not illustrated)
Find No 00332; Unstratified

91. Rivetted plate. Length 26mm; width 16mm; thickness 6mm; diameter of rivet head 9mm
Plate fragment with one straight edge, perforated near to this edge by a circular cross-sectioned rivet with a circular head. Three additional fragments are interpreted as being from the same object. Heavily corroded. (Not illustrated)
Find No 00591; Unstratified

92. Rod. Length 23mm; diameter 3mm
Rod or wire, widening slightly at each end. (Not illustrated)
Context 10108; Find No 50091; Phase 24

PLATES, SHEETS AND STRIPS

Several fragments of copper alloy plate and sheet were recovered. Some of these may be fragments of broken objects, while others may represent debris from the manufacture of sheet metal artefacts.

Many of the sheet fragments have trimmed edges, a characteristic which serves as an indicator of likely metal-working assemblages. Such assemblages are concentrated in Phase 14 and then again in Phases

20-22. Conclusions from the former concentration are problematic, since the finds were from a single, extensive soil layer (Soil 3), but the latter concentration represents activity around the time of the construction and use of the French fort.

Where the edges of a sheet have been trimmed, probably with a knife, they are referred to as trimmed edges in the catalogue entry. Other straight edges which do not show recognizable signs of trimming are referred to as straight edges. Many of the sheet fragments are under 1mm in thickness and, where this is so, measurements are expressed to the nearest 0.1mm.

PLATES

93. Plate. Length 24mm; width 6mm; thickness 1mm
Curved plate with one possibly trimmed edge. One edge is possibly broken across a circular hole. (Not illustrated)
Context 3034; Find No 80357; Phase 21

94. Plate. Length 26mm; width 17mm; thickness 0.8mm
Rectangular plate, with a rectangular perforation at its centre and a circular one near to one edge. The edge opposite the circular hole is notched. (Not illustrated)
Context 5048; Find No 90068; Phase 23

95. Plate. Length 37mm; width 24mm; thickness 3mm
Plate with a smooth curvature and broken edges. (Not illustrated)
Context 10101; Find No 50031; Phase 24

96. Plate. Length 36mm; width 27mm; thickness 2mm
Plate with a smooth curvature and broken edges. (Not illustrated)
Context 10101; Find No 50032; Phase 24

97. Plate. Length 22mm; width 22mm; thickness 2mm
Plate with a smooth curvature and broken edges. (Not illustrated)
Context 10101; Find No 50034; Phase 24

98. Plate. Length 26mm; width 21mm; thickness 1mm
Plate with a smooth curvature and broken edges. (Not illustrated)
Context 10101; Find No 50093; Phase 24

99. Plate. Length 45mm; width 33mm; thickness 2mm
Plate with a smooth curvature and broken edges. (Not illustrated)
Context 10101; Find No 50094; Phase 24

100. Plate. Length 23mm; width 15mm; thickness 2mm
Curved plate fragment with one straight edge. The curvature is irregular. (Not illustrated)
Context 10134; Find No 50085; Phase 20

SHEETS

101. Sheet. Length 21mm; width 10mm; thickness 0.4mm
Folded sheet fragment with irregular edges. (Not illustrated)
Context 0123; Find No 00027; Phase 24

102. Sheet. Length 11mm; width 8mm; thickness 0.3mm
Rectangular sheet with straight edges, folded once. A small rivet with a circular head pierces the centre of the sheet. (Not illustrated)
Context 0146; Find No 00149; Phase 21

103. Sheet. Length 13mm; width 11mm; thickness 0.6mm
Diamond-shaped sheet, folded once and bent over at the end. (Not illustrated)
Context 0159; Find No 00046; Phase 21

104. Sheet. Largest fragment: Length 20mm; width 8mm; thickness 0.2mm
Seven fragments interpreted as parts of a single sheet. Some fragments have straight edges. All are folded and distorted. XRF analysis revealed that the metal is copper. No tin was detected. (Not illustrated)
Context 0212; Find No 00146; Phase 24

105. Sheet. Length 25mm; width 9mm; thickness 0.3mm
Roughly rectangular sheet with three trimmed edges. A line of evenly-spaced, punched dots runs along the central axis of the object, and more closely spaced dots border its long edges. The object has a broken edge at one end. (Not illustrated)
Context 0252; Find No 00139; Phase 21

106. Sheet. Length 27mm; width 9mm; thickness 0.2mm
Sheet fragment with two straight edges. Folded and distorted. (Not illustrated)
Context 0270; Find No 00164; Phase 25

107. Sheet. Length 5mm; width 4mm; thickness 1mm
Sheet fragment with one trimmed edge. (Not illustrated)
Context 0274; Find No 00246; Phase 20

108. Sheet. Length 9mm; width 7mm; thickness 0.4mm
Sheet fragment with two trimmed edges. (Not illustrated)
Context 0307; Find No 00240; Phase 20

109. Sheet. Length 20mm; width 17mm; thickness 1mm
Sheet fragment with possibly trimmed edges. Heavily corroded condition. (Not illustrated)
Context 0307; Find No 00241; Phase 20

110. Sheet. Length 11mm; width 9mm; thickness 1mm
Sheet fragment with irregular edges and a circular perforation. (Not illustrated)
Context 0403; Find No 00295; Phase 8

111. Sheet. Length 19mm; width 10mm; thickness 0.5mm
Sheet fragment with trimmed edges. (Not illustrated)
Context 0435; Find No 00401; Phase 8

112. Sheet. Length 22mm; width 10mm; thickness 0.3mm
Sheet fragment with two trimmed edges. Folded and distorted. (Not illustrated)
Context 3024; Find No 80316; Phase 24

113. Sheet. Length 14mm; width 6mm; thickness 0.9mm
Sheet fragment with one smoothly curving edge. (Not illustrated)
Context 3035; Find No 80349; Phase 22

114. Sheet. Length 17mm; width 11mm; thickness 0.3mm
Sheet with one straight edge. One edge is folded over. (Not illustrated)
Context 5029; Find No 90012; Phase 24

115. Sheet. Length 25mm; width 12mm; thickness 0.2mm
Sheet fragment with one trimmed edge. Folded and distorted. (Not illustrated)
Context 5048; Find No 90067; Phase 23

116. Sheet. Length 35mm; width 8mm; thickness 0.2mm
Sheet fragment with one trimmed edge. One edge is folded over. (Not illustrated)
Context 5048; Find No 90069; Phase 23

117. Sheet. Length 33mm; width 12mm; thickness 2mm
Roughly rectangular sheet fragment with possibly trimmed edges. There is a notch at one end. (Not illustrated)
Context 10100; Find No 50015; Phase 24

118. Sheet. Length 36mm; width 27mm; thickness 0.7mm
Sheet fragment with one trimmed edge. A paperclip rivet, only part of which survives, has been inserted through a perforation at

the edge of the sheet. There is a second, unoccupied perforation. Possibly part of a repair patch. (Not illustrated)
Context 10101; Find No 50101; Phase 24

119. Sheet. Length 17mm; width 11mm; thickness 0.3mm
Diamond-shaped sheet with trimmed edges, folded once. (Not illustrated)
Context 10101; Find No 50511; Phase 24

120. Sheet. Length 12mm; width 7mm; thickness 0.3mm
Sheet fragment with one trimmed edge. (Not illustrated)
Context 10107; Find No 50079; Phase 14

121. Sheet. Length 24mm; width 18mm; thickness 0.7mm
Roughly rectangular sheet fragment with two trimmed edges. It has possibly been broken across holes at either end. (Not illustrated)
Context 10108; Find No 50090; Phase 24

122. Sheet. Length 10mm; width 9mm; thickness 0.6mm
Sheet fragment with three trimmed edges. (Not illustrated)
Context 10119; Find No 50165; Phase 23

123. Sheet. Length 16mm; width 13mm; thickness 0.4mm
Diamond-shaped sheet with trimmed edges, folded once. (Not illustrated)
Context 10131; Find No 50346; Phase 22

124. Sheet. Length 8mm; width 6mm; thickness 0.4mm
Sheet fragment with one trimmed edge. (Not illustrated)
Context 10287; Find No 50234; Phase 14

125. Sheet. Largest fragment: Length 9mm; width 5mm; thickness 1mm
Five fragments, interpreted as parts of a single sheet. The largest fragment bears parallel scratched lines. Another is perforated by a circular hole. (Not illustrated)
Context 10368; Find No 50292; Phase 6

126. Sheet. Length 26mm; width 7mm; thickness 1mm
Sheet fragment with three trimmed edges. (Not illustrated)
Find No 50191; Unstratified

STRIPS

127. Strip. Length 25mm; width 3mm; thickness 0.7mm
Strip with possibly trimmed edges. (Not illustrated)
Context 0238; Find No 00475; Phase 21

128. Strip. Length 76mm; width 2mm; thickness 1mm
Strip with straight edges. (Not illustrated)
Context 0307; Find No 00238; Phase 20

129. Strip. Length 27mm; width 3mm; thickness 2mm
Curved strip with straight edges. (Not illustrated)
Context 3035; Find No 80350; Phase 22

130. Strip. Length 36mm; width 12mm; thickness 1mm
Strip with two trimmed edges. An iron rivet perforates one end. Only a fragment of the rivet survives. (Not illustrated)
Context 10100; Find No 50053; Phase 24

131. Strip. Length 32mm; width 5mm; thickness 0.6mm
Tapering strip with possibly trimmed edges. Heavily corroded. (Not illustrated)
Context 10101; Find No 50008; Phase 24

132. Strip. Length 39mm; width 14mm; thickness 1mm
Strip with straight edges. A hole has been punched through it at one end, and it is broken across a hole at the other. (Not illustrated)
Context 10103; Find No 50041; Phase 23

133. Strip. Length 74mm; width 8mm; thickness 3mm
Strip with straight edges, folded once along its length and rivetted at one end to act as a solid edge, possibly to a leather or textile object. Heavily corroded. (Not illustrated)
Context 10188; Find No 50052; Phase 21

134. Strip. Length 71mm; width 7mm; thickness 1mm
Strip with straight edges, with a notch in one edge and parallel, longitudinal ribs on one side. (Not illustrated)
Context 10188; Find No 50082; Phase 21

135. Strip. Length 35mm; width 4mm; thickness 1mm
Strip with possibly trimmed edges. (Not illustrated)
Context 10235; Find No 50330; Phase 14

136. Strip. Length 45mm; width 3mm; thickness 2mm
Strip with irregular edges. (Not illustrated)
Context 12083; Find No 50399; Unphased

137. Strip. Length 57mm; width 13mm; thickness 1mm
Strip with two trimmed edges. (Not illustrated)
Find No 00036; Unstratified

LEAD ALLOY OBJECTS

(illus 97)

Of the lead alloy objects recovered (illus 97), most are small pieces of offcut sheet or waste fragments with irregular edges. No 138 is a fragment of a bar or ingot. No 139 is a fishing line sinker, made from a rolled sheet. Its external surface has been dented, possibly by contact with pebbles on the sea bed or beach.

Nos 158-161 represent evidence for the melting of lead alloy, perhaps for casting objects or for use in construction. The condition of nos 159 and 160

suggests that they may have been spilled onto an uneven surface, the impression of which remained in the lead alloy once it had solidified. No 161 also has a convex lower surface, as if it had solidified within a small hollow.

138. Bar. Length 42mm; width 15mm; thickness 12mm
Roughly rectangular cross-sectioned bar, broken at both ends. One face is uneven. (Not illustrated)
Context 10287; Find No 50229; Phase 14

139. Line sinker. Length 35mm; width 12mm; thickness 9mm
Line sinker, roughly oval in cross-section, made from a rolled sheet.

An opening has been left at one end of the object, and a small triangular hole perforates one side near to that end. The object has a hollow interior. The external surface bears several small indentations.

Context 10368; Find No 50250; Phase 6

140. Offcut. Length 39mm; width 4mm; thickness 2mm
Offcut with one knife-trimmed edge. (Not illustrated)
Context 0215; Find No 00216; Phase 14

141. Offcut. Length 34mm; width 16mm; thickness 5mm
Offcut with knife-trimmed edges, folded once. (Not illustrated)
Context 0256; Find No 00173; Phase 14

142. Offcut. Length 18mm; width 2mm; thickness 0.8mm
Offcut with one knife-trimmed edge. (Not illustrated)
Context 1401; Find No 00525; Phase 7

143. Offcut. Length 26mm; width 4mm; thickness 3mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10120; Find No 50109; Phase 21

144. Offcut. Length 52mm; width 38mm; thickness 2mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10126; Find No 50116; Phase 21

145. Offcut. Length 48mm; width 10mm; thickness 6mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10145; Find No 50114; Phase 20

146. Offcut. Length 17mm; width 7mm; thickness 2mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10145; Find No 50158; Phase 20

147. Offcut. Length 41mm; width 14mm; thickness 2mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10180; Find No 50542; Phase 22

148. Offcut. Length 34mm; width 5mm; thickness 2mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10180; Find No 51008; Phase 22

149. Offcut. Length 86mm; width 20mm; thickness 8mm
Offcut with one possibly knife-trimmed edge. The other edges are irregular. (Not illustrated)
Context 10189; Find No 50279; Phase 22

150. Offcut. Length 58mm; width 15mm; thickness 9mm
Offcut with one possibly knife-trimmed edge. The other edges are irregular. (Not illustrated)
Context 10189; Find No 51001; Phase 22

151. Offcut. Length 47mm; width 6mm; thickness 0.3mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10189; Find No 51002; Phase 22

152. Offcut. Length 19mm; width 3mm; thickness 0.3mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10189; Find No 51004; Phase 22

153. Offcut. Length 25mm; width 2mm; thickness 0.3mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10189; Find No 51005; Phase 22

154. Offcut. Length 10mm; width 4mm; thickness 1mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10189; Find No 51006; Phase 22

155. Offcut. Length 37 mm; width 5 mm; thickness 4 mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10215; Find No 50130; Phase 14

156. Offcut. Length 26mm; width 4mm; thickness 2mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 10807; Find No 50334; Phase 11

157. Offcut. Length 45mm; width 27mm; thickness 1mm
Offcut with knife-trimmed edges. (Not illustrated)
Context 12059; Find No 50394; Unphased

158. Spillage waste. Length 56mm; width 21mm; thickness 10mm
Once-molten waste with irregular edges. (Not illustrated)
Context 1214; Find No 00502; Phase 7

159. Spillage waste. Length 33mm; width 18mm; thickness 5mm
Once-molten waste with irregular edges. The texture of one surface indicates that the molten metal may have been spilled onto an uneven, sandy surface. (Not illustrated)
Context 1433; Find No 00527; Phase 7

160. Spillage waste. Largest piece: Length 231mm; width 182mm; max. thickness c 15mm
Pieces of once-molten waste with irregular edges. One surface of each piece indicates that the molten metal may have been spilled onto an uneven sand or clay surface. (Not illustrated)
Context 10386; Find No 50398; Phase 13

161. Spillage waste. Length 153mm; width 81mm; thickness 16mm
Once-molten waste with irregular edges. (Not illustrated)
Context 10869; Find No 50379; Phase 13

162. Waste. Length 70mm; width 41mm; thickness 2mm
Waste fragment with irregular edges. (Not illustrated)
Context 10107; Find No 50429; Phase 14

163. Waste. Length 48mm; width 12mm; thickness 2mm
Waste fragment with irregular edges. (Not illustrated)
Context 10180; Find No 51007; Phase 22

164. Waste. Length 33mm; width 13mm; thickness 6mm
Waste fragment with irregular edges. (Not illustrated)
Context 10189; Find No 51003; Phase 22

165. Waste. Length 9mm; width 8mm; thickness 2mm
Waste fragment with irregular edges. (Not illustrated)
Context 10283; Find No 50213; Phase 14

166. Waste. Length 31mm; width 15mm; thickness 8mm
Waste fragment with irregular edges. (Not illustrated)
Context 10288; Find No 50363; Phase 11

167. Waste. Length 16mm; width 4mm; thickness 1mm
Waste fragment with irregular edges. (Not illustrated)
Context 10349; Find No 50249; Phase 8

IRON OBJECTS

(illus 97-8)

ARROWHEAD

Residual in topsoil deposits, no 168 is a barbed and possibly socketed arrowhead, broken across its shaft. Among examples from England and Scandinavia, the form of no 168 is most closely paralleled by that of 12th- and 13th-century types (London Museum 1940, 68). Barbed and socketed arrowheads were used in hunting from the 14th century onwards, not being suitable for military use beyond that date as

they were not capable of penetrating the strengthened defensive body armour.

168. Arrowhead. Length 51mm; width 15mm; thickness 8mm. Barbed arrowhead with a broken circular cross-sectioned shaft. Possibly of a socketed type, although the shaft is solid at the point of fracture.

Context 10101; Find No 50028; Phase 24

BELL

Recovered from the deep soil deposits of Phase 14, no 169 is a bell, probably worn by a large animal such as a cow. Although the necessary suspension loop is missing, scars on the apex of the bell would appear to indicate its former position. Given the stratigraphic context of this bell, its date is unlikely to be later than the 10th century.

Bell made from iron sheet, with a roughly oval mouth and a horizontal apex. Scars at either end of the apex may indicate the position of a suspension loop, now missing. On the interior, just beneath the apex, a circular cross-sectioned, curved rod is attached. The clapper, which is now separate, would have been suspended from this rod. The clapper is rectangular in cross-section and hooked over at one end. It widens abruptly at the other end to form a club-shaped terminal. The exterior of the bell bears traces of copper alloy plating.

Context 0315; Find No 00230; Phase 14

169. Bell. Height 51mm; max. width at mouth 48mm; length of clapper 43mm

BELT FITTINGS

Nos 170-2 are parts of roughly D-shaped buckles of varying completeness. The most complete (no 170) is a plain buckle with an oval or D-shaped frame and its small size is indicative of use on a slender strap, perhaps on clothing or horse equipment. Little of the form of no 171 may now be discerned as it is so fragmentary and is very heavily corroded. No 172 may be part of a buckle frame and is the largest of the three examples.

cross-sectioned pin. The pin is curled over at one end for attachment to the frame. (Not illustrated)
Context 10126; Find No 50465; Phase 21

171. Buckle? Length 20mm; width 17mm; thickness 3mm. Possible buckle with a D-shaped frame. Parts of the frame and pin survive. Very heavily corroded. (Not illustrated)
Context 10238; Find No 50380; Phase 13

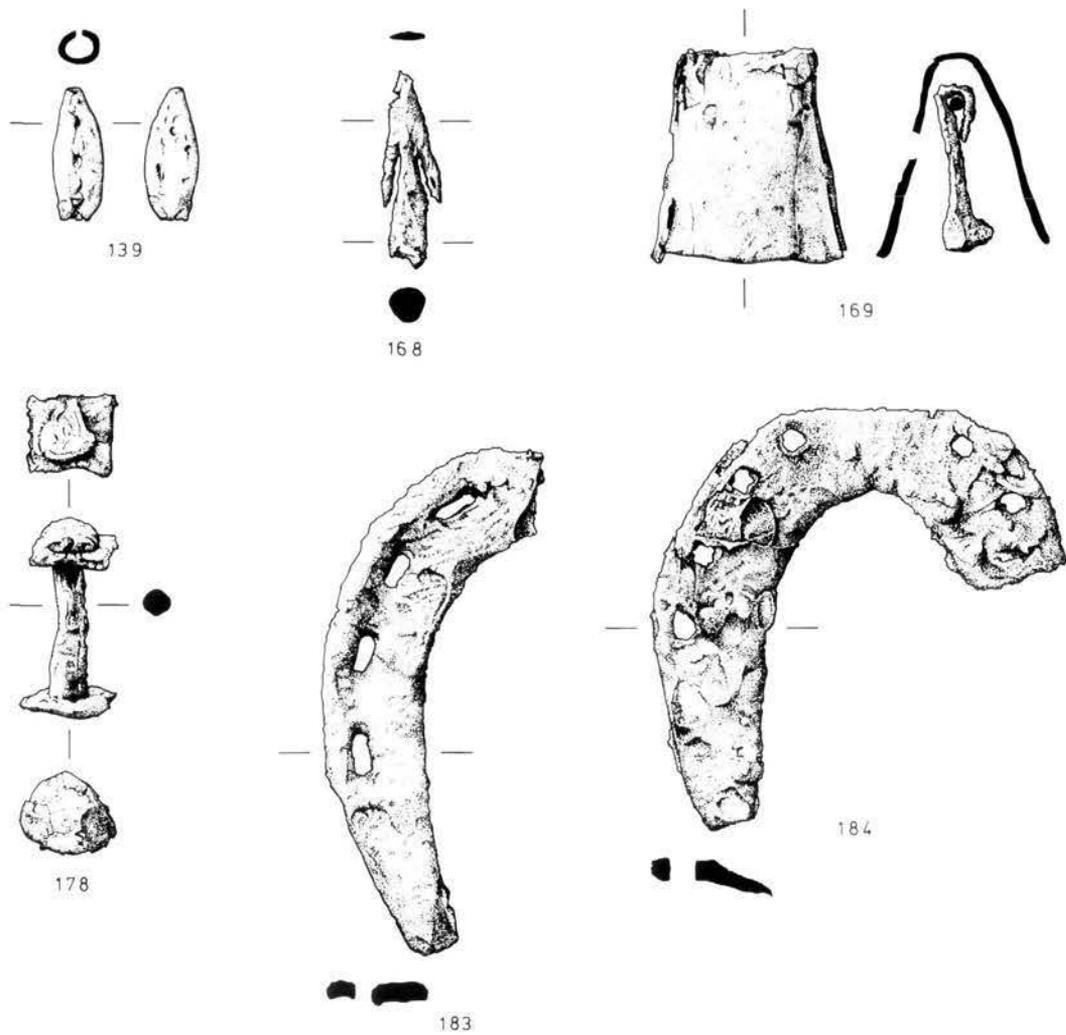
172. Buckle frame? Length 51mm; width 32mm; thickness 5mm. Possible buckle frame fragment, roughly D-shaped. (Not illustrated)
Context 10126; Find No 50098; Phase 21

170. Buckle. Length 21mm; width 11mm; thickness 3mm. Buckle with an oval or D-shaped frame and a rectangular

CLENCH BOLTS

Clench bolts, eight of which were recovered from the excavations, were used to secure a double thickness of timber. Each consists of a nail, which would have been driven through the timbers, and a rectangular or diamond-shaped plate called a rove, which was

placed over the tip of the nail. The nail tip would then have been clenched to secure the timbers in position. A series of clench bolts was found along the line of a timber-framed hall at Yeavinger, Northumberland (Hope-Taylor 1977, 49), indicating their use



Illus 97

Lead alloy line sinker (no 139), iron arrowhead (no 168), bell (no 169), clench bolt (no 178), horseshoes (nos 183 and 184). Scale 1:2.

in building construction. The Dunbar examples are predominantly from medieval contexts.

Three of the clench bolts (nos 174-6) are from a levelling deposit containing material thought to be derived from the demolition of the castle in Phase 19, and each has mineralised wood remains adhering to it. This group includes the largest and the smallest examples from the site. Nos 179 and 180 were both recovered from the extensive soil deposits of Phase 14 and are of similar form.

173. Clench bolt. Length 30mm; length of rove 16mm; width of rove 16mm; width of nail head 21mm
The nail has an irregularly shaped head and a rectangular cross-sectioned shaft. The rove is square. (Not illustrated)
Context 0249; Find No 00245; Phase 16

174. Clench bolt. Length 58mm; length of rove 26mm; width of rove 19mm; width of nail head 26mm
The nail has a roughly circular head and a rectangular cross-sectioned shaft. The rove is rectangular. Mineralized wood remains

are attached to the nail head and the rove. (Not illustrated)
Context 0258; Find No 00145; Phase 19

175. Clench bolt. Length 44mm; length of rove 23mm; width of rove 18mm; width of nail head 20mm
The nail has a roughly oval head and a rectangular cross-sectioned shaft. The rove is rectangular. Mineralized wood remains are attached to the rove. (Not illustrated)
Context 0258; Find No 00371; Phase 19

176. Clench bolt. Length 25mm; length of rove 17mm; width of rove 15mm; width of nail head 13mm
The nail has a roughly circular head and a possibly rectangular cross-sectioned shaft. Mineralized wood remains are attached to the nail and the rove. (Not illustrated)
Context 0258; Find No 00372; Phase 19

177. Clench bolt. Length 61mm; length of rove 25mm; width of rove 25mm; width of nail head 30mm
The nail has a roughly circular head and a probably circular cross-sectioned shaft. The rove is square. (Not illustrated)
Context 0488; Find No 00412; Phase 19

178. Clench bolt. Length 51mm; length of rove 21mm; width of rove 20mm; width of nail head 23mm

The nail has a roughly oval head and a circular cross-sectioned shaft. The rove is rectangular.

Context 1121; Find No 00451; Phase 18

179. Clench bolt. Length 39mm; length of rove 18mm; width of rove 16mm; width of nail head 16mm

The nail has an irregularly shaped head and a rectangular cross-sectioned shaft. The rove is rectangular. (Not illustrated)

Context 10287; Find No 50132; Phase 14

180. Clench bolt. Length 36mm; length of rove 20mm; width of rove 19mm; width of nail head 26mm

The nail has a roughly oval head and a rectangular cross-sectioned shaft. The rove is rectangular. (Not illustrated)

Context 10287; Find No 50333; Phase 14

HORSE EQUIPMENT

One complete horseshoe (no 181) and fragments of four others were recovered. All are of post-medieval date. No 181, a complete shoe of modern type, was found in the fill of a slit trench in Phase 24. Both no 182 and no 184 came from levelling deposits, in Phases 23 and 21 respectively. No 183 was found in the backfill of a deep ditch associated with the French fort, and no 185 was recovered from a deposit associated with a hearth cut into Courtyard 9 (Phase 21).

Nos 186-8 are mouthpiece links from bridle bits. None is complete. More complete examples have been found at Hereford (Shoemith 1985, 5, Fig 1, No 10) and Thetford (Goodall, I H 1984, 100, fig 138, nos 253-7). No 189 is part of a rowel spur, with one surviving arm and terminal.

181. Horseshoe. Length 69mm; width 71mm; thickness 6mm
Complete horseshoe with five evenly-spaced rectangular nail-holes. The nail-holes are lightly countersunk. (Not illustrated)
Context 0102; Find No 00097; Phase 24

182. Horseshoe. Length 96mm; width 23mm; thickness excluding nail 5mm

Horseshoe fragment with two surviving rectangular nail-holes, one of which is occupied. The nail-holes are lightly countersunk. (Not illustrated)

Context 3022; Find No 80303; Phase 23

183. Horseshoe. Length 132mm; width 27mm; thickness 8mm
Approximately half of a horseshoe, with four surviving rectangular

nail-holes. The nail-holes are lightly countersunk.

Context 3040; Find No 80355; Phase 21

184. Horseshoe. Length 108mm; width 30mm; thickness 6mm
Horseshoe fragment with six surviving nail-holes. The nail-holes are nearly square. The shoe has an irregular outline.

Context 10126; Find No 51000; Phase 21

185. Horseshoe. Length 89mm; width 24mm; thickness 8mm
Horseshoe fragment with two surviving rectangular nail-holes. It is broken across a third nail-hole. (Not illustrated)

Context 10188; Find No 50478; Phase 21

186. Mouthpiece link. Length 80mm; width 22mm; thickness 12mm

Mouthpiece link from a bridle bit, with looped terminals, one of which is missing. (Not illustrated)

Context 0170; Find No 00069; Phase 20

187. Mouthpiece link? Length 85mm; width 10mm; thickness 11mm

Probable mouthpiece link from a bridle bit. Both terminals are broken. Part of one loop survives. (Not illustrated)

Context 0256; Find No 00318; Phase 14

188. Mouthpiece link. Length 54mm; width 12mm; thickness 6mm

Mouthpiece link from a bridle bit, with looped terminals, one of which is broken. (Not illustrated)

Context 0424; Find No 00358; Phase 18

189. Spur. Length 143mm; length of neck 40mm; length of rowel box 32mm

Part of a rowel spur, with one surviving arm, with a single-loop terminal. There is a short projection at the junction of the arms. The neck is long and curved, and only one side of the rowel box survives. The rowel is missing. (Not illustrated)

Context 3073; Find No 80576; Unphased

KEYS

The kidney-shaped bow form of no 190 is a feature of keys of 15th- to 17th- century date, as at Sandal Castle (Goodall, I H 1983, 246-8). No 190 was found in a trench connecting two of the buildings of the French fort. No 191, which was recovered from topsoil deposits, has a bit at each end and on opposite sides of its shank, and would have been capable of opening two separate locks. Keys of this type were in existence by the 16th or 17th centuries.

190. Key. Length 74mm; width of bow 33mm; width of bit 20mm; max. diameter of shank 10mm

Nearly complete key with a kidney-shaped bow and a circular cross-sectioned shank. The shank is widest at the bow end and tapers towards the bit end, at which it is possibly broken. The bit has a complex arrangement of ward cuts.

Context 0264; Find No 00151; Phase 21

191. Key. Length 112mm; width of bit 20mm; diameter of shank 10mm

Complete key with a bit at each end. No bow is present. The shank is circular in cross-section and is encircled by four equidistant grooves. The bits, set on opposite sides of the shank, have different arrangements of ward cuts.

Context 10101; Find No 50019; Phase 24

KNIVES

A total of eleven knives, mostly fragmentary, was recovered from the site. Four of the knives (nos 192, probably 193, 198 and 200) are of whittle tang type, in which the tang would have been inserted into a solid handle. One of the knife handles (no 201) is an example of a scale tang type, in which plates or scales enclose the knife tang, being secured by rivets. No 202 is a handle from a folding knife. The remainder represented here consists of blade fragments which are of indeterminate type.

The earlier knives in this group are of whittle tang type. A recent study of over 300 knives from London revealed that all knives there which date to before the beginning of the 14th century are of whittle tang type (Cowgill *et al* 1987).

Among the whittle tang knives, no 198 is stratigraphically the earliest, coming from a midden deposit on the surface of Courtyard 5 (Phase 7). The cutting edge of this knife is slightly concave, possibly a reflection of wear resulting from repeated use. Excessive wear, resulting in inefficiency in use, may have prompted the discard of this knife, as it was possibly complete when deposited. No 200, also a nearly complete knife, was recovered from a deposit interpreted as part of the make-up of Courtyard 2 (Phase 9).

192. Knife. Length 90mm; width 12mm; thickness 6mm
Nearly complete blade and tang of a whittle tang knife. The blade back rises steeply away from the tang, then slopes steadily towards the tip. The edge is straight until it rises to meet the tip. The end of the tang is missing. (Not illustrated)
Context 0159; Find No 00053; Phase 21

193. Knife. Length 68mm; width 12mm; thickness 4mm
Blade fragment. The blade back is convex and the edge slightly concave. A small part of the tang, probably a whittle tang, survives. Attached to this are mineralized remains of a wooden handle. (Not illustrated)
Context 0208; Find No 00135; Phase 25

194. Knife? Length 33mm; width 10mm; thickness 2mm
Blade tip, probably from a knife. Heavily corroded. (Not illustrated)
Context 0249; Find No 00226; Phase 16

195. Knife. Length 55mm; width 17mm; thickness 5mm
Blade fragment. The blade back is convex and the edge slightly concave. (Not illustrated)
Context 0259; Find No 00306; Phase 21

196. Knife. Length 44mm; width 9mm; thickness 3mm
Blade fragment. The blade back and edge run nearly parallel to each other before beginning to converge near to the tip. (Not illustrated)
Context 0423; Find No 00400; Phase 18

197. Knife. Length 71mm; width 14mm; thickness 4mm
Blade fragment. The blade back is convex. The edge is nearly straight, rising towards the tip. (Not illustrated)
Context 0914; Find No 00127; Phase 20

198. Knife. Length 95mm; width 13mm; thickness 4mm
Nearly complete blade and tang of a whittle tang knife. The blade back rises steeply away from the slender tang and then dips gradually towards the tip. The edge is slightly concave. The blade is heavily corroded in its mid-section. (Not illustrated)
Context 1164; Find No 00496; Phase 7

199. Knife. Length 68mm; width 9mm; thickness 4mm
Blade only, of slender form. The blade back is slightly convex, sloping steadily towards the tip. The edge is almost straight, rising where it meets the tip. The tang is missing. (Not illustrated)
Context 3022; Find No 80302; Phase 23

200. Knife. Length 114mm; width 13mm; thickness 5mm
Complete blade and tang of a whittle tang knife. The blade back is straight until it dips gradually towards the tip. The edge is also straight until it rises to meet the tip.
Context 10196; Find No 50497; Phase 9

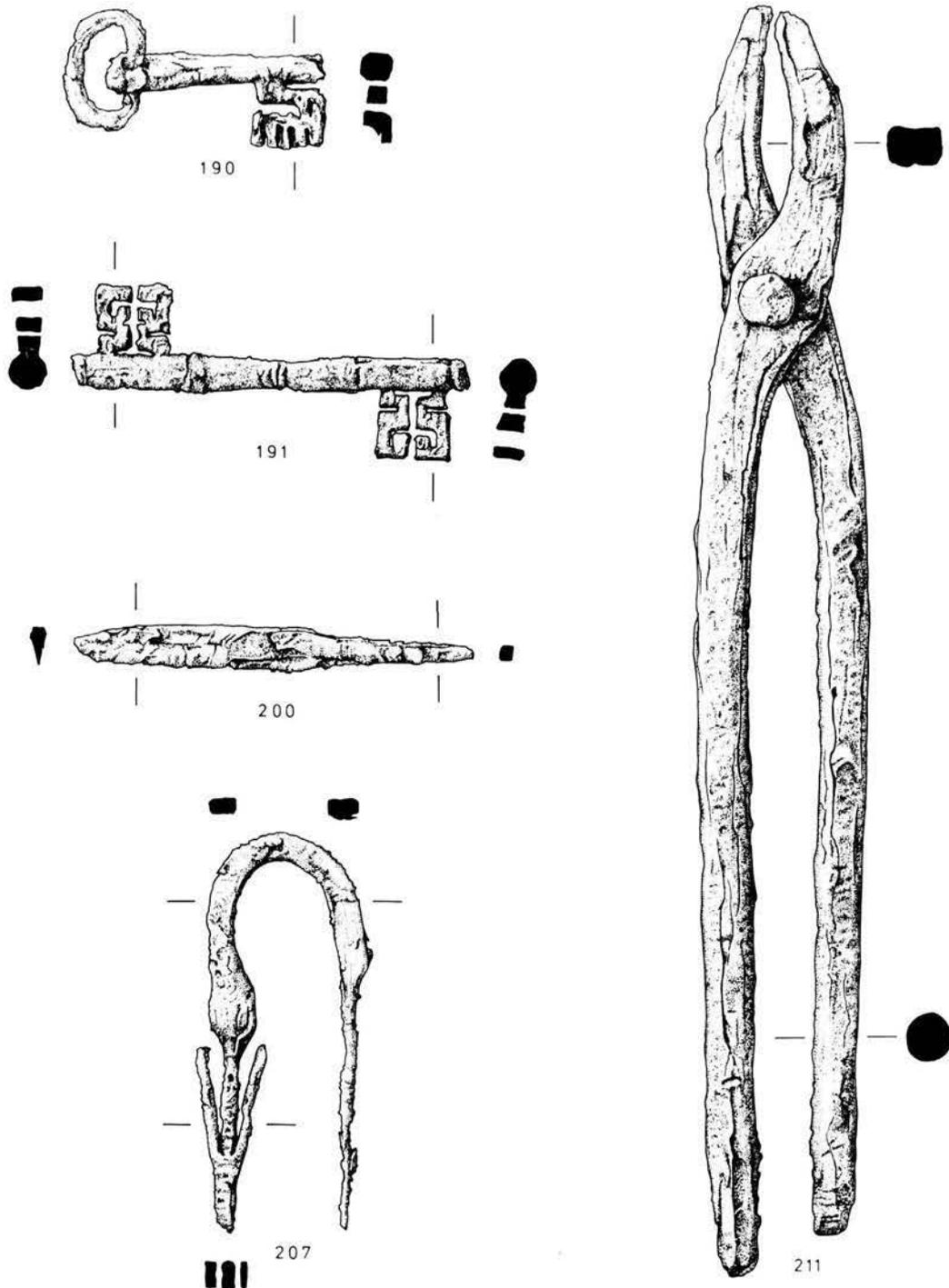
201. Knife handle. Length 78mm; width 18mm; thickness 12mm
Knife handle, of scale tang type. The tang is complete and has nearly complete bone scales attached to each side by means of three evenly-spaced iron rivets. The scales are derived from a large ungulate long bone shaft and have convex surfaces. The tang has a shoulder where it joined the blade. The blade is missing. (Not illustrated)
Context 5001; Find No 90076; Phase 24

202. Knife handle. Length 116mm; width 22mm; thickness 17mm
Handle from a folding knife. Two iron side plates and a rectangular cross-sectioned bar at the base of the handle enclosed the blade. The side plates join to form a solid terminal. Bone scales, derived from a large ungulate long bone shaft or antler, are attached to the side plates by iron rivets. Of one of the scales only traces survive. The blade, which would have been hinged at the narrower end of the enclosing handle, is entirely missing. (Not illustrated)
Context 5029; Find No 90005; Phase 24

MAIL

A mass of corroded links, representing a fragment of mail (no 203), was among several iron objects found in deposits surrounding a hearth cut into Courtyard 9 (Phase 21).

203. Mail. Overall dimensions: Length 61mm; width 32mm; thickness 29mm. Individual links: Max. diameter c 12mm; thickness c 2mm
Fragment of mail, comprising over 50 links, corroded together in a single mass. The individual links are roughly oval, with circular cross-sectioned edges. They are linked in a complex, overlapping pattern. (Not illustrated)
Context 10188; Find No 50492; Phase 21



Illus 98
Iron keys (nos 190, 191), knife (no 200), padlock mechanism (no 207) and tongs (no 211). Scale 1:2.

PADLOCK CASING (POSSIBLE)

A hollow rectangular object with raised strips on both faces (no 204) is possibly a padlock casing. Traces of copper alloy corrosion products on its surfaces

indicate that it was probably plated. It was recovered from Soil 1 (Phase 6).

204. Padlock casing? Length 84mm; width 44mm; thickness 28mm
Possible casing from a padlock, rectangular in shape, with raised central strips on both faces. Both ends of the object are partially

obscured by attached wood pseudomorphs. The object has been plated with copper alloy, which survives only in the form of traces of corrosion products. Heavily corroded. (Not illustrated)
Context 10368; Find No 50285; Phase 6

PADLOCK KEY (POSSIBLE)

Medieval barrel padlocks were opened by keys which were drawn or pushed along the springs of the internal mechanism. No 205 is possibly part of such a key, with both its terminals broken. It has an angled shank similar to that of an unstratified padlock key from Goltho (Goodall, I H 1975, 83, fig 39, no 52) and is plated with a lead tin alloy.

205. Padlock key? Length 61mm; width of bit 11mm; width of shaft 6mm; thickness 4mm
Possible barrel padlock key. The object has a rectangular cross-sectioned shank, broken at one end and angled near to the other end, which bifurcates to form a possible broken bit. XRF analysis revealed that the object had been plated with a lead tin alloy, only traces of which survive. (Not illustrated)
Context 10192; Find No 50493; Phase 21

PADLOCK MECHANISMS

Nos 206 and 207 are parts of the internal mechanisms of barrel padlocks, each consisting of a spring and bolt, separated by a loop. Barrel padlocks were in almost universal use during the medieval period for locking doors, gates, chests and boxes (Goodall, I H 1981, 60). The two examples here are from locks of roughly similar proportions and each has a slender bolt, although that of no 206 is largely missing. The two differ in the alignment of their spring mechanisms. No 206 is from one of a group of deposits surrounding a hearth in Phase 21. No 207 is from an unphased context.

206. Padlock mechanism. Length 96mm; width 45mm; thickness 17mm
Part of a spring and bolt mechanism from a barrel padlock. The spring survives in a heavily corroded condition. The bolt is missing. The rectangular cross-sectioned loop narrows abruptly where it joins the bolt, suggesting that the latter may have been of slender form. (Not illustrated)
Context 0146; Find No 00077; Phase 21

207. Padlock mechanism. Length 114mm; width 45mm; thickness 11mm
Spring and bolt mechanism from a barrel padlock. The spring and bolt are of equal length and are joined by a rectangular cross-sectioned loop. The bolt is slender and is heavily corroded.
Context 1122; Find No 00434; Unphased

STAPLES

Staples such as nos 208-10, of U-shaped form, have been in use over a considerable period of time and may be put to a variety of uses such as closing chests and boxes, and fastening doors or gates in conjunction with a hasp. Nos 209 and 210 were recovered from 19th-century landscaping features above the curtain wall.

208. Staple? Length 33mm; width 20mm; thickness 3mm
Possible U-shaped staple with rectangular cross-sectioned arms, tapering in thickness. Both arms are broken. (Not illustrated)

Context 0306; Find No 00208; Phase 20

209. Staple. Length 75mm; width 45mm; thickness 13mm
U-shaped staple. The arms are diamond-shaped in cross-section and terminate in points. (Not illustrated)
Context 10108; Find No 50024; Phase 24

210. Staple. Length 62mm; width 39mm; thickness 12mm
U-shaped staple. The arms are diamond-shaped in cross-section. Both arms are broken. (Not illustrated)
Context 10108; Find No 50025; Phase 24

TONGS

Pairs of iron tongs such as no 211 are often ascribed an iron-working function, as exemplified by a pair

from Garranes in Ireland (O'Riordáin 1942). The function of such tongs would be to hold hot objects

at some distance from the hand, hence the length of the handles, and they could equally have been used in domestic cooking with handled iron vessels as for an industrial function. A medieval illustration in Philip of Burgundy's Book of Hours shows a pair of tongs similar to no 211 beside a fire in a domestic kitchen (Ruempol & van Dongen 1991, 272).

211. Tongs. Length 369mm; max. width 47mm; max. thickness 21mm

Complete pair of tongs with circular cross-sectioned handles, becoming rectangular in cross-section as they approach their junction. The two pivot about a single rivet, the circular head of which projects from one side.

Context 0215; Find No 00271; Phase 14

TOOLS

No 212 is probably a chisel or a set. Blacksmith's sets, for cutting cold iron, often develop a burred head as a result of repeated strikes. The condition of the head of no 212 is uncertain, as the object is severely laminated. No 215 has a spoon-shaped blade and is probably an auger bit, used to bore holes in wood. It was recovered from the fill of Trench 2 in Phase 16.

212. Chisel or set. Length 49mm; width 20mm; max. thickness 16mm

Chisel or small set, tapering in thickness towards a wedge-shaped tip. Pseudomorphs of wood are attached to one side. Severely laminated and heavily corroded. (Not illustrated)

Context 0259; Find No 00316; Phase 21

213. Chisel? Length 64mm; width 26mm; thickness 10mm

Possible chisel, with a broad wedge-shaped tip. The object tapers towards the other end, which is broken. (Not illustrated)

Context 10156; Find No 50063; Phase 14

214. Tool. Length 179mm; width 9mm; thickness 6mm

Tool in the form of a slender rod, rectangular in cross-section at one end with a wedge-shaped tip. At the other it becomes circular in cross-section, tapering and becoming twisted at the pointed end. (Not illustrated)

Context 0258; Find No 00373; Phase 19

215. Tool? Length 46mm; width 9mm; thickness 8mm

Probable tool, with a concavo-convex spoon-like terminal. The object appears to bifurcate at the other end, where it is broken. (Not illustrated)

Context 0392; Find No 00324; Phase 16

216. Tool. Length 143mm; width 10mm; thickness 10mm

Possible reamer, rectangular in cross-section at one end with a wedge-shaped tip, becoming circular or square in cross-section at the other end and terminating in a point. (Not illustrated)

Context 0424; Find No 00363; Phase 18

217. Tool? Length 86mm; width 13mm; thickness 11mm

Possible tool fragment, in the form of a tapering, rectangular cross-sectioned object, terminating in a point. The other end appears to be broken. (Not illustrated)

Context 1258; Find No 00500; Phase 7

218. Tool? Length 63mm; width 7mm; thickness 5mm

Possible tool, in the form of a rod. It is rectangular in cross-section at one end with a wedge-shaped tip. At the other it becomes circular in cross-section and is broken. (Not illustrated)

Context 1458; Find No 00521; Phase 8

219. Tool? Length 127mm; width 20mm; thickness 10mm

Probable tool, with a circular cross-sectioned, pointed tang, bifurcating to form two flat side plates with rounded terminals, which appear to hold between them a plate or blade. The two side plates are possibly joined by a rivet at the open end. Heavily corroded. (Not illustrated)

Context 10288; Find No 50358; Phase 11

MISCELLANEOUS

No 220, of unknown function, resembles a lock bolt, although it is of slender form in comparison to more securely identified examples, for instance from Southampton (Harvey 1975, 285, fig 255, no 2077). No 224, in the form of a curved strip, decorated by ring and dot ornament and plated with copper alloy, may be a fragment of a brooch.

Eye bolts were driven into woodwork or crevices in stone walls, for the suspension of chains or other objects. No 225 may have functioned as an eye bolt, although the eye is now broken. Eye bolts with incomplete chain links attached have been found in medieval contexts in St Andrews and Perth (Maxwell 1997; Cox 1996c, 775).

No 226 is a hollow object, now broken and heavily corroded, which may represent part of a ferrule, from a walking cane or staff for example. No 227, a small fitting pierced by a single rivet, may be a fragment of a small strap hinge.

The hooked terminals of nos 231 and 240 resemble those on some Viking-age and medieval keys and padlock keys. This type of terminal became the commonest form of padlock key handle during the medieval period, with examples found at several sites, including London (London Museum 1940, 146-8) and Goltho (Goodall, I H 1975, 83). No 231 has only a slender shank and may have been too insubstantial to have functioned as a key, however

no 240 is more robust and may represent a key terminal.

A single iron needle, broken across its eye (no 236), was recovered from levelling deposits in Phase 19.

Nos 241 and 242 may represent vessel handles. No 242 was made by twisting a square cross-sectioned bar. As it was recovered from the soil deposits of Phase 14 (Soil 3), its immediate functional associations are lost. A similar object, thought to be a Saxon survival, was found in a 10th-century feature at Walton, Buckinghamshire (Farley 1976, 237, fig 33, no 3).

220. Bolt? Length 231mm; width 12mm; thickness 6mm
Possible lock bolt, made from a rectangular cross-sectioned bar, hooked over at one end. The other end is broken. (Not illustrated)
Context 1515; Find No 00568; Phase 7

221. Boss? Length 42mm; width 12mm; thickness 3mm
Possible boss or curved plate fragment with irregular, broken edges. Both surfaces have been plated with copper alloy. (Not illustrated)
Context 10459; Find No 50306; Phase 18

222. Curved bar. Length 68mm; width 10mm; thickness 9mm
Rectangular cross-sectioned bar, curved at one end. Broken at both ends. (Not illustrated)
Context 0111; Find No 00157; Phase 21

223. Curved bar. Length 120mm; width 6mm; thickness 6mm
Curved, square cross-sectioned bar, forming approximately a quarter arc of a circle, with traces of copper alloy plating on all surfaces. Both ends are irregular. One is plated with copper alloy, suggesting that it is the original terminal of the object. (Not illustrated)
Context 0423; Find No 00359; Phase 13

224. Decorated strip. Length 39mm; width 18mm; thickness 9mm
Rectangular cross-sectioned strip, curved and then broken at one end. At the other, a roughly rectangular loop projects from one side. On the other side, the object bears ring and dot decoration. The object has been plated on all surfaces with copper alloy. (Not illustrated)
Context 10238; Find No 50214; Phase 13

225. Eye bolt? Length 73mm; width 24mm; thickness 6mm
Possible eye bolt with a rectangular cross-sectioned shaft, tapering towards a missing point. At the other end is a broken loop. (Not illustrated)
Context 10235; Find No 50331; Phase 14

226. Ferrule? Length 55mm; width 21mm; thickness 17mm
Possible ferrule fragment, irregular in shape, with a hollow interior. Broken at both ends. (Not illustrated)
Context 0469; Find No 00333; Phase 19

227. Fitting. Length 41mm; width 12mm; thickness 5mm
Rectangular cross-sectioned strip, broken at one end and perforated by a rivet. At the unbroken end it tapers and thickens abruptly to form a narrow projection. (Not illustrated)
Context 0307; Find No 00263; Phase 20

228. Fitting. Length 16mm; width 7mm; thickness 4mm
Object with a circular terminal from which a rivet projects. A rectangular cross-sectioned strip with a broken end adjoins the terminal. (Not illustrated)
Context 10238; Find No 50382; Phase 13

229. Hook? Length 40mm; width 26mm; thickness 5mm

Possible hook made from a rectangular cross-sectioned bar, tapering towards both ends. (Not illustrated)
Context 10241; Find No 50172; Phase 13

230. Hooked strip. Length 38mm; width 13mm; thickness 8mm
Rectangular cross-sectioned strip, hooked over at one end. (Not illustrated)
Context 0335; Find No 00256; Phase 13

231. Hooked strip. Length 42mm; width 7mm; thickness 3mm
Rectangular cross-sectioned strip with a hooked terminal at its wider end. The other end is broken. (Not illustrated)
Context 0424; Find No 00382; Phase 18

232. Hooked strip. Length 66mm; width 10mm; thickness 4mm
Rectangular cross-sectioned strip, hooked over at its narrower end. (Not illustrated)
Context 10245; Find No 50178; Phase 23

233. Loop. Length 34mm; width 24mm; thickness 6mm
Loop made from a rectangular cross-sectioned strip. One end is broken. (Not illustrated)
Context 10101; Find No 50030; Phase 24

234. Loop. Diameter 38mm; max. thickness 6mm
Circular loop with a circular cross-sectioned edge of varying thickness. (Not illustrated)
Context 10188; Find No 50253; Phase 21

235. Loop. Length 27mm; width 6mm; thickness 4mm
Loop made from a rectangular cross-sectioned strip. One end is broken. (Not illustrated)
Context 10312; Find No 50252; Phase 12

236. Needle. Length 48mm; width at eye 3mm
Needle with an oval cross-sectioned shaft, narrowing in thickness at the oval eye, which is partially broken. The long axis of the eye appears to run at right angles to that of the shaft. (Not illustrated)
Context 0258; Find No 00364; Phase 19

237. Ring. Diameter 40mm; thickness 25mm
Plain ring made from a rectangular cross-sectioned strip. The two ends probably overlapped and were hammered together. (Not illustrated)
Context 3036; Find No 80351; Phase 22

238. Rod. Length 92mm; diameter 3mm
Circular cross-sectioned rod, broken at both ends. (Not illustrated)
Context 0341; Find No 00304; Phase 20

239. Rod. Length 135mm; width 5mm; thickness 5mm
Rectangular cross-sectioned rod, slightly curved. Broken at both ends. (Not illustrated)
Context 0905; Find No 00101; Phase 20

240. Terminal? Length 58mm; width 16mm; thickness 5mm
Possible decorative terminal from a padlock key or other device, in the form of a rectangular cross-sectioned strip, hooked over at its end. The object tapers at the other end and is broken. (Not illustrated)
Context 10215; Find No 50168; Phase 14

241. Vessel handle? Length 127mm; width 16mm; thickness 11mm
Possible vessel handle in the form of a curved bar with a central rib running along the convex surface. Traces of copper alloy plating survive on all surfaces. Broken at both ends. (Not illustrated)
Context 0935; Find No 00414; Unphased

242. Vessel handle? Length 100mm; width 6mm; thickness 6mm
Possible vessel handle in the form of a curved and twisted bar. The bar was originally square in cross-section and has been twisted several times along its length. It is broken at both ends. (Not illustrated)
Context 10269; Find No 50187; Phase 14

BARS

243. Bar. Length 60mm; width 9mm; thickness 8mm
Rectangular cross-sectioned bar, broken at both ends and heavily corroded. (Not illustrated)
Context 0111; Find No 00219; Phase 21

244. Bar. Length 131mm; width 18mm; thickness 9mm
Rectangular cross-sectioned bar of uneven width. The bar bifurcates at one end and is then broken. The other end is also broken. (Not illustrated)
Context 0215; Find No 00176; Phase 14

245. Bar. Length 97mm; width 10mm; thickness 10mm
Sub-rectangular cross-sectioned bar, becoming rectangular in cross-section at one end. (Not illustrated)
Context 0256; Find No 00174; Phase 14

246. Bar. Length 54mm; width 15mm; max. thickness 11mm
Rectangular cross-sectioned bar, tapering in thickness towards one end. Heavily corroded. (Not illustrated)
Context 0259; Find No 00277; Phase 21

247. Bar. Length 77mm; width 15mm; thickness 5mm
Rectangular cross-sectioned bar, broken at both ends and heavily

corroded. (Not illustrated)
Context 0375; Find No 00285; Phase 15

248. Bar. Length 95mm; width 13mm; max. thickness 9mm
Irregular cross-sectioned bar, broken at both ends and heavily corroded. (Not illustrated)
Context 0934; Find No 00423; Phase 15

249. Bar. Length 89mm; width 21mm; thickness 5mm
Rectangular cross-sectioned bar. One end is possibly original; the other is broken. (Not illustrated)
Context 1239; Find No 00497; Phase 6

250. Bar. Length 64mm; width 17mm; thickness 7mm
Rectangular cross-sectioned bar, curved at one end. Broken at both ends and heavily corroded. (Not illustrated)
Context 10156; Find No 50064; Phase 14

251. Bar. Length 97mm; width 15mm; thickness 10mm
Rectangular cross-sectioned bar, broken at both ends. (Not illustrated)
Context 10287; Find No 50332; Phase 14

MISCELLANEOUS FRAGMENTS

Several miscellaneous fragments of iron were recovered and have been classified as plates, sheets, strips and other fragments, according to their form. Some are probably parts of broken artefacts, while others may represent waste material associated with artefact manufacture. No 253, from Building 10 (Phase 20) may represent a fragment of armour.

252. Plate. Length 51mm; width 25mm; thickness 10mm
Plate fragment with irregular edges. Heavily corroded. (Not illustrated)
Context 0259; Find No 00305; Phase 21

253. Plate. Length 116mm; width 67mm; thickness 2mm
Plate with one possibly original, slightly curved edge. The other edges are irregular. There is a roughly circular hole (diameter 4mm) near to one edge. (Not illustrated)
Context 0306; Find No 00206; Phase 20

254. Plate. Length 46mm; width 40mm; thickness 3mm
Curved plate fragment with irregular edges. (Not illustrated)
Context 1121; Find No 00452; Phase 18

255. Plate. Length 115mm; width 67mm; thickness 5mm
Plate with irregular edges and a regular curvature. It appears to have been perforated in at least three places by circular or oval holes of different sizes. (Not illustrated)
Context 3034; Find No 80367; Phase 21

256. Plate. Length 72mm; width 42mm; thickness 4mm; diameter of hole 5mm
Plate with one straight edge. The other edges are irregular. There is a circular hole near to the straight edge. (Not illustrated)
Context 10188; Find No 50491; Phase 21

257. Plate. Length 44mm; width 41mm; thickness 9mm
Plate with irregular edges. Mineralized wood and possibly straw remains are attached to both surfaces. (Not illustrated)

Context 10434; Find No 50313; Unphased

258. Plate. Length 54mm; width 35mm; thickness 7mm
Plate with irregular edges and a slight curvature. Mineralized wood remains are attached to the concave surface. (Not illustrated)
Context 10460; Find No 50302; Phase 18

SHEETS

259. Sheet. Length 31mm; width 24mm; thickness 1mm
Sheet with irregular edges. Mineralized wood remains are attached to one surface. (Not illustrated)
Context 0291; Find No 00235; Phase 7

260. Sheet. Length 70mm; width 41mm; thickness 2mm
Roughly rectangular sheet. Mineralised wood remains are attached to both surfaces. Heavily corroded. (Not illustrated)
Context 0320; Find No 00265; Phase 21

STRIPS

261. Strip. Length 45mm; width 5mm; thickness 3mm
Rectangular cross-sectioned strip, slightly curved and broken at both ends. (Not illustrated)
Context 0258; Find No 00389; Phase 19

262. Strip. Length 36mm; width 6mm; thickness 5mm
Curved, rectangular cross-sectioned strip, broken at both ends. (Not illustrated)
Context 0376; Find No 00281; Phase 21

263. Strip. Length 118mm; width 8mm; thickness 6mm
Rectangular cross-sectioned strip with an irregular curvature. Broken at both ends and heavily corroded. (Not illustrated)
Context 3026; Find No 80320; Phase 23

264. Strip. Length 43mm; width 6mm; thickness 3mm
Rectangular cross-sectioned strip with a small notch at one end. The other end is broken. (Not illustrated)
Context 3034; Find No 80361; Phase 21

265. Strip. Length 44mm; width 10mm; thickness 4mm
Rectangular cross-sectioned strip, widening and angled at one end.
The other end is broken. (Not illustrated)
Context 10101; Find No 50055; Phase 24

266. Strip. Length 52mm; width 8mm; thickness 4mm
Rectangular cross-sectioned strip, possibly perforated by a rivet
at one end. Broken at both ends and heavily corroded. (Not
illustrated)
Context 10158; Find No 50083; Phase 18

267. Strip. Length 37mm; width 9mm; thickness 3mm
Rectangular cross-sectioned strip, broken at both ends and heavily
corroded. (Not illustrated)
Context 10188; Find No 50477; Phase 21

268. Strip. Length 57mm; width 7mm; thickness 2mm
Rectangular cross-sectioned strip, bent back upon itself. Broken at
both ends. (Not illustrated)
Context 10315; Find No 50258; Phase 9

269. Strip. Length 48mm; width 6mm; thickness 3mm
Sub-rectangular cross-sectioned strip, broken at both ends. (Not
illustrated)
Context 10895; Find No 50365; Phase 9

FRAGMENTS

270. Fragment. Length 36mm; width 17mm; thickness 5mm
Roughly triangular fragment, with one long edge folded and
hammered down. Broken at both ends. (Not illustrated)
Context 0299; Find No 00236; Phase 13

271. Fragment. Length 30mm; width 11mm; thickness 7mm
Rectangular cross-sectioned fragment, broken at both ends. (Not
illustrated)
Context 0430; Find No 00323; Phase 12

272. Fragment. Length 79mm; width 38mm; thickness 14mm
Fragment of nearly triangular cross-section, broken at both ends.
Pseudomorphs of wood are attached to the surface of the object.
(Not illustrated)
Context 1468; Find No 00530; Phase 8

273. Fragment. Length 64mm; width 15mm; thickness 13mm
Sub-rectangular cross-sectioned fragment, broken at both ends.
(Not illustrated)
Context 3035; Find No 80348; Phase 22

274. Fragment. Length 27mm; width 19mm; thickness 6mm
Diamond-shaped fragment with a short, broken projection from
one corner. (Not illustrated)
Context 10368; Find No 50261; Phase 6

STONE OBJECTS

POSSIBLE BEADS (CRINOID STEMS) (illus 99)

Several discoid and cylindrical objects identified by the excavators as beads are in fact fragments of fossil crinoid stems, which occur abundantly in local geological strata. Some have a naturally hollow central column and may have been utilized as beads in their unmodified state. Only those examples which appear to exhibit polishing or other modification (nos 275-9) have been included in the catalogue. All were found in Soil 3 in Phase 14.

275. Bead? Diameter 11mm; thickness 3mm
Possible bead, derived from a fossil crinoid stem fragment.
Discoid, with a circular central hole. The hole is possibly counter-
sunk from both sides. (Not illustrated)
Context 0215; Find No 00218; Phase 14

276. Bead? Diameter 7mm; thickness 3mm
Possible bead, derived from a fossil crinoid stem fragment.

Cylindrical, with a roughly circular central hole. Polished. (Not
illustrated)
Context 0215; Find No 00302; Phase 14

277. Bead? Diameter 9mm; thickness 3mm
Possible bead, derived from a fossil crinoid stem fragment.
Discoid, with a roughly circular central hole. The hole is possibly
countersunk from both sides. Polished.
Context 0256; Find No 00189; Phase 14

278. Bead? Diameter 9mm; thickness 2mm
Possible bead, derived from a fossil crinoid stem fragment.
Discoid, with a pentagonal central hole. Polished. (Not illustrated)
Context 0256; Find No 00309; Phase 14

279. Bead? Diameter 7mm; max. thickness 3mm
Possible bead, derived from a fossil crinoid stem fragment.
Discoid, with a roughly circular central hole. Its thickness is
considerably greater at one side than the other. Polished. (Not
illustrated)
Context 10269; Find No 50192; Phase 14

BUILDING STONE (illus 99)

Faced building stone fragments were recovered from a range of phases. A small cluster was noted around Phases 20-21 but no spatial concentrations were recorded among the retained fragments. The majority of fragments have a single surviving face or worked edge. Tool marks have been noted on some examples and traces of mortar are attached to some.

No 285, from the surface of Courtyard 5 (Phase 7), bears horizontal and vertical decoration. Nos 289 and 300, re-used as parts of a hearth base in Phase 21, may have come from the curtain wall (Phase 18).

280. Building stone. Length 320mm; width 298mm; thickness 181mm

Faced stone. Heavily tooled. (Not illustrated)
Context 0239; Find No 00163; Phase 20

281. Building stone. Length 540mm; width 400mm; thickness 195mm

Building stone with one surviving face. (Not illustrated)
Context 0253; Find No 00134; Unphased

282. Building stone. Length 292mm; width 219mm; thickness 233mm

Faced stone. Some tool marks are visible. Mortar is attached to two faces. (Not illustrated)
Context 0277; Find No 00168; Phase 20

283. Building stone. Length 110mm; width 81mm; thickness 42mm

Faced stone. (Not illustrated)
Context 0297; Find No 00252; Phase 20

284. Building stone. Length 312mm; width 299mm; thickness 91mm

Faced stone bearing tool marks. (Not illustrated)
Context 0328; Find No 00471; Phase 7

285. Building stone. Length 310mm; width 296mm; thickness 97mm

Faced stone, decorated on both surviving faces by a series of horizontal and vertical bands. There is some pitting on one decorated face.
Context 0328; Find No 00474; Phase 7

286. Building stone. Length 170mm; width 169mm; thickness 53mm

Corner fragment of a faced stone. (Not illustrated)
Context 0451; Find No 00390; Phase 7

287. Building stone. Length 476mm; width 401mm; thickness 120mm

Roughly rectangular block, heavily eroded on one face. (Not illustrated)
Context 0912; Find No 00453; Phase 20

288. Building stone. Length 603mm; width 260mm; thickness 289mm

Faced stone. (Not illustrated)
Context 0914; Find No 00129; Phase 20

289. Building stone. Length 381mm; width 240mm; thickness 149mm

Roughly rectangular block with a bevelled edge. Heavily tooled faces. Mortar is attached to one face and one edge. (Not illustrated)
Context 0919; Find No 00111; Phase 21

290. Building stone. Length 365mm; width 313mm; thickness 297mm

Faced stone, in two conjoining pieces. Heavily tooled on two faces. (Not illustrated)
Context 0934; Find No 00470; Phase 15

291. Building stone? Length 382mm; width 337mm; thickness 229mm

Possible building stone. Roughly squared. (Not illustrated)

Context 0937; Find No 00471; Phase 15

292. Building stone. Length 258mm; width 221mm; thickness 170mm

Faced stone. Mortar is attached to one face. Some tool marks are visible. (Not illustrated)
Context 1122; Find No 00455; Unphased

293. Building stone. Length 568mm; width 299mm; thickness 217mm

Faced stone. Some tool marks are visible. (Not illustrated)
Context 1160; Find No 00476; Phase 19

294. Building stone. Length 346mm; width 321mm; thickness 152mm

Faced stone of irregular shape. (Not illustrated)
Context 2210; Find No 00550; Phase 7

295. Building stone. Length 133mm; width 105mm; thickness 82mm

Fragment with one curved face. Mortar is attached to all faces. (Not illustrated)
Context 3032; Find No 80369; Phase 22

296. Building stone. Length 114mm; width 95mm; thickness 87mm

Curved fragment with broken edges. Some tool marks are visible. (Not illustrated)
Context 10102; Find No 50434; Phase 24

297. Building stone. Length 132mm; width 105mm; thickness 45mm

Faced stone. Eroded condition. (Not illustrated)
Context 10126; Find No 50468; Phase 21

298. Building stone. Length 259mm; width 170mm; thickness 79mm

Faced stone. (Not illustrated)
Context 10229; Find No 50124; Phase 18

299. Building stone. Length 290mm; width 162mm; thickness 109mm

Faced stone with a shallow, rectangular cross-sectioned groove running around all four faces. Possibly an upright. (Not illustrated)
Context 10229; Find No 50420; Phase 18

300. Building stone. Length 292mm; width 219mm; thickness 89mm

Building stone with one bevelled edge. There are traces of mortar on the edges. (Not illustrated)
Context 10509; Find No 50428; Phase 21

301. Building stone. Length 248mm; width 231mm; thickness 129mm

Faced stone. Heavily tooled. (Not illustrated)
Context 10908; Find No 50424; Phase 15

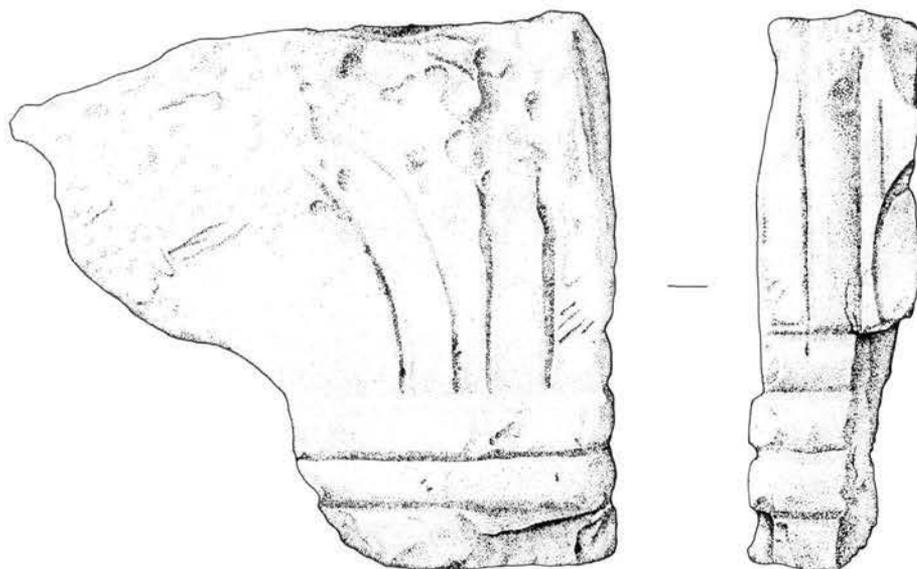
302. Building stone. Length 121mm; width 107mm; thickness 33mm

Corner fragment of a faced stone. (Not illustrated)
Context 12210; Find No 50556; Phase 4

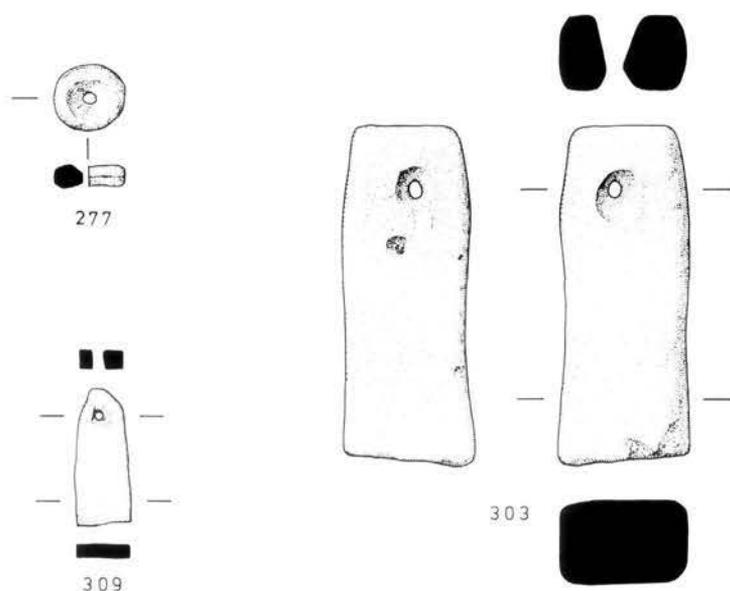
HONES (illus 99)

Hones were used to sharpen knives and other implements. Various types of stone were used for this purpose, although those which consist of a hard mineral set within a softer matrix were widely preferred for their superior honing qualities (Moore

& Oakley 1979, 280). A total of seven examples was recovered. Of these, three (nos 303, 307 and 309) have holes for suspension, possibly from a belt.



285



277

303

309

Illus 99

Possible stone bead (no 277), building stone (no 285), hones (nos 303 and 309). Scale: no 285 is at 1:4 and the rest at 1:2.

Three hones (nos 305, 307 and 308) have linear scratches or grooves on their surfaces, possibly caused by the sharpening of pins or needles. Hones with needle-sharpening grooves are known from other excavations, for example Kings Lynn (Geddes 1977, 317) and Thetford (Rogerson & Dallas 1984, 107-11).

303. Hone. Length 89mm; width 32mm; thickness 24mm. Rectangular cross-sectioned hone, broken at one end. A circular hole (max. diameter 13mm) has been bored at the other end. It widens at both faces of the object. Below the hole on one face is a small circular indentation.

Context 0216; Find No 00106; Phase 20

304. Hone? Length 148mm; width 45mm; thickness 21mm. Possible hone, sub-rectangular in shape. The underside is flat. No marks from the sharpening of tool blades are apparent. (Not illustrated)

Context 0350; Find No 00313; Phase 9

305. Hone? Length 68mm; width 17mm; thickness 12mm. Probable hone fragment, rectangular in outline with a regular cross-section. Broken at both ends. There are linear scratches on two faces of the object. (Not illustrated)

Context 10188; Find No 50496; Phase 21

306. Hone? Length 75mm; width 27mm; thickness 18mm. Possible hone, sub-rectangular in cross-section. Broken at one end. The surviving end is partially faceted. (Not illustrated)

Context 10193; Find No 50122; Phase 21

307. Hone. Length 58mm; width 11mm; thickness 8mm
Hone, roughly rectangular in cross-section, broken at both ends and along one edge. The object has broken across a circular hole at one end. Also at this end is a transverse groove on one edge. (Not illustrated)
Context 10206; Find no. 50121; Phase 21

308. Hone. Length 72mm; width 8mm; thickness 8mm
Rectangular cross-sectioned hone, widest in the middle and tapering towards both ends. One end has a series of grooves cut

into it, each face bearing a longitudinal and transverse groove. (Not illustrated)
Context 10215; Find No 50119; Phase 14

309. Hone. Length 36mm; width 13mm; thickness 4mm
Hone fragment, rectangular in cross-section, broken at one end. The surviving end has a circular hole (diameter 3mm) through it for suspension.
Context 10238; Find No 50195; Phase 13

QUERNSTONES (illus 100)

The quernstone fragments represented here span a broad time scale, from Phases 2 to 25, with one example being unstratified. All appear to be from rotary querns, although some are small fragments with few surviving diagnostic features. Stratified earliest was a fragment of the upper stone of a rotary quern of Iron Age date (no 316), recovered from the stone packing of a foundation trench in Phase 2. It has a broad collar around its central hole and a notch at the edge to enable its rotation using a stick or rod. No 315, a relatively small fragment, also appears to incorporate a collar and may have been re-used as building material in Phase 7. No 318, from Soil 1 (Phase 6) seems to have broken across a hole or notch. No 313, from Phase 20, may be an unfinished quernstone.

310. Quernstone? Length 185mm; width 102mm; thickness 59mm
Possible fragment of the upper stone of a small rotary quern. (Not illustrated)
Context 0176; Find No 00342; Phase 9

311. Quernstone. Length 188mm; width 170mm; thickness 42mm
Quernstone fragment, possibly from the rim of the upper stone of a rotary quern. (Not illustrated)
Context 0268; Find No 00223; Phase 25

312. Quernstone. Length 218mm; width 161mm; thickness 60mm
Quernstone fragment, possibly from the rim of the upper stone of a rotary quern. (Not illustrated)
Context 0306; Find No 00598; Phase 20

313. Quernstone? Diameter 438mm; thickness 110mm
A circular stone with a circular, central indentation in both faces, not perforating the stone. One face is naturally uneven. Possibly an unfinished quernstone. (Not illustrated)
Context 0323; Find No 00463; Phase 20

314. Quernstone. Diameter 420mm; thickness 112mm
Quernstone fragment, roughly shaped, with a tapering, central hole. (Not illustrated)
Context 0461; Find No 00395; Phase 18

315. Quernstone? Length 260mm; width 202mm; thickness 55mm
Possible quernstone fragment, broken across a hole bordered by a raised rim or collar. (Not illustrated)
Context 0954; Find No 00556; Phase 7

316. Quernstone. Diameter 383mm; thickness 128mm
Fragment of the upper stone of a rotary quern, representing approximately half of the stone. It is broken across a circular, central hole which is bordered by a broad, raised rim or collar. There is a notch in the upper surface at one edge. The underside is flat.
Context 2192; Find No 00547; Phase 2

317. Quernstone? Length 322mm; width 188mm; thickness 72mm
Possible quernstone fragment with part of the curved edge surviving. Heavily abraded. (Not illustrated)
Context 2210; Find No 00558; Phase 7

318. Quernstone? Length 338mm; width 190mm; thickness 98mm
Possible quernstone fragment with a curved edge. The fragment is broken across a possible hole or notch in the opposite edge. (Not illustrated)
Context 10428; Find No 50416; Phase 6

319. Quernstone. Length 351mm; width 200mm; thickness 52mm
Quernstone fragment, probably from the rim of a rotary quern. The quernstone has broken across the central hole. There is a shallow rim or collar bordering the hole on the upper surface. The underside is flat. (Not illustrated)
Context 10502; Find No 50422; Phase 18

320. Quernstone. Diameter 370mm; thickness 81mm
Upper stone from a rotary quern with a convex upper surface, now broken into two pieces across the tapering, central hole. (Not illustrated)
Find No 00024; Unstratified

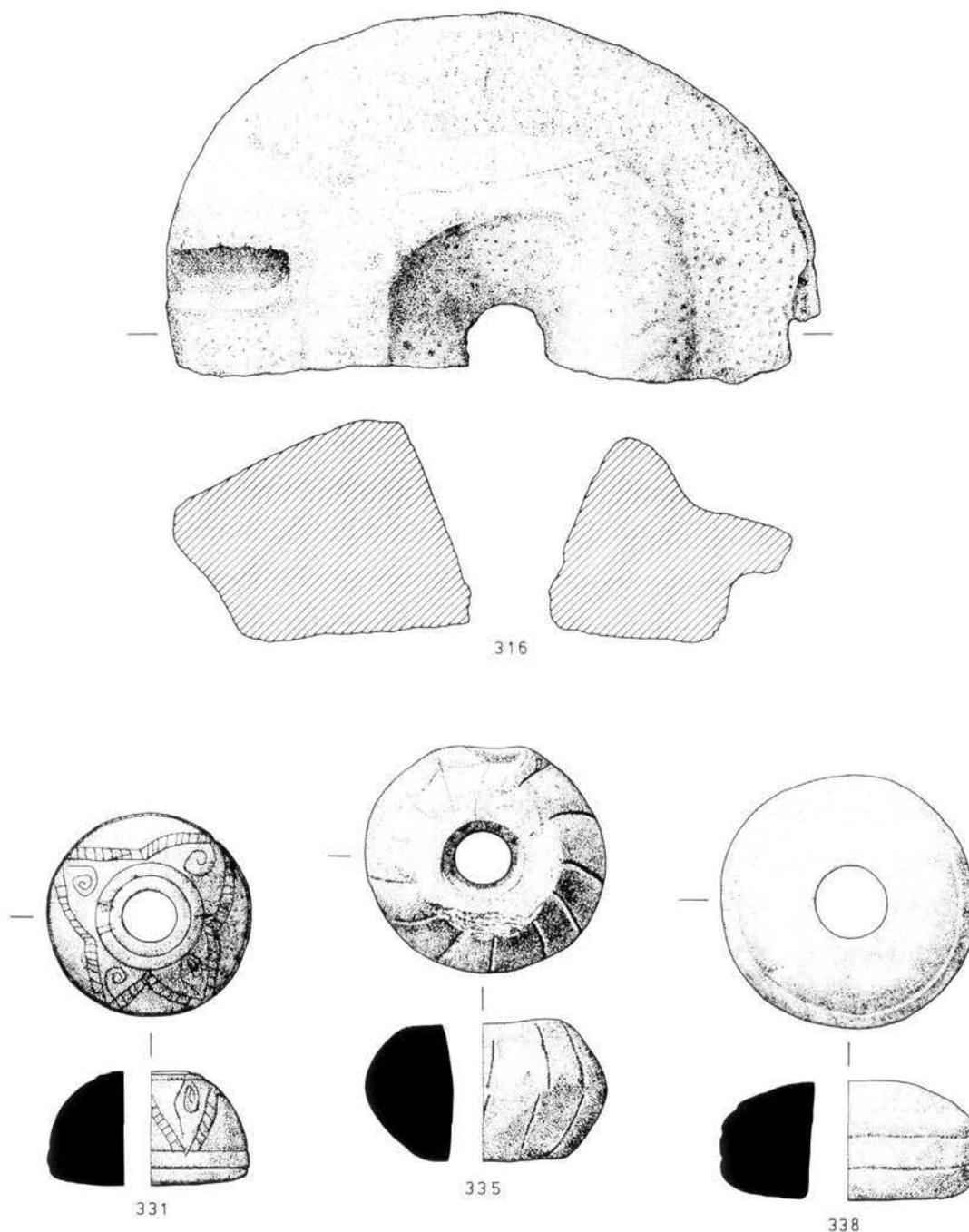
ROOF SLATES

A small quantity of perforated roof slates was retained by the excavators.

SPHERICAL OBJECTS

Several spherical stone objects were recovered. Considerable variation in size and weight is evident, the smallest example weighing 8g and the largest 267g. The function of these objects is uncertain, and, given the wide variation in date within the group, it is likely that more than a single function is represented.

No 329, from levelling deposits above one of the Iron Age defensive ditches (Phase 3) and at 16g among the lightest examples found, may have served as a sling shot or have been rolled like a marble. Small clay and stone balls have been found at Traprain Law, Broxmouth and other Iron Age forts in south-east Scotland (Close-Brooks 1983, 22; Cool 1982). Examples found in later deposits, from the period of



Illus 100
Quernstone (no 316; scale 1:4), spindle whorls (nos 316, 331, 335 and 338; scale 1:2).

the French fort onwards, may have functioned as marbles.

321. Shot or marble? Diameter 26mm; weight 22g
Possible shot or marble, roughly spherical. (Not illustrated)
Context 1454; Find No 00549; Phase 7
322. Shot or marble? Diameter 19mm; weight 8g
Possible shot or marble, roughly spherical, with irregular facets. (Not illustrated)
Context 10102; Find No 50012; Phase 24
323. Shot or marble. Diameter 31mm; weight 47g
Spherical shot or marble. (Not illustrated)
Context 10102; Find No 50017; Phase 24
324. Shot or marble. Diameter 21mm; weight 12g
Roughly spherical shot or marble. (Not illustrated)
Context 10109; Find No 50271; Phase 23
325. Shot or marble. Diameter 28mm; weight 27g
Roughly spherical shot or marble, slightly chipped. (Not illustrated)

- Context 10126; Find No 50104; Phase 21
326. Shot or marble? Diameter 32mm; weight 38g
Possible shot or marble, roughly spherical, with irregular facets. (Not illustrated)
Context 10197; Find No 50105; Phase 21
327. Shot or marble. Diameter 30mm; weight 34g
Spherical shot or marble. (Not illustrated)
Context 10426; Find No 50286; Phase 21
328. Shot or marble. Diameter 22mm; weight 14g
Possible shot or marble, roughly spherical. (Not illustrated)
Context 10914; Find No 50368; Phase 13
329. Slingshot? Diameter 23mm; weight 16g
Possible slingshot. Spherical. (Not illustrated)
Context 12279; Find No 50555; Phase 3
330. Shot or marble? Diameter 52mm; weight 267g
Possible shot or marble, roughly spherical. (Not illustrated)
Find No 50185; Unstratified

SPINDLE WHORLS (illus 100-101)

331. Spindle whorl. Diameter 29mm; thickness 16mm
Complete spindle whorl of biconical form with a circular, central hole (diameter 8mm). The upper surface is decorated by incised concentric circles and a pattern of triangles containing tightly curving lines. The underside is plain.
Context 0208; Find No 00075; Phase 25
332. Spindle whorl. Diameter 32mm; thickness 12mm
Complete spindle whorl of flattened, hemispherical form with a circular central hole (diameter 7mm). The object is decorated by a series of incised concentric circles, bordering the hole. The edge of the object is slightly chipped. (Not illustrated)
Context 0235; Find No 00196; Phase 21
333. Spindle whorl. Diameter 28mm; thickness 9mm
Spindle whorl of hemispherical form with a circular hole (diameter 7mm), positioned slightly off-centre. Incised, concentric rings decorate the upper surface. The lower surface is flat. (Not illustrated)
Context 0249; Find No 00211; Phase 16
334. Spindle whorl? Max. diameter 55mm; thickness 7mm
Possible spindle whorl, irregular in shape, with a roughly circular hole (max. diameter 12mm), positioned slightly off-centre. Lamination and breakage of the object have occurred. (Not illustrated)
Context 0338; Find No 00268; Phase 21
335. Spindle whorl. Diameter 32mm; thickness 19mm
Spindle whorl of flattened biconical form with a circular central hole (diameter 10mm). The object is decorated by incised radial lines. The flattened areas bordering the hole are undecorated.
Context 10109; Find No 50138; Phase 23
336. Spindle whorl. Diameter 29mm; thickness 14mm
Spindle whorl of roughly hemispherical form, with a circular central hole (diameter 8mm). Part of the upper surface has broken away. Both the upper and lower surfaces are decorated by a crude, incised zig-zag pattern. (Not illustrated)
Context 10263; Find No 50177; Phase 12
337. Spindle whorl? Diameter 35mm; thickness 11mm
Probable spindle whorl of roughly discoid form, broken across a circular central hole (diameter c 13mm). (Not illustrated)
Context 10287; Find No 50223; Phase 14
338. Spindle whorl. Diameter 34mm; thickness 15mm
Spindle whorl of flattened hemispherical form, with a circular central hole (diameter 10mm). Incised concentric rings decorate the upper surface. The lower surface is slightly convex.
Context 10287; Find No 50350; Phase 14
339. Spindle whorl. Diameter 40mm; thickness 11mm
Discoid spindle whorl with a circular central hole (diameter 10mm). The edges of the hole possibly exhibit signs of wear from use.
Context 10807; Find No 50337; Phase 11

WEIGHTS (illus 101)

Nos 340-4 are roughly triangular or sub-rectangular pebbles, each with a circular perforation (two perforations in the case of no 342), but otherwise showing no signs of modification. These objects may have functioned as weights, possibly used in fishing or as loomweights. No 341 may have broken

during the drilling of the hole or as a result of being dropped onto a hard surface during use. Oval stones perforated at both ends, from 10th- to 12th-century contexts at Birsay (Curle 1982, 81) are interpreted as line sinkers. No 342 is of a different form but could possibly have served this function.

340. Weight. Length 55mm; width 53mm; thickness 17mm
Roughly triangular object with naturally uneven surfaces. A circular, tapering hole (max. diameter 7mm) has been drilled through the object near to one corner.
Context 0249; Find No 00227; Phase 16

341. Weight? Length 67mm; width 43mm; thickness 12mm
Roughly triangular object with one flat face and one naturally uneven face. The object has possibly broken across a hole at one corner, drilled from the uneven face. (Not illustrated)
Context 0297; Find No 00243; Phase 20

342. Weight? Length 75mm; width 45mm; thickness 11mm
Roughly sub-rectangular object with one slightly concave face and one flat face. Two circular holes have been drilled through the

object, one through either side.
Context 10111; Find No 50440; Phase 22

343. Weight? Length 62mm; width 38mm; thickness 35mm
Roughly sub-rectangular pebble with smooth surfaces. A circular hole (max. diameter 12mm) has been drilled through the object in an oblique direction. (Not illustrated)
Context 10245; Find No 50152; Phase 23

344. Weight? Length 63mm; width 57mm; thickness 41mm
Naturally rectangular block, broken across its base. A circular hole (diameter 10mm) has been bored through its centre. No other modifications are apparent. (Not illustrated)
Context 10325; Find No 50415; Phase 13

WORKED STONES

Objects assigned to this category include fragments showing evidence of modification but being either very fragmentary or of uncertain function. For several examples a function is tentatively suggested: nos 353 and 355 may be fragments of roof slates, no 359 may have functioned as a hone or smoothing stone and no 361 possibly represents a quernstone fragment.

345. Worked stone. Length 238mm; width 169mm; thickness 35mm
Worked fragment. (Not illustrated)
Context 0293; Find No 00314; Phase 7

346. Worked stone? Length 327mm; width 140mm; thickness 60mm
Possibly worked fragment. (Not illustrated)
Context 0301; Find No 00212; Phase 20

347. Worked stone? Length 647mm; width 359mm; thickness 244mm
Block of roughly rectangular shape, tapering slightly. There is a roughly oval hole near to one end, perforating the stone. All surfaces are eroded and heavily pitted. (Not illustrated)
Context 0912; Find No 00472; Phase 20

348. Worked stone. Length 410mm; width 288mm; thickness 110mm
Worked stone with one curved edge and uneven faces. (Not illustrated)
Context 0934; Find No 00454; Phase 15

349. Worked stone. Length 340mm; width 252mm; thickness 119mm
Worked fragment with one surviving edge. (Not illustrated)
Context 1298; Find No 00516; Phase 7

350. Worked stone? Length 79mm; width 78mm; thickness 64mm
Possibly worked, smooth-sided stone of roughly oval cross-section. Broken at both ends. (Not illustrated)
Context 1454; Find No 00551; Phase 7

351. Worked stone? Length 130mm; width 68mm; thickness 61mm
Possibly worked, smooth-sided stone of roughly hemispherical cross-section. Broken at both ends. (Not illustrated)
Context 1454; Find No 00552; Phase 7

352. Worked stone. Length 120mm; width 107mm; thickness 24mm

Fragment with two curved edges and one flat surface. Broken at both ends. (Not illustrated)
Context 3003; Find No 80325; Phase 13

353. Worked stone. Length 66mm; width 47mm; thickness 10mm
Fragment, possibly of a roof tile, broken across a roughly circular hole.
Context 10105; Find No 50018; Phase 24

354. Worked stone? Length 221mm; width 147mm; thickness 30mm
Possibly worked stone. (Not illustrated)
Context 10126; Find No 50127; Phase 21

355. Worked stone. Length 78mm; width 56mm; thickness 9mm
Fragment, possibly of a roof tile, broken across a circular hole.
Context 10152; Find No 50149; Phase 20

356. Worked stone. Length 258mm; width 170mm; thickness 41mm
Rectangular cross-sectioned, worked stone with oval indentations forming an irregular pattern on one face and along two edges. These were probably deliberately made rather than a product of weathering. (Not illustrated)
Context 10197; Find No 00126; Phase 21

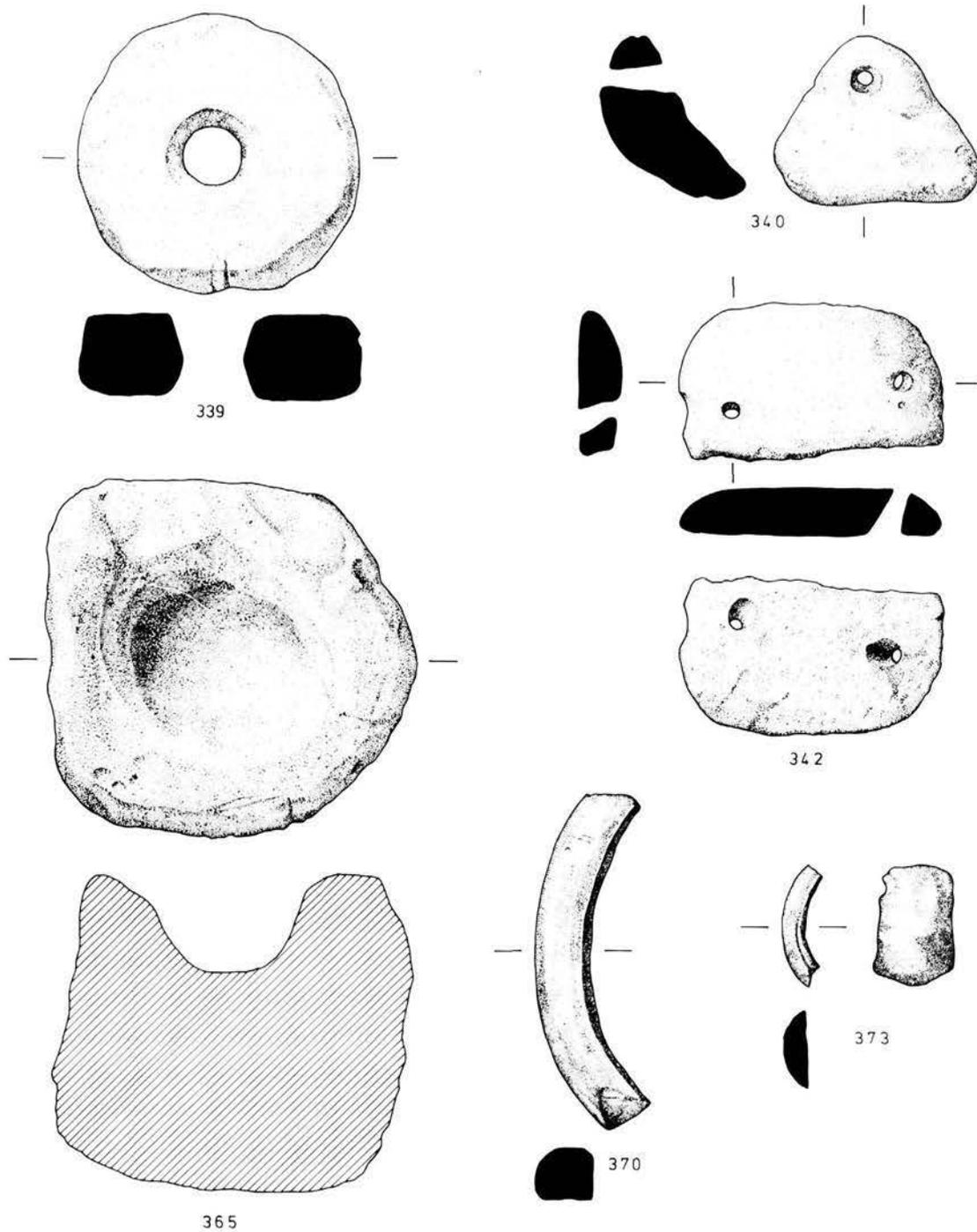
357. Worked stone? Length 78mm; width 55mm; thickness 33mm
Fragment with two possibly worked edges. The other edges are broken. (Not illustrated)
Context 10215; Find No 50210; Phase 14

358. Worked stone. Length 259mm; width 250mm; thickness 95mm
Worked fragment. Some tool marks are visible. (Not illustrated)
Context 10229; Find No 50426; Phase 18

359. Worked stone. Length 68mm; width 43mm; thickness 32mm
Possible hone or smoothing stone fragment, consisting of two conjoining pieces. The object is broken at one end and tapers smoothly towards a rounded terminal. (Not illustrated)
Context 10238; Find No 50196; Phase 13

360. Worked stone? Length 102mm; width 41mm; thickness 25mm
Possibly faced fragment, broken at both ends and along one edge. (Not illustrated)
Context 10238; Find No 50510; Phase 13

361. Worked stone? Length 47mm; width 29mm; thickness 27mm
Roughly triangular fragment in eroded condition. (Not illustrated)
Context 10384; Find No 50251; Phase 7



Illus 101

Spindle whorl (no 339; scale 1:1), weights (nos 340, 342; scale 1:2), socketed stone (no 365; scale 1:4), shale bangle (no 370; scale 1:1), and shale ring (no 373; scale 1:1).

362. Worked stone. Length 142mm; width 113mm; thickness 60mm
Worked fragment with one convex face and one flat face. (Not illustrated)
Context 10946; Find No 50421; Phase 9

363. Worked stone. Length 85mm; width 50mm; thickness 17mm
Roughly triangular fragment. Eroded condition. (Not illustrated)
Context 12205; Find No 50404; Phase 4

MISCELLANEOUS (illus 101)

No 364 may represent part of the rim of a mortar. The socketed stones (nos 365-8) were probably set into the walls of buildings to accommodate the lower ends of structural timbers or doorposts. No 368 came from the north end of one of the walls of Building 6 (Phase 13), while no 365 was recovered from the fill of a ditch in the same phase. A socketed stone with a round hole, worn by rotary motion, was found at Clatchard Craig, Fife, possibly *in situ* in the doorway of a building (Close-Brooks 1986, 173, fig 32, no 154).

1. Mortar fragment? Length 163mm, width 34mm; thickness 58mm

Possible mortar rim fragment, broken at the base and at both ends. A series of horizontal tool marks are visible on the exterior surface. This fragment suggests an internal diameter of *c.* 120mm. (Not illustrated)

Context 0230; Find No 00133; Phase 18

365. Socketed stone. Length 211mm; width 210mm; thickness 200mm

Roughly shaped block with a tapering roughly circular socket in its centre. Tool marks are visible on the base.

Context 0120; Find No 00030; Phase 13

366. Socketed stone. Length 245mm; width 103mm; thickness 145mm

Part of a rounded block with a tapering circular socket in its centre. The object has broken across the socket. The base is heavily tooled. (Not illustrated)

Context 0467; Find No 00467; Phase 8

367. Socketed stone. Length 552mm; width 470mm; thickness 275mm

Rectangular block with a central rectangular socket (length 194mm; width 132mm) perforating it. Tool marks are visible on the sides of the block. (Not illustrated)

Context 1108; Find No 00461; Phase 12

368. Socketed stone. Length 440mm; width 330mm; thickness 77mm

Irregularly-shaped block with a central rectangular socket, which perforates it. (Not illustrated)

Context 10518; Find No 50419; Phase 13

SHALE OBJECTS (illus 101)

The assemblage of artefacts recovered includes fragments of three bangles (nos 369-71), a possible pin fragment (no 372), a ring fragment (no 373) and four worked fragments (Nos 374-7). In addition, a number of pieces of shale, showing no signs of working, were recovered. Shale is the term used here to describe the material from which these artefacts were made, although different sources of materials may have been used at different times. Other workers (eg Kemp 1992, 42) have used the term jet to describe a range of related materials including shale.

Archaeological evidence for the use of jet, lignite and shale for the production of bangles, pendants and rings has been found in both Britain and Ireland, from as far back as the Bronze Age. There is evidence for the continuing production of jet objects in York in the Roman, Anglo-Scandinavian and medieval periods (Tweddle 1986, 186). This small assemblage from Dunbar, spanning Phases 6 to 20, includes both finished artefacts and evidence for the manufacture of artefacts at the site, utilising shale which was probably from local strata. As partly finished jet artefacts have been found throughout Scotland (Callander 1916, 234-7; Kemp 1992, 42), the use of local rather than imported resources seems likely.

The three bangles are each broken across their circumference and have split along their width, fracturing along the line of the natural layering of the

material. Each has a convex outer surface and a flat inner face, forming a D-shaped cross-section, which, according to Edwards (1990, 96), is characteristic of early medieval bangles.

No 371, from Phase 6 and stratigraphically the earliest example, is also the largest, having a projected diameter of *c.* 79mm. The remaining two bangles (nos 369 and 370), from medieval contexts, are similar in diameter (*c.* 62mm and *c.* 63mm, respectively), although no 369 is considerably thicker and is part of a heavier bangle. The internal faces of these latter two bangles are smooth and polished, probably as a result of use.

A highly polished, tapering, cylindrical fragment, possibly from a pin (no 372), was recovered from a feature in Phase 7 and may therefore date to the 7th century. A fragment of a finger ring, representing between one quarter and one third of the original object (no 373) was recovered from a stone-packed post pit in Phase 15 (as was bangle no 370). It has an internal diameter of *c.* 16-19mm and, in common with the bangles, a D-shaped cross-section.

The worked shale fragments provide evidence of the manufacture of artefacts, including the types described above. No 374, from a ditch fill in Phase 13, is a fragment from which a circular disc has been carefully cut, leaving a hole of *c.* 10mm diameter. The

resulting disc could have been used as a rough-out for a circular bead. No 376, from the demolition deposits of Building 6 (Phase 13), has also had a circular disc cut from it. The diameter of this disc (*c* 21mm) represents the approximate requirement for production of a finger ring; indeed it matches very closely the projected external diameter of no 373.

The greater part of the outer edge of no 376 is broken, but part of it has been cut and forms the arc of a circle with a projected diameter of *c* 50-60mm. Evidence from Ireland (Edwards 1990, 96) indicates that some bangles were made by splitting slabs of the requisite thickness and trimming them into discs. The interior, in the form of a smaller disc, was then removed by careful chiselling and the remaining crude bangle was finished by smoothing and polishing. It is possible that no 376 may represent the smaller disc cut from the interior of a larger one used for bangle manufacture. This possibility is confirmed by the angled nature of the cut at its edge and by its projected diameter. If no 376 represents evidence of both bangle and ring manufacture, it indicates that usable offcuts of high quality shale were not wasted.

No 377, from the construction trench for the west wall of Building 1 (Phase 7) possibly represents an unfinished artefact such as a bead or pendant. It has a convex surface, the result of trimming, and bears numerous linear striations indicative of its having been filed roughly into shape. It has fractured across an indentation which may represent an unfinished central perforation. A jet bead of Anglo-Scandinavian date from York (MacGregor 1978, 41, fig 23, no 1) is also thought to have broken in the course of perforation.

No 375, from Phase 18, is possibly a worked fragment, although this is uncertain.

369. Bangle. Length 56mm; width 7mm; thickness 10mm
Probable part of a bangle with a flat inner surface and a convex

outer surface. This fragment is broken at both ends and across its width. It has a projected internal diameter of *c* 62mm (Not illustrated)

Context 0277; Find No 00165; Phase 20

370. Bangle. Length 50mm; width 8mm; thickness 7mm
Part of a bangle with a flat inner surface and a convex outer surface. This fragment is broken at both ends and across its width. It has a projected internal diameter of *c* 63mm. Knife-trimming marks are visible.

Context 10327; Find No 51024; Phase 15

371. Bangle. Length 49mm; width 12mm; thickness 8mm
Probable part of a bangle with a flat inner surface and a slightly convex outer surface. This fragment is broken at both ends and across its width. It has a projected internal diameter of *c* 79 mm. Knife-trimming or file marks are visible. (Not illustrated)

Context 10368; Find No 50291; Phase 6

372. Pin? Length 20mm; max. diameter 7mm
Circular cross-sectioned object, tapering slightly towards one end. Broken at both ends. Knife-trimming marks are visible. Highly polished. (Not illustrated)

Context 10394; Find No 50305; Phase 7

373. Ring? Length 17mm; width 11mm; thickness 2mm
Probable finger ring fragment, broken at both ends. It has a flat inner surface and a convex outer surface, giving it an elongated D-shaped cross-section.

Context 10306; Find No 50297; Phase 15

374. Worked fragment. Length 25mm; width 20mm; thickness 4mm

Fragment either broken across a circular hole or from which a disc has been cut. (Not illustrated)

Context 3018; Find No 80008; Phase 13

375. Worked fragment? Length 30mm; width 17mm; thickness 9mm

Possibly worked fragment with a regular, roughly oval, cross-section. (Not illustrated)

Context 10163; Find No 50413; Phase 18

376. Worked fragment. Length 40mm; width 26mm; thickness 5mm

Fragment either broken across a circular hole or from which a disc has been cut. (Not illustrated)

Context 10238; Find No 50246; Phase 13

377. Worked fragment. Length 25mm; width 16mm; thickness 17mm

Roughly hemispherical fragment, carved and possibly filed into shape. It has broken across a circular central notch, possibly the beginnings of a central hole. (Not illustrated)

Context 12160; Find No 50402; Phase 7

BONE AND ANTLER OBJECTS

(Species identifications by C. Smith)

COMBS AND COMB FRAGMENTS (illus 102, 103)

Combs appear to have been articles of everyday use at every level of society and are associated, when recovered from burials, with either sex and all ages (MacGregor 1985, 73). A distinction may be drawn between one-piece combs, made from a single piece

of raw material, and composite combs, assembled from several structural elements. Within the latter category, combs may be either single-sided, having teeth projecting on one side only, or double-sided, where teeth project from both sides of the object.



Illus 102
Antler comb (no 381), the other
side of which is shown in the
drawing (illus 103).

The most frequently used material for the manufacture of composite combs is red deer antler, examples made from true bone being relatively uncommon (*ibid*, 74). Species identification of some of the smaller comb fragments represented here proved problematic, although the evidence from the more complete examples suggests that they are more likely to be of antler than of bone.

Both single-sided and double-sided composite combs are represented in the assemblage recovered from these excavations, the single-sided examples having an earlier stratigraphic distribution. Of the seven examples of combs of which more than one structural element survives, four (nos 379, 380, 381 and possibly 382) are single-sided and three (nos 378, 383 and 392) are double-sided. Individual tooth plates from both types of comb are also represented.

Of the single-sided combs, nos 380 and 381 are the most complete examples and are of a Viking-Age type, paralleled at such sites as Hedeby (Jankuhn 1943) and Jarlshof (Hamilton 1956).

The more complete of the two combs, no 381, is symmetrical, with a convex back and slightly upturned terminals, possibly of zoomorphic form. It has deep, thin side plates with a curved cross-section and is very similar to the Group A combs identified by Kristina Ambrosiani (nee Danielsson) at Birka (Danielsson 1973). The same author distinguished three sub-groups within the Group A combs and on the basis of its ornamental characteristics, no 381

would fall within Ambrosiani's sub-group A3, which dates from the late 9th to the mid 10th century (Ambrosiani 1981). Ambrosiani suggests an origin for the Group A combs in Scandinavia.

No 380, representing the middle section of a comb of very similar form to no 381, has equivalent zones of decoration, although they contain an interlace pattern within their borders, in contrast to the pattern of crossed lines decorating no 381. Interlace patterns of this type occur on Viking Age parallels from several of the sites mentioned above. Also in contrast to no 381, no 380 has a smaller number of broader teeth. The average maximum tooth width of no 380 is *c* 2.6mm whereas the teeth of no 381 measure an average *c* 1.7mm.

No 381 was found in the uppermost fill of a defensive ditch in Phase 13. It must have been nearly complete when deposited, only missing a few of its teeth. Subsequently it had been crushed from above, and reconstruction has been necessary. No 380, which must be of a similar date to no 381, was found in the fill of a large pit assigned to Phase 16, and was probably residual.

Part of a comb of similar style to that of nos 380 and 381 was found at St Andrew's Churchyard, North Berwick (NMS 1994, 46).

No 379, recovered from Courtyard 7 (Phase 9) and consisting of two conjoining fragments, appears to represent part of a composite handled comb.

Handled combs were popular from about the 7th century until the early medieval period. The probable method of construction of no 379 is described by MacGregor (1985, 91). Two elongated plates of antler would have been cut so that, when placed together, there remained a space into which tooth plates could be slotted. The tooth plates and the handle would have then been secured by iron rivets. On no 379, part of a single tooth plate, held in place by a (now broken) rivet, survives. Traces of iron staining indicate the position of a second rivet, which would have held together the two sides of the handle.

A comb fragment very similar to no 379 was one of several fragments of handled combs found at North Elmham Park (Wade-Martins 1980, 485, fig 259, no 3) and was thought to date from the late 9th or 10th century, making it a little later in date than no 379. Like No 379, the internal surfaces of the handle plates on this comb are partially concave, producing a hollow within the handle. Most examples of handled combs appear to have solid handles.

No 382, recovered from the fill of a trench or ditch in Phase 18, is an eroded fragment, possibly from a single-sided comb, with plain side plates. Secured between the side plates are remnants of an end plate and three further tooth plates, the upper edges of which are broken but appear to have projected above the upper edge of the side plates.

Three composite, double-sided combs (nos 378, 383 and 392) were recovered, and others are represented only by tooth plates. Of the two most complete examples (nos 378 and 383), no 378 is the larger, but only one side plate survives intact, along with the greater parts of both end plates. Several of the teeth of no 383 are broken but it is otherwise almost complete. On both these combs the teeth are of equivalent size on each side and, on both, the side plates are decorated by ring and dot motifs, those on no 378 being more numerous, though smaller, than those decorating no 383. A further fragment from a double-sided comb (no 392) is also decorated by ring and dot motifs.

One of the end plates of no 378 has a circular perforation. This was probably for ease of carrying and may indicate that this comb was provided with a case.

No 378 was recovered from a gravel and cobble surface in Phase 20, while no 383 came from a levelling deposit in Phase 21. No 392 was found in one of the lower fills of a trench in Phase 18.

No 391, a tooth plate from a double-sided comb, was

recovered from levelling deposits in Phase 19 which contained material thought to be derived from the demolition of the castle. Of the double-sided comb fragments, it is the only example to have teeth of different sizes on opposite sides of the comb.

378. Comb. Height 56mm; width 76mm; thickness including rivets 11mm

Derived from red deer antler. Composite, double-sided comb. Both end plates, one nearly complete side plate and fragments of the other side plate survive. The end plates were attached to the side plates by four iron rivets, all of which survive in part. The teeth on either side of the comb are of equal length. The side plates are decorated by a ring and dot pattern, three horizontal rows of motifs appearing on the complete plate. The end plates project beyond the ends of the side plates and one is perforated, possibly for the suspension of the comb. (Not illustrated)
Context 0345; Find No 00259; Phase 20

379. Comb. Height 19mm; width 42mm; thickness 14mm

Derived from red deer antler. Two conjoining fragments of a composite comb; possibly a handled type. Fragments of both side (or handle) plates survive. One has a small fragment of a tooth plate or end plate attached by means of a now broken iron rivet, now broken. This plate fitted into a slot between the two side plates, which are decorated by incised, vertical lines in sets of three. One of the side plates has a partially concave internal surface at the point where it becomes part of the comb handle. Overall measurements for the conjoined fragments are given. (Not illustrated)

Context 0353; Find No 00604; Phase 9

380. Comb. Height 39mm; width 129mm; thickness 11mm

Derived from red deer antler. Composite, single-sided comb. Three tooth plates survive, held between the side plates by iron rivets. The side plates are decorated by bands of incised interlace. (Not illustrated)
Context 0392; Find No 00424; Phase 16

381. Comb. Height 40mm; width 184mm; thickness 9mm

Derived from red deer antler. Composite, single-sided comb. Nearly complete after reconstruction. It comprises seven or (more probably) eight tooth plates, which were attached to the side plates by a total of seven iron rivets, six of which survive. The side plates are decorated by zones of incised, crossed lines. The terminals incorporate two small projections and may be of zoomorphic form. Part of one terminal is missing.

Context 0423; Find No 00297; Phase 13

382. Comb. Height 22mm; width 42mm; thickness 11mm

Derived from mammalian bone or antler. Fragment of a composite comb, probably single-sided. Parts of the end plate and three tooth plates survive, attached to fragments of the side plates by three iron rivets. The surviving side plate fragments are undecorated. Eroded condition. (Not illustrated)

Context 0424; Find No 00379; Phase 18

383. Comb. Height 45mm; width 59mm; thickness 9mm

Derived from red deer antler. Composite, double-sided comb. Nearly complete after reconstruction. It comprises four tooth plates, attached to the side plates by three iron rivets. The teeth on either side of the comb are of equal length. The side plates are decorated by a ring and dot pattern, two horizontal rows of motifs appearing on each plate. The end plates project beyond the ends of the side plates.

Context 10126; Find No 51014; Phase 21

384. Comb end plate. Height 28mm; width 25mm; thickness including rivet 9mm

Derived from mammalian bone or antler. End plate from a composite, single-sided comb. An iron rivet perforates the plate near to the inner edge. The lengths of the teeth decrease towards the outer edge. (Not illustrated)

Context 0215; Find No 00166; Phase 14

385. Comb end plate. Height 27mm; width 27mm; thickness 3mm
Derived from mammalian bone or antler. End plate from a composite comb. Its fragmentary and eroded condition makes it uncertain as to whether it is from a single or double-sided comb. It is decorated on both sides of its outer edge by a ring and dot pattern. The inner edge is broken across a perforation. (Not illustrated)

Context 10360; Find No 51015; Phase 7

386. Comb side plate? Height 17mm; width 101mm; thickness 3mm

Derived from a large ungulate rib. Possible side plate from a composite bone comb. The object has one straight edge and one slightly curved edge. Both edges bear a series of small nicks diagnostic of comb teeth having been cut against them. A circular hole has been bored through the centre of the object. It is broken at both ends. (Not illustrated)

Context 0233; Find No 00130; Phase 20

387. Comb tooth. Length 20mm; width 3mm; thickness 1mm

Derived from mammalian long bone or antler. (Not illustrated)

Context 0176; Find No 00593; Phase 9

388. Comb tooth. Length 26mm; width 2mm; thickness 2mm

Derived from mammalian long bone or antler. (Not illustrated)

Context 0256; Find No 00325; Phase 14

389. Comb tooth. Length 24mm; width 2mm; thickness 1mm

Derived from mammalian long bone or antler. (Not illustrated)

Context 10243; Find No 51013; Phase 21

390. Comb tooth plate. Height 42mm; width 13mm; thickness 3mm

Derived from mammalian long bone or rib, or antler. Tooth plate from a composite, single-sided comb. There is a small notch in one edge which bears traces of iron staining from contact with a rivet. The height of the plate decreases towards the notched edge. (Not illustrated)

Context 0226; Find No 00105; Phase 17

391. Comb tooth plate. Height 24mm; width 24mm; thickness including rivet 15mm

Derived from mammalian bone or antler. Tooth plate from a composite, double-sided comb. An iron rivet survives, set into a notch in one edge of the plate. All of the teeth are broken. (Not illustrated)

Context 0258; Find No 00231; Phase 19

392. Comb tooth plate. Height 60mm; width 17mm; thickness including rivet 11mm

Probably derived from antler. Fragment of a tooth plate from a composite, double-sided comb. The teeth on either side are of equal size. A small fragment of side plate, decorated by a ring and dot pattern, is attached by a single iron rivet.

Context 0424; Find No 00356; Phase 18

393. Comb tooth plate. Height 40mm; width 20mm; thickness 3mm

Probably derived from red deer antler. Tooth plate from a composite, single-sided comb. One edge bears traces of iron staining from contact with a rivet. (Not illustrated)

Context 1413; Find No 00529; Phase 7

394. Comb tooth plate. Height 20mm; width 16mm; thickness 3mm

Derived from red deer antler. Tooth plate from a composite, single-sided comb. There is a small notch in one edge which bears traces of iron staining from contact with a rivet. The height of the plate increases towards the notched edge. All of the teeth are broken. (Not illustrated)

Context 10101; Find No 50002; Phase 24

395. Comb tooth plate. Height 45mm; width 14mm; thickness 3mm

Derived from a large ungulate long bone shaft or rib, or antler. Tooth plate from a composite, double-sided comb. There are teeth on both sides, those on one side being considerably larger. The mid-point of one edge has been notched to accommodate a rivet. The notch has iron staining around it.

Find No 00013; Unstratified

HANDLES (illus 103)

Nos 396 and 401 are possibly handles, having been quite extensively modified from the original antler tines and having smooth, polished surfaces, possibly due to repeated handling. No 396 may have had a tang inserted into one end, although there are no traces of iron staining. No 401, perforated throughout its length, may have functioned as a handle for lifting an object such as a bucket. No 398, also derived from antler, has been more greatly modified and is more readily confirmed as an implement handle.

No 397 contains a small remnant of a probable iron tang within it and is broken across a suspension hole at the opposite end. The style of decoration on this object bears some similarities to that on an antler handle from Whitby, for which an 8th- to 10th-century date was proposed (Peers & Radford 1943). The context of no 397 suggests that it may belong to the latter part of this date range. Areas of incised cross-hatching on handles such as these would have helped to improve the user's grip on the

object in addition to their decorative function.

Earlier objects of similar form and decorative style to that of no 397 are also known, such as one recovered from a *Grubenhaus* of possible 5th-century date at Walton, Buckinghamshire. This object, which had no tang remnant, was interpreted as a possible pendant (Farley 1976, 199, fig 16, no 4).

No 399 is a handle from a whittle tang knife and is of post-medieval or early modern date. No 400 is a possible handle, the precise function of which remains uncertain.

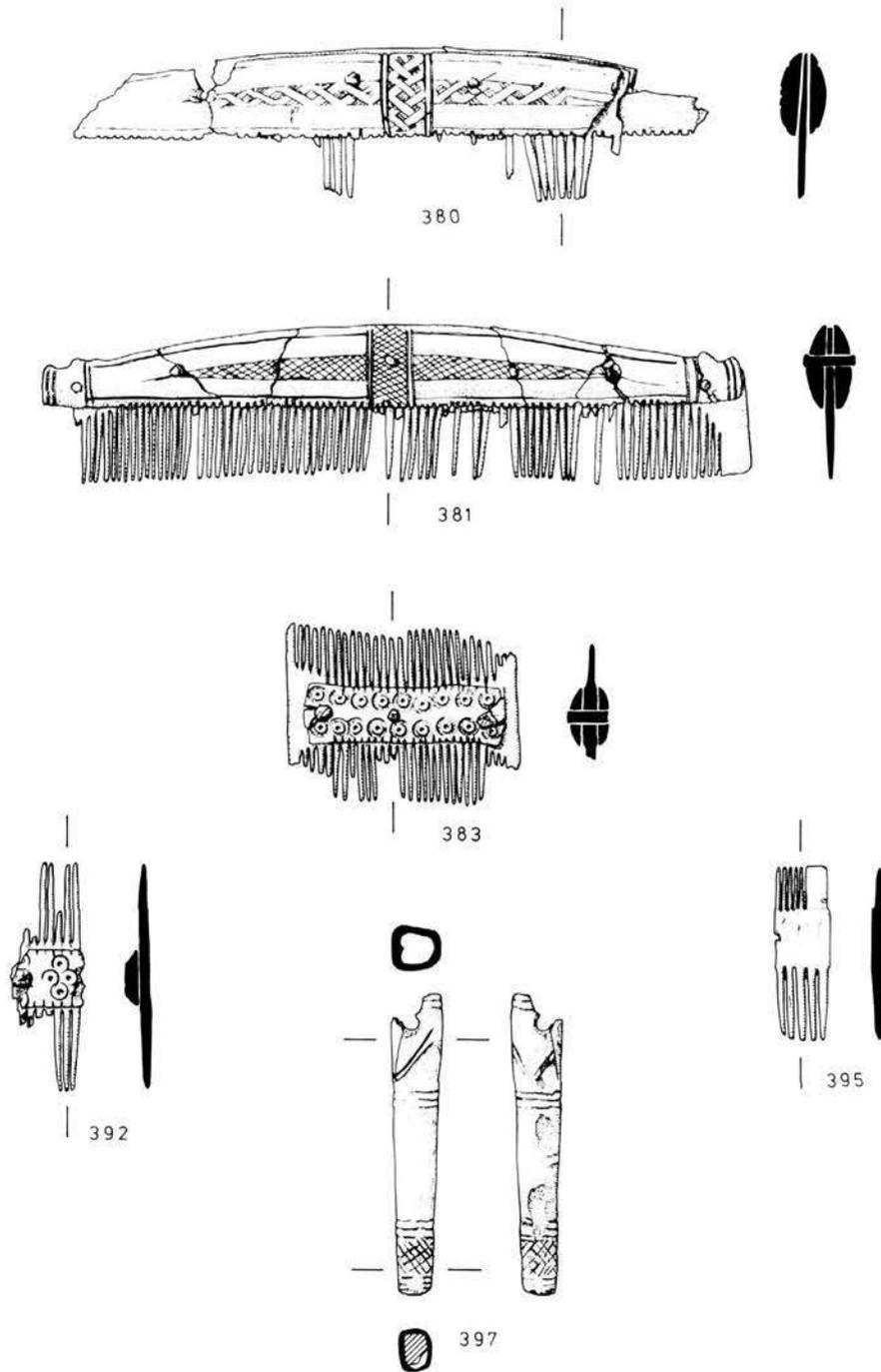
396. Handle? Length 81mm; width 17mm; thickness 15mm

Derived from a red deer antler tine. The base of the tine has been sawn or cut across and smoothed. A circular hole has been bored into the base. The surface of the tine has been knife-trimmed and filed. It is also polished. The tip has been trimmed to a point. (Not illustrated)

Context 0202; Find No 00113; Phase 20

397. Handle? Length 78mm; width 12mm; thickness 11mm

Derived from a sheep or goat metatarsal shaft. Midshaft section



Illus 103
Antler combs (nos 380, 381, 383, 392, 395), and bone handle (no 397). Scale 1:2.

only, with the proximal and distal articulations removed. The object has a sub-rectangular cross-section, tapering towards one end, and is decorated by incised lines. The narrower end is decorated by a pattern of crossed lines within a border of parallel lines encircling the shaft. The wider end is decorated by two parallel zig-zag lines within a similar border. The object is polished on all faces. A small fragment of an iron tang survives within the body of the handle at the narrower end. At the wider end, the object is broken across a circular hole.
Context 0215; Find No 00286; Phase 14

398. Handle. Length 62mm; width 32mm; thickness 18mm
Derived from red deer antler, sawn across both ends, trimmed and smoothed. The core of the antler has been removed at the wider end and an iron tang inserted into the resulting cavity. Only corroded fragments of the tang survive and there is no further evidence to indicate the type of implement to which the handle belonged. A small hole appears to have been bored at the narrower end, possibly for the attachment of an end plate. The object is now in two conjoining pieces. (Not illustrated)
Context 1403; Find No 00605; Phase 9

399. Handle. Length 60mm; width 17mm; thickness 8mm
Derived from a large ungulate long bone shaft, cut and polished on all four surfaces. Handle from a whittle tang knife. Traces of the tang remain within the handle. The knife blade is missing. The end of the handle has been shaped to accommodate an end plate and incorporates a rivet hole for its attachment. (Not illustrated)
Context 10100; Find No 50529; Phase 24

400. Handle? Length 33mm; width 8mm; thickness 7mm
Derived from a large ungulate long bone shaft. Object with an irregular cross-section, with a circular perforation at one end. A

scratched line encircles the object below the perforation. The object tapers towards the other end, which is broken. Polished. (Not illustrated)

Context 10109; Find No 50141; Phase 23

401. Handle? Length 101mm; width 22mm; thickness 19mm
Derived from a red deer antler tine. The tine has been sawn across at both ends and the core has been removed. The outer surface has been polished. The object is broken at one end. (Not illustrated)

Context 10939; Find No 50574; Phase 9

NEEDLES (illus 104)

Nos 402 and 403 are interpreted as needles, as each has a deliberately streamlined form which would offer little resistance in sewing, in contrast to the pig fibula pins discussed below. The eyes of both no 402 and no 403 show some signs of wear through use.

402. Needle. Length 37mm; width at eye 6mm
Derived from a large ungulate long bone shaft or a pig fibula.

Needle with a roughly oval cross-sectioned shaft, widening to form the head, which narrows again to terminate in a point. The eye is circular and its edges are slightly worn.

Context 10481; Find No 50294; Phase 4

403. Needle. Length 27mm; width at eye 3mm
Derived from an ungulate long bone shaft. Needle with a roughly oval eye with some wear around its edges. The shaft is broken. Highly polished.

Context 10807; Find No 50359; Phase 11

PINS – PERFORATED (illus 104)

Nos 404-420 are perforated pins. The majority represented here (nos 404-10, 412 and 414-6) were derived from pig fibulae, which, as MacGregor (1978, 120) notes, have a form which immediately recommends itself as a pin. In each example, a roughly circular hole has been bored at the distal end and the proximal end has been trimmed to form a pointed shaft. On most examples the distal end is unfused, denoting a young animal, and on all but three it is unmodified. On nos 408, 416 and possibly 414, the distal end has been trimmed, possibly to remove any rough edges.

The probable function of these pig fibula pins was to secure an article of dress, either in pairs, fastening the shoulders of a garment, or used singly as a form of safety pin (*ibid*, 121). Their abundance and lack of modification indicate their role as functional, everyday items. Their origins can be traced back to the pre-Roman Iron Age (*ibid*), and they occur in Anglo-Saxon contexts, for example at Spong Hill (Hills *et al* 1987, 47) and Southampton (Hinton 1980, 77), in some cases interpreted as needles.

Nos 409, 411 and 413 are perforated pins with roughly circular or oval heads. Of these, only no 409 was derived from a pig fibula, differing from the other pig fibula pins in the degree of its modification. Nos 411 and 413, derived from the long bone shafts of large ungulates, have been more greatly modified to achieve a similar result.

Nos 417-20 may represent a different functional group from that of the other perforated pins. Nos 417-19 (and probably no 420) were derived from large ungulate long bone shaft splinters. Similar objects from Kings Lynn (Geddes & Clarke 1977, 311-2, fig 143, nos 1-5) have been described as pin beaters and it is probable that nos 417-20 are also weaving tools.

404. Pin. Length 87mm; width at head 14mm; diameter of hole 4mm

Derived from a pig fibula. The distal end is unfused. A roughly circular hole has been bored at the distal end. The shaft has been trimmed to a point and is polished. Knife-trimming marks are visible. The lower edge of the hole is possibly slightly worn. (Not illustrated)

Context 0102; Find No 00025; Phase 24

405. Pin. Length 93mm; width at head 13mm; diameter of hole 6mm

Derived from a pig fibula. The distal end is unfused. A roughly circular hole has been bored at the distal end. The shaft has been trimmed to a point and is polished. Knife-trimming marks are visible.

Context 0120; Find No 00100; Phase 13

406. Pin. Length 67mm; width at head 11mm; diameter of hole 3mm

Derived from a pig fibula. The distal end is unfused. Complete pin. A roughly circular hole has been bored at the distal end. The shaft is roughly oval in cross-section. Knife-trimming marks are visible. (Not illustrated)

Context 0235; Find No 00128; Phase 21

407. Pin. Length 39mm; width at head 12mm; diameter of hole 4mm

Derived from a pig fibula. The distal end is unfused. A circular hole has been bored at the distal end. The shaft has been trimmed

and is polished. Knife-trimming marks are visible. The shaft is broken. (Not illustrated)
Context 0256; Find No 00312; Phase 14

408. Pin. Length 75mm; width at head 8mm; diameter of hole 3mm

Derived from a pig fibula. The distal epiphysis has been trimmed off and a roughly circular hole has been bored at the distal end. The shaft has been trimmed to a point. Knife-trimming marks are visible. (Not illustrated)

Context 0258; Find No 00391; Phase 19

409. Pin. Length 38mm; width at head 12mm; diameter of hole 4mm

Derived from a pig fibula. Pin with a roughly circular head with a hole bored through its centre. The shaft has a flattened oval cross-section and is broken. Some polish is visible on the shaft. Eroded condition. (Not illustrated)

Context 0297; Find No 00214; Phase 20

410. Pin. Length 92mm; width at head 9mm; diameter of hole 4mm

Derived from a pig fibula. A circular hole has been bored at the distal end. The shaft has been trimmed to a point and is polished. Knife-trimming marks are visible. (Not illustrated)

Context 0354; Find No 00409; Phase 9

411. Pin. Length 52mm; width at head 10mm; diameter of hole 3mm

Derived from a large ungulate long bone shaft. Pin with a circular head with a circular hole bored through its centre. The shaft is oval in cross-section. The point is missing. Knife-trimming marks are visible. Eroded condition.

Context 0451; Find No 00339; Phase 7

412. Pin. Length 64mm; width at head 12mm; diameter of hole 5mm

Derived from a pig fibula. Distal end probably unfused. A circular hole has been bored at the distal end. The shaft has been trimmed and shows slight polishing. Knife-trimming marks are visible. The shaft is broken. (Not illustrated)

Context 0469; Find No 00416; Phase 19

413. Pin. Length 60mm; width at head 9mm; max. diameter of shaft 5mm

Derived from a large ungulate long bone shaft. Pin with a roughly oval head with a circular hole bored through it. The shaft is roughly oval in cross-section. Knife-trimming marks are visible on the shaft. The point is missing. (Not illustrated)

Context 3003; Find No 80001; Phase 13

414. Pin. Length 61mm; width at head 8mm; diameter of hole 3mm

Derived from a pig fibula. The distal epiphysis has possibly been

trimmed and a roughly circular hole has been bored at the distal end. The shaft is polished and broken. Knife-trimming marks are visible. (Not illustrated)

Context 10326; Find No 50524; Phase 11

415. Pin? Length 45mm; max. width 8mm

Derived from a pig fibula. Probable fragment of pin shaft, broken across the hole. The shaft has been trimmed and is slightly polished. The point is missing. (Not illustrated)

Context 10385; Find No 50567; Phase 8

416. Pin. Length 99mm; width at head 7mm; diameter of hole 4mm

Derived from a pig fibula. Complete pin. The distal end has been trimmed. A circular hole has been bored at the distal end. The shaft is oval to circular in cross-section and has been trimmed to a point. Knife-trimming marks are visible.

Context 10817; Find No 50549; Phase 12

417. Pin or needle. Length 102mm; max. width 7mm; diameter of hole 2mm

Derived from a large ungulate long bone shaft. Complete pin or needle with a circular hole or eye bored at the wider end. There is no discrete head. The shaft has an oval cross-section becoming circular towards the point. Its maximum width is in the vicinity of the hole. The shaft is polished, and there are signs of wear and polish around the hole.

Context 0114; Find No 00031; Phase 22

418. Pin or needle. Length 121mm; max. width 14mm; diameter of hole 5mm

Derived from a large ungulate long bone shaft. Complete pin or needle with a roughly circular hole or eye bored at the wider end. There is no discrete head. The shaft has a flattened oval cross-section and terminates in a point. The medullary trabecular surface of the bone is exposed on one side. Knife-cuts are visible above the hole.

Context 0120; Find No 00026; Phase 13

419. Pin or needle. Length 49mm; max. width 10mm

Derived from a large ungulate long bone shaft. Pin or needle shaft fragment with a flattened oval cross-section, terminating in a point. Polished. (Not illustrated)

Context 10188; Find No 00230; Phase 21

420. Pin or needle. Length 71mm; width at head 7mm; max. diameter of shaft 4mm

Derived from a large ungulate long bone shaft or antler. Pin or needle with a circular cross-sectioned shaft, widening to form an irregularly shaped head. A roughly circular hole or eye has been bored through the head. It is countersunk on both sides. Highly polished.

Context 10287; Find No 50336; Phase 14

PINS - UNPERFORATED (illus 104)

A variety of forms of unperforated pin is represented here, their principle characteristics summarized in Table 2. Nos 421, 426, 427, 433 and 453 combine a spherical or bulb-shaped head with a short shaft, in some cases having a central expansion. Continuity of spherical-headed pins can be demonstrated from the mid-2nd century until the 12th century (MacGregor 1985, 117). They are known from other Scottish Dark Age sites, for example À Cheardach Mhor, South Uist (Young & Richardson 1960) and

Dun Cuier, Barra (Young 1956). Examples have also been recovered from deposits of Viking age at Jarlshof, Shetland (Hamilton 1956) and elsewhere.

Nos 423, 431, 432 and 450-2 have flattened, disc-shaped heads, those of no 431 and no 452 decorated by punched dots. Bands of incised cross-hatching appear on the shafts of nos 423, 431 and 452. These may have had a dual purpose, since, in addition to their decorative value, they would have impeded any

TABLE 2 UNPERFORATED BONE PINS

Cat No.	Head Type	Hipped Shaft	Any Decoration	Shaft Only
421	Ball	✓		
422	Flat (expanded)			
423	Disc	✓	✓	
424				✓
425	Flanged	✓	✓	
426	Ball	✓		
427	Ball			
428				✓
429	Facetted		✓	
430	Expanded			
431	Disc	✓	✓	
432	Disc	✓		
433	Ball	✓		
434	Stylised	✓	✓	
435	Flat (expanded)			
436	Expanded			
437	Flat			
438				✓
439	Flat (expanded)	✓	✓	
440				✓
441	Flat			
442				✓
443				✓
444				✓
445				✓
446	Flat (expanded)			
447				✓
448				✓
449				✓
450	Disc	✓		
451	Disc	✓		
452	Disc	✓	✓	
453	Ball			

tendency for the pin to slip out of position. This feature occurs most commonly on pins of 7th- to 8th-century date (MacGregor 1985, 116).

No 425 has a flanged head and a pronounced hip in its shaft. Pins with this type of hipped shaft have been noted on Dark Age sites in Britain and on the continent, and there seems to be general agreement that the type may not appear before the 7th century (Farley 1976, 204).

The head of no 429 has been carved to form lozenge-shaped and triangular facets and is decorated by incised lozenges and punched dots. Similarly faceted heads occur on copper alloy pins from Middle and Late Saxon contexts, for example at Whitby (Peers & Radford 1943, 63), Thetford (Goodall, A R 1984b, 69, fig 112, no 45) and Meols in the Wirral (Bu'lock 1960, 8-9). MacGregor (1985, 117) notes that firmly-dated examples in bone do not seem to occur before the Viking period.

No 434 has a stylised head reminiscent of that of a larger needle and pin from Thetford (Rogerson & Dallas 1984, 167, fig 189, no 33; 170, fig 190, no 45). In common with some of the disc-headed pins discussed above, it is decorated by bands of cross-hatching on its shaft and punched dots on its head.

Nos 422 and 446 have expanded heads, cut or sawn across at the top. Wear patterns on the shaft of no 422, the longest of the unperforated pins, suggest that it may have been fastened by a cord at two points along its shaft, probably being used to secure a garment or in the hair. No 439 also has a slightly expanded head, with notches cut into two sides. Nos 437 and 441 lack a recognizable head, being cut or sawn across at the top of a smoothly tapering shaft.

Both no 435 and no 436 owe their form more to the natural features of the long bone shaft splinters from which they were derived. Both have polished shafts and may have functioned either as pins or pin beaters.

421. Pin. Length 32mm; width at head 2mm; max. diameter of shaft 2mm
Derived from an ungulate long bone shaft. Complete pin with a bulb-shaped head and a circular cross-sectioned shaft terminating in a point. The shaft has a central expansion. Eroded condition. Context 0114; Find No 00032; Phase 22

422. Pin. Length 130mm; width at head 8mm; max. diameter of shaft 6mm
Derived from a large ungulate long bone shaft. Complete pin with an expanded, nail-type head and a circular cross-sectioned shaft. The shaft has two broad, shallow indentations which may represent zones of increased wear resulting from the mode of use of the pin. Highly polished.
Context 0134; Find No 00028; Phase 20

423. Pin. Length 32mm; width at head 6mm; max. diameter of shaft 3mm

Derived from a large ungulate long bone shaft. Pin with a disc-shaped head and a circular cross-sectioned shaft. The shaft has a central expansion and is broken. Below the head is a series of crossed, diagonal knife-cuts, possibly representing a zone of decoration. (Not illustrated)

Context 0144; Find No 00037; Unphased

424. Pin. Length 52mm; max. diameter 3mm

Probably derived from a pig fibula. Pin shaft fragment, oval in cross-section, becoming circular in cross-section towards the point. Knife-trimming marks are visible. (Not illustrated)

Context 0144; Find No 00590; Unphased

425. Pin. Length 53mm; width at head 5mm; max. diameter of shaft 4mm

Derived from a large ungulate long bone shaft. Complete pin. The circular cross-sectioned shaft widens at the head, which has a single encircling groove and a flat top. The shaft has a pronounced hip before it tapers to a point.

Context 0153; Find No 00041; Phase 9

426. Pin. Length 43mm; width at head 4mm; max. diameter of shaft 3mm

Derived from an ungulate long bone shaft. Complete pin with a roughly bulb-shaped head and a circular cross-sectioned shaft with a central expansion. Knife-trimming marks are visible.

Context 0183; Find No 00167; Phase 8

427. Pin. Length 26mm; width at head 3mm; max. diameter of shaft 2mm

Derived from ungulate or deer long bone shaft or antler. Complete pin with a roughly bulb-shaped head and a circular cross-sectioned shaft, terminating in a point. Knife-trimming marks are visible. (Not illustrated)

Context 0208; Find No 00125; Phase 25

428. Pin? Length 61mm; max. diameter 5mm

Derived from an ungulate long bone shaft. Possible pin shaft, circular in cross-section, tapering towards one end. Broken at both ends. Knife-trimming marks visible. (Not illustrated)

Context 0244; Find No 00405; Phase 12

429. Pin. Length 91mm; width at head 6mm; diameter of shaft 5mm

Derived from a large ungulate long bone shaft. Complete pin with a faceted head and a circular cross-sectioned shaft. The head has been carved to produce four lozenge-shaped facets interspersed with triangular ones. It is decorated by incised lozenges and punched dots. Five dots decorate the top surface of the head.

Context 0256; Find No 00172; Phase 14

430. Pin. Length 31mm; width at head 3mm; max. diameter of shaft 2mm

Derived from an ungulate long bone shaft. Pin with a circular cross-sectioned shaft, widening at the top to form the head. Knife-trimming marks visible. Eroded condition. (Not illustrated)

Context 0293; Find No 00291; Phase 7

431. Pin. Length 23mm; width at head 4mm; max. diameter of shaft 2mm

Derived from an ungulate long bone shaft. Pin with a disc-shaped head and a circular cross-sectioned shaft with a central expansion. The head is decorated by circular, punched dots forming a roughly circular pattern on each face. There are eight dots on one face and seven on the other. Two incised lines encircle the shaft just below the head and a band of crossed diagonal lines decorates the shaft below this. The point is missing.

Context 0307; Find No 00254; Phase 20

432. Pin. Length 29mm; width at head 4mm; max. diameter of shaft 2mm

Derived from an ungulate long bone shaft. Complete pin with a disc-shaped head and a circular cross-sectioned shaft, terminating

in a point. The shaft has a central expansion. Knife-trimming marks are visible.

Context 0345; Find No 00290; Phase 20

433. Pin. Length 32mm; width at head 4mm; max. diameter of shaft 2mm

Derived from an ungulate long bone shaft. Complete pin with a nearly spherical head and a circular cross-sectioned shaft, terminating in a point. The shaft has a central expansion. Eroded condition. (Not illustrated)

Context 0424; Find No 00360; Phase 18

434. Pin. Length 29mm; width at head 5mm; max. diameter of shaft 2mm

Derived from a large ungulate long bone shaft or antler. Pin with a stylized head and a circular cross-sectioned shaft, terminating in a point. The shaft has a central expansion. The head is decorated by six circular punched indentations on each face. The upper part of the shaft is decorated by two bands of hatched and crossed lines. (Not illustrated)

Context 0436; Find No 00322; Phase 9

435. Pin? Length 86mm; width at head 12mm

Derived from a large ungulate long bone shaft. Complete pin or pin beater with an oval cross-sectioned shaft, widening at one end to form the head and terminating in a point at the other end. The shaft is polished. (Not illustrated)

Context 1282; Find No 00501; Phase 8

436. Pin? Length 102mm; max. width 7mm

Derived from a large ungulate long bone shaft. Possible pin with an oval cross-sectioned shaft, becoming circular in cross-section towards the missing point. The medullary surface of the bone is exposed at the broader end. There is some polish on the shaft. (Not illustrated)

Context 1285; Find No 00522; Phase 8

437. Pin? Length 75mm; max. diameter of shaft 4mm

Probably derived from a large ungulate long bone shaft. Possible headless pin of ovoid cross-section. The shaft is cut or sawn across at the top and terminates in a rounded tip. (Not illustrated)

Context 1501; Find No 00523; Phase 5

438. Pin? Length 96mm; max. diameter 5mm

Derived from a large ungulate long bone shaft. Possible pin shaft, circular in cross-section and broken at both ends. Eroded condition. (Not illustrated)

Context 2186; Find No 00534; Phase 7

439. Pin. Length 66mm; width at head 4mm; max. diameter of shaft 2mm

Derived from a large ungulate long bone shaft. Complete pin. The shaft widens slightly at the top to form the head, which is notched on either side. The shaft is circular in cross-section and terminates in a point. It has a central expansion.

Context 2193; Find No 00533; Phase 4

440. Pin? Length 83mm; max. width 6mm

Derived from a large ungulate long bone shaft. Possible pin shaft fragment, roughly oval in cross-section, tapering towards a missing point. Knife-trimming marks are visible. (Not illustrated)

Context 3017; Find No 80332; Phase 13

441. Pin? Length 48mm; max. diameter 4mm

Derived from a large ungulate long bone shaft. Possible fragment of headless pin. The shaft is roughly circular in cross-section and tapers slightly. There is some polish on the shaft. Linear marks on the shaft may be rodent tooth marks. Eroded condition. (Not illustrated)

Context 3026; Find No 80007; Phase 23

442. Pin? Length 39mm; max. width 4mm

Derived from an ungulate long bone shaft or fibula. Possible pin shaft fragment, roughly oval in cross-section and terminating in a

point. (Not illustrated)

Context 10107; Find No 50155; Phase 14

443. Pin? Length 49mm; max. diameter 4mm

Derived from an ungulate long bone shaft or a pig fibula. Possible pin shaft fragment, circular in cross-section and terminating in a point. Knife-trimming marks are visible. (Not illustrated)

Context 10107; Find No 50157; Phase 14

444. Pin? Length 50mm; max. diameter 3mm

Derived from an ungulate long bone shaft or a pig fibula. Possible pin shaft fragment, circular in cross-section and terminating in a point. Polished. (Not illustrated)

Context 10109; Find No 50148; Phase 23

445. Pin? Length 36mm; max. width 4mm

Derived from a large ungulate long bone shaft or a pig fibula. Possible pin shaft fragment, roughly oval in cross-section and terminating in a point. Knife-trimming marks are visible. (Not illustrated)

Context 10215; Find No 50189; Phase 14

446. Pin. Length 40mm; width at head 6mm; max. diameter of shaft 3mm

Derived from a large ungulate long bone shaft. Pin with an expanded, nail-type head and a circular cross-sectioned shaft. The shaft is broken. Polished. Knife-trimming marks are visible. (Not illustrated)

Context 10215; Find No 50193; Phase 14

447. Pin? Length 23mm; max. width 6mm

Derived from a large ungulate long bone shaft. Possible pin shaft fragment, roughly oval in cross-section and slightly polished. Broken at both ends. Knife-trimming marks are visible. (Not illustrated)

Context 10241; Find No 50179; Phase 13

448. Pin? Length 44mm; max. width 6mm

Derived from a large ungulate long bone shaft. Possible pin fragment, roughly circular in cross-section and terminating in a point. It has been knife-trimmed and is polished. (Not illustrated)

Context 10273; Find No 50256; Phase 9

449. Pin? Length 24mm; max. diameter 3mm

Probably derived from a pig fibula. Probable pin shaft fragment, circular in cross-section. Broken at both ends. Polished. (Not illustrated)

Context 10479; Find No 50401; Phase 6

450. Pin. Length 36mm; width at head 4mm; max. diameter of shaft 2mm

Derived from an ungulate long bone shaft. Complete pin with a disc-shaped head and a circular cross-sectioned shaft, terminating in a point. The shaft has a central expansion. Knife-trimming marks are visible.

Find No 00012; Unstratified

451. Pin. Length 40mm; width at head 5mm; max. diameter of shaft 2mm

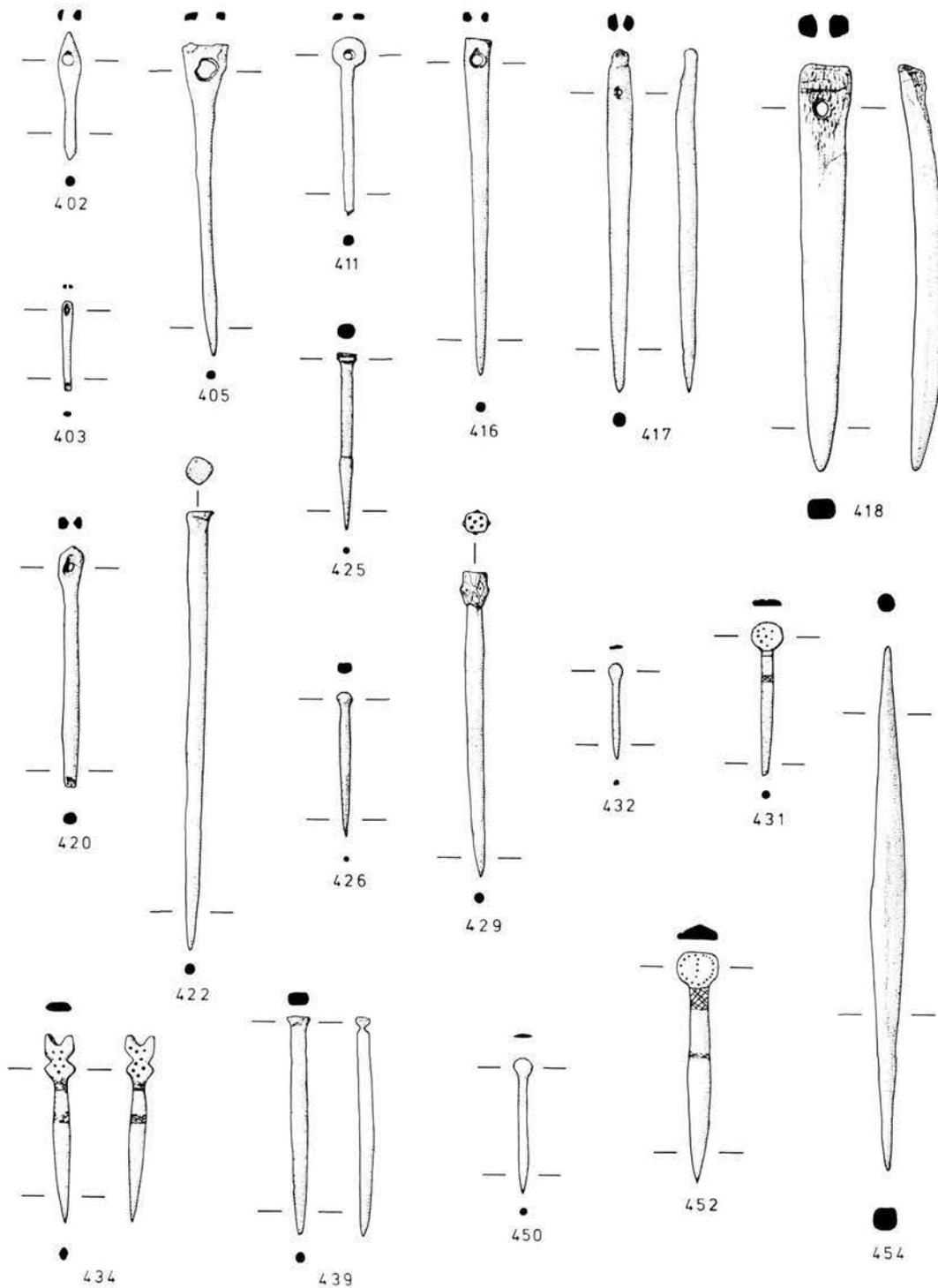
Derived from a large ungulate long bone shaft. Complete pin with a disc-shaped head and a circular cross-sectioned shaft terminating in a point. The shaft has a central expansion. (Not illustrated)

Find No 00014; Unstratified

452. Pin. Length 35mm; width at head 6mm; max. diameter of shaft 3mm

Pin with a disc-shaped head and a circular cross-sectioned shaft, terminating in a point. The shaft has a central expansion. The head is decorated by circular, punched dots. On one face, 13 dots border the head and a further three continue the vertical line of the shaft. On the opposite face, 18 border the head and 4 continue the line of the shaft. The upper half of the shaft is decorated by two bands of crossed lines.

Find No 00131; Unstratified



Illus 104

Bone needles and pins, and pinbeater (no 454). Scale all at 1:1 except nos 418 and 454 at 1:2.

453. Pin. Length 33mm; width at head 3mm; max. diameter of shaft 2mm

Derived from an ungulate long bone shaft. Complete pin with a bulb-shaped head and a nearly circular cross-sectioned shaft,

terminating in a point. Knife-trimming marks are visible. (Not illustrated)

Find No 00178; Unstratified

PIN BEATERS

Pin beaters are used to adjust single threads or groups of threads whilst weaving on hand looms. Five examples were recovered, including one, recovered from Soil 3 (Phase 14), decorated by incised diagonal grooves (no 458). Cigar-shaped pin beaters such as these are widely known from Anglo-Saxon sites, for example from Harston, Leicestershire (Dunning 1952).

Pin beaters survive in greater numbers than do their larger counterparts, sword beaters (see no 467), possibly because the latter may often have been made from wood (MacGregor 1985, 188). The two types performed complementary functions, the pin beater being inserted between individual warp threads and used at right angles to the plane of the weft, while the sword beater operated parallel to the weft (*ibid.*).

454. Pin beater. Length 154mm; max. diameter 9mm
Derived from a cattle metapodial shaft. Pin beater of roughly symmetrical form, tapering to a point at either end. The cross-section is roughly oval at the centre, becoming circular towards the ends. The object is highly polished.
Context 0228; Find No 00114; Phase 9

455. Pin beater. Length 90mm; max. diameter 6mm
Derived from a large ungulate long bone shaft. Pin beater, roughly oval in cross-section, tapering to a point at either end. Its maximum diameter is c 40mm from one end. It has a slight curvature and is highly polished. (Not illustrated)
Context 3521; Find No 80368; Phase 21

456. Pin beater? Length 50mm; max. diameter 7mm
Derived from a large ungulate long bone shaft or antler. Possible pin beater fragment, nearly circular in cross-section and tapering. Broken at both ends. The wider end is decorated by a zone of incised, crossed diagonal lines. Eroded condition. (Not illustrated)
Context 10126; Find No 50530; Phase 21

457. Pin beater. Length 82mm; max. diameter 10mm
Derived from a large ungulate long bone shaft. Pin beater of roughly symmetrical form, tapering towards a point at either end. Oval in cross-section. Where it survives, the surface is polished. Eroded condition. (Not illustrated)
Context 10196; Find No 50548; Phase 9

458. Pin beater. Length 95mm; max. diameter 8mm
Derived from a large ungulate long bone shaft. Pin beater of symmetrical form, tapering to a point at either end. The cross-section is circular at the centre, becoming oval towards the ends. A central band is decorated by incised diagonal grooves, bordered by two grooves encircling the shaft on either side. Both ends are polished.
Context 10215; Find No 50151; Phase 14

MISCELLANEOUS OBJECTS (illus 105)

No 459, a perforated disc, is probably a button backing. Examples of similar size and date have been recovered from excavations in Perth (Cox 1993; Cox 1994, 484, illus 9, no 45). Unperforated discs such as no 462 may have been used as button backings or as gaming counters.

Two small decorated fragments (nos 460 and 461) were recovered. No 460, from Courtyard 6 (Phase 9) is decorated by ring and dot motifs on both faces. Being decorated in this manner, it is unlikely to be from a mount and may possibly represent a fragment of a composite comb. No 461, from Building 9 (Phase 13) is decorated on one side only by cross-hatching and may be a fragment from a comb side plate.

No 463 may have functioned as a handle on a small item of furniture. It has been delicately fashioned on a lathe and incorporates a screw thread to join the upper and lower components. No 464 is a very thin slice of bone, highly polished on both faces and exhibiting increased abrasive wear in a small zone at its rounded end. This wear pattern would be consistent with its use as a plectrum or similar device.

No 465 is a decoratively carved ear scoop or similar

toilet implement, found in deposits of 19th- or early 20th-century date. A plainer ear scoop of 13th- or 14th-century date was recovered from recent excavations at the Abbot's House, Dunfermline (Cox 1996a, 100, illus 15, no 116).

Found in the fill of a foundation trench in Phase 6, no 466 is a spindle whorl, fashioned from whale bone. It is the largest and heaviest of the spindle whorls from the excavation, the other examples being of stone (see nos 331-9). Spindle whorls of bone are not uncommon, whorls made from the femur heads of cattle being the predominant type. As in this case, artefacts of whale bone tend to be found where the raw material is locally available. The lathe-turned decoration of concentric circles on no 466 echoes that on some of the stone spindle whorls from the site.

No 467, derived from a long bone shaft splinter, is probably a sword beater, used in weaving. It became highly polished through use and is broken at one end, although it may have continued in use after the break was sustained. Sword beaters are generally between 250 and 750 mm in length and were used in addition to the smaller pin beaters (see nos 454-8), being inserted horizontally in the warp shed to beat up a

weft row either in large sections or all at once (MacGregor 1985, 188).

No 468 is a pig metatarsal, modified by the removal of its proximal and distal articulations and by a single hole through the centre of the shaft. Objects of this type are not uncommon finds from medieval contexts and have been variously interpreted as bobbins, clothes fastening devices and musical toys. The latter interpretation gives rise to the term *buzzbone* (Lund 1981, 256-7), and Fenton (1978, 503-4) describes the custom in the Northern Isles for children to claim pig metapodials for making a toy called a *snorie bane*, so called because of the snoring sound it made when rotated quickly by means of a twisted cord fastened round it.

A number of possible unfinished artefacts was found. No 469 is probably a bird ulna, modified by cutting across each end and trimming the shaft. It may represent an unfinished whistle (see no 474). No 470 is an accessory metapodial of a horse, carefully trimmed to a point and given a triangular cross-section. It is clearly unfinished as the rough proximal articulation remains at the broader end.

Nos 471 and 472 may be unfinished artefacts. No 471 is a sheep metatarsal, modified by the boring of a hole through the proximal surface and by trimming of the shaft. Nos 478-9 are similarly modified sheep or goat metatarsals, trimmed to a point at their distal ends. No 472 is a long bone shaft splinter, crudely trimmed to a point at one end.

No 473 has probably been fashioned from a cattle rib, its long edges having been sharpened by trimming. These sharpened edges appear to have been smoothed and polished through use, and the object is interpreted as a possible weaving implement, perhaps functioning in the manner of a sword beater.

A probable whistle (no 474), made from a bird radius, perforated through the centre of the shaft on one side only was found in a dump of ashy clay in Phase 19.

459. Button? Diameter 16mm; thickness 1mm
Derived from an ungulate long bone shaft or antler. Probable button backing in the form of a disc with a circular, central perforation. There are saw marks on both faces.
Context 5044; Find No 90086; Phase 24

460. Decorated fragment. Length 21mm; width 13mm; thickness 3mm
Probably derived from a large ungulate or deer long bone shaft, scapula or mandible. Fragment with flat faces and three surviving finished edges. File marks are visible on the faces and each is decorated by a ring and dot pattern.
Context 0317; Find No 00299; Phase 9

461. Decorated fragment. Length 22mm; width 6mm; thickness 3mm
Possibly derived from a large ungulate rib. Fragment with one curved face and one flat face. The curved face is decorated by an incised pattern of crossed lines. The medullary surface of the bone is exposed on the flat face. (Not illustrated)
Context 10506; Find No 50242; Phase 13

462. Disc. Diameter 16mm; thickness 2mm
Probably derived from a large ungulate scapula or mandible. Plain, circular disc, polished on both surfaces. (Not illustrated)
Context 5000; Find No 90090; Phase 24

463. Drawer handle? Length 30mm; max. diameter 23mm
Probably derived from a large ungulate long bone shaft. Possible drawer handle from a wooden box or item of furniture. The object was made from two lathe-turned pieces which fit together by means of a screw thread. Traces of concentric turning grooves are visible on both pieces. A small fragment of copper alloy rivet survives within the hollow centre of the object. At the opposite end a countersunk hole has been drilled, possibly to accommodate a copper alloy ring. (Not illustrated)
Context 5002; Find No 90097; Phase 24

464. Plectrum? Length 30mm; width 10mm; thickness 0.5mm
Species unknown. A thin, polished slice of bone with a rounded terminal. Broken. (Not illustrated)
Context 10101; Find No 50016; Phase 24

465. Scoop. Length 54mm; width 5mm; thickness 4mm
Derived from a large ungulate long bone shaft. Object with a circular cross-sectioned shaft, terminating in a carved scoop or spoon at one end. At the opposite end, the shaft is decorated by a series of six small projections on one side. Two incised lines encircle this end of the shaft and below them is an incised 'V', on the face corresponding with the base of the spoon. The object is highly polished.
Context 10108; Find No 50013; Phase 24

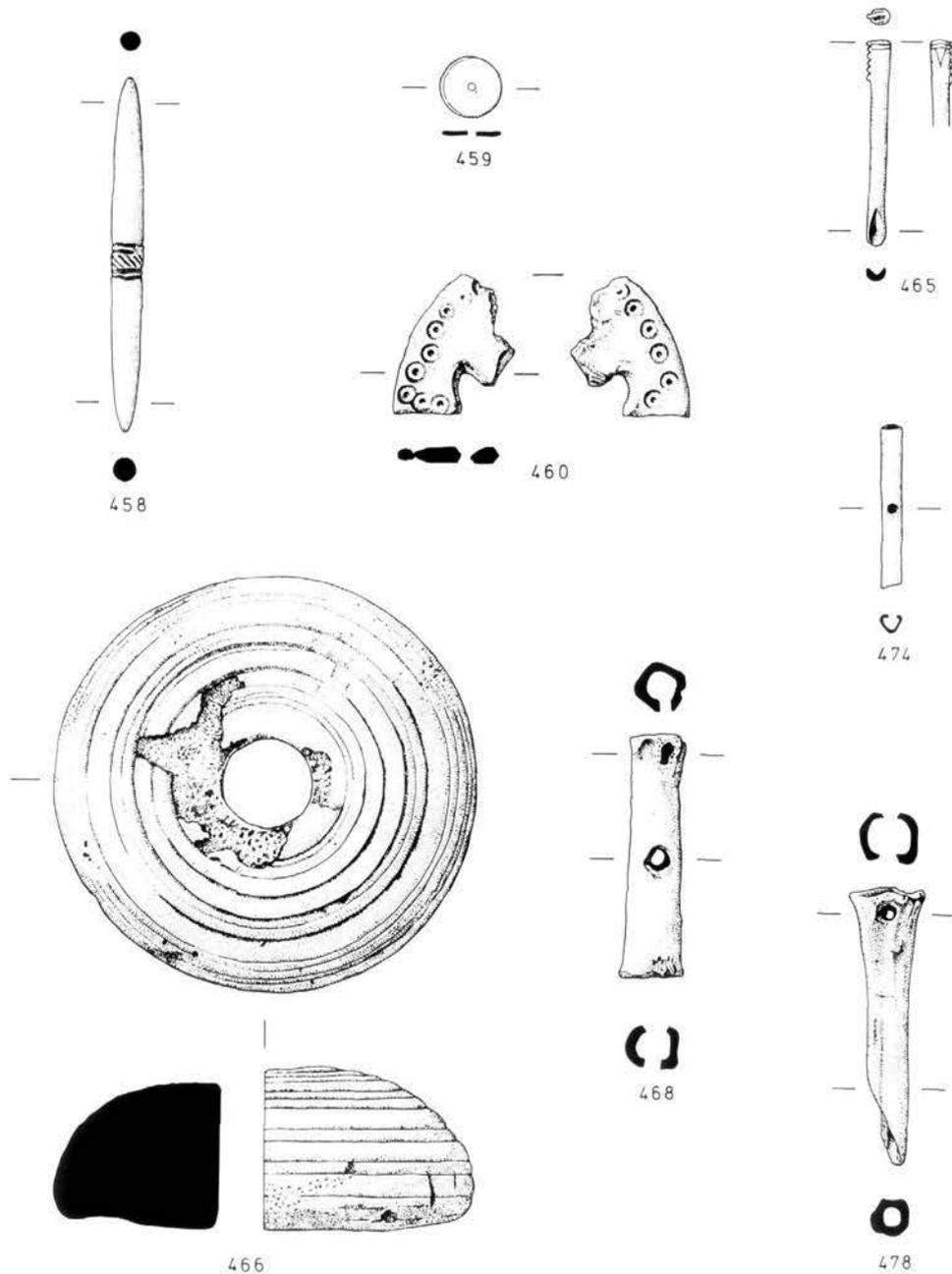
466. Spindle whorl. Diameter 55mm; thickness 17mm
Derived from whale bone. Spindle whorl of hemispherical form. The upper surface is decorated by a series of concentric rings around a circular, central hole. The surface has broken away at one edge of the hole, revealing the medullary surface below. Medullary tissue is also exposed on the flat underside of the object.
Context 2159; Find No 00570; Phase 6

467. Sword or pin beater? Length 185mm; width 14mm; thickness 11mm
Derived from a large ungulate long bone shaft. A shaft splinter, carved to form a point at one end. The other end is broken. The object is highly polished. (Not illustrated)
Context 0258; Find No 00378; Phase 19

468. Toggle or buzzbone. Length 64mm; width 16mm; thickness 14mm; diameter of hole 6mm
Derived from a pig metatarsal III or IV, with the proximal and distal articulations removed, leaving nearly flat surfaces at each end. The shaft has been trimmed. A roughly circular hole has been bored through the bone in an antero-posterior direction. There are small knife cuts at the edge of the hole on the anterior aspect.
Context 10192; Find No 50494; Phase 21

469. Unfinished artefact? Length 41mm; width 8mm; thickness 7mm
Probably derived from a bird (possibly gannet) ulna, cut across each end. Knife-trimming marks are visible along the shaft and at one end. (Not illustrated)
Context 0465; Find No 00388; Phase 13

470. Unfinished artefact? Length 56mm; width 8mm; thickness 7mm
Derived from a horse splint (accessory metapodial), knife-trimmed lengthwise on two faces, forming a point at one end. Part of the proximal articulation remains at the other end. (Not illustrated)
Context 3017; Find No 80575; Phase 13



Illus 105

Bone pin beater (no 458) and other bone artefacts (scale 1:2).

471. Unfinished artefact? Length 123mm; width 21mm; thickness 17mm

Derived from a sheep metatarsal. A roughly circular hole has been bored through the proximal surface and the shaft has been trimmed with a knife in the midshaft region. (Not illustrated)

Context 10170; Find No 50523; Phase 14

472. Unfinished artefact? Length 89mm; width 14mm; thickness 9mm

Probably derived from a large ungulate long bone shaft. A shaft splinter, trimmed to a point. The wider end is broken. (Not illustrated)

Context 10459; Find No 50573; Phase 18

473. Weaving tool? Length 214mm; width 21mm; thickness 8mm
Probably derived from a cattle rib. Both long edges have been sharpened by knife-trimming and the articular end has been removed. (Not illustrated)

Context 12032; Find No 51012; Phase 6

474. Whistle? Length 43mm; max. width 6mm

Derived from a bird (probably gannet) radius. The shaft has been cut at both ends and is polished. A circular hole has been bored through one face, approximately half way along its length.

Context 10218; Find No 50503; Phase 19

PERFORATED BONES (illus 105)

Both no 475 and no 477 are cattle femur heads, each with a single, circular perforation. Femur heads frequently provided the raw material for bone spindle whorls, for example at Thetford, where all of the 35 bone whorls found were cut from the proximal ends of horse or ox femora (Rogerson & Dallas 1984, 179). These two objects may possibly have functioned as whorls, although this seems less likely in the case of no 477 as it is irregular in form and would have been unevenly balanced around the perforation. No 475 is now in an eroded condition.

No 476 is a pig scapula with a rough-edged hole bored or punched through the blade. Schmidt (1972, 42) notes that perforations in the scapulae of oxen and pigs were caused by a prong or hook being pushed into the blade while still covered in meat, in order to hang them above a fire to be smoked.

No 478 and no 479 are sheep or goat metatarsals with holes bored through their proximal surfaces and their distal ends trimmed roughly to form points. Two smaller holes have, additionally, been bored just below the proximal end of no 478. No 480, a cattle metacarpal, may have also have been modified by a hole cut into the proximal end. Similarly modified cattle metapodials have been termed socketed points and a variety of functions has been suggested (MacGregor 1982, 96-7).

No 481, a pig phalange with a single circular hole bored into the anterior surface only is of unknown function.

475. Perforated bone. Length 32mm; width 29mm; thickness 17mm
Probably derived from a cattle femur head. A circular hole (diameter 8mm) has been bored through the object in an oblique

direction. Eroded condition. (Not illustrated)
Context 0232; Find No 00253; Phase 18

476. Perforated bone. Length 101mm; width 63mm; thickness 26mm
Derived from a pig left scapula. A rough-edged, roughly circular hole (diameter 6mm) has been bored or punched through the scapula blade. (Not illustrated)
Context 1109; Find No 00490; Phase 8

477. Perforated bone. Length 31mm; width 30mm; thickness 18mm
Proximal epiphysis of a cattle femur (unfused) with a circular hole bored through it in an oblique direction. (Not illustrated)
Context 10269; Find No 50224; Phase 14

478. Perforated bone. Length 73mm; width 18mm; thickness 18mm
Derived from a sheep or goat metatarsal. A hole has been bored through the proximal surface. Two smaller holes have been bored through the anterior and posterior surfaces just below the proximal end. The distal end has been roughly trimmed to a point. The point is worn smooth.
Context 10326; Find No 50525; Phase 11

479. Perforated bone. Length 102mm; width 17mm; thickness 15mm
Derived from a sheep or goat right metatarsal. A circular hole has been bored through the proximal surface. The distal end of the shaft has been trimmed to a point and is worn smooth. Knife-trimming marks are visible on the shaft. (Not illustrated)
Context 10452; Find No 50290; Phase 7

480. Perforated bone? Length 95mm; width 33mm; thickness 14mm
Derived from a cattle metacarpal. Approximately half of the proximal end survives. A circular hole may have been bored through the proximal articulation, which shows signs of wear. (Not illustrated)
Context 10464; Find No 50571; Phase 7

481. Perforated bone. Length 24mm; width 11mm; thickness 12mm
Derived from a pig first phalange. A circular hole (diameter 5mm) has been bored or cut into the anterior surface near to the distal end. (Not illustrated)
Find No 50188; Unstratified

POSSIBLE UTILIZED FRAGMENTS

A number of apparently water-worn fragments was recovered, two of which (nos 482 and 483) have pointed terminals and exhibit slight polishing on their points and edges. This may reflect their use as makeshift tools. No 482 was recovered from a levelling deposit in Phase 19, in association with a small number of artefacts connected with weaving. It may be possible that this object served a temporary purpose as a weaving implement.

482. Utilized fragment? Length 53mm; width 16mm; thickness 7mm

Derived from a large ungulate long bone shaft. Possible utilized fragment. Water-worn. One end is pointed and slightly polished. (Not illustrated)
Context 0258; Find No 00592; Phase 19

483. Utilized fragment? Length 55mm; width 13mm; thickness 2mm
Derived from a large ungulate long bone shaft. Possible utilized fragment. Water-worn. One end is pointed and may be polished. (Not illustrated)
Context 12028; Find No 51011; Phase 9

MISCELLANEOUS WORKED BONE

No 484, derived from the ventral section of a rib, has a polished surface and exhibits smooth wear on the edges of one broken end. It could have been used as a weaving tool. One of the long edges has been trimmed, possibly to remove a piece from which another artefact could be made. The function of the markings on the sides of the object is obscure.

Although in a very eroded condition, ring and dot decoration is visible on the slightly convex surface of no 485. The presence of iron staining on the flat back of the object suggests that it might represent a fragment of a mount or part of a handle. A handle from a folding knife from a late Saxon context at Northampton is similarly perforated and also bears ring and dot motifs (Oakley 1979b, 315, fig 141, no 78).

Nos 486 and 489 could have functioned as pin beaters. The latter has a slightly polished surface. The surface of no 486 is largely missing through erosion. No 491, recovered from the fill of the innermost Iron Age ditch, is a fragment of a perforated object of uncertain function, possibly derived from red deer antler.

484. Worked bone. Length 129mm; width 37mm; thickness 8mm
Derived from a large ungulate rib. Ventral section of a rib, with the more distal end trimmed, revealing the trabecular surface. The more proximal end is roughly chopped. Arrows have been scratched onto one side of the object. A more heavily incised 'Z' appears on the other side. (Not illustrated)
Context 0178; Find No 00049; Phase 21

485. Worked bone. Length 44mm; width 10mm; thickness 3mm
Derived from an ungulate long bone shaft. Object with a curved

cross-section, parallel long edges and a rounded terminal. There is a circular perforation near to the terminal. The other end is broken, possibly across a second hole. The convex surface bears incised ring and dot decoration. The concave surface is stained, possibly through contact with iron. Eroded condition. (Not illustrated)

Context 1109; Find No 00489; Phase 8

486. Worked bone. Length 65mm; width 8mm; thickness 5mm
Derived from a large ungulate long bone shaft. The object has an oval cross-section. It widens and then tapers at one end. The other end is broken. (Not illustrated)

Context 1121; Find No 00493; Phase 18

487. Worked bone. Length 87mm; width 37mm; thickness 21mm
Derived from a cattle right metatarsal, split once in the sagittal plane and once in the medio-lateral plane. The sagittally split edge has been smoothed or polished. (Not illustrated)

Context 10147; Find No 50572; Phase 20

488. Worked bone. Length 90mm; width 15mm; thickness 12mm
Derived from a sheep or goat left metatarsal. The proximal and distal ends have probably been removed by cutting or sawing. There are knife-trimming marks on the shaft. Eroded condition. (Not illustrated)

Context 10215; Find No 50562; Phase 14

489. Worked bone. Length 65mm; width 8mm; thickness 4mm
Derived from a large ungulate long bone shaft. Polished shaft fragment. (Not illustrated)

Context 10269; Find No 50568; Phase 14

490. Worked bone? Length 116mm; width 41mm; thickness 13mm

Sheep or goat left mandible with a small, smooth-edged hole in the ramus. (Not illustrated)

Context 10341; Find No 51026; Phase 7

491. Worked antler? Length 55mm; width 21mm; thickness 3mm
Possibly derived from red deer antler. A curved fragment with a rounded terminal, below which a circular hole (diameter 5mm) has been bored. The other end is broken. (Not illustrated)

Context 12333; Find No 50559; Phase 2

PERFORATED ANTLER TINES

Three perforated red deer antler tines were found. Nos 492 and 493 each have a circular hole bored into their bases, while no 494, with the tip removed, has been perforated longitudinally from one end to the other and could have been intended to function as a carrying handle.

492. Perforated tine. Length 98mm; width 19mm; thickness 18mm
Red deer antler tine, broken across the base. A circular hole has been bored into the base. The exterior surface is unmodified. (Not illustrated)

Context 0111; Find No 00020; Phase 21

493. Perforated tine. Length 128mm; width 22mm; thickness 18mm

Red deer antler tine, broken roughly at the base. A roughly circular hole has been bored into the base. Knife-trimming or file marks are visible near the tip, which is slightly polished. (Not illustrated)

Context 0118; Find No 00596; Phase 21

494. Perforated tine. Length 94mm; width 16mm; thickness 14mm
Red deer antler tine, with the tip and base removed. A roughly circular hole has been bored through the tine from the base to the tip. The exterior surface is unmodified. (Not illustrated)

Context 0215; Find No 00594; Phase 14

ANTLER OFFCUTS

Antlers were collected in the woods in the late winter and early spring when they were shed by the deer. Nos 495-509 are offcuts, probably left over from the manufacture of antler artefacts. Their occurrence spans the period from Phases 5 to 24. Nos 495, 496 and 504 were recovered from Courtyards 4 and 10, possibly representing a single courtyard (Phase 20). No 396, a possible handle made from an antler tine, was closely associated with these offcuts. This small assemblage appears to indicate antler working activity contemporary with the construction and use of the courtyard.

495. Antler offcut. Length 29mm; width 13mm; thickness 10mm
Red deer antler tine. Tip of tine only, possibly slightly polished. The base has been chopped and then snapped off. (Not illustrated)
Context 0297; Find No 00209; Phase 20

496. Antler offcut. Length 122mm; width 24mm; thickness 19mm
Red deer antler tine. The tip is intact. The base has been sawn or chopped and then snapped off. (Not illustrated)
Context 0297; Find No 00229; Phase 20

497. Antler offcut. Length 123mm; width 33mm; thickness 20mm
Red deer antler tine. The tip is intact and slightly polished. The base has been sawn and then snapped off roughly. Medullary tissue has been scooped out from the interior. Knife-trimming marks are visible. (Not illustrated)
Context 0423; Find No 00377; Phase 13

498. Antler offcut. Length 148mm; width 47mm; thickness 30mm
Red deer antler tine. The tip is intact. The base has been chopped across roughly. Knife-trimming and hacking marks are visible. (Not illustrated)
Context 1115; Find No 00449; Phase 8

499. Antler offcut. Length 71mm; width 17mm; thickness 15mm
Red deer antler tine. Tip of tine only. The base has been sawn and then snapped off. (Not illustrated)
Context 1162; Find No 00488; Phase 8

500. Antler offcut. Length 41mm; width 26mm; thickness 9mm
Red deer antler beam fragment, sawn at one end. There are numerous knife cuts on the surface. (Not illustrated)
Context 1510; Find No 00597; Phase 5

501. Antler offcut. Length 62mm; width 18mm; thickness 15mm
Red deer antler tine. The tip has been removed. The base has broken, probably recently. (Not illustrated)
Context 10101; Find No 50001; Phase 24

502. Antler offcut. Length 150mm; width 32mm; thickness 25mm
Red deer antler tine. The base has been chopped roughly. There are several knife-cuts on the surface. (Not illustrated)
Context 10101; Find No 51018; Phase 24

503. Antler offcut. Length 63mm; width 32mm; thickness 24mm
Red deer antler tine. The tip has been removed by sawing. The base has broken recently. The surface is unmodified. (Not illustrated)
Context 10126; Find No 51019; Phase 21

504. Antler offcut. Length 67mm; width 45mm; thickness 40mm
Red deer antler burr, beam and pedicle, split longitudinally. The pedicle and beam have been sawn across. There are knife cuts on the internal and external surfaces. (Not illustrated)
Context 10137; Find No 51017; Phase 20

505. Antler offcut. Length 136mm; width 30mm; thickness 14mm
Red deer antler beam fragment, split longitudinally. The base has been chopped across. There are knife cuts on the surface. (Not illustrated)
Context 10315; Find No 51016; Phase 9

506. Antler offcut. Length 114mm; width 29mm; thickness 11mm
Red deer antler beam fragment, split longitudinally. The base has been chopped or sawn. Conjoins with no 507. Eroded condition. (Not illustrated)
Context 10391; Find No 51021; Phase 7

507. Antler offcut. Length 120mm; width 27mm; thickness 8mm
Red deer antler beam fragment, split longitudinally. The base has been chopped or sawn. There are knife cuts near the base. Conjoins with no 506. (Not illustrated)
Context 10392; Find No 51020; Phase 7

508. Antler offcut. Length 37mm; width 14mm; thickness 11mm
Red deer antler. Tip of tine only, sawn across. Eroded condition. (Not illustrated)
Context 10807; Find No 50348; Phase 11

509. Antler offcut. Length 52mm; width 20mm; thickness 15mm
Red deer antler tine. Tip intact. The base has been sawn across. There are several longitudinal scratches on the surface. (Not illustrated)
Context 12032; Find No 51022; Phase 6

SHELL OBJECTS

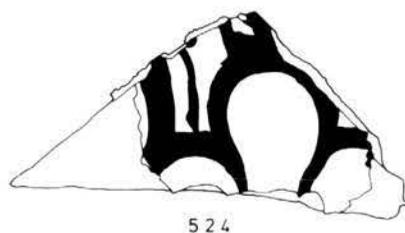
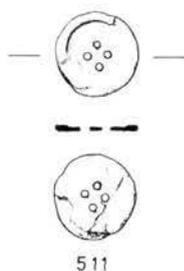
(illus 106)

Two circular shell buttons (nos 510 and 511) were found. No 510 appears to have been made in two pieces, while no 511 is a one-piece button. The tendency of mother-of-pearl artefacts to laminate in damp conditions makes buttons such as these rare finds in archaeological deposits (Cox 1996b, 55).

510. Button. Diameter 11mm; thickness 2mm
Circular button, slightly concavo-convex, made from mother-of-

pearl. There are two circular holes at its centre. It appears to have been made in two parts. One part is a perforated disc; the other is a ring which bordered the holes when affixed to the reverse side of the disc. The two parts have now separated. (Not illustrated)
Context 3009; Find No 80324; Phase 13

511. Button. Diameter 22mm; thickness 2mm
Circular button made from mother-of-pearl, with four circular holes at its centre and a slightly raised border on its upper face. The lower surface has laminated slightly.
Context 5044; Find No 90085; Phase 24



Illus 106
Shell button (no 511) and glass window
fragment (no 524) (scale 1:1).

GLASS OBJECTS

(illus 106)

Finds of glass bangles are not common in Britain and the nature of their development is not yet fully clear. Glass bangles are first found on the Continent during the Iron Age, and are known from native contexts in Wales and Scotland in the 1st and 2nd centuries AD. The type re-appears in Ireland in the early Middle Ages, and a few have also been found in Anglo-Saxon contexts (Edwards 1990, 95).

The projected diameter of no 512 (60mm) possibly makes it too small to have been worn by anyone other than a child. Edwards (1990, 94) notes this of many objects of this type, and suggests that, though they are generally known as bangles, many may in fact have functioned as pendants. However, Poluboyarinova (1967, 93) notes that glass bangles analogous to those from Novgorod (where they range from 52mm to 64mm in diameter) have been shown by their positions in graves to have been worn by women at their wrists.

Three glass beads (nos 513 and 515-6) were found. No 513 is of elongated ovoid form and has an orange colouration, while the remaining two beads are blue or bluish-green, biconical and of circular cross-

section. No 514, also of blue glass, is unperforated and may represent a droplet or an unfinished bead.

512. Bangle? Length 23mm; width 15mm; thickness 9mm
Possible bangle fragment of D-shaped cross-section, broken at both ends. Elongated voids are visible on all surfaces. The glass is opaque and pale blue. On the convex surface there are two bands of pale green glass, which probably represent part of a decorative pattern. The arc of curvature of this fragment indicates an internal diameter of c 60mm for the complete object. (Not illustrated)
Context 10238; Find No 50202; Phase 13

513. Bead. Length 11mm; width 6mm; thickness 3mm
Fragment of an elongated, ovoid bead of orange glass. It is broken across its central, circular hole. (Not illustrated)
Context 0111; Find No 00152; Phase 21

514. Bead or waste. Length 5mm; width 4mm; thickness 3mm
Rounded blue droplet, slightly flattened on one surface. Unperforated. (Not illustrated)
Context 0307; Find No 00250; Phase 20

515. Bead. Diameter 8mm; thickness 6mm
Biconical, circular bead, bluish in colour, with a central, circular hole. (Not illustrated)
Context 0448; Find No 00337; Phase 18

516. Bead. Diameter 7mm; thickness 5mm
Biconical, circular bead, bluish-green in colour, with a central, circular hole. (Not illustrated)
Context 2164; Find No 00567; Phase 8

VESSELS

Fragments of vessel glass were rare finds from the excavation and all four recovered are very small and exhibit few diagnostic features.

517. Vessel. Length 8mm; width 7mm; thickness 0.8mm
Fragment of vessel glass, colourless to pale green, with a slight curvature. (Not illustrated)
Context 0307; Find No 00239; Phase 20

518. Vessel. Length 5mm; width 4mm; thickness 0.4mm
Fragment of vessel glass, pale yellow to green, with a slight

curvature and a raised band or rib on the convex surface. (Not illustrated)
Context 1481; Find No 00528; Phase 8

519. Vessel. Length 27mm; width 22mm; thickness 5mm
Fragment of vessel glass. The glass has weathered and discoloured. (Not illustrated)
Context 10119; Find No 50144; Phase 23

520. Vessel. Length 9mm; width 9mm; thickness 1mm
Fragment of vessel glass with a pale blue to green colouration and a slight curvature. (Not illustrated)
Context 10479; Find No 50383; Phase 6

WINDOW GLASS

Nine small fragments of window glass (nos 521-9) were recovered from Phases 22-24. All are weathered and discoloured, and in some cases the fragments are laminated. Scored lines run along two parallel edges of no 521, evidence of the cutting out of individual panes. These edges also appear to exhibit evidence of grozing, indicated by the presence of a series of tiny conchoidal fractures, made when the uneven edges of the cut pane were pared down using a grozing iron or pincers. On two fragments (nos 524 and 526), traces of painted patterns survive.

521. Window. Length 25mm; width 19mm; thickness 1mm
Fragment of window glass. The glass has weathered and the surface is discoloured. It is now opaque. Small elongated bubbles are visible within the glass, and scored or scratched lines run along two parallel edges, which are possibly grozed. (Not illustrated)
Context 3022; Find No 80354; Phase 23

522. Window. Length 37mm; width 28mm; thickness 3mm
Fragment of window glass. The glass has weathered and the surface is discoloured. Beneath the surface layer the glass has become crystalline and has a yellow to green colouration. Circular bubbles are visible on one surface. (Not illustrated)
Context 3026; Find No 80353; Phase 23

523. Window. Length 25mm; width 24mm; thickness 1mm
Fragment of window glass. The pale green glass has weathered and discoloured. A single elongated bubble is visible on one surface. (Not illustrated)
Context 3035; Find No 80352; Phase 22

524. Window. Length 51mm; width 24mm; thickness 3mm

Fragment of painted window glass. The glass has weathered and laminated. The surfaces are discoloured and there are traces of a painted pattern on one surface. Beneath the surface there is a colourless to pale green glass core.
Context 10101; Find No 50003; Phase 24

525. Window. Length 32mm; width 15mm; thickness 3mm
Fragment of window glass. The glass has weathered and the surface is discoloured. (Not illustrated)
Context 10101; Find No 50011; Phase 24

526. Window. Length 33mm; width 23mm; thickness 2mm
Fragment of painted window glass. The surfaces have weathered, discoloured and laminated. There are traces of a painted pattern on one surface. Beneath the surface there is a colourless to pale green glass core. (Not illustrated)
Context 10109; Find No 50115; Phase 23

527. Window. Length 14mm; width 10mm; thickness 2mm
Fragment of window glass. The glass has weathered and discoloured. Beneath the surface layer the glass has become crystalline and is now opaque. (Not illustrated)
Context 10109; Find No 50154; Phase 23

528. Window. Length 14mm; width 11mm; thickness 1mm
Fragment of window glass. The glass has weathered and the surface is discoloured. Beneath the surface layer the glass is almost colourless. (Not illustrated)
Context 10111; Find No 51023; Phase 22

529. Window. Length *c* 21mm; width *c* 13mm; thickness *c* 2mm
Fragment of window glass. The glass is weathered and discoloured and is now opaque. The fragment was recovered within its soil matrix and is in a very fragmentary condition. The measurements given are approximate. (Not illustrated)
Context 10118; Find No 50312; Phase 23

CLAY LOOMWEIGHTS

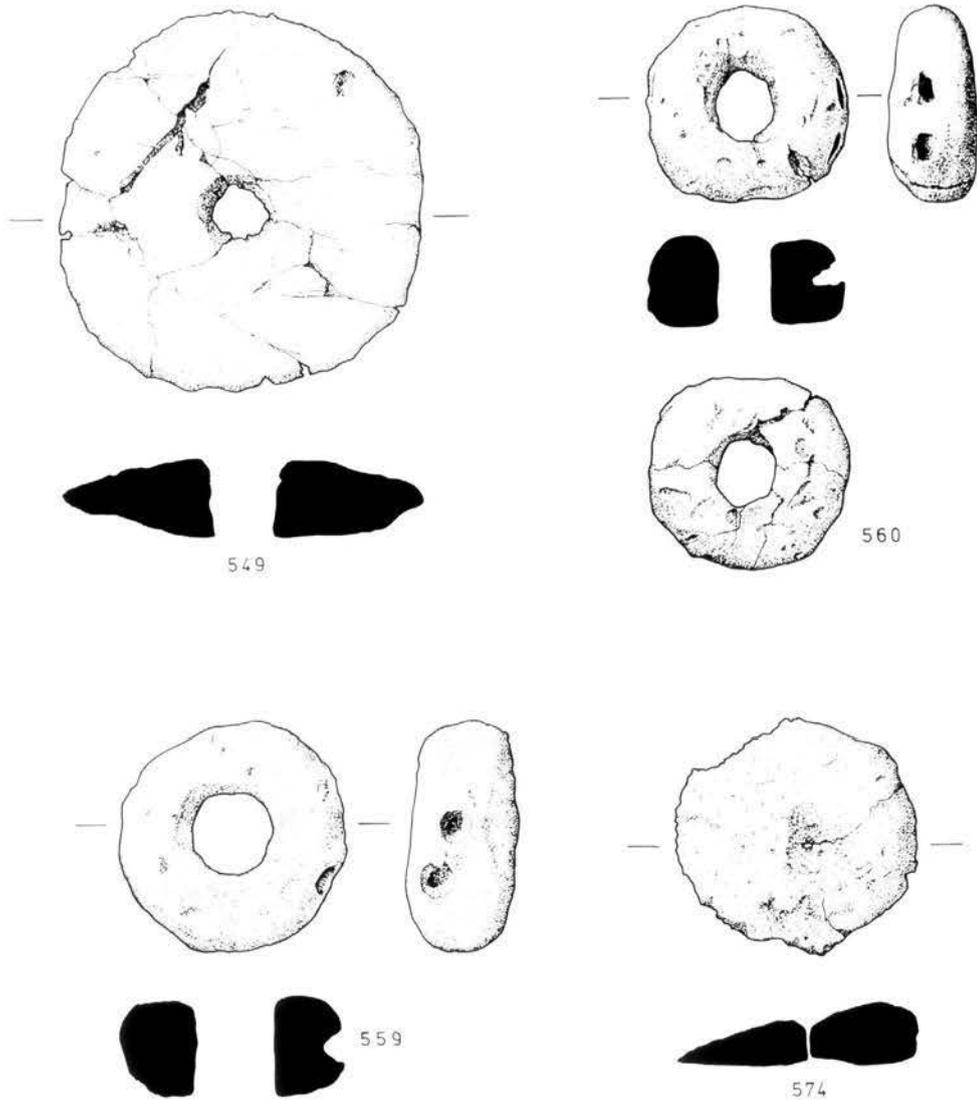
(illus 107, 108)

The loomweights from these excavations are of a similar type to those found at Yeavering (Hope-Taylor 1977, 181-2), Whitby (Peers & Radford 1943) and other Anglo-Saxon settlement sites, being of an intermediate form between the annular and bun-shaped varieties. Hope-Taylor (1977, 182) observes that this type of loomweight originated on the Continent in or before the 5th century, although it is found at sites in Britain dating broadly to the 7th to 9th centuries, and doubts whether the type can be regarded as a reliable chronological indicator.

A majority of the Dunbar loomweights was associated with Building 5, a *Grubenhäus* (Phase 7), which, on the basis of a range of radiocarbon dates, appears to date from the 7th century. Several

loomweights, although not from the *Grubenhäus* itself, were found in overlying features which had disturbed its destruction deposits and were, therefore, indirectly associated with it.

All of the loomweights and fragments recovered are of a broadly similar fabric, a fairly fine sandy clay with varying amounts of organic temper in the form of grass or straw. The fabric colour varies from brownish-yellow to dark brown or black, dependent on the degree of firing and of reduction. Some minor anomalies were noted. The fabrics of nos 550 and 553 contain more small, angular and rounded stones than the majority. Those of nos 532, 537 and 546 are more micaceous.



Illus 107
Clay loomweights (nos 549, 559, 560 and 574; scale 1:4).

METHODS OF MEASUREMENT

It was not possible in all cases for the maximum diameter, maximum thickness, maximum diameter of the central hole and the weight of the loomweight to be measured, due to the fragmentary nature of many examples. Weights have been measured only in cases where the loomweight is complete, almost complete, or where the loomweight has not been reconstructed but the total weight of the fragments approximates to that of the complete object. For individual fragments, length, width and thickness have been measured. Where a catalogue entry

comprises more than one fragment from a single loomweight, dimensions of the largest have been given.

A comparison was made of the varying degrees of firing of loomweights and loomweight fragments. Those which are partially fired have been classified from PF1 to PF10 (or assigned a range, eg PF3-5) according to their degree of firing, PF1 being at the lower end of the scale. This classification is noted in each catalogue entry.



Illus 108
Three stages in the manufacture of clay loomweights.

DISCUSSION

The fired finished loomweights in the assemblage are roughly circular in outline and approximately symmetrical across their diameter and thickness. They appear to have been made from discs of clay, represented by nos 571-4. Two of these (nos 573 and 574) have a central indentation on each side. As part of the manufacturing process, such indentations may have been enlarged and shaped by hand to form the central, circular holes of the finished examples (see illus 108). Two of the partially-formed loomweights (nos 549 and 550) are of a more flattened, discoid form than the finished examples.

The clay discs and partly-formed loomweights, diagnostic of loomweight manufacture, were largely found in the *Grubenhäus*, some lying on the surface of the yellow to brown clay deposit at the eastern end of the building which appears to have been used in their fabrication.

The largest group of loomweights was found lying within the *Grubenhäus* but not in the loomweight manufacturing area described above. Some examples appear to have come from within the burnt destruction debris. Within this group, some examples had been partially fired, presumably accidentally when the building, or the debris from it, was burned.

Four of the loomweights from within and below the destruction deposits of the *Grubenhäus* (nos 554-5 and 560-1) and two from deposits directly above it (nos 530 and 538) have wear marks around the edges of their central perforations, indicating that they had been used. These wear marks consist of grooves worn into the edges of the perforations, consistent with the loomweights having been suspended from the warp threads. These used loomweights are among the most highly fired and are of a fairly

consistent weight, ranging from 408g to 533g. A degree of firing may have been part of the intentional process of manufacture. Fired loomweights would have been more resistant to the occasional knock whilst in use, whereas if they were used in a completely unfired state they would have been quite susceptible to breakage.

Finger impressions were noted on three loomweights (nos 559-61), all from below and within the destruction debris of the *Grubenhäus*. Two of the three (nos 560-1) show definite signs of having been used. The position of the finger impressions in relation to the wear marks is consistent on these two examples. The function of the finger impressions is not fully clear. They could represent remnant elements of the manufacturing process. If they had been intended for the insertion of weighting devices (eg lead plugs), it is surprising that they are not positioned centrally in relation to the wear marks.

530. Loomweight. Max. diameter 108mm; thickness 40mm; max. diameter of hole c 33mm; weight 345g
Very fragmentary loomweight, of which the entire circumference has been reconstructed. Wear marks on the edges of the central hole indicate that the object has been used. Fired/PF8-9. (Not illustrated)
Context 0183; Find No 00039; Phase 8

531. Loomweight fragment. Length 31mm; width 35mm; thickness 22mm
Loomweight fragment. Fired. (Not illustrated)
Context 0258; Find No 00408; Phase 19

532. Loomweight fragment. Length 65mm; width 23mm; thickness 38mm
Loomweight fragment. Fired. (Not illustrated)
Context 0297; Find No 00284; Phase 20

533. Loomweight fragment. Max. diameter c 122mm; thickness 34mm; max. diameter of hole c 36mm
Loomweight fragment. Fired/PF9-10. Approximate measurements for the complete object are given. (Not illustrated)
Context 0435; Find No 00399; Phase 8

534. Loomweight fragment. Length 87mm; width 47mm; thickness 20mm
Fragment of a partially-formed loomweight. Unfired. (Not illustrated)
Context 0448; Find No 00430; Phase 18
535. Loomweight fragment. Length 51mm; width 31mm; thickness 26mm
Loomweight fragment. Fired. (Not illustrated)
Context 0451; Find No 00402; Phase 7
536. Loomweight fragment. Length 74mm; width 32mm; thickness 36mm
Loomweight fragment. Fired. (Not illustrated)
Context 0458; Find No 00385; Phase 7
537. Loomweight fragment. Length 89mm; width 35mm; thickness 32mm
Loomweight fragment. Fired. (Not illustrated)
Context 0461/0462; Find No 00397; Phase 18
538. Loomweight. Max. diameter 101mm; thickness 46mm; max. diameter of hole 38mm; weight 408g
Complete loomweight. Wear marks on the edges of the central hole indicate that the object has been used. Fired. (Not illustrated)
Context 1265; Find No 00495; Phase 8
539. Loomweight fragments. Max. diameter *c* 112mm; thickness 31mm; max. diameter of hole *c* 36mm
Three conjoining fragments of a loomweight. The object has been fired more on one side than the other. Approximate measurements for the complete object are given. Partially fired PF7-8. (Not illustrated)
Context 1302; Find No 00503; Phase 8
540. Loomweight fragments. Largest fragment: Length 70mm; width 34mm; thickness 40mm
Two fragments, interpreted as being from a single loomweight. Fired/PF9-10. (Not illustrated)
Context 1302; Find No 00504; Phase 8
541. Loomweight fragments? Largest fragment: Length 89mm; width 54mm; thickness 41mm
Several fragments, probably from a single loomweight. The largest fragment has an additional hole (diameter 7mm) bored through it in an oblique direction. Fired. (Not illustrated)
Context 1302; Find No 00505; Phase 8
542. Loomweight fragments. Max. diameter *c* 108mm; thickness 36mm; max. diameter of hole *c* 41mm
Two fragments, interpreted as being from a single loomweight. Fired/PF9. Approximate measurements for the complete object are given. (Not illustrated)
Context 1302; Find No 00508; Phase 8
543. Loomweight fragments. Largest: Length 80mm; width 50mm; thickness 35mm
Two fragments, interpreted as being from a single, partially-formed loomweight. Unfired/PF2-4. (Not illustrated)
Context 1302; Find No 00603; Phase 8
544. Loomweight fragment. Length 71mm; width 27mm; thickness 24mm
Fragment of a partially-formed loomweight. (Not illustrated)
Context 1339; Find No 00509; Phase 7
545. Loomweight fragments. Largest fragment: Length 70mm; width 33mm; thickness 23mm
Four fragments, interpreted as being from a single, partially-formed loomweight. Unfired. (Not illustrated)
Context 1498; Find No 00566; Phase 8
546. Loomweight. Length 59mm; width 36mm; thickness 18mm
Loomweight fragment. Fired. (Not illustrated)
Context 1498; Find No 00602; Phase 8
547. Loomweight. Max. diameter 197mm; thickness 38mm; max. diameter of hole 46mm; weight 1232g
Very fragmentary, partially-formed loomweight. The central hole is not fully formed. Unfired. (Not illustrated)
Context 2186; Find No 00560; Phase 7
548. Loomweight. Length 179mm; width 140mm; thickness 43mm
Partially-formed loomweight. Unfired. (Not illustrated)
Context 2186; Find No 00561; Phase 7
549. Loomweight. Max. diameter 191mm; thickness 35mm; max. diameter of hole 39mm; weight 1074g
Partially-formed loomweight. Discoid. There is an additional hole (max. diameter 9mm) between the central hole and the outer edge. Unfired.
Context 2186; Find No 00562; Phase 7
550. Loomweight fragment. Max. diameter *c* 183mm; thickness 26mm
Fragment of a partially-formed loomweight. Discoid. Broken across a central hole. Unfired. (Not illustrated)
Context 2186; Find No 00564; Phase 7
551. Loomweight fragments. Largest fragment: Length 94mm; width 44mm; thickness 30mm
Three fragments interpreted as being from a single, partially-formed loomweight. Unfired/PF2. (Not illustrated)
Context 2191; Find No 00559; Phase 8
552. Loomweight. Max. diameter 105mm; thickness 41mm; max. diameter of hole 51mm; weight 382g
Almost complete loomweight. The object is partially fired, having been fired more on one side than on the other. (Not illustrated)
Context 2194; Find No 00539; Phase 7
553. Loomweight fragments. Largest fragment: Length 59mm; width 30mm; thickness 32mm
Several fragments, interpreted as being from a single loomweight. Unfired. (Not illustrated)
Context 2205; Find No 00535; Phase 4
554. Loomweight. Max. diameter 120mm; thickness 33mm; max. diameter of hole 42mm; weight 506g
Almost complete loomweight. Wear marks on the edges of the central hole indicate that the object has been used. Fired/PF9-10. (Not illustrated)
Context 2209; Find No 00536; Phase 7
555. Loomweight. Max. diameter 111mm; thickness 36mm; max. diameter of hole 51mm; weight 443g
Almost complete loomweight. Wear marks on the edges of the central hole probably indicate that the object has been used. Fired. (Not illustrated)
Context 2209; Find No 00540; Phase 7
556. Loomweight. Max. diameter 94mm; thickness 28mm; max. diameter of hole 31mm; weight 302g
Almost complete loomweight, slightly broken around its edges. Fired/PF10. (Not illustrated)
Context 2209; Find No 00541; Phase 7
557. Loomweight. Max. diameter 106mm; thickness 46mm; max. diameter of hole 34mm; weight 334g
Almost complete loomweight, partially broken across its base. Unfired/PF1. (Not illustrated)
Context 2209; Find No 00542; Phase 7
558. Loomweight fragments. Max. diameter 97mm; thickness 31mm; max. diameter of hole 35mm
Two conjoining fragments, probably of a partially-formed loom weight. The edges of the fragments are abraded, therefore they have not been re-joined. Partially fired PF1-2. (Not illustrated)
Context 2209; Find No 00543; Phase 7

559. Loomweight. Max. diameter 114mm; thickness 38mm; max. diameter of hole 46mm; weight 492g
Almost complete loomweight. There are two adjacent impressions, probably made by the insertion of fingers, in the outer edge. Partially fired PF8.
Context 2209; Find No 00544; Phase 7

560. Loomweight. Max. diameter 101mm; thickness 43mm; max. diameter of hole 37mm; weight 431g
Complete loomweight. There are two adjacent impressions, probably made by the insertion of fingers, in the outer edge. Wear marks on the edges of the central hole indicate that the object has been used. Fired.
Context 2209; Find No 00545; Phase 7

561. Loomweight. Max. diameter 107mm; thickness 45mm; max. diameter of hole 46mm; weight 533g
Complete loomweight. There are two adjacent impressions, probably made by the insertion of fingers, in the outer edge. Wear marks on the edges of the central hole probably indicate that the object has been used. Fired/PF9. (Not illustrated)
Context 2209; Find No 00546; Phase 7

562. Loomweight. Max. diameter *c* 106mm; thickness 35mm; max. diameter of hole 36mm; weight 320g
Loomweight, broken around its edges. Unfired/PF1. (Not illustrated)
Context 2209; Find No 00553; Phase 7

563. Loomweight fragment. Max. diameter 110mm; thickness 31mm; max. diameter of hole *c* 27mm
Loomweight fragment, broken across the central hole. There is a circular indentation (max. diameter 9mm) approximately half-way between the central hole and the outer edge of the object. Unfired. (Not illustrated)
Context 2209; Find No 00554; Phase 7

564. Loomweight fragment. Length 102mm; width 66mm; thickness 31mm
Fragment of a partially-formed loomweight. Unfired. (Not illustrated)
Context 2209; Find No 00555; Phase 7

565. Loomweight. Max. diameter *c* 123mm; thickness 25mm; max. diameter of hole 30mm; weight 287g
Partially-formed loomweight, broken around its edges. Unfired. (Not illustrated)
Context 2209; Find No 00599; Phase 7

566. Loomweight. Length 127mm; width 98mm; thickness 38mm; max. diameter of hole 21mm
Partially-formed loomweight with irregular edges. The object is broken across its base. Unfired. (Not illustrated)
Context 2209; Find No 00600; Phase 7

567. Loomweight fragment. Length 105mm; width 37mm; thickness 40mm
Fragment, probably of a partially-formed loomweight. Partially fired PF2-3. (Not illustrated)
Context 2209; Find No 00601; Phase 7

568. Loomweight. Max. diameter 107mm; thickness 27mm; max. diameter of hole *c* 35mm; weight 226g
Loomweight, almost complete after reconstruction. Mis-shapen. Partially fired PF7-9. (Not illustrated)
Context 5132; Find No 90019; Phase 4

569. Loomweight fragment. Length 99mm; width 54mm; thickness 28mm
Loomweight fragment. Unfired/PF1 (Not illustrated)
Context 5138; Find No 90020; Phase 4

570. Loomweight. Max. diameter 161mm; thickness 53mm; max. diameter of hole 58mm; weight 1243g
Almost complete loomweight, consisting of two conjoining fragments. The edges of the object are slightly chipped and abraded. Unfired/PF2-3. (Not illustrated)
Context 12215; Find No 50446; Unphased

571. Clay disc. Max. diameter 114mm; thickness 27mm
Clay disc with its edge partially broken. Unfired. (Not illustrated)
Context 0291; Find No 00498; Phase 7

572. Clay disc. Max. diameter 103mm; thickness 28mm
Fragmentary clay disc. Unfired. (Not illustrated)
Context 0362; Find No 00386; Phase 13

573. Clay disc. Max. diameter 117mm; thickness 33mm
Clay disc with an indentation at the centre of each side. The object has been partially fired on one edge but is otherwise unfired. Unfired/PF5. (Not illustrated)
Context 2209; Find No 00537; Phase 7

574. Clay disc. Max. diameter 125mm; thickness 30mm
Clay disc with an indentation at the centre of each side. Unfired.
Context 2209; Find No 00538; Phase 7

CERAMIC CRUCIBLE FRAGMENTS

Nos 575 and 576 were recovered from Soil 3 (Phase 14) and are therefore of uncertain origin. No 577, consisting of four fragments, probably of a single crucible, came from a gravel surface in Phase 20 and was associated with copper alloy working debris. Paul Wilthew of the National Museums of Scotland carried out an XRF analysis of the vitrified deposit adhering to no 576. The results, though inconclusive, indicated that the fragment may be from a crucible used to melt debased silver.

575. Crucible fragment. Length 20mm; width 18mm; thickness 9mm
Rim fragment from a crucible in a moderately coarse, buff to brown fabric. There is a deposit of green, glassy material on the internal surface of the fragment. (Not illustrated)
Context 0215; Find No 00200; Phase 14

576. Crucible fragment. Length 12mm; width 11mm; thickness 7mm
Rim fragment from a crucible in a moderately coarse, buff to brown fabric. There is a deposit of green, vitrified material on the internal surface of the fragment. XRF analysis revealed that this is probably a slag rich in copper and silver, also containing tin and lead. (Not illustrated)
Context 0215; Find No 00204; Phase 14

577. Crucible fragments? Largest fragment: Length 27mm; width 22mm; thickness 5mm
Four fragments, interpreted as being from a single vessel, in a moderately coarse, buff to grey fabric. One fragment is from the vessel rim and has a glassy deposit on its internal surface. Another of the fragments bears minor traces of this material. (Not illustrated)
Context 0307; Find No 00255; Phase 20

COINS

NORTHUMBRIAN STYCAS

Elizabeth Pirie (illus 109, 110)

Both coins must be assigned to the second phase of issue: *c* 837-55. These stycas from Dunbar provide a link in a chain of Northumbrian coin finds recovered from coastal sites in the region, from Aberlady (overlooking the Firth of Forth) to Bamburgh in Northumberland. Comparatively recent, but still unpublished, excavations at Bamburgh have produced a considerable number of specimens issued during Phase II of the coinage, both as authorized coins and as irregular imitative pieces. On Lindisfarne one or two of the earlier sceattas have been recovered, as well as the later copper stycas. Farther north, an early silver styca of Phase I, by the moneyer Eaduulf for Archbishop Eanbald II of York (*c* 810-30) was discovered at Coldingham in Berwickshire about 1882. Most of these specimens have been recorded in Pirie 1986 (nos 87, 88 and 91); one of the Lindisfarne sceattas (a coin for Eadberht, *c* 737-58), although excavated in 1977 was not available for inclusion there before publication elsewhere (*British Numismatic Journal* 57 (1987), 124).

Two stycas were found at Aberlady in 1989; the earlier specimen, a coin for King Eanred by the moneyer Eaduni, may be judged contemporary in issue with the styca from Coldingham. One may note, too, that the second, for Æthelred II by the moneyer Eanred, is from the same section of the later coinage (Phase II, Group Cii) as the second of these finds from Dunbar. In this respect, however, the Aberlady example (though a mis-struck coin, it is from a fully authorized issue) must have been made marginally earlier than this descendant found at Dunbar.

578. Eanred; *c* 810-41; copper issue, *c* 837-41; moneyer: Wihtréd
obv: +EANREDREX, round central cross; some letters partially obscured by accretion.

rev: +DIHTRR, round central cross (the H, double-barred).
weight: 1.05gm (16.2gr) with accretion; die axis: 135°
Context 10238; Find No 51008; Phase 13

The obverse is one used by the moneyers Monne and Wihtréd, with several reverses for each. Some of Wihtréd's personal dies have the name in runes or, as here, partially runic and aberrant. This particular reverse is known also in combination with two other obverses. Five of the other reverses of both moneyers (Monne, 1; Wihtréd, 4) are used again during the reign of Æthelred II, with obverse dies having the spellings assigned to Group A (Pirie 1987). One feels justified, therefore, in attributing the coins of Eanred, struck from this obverse, to Group A, late in his reign. This particular specimen has acquired some surface accretion, but the legends are still crisp enough to indicate that the piece must have been lost when almost new.

579. Æthelred II; *c* 841-3/4, deposed; restored 843/4-9; copper issue, at or about the time of Reduulf's usurpation (conventionally in 844); a descendant coin (Pirie 1987), ostensibly by the episcopal moneyer Coenred.
obv: +EDILRED REX, round central cross.
rev: +COENVED, retrograde, round central evangelistic cross.
weight: 0.73gm (11.2gr); die axis 200°
Context 10296; Find No 51010; Phase 15

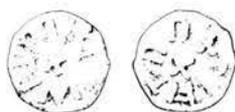
The obverse is one normally used by the moneyer Uulfred, in Group Cii; at some point the die got away to become one of several used in combination with a large number of poor quality dies which essay the names of different moneyers, both regal and episcopal, to produce low-weight coins, usually of poor fabric. The re-use of one of these reverses, in the name of Odilo, with an obverse for Reduulf, can be taken to determine the stage at which these coins were issued. Judging by the condition of the Dunbar specimen, it can have had little circulation before loss.

DANISH SILVER PENNY ('SCEAT') (illus 109, 110)

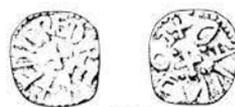
Mark Blackburn

This is a highly important find. There is very little evidence for the presence of coinage in early

medieval Scotland before the Viking Age. There are no recorded coin finds from the 5th to 7th centuries,



578



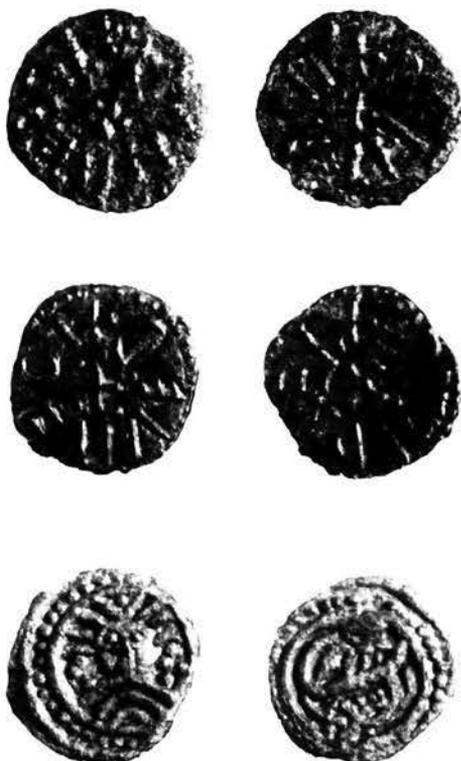
579



580

Illus 109
Northumbrian stycas (nos 578
and 579) and Danish 'sceat' (no
580) (scale 1:1).

and 8th-century coins are known from only four sites: Whithorn Priory (Dumfries and Galloway), 14 'sceattas' (one Series J, 12 Series Y, and one Beonna of East Anglia; Pirie 1997); Mochrum (Dumfries and Galloway), one 'sceat' (Series Y, Eadberht; Pirie 1997, 334); Aberlady (East Lothian), one 'sceat'



Illus 110
Coins: top, stycas of Eanred (no 578); middle, stycas of Æthelred II (no 579); bottom, Danish 'sceat' (no 580). (Reproduced by permission of the Trustees of the National Museums of Scotland).

(Series Y, Eadberht; Bateson 1995); and Dunbar (East Lothian), the present find (no 580). They form two groups – in the south-west, Mochrum is very near to the extraordinarily prolific Northumbrian minster site of Whithorn, and in the south-east, Dunbar and Aberlady are only *c* 25km apart around the coast. In the very north of England 8th-century coin finds are equally rare, but they relate in a way to the two Scottish groups. Carlisle, at the head of the Solway Firth, has produced one 'sceat' of Series QIG (Metcalf 1993-4, III, 491) and one of Series Y (Æthelred I with Archbishop Eanbald; Pirie 1997, 334), while on the east coast Lindisfarne, some 70km south of Dunbar, has yielded one 'sceat' of Series Y (Æthelred I, first reign; Pirie 1986, 74).

It is not surprising that the majority of the coins from the western sites are Northumbrian issues (Series Y and possibly Series J), but it is interesting that the two non-York coins should both be East Anglian (Series QIG and Beonna). They may have come via York, where coins of Series Q have also been found. From the eastern sites, two of the three coins are again Northumbrian, but the odd-man-out, the Dunbar coin, is a Danish issue, probably from Ribe. The critical question is whether this should be seen as evidence of direct contact between Scandinavia and lowland Scotland, or whether it came by some other route, eg via the east coast of England. The 'sceattas' were an international currency, circulating freely around the North Sea littoral, yet each of the many distinctive types has its own geographical distribution. Coins of Series X, the Dunbar type, have been found prolifically in Denmark and Frisia, and they are reasonably plentiful in southern England (Metcalf 1993-4, II, 291, map), but there is only one find so far from north of the Humber (Bonser 1997, 43). We cannot rule out the possibility that the coin from Dunbar had circulated in southern England, or even in Northumbria, before travelling north up the east coast. However, on a statistical basis it is more likely to have been a direct arrival from southern Scandinavia, where Series X constitutes a much larger proportion of the coinage in circulation.

Coins of Series X were produced *c* 710-40, and they would not have circulated in England beyond the mid-8th century. The excavations at Ribe suggest that in Scandinavia they remained in use rather longer, and thus if the Dunbar coin came directly across the North Sea it could have arrived during the second half of the 8th century.

580. Danish silver penny ('sceat'). Probably struck at Ribe, *c* 710-40. Anonymous issue. 'Wodan/monster' type, Series X; *BMC* type 31; Metcalf 1993-4, II, 275-93. Obverse facing head flanked by crosses; rev. mythical beast left, looking over its back. Context 10195; Find No 51009; Phase 9

MEDIEVAL AND POST-MEDIEVAL COINS

N M McQ Holmes

Thirteen coins were recovered, comprising five medieval silver and eight base metal issues of the late 16th and 17th centuries. Of the former, the cut halfpenny of David I (no 581) is the most notable on two separate accounts. Coin finds of this period are scarce in any case, and this particular coin displays an unusual reverse type, with a pellet on a stalk in one angle of the cross, and a stalk only in the adjacent one. This minor variety appears to be represented on the coins illustrated by Burns (1887) as figs 18 and 19, although it is not noted in the text. Neither of these coins is from the same die as the Dunbar specimen.

The four English Edwardian pennies (nos 590-3) are not unexpected on a site with 14th-century occupation, although the class 7b (no 590) is a scarce type. As far as can be established, given the corrosion and accretion present on these coins, none of them is particularly worn, and all are likely to have been lost before 1350.

The eight Scottish coins of James VI and Charles I-II (nos 582-9) are all 'small change' issues found frequently in 17th-century contexts. None of them is scarce, and the only unusual feature of the group is that it contains five turners of Charles I's second (1632-9) issue, but none of the third (1642-50). Most of the former display only moderate wear, perhaps indicating that activity on the site involving the loss of coins came to an end around the early 1640s, although the number of coin finds is not statistically large enough to support such an assertion. The fairly worn Charles II (1663 issue) turner represents an isolated late 17th- or even 18th-century loss.

SCOTLAND

581. DAVID I, silver cut halfpenny, uncertain type (1135-53)
diameter *c* 21mm; weight 0.47g; die axis uncertain
obv: illegible; bust to right with sceptre
rev: illegible; short cross moline; pellet on stalk in one angle; stalk only in the other
piece broken off and missing; accretion on obverse; fairly worn. (Not illustrated)
Context 1121; Find No 00442; Phase 18

582. JAMES VI, billon hardhead, 2nd issue (November 1588)
weight 0.84g; die axis 3.0
surfaces corroded; probably moderate wear. (Not illustrated)
Context 3022; Find No 80004; Phase 23

583. CHARLES I, copper turner, 1st issue (1629)
weight 1.63g; die axis 12.0
obverse very slightly off-centre; green patina; slight flattening;

mainly moderate wear. (Not illustrated)
Context 3034; Find No 80015; Phase 21

584. CHARLES I, copper turner, 2nd issue (1632-9)
weight 0.73g; die axis 7.0
under-sized flan; green patina; moderate wear. (Not illustrated)
Context 5020; Find No 90003; Phase 24

585. CHARLES I, copper turner, 2nd issue (1632-9)
weight 0.56g; die axis 7.0
bent; some surface corrosion; moderate wear. (Not illustrated)
Context 3026; Find No 80010; Phase 23

586. CHARLES I, copper turner, 2nd issue (1632-9)
weight 0.78g; die axis 6.5
very slightly buckled; green patina; fairly worn. (Not illustrated)
Context 3026; Find No 80006; Phase 23

587. CHARLES I, copper turner, 2nd issue (1632-9)
weight 0.63g; die axis 9.0
reverse badly off-centre; slightly bent; green patina; some flattening; moderate wear. (Not illustrated)
Find No 00001; Unstratified

588. CHARLES I, copper turner, 2nd issue (1632-9)
weight 0.69g; die axis 9.0
slightly buckled; dark green patina; moderate wear. (Not illustrated)
Context 3034; Find No 80016; Phase 21

589. CHARLES II, copper turner (1663)
weight 2.27g; die axis 3.0
both sides slightly off-centre; green patina; fairly worn. (Not illustrated)
Context 0102; Find No 00018; Phase 24

ENGLAND

590. EDWARD I, silver penny of London, class 7b (1292-6)
diameter 18.0mm by 17.5mm; weight 1.40g; die axis 10.0
obv: + EDWR'ANGL['] DNShYB; unbarred A; closed Old English E; double-barred Ns; non-composite S; rose on breast.
rev: double-barred Ns; composite S. cf North (1989), No 315.
Very slightly bent; some corrosion and accretion on surfaces; slight to moderate wear. (Not illustrated)
Context 10101; Find 50007; Phase 24

591. EDWARD I, silver penny of London, class 10cf1 (early) (*c* 1305-6)
diameter 18.0mm; weight 1.16g; die axis 5.5
obv: + EDWARANGDNShYB; unbarred As; closed Old English E.
rev: may be of class 10ab5 (late) - uncertain, cf North (1989), Nos 568-71. Some surface corrosion; moderate wear. (Not illustrated)
Context 1122; Find No 00425; Unphased

592. EDWARD II, silver penny of London, class 11a1 (*c* 1310-12)
diameter 19.0mm; weight 1.42g; die axis 1.0
overall black accretion; probably moderate wear. (Not illustrated)
Context 5048; Find No 90016; Phase 23

593. EDWARD I-II, silver penny of London, possibly class 10-11 (1301-14)
diameter 19.0mm by 18.0mm; weight 1.51g; die axis 12.0
coated in black accretion; detailed identification impossible; degree of wear uncertain. (Not illustrated)
Context 0315; Find 00051; Phase 14

CLAY PIPES

P J Davey (illus 111, 112)

The clay tobacco pipes recovered from the excavations in Dunbar have been recorded and studied according to draft *Guidelines* which have recently been proposed for the processing of excavated groups (Higgins & Davey 1988). These are based on earlier systems used by the Department of Urban Archaeology in London (now Museum of London Archaeological Service), by Higgins (1987) and that agreed at the 1980 Conference of the Welsh Medieval Pottery Research Group at Cardiff (Davey 1981). A copy of the new *Guidelines*, one Status Record Sheet, 17 Context Record Sheets and four Context Summary Sheets, together with four pages of record sketches and correspondence are held with the site archive. Stem-bore measurements have been taken using the butt end of imperial drilling bits graded in 64ths of an inch. Plaster casts have been taken of all the stamps in the collection. Dr Higgins has entered details of these into the National Tobacco Pipe Stamp Catalogue held at Liverpool.

THE PIPES IN CONTEXT

The four excavations at Castle Park, Dunbar, retrieved a total of 317 fragments of clay tobacco pipe (33 bowls, 274 stems, 10 mouthpieces) from a minimum of 117 different pipes out of some 41 contexts.

DATING THE CONTEXTS AND PHASES

The majority of the context groups are small. Although the average group from the excavations consists of 7.7 fragments, only five contexts exceed 20 pieces. This means that any dating or other interpretative information, which might be obtained from any individual context, must be used with some caution. The text which follows will, therefore, consider the dating evidence provided by the pipes according to the phases identified by the excavator. Two main dating criteria are used. First the stembore information is tabulated, in /64", for Phases 21 to 25 (Table 3). Secondly, any dating information provided by the bowl form, decorative characteristics or makers' names is placed alongside the bore data.

PHASE 14

The single 17th-century stem fragment from Context 10107 must be considered intrusive and is not discussed further.

PHASE 21

A levelling deposit (Context 3034) above the French Fort Ditch and the sandstone surface of Courtyard 9 (Context 10120) contained a total of 73 fragments of clay pipe, all of which appear to be entirely consistent for an early to middle 17th-century date. The bowl forms present include a small group which dates to the first few decades of the century (nos 594 and 597) and another, including some Dutch-style products, which belongs firmly to the middle (nos 600-603 and 613). The material is consistent with rubbish being incorporated into the silting from soon after 1610 up to around 1660.

The accumulative bowl range of 1631-1656 and mean bowl date of 1643 are too early, as they have been depressed by the presence of earlier bowls in the group. For the same reason the stem-bore date of 1655 may be a little old. Taking into account the pre-1664 *floruit* of the AW maker and the dramatic decline in Dutch imports into Scotland which occurred during the Dutch Wars between the Netherlands and England (1652-4, 1665-7 and 1672-4), this group probably dates from 1655-65.

PHASE 22

The 63 fragments from this phase were largely associated with Building 16. With the exception of two stem fragments which are almost certainly of 19th-century date and, therefore, probably intrusive, the assemblage belongs to the 17th century. It contrasts with the group from Phase 21 in that there are no very early bowl forms and a small but significant number of the pipes associated with the levelling of the site date from the last years of the century (eg nos 607 and 608).

The presence of an earlier element in the collection from this phase has depressed the accumulative range (1653-1684), mean bowl date (1668) and bore date (1664). On the basis of the pipe evidence, that three of the seven dateable bowls in this group certainly belong to the latter part of the century, the activity represented by the levelling should date to around 1700.

PHASE 23

The 63 fragments which belong to this phase contrast with Phase 22 in two ways. First, the 17th-century material, which is contained predominantly in garden

TABLE 3 DATE OF RANGES OF PIPES

Phase	Mean Bore	Bore 'date'	Bowl range	Accumulative range	Total	Mean bowl range
21	7.233	1655	1610-1660	1631-1656	73	1643
22	7.000	1664	1620-1700	1653-1684	63	1668
23	6.762	1673	1620-1900	1675-1703	63	1689
24	5.808	1710	1640-1902	1757-1806	73	1803
25	5.846	1708	1650-1967	1804-1858	26	1831

The bore date is arrived at according to Harrington's method (cf Oswald 1975, 92-95); the bowl range is the lowest and highest value given for any individual pipe in the phase; the accumulative range is the product of all of the stated date-ranges of pipes in the phase divided by the number of pipes for which ranges have been given; the mean bowl range is the average of the accumulative range

TABLE 4 PHASE 24 – DATE RANGES OF PIPES COMPARED BETWEEN TOPSOIL AND OTHER CONTEXTS

Context	Mean Bore	Bore 'date'	Bowl range	Accumulative range	Mean bowl range
Topsoil	6.285	1691	1630-1900	1757-1806	1781
Other	4.833	1747	1630-1900	1798-1860	1829
Total	5.808	1710	1630-1900	1776-1831	1803

soils, covers the whole range from 1620 until 1700 and, secondly, there is a small but definite 19th-century presence in the levelling Contexts 5049 and 10212 (cf no 615).

The relatively high proportion of early, 'residual' material has produced an 'early' accumulative bowl range of 1675-1703, a mean bowl range of 1689 and a bore date of 1673. The small group of later material, particularly the decorated bowl fragment from Context 5049 suggests a date towards the end of the 19th century for this phase.

PHASE 24

The 73 fragments from Phase 24 contrast with all the previous phase groups in that, despite some 17th-century 'residual' material, the 19th-century products are dominant (nos 617, 623 and 624). The earlier pipes are mainly from topsoil contexts and probably represent the product of repeated reworking of archaeological layers by gardening activity. In contrast, the levelling and landscaping layers and First World War trenches contain a much smaller proportion of 17th-century finds. If finds from the topsoil layers (T) are tabulated separately from the other contexts (O) the contrast between the two groups becomes quite clear (Table 4).

The topsoil layers contain significant numbers of

fragments with stem bores of 7/64" and 8/64" whilst the other contexts have very few. This difference is reflected both in the stem bore 'date' and in the accumulative and mean bowl ranges. Given the presence of some very late forms this phase may well date from some time in the late 19th or early 20th century.

PHASE 25

The rather smaller group of 26 fragments from this phase includes a slightly greater proportion of 17th-century finds than from Phase 24. Despite this, seven out of nine dateable fragments are of 19th-century types (nos 614, 616 and 618-22). They include stems of Thomas White of Edinburgh (1823-1882), Peter Wilson of Leith (1847-1902) and McDougall's of Glasgow (1846-1967). These finds closely parallel the 19th-century products from Phase 24 and, simply in terms of pipe dating, cannot be distinguished from them.

The quantity of 'residual' material is reflected in the 'early' bore date of 1708. The accumulative and mean bowl ranges, on the other hand (1804-1858; 1831 respectively), lie firmly within the 19th century. If the two 17th-century bowls are removed from the equation, the bowl dating of the group would move into the later 19th century (1845-1908; 1876).

COMMENTARY ON THE DATING

There are two main problems posed by the Dunbar finds. First, many of the larger contexts represent slow accumulations, such as ditch fills or garden soils, that have been receiving rubbish over quite long periods. Secondly, levelling or demolition horizons which, in principle, should provide unequivocal evidence for the dating of individual phases, tend to contain very few items contemporary with the activity which they represent and often include residual material. For these reasons the stem-bore 'dates' are generally unhelpful and, if taken on their own, are often highly misleading. Even in Phases 21 and 22, which appear to belong firmly to the 17th century, the bore determinations are decidedly too old as a result of the earlier material included in the main pipe-bearing deposits. For Phases 23 to 25 the bore 'dates' are completely unreliable, partly due to the quantity of 17th-century material contained in deposits which must date from the 19th or even early 20th centuries and partly because bore dating is known to become ineffective after around 1750 in any case (cf Oswald 1975, 92; Davey 1975; Davey 1980, 267).

Apart from giving the likely latest date for a group, the bowl ranges are also not very informative. For Phases 21 and 22 they give a clearer idea of the dating evidence than do the bore determinations. For the succeeding phases they show that the dateable finds range from the 17th to the late 19th or early 20th centuries, but give no idea of what weight should be given to any individual time-zone within the overall range. The accumulative bowl ranges are more satisfactory. Because of the earlier 17th-century material present in Phases 21 and 22 the accumulative ranges and means lie some 5 to 15 years earlier than the likely 'final' date for the phase. Even in Phase 23, when the residual material has produced a very depressed accumulative range of 1675-1703 and a bowl mean of 1689, these figures are significantly better than the bore 'date'. In Phases 24 and 25 the accumulated ranges and means and ranges come much closer to the likely date of deposition than either the bore 'dates' or the crude bowl ranges.

THE 18th CENTURY

The absence of 18th-century finds is noteworthy. Clay pipe smoking declined sharply in the British Isles during the 18th century in favour of snuff. This trend is particularly evident in Scotland. The absence of 18th-century finds in Dunbar, cannot, therefore, be taken as clear evidence that the land was undisturbed or that alternative forms of rubbish

disposal were being practised at that time. Indeed, it is just possible that a handful of stem fragments may represent the remains of 18th-century pipes whose bowls have not survived. In Context 3029 (Phase 22) there are two examples and in Context 3022 (Phase 23) one of narrow-bored, thin, stem fragments with fine finish which may pre-date the 19th century. There is also an unstratified stem in a 19th-century fabric (Fabric A below) with a 6/64" bore. None of these finds is conclusive.

BURNISHING AND FINISHING

Only 21 pieces are burnished, some 7% of the whole collection. There are far too few pieces from any individual context or phase for any socio-economic, inter-contextual or period interpretations to be attempted, such as was carried out successfully at Norton Priory, Cheshire (Davey 1985, 164-166). This form of explanation is based on the premise that the extra cost of production and, therefore, value of burnished pipes reflects the status of the owner. There is also very little comparative data from other Scottish sites. The same applies to features such as milling. Much larger groups will be needed from a number of Scottish sites before these factors can become useful indicators of relative wealth.

THE PIPES THEMSELVES

The excavations at Dunbar produced a range of locally made and imported types dating from as early as 1620 up to 1900 or soon after. The most significant of these are illustrated as follows: the details of individual pipe fragments are recorded in the following order: description of form of pipe; fabric; burnishing, where present; milling; trimming method; stamp or decoration details; record sketch letter code; stem bore in /64"; suggested date; any comparanda or discussion in square brackets; context on site; find number.

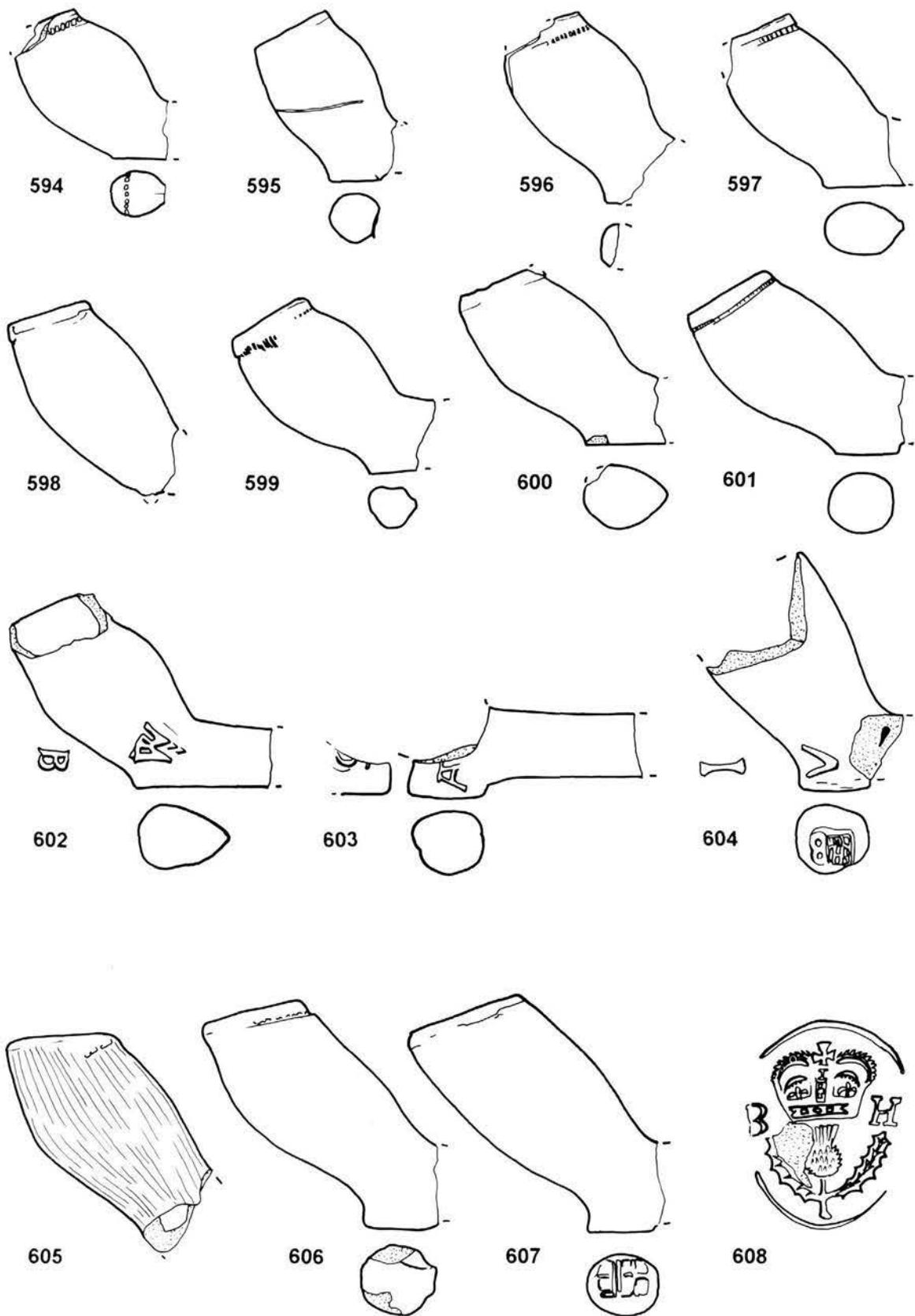
594. Small, heeled bowl, slightly damaged rim; C; probably milled all round; bottered; single line of milling on heel; Q; 7/64"; 1610-1640. [cf Tron Kirk, Edinburgh (Gallagher 1987f, 270, fig 6, nos 4-5)]
Context 3034; Find No 80469

595. Small heeled bowl; C; bottered; E; bore damaged; 1630-1650. [cf Tron Kirk, Edinburgh (Gallagher 1987f, 270, fig 6, nos 1-2)]
Context 3022; Find No 80384

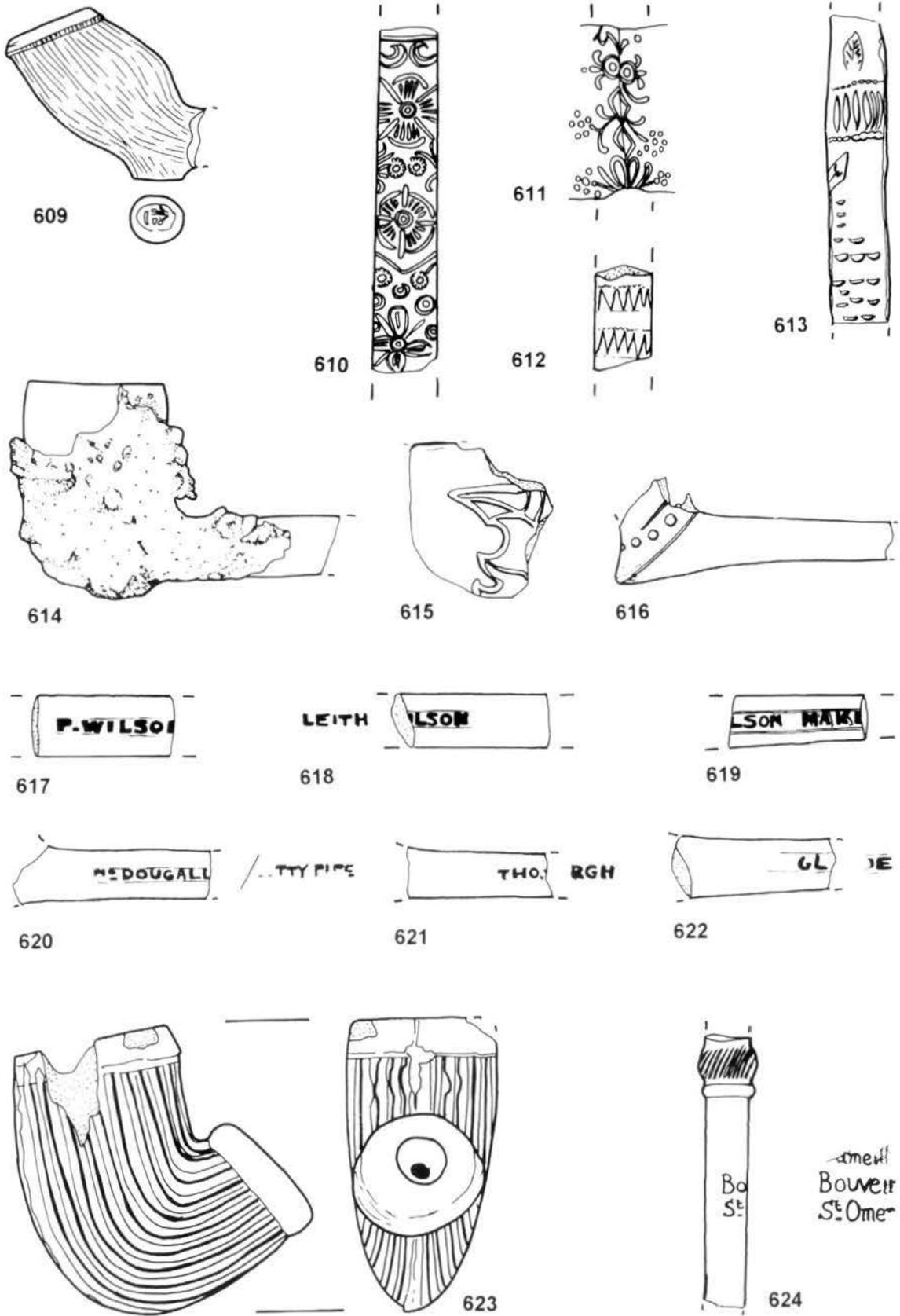
596. Heeled bowl, damaged rim, charcoal stained on the exterior only; C; probably milled all round; bottered; W; windway partially blocked at bowl junction, 8/64"; 1620-1650. [A rather bulky version of Sharp's Edinburgh Forms 1 and 2 which he places slightly earlier (Sharp 1987, 14-16, fig 1)]
Context 3035; Find No 80539

597. Very fine quality heeled bowl; damaged rim; C; probably milled all round; bottered; R; 8/64"; 1620-1650. [Edinburgh Forms 1-2 (cf Sharp 1987, 14-16, fig 1)]
Context 3034; Find No 80470

598. Bowl with heel missing, slightly damaged rim; C; bottered; F; 7/64"; 1650-1670. [Form close to later William Banks types (eg Pittenweem - Martin 1987a, 192, 34-41)]
Context 3022; Find No 80385
599. Well-made and finished heeled bowl, slightly damaged rim; fumed external surfaces; C; milled; bottered; AA; 7/64"; 1650-1670. [cf Pittenweem, as for no 598 above]
Context 400
600. Heeled bowl with damaged rim, poorly finished; C, but fired off-white/pink; bottered; M; 7/64"; 1640-1660. [Similar to Edinburgh Forms 14-17 (Sharp 1987, 18-19, fig 3)]
Context 3034; Find No 80465
601. Very fine quality heeled bowl; milled all round; bottered; C; N; 8/64"; 1640-1660. [cf Edinburgh Forms 14-17, as for no 600 above]
Context 3034; Find No 80466
602. Bowl with slightly tailed heel, damaged rim; letters W B moulded either side of the heel, the W appears to have been recut in the mould over a previous W and possibly an A; milled; bottered; C; O; 7/64"; 1640-1660. [A William Banks of Edinburgh product (cf Gallagher 1987a, 5-8; Gallagher 1987b, 29; Sharp 1987, 16-19, figs 3 and 4)]
Context 3034; Find No 80467
603. Stem and heel fragment; letter A on left side of the heel, right side damaged and not legible; C; ; S; 8/64"; 1640-1660. [Probably William Arthur of Edinburgh (cf Pittenweem - Martin 1987a, 196-198, fig 10, nos 75-77)]
Context 3034; Find No 80490
604. Large, broken heeled bowl with the moulded letters W I on either side of the heel; portcullis heel stamp; rim missing; B; K; 7/64"; 1660-1690. [Initials and form as in three examples from Pittenweem (Martin 1987a, 196-198, Fig 10, Nos 79-81) - maker unknown; portcullis stamp similar to Kelso Type B3 (Gallagher 1987g, 290, Fig 17, No 3)]
Context 3030; Find No 80440
605. Bowl with heel missing, burnished and fumed surfaces; bottered; B; ; C; bore missing; 1670-1700. [The strongly curvaceous form is reminiscent of the 'chinned' examples of James Colquhoun of Glasgow (Gallagher 1987c, 50-52, Fig 6, Nos 2-4) but the fabric suggests a more local source such as Stirling (Gallagher 1987e; Gallagher and Harrison 1995) or St Andrews (cf Davey 1997)]
Find No 80330; Unstratified
606. Large heeled bowl, slightly fumed outer surfaces; milled on the front only; bottered; B; G; deformed bore at bowl junction 5/64"; 1670-1700. [cf no 605 above]
Context 3022; Find No 80386
607. Large, crudely finished, heeled bowl with deformed portcullis stamp on the heel; bottered; B; J; 7/64"; 1670-1700. [Typical of a late 17th century product from 'local' centres, not Edinburgh and Glasgow cf no 605 above]
Context 3030; Find No 80439
608. Stem, burnished and smoked; relief stamp depicting a crowned thistle with the letter B H either side; C; X; 6/64"; later 17th-century. [No parallel for this stamp or for the type in Scotland, but on grounds of fabric, stem thickness and bore, probably a later 17th-century local product]
Context 3035; Find No 80556
609. Dutch-style heeled bowl, highly burnished; finely milled all round; relief heel stamp showing a deformed crowned Tudor rose; C; Y; 8/64"; 1640-1660. [Bowl form is Duco Type 1 (cf Duco 1987, 26-28; Davey 1992, 279-281) which is the most common Dutch-style product found in Scotland. The stamp depicts a popular motif amongst Dutch pipemakers; a further example was recovered from Scalloway Castle, Shetland (Davey 1987c, 319-320, fig 29, no 32); for a general discussion of Dutch production during this period cf Duco 1981]
Context 3038; Find No 80566
610. Highly decorated Dutch-style stem with moulded floral designs; C, off-white; V; 7/64"; 1610-1650. [Similar to an example from Aberdeen (Davey 1987b, 255-256, fig 2, no 13) and probably made in Amsterdam. This is the best Scottish example so far]
Context 3034; Find No 80535
611. Mould decorated stem, iron stained; fabric difficult to see; H; bore not accessible; 1620-1650. [The decoration on this stem is very closely paralleled at Scalloway (Davey 1987c, 316, fig 27, no 4)]
Context 3022; Find No 80387
612. Stem fragment with rouletted decoration; C; AK; 7/64"; later 17th century. [Good comparisons can be found in the material from the wreck of the *Kennemerland*, 1664 (Martin 1987b, 213, fig 2, nos 12 and 218, fig 7, no 67) but terrestrial finds from Scotland are rare; probably mid to late 17th century]
Context 10100
613. Mould decorated stem fragment, showing the scales of the sea monster and the beginnings of its jaws being about to consume Jonah; the mould was loose when used to make this pipe; C; T; 8/64"; 1630-1660. [Similar to two fragments of 'Jonah' stem found at Scalloway Castle (Davey 1987c, 316, fig 27, nos 7-8); this is a much large piece to survive; probably early to mid 17th century]
Context 3034; Find No 80533
614. Plain spurless bowl, having been subject to heat and encrusted with clinker; cut rim; A; ; D; 5/64"; late 19th century. [A brier skeomorph such as were produced towards the end of the century by local makers such as Davidson (Gallagher & Price 1987, 123-129, figs 7-13)]
Find No 80331; Unstratified
615. Rim fragment with moulded decoration showing a thistle; cut rim; A; A; probably later 19th century. [A popular motif with Scottish makers such as Davidson (Gallagher & Price 1987, 126, Fig 10, No 76 - described as the 'Thistle Ben Nevis' and 133, fig 17, no 2G)]
Context 5049; Find No 90049
616. Stem and base of bowl of spurless mould decorated pipe, with moulded dots; A; A; 4/64"; later 19th century. [Probably the collar around the neck of a 'head' such as William Shakespeare (Gallagher & Price 1987, 135, fig 19, no 201) but with the addition of dots]
Find No 80328; Unstratified
617. Stem with moulded lettering which reads ..P.WILSON../indistinct mark on opposite side, possibly reads Leith; A; AI; 5/64"; 1847-1902. [This maker is listed as Peter Wilson of Edinburgh in directories (Martin 1987, 350); this is the first marked example of his work to be published]
Context 5044; Find No 90041
618. Stem with moulded lettering which reads LEITH/II.SON; A; AC; 4/64"; 1847-1902. [cf above no 617]
Context 400
619. Stem with moulded lettering which reads ...ILSON MAKE...; A; AB; 4/64"; 1847-1902.
Context 400
620. Stem and bowl junction with moulded lettering which reads McDOUGALL/...T'Y PIPE; C; B; 4/64". [A product of McDougall's of Glasgow which was in production 1846-1967 (Martin 1987, 345); almost certainly one of the Cutty pipes which occur frequently in the published catalogues (eg Gallagher 1987d, 144-7)]
Find No 80326; Unstratified



Illus 111
 Clay pipes (scale 1:1; no 608 is at 2:1).



Illus 112
Clay pipes (scale 1:1).

621. Stem fragment with moulded lettering which reads THO.W.../....RGH; C; AE; 4/64" 1823-1882. [A product of Thomas White of Edinburgh (Martin 1987, 350)]
Context 400

622. Stem fragment with moulded lettering which reads GL.../....; C; AD; 4/64"; later 19th century.
Context 400

623. Stub stemmed pipe with multiple ribbed decoration; finely micaceous fabric which has burnt pink/orange; traces of ?illite slip between the ribs; AF; probably 19th century. [The type is common in eastern Europe and the Mediterranean, but was also produced by Italian and French makers during the 19th century (the slip suggests southern France)]
Context 102

624. Stem with finely moulded decoration, stamped with the letters UMERIL/BOUVEUR/ST OME.; C; AO; 6/64"; French, (St Omer, Pas de Calais) late 19th century. [The pipe dates from the period of collaboration between Duménil and Emile Bouveur which took place towards the end of the activity of the firm. It probably dates to the period after 1875 when Duménil became mayor of St Omer and 1886 when the factory closed (Deloffre 1991, 45)]
Context 102

THE FABRICS

For the purposes of this study three main fabric types, A, B and C were identified using a x10 hand-lens. Each type may well represent a number of different sources which it would require thin-section or high resolution elemental analysis to define more precisely. The three types are as follows:

Type A

Very fine, dense, pure white fabric with no visible inclusions; in most examples the individual grains of clay present are also invisible under x 10 hand-lens.

Type B

Hard off-white, coarse, granular fabric with a range of inclusions including quartz grains and fine white mica flakes; often fumed in firing.

Type C

Very fine, hard and pure white fabric with very few visible inclusions; the clay minerals are usually visible under hand-lens; rare, dense, dark brown/black sub-rounded inclusions, less than 1mm in diameter, possibly fragments of basalt.

DISCUSSION OF THE FABRIC ANALYSIS

Summary statistics by phase show that, with the exception of Phase 21 which lacks Fabric A examples, the three fabrics are well represented throughout the majority of the pipe-bearing stratigraphy on the site. Given the degree of residuality known to be significant in many contexts, the data do not clarify the chronological position of the fabric types, except to say that Fabric A is not likely to be early or mid 17th-century in date.

In contrast, analysis of fabric types by dateable bowls and stems gives a clear temporal framework. All of the early to mid 17th-century bowls, up to 1660, are in Fabric C, whilst the pipes which certainly date from 1660-1700 are all in Fabric B. The two examples in Fabric C which are dated to the broad range 1650-1700 are so fragmentary that a more precise date is not possible. In the light of the rest of the 17th-century collection from Dunbar it seems likely that these two pieces actually belong nearer to the middle of the century than to the latter part. All of the 19th-century pipes are in Fabric A.

It seems likely that Fabric C represents the locally derived Coal Measures Clays used by William Banks and the other early Edinburgh makers, whilst Fabric B may be derived from another, more local, source. There also appears to be a relationship between Fabric B and burnishing.

Whilst only 21 out of 315 pipe fragments are burnished (7%), a much higher proportion of Fabric B, nine out of 39 pieces, are burnished (23%). Fabric B pipes only make up 12% of the collection but constitute 43% of the burnished examples. Thus, whilst burnishing is clearly an element in the Edinburgh products of the period 1620-1660 which were being smoked in Dunbar, burnished examples only make up some 5% of the Fabric C group. However, in the latter part of the century, from 1660-1700, burnishing appears to have been applied to between a quarter and a half of the pipes in circulation. Much larger closed groups from 17th-century deposits will be needed before the pattern of burnishing and its possible socio-economic implication can be elucidated.

THE 17th CENTURY

The earliest bowls (nos 594-7) are well made, neatly milled and finished products similar to those sealed by the 1637 construction levels of the Tron Kirk in Edinburgh (Gallagher 1987f, 269-271, fig 6, no 4). The Dunbar examples probably date from 1620-40 and show that good quality pipes were in general use in Dunbar at quite an early date. Mid-17th century products, dating from 1640-60, are more numerous (nos 598-603) with a number of bowl/stem junctions also dating from the same period (cf Archive sketches I, S & U). A single product of William Banks (no 602), together with a possible William Arthur heel fragment (no 603) suggests that Edinburgh was the main source of pipes at that time. During the remainder of the century a much wider range of Scottish products is in evidence (nos 604-8). There is a greater range of form, fabric and finish, implying a larger number of production centres. Burnishing is

much more in evidence. The variety observed in all of these elements compares closely with finds of the same period from St Andrews (Davey 1997).

The only maker-marked bowl (no 604) appears to carry the initials WI and is very similar to examples from Pittenweem (Martin 1987a, 198, fig 10, nos 79-81). The identity and place of work of this maker are unknown. A singular stem stamp which includes a crowned thistle and the letters BH (no 608) is without parallel so far from Scotland. The initials BH do not correspond with any known Scottish maker at this period.

A small number of Dutch-style products – four decorated stems and one stamped bowl – complete the 17th-century picture of pipes in circulation in Dunbar (nos 609-13). They are of types already encountered in Scotland (Davey 1992) and probably date from 1630-60. The complex mould-decorated stem (no 610) is a more complete example than a similar piece from Aberdeen (Davey 1987b, 256, Fig 2, No 13) and there is also rather more of the 'Jonah' stem (no 613) than the two fragments found at Scalloway Castle (Davey 1987c, 316, fig 27, nos 7-8). The less elaborate moulded stem (No 611) is also very closely paralleled at Scalloway (Davey 1987c, 316, fig 27, no 4). The most unusual

Dutch-style pipe from Dunbar is the well-made and burnished bowl (no 609) stamped with what appears to be a deformed Tudor rose design – a popular motif among Dutch makers in the first part of the 17th century. It is the only example recorded so far from Scotland.

THE 19th CENTURY

The 19th-century finds from Dunbar consist of a single, plain, spurless bowl (no 614), a number of fragments of mould-decorated bowl or bowl/heel junction (eg nos 615 and 616) and six maker-marked stems (nos 617-622). This latter group includes two Glasgow products – a McDougall cutty and a stem marked GL... Three of the remaining stems are by P Wilson of Leith who is recorded as working from 1847-1902 (Martin 1987, 350). The fourth is a piece by Thomas White of Edinburgh (1823-1882). The Wilson finds are important as they are the first products of this maker to have been identified.

To complete the 19th-century picture are two imports – a stem stamped at St Omer in north-east France (no 624) and a stub-stemmed bowl (no 623) from the central or eastern Mediterranean region, possibly from France or Italy.

SUMMARY

The Dunbar excavations produced a good series of 17th-century pipes which demonstrate that good quality pipes, probably deriving from Edinburgh, were available in the town from as early as 1610. A small group of 17th-century Dutch-style pipes adds both to the range of such material known from Scotland and to the number of sites from which it

has been recovered. There is a hint at more local production in the latter part of the century. There are no 18th-century pipes. The 19th-century finds, which derive predominantly from Edinburgh makers, include three examples of different mould-marked stems made by Peter Wilson of Leith.

ANALYSIS OF ARTEFACT ASSEMBLAGES

Adrian Cox

INTRODUCTION

Each of the catalogued finds from the site has been assigned a functional classification (Table 5), allowing functional trends, as reflected by the artefact assemblages, to be examined both within a particular period of activity or phase by phase, in relation to the site chronology. The following report presents the results of this analysis. Phases 1 and 25 have been omitted as the former includes only natural deposits and finds from the latter were mainly unstratified. Clay pipes are omitted from this analysis as it was completed before the pipes report was available.

A comparison of the broad characteristics of the artefact assemblages by chronological period (Iron Age activity, Phases 2-5; the Anglian or Northumbrian period, Phases 7-13 and the Medieval period, Phases 15-21) reveals some areas of continuity and others of discontinuity and marked change (illus 113). For example, the proportion of artefacts in the assemblages representing bone and antler working evidence remains broadly constant from one period to another, whereas weaving activities are reflected strongly in the first two periods and far less so in the third.

PHASE 2

Only two artefacts were associated with the structures and defensive features of the promontory fort. The first of these is a quernstone fragment (no 316) with a broad collar bordering its central hole and a socket to enable it to be turned with the aid of

a rod or stick, which was incorporated into the stone packing of foundation trench. An artefact possibly derived from red deer antler and perforated, possibly for suspension (no 491), was recovered from the fill of one of the defensive ditches.

PHASE 3

A single spherical stone object (no 329) came from levelling deposits above the middle of the three defensive ditches of the promontory fort (Phase 2). The function of this object is uncertain. It could have functioned as a slingshot, the occurrence of which in association with defensive structures would not be

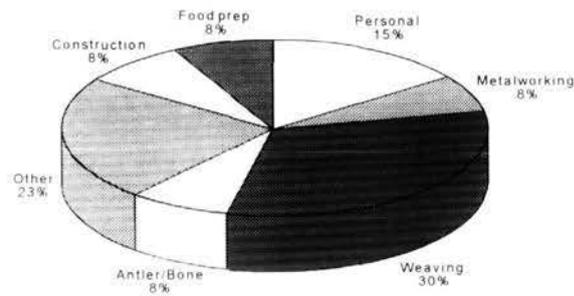
surprising, or it could have been used as a marble in some form of leisure pursuit. Excavations at Traprain Law, Broxmouth and other Iron Age forts in south-east Scotland have also produced small clay or stone balls (Close-Brooks 1983, 22; Cool 1982).

PHASE 4

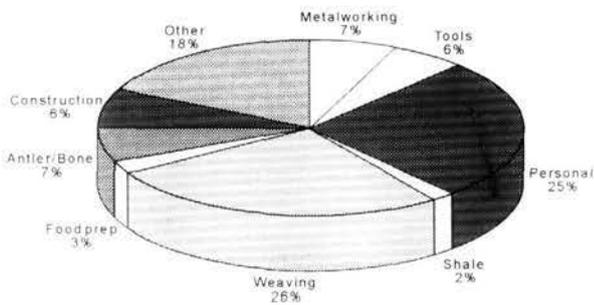
Fragments of three clay loomweights (nos 553, 568 and 569) were found in features assigned to this phase of activity.

Nos 568 and 569 were recovered from a partially excavated, flat-bottomed feature overlying the course of the outer ditch of the promontory fort (Phase 2). A possible interpretation of this feature is that it

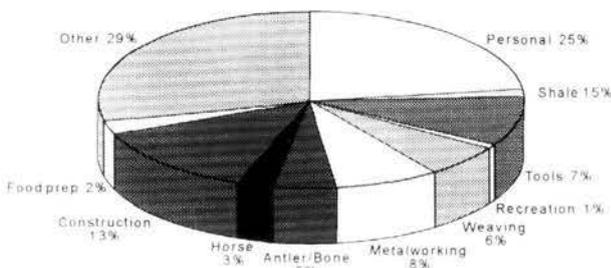
PHASES 2 - 5



PHASES 7 - 13



PHASES 15 - 21



Illus 113
Assemblage characteristics: Phases 2-5, 7-13 and 15-21.

represents part of the upper fill of the ditch or levelling above it, although the base of it resembled a clay floor. One of the loomweights (no 568), which is almost complete after reconstruction, was lying above this clay surface. It has been burned or partially fired. No 569, in contrast, was found below the clay surface in deposits interpreted as levelling, and is unfired.

No 553 is from levelling deposits which were truncated by the flat-bottomed feature described above. Some differences were noted between the fabric of no 553 and the majority of the loomweights recovered from the site.

In terms of form, the three loomweights from this phase of activity appear similar to those from Phases 7 and 8, which are more numerous. Weaving activity is indicated by their presence, but there is no clear structural evidence in this phase relating to weaving. However, two further artefacts recovered from levelling deposits overlying the defensive ditches (nos 402 and 439) may have been associated with the textile-making activities indicated by the loomweights. No 402, a bone needle, was found in levelling deposits above the western end of the middle defensive ditch. A bone pin, notched at either side of its head (no 439), was found in association with no 553 in deposits overlying the outer ditch.

PHASE 5

A piece of gold wire (no 2) was found in the fill of a foundation trench for a timber fence, part of a boundary fence newly enclosing the settlement at this time. The wire was found near to the secondary entrance in a feature representing a modification to the earliest Phase 5 boundary fence layout. With its splayed, hammered end, this gold wire may represent evidence of gold leaf manufacture, presumably taking place within the settlement and possibly contemporary with the Phase 5 structures. It may, however, be residual in Phase 5, given that the foundation trench was dug into earlier deposits.

Although evidence was found of a yard enclosed by the boundary fence, any associated buildings must have lain outwith the excavated area, hence the origins of this gold wire in terms of manufacturing activity are difficult to assess.

A red deer antler beam fragment, sawn across one end (no 500) was found in loam deposits in this phase and is the earliest secure evidence for the working of antler on the site. A probable bone pin (no 437) was also found in a loam deposit.

PHASE 6

Finds recovered from Soil 1, a substantial soil layer extending across much of the northern part of the site, are of uncertain origin due to there being a number of possible explanations for the existence of this soil. One possibility is that the soil was imported to the site to act as levelling for the initial phase of Anglian building construction (Phase 7). It is possible, however, that activity continued on the site outwith the excavated area, and that artefacts from Soil 1 may provide clues to activities taking place in the vicinity during Phase 6.

The earliest evidence for the working of shale appears in this phase in the form of a bangle fragment (no 371).

Textile manufacturing activity is represented by a large spindle whorl made from whale bone and a possible weaving tool derived from a cattle rib (no 473). A single bone pin shaft fragment (no 449) was also found.

The presence of a probable lead alloy line sinker (no 139) sheds some light on fishing practices, although it is likely that, given the geographical location of the site, a range of fishing practices were employed by the local population.

PHASE 7

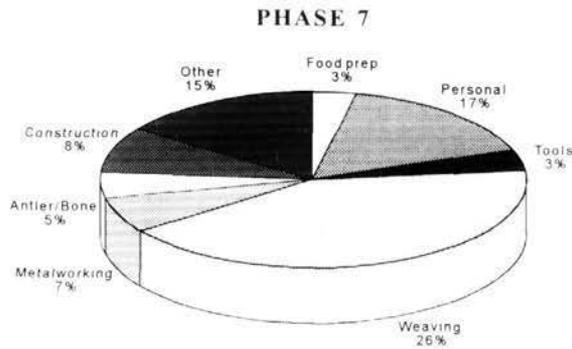
A copper alloy pin shaft (no 43) was found in the fill of the construction trench for the southern wall of the trench-built structure, Building 1. From the construction trench for the west wall, a worked piece of shale, possibly representing an unfinished bead or pendant (no 377) was recovered.

Levelling deposits above Building 1 produced evidence of lead alloy melting and working in the form of pieces of once-molten waste (nos 158 and 159) and an offcut (no 142). These objects may be associated with a possible hearth in Building 1 or to the construction of Building 3 (Phase 8) as the deposits are directly below it.

A series of small pits, possibly representing the

robbing of the posts of Building 1 for re-use, produced a bone or antler comb end plate (no 385) and two antler offcuts (nos 506 and 507). A calibrated radiocarbon date range of AD 230-620 (GU-2989) was obtained for the destruction and robbing of Building 1.

Conjoining components of a gilded buckle plate (no 8) were found in a foundation trench for a fence which formed one side of an enclosure attached to Building 1. They have been identified by Leslie Webster as parts of an Anglo-Saxon buckle of early 7th-century date. The presence of these buckle components is among the indicators of an Anglian presence at Dunbar at the beginning of Phase 7. Taken as a whole, the radiocarbon dating evidence



Illus 114
Assemblage characteristics: Phase 7.

for this phase corresponds well with the early 7th-century date of the buckle.

A perforated sheep or goat metapodial (no 479) was the only find from a further trench-built structure, Building 2, which may have functioned as a store, its construction making it unlikely to have been a dwelling.

Lying to the south of Buildings 1 and 2 was Building 5, identified as a sunken-featured building or *Grubenhäus*. Only part of this structure survived, as much of it had been removed by later intrusions, including a post-medieval kiln and a 16th-century building, but deposits on the surviving internal surfaces within the building revealed something of the nature of its use and destruction. Twenty of the 41 clay loomweights and loomweight fragments from the site were directly associated with the *Grubenhäus* and several others were indirectly associated, having been redeposited in later features above it. One loomweight fragment (no 544) was recovered from one of a series of postholes along the southern edge of the building.

An area within the *Grubenhäus*, at its eastern end, appears to have been a manufacturing area for the production of loomweights from a deposit of yellow to light brown clay. Partially-formed loomweights (nos 547-50) were recovered from this area. Within the *Grubenhäus* as a whole, loomweights in various stages of their manufacture were found, ranging from crudely-formed clay discs (nos 573 and 574) to fully-formed examples such as nos 554-6.

The largest group of loomweights was found on a possible floor surface of the *Grubenhäus* and in the destruction deposits directly overlying it. The destruction deposits consisted of charcoal and orange sand, containing burnt twigs, timbers and large stones. Some of the loomweights within and below these deposits had been partially and unevenly fired, presumably accidentally during the burning of the timbers. Others remained unfired, either sheltered

under large stones or lying on surfaces not covered by the charcoal.

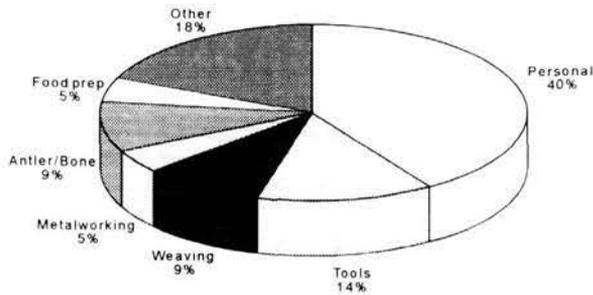
Four of the loomweights from within and below the destruction deposits (nos 554-5 and 560-1) have wear marks around the edges of their central perforations, indicating that they had been put to use. These loomweights are among the most highly fired examples, and, while it is possible that this is co-incidental, the possibility also exists that loomweights were at least hardened by fire as a final stage of their manufacture before being utilized.

The existence of used loomweights is the clearest evidence available that weaving, using a warp-weighted loom, was being carried out within the *Grubenhäus*. None was in a linear arrangement as has been recorded in structures interpreted as weaving sheds elsewhere (eg Smith 1995, 104-8), and no structural evidence of looms was recovered, but at least two functions of the Dunbar *Grubenhäus* are clearly indicated, being the manufacture of clay loomweights and their use in weaving activities. Artefacts associated with weaving activities form a large proportion (42%) of the artefact assemblage from this phase (illus 114). Charcoal derived from burnt oak timbers in the destruction deposits of the *Grubenhäus* gave a calibrated radiocarbon date of AD 240-555 (GU-2992).

A trench and posthole to the south of the *Grubenhäus* produced two fired loomweight fragments (nos 535 and 536) and a perforated pin (no 411). These features were thought to be associated with the *Grubenhäus*. A further bone pin (no 430) was found in loam deposits which contained ash, interpreted as possible trample, but which were of uncertain relationship to the *Grubenhäus*.

Other finds from features assigned to Phase 7 include a possible pin shaft of shale (no 372) and a whittle tang knife (no 198). The latter was found in midden deposits above Courtyard 5, to the south of Building 5.

PHASE 9



Illus 115
Assemblage characteristics: Phase 9.

PHASE 8

Deposits filling the depression above the *Grubenhäuser* (Phase 7) contained several loomweights and loomweight fragments, including two on which wear marks indicate use (nos 530 and 538). Other finds from these deposits included a glass bead (no 516), an antler offcut (no 498) and a bone pin (no 426). A further antler offcut (no 499) was found in the fill of a foundation trench for Building 4, a trench-built timber building. Deposits of ash and slag were recorded in the interior of Building 4, possibly

indicating industrial activity, although the total quantity of slag recovered was small and the building appears, from what little can be deduced about its construction technique, to be too substantial to represent a workshop.

A socketed stone (no 366) was recovered from an area of stone blocks and boulders which may have formed a roadway through the defensive rampart into the settlement.

PHASE 9

Several artefacts were recovered from Courtyards 2, 6 and 7, mainly from contexts recorded as being the make-up of the courtyards, but possibly incorporating material from the courtyard surfaces, contemporary with their use.

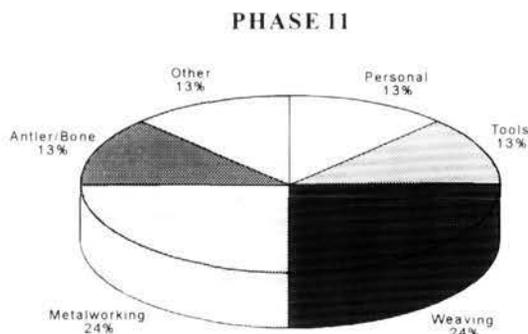
An iron knife of whittle tang type, with a complete blade and tang (no 200), was found on Courtyard 2, in association with a plain bone pin beater (no 457). A bone pin fragment (no 448) was recovered from a separate part of Courtyard 2. These artefacts were from deposits recorded as courtyard make-up. From overlying deposits, interpreted as being a mixture of natural accumulation and occupation deposits on the courtyard surface, an early 8th-century 'sceat' (no 580) and an antler offcut (no 505) were recovered. The coin shows little sign of wear, indicating that it may not have been in circulation for very long. An 8th-century date is indicated by the overall artefact assemblage from this phase.

Deposits recorded as the make-up of Courtyard 6 produced three pins: a copper alloy example with a bulb-shaped head (no 38), a perforated pig fibula pin (no 410) and an unperforated bone pin with a

flanged head and hipped shaft (no 425). Two conjoining fragments of an antler comb (no 379) were also found. Each of these artefacts is small and could easily have slipped into voids between the larger gravel and cobbles of the courtyard surface. Wind-blown deposits of fine soil can build up rapidly on the headland, as was noted during the excavations, and artefacts lying in such voids could easily become covered and remain relatively free of abrasion, as these are.

In common with Courtyard 6, Courtyard 7 yielded pins of both copper alloy (no 40) and bone (no 434). Both pins are decorated, no 434 having a particularly stylized head form. The recovery of this assemblage of pins and an antler comb fragment from Courtyards 6 and 7 contributes to a high proportion of personal equipment among the artefact assemblage from this phase (illus 115).

A loam deposit containing numerous pebbles, interpreted as possible patching of the gravel courtyard surface, produced a bone pin beater (no 454). Given its context, from a deposit which presumably would have been trampled and compacted, this slender object has remained



Illus 116
Assemblage characteristics: Phase 11.

remarkably intact, although it does show some signs of surface erosion.

Weaving activities may be indicated in this phase, as pin beaters were recovered from both Courtyard 2 and Courtyard 7. No loomweight fragments were

present in Phase 9, but it is possible that weaving activities were carried out beyond the limits of the excavated area during this phase. Artefacts indicative of weaving activities form only 9% of the total assemblage from Phase 9, as compared with 42% in Phase 7 (see illus 114 and 115).

PHASE 10

No artefactual material was associated with the mortar mixer in this phase.

PHASE 11

In this phase, a courtyard surface, composed of crushed red sandstone (Courtyard 3) was laid down above the wall enclosing the mortar mixer (Phase 10). A piece of lead alloy waste (no 166) was found in the make-up of the courtyard. A small fragment of lead alloy sheet with trimmed edges (no 156) was found in deposits interpreted as resulting from occupation on the surface of Courtyard 3. Artefacts indicative of metal working activities form almost a quarter of the assemblage from this phase (see illus 116).

A possibly significant, although small, concentration of artefacts connected with textile manufacture was recovered from deposits on the surface of Courtyard 3. This assemblage includes a stone spindle whorl of

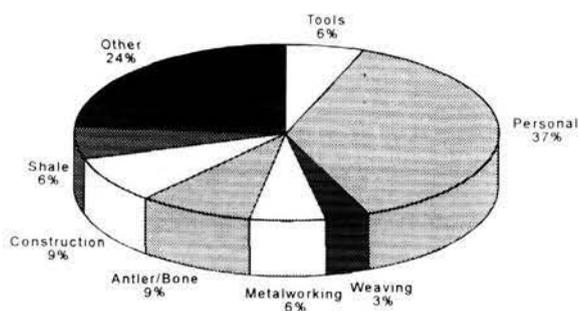
discoid form (no 339), a bone needle (no 403) and perforated pin (no 414), and a perforated sheep or goat metatarsal which may have been used in a process connected with textile manufacture (no 478). Each of these artefacts shows signs of wear from use. On the bone artefacts this appears as a polish on their most utilized surfaces. The origins of the deposits containing this assemblage are not precisely known, but they may have been derived from activities within structures contemporary with the use of Courtyard 3. If so, a continuity of textile manufacture on the site may be indicated, given the more striking evidence from the *Crubenhau* in Phase 7. In the Phase 11 assemblage, artefacts associated with weaving activities form 24% of the total, as compared with 42% in Phase 7 (see illus 114 and 116).

PHASE 12

Overlying the possible occupation deposits on Courtyard 3 was a substantial deposit of soil (Soil 2). The distinction between Soil 2 and the deposits directly below it may not have been entirely clear

during the excavation, which allows the possibility that there is a relationship between the finds from above Courtyard 3 in Phase 11 and those from Soil 2. In functional terms, there seems to be some

PHASE 13



Illus 117
Assemblage characteristics: Phase 13.

continuity. Another stone spindle whorl (no 336) was found in Soil 2, as were a further perforated pin (no 416) and a probable bone pin shaft fragment (no 428). The spindle whorl (no 336) is of hemispherical form and is decorated by a crude zig-zag pattern,

making it very different from the example from Phase 11 (no 339). No 416, however, is very similar to the perforated pin from Phase 11 (no 414), both examples being derived from pig fibulae and exhibiting similar modifications.

PHASE 13

Above Soil 2 (Phase 12) were a number of burnt features, one of which contained a large piece of once-molten lead alloy waste (no 161), indicative of lead alloy melting activity. It was not associated with any other finds.

The presence of socketed stones in the stone foundations of Building 6 suggests that the walls of the building may have been of timber, the stones being used to secure the bases of uprights which, in turn, secured roof supports. Only one of the socketed stones from these foundations (no 368) was retained. It is a substantial and irregularly-shaped block with a central rectangular socket. A smaller block, with a roughly circular socket (no 365) was found in the fill of the defensive ditch at the southern end of the site.

A spread of stony deposits above and outside Building 6 is interpreted as resulting from its demolition. These deposits contained a heavily corroded iron buckle (no 171), a possible buckle frame fragment of copper alloy (no 5) and a fragment of a glass bangle (no 512), all of which may have belonged to the occupants of Building 6. Personal equipment is strongly represented among the finds from this phase (see illus 117). A copper alloy styca, minted in AD 837-41 (no 578), was also recovered from the Building 6 demolition deposits, and indicates a mid 9th-century date for the deposition

of this small assemblage.

A further stone-footed timber building (Building 9) contained a kerbed pavement or hearth, below which were found several pieces of lead alloy waste (no 160). This waste was of once-molten lead alloy, apparently dropped or spilled onto an uneven sand or clay surface which left an impression on the underside of each piece. As with the lead alloy waste from the burnt feature above Soil 2, there were no artefactual associations, but lead alloy melting on perhaps a semi-industrial scale is indicated. Deposits in the interior of Building 9 yielded broken pin shaft fragments, one of copper alloy (no 62) and one of bone (no 447).

A composite single-sided antler comb of Viking-age type (no 381) was lying in the fill of the defensive ditch at the southern end of the site. A late 9th- to mid 10th-century type, the comb was virtually intact except for a small number of missing teeth, although it had been crushed, perhaps by rubble thrown into the ditch above it. Other finds from the ditch fills include a perforated pig fibula pin (no 405) and a pin or needle made from a long bone shaft (no 418). A group of seven split cattle metapodials, possibly functioning as pegs, were found in a close alignment in one of the ditch fills (illus 62). Their purpose remains uncertain.

PHASE 14

All of the finds from Phase 14 were recovered from Soil 3, an extensive and deep layer of soil taken as broadly representative of the interface between the end of the Anglian occupation of the site and the medieval occupation. The assemblage from this soil layer includes a wide range of materials and of artefact types. Though associated by being found in the same group of deposits, the artefacts may have different derivations. Some may reflect activities that took place in the latest recognized phase of Anglian occupation (Phase 13), perhaps being derived from the demolition of buildings in that phase. Others may be contemporary with the deposition of the soil itself, reflecting activity nearby, and a few others may be intrusive and of medieval date.

A total of seven bone pins and pin fragments was found in Soil 3. One of these (no 429) has a faceted head, decorated by incised lozenges and punched dots. Another (no 446) has a nail type head. A decorated pin beater (no 458) and handle (no 397) were also recovered. In addition to the presence of the pin beater, evidence of textile manufacturing

activity was also indicated by the recovery of two stone spindle whorls (nos 337-8).

The only other industrial activity of which there are possible indications within the overall assemblage from Soil 3 is metal-working. A pair of iron tongs (no 271) was recovered in fairly close association with two ceramic crucible fragments (nos 575-6) and a small quantity of lead alloy offcuts and waste. This assemblage may relate to the earlier evidence of lead alloy melting associated with Building 9 and another feature in Phase 13.

Other artefacts from this extensive soil layer are of intrinsic interest individually, although perhaps distant from their functional environment. Some of these show a high level of skill in craftsmanship and in the careful detail of their manufacture. A short length of copper alloy chain or mail (no 20) is among these, as is an iron bell (no 169) and a possible vessel handle fragment made from a twisted iron bar (no 242).

PHASE 15

A line of large post pits was assigned to this phase. Only a small number of artefacts was found in their fills, which were predominantly stone-packed. The fill of Pit 10672 produced a Northumbrian styca, minted in *c* 841-9 (no 579). Although showing few signs of wear and therefore likely to have been lost when almost new, this may possibly have been redeposited.

Two fragments of shale artefacts were also found. Part of a bangle (no 370) was recovered from the uppermost fill of Pit 10761 and a fragment of a finger ring (no 373) was found in the uppermost fill of Pit 10760.

PHASE 16

A single-sided composite antler comb (no 380), of similar type to the example recovered from the defensive ditch in Phase 13, was found in the fill of a large pit or trench of unknown function. This feature had been cut from a higher level than that at which it was first detected, making its stratigraphic position uncertain. No 380 was thus possibly, although not certainly, residual. An iron spoon auger

(no 215) was found in association with the comb.

The fills of a curvilinear feature, containing large sandstone blocks and possibly representing a robbed wall foundation trench, contained an iron clench bolt (no 173), a decorated stone spindle whorl (no 333) and a stone weight (no 340).

PHASE 17

A tooth plate from a single-sided composite comb (no 390) was the only find from the cobble surface of Courtyard 12.

PHASE 18

The majority of the finds from this phase were from two wide, parallel trenches which were possibly defensive or components of siegeworks. The lower fills of the southern trench (615) were the most artefact-rich, containing two fragments of composite combs (nos 382 and 392), a complete bone pin (no 433), a copper alloy pin or needle shaft fragment (no 42) and an iron tool, possibly a reamer (no 216). Other finds from the two trenches include two clay loomweight fragments, one of which (no 534) is from a partially-formed and unfired loomweight, reminiscent of those from the *Grubenhaus* of Phase

7. Given the nature and depth of these trenches, cutting through earlier features, some of the finds in their fills were likely to have been residual. Redeposition appears particularly likely in the case of the loomweight fragments and the bone pin (no 433).

A quernstone fragment (no 319) was incorporated in the substantially robbed remains of a structure interpreted as a curtain wall, blocking the approach to the headland overlooking the castle.

PHASE 19

At the southern end of the site was a substantial dump of material containing rubble and thought to be derived from the demolition of the castle. This levelling dump contained a small assemblage of artefacts connected with textile manufacture, including an iron needle (no 236), a bone sword beater (no 467) and a fired loomweight fragment (no 531). Two perforated pig fibula pins (nos 408 and 412) were also found in the dump deposits. The presence of the loomweight fragment, in particular, may be indicative of a degree of residuality within these deposits.

Three iron clench bolts, used in construction to secure two or more thicknesses of timber (nos 174-6)

were recovered from the levelling deposits and may have derived from the demolition of the castle. All three objects have mineralized wood remains attached to them, indicating that they had been used and may have been deposited while still attached to structural timbers.

A tooth plate from a composite, double-sided comb (no 391) was among other artefacts recovered from the levelling deposits, along with a small strap-end buckle of copper alloy (no 4).

To the north-west of the levelling deposits was a further dump of brown ashy clay, which yielded a small whistle derived from a bird radius (no 474).

PHASE 20

A sandstone courtyard (Courtyard 4) was laid down above the face of the curtain wall (Phase 18). In common with the earlier courtyards of Phase 9 (Courtyards 2, 6 and 7), the make-up of Courtyard 4 produced a reasonably large artefact assemblage. One of the major components of this assemblage is iron nails, 13 of which were recovered. Ten of these came from Context 202, one of the main deposits of sandstone fragments forming the courtyard.

An antler tine with a circular hole bored into its base and further modified by trimming and polishing (no 396) was recovered from Context 202. A sawn antler offcut, comprising the burr, beam and pedicle (no 504), was also recovered from Courtyard 4. Accumulation on Courtyard 10, possibly the same as Courtyard 4 but separated by intervening features, produced two antler tines (nos 495 and 496). This assemblage is strongly indicative of antler working,

apparently contemporary with the use of these courtyard surfaces and perhaps taking place in a nearby workshop. The intended function of no 396 is uncertain but it may represent a crudely-made or unfinished handle.

A sandy clay layer, interpreted as resulting from the use of Courtyard 4 and overlying an area of flat stones, produced two offcuts of lead alloy sheet (nos 145 and 146). Associated with these was a small circular-headed copper alloy stud (no 70).

Associated with the two phases of construction of Building 12, a stone-footed timber building, were a knife blade fragment (no 197), a perforated hone (no 303) and a shale bangle fragment (no 369). Building stone fragments nos 287 and 288 were retained from the initial phase of construction. A complete bone pin (no 422) was found in a rubble deposit associated with the final demolition of Building 12.

A stone building (Building 10) lay to the north-west of Building 12 and was of uncertain relationship to it. Its construction disturbed gravel and cobble surfaces, not apparently associated with a building or courtyard. These surfaces produced a small but spatially concentrated assemblage indicative of copper alloy working, including several sheet offcuts (nos 107-9 and 128) and a piece of once-molten waste (no 72). A rounded droplet of glass, either representing an unfinished bead or waste (no 514) was also recovered, as were four fragments of a crucible (no 577). The crucible fragments probably came from a single vessel. Artefacts representing metal working evidence form 13% of the total assemblage from this phase (illus 118).

The gravel and cobble surfaces described above also produced one of the rare fragments of vessel glass from the site (no 517), along with a composite, double-sided comb (no 378) and two bone pins (nos 431 and 432), the former having a decorated head.

PHASE 21

The artefact assemblage from this phase was associated with various features resulting from the construction, occupation and demolition of the 16th-century French fort. The assemblage contains relatively high proportions of personal equipment (20%), tools (9%) and horse equipment (4%), reflecting the occupation of the headland by troops during this phase (see illus 122).

The fills of a deep ditch, probably part of the fort's defences, contained numerous clay pipes, a turner of Charles I (no 583), a highly-polished bone pin beater (no 455) and a horseshoe fragment, representing approximately half of the shoe (no 183). The horseshoe is one of three recovered from this phase.

A fragment of a decorative copper alloy mount (no 28) and a copper alloy pin (no 59) were recovered from a sandstone courtyard (Courtyard 9). A decorated copper alloy strap end (no 9) was recovered from the sandy fill of a gully cut into this courtyard.

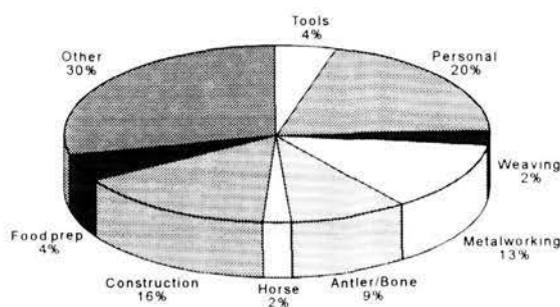
Another feature cut into Courtyard 9 was interpreted as a hearth with a stone surround, which may have been contained within a building. Deposits surrounding this hearth, containing abundant shell fragments, charcoal and coal, produced a varied assemblage of iron artefacts. This included a part of

a padlock mechanism (no 206), a possible padlock key (no 205), a horseshoe fragment (no 185) and a mass of chain links representing a fragment of mail (no 203). The presence of these artefacts may be indicative of a semi-industrial function for this hearth, although the abundant shellfish remains indicate that it may also have been used in food preparation. A probable hone fragment, also recovered from the deposits around the hearth (no 305) provides additional evidence of at least a partial workshop function for the building containing this hearth.

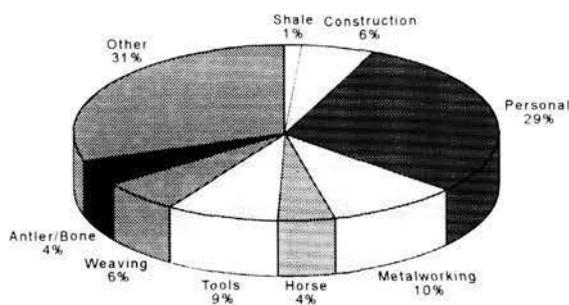
Deposits from the interior of Building 13, probably one of the buildings of the French fort, contained a small assemblage of domestic items which may contribute to the identification of this building as a dwelling. Copper alloy items from Building 13 include a lace tag fragment (no 22), a needle (no 30), a pin with a wire-wound head (no 41) and a plain finger ring (no 64). A knife blade fragment (no 195) and a possible chisel (no 212) were also recovered. Overlying, rubble-rich deposits, possibly resulting from the demolition of Building 13, contained a further lace tag (no 21) and another, more complete knife (no 192). A glass bead (no 513) was also found.

An iron key (no 190) with a kidney-shaped bow,

PHASE 20



PHASE 21



Illus 118
Assemblage characteristics: Phases 20 and 21.

characteristic of keys of 16th-century date, was found in the fill of a narrow trench linking Building 13 with its neighbour, Building 14. Features associated with the latter building produced no artefactual material.

A composite, double-sided antler comb (no 383), decorated by ring and dot motifs, was recovered from a levelling deposit which lay to the west of Building 13 and sealed a number of earlier features. Two iron buckle fragments (nos 170 and 172) and a horseshoe fragment (no 184) also came from this deposit.

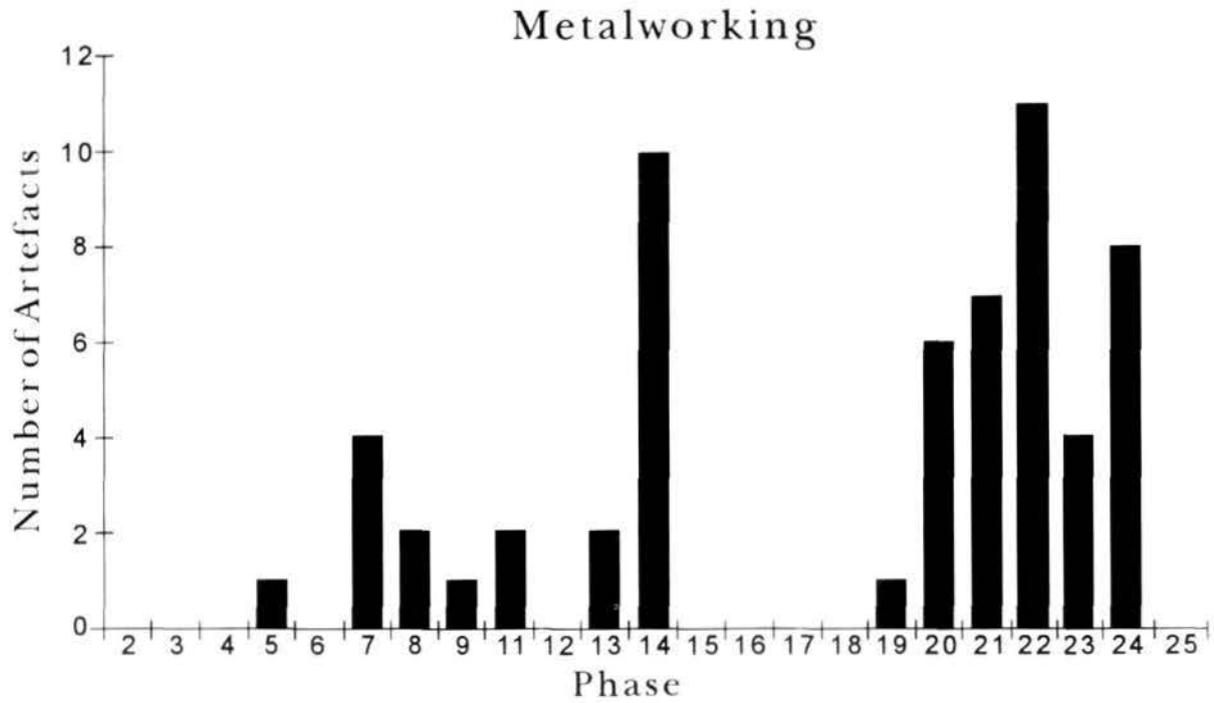
PHASE 22

Backfill in the foundations of Building 16 produced two copper alloy pins with wire-wound heads (nos 46 and 47) and a number of clay pipe fragments. Pipe fragments were abundant in deposits resulting from the demolition of the building, which also produced a wire-wound headed pin (no 45). As the foundations of Building 16 cut into the backfill of the French fort ditch (Phase 21), at least some of this material will have come from the upper fills of the ditch. As clay pipe fragments were also included in the fabric of the walls of the building, it must have been of 17th-century or later date.

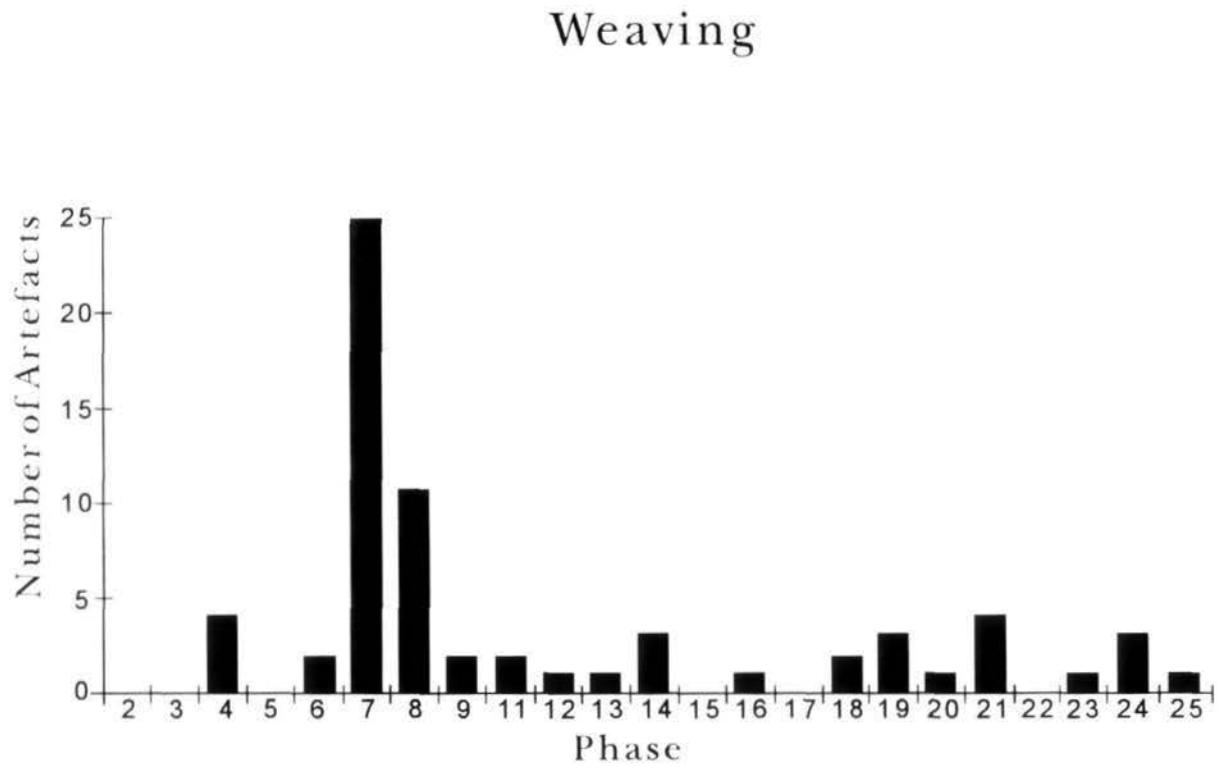
Finds from the possible lime kiln included a bone pin

or needle (no 417) and a bone pin (no 421), which came from a coarse orange sand deposit. This deposit may have been quarried from the headland, disturbing earlier archaeological deposits, hence both finds may be residual. No 421 is in a very eroded condition.

A small pit within the heavily robbed remains of Building 15 yielded several lead alloy sheet offcuts (nos 147-54) and two other pieces of lead alloy waste (nos 163-4). The majority of these came from the lower fill of the pit. Given this concentration of debris within a small feature, the pit may have been a rubbish pit for construction debris.

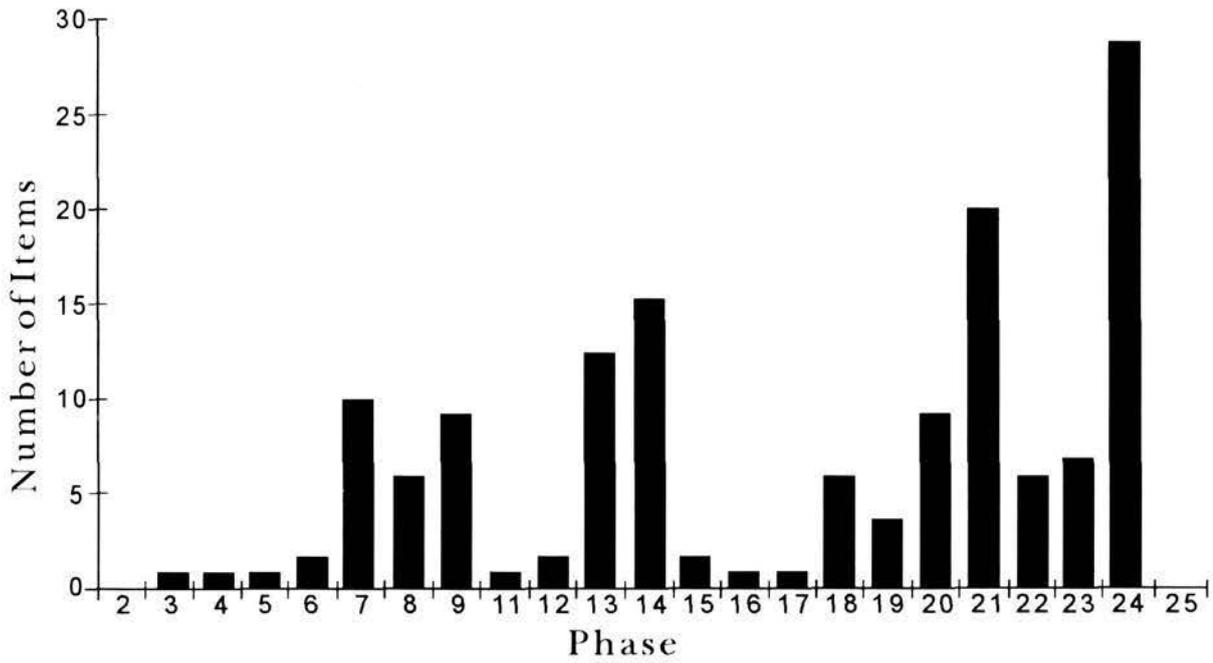


Illus 119
Number of items associated with metalworking, by Phase.



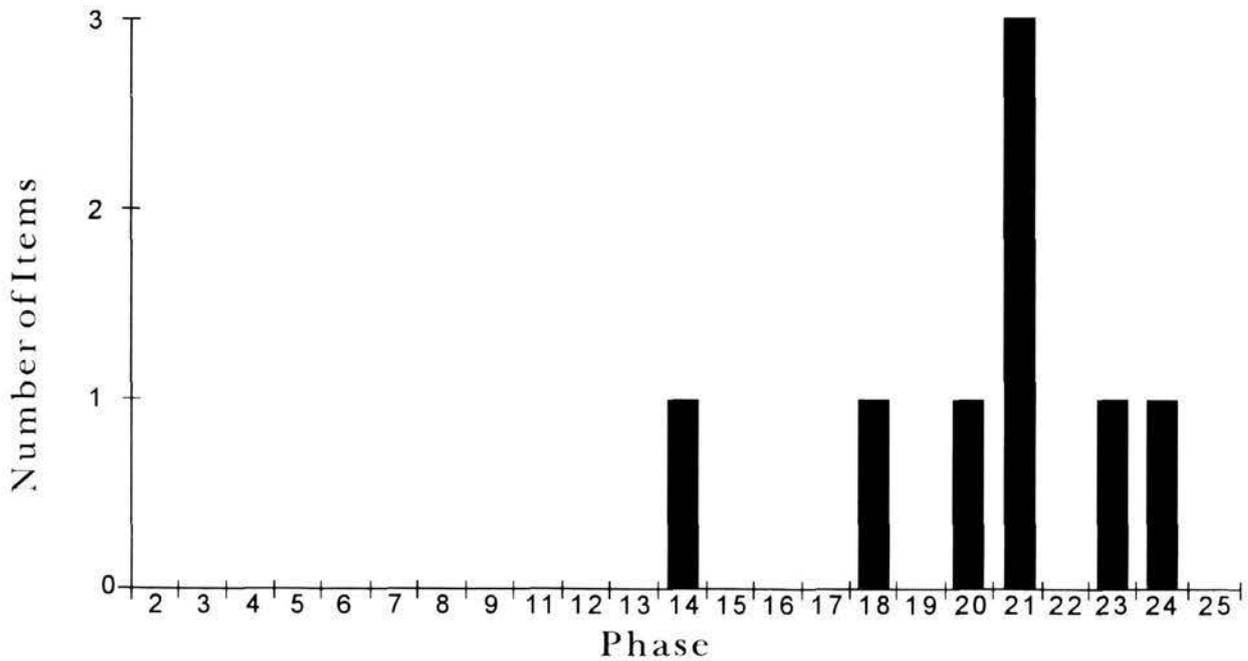
Illus 120
Number of items associated with weaving and textile manufacturing, by Phase.

Personal



Illus 121
Number of items of personal equipment, by Phase.

Horse Equipment



Illus 122
Number of items of horse equipment, by Phase.

PHASE 23

Finds from this phase of activity came mainly from a series of landscaping and levelling deposits. Clay pipe fragments formed a large part of the assemblage, as they had in Phases 21 and 22. A substantial levelling deposit overlying the demolition debris of Building 16 (Phase 22) produced three coins of 17th-century date (including nos 582 and 585). Also from this deposit a copper alloy lace tag (no 24), a

pin (no 44) and a key escutcheon (no 85) were recovered, along with a horseshoe fragment (no 182) and a knife blade (no 199). A copper alloy stud (no 68) was found in a probable garden feature. Other finds from various landscaping and levelling deposits included a copper alloy finger ring with an elliptical bezel (no 65) and a stone spindle whorl decorated by incised, radial lines (no 335).

PHASE 24

Several copper alloy buttons (nos 10-15) and one of shell (no 511) were among the clothing fittings recovered from a number of cut features dating from the occupation of the headland by military personnel. Copper alloy lace tags (nos 25-6), needles (nos 31-2) and pins (nos 48-57) were also found. A complete

horseshoe (no 181) was found in the fill of a slit trench. A deep deposit of topsoil, covering much of the site, contained a small number of residual finds including a barbed arrowhead (no 168) and a tooth plate from an antler comb (no 394).

TABLE 5 FUNCTIONAL CATEGORIES

Personal	Personal equipment and dress accessories, including pins, buckles, mail, keys, lace tags, mounts, combs, rings, studs, etc.
Tools	Including knives, tongs, chisels, hones, etc.
Weaving	Objects associated with weaving and textile manufacture, including needles, pin beaters, spindle whorls, loomweights, etc.
Recreational	Includes objects associated with recreational or leisure pursuits, eg playthings and musical instruments.
Metal working	Debris and unfinished objects, indicating metal working activities. Includes metal offcuts, once-molten waste, crucibles, etc.
Antler/boneworking	Includes debris indicative of bone or antler working, unfinished artefacts and offcuts.
Horse equipment	Includes horseshoes, bridle bits and other horse trappings.
Construction	Objects associated with the physical fabric of buildings and other structures, eg building stone, clench bolts, window glass, etc.
Food preparation	Objects associated with agriculture, fishing and the preparation of food.
Shale	Includes evidence for shale working (unfinished artefacts and offcuts).
Other	Objects which fall into none of the above categories or are of uncertain function.

DISCUSSION

The functional characteristics of the artefact assemblages from this site help to reveal the nature of its economy from the Iron Age through to the Post-medieval and Early Modern periods. Broadly speaking, until the Post-medieval period, the assemblages reflect a perhaps surprising degree of continuity, a diverse economy being indicated by the evidence of small-scale metal working, weaving activities, antler and bone working, and the consistent presence of tools, personal accessories and construction-related artefacts throughout the stratigraphic sequence (see *illus 113*). Examined in more detail, however, the assemblages indicate the relative concentration of some activities in specific phases of the site's occupation.

Evidence for the working of metals (mainly copper and lead alloys) (*illus 119*) is present in the Northumbrian period. Evidence for the melting of lead alloy on any significant scale is restricted to Phases 7 and 13. The large assemblage from Soil 3 in Phase 14 includes several sheet offcuts of copper alloy, indicating the manufacture and repair of artefacts. Throughout much of the Medieval period,

however, metal working evidence is absent (Phases 15-18), until it re-appears in Phase 19 and increases during the occupation of the French fort and during the Post-medieval period, mainly reflecting the cold working of copper alloy sheet. Evidence of textile manufacturing activity is far more concentrated in a particular phase, overwhelmingly in Phase 7, with a significant number of finds also from Phase 8 (see *illus 120*).

At the end of the medieval period, many aspects of the economic continuity on the site, as represented by artefact assemblage characteristics up to and including those from Phase 20, change quite markedly with the construction and occupation of the French fort. In artefactual terms, the numbers of iron objects recovered increased quite significantly in Phase 21, increased numbers of tools, personal accessories/equipment (see *illus 121*) and items of horse equipment (see *illus 122*) reflecting the presence of numbers of military personnel and their horses. Finds of personal accessories were again high in Phase 24 (see *illus 121*), when the headland was the focus of more recent military activity.

THE ANIMAL BONE

C Smith

INTRODUCTION

Animal bones from Dunbar accounted for a significant proportion of the finds assemblage, weighing in at an estimated 850kg (over 16.7cwt). Given such a large sample it seemed unreasonable to expect to examine every fragment, although initially this was attempted. Thus all bones from the first season of excavation (DB88F) were examined and recorded. Subsequently it was felt that sufficient material had then been analysed to provide a full picture of the economy of the site and that, because of financial and time constraints, a sampling policy would have to be adopted for any further material from the site. In the event, more time became available for study and it was eventually possible to examine and record approximately three quarters

of the material from the second, third and fourth seasons of excavation (DB03, DB04, DB08A). Priority was given to material of the earliest date and to large context assemblages, but, as the site phasing was in its initial stages when the bone sampling took place, a small amount of early material was unavoidably missed. Some phases of the site's history are therefore incomplete as far as the bones are concerned (Phases 4, 14, 15, 22, 24, 25), but it was felt that a representative sample had been included in each phase. In addition, in some of the sampled contexts, unidentified bone fragments were not recorded in order to speed up the initial identification process (Phases 8, 20, 21, 22). Eventually, over 60,000 fragments were recorded.

METHODS AND MEASUREMENT

The bones were identified by direct comparison with modern reference specimens, including Chillingham cow, Soay sheep, Northumbrian pit pony and red deer. Bones of mammals and birds were identified as far as possible to particular bone and species. Fish bones were merely recorded as such. Sheep and goat bones were separated where possible using Boessneck's (1969) criteria, but where indistinguishable were designated sheep/goat. Mammalian bones which proved impossible to allocate to species were recorded as large ungulate, small ungulate or indeterminate mammal. All ribs and vertebrae other than the first two cervical vertebrae, the atlas and axis, were described as large or small ungulate on the basis of size. Large ungulate included bones which

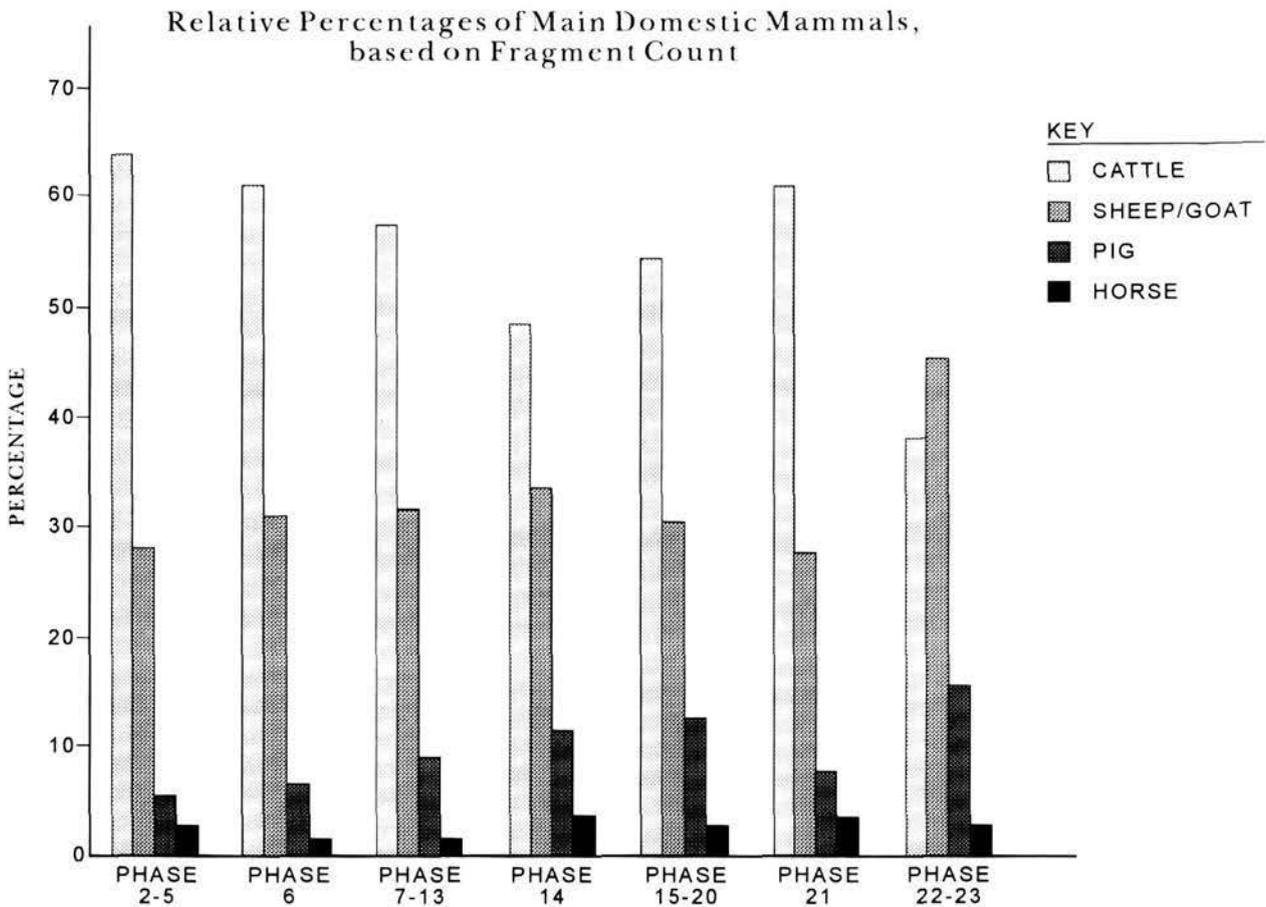
on the basis of probability derived mainly from cattle, but could also have come from horse, or less likely, red deer, while small ungulate described fragments which were most likely to have come from sheep, but could have included goat, pig or roe deer.

Measurements were made in accordance with the scheme of von den Driesch (1976) and are expressed in millimetres. Some additional measurements on the humerus follow Legge and Rowley-Conwy (1988, 124). Mandibular tooth eruption and wear patterns were assessed using Grant's (1982) scheme for cattle, sheep/goat and pig as well as Payne's (1973) scheme for sheep/goat.

RELATIVE FREQUENCIES OF SPECIES

The large animal bone assemblage found at Dunbar was dominated by the remains of domestic animals.

Cattle were the most numerous in terms of fragment count (12981). Sheep and goat bones were, because



Illus 123
Relative percentages of main domestic mammals, based on fragment count.

of the well known difficulties in distinguishing between the two species, counted together as sheep/goats, and were second in importance as far as numbers of fragments were concerned (7383). However, as only 21 of these (highly diagnostic horn cores and metapodials) could be recognized as goat, it was felt that the bulk of the ovicaprid bones were truly from sheep. Pigs were third in importance as regards the number of fragments (2332), while horses accounted for only 560 fragments (although they occurred in all phases of the site.)

The numbers of fragments from each species occurring in each phase is shown in Table 6. Minimum numbers of the main food forming mammals (cattle, sheep/goat, pig, horse and deer), calculated on the basis of the most commonly occurring bone in a given period, are shown in Table 7. A comparison of the fragment numbers and percentages of the main food forming mammals (including deer) in each phase is shown in Table 8, and a diagrammatic representation, excluding deer, is shown in illus 123. Both the fragment counts and

minimum numbers of animals show fluctuations with time in the relative importance of cattle to sheep/goats and pigs. With the progression of the Iron Age (Phases 2-5) to the Northumbrian period (Phases 7-13), cattle numbers appear to decrease with respect to sheep/goats and pigs. However, by the start of the medieval period (Phases 15-20) cattle numbers had increased, perhaps at the expense of sheep, since pig numbers were themselves also increasing. During the 16th century, (French fort, Phase 21), cattle numbers again increased, almost to the level attained during the Iron Age. In fact the picture of animal frequencies is strikingly similar in both the Iron Age and French fort periods, despite the intervening centuries. A major change, however, had taken place by the post-medieval period (Phases 22-23), when sheep numbers outstripped those of cattle, possibly indicating a move towards a more market-based economy, or at least a change in local farming practices.

The change in the frequency of occurrence of pigs is of great interest. Given the numerous references

TABLE 6 TOTAL NUMBER OF ANIMAL BONES: DOMESTIC

Phase	Cattle	Sheep/ Goat	Goat	Pig	Horse	Dog	Cat
2	79	41		7	2	2	1
3	25	13			1		
4	220	85	1	25	6		
5	56	21		2	4		
2-5	6	5					
4-5	6	6					
6	535	266	1	54	11	2	2
1-6		3					
7	1276	428	2	176	29	2	
8	540	179	1	71	20		
7-8	25	15		1	2		1
9	1876	876		286	55	2	1
10	7	12		3	1		
11	372	314		82	12		
12	649	600		109	27		1
13	1471	961	2	265	68	13	1
7-13	4	1					
14	1068	768	2	245	86	10	2
15	251	180	9	48	7	1	
16	224	132		34	20		
17	207	177		38	10		
18	793	408	2	218	41	11	6
19	285	136		75	10	4	
20	733	327		169	17	1	
16-20					1		
21	1549	706		197	81	10	3
22	187	238		27	14	4	9
23	351	368		175	25	6	2
24	395	297		68	13	41	3
Total	13190	7563	20	2375	563	109	32

TABLE 6 (continued) TOTAL NUMBER OF ANIMAL BONES: WILD

Phase	Red Deer	Roe Deer	Fallow Deer	Wild Boar	Fox	Otter	Badger
2							
3							
4	2						
5	1						1
2-5							
6	10				6		1
7	5						
8	2						
7-8	1						
9	4	5					
10		2					
11							
12	2	1					
13	18	6		2	1		
14	23	8		1	1	2	
15	1						
16	6	3		4			
17		2					
18	12	3			2		
19	2	1					
20	6				1		
21	12	5	1		1	1	
22		1					
23	16	1	1		3		
24	6	1			2		
Total	129	39	2	7	17	3	2

Phase	Hare	Rabbit	Vole	Rodent	Seal sp	Bear	Cetacean
2							
3			1				
4			34				
5				1	1		
2-5							
6	2			4	1		

TABLE 6 (continued) TOTAL NUMBER OF ANIMAL BONES: WILD

7	2		3	4	1		
8							
7-8							
9	2						
10					5		
11							
12							
13	8		1	2			1
14	3	1		2			1
15	1			5	1		1
16	2						
17	1			1			
18	1					1	
19				1			
20	3	1			1		
21	5	6	2	1			
22	2			4			3
23	8	3		4			
24	3	10		3			
Total	43	21	41	32	10	1	6

to swine in Anglo-Saxon documentary records, which has historically been assumed to mean that great herds of pigs were kept (Clutton-Brock 1976, 378; Trow-Smith 1957, 54), one would expect to see a noticeable increase in pig numbers at Dunbar between the Iron Age and Northumbrian periods. However, reference to *illus* 123 indicates that, although there is an increase, it is only a very slight one and is probably not significant. The trend in pig numbers, however, continues upward after the end of the Northumbrian period, dipping down in the French fort phase, only to climb again to a maximum in the post-medieval period when, as we have already seen, cattle numbers were in a decline.

Since Dunbar is situated at the most northerly extent of the Northumbrian kingdom and is geographically dissimilar from other excavated Anglo-Saxon sites, many of which are located in East Anglia, Norfolk or London, it is difficult usefully to compare data. However, a survey of such sites, which include trading emporia (Hamwih, Lundenwic) as well

as farm villages (West Stow), reveals rather less evidence of pig husbandry than the strictly historical view would seem to suggest (Table 9). For instance, the most northerly site apart from Dunbar itself, the Northumbrian hall at Yeavinger (Hope-Taylor 1977, 325-32) produced only 1.09% of pig bones, compared with 9.2% in the Northumbrian period at Dunbar. However, it was recorded by Yeavinger's excavator that bone survival was very poor (*ibid*, 325), and in addition there may have been origins other than food refuse for the assemblage, which was dominated by cattle skulls and may partly have been a ritual deposit. Thus the collection from Yeavinger is probably an inappropriate comparison for Dunbar.

At the early Anglo-Saxon village of West Stow in Suffolk (Crabtree 1990, 6), pigs accounted for 14.2% of the food forming mammals, while at North Elmham, East Anglia, the figure was 28% (Clutton-Brock 1976, 377). West (1988, 150-1), writing of London emporia sites, where pigs were relatively abundant, has suggested that 'high levels of pork

TABLE 6 (continued) TOTAL NUMBER OF ANIMAL BONES: BIRDS, FISH, AMPHIBIAN

Phase	Fowl	Goose	Duck	Other Bird Species	Indeterminate Bird	Fish	Amphibian
2	1				1	1	
3				1		3	
4	2	2			1	1	
5				1		2	
2-5	2	1		1			
4-5	1					2	
6	6	8	2	5	2	8	
7	10	6	4	8	5	19	
8	6	6			2	5	
7-8		2		1			
9	16	15	6	4	4	15	
10			1		1	2	
11	8	9		3	3	92	
12	6	20	1	1	2	61	
13	14	31	3	24	23	504	1
7-13							
14	15	23	3	10	8	216	
15	3	7	1	7	3	182	
16	1	4		6	2	43	
17		9		4	5	34	1
18	27	27	1	3	4	221	
19	5	5		3	7	244	
20	41	14	4	9	11	305	
16-20							
21	54	22	4	9	10	372	
22	10	5	1	3	1	19	
23	43	18	2	17	3	123	1
24	16	5	1	12	3	15	
Total	287	239	34	132	101	2,489	3

TABLE 6 (continued) TOTAL NUMBER OF ANIMAL BONES: OTHER

Phase	Large Ungulate	Small Ungulate	Indeterminate Mammal	Sub Total	Domestic: Sub Total	Other: Sub Total	Grand Total
2	88	46	195	329	132	3	464
3	18	10	76	104	39	5	148
4	196	82	448	726	337	42	1105
5	59	19	34	112	83	7	202
2-5	3	7	31	41	11	4	56
4-5	9			9	12	3	24
6	553	225	68	846	871	55	1722
1-6			1	1	3		4
7	1132	353	1534	3019	1913	67	4999
8	396	123	670	1189	811	21	2021
7-8	31	16	86	133	44	4	181
9	1613	484	1691	3788	3096	71	6955
10	16	5	37	58	23	11	92
11	656	323	523	1502	780	115	2397
12	1192	382	803	2377	1386	94	3857
13	1080	368	1784	3232	2781	639	6652
7-13	1	2	43	46	5		51
14	1172	528	867	2567	2181	317	5065
15	183	96	872	1151	496	212	1859
16	163	63	344	570	410	71	1051
17	125	115	233	473	432	57	962
18	604	352	1501	2457	1479	302	4238
19	214	98	421	733	510	268	1511
20	590	294	1354	2238	1247	396	3881
16-20	1		4	5	1		6
21	750	342	1813	2905	2546	505	5956
22	79	39	269	387	479	49	915
23	240	224	780	1244	927	243	2414
24	245	108	666	1019	817	77	1913
Grand Total	11,409	4,704	17,148	33,261	23,852	3,638	60,751

TABLE 7 MINIMUM NUMBERS OF ANIMALS IN SELECTED PHASES, BASED ON MOST COMMONLY OCCURRING BONES

Phase	Cattle	Sheep/Goat	Pig	Horse	Red Deer	Roe Deer
2	3	2	1	1		
3	2	2	1	1		
4	10	4	2	1	1	
5	4	1	1	1	(1†)	
6	28	11	5	1	1	
7	13	13	4	1	1	
8	12	6	3	1	(1†)	
9	31	23	10	2	1	1
10	2	3	1	(1*)		1
11	12	15	3	2		
12	25	15	3	2	1	1
13	23	22	6	4	1	2
14	18	22	7	3	2	1
21	25	20	6			

* Based on tooth only

† Based on antler fragment only

consumption relative to mutton correlate with historical evidence for prosperity and high status' and that lack of woodland pannage for pigs did not influence pork consumption. It may well be the case that standards of living were lower in Northumbrian Dunbar than in Saxon London and may relate to the low uptake of pig meat. But how then, given the supposed Anglo-Saxon predilection for pork, does one explain the seeming contradiction that, in the far north of Scotland, more pork appears to have been consumed at Iron Age broch sites than at Northumbrian Dunbar? For example at Howe, Orkney (Smith 1994) during later Iron Age Phase 8, 20.6% of the main domestic animal bones came from pigs, while at Crosskirk Broch, Caithness (McCartney 1984) the comparable figure was 17.4%.

Horses appear to have been eaten at Castle Park in all phases, as indicated by butchery marks, but their contribution to the diet was probably never of major importance. Cat and dog bones were not plentiful, although they occurred in all periods, first appearing in the Iron Age.

Bones of red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*) were present in the majority of phases but were not of great dietary importance. The

main value of red deer probably lay in their antlers. Two bones thought to have come from fallow deer (*Dama dama*) were found, one in Phase 21, the other in Phase 23. The origins of the reintroduction of fallow deer to Scotland are rather obscure; it is believed that some animals may have been imported to Britain during the Roman period, but that the Normans were responsible for bringing more significant numbers (Corbet & Southern 1977, 433; Grant 1981, 206). Bones of fallow deer in the 16th-century French fort and in post-medieval Phase 23 are an indicator of the range of this species in medieval Scotland, the only other known incidence of fallow deer occurring at post-medieval Cathcart Castle, Glasgow (Smith, Scottish Urban Archaeological Trust archive report). Taken in combination with the relatively low importance of pigs at Dunbar, the scarcity of deer species may indicate that woodland cover in the vicinity of the site may have been sparse. However, a very few bones thought to be of wild boar occurred in Northumbrian Phase 13, as well as Phases 14 and 16.

Other wild species found at Dunbar were fox (*Vulpes vulpes*), otter (*Lutra lutra*), badger (*Meles meles*), brown bear (*Ursus arctos*), phocid seal species, cetacean species (including Greenland Right whale

TABLE 8 PERCENTAGES OF FOOD FORMING ANIMALS

Phase		Cattle	Sheep/ goat	Pig	Horse	Deer	Total
2-5	n	392	172	34	13	3	614
	%	63.8	28.0	5.5	2.1	0.5	
6	n	535	267	54	11	10	877
	%	61.0	30.4	6.2	1.3	1.1	
7-13	n	6220	3391	993	214	46	10864
	%	57.3	31.2	9.1	2.0	0.4	
14	n	1068	790	245	86	31	2220
	%	48.1	35.6	11.0	3.9	1.4	
15-20	n	2493	1371	582	106	46	4598
	%	54.2	29.8	12.7	2.3	1.0	
21	n	1549	706	197	81	18	2551
	%	60.7	27.7	7.7	3.2	0.7	
22-23	n	538	606	202	39	19	1404
	%	38.3	43.2	14.4	2.8	1.4	
Total	n	12795	7303	2307	550	173	23128
	%	55.3	31.6	10.0	2.4	0.7	

(*Balaena mysticetus*) and killer whale (*Orcinus orca*), bank vole (*Clethrionomys glareolus*), field vole (*Microtus agrestis*), mole (*Talpa europaea*), rat (*Rattus* sp.), hare (*Lepus capensis*) and rabbit (*Oryctolagus cuniculus*). One rabbit bone occurred in Phase 14 and the remainder in Phase 21 onwards and there is a strong possibility that some of these animals were intrusive. This may also have been so for the rat, vole and mole bones. Amphibian bones, most probably from frogs, were found in Phases 13, 17 and 23. Fish bones were present throughout the timespan of the site, as is to be expected given its proximity to the sea.

Birds included domestic fowl (*Gallus gallus*) and domestic geese (*Anser anser*), fowl being the more plentiful of the two in the earlier phases (see Table 10). From Phase 12 to Phase 19, goose bones were more numerous or were equal in number to fowl, and thereafter fowl bones were again predominant, particularly in Phases 20 and 21. Wild geese were thought to have been present, but because of the similarity between the bones of domestic goose and its wild ancestor, the greylag (*Anser anser*), particularly in early contexts, it is more than likely that the two were not distinguished from one another. Domestic ducks were not thought to have been kept. They are not generally found at sites in Scotland until

the medieval period, and even then their presence is often in doubt, again because of an inability to distinguish their bones from those of the wild progenitor, the mallard (*Anas platyrhynchos*). Further Anatid species found at Dunbar were wigeon (*Anas penelope*) brent/barnacle goose (*Branta bernicla/leucopsis*) and swan (*Cygnus* sp.). Also exploited were sea birds including the Auk family: guillemot (*Uria aalge*), razorbill (*Alca torda*) and great auk (*Alca impennis*); gannet (*Sula bassana*), cormorant (*Phalacrocorax carbo*), shag (*Phalacrocorax aristotelis*); great black-backed gull (*Larus marinus*), herring/lesser black-backed gull (*Larus argentatus/fuscus*), black headed gull (*Larus ridibundus*), kittiwake (*Rissa tridactyla*), curlew (*Numenius arquata*) and oystercatcher (*Haematopus ostralegus*).

The bones of great auk (*Alca impennis*) in Phases 5 and 6 are of interest since this is a flightless bird, extinct since the mid 19th century AD because of over-exploitation by man. Bones of great auk have been found at broch sites of the Iron Age in Orkney and Caithness (Fisher & Lockley 1989, 66). Known to the 18th-century St Kildans as the garefowl, this bird was valued both for its flesh and for its large eggs which were harvested annually during the breeding season (Martin 1753, 27).

TABLE 9 PERCENTAGES OF FOOD FORMING ANIMALS AT SITES OF SAXON TO EARLY MEDIEVAL DATE

Site	Date	Cattle	Sheep/ Goat	Pig	Horse	Total Fragments
<u>Dunbar: Phases 7-13</u>	Northumbrian	57.5	31.3	9.2	2.0	10818
West Stow	Anglo-Saxon	40.1	43.8	14.2	1.9	64840
North Elmham	Anglo-Saxon	19.0	48.5	28.0	4.7	N/A
Thetford	Late Anglo-Saxon	45.0	31.9	19.3	3.8	2041
Hamwih	Mid Saxon	52.5	32.1	15.3	0.1	45504
Peabody site, London	7th-9th century	46.9	22.9	30.0	0.2	4888
National Gallery, London	7th-9th century	29.6	41.2	29.3		1606
Maiden Lane, London	7th-9th century	54.4	16.2	29.1	0.2	5317
Jubilee Hall, London	7th-9th century	54.5	21.7	23.6	0.2	1547
Yeavinger	Northumbrian	95.2	2.2	1.1	1.6	643
Coppergate, York	Mid 9th to late 9th/10th century	71.5	19.5	7.3	1.7	3154
Dorestad: Hoogstraat I	AD750-850	60.5	24.4	13.4	1.6	2552
Dorestad: Settlement-North	AD750-850	72.5	13.0	12.6	1.9	2006
Dorestad: Settlement-South	AD750-850	71.8	13.0	10.0	5.2	863

One of the nesting grounds of the great auk in the Iron Age may have been the Bass Rock, 2km offshore from Dunbar in the Firth of Forth. At the present day, gannets, fulmars, shags, kittiwakes, guillemots, razorbills and puffins use the Bass Rock as a nest site, and they could have been harvested there in the manner of the 18th-century St Kildans or the present day seabird hunters of Sula Sgeir in the Hebrides (Beatty 1992).

Other edible bird species found at Dunbar were woodcock (*Scolopax rusticola*), grey partridge (*Perdix perdix*) and wood pigeon (*Columba palumbus*). Bones of sparrowhawk (*Accipiter nisus*), buzzard (*Buteo*

buteo), eagle species (*Aquila/Haliaeetus*), crow (*Corvus corone*) and blackbird (*Turdus merula*) were also found, but whether they were eaten is a matter of conjecture.

Marine molluscs were, not unexpectedly, found on the site. The majority of the shells were of periwinkle (*Littorina* sp.), but limpets (*Patella* sp.) and oysters (*Ostrea edulis*) were also present. The periwinkles were found in large dumps, indicating that they were eaten by humans. Oysters were probably also used as food, while the limpets may have been eaten, although they were more likely to have been used as fishing bait.

SIZE, TYPE AND SEX OF ANIMALS

In order to assess the stature of the Dunbar animals, accurate anatomical measurements were taken wherever possible, following von den Driesch (1976). Because of the large quantities of bone present, some selection of data had to be undertaken. Accordingly, measurements of cattle, sheep/goat and pig from the important early phases (2-14) were compiled, along with those from Phase 21 (the French fort), which was considered to be reliably dated to the late medieval period and thus able to provide a valuable late comparison for the earlier phases.

CATTLE: SIZE

Intact long bones from the earliest Iron Age phases were unfortunately not plentiful. However, rather more unbroken examples were found in Phases 7-13, providing greatest length measurements from which withers heights could be estimated (after von den Driesch and Boessneck 1974). Table 11 lists measurements of complete cattle bones and withers heights calculated from them. These figures indicate that the smallest beast

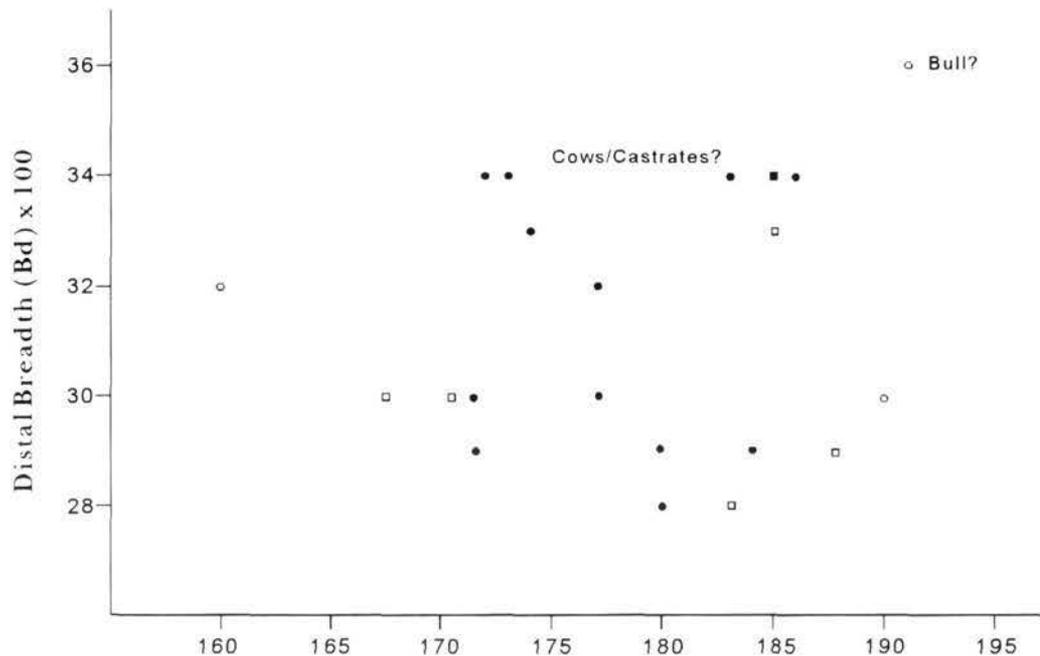
TABLE 10 WILD BIRD SPECIES PRESENT IN EACH PHASE

Phase	Species	Number of bones
2-5	Razorbill (<i>Alca torda</i>)	1
3	Wader <i>sp.</i>	1
5	Great auk (<i>Alca impennis</i>)	1
6	Cormorant (<i>Phalacrocorax carbo</i>)	1
	Great auk	1
	Guillemot (<i>Uria aalge</i>)	1
	prob Curlew (<i>Numenius arquata</i>)	1
	Buzzard (<i>Buteo buteo</i>)	1
7	Brent/Barnacle goose (<i>Branta sp.</i>)	3
	Shag (<i>Phalacrocorax aristotelis</i>)	1
	Guillemot	2
	Herring/Lesser black-backed gull (<i>Larus argentatus fuscus</i>)	2
7-8	Herring gull (<i>Larus argentatus</i>)	1
9	Shag	1
	Wader <i>sp.</i>	1
	Great black-backed gull (<i>Larus marinus</i>)	1
	prob Wigeon (<i>Anas penelope</i>)	1
11	Small goose: Brent or Pinkfooted (<i>Anas brachyrhynchos</i>)	1
	Anatid <i>sp.</i>	1
	Herring/Lesser black-backed gull	1
12	prob Swan (<i>Cygnus sp.</i>)	1
13	prob Wigeon	1
	Herring/Lesser black-backed gull	15
	Oystercatcher (<i>Haematopus ostralegus</i>)	1
	prob Grey partridge (<i>Perdix perdix</i>)	1
	Pigeon (<i>Columba sp.</i>)	1
	Small Passerine	4
	Small Corvid	1
14	Shag/Cormorant	1
	Buzzard	2
	Raptor <i>sp.</i>	1
	Herring/Lesser black-backed gull	1
	Guillemot	3
	Blackbird/Thrush (<i>Turdus merula/philomelos</i>)	1
	Raven (<i>Corvus corax</i>)	1
15	Wigeon	1
	Buzzard	1
	Wader <i>sp.</i>	1
	Great black-backed gull	2
	Herring/Lesser black-backed gull	1
	Guillemot	1
16	Gannet (<i>Sula bassana</i>)	2
	Razorbill	2

TABLE 10 (continued)

Phase	Species	Number of bones
	Woodcock (<i>Scolopax rusticola</i>)	2
17	Buzzard	1
	Raptor <i>sp.</i>	1
	Curlew	1
	Herring/Lesser black-backed gull	1
18	Brent/Barnacle goose	1
	Herring/Lesser black-backed gull	1
	Corvid	1
19	Gannet	2
	Passerine	1
20	Cormorant	1
	Eagle <i>sp.</i> (<i>Aquila/Haliaeetus sp.</i>)	1
	Curlew	2
	Wader <i>sp.</i>	1
	Razorbill	1
	Guillemot	1
	prob Dunnock	1
	?Stork	1
21	Gannet	4
	Raptor <i>sp.</i>	1
	Curlew	1
	Guillemot	1
	Wood pigeon	1
	prob Jackdaw (<i>Garrulus glandarius</i>)	1
22	Wader <i>sp.</i>	2
	Guillemot	1
23	prob Sparrowhawk (<i>Accipiter nisus</i>)	1
	Great black-backed gull	2
	Lesser black-backed gull	1
	Larus <i>sp.</i>	5
	Kittiwake (<i>Rissa tridactyla</i>)	1
	Razorbill	1
	Wood pigeon	3
	Grey partridge	2
	Long/Short eared owl (<i>Asio sp.</i>)	1
24	small Raptor <i>sp.</i>	1
	Great black-backed gull	5
	Black-headed gull (<i>Larus ridibundus</i>)	1
	Larus <i>sp.</i>	1
	Oystercatcher	1
24	Wood pigeon	1
	Crow	1
	Raven	1

Cattle Metacarpal Length versus Distal Metacarpal Index (after Howard, 1963)



Key Greatest Length (GL) in millimetres

- Phase 6
- Phases 7 - 13
- Phase 14
- Phase 21

Illus 124

Cattle metacarpal length versus distal metacarpal index, after Howard (1963).

occurred in Northumbrian Phase 13 (withers height = 98.6cm), while somewhat surprisingly, the largest (withers height = 122.6cm) was found in the earlier Phase 6. Perhaps unexpectedly, the mean withers height based on the metapodials in the French fort Phase 21 (109cm) was not markedly different from that in Phases 7-13 (109.1cm).

Dimensions of the most commonly measured cattle bone from archaeological sites, the astragalus, have been compiled by Maltby (1981, 187) in his review of the faunal remains from Iron Age, Romano-British and Saxon sites. Table 12 uses Maltby's data as well as that from Dunbar and other, more recently published sites. The sites thus compared are, of course, geographically dissimilar, including as they do northern brochs of the Iron Age (Howe and Crosskirk), a Roman site situated in what is now modern day Northumberland (Vindolanda) and Saxon sites from the south of England. What is interesting, however, is the way in which the Dunbar measurements fit into the sequence of gradually increasing size with time. Although the Dunbar astragali from Phase 6 and the Northumbrian Phases 7-13 follow the pattern of other sites of equivalent time period (ie Saxon), there is apparently a decrease, rather than an increase, in length at Dunbar from the Iron Age to the medieval period. Measurements of the Dunbar cattle calcanea, another commonly measured bone, also show such a decrease (see Size Range Summary, Table 24a). Thus although the sample sizes are in some cases small and cannot be tested statistically, the trend at Dunbar is one of decreasing size from the Iron Age to the Northumbrian periods, rather than the slight increase observed at other sites. This may be because, unlike other contemporary sites

which fell under Roman or Romano-British influence, no larger breeds of cattle were imported to improve the native breeding stock (eg Hodgson 1968, 133).

Cattle withers heights at Northumbrian Dunbar (range 98.6cm-117.2cm, mean = 109.1cm), however, compare very well with those at later Iron Age Howe (Phases 7 and 8) where the withers heights range calculated from the metapodials was 107cm-117.1cm, mean 107.6cm, and indeed with those from the Iron Age features at West Stow, where the range calculated from all long bones was 99.6cm-116.3 cm, mean = 107.4 cm (Crabtree 1990, 35). It would, however, appear that the Northumbrian cattle were smaller than those from the Saxon phases at West Stow (withers height range 104.6cm-120.9cm, mean 111.7cm). In summary then, the Northumbrian cattle at Dunbar are comparable in size with those at other British sites of Iron Age date but are probably smaller than their southern Saxon counterparts.

CATTLE: SEX

Horn cores are probably the best indicators of the sex of the cattle, but unfortunately most of those from Dunbar were broken or butchered and thus length measurements could not be taken. In general, they appeared to be of a short horn type, similar to those from Scottish sites of the medieval period, and appeared to have come from females or castrates. No obvious examples of large, robust bull horn cores were seen. It was presumed that all of the cattle were horned, for no polled skull fragments were found.

TABLE 11 DIMENSIONS OF COMPLETE CATTLE LONG BONES AND ESTIMATED WITHERS HEIGHTS**a: RADIUS****Phase 6**

Context	GL	Bp	Bd	SD
328	255	69.0	64.0	35.5
328	264	73.5	65.0	36.5
328	237	69.0	57.5	31.0

Phases 7-13

Context	GL	Bp	Bd	SD
3017	251	72.1	65.7	35.4
3017	251	72.8	62.8	34.5

b: METACARPAL**Phase 6**

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
328	185.05	58.0	37.0	63.0	34.5	113.7

Phases 7-13

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
353	174			50.8	27.4	106.7
354	180		33.3	52.0	28.5	110.3
404	180	49.3	31.3	50.7	26.4	110.3
1421	177		31.5	52.4	27.0	108.5
3017	174	49.9	31.5	51.6	29.5	106.7
3017	174	59.3		58.0	34.6	106.7
10238	184	52.5	33.0	53.0	28.0	112.8
10238	161					98.7
10241	183	59.5	36.0	61.5	33.0	112.2
10241	172			58.0	34.0	103.4
10241	173	58.5	38.0	59.5	35.0	106.0
10317	186	61.2	38.4	63.4	33.0	114.0
10396	191					117.1
10464	177	50.5	30.5	56.5	27.5	108.5

TABLE 11 (continued)**Phase 14**

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
215	190	58.4	36.0	57.6	35.0	116.5
215	160	50.0	31.0	50.5	27.5	98.1
10215	191	62.0	39.5	69.5	37.5	117.1

Phase 21

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
159	183	50.0		51.0	28.0	112.2
10188	173	51.0	31.0	51.5	30.0	106.0
10210	185	56.0	36.0	61.0	31.0	107.3
10216	170	46.5	27.5	51.0	25.0	104.2
10216	188	52.0	32.5	54.0	30.0	115.2

c: TIBIA**Phases 2-5**

Context	GL	Bp	Bd	SD	Withers height (cm)
10481	310			34.0	106.95

Phase 14

Context	GL	Bp	Bd	SD	Withers height (cm)
215	300		55.5	33.0	103.5

d: METATARSAL**Phases 2-5**

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
1219	198	39.0	39.0	46.0	23.5	107.9
12188	217	43.0	41.5	49.5	25.0	118.3

Phase 6

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
328	225	51.5		60.0		122.6
328	197	42.5		47.5	24.0	107.4

TABLE 11 (continued)

Phases 7-13

Context	GL	Bp	Dp	Bd	SD	Withers height (cm)
183	206	42.0	39.0	46.5		112.3
293	196	40.2		47.0	24.0	106.8
372	212	50.0	46.5	62.0	27.8	115.5
1403	203	46.1	43.8	53.6	27.4	110.6
3003	194	39.9	41.0	46.2	23.7	105.7
3017	200	46.3	44.8			109

SUMMARY OF MEAN CATTLE WITHERS HEIGHTS BASED ON METACARPALS AND METATARSALS

Phase	Range	n	Mean
2-5	107.9-118.3	2	113.1
6	107.4-122.6	3	114.6
7-13	98.7-117.1	20	109.1
14	98.1-117.1	3	110.6
21	104.2-115.2	5	109.0

In an attempt to separate long bones from different sexes graphically, indices based on the length and distal breadth of the metacarpal have been devised (Howard 1963) which make use of the observation that female metacarpals should be relatively short and slender, male metacarpals stouter, while those from castrates will be longer than those of bulls, but more slender. Accordingly, a plot was drawn of the distal breadth index ($Bd \times 100/GL$) against greatest length (GL) of all intact cattle metacarpals. The resulting scatter diagram can be seen in *illus 124*. One outlying point may indicate a bull and another a small cow, but the majority of the points are clustered together, probably indicating cows or castrates, with no obvious separation of the two. However, when the same data was illustrated in histogram form (*illus 125*), it is possible that a triphasic distribution may indeed be revealed, although this is still somewhat dubious. A further plot of cattle midshaft width index ($SD \times 100/GL$ against GL) was less conclusive than that for the distal breadth index (see *illus 126*).

CATTLE: NON-METRICAL TRAITS

Noddle (1983) has used the varying positions of the femoral foramen to build up skeletal profiles of both cattle and sheep (the foramen is the small aperture through which blood is supplied to the bone). In cattle this foramen most commonly occupies one of two positions: close to the supracondylar fossa (abbreviated as SF), or medial to this (DM). Occasionally it also occurs in the anterior proximal position (AP). Table 13 shows the numbers of cattle femora found with foramina in these positions. Apparently the lateral SF position is most common in all of the phases studied, except for Phase 21, for which only four specimens were available.

A further non-metrical variation which was observed in the Dunbar material was the presence or absence of a foramen near the anterior proximal end of cattle metacarpals and metatarsals. Bourdillon and Coy (1980, 91-2) do not consider this trait to be age dependent

and suggest it may be used to indicate the degree of homogeneity of a particular population. At Dunbar in the Northumbrian Phases 7-13, this foramen is absent from 20.8% of the metacarpals and 31.3% of the metatarsals, compared with 39% and 40% respectively at Saxon Hamwih (*ibid*). Although the sample size is small in some phases, metapodials in which the foramen is present outnumber those in which the foramen is absent, throughout the life of the site. Taken together with the evidence from the femoral foramen (as well as the relatively unvarying stature of the animals), there are grounds for suspecting that no great changes took place in the genetic pool of cattle between the Northumbrian period and the time of the 16th-century French fort.

SHEEP: SIZE

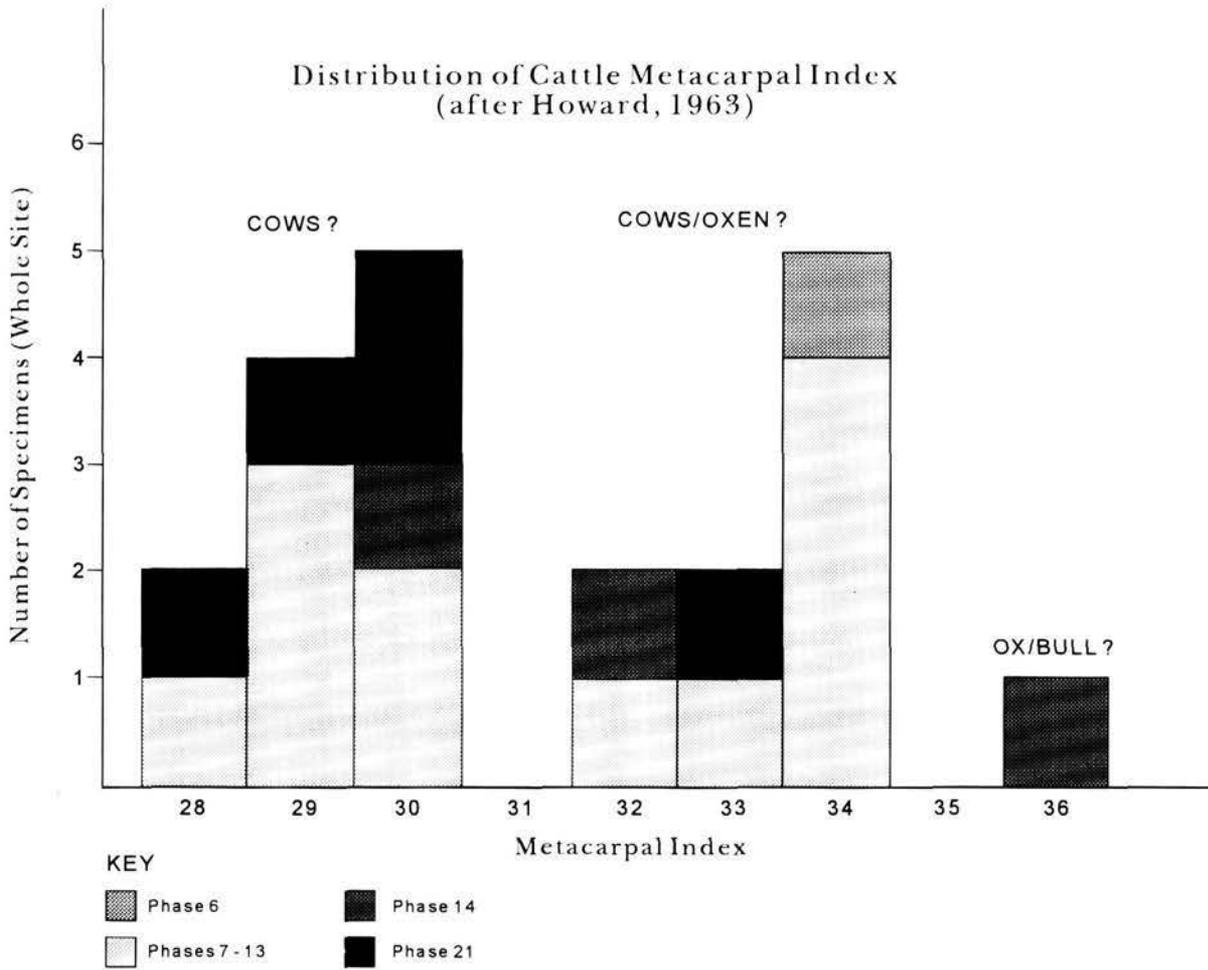
A summary of sheep size ranges is shown in Table 24b. (It is assumed that the majority of the bones are from sheep rather than goats.) Withers heights were calculated using Teichert's (1975) factors and are presented in Table 14. Unfortunately no intact sheep long bones survived in Phases 2-5. The mean withers height ranged from 55.4cm in Phases 7-13 to 61.0cm in Phase 6; a modern male Soay sheep used as a comparison had an estimated height of 59.0cm. Post-medieval sheep in Phase 22 showed a slight increase in mean withers height (60.8cm) over the previous phases, but were still smaller on average than the mean in Phase 6; however it should be remembered that only four withers heights could be estimated for Phase 6, compared with 29 in Phase 22. All of the post-medieval sheep heights (and indeed all of the Dunbar sheep of all phases) fell within the range of medieval sheep at 75-77 High Street, Perth, of 48.8cm-65.8cm (Hodgson 1980).

The Dunbar Northumbrian sheep were probably shorter than those found at Saxon West Stow, whose mean withers heights ranged from 61.7cm to 62cm (Crabtree 1990, 49). They were also probably shorter than Scottish Iron Age sheep at Crosskirk Broch

TABLE 12 GREATEST LENGTH (GLI) OF CATTLE ASTRAGALI FROM SITES OF COMPARABLE DATE

<i>Site and Data Source</i>	<i>Date</i>	<i>n</i>	<i>Range</i>	<i>Mean</i>
Exeter ¹	55-300	14	50.7-59.6	55.2
Howe, Orkney ⁵	Iron Age	102	47.0-65.0	56.6
Catcote ¹	Iron Age	14	51.0-63.0	57.0
Gussage all Saints ¹	Iron Age	54	54.0-62.0	57.0
Winnall Down ¹	Mid Iron Age	7	53.1-61.0	57.3
Croft Ambrey ¹	Iron Age	20	55.0-63.0	57.7
Balksbury 1973 ¹	Mid Iron Age	12	55.0-63.1	57.9
Appleford ¹	Iron Age	8	55.0-60.0	58.0
Winnall Down ¹	Early Iron Age	8	55.8-61.6	58.0
West Stow ²	Iron Age	8	53.9-61.3	58.0
Corstopitum ¹	Roman	9	53.0-63.0	58.0
Exeter ¹	300-400	18	54.3-62.0	58.3
Ashville ¹	Iron Age	18	53.0-64.0	58.5
Barley ¹	Iron Age	13	54.1-62.1	58.5
Crosskirk Broch ³	Iron Age	26	54.0-65.0	58.8
Vindolanda ⁴	AD90-4th century	76	53.0-77.0	59.2
Grimthorpe ¹	Early Iron Age	8	56.3-61.5	59.5
<u>Dunbar: Phase 14</u>	Medieval	5	55.5-62.5	59.5
<u>Dunbar: Phase 21</u>	French fort	24	55.0-67.8	59.9
West Stow ²	6th Century AD	61	53.6-67.2	60.1
West Stow ²	7th century AD	8	56.1-70.3	60.7
West Stow ²	Roman	4	59.7-63	60.8
Hamwih ¹	Mid Saxon	167	49.2-71.5	60.9
<u>Dunbar: Phase 6</u>	Iron Age - Northumbrian	23	56.0-66.0	60.8
West Stow ²	5th century AD	27	54.2-65.8	61.1
<u>Dunbar: Phases 7-13</u>	Northumbrian	74	53.0-70.0	61.2
Baylham House ¹	100-200	10	56.0-65.8	61.3
Alcester ¹	Late Roman	30	53.9-67.6	61.4
Shakenoak Farm ¹	Late Roman	44	53.0-72.0	61.6
Winnall Down ¹	Early Roman	16	56.1-68.4	61.6
Ramsbury ¹	Mid Saxon	6	51.5-66.5	61.9
<u>Dunbar: Phases 2-5</u>	Iron Age	3	57.5-69.5	64.0

Data sources: 1 Maltby 1981, 187
2 Crabtree 1990, 35
3 McCartney 1984, 145
4 Hodgson 1980
5 Smith 1994



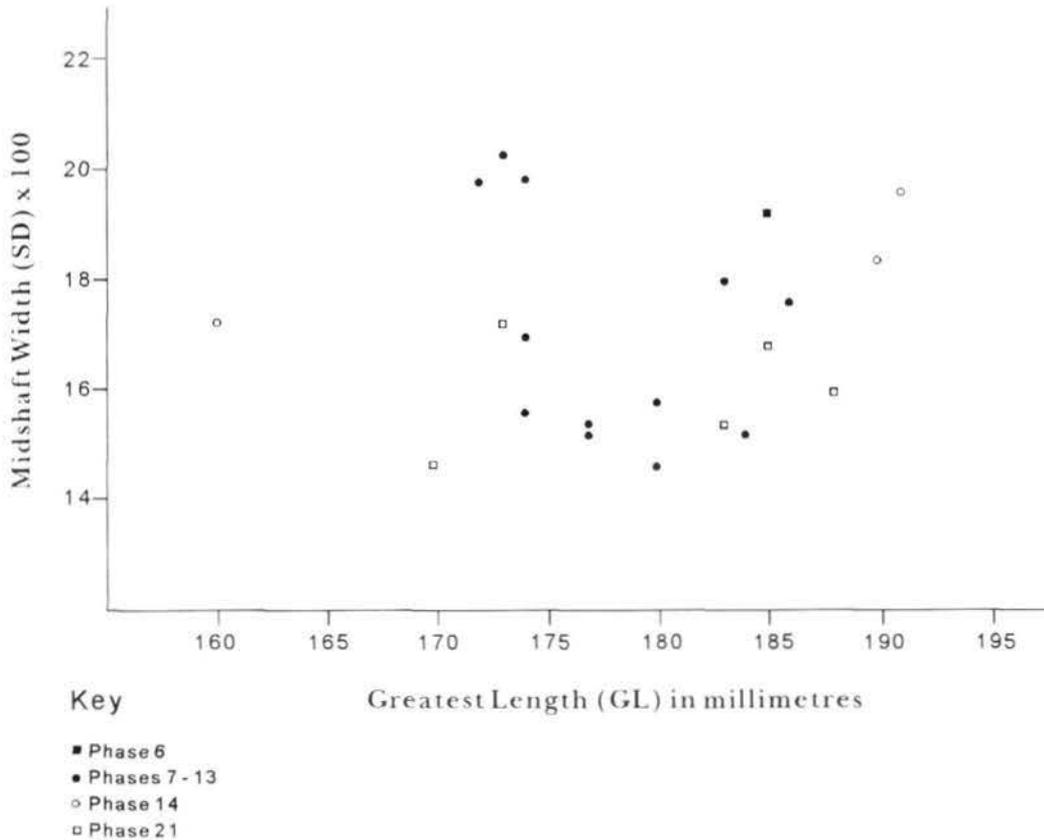
Illus 125
Distribution of cattle metacarpal index, after Howard (1963).

TABLE 13 SHOWING THE POSITION OF THE NUTRIENT FORAMEN IN CATTLE FEMORA (after Noddle 1983)

Position	Phase 6		Phases 7-13		Phase 14		Phase 21	
	n	%	n	%	n	%	n	%
SF	12	85.7	30	58.8	9	64.3	2	50.0
DM	1	7.1	19	37.3	5	35.7	2	50.0
AP	1	7.1	2	3.9				
Total	14		51		14		4	

Key
 SF = Near to supra-condylar fossa
 DM = Medial to SF position
 AP = Anterior proximal

Cattle Metacarpal Length versus Midshaft Metacarpal Index (after Howard, 1963)



Illus 126

Cattle metacarpal length versus midshaft metacarpal index, after Howard (1963).

(mean withers height 57.5cm; McCartney 1984, 140) and at Howe, Orkney (mean withers height 57.5cm; Smith 1994) but were less spindly-legged if, for example, the distal tibia breadth is considered. Table 15 lists distal breadths (Bd) of sheep tibiae of comparable date from sites throughout Britain. This particular measurement is chosen because it is one of the most commonly recorded (Maltby 1981, 189).

Again, the Dunbar sheep measurements were on average smaller than those at West Stow, but only by a very small margin and generally compare well with those from sites of Saxon date, such as Hamwih, presented by Maltby (*ibid.*, 190). What may be more significant is the apparent lack of change in distal tibia breadth from the earliest to the latest phases at Dunbar, the mean being 25.5mm in Iron Age Phases 2-5 compared with 25.3mm in the 16th century (Phase 21).

To summarize then, the Dunbar sheep stood at about the same height as the modern Soay, were slightly shorter but less gracile than their counterparts in the far north of Scotland, but were also slightly smaller than Saxon sheep in the south of England.

SHEEP: SEX

Working on the sheep bones from North Elmham, Noddle (1980, 396) found that ewes, wethers (castrated males) and rams of the same breed could be separated on the basis of the breadth of the distal tibia. Assuming that all the sheep at Dunbar were of the same breed, a histogram of distal tibia measurements (Bd) from Phases 7-13 was plotted (see illus 127). This distribution seemed to be as Noddle suggested, triphasic, or exhibiting three peaks, the middle mode representing a substantial number of wethers. A further method of separating the sexes was attempted using the scapula neck width index illustrated by Boessneck, Muller and Teichert (1964); see illus 128 which shows the distribution of sheep scapulae in Phases 6 and 7-13. The index ASG/SLC is plotted against SLC, where ASG is the distance between the junction of the scapula spine with the blade and the glenoid cavity and SLC is the smallest length of the scapula neck (von den Driesch 1976). Initially this method was used to try to distinguish between sheep and goats at Dunbar. However, the resulting scatter diagram, combined with evidence from metapodials and horn cores which implied that only a small number of goats was ever present, indicated the

TABLE 14 ESTIMATED SHEEP WITHERS HEIGHTS, CALCULATED USING TEICHERT'S (1975) FACTORS

Phase 6			
	n	Range (cm)	Mean (cm)
Radius	2	55.9-56.7	56.3
Metacarpal	2	61.6-69.7	65.6
Total	4	55.9-69.7	61.0
Phases 7-13			
	n	Range (cm)	Mean (cm)
Radius	9	55.3-60.7	58.5
Tibia	1	50.6	50.6
Metacarpal	4	51.3-58.2	56.0
Metatarsal	6	51.3-60.8	56.5
Total	20	50.6-60.8	55.4
Phase 14			
	n	Range (cm)	Mean (cm)
Radius	2	55.9-58.7	57.3
Metacarpal	1	58.2	58.2
Metatarsal	3	55.8-61.3	58.6
Total	6	55.8-61.3	58.0
Phase 21			
	n	Range (cm)	Mean (cm)
Radius	2	55.9-56.7	56.3
Metacarpal	1	55.3	55.3
Total	3	55.3-56.7	56.0
Phase 22			
	n	Range (cm)	Mean (cm)
Metacarpal	20	55.7-66.5	61.7
Metatarsal	9	53.6-64.9	59.8
Total	29	53.6-66.5	60.8
Soay sheep (modern specimen)			59.0

TABLE 15 DISTAL BREADTH (Bd) OF SHEEP TIBIAE FROM SITES OF COMPARABLE DATE (in millimetres)

Site	Date	n	Range	Mean
Howe, Orkney	Iron Age	67	21.0-27.0	23.4
Vindolanda	AD 90-4th century	6	22.0-27.0	24.0
Dunbar - Phase 21	French fort	14	23.0-27.0	25.3
Dunbar, Phase 6	Iron Age - Northumbrian	6	22.5-28.0	25.4
Dunbar, Phases 2-5	Iron Age	3	22.5-28.5	25.5
West Stow	Iron Age	13	17.9-25.6	25.6
West Stow	Roman	9	22.1-27.4	25.6
Hamwih	Mid Saxon	267	21.8-30.0	25.9
Dunbar, Phases 7-13	Northumbrian	85	23.0-29.0	25.9
Dunbar, Phase 14	Medieval	26	22.5-28.5	26.0
West Stow	6th century	96	22.8-29.5	26.0
West Stow	5th century	42	22.4-27.9	26.2
West Stow	7th century	9	23.9-29.0	26.1

TABLE 16 SHOWING THE POSITION OF THE NUTRIENT FORAMEN IN SHEEP/GOAT FEMORA (after Noddle 1983)

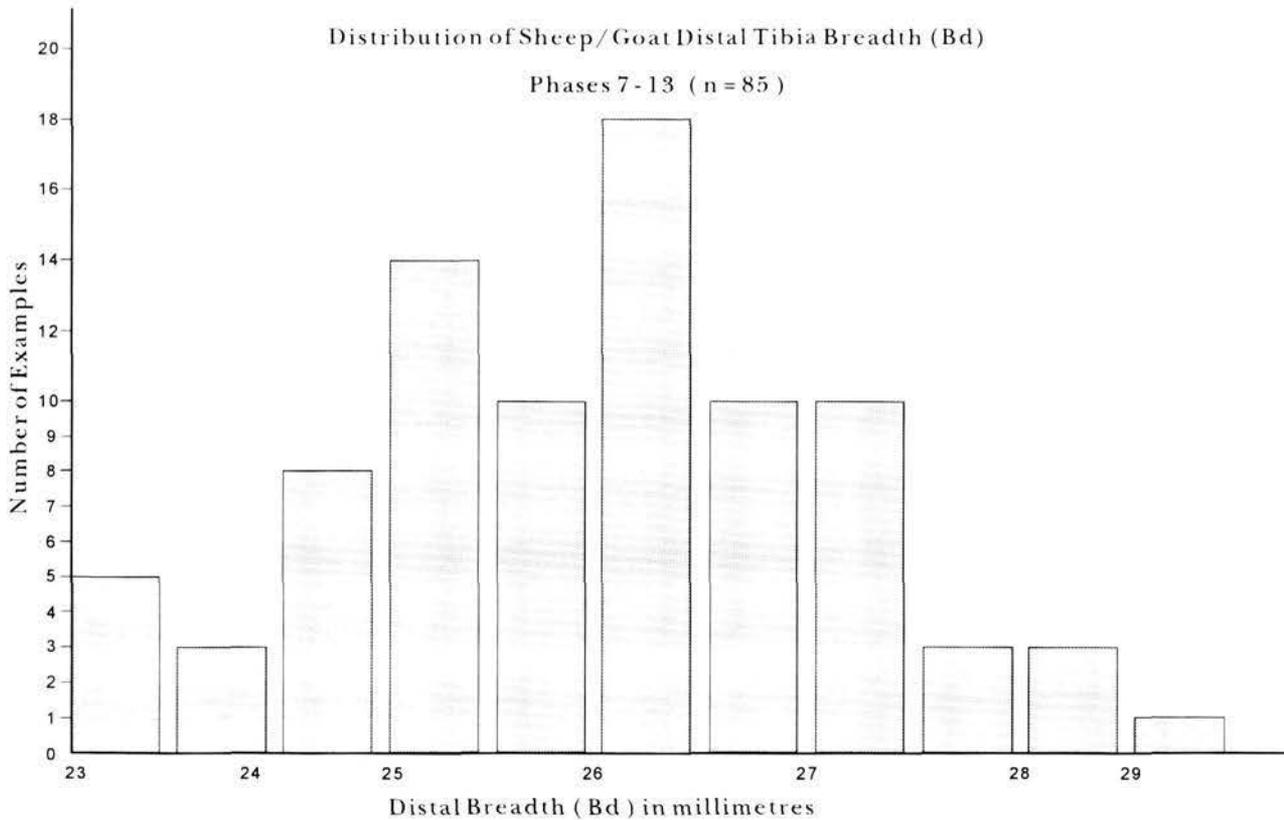
Position	Phases 2-5		Phase 6		Phases 7-13		Phase 14		Phase 21	
	n	%	n	%	n	%	n	%	n	%
AP			1	33.3	18	40.9			6	66.7
PM	2	100	2	66.7	13	29.5	2	50.0	1	11.1
PD					10	22.7	1	25.0	2	22.2
AP and PM					2	4.5				
AP and PD							1	25.0		
PM and PD					1	2.3				
Total	2		3		44		4		9	

Key AP = Anterior proximal
 PM = Posterior midshaft
 PD = Posterior distal

possibility that the scapula distribution was also trimodal for sheep alone, again revealing the presence of wethers in substantial numbers. The sheep populations at North Elmham, West Stow (Crabtree 1990, 51) and Hamwih (Bourdillon & Coy 1980, 110) apparently also contained more wethers and rams than ewes, indicating the relative importance of wool production at sites of Saxon date.

SHEEP: NON-METRICAL TRAITS

As with cattle, the nutrient foramen of the femur can vary in position and has been investigated by Noddle (1983). Table 16 shows the positions of Dunbar sheep foramina. The foramen was found in either the anterior proximal position (AP) the posterior midshaft position (PM), the posterior distal position (PD) or



Illus 127
Distribution of sheep/goat distal tibia breadth (Bd) in Phases 7-13.

occasionally a combination of two of these positions. At Dunbar, the anterior proximal position seems to predominate in Phases 7-13 (40.9%) and Phase 21 (66.7%), but in the other phases the evidence, based on small sample numbers, is inconclusive. However as with the size evidence, a lack of change between the Northumbrian and French fort periods is strongly suggested.

PIGS: SIZE

A summary of pig sizes is given in Table 24c. Few measurable pig bones were present, either because of butchery or of immaturity of the specimens. However, one complete tibia from Phases 7-13 with a greatest length of 190mm was estimated to have a withers

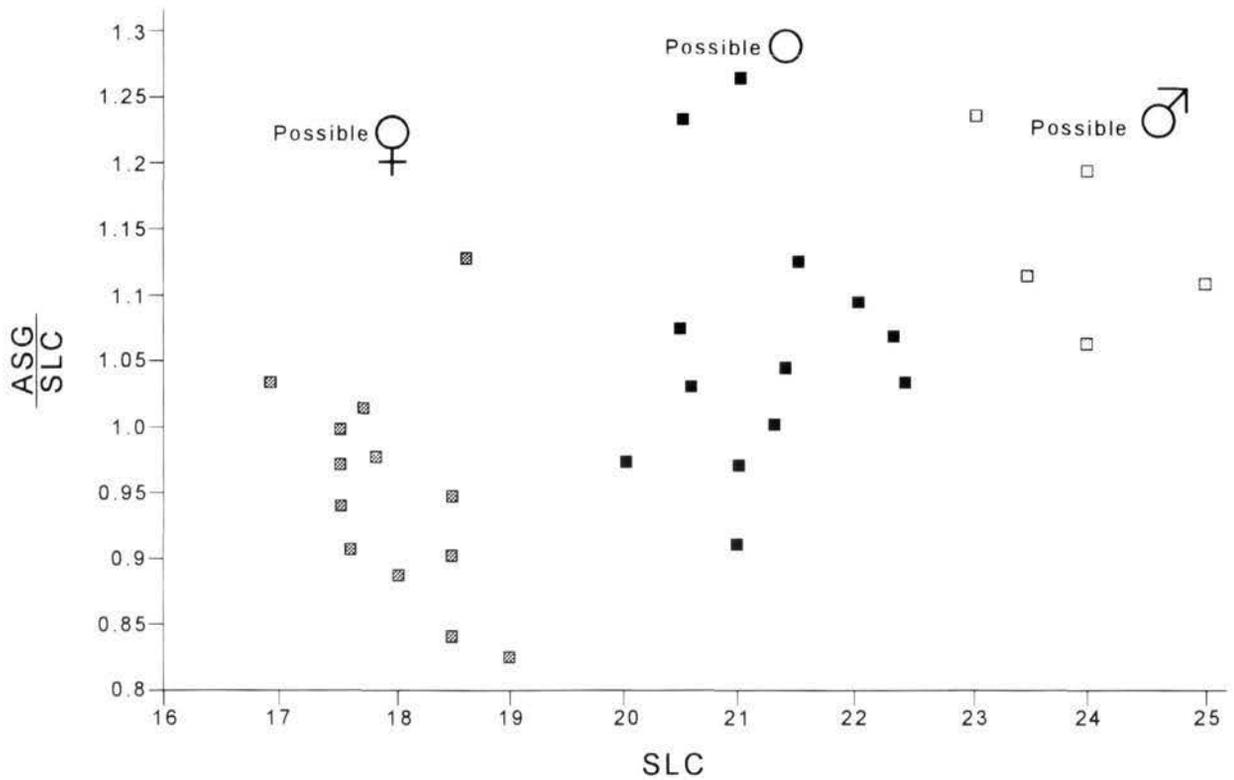
height of 74.5cm (after von den Driesch & Boessneck 1974). This falls within the range of 63.2cm-77.8cm, mean value 71.5cm, also calculated on the tibia from Saxon Hamwih (Bourdillon & Coy 1980, quoted in Prummel 1983, 215). By comparison a complete Iron Age pig from Howe, Orkney, was substantially smaller than the Dunbar specimen, standing at c 64.7cm.

Complete astragali and calcanei also provided withers heights estimates, although these are probably less reliable than estimates based on other, longer bones. These are shown in Table 17 and include some smaller animals in Phases 7-13 (withers height 55.5cm) as well as a very large example in Phase 14 (withers height 88.6cm) which may well have come from a wild boar.

**TABLE 17 ESTIMATED PIG WITHERS HEIGHTS (in centimetres)
BASED ON THE TIBIA, ASTRAGALUS AND CALCANEUM
(after von den Driesch and Boessneck 1974)**

Phase	Withers height based on:					
	Tibia	n	Astragalus	n	Calcaneum	n
2-5	74.5	1	69.8	1		
6			72.5-73.4	2		
7-13			55.5-76.1	8	72.9	1
14			70.7-88.6	5		
21			53.7-66.2	2	69.1	1

Sheep/Goat Scapula Neck Width Index,
Phases 6 - 13,
(after Boessneck, Muller & Teichert, 1964)



ASG - Distance between Distal End of Spine & Glenoid Cavity
SLC - Smallest Length of Scapula Neck

Illus 128

Sheep/goat scapula neck width index, Phases 6-13, after Boessneck, Muller & Teichert (1964).

Comparisons with Hamwih withers heights calculated on the astragalus and calcaneum show that pigs of from 56cm-82.8 cm height were present there (*ibid*); similar calculations for Iron Age Howe give a height range of 51.9cm-73.4cm.

Contemporary continental pigs from Dorestad and Haithabu (Prummel 1983, 215-6) were of comparable stature to those at Dunbar, having withers heights calculated from the astragalus of 62.1cm-73.4cm and 58.9cm-60.2cm respectively.

It would seem that the Northumbrian pigs from Dunbar were more similar in stature to those at Saxon Hamwih and West Stow (Crabtree 1990, 51) than to the small Iron Age animals on Orkney, and were probably also more robust than the latter.

However, smaller animals were present at Dunbar in the 16th century (Phase 21) (withers height range 53.7cm-66.2cm). These may be compared with pigs at the lower end of the range for Scottish medieval animals at Perth, that is, 55.5cm-82.3cm calculated from the astragalus (Hodgson 1980).

HORSES

Measurement summaries of horse bones are shown in Table 24d. Because of the extensive butchery of horse bones, very few survived intact from which to calculate withers heights. However, one metacarpal in Phase 6 (L1 = 214mm) probably came from an

animal of approximately 131.4cm at the withers, estimated using Kieswalter's factors (quoted in Ambros & Muller 1980, 30). This corresponds to about 13 hands height. A further metacarpal from Phases 7-13 (L1 = 200mm) gave a withers height of 128.2 cm or approximately 12:3 hands, while a metatarsal from Phase 14 (L1 = 263mm) came from an animal of about 140.2cm or 13:3 hands. As all of these early horses are below the standard height of 14:2 hands (c 146.3cm), they can thus be considered to be ponies. At West Stow, horses were of a similarly small size, being approximately 13 hands high (as were those at Hamwih), and were likened to the New Forest pony (Crabtree 1990, 62).

One larger animal, however, was found in medieval Phase 19. A metacarpal (L1 = 270mm) gave an estimated withers height of 173.1cm, or approximately 17 hands height. This horse was, therefore, larger than all those found at medieval urban sites throughout Scotland where only ponies of similar stature to those at Iron Age and Northumbrian Dunbar have so far been found (Smith, Scottish Urban Archaeological Trust archive report).

DOGS

Very few dog bones were present at the site, and even fewer were found intact. A tibia from Phase 2, whose greatest length was estimated at 165mm, probably came from a dog of 49.1cm shoulder height (based on Harcourt's 1974 factors). Harcourt found that the range of shoulder heights of Iron Age dogs was

29cm-58cm, so the Phase 2 animal is in the upper part of this range. A Scottish Iron Age dog from Howe was probably about the same size as that from Dunbar, having a shoulder height of 52cm based on the ulna.

One other intact canine bone came from Phase 14; this was a femur, GL = 201mm, which gave an estimated shoulder height of 61.8cm. Again this falls within the upper part of Harcourt's range of 23cm-71cm for dogs of 5th/6th-century date. A medieval dog from Phase 19 was estimated to have stood at 56cm at the shoulder, based on the radius.

CATS

Measurable cat bones were few and far between. All that could be said is that they would not be out of place in a medieval domestic population.

DOMESTIC FOWL

Sizes of domestic fowl bones are summarized in Table 24g. Comparison with the middle and late Saxon chicken bones from North Elmham (Bramwell 1980, 410) revealed that the Phase 7-13 fowls generally fell within the lower part of the range. Bramwell (*ibid.*, 41) suggested that there were 'some small bantam-like specimens and more of a slightly larger variety' at North Elmham. The Dunbar Phase 7-13 birds would probably have been of a similar bantam type, in other words, approximately a quarter of the size of modern large breeds (Silk 1974, 1).

Sizes of birds from medieval Phase 15 onwards all fell within the range of bones from medieval 75 High Street, Perth (Smith & Clarke, forthcoming), except for two bones, a humerus from Phases 15-20 and a radius from Phase 21 which were both longer by approximately 3mm, and a tarso-metatarsus from Phase 18 which was shorter at 48.75mm, as opposed to 56mm at Perth. This last example was presumably similar to the bantam sized birds in the Northumbrian period.

AGE OF ANIMALS AT DEATH

CATTLE

To understand the pattern of livestock husbandry at Dunbar, it is necessary to try to judge the age of the animals at slaughter. The most satisfactory results are achieved by assessing the degree of tooth eruption and wear of the mandibular cheek teeth. This was duly done for the Dunbar mandibles, according to Grant's (1982) scheme. However, because most of the mandibles, being of a large size, were heavily butchered or fragmentary, teeth were often missing or chopped through the crowns, obliterating the wear pattern. Thus in many cases wear stages either had to be estimated or disregarded if the wear stage interval was too large. In order to compensate for this, the mandibles were grouped into age categories, thus:

Age	Dental characteristics	Approximate MWS
J	deciduous dentition	1-4/5
J/I	1st molar erupted	6-14/15
I/A	2nd molar erupted	16-28
A	3rd molar erupted	29/30-38
A+	3rd pillar (5th cusp) of M3 in wear	38 onwards

RED AND ROE DEER

Summaries of red and roe deer measurements are shown in Tables 24h and 24i. Unfortunately few red deer measurements were available, as were comparanda from other sites. Noddle (1982) has, however reviewed the evidence from British sites from the Mesolithic period to the present day; the red deer from Dunbar are found to be either similar in size to those of like date, such as from Iona and Hereford, or are in some instances larger than those published. In general, they are also larger than those found on Iron Age Orkney (Smith 1994). A cervine radius from Phase 6, with a greatest length of 323mm, is extremely large, exceeding for example one of the previously largest published radii from Roman Corstopitum (GI = 317mm; Meek & Gray 1911, 120). The radius of a modern four and a half year old Northumbrian animal used as a comparison measured only a paltry 233mm.

The evidence from the bones of red deer would seem to indicate that human pressure in the local environment had not risen to such a level as to cause the size reduction (and partial extinction) seen in Britain in the period between post-medieval and modern times. Although red deer antlers (present only in the male) were found at Dunbar, most were in the form of worked offcuts and so could not provide anatomical measurements. However, they appeared to be large and well formed, and similar in size to those at Scottish medieval sites. No skull fragments from females were recognized.

Bones of roe deer were few; those which were available however, were found to be a few millimetres larger than the Scottish adult male roe used for comparison. The Dunbar roe also fell within the size ranges for Mesolithic animals recorded at Star Carr (Legge & Rowley-Conwy 1988, 136-8). Presumably the reduction in body size in British red deer with time is not seen to the same extent in roe deer.

Numbers of cattle mandibles and long bones in each age category and phase are shown in Table 19.

Epiphyseal fusion evidence from long bones is generally regarded as being much less reliable than that from tooth wear due to the greater variability in the dates at which the various bones fuse and become mature. However, since in some of the phases intact mandibles were not plentiful, long bones were assessed as to their state of epiphyseal fusion and placed in age categories corresponding with those for the mandibles, according to the following scheme based on Silver's (1963) fusion dates.

In Phases 2-5, mandibles were few (n = 4) and the bias was towards the juvenile or juvenile/immature age groups, while the epiphyseal data indicates that many more older animals were present (Table 19). However, although a few neonatal or foetal bones were present, no mandibles from such very young animals were found. This may be because very young jaws tend to disintegrate and lose teeth more easily than older ones.

In Phase 6 there was good agreement between the results based on teeth compared with long bones, as regards the numbers in the

TABLE 18 KEY TO AGE CATEGORIES BASED ON EPIPHYSEAL FUSION OF LONG BONES (after Silver 1963)

DATE OF FUSION	BONE	AGE CATEGORY	
		UNFUSED	FUSED
Early	Scapula	J	I/A
Late	Humerus (proximal)	J/I	A
Early	Humerus (distal)	J/I	I/A
Early	Radius (proximal)	J/I	I/A
Late	Radius (distal)	J/I	A
Late	Ulna (proximal)	J/I	A
Late	Ulna (distal)	J/I	A
Intermediate	Metacarpal (distal)	J/I	A
Late	Femur (proximal)	J/I	A
Late	Femur (distal)	J/I	A
Late	Tibia (proximal)	J/I	A
Intermediate	Tibia (femur)	J/I	A
Late	Calcaneum	J/I	A
Intermediate	Metatarsal (distal)	J/I	A
Early	1st Phalange	J/I	I/A
Early	2nd Phalange	J/I	I/A

Notes

Early, late and intermediate dates of fusion are based on data given by Silver (1963, 252-3) for cattle, sheep and pig.

J = Juvenile

I = Immature

A = Adult

F = Foetal: this category was used when both epiphyses of a long bone were unfused and the diaphysis was obviously small

younger age groups (26.7% of mandibles were in the J or J/I categories, compared with 24.7% for bones). However, the mandible distribution was more skewed towards older adults than was the bone evidence. This difference may be more apparent than real, one of the drawbacks of using such an aging system being that once a bone which fuses at an early age has become fused, one can only describe it as immature *or* adult; in reality it could be either. Certainly in the case of the Phase 6 cattle, the majority of the animals were grouped in the I/A, A or A+ age classes on the basis of both jaws (66.6%) and long bones (75.1%) indicating that either most animals in Phase 6 had a good chance of surviving to maturity or that bones of young animals were so poorly preserved that they were lost to the archaeological record.

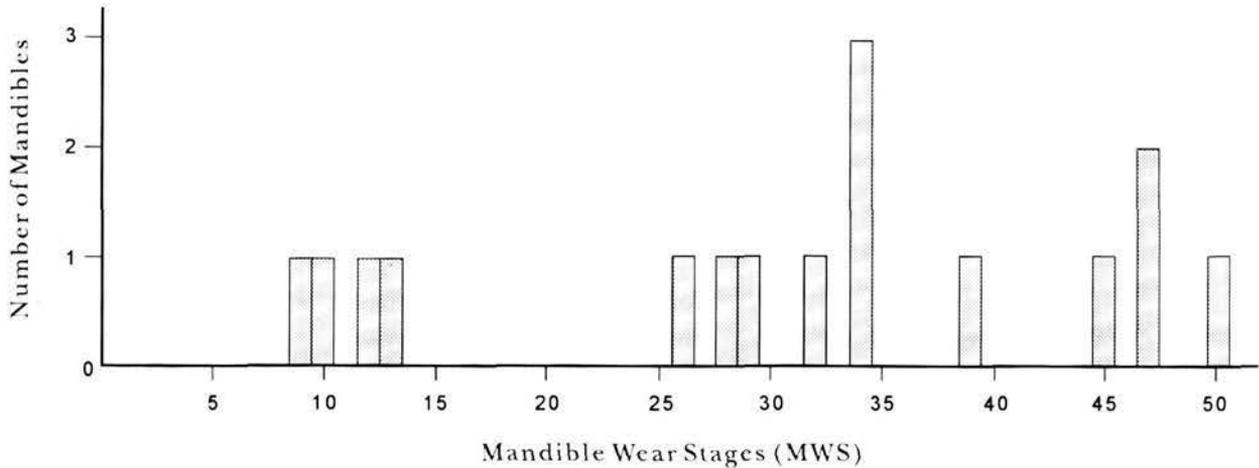
In Phases 7-13, as in the previous phases, young mandibles seem to be under-represented, although foetal or neonatal bones were present in small quantities. However, there is better general agreement for the older age groups, with tooth wear evidence showing that some old adults were present. A diagrammatic representation of distribution of mandible wear stages is shown in illus 129, although only a few jaws were complete enough to be included.

Long bones from medieval Phases 15-20 were not examined for epiphyseal fusion evidence, but mandibles were assessed. There was probably an increase in the proportions of younger animals when compared with the Northumbrian period, possibly evidence of a change in preference for younger, more tender meat, although as the sample number was fairly small (n = 18) there may be an element of bias.

Only eight mandibles were present in Phase 21, but half of these were from old animals. Long bone evidence agreed with this finding, older animals being present in similar proportions to those in the Northumbrian period. Thus although there were some fluctuations in Phase 14 (where more young animals were found than in the previous periods), throughout the life of the site, older cattle appeared to have been far more numerous than younger ones. This indicates that there was no shortage of winter fodder and that husbandry practices were sufficiently skilled to allow most of the cattle to survive several winters without having to resort to a mass autumn slaughter of beasts.

Cattle Mandible Wear Stages, Phases 7-13 (after Grant, 1982)

n = 16



Illus 129
Mandible wear stages for cattle in Phases 7-13, after Grant (1982).

SHEEP/GOAT

Two systems were used to age the sheep/goat mandibles, that of Payne (1973) and Grant (1982). Results obtained from these two systems were not always consistent; this was probably because estimates of the mandible wear stage (Grant's MWS) ranging over an interval greater than three tooth wear stages (twos) are not suitable for inclusion in a histogram, whereas Payne's system uses a smaller number of age stages in which estimates can more easily be included. Thus in Phases 7-13, 143 mandibles could be aged by Payne's method, while only 85 were suitable for inclusion in Grant's.

Culling patterns derived from mandibular evidence for the different phases are presented in illus 130-139 (except for Phases 2-5) while epiphyseal fusion data are shown in Table 20. Only a small number of mandibles was found in Phases 2-5 ($n = 7$); these consisted of one from an animal at Payne's stage C/D (between six months to two years in modern terms), three at stage E (two to three years), and one at stage F (four to six years). Epiphyseal fusion evidence indicates that 18.3% of the long bones were from foetal/neonatal or juvenile animals, a far higher proportion than from cattle in the same period.

A larger sample of mandibles ($n = 16$) in Phase 6 allowed a culling diagram to be drawn (illus 130). Peaks occurred at stage C (six months to one year) and at stage E (two to three years) while some animals survived to between six and eight years. Presumably these were breeding ewes, and wethers kept for their wool. Epiphyseal fusion evidence for Phase 6 broadly agrees with this cull pattern. As in Phases 2-5, more young sheep than cattle were killed.

In Phases 7-13, where the correlation between mandibular and epiphyseal fusion evidence was reasonably good, the sample number of mandibles was much larger. Nearly 35% of the sheep were under two years of age when killed (up to and including Payne's stage D). Those killed between the ages of two to six months (stages B and C) were probably lambs slaughtered before their first winter; killing such young lambs before weaning would have allowed the ewes' milk to be collected for human use (illus 131). Comparing the Phase 7-13 MWS diagram (illus 138) with those from Anglo-Saxon West Stow (Crabtree 1990, 84) shows

that many more lambs survived at Dunbar. Although older animals were found at West Stow, they appear to have been more numerous at Dunbar, where some sheep probably lived until the advanced age of 10 years. This demonstrates the continuing importance of wool in the Northumbrian period. Finds of loomweights, spindle whorls and bone weaving tools suggest that wool from local sheep was indeed spun and woven on site.

In Phase 14, rather more young sheep were killed than in Phases 7-13, 43.2% dying before the age of two years (illus 132). Epiphyseal evidence for Phase 14 is rather at odds with that from the mandibles, but still indicates that a substantial number of young animals died (18% in the J and J/I long bone categories). Again, the MWS diagram differs from that at West Stow, in that many more old animals died at Dunbar (illus 139).

In the medieval Phases 15-16 and 17-18 the cull of lambs up to the age of two years was 26.7% and 31.3 % respectively, which is rather lower than the rate in Phase 14 (illus 133, 134); however in Phases 19-20 it rose to 42.9% (illus 135), with a further peak between three to four years (stage E). By Phase 21 the percentage killed by the age of two years fell to 24%, perhaps reflecting the different requirements of the occupants of the French fort (illus 136). More sheep, however, died between the ages of three to four years (stage F). These may have been cast ewes no longer capable of breeding, or wethers killed for a more strongly flavoured (and possibly fatter) mutton than that produced by younger lambs. In the post-medieval period (Phases 22-23) a similar number of young animals were killed to that in Phase 21 (24%), and in fact the cull pattern in Phase 21 was strikingly similar to that in Phases 22-23 (illus 137).

In all phases from the early medieval period onwards, older animals were present in substantial numbers, suggesting that wool was of continuing importance in the economy of the site.

PIG

Pig mandibles were assessed using Grant's (1982) wear stages, but, as there was a high degree of butchery of the jaws, this often had to be estimated and thus did not fall within a MWS range small enough to be suitable for inclusion in a diagrammatic

TABLE 19 NUMBERS OF CATTLE MANDIBLES AND LONG BONES IN EACH AGE CATEGORY, BY PHASE

Phase 2-5

Age Category	Mandibles		Long bones	
	n	%	n	%
F			1	0.9
J	2	50.0	7	6.0
J/I	1	25.0	23	19.7
I/A			52	44.4
A	1	25.0	34	29.1
Total	4	100.0	117	100.1

Phase 6

Age Category	Mandibles		Long bones	
	n	%	n	%
J			13	3.6
J/I	4	26.7	76	21.1
I	1	6.7	1	0.3
I/A	2	13.3	148	41.0
A	2	13.3	123	34.1
A+	3	20.0		
A/A+	3	20.0		
Total	15	100.0	361	100.1

Phases 7-13

Age Category	Mandibles		Long bones	
	n	%	n	%
F			3	0.2
J			29	1.9
J/I	6	18.2	382	25.0
I			16	1.0
I/A	2	6.1	732	48.0
A	11	33.3	363	23.8
A+	10	30.3		
A/A+	4	12.1		
Total	33	100.0	1525	99.9

TABLE 19 (continued)**Phase 14**

Age Category	Mandibles		Long bones	
	n	%	n	%
J	3	21.4	10	3.8
J/I	1	7.1	51	19.5
I			3	1.1
I/A	3	21.4	136	51.9
A	5	35.7	62	23.7
A+	1	7.1		
A/A+	1	7.1		
Total	14	99.8	262	100.0

Phases 15-20

Age Category	Mandibles	
	n	%
J	7	38.9
J/I	2	11.1
I/A	4	22.2
A	3	16.7
A+	2	11.1
Total	18	100.0

Phase 21

Age Category	Mandibles		Long bones	
	n	%	n	%
J			2	0.5
J/I	1	12.5	120	28.4
I			7	1.7
I/A	2	25.0	174	41.2
A	1	12.5	119	28.2
A+	4	50.0		
Total	8	100.0	422	100.0

TABLE 20 NUMBERS OF SHEEP/GOAT LONG BONES IN EACH AGE CATEGORY, BY PHASE**Phases 2-5**

Age Category	Long Bones	
	n	%
F	6	12.2
J	3	6.1
J/I	11	22.4
I	1	2.0
I/A	19	38.8
A	9	18.4
Total	49	99.9

Phase 6

Age Category	Long Bones	
	n	%
F	5	4.6
J	8	7.3
J/I	24	22.0
I	1	0.9
I/A	36	33.0
A	35	32.1
Total	109	99.9

Phases 7-13

Age Category	Long Bones	
	n	%
F	1	0.1
J	43	5.7
J/I	142	18.7
I	21	2.8
I/A	295	38.8
A	259	34.0
Total	761	100.1

TABLE 20 (continued)

Phase 14

Age Category	Long Bones	
	n	%
F		
J	9	5.4
J/I	21	12.6
I	3	1.8
I/A	70	41.9
A	64	38.3
Total	167	100.0

Phase 21

Age Category	Long Bones	
	n	%
F	1	0.5
J	13	5.8
J/I	47	21.1
I	5	2.2
I/A	78	35.0
A	79	35.4
Total	223	100.0

representation. A further scale of ages at death using Habermehl's data for late maturing modern pigs (quoted in Bull & Payne 1982, 56) was devised:

Dental characteristics	Approx age	Age stage
Deciduous dentition only, molars unerupted	<c 8 months	A
M ₁ erupted, M ₂ unerupted	c 8-13 months	B
M ₂ erupted, M ₃ unerupted	c 13-20 months	C
M ₃ erupted	c 20 months and over	D

Table 21 presents the age stages for pig mandibles by phase. Mandibular evidence shows that well matured animals (over the age of 20 months) were killed in all phases, as well as young piglets. Epiphyseal fusion evidence, however, does not correlate well with that from mandibles, indicating as it does that many younger animals, including a small proportion of neonates, were present (see Table 22). The mandibles of piglets are thus probably under-represented, perhaps because of their fragility. The long bones of older pigs are present, but not in the same proportions as mandibles of older animals. This may be related to the greater durability of older mandibles compared with young ones. Because of the discrepancies between the two strands of evidence, it is difficult to identify any differences in pig husbandry with time; however there may be a trend towards culling more immature animals in post-medieval Phases 22 and 23 than in earlier periods.

It is also difficult to determine whether pigs were mainly allowed to roam free in search of food as opposed to being kept in sties. The culling of some very young animals implies a degree of control over the herd which would have been made easier if at least some of the breeding sows were enclosed in sties.

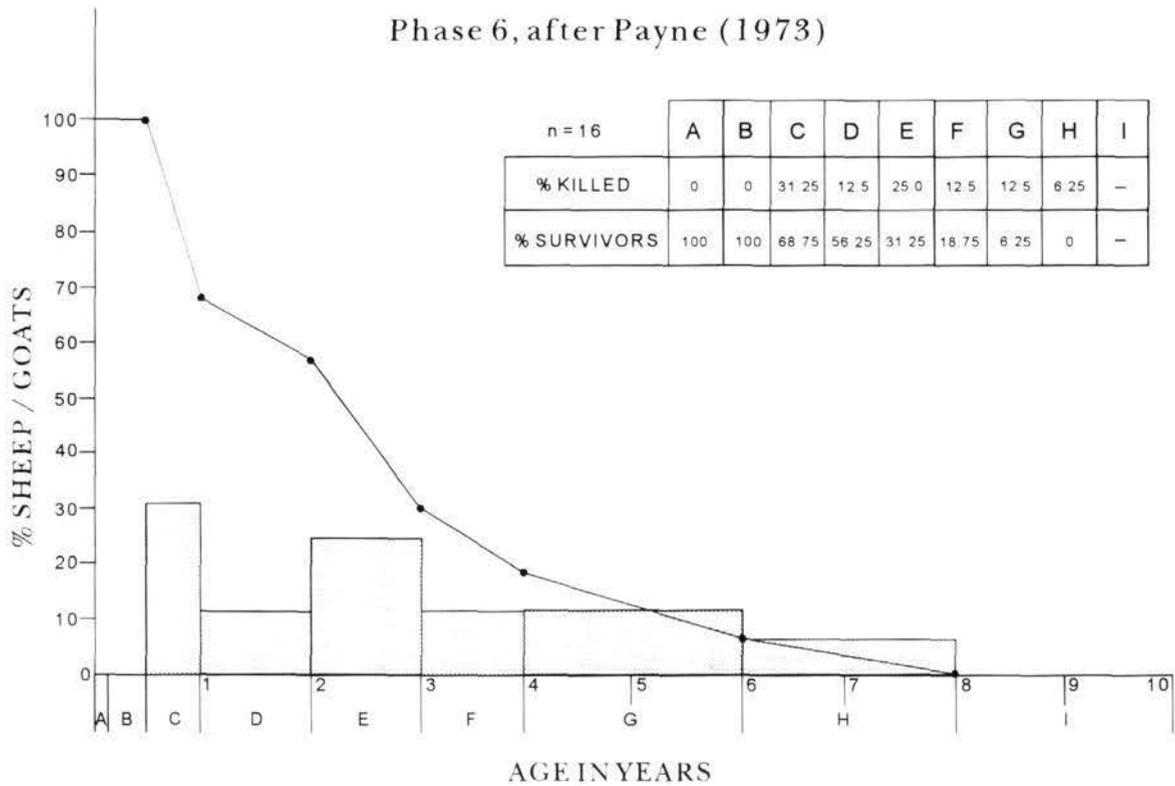
The substantial numbers of mature animals may represent the female breeding stock. As pigs are raised only for their meat and fat, there is little advantage (apart from dung production) in wasting feed on them after they have reached an optimum size if they are not to be kept for breeding purposes. Perhaps the reason for allowing some of the pigs to live on past adolescence was as much a matter of expediency as of taste for a stronger flavoured meat since animals allowed to roam freely in search of pannage cannot have been easy to round up and kill.

HORSE

Evidence from three mandibles in Phases 7-13 assessed on Silver's 1963 (257-60) criteria indicates that one animal died between the ages of three and four years (Phase 9), one between four and four and a half years (Phase 13) and one between four to five years (Phase 8). Further evidence of young animals dying or being killed was provided by long bones in Phases 7-13 with unfused epiphyses: of seven distal radius fragments, three were unfused, or 42.9%. Silver (*ibid*, 252-3) lists this bone as fusing at about three and a half years, thus these animals were probably less than this age at death. Similarly, two out of six distal tibiae, which fuse at

Dunbar Sheep / Goat Culling Pattern

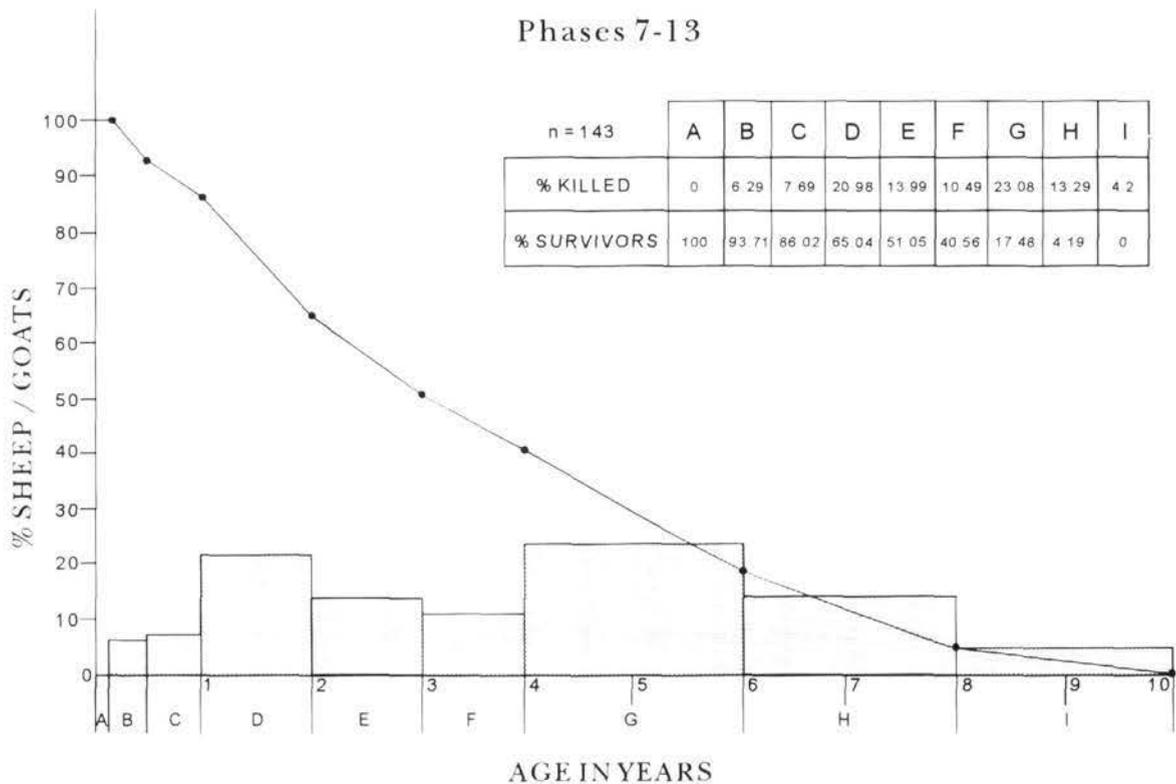
Phase 6, after Payne (1973)



Illus 130
Sheep/goat culling pattern, Phase 6, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

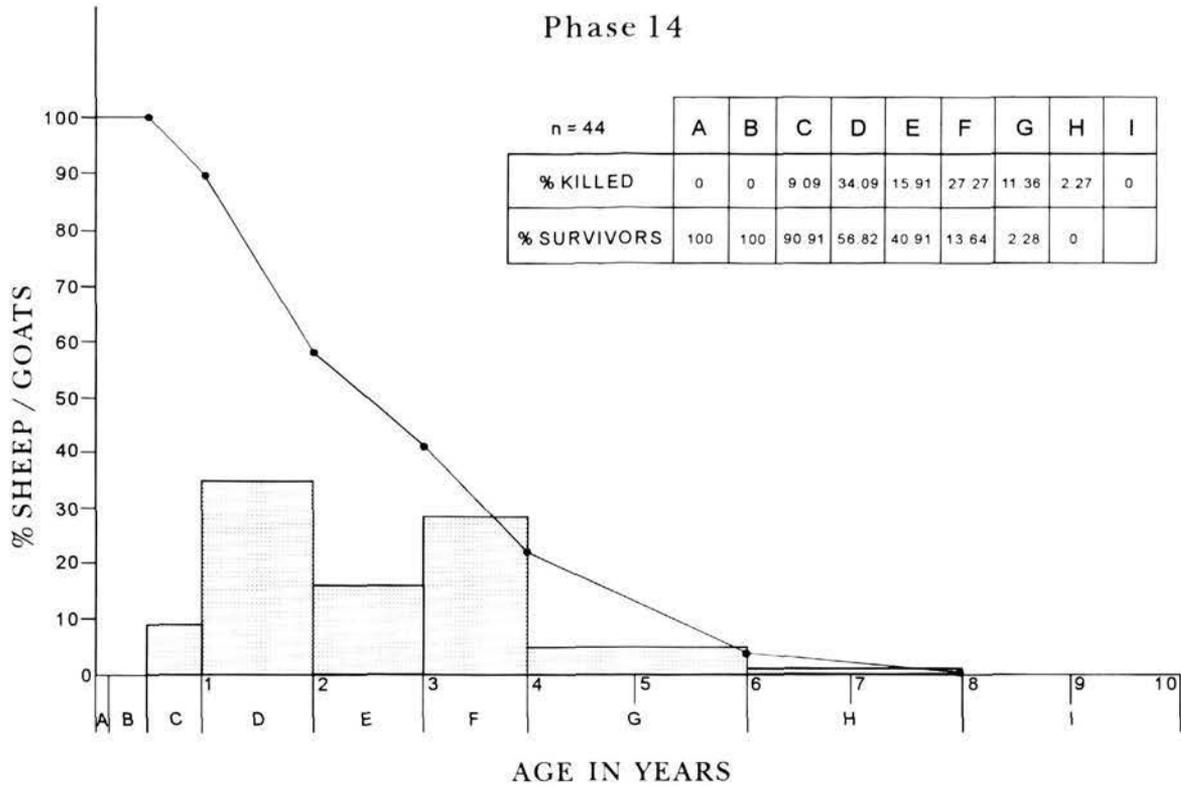
Phases 7-13



Illus 131
Sheep/goat culling pattern, Phases 7-13, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

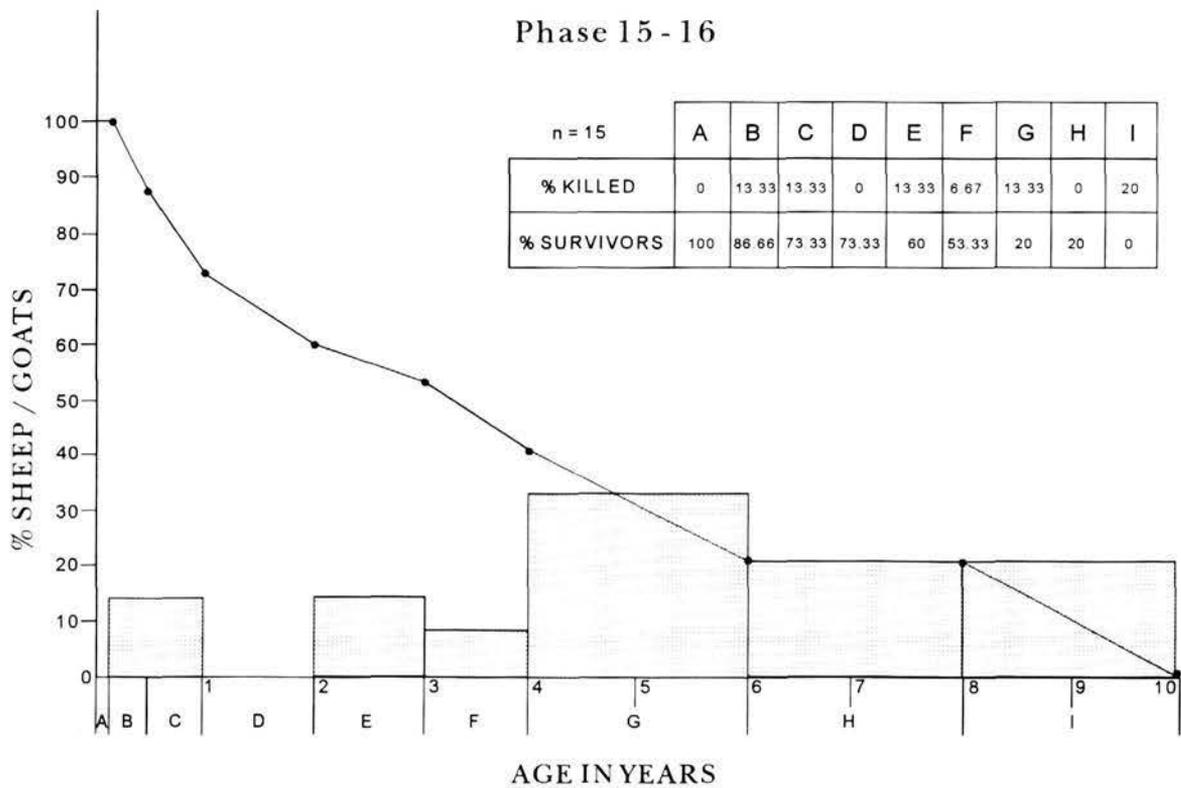
Phase 14



Illus 132
Sheep/goat culling pattern, Phase 14, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

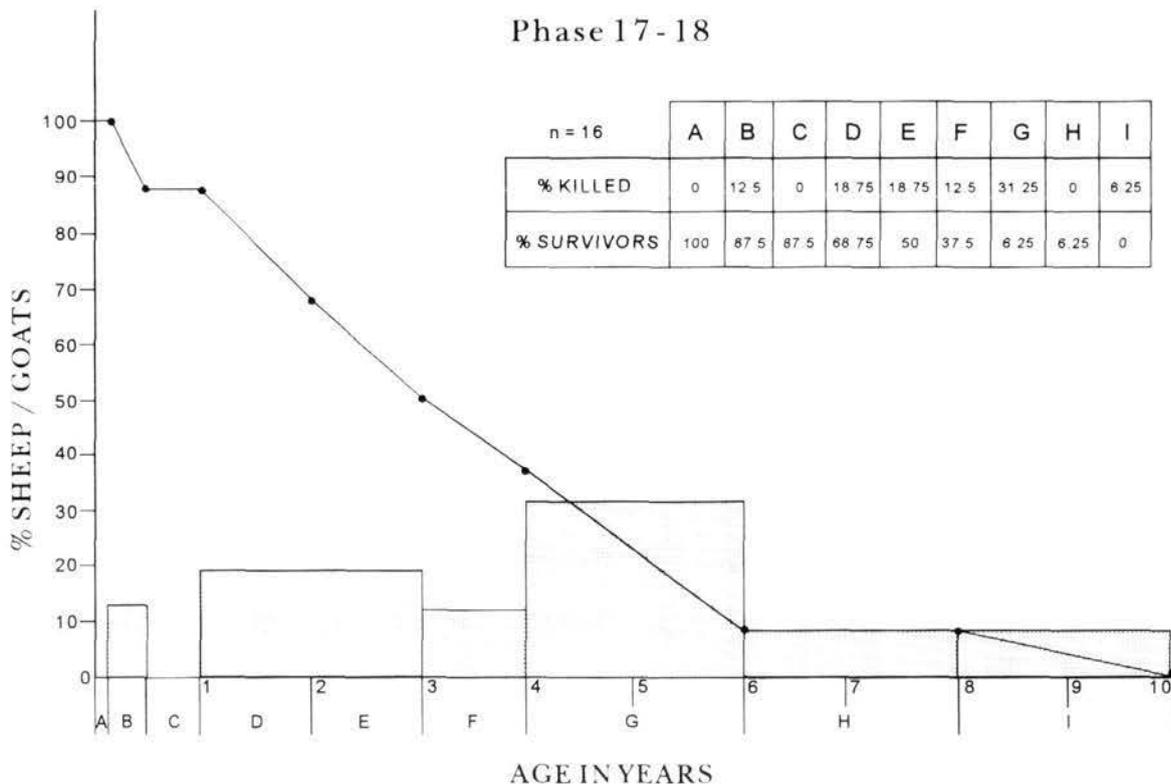
Phase 15 - 16



Illus 133
Sheep/goat culling pattern, Phases 15-16, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

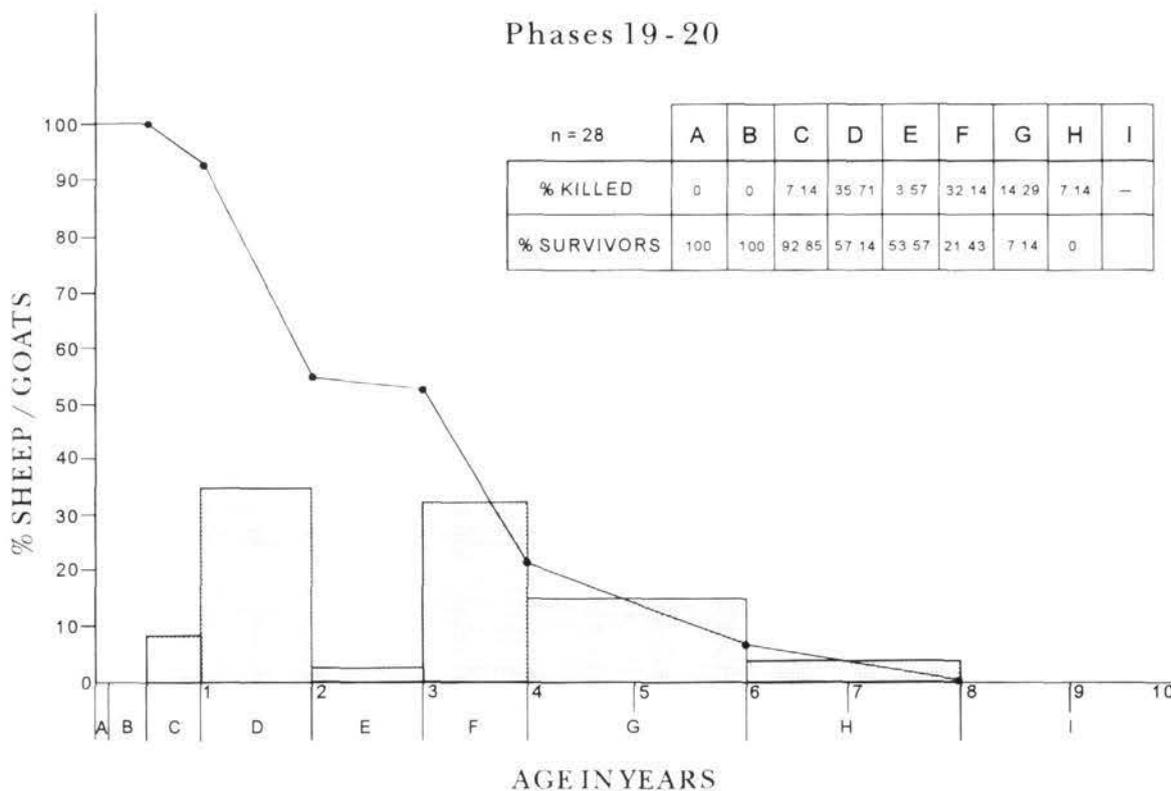
Phase 17-18



Illus 134
Sheep/goat culling pattern, Phases 17-18, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

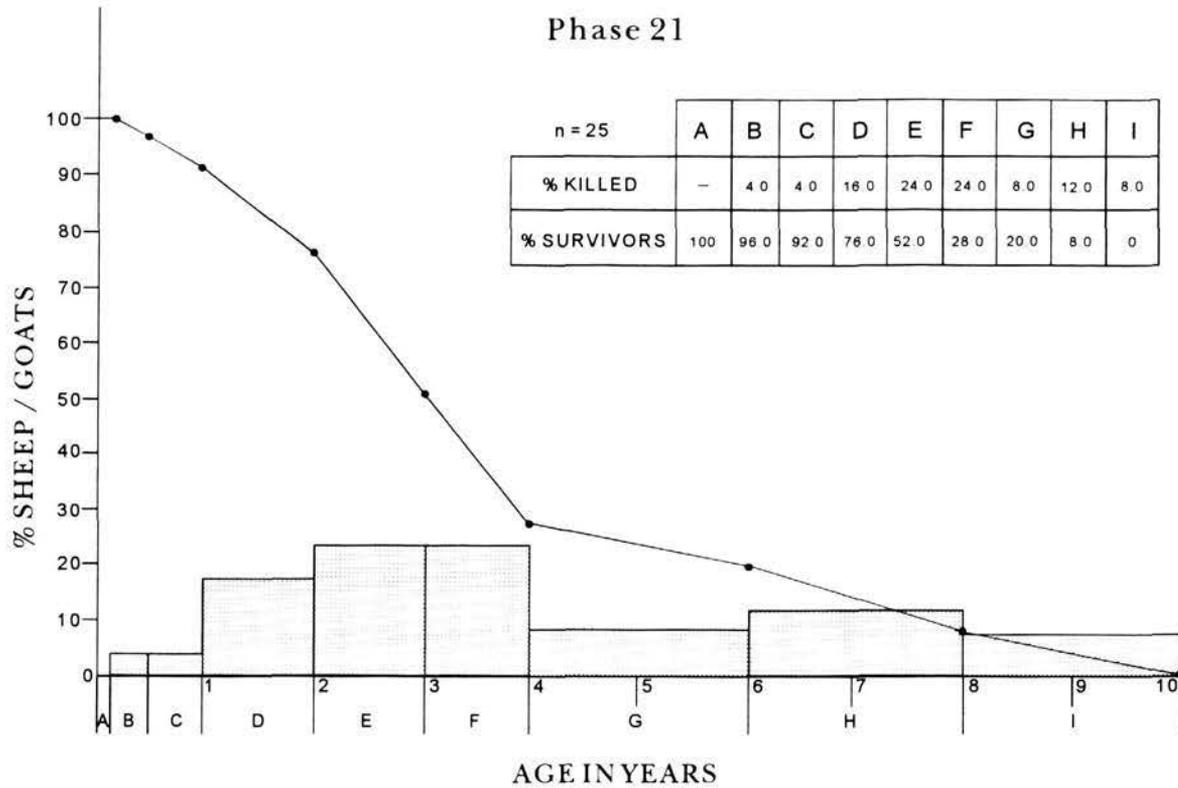
Phases 19-20



Illus 135
Sheep/goat culling pattern, Phases 19-20, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

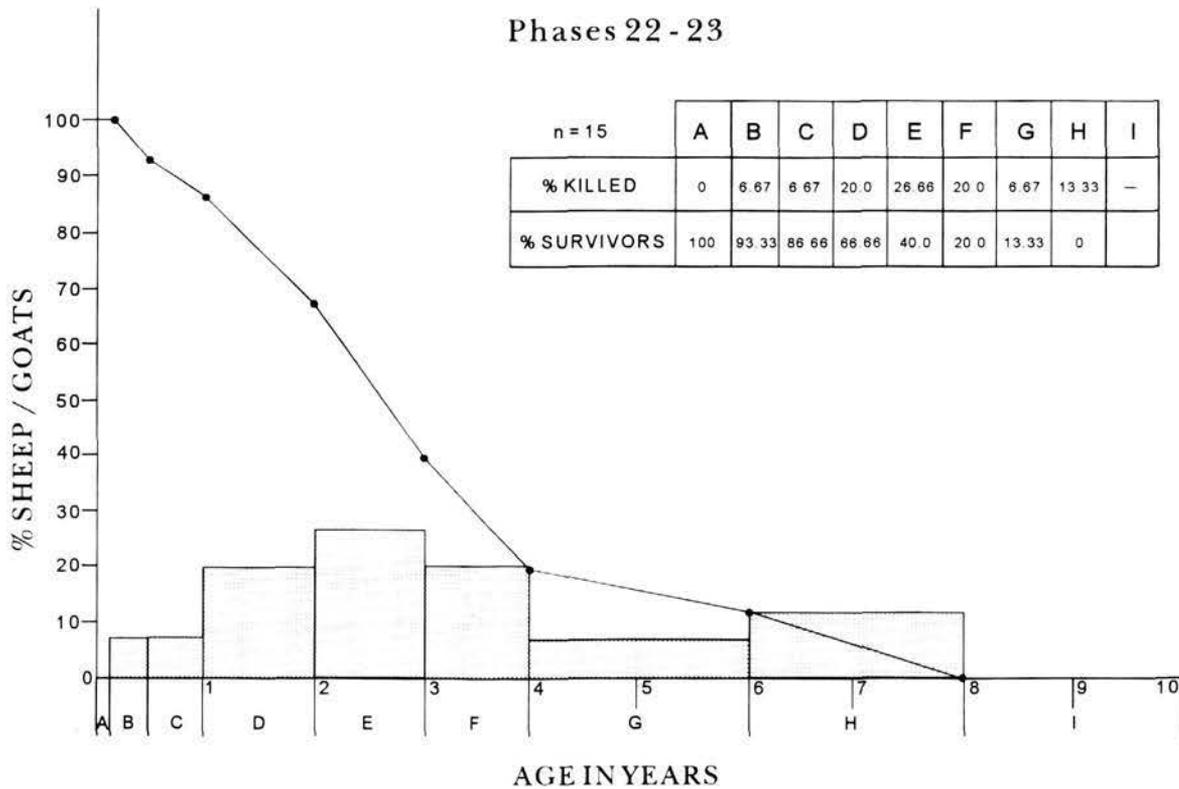
Phase 21



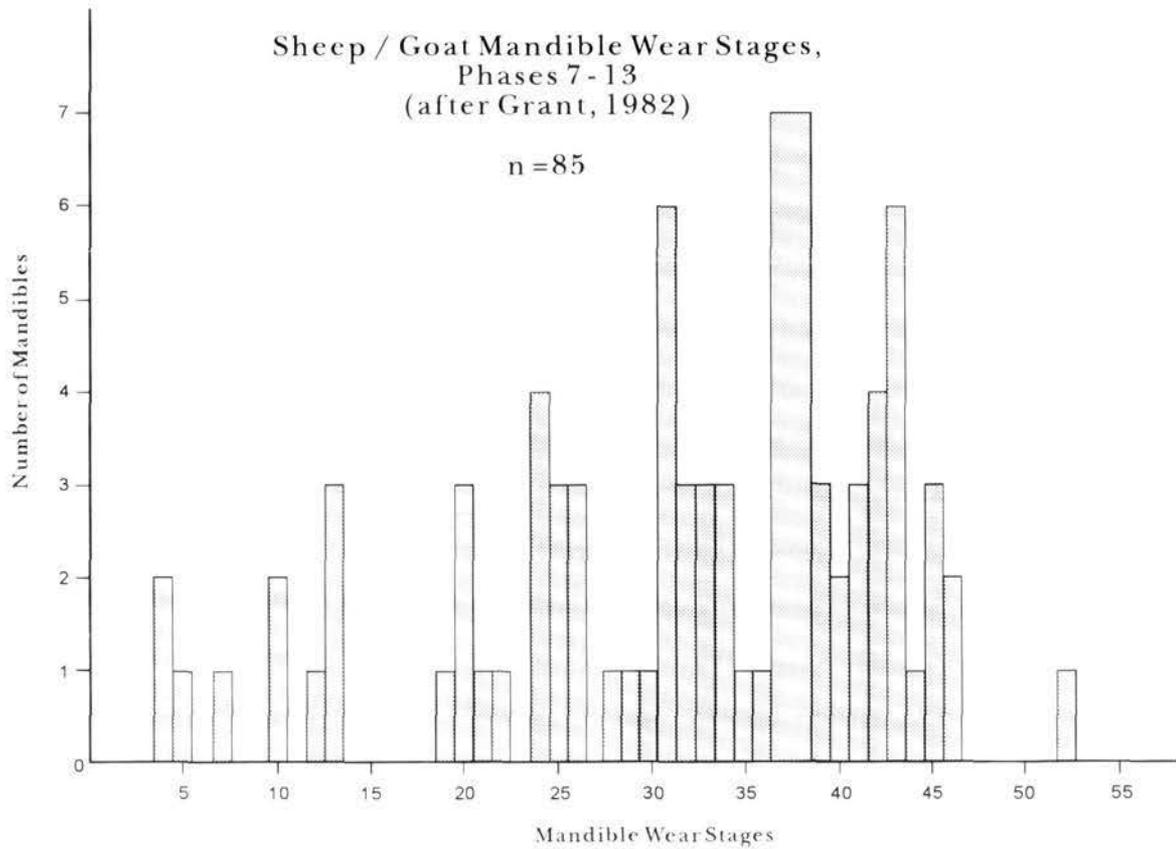
Illus 136
Sheep/goat culling pattern, Phase 21, after Payne (1973).

Dunbar Sheep / Goat Culling Pattern

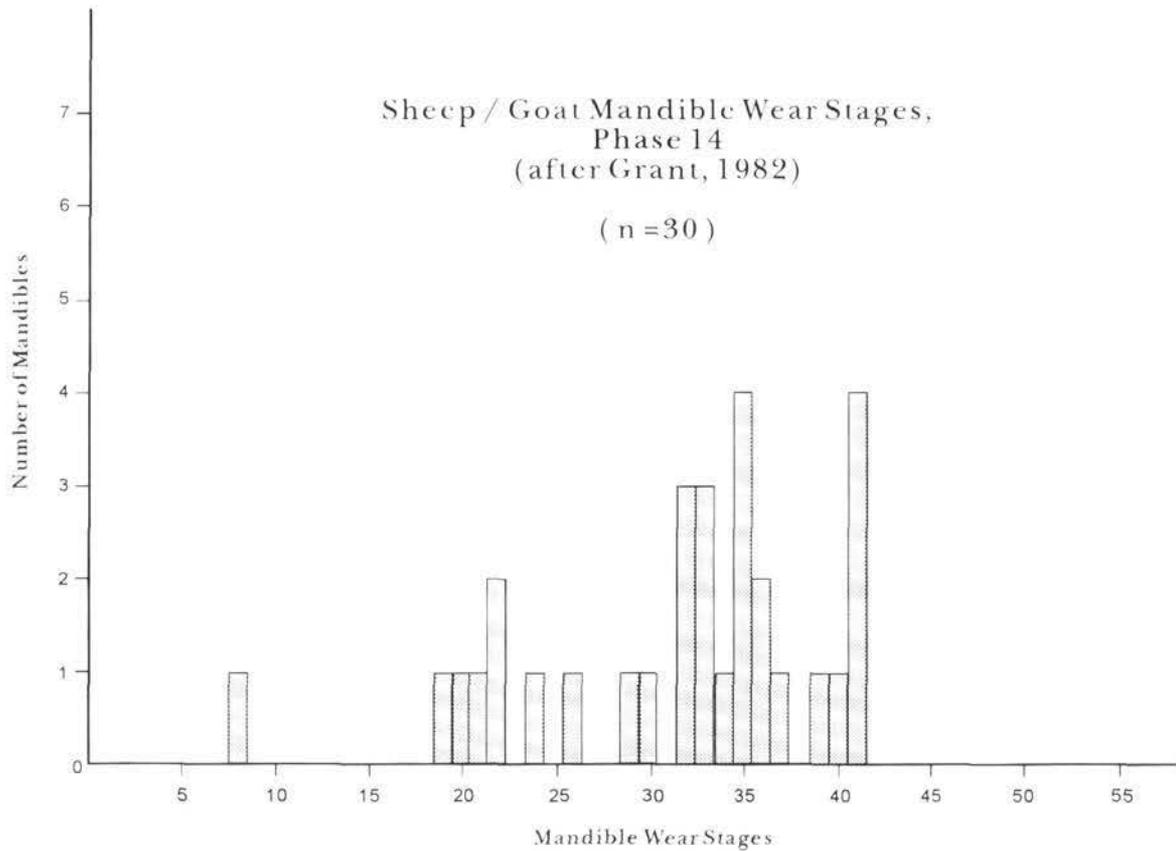
Phases 22 - 23



Illus 137
Sheep/goat culling pattern, Phases 22-23, after Payne (1973).



Illus 138
Sheep/goat mandible wear stages, Phases 7-13, after Grant (1982).



Illus 139
Sheep/goat mandible wear stages, Phase 14, after Grant (1982).

TABLE 21 NUMBERS OF PIG MANDIBLES IN EACH AGE CATEGORY, BY PHASE

Phase	A		B		C		D		Total
	n	%	n	%	n	%	n	%	
2-5					1	50.0	1	50.0	2
6							2	100.0	2
7-13	3	8.3	10	27.8	6	16.7	17	47.2	36
14	1	8.3	2	16.7	2	16.7	7	58.3	12
15-16	1	14.3			3	42.9	3	42.9	7
17-18	3	15			5	25.0	12	60.0	20
19-20					2	28.6	5	71.4	7
21			2	28.6	3	42.9	2	28.9	7
22-23			2	15.4	9	69.2	2	15.4	13

TABLE 22 NUMBERS OF PIG LONG BONES IN EACH AGE CATEGORY, BY PHASE

Phase	F		J		J/I		I		I/A		A		Total
	n	%	n	%	n	%	n	%	n	%	n	%	
2-5					3	37.5	1	12.5	3	37.5	1	12.5	8
6			1	2.0	31	62.0	2	4.0	10	20.0	6	12.0	50
7-13	4	1.5	16	6.2	153	58.8	16	6.2	44	16.9	27	10.4	260
14	1	1.7	7	11.9	32	54.2	1	1.7	7	11.9	11	18.6	59
21	1	1.6	3	4.9	36	59.0	1	1.6	11	18.0	9	14.8	61

under 20-24 months, were unfused, suggesting they came from animals under two years old.

An unfused first phalange (one out of 14 examples) probably came from an animal under 15 months old at death. Unfused humerus epiphyses (one distal and one proximal) came from animals less than about 18 months and three and a half years old respectively. In Phase 14, a mandible fragment with both central and lateral incisors displaying the star, a characteristic dentine pattern, described by Silver (*ibid*, 258-9), was thought to have come from a horse of about six years of age.

Unfused long bones in Phase 14 (a distal tibia and a proximal calcaneum) came from animals aged under two and three years respectively.

Thus, although the majority of long bones were from mature animals, a sizeable proportion were unfused and, therefore, immature. On the other hand, on mandibular evidence, no very old individuals were present either. At West Stow (Crabtree 1990, 95) immature horse bones were also recovered from Anglo-Saxon features but, in contrast to Dunbar, elderly animals were also present. Butchery marks on the bones suggest that horse flesh was eaten, and it is likely that animals surplus to requirements, or sick animals, or those with faulty conformation making them unsuitable for work, were culled at a young age for their meat.

OTHER ANIMALS: DOG, CAT, DEER AND SEAL

A single foetal tibia which was thought to be of puppy or kitten, but could not be more closely identified, came from Phase 6; otherwise no immature dog bones were found in any phase up to and including Phase 14. An unfused cat fibula was the only evidence for the presence of kittens in Phases 7-8.

Although red deer antler fragments were relatively numerous, only one provided evidence of the age of the animal from which it came. This was a beam fragment from Phase 6, which bore a fragment of the trez tine, implying that the animal was in its third year or older. A red deer distal radius in Phase 14 was unfused, indicating a young animal, otherwise all the red deer bones appeared to have come from mature beasts, as did a red deer mandible from Phase 16, which was assessed as belonging to an animal of Ratcliffe's age class 5 (1977, 88). Two bones from an immature roe deer (an articulating radius and ulna) were found in Phase 10; all other roe deer bones were mature.

Five seal bones from Phase 10 (a left and right radius and three metapodials) were all unfused and possibly came from the same pup seal.

TABLE 23 NUMBERS AND PERCENTAGES OF IMMATURE AND ADULT BONES OF DOMESTIC FOWL

Phase	Immature		Adult		Total
	n	%	n	%	
2-5			2	100.0	2
6			8	100.0	8
7-13	3	7.0	40	93	43
14	1	8.3	11	91.7	12
15-20	5	11.1	40	88.9	45
21	14	34.1	27	65.9	41
22-23	6	18.8	26	81.3	32
Total	29		154		183

DOMESTIC FOWL

Since the epiphyses of bird bones ossify at an early age (under six months: Silver 1963, 266), bones of domestic fowl were classified as either immature or adult.

The results for each phase are set out in Table 23. During the Iron Age (Phases 2-5) and Phase 6, no young birds died or were killed; however, in the subsequent Northumbrian period, a small percentage (7%) died. There was a noticeable increase in young birds in the French fort, Phase 21 (34.1%), while the percentage in the post-medieval period, although falling to 18.8%, was still

relatively high. This fluctuating kill of young birds probably reflects a dietary preference for their meat, rather than for keeping the birds to maturity for their eggs in the later phases of the site.

As only a few fowl bones were present in the Iron Age phases, it is perhaps unsurprising that no young birds were found. However, it is interesting to note that in 54 BC Julius Caesar considered that the natives of Britain, although they kept hares, fowl and geese, thought them 'unlawful to eat, but rear[ed] them for pleasure and amusement' (Handford 1953, 135). Presumably in the Iron Age chicken and goose eggs were more highly favoured than their flesh.

BUTCHERY

Evidence of cut, chop and saw marks on bones was interpreted as resulting from butchery of animals for meat. In early societies where many people were responsible for husbanding their own animals, probably anyone who could wield an axe could and did butcher a carcass when required, butchery not being regarded as a craft, as it was in towns in the medieval period.

The anatomy of a large animal, such as an ox, suggests a series of logical steps for dismembering it, the precision with which this is done being dependent on the skill and knowledge of the flesher. **PRIMARY BUTCHERY** following slaughter would involve gutting and skinning the animal, removing its head and horns and removing the relatively meatless lower limbs (the feet, consisting of metapodials and phalanges). Splitting of the carcass into sides would occur at this stage.

SECONDARY BUTCHERY would then involve dismembering the carcass into convenient joints of meat, the size of which would probably be determined either by the size of the vessel used for salting or other preserving process, or by the size of cooking pot if the meat was to be used fresh.

TERTIARY BUTCHERY is the final process, involving cutting the flesh from bones, removal of brains and splitting of the bones in order to extract marrow.

It is obvious that any evidence of the final tertiary stage of butchery

may overlie and partially obscure that of earlier parts of the process, thus rendering interpretation rather more subject to the opinion of the observer than other aspects of archaeozoology. As evidence of butchery was abundantly evident on bones from all phases of the site, and it is not possible or indeed desirable to list each and every example of cutting and chopping here, a summary of examples by phase follows. (Observations on modern butchery were made while watching a skilled Scottish butcher at work).

PHASE 2 (IRON AGE)

Evidence of removal of horns was seen in a sheep skull, butchered at the base of the horn core; this specimen was also chopped in the median sagittal plane (parallel to the sagittal suture of the skull), possibly in order to extract the brains, which are edible.

Most of the cattle vertebrae seem to have been chopped laterally, often twice, indicating that these carcasses were divided on a flat surface; those carcasses which were hung up to facilitate division into two equal sides would have produced vertebrae split symmetrically in the sagittal plane, and these were in the minority in Phase 2 (Armitage 1982, 98).

Secondary butchery or disjuncting into cuts of meat, is implied by the presence of a collection of articulating cattle vertebrae (atlas, axis and other cervical). The bones may have been thrown away while still connected by ligaments (gristle).

There was more evidence of tertiary butchery, for many long bones, particularly of cattle, had been split sagittally in order to help remove the marrow. There was evidence of the removal of flesh from bones, in the form of a knife cut (made by a metal knife) on a cattle scapula blade.

Finally, there was evidence of butchery of a dog – a canine femur was chopped in a medio-lateral direction across the shaft. This is not unusual in an Iron Age context, and has been noted on sites of early date throughout Britain (Harcourt 1974, 171).

PHASE 3 (IRON AGE)

A cattle metatarsal chopped medio-laterally across the shaft was probably evidence of removal of the lower hind limb during primary butchery, while a cattle innominate with a hack near the pubic symphysis may indicate carcass division into equal sides of beef.

Evidence for disjuncting into cuts of meat may be seen in, for example, a cattle humerus shaft with a medio-lateral hack and a cattle/large ungulate rib bearing a hack near the articular facet. However, removal of meat from the bones using a cleaver rather than a knife may also have caused such marks.

PHASE 4 (IRON AGE)

Removal of the head was probably demonstrated by a cattle axis (second neck vertebra) which was chopped in a dorso-ventral direction.

Red deer carcasses were treated in a similar way to those of cattle. A stag skull had chop marks on the pedicle, or antler-bearing part, while the skull itself was chopped both sagittally and medio-laterally, all of these actions having been intended to remove the antler. A red deer first phalange bore hack marks indicating that the feet had been removed from the carcass.

Vertebrae of both large and small ungulates were still mainly chopped laterally, as they were in Phase 2.

Disjuncting of the femur from the pelvis was probably the reason for an obliquely chopped cattle femur head. Similarly, the separation of the pelvis from the sacral vertebra was probably the reason for numerous hacks on a cattle ilium.

The first evidence for the use of a saw was observed in a cattle metatarsal, which was sawn cleanly across the shaft, leaving a small central lug at the point where the bone had been snapped free. Since the use of saws was very rare at the site, such careful treatment probably meant that the bone shaft was intended for use in bone working.

PHASE 5 (IRON AGE)

Saws were also used for careful removal of horn cores, for example a sheep horn core was sawn from both the medial and lateral sides and snapped off in the middle. Similarly a red deer antler fragment was probably sawn across its base.

An obliquely chopped cattle astragalus probably resulted from removal of the lower hind limb at the level of the hock joint. This contrasts with the modern practice, which is to locate and cut through the articulation of the naviculo-cuboid tarsal with the metatarsal, a technique which avoids splintering the bones, and leaves the calcaneum and Achilles tendon fixed in place to take a hanging hook (MacGregor & Gerrard 1965, 29). Chopping through the astragalus, however, need not damage the Achilles tendon, which is inserted into the calcaneum, and the hind quarter could still be conveniently suspended by it if required, for example if the joint of meat was to be preserved by smoking.

There was evidence for the first time that horses were butchered,

in the same way as cattle: a horse metacarpal was chopped across the shaft in a medio-lateral direction.

PHASE 6 (IRON AGE/NORTHUMBRIAN)

Butchery techniques were similar to those in Phases 2-5, in that the most frequently used tools were axes or cleavers, as indicated by hack marks on the bones. Red deer antlers were again given more careful treatment, being sawn rather than chopped. However, other bones were occasionally sawn, as in the case of a cattle innominate, sawn through the pubis.

There was more evidence for division of the carcass into sides of beef than in previous phases, although lateral division still seems to have been the preferred or most convenient method. For example, in one particular context group, 32 large ungulate vertebrae were split laterally, while only 24 were split sagittally. In addition, five were chopped dorso-ventrally (as was the case in many other instances), perhaps in order to cut a joint of meat into pot-sized pieces.

There was some evidence of the remains of individual joints of meat; a right innominate, femur and tibia from a young calf may all have come from the same hind quarter. Two cattle scapulae, one with two holes roughly punched in the infraspinatus region of the blade, the other with a single hole, suggested that these came from joints of meat which had been hung up, perhaps to be smoked over a fireplace. Schmidt (1972, 42) noted such perforations in the Roman ox scapulae at Augusta Raurica.

In addition, the spines of the Dunbar examples had been trimmed off; such a technique is probably associated with filleting, and has frequently been observed in Romano-British material from Hampshire (Maltby 1989, 81). Other cattle scapulae were chopped across the neck, probably as a result of removal of the fore quarter. Cattle ulnae often bore hacks or were chopped through the olecranon process, a point at which modern butchers often cut through to release the distal humerus from the proximal radius, thus separating the better quality cut from the tough meat of the lower leg.

A sheep/goat atlas (neck) vertebra had knife cuts at both the cranial and caudal articulations, possibly resulting from careful removal of the head, while decapitation was probably also the object of chopping a cattle skull through the occipital and styloid process.

Sagittal splitting of long bones of cattle, sheep/goat and pig was still commonly practised.

Examples of both sheep/goat and cattle hyoids (the small bones of the throat region which support the tongue) were chopped or bore knife cuts, indicating that the tongue, which provides a substantial amount of meat in the case of cattle, was removed. A knife cut on the lingual aspect of a sheep mandible may have been evidence of the same process, although removal of the cheek meat could also have been responsible.

Mandibles of cattle were chopped at the angle of the jaw, probably to remove them from the skull.

There was further evidence in Phase 6 of butchery of horses, a radius bearing knife cuts on the shaft.

PHASES 7-13 (NORTHUMBRIAN)

As in the Iron Age, the most commonly used implements for dismembering were still axes or cleavers, and saws were seldom used except for removal of valuable parts such as horn cores (in Phase 9) and antlers (Phase 7). A fragment of cetacean bone from Phase 13 was also sawn, probably because of the unwieldy size of the original bone. Occasionally other bones such as a cattle innominate were sawn roughly (Phase 7).

A sheep axis, chopped dorso-ventrally, was probably evidence of

removal of the head (Phase 7). Metapodials of cattle and sheep were chopped medio-laterally across the shaft in order to remove the lower limb, while hacks on the more distal regions of the tibia shafts of cattle, sheep and pigs may also have occurred for this reason (Phase 7). A cattle astragalus with knife cuts on the tibial articulation probably indicated removal of the tarsals (Phase 7).

Lateral division of large and small ungulate vertebrae was still more common than sagittal, indicating that the practice of hanging the carcass in order to divide it was still relatively uncommon.

A cattle innominate, chopped twice laterally at the pubic symphysis, probably came from an animal which had not been cut into equal sides of beef (Phase 7).

Secondary butchery, or disjuncting of the femur of cattle from the innominate, was still achieved by chopping obliquely through the femur head (Phase 7), although it is not particularly difficult to insert a thin bladed knife into the femero-pelvic joint in order to sever the connecting ligaments. Chopping through the femur head is also commonly observed at Scottish urban sites of medieval date.

A cattle humerus which had a small slice chopped medio-laterally from the distal trochlea was evidence of separation from the radius (Phase 7), while ulnae chopped across the olecranon probably resulted from the same action (Phase 7).

Cattle scapulae were again found with the spines trimmed off (Phase 7) or chopped across the neck (Phase 7). Cattle scapula blades were also commonly chopped across in a dorso-ventral direction (Phase 13).

Knife cuts parallel to the scapula spine were not common but were observed on one sheep shoulder blade (Phase 7). Crabtree (1990, 101) has since noted parallel cuts on cattle and sheep scapulae from West Stow and identically placed marks are made by modern butchers in Scotland while filleting out the spaul (spale) bone.

Sagittal splitting of long bones was still commonly practised in the Northumbrian period indicating a continuing taste for marrow. Crabtree (*ibid.*, 104) found this process was rare at West Stow although it was recorded at both Hamwih and Portchester Castle, leading her to suggest there may have been regional or chronological variations in Anglo-Saxon butchery practices.

Horse and red deer bones were butchered in a similar way to those of cattle, indicating the use of these animals for their meat (Phase 7).

Evidence of butchery on a bird bone was seen in the furcula of a goose, which had been chopped through the central point of the wish bone (Phase 7).

A radius from a pup seal in Phase 10 bore a knife cut, and while the meat may have been eaten, the animal may rather have been utilised for its fur and fat.

PHASE 14

Evidence of butchery in Phase 14 suggested that methods had not changed since the preceding Northumbrian period. Saws were still only rarely used for removal of red deer antlers and cattle and sheep horn cores. No long bones were sawn in Phase 14.

Cattle were decapitated by hacking through the cervical vertebrae, as shown by an axis from which the odontoid process had been chopped; cattle tongues were still utilised, as revealed by a knife cut on a hyoid bone.

Carcasses were divided laterally more often than into equal sides of beef or mutton as the vertebrae show; for example in one context 33 vertebrae were split laterally compared with only one sagittally split example. Knife cuts on the articulation of the calcaneum of a pig indicate removal of the tarsals and feet.

Disjuncting of the pig elbow joint was achieved in similar style to that used for cattle, by chopping through the olecranon of the ulna.

Removal of a sheep proximal humerus from the glenoid of the scapula was probably the cause of parallel knife cuts placed on the lateral shaft just distal to the lateral tuberosity. These marks were similar to those illustrated by Binford (1981, 122) who argues that only two simple cuts and a little leverage are required to dismember this joint. However, this was the sole evidence of such skill at Dunbar.

Cattle and sheep scapulae again frequently had the spines trimmed off and one sheep scapula had a rough hole punched through the blade suggesting hanging of joints of meat continued as it had in earlier phases.

Knife cuts on the anterior aspect of a cattle patella may have been associated with separation of the knee joint. The modern practice is to disarticulate the tibia from the femur, leaving the patella attached to the femur, then to bone out the femur, the patella remaining with the cut known as round steak, to be discarded later on cutting. Knife cuts on the patella could thus be associated with tertiary rather than secondary butchery.

Butchery of horses continued in Phase 14 – a horse radius and ulna had been disarticulated from the humerus in exactly the same way as for cattle, by chopping through the olecranon and proximal part of the radius.

A horse skull was chopped twice laterally through the basilar process, presumably to allow brain removal.

A dog femur was chopped medio-laterally across the shaft. Somewhat ironically this bone showed all the signs of having been gnawed, a case of dog eat dog.

Bones of geese were also chopped (a furcula chopped in half) or showed knife cuts (a humerus shaft).

PHASES 15-20 (MEDIEVAL)

All of the techniques of the preceding periods were again seen in the medieval period, and the tools used were mainly axes and cleavers. Saws were used as infrequently as they had been in the Northumbrian and Iron Age periods. One tool used to saw a cattle innominate dorso-ventrally appeared to have been of a wide toothed variety.

One red deer skull fragment which consisted of a sawn pedicle burr and beam also showed saw cut marks on the medial side of the beam. These probably arose when the antler at the opposite side of the head was removed, the saw having accidentally struck against the inner surface of the remaining antler (Catalogue No 503).

Carcasses of cattle and sheep were again divided laterally rather than into sides of beef and mutton. In one context in Phase 20 the vertebrae were particularly heavily butchered by clean, chopping blows, perhaps from a very sharp blade; one cattle large ungulate vertebra had been chopped once in a sagittal direction, and twice in a transverse direction, leaving only a very small slice of centrum.

Dismembering of various joints was seen; the femero-pelvic joint of cattle for example, was, as in the previous phases, dealt with by chopping through the head of the femur; occasionally the rim of the pelvic acetabulum was chopped off instead.

Sagittal splitting of long bones was still common, as it was at many urban Scottish sites of medieval date. In one case, a cattle humerus shaft was sawn sagittally, while a sagittally split cattle radius had a medio-lateral hack on its trabecular, internal surface, indicating rather intense butchery.

Horses were again butchered in the same way as cattle, while dog

bones continued to be chopped through the shafts. Bones of hare, roe deer, goose and fowl all showed knife cuts or chop marks, while a gannet ulna was chopped across the shaft as well as bearing a small knife cut, indicating wing removal.

PHASE 21 (FRENCH FORT)

The pattern of butchery in Phase 21 was consistent with that in the previous medieval phases (15-20) and indeed in the Iron Age and Northumbrian period. Use of saws was still infrequent.

Although horse meat was still being utilised, there was no longer evidence of butchery of dogs. A rabbit innominate with knife cuts on the ilium was evidence that this animal at least was not intrusive but had been eaten or skinned. A duck humerus which was chopped medio-laterally across the shaft was almost identical to a modern mallard specimen which had been butchered in this way in order to remove the wing.

PHASES 22-23 (POST-MEDIEVAL)

Somewhat surprisingly, saws were used no more frequently in the post-medieval period than previously. Patterns of butchery were also otherwise consistent with the earlier periods, horses having been butchered as late as Phase 23.

However, a somewhat bizarre collection of sheep metapodials found scattered throughout the robbing or demolition of Building 16 in Phase 22 was notably different from anything seen previously. Many of these were entire (representing for example a minimum number of 17 animals in one particular context group) and are notable in that the proximal ends were much more eroded

than the distal ends. The erosion extended from half to two-thirds of the length of the shafts, and where distal ends only were present there was evidence of erosion and breakage at roughly mid-shaft level. As there was no evidence of the bones having been found together but were instead scattered throughout the contexts, it could be supposed that they are merely the end products of skilful lower limb removal, in the modern style. However, this would not explain the peculiar and consistent erosion pattern on the bones. One explanation may be that they were used as tools to stir some corrosive substance, such as lime; glue boiling is unlikely since the distal ends with their attached hooves would have produced more glue or gelatine than the proximal ends, and thus would have become more eroded. Neither was there any evidence from their position that they had been used as pegs or as part of a floor surface, although cattle metapodials have been used in this way by being driven vertically into the ground, leaving the articular surfaces exposed (Armitage 1989a, 206). These knuckle bones floors are found as architectural features in buildings no earlier than the 17th and 18th centuries (Armitage 1989b, 154).

It may be significant that these sheep metapodials were associated with a context containing parts of a pair of mandibles of a Greenland Right whale into which an iron nail had been driven and which had also been sawn across. It is possible that these whale jaws had been used structurally, perhaps as an entrance or doorway, as were once common throughout the east of Scotland in areas connected with the whaling trade (Redman 1984). A whale jaw bone arch still decorates the top of Berwick Law, North Berwick, and may also have had some connection with the whaling industry established at Dunbar in 1751 by the East Lothian and Merse Whale Fishing Company (Jackson 1976, 50).

PATHOLOGY AND ABNORMAL BONES

The archaeological evidence for animal diseases at Dunbar is of necessity confined to those which leave traces on the skeleton. A low incidence of recorded abnormalities on the bones need not thus imply that animal health was always good, since those infectious diseases known anciently as murrains or cattle plagues,

which kill quickly, would have little time to affect the skeleton before death occurred. However, other processes affecting animal health were detected in the Dunbar material, as well as congenital skeletal abnormalities which would not necessarily have been harmful.

DENTAL ABNORMALITIES

Dental health of the Dunbar livestock was generally good. Only a few sheep suffered from dental calculus. In some cases alveolar recession occurred, mainly in the lower jaw, with ten times as many sheep being affected as cattle or pigs. Alveolar recession was associated in some cattle, sheep and pigs with the absence of teeth, interpreted as ante-mortem tooth loss, although Lunt (1997) has observed that, in humans at least, teeth can remain hanging on in the jaw while attached only by soft tissue for some time before being finally lost. Three loose sheep/goat upper cheek teeth had deformed roots and the maxilla with which they were associated exhibited bony exostoses in the region of the third molar. The presence of heavy calculus on one of the teeth leads to the suspicion that the damage to the teeth and jaw was caused by chronic infection, although there did not appear to have been an abscess cavity. A further abnormality in a tooth root was that seen in a cattle incisor, which was very similar to the example illustrated by Baker and Brothwell (1980, 150). Two cases of caries were seen in the Dunbar material; occlusal caries in a horse upper molar or

pre-molar, and interproximal caries in a pig first molar. This tooth was also impacted against the fourth premolar, with associated alveolar recession and a possible abscess. Perhaps this animal's poor dental health was the reason for culling it. Tooth crowding and malocclusion was also seen in some of the Dunbar pigs.

Dental abnormalities thought to be of congenital (non-inherited) origin occurred rarely in the Dunbar material: absence of the 2nd premolar was observed in both cattle and sheep, while reduction of the third pillar (5th cusp) of the lower third molar of cattle was also seen (Andrews & Noddle 1975).

A more unusual occurrence was that of a probable supernumerary tooth in a pig mandible – the extra tooth, situated distal to the abnormally-shaped third molar, had been lost during life. Two unresorbed alveoli and one partially absorbed alveolus were the only evidence of the prior existence of this extra tooth.

OTHER CONGENITAL ABNORMALITIES

These abnormalities included the presence of extra nutrient foramina in cattle calcanei, a sheep/goat tibia and the palate of a cattle skull; and double mental foramina in cattle and sheep/goat mandibles, observed by Baker and Brothwell (1980, 35) at sites covering a wide date range, as well as occurring sporadically in Scottish urban medieval material.

A variation observed in the innominate of mature cattle, a more or less small perforation in the acetabulum at the junction of the pubis and ilium suggestive of incomplete fusion of these elements, was common at Dunbar. This condition was also observed at Hamwih by Bourdillon and Coy (1980, 92) although they consider this to be an inheritable trait rather than a non-inheritable one.

The small accessory metacarpal (II/V) of a sheep or goat was completely fused to the large metacarpal (III/IV); normally this is a separate bone, which is only rarely retrieved on archaeological sites.

A further interesting condition was seen in the parietal bone of a cattle skull in which two smooth-edged holes, diameter 10mm and 9.5mm, were present. Ryder (1970) has suggested that such holes are often seen in the skulls of plough oxen accustomed to wearing heavy wooden yokes, but Baker and Brothwell (1980, 37) consider that they are of congenital origin. Such holes, whatever the cause, have commonly been observed in Scottish medieval cattle (Smith unpublished).

DISEASES OF JOINTS

Only a few bones fulfilled all of the criteria which would support Baker and Brothwell's (1980, 115) diagnosis of osteoarthritis, that is, suffering from at least three of the following four changes: grooving; eburnation; extension or lipping of the articular surface; exostoses. These included a cattle first phalange, innominate and proximal metatarsal. Various other cattle and sheep/goat bones were affected by only one or two of the above changes, the most commonly affected being cattle hip joints (acetabulum of the innominate) and sheep/goat elbow joints. As well as cattle and sheep, bones of other animals were affected by arthritic changes – a horse astragalus (exostoses, distal), a dog distal metacarpal III (eburnation) and a cat innominate (mis-shapen acetabulum with osteophytic outgrowth of the rim). Joint surfaces which displayed pitting and erosion may have been affected by infectious arthritis, rather than osteoarthritis; these included a cattle innominate, a cattle proximal metatarsal, a cattle mandibular condyle and a large ungulate lumbar vertebra.

Interarticular lesions similar to Baker and Brothwell's Types 1, 2 and 3 (*ibid.*, 109-14) occurred in numerous cattle, sheep/goat, pig and horse bones. The most commonly affected were cattle first and second phalanges and proximal metatarsals. It is likely that some of the smaller depressions were non-pathological, while the more extensive examples, such as those in cattle naviculo-cuboid tarsals, may have been associated with arthritic changes. In some cases, the small lateral cuneiform tarsal was fused completely with the naviculo-cuboid tarsals, associated with either increased vascularised pits in the bone or with exostoses, suggestive of spavin. Such animals may have been plough oxen (as may those which displayed marked splaying of the distal condyles of the metapodial). A pair of articulating horse tarsals, a navicular and lateral cuneiform, also displayed interarticular lesions on the corresponding articulating surfaces which may have been related to spavin.

TRAUMA AND INFECTION OF BONES

Only a few incidences of trauma were observed and these were all accompanied by evidence of infection so that it was not possible to decide which came first – the fracture, or the infection, properly an osteoperiostitis – which could be capable of causing a so-called pathological fracture.

Two large ungulate ribs were affected in such a way; one specimen had in addition developed what appeared to be a false joint at the fracture line. Fracture of bovine ribs in this fashion could have come about because of rough handling of livestock by the husbandmen.

A pig fibula with a midshaft swelling accompanied by osteophytic outgrowths was also thought to be evidence of traumatic damage.

Re-united fracture was suspected to be the cause of a smooth lesion at the aboral angle of a cattle mandible; lumpy jaw was not implicated as there were no bony spicules present.

A cattle scapula with irregular thickening of the caudal edge may be evidence of periosteal membrane damage, perhaps caused by a fall, while a sheep ulna in which the volar edge of the olecranon process was thickened may have had a similar cause.

Finally, four cases of possible osteomyelitis, two in cattle and two in sheep, were observed. In one of these, a cattle tibia shaft, a sinus had formed between the old bone and a deposit of new bone on

the shaft, which may have been due to the rupture of the periosteal membrane followed by the spread of inflammatory material into the soft tissues (Baker & Brothwell 1980, 67). A second cattle tibia was butchered or broken in such a way as to reveal the internal structure of the shaft, the inner surface of which was thickened with fibrous tissue, the external shaft being unaffected. Haematogenous osteomyelitis was suspected.

Similarly the medullary cavity of a sheep/goat distal metapodial was filled by porous bone, but in this case the disease had reached the outside of the shaft, forming osteophytic outgrowths. A sheep metacarpal was affected by marked swelling and an apparent sinus on the anterior shaft, and by spicules of new bone on the posterior, suggestive of infection.

Two further cattle metapodial fragments were also affected by osteophytic outgrowths on their shafts possibly due to infection.

Those animals which were suffering from infections of the bones of the lower limbs must have experienced a degree of lameness and pain which could have been the reason for culling them. That the lesions had progressed to such a stage as to discharge pus to the outside of the leg suggests that the herdsmen may have adopted a 'wait and see' attitude, reserving culling for animals which did not recover after some time had elapsed since the onset of the disease. This is not to suggest that veterinary medicine was not practised; the foot health of both cattle and sheep was remarkably good, no diseased phalanges suggestive of foul-in-the-foot or

laminitis having been found, which implies that the Dunbar stockmen knew how to take care of these common but debilitating

and painful problems.

EVIDENCE OF POSSIBLE DIETARY DEFICIENCY

Several sheep horn cores displayed constrictions at their bases, resembling thumbprints. Such irregularities are thought to be associated with poor planes of nutrition and particularly affect the thinner walled horn cores of castrate wethers (Hatting 1975, 346).

Similar marks have been found on sheep horn cores at Saxon Hamwih (Bourdillon & Coy 1980, 92) as well as at Scottish urban sites of medieval date.

DISCUSSION

Throughout the occupation of the site, the animal based economy was heavily reliant on domestic beasts: cattle, sheep and pigs, and to a lesser extent, horses and goats. From the earliest Iron Age period until medieval times, cattle were more important than sheep in terms of numbers and would have provided the bulk of the meat eaten at the site. Only in the post-medieval period did sheep become more abundant than cattle, probably in response to external economic factors such as the exportation of wool and woolfells.

Wild game such as red and roe deer and wild boar were never of great importance as meat providers, although red deer antlers were a valued raw material. The implication is that the nutritional, specifically protein, requirements of the inhabitants of Dunbar must have been met by their domestic livestock and there was no pressing necessity to hunt even in the earliest periods. The hunting of game was more likely to have had a sporting or social function than to have been a necessary part of a subsistence strategy.

Domestic animals, as well as providing meat, were the source of a variety of other by-products such as leather, horn, gut, sinew and bone for working into artefacts. Live cattle were in addition valued as working plough oxen, simultaneously producing dung which sustained the fertility of the fields. Cows would have provided milk for at least part of the year after calving, forming a valuable addition to the human diet, although sheep milk may have been equally important.

Sheep were undoubtedly valued as producers of wool in all periods of the site's occupation. The cull pattern indicates that sheep, many of them castrate wethers, could be kept until about the age of eight to 10 years, which was presumably when they ceased to produce good quality wool. Weaving and spinning tools found at Dunbar indicate that some of their wool may have been spun and woven locally.

Possibly any surplus would have been traded.

The first documentary reference to wool as a commodity at Dunbar is unfortunately rather late, found in the Exchequer Rolls of Scotland for the year 1371/2, when 3337 woolskins were exported (*ERS*, ii, 379). This trade continued to thrive in Scotland throughout the late medieval period, but slumped in the later 16th century (Guy 1986, 63).

The evidence from post-medieval Dunbar is at first sight rather at odds with this, for it is in post-medieval Phases 22 and 23 that a sharp increase in the proportion of sheep to cattle is noted, probably about the same time as the recession in trade occurred. However, it may be that the observed differences are due to the contrast between the economic strategies of the Iron Age, Northumbrian and early medieval periods which were mainly based on the consumption of locally produced commodities, changing instead to a post-medieval market economy concerned with the export of animal based goods. With the demise of the medieval castle, the area covered by the later phases of excavation may have become a backwater where commercial rubbish, such as the large collection of sheep metapodials from Phase 22, may have been dumped.

Pigs were much less frequent at Dunbar than either cattle or sheep. Evidence of the relatively late age at which many pigs died seems to indicate that they were allowed to roam freely, rather than being enclosed in sties, from which they could easily be culled as soon as they reached an optimum size. Wooded areas, in which pigs could forage for pannage (the fruit of deciduous trees such as oak or beech, Trow-Smith 1957, 82) probably occurred locally, although it is not known how extensive these would have been. Certainly the large size of the red deer at Dunbar indicates that human pressure on this species was not so great as at the present day and points to a survival of their preferred woodland

habitat which could also have been utilised by pigs. Indeed, Gilbert (1979, 7) has pointed out that the name of Swinewood in the shire of Coldingham (Berwickshire) is mentioned in an 11th-century charter, suggesting that the practice of putting pigs out to pannage was current in the area prior to this date.

Pigs were not kept in great numbers in the early periods of the site, and certainly not as frequently as at contemporary sites in other parts of Britain. More pork appears to have been consumed even in Iron Age Orkney and Caithness than at Northumbrian Dunbar. This is rather at odds with the historians' picture of vast herds of swine roaming the Domesday landscape, a portrayal which does not appear to have been true of East Lothian at this period.

The stature of the domestic animals from Dunbar was generally much smaller than that of modern improved livestock breeds. The cattle may even have decreased in size between the Iron Age and Northumbrian periods, when they were smaller than their contemporaries in the south of England (eg West Stow). Sheep, at least up to and including the medieval period, were probably about the same height as the modern Soay, and were also smaller than at southern English sites, perhaps in response to a harsher climate. Their stature remained constant throughout the Iron Age, Northumbrian and medieval periods, but finally began to increase in post-medieval times. Pigs were similar in size to those in England (eg Hamwih) but were more robust and heavy boned than contemporary animals in the far north of Scotland. As for horses, all the equines at Dunbar were large ponies, with the exception of one medieval animal, which at 17 hands height stood taller than any other found at medieval urban sites in Scotland. Such horses as were found in the Northumbrian period may have been similar to those kept by the continental Germanic tribes, which Tacitus disparagingly describes as 'not remarkable for either beauty or speed' (Mattingly 1970, 106).

The domestic fowl at Dunbar were bantam-sized in the Northumbrian period with some large birds appearing by medieval times. No large dogs were found in any period, suggesting that canines may have been kept as sheep herders rather than as hunters.

As regards wild animals, the red deer were much larger than modern day animals in both Scotland and the north of England. The antler fragments all appeared to be large and well formed, although, as these may have been imported onto the site, they may not represent local deer.

Butchery evidence indicates that both horses and dogs were eaten by humans (although it is also possible that their meat was used as dog food). Butchered equine and canine bones are certainly not unusual at archaeological sites in Scotland, the edibility of horse, at least, being in little doubt. Modern dietary evidence has shown that horsemeat is fashionably low in cholesterol and fat, as well as being high in iron, and a press release for a Parisian trades fair held as recently as 1992 encourages us to 'Mangez sain, mangez du cheval' (US Meat Export Federation Bulletin).

This is exactly the opposite view from that of the early Christian church, which officially frowned upon the uses of the horse as a food animal. In AD 732, Pope Gregory III was shocked to discover that the continental German tribes ate horsemeat and instructed his missionary Boniface to prevent this 'unclean and detestable practice' (Harris 1986, 96). Elsewhere, the early Irish church had also condemned the use of horseflesh as 'fitting only for thieves' (McCormick 1981). Whether these prohibition orders had filtered through to Northumbrian Dunbar in the Christian era will never be known, but it seems they were not acted on, for horses continued to be eaten there until at least the post-medieval period. However, they were never present in great numbers and their use for food was probably secondary to their importance as providers of prestige transport, much superior in this respect to plough oxen.

Notable for its presence in a medieval deposit was one bone from a brown bear, *Ursus arctos* (Phase 18). Although the brown bear is thought to have survived in Britain until at least the Bronze Age, it is generally considered to have died out in Scotland by about the tenth century AD (Ritchie 1920, 114). Aybes and Yalden (1995, 217) have traced the place name evidence for bears in Scotland, but consider that the transportation of the animals around Europe, for the purposes of bear-baiting and other 'entertainments', has confused both the documentary and archaeological records. Dancing bears were a familiar sight until the suppression of the custom in the 19th century (Hole 1978, 16). The bear from Dunbar may have been just such an animal. An interesting feature of the Dunbar bone, a scapula, is the presence of chop marks across the neck, which indicate that the carcass was butchered; the marks are in excess of what would be expected if the animal was only relieved of its skin. Many folk remedies advised the use of bear's grease both for medicinal and cosmetic purposes and this may explain why the bone was chopped open. The meat may, of course, have been eaten, perhaps cured as hams, as has been

known in Russia and other European countries, but a modern gastronomical work has this to say: 'Bear meat can only be used after it has been marinated for a long time. It is not particularly tasty and is often tough.' (Montagné 1977, 95).

Marine resources, although exploited at Dunbar from the earliest period, were probably never the mainstay of the population, but merely provided an addition to the diet. However, there is no doubt that if dearth or crop failure were to occur, fresh or preserved sea birds such as gannets, guillemots, razorbills and great auks as well as fish and molluscs would sustain the people of Dunbar through the lean times. There is in fact 16th-century documentary evidence of harvesting of gannets on the Bass Rock, the right to which was jealously guarded by the current laird (*APS*, iii, 614). Seal meat, as well as seal fur, was probably used, as was whale meat or oil which presumably came from beached animals in the early periods. Commercial whaling, using Dunbar as a home port, did not commence until the 18th century, and a post-medieval mandible of Greenland Right whale probably originated from this venture.

The sea would also have provided crops of seaweed, which could have been used as winter fodder for animals, as it has been in Orkney, either collected and fed to the cattle in byres or grazed by the seaweed-eating breed of sheep on the shores of North Ronaldsay (Fenton 1978, 455, 467).

Certainly, the fact that the majority of the domestic animals at Dunbar survived to maturity and in some cases to old age points to an availability of some kind of winter fodder. Oats and barley, both found in environmental samples at the site would have provided straw which could have been used as winter feed, as could straw from early varieties of wheat, which, unlike that from modern wheat, is palatable to cattle (Reynolds 1987, 56).

Hay was probably also prepared in the summer months, and archaeological features consisting of areas of larger stones within a cobbled courtyard (Courtyard 1, Phase 4) have been tentatively interpreted as the bases for hay stacks, as have circular stone settings in Courtyard 5 (Phase 7).

Leaf fodder may also have been important during the winter, and the presence of hazelnuts in the environmental samples indicates that hazel trees at least could have been used. Other trees which provide palatable leaf fodder for primitive sheep breeds and goats are elm and ash (*ibid*, 45) and

although there is no direct evidence of these tree species at Dunbar it is possible they may have been used in this way.

Animal health at Dunbar was relatively good, although a small number of older sheep suffered from dental problems which might have caused them to lose condition and probably favoured their selection for culling. Some of the cattle suffered from arthritic changes which may have been related to their use as plough oxen; while some traumatic conditions may have been caused by rough handling. Foot health of both cattle and sheep was remarkably good, however, indicating that the husbandman knew well how to deal with common foot problems which can cause pain and loss of health.

Livestock husbandry was probably affected by fluctuations seen in the British climate. During the period corresponding with the Iron Age at Dunbar the climate was probably warmer and drier than it is today (AD 250-400), became wetter and colder (AD 400-700), fluctuated between the 8th to 10th centuries (Northumbrian), before going through a continental warm phase which lasted from *c* AD 980 until 1300 (Northumbrian/medieval) (Lamb 1981, 56-61). In the present century, the dry climate is considered to be favourable for the pasturage of hill sheep in the Lammermuirs, and flocks (mostly of Blackface) are said to be remarkably free of disease (Snodgrass 1953, 96). This may well have been true of earlier periods in the history of East Lothian.

The recurring pattern of animal use at the site is one of remarkable continuity from the Iron Age to the medieval period, both in the animals themselves, which as far as the domestic stock are concerned changed relatively little in stature and observable genetic traits, as well as in their pattern of utilisation by the inhabitants. This continuity is certainly interesting with regard to the cultural changes which might have been expected to have taken place, for example, at the interface between the Iron Age and Northumbrian periods. Given Dunbar's status as a Northumbrian royal centre which the king and his retinue would have visited, the supposition is that the animal bones from Phases 7-13 may have come from livestock rendered to the king as part of his food rent or *feorm* which, in its earliest form, consisted of a 'quality of provisions sufficient to maintain a king and his retinue for 24 hours, due once a year from a particular group of villagers' (Stenton 1947, 284). Although no early laws from Northumbria have survived, in 7th-century Wessex the types of food and livestock rendered were oxen or cows, wethers, geese, hens, salmon, eels, butter, cheese, honey,

loaves, ale and fodder for animals (*ibid*, 285). It is interesting, in the light of the archaeological evidence for castrated animals, to note that wethers and oxen are stipulated. Fodder was obviously also of importance.

Given the almost identical relative frequencies of cattle, sheep and pigs in the Iron Age and in the Northumbrian periods, it is probable that the food rents payable to the king, and at a later date perhaps to his esteemed servants (Welch 1992, 50), at Dunbar would have depended on the available resources and would have been exacted accordingly. There would have been little to gain in stipulating payment of livestock in proportions which were not available locally. That this was so, is indicated by the

continuity of animal relative frequencies after the end of the Northumbrian period, with little real change being observed until post-medieval times. Crabtree (1990, 107), observing a similar degree of continuity in animal husbandry at Anglo-Saxon West Stow in Suffolk, suggests that, taken along with a growing body of documentary, linguistic and place-name evidence, there is a corresponding continuity in population from the preceding Romano-British period. The animal evidence from Dunbar may be viewed in a similar light, indicating rather less of a complete replacement by Anglian Northumbrians than of a gradual assimilation into the local British population. At the very least an adoption of some of the local customs of livestock management is implied.

TABLE 24A CATTLE BONE SIZE RANGE SUMMARY, PHASES 2-5

		Phases 2-5				
	Measurement	Min	Max	Mean	SD	n
Horn Core	max	38.5	44.5	41.5	3	2
	min	27.5	29	28.25	0.75	2
	BC	106	118	112	6	2
	OC					
Atlas	GL					
	GB					
	BFcr					
	BFcd					
Axis	BFcr					
	SBV					
	LCDe					
	LAPa					
	BPacd					
Scapula	BFcd					
	SLC	41.5	41.5	41.5		2
	GLP	54.6	65	58.4	4.72	3
	GL					
Humerus	Bp					
	Bd	76	90.5	83.2	5.92	3
	SD					
	GL					
Radius	Bp	74	77.5	75.75	1.75	2
	Bd					
	SD					
	GL					
Ulna	DPA	55	57	56	0.5	2
	SDO	47	47	47		2
Magnum	GB					

TABLE 24A (continued)

Unciform	GB	29	29	29		1
Metacarpal	GL					
	Bp	46	46	46		1
	Dp	28	28	28		1
	Bd					
	SD					
Innominate	LAR					
	LFo					
Femur	GL					
	Bp					
	Bd					
	SD					
Patella	GL					
	GB					
Tibia	GL	310	310	310		1
	Bp	34	34	34		1
	Bd					
	SD					
Os Malleolare	GD					
Astragalus	GLI	57.5	69.5	64	4.95	3
	Bd	35	44	38	3.21	5
Calcaneum	GL	114	139	126.6	10.97	5
Naviculo-cuboid	GB	47	58.5	53	4.71	3
Metatarsal	GL	198	217	207.5	9.5	2
	Bp	39	46.5	41.6	2.82	5
	Dp	37.5	41.5	39.66	1.43	6
	Bd	46	57	50.83	4.59	3
	SD	23.5	25	24.25	4.59	2
1st Phalange	GLpe	49	62.5	55.36	3.82	11
	Bp	24.5	35.5	28.6	3.5	10
	Bd	22	32.5	27	3.66	7
2nd Phalange	GL	32	40	36.19	2.55	8
	Bp	26	35.2	28.35	2.94	8
	Bd	21.8	30.5	24.33	2.92	6
3rd Phalange	DLS	50	57.5	53.33	3.12	3
	Ld	38.5	45	41.66	2.66	3

TABLE 24A (continued)

	Measurement	Min	Max	Phase 6		n
				Mean	SD	
Horn Core	max					
	min					
	BC					
	OC					
Atlas	GL					
	GB					
	BFcr					
	BFcd					
Axis	BFcr					
	SBV					
	LCDe					
	LAPa					
	BPacd					
	BFcd					
Scapula	SLC	45	52.5	49.5	3.18	4
	GLP	60	69	64	2.16	7
Humerus	GL					
	Bp					
	Bd	69.5	9	82.37	10.36	4
	SD					
Radius	GL	237	264	252	11.22	3
	Bp	60.5	74	69.31	4.01	13
	Bd	57.5	73.5	64.75	4.75	6
	SD	31	36.5	34.33	2.39	3
Ulna	DPA	55.5	59	57	1.38	5
	SDO	44	48.5	47.25	1.89	4
Magnum	GB	24	24	24		1

TABLE 24A (continued)

Unciform	GB	32	32	32		1
Metacarpal	GL	185.5	185.5	185.5		1
	Bp	51.5	58	54.75	3.25	2
	Dp	32	37	34.5	2.5	2
	Bd	48.5	63	53.87	5.5	4
	SD	34.5	34.5	34.5		1
Innominate	LAR	53	53	53		1
	LFo					
Femur	GL					
	Bp					
	Bd					
	SD					
Patella	GL	51.5	51.5	51.5		1
	GB					
Tibia	GL					
	Bp					
	Bd	52.5	61.5	55.7	2.23	14
	SD					
Os Malleolare	GD	31	31	31		1
Astragalus	GLI	56	66	60.77	2.77	23
	Bd	34.5	57	40.93	4.46	22
Calcaneum	GL	114	146	124.54	8.83	12
Naviculo-cuboid	GB	38	61	49.25	6.81	6
Metatarsal	GL	197	225	211	14	2
	Bp	39.5	51.5	43.5	3.85	7
	Dp	42.5	42.5	42.5		1
	Bd	47	60	51.66	4.4	9
	SD	24	24	24		1
1st Phalange	GL _{pe}	48.5	62.5	54.53	3.38	36
	Bp	23	34	26.57	2.48	37
	Bd	21.5	32	25.06	2.43	32
2nd Phalange	GL	32.5	40.5	36.34	2.43	19
	Bp	21.5	32	27.1	2.05	21
	Bd	19.5	26	22.08	1.84	13
3rd Phalange	DLS	56.5	83	66.23	8.14	11
	Ld	41	60	48.86	5.97	11

TABLE 24A (continued)

		Phases 7-13				
	Measurement	Min	Max	Mean	SD	n
Horn Core	max	38.4	73.5	52.77	11.9	9
	min	29.3	59	40.26	10.73	9
	BC	106	216	150.22	40.41	9
	OC	122	311	222.66	77.65	3
Atlas	GL	82.6	77	79.8	2.8	2
	GB	78	78	78		1
	BFcr	81.4	87	84.2	2.8	2
	BFed	71.3	89	85.15	3.85	2
Axis	BFcr	76	86	80.4	3.61	3
	SBV	46.7	46.7	46.7		1
	LCDe	106.4	106.4	106.4		1
	LAPa					
	BPacd	56.5	56.5	56.5		1
	BFcd	45	45	45		1
Scapula	SLC	38	63.5	46.06	4.94	29
	GLP	53.5	71.5	61.59	4.48	30
Humerus	GL					
	Bp	75	82.5	79.5	2.91	4
	Bd	68.8	90.6	74.63	5.39	16
	SD	31.6	31.6	31.6		1
Radius	GL	251	251	251		2
	Bp	64.2	89	74.62	6.11	34
	Bd	59.5	77	65.26	4.9	20
	SD	35.4	35.4	5.4		2
Ulna	DPA	52	71.5	56.63	6.21	7
	SDO	44	56.5	46.63	4.14	7
Magnum	GB	24.5	35	27.58	3.84	5
Unciform	GB	30.3	43	35.54	4.07	8
Metacarpal	GL	161	191	177.57	7.07	14
	Bp	49	61.2	52.98	3.81	26
	Dp	30	38.4	32.9	2.39	19
	Bd	48	67.3	56.19	5.98	34
	SD	26.4	51.3	32.79	6.57	11
Innominate	LAR	45	61.5	52.3	5.12	5
	LFo					

TABLE 24A (continued)

Femur	GL					
	Bp					
	Bd					
	SD					
Patella	GL	56	68	58.51	3.26	12
	GB	43.2	58	46.76	4.2	9
Tibia	GL					
	Bp	80.5	89.3	84.26	3.17	5
	Bd	43	69	56.87	5.24	37
	SD					
Os Malleolare	GD	34.8	34.8	34.8		1
Astragalus	GLI	53	70	61.15	3.1	74
	Bd	33.6	47	39.15	3	73
Calcaneum	GL	110	134	117.33	6.1	21
Naviculo-cuboid	GB	44.6	60.1	52.23	4.26	24
Metatarsal	GL	194	212	201.83	6.07	6
	Bp	35	51.7	43.53	3.28	29
	Dp	38	49.6	42.46	2.65	25
	Bd	46.2	62	50.22	4.06	20
	SD	23.7	27.4	25.73	1.88	4
	GLpe	46	70.2	54.97	3.48	180
1st Phalange	Bp	23	40.3	27.78	2.96	159
	Bd	21.4	36	25.93	2.56	166
	GL	31.5	43	36.76	2.4	109
2nd Phalange	Bp	23	35.5	28.17	2.9	115
	Bd	19	30	23.17	2.35	93
	DLS	47.5	81	62.95	7.53	59
3rd Phalange	Ld	38.7	67.5	48.86	5.59	60

TABLE 24A (continued)

	Measurement	Phase 14				
		Min	Max	Mean	SD	n
Horn Core	max	46.2	49	47.6	1.4	2
	min	33	37	35	2	2
	BC	125	131	128	3	2
	OC					
Atlas	GL					
	GB					
	BFer	84.5	84.5	84.5		1
	BFcd	80	80	80		1
Axis	BFer	77.5	77.5	77.5		1
	SBV	44	48	46	2	2
	LCDe					
	LAPa					
	BPacd					
	BFcd					
	SLC	35	60.5	47.55	6.96	11
Scapula	GLP	55.5	74	65.17	6.29	9
Humerus	GL					
	Bp					
	Bd	71	91	79.33	8.5	3
	SD					
Radius	GL					
	Bp	71.5	83	77.21	3.84	7
	Bd	63.5	84	70.5	9.55	3
	SD					
Ulna	DPA	69	69	69		1
	SDO					
Magnum	GB	24	27	25.5	1.5	2
Unciform	GB	28.5	36	32.62	2.88	4
Metacarpal	GL	161	191	180.66	13.91	3
	Bp	48	62	58.85	4.34	11
	Dp	31	39.5	34.69	2.69	8
	Bd	50	69.5	56.51	6.41	10
	SD	27.5	37.5	33.33	4.25	3
Innominate	LAR	50	56	52.37	2.22	4
	LFo					

TABLE 24A (continued)

Femur	GL					
	Bp					
	Bd	82	82	82		1
	SD					
Patella	GL	54	59.5	56.5	2.27	3
	GB	42	45	44	1.41	3
Tibia	GL	300	300	300		1
	Bp					
	Bd	53	67	56.77	3.51	13
	SD	33	33	33		1
Os Malleolare	GD	28	33	30.5	2.5	2
Astragalus	GLI	55.5	62.5	59.5	2.28	5
	Bd	36.5	41.5	38	2.03	4
Calcaneum	GL	115	137	126.5	7.59	5
Naviculo-cuboid	GB	46.5	57	50.1	3.64	5
Metatarsal	GL	194	209	202.33	6.24	3
	Bp	39	50.1	43.78	3.09	9
	Dp	39	46.9	42.49	2.42	7
	Bd	46.2	59.2	49.84	4.76	5
	SD	23	31.3	25.77	3.91	3
1st Phalange	GLpe	48.5	62	54.76	3.42	38
	Bp	23.5	36	27.65	2.73	36
	Bd	22	30	25.91	2.05	30
2nd Phalange	GL	32.9	42.5	36.16	1.92	19
	Bp	24	33	27.34	2.02	23
	Bd	21	28	22.89	1.82	17
3rd Phalange	DLS	43	69.5	59.41	8.35	12
	Ld	42.4	67.5	52.61	7.58	12

TABLE 24A (continued)

	Measurement	Phase 21				
		Min	Max	Mean	SD	n
Horn Core	max	43	57.5	48	0.25	3
	min	30.5	33	31.75	1.25	2
	BC	113	120	116.5	3.5	2
	OC	107	107	107		1
Atlas	GL	74	83	78.5	4.5	2
	GB	126	126	126		1
	BFcr	88.5	88.5	88.5		1
	BFcd	84	84	84		1
Axis	BFcr	86	86	86		1
	SBV					2
	LCDe					2
	LAPa					1
	BPacd					
	BFcd					
Scapula	SLC	42.5	45.5	44.33	1.31	3
	GLP	57	68.5	62.08	4.68	6
Humerus	GL					
	Bp					
	Bd	71.5	81	76.66	3.92	3
	SD					
Radius	GL					
	Bp	73.5	84	77.5	4.64	3
	Bd	62.5	75	66.79	3.73	7
	SD	38.5	38.5	38.5		1
Ulna	DPA					
	SDO					
Magnum	GB	26	26	26		1
Unciform	GB	30.1	35	32.37	2.02	3
Metacarpal	GL	170	188	179.8	7.03	5
	Bp	46.5	62	53.82	5.03	14
	Dp	27.5	60.5	35.56	9.3	9
	Bd	50.5	64	54.28	4.57	9
	SD	25	31	28.8	2.13	5
Innominate	LAR	47	62	54.2	5.04	5
	LFo					

TABLE 24A (continued)

Femur	GL					
	Bp					
	Bd	86	86	86		1
	SD					
Patella	GL	57	62.5	58.83	2.59	3
	GB	45	48	46.33	1.25	3
Tibia	GL					
	Bp	101	101	101		1
	Bd	51	68	59	6.78	6
	SD					
Os Malleolare	GD	35.5	35.5	35.5		1
Astragalus	GLI	55	67.8	59.87	3.32	24
	Bd	33	43.7	38.23	2.86	21
Calcaneum	GL	110	147	127.31	14.55	8
Naviculo-cuboid	GB	49	59	54.42	3.83	6
Metatarsal	GL	214	214	214		1
	Bp	42	51.5	45.41	3.67	7
	Dp	39	49	43.56	3.2	5
	Bd	47.5	62.5	53.69	6.54	7
	SD	39.5	39.5	39.5		1
1st Phalange	GL _{pe}	49	61	54.5	2.98	23
	Bp	23.7	32.5	27.82	2.31	21
	Bd	22.4	32.5	26.52	2.79	21
2nd Phalange	GL	32.5	43	36.14	2.71	20
	Bp	24	32	27.06	2.2	21
	Bd	19.5	26.9	22.27	1.96	20
3rd Phalange	DLS	60	82.5	69.08	7.79	13
	Ld	44.5	58	51.03	4.22	13

TABLE 24B SHEEP BONE SIZE RANGE SUMMARY, PHASES 2-5

	Measurement	Phase 2-5				
		Min	Max	Mean	SD	n
Horn Core	max	43	51.5	47.25	4.25	2
	min	27	41.5	34.25	7.25	2
	BC	110	152	131	21	2
	OC					
Atlas	GL	50	50	50		1
	GB	65	65	65		1
	BFcr	48	48	48		1
	BFcd	47	47	47		1
Axis	BFcr	43.5	43.5	43.5		1
	SBV	23.5	23.5	23.5		1
	LCDe	61.5	61.5	61.5		1
	LAPa	48	48	48		1
	BPacd	32.5	32.5	32.5		1
Scapula	BFcd					
	SLC					
	GLP					
Humerus	ASG					
	GL					
	Bp					
	Bd	26.5	33.5	30.3	2.89	3
Radius	SD					
	GL					
	Bp	27.5	31	28.75	1.35	4
	Bd					
Ulna	SD					
	DPA					
Magnum	SDO					
	GB					
Unciform	GB					
	GL					
Metacarpal	Bp					
	Dp					
	Bd					
	SD					
	LAR					
Innominate	LFo					

TABLE 24B

Femur	GL					
	Bp					
	Bd					
	Sd					
Patella	GL					
	GB					
Tibia	GL					
	Bp					
	Bd	22.5	28.5	25.5	2.45	3
	Sd					
Os Malleolare	GD					
Astragalus	GLI	31	31	31		1
	BD	18	18	18		1
Calcaneum	GL					
Naviculo cuboid	GB					
Metatarsal	GI					
	Bp	19	20	19.5	0.5	2
	Dp	17	20	18.5	1.5	2
	Bd					
1st Phalange	SD					
	GLpe	34	34	34		2
	Bp	10.5	11	10.75	0.25	2
	Bd	10.5	11	10.75	0.25	2
2nd Phalange	GL					
	Bp					
	Bd					
3rd Phalange	DLS					
	Ld					
				Phase 6		
	Measurement	Min	Max	Mean	SD	n
Horn Core	max	32.5	32.5	32.5		1
	min	19.5	19.5	19.5		1
	BC					
	OC					
Atlas	GL					
	GB					
	BFcr	40.5	40.5	40.5		1
	BFcd	43	43	43		1

TABLE 24B

Axis	BFcr	40.5	40.5	40.5		1
	SBV	23.5	23.5	23.5		1
	LCDe	48	48	48		1
	LAPa					
	BPacd					
	BFcd					
Scapula	SLC	18.5	23.5	20.62	2.01	4
	GLP	28.5	37	32.75	4.25	2
	ASG	20.4	24.5	22.45	2.05	2
Humerus	GL					
	Bp					
	Bd	24	31	27.42	2.35	6
	SD					
Radius	GL	139	141	140	1	
	Bp	29	32.5	29.66	1.28	6
	Bd	28	28	28		3
	SD	15	16	15.5	0.5	2
Ulna	DPA					
	SDO					
Magnum	GB					
Unciform	GB					
Metacarpal	GL	126	142.5	134.25	8.25	2
	Bp	118.5	23.5	20.92	1.81	6
	Dp	14	15.5	14.66	0.62	3
	Bd	24.5	26	25	0.71	3
	SD	13	14.5	13.75	0.75	2
Innominate	LAR	23.5	32	25.6	3.25	5
	LFo	25.5	30.5	28	2.5	2
Femur	GL					
	Bp	39	39	39		1
	Bd	35	35	35		2
	Sd					
Patella	GL					
	GB					
Tibia	GL					
	Bp					
	Bd	22.5	28	25.42	1.62	6
	Sd					
Os Malleolare	GD					

TABLE 24B

Astragalus	GLI	25.5	30	27.3	1.67	4
	BD	17.8	20	18.6	0.99	3
Calcaneum	GL	51	77.5	64.25	13.25	2
Naviculo cuboid	GB	23	23	23		1
Metatarsal	GI					
	Bp	18	20	19.25	0.75	6
	Dp	19	20.5	19.66	0.62	3
	Bd	19.5	23	21.25	1.75	2
	SD					
1st Phalange	GL _{pc}	32.5	34.5	33.33	0.85	3
	Bp	11.5	15.5	13	1.78	3
	Bd	11.5	14.5	13	1.5	2
2nd Phalange	GL					
	Bp					
	Bd					
3rd Phalange	DLS					
	Ld					
Phase 7-13						
	Measurement	Min	Max	Mean	SD	n
Horn Core	max	26	62.5	36.35	8.91	17
	min	18	46	23.76	7.23	16
	BC	72	182	98.25	30.8	12
	OC	72	95	85.3	11.5	2
Atlas	GL	40	54.2	48.3	5.24	4
	GB	53	60.7	50.03	3.56	3
	BFcr	43.4	49.8	46.13	2.14	6
	BFcd	38.5	49.8	44.2	4.27	5
Axis	BFcr	37.5	44.5	40.83	2.51	7
	SBV	21.5	24.5	22.82	1.11	5
	LCDe	56	61.1	58.55	2.55	2
	LAPa					
	BPacd					
Scapula	SLC	16.3	23	19.69	1.71	44
	GLP	27	35.5	31.83	1.94	28
	ASG	16.9	25	20.28	2.23	32
	BFcd					
Humerus	GL					
	Bp	35.5	42.5	38.62	2.97	4
	Bd	24.5	37	30.19	21	81
	SD					

TABLE 24B

Radius	GL	137.5	151	145.5	4.37	9
	Bp	27	35	30.81	1.78	39
	Bd	26	31	28.45	1.44	15
	SD	15	19	17.13	1.37	9
Ulna	DPA	20.5	29.5	26.16	2.45	9
	SDO	19.5	24	22.34	1.4	8
Magnum	GB					
Unciform	GB					
Metacarpal	GL	105	119	114.5	5.72	4
	Bp	21	24	22.31	0.97	18
	Dp	15.5	17.5	16.3	0.72	16
	Bd	23	27	25.2	1.33	8
	SD	12	16	14.35	1.47	4
Innominate	LAR	20	29	24.87	1.88	21
	LFo	32.6	36.5	34.91	1.51	6
Femur	GL					
	Bp	42	44.5	43.25	1.25	2
	Bd	34.5	37	36.17	1.18	3
	Sd					
Patella	GL	28.6	31.4	30	1.4	2
	GB	20	20	20		1
Tibia	GL	168	168	168		1
	Bp	27.5	44	37.72	5.49	5
	Bd	23	29	25.92	1.37	85
	Sd					
Os Malleolare	GD					
Astragalus	GLl	24.5	31	27.81	1.66	21
	BD	16.5	21	15.59	1.2	18
Calcaneum	GL	49	60.5	55.4	2.93	17
Naviculo cuboid	GB	22.4	22.5	22.45	0.05	2
Metatarsal	Gl	113	134	124.5	7.97	6
	Bp	16.6	22.8	19.28	1.15	20
	Dp	18.5	22	19.99	1.05	16
	Bd	19.9	26	23.4	1.93	6
	SD	10.8	13.5	11.86	0.9	5
1st Phalange	GLpe	31	35.5	33.5	1.45	9
	Bp	11	13	12.04	0.76	11
	Bd	9.5	12	1.86	0.95	7

TABLE 24B

		Phase 14				
	Measurement	Min	Max	Mean	SD	n
2nd Phalange	GL					
	Bp					
	Bd					
3rd Phalange	DLS					
	Ld					
Horn Core	max	24.2	54.5	34.34	10.94	5
	min	18	36.5	23.86	6.05	5
	BC	72	145	98.75	27.67	4
	OC	80	135	107.33	22.45	3
Atlas	GL					
	GB					
	BFcr	46	46	46		1
	BFcd	43.5	43.5	43.5		1
Axis	BFcr	40	40	40		2
	SBV	23	23	23		1
	LCDe	53.5	53.5	53.5		1
	LAPa	43.5	58	50.75	7.25	2
	BPacd	21.5	21.5	21.5		1
	BFcd	28	28	28		1
	SLC	16	27.5	20.64	2.13	9
Scapula	GLP	22.5	35	33.3	1.46	9
	ASG	16.5	31.5	21.19	2.49	8
	SD					
Humerus	GL					
	Bp	34.5	34.5	34.5		1
	Bd	28	33	29.84	1.39	18
	SD					
Radius	GL	139	146	142.5	3.5	2
	Bp	25	34.1	30.6	3.3	6
	Bd	26.5	29.5	28.23	1.27	3
	SD	17.5	17.8	17.65	0.15	2
Ulna	DPA	25.5	25.5	25.5		2
	SDO	22	22.5	22.25	0.25	2
Magnum	GB					
Unciform	GB					

TABLE 24B

Metacarpal	GL	119	119	119		1
	Bp	14.5	24.2	20.78	3.01	17
	Dp	14.5	17.5	16.6	1.11	5
	Bd	23.7	26.5	24.73	1.25	3
	SD	13.6	16	14.53	1.05	3
Innominate	LAR	21.4	27	24.8	2.44	3
	LFo	26.2	26.2	26.2		1
Femur	GL					
	Bp	39	39	39		1
	Bd	34.5	34.5	34.5		1
	Sd					
Patella	GL					
	GB					
Tibia	GL					
	Bp	39	39	39		1
	Bd	22.5	28.5	25.95	1.47	26
	Sd					
Os Malleolare	GD					
Astragalus	GLI	26	29	27.16	1.31	3
	BD	17.5	19	18	0.71	3
Calcaneum	GL	51.5	60.5	57.62	3.61	4
Naviculo cuboid	GB					
Metatarsal	Gl	123	135	129	4.9	3
	Bp	17.5	22.5	19.5	1.54	8
	Dp	18	22.4	20	1.55	6
	Bd	21	25.9	23.62	1.6	6
	SD	10.6	13.3	12.3	1.21	3
1st Phalange	GLpc	31	39.8	34.27	2.68	7
	Bp	11.5	12.5	11.85	0.33	6
	Bd	9.5	11.8	10.8	0.81	6
2nd Phalange	GL	19.5	19.5	19.5		1
	Bp	13	13	13		1
	Bd	10	10	10		1
3rd Phalange	DIS	24.5	28.5	26.5	2	2
	Ld	27	27	27		1

TABLE 24B

	Measurement	Phase 21				
		Min	Max	Mean	SD	n
Horn Core	max	25	54.4	36.83	12.73	3
	min	18.5	38.5	25.83	8.99	3
	BC	71	146	100	32.89	3
	OC					
Atlas	GL					
	GB	45	47	46	1	2
	BFcr					
Axis	BFcd	44	47.5	45.75	17.75	2
	BFcr					
	SBV					
	LCDe					
	LAPa					
	BPacd					
Scapula	BFcd					
	SLC	15.5	27.5	19.75	3.82	6
	GLP	30	32.5	30.83	1.18	3
	ASG	17	22	19.4	5.82	5
Humerus	GL					
	Bp	35	35	35		1
	Bd	25	31.5	28.33	2.08	11
	SD					
Radius	GL	139	141	140	1	2
	Bp	28	30.6	29.1	0.96	6
	Bd	21	29	26.42	2.71	6
	SD	16.5	16.5	16.5		2
Ulna	DPA	25.5	26.5	26	0.5	2
	SDO	20	23.5	21.75	1.75	2
Magnum	GB					
Unciform	GB					
Metacarpal	GL	113	113	113		1
	Bp	20	23	21.57	1.08	7
	Dp	15.5	17.5	16.37	0.89	4
	Bd	23	28	24.62	1.98	4
	SD	12.5	13	12.75	0.25	2

TABLE 24B

Innominate	LAR	23.5	25	24.25	0.75	4
	LFo	33	36.5	34.5	1.47	3
Femur	GL					
	Bp	39.5	42	40.75	1.25	2
	Bd	35	35	35		1
	Sd					
Patella	GL					
	GB					
Tibia	GL					
	Bp					
	Bd	23	27	25.52	1.22	14
	Sd					
Os Malleolare	GD					
Astragalus	GI1	25	26.8	25.95	0.64	4
	BD	17	18	17.5	0.5	2
Calcaneum	GL	51	57.5	53.46	2.18	7
Naviculo cuboid	GB	21.5	23.5	22.5	1	2
Metatarsal	GI					
	Bp	19	20.3	19.82	0.78	3
	Dp	19.8	20.5	20.15	0.35	2
	Bd	23	24	23.5	0.5	2
	SD					
1st Phalange	GI pe	32	45.5	35.25	3.56	8
	Bp	11	15.5	12.39	1.26	9
	Bd	9.5	12.5	11.21	0.96	7
2nd Phalange	GL					
	Bp					
	Bd					
3rd Phalange	DLS					
	Id					

TABLE 24C PIG BONE SIZE RANGE SUMMARY, PHASES 2-5

	Measurement	Phases 2-5				n
		Min	Max	Mean	SD	
Atlas	GL					
	GB					
	BFcr					
	BFcd					
Axis	BFcr					
	SBV					
	LCDe					
	LAPa					
	BPacd					
Scapula	BFcd					
	SLC					
	GLP					
Humerus	GL					
	Bp					
	Bd	33	33	33		1
	BT					
	HT					
	HTC					
	SD					
Radius	GL					
	Bp	27	27	27		1
	Bd					
Ulna	SD					
	DPA					
Metacarpal III	SDO					
	GL					
Metacarpal IV	Bp					
	Bd					
	GL					
Innominate	Bp					
	Bd					
	LAR	31	31	31		1
Femur	LFo					
	GL					
	Bp					
Tibia	Bd					
	SD					
	GL					
	Bp					

TABLE 24C

	Measurement	Min	Max	Phases 2-5		n
				Mean	SD	
Fibula	Bd					
	SD					
	GL					
	Bp					
Astragalus	Bd					
	GLI	39	39	39		1
	GLm	36	36	36		1
Calcaneum	GL					
Navicular	GB					
Metatarsal III	GI					
	Bp	15.5	15.5	15.5		1
Metatarsal IV	Bd					
	GI					
	Bp					
	Bd					
1st Phalange digit III/IV	SD					
	GL _{pe}					
	Bp					
1st Phalange digit II/V	Bd					
	GL _{pe}					
	Bp					
2nd Phalange	Bd					
	GL					
	Bp					
3rd Phalange	Bd					
	DLS					
	Ld					
	Measurement	Min	Max	Mean	SD	n
Atlas	GL					
	GB					
	BFcr					
	BFcd	54	54	54		1
Axis	BFcr	49	49	49		1
	SBV	27	49	38	11	2
	LCDe					
Scapula	LAPa					
	BPacd					
	BFcd					
	SIC	21	28.5	23.7	2.46	7
	GLP	30.5	40	34.57	2.82	7

TABLE 24C

Humerus	GL					
	Bp					
	Bd					
	BT					
	HT					
	HTC					
	SD					
Radius	GL					
	Bp	26	26	26		1
	Bd					
	SD					
Ulna	DPA					
	SDO					
Metacarpal III	GL	69.5	69.5	69.5		1
	Bp	15.5	15.5	15.5		1
Metacarpal III	Bd	16.5	16.5	16.5		1
Metacarpal IV	GL					
	Bp					
	Bd					
Innominate	LAR					
	LFo					
Femur	GL					
	Bp	64	64	64		1
	Bd					
	SD					
Tibia	GL					
	Bp					
	Bd	27.5	27.5	27.5		1
	SD					
Fibula	GL					
	Bp					
	Bd					
Astragalus	GLI	40.5	41	40.75	0.25	2
	GLm	26	26	26		1
Calcaneum	GL					
Navicular	GB	28	28	28		1
Metatarsal III	GI	88.5	88.5	88.5		1
	Bp	14	14	14		1
	Bd	16.5	16.5	16.5		1

TABLE 24C

Metatarsal IV	Gl					
	Bp					
	Bd					
Metatarsal IV	SD					
1st Phalange digit III/IV	GLpe					
	Bp					
	Bd					
1st Phalange digit II/V	GLpe					
	Bp					
	Bd					
2nd Phalange	GL					
	Bp					
	Bd					
3rd Phalange	DLS					
	Ld					
				Phases 7-13		
	Measurement	Min	Max	Mean	SD	n
Atlas	GL	38.2	43.5	40.85	2.16	2
	GB	78.4	78.4	78.4		1
	BFcr	53.5	57	55.43	1.26	3
	BFcd	48	52	50	2	2
Axis	BFcr	49	52	50.5	1.5	2
	SBV	33	35	34	1	1
	LCDe					
	LAPa					
	BPacd					
	BFcd					
Scapula	SLC	20	26.5	23.27	2.23	11
	GLP	31.5	38.5	34.71	2.46	10
Humerus	GL					
	Bp					
	Bd	35.9	48	39.53	3.27	15
	BT	28.5	40.25	32.32	3.43	7
	HT	25	30.85	27.66	1.91	7
	HTC	17	21.6	19.06	1.34	7
	SD					
Radius	GL					
	Bp	23	35.8	28.25	3.18	11
	Bd					
	SD					

TABLE 24C

Ulna	DPA					
	SDO					
Metacarpal III	GL	70.5	72.5	71.5	1	2
	Bp	15.5	19	17.7	1.33	5
	Bd	16	19	17.33	1.25	3
Metacarpal IV	GL	71.2	71.2	71.2		1
	Bp	15.3	15.3	15.3		1
	Bd	14.8	14.8	14.8		1
Innominate	LAR	27.4	36	30.04	2.46	10
	LFo	37	37	37		1
Femur	GL					
	Bp	51	51	51		1
	Bd	45	45	45		1
	SD					
Tibia	GL	190	190	190		1
	Bp	42.2	45.6	43.9	1.7	2
	Bd	26.6	30	28.44	0.92	8
	SD					
Fibula	GL					
	Bp					
	Bd					
Astragalus	GLl	31	42.5	38.29	3.31	8
	GLm	22.5	38	33.69	4.85	7
Calcaneum	GL	78	78	78		1
Navicular	GB	18	18	18		1
Metatarsal III	Gl					
	Bp					
	Bd	16.9	16.9	16.9		1
Metatarsal IV	Gl	82	91	86.5	4.5	2
	Bp	14	15.5	14.75	0.75	2
	Bd	15.5	17.5	16.5	1	2
	SD	12.5	12.5	12.5		1
1st Phalange digit III/IV	GLpe	33	37.4	34.67	1.6	8
	Bp	14	17.5	15.84	0.98	8
	Bd	13.5	17	15.23	1.12	9
1st Phalange digit II/V	GLpe	23	36.5	27.66	6.25	3
	Bp	10.5	17.5	13.16	3.09	3
	Bd	7.5	8.5	8	0.5	2

TABLE 24C

2nd Phalange	GL	20.5	23.5	22.25	1.15	4
	Bp	15.5	16.5	15.87	0.41	4
	Bd	13.5	15.5	14	0.87	4
3rd Phalange	DLS	27.5	28.5	27.83	0.47	3
	Ld	25.5	27	26.16	0.62	3
Phase 14						
	Measurement	Min	Max	Mean	SD	n
Atlas	GL					
	GB					
	BFcr					
	BFcd					
Axis	BFcr	48	49.9	48.95	0.95	2
	SBV	35.4	35.5	35.45	0.05	2
	LCDe					
	LAPa					
Scapula	BPacd					
	BFcd					
	SLC					
Humerus	GLP					
	GL					
	Bp	48	48	48		1
	Bd	36	41.5	38.75	2.75	2
	BT					
	HT	31	31	31		1
	HTC	20.5	20.5	20.5		1
Radius	SD					
	GL					
	Bp	28	31	29.55	1.14	4
	Bd	38	38	38		1
Ulna	SD					
	DPA	36.6	44.8	40.7	4.1	2
Metacarpal III	SDO	27.9	36.6	32.15	4.45	2
	GL					
	Bp					
Metacarpal IV	Bd					
	GL	69	69	69		1
	Bp	14	14	14		1
Innominate	Bd	15	15	15		1
	LAR	24.5	34.5	30.38	3.81	5
	LFo	41.5	41.5	41.5		1

TABLE 24C

Femur	GL					
	Bp					
	Bd	52.5	52.5	52.5		1
	SD					
Tibia	GL					
	Bp					
	Bd	25.5	28.3	26.9	1.4	2
	SD					
Fibula	GL					
	Bp					
	Bd	18.5	18.5	18.5		1
Astragalus	GLl	39.5	49.5	34.5	5	2
	GLm	35.9	44	39.95	4.05	2
Calcaneum	GL					
Navicular	GB					
Metatarsal III	Gl	81.5	83.5	82.5	1	2
	Bp	15	18	16.5	1.5	2
	Bd	15.5	17	16.25	0.75	2
Metatarsal IV	Gl					
	Bp					
	Bd					
	SD					
1st Phalange digit III/IV	GLpe	31.5	44	37.75	6.25	2
	Bp	16	17.5	16.75	0.75	2
	Bd	14.5	14.5	14.5		1
1st Phalange digit II/V	GLpe	23.5	23.5	23.5		1
	Bp	10	10	10		1
	Bd	7.5	7.5	7.5		1
2nd Phalange	GL	21.5	21.5	21.5		1
	Bp	14.5	14.5	14.5		1
	Bd	12	12	12		1
3rd Phalange	DLS					
	Ld					
Phase 21						
	Measurement	Min	Max	Mean	SD	n
Atlas	GL					
	GB					
	BFcr					
	BFcd					

TABLE 24C

Axis	BFer				
	SBV				
	LCDe				
	LAPa				
	BPacd				
Scapula	BFcd				
	SLC				
	GLP				
Humerus	GL				
	Bp				
	Bd	38.5	38.5	38.5	1
	BT				
	HT				
	HTC				
	SD				
Radius	GL				
	Bp				
	Bd				
	SD				
Ulna	DPA	48	48	48	1
	SDO	37.3	37.3	37.3	1
Metacarpal III	GL				
	Bp				
	Bd				
Metacarpal IV	GL				
	Bp				
	Bd				
Innominate	LAR				
	LFo				
Femur	GL				
	Bp				
	Bd				
	SD				
Tibia	GL				
	Bp				
	Bd	33.5	33.5	33.5	1
	SD				

TABLE 24C

Fibula	GL					
	Bp					
	Bd					
Astragalus	GLl	30	37	33.7	3.5	2
	GLm	34	34	34		1
Calcaneum	GL	74	74	74		1
Navicular	GB					
Metatarsal III	Gl					
	Bp					
	Bd					
Metatarsal IV	Gl					
	Bp					
	Bd					
	SD					
1st Phalange digit III/IV	GLpc					
	Bp					
	Bd					
1st Phalange digit II/V	GLpc	19	19	19		1
	Bp	10	10	10		1
	Bd	6.5	6.5	6.5		1
2nd Phalange	GL					
	Bp					
	Bd					
3rd Phalange	DLS					
	Ld					

TABLE 24D HORSE BONE SIZE RANGE SUMMARY, PHASES 2-5

	Measurement	Phase 2-5			n	
		Min	Max	Mean		
Atlas	GL					
	GB					
	BFcr					
	BFcd					
Axis	BFcr	70.5	70.5	70.5	1	
	SBV	36	36	36	1	
	LCDe					
	LAPa					
	BPacd					
Scapula	SLC					
	GLP					
Humerus	GL					
	Bp					
	Bd	70.5	70.5	70.5	1	
Radius	SD					
	GL					
	Bp					
	BFp					
	Bd					
	BFd					
Ulna	SD					
	DPA					
	SDO					
Unciform	GB					
Metacarpal	GL					
	GLI					
	LI					
	Bp					
	Dp					
	SD					
	Bd					
	Dd					
	Innominate	LAR				
		LFo				
Femur	GL					
	Bp					
	Bd					
	SD					

TABLE 24D

	Measurement	Phase 2-5			
		Min	Max	Mean	n
Patella	GL				
	GB				
Tibia	GL				
	Bp				
	Bd				
	SD				
Os Malleolare	GD				
Astragalus	GH				
	GB				
	BFd				
	LMT				
Calcaneum	GL				
Naviculo-cuboid	GB				
Metatarsal	GL				
	Bp				
	BFp				
	Dp				
	Bd				
	BFd				
	SD				
1st Phalange	GL	86	86	86	1
	Bp	54	54	54	1
	BFp	49	49	49	1
	Dp	41.5	41.5	41.5	1
	Bd	45.5	45.5	45.5	1
	BFd	42.5	42.5	42.5	1
	SD	32	32	32	1
2nd Phalange	GL	46	46	46	1
	Bp	51.5	51.5	51.5	1
	BFp	46	46	46	1
	Dp	32.5	32.5	32.5	1
	SD	42.5	42.5	42.5	1
	Bd	47	47	47	1
3rd Phalange	GL				
	GB				
	LF				
	BF				
	LD				

TABLE 24D

	Measurement	Phase 6			n
		Min	Max	Mean	
Atlas	GL				
	GB				
	BFcr				
	BFcd				
Axis	BFcr				
	SBV				
	LCDe				
	LAPa				
Scapula	BPacd				
	BFcd				
	SLC				
Humerus	GLP				
	GL				
	Bp				
Radius	Bd				
	SD				
	GL				
	Bp				
	BFp				
Ulna	Bd				
	BFd				
	SD				
	DPA				
Unciform	SDO				
	GB				
Metacarpal	GL	224	224	224	1
	GLl	219	219	219	1
	LI	214	214	214	1
	Bp	49	49	49	1
	Dp	31.5	31.5	31.5	1
	SD	32	32	32	1
	Bd	47.5	47.5	47.5	1
	Dd				
Innominate	LAR				
	LFo				
Femur	GL				
	Bp				

TABLE 24D

	Bd				
	SD				
Patella	GL				
	GB				
Tibia	GL				
	Bp				
	Bd				
	SD				
Os Malleolare	GD				
Astragalus	GH				
	GB				
	BFd				
	LMT				
Calcaneum	GL				
Naviculo-cuboid	GB				
Metatarsal	GL				
	Bp				
	BFp				
	Dp				
	Bd				
	BFd				
	SD				
1st Phalange	GL	83.5	83.5	83.5	1
	Bp	57.5	57.5	57.5	1
	BFp	48	48	48	1
	Dp	34	34	34	1
	Bd	51.5	51.5	51.5	1
	BFd	45.5	45.5	45.5	1
	SD	37	37	37	1
2nd Phalange	GL	46	46	46	2
	Bp	52	52	52	2
	BFp	43.5	43.5	43.5	2
	Dp	29.5	32	30.75	2
	SD	42	46	44	2
	Bd	46	49.5	47.75	2
3rd Phalange	GL				
	GB				
	LF				
	BF				
	LD				

TABLE 24D

		Phases 7-13			
	Measurement	Min	Max	Mean	n
Atlas	GL				
	GB				
	BFcr				
	BFcd				
Axis	BFcr				
	SBV				
	LCDe				
	LAPa				
	BPacd				
Scapula	BFcd				
	SIC				
	GLP	92	92	92	2
Humerus	GL				
	Bp				
	Bd				
	SD				
Radius	GL				
	Bp	77	84	80.02	4
	BFp	62	78	71.17	4
	Bd	70.2	75.3	73.5	3
	BFd	61	64	63	3
	SD	38	38	38	1
Ulna	DPA	61	61	61	1
	SDO	47	51	49	2
Unciform	GB				
Metacarpal	GL	207	218	212.5	2
	GL1	203	213	208	2
	L1	200	200	200	1
	Bp	47.5	52	48.37	4
	Dp	31	36	33.25	4
	SD	31.5	33.7	32.6	2
	Bd	46	47.2	46.6	2
	Dd	35	35	35	1
Innominate	LAR	47	63	59.66	3
	LFo				
Femur	GL				
	Bp				
	Bd				
	SD				

TABLE 24D

	Measurement	Phases 7-13			
		Min	Max	Mean	n
Patella	GL	63	63	63	1
	GB	64.5	64.5	64.5	1
Tibia	GL				
	Bp				
	Bd				
	SD				
Os Malleolare	GD				
Astragalus	GH	52	58	55.5	4
	GB	56	61	58.5	4
	BFd	47.8	53	49.82	4
	LMT	54.2	58.1	56.32	4
Calcaneum	GL				
Naviculo-cuboid	GB				
Metatarsal	GL				
	Bp	46	49.5	47.75	2
	BFp				
	Dp	37	37	37	1
	Bd	44	48	46	2
	BFd				
	SD				
1st Phalange	GL	73	84	78.87	8
	Bp	50.5	54.5	52.45	6
	BFp	47	52.1	49.2	6
	Dp	35	41.5	37.1	5
	Bd	35.5	46	42.78	6
	BFd	40	45	43.58	4
	SD	32	37.8	33.7	9
2nd Phalange	GL	45	47	46.1	5
	Bp	49.7	53.5	51.4	4
	BFp	43	48	46.15	4
	Dp	25.7	44	33.4	5
	SD	41.5	44.8	42.92	4
	Bd	45	57.5	50.93	3
3rd Phalange	GL				
	GB	69.5	69.5	69.5	1
	LF	36.5	45	35.75	2
	BF	25.5	25.5	25.5	1
	LD				
	HP	47	47	47	1

TABLE 24E DOG BONE RANGE SUMMARY, PHASES 2-6

		Phases 2-5			Phase 6		
		Min	Max	n	Min	Max	n
Atlas	GI						
	GB						
	BFcr						
	BFcd						
	GLF						
	Lad						
	H						
Axis	LCDe						
	BFcr						
	SBV						
	BFcd						
	LAPa						
Scapula	SLC						
	GLP						
	HS						
Metacarpal III	GI				62.5		1
	Bd				9.5		1
	SD				6.5		1
Innominate	IAR						
	SB						
Femur	GI						
	Bd	36.7		1			
Tibia	GI	165 est		1			

est = estimated

		Phases 7-13			Phase 14		
		Min	Max	n	Min	Max	n
Atlas	GI	30.5		1			
	GB	70		1			
	BFcr	28.5		1			
	BFcd	35.5		1			
	GLF	26		1			
	Lad	13		1			
	H	25		1			

TABLE 24E

Axis	LCDe				41	1
	BFcr				20.5	1
	SBV				15	1
	BFcd				13	1
	LAPa				29	1
Scapula	SLC	29.5	31.5	2		
	GLP	40		1		
	HS	151		1		
Metacarpal III	GL					
	Bd					
	SD					
Innominate	LAR				29	1
	SB				12.5	1
Femur	GL				201	1
	Bd					
Tibia	GL					

TABLE 24F CAT BONE SIZE RANGE SUMMARY, PHASES 2-6

	Measurement	Phases 2-5			Phase 6		
		Min	Max	n	Min	Max	n
Humerus	Bd				18		1
Innominate	LAR	9.9		1	11.5		1
	Measurement	Phases 7-13			Phase 14		
		Min	Max	n	Min	Max	n
1st Phalange	GL				1	11.5	

TABLE 24G DOMESTIC FOWL BONE SIZE RANGE SUMMARY, PHASES 2-6

		Phases 2-5			Phase 6		
		Min	Max	n	Min	Max	n
Coracoid	GL	47		1	49		1
	Lm	44.3		1	26.5		1
	BF	11		1	10		1
Scapula	GL						
	Dic						
Humerus	GL						
	Bp						
	Bd						
Radius	GL						
	Bd	5.8		1			
Ulna	GL						
	Bp						
	Did						
Carpometacarpus	GL						
	Bp						
	Did						
Innominate	LV						
	DiA				8.5		1
Femur	GL				67		1
	Bp						
	Bd				13.2	13.3	2
Tibio-tarsus	GL						
	Dip				16.6		1
	Bd				9.5	11	2
Tarso-metatarsus	GL						
	Bp						
	Bd						
		Phases 7-13			Phase 14		
	Measurement	Min	Max	n	Min	Max	n
Coracoid	GL	54.2	56.3	3			
	Lm	51.6	52	2			
	BF	11.7	13	2			
Scapula	GL	64		1			
	Dic	13.5		1	12		1
Humerus	GL	62.1	64.9	2			
	Bp	17.4	17.6	2			
	Bd	13.2	13.2	2	9.15		1

TABLE 24G

Radius	GL	60.1	64.1	2		
	Bd	6.9	7.1	2		
Ulna	GL	63	67.2	2		
	Bp	8.4	9.8	3		
	Did	9.95	10.5	2	8.5	1
Carpo- metacarpus	GL	34.5	36.8	4	32.7	1
	Bp	10	11.5	4	10.5	1
	Did	6	8.7	4	7.5	1
Innominate	LV	63.1		1		
	DiA					
Femur	GL	71.5		1	65.5	77
	Bp	14.4	16.2	2	14.5	16.5
	Bd	13.5	15.1	1	12.5	1
Tibio-tarsus	GL				109.5	1
	Dip	20		1	20	1
	Bd	10.7	11.9	2	11	1
Tarso- metatarsus	GL	66.2		1		
	Bp	11.5		1		
	Bd	12.4		1		

Phases 15-20

Phase 21

	Measurement	Min	Max	n	Min	Max	n
Coracoid	GL	51	53	3	48.7		1
	Lm	48.5	53.2	3	46		1
	BB	11	12.6	3	10.8	18.5	3
Scapula	Dic	11.5		1			
Humerus	GL	81.8		1	62.5	64	3
	Bp	22.9		1	16.2	20.5	3
	Bd	14.3	16	2	13.2	16.3	3
Radius	GL				69.3		1
	Bd	6.5	6.9	2	7.5		1
Ulna	GL	61.5		1	60.6	69.3	4
	Bp	8.2	9	2	8.1	9	3
	Did	8.5	9.8	4	8.6	9.5	5
Carpo- metacarpus	GL	32.7	35.9	2	34		1
	Bp	10.5	11.8	2	10		1
	Did	6.8	7.5	2	6.7		1

TABLE 24G

Innominate	DiA	7.8	8.4	2	5	9.5	2
Femur	GL	75.2		1	80.5		1
	Bp	17	17.2	2	17.5		1
	Bd	13	15.2	3	13.8	16	2
Tibio-tarsus	GL	98.4	98.4	2			
	Dip	10.1	10.1	2			
	Bd	10.5	11.9	6	9.6		1
Tarso-metatarsus	GL	48.7		1			
	Bp	9.8		1	11.8		1
	Bd	11.2		1			

Phases 22-23

	Measurement	Min	Max	n
Coracoid	GL			
	Lm			
	BB			
Scapula	Dic	61	66	2
Humerus	GL	63		1
	Bp	16.9		1
	Bd	13.2	14.4	4
Radius	GL	60.9		1
	Bd	6.4	6.6	2
Ulna	GL	61	62.7	2
	Bp	8.5	8.7	2
	Did	8.1	9.4	3
Carpo-metacarpus	GL			
	Bp	12		1
	Did	7.3		1
Innominate	DiA			
Femur	GL	71.2		1
	Bp	15.2		1
	Bd	14.2		1
Tibio-tarsus	GL	11.5		1
	Dip	21.6	22.3	2
	Bd	9.9	12.6	6
Tarso-metatarsus	GL			
	Bp			
	Bd			

TABLE 24H RED DEER BONE SIZE RANGE SUMMARY, PHASES 2-6

		Phases 2-5			Phase 6		
		Min	Max	n	Min	Max	n
Humerus	Bd				64.5		1
	BT				58		1
	HT				39		1
	HTC				30		1
Radius	GL				323		1
	Bp				60		1
	Bd				54.2		1
	SD				35.5		1
Ulna	DPA						
	SDO						
Femur	Bp						
Patella	GL						
Astragalus	GLI						
	Bd						
Calcaneum	GL						
Metatarsal	GI						
	Bp						
	Bd						
	SD						
1st Phalange	GL.pc	62		1			
	Bp						
	Bd	20.5		1			
2nd Phalange	GL						
	Bp						
	Bd						
3rd Phalange	DLS						
	Ld						

TABLE 24H

	Measurement	Phases 7-13			Phase 14		
		Min	Max	n	Min	Max	n
Humerus	Bd	63.5		1			
	BT						
	HT						
	HTC						
Radius	GL						
	Bp						
	Bd	48.5	49.5	2			
	SD						
Ulna	DPA	48		1			
	SDO	44.5		1			
Femur	Bp	83.7		1			
Patella	GL				26		1
Astragalus	GLI				51.5		1
	Bd				32.5		1
Calcaneum	GL				107		1
Metatarsal	GL	296		1			
	Bp	36.5		1			
	Bd	39.5		1			
	SD	23		1			
1st Phalange	GL _{pe}	48.6		1	63.5		1
	Bp	23		1	22.5		1
	Bd				21.5		1
2nd Phalange	GL				44		1
	Bp				21.5	22	2
	Bd				18		1
3rd Phalange	DLS				57		1
	Ld				51		1

TABLE 24I ROE DEER BONE SIZE RANGE SUMMARY, PHASES 7-14

		Phases 7-13			Phase 14		
		Min	Max	n	Min	Max	n
Scapula	SLC	18.3		1			
	GLP	30.4		1			
Humerus	Bd	31.5		1			
Radius	Bp	28.5		1			
Ulna	DPA				27		1
	SDO				22.5		1
Innominate	LAR	28		1			
	LFo	33.5		1			
	GL	197		1			
	SB	20.5		1			
Femur	Bp	45.5		1			

THE ENVIRONMENTAL SAMPLES

Alan D Fairweather

INTRODUCTION AND METHODOLOGY

Fourteen soil samples were selected, at the discretion of the excavators, from contexts in Phases 2, 7, 8, 11, 13 and 15. Sub-samples of 500ml volume were taken from each of the selected samples. These sub-samples were soaked and wet-sieved through sieves of 2mm, 1mm, 500 micrometres and 300 micrometres mesh size, to produce four fractions. Plant and other macrofossils obtained from these fractions were then examined microscopically.

All of the sub-samples were found to contain botanical remains, although these were scanty. This paucity of plant macrofossils may have occurred because soil conditions did not favour their preservation, rather than that a lack of botanical material had been deposited. It is probable that high concentrations of organic remains containing calcium, such as occurs in animal bone and molluscan shell, would tend to increase the pH of the soil. Indeed, some wood fragments (Context 478) had been partially mineralized, indicating a high

concentration of salts. Such soil conditions as appear to have obtained at the site are inimical to the preservation of uncarbonized plant material unless the deposits are waterlogged. Thus, most of the plant material which survived at the site did so because it was carbonized, and indeed very little was found preserved in a waterlogged condition.

All of the cereal grains were found in a carbonized condition. Barley, in its hulled form (*Hordeum vulgare*) was present in most samples. Oats (*Avena* sp.) were also present, although less frequently than barley. Wheat was represented only in Context 10852. Hazelnut (*Corylus avellana*) fragments occurred in some samples, but were not frequent.

The presence of ruderal plant species associated with disturbed or bare soil, for example, chickweed (*Stellaria media*) is unsurprising. Fragments of mammal and fish bone as well as pieces of shell occurred in most of the samples.

DISTRIBUTION OF PLANT REMAINS BY PHASE

PHASE 2 (IRON AGE)

Context 10494 (Fill of Middle Ditch)

The sample consisted almost entirely of wood charcoal fragments, one of which had cuts on the surface. There were no other identifiable plant remains nor were there any bone or shell fragments.

PHASE 7 (NORTHUMBRIAN)

Context 1486 (Stone lined pit)

No cereal remains were present. Carbonized capsules of *Calluna vulgaris* (heather/ling) and one carbonized seed from a legume, probably from vetch or clover, (dimensions 2mm by 2mm) were found. Wood charcoal and bone fragments were the only other organic components of the sample.

PHASE 8 (NORTHUMBRIAN)

Context 434 (Under Courtyard 6, over Building 4)

Cereals were represented only by one carbonized grain of *cf*

Hordeum (barley). Also present were twigs and leaves of *Calluna vulgaris*. A large part of the volume of this sample was made up of wood charcoal fragments.

Context 478 (Fill of possible metalworking pit in Building 4)

Cereals were represented by one carbonized and abraded grain of *cf* *Hordeum*. Other possible food debris consisted of one carbonized shell fragment of *Corylus avellana* (hazelnut). The sample contained no waterlogged material apart from wood charcoal and some mineralized wood fragments. Other organic materials were bone and shell fragments.

Context 1257 (Destruction of Building 3)

The cereal component of this sample consisted of three carbonized grains of *Hordeum* and eight further fragments thought also to be *Hordeum*. Eight carbonized *Avena* (oat) grains were also present, as well as one cereal fragment which it was not possible to identify further. One carbonized shell of *Corylus avellana* was also found. Weed species were represented by one fragment from *Chenopodium album* (fat hen). Waterlogged material was absent from this context. The bulk of the organic fraction consisted of

wood charcoal fragments. Sclerotia of the soil fungus *Cenococcum geophyllum* were also noted.

PHASE 11 (NORTHUMBRIAN)

Context 10807 (Occupation or levelling on Courtyard 3)
Present were about fifteen carbonized grains of *Hordeum vulgare*, two *Avena* carbonized grains and two *cf. Triticum* (wheat) carbonized grains. The cereal grains from this sample were thus all carbonized; waterlogged material was absent. One abraded macrofossil which was possibly a seed, and a small quantity of wood charcoal fragments were also found. Other organic remains were fish bone and shell fragments.

PHASE 13 (NORTHUMBRIAN)

Context 3033 (Primary fill of the earlier phase of Anglian ditch)
The sample had very little organic material and was entirely composed of small fragments of wood charcoal.

Context 10386 (Fill of metalworking pit in Building 9)
Only a small quantity of organic matter was present in this sample, consisting of bone chips and small fragments of wood charcoal.

Context 10857 (Building 8)
Cereal remains present in this sample were one *Avena* sp. grain, and one of *cf. Hordeum*. Weed species were represented by one fruit of *Rumex acetosa* (sourcrops/sorrel). The sample contained no waterlogged material. The organic component consisted of fragments of wood charcoal, bone and shell. There was in addition, a portion of an uncarbonized woodlouse (*Asseius* sp.) as well as an insect larval skin.

Context 10869 (Primary fill of burnt trench 10789)
Two carbonized *cf. Hordeum* grains were present. Weed species were represented by one seed of *Spergula arvensis* (corn spurrey) and one seed of *Stellaria media* (chickweed), both of which were also carbonized. Waterlogged material was absent from the sample. Other organic matter was only found as occasional fragments of wood charcoal, shell and bone.

PHASE 15 (MEDIEVAL)

Context 366 (Ash deposit above stone hearth)
All of the cereal remains were found to be carbonized. These were five *Hordeum* grains and three fragments of *cf. Hordeum*, two grains of *cf. Triticum* and three of *Avena*. Remains from another plant of economic importance were two carbonized seeds of *Linum usitatissimum* (flax). One of these seeds was at the lower end of the size range for this species while the other was incomplete and damaged. Ruderal species were represented by one seed of *cf. Galeopsis tetrahit* (common hemp nettle) and one carbonized seed of *Plantago lanceolata* (ribwort plantain). In addition one unidentified carbonized bud was also found. No waterlogged material was found in this sample. Possible fish bone and shell fragments were present, one of the former being embedded in a mortar or ash concretion.

Context 10335 (Primary fill of post pit 10671)
Apart from some carbonized grain fragments of *cf. Hordeum vulgare*, very little identifiable material was present. The only other organic remains were wood charcoal, mammal bone fragments and a possible fish vertebra.

Context 10852 (Fill of post pit 10775)
Seven abraded and damaged carbonized cereal grains (*Hordeum/Triticum* (barley/wheat)) were present. Four of these were attributable to *Triticum cf. aestivum*. One carbonized abraded grain of *cf. Avena* sp. was also noted. In addition, a carbonized fragment of a seed with prominent ridges of *Apiacea*, was present. Apart from the cereal grains and fragments of wood charcoal, bone and shell, the sample contained no other organic material.

Context 10855 (Fill of post pit 10775)
Avena sp. was represented by two abraded carbonized grains and one fragment of awn. Two *cf. Hordeum* grains as well as carbonized and abraded *Hordeum* fragments were also recorded. The sample contained little organic matter and no waterlogged material. There were scattered fragments of wood charcoal and some bone and shell fragments.

DISCUSSION BY SPECIES

CEREALS

Avena spp: Oat grains of various sizes were found, although the diagnostic chaff parts were absent. The larger grains could have come from *Avena sativa* (the white oat) or *A. strigosa* (the grey or bristle oat). The smaller grains may either be from *A. fatua* (wild oat) or secondary grains of the former two cultigens. The historical literature would indicate these were *A. strigosa*, as there seem to be no discriminative historical records of *A. sativa* before 1548 (Symon 1959, 58). This does not, however, discount this species being grown before that time. Indeed at the medieval site at 75 High Street, Perth, the majority of remains of oats came from *A. sativa* while none was identified as having come from *A. strigosa* (Fraser & Smith, forthcoming).

Hordeum vulgare: Barley grains were all attributable to the hulled type. Whether these were six-row or not could not be determined with certainty; no grains were well enough preserved to demonstrate the expected ratio of 2:1 twisted to straight grains, seen in lateral grains. No other diagnostic parts were found. The early date of the remains would indicate that the barley found here was most probably the six-rowed bere type.

Triticum cf. aestivum: Symon (1959, 58) quotes records of wheat being grown in the 13th century at Coldingham, Berwickshire, on monastery lands, when a claim was made against the invading English army of Edward I for the destruction of 48 quarters of

wheat as well as oats and barley. Wheat was not common north of the Forth at this time except in the kinder climes of Moray. Some of the grains retrieved were attributable to this species, but given the distorted and abraded condition of most of the cereal grains, a more tentative identification is circumspect. The most confident identification is of four grains from Context 10852 and perhaps also from Context 366. There was no evidence for rye (*Secale cereale*) having been present although it was a common crop in medieval Scotland.

OTHER PLANTS USEFUL TO MAN

Calluna vulgaris: Heather (ling) was present as small twig fragments and leaves in Context 434 and as capsules in Context 1468, making up nearly all the identifiable remains in the latter sample. Heather may have been collected for use as roofing and bedding material.

Corylus avellana: Hazelnuts were only found as one carbonized fragment in each of Context 1257 and Context 478. The nuts presumably formed part of the human diet. Hazelnut shells are common finds on British archaeological sites from the Mesolithic onwards (Dimbleby 1978, 34).

Linum usitatissimum: Two seeds comparable to flax were found in Context 366. Although one seed was damaged, its outline and surface contours confirmed the identification. The other seed,

although small and abraded, was most probably the same species on the basis of its shape. As the plant is very unlikely to survive as a self seeding volunteer, the presence of flax on the site is due either to its importation from elsewhere, or to the crop having been grown near the site.

RUDERAL OR WEED SPECIES

Plantago lanceolata: One seed of ribwort plantain was recovered from Context 366. This is a common weed of waysides and field edges. One isolated seed from one sample requires no special interpretation as it is a common species in open unshaded ground and in addition is a prolific seeder.

Chenopodium album: Only one seed of fat hen was present, in Context 1257. This species is associated with recently disturbed soil.

Spergula arvensis: Spurrey is a common arable weed of arable and disturbed ground. If found in large quantities it is indicative of acid soil, however in this case, only one seed occurred in Context 10869.

Stellaria media: One seed of chickweed, a very common weed of disturbed ground, was found in Context 10869.

Galeopsis tetrahit: The common hemp nettle was represented by only one seed in Context 366.

Rumex acetosa: Sourocks (also known as sorrel or sour dock) is a common pasture weed and was represented here by one seed from Context 10857. As with the other weed species found at the site, one isolated seed does not justify any special interpretation.

MISCELLANEOUS PLANT REMAINS

Context 10807 yielded one blown and abraded seed which was not further identifiable. Context 10852 contained a fragment of a strongly ridged entity which was possibly an umbellifer (cow parsley/carrot family). Context 366 contained a bud too damaged for identification and in Context 1486 a legume remained unidentified.

THE CEMETERY

David Perry

In February 1993, a cemetery was uncovered by workmen digging trenches by machine for a system of field drains in a grassed over area between Lauderdale House and the newly-built leisure pool (illus 140). The cemetery comprised both long cists and unlined, earth-cut graves, although one skeleton, in an apparently unlined grave (Burial 29 in the side of Trench 7), had a capstone above its feet. Investigation was limited to the lines of the trenches, with excavation beyond where necessary to recover skeletons or parts of them. At least 26 cists and 21 inhumations were observed, although it is possible that a skull, of Burial 31 in the western side of Trench 4, was part of Cist 26 in the eastern side. (A skull, SKL 6, in Trench 11 may have been disturbed from a burial by the cutting of Cist 23.) Of these, only one cist with its skeleton was completely excavated, SKL 5 from Cist 10 in Trench 9. Parts of the skeletons from eight cists and four inhumations were recovered as well as a considerable quantity of machine-disturbed bone. The machining revealed that at the south-eastern corner, below the grass, there was a considerable area of mortared rubble, up to 0.70m deep. This had not totally destroyed the cemetery here, as a skull (Burial 45) was seen beneath this rubble in the side of the manhole, Trench 12, and two skeletons (Burials 42 and 43) survived in the sides of Trench 10 beneath a shallower rubble dump.

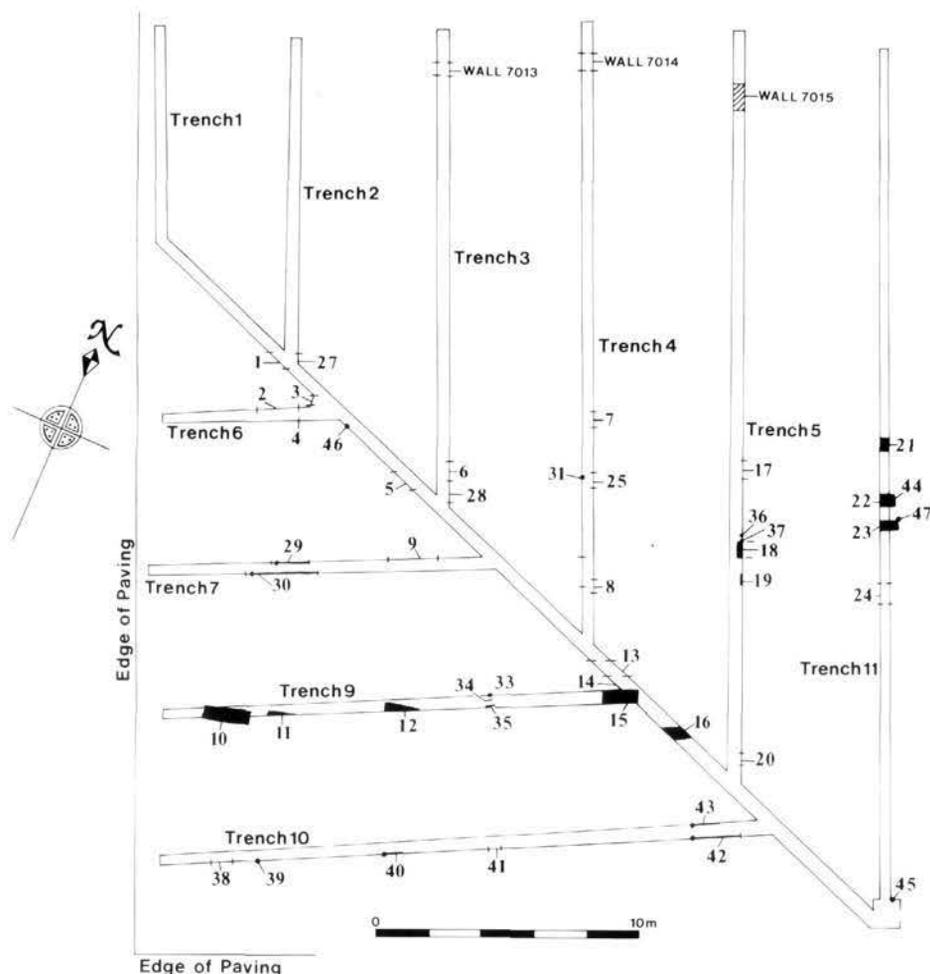
No grave cuts were found by excavation for either the cists or the dug graves, although cuts for the latter were observed in the sides of the trenches elsewhere. Owing to the limited uncovering of cists and burials, alignment is difficult to assess, but from Trench 9, where four cists were revealed, the cists seem not to have been on a strict west/east alignment, but on a more south-west/north-east alignment, and even these were not uniform. All skeletons excavated, or where it could be determined in the sides of the trenches, had their skulls at the west and their feet to the east.

The cists were formed of sandstone slabs, 0.06m-0.10m thick, set on edge, single stones at the head and feet and two to four stones along the side,

with capstones laid across the grave. One of the stones had been re-used from a building, for mortar was seen adhering to the outer face of the head stone of Cist 15. Large fragments of mortar were also found in the fill of Cist 16, sealed by a capstone, but these may have been intrusive, filtering into the cist with the fill of brown sand. Mortar was also found in the fill of Cist 21, but that cist had had capstones removed during the redevelopment of the site in 1990-1. As the cists were presumably not backfilled before the capstones were placed over the skeleton, their fills and anything in them, must have filtered inside later. A perforated slab, possibly a re-used quern, was observed in a mound of stones disturbed during the machining at the junction of Trenches 6 and 8 and could have come from Cists 2, 3 or 4. In Cist 21, the excavated northern side slab was very soft, and the western slab had dissolved into clay.

Some capstones lay immediately under the turf, and others were deeply buried. Presumed capstones of an unexcavated cist lay at the base of the western end of Trench 10 at a depth of over 0.64m. Some cists were missing all or part of their covering. This disturbance may have taken place in the 19th century or earlier. However, in at least one instance (Cist 21) it occurred more recently, probably during the removal, in 1990-1, of the surface of the car park which occupied the former parade ground of the army barracks (a lump of tarmac was redeposited in soil immediately above the western end of the south-western side stone). The capstones of Cists 11 and 12 appeared to taper towards the feet, but, as they were not fully excavated, it is not possible to confirm this impression. Cist 23 had a tapering capstone at its foot. The side stones of Cist 21 appeared to taper towards the feet. Cist 15 appeared to be a rectangle, although only one capstone survived at the skull end, and that lay within the cist.

Although the excavated cists had stone linings and capstones, none had definite stone floors. There were two instances of bones lying above slabs in the sides of Trenches 6 and 8 (Cists 1 and 2) but it is not clear if these were genuine paved cists or redeposited



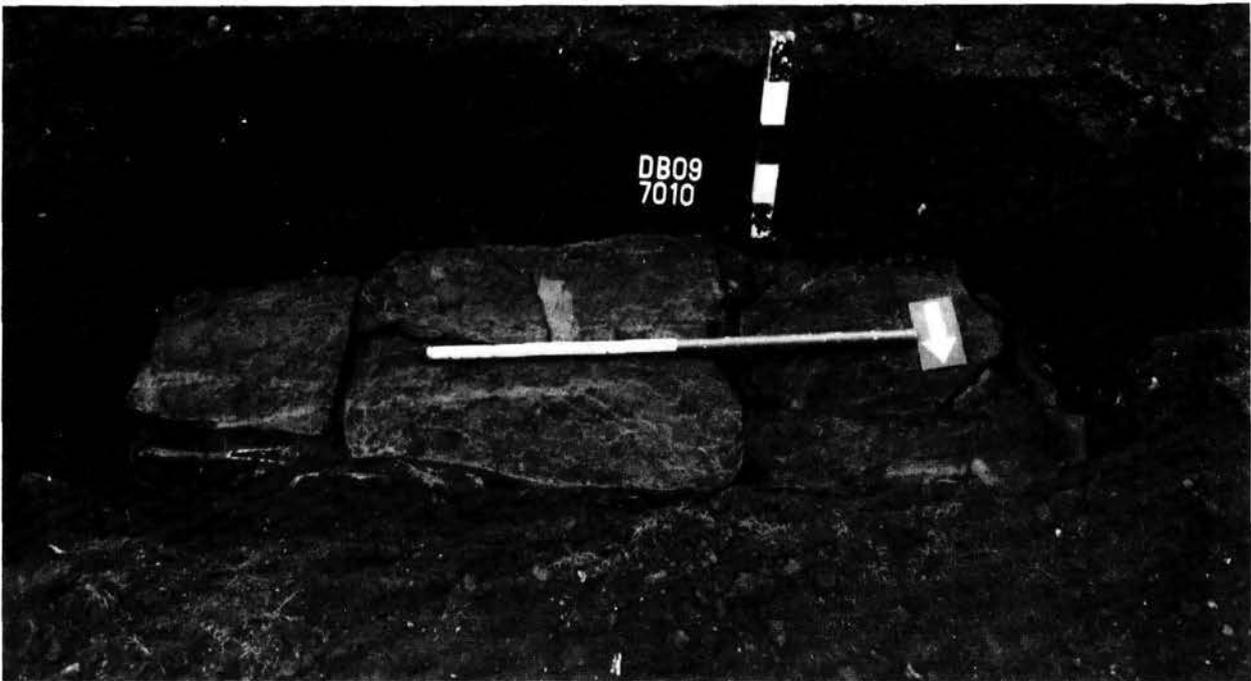
1-25 Cists
 26 Unplanned Cist in West part of Trench 10
 27-47 Burials

Illus 140
 Plan of Castle Park cemetery.

bones or burials on top of capstones. Post-excavation analysis of disturbed bones (SKL 1), probably from Cist 2, revealed that there was more than one burial involved, possibly one on top of the cist as well as one in it. This practice, burial on top of a cist, occurred at least once, where a skeleton, SKL 7, was found on top of the capstones of Cist 22. Cist 14 appeared to have a paved floor, but it is possible that it was an inhumation on top of capstones which had collapsed into the cist (the skeleton, SKL 12, seemed rather high compared with the apparent side stones). No capstones survived above the disturbed skeleton from which one of the lower right leg bones was missing. A similar bone was found lying on a gravel surface nearby and may have been the missing one. This disturbance is unlikely to have been recent, i.e. during the redevelopment of Castle Park, but may have occurred in 1801 (Miller 1830, 6; Turner Simpson & Stevenson 1981, 15) or later in the 19th century.

Three cists did have floors: 10, of loose, orange-brown shelly sand; 13, of white sand; 21, of mixed pea-grit and crushed shell. A floor of white sand was also noted in Burial 32 in the side of Trench 8.

Although the burial of the skeleton (SKL 7) on top of Cist 22 is a clear indication of an inhumation post-dating a cist, there were two instances where cists had disturbed earlier burials, presumably inhumations since there was no evidence of cists: Cist 18 and Burial 37 in Trench 5, and Cist 23 and SKL 6 in Trench 12. Further evidence of later burials disturbing earlier ones is apparent in the remains of three adjacent inhumations: Burial 33 (SKL 11), Burial 34 (SKL 15) and Burial 35 (SKL 14) in Trench 9. All that survived of Burial 34 were the lower legs, the rest having been machined away. Burials 33 and 35 were partly in the sides of the trench, the former having its right hand placed over the pelvis. In addition, there were three adjacent cists



Illus 141
Cist 10 with capstones.

(13, 14 and 15) at the junction of Trenches 8 and 9, Cist 13 apparently removing the northern side stones of 14, although 13 was actually more deeply set into the ground than 14.

Nevertheless, there is also some evidence of orderly burial in rows. In the eastern side of Trench 5, the three head ends of Cists 17, 18 and 19 were visible as well as two skulls (Burials 36 and 37). Trench 11 passed through the lower limbs of three cists (21, 22 and 23) and of one inhumation (Burial 44).

The completely excavated cist (10) had four stone slabs, two on each side, 0.80m long, a single slab at the head, 0.50m long, and another at its foot, 0.35m long (illus 141). The slabs were 0.40m high and 0.05m thick and were all of red sandstone. There were three capstones, two of which were shattered. They tapered towards the feet. A single human long bone lay at the north-eastern corner of the capstones, by a broken edge. It was not disturbed from the skeleton in the cist, but came from elsewhere and appeared to have been deliberately placed beside the broken capstone. The fill of the cist was loose, light brown, sandy, clay loam with occasional fine pebbles, small fragments of sandstone and charcoal flecks. The fill became darker and more charcoal-laden with depth. The soil and charcoal had presumably filtered down between the stones, for there was insufficient charcoal for this to have been a charcoal burial. The

skeleton (SKL 5) was fully extended on its back, with the hands over the pelvis but uncrossed.

This cist contained a remarkable feature. The skull was protected by a box composed of two thin slabs on either side of the skull, with a third lying across them forming a mini capstone above the skull (illus 142-3). The box was presumably designed to protect the skull and keep it upright. It failed to do either, for the skull had fallen to face northwards and the mini capstone was shattered, breaking the skull. A fragment of iron was found by the skull and a copper alloy fragment between the femurs. Two sherds of White Gritty ware were found in the fill of the cist.

Cist 4, in the side of Trench 6, had a possible skull-flanking stone beneath the capstone, adjacent to the headstone. A skull (Burial 46), in the side of Trench 8, also appeared to have a flanking stone on its southern side, which had fallen outwards (towards the south), but none on the northern side. No evidence of a cist was visible around the skull or in the opposite side of the trench, and the flanker was too thin (0.02m) to be a cist side stone.

An apparent limit to the cemetery is suggested by the absence of graves in the northern parts of the trenches. Wall foundations visible at the northern ends of Trenches 3, 4 and 5 are unlikely to have been a boundary for the cemetery as they were so far (over



Illus 142
Cist 10 with mini capstones over skull.

12m) from the northern limit of the cists. Also, in Trench 4, the wall was built over a wide infilled edge, possibly of a ditch. Machining in Trench 11 beyond the limit of the cists was not monitored, and the provenance of a skull at the northern end of that

trench is unknown. No cists or other bones were evident in the sides of the trench at this end, and the skull may have been redeposited from previous disturbance of the site.

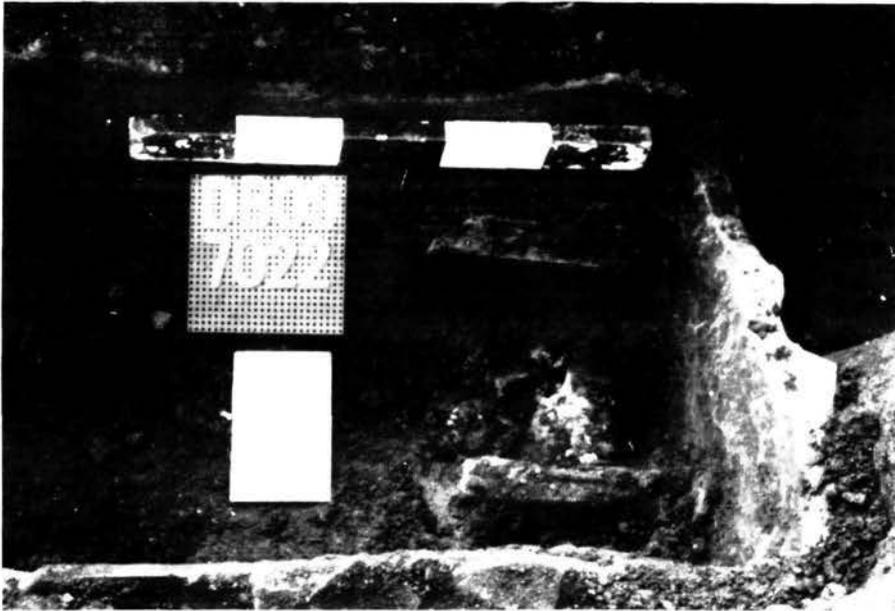
DISCUSSION

St Abb's upon the Nab,
St Helen's upon the Lea,
St Bae's, upon Dunbar sands,
Stands nearest to the sea.

This rhyme is quoted by the minister of Dunbar in his account of the parish in September 1835 (*NSA* 1845, 89n). The minister of the nearby parish of Cockburnspath and Old Cambus, Berwickshire gives a prose version of the tradition behind the rhyme in his account of that parish in December 1834 (*ibid.*, 304-5). The story is that three Northumbrian princesses fleeing from disorder in their kingdom were shipwrecked off St Abb's Head and given shelter by a bishop or prior at Coldingham. As a thanksgiving for their safety, each vowed to build a church near the sea. Of the three churches in the rhyme, only St Abb's has definite Northumbrian origins, for it is mentioned by Bede (Sherley-Price

1970, 239). The surviving ruins of St Helen's, Old Cambus, date from the 12th century with later additions (RCAHMS 1915, 24). The churchyard contains two hogback monuments of 11th-century date (Laing 1974, 231). No church is mentioned in King Edgar's grant of Old Cambus to Durham in 1095 (Lawrie 1905, No XV), but that may be simply because it was not then the practice to list the pertinents of a place. A coin hoard with coins of King Athelstan of Wessex (924-39), found in the churchyard about 1831 (*NSA* 1845, 305), is the only indication of a presence here before the 11th century.

The story is no doubt nonsense, and is of doubtful relevance to Castle Park. The natural subsoil at Castle Park is hardly sand, more a degraded sandstone. In contrast, at the south end of the town, the present parish church probably stands on the site of its medieval predecessor on natural beach sand,



Illus 143
Cist 10 with mini capstone
removed, towards S.

as evidenced by the placename 'links' and by the sand revealed during trial excavations in 1996 on the site of the Golf Hotel between Church Street and Lamer Street. The importance of the rhyme lies in the fact that it commemorates a tradition of an early church site at Dunbar. The medieval parish church was demolished in 1819 to make way for the present building, but it was described as 'a church partly Gothic and partly Saxon' (Miller 1830, 191). By 'Saxon' Miller presumably meant the Romanesque or Norman style of the 12th or early 13th century.

The only surviving association of St Bey with this end of the town is her well and cave on the western side of Castle Park. The well is described as 'Excellent Spring Water' on a map of 1837 (NLS, 'Plan of the Dunbar Castle and Bay Rocks and Showing the Proposed Great Line of Breakwater Pier and Harbour 1837', Stevenson Maps, Ms 5847, nos 35-36). Her well gives its name to Bayswell Road and Bayswell Park. Little is known of her, but she is associated with St Bee's Head, Cumbria, where she founded a monastery, and with Little Cumbrae in the Firth of Clyde (Mackinlay 1914, 192, 260-1). She is said to have been a 7th-century Irishwoman and is identified with Begu, a 7th-century nun at Hackness, Yorkshire, mentioned by Bede (Sherley-Price 1970, 249).

Some 12 long cist cemeteries in East Lothian were listed by Audrey Henshall (1956, 278-81) out of a total of 50 from south-east Scotland (illus 150). To these can be added the cemeteries at Gullane, where six cists were found (Henshall & Mountain 1972, 1); Prestonpans, where one cist was excavated and parts

of at least four skeletons were recovered from an unknown number of destroyed cists (Close-Brooks 1979, 13-14); and Four Winds, Longniddry, where 24 long cists and one inhumation were found (Dalland 1992, 198, 199). There may have been a cemetery at Dryburn Bridge where four long cists were found in road works in 1972 near the site of a possible cist investigated in 1964 (Close-Brooks 1979, 7-9). As well as these new East Lothian cemeteries, an extensive long cist cemetery was excavated at Hallowhill, St Andrews, in 1975-7 (Proudfoot 1996).

Of the East Lothian cemeteries, two were found in or near Dunbar, at Belhaven and Kirkhill Braes. In addition to these cemeteries of six or more cists, individual long cists have been found at East Links, Dunbar (Hardy 1891, 320; Close-Brooks 1972, 21); Long Craigs, Belhaven (Spearman 1986, 20) and between Stafford House and the sea (Hardy 1891, 320) (see illus 152).

The presence of a cemetery at this end of the town was not unexpected. Redeposited human bones had been found in the DB88F and DB04A excavations in 19th- and 20th-century deposits. A watching brief in 1991 on a pipe trench to the east of the present cemetery had revealed three burials, as well as a large area of machine-disturbed human bones beside the trench. Two of the burials were taken by the police (*East Lothian Courier*, 3 May 1991). A cemetery was uncovered in 1801 during levelling operations in front of Lauderdale House (Miller 1830, 6), but the presence of stone shot led to the impression that it was late medieval. No mention is made of stone

coffins. Also grave stones carved with swords and other devices, found in the 19th century near the castle, seemed to confirm this late dating (Turner Simpson & Stevenson 1981, 15). All these were assumed to have been part of a cemetery related to the castle as there was nothing to indicate an earlier cemetery. Therefore, the discovery of the long cists in 1993 came as a surprise. However, it is quite clear from a comparison of Miller's meagre description and the source for the carved graveslabs (Carfrae 1803, 279-80) that they refer to the same cemetery. Both refer to the discovery of stone balls, 'some as large as 24 pounds'. These were presumably the products of medieval sieges at the castle. Equally it is clear from Dr Carfrae's account, apparently derived from the workmen involved, that it was a long cist cemetery.

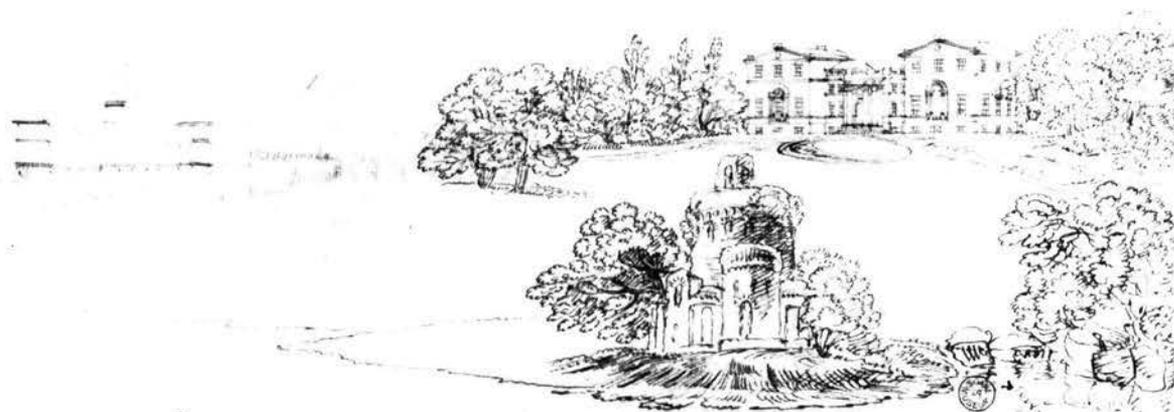
The site is described as 'a circular piece of ground, enclosed with a stone wall, the foundation of which was still complete within the ground . . .'. The coffins and bones were 'numerous and of all ages, many of them children's . . .', but it is not recorded how they were laid out, whether in rows or haphazardly. The coffins were all lying 'east and west' and composed of ' . . . materials such as have been generally found in all the tumuli that have been opened in every part of Scotland: consisting of thin broad stones, set on their edges for the sides and ends, and laid flat for the top and bottom . . .'. Some stones, however, were 'of superior polish, cemented with lime, and adorned with scriptural figures on the lids and ends; these figures were a sun on the east end, and swords, and other ornaments, upon the lid'. One coffin was found to contain pieces of leather assumed to have been from a boot. Also ' . . . in a particular place, a great number of thigh and leg bones were found lying together, without the other parts of the human body . . .'.

As the ground was being levelled, it is reasonable to assume that the cemetery was actually in a mound or knoll. It is possible that the mound is illustrated in Robert Adam's view of his additions to Lauderdale House in 1790-1 (illus 144; RCAHMS, NMR, ELO/37/2; original in the Soane Museum, London, vol 48, no 49). That drawing includes a circular area depicted in front of the house, although there is no indication of it being a mound. A cemetery in a mound is not an unusual feature. Other long cists, in cemeteries and individually, have been found in what are variously described as knolls, knowes, mounds, ridges, rising ground, tumuli, barrows or a circular rise (Addinston, Hartlaw, Hoprig, Milton, Windymains, Catstane, Cramond Bridge, Hopetoun, Wyndford I, Ardyne; for references see Henshall 1956, 278-81; see also Hutchison 1866, 191). It is

not clear if this use of mounds etc represents an attempt to continue the tradition of cairns from the Bronze Age or if it merely reflects unsuitability of low-lying marshy or wet ground. Alternatively, burial grounds may have been sited away from flatter arable land. Enclosing walls seem to be rare and have only been recorded at the Catstane, Hartlaw and Parkburn cemeteries (Henshall 1956, 259, 268). No trace of either the mound or the wall was found in 1993 unless a sloping edge observed in Trench 4 was the edge of the mound. The wall foundations seen in 1993 were too far away from the nearest burials to have been an enclosing wall. They may have been foundations of a boundary wall shown on an OS map of 1894.

The 'many' children's graves are interesting. No specific children's graves (cists or inhumations) were found in 1993, although child burials have been found during 1998 excavations on the site of the shop, formerly the guardhouse at the entrance to Castle Park (Moloney 1998). Nevertheless, infant/foetal and one child's remains were identified in material from three cists found in 1993 and two immature and one infant's remains were found with adult inhumations but no children or juveniles, although at least three infants/foetuses, four infants, twelve children and eight juveniles were identified amongst machine-disturbed bones. This compares with a total of at least 73 identified adult remains (including 13 cist burials and 7 inhumations): 31 female, 26 male and 16 indeterminate. These identifications suggest that a number of children were buried at Castle Park. Children's graves are known (Henshall 1956, 268), but 'many' is unusual, although at Barhobble, Wigtownshire, out of 137 graves, 47 are 1m or less in length and a further 13 are 1.5m or less (Cormack 1995, 40-2). It is possible that some of the children's graves identified in 1801 at Castle Park were misinterpretations of what are now called short cists. But, as there are no descriptions of the skeletons (whether crouched or extended) or of the coffin sizes, it is impossible to be certain if short cists were present as well as long cists. The apparent absence of grave goods need not argue against the presence of short cists. Three short cists, with no grave goods, were found at Dunbar Golf Course (Callander 1922, 33).

The reference to the polished, mortared and carved stones is confusing as no drawings exist of them. The stones may have had all three attributes, in which case they were presumably single slabs mortared onto cists as lids. However, the use of mortar in this way is not recorded at other long cist cemeteries. It is, perhaps, more likely that these were re-used building stones as was the head stone of Cist 15 in 1993.



Illus 144

View of Lord Lauderdale's House at Dunbar, by Robert Adam (*Crown Copyright: Royal Commission on the Ancient and Historical Monuments of Scotland, by courtesy of the Trustees of Sir John Soane's Museum*).

Re-use of stones is not unknown, for Roman stones were re-used in a cist at Parkburn (Henshall 1966, 204-7, 209-10) as were three querns in two other cists (Henshall 1956, 261, 276-7).

The decorated stones, likewise, do not seem to be paralleled in other cemeteries, either as capstones or end stones. The description of the decoration is contradictory. The 'scriptural figures' turn out to be a 'sun' on foot stones and 'swords and other ornaments' on lids (not crosses, humans, animals, biblical scenes, interlacing or vine-leaf decoration which could imply re-use of Anglian crosses). Nor is there any indication that they resembled the recumbent graveslabs at Govan or Inchinnan. It is not recorded if the sun on the foot stones was outside or inside (to be seen by the resurrected body). It is probable that the capstones carved with swords were medieval graveslabs. The practice of carving graveslabs with swords and tools or emblems of trade and profession appeared in England in the 12th century and in Scotland soon after (Steer & Bannerman 1977, 13), although such stones are not usually associated with cists. Two burials, not cists, at Raunds, Northamptonshire, were covered by decorated slabs dated tentatively to the 10th century (Boddington 1980, 377).

The leather mentioned in one of the cists found in 1801 must be considered suspect. Soil conditions at Castle Park and elsewhere in Dunbar are such that the only organic material to survive is bone. No leather, textile or wood was found other than charcoal, mineralized wood or leather (see nos 4,

174-6, 193, 257-60) or very recent rotted wood. The dog burial, a pet or army mascot of Phase 24, still had traces of skin and hair but was of course quite recent. The leather in the cist was, therefore, if not mineralized, either not leather at all, or it was intrusive. The medieval sherds and metal fragments in Cist 10 in 1993 are, likewise, probably intrusive.

The disturbance of earlier burials by later burials presumably resulted in the collection of leg bones observed in 1801, although the absence of other parts of skeletons is remarkable. The leg bone apparently placed at the side of the capstone of Cist 10 (illus 141) in 1993 may or may not be related to this collection. Evidence of burials intruding into earlier ones at Castle Park is apparent from the group of Burials 32, 33 and 34 and from the group of Cists 13, 14, 15 as well as the disturbance of skulls of Burial 34 and SKL 6 by Cists 18 and 23 respectively. There was also the deliberate placing of Burial 44 (SKL 7) on top of Cist 22. This seeming overcrowding is at odds with the spacing between the cists in Trench 9 and between the rows of headstones in Trench 5 and legs in Trench 11. The layout of cists in rows is known at other cemeteries eg Knowes, Catstane, Nunraw, as is overcrowding at eg Addinstone, Hoprig, Yeavinger (Henshall 1956, 267) and Barhobble (Cormack 1995, fig 22).

But to have both overcrowding and apparent regular layout as at Castle Park does not seem to be paralleled elsewhere. Overcrowding implies lack of grave markers while regular layout implies their existence. This may indicate two phases, but it cannot be said

that inhumations belong to one phase, cists to another. Although skulls were disturbed by two cists, there was one burial on top of a cist. This combination of inhumations and cists is also known at eg Belhaven, Gogar and Parkburn (Henshall 1956, 267), Four Winds (Dalland 1992, 199) and Kirkhill, St Andrews (Wordsworth & Clark 1997). It is unlikely that the different burial types represent different populations (eg cists for native British inhabitants, inhumations for incoming Angles), as unlined burials are known from Iron Age sites at Broxmouth and Dryburn Bridge (Hill 1982b, 179-80; Triscott 1982, 122). Only two long cists were found at Kirkhill in 1980, although 10 or 11 were found in 1860.

The skull-flanking stones and mini capstone around the skull (SKL 5) in Cist 10 (illus 142-3) seem only to be paralleled in Scotland at two graves in a cemetery at Newhall Point, Balblair, Ross and Cromarty and three other graves had possibly disturbed, similar arrangements, although these were not cist graves (Reed 1995). However, given the inadequate accounts of long cist and other cemeteries found in the 19th century and earlier this century, the lack of comparisons is hardly surprising. Cist 4 and Burial 46 at Castle Park may each have had a flanking stone by its skull.

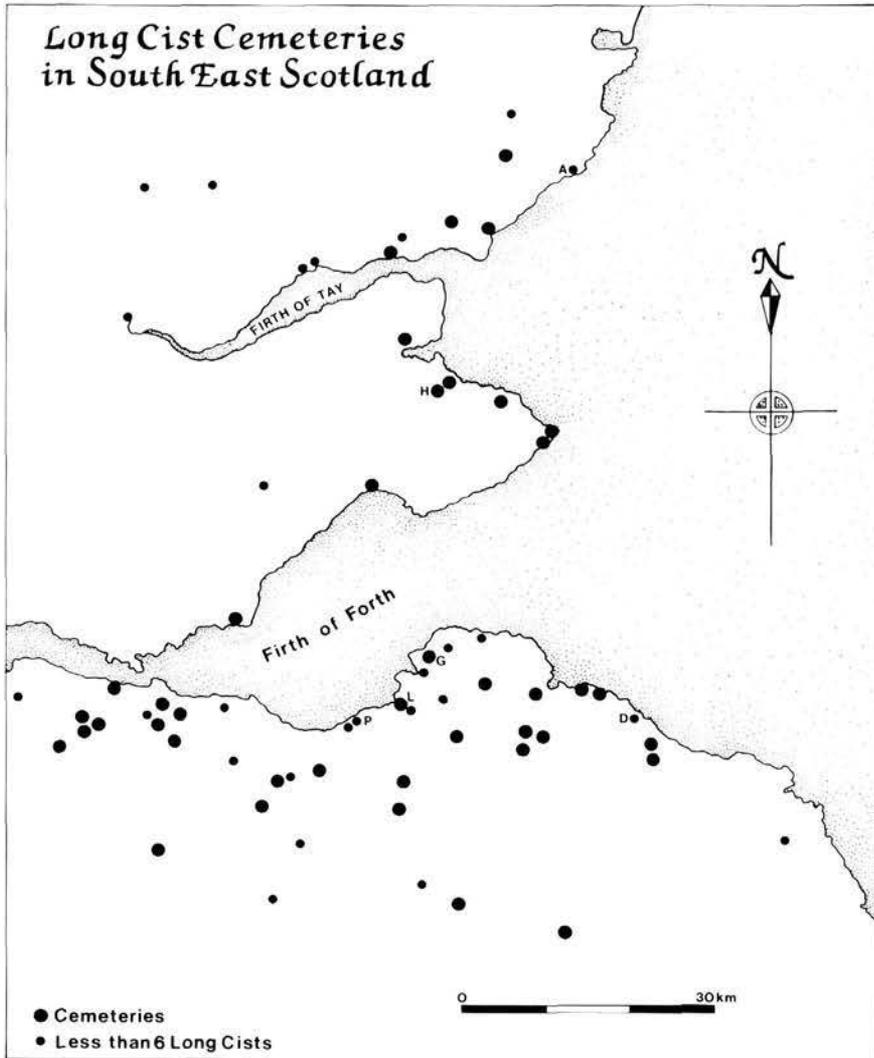
The non-cist cemetery at Newhall Point also had six graves with stones flanking the skulls (*ibid*). Five flanked-skull graves, not cists and without mini capstones, were found at Kirkhill (Wordsworth & Clark 1997, 9). Of these, two had only one stone as with Burial 46 at Castle Park, while two had pairs of flanking stones. The fifth grave had one definite flanker *in situ* and one possibly disturbed flanker. The skeleton in this grave was radiocarbon dated to 1295 ± 60 BP (calibrated to AD 639-881). Eleven flanked-skull graves were found at Barhobble (Cormack 1995, 40-2), although none were in cists. One grave at Kirkhill, St Andrews appeared to have flankers supporting a capstone, but the stones flanked the shoulders and, because the full length of the grave was not excavated, it is not clear if this was a disturbed long cist – there was no stone behind the head (Wordsworth & Clark 1997, 9). Flanked-skull graves were found at Barton-on-Humber, Humberside (Rodwell & Rodwell 1981, 212-3), at Raunds, Northamptonshire (Boddington 1980, 377; see also Selkirk & Selkirk 1981, 113) and at three sites in Thetford, Norfolk (Dallas 1993, 221 and *fiche*).

There was one instance of a pillow stone at Castle Park, Burial 44 (SKL 7), lying on top of Cist 22. Pillow stones, underneath the skull, have been found

at Raunds and Barton-on-Humber. Such pillows are known in Scotland. A headrest was found in a grave at Barhobble (Cormack 1995, 40). Two stones bedded in clay were found beneath a skull in a long cist in Orkney dated to AD 1085 ± 55 (Hedges 1978, 377). Two pillow stones were found in infant graves at Newhall Point (Reed 1995, 784). A pillow stone was found in a long cist at Crosskirk, Caithness (Fairhurst 1984, 102). No precise date for this last was given although a date around AD 600 was ‘very tentatively’ suggested. A date this early is unlikely, as the description of the skull, being tilted forward to look down the grave, is comparable to skulls at Raunds (Boddington 1980, 377).

The size of the cemetery is unknown, but it is certainly among the larger Scottish cemeteries. Some 47 graves (26 cists and 21 inhumations) were noted in 1993. The numbers destroyed in 1801 and 1990-1 are unknown. Only six cemeteries listed by Henshall (1956, 278-81) have more recorded burials. The cemetery at Parkburn was estimated to be some 720 feet (219.46m) in length along a ridge (Henshall 1966, 208). The area covered by the cemetery in front of Lauderdale House in 1993 is about 27m east to west by 21m north to south (which is about the size of Hoprig where only 6 burials are known). The extent of the circular mound levelled in 1801 and its exact relation to the 1993 cemetery are unknown, although, if it is the circular feature shown on Adam’s drawing, it was slightly to the west of Lauderdale House. Trenching by Scottish Power at the entrance to Castle Park in Westgate revealed a possible side stone of a cist and a skull and other human bones. Excavation by Headland Archaeology on the site of the former shop at the entrance to Castle Park has uncovered more graves, some in cists (Moloney 1998). If these and the burials noted in the watching brief to the east in 1991 form part of the cemetery as well, then it covers an enormous area, approximately 90m east to west by 50m north to south.

No southern, eastern or western limits to the cemetery were found. No burials were reported under Lauderdale House during Scottish Power’s trenching there, but as there is a deep cellar beneath the house, any graves there would have been destroyed in the construction of the house before 1732 and the extensions in 1790-1. A notebook exists concerning Robert Adam’s additions (SRO, ‘Notebook containing . . . 4) Estimates, correspondence etc., regarding additions to the Earl of Lauderdale’s house at Dunbar, September 1790’ [*recte* April-May], Clerk of Penicuik Muniments, GD18/4965) but no mention is made of burials. However, given the cavalier fashion in which the burial mound was



Illus 145
Long cist cemeteries in south-east
Scotland after Henshall 1956, with
the following additions:
A = Arbroath; D = Dryburn Bridge;
G = Gullane; H = Hallowhill;
L = Longniddry; P = Prestonpans.

levelled in 1801 and in which most cist cemeteries were cleared away in the 19th century, that means nothing. Nevertheless, no mention of burials is made in the account of the parish written in 1792 after the additions to the house had been completed (OSA 1793, 476).

In general long cist cemeteries are dated from the 5th-8th or 9th centuries (Henshall 1956, 269), although long cists occur both earlier and later than those dates. An unglazed pot from a long cist near Dunbar parish church was dated to the early 14th century (Callander 1922, 31). The radiocarbon dates from two skeletons indicate that the Castle Park cemetery continued in use possibly as late as the 13th century. Burial 34 (SKL 15) was dated 990 ± 60 BP (GU-3937), calibrated to AD 895-1220. The skeleton (SKL 16) in Cist 16 was dated 900 ± 50 BP (GU-3938), calibrated to AD 1020-1250. These late dates are supported by the parallels for the

skull-flanking stones from England, 'mid- to late-Saxon' (Rodwell & Rodwell 1981, 213), and Barhobble, Celto-Norse (Cormack 1995, 49). The cemeteries at Raunds and Barton-on-Humber were dated to the 10th-12th centuries while Barhobble dated to the 8th-12th centuries. The cemetery at Newhall Point provided calibrated radiocarbon dates of the 11th-12th centuries (Reed 1995, 788).

The date for the beginning of the cemetery at Castle Park is unknown. The circular nature of the ground levelled in 1801 suggests a British origin. It need not preclude an Anglo-Saxon origin or Anglo-Saxon re-use of an earlier Celtic site, for the 7th- or 8th-century church of St John at Escomb, Co. Durham, stands in a circular churchyard (Taylor & Taylor 1965, 234). The Castle Park cemetery was presumably abandoned when the medieval parish church was built at the other end of the town in the 12th or early 13th century.

TABLE 25A DUNBAR CEMETERY (DB09, DB10) – BURIALS

Burial	Context	exc/unexc	Trench	Skeleton Number	M/F/Unid	Infant/Child/Juvenile
Cist 1		unexc	8			
Cist 2	7001 u/s	unexc	6	SKL1	1m? 1f	
Cist 3	7002 u/s	unexc	6/8	SKL2	1m, 1f	
Cist 4		unexc				
Cist 5		unexc				
Cist 6	7003 u/s	unexc	3	SKL3	1f	1 infant
Cist 7		unexc				
Cist 8		unexc				
Cist 9		unexc				
Cist 10	7022	exc	9	SKL5	1f	
Cist 11		unexc	9			
Cist 12		unexc	9			
Cist 13	7042	exc	8	SKL13	1m?	
Cist 14	7041	exc	8	SKL12	1m	
Cist 15	7039	exc	9	SKL10	1f	
Cist 16	7045	exc	8	SKL16	1m	
Cist 17		unexc				
Cist 18		unexc	5	SKL18		
Cist 19		unexc				
Cist 20		unexc				
Cist 21	7019 7034	exc	11	SKL4	1m	1 infant, 1 child
Cist 22	7036	exc	11	SKL9	1f?	1 infant
Cist 23	7046	exc	11	SKL17	1m?	
Cist 24		unexc				
Cist 25		unexc: = Burial 31?	4			
Cist 26		unexc	10			
27		unexc	2			
28		unexc	3			
29		unexc	7			
30		unexc	7			
31		unexc: = cist 25?	4			
32		unexc	8			
33	7040	exc	9	SKL11	1m	1 immature
34	7044	exc	9	SKL15	1f?	
35	7043	exc	9	SKL14	1m?	
36		unexc	5			

TABLE 25A (continued)

Burial	Context	exc/unexc	Trench	Skeleton Number	M/F/Unid	Infant/Child/Juvenile
37	7035	unexc	5	SKL8		
38		unexc	10			
39		unexc	10			
40		unexc	10			
41		unexc	10			
42		unexc	10			
43		unexc	10			
44	7029	exc	11	SKL7	1m?	1 infant, 1 immature
45		unexc	12			
46		unexc	8			
47	7026	unexc	11	SKL6		
48	8005	exc		SKL19	1m, 1f	
49	8006	exc		SKL20	1f?	
Subtotal					11m, 9f,	4 infants, 1 child, 2 immature

No remains of a church were observed in the watching briefs at Castle Park, although large quantities of mortar and rubble were seen. These could have come from any of the building operations at Lauderdale House, during its construction or alteration or from the buildings that preceded it. Apart from the enclosing wall around the burial ground, no other walls were mentioned in 1801 (Carfrae 1803, 279-80), although any traces of a timber church would not have been seen.

Equally unclear is the relation of the cemetery to the settlement excavated at Castle Park. That settlement appears to have been of a restricted nature, a royal centre under the kings of Northumbria. Under their predecessors, the Votadini or Gododdin, it seems to have been a defended homestead. The size of the

eastern cemetery at Yeavinger, centred on a timber church, suggests use of the cemetery by a much larger population nearby than that of the royal centre on its own. That cemetery may have continued in use after the abandonment of Yeavinger as a royal centre. Small cemeteries found at other excavated sites near Dunbar probably served the occupants of these sites: 12 graves outside the palisaded enclosure at Doon Hill (7th century AD?; Hope-Taylor 1980, 19); nine graves outside, and four graves inside, the hill fort at Broxmouth (Iron Age; Hill 1982b, 179-80); and 14 graves at the palisaded enclosure at Dryburn Bridge (first millennium BC; Triscott 1982, 122, 123). But these were small in comparison with the Castle Park cemetery. It is possible, therefore, that the latter cemetery served a wider community than the royal centre on the headland.

TABLE 25B DUNBAR CEMETERY (DB09, DB10) – DISTURBED BONES

	Context	exc/unexc	Trench	Skeleton	M/F/ Unid	Infant/Child/ Juvenile
	7024	exc			2 unid	1 infant, 1 child
	7025	exc	9		1m	
fill of cist 18	7049		5		1m	
u/s	DB09	machine disturbed			1f, 3 unid	2 children, 1 juvenile
u/s	7000	machine disturbed	6		1f?	
u/s	7004	machine disturbed	4		2m	1 infant, 2 children
u/s	7005	machine disturbed	8		1m?, 4f?	1 infant, 1 child, 1 juvenile
u/s	7006	machine disturbed	7		1m, 2f	1 child
u/s	7007	machine disturbed	9		1m, 1f, 5 unid	3 infants, 1 child, 2 juveniles
u/s	7008	machine disturbed	10		3m, 4f	1 child, 2 juveniles
u/s	7009	machine disturbed	5		2f? 1 unid	2 children, 1 juvenile
u/s	7018	machine disturbed	11		1m, 4f, 5 unid	1 infant, 1 child, 1 juvenile
u/s	DB10	machine disturbed			4m? 3f?	
Sub total					15m, 22f 16 unid	7 infants, 12 children, 8 juveniles.
Grand total					26m, 31f, 16 unid	11 infants, 13 children, 8 juveniles, 2 immature

Abbreviations:

exc	excavated
unexc	unexcavated
u/s	unstratified
m	male
f	female
unid	unidentified

THE HUMAN REMAINS

Margaret Bruce

INTRODUCTION

The human skeletal remains were recovered from two separate watching briefs, DB09 and DB10. The human bone from DB09 is described separately according to context references: DB09 cists, DB09 inhumations, DB09 unstratified and DB09 machine disturbed from individual trenches; bone from DB10 is described separately. Skeleton numbers (SKL) were assigned on site to *in situ* burials only (see Table 25).

Comparisons within the DB09 material and between DB09 and DB10 are attempted but the small overall sample sizes, unequal sample size, incomplete skeletons in varying levels of preservation severely limit the conclusions that can be drawn. It is assumed that all the material is broadly contemporary.

A summary of the results of the analysis is presented below; more detailed descriptions of the remains from each context follow.

DEMOGRAPHY

Standard methods were used to determine sex and age-at-death (Bass 1987) depending on which skeletal elements were available.

AGE-AT-DEATH

The following broad age categories were used:

Foetal/Infant	birth ± 2 months
Infant	2 months – 2 years
Child	2 – 10 years
Juvenile	10 – 18 years
Subadult	18 – 22 years
Young adult	little/no degenerative change; little/no dental attrition
Mature adult	some degenerative change some moderate/severe dental attrition
Old age	severe degenerative change severe dental attrition, tooth loss
Adult	insufficient evidence for closer attribution
Immature	skeletal/dental development incomplete but insufficient evidence for closer attribution

SEX DETERMINATION

This was based as far as possible on pelvic evidence, and the degree of confidence of the determination is indicated in the detailed reports.

Both sexes and all age groups were represented in the DB09 assemblage. Associated mature adult and foetal/infant bones were identified from two cist contexts and may represent deaths of mother and child at or around birth. An adult male/infant association from a cist context may represent incorrect adult sexing (although this is considered unlikely), or this association may be

accidental as may be the adult/adult associations in two cist contexts. In only one cist (21) were immature remains older than the infant category recovered. Although one female was considered to be in her late teens, all individuals, apart from the sparse infant material, could be considered 'social' adults. Males and females appear to have been about equally represented, and none seems to have survived beyond middle-age.

Associated but extremely sparse infant material was also found with two of the DB09 inhumations, but in both cases the adults were considered to be male and an accidental association is probably most likely. All four inhumations were of adults and consisted of two young adult males, a mature adult male and an adult female.

Ages from infancy, through childhood and the juvenile period to adulthood were represented in the general unstratified DB09 material and in the machine-recovered, unstratified bone from individual trenches. Female remains appear to predominate in unstratified material from Trenches 8, 9 and 11 but it would be unwise to attribute too much significance to this finding since the remains are generally very incomplete/poorly preserved and sex estimates are tentative.

A substantial number of individuals were represented in unstratified material from Trenches 9 (n=13, of whom seven were adult, six immature) and 11 (n=13, of whom ten were adult, three immature).

Thus it appears that in DB09 generally both sexes and all ages were buried, but there appears to be only one child in the cist contexts, and possibly more female burials associated with Contexts 7005, 7007 and 7018.

In DB10, both sexes (four males, three females) but no immatures were identified, while of the seven adults, two had survived to at

least middle-age and one female to old age and two others had died in young adulthood.

No attempt could be made to estimate life expectancy or mortality

rates but the pattern appears broadly comparable to contemporary populations (with the exception of the very limited sample from DB10).

BODY BUILD

HEIGHT

This was estimated using standard regression formulae based on long bone lengths (Trotter & Gleser 1958): where more than one long bone was available for an individual, only that for which the regression formula had the lowest standard error of estimate was used (femur, tibia, humerus, radius were used). In commingled assemblages only femora or tibiae were used in order to reduce the chances of one individual contributing to more than one height estimate.

Cist height estimates ranged from 166cm-177cm (5'5"-5'9") for males, mean 171cm (5'7") to 152cm-164cm (5'1"-5'4") for females, mean 157cm (5'2"). The remainder of the DB09 assemblage clustered very closely round these values (males, n=2, mean 170cm; females, n=3, mean 157cm) as did the DB10 estimates (male, n=1, 168cm; female, n=1, 159cm). These results are very similar to those reported for a large number of historic British populations and also to those reported by Brothwell and Powers (1966) for multiple burials from an Iron Age cist from Dunbar. Female height is only some 92% of male height but this difference is probably exaggerated because the heights of 'indeterminate' sex individuals cannot be estimated (the formulae are sex-specific) and thus height can only be obtained from 'obviously' male or female skeletons.

SKULL SHAPE

Unfortunately only three skulls were sufficiently intact to permit metric shape descriptions. The cranial indices ranged from 80 for a female cist skull to 72 and 70 from DB09 trenches. The cist skull was in the rounded or brachycranic range, and the others were longer or dolichocranic. Brothwell and Powers (1966) noted cranial indices ranging from 68-78 in the Dunbar Iron Age multiple burials.

The skull of a middle-aged cist female showed slight deformation in that the sagittal suture appeared to be depressed as a result of some 'heaping up' of bone on either side along its length while on the only surviving parietal there was a rectangular depression. However, it is suggested that these features may be associated with osteoporotic bone loss (see below).

LIMB SHAPE

Femoral and tibial shaft shape are often described quantitatively by means of the meric and enemic indices respectively. These describe the extent to which the upper shaft deviates from a cylindrical shape.

All femora from DB09 and DB10 showed some flattening of the proximal shaft, the meric indices falling in one case at, in all others below 85. Sixteen non-cist femora from DB09 were available – seven from the left, nine from the right side. The mean meric index (left) was 71.6; the mean meric index (right) was 73.8 (combined range 66-85). From the cists, 13 femora from seven individuals were available. The combined sample index ranged from 68-81; for those 'paired' femora (n=4) the mean left index was 77, the mean right index was 73. Only three femora were available from DB10, where the index ranged from 66-77 (mean 70).

There appeared to be no sex difference in the meric indices. There was a trend for the left femur to be less flattened (that is, to be more cylindrical) than the right. This may be because the left limb is generally the push-off limb in walking or the bracing limb in right-side dominant activity. Flattening of this type (platymeria) is common in pre-industrial populations but has not yet been satisfactorily accounted for, although biomechanical, nutritional and genetics factors have all been invoked.

By contrast, few tibiae exhibited flattening of the proximal shaft (platycnemia). In the non-cist DB09 tibiae only three of 25 bones (12%) were flattened. The enemic index ranged from 59-76, with values below 63 considered platycnemic, but most bones clustered at the mesocnemic/eurycnemic border (65-70). There was a trend for left tibiae to be less flattened than the right (left mean index 69, right mean index 66). The cist tibiae followed this pattern closely (range 57-79), clustering at 65-70; but with both left and right means at 70; only two of seven individuals and three of 13 bones showed flattening (no apparent sex difference). The four tibiae from DB10 (all left) clustered within index values of 69-71 (mean 70) with none being platycnemic.

There appears to be no association between the degree of femoral and tibial flattening. These results again are broadly comparable with contemporary British populations.

HEALTH STATUS

EVIDENCE OF TRAUMA: FRACTURES

No evidence of fractures was identified in any bone from either the DB09 or DB10 assemblages. Given the fragmented nature of much of the skeletal material this is perhaps not surprising. Indeed Cardy (1997a) in a recent study on a large skeletal series from Whithorn found only 7% of individuals with fractures.

ENTHESOPATHIES

These are usually roughened outgrowths or other disturbances of cortical bone at the attachment of muscles, tendons or ligaments and are thought to be caused by repeated microtraumata or by a single episode of macrotrauma involving muscles/tendons/

ligaments. They are relatively common and by their nature tend to increase with age. Analysis of differences in enthesopathic sites between the sexes, and between skeletal series may provide insights into differences in occupation/life-style.

Enthesopathies were common at the attachments of shoulder muscles, particularly pectoralis major (n=4), teres major (n=2) and latissimus dorsi (n=2) which are used in powerful flexion and extension movements as well as at the attachment of the stabilising costo-clavicular ligament (n=2) and muscle subscapularis (n=2). There appears to be a trend, not surprisingly, for the right side to have been more frequently affected. Shoulder enthesopathies were found in females (SKL5; DB10 unstratified) and in males (one each from SKL7, SKL11 and DB09 unstratified; two in unstratified material from Trenches 10 and 11). Movements at the



Illus 146
Osteochondritis dissecans on a
talus (DB10, Burial 48,
SKL19).

elbow joints (flexion and extension and or pronation/supination) appear to have been implicated in somewhat fewer lesions (SKL11 – supination/flexion at biceps attachment to the radius; SKL14 – flexion at the brachialis attachment on the ulna and pronation at the pronator quadratus attachment on the same ulna). The only wrist and hand attachments apparently involved were at the flexor attachment to the hook of the hamate in the male from SKL11 and at multiple sites at the attachments of the intrinsic and extrinsic muscles of the hands in SKL16.

Possible enthesopathies were noted in two females at the attachment of the sacro-tuberous ligaments in the pelvis – both may have been related to obstetrical trauma (SKL3 and an unstratified innominate from Trench 9).

Enthesopathies were common at the attachments of the muscles/tendons/ligaments of all the major joints of the lower limb, but particularly those of the ankle joint, where no fewer than 15 such lesions were observed. Most of these involved the distal attachment of the powerful ankle plantar-flexor via the Achilles tendon to the calcaneus (n=7) and the inferior tibiio-fibular ligament of the ankle joint (n=6), while in two cases the proximal attachment of the soleus was affected. At the hip joint the most commonly affected muscle attachment was the femoral insertion of the stabilising muscle obdurator externus (n=8), followed by the femoral attachment of the extensor gluteus maximus (n=4) and the flexor ilio-psoas (n=3). At the knee joint, the insertion of powerful extensor quadriceps femoris on the patella or tibia (n=4) was the most frequently affected site, followed by the femoral attachment of the lateral head of this muscle (n=3). The medial head of gastrocnemius, a flexor of the knee and plantar flexor of the ankle (n=2); the tibial attachments of the anterior cruciate ligament (n=1) and the medial ligament (n=2) were also affected. Movements of inversion of the foot (tibialis anterior) and eversion of the foot (peroneus longus) were probably responsible for two cases of enthesopathies on the tibia and fibula respectively.

The only other likely examples of this type of lesion were seen on the skulls of two individuals at the attachments of the temporal fascia and in one of these individuals also at the cranial attachment of the lateral pterygoid muscle. All of these may be related to powerful masticatory movements.

One skeleton, SKL16, was noteworthy in that almost all sites of muscle/tendon and ligament insertions could be considered enthesopathic. Radiological examination revealed no underlying metabolic or other disorder and, individually, the affected bones

were considered to be 'radiologically within normal limits' and typical of the condition seen for example in athletes.

No sex or side differences were apparent in the distribution of enthesopathies in the lower limb.

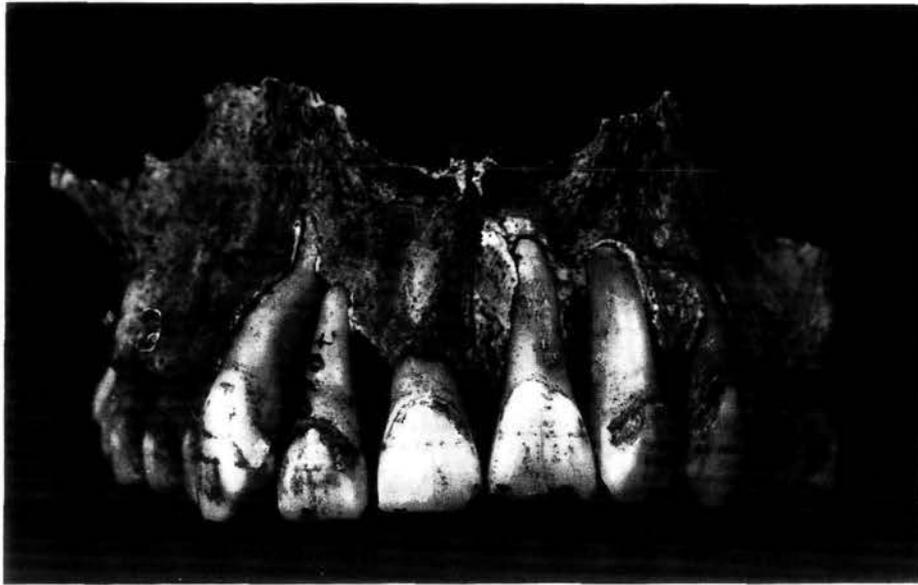
SCHMORL'S NODES

These lesions on the surfaces of vertebral bodies are thought to be the result of trauma, particularly that associated with sudden compression such as that caused by heavy lifting and are most likely to develop in adolescence or young adulthood where the discs are still turgid (Resnick & Niwayama 1978). Vertebrae were generally rather poorly represented from both sites. However, an extensive series of these nodes was identified in a young adult male (SKI.7). They were also noted in a mature adult female cist burial (SKL5), in a mature adult male (SKL11), in isolated vertebrae from the unstratified material from DB09 and in the unstratified DB10 bones.

DEGENERATIVE JOINT DISEASE (DJD) (illus 146)

Two main types are recognized, one where the degenerative changes represent 'wear and tear' associated with the ageing process and another associated with altered joint mechanics such as may follow a misaligned healed fracture. The former usually affects more than one joint and is commonly used to determine adult age categories, while the latter is usually confined to one (or related) joints. Thus both age and trauma are important factors, although heredity, diet and endocrine agents are also thought to be significant.

As in most skeletal series the vertebral column was a common site of DJD, although vertebrae were generally under-represented in both the DB09 and DB10 series. Only in unstratified material from Trench 11 was moderate/severe degenerative change observed. A series of cervical vertebrae, probably from one individual, showed degeneration of the body surfaces, and to a slight degree of the facet joints, together with osteophytic spurs on the margins of the bodies. The most severe example of DJD was seen at the distal articular surface (capitulum) of an isolated right humeral fragment from Cist 22. It is possible that the vertebrae, humerus and at least some of the 'old' jaws from this cist belong to one (?female) individual. The humeral surface had become eburnated and movement at the elbow joint was probably much restricted and very painful.



Illus 147
Enamel hypoplasia in a
maxilla (DB09, Burial 44,
SKL7).

Other less severe examples of DJD were observed at the posterior margins of the occipital condyles (isolated occipital fragment among unstratified material from Trench 11); at the tip of a left ulnar styloid process (DB09, unstratified); at the proximal end of a right ulna (SKL19); at the medial end of a right clavicle (DB09, unstratified); at the upper rim of the acetabulum (SKL11 and unstratified material from Trench 10); on the femoral head (SKL12 and unstratified material from Trench 8); and at medial side of the head of a first metatarsal.

No unusual distribution or sex/site differences could be identified.

PERIOSTEAL NEW BONE DEVELOPMENT (PNBD)

Direct trauma is one of several factors which may lead to inflammation of the periosteal membrane of a bone. This may in turn stimulate the production of 'new' bone over the existing bone surface. Infection or venous stasis associated with varicose veins are other factors which can evoke the same response. PNBD was seen most frequently on the distal half of the tibia and fibula. The distal and external surfaces of the three unstratified fibulae from Trench 8, two from Trench 9 and the medial surface of a tibial fragment from Trench 8 were affected. These sites are superficially situated with little overlying muscular 'protection' and trauma is likely to have been a causative factor. A facial injury, possibly infected, may have been the cause of the PNBD seen on an isolated cheek bone (DB09, unstratified).

One skeleton (SKL16), which has extensive enthesopathic lesions, also had areas of PNBD on metacarpals and on a tibia and fibula. Whether the exuberant bone deposition resembling multiple enthesopathies is linked to the PNBD is unclear. At some sites there was difficulty in classifying the bone deposition as enthesopathic or PNBD.

INTERVERTEBRAL OSTEOCHONDROSIS

Semi-circular lytic lesions on the anterior aspect of the superior and inferior surfaces of a tenth thoracic vertebra in the young male, SKL7, were considered to be examples of this condition. This individual had also an extensive series of Schmorl's nodes (see above), which have been implicated in the subsequent development of intervertebral osteochondrosis (Resnick & Niwayama 1978) but which itself has also been said to result from physical trauma (Kelley 1982).

OSTEOCHONDRITIS DISSECANS (illus 146)

This trauma-related joint condition is thought to be caused by an interruption of blood supply to an area of bone associated with damage to the adjacent articular cartilage. Only one case was considered to be attributable to this condition – a defect on the superior articular surface of the right talus of a ?female (SKL19). Smaller defects in articular surfaces of the type described by Cardy (1997b) were noted in six instances, ranging from the glenoid fossa of a scapula (n=1), the head of a humerus (n=1), the head of a radius (n=1), the distal surface of a tibia (n=1), the superior surface of a talus (n=1) to the proximal surface of a navicular bone (n=1). They may be associated with osteochondritis dissecans but may well also be of little functional significance.

OTHER

An injury to an unstratified mandible from Trench 8 may have been caused at or around the time of death. There is no evidence of healing, the cut marks are not 'fresh' but it is difficult to determine whether the blow was delivered after death. The instrument used appears to have been of a fairly heavy blade type but, from the positioning of the injury across the lower jaw, through the molar teeth, it is not easy to see how it could have occurred during life. Unfortunately the jaw could not be associated with any other skeletal elements.

The amount of trauma seen in the DB09 and DB10 series is not extensive. There is little or no evidence of interpersonal injury (with the possible exception of the mandible from Trench 8 described above). The pattern of vertebral column and upper and lower limb trauma is not unusual and, unfortunately, because of the fragmented nature of the material, there is insufficient data to permit an analysis of sex/age/site differences.

INFECTION: PNBD

When this is found on bones well protected by muscles etc, or where the PNBD is widespread, the cause is likely to be infection rather than trauma (see above). As noted earlier, most of the cases of PNBD in DB09 (none was found in DB10) were on the tibia and fibula where trauma is a likely cause. However, PNBD on the superficial aspects of the leg has also been associated with, *inter alia*, syphilis, typhoid fever, tuberculosis and scurvy. However, there is no evidence from any other part of the skeleton from any context to suggest any of these conditions. A small area of PNBD was noted on the visceral surface of an isolated rib fragment (small

?female) from the unstratified DB09 material. Unfortunately this could not be associated with any other bones. PNBD in this position may result from infections such as pneumonia or tuberculosis but no firm diagnosis can be made on such insufficient evidence.

The only other example of PNBD in the series was seen on the non-articular surface of an acetabulum from a cist burial (SKL3). No other evidence of infection on the general skeleton was found (but see dental evidence below).

Absence or relative absence of evidence of infection cannot, of course, be interpreted as evidence of the relative absence of infection in the population. Only infections directly affecting bone or long-standing chronic infections are likely to leave traces on the skeleton. Acute and chronic infection must have been a major cause of death in pre-antibiotic times and the Dunbar populations sampled here are likely to have been no exception.

METABOLIC DISEASE

There was no evidence of deficiency diseases such as rickets, osteomalacia or scurvy, although it is possible that some of the PNBD may have been associated with the latter condition. The parietal flattening or thinning seen in a mature/middle-aged cist female (SKL5) may have been associated with post-menopausal osteoporosis (Steinbock 1976).

MISCELLANEOUS CONDITIONS

A number of minor lesions were identified, which do not fall clearly into any of the above categories. They include the following: a small area of bone erosion on the lower left sternum of a middle-aged cist female (SKL5); a small bony nodule on an occipital clivus from Trench 11; a small rounded erosion between the foramen rotundum and foramen spinosum on an unstratified sphenoid from DB09; a small eroded area in the trochlear fossa of a young adult male (SKL7).

CONGENITAL/DEVELOPMENT ANOMALIES

The fairly common condition of partial lumbarisation of the first sacral segment was seen in a male from SKL11. Less common

was the presence of four supernumerary teeth (probably in the premolar series, two in each jaw, set bilaterally with the maxillary 'extras' internal to the dental arch while the mandibular 'extras' were external) in a male (SKL7).

BIOMECHANICAL/LIFESTYLE FEATURES

Some cases of asymmetry were noted, all of them relatively minor in extent and unlikely to have been the result of, for example significant disuse atrophy following injury or paralysis but possibly related to differential side use in everyday life. Right side dominance is strongly suggested in the upper limb of a female, SKL5. On the skull of SKL10 the left pterygoid plate was markedly larger than the right, suggesting greater development of the pterygoid masticatory muscles (where the right canine socket was much larger than the left in this individual); in the skeleton SKL13, the left tarsal bones were larger than the right, but there was a greater discrepancy in the size of the fragmentary fibular heads from this burial which may indicate more than one individual was represented; the right mastoid process was larger than the left in two young adult males (SKL7 and SKL11) and in the former case the left process was more vertically oriented. The muscle attached to this process pulls the head across towards the opposite side.

Squatting facets are extensions of the distal tibial articular surfaces which have been interpreted as resulting from the posture of the ankle joint in habitual squatting although this association cannot be regarded as firm. Such facets were common and were noted in SKL9 and SKL10; and in Trenches 5, 8 (4), 9 (2) and 11 (2) and in unstratified material from DB09 (2); none was seen in DB10 (where tibiae were few). Extensions beyond that usual for the articular surfaces were also noted on the talus (in the position caused by extreme dorsiflexion as in squatting) of the young female, SKL3, and on the glenoid surface of the shoulder joint (in the position caused by backward extension) of the female, SKL5. The left femur in SKL12 was moderately reinforced by a bony pilaster along its midshaft posteriorly. The lateral tuberosity of the calcaneus from SKL17 was particularly well developed. A medial flange supported the femoral neck (suggesting reinforcement to meet compressional loading) of a juvenile femur from Trench 9.

Apart from the commonly occurring 'squatting' facets, no pattern suggesting particular occupation/lifestyle could be discerned in these small fragmented series.

TABLE 26 MEAN ADULT HEIGHT OF HISTORIC BRITISH POPULATIONS

Period	Male Mean (cm)	Female Mean (cm)	Source
Bronze Age, Scottish	171	160	Bruce 1986
Iron Age, Dunbar	(169)*	(158)*	Brothwell and Powers 1966
10th-16th century, York	169	157	Dawes and Magilton 1980
13th-15th century, Whithorn	169	155	Cardy 1997a
13th-16th century, Aberdeen	168	160	Cross and Bruce 1989
13th-17th century, Linlithgow	170	156	Cross and Bruce 1989
15th-16th century, St Andrews	169	156	Cardy 1997b
Modern British	177	163	Knight 1984

*determined from their data

CHILDHOOD MORBIDITY (illus 147)

Evidence from, for example, adult heights, hypoplastic lines on the enamel of teeth and the proportion of immature remains can shed light on childhood health. The mean adult height for males and females (170cm; 157cm respectively) is in line with that estimated for British historic skeletal series (Table 26).

Several individuals showed one or more hypoplastic lines of disturbed enamel formation (young females, SKL2 and SKL10; young male SKL11, and an adult from DB10). There was no case of cribra orbitalia (pitting of the orbits), which has been associated with childhood anaemia, or orbital infection (but the number of crania recovered was small). Occipital 'buns' have been associated with childhood skull growth catch-up. Minor 'bunning' was seen in three skulls: SKL5 (mature female); an unlocated skull from Trench 10 (adult male); and ?male skull from DB10.

Immature skeletal material was sparse in both collections and no complete or nearly complete immature skeleton was recovered although isolated bones representing all ages from foetal/infant to older juveniles were recovered. No realistic estimate of the proportion of immature to adult individuals can, therefore, be made for DB09. No immature remains were identified from DB10 but the small size of the sample may account for this bias. The evidence available, albeit sparse and dispersed, suggests that childhood conditions for the DB09 sample were unlikely to have differed much from that experienced by other contemporary populations.

DENTAL HEALTH STATUS

A specialist analysis has not been undertaken and only a general assessment is given below. Levels of dental attrition were used in age-at-death assessment, on the assumption that they were broadly

in line with those for similar populations and also considerably higher than that seen in modern populations.

High levels of attrition lead to destruction to the enamel surface of a tooth with eventual pulp exposure and the subsequent risk of infection, abscess formation, bone loss and tooth loss. This was the likely sequence of events in the lesions seen on alveolar bone in several jaws (SKL5, SKL11; one unstratified jaw from Trench 11 and two mandibles from DB10). In most cases the lesions were associated with the first or second molar teeth. In a number of individuals there had been loss of teeth during life, extensive in some cases. No fewer than five individuals identified in DB10 showed ante-mortem tooth loss. The most extreme loss was seen in an edentulous mandibular fragment from Trench 11, tentatively matched with a maxillary fragment from which all the incisors and canines had been lost during life.

Caries were identified in only three cases (SKL10 – lower right canine; SKL7 – on the ?unerupted extranumerary lower left tooth; and on an unstratified lower ?first from DB09). Calculus deposits ranging from slight to moderate were common, indicating poor oral hygiene. No assessment of periodontal health status was made. Enamel hypoplasia is described above. The pattern of high levels of attrition, dental abscesses, substantial ante-mortem tooth loss, but with relatively low levels of dental caries described by Kerr (1989 and 1991; Kerr *et al* 1988) in a recent series of publications on Scottish medieval populations appears also to obtain for these Dunbar series. It is noteworthy that the DB10 series apparently represented 'older' individuals with correspondingly high levels of 'degeneration' of their dental apparatus. This may of course be simply a sampling bias.

NON-METRIC TRAITS

No attempt was made to record frequencies of non-metric traits in such a fragmented collection. However, it was noted that no

TABLE 27 METOPIISM IN HISTORIC BRITISH POPULATIONS

	Date	%	Source
England			
Trentholme	Romano-British	5	Warwick 1968
St Nicholas Shambles	11th-12th century	11.3	White 1988
Spitalfields	16th century	8.2	Morant and Hoadley 1931
Whitechapel	17th century	8.7	Macdonnell 1904
Moorfields	17th century	6.7	Macdonnell 1904
Faringdon	17th century	9.6	Hooke 1926
York	10th-16th century	11	Dawes and Magilton 1980
Scotland			
Dunbar	Iron Age	0	Brothwell and Powers 1966
Whithorn	13th-15th century	11.4	Cardy 1997a
Aberdeen	13th-16th century	21	Cross and Bruce 1989
Linlithgow	13th-17th century	22	Cross and Bruce 1989
Logie's Lane, St Andrews	15th-16th century	28	Cardy 1997b
Kirkhill, St Andrews	11th-15th century	17	Bruce <i>et al</i> 1997
Ensay	15th-18th century	21	Miles 1989

examples of metopism were observed in some 16 frontal bones from the combined sites. Metopism occurs in about 10% of adult skulls in modern Caucasoids although varying incidences have been reported in a number of British historic skeletal series (Table 27).

A genetic basis has been invoked for this trait although nutritional and other factors such as poor general health have also been said to be implicated. It is particularly unfortunate that both the present sample and the earlier Iron Age Dunbar sample (Brothwell & Powers 1966) are so small that it would be unwise to draw inferences about genetic continuity (and differentiation from other East Coast samples) or nutritional or other factors.

CAUSE OF DEATH

In no case could the cause of death be determined.

CIST SKELETONS

SUMMARY

In only one case (SKL5) was a relatively complete skeleton recovered; for the rest the lower limb was the best represented part of the skeleton and height and bone shape estimates could be made in most cases. Sex determination could be made with some confidence based on pelvic evidence or where bone dimensions were clearly in the male or female end of the range. Age determination within the adult range was based on dental attrition and/or the appearance of degenerative change. Immature status was accorded on the basis of size and incomplete maturation. Since there was considerable disturbance of the burials by machinery it is not surprising that in several cases more than one individual was represented in the assemblage for each context related to a cist burial. A summary of the age and sex distribution, physical characteristics (including height) and the pathological conditions recorded for the cist burials is given below. Skeletal material from 11 cists was examined; in five (possibly six) cases there was evidence of more than one individual.

Cist 2 SKL1 Context 7001 – two adults (young female, older male), possibly a skeleton above cist as well as in it

Cist 3 SKL2 Context 7002 – two adults (young female, older ?male)

Cist 6 SKL3 Context 7003 – one adult female; infant

Cist 21 SKL4 Contexts 7019, 7034 – one adult male; infant; child

Cist 22 SKL9 Context 7036 – one adult female; infant

Cist 13 SKL13 Context 7042 – possibly two adults

SUMMARY

The small sample size and fragmented condition of much of the material precluded statistical analyses. All ages and both sexes were represented in DB09, but only adults from DB10. In body build and health status, as far as it could be determined, both samples fell within the pattern noted for contemporary/historic British populations. No particular life-style factor could be identified. The most noteworthy features of the two series are the fact that no case of metopism was identified in either sample, and the different age composition of the DB10 sample with its correspondingly higher levels of 'dental degeneration'.

In all female/infant associations the infant material is sparse but could be neonatal or even late foetal and may represent joint burial of mother and infant. In the case of SKL4, the adult is estimated to be male with some degree of confidence; the only infant fragment is a vertebral body and the association may be as a result of disturbance. This is also the most likely reason for the associated adult 'pairing'. Interestingly, all the immature material recovered was in the infant category. No children or juvenile material was present.

There were probably six females (SKL1, SKL2, SKL3, SKL5, SKL9, SKL10) and seven males (SKL1, SKL2, SKL4, SKL12, SKL13, SKL16, SKL17) represented. The females were either young adult/subadult (SKL1, SKL2, SKL10) or middle-aged adults (SKL3, SKL5, SKL9); the males ranged from young adulthood (SKL4) to middle-age (?SKL1, SKL2, SKL16).

Height for the females ranged from 5'0" (SKL10), 5'1" (SKL5) to 5'4" (SKL9) while male height ranged from 5'5" (SKL4), 5'7" (SKL12, SKL13) to 5'9" (SKL16, SKL17); female mean 5'2"; male mean 5'7"; index of sexual dimorphism 92 (ie, females achieved only 92% of male height).

Skull shape could be determined metrically only for the female, SKL10, whose skull was round (brachycranic) but low with a narrow forehead, nose and palate. Flattening of the upper femoral shaft, which is commonly found in pre-industrial populations, was seen in every individual. The meric index, which quantifies this flattening, ranged from 68 to 81; in those paired femora (4) available there

was a trend for the left to be less flattened (mean meric index 77 left, 73 right; 3 of 4 individuals with left index greater than the right, one individual with no side difference). This is probably associated with the role of the left limb as the leading limb in walking. In most of the femora the shaft flattening was associated with a flange of bone on the outside of the shaft.

The tibiae in this cist group tended to be more 'modern' in shape, ie more cylindrical with cnemic indices ranging from 60-75, ie from platycnemic (flattened as in SKL1, SKL5, SKL12) to eurycnemic (rounded as in SKL4, SKL17). Again, in those paired tibiae available there was a trend for the left to be less flattened, though this was less marked (mean cnemic index left 69.5, right 68.5). There was no clear association between femoral and tibial flattening. Males tended to have less flattened femora (male mean meric index 76.3, female mean 67.3) and tibiae (male mean cnemic index 69, female mean 65). This may be a function of the shorter femoral and tibial length in females or it may represent other sex difference in bone loading or in bone quality.

DETAILED DESCRIPTIONS

Cist 2, SKL1, Context 7001

Human remains, apparently from Cist 2, consisted of fragments of a skull, of a robust mandible (with teeth 208), of a gracile mandible, of rib, humerus (distal left shaft), right innominate, right temporal midshaft, right tibial midshaft. At least two individuals are represented – a female (wide sciatic notch, gracile mandible and femur) aged 20-25 years (iliac crest fusing at time of death) and an older ?male (robust mandible with dental attrition). There were heavy calculus deposits on the teeth. The gracile femur had a distinct lateral flange and was platymeric (meric index 61) while the tibia was mesocnemic (cnemic index 66). Animal bones were also present.

Cist 3, SKL2, Context 7002

Human remains, apparently from Cist 3, consisted of fragments of a gracile mandible (with teeth right 3-7, ?unruptured 8), of the proximal third of the left ulna and robust femoral shafts (right and left). At least two individuals are represented – a young adult/subadult (dental attrition) female (gracile mandible) and an older (lipping into linea aspera) male (robust femora). There were moderate amounts of calculus on the teeth; a hypoplastic line on the enamel of the canine tooth near to its base was present.

Cist 6, SKL3, Context 7003

Human remains, apparently from Cist 6, consisted of fragments of skull, rib, right and left innominates, left femoral head and left calcaneus. At least two individuals are represented – an older adult (pubic symphyseal face, femoral foveal lipping) female (sciatic notch) and an infant (rib, skull). There was an enthesopathy at the attachment of the sacro-tuberous ligament on the left innominate which may have been the result of obstetrical trauma.

Left femoral head diameter 42.8 mm.

Animal bones were present.

Cist 10, SKL5, Context 7022

Human remains consisting of the almost complete skeleton of a female (pelvic and cranial evidence) aged probably at least 40 years (dental attrition, degenerative change in the vertebrae and heads of ribs).

The skull exhibited the following features of note – a moderately developed occipital bun; a depressed sagittal suture with the bone along the margins of the suture 'heaped up' and a somewhat rectangular depression on the left parietal (right parietal badly damaged/missing) about 50mm by 45mm. Given the age and sex of this individual, it is possible that this is parietal 'thinning', associated with osteoporotic bone loss (Steinbock 1976). The root of the right tooth 6 extended into the floor of the maxillary sinus.

The teeth showed heavy attrition. There had been ante-mortem loss of the lower left tooth 5 and there had been an abscess associated with lower right tooth 6, probably resulting from pulp exposure following attrition or subsequent to caries. There was some relatively minor degenerative change on the vertebral column (at the odontoid facet on CV1, on the adjacent bodies of CV3 and CV4 and on a lower thoracic body margin); there were Schmorl's nodes on several lower thoracic vertebrae. On the lower left side of the sternal body there was a very small area of bone destruction of unknown aetiology.

The upper limb bones were quite robust with enthesopathic change at the humeral attachments of the following muscles – subscapularis, pectoralis major, latissimus dorsi and deltoid on both sides, although more marked generally on the right. The capitulum of the right humerus was larger than the left. The scapula of both sides had an extension of the articular surface postero-superiorly and well-marked attachments for the teres major muscle. There was a small defect on the articular surface of the right radial head; the right ulna was longer and more robust than the left. In the hands, the terminal phalange of the thumb and the fourth metatarsal were markedly larger on the right side. The overall impression is of heavy use of the upper limb with powerful shoulder movements and marked right side dominance. The lower limbs also show evidence of heavy muscle use with enthesopathic change at the femoral attachments of the muscles obdurator externus, vastus lateralis, gluteus maximus, at the intertrochanteric line, at the foveal attachment of the ligament of the head of the femur and on the patellae at the attachments of the patellar ligament. There was some lipping into the ligaments of the distal tibio-fibular joints and on the feet both right and left navicular bones had small defects on the proximal articular surfaces.

Unfortunately it was not possible to take any measurements from the skull.

Upper limb

Left humerus, maximum length	309mm
Right humerus, maximum length	310mm
Left humerus, bicondylar width	56.0mm
Right humerus, bicondylar width	56.0mm
Left humerus, maximum head diameter	45.0mm
Right humerus, maximum head diameter	46.2mm
Right ulna, maximum length	245mm
Left radius, maximum length	209mm
Right radius, maximum length	210mm
Left clavicle, maximum length	128mm
Right clavicle, maximum length	128mm

Lower limb

Left femur, maximum length	411mm
Right femur, maximum length	408mm
Left femur, maximum head diameter	42.0mm
Right femur, maximum head diameter	42.6mm
Left femur, maximum antero-posterior shaft diameter	27.3mm
Left femur, meric index	78 (platymeric)
Right femur, meric index	73 (platymeric)
Both femora exhibited lateral flanges on the proximal shaft, contributing to their flattening of platymeria.	
Left tibia, maximum length	335mm
Right tibia, maximum length	330mm
Left tibia, position of nutrient foramen	105mm
Right tibia, position of nutrient foramen	114mm
Left tibia, head breadth	71.6mm

Right tibia, head breadth	71.6mm
Left tibia, cnemic index	60 (platycnemic)
Right tibia, cnemic index	62 (platycnemic)
Right fibula, maximum length	319mm
Height estimate based on femoral length 155.6 +/- 37.2 cm (5'1")	

Cist 13, SKL13, Context 7042

Human remains consisting only of fragmented left and right tibiae and fibulae and most of the right and left foot skeleton. The right and left fibular heads are asymmetrical and may not belong to the same individual, although there is also some asymmetry in the tarsal bones with the left cuboid and navicular being larger. All bones are 'adult'. There is some lipping into the triceps surae attachment to the calcanei and the peroneal tubercles are well developed on both calcanei.

Left tibia, maximum length	365mm
Left tibia, position of nutrient foramen	122mm
Left tibia, head breadth	74.9mm
Left tibia, cnemic index	63 (mesocnemic)
Right tibia, cnemic index	64 (mesocnemic)
Right calcaneus, maximum length	81mm
Height estimate based on tibial length, if sex is assumed to be male, 170.3 +/- 4.00cm (5'7")	

Cist 14, SKL12, Context 7041

Human remains consisting of a fragment of the left pelvis, right and left femora, left tibia and fibula, left first podial proximal phalange, left calcaneus, a fragment of the left radius, metacarpals and phalanges of both hands, and a lower lumbar vertebral fragment – most probably from the same individual, a mature adult (foveal lipping) male (sciatic notch).

There was some lipping into the posterior sacro-iliac ligament attachment; the fossa for the obdurator externus was very deep on the left femur and the femoral shaft was pilastered. On the right femoral head there was a small area of broken down articular bone surface adjacent to the fovea while a similar lesion appeared to have merged with the fovea on the left. There was lipping into the triceps sural attachment on the left calcaneus.

Left femur, maximum length	431mm
Right femur, maximum length	433mm
Left femur, bicondylar width	77.0mm
Right femur, bicondylar width	75.9mm
Left femur, maximum antero-posterior diameter	29.9mm
Left femur, meric index	78 (platymeric)
Right femur, meric index	71 (platymeric)
Left tibia, maximum length	359 mm
Left tibia, position of nutrient foramen	107mm
Left tibia, head breadth	74.6mm
Left tibia, cnemic index	62 (platycnemic)
Height estimate based on femoral length 169.8 +/- 3.94cm (5'7")	

Cist 15, SKL10, Context 7039

Human remains consisting of a skull, vertebrae, rib fragments and sternum and humerus, the third left digital ray, the left innominate, femur, tibia, fibula, the left tarsus and metatarsus and the right navicular, medial two cuneiforms and first metatarsal. One individual was represented – a young adult/subadult (apices of the roots of teeth 8 open; vertebral ring epiphyses not completely fused; recent closure of basisphenoid-basioccipital synchondrosis) female (pelvic and cranial evidence). On the skull the left pterygoid plate was markedly larger than the right with bony bridging from the plate to the spine of the sphenoid.

The skull was brachycranic (round) but with a low breadth to height ratio, narrow fronto-parietally, nasally and at the palate.

All teeth were present at the time of death; the right upper canine socket was markedly smaller than that on the left; the roots of the upper third molars were distorted; there were at least three hypoplastic lines on the crowns of the mandibular canines and incisors; an extensive carie was present on the right mandibular canine.

A preauricular sulcus was present on the innominate; there were deep ?vascular foramina on the non-articular surface of the acetabulum and the femoral foveae were extensive with ?vascular pitting but no lipped margins. There was a squatting facet on the left tibia.

Cranial maximum length	175mm
Nasion-occipital length	169mm
Nasion-lambda length	172mm
Basion-nasion length	89mm
Basion-alveolare length	87mm
Basion bregma height	123mm
Alveolare-nasion height	62mm
Maximum breadth	140mm
Minimum breadth	91mm
Bizygomatic breadth	116mm
Bimaxillary breadth	86 mm
Dacryon-dacryon breadth	20.8mm
Left orbital height	34.2mm
Left orbital breadth	39.6mm
Right orbital height	32.3mm
Right orbital breadth	36.8mm
Nasal height	46.1mm
Nasal breadth	21.5mm
External palatal length	53.0mm
External palatal breadth	57.0mm
Foramen magnum length	31.2mm
Foramen magnum breadth	27.1mm
Cranial index	81 (brachycranic)
Length/height index	70 (average)
Breadth/height index	88 (low)
Fronto/Parietal index	65 (narrow)
Orbital index L	86 (average)
R	88 (average)
Nasal index	47 (narrow)
Palatal index	107 (narrow)
Upper face index	53 (average)

Upper and lower limbs

Left clavicular length	133mm
Left femur, maximum length	398mm
Left femur, maximum head diameter	37.6mm
Left femur, maximum antero-posterior breadth	23.5mm
Left femur, meric index	76 (platycnemic)
Left tibia, maximum length	329mm
Left tibia, position of nutrient foramen	100mm
Left tibia, cnemic index	66 (mesocnemic)
Height estimate based on femoral length 152.4 +/- 3.72cm (5'0")	

Cist 16, SKL16, Context 7045

Human remains consisting of fragments of the left humerus, radius, ulna, the carpals, metacarpals and phalanges of both hands, the coccyx, both innominates, the right femur, tibia and fibula and the left cuboid – all apparently from one individual, a mature (pubic symphysis) adult male (sciatic notch). There were extensive periosteal new bone deposits on most bones, mainly at the sites of attachment of muscles, ligaments and joint capsules and particularly marked along the length of the femoral linea aspera but also on the gluteal ridge, on the greater trochanter, lesser trochanter and on the inter-trochanteric ridge anteriorly. On the right innominate similar deposits were evident on the ischial tuberosity, extending on to the ischio-pubic ramus and at the adductor attachments while there was lipping into the obdurator membrane. On the left innominate they were evident on the supero-posterior quadrant of the acetabular surface, while there were fine new bone deposits on the non-articular surface of the acetabulum; spicules of bone were evident on the external aspect of the left iliac blade in front of the sciatic notch and at the attachment of the external oblique on the iliac crest. On the right tibial head fragment there was also ossification into the attachment of the ilio-tibial tract and the semi-membranosus muscle and, to a lesser extent, into the soleal line. There were extensive new bone deposits all round the shaft of the left fibular shaft fragment, but of a type frequently ascribed to 'periostitis' and associated with bony response to infection (systemic or following local injury).

There was nothing of note on the humeral or radial fragments but on the ulna some periosteal new bone deposits were evident all around the shaft with some minor 'spicular' ossification at the attachment of the pronator quadratus muscle. On the hands minor amounts of periosteal new bone deposits were found on the lateral and medial aspects of the third right metacarpal and on the right and left fourth metacarpals, medially and laterally on the shafts. There was lipping at the distal articular surface on the right and left first metacarpals, on the proximal articular surfaces of the first proximal phalanges and distally on the first distal phalanges and into the tendon attachments on the posterior surfaces of both second metacarpals. The right lunate was larger than the left; both had irregular margins while the left triquetrum showed extensive lipping on its posterior aspect. Extensive new bone formation was also evident on a bone fragment, probably tibial shaft. The 'spicular' lipping into muscle/tendon/ligament attachment is much more extensive than usual and its association (sometimes at the same site) with periosteal new bone deposits suggests some systemic cause. Radiological examination of the femur and the fibula showed no evidence of metabolic bone disease and the underlying trabecular pattern and rest of the cortex was normal (Weir pers comm).

Left humeral bicondylar width	66.0mm
Right femoral length	(474) mm
Right femoral maximum head diameter	53.9mm
Right femoral meric index	77 (platymeric)
Height estimate based on femoral length	175.6 +/- 3.94cm (5'9")

Animal bones were present.

Cist 21, SKL4, Context 7019

Human remains consisting of right and left radii and ulnae, right and left hand bones, fragments of the lower sacrum and right and left innominates, femora, tibiae and fibulae and a vertebral body. At least two individuals were represented – a young (recent closure of tibial epiphysis, incomplete sacral fusion) male (sciatic notch) and an infant (vertebral body). The right femur was slightly bowed and had an enthesopathy just above the medial condyle posteriorly, probably at the attachment of the medial head of gastrocnemius. The soleal lines on both tibiae were particularly prominent giving a flanged appearance.

Left ulna, maximum length	261mm
Right radius, maximum length	245mm
Left femur, meric index	81 (platymeric)
Right femur, maximum head diameter	45.1mm
Right femur, bicondylar width	77.3mm
Right femur, maximum antero-posterior diameter shaft	31.0mm
Right femur meric index	81 (platymeric)
Left tibia, maximum length	348mm
Left tibia, position of nutrient foramen	102mm
Left tibia, cnemic index at nutrient foramen	72 (eurycnemic)
Right tibia, maximum length	342mm
Right tibia, position of nutrient foramen	105mm
Right tibia, maximum head breadth	73.8mm
Right tibia, cnemic index at nutrient foramen	71 (eurycnemic)
Left fibula, maximum length	343mm
Height estimate based on tibial length	166 +/- 4.00cm (5'5")

Animal bones were present.

Cist 21, Context 7034

Very little human bone was recovered; an infant/foetal neural arch

rib, proximal humerus, phalanges and ischium, an adult right trapezium and metacarpals 1-3, left and right patellae, talus, navicular and a sacral fragment were identified. There was a defect on the proximal talar articular surface. Three individuals – an infant/foetus, a child and an adult were represented.

Cist 22, SKL9, Context 7036

Human remains consisting of right and left femora, tibiae, fibulae and feet with a second right femur and tibia. Two individuals were represented – a mature adult (foveal lipping), possibly female (bone dimensions) and an infant (possibly neonatal or even foetal). Lipping was present at the attachment of the following muscles – vastus lateralis on both femora (upper attachment), gluteus maximus on both femora, quadriceps femoris on the left patella, peroneus longus on the left fibula and triceps surae on the calcaneus and at the femoral foveae. Squinting facets were present on both tibiae and there was marked asymmetry in the talar facets for articulation with the sustentaculum tali.

Left femur, maximum length	444mm
Right femur, maximum length	440mm
Left femur, maximum head diameter	41.2mm
Right femur, maximum head diameter	40.6mm
Left femur, bicondylar width	75.0mm
Right femur, bicondylar width	76.4mm
Left femur, maximum antero-posterior diameter	26.8mm
Right femur, maximum antero-posterior diameter	28.4mm
Left femur, meric index	70 (platymeric)
Right femur, meric index	68 (platymeric)
Left tibia, maximum length	351mm
Right tibia, maximum length	352mm
Left tibia, position of nutrient foramen	114mm
Right tibia, position of nutrient foramen	108mm
Left tibia, head breadth	71.0mm
Right tibia, head breadth	71.4mm
Left tibia, cnemic index	71 (eurycnemic)
Right tibia, cnemic index	67 (mesocnemic)
Left calcaneus length	76mm
Right calcaneus length	77mm
Height estimate based on femoral length	163.8 +/- 3.72cm (5'4")

Cist 23, SKL17, Context 7046

Human remains consisting of right and left tibiae, fibulae, most of bones of both feet and the first left metacarpal, all apparently from the same individual – an adult, probably male (tibial size).

The only features of note were the well developed lateral tubercle on the right calcaneus and some lipping at the attachment of the triceps sural tendon on both calcanei.

Right tibia, maximum length	384mm
Right tibia, position of nutrient foramen	120mm
Right tibia, maximum head breadth	72.9mm
Left tibia, cnemic index	75 (eurycnemic)
Left tibia, cnemic index	74 (eurycnemic)
Right fibula, maximum length	364mm
Left calcaneus, maximum length	77.0mm
Right calcaneus, maximum length	77.0mm
Height estimate based on tibial length	174.8 +/- 4.0cm (5'9")

DB09 INHUMATIONS

Although there had been some disturbance in these contexts there was no significant conmingling of remains and it was clear which skeletal elements represented the main inhumation. All the individuals were adult although unassociated immature bones

were found with the young adult ?male, SKL7 (infant/child vertebral fragment, immature metatarsal) and with the middle-aged male, SKL11 (immature cervical vertebrae). Three of the four inhumations appear to have been male (SKL7,

SKL11, SKL14) and one female (SKL15) although this must be regarded as very tentative for SKL14 and SKL15. Only one appears to have reached at least middle-age (SKL11) while SKL7 and SKL14 died in young adulthood. From the evidence in the vertebral column and limbs (SKL7 – Schmorl's nodes, intervertebral osteochondrosis, enthesopathies of shoulder muscle; SKL11 – vertebral osteophytes, enthesopathies of shoulder and elbow muscles and ligaments), it appears that physical labour characterized young and old.

Dental evidence is scarce but conforms to the pattern seen in most archaeological populations – calculus deposits (SKL7, SKL14), heavy attrition resulting in abscesses and tooth loss (SKL11). Interestingly, SKL7 showed an unusual number of extranumerary teeth – bilateral pairs of ?premolars in each jaw. A fairly common congenital anomaly was seen in SKL11 – partial lumbarisation of the first sacral segment.

There was no evidence of infection or metabolic disease, although the lines of enamel hypoplasia seen in SKL7 (illus 147) and SKL11 suggest episodes of childhood illness/stress/malnutrition. All three males appear to have been about 5'7" in height with the female about 5'4". The only available femur in this group was flattened proximally, although not markedly so (meric index 80).

DETAILED DESCRIPTIONS

Burial 33, SKL11, Context 7040

A fragmented skull, vertebral column, hyoid body, ossified thyroid fragment, ribs, sternum, right clavicle, scapula, humerus, radius, ulna, carpus, metacarpus and proximal phalanges, innominate and proximal femur representing a middle-aged (ossified thyroid, dental attrition, vertebral osteophytes, pubic symphysis) male (sciatic notch); in addition unassociated immature cervical vertebrae (?4-6) were identified.

On the skull the right mastoid process was larger than the left. The teeth showed extreme attrition with ante-mortem loss of the maxillary right tooth 6 and an abscess associated with the mandibular right tooth 6; there were moderate calculus deposits. The vertebral column was virtually intact and well preserved, with osteophytes ranging from slight to severe present throughout the lower thoracic (from TV6) and all the lumbar region, on both sides of the vertebral bodies. There was little, if any, facet joint degeneration and only one Schmorl's node was identified (on the upper surface of TV12 body). There was partial lumbarisation of the first sacral segment on the right side.

The clavicle was short but robust with enthesopathic change at the attachment of the pectoralis major and of the costo-clavicular ligament and degenerative change at the medial articular surface. The humerus was also short but robust with muscle attachments (deltoid and subscapularis) prominent and enthesopathic change at the attachment of the pectoralis major (see above) at the lateral lip of the bicipital groove and in the floor of the groove at the attachment of the latissimus dorsi muscle. A small bony tubercle was present at the site of the capsular attachment above the trochlea.

The scapula was large with prominent muscle markings; the radius and ulna were also robust with enthesopathic change at the radial attachment of the biceps brachii muscle. There was lipping on the hook of the right hamate.

The prominent muscle markings, robust bones and enthesopathies associated with powerful shoulder muscles and the biceps indicate habitual powerful physical activity.

There was degenerative change, characteristics of early osteoarthritis at the upper border of the right acetabulum; muscle markings were prominent on the posterior aspect of the robust femoral shaft.

Right humeral, maximum length	324mm
Right humeral, maximum head diameter	47.7mm
Right humeral, bicondylar breadth	61.5mm
Right ulna, maximum length	262mm
Right radius, maximum length	240mm
Right clavicle, maximum length	140mm
Right femur, maximum head diameter	48.6mm
Right femur, meric index	80 (platymeric)
Height estimate based on humeral length	172 +/- 4.57cm (5'8")

Burial 34, SKL15, Context 7044

Right and left fibulae, some tarsal and metatarsal bones and pedal phalanges, representing a small adult, possibly female (size).

There was some lipping into the attachment of the triceps sural tendon on both calcanei.

Left fibula, maximum length	350 mm
Height estimate based on fibular length and assumed female sex	162 +/- 3.58cm (5'4")

Burial 35, SKL14, Context 7043

A mandibular fragment, fragments of vertebrae, ribs, sternum, right clavicle, scapula, left radius, ulna and two proximal phalanges of the left hand, representing a young adult (neural-central junction still visible; ring epiphyses not fully closed), very tentatively sexed as male (radius length).

There was enthesopathic change at the ulnar attachment of the muscles brachialis and pronatus quadratus.

Left radius, maximum length	238mm
Height estimate based on radial length and assumed male sex	170 +/- 4.66cm (5'7")

Burial 44, SKL7 Context 7029

A badly fragmented skull, vertebral column, ribs, sternum, right and left clavicles, scapulae, humeri, proximal radii and ulnae, representing a young adult (dental attrition; incomplete closure of medial clavicular epiphysis), probably male (cranial features; humeral dimensions); in addition there was a large left scapula, an immature metatarsal, and an infant/child's neural arch.

The mastoid processes were prominent but asymmetrical, with that on the left being smaller and angled vertically downward, in contrast to the usual more forward projection seen on the right, which reflects the usual direction of pull of the sterno-cleido-mastoid muscle. There was no anomaly at the left sternal or left clavicular attachment area of this muscle, although the left clavicle was longer than the right.

There were four extranumerary teeth, probably premolar in type, two in each jaw, on each side between the third and fourth teeth. On the maxilla, the 'extra' teeth were positioned on the lingual side of the dental arch, while on the mandible they were on the buccal aspect. The 'extra' lower right tooth had probably not erupted through the gum but bore a ?carious cavity; the unerupted extra lower left tooth was exposed by a postmortem break. All thirty-two permanent teeth were recovered *in situ* in the jaws. Two hypoplastic lines were evident on the upper central incisors and canines midway and two-thirds of the way from the incisal edge of the crown (illus 147); there were moderate amounts of calculus deposits and little dental attrition.

There was an extensive series of Schmorl's nodes throughout the thoracic (from TV2) and lumbar (to LV3) vertebral column, affecting upper and lower surfaces; the upper and lower rims of TV10 were affected by intervertebral osteochondrosis; the superior right facet of TV4 and the inferior facets on TV10 showed some breakdown of the articular surface. These features are often associated with heavy physical stress on the back, possibly due to carrying loads at a time when the intervertebral discs are still turgid and may herniate, under load, into the over and underlying bodies.

The scapulae had prominent flanges infero-laterally at the attachment of the shoulder muscle teres major. The 'extra' scapula had a smooth irregular indentation on the glenoid surface. The clavicles and humeri were slender but the extremities of the latter were quite broad and fell within the male range (Bass 1987). There

was a supracondylar spur on the right humerus which was markedly broader distally than the left.

There was enthesopathic change on the distal end of the medial lip of the bicipital groove for some 2cm, at the lower attachment of the teres major muscle (see above), while in the trochlear fossa there was a small eroded area some 1cm by 0.2cm with what appear to be vascular foramina above.

Right humerus, maximum length	321mm
Right humerus, maximum head diameter	45.2mm
Right humerus, bicondylar width	64.6mm
Left humerus, bicondylar width	62.0mm
Right clavicle length	141mm
Left clavicle length	144mm
Height estimate based on humeral length	171 +/- 4.56cm (5'7")

DB09 UNSTRATIFIED

The human remains described below are unprovenanced machine-disturbed bone from site DB09. The remains represented several incomplete and fragmented adult and immature skeletons – a minimum of four adults, one juvenile and two children/infants.

Crania: three left and two right petrous temporals, condylar portion of the occipital; right frontal fragments (1 adult, 1 child); a right zygomatic arch/maxillary fragment and two left sphenoid fragments were identified.

A small lesion of unknown aetiology was present between the foramen ovale and foramen rotundum on a left sphenoid fragment. An extensive area of periosteal new bone deposits was evident on the zygomatic arch/maxillary fragment, possibly a consequence of an infected facial injury.

Mandibles: two right mandibular rami were identified, one bearing a third molar (worn).

Teeth: only one molar was present, with a huge carie (a mandibular ?first molar).

Vertebral column: only two vertebral bodies (lower thoracic and upper lumbar) and a cranial sacral fragment were present. A Schmorl's node was noted on the thoracic vertebral body (upper surface).

Ribs: a small adult left rib (?female) was identified, with a small area of periosteal new bone deposit on the inner (pleural) aspect. This type of lesion may have been associated with tuberculosis, pneumonia or bronchitis, but unfortunately there is no other skeletal evidence available to support any particular diagnosis.

Upper limb: four left and three right scapular fragments (all glenoid or spinous processes), two left humeral shafts, a left humeral head, a left distal humerus, three right distal humeri (one immature), two proximal left radii (one from a child), one complete right and one proximal right radius, four left ulnar fragments (one from a child) and two proximal right ulnar fragments were identified. Enthesopathic change was noted at the subscapularis attachment on the greater tuberosity of a right humerus, while the styloid process of a left ulnar fragment showed degenerative change.

Left humerus 1, maximum diameter	51.8mm
Left humerus 2, bicondylar breadth	69.5mm
Right humerus 3, bicondylar breadth	56.8mm
Right radius, maximum length	252mm

Lower limb: three left innominate and one right innominate fragment (including one adult female and one infant/child), four left and five right femoral fragments (one immature), four left and six right tibial fragments (one from a child), a left and two right calcanei and a left first metatarsal were identified. Squatting facets were noted on two right tibiae and a bony spicule had formed just below the head of a left tibia in the area of attachment of the medial ligament of the knee. Both femora were platymeric; the tibiae ranged from platynecemic through mesocnemic to curynecemic.

Left femur 1, maximum head diameter	47.8mm
Left femur 2, maximum head diameter	48.5mm
Left femur 3, meric index	77 (platymeric)
Right femur 4, meric index	71 (platymeric)
Left tibia 1, cnemic index	69 (mesocnemic)
Left tibia 2, cnemic index	70 (curynecemic)
Left tibia 3, head breadth	67.2mm
Left tibia 4, head breadth	68.4mm
Right tibia 5, cnemic index	59 (platynecemic)
Right tibia 6, cnemic index	65 (mesocnemic)

Animal bones were present.

DB09 MACHINE DISTURBED BONE FROM INDIVIDUAL TRENCHES

TRENCH 4, CONTEXT 7004

Crania: Two left frontal fragments; several parietal, temporal, and occipital fragments; nasal, sphenoid and zygomatic fragments and a right maxilla with right teeth 3-8 *in situ* together with the pterygoid plates, sinus and greater and lesser wings of the right sphenoid.

Mandibles: Two fragments consisted of a body with teeth R8-1,

L1-4 *in situ* (little wear, young adult ?male) and a left ramus; the two fragments could be from the same individual.

At least two adult individuals are represented in the cranial assemblage, probably both males, one a young adult (dental attrition), the other somewhat older (dental attrition). Both left frontal bones and one pterygoid plate showed spicules of bone at the attachment of the temporalis fascia and the lateral pterygoid muscle respectively, that is at sites associated with muscles of mastication; there were calculus deposits on the maxillary and

mandibular teeth; the latter had hypoplastic linear defects on teeth 3, 4, 5, 6, 7.

Vertebrae/ribs: Only lumbar vertebrae (possibly LV1, LV4, LV5 and an unknown lumbar) were identified: the first had Schmorl's nodes on the upper and lower surfaces and the fourth had a small osteophyte on the upper rim. Fragments of adult ribs were present.

Upper limb: Left clavicular fragment; two scapular fragments; several humeral fragments (one from a child); proximal radial shaft (child).

Left humerus 1, maximum head diameter 44.8mm (?female)
Right humerus 2, bicondylar width 62.5mm

Lower limb: A mature pubic symphyseal fragment; five femoral fragments (one from a child); two tibial fragments (one from a child, not matching the femur and one foetal/infant). Enthesopathic change was seen at the femoral attachment of the right gluteus maximus in one individual.

Right femur, meric index 66 (platymeric)
Left tibia (child), cnemic index 66 (mesocnemic)
Left tibia (infant/neonate), length shaft 62.5mm
Left tibia (infant/neonate), cnemic index 94 (eurycnemic)

At least five individuals were represented in the assemblage – two adults, probably both male (one a young adult, the other perhaps a decade older); two children and one foetus/infant.

Animal bone was present.

TRENCH 5, CONTEXT 7009

Crania: Some frontal, parietal, temporal, occipital, maxillary and zygomatic fragments, representing at least two individuals, including at least one small, older juvenile (basisphenoid-basioccipital synchondrosis not fused; root apices of teeth 8 open); teeth L4-8, R6 borne on the maxilla, little wear.

Mandibles: None.

Vertebral column/ribs: None.

Upper limb: Only fragments of three humeri, three left radii, a left ulna and some left carpal and metacarpals were recovered, representing at least three individuals, of whom one was a small older juvenile. A right humerus had a small defect on the articular surface of the head.

Right humerus, maximum head diameter 43.0mm

Lower limb: Several right and left innominate fragments (at least four individuals, of whom two were probably female, together with a child of less than 8 years); four femoral fragments (at least one adult, two children); four adult tibial fragments; a right talus and first metatarsal were recovered. Squatting facets were present on two tibiae.

Left femur, maximum head diameter 46.5mm
Left femur (child), meric index 72 (platymeric)
Left tibia, maximum length 342mm
Height estimate based on tibial length, female sex assumed on basis of size 161 +/- cm (5'3")

At least six individuals were represented in this relatively small assemblage – three adults, of whom two were probably female, an older juvenile and two children, one less than eight years of age.

TRENCH 6, CONTEXT 7000

Fragments of a cranial vault; an adult canine tooth (small, well worn); fragments of an unfused sacral body; a distal humeral fragment; a left tibial midshaft fragment; the upper half of a calcaneus and a fragment of the talar facet of a calcaneus; it is possible that all the above came from one small (?female) adult.

TRENCH 7, CONTEXT 7006

Crania: Parietal and occipital vault fragments, possibly from the same skull.

Mandibles: None.

Vertebral column/ribs: Fragments of mid/lower thoracic vertebrae with minor lipping; one rib fragment from a child.

Upper limb: Gracile clavicular fragment (?immature); gracile distal humeral fragment (?female), several manual phalanges.

Lower limb: Two ischial fragments, both gracile (one sub-adult); three femoral fragments (one from a small ?female) adult, one from a large (?male) adult; three tibial shaft fragments (one large ?male); fibular fragment; a small medial cuneiform.

Left femur, bicondylar breadth 85 mm
Left tibia, cnemic index 66 (mesocnemic)

At least three adult individuals (two females, one possibly sub-adult; one male) and one child were represented from this context.

Animal bone was present.

TRENCH 8, CONTEXT 7005

Crania: Frontal, parietal and occipital fragments and a maxilla (with teeth 3- 7 little wear) representing at least two adults (one of which was young).

Mandibles: Left half bearing teeth 1-6, 8, 3-5, 8, heavy attrition, ante-mortem tooth loss of teeth 6, 7, middle-aged adult; body with teeth 2-5 right, small ?female; body with teeth 1, 2, 4-6 left, 1-6 right, slight attrition, adult male; right body with deciduous molars, unerupted permanent incisors, child about 5 years; at least five individuals.

The left half of the mandible of a young adult showed evidence of having been struck with a heavy sharp edged instrument which left an extensive cut mark from the outer border of the mandible at the junction of the ramus and body in front of the third molar, through and breaking off the crown of the second molar and shearing off the posterior lingual quadrant of the first molar. There is no evidence of healing at the bony edges of the 'wound'; the cut edges are not 'fresh', that is they are not the result of damage in this excavation. It is not clear whether the blow was struck at or around the time of death – although it is difficult to reconstruct how this kind of injury could have been inflicted and, unfortunately, there are no other firmly associated bones. It is, possibly, the result of earlier disturbance of the graves, although no similar cut marks were identified on any human bones from either the DB09 or DB10 contexts.

Vertebral column/ribs: Only a third cervical, some fragments of thoracic and one lumbar vertebrae were recovered with some rib fragments.

Upper limb: Right clavicular shaft; two scapular fragments (including one immature), several fragments of right and left humeri, radii (including one immature), ulnae (including one immature), second right metacarpal; at least five individuals (including an immature) were represented. Degenerative change was present at the medial clavicular articular surface and at the proximal end of a right ulna.

Right humerus, maximum head diameter 51.5mm

Lower limb: Four adult innominate fragments (including one adult male) and right and left paired immature ilia (child, less than 8 years); several femoral fragments, including two immature (mid-late teens; infant); tibial and fibular fragments; several metatarsals.

There was degenerative change on the articular surface of an adult

left femoral head, adjacent to the fovea with enthesopathic change at the attachment of the obdurator externus on the same femur and at the patellar ligament attachment on a right tibia; at the attachment of the inferior tibio-fibular ligament on two left tibiae and at the attachment of the medial ligament of the ankle joint at the medial malleolus of a left tibia; a defect on the talar articular surface was observed on one left tibia; squatting facets were present on four left tibiae. Periosteal new bone deposits were noted on three distal fibulae.

Left femur, infant, maximum shaft length	90mm
Left femur (teens), maximum antero-posterior diameter	26.1mm
Left femur (teens), meric index	67 (platymeric)
Right femur (teens), meric index	66 (platymeric)
Left femur 2, maximum antero-posterior diameter	28.0mm
Left femur 3, maximum antero-posterior diameter	27.4mm
Left femur 4, maximum antero-posterior diameter	28.4mm
Left femur 4, meric index	76 (platymeric)
Right femur 5, maximum head diameter	43.6 mm
Right femur 6, meric index	92 (eurymeric)
Left tibia 1, maximum length	360mm
Left tibia 2, maximum length	342mm
Left tibia 1, cnemic index	76 (eurycnemic)
Left tibia 2, cnemic index	70 (eurycnemic)
Left tibia 3, cnemic index	71 (eurycnemic)
Right tibia 4, cnemic index	62 (platymeric)
Height estimate based on tibia 1, sex assumed to be male (size 169 +/- 4.0cm (5'7"))	

At least five adults were represented from this context; four tentatively sexed as female (tibial size) and one as male (sciatic notch); at least one (?male) had reached middle-age (dental attrition); there was, in addition, one juvenile (mid-late teens), one child about 5 years old and an infant in the first year of life.

Animal bone was present.

TRENCH 9, CONTEXT 7007

Cranial: Only three maxillary fragments were recovered – one of a middle-aged adult with teeth L5-8, R4-8 *in situ* with heavy attrition (see mandible below) and two immature bones – one bearing deciduous teeth R4, 5, the other deciduous R3, 5 (both aged less than 6 years).

Mandibles: Six fragments representing three adults and three immatures were identified; adult A bearing teeth I.1-8, R1-7; adult B bearing teeth I.6-8, R4-8; adult C bearing L4-8, R2, 4-8; immature A bearing teeth R6-8; immature B bearing teeth R4, 5; immature consisted only of the right condylar and coronoid process; one adult was probably middle-aged, another young; one immature individual was in the juvenile range, another less than 6 years old.

Vertebrae/ribs: Fragments of several cervical, thoracic, lumbar and sacral vertebrae and of several ribs were recovered.

Upper limb: Several clavicular, scapular (including one immature), humeral (including four immature), ulnar (including four immature), radial (including two immature), metacarpal and phalangeal fragments from both sides were identified.

Left humerus 1, bicondylar breadth	58.2mm
Right humerus 2, bicondylar breadth	69.3mm
Right humerus 3, bicondylar breadth	56.3mm
Right humerus 4, bicondylar breadth	55.2mm
Right humerus 5, maximum head diameter	50.4mm

Lower limb: Several adult (one male, one female) and three immature innominates (one child, one infant); adult and immature femora, tibiae and fibulae and adult tarsals and metatarsals were identified. Femoral fragments were the most frequently identified bones in this assemblage and provided an estimate of a minimum

of 13 individuals – seven adults (of which one was middle-aged, one was mature and one was young) and six immatures (of which there were at least one in the first year of life, two older infants, one child and two juveniles). The majority of femoral fragments appeared to be gracile and were assumed to be from females, only one being considered male on the basis of size; four could not be assigned.

Enthesopathies were noted as follows:

Innominate – one female at the attachment of the sacro-tuberous ligament (possibly due to obstetrical trauma).

Femur – on three right and one left femora at the attachment of the obdurator externus muscle, on one of these right femora at the attachment of the ilio-psoas muscle.

Tibia – at the attachment of the medial ligament of the right knee (similar to that seen in a tibia from DB09, unstratified).

Fibula – on a right and left distal fibula at the attachment of the inferior tibio-fibular ligament.

Evidence of infection in the form of periosteal new bone deposits was seen all round the midshaft of a tibial fragment and to a lesser extent on two distal fibular shafts.

A medial flange was noted, underpinning the neck of an immature (juvenile) femur.

All femora, for which the relevant portion of shaft was available, were platymeric (range 67-81), while adult tibial shafts were all in a narrow range 64-67 (platymeric/mesocnemic border) and an immature tibial shaft was almost cylindrical, with a cnemic index of 96.

Left femur 1, bicondylar breadth	70.4mm
Left femur 1, maximum antero-posterior diameter	26.8mm
Left femur 1, meric index	81 (platymeric)
Left femur 2, meric index	70 (platymeric)
Left femur 3, meric index	67 (platymeric)
Left femur 3, maximum antero-posterior diameter	27.4mm
Left femur 4, bicondylar breadth	75.4mm
Left femur 5, (juvenile) meric index	72 (platymeric)
Right femur 6, maximum head diameter	40mm
Right femur 6, meric index	80 (platymeric)
Right femur 7, maximum head diameter	50.3mm
Right femur 7, bicondylar width	75mm
Right femur 8, maximum antero-posterior diameter	26.5mm
Right femur 9, maximum head diameter	45.6mm
Right femur 10, bicondylar breadth	66mm
Right femur 11, meric index	72 (platymeric)
Right femur 12, bicondylar breadth	74.1mm
Right femur 13, maximum antero-posterior diameter	30mm
Right femur 13, meric index	77 (platymeric)
Right femur 14, bicondylar breadth	72.1mm
Right femur 15, bicondylar breadth	76mm
Right femur 16, (immature, about 6 years) maximum shaft length	200mm
Right femur 17, (immature, about 6 months) maximum shaft length	100mm
Left tibia 1, maximum length	314mm
Left tibia 1, cnemic index	67 (mesocnemic)
Left tibia 2, cnemic index	64 (platymeric)
Left tibia 3, cnemic index	65 (mesocnemic)
Left tibia 4, immature, cnemic index	96 (eurycnemic)
Right tibia 5, maximum length	329mm
Right tibia 5, cnemic index	65 (mesocnemic)
Height estimate based on tibial length (tibia 5, female sex assumed on basis of small size) 157 +/- 3.66cm (5'0").	

TRENCH 10, CONTEXT 7008

Crania: A virtually intact cranial vault and base, Skull 1 (probably male), together with a substantial number of frontal, parietal, occipital, temporal, and a few facial fragments were identified, representing at least six adults (at least one male, two females) and

one child probably about 6 years old. The skull vault had an occipital bun and no metopic suture.

Skull 1	maximum length	197mm
	maximum breadth	137mm
	cranial index	69.5 (dolichranic)
	foramen magnum length	35.2mm
	foramen magnum breadth	27.7mm

No maxillae or maxillary teeth were recovered.

Mandible: Only one fragment of a left ramus was identified; no mandibular teeth were recovered.

Vertebrae/Ribs: Only cervical vertebrae 1-4, very possibly from the same individual, and CV7 and TV1 with an upper sacral fragment were identified; rib fragments were recovered.

Upper limb: Three clavicular fragments, two scapular fragments, a substantial number of humeral fragments (mainly from the left side and including four immatures), together with several radial (left only) and ulnar fragments and some left metacarpals and carpals were recovered.

Enthesopathies were observed on the left (?male) clavicle at the attachment of the costoclavicular ligament and on a right (?male) humerus on the lateral and medial lips of the bicipital groove at the attachment of the powerful shoulder muscles pectoralis major and teres major. A defect in the articular surface of the glenoid cavity of a left scapula was noted.

Left clavicle, maximum length	150mm
Left humerus 1, maximum head diameter	48.5mm
Left humerus 2, bicondylar breadth	63.9mm
Left humerus 3, maximum head diameter	47.1mm
Left humerus 4, bicondylar breadth	55.1mm
Right humerus 5, maximum head diameter	50.5mm
Left radius, maximum length	299mm
Left ulna, maximum length	292mm

Lower limb: Several left and right innominate fragments (four possibly female, three possibly male) including two immature specimens (one from a young child and one from an older child/juvenile); a substantial number of incomplete femora (predominantly right), of which two were immature (both children); and tibiae (again predominantly right); only four fibular fragments and a right talus and calcaneus were identified.

Enthesopathies were noted at the attachment of the patellar ligament, anterior cruciate ligament and the muscle tibialis anterior on a right tibia, at the attachment of the muscle soleus to a right fibula and at the inferior tibio-fibular ligament on a fibular fragment. Degenerative lipping in the form of a small osteophyte was seen on the upper acetabular rim of a right (?male) innominate.

Left femur 1, maximum antero-posterior diameter	25.5mm
Left femur 1, meric index	74 (platymeric)
Left femur 2, maximum antero-posterior diameter	28.4mm
Left femur 2, maximum bicondylar breadth	82.3mm
Right femur 3, maximum antero-posterior diameter	29.5mm
Right femur 3, bicondylar breadth	81.2mm
Right femur 4, meric index	86 (mesomeric)
Right femur 5, maximum head diameter	48.8mm
Right femur 6, maximum head diameter	50.6mm
Right femur 7, maximum head diameter	51.4mm
Right femur 8, meric index	68 (platymeric)
Right femur 9, meric index	73 (platymeric)
Right femur 10, (immature, about 6 years old) maximum length	210mm
Left tibia 1, maximum length	366mm
Left tibia 1, cnic index	69 (mesocnic)
Left tibia 2, cnic index	66 (mesocnic)
Right tibia 1, maximum length	365mm
Right tibia 1, maximum head breadth	77.3mm
Right tibia 1, cnic index	76 (eurycnic)
Right tibia 3, cnic index	65 (mesocnic)

Right tibia 4, cnic index	64 (mesocnic)
Right tibia 5, cnic index	73 (eurycnic)
Height estimate based on tibial length, assumed male on basis of size, right and left tibiae 1 assumed to be from same individual) 170 +/- 4.00cm (5'7")	

At least seven adults, of whom three males and four females could be identified, a child of about 6 years and two other immature individuals (older children/juveniles) were represented.

TRENCH 11, CONTEXT 7018

Crania: Frontal, parietal, temporal, occipital and maxillary fragments were identified, representing at least nine adult individuals, together with an almost complete cranial vault and base (10 individuals); all left upper incisor and canine teeth had been lost before death in one individual, other maxilla bone teeth 1-7 on both sides (considerable attrition, mature adult).

A very small bony nodule was noted on a occipital clivus about 1 cm in front of the foramen magnum; there was some degenerative lipping on the right and left posterior margins of the occipital condyles in the almost intact skull – a slight bun was present on a third occiput.

Skull, maximum length	141mm
Skull, maximum breadth	195mm
Skull, cranial index	72 (dolichranic)

Mandibles: Five mandibular fragments representing five adults were recovered (one was edentulous, probably matching the edentulous maxillary fragment), one with teeth R5-7, I.5 *in situ* with ante-mortem loss of L3 and moderate attrition was probably from a mature female; one with all teeth *in situ* and little attrition was probably from a young female; another mature female was probably represented in the fragment with L3-7, R4-7 *in situ*, L8 and R8 absent/unerupted and moderate attrition, while yet another with only teeth L4-7 *in situ* showed extreme levels of attrition, with an abscess, probably due to infection following pulp exposure – below I.6/7.

Vertebrae/ribs: Eight cervical (including 'matching' CV3-5), nine thoracic and four lumbar vertebrae were recovered together with three immature (juvenile) fragments. Several rib fragments were also present.

There was moderate osteophytic lipping at the margins of the 'set' CV3-5, and moderate to severe degenerative change on the body surfaces, especially on CV4; facet joint degeneration was slight and also seen on a CV7; several of the thoracic vertebral bodies and facet joints also showed slight degenerative change; Schmorl's nodes and moderate/severe osteophytic lipping were seen on all adult lumbar vertebrae.

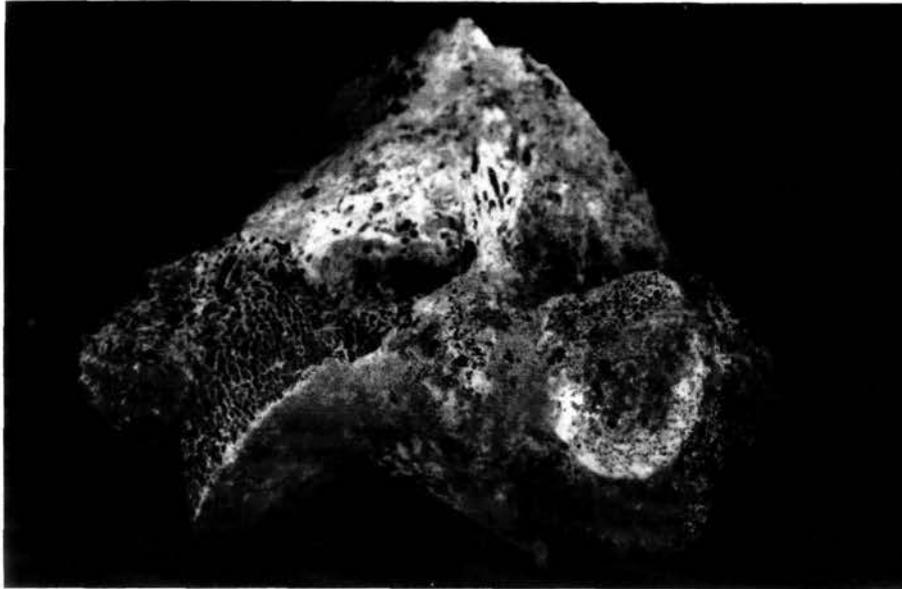
Four individuals are represented (two adults and two immatures).

Upper limb: A clavicle (infant/foetus), two right scapular fragments, four left and one right humeral; six radial, four ulnar and a left fourth metacarpal were recovered.

An enthesopathy was noted at the attachment of the muscle pectoralis major on the lateral lip of the bicipital groove in a right humerus, where the radial groove was particularly well defined, probably because of the prominent deltoid tuberosity. The most severe example of degenerative (?osteoarthritic) joint disease in any of the assemblages was seen on a left distal humeral fragment, where there was an area of eburnation some two centimetres in diameter on the capitulum (illus 148); the sex of this individual is tentatively assumed to be female on the basis of size.

Left clavicle, length (infant/foetal)	55mm
Left humerus 1, maximum head diameter	38.5mm
Left humerus 2, maximum head diameter	44.0mm
Left humerus 3, bicondylar breadth	55mm

Lower limb: Several adult innominate fragments (two female, one middle-aged adult), several right and left femoral, tibial and fibular



Illus 148
Eburnation on a distal
humerus (DB09, Trench 11,
u/s).

fragments, and a right first metatarsal and proximal phalange were recovered; there was in addition a child's femur.

Enthesopathic change was seen in a fibular fragment at the attachment of the inferior tibio-fibular ligament. Two tibiae had squatting facets. There was degenerative lipping at the medial side of the head of the first right metatarsal.

Left femur 1, maximum head diameter	46.5mm
Left femur 2, maximum head diameter	45.0mm
Left femur 3, bicondylar breadth	82.1mm
Left femur 4 (child), meric index	72 (platymeric)
Left femur 5, meric index	66 (platymeric)
Right femur 6, maximum head diameter	46.5mm
Right femur 7, bicondylar breadth	73.5mm
Right femur 8, maximum antero-posterior diameter	30.9mm
Right femur 8, meric index	77 (platymeric)
Right tibia 1, enemic index	74 (eurycnemic)
Right tibia 2, enemic index	60 (platycnemic)

At least ten adults were represented in this assemblage, with possibly the oldest individual from any context – the edentulous jaws, the vertebrae showing degenerative change and the eburnated humerus may have come from one female individual, although there was at least one other middle-aged-old individual sampled, judging from the extreme dental attrition seen in a second mandible. At least four females and one male were identified and

the adult age range extended from young to old. An infant, possibly even foetus, was also represented together with a child probably 2-3 years old and at least one juvenile, although immature fragments were very sparse.

Animal bone was present.

TRENCH 8, CONTEXT 7024 (LEVELLING FOR POST-CEMETERY COURTYARD/SURFACE?)

Very little human bone was recovered: an infant/foetal left temporal fragment, an infant mandibular fragment (with an unerupted ?molar crown); an infant proximal humerus; an infant/foetal phalange; an infant/foetal ilium; a child's rib; a child's ischium and several young adult vertebral and rib fragments were identified. Thus no fewer than four individuals ranging from infant/foetus to young adulthood were represented in only a handful of bones.

Animal bones were present.

TRENCH 9 CONTEXT 7025 (SOIL AROUND SKLS 11, 14, 15)

Only an innominate fragment from an adult male was recovered.

DB10

The human remains from DB10 were noteworthy in that no immature remains were recovered and at least three adults (of seven) had reached middle to old age on the evidence of dental 'break down', ie substantial ante-mortem loss of several teeth, probably due to abscesses following pulp exposure as a result of heavy attrition. The human remains from this site consisted of parts of two skeletons, SKL19 and SKL20, and unstratified bones.

DETAILED DESCRIPTIONS

Burial 48, SKL19, Context 8005

Cranial vault fragments from the left side (?male, mastoid process), a distal right femur, an intact left tibia and right tibial fragment, distal left fibula and right and left tarsal and metatarsal bones were identified; the postcranial remains are adult; two individuals are possibly represented – male (skull), female (postcranial).

There was lipping into the calcaneal attachment of the triceps surae tendon on both feet; the right talus had a large defect on the superior articular surface, probably an example of osteochondritis dissecans (illus 146).

Right femur, bicondylar width	65.8mm
Left tibia, maximum length	336mm
Left tibia, position of nutrient foramen	109mm
Left tibia, cnemic index	71 (eurycnemic)
Right tibia, head breadth	63.8mm
Left calcaneus, maximum length	81.0mm
Right calcaneus, maximum length	81.0mm
Height estimate based on tibial length and assumed female sex	
159 +/- 3.66cm (5'3")	

BURIAL 49, SKL20, CONTEXT 8006

Skull vault fragments (?female, mastoid process) with sagittal and coronal sutures closed (mature adult) and a right clavicular fragment were recovered.

There were no features of note.

DB10 UNSTRATIFIED

Cranial remains predominated. At least seven individuals (four of whom were probably male and three female; three of whom were mature/old adults and two young adults; no immature material).

CRANIA

cranium 1 (occipital, left and right parietals, right petrous temporal; prominent occipital bun) adult, possibly male

cranium 2 (left and right frontals, parietals, petrous temporals and occipital) young adult, possibly female

cranium 3 (left and right parietals, petrous temporals and occipital) adult, possibly male

cranium 4 (left frontal, left and right parietals) young adult
cranium 5 (right and left frontals, left parietal, left petrous temporal, small bony spicule of the left external auditory meatus) adult, probably male

cranium 6 (left parietal and left petrous temporal) adult, possibly female

MAXILLAE

right and left matching maxillae 1 (extensive ante-mortem loss of all molars, both teeth 5, right 4 and possibly also right incisors and canines)

right and left matching maxilla 2 (heavy attrition, ante-mortem tooth loss of all molars, except left 6 where bone loss, ?due to an abscess, has been very considerable)

MANDIBLES

Mandible 1 (almost intact, possibly male, left teeth 5, 6, 8 and right 8 *in situ*, recent ante-mortem loss of left 7; abscess below left 7; possibly matches maxilla 2

mandible 2 (right half, possibly male; double mental foramen; teeth 1-3, 5, 6 *in situ*, ante-mortem loss of 7, large carie on 6; heavy attrition; extensive calculus)

mandible 4 (left half, teeth 6, 7, 8 *in situ*, moderate attrition)

mandible 5 (left half and right body to mental foramen; possibly female; right and left teeth 4 *in situ*, teeth 5-8 left lost ante-mortem)

Vertebral column: Little was recovered (fragments of cervical vertebrae 1, 2, 3; fragments of lower thoracic bodies with Schmorl's nodes; a mid lumbar vertebra with a small osteophyte on the left upper body; upper sacral fragment).

Upper limb: Proximal left and distal right and left humeral fragments, and an intact left radius were identified.

There was enthesopathic change at the attachment of the muscle subscapularis on the greater tuberosity of the right humerus.

Left humerus 1, maximum head breadth 50.8mm

Left humerus 2, bicondylar breadth 64.1mm

Right humerus 3, maximum head breadth 40.6mm

Left radius, maximum length 231mm

Lower limb: Paired right and left innominate fragments (mature adult, female), a left innominate fragment, five left and seven right femoral fragments, five left and one right tibial fragments, a left calcaneus, talus, first and fifth metatarsal and a right calcaneus and talus were identified (all tarsal bones may be from the same individual).

Enthesopathies were present on two left femora at the attachment of the muscle obdurator externus, and in one of these also at the attachment of the muscle ilio-psoas to the lesser trochanter.

Tibial shape varied little (cnemic index 69-70, n=3).

Left femur 1, maximum length 440mm

Left femur 1, bicondylar breadth 77.1mm

Left femur 1, maximum antero-posterior diameter of shaft 34.2mm

Left femur 1, meric index 85 (mesomeric)

Left femur 2, maximum head diameter 44.2mm

Left femur 3, bicondylar breadth 66.8mm

Left femur 4, maximum antero-posterior diameter of shaft 27.8mm

Right femur 5, maximum head diameter 46.3mm

Right femur 6, maximum head diameter 50.8mm

Right femur 7, maximum head diameter 42.6mm

Right femur 7, meric index 70 (platymeric)

Left tibia 1, cnemic index 69 (mesocnemic)

Left tibia 2, cnemic index 70 (eurycnemic)

Left tibia 3, head breadth 67.2mm

Left tibia 4, head breadth 68.4mm

Right tibia 6, cnemic index 70 (eurycnemic)

Height estimate based on femur 1, male sex assumed on size
168 +/- 3.94cm (5'6")

DISCUSSION

David Perry

The excavations at Castle Park have established that the place name *Dynbaer* (summit fort) refers to the blockhouse stack and headland in front of it, not, as previously thought, to Castle Rock (Alcock *et al* 1986, 256). The headland and stack overlook Castle Rock, as observed by Lord Dacre in 1523 (MacIvor 1981, 111). It was on this headland that a British promontory fort, presumably of the Votadini/Gododdin, was situated, as was its successor, an Anglian *urbs regis*. Subsequently, the headland formed part of the precinct of the medieval castle of Dunbar, of the site of a mid 16th-century French fort, of an 18th-century park and of a 19th- and 20th-century army barracks.

The date for the earliest settlement, the promontory fort, is unclear. It may have begun as a single-ditch fort behind the Inner Ditch, enclosing some 0.17 hectares, in the pre-Roman period, before being succeeded by an unenclosed settlement, which, in turn, was succeeded by a new defended settlement behind the Middle and, possibly, Outer Ditches in the Roman period. Or settlement may have begun in the Roman period as a single-ditch fort behind the Outer Ditch, enclosing some 0.3 hectares in extent, before being transformed into a multi-ditched fort by the addition of the other two ditches. Although forming a promontory fort on the headland, the settlement is more comparable to the well-fortified homestead at Camelon, West Lothian (Proudfoot 1978). That site contained two successive round houses on a promontory overlooking the River Carron, defended by three ditches and four palisades, whose sequence could not be determined. Occupation was dated to the 1st and 2nd centuries AD. Other such settlements are known inland near Dunbar from aerial photography (illus 3).

Even if the origins are obscure, occupation of the Castle Park fort can certainly be dated to the Roman period on the basis of the radiocarbon date of the 1st to 4th centuries AD from a feature pre-dating the Middle Ditch (GU-2991) (Table 28). The presence of three residual sherds of Samian ware in later deposits confirms contacts between the inhabitants

of the fort and the Romans. It is not clear when the settlement on the headland ceased to be defended by the ditches, but radiocarbon dates (GU-2582, GU-2583, GU-2584) of the 2nd to 5th centuries AD were obtained from charred wood above Courtyard 1 (Phase 4) when the site was undefended. Therefore, the fort must have been constructed, or reconstructed, and occupied (Phase 2) and replaced by at least two non-defensive settlements (Phases 3 and 4) in the Roman and sub-Roman periods (1st to 5th centuries).

The general assumption has been that the British inhabitants of Lothian, the Votadini or Gododdin, were friendly to the Romans, hence both the absence of Roman military installations in East Lothian and the apparently unique position of Traprain Law as a native fortified settlement in this area in the Roman period. It has, however, been suggested that Traprain was abandoned or of a reduced size before the arrival of the Romans and thus it would fit with the other evidence of abandoned or decayed hillfort settlements in southern Scotland in the later pre-Roman Iron Age (Hill 1987, 88). The Roman objects found there would be, therefore, 'votive offerings garnered from near and far brought to the ancestral home imbued with mysteries of antiquity' (*ibid.*, 89).

This radical interpretation of Traprain has been questioned on the basis that the 'abandonment' of settlements in the Tyne-Forth area in the later 2nd century AD has been presumed from the absence of late Roman pottery (Close-Brooks 1987, 92; Jobey 1967, 41). However, excavations at Edinburgh Castle and at Eildon Hill North, Roxburghshire, have revealed that Traprain was not unique in its evidence of occupation in the Roman period. Contacts with the Romans between the 1st and 4th centuries AD have been revealed at Edinburgh in Roman objects of those dates, leading to the suggestion of a lowland broch-type settlement, as at Edin's Hall, Berwickshire (Driscoll & Yeoman 1997, 223-8). At Eildon Hill North occupation in the 2nd century AD, contemporary with the Roman fort at nearby Newstead, was found (Owen 1992, 69). It is also

TABLE 28 RADIOCARBON DATES

Lab number	Material dated	BP	$\delta^{13}C\text{‰}$	cal AD	
				x 1	x 2
GU-2582	<i>Betula sp</i> and <i>Corylus avellana</i> Context 10492	1700 ± 50	-25.3	240-420	145-495
GU-2583	<i>Fraxinus excelsior</i> and <i>Salix sp</i> Context 10492	1750 ± 50	-24.4	150-390	125-420
GU-2584	<i>Alnus glutinosa</i> Context 10492	1740 ± 50	-27.0	210-395	125-425
GU-2989	<i>Corylus avellana</i> and <i>Betula sp</i> Context 1101	1620 ± 80	-26.6	250-590	230-620
GU-2990	<i>Quercus sp</i> Context 1412	1640 ± 50	-24.8	340-500	240-590
GU-2991	<i>Calluna vulgaris</i> and <i>Corylus avellana</i> Context 2178	1810 ± 50	-26.2	120-320	85-380
GU-2992	<i>Quercus sp</i> Context 2206	1650 ± 50	-24.9	250-495	240-555
GU-2993	Cattle cannon bone (metapodial) Context 1136	1590 ± 50	-20.5	405-595	340-610
GU-2994	Cattle cannon bone Context 1219	1540 ± 50	-20.2	435-610	405-625
GU-2995	Cattle cannon bone Context 1220	1500 ± 50	-22.6	455-620	430-655
GU-3937	Human bone Context 7044	990 ± 60	-22.4	980-1150	895-1220
GU-3938	Human bone Context 7045	900 ± 50	-24.2	1030-1225	1020-1250

Species identification of samples GU-2582-2584 was by Rod McCullagh, GU-2989-2992 was by B A Crone. Animal bones identified by C Smith.

The above ^{14}C dates are quoted in conventional years BP (before 1950 AD) and are uncalibrated with respect to dendrochronological age. The errors are expressed at the +/- one sigma level of confidence.

Calibration at one and two times standard deviation (67% and 95% probability) after Pearson et al 1986.

possible that occupation at The Dunion, Roxburghshire, continued into the Roman Iron Age (Rideout 1992, 115; but see also 118). The evidence from Castle Park indicates that the promontory fort and the succeeding palisaded enclosures were occupied during the Roman period.

The excavations at Broxmouth, south-east of Dunbar, revealed that the hillfort defences were abandoned at the end of the first millennium BC in Period VII, to be succeeded by a post-defensive settlement in Period VIII producing a hoard of Samian sherds and broken glass bangles (Hill 1982b, 168-9). The exact relation between Castle Park and

Broxmouth cannot be determined but, broadly, the defensive settlement at the former appears to have been the successor to the latter. Hence the 'votive offering' of the hoard of Samian sherds and bangle fragments at Broxmouth, a site which had been inhabited since the Late Bronze Age or Early Iron Age.

There are two ways of looking at the origins of the settlement at Castle Park. Any much earlier pre-Roman occupation at Castle Park aside, the promontory fort may have been constructed and then strengthened in response to the initial Roman advance into northern England and southern

Scotland. It may then have been dismantled and replaced by the fenced settlement of Phase 3 and unenclosed settlement of Phase 4 during any of the Roman occupations of southern Scotland under Agricola or Antoninus Pius, in the 80s and in the mid 2nd century AD respectively, or in the period of Roman control of southern Scotland between these dates or after the abandonment of the Antonine Wall.

Alternatively the fort at Castle Park may have been established *because* of the Roman presence – to maintain trading links with them, presumably for exporting grain and livestock to the Roman garrisons in Scotland or, later, on Hadrian's Wall and importing Roman goods or trinkets. Coastal promontory forts (as opposed to inland sites) are not typical of the Votadini. The only other one in East Lothian is at Castle Dykes (parish of Oldhamstocks) (RCAHMS 1924, 79). Similar forts in Berwickshire are equally rare, only one site being known, at Castle Dykes (parish of Cockburnspath) (RCAHMS 1915, 29-30), although a possible Iron Age promontory fort may underlie 16th-century earthworks at Eyemouth (Caldwell & Ewart 1997, 80). Twin forts on the cliff top at Earn's Heugh, Coldingham, are not on a promontory (RCAHMS 1915, 45-6). Of these sites from the territory of the Votadini, both Castle Park and Earn's Heugh (Childe & Forde 1932, 182) have been dated by excavation to the 1st to 4th centuries AD. A rim fragment of Roman glass was found at Castle Dykes, Oldhamstocks, indicating that the site may have been occupied during the Roman period (Hogg 1945, 172). Another rim fragment of Roman glass, dated to AD 150-250, was found at Kirk Hill, St Abb's Head, (*ibid.*, 173), although no structural evidence of a pre-Anglian defensive settlement was found there (Alcock *et al.* 1986). Further south in northern England, in territory between the Tyne and the Tweed, coastal promontory sites have been identified at Tynemouth (Jobey 1967, 39-40) and Bamburgh (Hope-Taylor 1977, 301) and suggested for Dunstanburgh (Jobey 1972, 289-90).

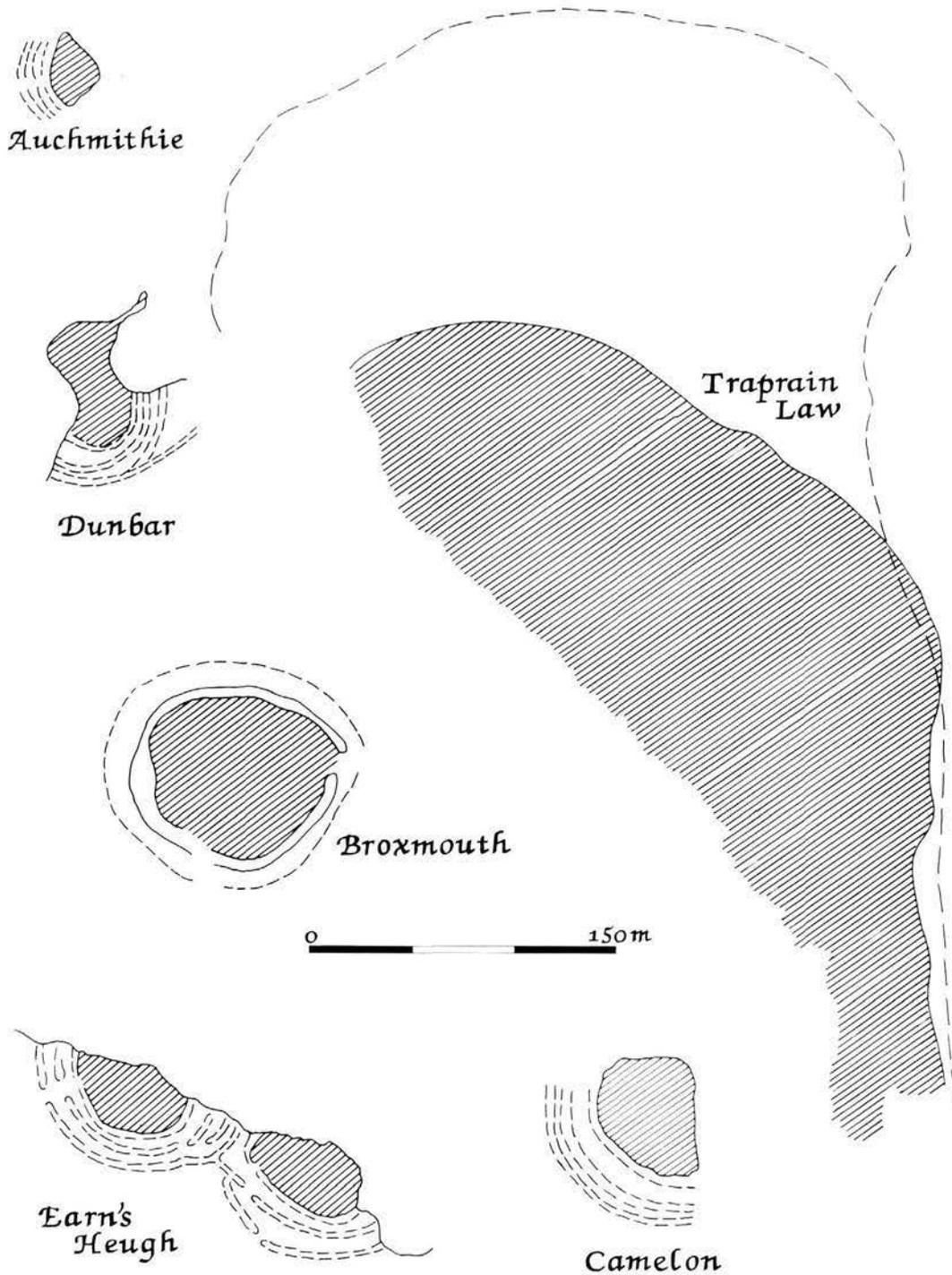
There existed a natural harbour at Lamerhaven, to the east of Castle Park, through which trade could have been conducted under the control of a chief resident at Castle Park. This chief would have been subordinate to the ruler of the Votadini on Traprain Law. It may even have been through Dunbar that Roman items reached Traprain. That the east coast was a more important trade route to the Roman south than the west coast has long been suggested (Curlie 1932, 346). Seaborne traffic clearly existed between the major ports of entry to Roman military installations of the northern frontier (Jobey 1967,

40), and the possibility of small craft 'creeping from one small harbour to the next' for trade with native settlements along the coast has been suggested (Simpson 1949, 20). Lamerhaven would certainly fit that pattern.

Of the four tribes recorded by Roman writers in southern Scotland, the Votadini, Novantae, Damnonii and Selgovae, the first three appear to have retained their tribal identities into the post-Roman period as the Gododdin, and the kingdoms of Rheged and Strathclyde. The tribes of Scotland north of the Antonine Wall (except the Maetae or Miathi who seem to have maintained their identity into the 6th century – Alcock 1973, 131), in contrast, seem to have united to form the kingdom of the Picts, possibly as a defensive measure against the Romans. It may be that the southern tribes were deliberately prevented from uniting against the Romans who maintained control over them through the maxim 'divide and rule'. However, the main threat to Roman Britain seems to have come, not from southern Scotland, but from the Picts to the north of the Antonine Wall and from the Scots in Ireland. If the Romans had wanted to divide and rule, they would surely have directed their attentions as much to the north of Scotland as to the south. Therefore, it is possible that rulers of the tribes between the Antonine Wall and Hadrian's Wall saw that it was to their own advantage to maintain good relations with the Romans. No doubt they were aware that the Romans could have made life extremely unpleasant if they did not co-operate. Equally no doubt, gifts or subsidies, such as the Traprain treasure (Alcock & Alcock 1990, 121) and the Falkirk hoard (Todd 1985, 230), helped assuage any lingering animosity or doubts.

The lack of finds from the pre-Anglian settlement is disappointing but this emphasizes that it was not as important as either Traprain or Edinburgh Castle. The absence of Roman objects may suggest that any imports at the haven were destined not for Dunbar but for Traprain. It is, perhaps, surprising that Castle Park produced fewer artefacts than either the crowded site at Earn's Heugh, where ten hut circles were observed (Childe & Forde 1932, 163, 179-83), or the single homestead at Camelon (Proudfoot 1978, 120, 124-5). This may be because the excavations at Castle Park were on the fringe of the Iron Age settlement, or because rubbish was disposed of by being thrown over the cliff into the sea.

The inhabitants practised mixed farming, both arable as evidenced by quernstones (nos 316 and 318) and pastoral. For the latter, cattle predominated, being twice as numerous as sheep or goats (see Table 6). Animal husbandry not only provided a source of



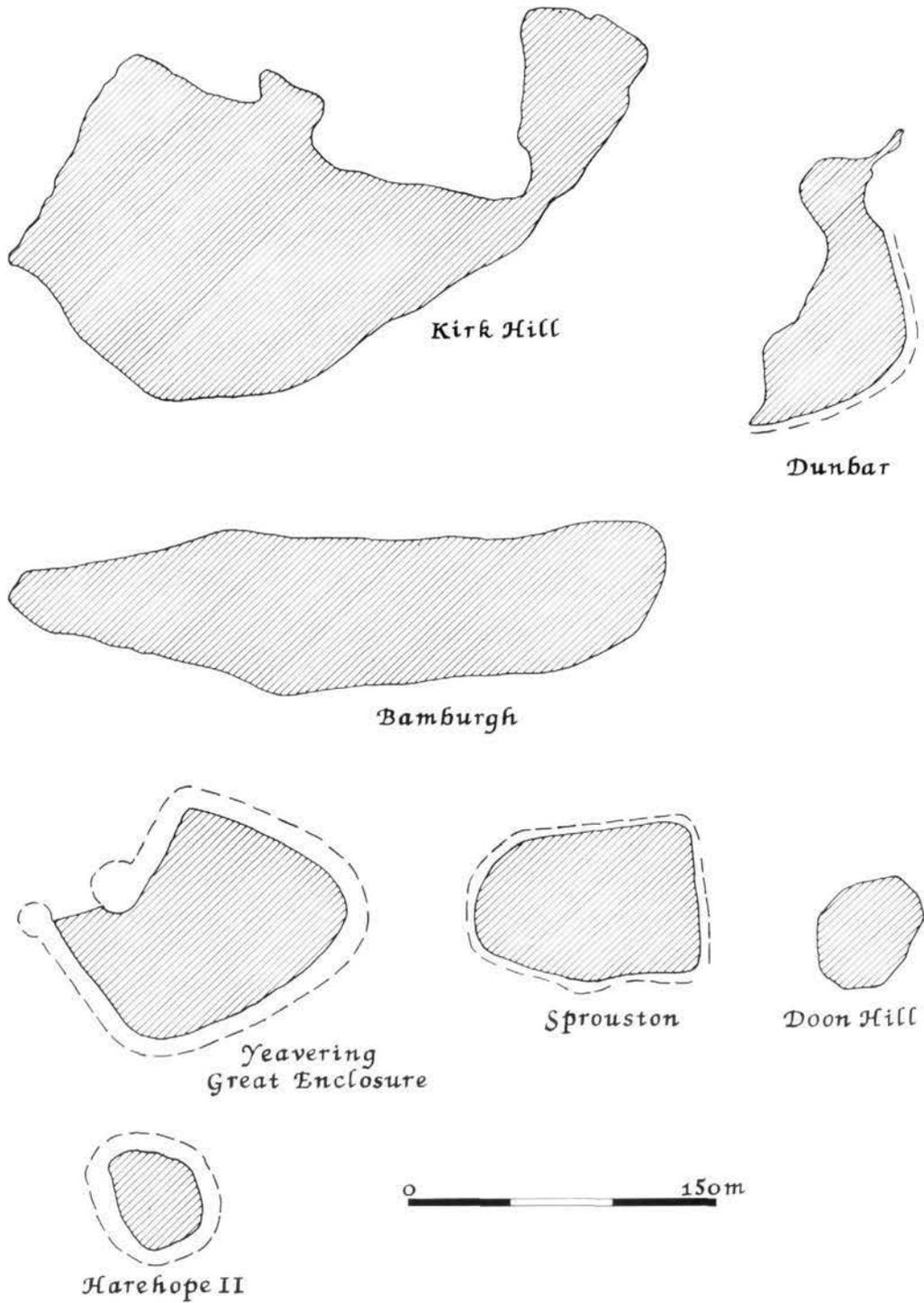
Illus 149

Comparative block plans of the Iron Age promontory fort at Dunbar with Auchmithie (after Ralston 1986), Broxmouth Phase VII (after Hill 1982b), Earn's Heugh (after Childe & Forde 1932), Camelon (after Proudfoot 1978) and Traprain Law (after RCAHMS 1924).

food, but also raw materials for small-scale industry such as weaving, and bone and antler working. No evidence of metalworking was found from the pre-Anglian period except for a piece of gold wire beaten flat at one end (no 2) from Phase 5. Fishing was also practised, for fish bones were found in

Phases 2, 3 and 6 and a fishing sinker in Phase 6 (no 139).

No definite buildings survived from the Iron Age settlement. The two posthole alignments in Phase 4 at approximately right angles to each other at the



Illus 150
Comparative block plans of Northumbrian *urbs regis* (Phase 13) at Dunbar with Kirk Hill, Bamburgh, Yeavinger, Doon Hill and Harehope II (after Alcock *et al* 1986) and Sprouston (after Smith 1991).

south-western end of Courtyard 1 (illus 18) may have been part of an enclosure. Fence 5 (Phase 3), which overlay the Inner Ditch, may have been part of a round house, some 12m in diameter, rather than an enclosure (illus 11). If so, it was of a different construction from the possible ring-ditch house,

some 6m in diameter, of Phase 4 (illus 17).

The arrival of the Angles seems to have marked a change in the status of Dunbar. From being a subordinate settlement of Traprain, Dunbar became an *urbs regis*, presumably being chosen by the Angles

as their centre in preference to Traprain because of its accessibility by sea. The Angles were a sea-faring people who had crossed to Britain from the Continent by boat. Ida himself arrived in Bamburgh by sea from the south, and his successors in the 7th century were operating in the Isle of Man and Ireland (Higham 1993, 116 and 139). Perhaps in the earliest stage of Anglian penetration of Lothian, Dunbar would, if necessary, have been an easier place from which to escape. Dunbar would also have been a convenient place for trade, although no obvious imports of pottery or glass were recovered such as have been found in other sites (Alcock & Alcock 1990, 119-30). The glass vessel fragment (no 518) and the bead (no 516) in Phase 8 have not been identified and may be residual from the Roman period, rather than 'Germanic' imports. Another glass vessel fragment was found in Phase 6 (no 520), pre-dating the Anglian period, and is also unidentified.

It is not clear when Traprain was abandoned as a settlement. Conventional dating of the metalwork from the site suggests desertion in the mid 5th century (Alcock & Alcock 1990, 121). However, as already mentioned, finds there have comparisons with Viking, Merovingian, Dark Age and Anglo-Saxon objects, indicating that occupation seems to have continued after the 5th century.

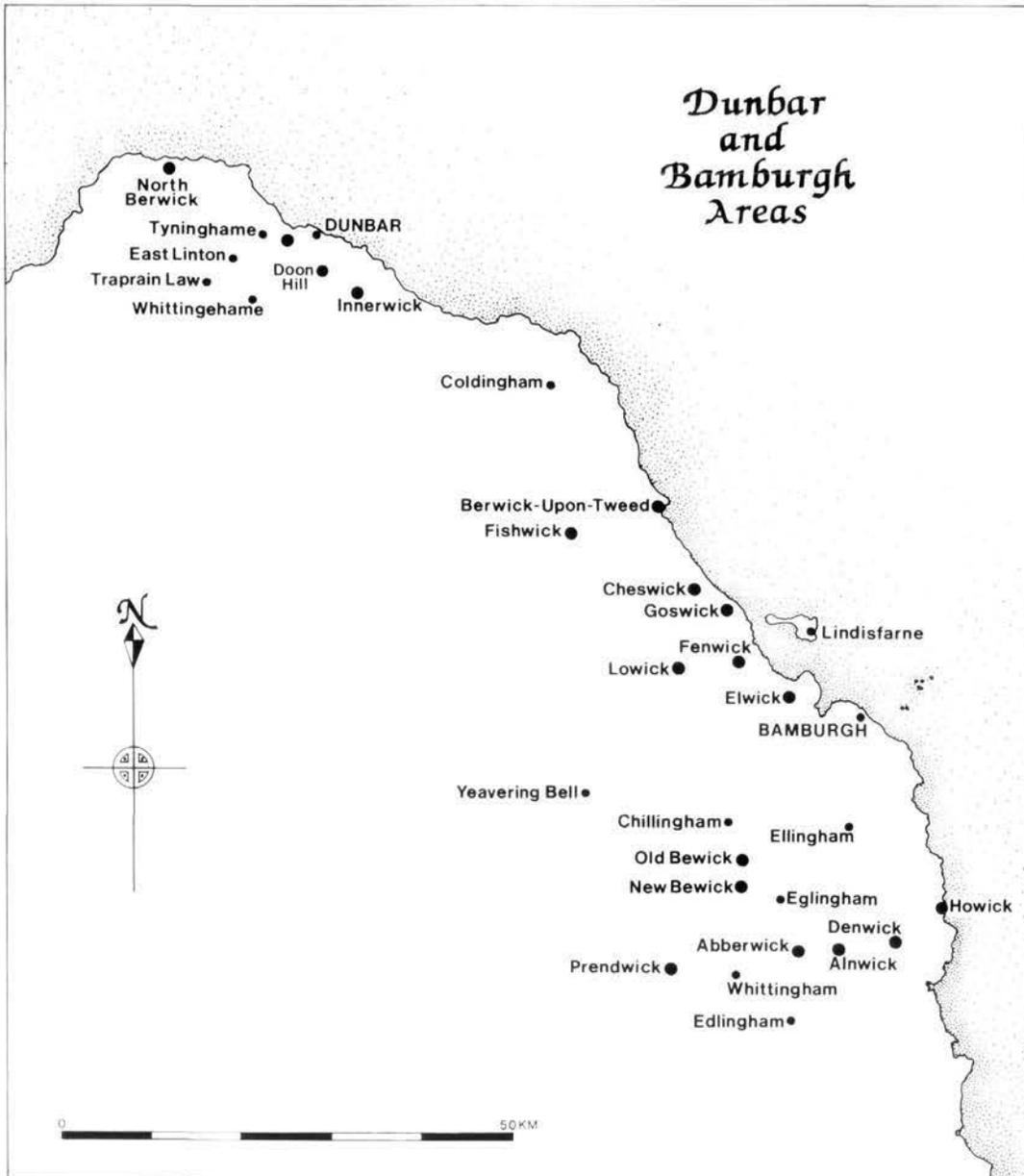
The term *urbs* in the case of Dunbar cannot refer to a city or urban centre in the modern sense, as such places did not exist in Britain at this time after the withdrawal of the Romans. The term is also applied by Bede and Eddius Stephanus to other sites, *urbs Giudi/Iudeu* (Stirling, Inveresk or Edinburgh), *urbs Coludi* (Coldingham, ie, St Abb's Head), *urbs Bebbae* (Bamburgh), *urbs Alcuith* (Dumbarton) and *Broninis* (possibly Lindisfarne – Alcock and Alcock 1990, 136). Like *Dynbaer* these were probably already existing British tribal or royal centres taken over by the Angles, although they are much larger than Dunbar. The *urbs* of Dunbar, as enclosed by the rampart and palisade of Phase 8, measured some 0.47 hectares, and, as enclosed by the ditch in Phase 13, measured some 0.56 hectares. Both these areas are dwarfed by Coldingham, 3 hectares, and Bamburgh, some 2 hectares (Alcock *et al* 1986, 274). Indeed, the *urbs* of Dunbar is smaller than the palisaded Great Enclosure at Yeavinger, some 0.73 hectares, and the palisaded enclosure of Phase III at Sprouston, Roxburgh, some 0.72 hectares (Smith 1991, 272) (illus 150). Yeavinger was a *villa regis*, while Sprouston may have been an *urbs regis* (*ibid*, 287). Clearly *urbs* does not refer to the size of the site. It must, instead, refer to its status and function

as a 'royal centre plus district' (*manerium cum appendiciis*) or shire (Barrow 1973, 27, 66).

Despite the disparity in size, there are similarities between the Northumbrian royal centres of Dunbar and Bamburgh (illus 151). At both places the Angles took over earlier British sites having access to the sea, *Dynbaer* and *Dinguayrdi*. Both are in the vicinity of large hillforts (*oppida*), occupied in the later pre-Roman Iron Age, Traprain Law and Yeavinger Bell. Three -ingham and three -wick placenames occur within a short distance of Dunbar: Tynninghame, Whittingehame and 'Lyneringham' (possibly East Linton) (Aliaga-Kelly 1986, 123-4); North Berwick, Hedderwick and Innerwick. There is also Coldingham in Berwickshire, while five -ingham and 12 -wick placenames occur near Yeavinger and Bamburgh (illus 151). Near both were important religious sites, Tynninghame and Lindisfarne. These similarities suggest that a comparable political, social and economic organization existed at these centres. The placename elements -ingham and -wick denote, respectively, early and dependent Anglian settlements (Nicolaisen 1976, 73, 81). Yeavinger and Bamburgh are both 6th-century Anglian sites, and it is possible that Anglian occupation in East Lothian began by the end of that century.

The shire in Northumbria was a unit on which was based a system of royal lordship (Barrow 1973, 27). This system, elsewhere based on similar units with different names, has been observed across an extensive tract of eastern Britain from Kent to the Moray Firth, as well as in Wales. It is, therefore, unlikely to have been an Anglo-Saxon development, as it occurred outside areas of Anglo-Saxon control (Campbell 1991, 41, 58). Instead it is more likely to have been a native British, pre-Anglo-Saxon, if not pre-Roman system, taken over by the incoming Anglo-Saxons. Although Dunbar is nowhere referred to as a shire in surviving historical sources, it is likely that it was still such in the 11th and 12th centuries (Barrow 1973, 66-7).

The focus of the shire was the royal hall, where the king would reside on his periodic travels round his kingdom as described by Bede of King Edwin (Sherley-Price 1970, 132). His attendants were accommodated in the hall or in subsidiary buildings nearby and stables were required for their horses. The purpose of these visits was to enable the king to collect and consume the food renders in livestock and grain provided by the inhabitants of outlying settlements within the shire. These tenants also provided labour and military services. The renders



Illus 151
The Dunbar and Bamburgh areas.

required the provision of barns, stables and pens. The processing of the renders into a consumable form was carried out by butchers, bakers and cooks in special areas within the royal centre. The surplus food renders and their by-products supported craft industries, such as tanning, weaving, bone working, glass making and smithing. Space was also needed for camps to accommodate soldiers and other retainers as well as for civil and military assemblies and markets. In the king's absence, the shire was administered by a royal official, the reeve or thane. In addition to the secular focus at the royal hall, there was also a religious focus, not necessarily at, but near, the royal hall.

If that is the theory behind the shire system (Barrow 1973, 47, 259; for the church, *ibid*, 21, 26-7, 63-4; Smith 1991, 286-7), how does Dunbar reflect it? There is one documentary reference to a reeve at Dunbar, Tydlin, in 680 when St Wilfrid was imprisoned there. The same source also mentions not very skilful smiths, whose fetters failed to hold their prisoner (Webb 1986b, 145). But it is archaeology which provides most of the evidence for Dunbar as a shire centre.

No timber hall, such as have been excavated at Yeaveering, Doon Hill, Cowdery's Down or Northampton, was found, but such a feature could

have been situated to the north of the excavated area, near the site of Building 8, the mortared stone structure on the northern edge of the excavation. This stone structure could be either a royal hall or a church associated with the royal hall. It is interpreted here as a royal hall on the basis of its being the successor to assumed timber halls on more or less the same site, as at Northampton where a stone hall succeeded a timber hall (Williams *et al* 1985, 39). Any doubts on Dunbar's status arising from the absence of a large timber hall can be quelled by the mortar-mixer of Phase 10. This was one of the most significant features found at Castle Park. This is apparently only the third site in Britain to have produced a mortar-mixer datable to the Anglo-Saxon period. The others were found at Monkwearmouth and Northampton (*ibid*, 36).

Such mixers found elsewhere in England and on the continent are associated with 'high status' sites, whether imperial, royal or ecclesiastical (*ibid*, 36-7), and the presence of one at Dunbar establishes that this was either a royal or an ecclesiastical site. On the basis of the statement by Eddius Stephanus that Dunbar was an *urbs regis*, it was presumably a royal site. The mixer is the only definite archaeological evidence of Dunbar's royal status, which none of the excavated timber buildings can establish. Although no stone building can be definitely linked to the mixer, it is probable that it was used in the construction of Building 8 (Phase 13). That structure, at the northern edge of the excavation, was probably the royal hall. If Dunbar, on the periphery of the kingdom of Northumbria, had a stone-built royal hall, it is certain that others await discovery for example at Bamburgh and York.

The other excavated structures of Phases 7, 8 and 13 can be seen as subsidiary buildings arranged around the royal hall. In Phase 7, the timber structures and features of an industrial area were within an enclosure to the east of an approach to the presumed site of the king's hall to the north of the excavated area. Much further to the south was a *Grubenhaus* where loomweights were made and weaving carried on. In Phase 8, the excavated timber structures at the northern end of the site were arranged around two sides of an open space, again probably to the south of the royal hall. One of them, Building 18, was, in fact, a succession of temporary structures, probably erected and dismantled in association with the king's periodic visits.

These timber buildings were replaced in Phase 13 by three stone-footed timber structures, associated with a royal hall (Building 8). The transition from earth-fast timber buildings to stone-footed timber

buildings has also been found at Hartlepool (Daniels 1988, 203) and has been suggested for Whitby (Rahtz 1976b, 461). Two of these structures were outside an enclosure around the hall. Of these, Building 9 was probably a metalworking area. The resemblance of the other, Building 6, to a monastic building, possibly a cell or workshop, at Hartlepool raises the question of whether Dunbar was a monastic site and Building 8 a church. Here the problem is distinguishing secular and monastic sites, for the timber structures at each type of site are similar. The timber buildings at Hartlepool formed part of the Anglo-Saxon building tradition, although smaller than elsewhere (Daniels 1988, 203, 205). The timber structures at Tynemouth (Cramp 1976, 219-20) and Flixborough, Humberside (Whitewell 1991, 246) likewise resemble secular structures but have been claimed as monastic, for Tynemouth from a documentary reference (Cramp 1976, 217) and for Flixborough from finds, specifically a plaque with a list of names of nuns (Whitewell 1991, 246; also Leahy 1995, 352). These examples reveal the only way in which it will be possible to distinguish monastic and secular sites: documentary evidence as for Tynemouth, or finds as for Flixborough, or both as for Hartlepool. Flixborough, however, has been recently re-interpreted as a royal site (Loveluck 1997, 8), indicating that identification of sites as either secular or ecclesiastical is unlikely to be final. Dunbar is documented as a royal site and produced no obviously monastic finds. The gold cross fragment inlaid with garnets (no 1), unstratified but possibly from Courtyard 6 or 7 (Phase 9), may have been ecclesiastical but, even if it is a fragment of a pectoral cross, it could have been lost by a cleric or bishop travelling round his diocese as is recorded of St Aidan (Sherley-Price 1970, 168) and St Cuthbert (Webb 1986a, 54-5, 83).

Courtyards 2, 6 and 7 (Phase 9) were probably places for mustering troops or holding markets or civic assemblies as were, possibly, Courtyards 3 (Phase 11) and 5 (Phase 7). Courtyard 3 was probably associated with an early phase of Building 8, before the stone-footed structures were erected.

The vast quantity of animal bone from the Northumbrian period (Phases 7-13) amounted to almost half of the bones recovered from the excavations at Castle Park (see Table 6). This is unlikely to be simply the accident of archaeological survival. It is more likely that it reflects Dunbar's enhanced status as an *urbs regis*, being debris of food renders consumed by the king and his retinue on their visits, when Castle Park would have been the focus of occupation of a great number of officials, servants, guards and hangers-on. This contrasts with

the small Iron Age settlement, probably a homestead dependent on Traprain Law, and the later medieval period when the focus of occupation had shifted to Castle Rock with Castle Park becoming an adjunct thereto.

Seed evidence indicates that barley, oats and wheat were grown in the environs of Dunbar and brought to the site in the Anglian period. Fat hen may also have been gathered as a vegetable crop, although not necessarily grown as such (Reynolds 1987, 33; Jobey 1982, 22). Flax was being grown in the immediate post-Anglian period (Phase 15) and may have been grown earlier as well.

A variety of crafts and industries were carried on. Metalworking is evident from pieces of lead waste (nos 158-60, 166, 167) and copper alloy waste (no 73). Bone and antler working is revealed in unfinished bone artefacts (nos 469-70) and antler offcuts (nos 497-500, 505-9). The industrial area of Phase 7, with its drain and stone-lined pits, may have been used for tanning or for retting flax.

If archaeology has been able to confirm the buildings, craft industries, farming and feasting at this shire centre, the religious side of the shire is less clear. The cemetery of long cists and inhumations found outwith the settlement area at Castle Park could have been the burying ground for the inhabitants of Dunbar. The size of the cemetery suggests that it may have served a wider area than just Castle Park, but there is no indication of a church such as have been found at Sprouston (Smith 1991, 281) and Yeavering (Hope-Taylor 1977, 73-4). At Sprouston some 380 graves laid out in rows have been identified in an almost rectangular enclosed area, some 40m by 30m (Smith 1991, 280-1). The eastern cemetery at Yeavering was also contained in a rectangular fenced area, some 40m by 15m, and comprised a mass of intercutting graves of five phases, of which the second comprised parallel lines of graves laid head to foot (Hope-Taylor 1977, 72-3).

The layout of the Dunbar cemetery is difficult to determine because of the considerable disturbance it has undergone and because so little of it was revealed in 1993. Some graves found in 1993 appeared to have been carefully laid in rows comparable to Sprouston. Yet in 1801 the cemetery was apparently in a 'circular piece of ground, enclosed with a stone wall, the foundation of which was still complete within the ground'. The apparently circular nature of at least part of the cemetery is suggestive of Celtic influence, either pre-Synod of Whitby in 664 or after the Scottish occupation of East Lothian in the late 10th or 11th century. The latter is certainly

supported by the radiocarbon dates. The size of this circular enclosure is unknown but the cemetery as a whole could have been as large as 90m by 50m or as small as 27m by 21m. It is even possible that at least two phases to the cemetery are represented by the circular enclosure and the rows of graves, with an original circular cemetery being extended to accommodate regular rows of graves. Such a development has been proposed for the cemetery at the Catstane, Midlothian, dated from the 4th to the 7th centuries by radiocarbon dating (Cowie 1978, 186-7, 199). The Dunbar cemetery is unlikely to have been the site of the mother church of the shire of Dunbar. That seems to have been at Tynninghame, where St Baldred (died 756) founded a monastery and to which pertained ecclesiastical jurisdiction over the land 'from Lammermuir even to Eskmouth' (Anderson 1908, 60 n 8).

Tynninghame has been claimed as a shire in its own right (Barrow 1973, 35) but it is more likely to have formed part of a single estate with Dunbar. In 1591, the tenants of the lordship of Tynninghame had rights of common pasture in the moors of Lammermuir on the east and west, respectively the commonities of Innerwick, Thornton and Dunbar, with the privilege of cutting peats, turves, fuel, fail and divot there (*RMS*, v, No 1914). The lordship of Tynninghame shared no boundary with these commonities, from which it was separated by the lordship of Dunbar. Therefore, any rights which its tenants had in the Lammermuirs must date back, at least before the 12th century, to a period when they were both part of the same estate.

A link between Tynninghame and Dunbar is suggested in the grant of Tynninghame to Durham Cathedral by Duncan II in 1094. Included in the grant were Hedderwick and service from Broxmouth (Lawrie 1905, No XII). The other places listed are Auldham, Scoughall and Knowes, if the last is 'Cnolle' (*RMS*, v, No 1914), and they were presumably in the medieval parish of Tynninghame, now united with Whitekirk, although Auldham later became a parish in its own right (Dunlop 1939, 33, 57, 58). Hedderwick and Broxmouth, however, are in the parish of Dunbar. In fact the grant was ineffective, Hedderwick being, by 1342, the site of a chapel annexed to the parish church of Dunbar (Easson 1939, 90). Nevertheless, the inclusion of Hedderwick and Broxmouth with Tynninghame in Duncan's grant suggests that Tynninghame and Dunbar may have once been part of a single estate, which was broken up in 1072 at the latest, when Dunbar was granted by Malcolm III to Cospatrick. Perhaps the shire of Dunbar had two centres, Tynninghame the religious centre and Dunbar the

secular centre. Presumably by the time of this separation, the church of Dunbar had come to eclipse that of Tynninghame, which may never have recovered from its sack by the Danes in 941 (although Tynninghame retained special rights of sanctuary (Barrow 1960, 23, 83, 246)). In the ecclesiastical taxation lists for 1274-5 and 1275-6 known as Bagimond's Roll, Dunbar (with Pentland/Pentathat/Pentacland) was taxed at £14-13s-4d and £15-6s-8d (with an augment of £7-16s-10d for the second year), while Tynninghame paid £6 in both years (Dunlop 1939, 33, 57, 58). In later valuation rolls (eg *Arbroath Liber*, i) Dunbar and Whittinghame were valued at 180 merks (£120) while Tynninghame was worth only 40 merks (£26-13s-4d). Dunbar, with Whittinghame (presumably the earlier Pentland, etc), seems, in fact, to have been the wealthiest parish church in Scotland. It was this wealth that enabled Patrick, 9th Earl of March to erect the church of Dunbar into a collegiate church in 1342, for a dean, archpriest and eight canons or prebendaries (Easson 1939).

This separation of the religious and secular centres of a shire is not unusual. Bamburgh, the chief stronghold of the kings of Bernicia, later kings of Northumbria, was an important centre for the cult of St Oswald, king and martyr, whose right arm and hand were kept in a silver reliquary in the church of St Peter there (Sherley-Price 1970, 150). However, it was Lindisfarne that was the religious centre of Bernicia and the seat of the bishops of Northumbria until the division of the diocese of Lindisfarne in 678. Similarly, the parish church for the shire of Arbroath, granted by William the Lion to the abbey he founded there in 1178, was at nearby St Vigeans, which the presence of one of the largest and most important collections of Pictish stones shows to be an Early Christian site (Oram 1996, 98-9).

Although Phase 13 was the last definite Northumbrian phase, it does not mark the end of Castle Park as the focal point for settlement at Dunbar. The soil deposits sealing Phase 13 marked the interface between the Northumbrian and medieval periods. Cut through this soil were the large post pits of Phase 15, which may have been Northumbrian on the basis of a mid 9th-century styca (no 579). Alternatively they may represent the earliest Scottish presence at Dunbar in the 10th, 11th or 12th centuries before the construction of the curtain wall.

The pits were possibly part of a timber hall, successor to the royal hall of the Northumbrian kings, but, if so, the owner of the hall is unknown. This was the last important structure on the site before the focus

of settlement moved from Castle Park to Castle Rock, and the hall should be seen as the immediate forerunner of the medieval castle situated on its rock. No other important structures were found at this end of Castle Park, except the Curtain Wall of Phase 18, which was designed to prevent access to the headland overlooking the castle. The hall of Phase 15 was succeeded by, amongst other features, a series of courtyards, presumably for military musters on the castle precinct which now occupied the headland. Even the short-lived French fort was merely an adjunct to the castle.

No certain date can be assigned to the curtain wall, other than that it was medieval, although it did predate the rebuilt castle of 1497. It was probably part of the castle built at the expense of Edward III of England in 1333, the earlier castle having presumably been slighted on the orders of Robert I, as were most Scottish castles to prevent them being occupied by the English. If so, it was possibly from the top of this wall that Black Agnes taunted the English besiegers in 1338. This 14th-century castle was demolished in 1488 on the orders of Parliament. The purpose of the structures found at the southern end of the site, Buildings 10 and 12, cannot be determined, although the latter, with its paved forecourt, was clearly a building of some pretension.

Given that the French fort seems to have only been in existence for a matter of some five months, it must have been largely constructed of turf, earth and stones, although the presence of the mortared stone block in the ditch suggests the defences were, in part at least, faced in stone, as at Eyemouth and Inchkeith (Caldwell & Ewart 1997, 112). The stone structures datable to the 16th century, Buildings 13 and 14, may have already been in existence and incorporated into it. It is possible that the fort had been under construction since 1550, when the Privy Council had ordered the repair and building of a fort at Dunbar (*RPC*, i, 111), if not 1548, when French troops were reported to be fortifying Aberlady (Luffness) and Dunbar (*CSP Scot*, i, 94).

Nevertheless, it is puzzling that there is no identifiable French object from the excavation (pottery or coins), although a similar absence is evident at the contemporary French fort at Eyemouth (Caldwell & Ewart 1997, 97, 101, 104). The French presence at Dunbar is revealed only in historical references not by archaeology. Presumably the French troops were based in the castle not on the headland, except during the short-lived fort. The artefacts of Phase 21 are generally of a late medieval date and indicate a military presence from the amount of ironwork, including horseshoes, although

no weapons were found. (Indeed few weapons, ammunition or other military equipment were found during the excavation of this military site: an iron barbed arrowhead (no 168), fragments of possible copper alloy and iron mail (nos 20 and 203), a fragment of possible iron armour (no 253), a possible stone slingshot from levelling above the Middle Ditch as well as other possible shot or marbles (nos 321-30) and bullets in Phase 24.) Only one object, a key (no 190), was of a type securely datable to the 16th century. It was found in the robber trench for a wall linking Buildings 13 and 14 and is the only dating evidence for those structures. The lack of identifiable 16th-century objects, apart from pottery, may be because those recovered from the excavation are by nature functional rather than cultural.

Most of the pottery from Phase 21 is virtually indistinguishable from the preceding medieval phases (15-20). The exception is the backfilled defensive ditch which produced 16th- and 17th-century pottery. Coins of Charles I (nos 583 and 588) and a coin of Charles II (no 589) were also found in the topmost fill of the ditch, as were many clay pipe fragments dated to the early to mid 17th century. These merely indicate that the ditch was still being backfilled and levelled in the 17th century. The nature of the animal bone assemblage from its backfill more closely resembles that of the post-

medieval Phases 22 and 23, while the rest of the animal bone from Phase 21 would not be out of place in the medieval period. Phase 21 has been identified as 16th century, including the short-lived French fort, on the basis of stratigraphy. It post-dates the curtain wall of the medieval castle demolished in 1488 and predates post-medieval deposits.

After the demolition of the castle on the order of Parliament in 1567, Castle Park ceased to have any military significance until the mid 19th century, and later military installations were sited away from Castle Park. The purpose and nature of the buildings (Buildings 15 and 16) erected on the site between the 16th and 19th centuries are unknown. Roy's Military Survey of 1747-55 (illus 8) indicates two buildings in Castle Park on the north side of the former Fishergate, although these seem to be too far south to be the excavated buildings. Nor is it possible to date the kiln with any certainty: it could be late medieval or even part of the French fort, if used as a lime kiln for building purposes.

It was as a result of the Crimean War and a need to improve the country's coastal defences that Castle Park resumed its military role with the acquisition by the War Office of the Park and Lauderdale House as a barracks and the site of a practice battery for local artillery militia and volunteers.

CONCLUSIONS

Each of the successive periods of activity at Castle Park – Iron Age fort, Northumbrian royal centre, medieval castle precinct, 18th-century park and modern army barracks – left its mark in the archaeological record. The phases from which most *personal* artefacts were recovered were those when Castle Park was being 'permanently' inhabited, as Northumbrian *urbs* (Phases 7, 9, 13), French fort (Phase 21) and modern barracks (Phase 24); these artefacts were lost or discarded by the inhabitants of Castle Park (illus 121). The phases of non-permanent occupation in the castle precinct (Phases 15-20) and 18th-century park (Phases 22-3) produced fewer personal artefacts. This is an important point to establish because it means that Castle Park, when not permanently occupied, was not being used as the equivalent of a municipal tip by the inhabitants of the burgh. Consequently the pottery, animal bone and other finds from the site are more likely to be the rubbish of the occupants, not imports to the site. Surprisingly, in view of the wide cultural differences between the Votadini, Angles, medieval Scots and French, the most striking

factor before the post-medieval period (Phases 22 and 23) is the evidence of continuity in diet, animal husbandry and butchery practice. This suggests a continuity in the local population between the Iron Age and the medieval period, as well as in the requirements for food renders and labour services of the incoming Anglian and Scottish overlords in the 7th and 10th centuries. It is presumed that, in each case, the incomers simply took over an already existing social and economic system, although they may have adapted it.

The study of the animal bones has revealed that cattle predominated as the food-forming animal at Castle Park (over 50%), with sheep/goat (probably sheep) a poor second (c 30%) and pigs an even poorer third (c 10%) from the Iron Age until the post-medieval period when sheep/goat predominate for the first time (see Table 8). Also continuous is the evidence for the survival of these animals beyond juvenile stage in all periods up to and including Phase 21 (c 50-75%), implying good animal care and a plentiful supply of winter fodder (see Tables 19-22).

This latter point calls into question the traditional view of a mass autumn slaughter of livestock at Martinmas for lack of fodder. Certainly livestock was culled, but more survived than for mere breeding purposes.

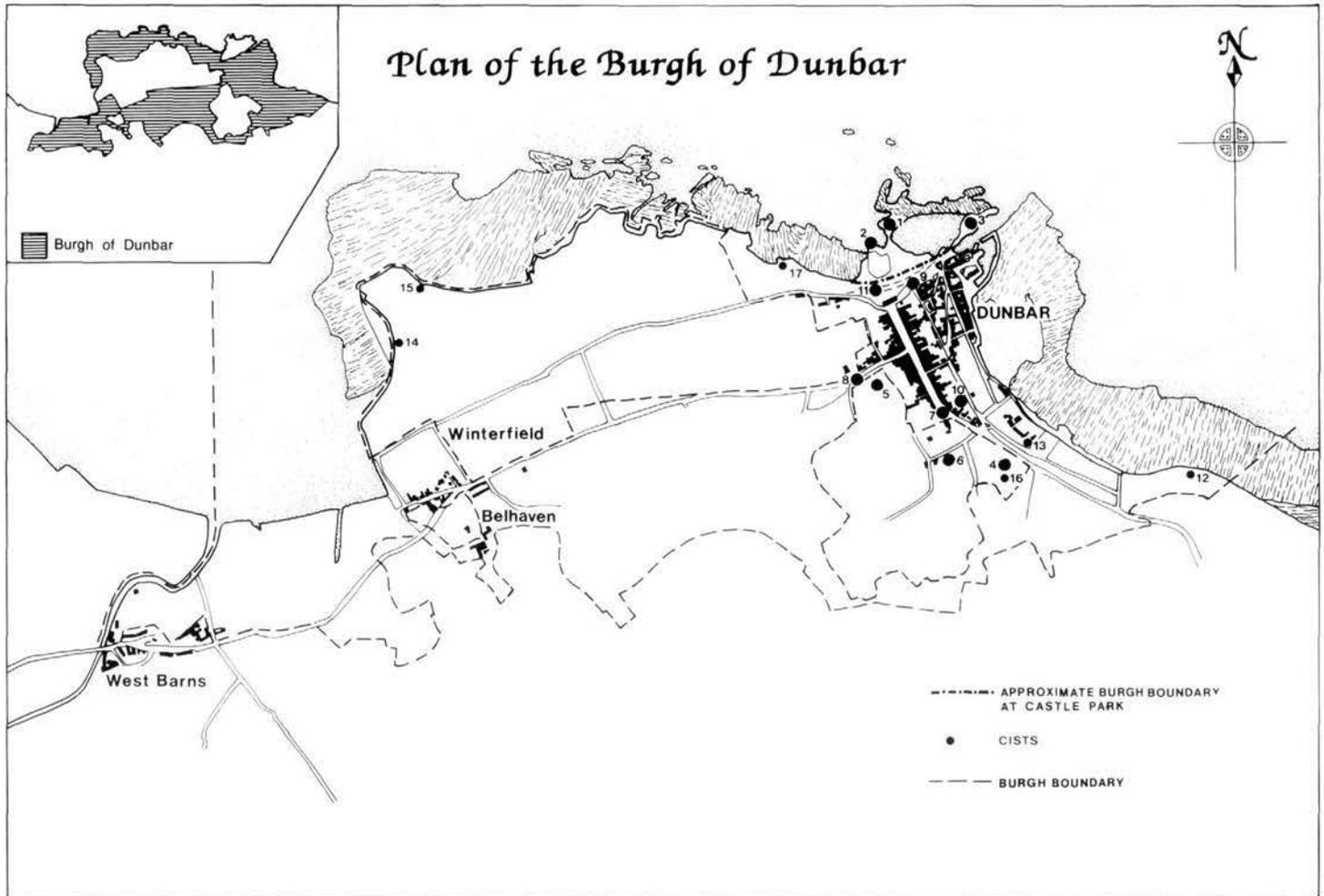
The predominance of cattle over sheep in the medieval period (Phases 15-21) contradicts the historical evidence which records the numerical supremacy of sheep over cattle. The customars' accounts for the burgh of Dunbar, which survive, with some gaps, from 1371-1509 (*ERS*, ii-xiii, *ad indices*), note the predominance of sheepskins over cattle hides. A list of livestock at the granges of the castle of Dunbar, in September 1503, comprised 86 plough oxen, 487 older sheep (320 ewes, 4 rams, 195 gimmers and dinmonts, 8 tups and wethers; total 527) and 217 (*recte* 237) lambs (*ERS*, xii, 345 n and 560). A grant of land at Maysiels (parish of Whittinghame) to the monks of the Isle of May in the early 13th century included pasture for 300 ewes, 30 brood cows and 24 brood mares with young under 2 years old, as well as 10 brood sows with young under the age of 1 year (Stuart 1868, 16). It is hard to explain this contradiction of the historical evidence by the archaeological evidence. The number of bones per carcass for sheep and cattle is virtually the same. Perhaps mutton was considered less fitting for the earl of Dunbar or the garrison than beef. Or perhaps sheep were kept for their wool rather than their mutton. Nevertheless, it is unthinkable that sheep carcasses were not eaten if evidence from Castle Park indicates that horses and even dogs could be butchered. (The place-name element 'lammer' in Lammermuir, to the south of Dunbar, and in Lamerhaven and Lamer Island at Dunbar is connected to the Old English word for lamb (Graham 1967, 174 n 8) and suggests that the historical predominance of sheep over cattle dates back to the Anglian period at least.)

It must be said that the excavations at Castle Park have shed little or no light on the origins of the burgh of Dunbar. Instead, the Iron Age and Northumbrian settlements should be seen as the predecessors of the medieval castle: a British chiefly homestead (the original *Dynbaer*) and a Northumbrian *urbs regis*. It is not certain whether any settlement developed outside these sites, although any such subsidiary settlement is more likely outside the *urbs* than the homestead. That there was such a settlement is implied by the size of the cemetery at Castle Park, which must have been the burial ground for a substantial community before the transfer of the cemetery (and, possibly, church) to the opposite end of the High Street. However, the location of any such settlement is unknown.

It is possible that the transfer of the religious centre of Dunbar away from Castle Park may be linked to the transfer of the secular centre from Castle Park to Castle Rock as part of a reorganization imposed by a 12th-century earl of Dunbar. The earl may have intended to create a burgh along a road on the crest of a ridge leading from the old secular and religious focus at Castle Park to the new parish church to the south, with a harbour at nearby Belhaven. (The suggestion that the original axis of the burgh may have been along Castle Street and Church Street (cited in Turner Simpson & Stevenson 1981, 4) can be discounted now that the recent excavations have established that the initial focus of settlement was at Castle Park not Castle Rock.) The medieval burgh of Dunbar seems to have consisted of a single street laid out along the present High Street, for a charter of 1479 refers to a 'tenement lying in the burgh of Dunbar on the west side of the Street thereof' (SRO, Swinton Charters, 60). Church Street/Castle Street developed as a back row at the end of rigs extending backwards from the east side of the High Street. Back rows have developed as streets in their own right at other burghs, eg Edinburgh (Cowgate to the south of the High Street), Dundee (Cowgate to the north of Seagate) and Old Aberdeen (Elphinstone Road and Dunbar Street on each side of High Street). No corresponding back row apparently developed on the western side of Dunbar, and none is indicated on Roy's map (illus 8) (Lawson Place, on the western side of High Street, to the north of West Port, is a modern street). To the south of West Port, the Trinitarian friary, founded between 1240 and 1248 by Christian Bruce, Countess of Dunbar (Cowan & Easson 1976, 108), lay to the rear of the rigs, indicating that this end of the High Street must have been laid out by then, ie, over a century before the creation of the burgh in 1370.

It has been suggested that Dunbar was an early burgh which lost its status during the Wars of Independence (Turner Simpson & Stevenson 1981, 1). There is, in fact, no documentary evidence for this suggestion, and it is unlikely that any will be forthcoming to show whether the earl ever received a now lost royal charter for his projected burgh in the 12th century. Nevertheless, it is probable that Dunbar was not a burgh before 1370.

The boundaries of the burgh, as drawn on the OS 1854 map, are probably almost unaltered (except for the inclusion of the new harbour created in 1842) from those as defined in 1569 (*RMS*, vi, No 1418). They reveal that the sites of the friary, the Maison Dieu (a hospital whose foundation date is unknown) and of the parish church, as well as of a large area of land to the west of the church, all lay outwith the



Illus 152

Plan of the burgh of Dunbar (detached portions omitted): 1 remains of castle; 2 remains of blockhouse; 3 remains of battery (1781); 4 parish church; 5 remains of Trinitarian friary; 6 site of Maison Dieu; 7 site of East Port; 8 site of West Port; 9 site of Sea Port; 10 remains of town wall; 11 site of Fishergate. Long cists: 12 Kirkhill Braes; 13 Clyde Villa; 14 Belhaven; 15 Long Craig; 16 churchyard; 17 Stafford House.

bounds of the burgh (illus 152). The friary was founded before the mid 13th century. The parish church was erected into a collegiate church by Patrick, 9th Earl of March (husband of Black Agnes) in 1342 and endowed with land to sustain crofts for the prebendaries of the church (probably the large area of land to the west of church). Also outwith the burgh was the estate of Winterfield and some land at Belhaven. The land later called Winterfield, previously belonging to Robert Senior (Cissoris?),

had been granted to Geoffrey Cissoris, probably in the late 12th or 13th century, by a Patrick, Earl of Dunbar (SRO, 'Register of Acts and Decrees of the Lords of Council and Session', CS7/42, fo. 473r). None of these 'holes', created in or before the 13th century within the burgh's common land, is likely to have been made if Dunbar had been a burgh since the 12th century. It is, therefore, improbable that burgh status was ever achieved before 1370.

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Roxburghe Muniments, Survey 1100.
RCAHMS NMRS Royal Commission on the Ancient and Historical Monuments of Scotland, National Monuments Record of Scotland.
SRO Scottish Record Office (now National Archives of Scotland), General Register House, Edinburgh.
Clerk of Penicuik Muniments, GD18.
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