VII

THE EXCAVATION OF A 17th-CENTURY BASTION IN THE CASTLE OF NEWCASTLE UPON TYNE, 1976–81

Margaret Ellison and Barbara Harbottle

TOWARDS THE end of the 1976 season we began the excavation of the ground beneath and to the south of the three western arches of the railway viaduct where it passes through the castle, and by the summer of 1981 this work was complete. In accordance with the original decision to publish the castle excavations in a series of articles it was decided, in the first report for this new area, to describe the 17th-century archaeology of the site.

As in previous years the excavations were instigated by the Land and Property Committee of the City of Newcastle, administered by Ivan Stretton of the City Estate and Property Department, for whose help and unflagging interest we are most grateful, and jointly financed by the City, the County of Tyne and Wear and the Department of the Environment. Without the kind co-operation of British Rail in allowing us to excavate under the viaduct the work could not have taken place, and we acknowledge with gratitude their donation to the Museum of Antiquities of the finds from their property. The preparation of the reports on the pottery, glass, military finds, leather and textiles, and of the illustrations was also paid for by the County Council. For the drawings we thank Miriam Daniels and Margaret Finch (the finds) and Francis Burton (plans and sections). We are grateful to all who have written specialist reports and are named in the appropriate places, and to all who have commented on specific groups of finds: Peter Archer, John Hurst, Rose Kerr, Gail Larrabee and Stephen Moorhouse (pottery); June Swann (leather); and A. M. Tynan (geological identifications). We acknowledge with gratitude the work of all the excavators, in particular John Nolan, Michael Shanks and Edmund Tullett. The publication of this report has been substantially assisted by grants from the City of Newcastle upon Tyne, the County of Tyne and Wear, and the Department of the Environment.

That part of the site with which we are here concerned consisted of five areas. The largest were the three railway arches, each visually cut off from its neighbours and hence separately excavated, from the west R.A. 1 1977–8, R.A. 2 1976–8, R.A. 3 1977, 1979–81. The fourth area, A2/C3, was small, was situated immediately north of R.A. 2, though cut off from it by a wall and a concrete cable box, and was completed in 1974 during the clearance of the castle ditch. The fifth area, between R.A. 3 and the keep, and divided from the former by a drain-pipe and electricity cable, was excavated in 1981. While certain important features connect the five areas to one another the detailed stratification of each obviously remains separate.

Newcastle's defences during the Civil War

The precise appearance of the northern part of the castle in the early years of the 17th century is unknown. In preparing the site for the construction of the railway in the 1840s many post-medieval buildings were demolished[1] and the ground beneath them levelled down to an arbitrary horizontal, so exposing features ranging in date from the 11th to the 18th centuries. In spite of this clearance, however, there is enough archaeological and documentary evidence to support a topographical sketch (see fig. 1).

Close to the keep on its north side there was a medieval building (Building A). Its original size and function are as yet unknown, and its condition in *c.* 1600 is uncertain though it may well have been derelict. Beyond to the west we assume the 12th-century curtain wall of the castle still stood on top of the Norman clay bank.[2] Looming high above the wall and beginning to bear down upon it was the great dunghill of the town. By 1620 the curtain could no longer withstand the weight of the citizens' refuse and part of it collapsed,[3] and it is unlikely that there was any immediate move to clear up this untidy heap since the castle had long since been abandoned as a fortification.[4]

The actual location of the collapse is not certain.[5] The central section of the west curtain survived into the 19th century. It is shown as "outworks of old castle" on a plan accompanying a deed of 1824,[6] and was reported by G. B. Richardson to have been demolished in 1847.[7] Longstaffe believed it was the south end which had fallen down before the encroaching dunghill, and wrote that portions of the northern section could still be traced in the houses in this area in the mid-19th century. Although the results of the excavation show that part at least of this stretch could not have survived the construction of the new Civil War defences, and indeed if the curtain had still stood to any height in 1643 the new works might well have been placed outside it, one nevertheless hesitates to contradict Longstaffe. The total extent of damage by the dunghill, therefore, must remain in doubt.

The threat of war from Scotland in 1638 brought a flurry of activity in Newcastle. By mid-November the mayor and burgesses had, as directed, repaired the town's walls, gates and "percullises",[8] and early in 1639 Sir Jacob Astley arrived as sergeant-major general to advise on measures for the defence of the town.[9] He bestirred himself at once and to such purpose that well before the end of January the mayor and burgesses had received his instructions.[10] In April the engineer, De Bois, was ordered to Newcastle to supervise the fortifications,[11] and finally in May the king himself came north to hear Astley's report in person.[12]

Astley's recommendations were based on a realistic assessment that the town could not be defended for any length of time because it "is soe commanded by the hills adiacent". Its capacity for a limited defence could however be improved if the work on the gates was completed, the twenty guns within the walls were placed on the towers and gates, or on "convenient batteries", a drawbridge was made at the south end of the Tyne bridge[13] and the houses at this end of the bridge removed. Arms and ammunition were needed for the 500 men of the trained bands, another 1500 townsmen able to bear arms and yet 1000 more likely to take refuge in the town.

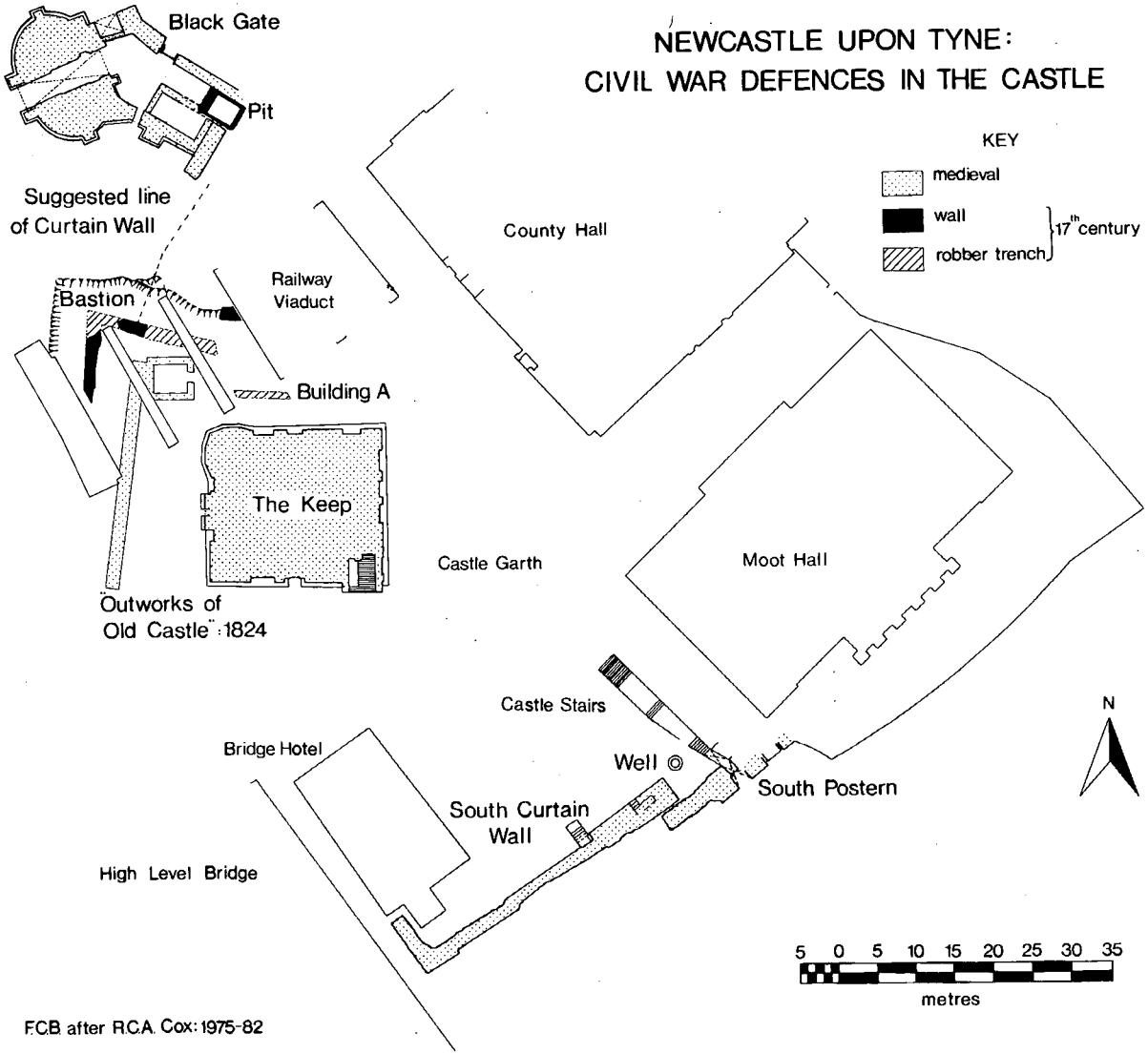

NEWCASTLE UPON TYNE:
CIVIL WAR DEFENCES IN THE CASTLE
KEY
medieval
wall
robber trench
17th century
Black Gate
Pit
Suggested line of Curtain Wall
Bastion
Railway Viaduct
Building A
The Keep
Outworks of Old Castle 1824
County Hall
Castle Garth
Moot Hall
Castle Stairs
Bridge Hotel
Well
South Curtain Wall
South Postern
High Level Bridge
N
5 0 5 10 15 20 25 30 35
metres
F.C.B. after R.C.A. Cox: 1975-82

Fig. 1.

Although great importance was attached to the proper maintenance and manning of its old walls, some effort was also made to provide Newcastle with new artillery fortifications[14] (see fig. 2). Certainly one fort and possibly two were constructed outside the town,[15] and Carr's Battery inside.[16] The battery probably dates from 1639–40, but when the forts were built and on whose initiative is not stated. It is however instructive to note that Shieldfield Fort stood on the ground where Astley had written on his plan "this hill doth commaunde the towne".[17] One must wonder whether there had ever been the intention to site similar sconces at Leazes and high up Westgate Hill, two points on the map where the same words appeared. In the end Newcastle was no better supplied with artillery fortifications than York, and both had to rely for their defence on their medieval walls.[18]

These preparations, whether finished or unfinished, were not to be needed immediately. There was no war in 1639, and after their victory at Newburn in August 1640 the Scots occupied Newcastle for a whole year without another blow being struck. In 1642 the town declared for the king, and a stout-hearted royalist, John Marley, was elected mayor, an office he held for the next two years. During 1643 Newcastle suffered only as a result of the blockade of the Tyne, and it was not until 1644 that the new or repaired fortifications were put to the test, first in February and later during the siege from July to October.

It is clear from contemporary comments that further defensive measures had been taken before the siege began, that some of these preparations, perhaps all, had been completed by January, 1644, and that Marley was at least partly responsible for the work. Of the improvements to the town wall and ditch, most of which were described by Lithgow, a Scottish observer of the siege,[19] Marley is explicitly credited with backing the wall with material from "the high and great Heap, viz. the Dung-hill on the West-side of the Castle",[20] though there is no date for this activity. In the castle he is known to have employed shipwrights on repairs to the keep in 1643, and to have deployed his guns,[21] which later mightily annoyed the enemy,[22] but much else must have been done there before the following January to change the "High Castle" from a near ruin into the only fortified place in the town.[23] Since it was Marley who commanded the garrison of 500 townsmen in early 1644, before the brief stay of the marquis of Newcastle and a royalist army in February, and Marley who led the defenders during the siege later the same year, it was probably he who instigated the refortification of the castle.

Only one description of these new works is known to survive, again by Lithgow. "And above all other workes, the Towne Castle itself was seriously enlarged, with diverse curious fortifications, besides breast works, Redoubts, and terreniat Demilunes; and withall three distinctive Horne-workes, two of which exteriourly are strongly pallosaded, and of great bounds".[24] These apparently impressive defences were not referred to by later historians because they had disappeared before the time of such 18th-century antiquarians as Henry Bourne; the reason for their disappearance will emerge in due course. It seems fair to suggest, however, that most of the earthworks would have been sited to protect the west side of the castle, not only because the lie of the ground had always rendered this the most vulnerable but also because

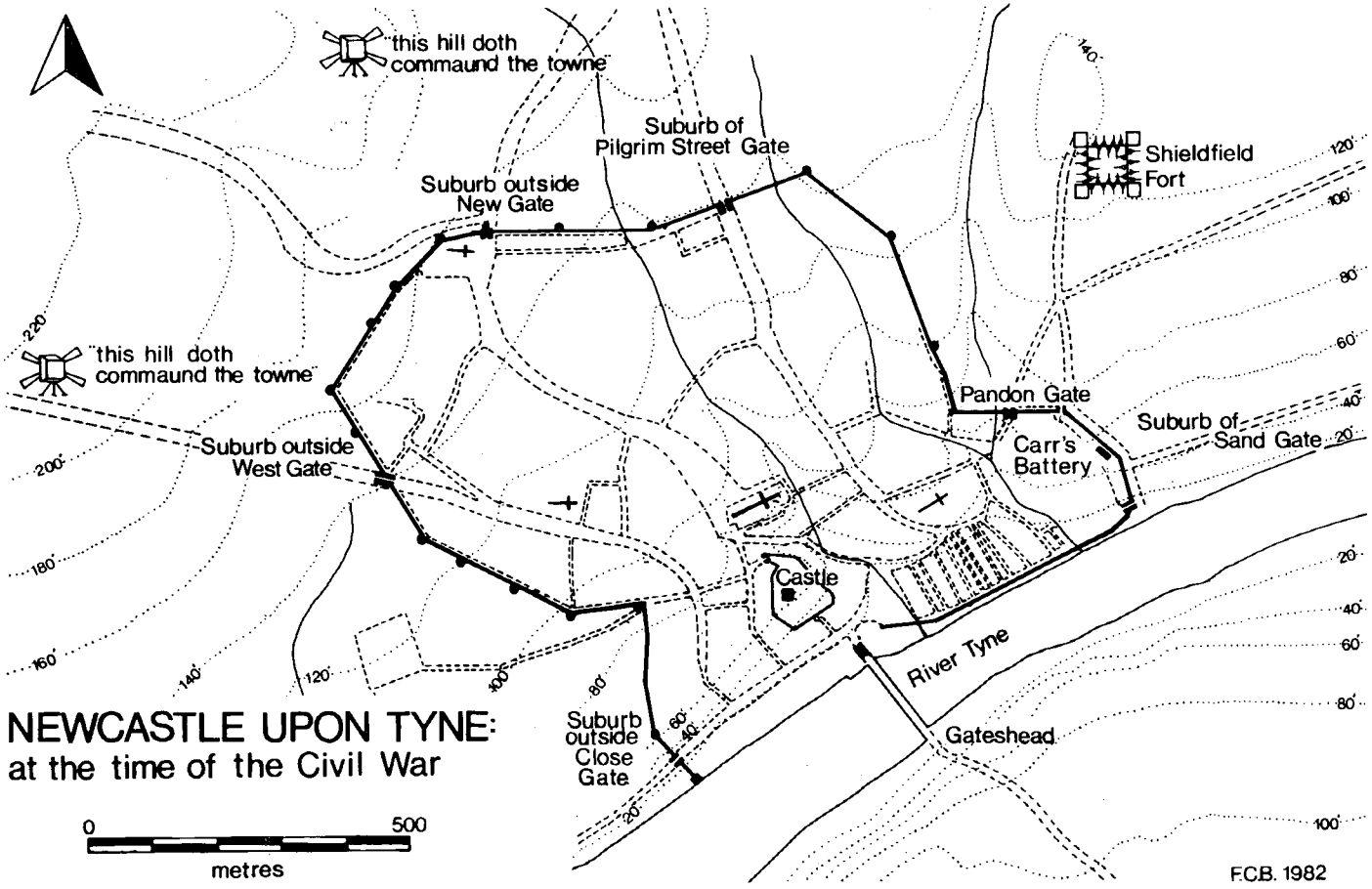

this hill doth
commaund the towne
Suburb of
Pilgrim Street Gate
Shieldfield
Fort
Suburb outside
New Gate
this hill doth
commaund the towne
Pandon Gate
Suburb of
Sand Gate
Suburb outside
West Gate
Carr's
Battery
Castle
River Tyne
Gateshead
Suburb
outside
Close
Gate
NEWCASTLE UPON TYNE:
at the time of the Civil War
0
500
metres
F.C.B. 1982

Fig. 2.

the dunghill had here obliterated both the ditch and part of the curtain. Marley's removal of this heap would thus clear the ground for a modern replacement of the medieval defences.

In addition to the information from the excavations of 1976 onwards a little is known or may be surmised about the minor works. At least one house was demolished in Castle Garth for the improvement of the fortifications,[25] and a stone-lined pit was constructed to bar entry through the north gate.[26] Finally, the bank of clay noted against the south curtain wall in 1960 can now be credibly explained as having been dug out of one of the new ditches, and deliberately dumped to support the wall.[27]

The siege of Newcastle could be said to have begun at the end of July with the capture of Gateshead by the Earl of Callendar and his Scottish force. It effectively ended on 19th October when the combined armies of Leven and Callendar broke through the breaches in the wall and overran the town, though it was not until 22nd that Marley made his formal surrender from the castle.

In towns of military significance, whether their own or newly captured, Parliament was concerned to maintain garrisons and to repair the defences.[28] A Scottish garrison was left in Newcastle until February 1647,[29] and the repair of the town wall was begun as early as April 1645 with work on the breaches at White Friar Tower and Wallknoll.[30] The keep of the castle stayed in military use for a time, being described in 1649 as "a stronge and greate tower .... bounded with stronge workes of stone and mudde .... garrisoned by the parliament's forces and used by them as a magazeene of ammunicion for the garrison ...."[31] The remainder of the castle, however, both within the curtain and immediately outside it, must have quickly reverted to a peace-time state of domesticity and squalor.

The creeping disappearance of the castle beneath private houses and gardens had begun some years before the Civil War, and had apparently been instigated by Alexander Stevenson, who leased the castle from the king in 1619 and held it until his death in 1640.[32] In the inquest of 1620 some of these properties were described as within the curtain wall, some as outside it but within the castle's outermost boundaries.[33] A comparison of the tenants' names in 1620 with those in the leases of the 1650s suggest that the first part of the castle to be adapted to domestic purposes was the street through the Black Gate southwards as far as the medieval moot hall.[34]

The Civil War can have been only a temporary setback to the development of Castle Garth, and during the corporation's first period as lessees (*c.* 1652–69)[35] they renewed leases, gave approval for the building of new houses[36] and appointed a rent collector.[37] A rental of 1661 lists eighteen tenants, one of whom paid rent for a cobbler's shop and another, Michael Hayropp, who was a skinner and glover.[38] Although a French visitor during the reign of Charles II reported that "the castle .... encloses within its walls, like a little city, the habitations, as I think, of all the cobblers of Newcastle",[39] leases of 1664 show that men of other occupations were also here at this time—a fuller and dyer, two merchants, two gentlemen, two housewrights, two tailors, and cordwainers as well as cobblers.[40]

The common council acquired an almost intractable problem in the "waste ground, lying west and north of the old castle without the works or moate thereof",[41] once

the site of the great dunghill. ".... well knowing the said parcel of waste ground will in a short time become a general nuisance to the Inhabitants dwelling near thereabouts by reason of the Dunghill in the same and the constant carrying of rubbish thither ....", they extricated themselves from this difficulty by leasing it in 1655 to Humphrey Boulron, another skinner and glover.[42] For 12d p.a., and on condition he erected a fence between the ground and the castle, i.e. roughly on the line of the old west curtain, and kept the street clean between Bailiffgate and Long Stairs, he was free "to dig, delve, use, convert and dispose of to his best advantage", though he was refused permission to erect a small building on the site.[43] Boulron clearly thought there was a living to be made out of other people's rubbish.

Though described in some detail, Boulron's eastern boundary cannot be translated to a modern map, and we therefore cannot be certain that it enclosed the area of the excavation. It is probable that it did if only because of our discovery of a rubbish dump, and it is tempting to equate the "Trench Wall", which was followed by his boundary, with the revetment of the excavated bastion. An element of doubt must, nevertheless, remain.

Because the common council were not the lessees of the castle between *c.* 1669 and the early years of the 18th century, there is no documentary evidence to indicate what happened in Castle Garth in that period. The earliest lease (1704) to survive after they regained the property, however, shows there had been some changes.[44] Multi-occupation had begun, the seven rooms of the house in question being let to seven different men. Attached to the lease was a list of rules for the control of the cordwainers, cobblers and tailors inhabiting or exercising their crafts in Castle Garth, perhaps a recognition of what had become, and were to be into this century, the predominant trades of the neighbourhood. Finally, the council had at last acquired some control over the matter of refuse by issuing each tenant with detailed instructions on how to behave in this matter. The tenant "shall and will once a month at least cleanse and dress or cause to be cleansed and dressed the onsett or frontstead of the said demised premises from all mire & dirt for the better preserving the said Castlegarth from unwholesome smells & keeping good neighbourhood & carry & lay all such mire and dirt in some convenient place from the circuit of the said Castlegarth".

The Excavation: Building A (figs. 3 and 4)

It is possible that the destruction of Building A was the first event after 1600 for which there is archaeological evidence. Part of its south wall was found in the form of a robber trench 6·20 m long, and a maximum of 0·90 m wide. At the west end of the trench two courses of footings remained, but at the east end every stone had been removed. The trench had then been back-filled with bands of stone rubble and yellow or white mortar, ash and clods of light brown clay.

Unless and until further excavation provides the answer, there must be doubt about the date of this demolition. The actual robbing could not have occurred before the 17th century since it happened after the deposition, inside the building, of layer 76 which contained at least one 17th-century sherd. To the north layer 76 was cut by 77 which yielded an 18th-century sherd, and both deposits were sealed only by 19th-

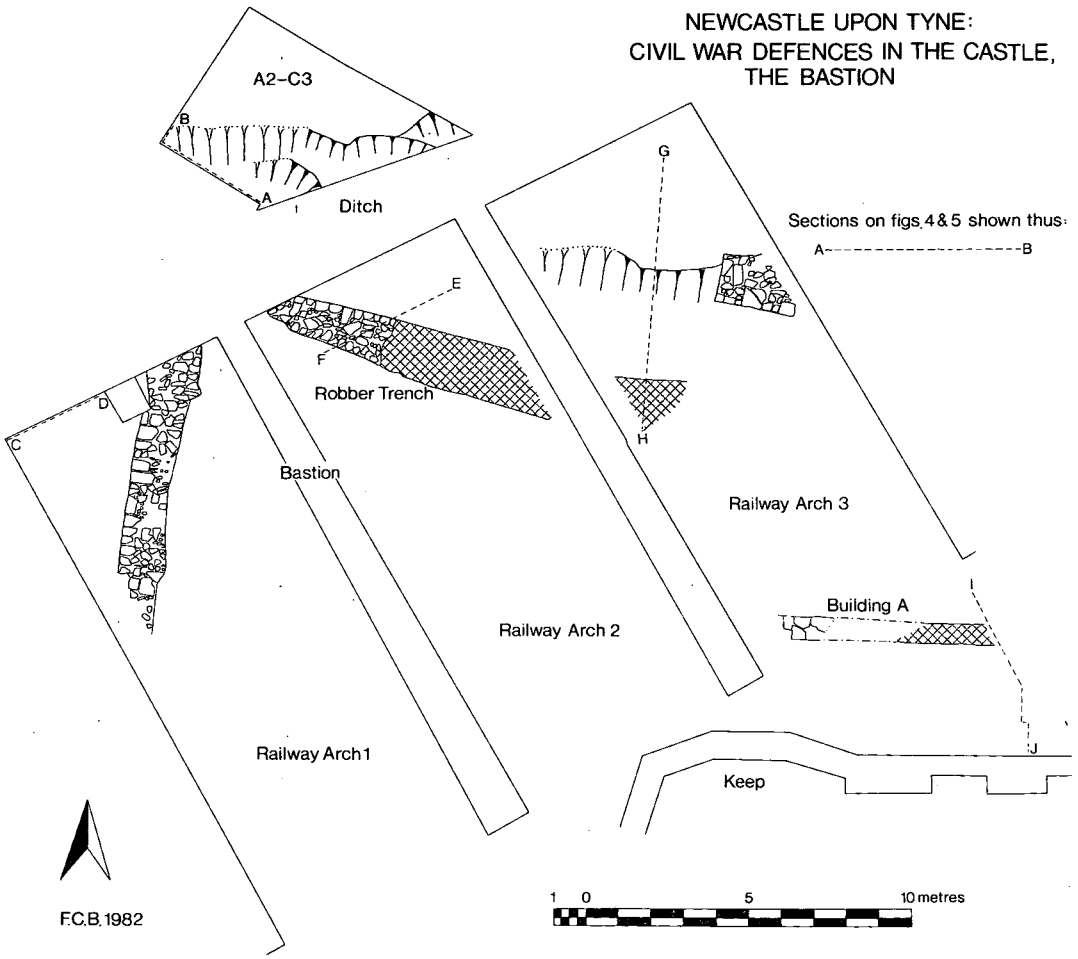


Fig. 3.

century material. The pottery from the trench itself, if considered alone, suggests that it would probably have been filled up by the middle of the 17th century and must have been full by the end of the third quarter. The almost total absence of clay tobacco pipes (only three tiny fragments of stem were found) supports an earlier rather than a later end to the filling. Once again, however, there is nothing between the top band of the filling and material laid down in the 19th century. Having made this *caveat* it nevertheless seems more likely than not that Building A was destroyed in the first half of the 17th century, perhaps at the time of the Civil War. It is possible that it was demolished when the castle was being strengthened, both to clear the ground and to provide building stone for re-use elsewhere.

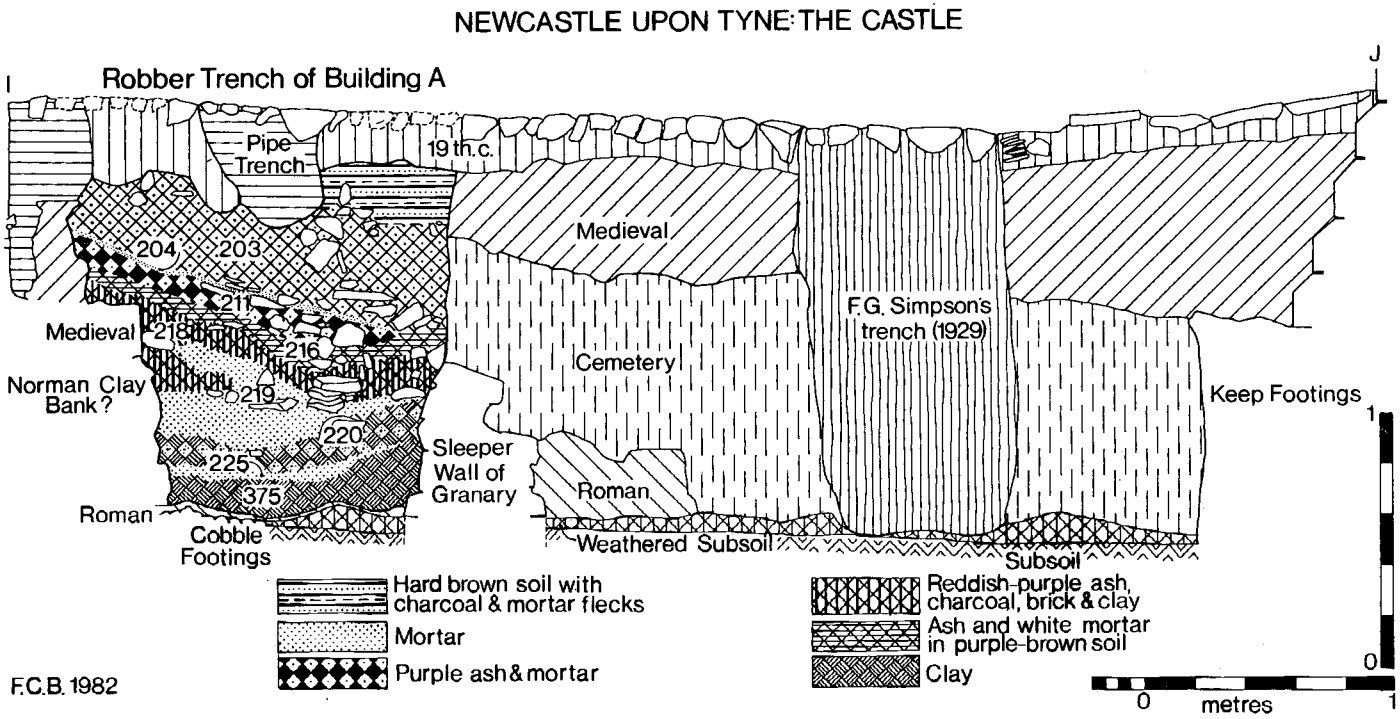

NEWCASTLE UPON TYNE: THE CASTLE
I
J
Robber Trench of Building A
Pipe Trench
19th.c.
Medieval
204
203
211
218
216
219
220
225
375
Medieval
Norman Clay Bank?
Roman
Cobble Footings
Sleeper Wall of Granary
Cemetery
F.G. Simpson's trench (1929)
Keep Footings
Roman
Weathered Subsoil
Subsoil
Hard brown soil with charcoal & mortar flecks
Mortar
Purple ash & mortar
Reddish-purple ash, charcoal, brick & clay
Ash and white mortar in purple-brown soil
Clay
F.C.B. 1982
1
0
0
metres
1

Fig. 4.

The Bastion (figs 3 and 5)

Two features, a stone revetment with a ditch in front of it, were found to run through all three railway arches. Both features were V-shaped in plan (though the apex of the V had been destroyed by later building), and together they faced north-east across the front of the Black Gate. Their course to the west was broken by a principal pier of the viaduct, and to the east by the insertion of a cellar in the 18th century.

Construction began by digging a trench wide enough to accommodate both revetment wall and ditch. Its rather erratic width, from just over 5 m to just under 7, may perhaps be attributed to differential weathering of its unstable outer edge which was steep in one place, gentle in another. The trench was cut through all earlier deposits and 0·35 to 0·40 m into the subsoil where the latter was undisturbed; where the natural clay had been previously removed, the 17th-century excavators stopped on top of the lowest man-made layers. They thus produced a flat-bottomed trench which, like the ground surface above, sloped gently from north-west (*c.* 26·50 m O.D) to south-east (25·60 m).

A stone wall, 1·20 to 1·40 m wide at its base, was built to revet the vertical inner edge of the trench. Though its western arm survived only as foundations and much of its eastern arm had been robbed out altogether, a short stretch of this wall stood to a height of 2 m, or nine courses. Its face was sheer, and it was constructed of roughly dressed stones of various sizes bonded with white mortar.

The extreme east end of the outer edge of the trench was recessed to take the butt end of a second, similar revetment, some 1·50 m wide and three to four courses, or 1 m, high.

The later levelling of the site, whether for the building of the railway or before that, removed the evidence for the original height of the revetment wall or, to put it another way, for the original depth of the ditch below its contemporary ground surface. The effect of the levelling was, fortunately, not so damaging to the evidence for the date of construction of these features. Although the *terminus post quem* for the wall was the base of the clay bank of the Norman castle, the raggy lip of the ditch, where it projected north of the viaduct, was found to be cut into the late 16th-century deposits of the moat of the castle.

The ditch did not remain clean and empty for long. A pair of planks lying on the bottom against the wall had all the appearance of duckboards abandoned by the builders, and in another place someone had dug a pit before silting, erosion and rubbish dumping began. The filling up seems to have started in the mid-17th century and to have been complete by perhaps the 1680s. While this accumulation can be split into three phases on the evidence of the nature of the deposits and the character of the pottery, it was not identical in the four areas in which it was examined. They had, however , one feature in common, the direction from which the rubbish came: all the deliberate tipping of man-made refuse was from the outside of the ditch against the revetment.

The first phase of the filling was marked by silting in the wetter parts of the ditch, that is in the lower stretches in R.A. 2 and R.A. 3, followed by a piling up of lumps of clay, soil and stones separated by thin layers of ash. At the bottom, against the

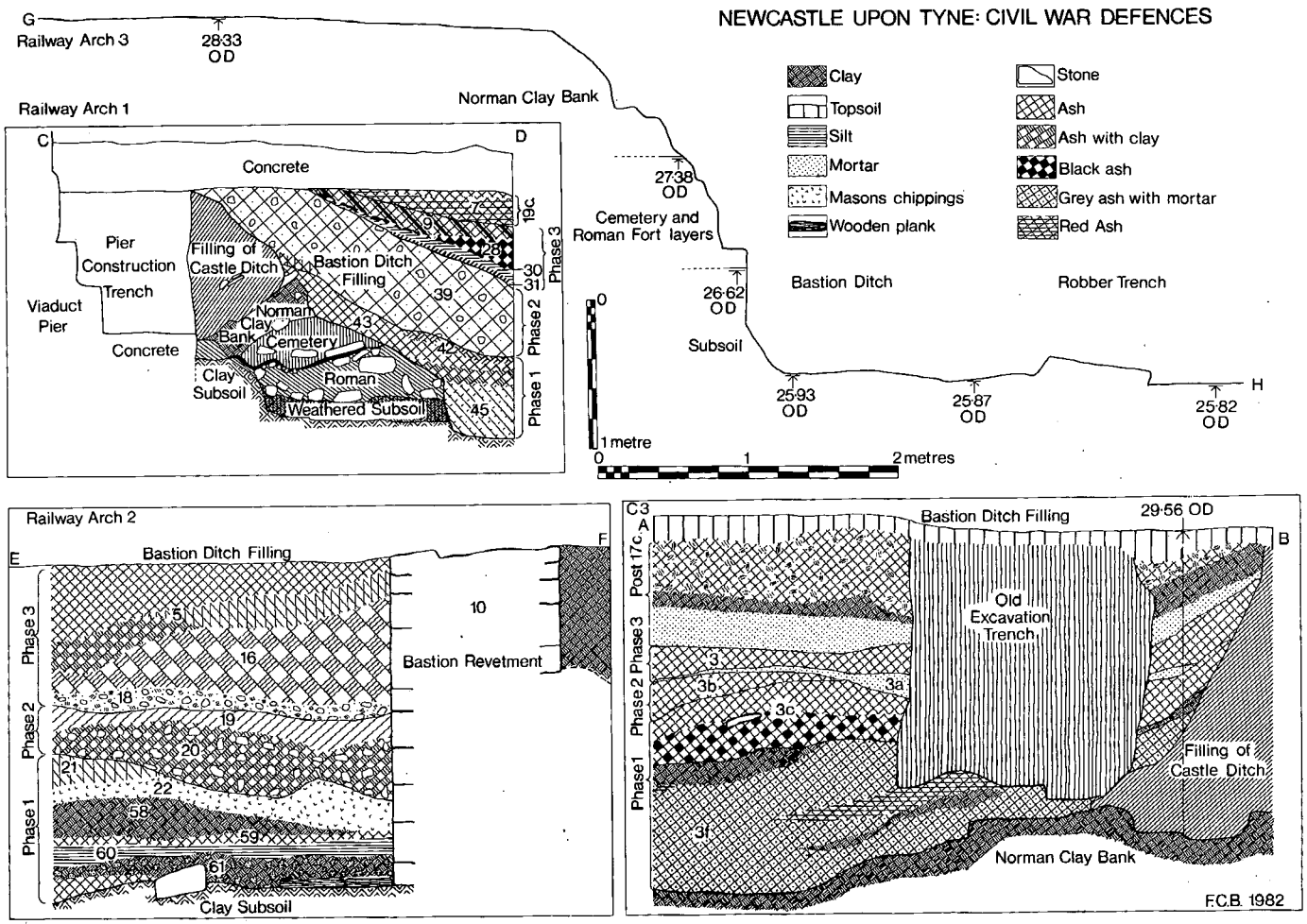

NEWCASTLE UPON TYNE: CIVIL WAR DEFENCES
Clay
Topsoil
Silt
Mortar
Masons chippings
Wooden plank
Stone
Ash
Ash with clay
Black ash
Grey ash with mortar
Red Ash
G
Railway Arch 3
28·33 OD
Railway Arch 1
Norman Clay Bank
27·38 OD
Cemetery and Roman Fort layers
26·62 OD
Subsoil
Bastion Ditch
Robber Trench
25·93 OD
25·87 OD
25·82 OD
H
C
D
Concrete
Pier Construction Trench
Viaduct Pier
Concrete
Filling of Castle Ditch
Bastion Ditch Filling
Norman Clay Bank
Cemetery
Roman
Clay Subsoil
Weathered Subsoil
19c
Phase 3
Phase 2
Phase 1
30
31
39
43
42
45
0
1 metre
0
1
2 metres
Railway Arch 2
E
F
Bastion Ditch Filling
Bastion Revetment
10
5
16
18
19
20
21
22
58
59
60
61
Clay Subsoil
C3
A
B
Post 17c.
Phase 3
Phase 2
Phase 1
Bastion Ditch Filling
29·56 OD
Old Excavation Trench
3
3a
3b
3c
3f
Filling of Castle Ditch
Norman Clay Bank
F.C.B. 1982

Fig. 5.

wall, there were places where these layers together were as much as 1 m deep. Since they produced a high proportion of residual pottery, from Roman to 16th-century, it seems probable that many were the result of the erosion of earlier strata exposed in the outer edge of the ditch. Some of the deposits, however, were obviously refuse since they contained objects unlikely to be residual—clay pipes, musket balls and powder flasks. Although no pottery was found which had to be later than the middle of the 17th century, it is not possible to be so precise about the clay pipes.

The fragment of wall inserted into the outer edge of the ditch disappeared from view either in phase 1 or early in phase 2. As it was separated from the layers of ditch filling only by a spread of white mortar, and there was no evidence for a robber trench, its upper courses had either been removed earlier, or had never existed. Future excavation to the east might solve the problems of its original purpose and date of demolition.

Phase 2 was marked by the tipping of large quantities of ash, other types of deposit being few, and by a change in the pottery. The proportion of residual material was smaller, and there were present for the first time sherds as late as the third quarter of the 17th century. Some layers were full of artifacts, R.A. 1, 39 and R.A. 3, 37/39 being notable for the quantities of pottery, glass, iron, animal bones and clay pipes. The organic material, leather, textiles and wood, in this as in the other phases came largely from R.A. 3 where the wettest conditions prevailed.

Although there was probably little difference in date between phases 2 and 3, the layers which constituted phase 3 contained considerable quantities of white mortar in spreads and lumps among the more usual ash, clay and stones. Although residual pottery was still plentiful in R.A. 2 it was sparse elsewhere, and wares of the late 17th century, particularly in R.A. 3, became more common.

On the evidence of the white mortar it seems conceivable that the highest deposits in the ditch were forming as the stone revetment was either collapsing or being destroyed. It is certain from the stratification that its final demolition, thorough except in R.A. 2, post-dated the latest surviving layers in the ditch. A *terminus ante quem* for this destruction was provided by finding in the robber trench of the wall fragments of lead glass dating from between 1676 and the 1690s. Their recovery was fortunate since most of the finds from this context were residual, and in this instance one must suppose that they came from deposits south of the revetment, that is from inside the castle bailey.

Conclusion

There can be little doubt that this V-shaped wall and ditch were part of the defences hastily added to the castle by John Marley. The plan does not lend itself to any other interpretation, and while there is no archaeological evidence for a precise date of construction the work would not have been necessary before the postulated collapse of the curtain wall in 1620. Indeed it could not have been built before Marley had cleared away the dunghill during the Civil War. A point in the mid-17th century for the start of its decay is suggested by the information from the excavation, and would seem historically probable.

It is, at the moment, impossible to be certain how the structure fitted into a defensive system. It was, presumably, one element in a fortified perimeter or bulwark since there was no ditch separating it from the keep to make it an outwork or, if Lithgow described them correctly, a hornwork, redoubt or demilune. Although it has been termed a bastion for the purpose of this report, without evidence for flankers this is a loose use of the word, and it was perhaps no more than a salient on the perimeter. In addition, its two constituent parts have unusual, even contradictory, features. The stone revetment is hitherto unparalleled in defensive works of the Civil War, Duffy stating categorically that all known fortifications of this period were of earth.[45] To find a mortared wall of reasonable quality suggests that care was taken in its construction, care which was not extended to the ditch which was so tiny as to make one suppose it had been dug out in great haste. Moreover, on the evidence available at present, it does not seem to have been a common practice to add new defences to medieval castles in towns though some urban castles, such as Nottingham, were repaired at this time.[46] Instead it was more usual to strengthen the town walls, as at Worcester,[47] or even for such walls to be partly superseded by new lines of fortifications as at Oxford[48] and Chester.[49]

The gradual disappearance and final dismantling of the bastion, as demonstrated by the archaeological evidence, is well in accord with the activities of Humphrey Boulron and his unlicensed predecessors. Like the 16th-century dunghill this 17th-century rubbish contained both domestic and industrial waste. In the first category there was, as before, pottery and glass discarded by the more affluent townspeople. In contrast with the earlier heap, however, the animal bones were now the debris from private households, suggesting that butchers were carrying their garbage elsewhere. Though there is a little evidence for an apothecary sending broken glass vessels to the tip, most of the industrial waste consisted of the offcuts and scrap of cobblers and tailors, and so was probably emanating from near at hand. Sadly, the redevelopment of the last century prevented our finding out whether the inhabitants of Castle Garth obeyed the instructions of the early 18th century to take their rubbish away.

APPENDIX

CARR'S BATTERY

Christopher North

Carr's Battery was an artillery emplacement on the east side of Newcastle's 17th-century defences (fig. 1). According to Bourne,[50] it was named in honour of Alderman Leonard Carr (*c.* 1575–1658)[51] who had been appointed by the Corporation at an unspecified date as Chief Surveyor for building a fort in Newcastle.

Carr probably paid for its establishment himself, hence the dedication, and not simply as Bourne says because he made such a good job of it. He had been Sheriff of Newcastle in 1635/6,[52] and although he was not so passionately behind the Royalist cause as some of the others in the Corporation, he was strongly anti-Scottish Presbyterian.[53] Also the Corporation was heavily in debt after the outbreak of plague in 1636.[54]

The battery was probably built between early 1639 and the first Scottish occupation

in August 1640 after the battle of Newburn. Sir Jacob Astley surveyed Newcastle's defences at the end of 1638 but he did not record the battery as being then in existence.[55] His sketch of January 1639 proposed that guns should be placed at this part of the town so, although Carr received the honour after building the battery, Astley must have the credit for its location.[56]

The site was just inside the town wall bridging the large distance between Carpenters' Tower on the Wallknoll and Sandgate Gate.[57] The battery stood at the most southerly highest point before the ground dropped steeply down to the river.[58] It gave the gunners the maximum possible control of the approaches to the walls from the east along the Sandgate and the fields to the north, which would also be within range of the guns in the Shieldfield fort. The plot was later described as 24 yards by 10 yards,[59] with the main axis running parallel with the town wall.[60]

The battery saw action during the siege and must have been heavily involved in the unsuccessful attempt to prevent the Earl of Callendar establishing his troops in the Sandgate area.[61] The largest gun available to the town was the demiculverin, which could fire a 9lb ball up to 2,000 paces every five minutes or so.[62] This was powerful enough to blow the bonnet off any Scot sheltering in the remotest end of the Sandgate, nevertheless, they had two batteries there, one of which demolished much of Carpenters' Tower.[63]

Carr's Battery was destroyed at the opening of the final assault on the afternoon of 19th October, 1644, by a mine being detonated beneath it.[64] Its destruction facilitated the Scottish entry through the breach near Sandgate Gate about two hours later.[65]

There were some attempts to tidy up the scenes of death and destruction in the spring of 1645,[66] but there is no evidence to suggest that Carr's Battery was rebuilt. Instead, Haslerigg built a fort just outside Sandgate Gate;[67] at least this could not be undermined though it would not have the same field of fire. The name of Carr's Battery survived until the start of the 19th century. Described as waste ground belonging to the Corporation in 1703,[68] the land was subsequently used for stables[69] and later more permanent housing called Harvey's Buildings was erected there.[70] By 1831 they were called Cox's Buildings.[71] Finally, the buildings and the land disappeared under the east end of City Road in 1880–2.

THE FINDS

The finds are of little help in understanding the excavated structures. Nevertheless, by comparison with the 16th-century material from the castle ditch, they can be profitably used to examine changes and continuity in the production and use of various artifacts. It must however be emphasized that the large amount of residual material limits the inferences which can be drawn, particularly from the bone assemblages.

The provenances of the finds (fig. 6) have been abbreviated as follows:
Bldg. A, followed by the context number, indicates the position in the robber trench. Ph. 1, 2 or 3, followed by the area code R.A. 1, 2 or 3, and A2 or C3 and context number, indicates the position in the bastion ditch. B.R.T., followed by the area code as above and context number, indicates the position in the bastion robber trench.

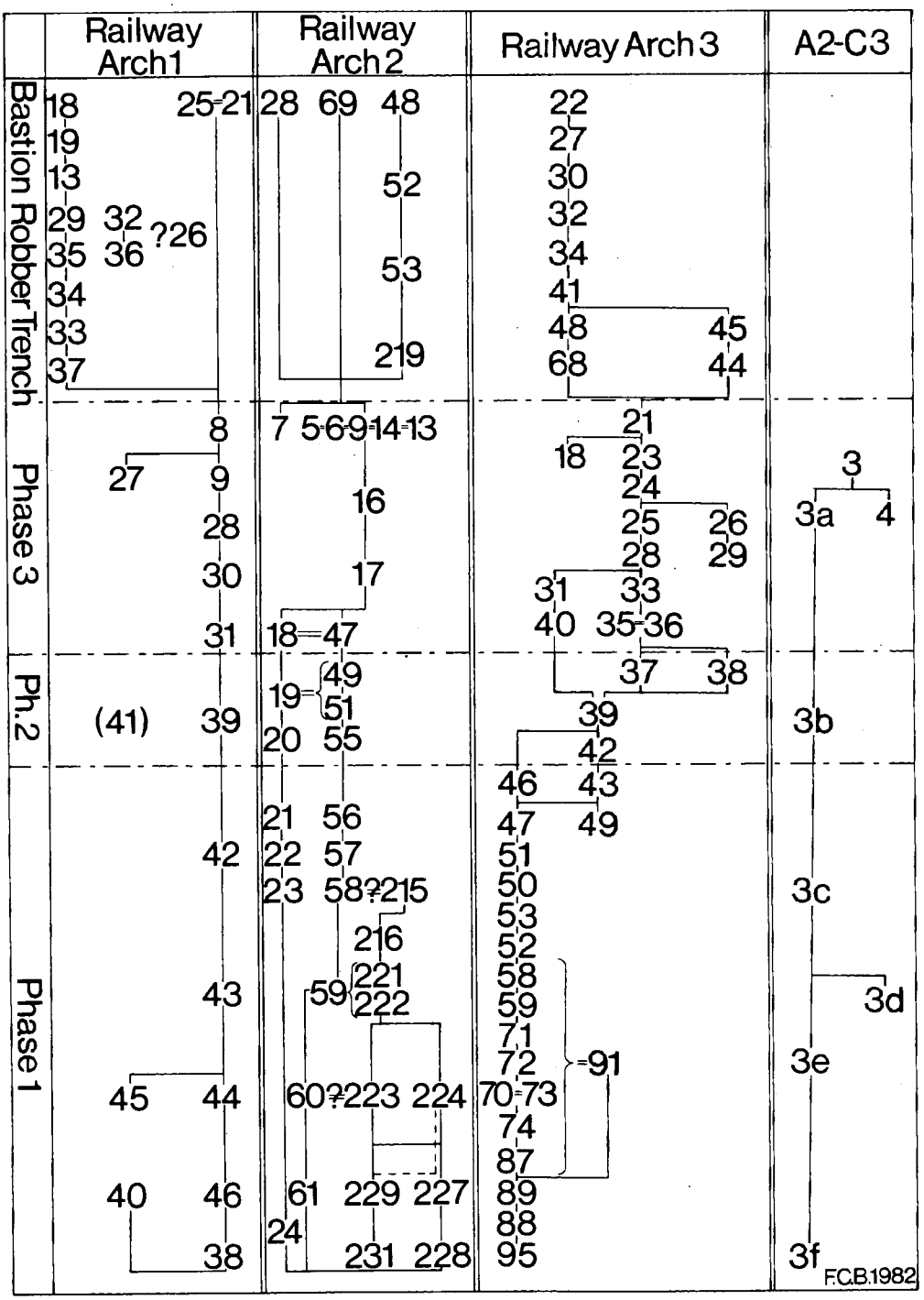

Railway Arch1
Railway Arch2
Railway Arch3
A2-C3
Bastion Robber Trench
Phase 3
Ph.2
Phase 1
18 19 13 29 32 35 36 ?26 34 33 37 25=21
28 69 48 52 53 219
22 27 30 32 34 41 48 45 68 44
8 27 9 28 30 31
7 5=6=9=14=13 16 17 18=47
21 18 23 24 25 26 28 29 31 33 40 35=36 37 38 39 42
3 3a 4
49 19=51 20 55
(41) 39
3b
46 43 47 49 51 50 53 52 58 59 71 72 =91 70=73 74 87 89 88 95
42 43 45 44 40 46 38
21 56 22 57 23 58?215 216 221 59 222 60?223 224 61 229 227 24 231 228
3c 3d 3e 3f
F.C.B.1982

Fig. 6.

THE POTTERY

Margaret Ellison

A cursory glance at the pottery assemblage immediately suggests that significant changes must have taken place, both in domestic habits and in the pottery industry itself, in the period since the latest deposits in the castle ditch at the end of the 16th century. On the one hand there is the demise of reduced greenware and the virtual disappearance of the cistern, on the other hand the quantity and range of attractive table wares (especially plates) which must have been in common use in an increasing number of households for the first time. A closer examination of the sources of this pottery points to the spread of modern patterns of production and distribution.

As in the 17th century pit behind the Black Gate,[72] there is no evidence of a significant local industry. Although not all the redwares can be provenanced, the majority are clearly from either the Low Countries, or the London metropolitan area. There is some decline in the percentage of Low Countries and Rhenish wares as compared to the late 16th century deposits[73] but the most dramatic change is in the proportion of wares coming from the London area (from 1% to over 40%). In the same way as the Low Countries redwares and Rhenish stonewares in the 15th and 16th centuries gradually replaced much of the local industry,[74] so in the 17th century, metropolitan wares took the place of local pottery and also perhaps, made some inroads into the established overseas imports. As in the 16th century, it is important to look at the types of vessels involved. Metropolitan and delftware mugs have to some extent replaced Rhenish vessels, and one or two metropolitan redware tripod cooking pots occur, but the bulk of the increase is made up of vessels which are new or were previously uncommon (e.g. plates and skillets).

But just as, in the 16th century, the scarcity of London wares did not accurately reflect the known importance of general trade with that area,[75] in particular the coal trade, so these changes in the 17th century appear to be due to changes in the pottery industry itself rather than general trade patterns, and although there are some external factors which may have had a marginal effect on the level of pottery imports from the Low Countries, these cannot explain the enormous increase in the use of pottery from the London area.

For example, the increase in the proportion of coastwise (i.e. mostly to London) as opposed to overseas coal trade from an average of 80% in the last decade of the 16th century to an average of 93% in the third quarter of the 17th century[76], does not represent a fundamental change in trading patterns but the continuation of a trend in which the London trade was always pre-eminent. The somewhat smaller proportion of Low Countries and Rhenish wares in the 17th century sample may be attributable to that trend. Also discriminatory taxes levied during the middle years of the 17th century on coal cargoes carried by foreign ships eventually resulted in a majority of English ships carrying the coal trade, reversing the situation in the 16th century when the trade was almost exclusively in the hands of Dutch, Flemish and French merchants.[77] This too may have affected the Low Countries imports, although the reversal may not have been as complete as the records suggest, since evasion of

the tax by entering foreign owned ships as English was a common practice.[78] It is worth remembering in this context that the importance of French vessels in the 16th century coal trade was not reflected in the quantity of French pottery imported, other factors were clearly involved. (The periods of interruption of trade due to the three Dutch wars are unlikely to have any significance in the context of this problem; since Dutch efforts in these wars were directed at the disruption of the whole coastal trade, the effects must have been a general reduction in trade with both London and the Low Countries).

None of the above factors explain why certain wares from the London area (and not others) occur in such large quantities. The Surrey/Hampshire white wares do not occur in significantly larger quantities than in the 16th century. The main increase is overwhelmingly due to the introduction of metropolitan redwares and to a lesser extent, English delftwares. It is apparent from the numbers of these wares that they represent an organized, regular trade similar to that developed in the Low Countries and Rhineland more than a century earlier. In other words, the increase in the incidence of these wares from London demostrates that the production of the metropolitan and delftware potteries was geared to a wide distribution system including regular sale at the ports, that is a modern rather than a medieval pattern of distribution. Their appearance in Newcastle is due rather to increased availability in London than to increased trade with that area.

The pottery has been considered in detail under three headings: in relation to the sequence of events on the site—*Pottery related to the Site*; the proportions of different fabric groups—*The Fabric Groups* (and Table A); the numbers of different vessel types—*The Vessels* (and Table B). The catalogue of vessel forms is arranged under this last heading by vessel type (Cooking pots, Jugs etc.) and by fabric group (English Redwares etc.) within those types in the same order as Table A.

POTTERY RELATED TO THE SITE

Robber Trench Fill Building A

The quantity of pottery from this context was small in comparison with the other deposits and mostly broken into small, often abraded sherds, hence the large proportion of "unknown" sherds (see Table A) and small number of identifiable vessel forms. Residual medieval wares are by far the most common and there is a certain amount of residual 16th-century pottery. The figure for Low Countries redwares is certainly augmented by the presence of residual 15th and 16th-century wares (see below *Tripod Cooking Pots*). There was no pottery in this group which was necessarily later than the first half of the 17th century.

Bastion Ditch Fill

Phase 1

This was characterised by a high incidence of residual 16th-century and medieval pottery and the occurrence of Roman pottery in significant quantities, the result, presumably, of the weathering of the sides of the trench cut through earlier deposits.

TABLE A

FABRIC TYPES	17th Century: English Redware	Low Countries Redware	Eng/L.C. Redware	Neth/Eng. Delft	English Delft	Blackware	English Whiteware	Yellow Slipwares	Frechen	Occasional foreign	Residual: Residual Rhenish	Residual French	Local 16th c.	Cistercian ware	English Medieval	Roman	Unknown	Intrusive	TOTAL FRAGMENTS
%	ROBBER TRENCH FILL																		number
ROBBING BASTION WALL	14·20	25·78	6·84	2·63	–	2·10	2·63	–	6·84	3·68	1·05	0·52	8·42	7·36	8·41	–	9·47	–	190
%	BASTION DITCH FILL																		number
PHASE 3	40·30	17·45	4·52	2·37	5·17	3·44	3·87	–	5·60	1·29	1·50	1·07	2·15	4·52	3·66	0·21	3·23	0·21	464
PHASE 2	42·59	11·85	4·62	4·25	4·81	2·40	1·85	0·37	6·66	1·29	0·92	0·55	3·14	3·14	6·11	0·92	3·70	0.92	540
PHASE 1	30·29	18·82	2·64	2.64	1·17	1·47	2·05	–	3·82	1·47	0·29	2·35	3·82	5·29	15·00	4·70	3·82	–	340
%	ROBBER TRENCH FILL																		number
ROBBING BUILDING A	7·60	20·65	4·34	4·34	–	2·17	5·43	–	3·26	1·08	–	1·08	7·60	–	34·77	–	7·60	–	92

TABLE B

17th Century Vessels	Cooking pots	Jugs	Jars	Ointment pots	Cisterns?	Frying pans	Skillets	Flasks and Bottles	Dishes	Plates	Bowls	Porringers	Mugs	Cups	Urinals and Chamber pots	Lids	Miscellaneous	Total of Identifiable Vessels.
ROBBING BASTION WALL	24	2	–	1	–	2	2	1	4	5	12	7	1	5	1	1	1	69
BASTION DITCH PHASE 3	31	8	6	4	1	–	9	1	16	45	17	1	16	17	1	1	–	174
BASTION DITCH PHASE 2	23	11	9	5	2	1	37	4	26	87	21	2	37	11	1	3	1	281
BASTION DITCH PHASE 1	18	4	7	2	–	4	8	2	16	34	16	4	18	4	1	1	3	142
ROBBING BUILDING A	6	–	–	–	–	–	1	–	3	2	–	–	2	2	–	–	–	16

The relatively smaller quantity of pottery in this phase compared to the later phases of the fill is another indication of a period of little activity (see above). None of the 17th-century pottery from this phase was necessarily later than the mid 17th century.

Phase 2

The ash deposits (see above) contained a high proportion of pottery as of other finds. There were less residual and more contemporary finds, for example there was more than 10% increase in the quantity of English redwares. For the first time there were examples of wares certainly attributable to the second half and some probably to the last quarter, of the 17th century. (Staffordshire yellow slipware no. 67, Delftware no. 50, Lambeth type dishes no. 39 and fragment in R.A. 3, 42 and a Chinese rim fragment, possibly from the same vessel as no. 63, in R.A. 3, 37).

Joining fragments of one vessel, no. 34, occurred in R.A. 2, 49 and R.A. 3, 37 and 39, which provided further evidence for relating the deposits in the two railway arches.

Phase 3

In railway arches 1 and 3 and in A2/C3 almost no residual pottery occurred and even the comparatively high incidence in railway arch 2 was a smaller proportion of the total from that context than in the preceding phase. The numbers of late delftwares increased in this phase (e.g. nos. 20 and 49 in A2/C3, 3) but the date range of 17th-century wares is not noticeably different from phase 2.

Robber Trench Fill, Bastion

Although this is stratigraphically the latest deposit the pottery from the fill is more similar to the group from the robbing of Building A than the latest deposits in the Bastion ditch fill. Apart from the fragment of Chinese porcelain, which was probably disturbed from the ditch fill (see below no. 63), there are no wares present which are necessarily later than the first half of the 17th century. A large amount of residual pottery is present, more 16th-century than medieval, including at least some of the Low Countries redwares. The incidence of pottery is low compared to the Bastion ditch fill and includes a large number of small, unidentifiable burnt and abraded sherds and few identifiable vessel forms.

THE FABRIC GROUPS

(see Table.) Although the quantities are represented as percentages the amount of pottery recovered was barely large enough to provide a valid sample, so the results should be regarded with some caution.

English Redwares

The majority of these fragments appear to be metropolitan wares. A few other fragments included in this group are clearly not Low Countries wares and share some characteristics with the metropolitan wares.

Low Countries Redwares

This group includes only those wares which could be fairly positively ascribed to

Low Countries rather than English sources on stylistic grounds or characteristics of fabric and glazing. Slipwares such as nos. 34–36 and the fragment of a North Holland dish, R.A. 2, 20, are included.

English/Low Countries Redwares
This group consists of unprovenanced redwares which could be Low Countries or English, or indeed, from some other source.

Netherlands/English Delftwares
The majority of these fragments are probably North Netherlands delftwares of the first half of the 17th century, though some may be English and a few can be attributed to the later 17th century (e.g. nos. 49 and 50).

English Delftwares
This group includes occasional blue-painted wares of the early 17th century, manganese sprinkled and plain white-glazed wares, which are known to have been manufactured from the late 16th century onwards, and Lambeth wares of the later 17th century.

Many of the recognizable vessel forms of white-glazed wares in phases 2 and 3, bastion ditch, are close parallels of lambeth vessels so the majority may be Lambeth wares of the later 17th century.[79]

Fragments of manganese or cobalt sprinkled and white-glazed wares, and at least one blue-painted charger, occurring in the bastion ditch fill ph. 1 and R.A. 3, 42 (ph. 2) were recovered with shiny black surfaces caused by de-oxidizing conditions in the soil.[80] (All these fragments came from silt deposits).

Blackwares
The majority of fragments are from cups with one possible example of a jug. A few fragments are possibly from the metropolitan kilns but most have a redder and grittier fabric than metropolitan redwares. The glaze is not always a uniform glossy black. Greenish and mottled brown/black glazes occur, similar to examples in the last phase of the castle ditch fill[81] and may therefore be somewhat residual early Blackwares.

Apart from the fact that few Blackwares were coming from the metropolitan kilns (and may therefore have a more local source) the overall proportion of blackwares to redwares seems small, (Harlow kilns produced 15–20% blackwares)[82] but this seems to be a reflection of the comparatively low proportion of cups to plates in the whole group and the apparent decline in the incidence of cups compared to the late 16th century, (see below *Cups*).

English Whitewares
These are probably mainly from the Surrey/Hampshire area with one or two Midlands wares. A number of these fragments are likely to be residual 16th-century wares.

Yellow Slipwares
In addition to the illustrated fragments (nos. 60 and 67), three fragments occurred unstratified in R.A. 2. One of the unstratified fragments is possibly a Bristol ware (dated at the earliest 1675),[83] the rest are probably Staffordshire wares.

Frechen Stonewares

The majority of fragments seem to be from mugs in forms common in the late 16th century but which continued into the 17th century (see below *Mugs*). Two 16th-century Cologne/Frechen vessels occurred (see below *Residual Rhenish Wares*) so some of the fragments listed as 17th century Frechen in Table A may in fact be residual 16th-century. Bellarmine bottles are uncommon, though some fragments could be from either Bellarmines or mugs.

Occasional Foreign Wares

The majority of these are 17th-century wares. The group includes the following types:

German Redware?—see no. 5

Low Countries Whitewares—fragments in: ph. 1, R.A. 1, 43; ph. 2, R.A. 1, 39 (2 vessels); unstratified, R.A. 2, (four vessels including no. 4). The fabric is grittier than English whitewares and the majority are green-glazed. These wares occur in the 16th century but are more common in the 17th century in the Low Countires. At least one vessel in this group (see below *Porringers*) is a common 17th-century type, and perhaps the majority may be 17th rather than 16th-century.

Werra Ware?[84]—see no. 41. A small chip from a rim, possibly of this ware, occurred in Bldg. A, 203.

Weser Wares—fragments in: ph. 1, A2/C3, 3f, R.A. 2, 223; ph. 2, R.A. 3, 37; ph. 3, A2/C3, 3; B.R.T., four vessels including no. 61 and one unstratified. All are from small bowls or dishes (such as those found at the Black Friars, Newcastle)[85] except one small fragment in R.A. 2, 223, which has pale orange internal glaze, external white slip covered in pale green glaze with rouletted or stamped decoration and applied red/brown and green dots. This kind of decoration is common on Weser hollow wares such as small pipkins, cups and jugs.[86]

Westerwald Stoneware—two fragments occurred: ph. 1, R.A. 3, 91 (probably a jug); ph. 2, R.A. 3, 39 (a mug rim fragment).

Martincamp—only two fragments of the 17th-century type III flasks occurred; no. 32 and a fragment in the bastion robber trench. Type I and Type II flask fragments are included in the totals for residual French wares.

Italian Maiolica—see nos. 51 and 62. One other badly abraded fragment with flaking polychrome glaze occurred: ph. 3, R.A. 1, 31.

Low Countries Maiolica—see no. 22.

Mediterranean or Spanish Coarse Wares—four fragments (2 in ph. 3, A2/C3, 3; 2 in ph. 2, R.A. 3, 39 and 37) in unglazed micaceous buff and pinkish buff fabrics are probably from jars. One fragment in A2/C3, 3 is particularly similar to the fabric of costrel found in the Castle ditch. (*Castle Ditch* no. 379).

Valencia Lustreware—see no. 40 (residual in this group).

Provincial South Chinese Porcelain—see no. 63.

Residual Rhenish Wares—includes fragments of Langerwehe, Raeren, Cologne/Frechen (acanthus leaf and medallion decoration) stonewares and 16th-century Rhenish yellow-wares.

Residual French Wares—includes medieval and 16th-century Saintonge wares,

Beauvais wares, Martincamp flasks types I and II and one sherd of red-painted ware from Bldg. A.

Local 16th-Century Wares—the majority are reduced greenware type 5, with occasional examples of type 6.[87]

Cistercian Wares—the majority appear to be 16th-century (cup forms *Castle Ditch* nos. 327, 328 and late type of decoration[88]). See below, *Cups*. A possible Cistercian ware waster occurred unstratified in R.A. 2.

Medieval English Wares—includes local reduced greenwares, buff/white wares and oxidized gritty wares and Scarborough ware.

Roman Wares—the fact that these occur only in the Bastion ditch fill, particularly in phase 1, suggests that they result from disturbance and weathering of the Roman levels cut by the construction of the Bastion.

Unknown Provenance—the majority are small, burnt and badly abraded fragments, which are probably unidentifiable. The greater proportion of these sherds in the two robber trenches is a reflection of the usual condition of pottery in such re-handled deposits.

A smaller number of sherds are undamaged but so far unprovenanced. One fabric group with several vessel forms was identified (see below) but the rest are unique occurrences, mostly of body sherds.

Intrusive Sherds—these are all 19th-century wares and occurred in contexts cut by the railway construction trenches and a 20th-century pit.

THE VESSELS (see Table B)

A comparison of the incidence of vessel forms in the 17th-century deposits with that in the late 16th-century deposits in the Castle ditch,[89] reveals some clear changes in the types of ceramic vessels in common use. In particular there is a big increase in the quantities of decorative bowls, dishes and plates for use on the table, while some kitchen wares decline in importance or disappear, perhaps suggesting the growth in the use of other materials such as metal for kitchen vessels. Both these changes can be seen as indications of the increased affluence of the townspeople using the castle tip.

Some vessel forms occurring in this sample have already been illustrated in two previous reports by the authors.[72, 73] These examples, therefore, are listed under the catalogue numbers of these reports prefixed by either *17th-Century Pit* or *Castle Ditch*.

TRIPOD COOKING POTS

These were the second most common vessel form (after cups) in the late 16th century and continue to be important in the 17th-century sample. It is difficult to determine exactly how important, since changes in form and fabric which developed in the late 16th century in the Low Countries continued into the 17th century and a proportion of the vessels listed must certainly be residual late 16th-century wares. This means that the proportion of cooking pots to other vessels in the 17th-century sample is somewhat less than indicated by Table B and there may have been some decline in its use.

The predominance of the cooking pots in the fill of the robber trenches is therefore a reflection of the high proportion of residual material in those contexts and although few recognizable cooking pot forms occurred some vessels were clearly attributable to the 15th and early 16th centuries on grounds of fabric and glazing.

As in the 16th century the overwhelming majority of these vessels are of Low Countries origin but occasional English vessels, both redware and whiteware also occurred.

English Redwares

1. Fragment of a base with foot in metropolitan redware fabric with internal chestnut brown glaze and runs externally. These vessels were clearly thrown with a flat base forming a sharp angle between wall and base, unlike the Low Countries vessels of the same type which have convex bases. This feature can be regarded as diagnostic of English vessels in both redware[90] and whiteware.[91] Ph. 3, R.A. 1, 8a. Other examples: ph. 1, R.A. 2, 21/56; ph. 2, R.A. 1, 39.
2. Rim fragment in metropolitan redware fabric with internal chestnut brown glaze. Ph. 2, R.A. 3, 37.

Low Countries Redwares

All the common rim types identified in the late 16th century as well as some residual forms occur. The vessels in this sample are therefore related to vessels illustrated in the Castle Ditch report.

Castle Ditch 163 or 164

One example of this residual 15th-century type occurred. Unstratified.

Castle Ditch 165–166

One example of this lid-seated rim form, with a handle pinched together at the top in the characteristic 17th-century manner, occurred, ph. 2, R.A. 1, 39, and one other rim fragment, ph. 3, A2/C3, 3.

Castle Ditch 167–169

As in the 16th century this rim type is the most common. In some cases, ph. 2, R.A. 2, 20/55 and B.R.T., R.A. 3, 22, sufficient rim survived to show that these were wide-necked late 16th- or 17th-century vessels (*Castle Ditch* 169) and one fragment had the 17th-century "pinched" handle form, ph. 3, R.A. 2, 16. Two unstratified examples and one in ph. 2, R.A. 1, 39 and one in ph. 3, A2/C3, 3, were narrower necked and clearly like *Castle Ditch* 167, therefore probably 16th-century. Two fragments of small vessels similar to *Castle Ditch* 167, though possibly wider necked, occurred: ph. 3, R.A. 1 27; ph. 2, R.A. 2 20/55. The rest of the rim fragments were too small to indicate more than the general rim type, though the fabric and glaze of the majority was consistent with a late 16th or 17th-century date. The occurred: ph. 1, R.A. 1, 43, R.A. 3, 85, A2/C3, 3f; ph. 2, R.A. 3, 39 (2 vessels); ph. 3, R.A. 3, 33; B.R.T., R.A. 1, 33, 21/25 (3 vessels).

Castle Ditch 170

Fragments of vessels with rims similar to this occurred: ph. 1, R.A. 2, 227, R.A. 3, 87, 91, 53; ph. 2, R.A. 3, 39; ph. 3, A2/C3, 3, and one unstratified.

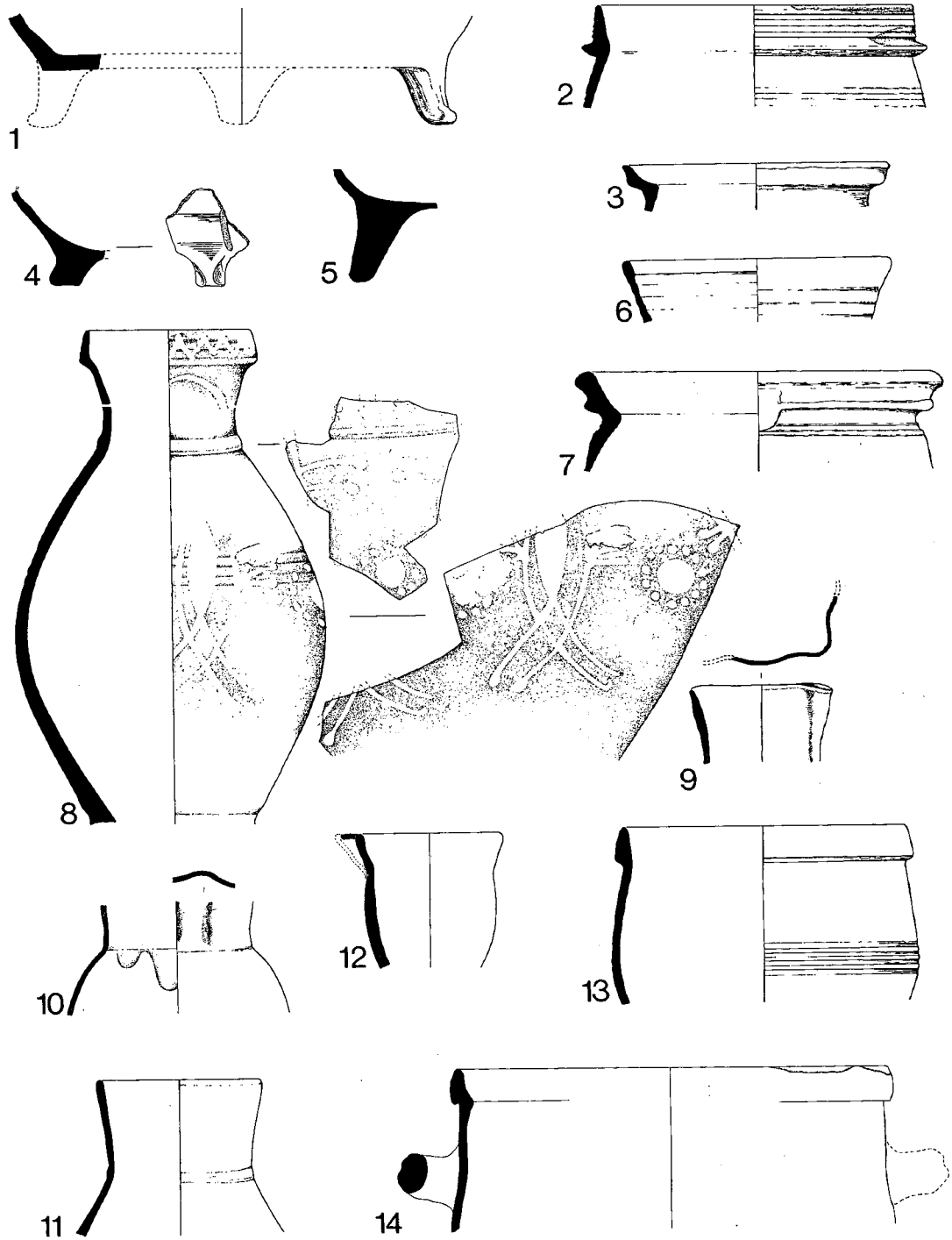


Fig. 7. Pottery ($\frac{1}{4}$).

The width of the body in proportion to the neck, an indicator of date,[92] could not be ascertained.

Castle Ditch 171

A rim fragment in ph. 2, R.A. 3, 37, was probably similar in form, and very similar in fabric and glaze, to this unusual vessel from the Castle Ditch.

Castle Ditch 172

Three fragments of this rim form occurred: ph. 1, R.A. 2, 223; ph. 2, R.A. 1, 39; one unstratified.

Castle Ditch 173

One example ph. 2, R.A. 1, 39. One with the same rim form but without thumbing, ph. 3, A2/C3, 3.

Castle Ditch 177

This type occurred late in the castle ditch sequence (phases 14–17) and was presumably a type that continued into the 17th century. Four examples occurred: ph. 2, R.A. 1, 39, R.A. 3, 37; ph. 3, R.A. 1, 28 (with "pinched" handle); one unstratified.

Castle Ditch 178

Two rim fragments of this form, but with no surviving evidence of spouts, occurred: ph. 2, R.A. 3, 37; ph. 3, R.A. 2, 2/5/7/13/14. They are clearly residual.

English or Low Countries Redware

A few cooking pots in redware fabrics which could not be confidently ascribed to English or Low Countries sources occurred in common Low Countries forms: bastion ditch phase 2, R.A. 3, 39, a small vessel similar to *Castle Ditch* 168 but wider necked (i.e. probably 17th-century); B.R.T., R.A. 1, 21/25, as *Castle Ditch* 170; Unstratified, *Castle Ditch* 167–69 and 172.

English Whitewares

3. Rim fragment in fairly hard pinkish white fabric with internal yellow glaze. Similar to vessels excavated in Hampshire.[93] B.R.T., R.A. 1, 33.
   A tubular handle of the type common on these whiteware pipkins occurred: ph. 3, R.A. 1, 28.

Low Countries Whiteware

4. This vessel has the curved base typical of Low Countries cooking pots and the external ribbing on the upper body, just visible below the fracture, is a common feature on 17th-century vessels.[94] Fine-grained gritty white fabric, full internal copper green glaze, partial external glaze (including base of foot) yellow in places. A redware scar on the outer surface shows that, as was commonly the case,[95] the vessel was fired with redwares. R.A. 2, uncertain context, bastion robber trench or ditch.

German Redware?

5. Cooking pot or skillet in a fairly hard light orange/buff sandy fabric with internal yellow/brown glaze. The form of the foot and external ribbing are very similar

to vessels excavated in Norway and thought to originate in Germany.[96] R.A. 2, uncertain context, bastion robber trench or ditch.

Local 16th-Century Wares

6. Rim fragment in reduced greenware type 5, green-glazed internally. External sooting suggests this may be a cooking pot. B.R.T., R.A. 1, 19.

Unknown Provenance

7. Rim fragment thickening towards the start of a handle. Sandy light red fabric, reduced in places, with occasional large grits. Internal pitted greenish brown glaze and splashed glaze externally. The fabric and glaze are very similar to no. 30 and no. 64 and two fragments in the bastion robber trench. The form is clearly related to the common cooking pot form *Castle Ditch* 167–9. B.R.T., R.A. 1, 26.

JUGS

There is perhaps some indication of an increase in the incidence of jugs after their apparent scarcity in the 16th century. All except one Low Countries vessel and possibly one Blackware vessel, are metropolitan redwares, either plain or slip-decorated.

English Redwares

8. Fragments of a jug in metropolitan redware fabric with full external chestnut brown glaze and slip decoration, patches of glaze internally. Ph. 2, R.A. 1, 39. A rim fragment of a second similar vessel occurred in the same context.
9. Rim fragment in metropolitan redware fabric with full cover of brown glaze. Ph. 2, R.A. 3, 37.
10. Fragment of the neck and shoulder of a vessel, probably similar to no. 9. Hard near-vitrified dark red fabric (probably metropolitan ware)[97] with full cover of dark brown glaze externally and on internal rim. Ph. 3, R.A. 3, 35/36.
11. Fragments of a vessel similar in form to the common metropolitan mug form,[98] but larger and therefore more probably a jug. Metropolitan redware fabric with full cover of chestnut brown glaze. Fragments of less complete examples of this form occurred in the 17th-century pit.[99] Ph. 2, R.A. 3, 38. Three other examples occurred: ph. 2, R.A. 3, 39/37; ph. 3, R.A. 3, 40; B.R.T., R.A. 1, 37.

17th-Century Pit 4

The bases of two plain glazed metropolitan ware vessels were very similar to this form: ph. 1, R.A. 3, 91; ph. 3, R.A. 2, 5/7/13/14.

17th-Century Pit 15

Rim and handle fragments of three metropolitan ware vessels (probably jugs) similar to this form occurred: ph. 3, R.A. 3, 35/36, 28.

17th-Century Pit 3a

Fragments of the base and lower part of two plain-glazed, probably metropolitan ware, vessels are similar to this form and probably represent jugs: ph. 1, R.A. 3, 91.

Low Countries Redware
Castle Ditch 185
A rim and shoulder fragment with thickening indicating the start of a handle is similar to this form. Ph. 1, R.A. 3, 85.

SPOUTED VESSEL

Unknown Provenance
12. Hard, largely reduced (mid grey) fabric with moderate sized quartz and iron inclusions, olive green/brown glaze, internal sediment. B.R.T., R.A. 1, 21/25.

Jars
(storage vessels with a variety of functions and ointment pots.)
The distinction between some jars and cooking pots is to some extent arbitrary, since some forms were used either for cooking or storage. Those forms commonly used for cooking, indicated by sooting, are listed as cooking pots, the rest as jars. More of these vessels appear to have been used for purposes other than cooking than in the 16th century. The ointment pots represent a virtually new category of small storage vessel. Apart from these and no. 21, all are in metropolitan redware fabric.

English Redwares
13. A similar vessel to *17th-Century Pit* 14. Metropolitan redware fabric, internal chestnut brown glaze and external ribbing. Ph. 3, R.A. 1, 8a. Rim fragments of this form occurred: ph. 1, R.A. 1, 43, R.A. 2, 215, A2/C3, 3f (2 vessels); ph. 2, R.A. 1, 39, R.A. 3, 39; ph. 3, R.A. 2, 16, R.A. 3, 24, 40.
14. Fragment in metropolitan redware fabric with internal chestnut brown glaze. Unstratified A2. A similar vessel occurred: ph. 1, R.A. 3, 91.
15. Fragment in metropolitan redware fabric with internal yellow/brown glaze and a single thumb press at the base of the handle. Ph. 2, R.A. 1, 39.
16. Rim fragment in metropolitan redware fabric with internal chestnut brown glaze. Ph. 2, R.A. 1, 39.

Vessels of similar form to *17th-Century Pit* 8 and no. 21 below, occurred: ph. 1, R.A. 1, 43; ph. 2, R.A. 1, 39 (2 vessels), R.A. 2, 19, 49, 51 (2 vessels, one with the scar of a handle broken off); ph. 3, R.A. 1, 31, 8a.

17th-Century Pit 22
A fragment of a similar, but larger vessel occurred, unstratified.

17th-Century Pit 24
A vessel of this form, but sooted indicating use as a cooking pot, occurred: ph. 2, R.A. 3, 42.

Netherlands/English Delftwares
17. Fragment of an ointment pot. Internal and external tin glaze with external dark cobalt blue and manganese purple painting. Pinkish buff fabric with cream unglazed surface on external base. English or Netherlands late 16th or early 17th-century. Ph. 1, A2/C3, 3f.

18. Fragment of an ointment pot. Pale cream/buff fabric, internal and external tin glaze and external blue painting. Probably Netherlands. Ph. 3, R.A. 3, 31.

English Defltwares

19. Fragment of an ointment pot in fairly hard cream fabric with occasional pink streaks and large red (grog?) inclusions. Internal pale yellow lead glaze, external tin glaze and blue painting with a slightly mauve tinge (cobalt blue with some mixture of manganese?). Probably English, early 17th-century. Ph. 2, R.A. 2, 49.
20. Fragment of an ointment pot in cream/buff fabric with internal and external pink tin glaze and external blue painting. English late 17th century. Ph. 3, A2/C3, 3.

English Whiteware

21. Rim fragment in pale buff fabric with pinkish surfaces. Internal dull yellow glaze and patches externally. The form is similar to metropolitan redware vessels such as *17th-Century Pit* 8. Midlands or Surrey. The rim form is common in both areas[100] and commonly occurs on pipkins but there is no evidence of this vessel being used for cooking. Ph. 2, R.A. 1, 39.

Low Countries Maiolica

22. Rim fragment of an albarello in cream/buff fabric with internal tin glaze mixed with lead glaze(?) external pale blue tin glaze with dark blue painting. Probably Low Countires.[101] B.R.T., R.A. 1, 18.

CISTERNS

These are either scarce or non-existent. This is a continuation of the evident decline in their use and manufacture at the end of the 16th century and raises the question of what other means of liquid storage (using other materials) were available in the 17th-century kitchen.

English Redwares.

Base fragments of the same form and in two cases the same diameter, as *17th-Century Pit* 11 (metropolitan redware) occurred but without evidence of spigot holes. Ph. 2, R.A. 1, 39, R.A. 3, 38; ph. 3, R.A. 1, 8a.

FRYING PANS

These are all *Low Countries redwares* of late 16th or early 17th-century types and disappear after phase 2 of the bastion ditch fill. Dripping pans were also apparently no longer in use. Does this mean that, for example, metal vessels were now being used for frying and spit roasting?

Low Countries Redwares

23. Fragment in fairly hard, light red, slightly sandy fabric with internal brown/orange glaze. The profile of the base angle is similar to the late 16th-century vessels in the castle ditch.[102] B.R.T., R.A. 1, 18.
24. Fragment in sandy orange/buff fabric, heavily sooted externally with internal brown/orange glaze. The form is similar to *Castle Ditch* 200, a late 16th/17th-century type. B.R.T., R.A. 2, 33.

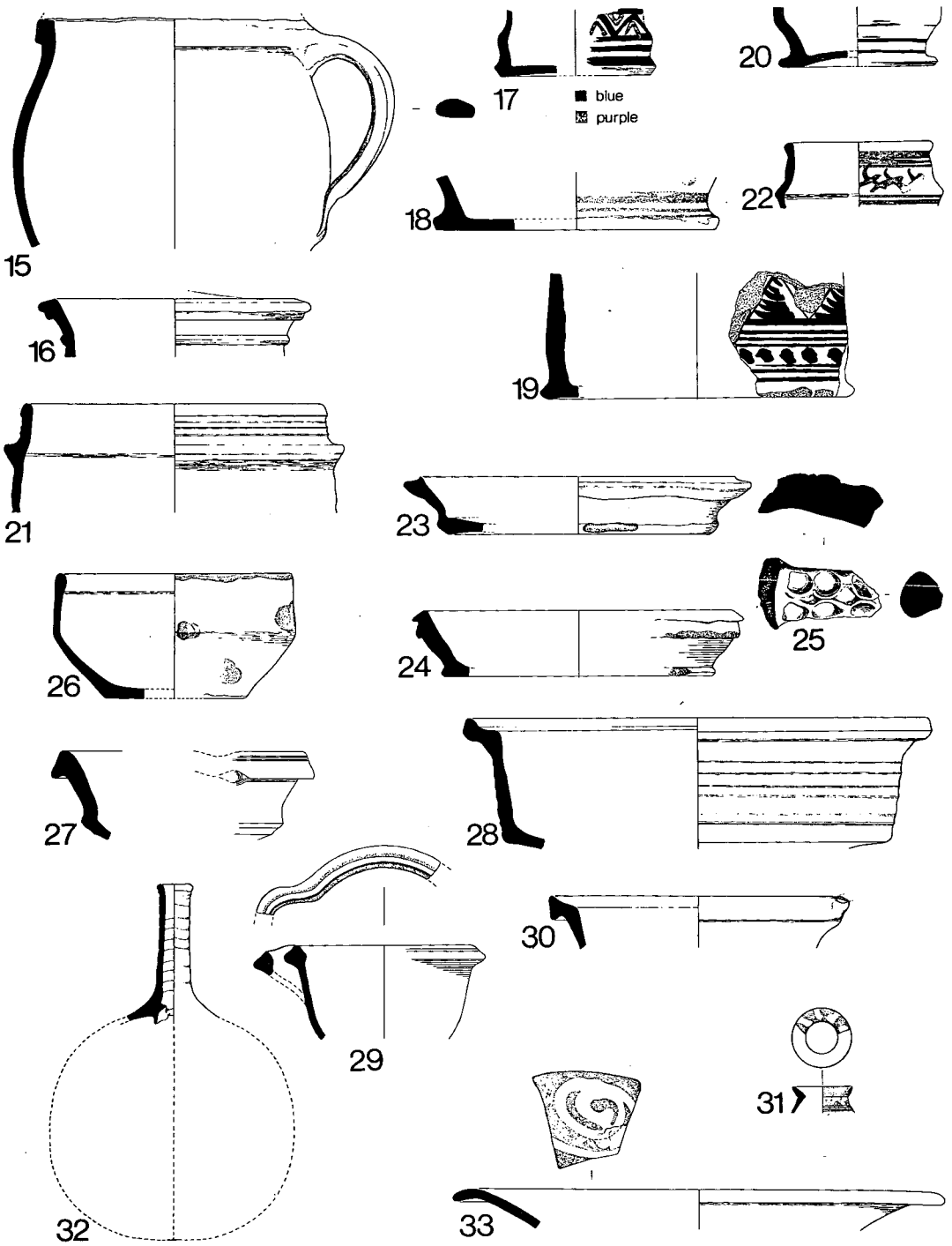


Fig. 8 Pottery ($\frac{1}{4}$).

Two frying pan or skillet handles in ph. 1, R.A. 2, 223 and ph. 2, R.A. 2, 20, were of late type with folded edges.[103]

English/Low Countries

25. Fragment of a handle, possibly from a frying pan or skillet in fairly hard light red, slightly sandy fabric with full cover of brown/orange glaze. The form seems likely to be Low Countries but the fabric is more like English redwares. (see no. 81 below). Ph. 1, R.A. 3, 91.

SKILLETS

One or two shallow tripod-footed cooking vessels from the Low Countries and Rhineland began to appear at the end of the 16th century[104] and this type also occurred in small numbers in the 17th-century deposits but the majority of the large number of vessels listed in phase 2 (see Table B) are English, probably metropolitan, redware vessels like *17th-Century Pit* 9 and no. 26 in this report. These vessels perhaps combined some of the functions of both frying pans and porringers, but seem to have been a relatively short-lived fashion. As in the 17th-century pit, the numbers in this sample decline in the latest deposits (ph. 3).

English Redwares

26. Fragment in light red metropolitan type fabric with occasional white grog inclusions, internal orange glaze and splashes externally. External sooting. Possibly a skillet like *17th-Century Pit* 9. The body form of both vessels is similar to a vessel from Woolwich[105] except that that vessel has no spout and a horizontal loop handle. Where handles have survived on these vessels on the Newcastle site they are always pan handles as on *17th-Century Pit* 9. Ph. 2, R.A. 3, 37. One other similar vessel ph. 3, R.A. 3, 33.

17th-Century Pit 9.

Vessels of this form occurred: Bldg. A, 216; ph. 1, R.A. 3, 91, A2/C3, 3f; ph. 2, R.A. 1, 39 (4 vessels) R.A. 2, 20, R.A. 3, 39 (2 vessels); ph. 3, R.A. 1. 31, R.A. 3, 35/36.

Fragments of 34 other vessels similar to no. 26 and *17th-Century Pit* 9 occurred (see Table B).

Low Countries Redware

27. Fragment of a spouted cooking vessel in sandy, light red fabric with internal orange glaze. Sooted externally. Similar to *Castle Ditch* no. 180. Unstratified, R.A. 2.
28. Fragment of a cooking vessel in light red sandy fabric with internal orange glaze. Similar to *Castle Ditch* 180. Unstratified, R.A. 2. A similar vessel occurred in ph. R.A. 3, 52.
29. Fragment of a spouted cooking vessel in sandy orange/buff fabric with internal yellow/brown glaze. External sooting. Similar to *Castle Ditch* 181. Unstratified, R.A. 2. A similar vessel occurred in ph. 1, R.A. 2, 221.

English/Low Countries Redwares
A vessel similar in form to no. 26 occurred in a rather sandy fabric more typical of Low Countries than English wares. Ph. 1, R.A. 2, 221.

Unknown Provenance
30. Fragment of a cooking vessel similar in form to Low Countries vessels such as *Castle Ditch* 180. Fabric and glaze are similar to no. 7 above, but almost fully reduced and fully glazed. A thickening on the rim probably indicates a handle. Ph. 2, R.A. 1, 39.

FLASKS AND BOTTLES

This category includes one metropolitan ware vessel (no. 31), two Martincamp flasks (see no. 32) and Frechen Bellarmines. As in the 17th century pit the Bellarmine is not particularly common and bottles and flasks are clearly no more common than in the 16th century. Martincamp flasks, which were the most common in the 16th century are now rare and it is difficult to know whether the Bellarmines could have filled the same function in the 17th century or whether the development of the bottle glass industry led to ceramic bottles being replaced by glass. If the Martincamp flasks were used as containers for the sale of liquids the latter is more likely but they were no doubt also re-used as domestic containers and the Bellarmines could have been used for this purpose.

English Redwares
31. Fragment of the neck of a bottle or flask in metropolitan redware fabric, internal and external chestnut brown glaze and external slip decoration. Ph. 1, A2/C3, 3c.

Martincamp
32. Neck of a flask in Martincamp type III fabric.[106] Ph. 1, R.A. 2, 227. Another fragment B.R.T., R.A. 2, 54.

DISHES

Shallow Low Countries redware dishes with pinched feet, which were fairly common in the 16th century continued to occur in the 17th-century sample (see nos 34–36) in moderate numbers. Judging by the modest numbers which occur in both samples and the sooting on the underside of many, they were probably used for warming and serving food.

More decorative dishes for use on the table only were rare in the 16th century, but in the 17th century delftware vessels (English and North Netherlands) and occasional Italian maiolicas fill this role and occur as commonly as the Low Countries redware type.

English Redwares

33. Rim fragment in hard light red fabric with orange/buff external surface, internal chestnut brown glaze and slip-trailing. Badly chipped and worn. Probably English. Ph. 2, R.A. 3, 39.

Low Countries Redwares

34. Dish in sandy orange/buff fabric with internal yellow/orange glaze and slip-trailed decoration. Ph. 2, R.A. 2, 49, R.A. 3, 37 and 39. A rim fragment of another very similar vessel with flecks of copper green in the glaze occurred in the same context (R.A. 2, 49).
35. Fragment of a dish in light red sandy fabric with internal yellow/brown glaze stained with copper in places and slip-trailed decoration. Ph. 1, R.A. 2, 22/57.
36. Fragment in sandy orange/buff fabric with internal brown/orange glaze and slip-trailed decoration, a run of glaze externally and external sooting. Ph. 3, R.A. 2, 5/7/13/14. A burnt rim fragment of the same, or a matching vessel occurred in the same context.

The form of these vessels remains very similar to late 16th-century dishes but slip-trailing rather than slip-coating is the common form of decoration. As in the 16th century plain-glazed vessels also occurred and some of these may be residual.

Vessels similar to nos 34–36 occurred: ph. 1, R.A. 1, 40, R.A. 2, 216; ph. 2, R.A. 1, 39; ph. 3, R.A. 1, 30. A vessel in ph. 3, A2/C3, 3 is like *Castle Ditch* 213.

Netherlands/English Delftware

A flanged rim fragment in ph. 2, R.A. 1, 39, with external lead glaze and internal tin glaze with blue painting, is probably a North Netherlands rather than English vessel, but similar in form to no. 37. Details of the form of other vessels could not be determined.

English Delftwares

37. Dish in pinkish buff fabric with internal tin glaze and blue painting, and external lead glaze mixed with tin glaze. The decoration is very similar to *17th-Century Pit* 27. Probably mid 17th-century English. Ph. 3, R.A. 3, 36/35. Fragments of similar vessels, probably also English, occurred: ph. 2, R.A. 3, 39 (2 vessels); ph. 3, A2/C3, 3.
38. Rim fragment of a dish in pale buff fabric with internal tin glaze and blue and orange painting, thinner external tin glaze. Probably English and somewhat later than 37. Ph. 2, R.A. 3, 39.
39. Rim fragment in pale buff fabric with internal tin glaze with blue painting and external lead glaze. The rim form is a common form on English delftwares of the later 17th century.[107] Ph. 2, R.A. 2, 20. Other examples occurred: ph. 2, R.A. 3, 42, 39 (3 vessels).

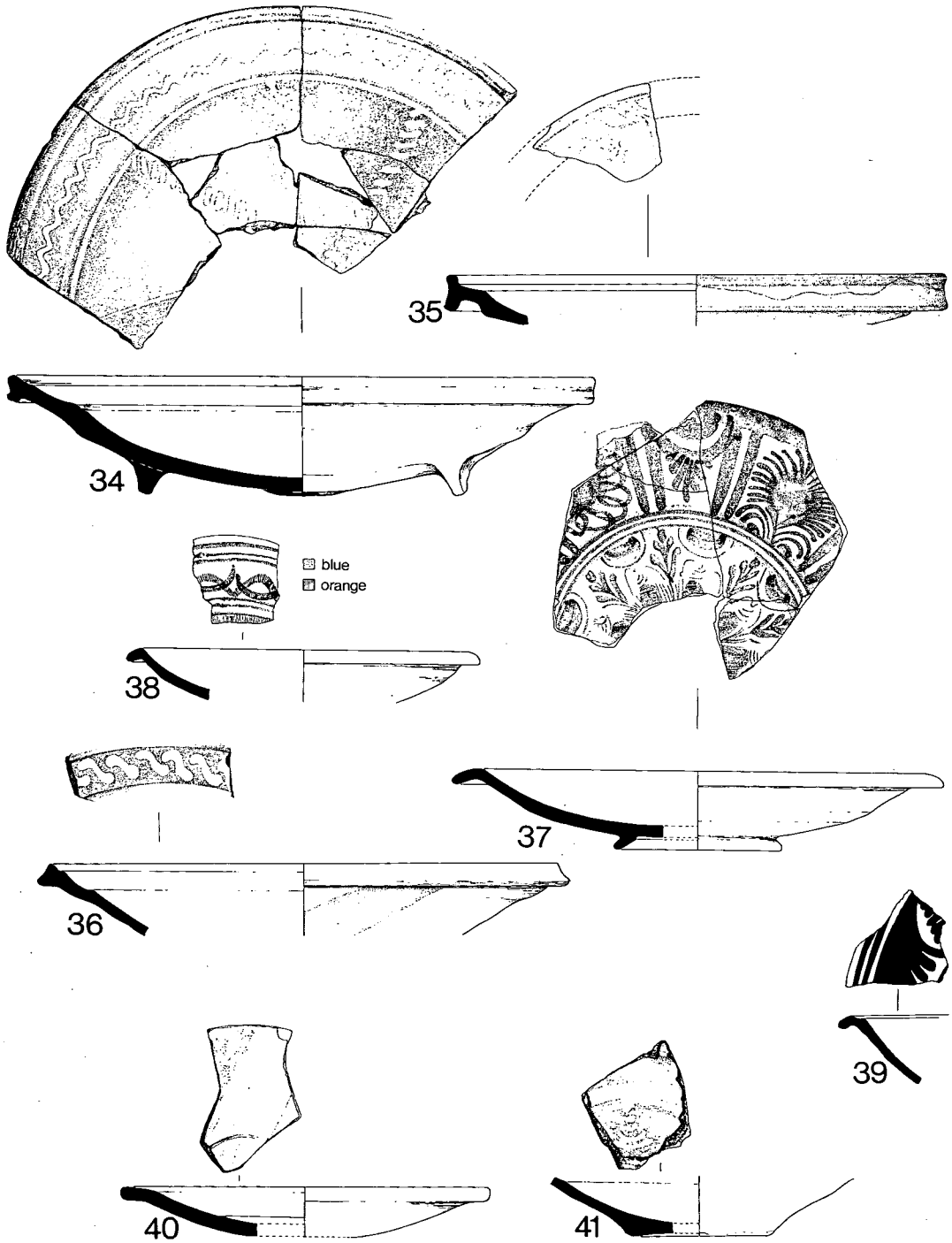


Fig. 9. Pottery ($\frac{1}{4}$).

One fragment of a dish, similar in form to Norfolk House No. 37[108] and with internal and external tin glaze and internal blue occurred, ph. 2, R.A. 3, 37.

English Whiteware
A green-glazed fragment of a dish, possibly similar to vessels from Ash, Surrey[109] and a second rim fragment similar to one from Cove, Hampshire,[110] occurred Bldg. A, 203.

Valencia Lustreware (residual)
40. Fragment of a dish in pale buff fabric with internal and external white tin glaze with faint traces of full lustre decoration internally. Probably first half of 16th century.[111] Bldg. A, 203

Werra Ware
41. Fragment of the base of a dish in light red fabric with opaque white inclusions, internal slip decoration and full cover of glaze, orange/brown on the red fabric, greenish yellow on the slip. B.R.T. R.A. 1, 33. This fragment is particularly similar to wares from kilns in the Göttingen area such as Witzenhausen and Hannoverisch Münden.[112]

PLATES (flat-bottomed shallow vessels)
These were rare in the 16th century, Beauvais being the only source of supply and these highly decorative vessels occurred in such small numbers as to suggest a use as serving dishes rather than for eating off. In contrast the 17th-century metropolitan ware plates (the most common vessels in this period) occur in such large numbers in proportion to other vessels that they may well have been used for eating off as well as for serving. The occasional tin-glazed vessels, on the other hand, were probably used as serving vessels.

English Redwares
42. Fragment of a metropolitan slipware plate. The form is the same as the most common plate form in the *17th-century Pit* (la). Ph. 3, R.A. 1, 8a.
43. Fragment of a metropolitan slipware plate. Possibly from Harlow, Essex.[113] The rim form is similar to *17th-Century Pit* 1a. Ph. 3, A2/C3, 3.
44. Fragment of a plain, glazed metropolitan redware plate. Also similar in form to *17th-Century Pit* 1a. Ph. 3, A2/C3, 3.

Fragments of vessels with rim forms like nos 42–44, ranging in diameter from 28–32 centimetres (the majority being 28 cm) occurred: Bldg. A, 218; ph. 1, R.A. 3, 91 (2 vessels); ph. 2, R.A. 1, 39, R.A. 2, 19/49/51 (2 vessels), R.A. 3, 39 (13 vessels), 38 (3 vessels), 37 (4 vessels); ph. 3, R.A. 1, 31, R.A. 2, 5/7/13/14, R.A. 3, 40 (2 vessels), 35/36, 33, 28, 25 and 23; B.R.T., R.A. 1. 13 (2 vessels).

45. Fragment of a small slipware plate in a rather hard, smooth, light red fabric with bright orange glaze. Possibly metropolitan ware. The diameter is probably the same as *17th-Century Pit* 2 and the form is similar. Ph. 1, R.A. 3, 91. Another small metropolitan ware plate more like *17th-Century Pit* 2, occurred in ph. 3, R.A. 3, 24.

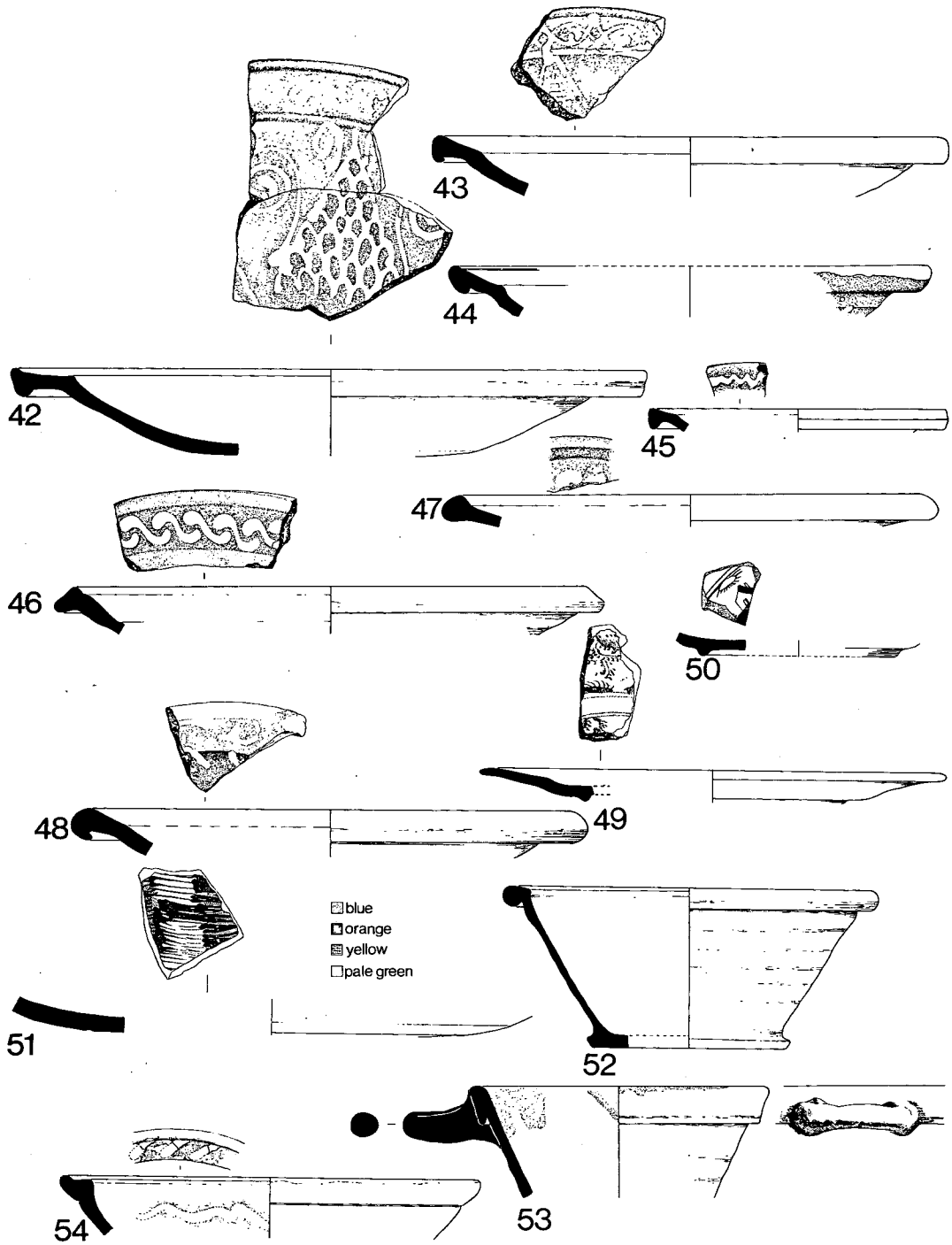


Fig. 10. Pottery ($\frac{1}{4}$).

English or Low Countries Redware

46. Rim fragment of a plate or dish in a light red fabric, similar to, but rather coarser than the usual metropolitan wares, with internal bright orange glaze and slip trailing. Both the slip pattern and the rim form are similar to the Low Countries dish no. 36 above. Ph. 3, R.A. 3, 24.
47. Rim fragment, probably a plate. The fabric is very similar to metropolitan wares but the rim form is not typical and traces of copper green on the glaze suggest a Low Countries origin, as the North Holland slipwares used copper green with plain yellow glazes. These traces do also appear, however, on Woolwich pottery.[114] Ph. 2, R.A. 1, 39.
48. Rim fragment, probably a plate, in light pinkish red fabric with light grey reduced surfaces, internal greenish yellow glaze, rather blackened, and traces of slip-trailed decoration which has flaked off. External sooting. Ph. 1, R.A. 3, 53.

Netherlands/English Delftware

49. Fragment of a plate in cream fabric with internal tin glaze and blue painting and external tin glaze. The edge of the rim is somewhat abraded. The use of high quality tin glaze on both sides and the Chinese style of decoration suggest a date in the last quarter of the 17th century. Ph. 3, A2/C3, 3.
50. Fragment, possibly a plate, cream fabric with internal and external high quality tin glaze and internal blue painting. Like no. 49, datable to the last quarter of the 17th century. Ph. 2, A2/C3, 3b.

Italian Maiolica (Montelupo)

51. Fragment, possibly from a plate, in pale pinkish buff fabric with internal tin glaze and polychrome brush strokes and external pale yellow lead glaze. This style of rapid painting is common on plates of the first half of the 17th century in Montelupo.[115] Ph. 2, R.A. 3, 37.

BOWLS

These were relatively scarce in the 16th century but one of the commoner vessel forms in the 17th-century sample. The increase is mainly due to the appearance, for the first time, of decorative table wares (metropolitan slipwares, delftwares and occasional Weser, North Holland Slipwares and Italian maiolicas).

The Low Countries "cream pan" (*Castle Ditch* 216–219) which was the most common bowl form in the 16th century, occurred once in a stratified context (ph. 1, R.A. 3, 46), possibly residually, and once unstratified in this sample.

The plain glazed metropolitan redware vessels such as *17th-Century Pit* 10 and nos..52 and 53 below, seem to be general purpose kitchen bowls and probably took over some of the functions of the so-called "cream pan" but would not have been suitable for cheese-making, suggesting that vessels of some other material were being used for that purpose. (Probably only a few of the 16th-century vessels were actually used exclusively as cream pans.)[116]

English Redwares

52. Metropolitan redware bowl with internal brown glaze. The form is very similar to *17th-Century Pitt* 10. Ph. 2, R.A. 3, 37. Vessels similar to 52 occurred: ph. 1, R.A. 2, 21/56, R.A. 3, 91; ph. 2, R.A. 1, 39, R.A. 2, 19/49/51, R.A. 3, 39 (3 vessels); ph. 3, R.A. 3, 40, 35/36 (slip-decorated), 29; Unstratified R.A. 2.
53. Bowl in rather hard, slightly sandy mid-grey (reduced) fabric with light red surfaces, incomplete internal white slip-coating and yellow, iron-stained glaze. Probably English. The form and slip-coating are characteristic of Woolwich redware bowls,[117] but the fabric is less so. Ph. 3, R.A. 1, 8a.
54. Fragment of a metropolitan redware bowl with flaking internal slip-trailing and yellow/brown glaze. Ph. 2, R.A. 1, 39. Two other matching, badly flaking vessels occurred in the same context.

Plain glazed lid-seated rimmed bowls similar in form to no. 54 and *17th-Century Pit* 13, occurred: ph. 2, R.A. 1, 39; ph. 3, R.A. 3, 35/36, A2/C3, 3; unstratified, A2/C3.

55. Fragment of a bowl in light pinkish red fabric with fine sand inclusions, internal yellow/brown glaze and slip-trailing. The form is like *17th-Century Pit* 5. Ph. 1, R.A. 3, 91.

Other redware examples similar to no. 55 or smaller occurred: ph. 1, R.A. 2, 215, 21/56; ph. 2, R.A. 1, 39, R.A. 3, 39. (A whiteware (probably Surrey/Hampshire) vessel of slightly larger diameter but very similar form occurred. See below, *English Whitewares*.) These vessels are probably English although this is not so far a known metropolitan form.[118] The fabric of several appears to be like metropolitan wares and others are similar. The fact that the form occurs in whiteware from the London area also suggests an English rather than Low Countries source.

56. Base fragment, possibly of a bowl like 55, in metropolitan fabric with internal brown glaze and slip-trailing. Ph. 3, R.A. 3, 26. Another example occurred: ph. 2, R.A. 3, 37.

Low Countries Redware

57. Bowl in light red sandy fabric with internal yellow/brown glaze and external sooting. Ph. 3, A2/C3, 3.

Castle Ditch 220

A "cream pan" of this type (though no handle survived) occurred: ph. 1, R.A. 3, 46.

Castle Ditch 221

Fragments of similar bowls occurred: ph. 2, R.A. 1, 19; ph. 3, R.A. 3, 22.

Castle Ditch 226

One vessel occurred: ph. 3, R.A. 3, 22. A North Holland slipware bowl[119] occurred: ph. 2, R.A. 2, 20/55.

Netherlands/English Delftware
Fragments of four flanged rimmed bowls, probably North Netherlands, first half of 17th century, occurred: ph. 2, R.A. 1; 39; ph. 3, R.A. 1, 31; B.R.T., R.A. 1, 33; unstratified, A2/C3.

English Delftwares
A rim fragment of a flanged rimmed bowl similar to vessels from Norfolk House,[120] with internal white tin glaze and manganese painting and external lead glaze occurred: ph. 3, A2/C3, 3.

English Whitewares
58. Rim fragment of a bowl in fine, sandy, pale buff fabric with full cover of yellow glaze. The fabric and glaze are like Surrey/Hampshire wares but the form is not known. Ph. 3, R.A. 3, 33.
59. Bowl in pinkish buff fabric with laminated structure. Internal copper green glaze, external thin pale yellow glaze. Probably Surrey/Hampshire. B.R.T., R.A. 3, 32.

A bowl very similar in form to no. 55 above but probably of larger diameter, in pinkish white fabric with full cover of internal yellow glaze, occurred: ph. 3, A2/C3, 3.

Yellow Slipware
60. Rim fragment of a bowl in soft pinkish white fabric, yellow glazed with external dark brown slip decoration. Probably Staffordshire. Ph. 2, R.A. 1, 39.

Weser Ware
61. Fragment of a bowl in hard pale pink fabric (orange under the glaze), with internal cream and green slip and pale yellow glazing. B.R.T., R.A. 1, 29. Rim fragments of similar bowls occurred: ph. 2, R.A. 3, 37; B.R.T., R.A. 1, 33; unstratified, A2/C3.

Italian Maiolica
62. Rim fragment, probably a bowl, in smooth soft cream fabric, painted internally and externally in rich colours. The palette is characteristic of North Italian maiolicas of the first half of the 16th century, for example, Faenza, Siena, Deruta.[121] Ph. 3, R.A. 1, 8a.

South Chinese Provincial Porcelain
63. Base fragment of a bowl in pale grey porcelain fabric with internal and external blue/grey painting and clear glaze. The foot ring has a sandy accretion. The vessel appears to come from a South Chinese kiln, though not from Jingdezhen in Jiangxi province, which is the home of the majority of these porcelains. Vessels of this kind have been regarded as being of late 17th-century/eighteenth-century date, but in view of the date range of other finds from this context, a date in the last quarter of the 17th century is probable.[122] B.R.T., R.A. 3, 45 and a fragment of the same base in ph. 3, R.A. 3, 33. Although the illustrated

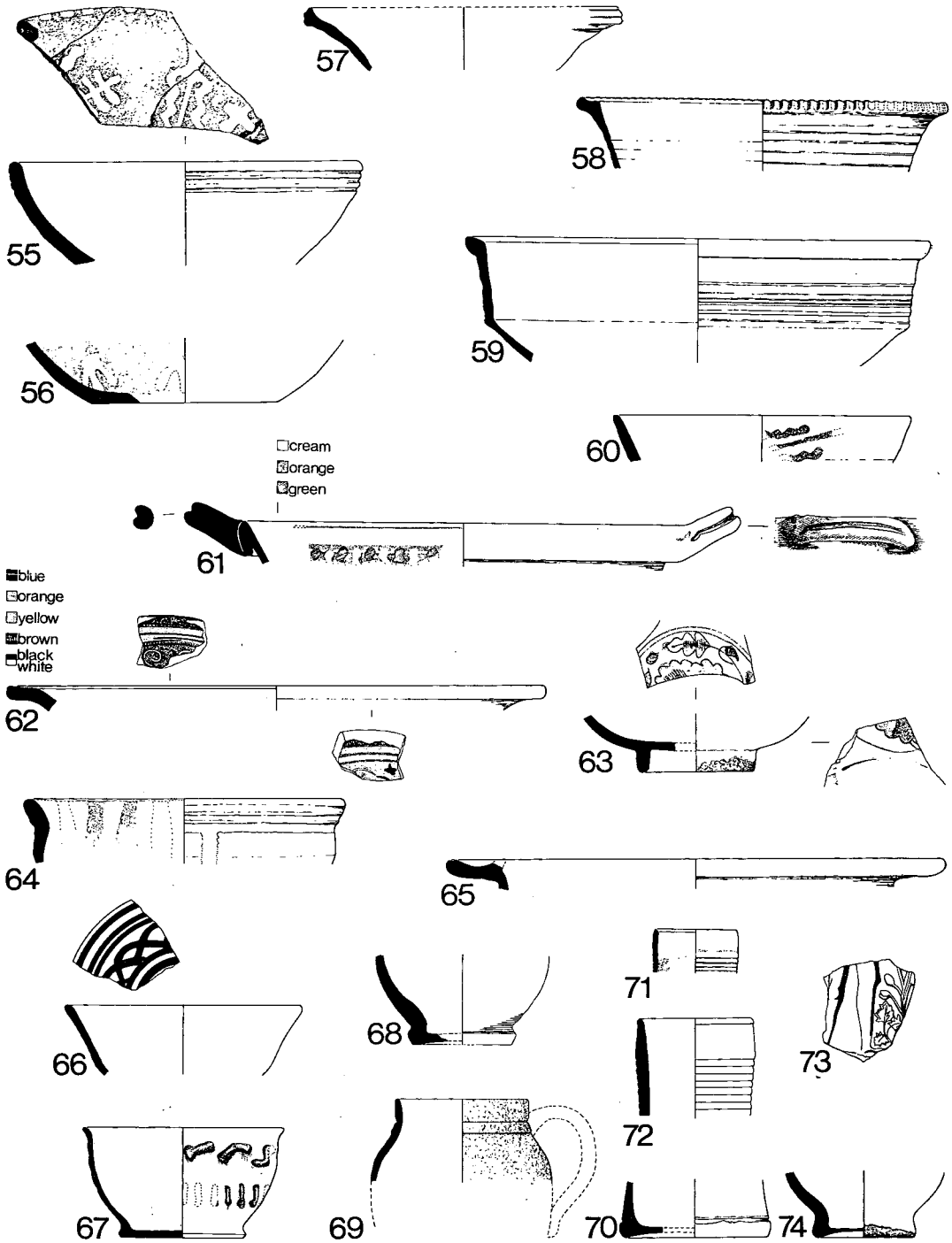


Fig. 11. Pottery ($\frac{1}{4}$).

sherd was recovered in a context probably datable to the last years of the 17th century, the vessel appears to have been first discarded earlier than that in ph. 3 and disturbed from that context by the robbing of the bastion wall. A rim fragment also occurred in ph. 2, R.A. 3, 37. The fragment was not large enough to illustrate or accurately measure its diameter but it was part of either the same or a similar vessel. Unless this fragment too, was the subject of disturbance (undetected in excavation) a somewhat earlier date (in the 1670s–80s) than that so far suggested for these wares has to be considered.

Unknown Provenance

64. Rim fragment of a bowl in a coarse, sandy red/brown fabric, coated internally with a red slip over-painted with white slip which spills over the rim externally; over-glazed internally and on the rim with pale copper green glaze. Ph. 2, R.A. 1, 39.
65. Rim fragment, possibly a bowl, similar fabric to nos. 7 and 30 with internal pitted olive green to amber glaze. B.R.T., R.A. 3, 30.

PORRINGERS

It seems that this type of vessel was not in common use locally by the mid 17th century. Perhaps its function was taken over by the small skillets which are so common. Only the yellow slipware vessel, no. 67, is likely to be later than the mid 17th century.

Low Countries Redware

All the porringers in the bastion robber trench and two in ph. 1 (A2/C3, 3f, 3c) are Low Countries redware vessels similar to *Castle Ditch* nos. 230–232. It seems likely as they occurred in those deposits with the highest proportion of residual 16th-century material and do not persist in the later ditch deposits, that all or most are either residual 16th-century or at most, early 17th century.

Netherlands/English Delftwares

66. Fragment, probably a porringer as *17-Century Pit* 33, in cream fabric with internal tin glaze and blue painting and external lead glaze. Probably North Netherlands, early 17th century. Ph. 1, A2/C3, 3f.

English Whiteware

One fragment occurred, ph. 3, A2/C3, 3, possibly similar to vessels from Cove, Hampshire,[123] and another fragment, ph. 2, A2/C3, 3b.

Yellow Slipware

67. Fragments of a porringer in hard cream fabric with iron oxide inclusions, full rich yellow glaze (except on external base) and external dark brown slip decoration. Probably Staffordshire. The form is very similar to a vessel from a pottery dump in Newcastle Street, Burslem, dated between 1640 and 1670.[124] Ph. 2, R.A. 1, 39.

MUGS

In the late 16th century mugs, mostly Rhenish stonewares, were the most common vessels after cups and cooking pots. Mugs in the same form but coming more from English than Rhenish potteries, were equally common in the 17th century.

Metropolitan redware vessels, both plain and slip-decorated, are the most common, followed by Frechen stonewares and English Delftwares. As in the 16th century, many of the larger examples may have served as jugs.

English Redwares

17th-Century Pit 3 (metropolitan redware)

The majority of mug fragments, both plain and slip-decorated, are probably of this form, derived from the common Rhenish stoneware mug form. Clearly identifiable examples of the form occurred: ph. 1, R.A. 1, R.A. 3, 42, 39 (2 vessels), A2/C3, 3f; ph. 2, R.A. 1, 39, R.A. 3, 91, 52 (2 vessels), A2/C3, 3b; ph. 3, R.A. 3, 31, 35/36 (3 vessels).

68. Base fragment, possibly a mug, in partly reduced metropolitan redware fabric with external olive green glaze, unglazed internally. Unstratified A2/C3.

English Delftwares

69. Fragment of a mug in pinkish buff fabric with internal white tin glaze and external tin glaze sprinkled with manganese purple. London 17th-century. Unstratified, R.A. 2.

Fragments of vessels of the same form as 69 (either manganese purple or cobalt blue sprinkled) occurred: ph. 1, R.A. 3, 53; ph. 2, R.A. 3, 39 (2 vessels), 38, A2/C3, 3b; ph. 3, R.A. 1, 8a, R.A. 3. 31, 23, A2/C3, 3; unstratified, R.A. 2.

Fragments in cream/buff fabric with full cover of pink-tinged tin glaze appear to be a mug similar to no. 64 Norfolk House.[125] Ph. 2, R.A. 3, 39.

English Whitewares

70. Base fragment, probably a mug. Fairly hard cream fabric with pink surfaces where unglazed under base, internal and external yellow glaze. The fabric is of Surrey/Hampshire type and the form is similar to a vessel from Cove.[126] Ph. 1, R.A. 3, 85. A similar base fragment, ph. 3, R.A. 2, 16, is fully glazed, including external base, and has a redware scar on the base, indicating firing with redwares, as was done at Cove, for example.[127]
71. Rim fragment of a mug or beaker in cream/buff fabric with internal and external pale green glaze. The form is apparently derived from earlier Rhenish stoneware vessels.[128] Ph. 2, R.A. 1, 39.

Frechen

Since the common mug form in the late 16th century continued into the 17th century with little change it is not possible to be certain how many of the vessel fragments in this 17th-century group are residual. However, the numbers occurring, especially

in the later phases where residual material is less common (about one third of mugs ph. 2 and a quarter ph. 3), do suggest that perhaps most are contemporary, so they have been included in the totals of 17th-century vessels in Table B.

Castle Ditch 288

Rim and base fragments in this form occurred: ph. 2, R.A. 1, 39, R.A. 3, 39; ph. 3, R.A. 3, 35/36, 26, A2/C3, 3 (2 vessels); B.R.T., R.A. 1, 33.

Castle Ditch 290

One rim fragment occurred, ph. 1, R.A. 3, 91.

Castle Ditch 297

Undecorated vessels in this form occurred: ph. 1, R.A. 3, 50; ph. 2, R.A. 1, 39.

72. Rim fragment of a mug or jug in mid grey stoneware with external grey salt glaze over turned bands. Possibly Frechen. Ph. 2, R.A. 2, 49.
73. Fragment of a decorative panel of a *schnelle*, in cream stoneware with pale brown salt glaze, depicting a figure and foliage, possibly an Adam and Eve scene. Cologne/Frechen or possibly Siegburg, late 16th/early 17th-century. Unstratified, A2/C3.

Westerwald

A rim fragment of a mug occurred: ph. 2, R.A. 3, 39. An 18th-century example of this form is illustrated from Southampton.[129] Vessels of this type occur from the middle of the 17th century.[130]

CUPS

Cistercian ware cups were the most common vessels at the end of the 16th century. Fourteen of these vessels occurred in the bastion robber trench and twenty in the ditch fill. They are all of the late 16th-century type *Castle Ditch* 327 and 328, but occur in so much smaller numbers than in the late 16th-century contexts that there is no reason to suggest continued manufacture after 1600, though a number may have continued in use into the 17th century.

The numbers of 17th-century cups in Table B are small compared to the late 16th century but it is still a common vessel. The majority are Blackware vessels, but plain white English delftware vessels are fairly common. One metropolitan ware vessel occurred (see below) and a few of the Blackware vessels may be from metropolitan kilns.

English Redware

The base of a plain-glazed metropolitan redware cup, similar to *17th-Century Pit* 6, occurred, ph. 3, R.A. 3, 40.

English Delftwares

74. Base fragment in cream/buff fabric with internal and external (except on base)

pink-tinged tin glaze. The base is rather abraded. Probably like no. 62B, Norfolk House.[131] Ph. 2, R.A. 3, 39. Another similar fragment, ph. 3, R.A. 3, 35/36. Fragments of cup bases like Norfolk House 61B and 63 occurred: ph. 2, R.A. 3, 37; ph. 3, R.A. 3, 35/36.

Blackware
Ridged Cups (Briers forms 2–5)[132]
Ph. 1, R.A. 2, 228, A2/C3, 3c; ph. 2, R.A. 3, 42, 39, 37 (2 vessels); ph. 3, R.A. 1, 28, R.A. 2, 16, 18, R.A. 3, 29 A2/C3, 3a, 3; B.R.T., R.A. 1, 21/25, 32; Bldg. A, 203, 213; unstratified, R.A. 2 (2 vessels).
One clear example of Briers form 6 (occurred, ph. 2, R.A. 3, 42. A number of other fragments of cups occurred which could not be identified with any particular form.

English Whiteware
Castle Ditch 360
Three examples occurred. This form is probably residual in the second half of the 17th century. Ph. 1, R.A. 3, 43; ph. 2, A2/C3, 3b; unstratified R.A. 2.

CHAMBER POTS AND URINALS
These are more common than in the 16th-century sample.

English Redwares
75. Vessel in metropolitan redware fabric with internal chestnut brown glaze. Traces of internal sediment and the absence of external sooting suggest use as a chamber pot. B.R.T., R.A. 3, 68.
76. Fragments of a rather over-fired, consequently warped, vessel in metropolitan redware fabric with internal red/brown glaze and traces of sediment. Ph. 3, R.A. 3, 31.

Low Countries Redware
Castle Ditch 240
This is a common form in the Low Countries in the 17th century. One vessel occurred, ph. 1, R.A. 3, 53.

English Whiteware
Castle Ditch 363 (probably Midlands Yellow-ware)
One vessel occurred, ph. 2, R.A. 1, 39.

LIDS
These appear to occur rather more frequently than in the 16th century but are still not common.

English Redwares
77. Knob of a lid in unglazed metropolitan redware fabric, ph. 3, R.A. 2, 13.

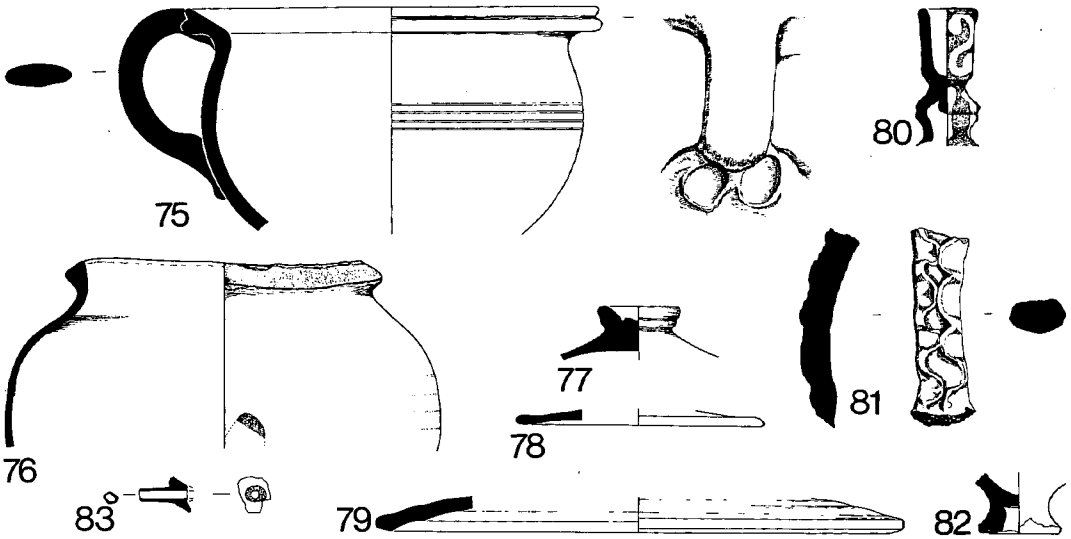


Fig. 12. Pottery (¼).

78. Rim fragment in metropolitan type fabric with external splashes of green glaze. B.R.T., R.A. 1, 21/25.

One metropolitan slipware fragment, ph. 2, R.A. 3, 39, was probably a lid.

Low Countries Redware

79. Rim fragment in sandy pinkish buff fabric, unglazed. Slightly smoke-blackened internally, which may indicate use as a fire pot cover. Ph. 2, A2/C3, 3b.

OTHER VESSELS

The candlestick (80) and the salt (82) are vessel forms which have not occurred before in pottery in Newcastle. A popular 16th-century vessel, the chafing dish, is absent from this 17th-century group and although one 17th-century example has been found at the castle,[133] they must have been rather rare, perhaps replaced by metal vessels? Collanders were never very common and it is not possible to suggest whether the few examples, from the Low Countries as in the 16th century, are contemporary or residual.

English Redwares

80. Candlestick in metropolitan redware fabric with external yellow/brown glaze and slip-trailing. Ph. 1, R.A. 3, 91.

Low Countries Redware

Fragments of collanders occurred, ph. 1, A2/C3, 3c; B.R.T., R.A. 1, 19, the latter similar to *Castle Ditch* 244.

English/Low Countries Redware

81. Fragment of a handle, possibly of a jug, in light red slightly sandy fabric with full cover of chestnut brown glaze. (See no. 25 above). Ph. 3, R.A. 3, 24.

English Delftwares

82. Fragment from the "waist" of a vessel similar to Norfolk House no. 68 (possibly a salt), in pinkish buff fabric, plain white tin-glazed. Ph. 2, R.A. 3, 39.

Unknown Provenance

83. Fragment of unknown object made out of pipe clay. The external surface, shown in plan, is green glazed. Ph. 3, A2/C3, 3.

THE GLASS

Margaret Ellison

The glass is described and catalogued in four categories: window, green vessel, bottle and crystal glass. The sample was too small to provide a reliable statistical sample but the proportions of the different categories have been calculated for each major context to provide some basis for discussion. However, a comparison between the proportion of green vessel glass to crystal glass in this group and that in the 17th-century pit,[134] must lead one to be cautious about drawing any general conclusions from them. The two groups appear to present exactly opposite trends: while the first phase in the pit (below layer 9), which is roughly contemporary with phase 1 of the bastion ditch, had a high proportion of green vessel glass to crystal glass and the second phase, contemporary with phases 2 and 3 in the ditch, had hardly any green glass and an increased quantity of crystal glass, exactly the opposite is true of the ditch fill. On the other hand the first phase in the pit and phases 2 and 3 in the ditch are similar types of deposit: rapid tipping of rubbish in thick layers of ash. This, rather than the date of the deposits, may be the significant factor. Since all the glass from any of these phases amounted to no more than could have been thrown away from one household and/or apothecary's shop, the factors governing the deposition may be very local and specific and in no way representative of general trends.

Description and Catalogue

Vessels of the same form as examples published in the report on the 17th-century pit have not been illustrated but referred back to catalogue numbers in that report.

WINDOW GLASS	*Fragments*	*% of total glass*
Bastion ditch phase 1	16	33
Bastion ditch phase 2	52	68
Bastion ditch phase 3	18	46
Bastion robber trench	42	62

The robber trench of Building A contained three fragments of badly devitrified window glass.

There was no obvious reason why more window glass should have been discarded in phase 2 of the ditch and the bastion robber trench than elsewhere.

The three phases of the ditch fill are broadly similar to each other in the composition of the sample recovered and to the sample recovered from the 17th-century pit.[135]

The majority of the fragments are of a light green metal, *17th-Century Pit* Type 1, (that is, about 86% of the total number of fragments) and a further 7% approximately, were identified as Type 2 (blue/green metal). One fragment of crown glass is dark blue in colour (ph. 1, R.A. 2, 216).

Less than 5% of the fragments could be identified as crown glass.[136] All but one of these is in Type 2 metal.

All the other fragments are likely to be broad glass, being of even thickness, the majority (80% of total fragments) 1 mm, a few of 1·5 mm and occasional examples of 2 mm thickness. There were also a few examples of straight 'thumb' edges.

As suggested in the report on the 17th-century pit, the fragments of thin broad glass in Type 1 metal, which constitute the majority, are likely to be the local product.

Although fragments occurred with grozed edges, it was not possible to determine the dimensions of any quarrels. One fragment (Type 2, 2 mm thick) is apparently from a circular pane of 60 mm diameter (ph. 2, R.A. 3, 42).

The material from the bastion robber trench contained both a much higher proportion of Type 2 metal than the ditch fill, including one painted fragment, (Type 2 17%, Type 1 72%) and more fragments of thicker glass (20% 2 mm thickness and one example of 3·5 mm). Slightly more crown glass was also present. These are all probably reflections of the quantity of residual 16th-century material in this context. The material from the 16th-century phases of the Castle Ditch, though rather fragmentary, indicated a greater incidence of these characteristics than the sample from the 17th-century pit.[137]

GREEN VESSEL GLASS

	Fragments	*% of total glass*
Bastion ditch phase 1	7	15
Bastion ditch phase 2	13	18
Bastion ditch phase 3	11	28
Bastion robber trench	4	10

The majority of fragments are in a light green, at times almost clear metal with some variation in quality but generally little weathered. A few examples of bluish metal occur. As with the window glass, it seems logical that the majority in green metal may be the local products.

The proportion of green glas clearly increases from ph. 1 to ph. 3 (although ph. 2, as with other finds, has the largest actual quantity). This pattern is matched by a parallel, but probably unrelated, decrease in crystal glass (see below).

The proportion of green glass to crystal glass in the bastion robber trench is similar to that in ph. 1, probably a reflection of the residual nature of much of the material.

The whole group is characterized by a scarcity of tablewares and, in fact, a complete absence of any that might probably be local. Ph. 1 and 2 produced only fragments of flasks, small bottles, tubing and stirring rods, all of which might well be, for example, apothecaries' waste. Much of the material in ph. 3 and in the bastion robber trench, was also of this type, apart from the beakers (probably of non-local manufacture and somewhat residual) described below (nos. 84, 85 and other fragments). The material in the 17th-century pit was also predominantly non-domestic and possibly pharmaceutical, although a few domestic, possibly local wares were present.

Beakers

84. Fragment of the pushed-in base of a beaker in clear bluish metal with surface weathering. Similar vessels have been found at glasshouse sites of late 16th, early 17th-century date.[138] Ph. 3, A2, 3.
85. Fragment of the pushed-in base of a beaker in bluish metal similar to no. 84. This form is also paralleled at early 17th-century glasshouse sites.[139] B.R.T., R.A. 1, 33.

A badly devitrified fragment of a third beaker base was found in a modern context, R.A. 1, 7, and a fragment with moulded raised ribbing, almost certainly a beaker, and in the same metal as 84 and 85, occurred amongst the mortar of the partly demolished bastion wall (R.A. 2, 10). Two fragments in ph. 3 in light green metal were from thin-walled vessels, possibly beakers rather than small bottles.

Bottles and Flasks

86. Neck of a small bottle in very high quality dark green metal with no devitrification. Probably a square-sided 'case' bottle or a small cylindrical bottle, though the latter are less common.[140] This type of vessel is known from the late 16th century to late 17th century but the quality of the metal suggests a date in the second half of the 17th century. Ph. 1, R.A. 3, 91.
87. Neck of a similar bottle to 86 but in light green metal with weathered surfaces. Ph. 3, C3, 3.
88. Neck of a bottle in light green bubbled metal. Similar examples have occurred frequently in late 16th-, early 17th-century contexts.[141] This example may therefore be somewhat residual. Ph. 1, R.A. 1, 42.
89. Base of a bottle in light green metal with slight surface weathering. (Clearly not the dark green, heavy 'sack' bottle metal which is subject to extensive devitrification). This is the usual form for bases of larger bottles from the late medieval period into the 17th century.[142] Ph. 2, R.A. 3, 39.

17th-Century Pit no. 50

Two fragments, ph. 3, R.A. 2, 9 and R.A. 3, 35, are from the necks of flasks similar to this and a third in ph. 1, R.A. 3, 59, is perhaps of this type or like 88.

Seven fragments in ph. 2, three in ph. 3 and two in B.R.T. in light green metal are

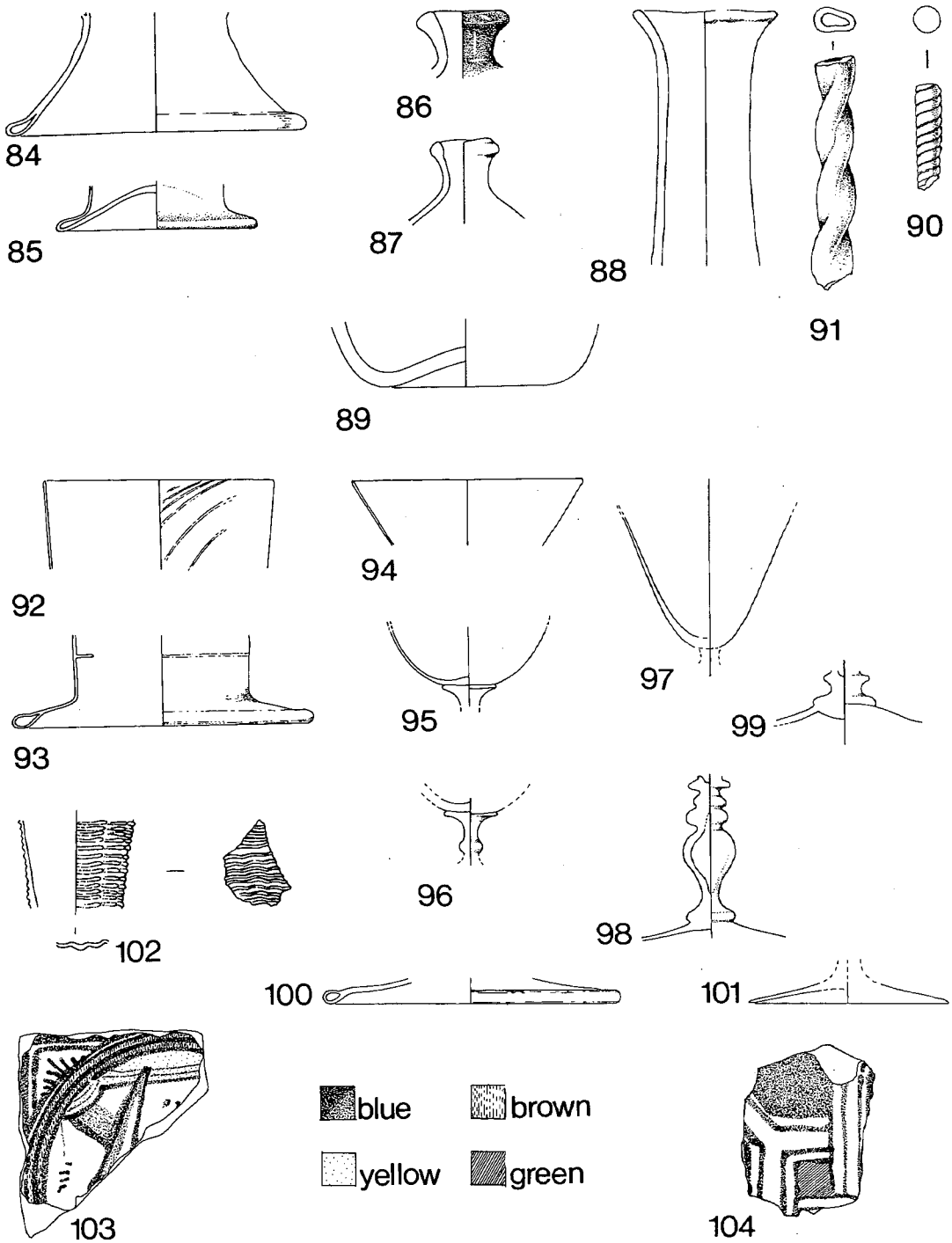


Fig. 13. (½) Glass and Wall Tiles.

probably from bottles or flasks rather than beakers. The fragments vary in thickness from 1·5 to 3 mm, that is, rather thicker than beakers but thinner than "sack" bottles.

Stirring Rods

90. One of two fragments of a solid glass rod in light green metal with slight surface weathering. A stirring rod for pharmaceutical purposes? Ph. 2, R.A. 3, 39. A fragment of an apparently identical rod occurred in ph. 1, A2, C3, and a fragment of a plain rod with oval section in ph. 2, R.A. 1, 39. The latter had been partly melted but may have broadened at one end.
91. Fragment of a hollow twisted glass rod in clear light green metal. Although it is not solid, it is difficult to suggest a function other than stirring for this. Ph. 2, R.A. 3, 39.

Tubing

17th-Century pit no. 52

Fragments of tubing occurred as follows: ph. 2, four fragments with internal diameters of 4 mm, 8 mm (2) and 10 mm; ph. 3, one fragment of internal diameter 10 mm and one of oval section 4–5 mm internally.

BOTTLE GLASS

	Fragments	*% of total glass*
Bastion ditch phase 1	15	33
Bastion ditch phase 2	3	4
Bastion ditch phase 3	7–8	20
Bastion robber trench	2	5

The majority of these fragments are of a thick (average 4–5 mm) dark green metal, usually with flaking brown devitrified surfaces. Probably all the fragments represent "sack" bottles, which were manufactured from the mid-17th century onwards.[143]

The small quantity in ph. 2 is noticeable but not readily explicable. Probably casual factors governing the nature of the rubbish being deposited were responsible rather than any general scarcity. However, the small quantity in the robber trench is to be expected in view of the predominantly late 16th-, early 17th-century date of many of the finds.

CRYSTAL GLASS

	Fragments	*% of total glass*
Bastion ditch phase 1	8	17
Bastion ditch phase 2	9	12
Bastion ditch phase 3	3	8
Bastion robber trench	10	24

The apparent decline in the incidence of crystal glass probably has only very local

significance (see above) but the types present are of interest as they cover the period of transition from *façon de Venise* crystal to English lead crystal,[144] which took place during the 1660s and 1670s in London and reached provincial glass houses in the 1680s. Residual late 16th-century and early 17th-century wares are also present and, in the bastion robber trench, examples of fully developed lead crystal. (Virtually the only finds from that context contemporary with the likely date of the robbing at the end of the 17th century.)

Beakers

92. Fragment of the rim of a beaker in slightly smokey clear metal with opaque white surface weathering and scored line decoration. Ph. 1, R.A. 3, 52.
93. Fragment of the pushed-in base of a beaker in almost clear metal with numerous bubbles (some as much as 6 mm across). Ph. 2, R.A. 1, 39.
    The folded foot of a similar beaker (diam. 10 cm) occurred in ph. 1, R.A. 3, 59.

17th-Century pit no. 42b

A beaker base with rigaree decorated cordon. The illustrated example was in green glass but the crystal glass vessels are no different in form. Four examples occurred: ph. 1, R.A. 2, 59, dark smokey grey metal, unweathered; ph. 3, R.A. 1, 8, slightly smokey metal with surface weathering; B.R.T., R.A. 1, 13, similar metal to the first example; unstratified, a badly weathered fragment of rigaree cordon.

Two fragments, probably beakers, with mould blown ribbing occurred: ph. 2, A2, 3b and B.R.T., R.A. 1, 25.

A rim fragment (diam. 6 cm) in an almost clear bubbled but unweathered metal, very similar to no. 101, occurred in ph. 2, R.A. 1, 39.

A badly weathered fragment in slightly bluish metal with raised bosses is probably from a beaker in crystal glass, or possibly green glass type 2. ph. 1, A2, 3c.

Wine Glasses

94. Fragment of the rim of a wine glass in slightly smokey clear metal with irridescent surface weathering. Ph. 3, A2, 4.
95. Fragment of a bowl and stem of a wine glass in slightly smokey clear metal. Slight surface weathering. Ph. 1, R.A. 3, 52.
96. Fragment of a bowl similar to above, and probably a multi-knopped stem of a wine glass with an opaque, weathered surface, Ph. 2, R.A. 2, 55.
    A fragment of a vessel similar to 95 and 96 occurred in ph. 1, A2, 3f.
97. Fragment of the lower bowl of a wine glass of round funnel shape in clear, slightly greyish, bubbled metal. R.A. 2, 34. Another similar example occurred in R.A. 2, 41. (It was not clear if these contexts were in the bastion ditch or robber trench).
    A fragment of this form but in a clear, good quality lead crystal, occurred in B.R.T., R.A. 1, 13.
98. Base and knopped stem of a wine glass in slightly cloudy and fairly heavy "white" metal with slight surface weathering. This form is characteristic of the second half of the 17th century and similar to some of the earliest lead crystal

wares, but the metal, although it may contain some lead oxide, is not a true lead crystal. It is probably one of the transitional wares of the 1660s and early 1670s or an early example of provincial lead crystal, which was often of inferior quality.[145] Ph. 2, R.A. 1, 39. A fragment of a second matching vessel occurred in the same context.

99. Fragment of the stem and base of a wine glass of similar form to 98 but in smokey blue/grey metal of the earlier *façon de Venise* type with some surface weathering. Ph. 2, R.A. 3, 39. A fragment of a similar base in a similar metal occurred in the same context.
100. Fragment of the folded foot of a wine glass in clear, slightly smokey metal with some surface weathering and pitting. R.A. 2, 33, (uncertain context, bastion ditch or robber trench).
101. Fragment of the solid foot of a wine glass in almost clear, bubbled metal of good quality, unweathered. Probably an example of one of the better quality "white" or "rock crystal" metals of the 1660s and early 1670s.[146] R.A. 2, 39, (uncertain context, bastion ditch or robber trench.)

Goblets?

102. Fragment, possibly from the mould blown stem of a goblet, a type occurring in the first half of the 17th century.[147] Clear metal with a smokey tinge, ribbed vertically with horizontal trailed threads in the same metal externally. B.R.T., R.A. 1, 18.

Another small fragment with a rigaree cordon, is possibly from the angle of the neck and shoulder of a vessel of this type, with globular body and straight neck. Ph. 2, R.A. 2, 19.

Bottle?

A fragment in clear metal, pitted by opaque weathering, is possibly from the neck of a bottle. B.R.T., R.A. 1, 18. Three fragments in ph. 1 and one in ph. 3 are probably either beakers or wine glasses. Two fragments in B.R.T. were too small to identify with any vessel form.

Three small fragments of lead crystal glass occurred. They were flat and of an even thickness of 2 mm. B.R.T., R.A. 1, 13.

CLAY TOBACCO-PIPES

Adrian Oswald

These pipes supplement and enlarge the conclusions drawn from those discovered in the Black Gate Pit.[148] The vast majority are clearly of local manufacture and therefore it seemed necessary to produce a typology (fig. 14). Nos 1, 2 and 3 are the local varieties distinguished in size (with of course intermediate examples). Group A has the so-called "chinned" bowl leaning forward with a marked inward kink. Group B has a more elliptical profile but here again the two groups mingle. The distinctive "chinned" bowl occurs by the end of the 16th century in London, Central Southern

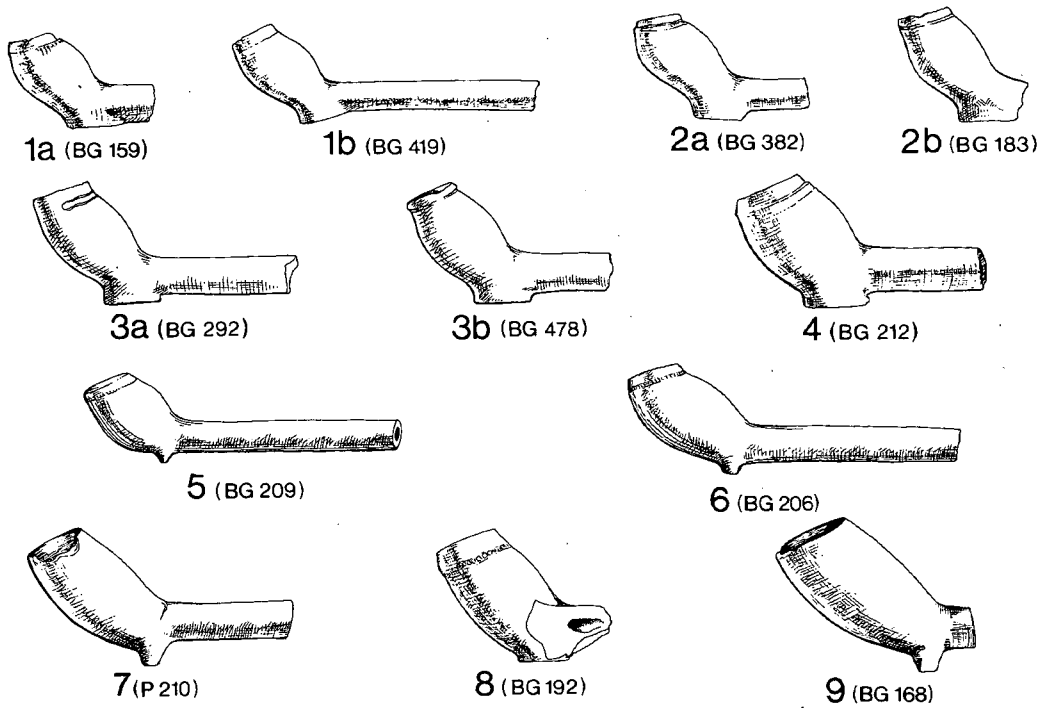


Fig. 14. Types of Clay Tobacco-Pipes ($\frac{1}{2}$). Individual pipe numbers thus (168).

	CLAY TOBACCO PIPES: TYPES							
	1	2	3	4	5	6	7	8
B.R.T.	4	8	6	–	1	1	–	–
3	9	90	59	2	11	11	2	1
2	8	124	21	2	10	6	–	–
1	4	28	5	–	9	1	–	–

Fig. 15.

England and at Plymouth and became a favourite shape at Bristol *c.* 1650–80.[149] A heart-shaped base is another local characteristic numbering no less than 319 examples as against 134 pipes, all of types 1–3, with round projecting bases. Heart-shaped bases are found from London and the Central South from *c.* 1600,[150] in Lincolnshire between 1640–90,[151] in Yorkshire from Hull *c.* 1660–75 and from York *c.* 1640–70,[152] but the combination between this type of base and the chinned bowl is rare apart from the Newcastle examples. The earliest examples occur in Wiltshire, Plymouth, Exeter with a gauntlet stamp and Salisbury, between *c.* 1590–1620. There are also pipes of much the same date from London. The examples of this combination from Newcastle and the North-East far outnumber those from other sources and clearly imply a local style and manufacture.

Apart from the pointers to dates instanced above the slight identification of marks with makers (see marks below) confirm a time bracket of *c.* 1635–75 for these local types. For the group as a whole the presence of two examples of type 9 (Parsons 5),[153] though from a contaminated context, might bring the date to a possible 1690.

The Types

Types 1–3 may be considered local products and occur with heart-shaped and round projecting bases in the proportion of more than two to one. A has a marked "chinned" profile, B a more oval bowl but they do merge to some extent. On size alone 1 might date from *c.* 1635–50, 2 from 1645–60 and 3 from 1650–70 or perhaps a little later. Type 3 corresponds to type 5M.[154]

Type 4 is a Yorkshire type, *c.* 1660–90.[155] Four examples.

Type 5 is the spurred variety of type 1, the equivalent of type 16G,[156] *c.* 1630–45. 31 examples.

Type 6 is a larger development of 5, *c.* 1645–60. 19 examples.

Types 7 and 9 a further development, *c.* 1660–90. Two examples each.

Type 8 is the flat based equivalent of 7, *c.* 1660–80. One example.

The Marks (relief in heart-shaped bases with no roulette unless stated):

Mark GC	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl	Bore of stem	Comment
	382	2A	Large letters over 5 sepal rose. Plain inner border.	9 mm	7/64	White smooth clay well burnished.
	487	2A	Large letters over rose as above. Corded inner border.	10 mm	8/64	Grey/white clay some black intrusions Medium burnish.

Mark GC	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl	Bore of stem	Comment
	213, 326 617	2A	Small letters over rose as above. Plain inner border.	11 mm	8/64 6/64 7/64	White clay, no intrusions. Medium burnish. Rt. hand side of bowl shows diagonal ridge from l. to r. suggesting mould wear. Similar mark at Chester.
	219	2A	Large letters over 5 point star.	10 mm	7/64	White clay no intrusions. Medium burnish. Similar mark, London (Elkins Coll), Newcastle Curtain Wall.
	398	2A	Large letters over cross fleurie.	10 mm	7/64	White clay no intrusions. Medium burnish. Similar mark. London, (Elkins Coll).
	621	2B	Crude letters over deformed 3 point star. No inner border.	11 mm	7/64	Grey white clay. Brown intrusions. Medium burnish.
	542	2B	Large letters over fleur de lis. Inner border.	10·5 mm	7/64	Yellowish clay. Small black intrusions. Similar mark Berwick on Tweed. Medium burnish.
	478	3A	Small letters over 5 sepal rose. Plain inner border. The mark is larger than nos. 213 etc. and the G impinges on the inner border.	12 mm	7/64	Grey white clay no intrusions. Medium burnish.
	270	3A probably	Large letters. 3 dots above one below.	Bowl missing.	8/64	Grey white clay no intrusions. Medium burnish. Round base.

The remarks on this maker on a pipe from the Black Gate Pit suggested that he moved from the Central South of England to London and thence to the North perhaps between 1620 and 1650. The "chinned" type of bowl certainly originated from the

Central South and Bristol areas but the heart-shaped bases, while occurring in London in the earlier part of the 17th century, became common in Lincolnshire at the middle of the century. Most of the London marks are found on round bases; the numerical distribution is

Thames Reading area	3
London	10
Chester	3
Lincs and Yorks	8
Newcastle and N.E.	93

The identification of the mark with a maker is quite uncertain. Of the Newcastle area makers (predominantly Gateshead) the only possibility is George Carter of Gateshead who married in 1667. The date range of the pipes on type should be between 1640 and 1660 so unless Carter's was a late or second marriage he would be too late to qualify.

Nine different stamps were used by this maker and a minimum of three moulds. Bowl diameter measurements suggest the use of at least four buttons for trimming the mouth of the bowls.

Mark NW	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl.	Bore of stem	Comment
	414	1a	Medium letters over 5 pointed star.	9 mm	7/64	Grey/white clay. No intrusions. Well burnished.
	386	1a	Medium letters over 3 leaves.	9 mm	7/64	White clay, well burnished. Similar mark London (Elkins Coll).
	513	2b/3b	Large letters. 2 dots above 4 below.	12 mm	8/64	Yellow white clay. No inclusions. Medium burnish. Similar mark Richmond, Yorks and Kirkwall.
	608	2b/3b	Large letters over 3 leaves.	11 mm	7/64	Grey white clay. Medium burnish, mould line poorly trimmed. Similar mark London (Cheminant Coll).

Mark NW	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl.	Bore of stem	Comment
	607	?3b	Small letters over a scroll possibly the same above.	No bowl	8/64	Similar mark Belfast. Round base. Grey white clay no inclusions.
	292, 341	3a	Medium letters with N reversed. Scrolls above and below.	12 mm	7/64	Yellow white clay no inclusions. Medium burnish. Rouletted top. Round base.

This maker used at least six dies for his mark, three buttons for the bowl tops together with one roulette "mushroom" and at least three moulds. No less than 36 examples of his pipes have been found in the Newcastle area as against one in Scotland and Yorkshire and four in London. Among the latter was a base with the bowl missing stamped 1666 above NW in an octagonal frame on a heart-shaped base.[157] The bowl is missing but was probably a type 3. The style of this mark as far as the letters are concerned resembles that of no. 608 above. Two bowls of type 1a and marked NW (BG P 386, 414) can hardly be later typologically than *c.* 1640 so that a date range of 1640–70 seems likely for this unknown maker.

Mark IG	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl	Bore of stem	Comment
	419	1b	Medium letters over 5 pointed star. No inner border.	10 mm	7/64	Greyish white clay, rough unburnished surface but mould lines trimmed.
	418	1/2b	Mark as above but slightly larger with inner border.	11 mm	7/64	Greyish white clay with some black intrusions. Slight burnish.
	417	2b	Medium letters over fleur de lis. Inner border.	11 mm	7/64	Yellow white clay, no inclusions. Medium burnish.

Mark IG	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl	Bore of stem	Comment
	609	2b	Large letters, inner border.	11 mm	7/64	Yellow white clay, no inclusions. Medium burnish.
	611	2b	Large letters, crossed I. No inner border.	N/A	9/64	Grey white clay. Slight burnish. There appear to be file marks on the sides of the bowl. ? a lead mould.

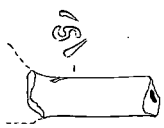
There seem to be no parallels for this maker's marks. His pipes, of which 14 were recovered, seem to be typologically a little earlier than GC and NW, and with the exception of BG P 417 and 609 less well made. A date bracket of 1635–60 seems probable.

Mark	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl	Bore of stem	Comment
IB 	211	4	Medium letters, above 2 dots and 5 sepal rose. Below a 5 pointed star. Fretted wavy line inner border, rouletted rim. Round base.	13 mm	8/64	Grey white clay with brown inclusions. No burnish but mould lines trimmed. Similar mark from York. Type is basically Yorks. Large round base.
IB 	600	2b	Medium letters. No inner border.	12 mm	8/64	Yellow white clay with some brown inclusions. Unburnished with mould lines visible. Possibly *John Bowman*, Gateshead 1645 (m)–1689 (ob).
BP 	234	2a	Well formed letters over 3 leaves. Innter border, rouletted rim.	9 mm	7/64	White clay but inner and outer surfaces dyed red. Unburnished but mould lines trimmed. Similar mark and type Salisbury also B.G. pit No. 76.

Mark	Black Gate nos.	Type	Mark Description	Interior Diam. of bowl	Bore of stem	Comment
RPS 	547	3b	3 letter mark. Inner border. Rouletted rim.	13 mm	7/64	Grey white clay. Unburnished but mould line trimmed. Style of 3 letter mark is Scottish.
IR 	262	1b	Plain mark on a round base but with a slight tail. Rouletted rim. No inner border.	11 mm	8/64	Soft grey white clay. Unburnished. This pipe looks non local and in type is a 4G[158] with parallels in London (Battersea, Watling House and British Museum).
WS 	664	3a	Crude letters, no inner border. Rouletted rim.	10 mm	8/64	Smooth white clay, no inclusions. Medium burnish.
WS 	535	3b	Neat letters over a cross. Beaded inner border.	12 mm	8/64	Smooth white clay small black inclusions. Medium burnish. *William Sewell* Gateshead 1646–51 seems a probable maker for this pipe but perhaps not No. 664.
EW 	494	2a/3a	Small letters over a dot. No inner border.	10 mm	7/64	Grey white clay, unburnished.
ESX 	183	2a	Well formed letters with dot above and scroll below. Rouletted rim. No inner border.	11 mm	7/64	White clay, medium burnish. Same scroll as that on the pipe (no. 73) from the Black Gate pit. Distribution of the mark extends from Wilts to London with 6 examples, one dated 1644–45 from Basing House.

Stem Marks.

Black Gate no.

525 

SV incuse. Buff white clay, well burnished. Bore 8/64. This mark had a wide distribution over England but is found in quantity in London and Lincolnshire with about 90 examples from the former and over 100 from the latter. The London pipes have a date range from *c.* 1620–70, the Lincs ones from *c.* 1670–1730. The marks are incised separately by hand, and all have minute differences. One example from London *c.* 1640 has 3 lots of SV initials on the stem. Incised in the same manner are WV marks on pipes dating *c.* 1630–50. No maker has been traced, but SV's were exported to Virginia. The production lasted over a century, the finish was usually good and they were clearly popular. It has been suggested that the initials stood for a slogan but the existence of the WV marks makes such a proposition unlikely. The Lincolnshire centre of manufacture seems to have been Horncastle.

254 

HW un a lozenge between two fleur de lis. Smooth unburnished surface. Bore 8/64. Rouletting at junction of stem and bowl. Clay is white and soft with no inclusions.

This type of mark although Dutch in style was considered by Parsons to originate from the North East (see No. 69, Black Gate pit) and his supposition receives support from other similar marks with initials IB, FH, LH, HR and C COLL . . . from Hartlepool. These marks could well relate to the Gateshead makers, John Bowman 1645–89, Leonard Holmes 1659–91, and Henry Walker 1674–99. Coll could refer to one of the Colling family. The mark is found on types 6 and 7 (Parsons 4 and 5), types which do not occur in Holland.[159]

281 Single fleur de lis on a stem of greyish white clay medium burnished. 7/64. Similar mark on pipes of Jan Muur, Amsterdam *c.* 1640.

541 Lozenges of four fleur de lis with a roulette between. Greyish clay medium burnish. 7/64. Similar mark from Gouda on a pipe *c.* 1645–65.

721 Lozenges of four fleur de lis with beaded borders. Greyish white clay highly burnished. 8/64. Similar mark from Amsterdam 1620–45.

The last three stems are markedly better finished than No. 254.

Symbol Marks	Black Gate nos.	Type	Mark Description	Interior Diam. of	Bore of stem	Comment
	159	1a	Wheel of 8 spokes on a tailed base. Rouletted rim.	10 mm	6/64	Grey white clay with buff surface. Medium burnish. Similar marks from Boston *c.* 1625–40.

Symbol Marks	Black Gate nos.	Type	Mark Description	Interior Diam. of	Bore of stem	Comment
	592	2a	? a trident.	10 mm	8/64	Fine white clay well burnished. High quality. Similar mark and bowl from Bristol connected with the siege of 1643/44.
	381	N/A	Tudor rose on tailed base. Rouletted rim.	11 mm	6/64	Soft grey white clay with patches of red dye. Well burnished. Probably Dutch *c.* 1630.
	594	N/A	Fleur de lis in lozenge. No inner frame.	N/A	8/64	Fine white clay. Medium burnish. Similar mark from Amsterdam 1620–50, but heart-shaped base against Dutch origin.

Conclusion

Of the 500 fragments of pipes found in the filling of the bastion ditch and robber trench some 460 bowls and/or marks could be classified. A representative sample, amounting to about a quarter of these, formed the basis of the above report. The totals (which were added by Barbara Harbottle) for types 4 to 9, and for the maker IG, refer only to the finds from the bastion; those for GC and NW include the pipes from the Black Gate pit.

Building A

Three fragments of unmarked pipe stem were found in layers 203 and 216 in the robber trench.

BUILDING MATERIALS

WALL TILES

103. Fragment of a wall tile in hard cream/buff fabric, 16mm thick. Upper surface tin-glazed and painted in blue, yellow and manganese brown. Probably North Netherlands. Ph. 1, R.A. 1, 44.
104. Fragment as above, painted in blue and turquoise green. Ph. 2, R.A. 3, 39.

FLOOR TILES

Thirteen broken, plain-glazed floor tiles were found in the robber trench of Building A, and others, though here only sampled, from all three phases of the filling of the bastion ditch. Only one was recovered from the robber trench of the bastion.

They can be divided into two main groups:

a) Medium-sized tiles 106 to 127 mm square, 22 to 27 mm thick, and with both straight and bevelled edges. The colours of glaze were the usual yellow, amber, various shades of green and dark brown. Some tiles retained traces of nail-holes in the corners and centre of the top surface.

b) Large tiles, 30 to 36 mm thick on the edge and thicker in the middle, with bevelled edges and the same glazes, except amber, as the first group. The one complete side measured 235 mm. None had nail-holes.

BRICKS

Sixty fragments of bricks were catalogued from 17th-century deposits in the bastion and Building A. It now seems certain that two distinct sources of clay were used in their manufacture—various sandy clays, which resulted in lightweight bricks, yellow, buff or pale pink in colour (types i, iii, iv, v, vii, viii), and clay with a high iron content, hard-fired to produce a heavy brick, bright red, deep pink or purple (types vi, ix, x, xi, xii). The type series has been continued from the previous report, but note that no wide red bricks of type ii were recovered.

i) Yellow soapy bricks, with occasional ash-glaze surfaces. Five examples, all from Bldg. A, 218, 219, 229.
While the dimensions of the two complete ones were irregular, their maximum thickness was 60 mm, width 105 mm, and length 210 and 220 mm. The corner of one long side had been chamfered off.

iii) Dirty buff sandy bricks. Thickness 40 mm, width 80–88mm, average length 180 mm. Three were found, two being complete, in Bldg. A, 219, 229.

iv) Pink or cream-coloured sandy bricks, very light in weight and hence never found complete. One, 50 mm thick and 105 mm wide, was larger than the others, which ranged from 38–45 mm in thickness, 80–85 mm in width. Of the seven found three were from Bldg. A, 203, 221, 229, and the rest from ph. 3, R.A. 1, 28 (3), 31.

v) Sandy bricks, pink rather than buff, bearing similarities to both iii and iv. Fifteen were found, most were 40–45 mm thick, and had an average width of 85 mm. There were none with complete long sides, but one measured more than 190 mm. Eight from Bldg. A, 203, 211, 218 (2), 219, 225, 229 (2); one from ph. 1, R.A. 2, 223, two from ph. 2, R.A. 3, 37, three from ph. 3, R.A. 1, 28, 31 (2), one from B.R.T., R.A. 1, 33.

vi) Five bricks are included in this miscellaneous category of dark purple, or purplish-brown, over-fired examples, two with large inclusions. They may well be of several types which cannot be separated because of the over-firing. From Bldg. A, 211, 229; ph. 2, R.A. 1, 39 (2); ph. 3, R.A. 1, 31.

vii) Two thin sandy bricks, pink and red, with the dimensions of 38 × 92 mm and 35 × 83 mm. They thus do not have the usual proportions, thickness to width, of 1:2. One is unstratified, the other from B.R.T., R.A. 1, 25.

viii) Three brown sandy bricks which do not fit into any of the above categories. One is slightly bigger, at 47 × 100 mm, and all are rather harder fired than usual.

One is unstratified, the others from ph. 2, R.A. 1, 39, and B.R.T., R.A. 1, 34.

ix) Two hard, heavy red bricks, better made than any others in the group. The more complete example has unusually smooth sides, and is 40–44 mm thick, 114 mm wide. From ph. 1, R.A. 3, 59, and B.R.T., R.A. 1, 34.

x) Nine flat, hard-fired, dark pink to red bricks. The dimensions vary considerably from brick to brick, but all are thin in proportion to their width, the smallest being 40 × 111 mm, the largest 51–55 × 119 mm. From Bldg. A, 203 (2), 216, 218, 229 (2); ph. 2, R.A. 3, 39 (3).

xi) Seven dark red bricks, hard-fired and with many inclusions. They vary in thickness from 45–55 mm, in width from 106–110 mm. Where both thickness and width can be measured the proportions are roughly 1:2. From ph. 1, R.A. 2, 215 (3), R.A. 3, 70; ph. 2, R.A. 3, 39; ph. 3, R.A. 1, 28; B.R.T., R.A. 1, 25.

xii) Three bright red bricks, also hard-fired and with inclusions, but rather smaller in size than xi. Thickness 37–43 mm, width of one 92 mm. From ph. 2, R.A. 3, 37; ph. 3, R.A. 1, 31; B.R.T., R.A. 1, 25.

It now seems clear that, since examples of types i, iii, iv in particular, and of the less precise v, have been recognized again from a different context, there is some validity in the grouping. It must be said, however, that the red bricks have been split up according to their proportions rather than by any other characteristic, and these divisions may later prove to be unreal.

ROOFING MATERIALS

Roman Tegulae

Three probable fragments of *tegulae* were recovered from ph. 1, R.A. 1, 46, and ph. 2, R.A. 3, 39 (2).

Glazed Clay Ridge Tiles

Only five green-glazed ridge tiles were found, and it seems reasonable to assume that these, so common in medieval contexts, were residual by the 17th century. Their fabric was similar to either the local reduced greenware or the buff/white ware pottery. From Bldg. A, 203; ph. 1, R.A. 229; ph. 2, R.A. 3, 42, A2/C3 3b; ph. 3, A2/C3 3.

Clay Plain Tiles

Fragments of three clay plain tiles were found. Bldg. A, 203, 211, 212.

Clay Ridge Tiles

Parts of two half-round ridges tiles were recovered from ph. 2, R.A. 3, 39, and ph. 3, R.A. 3, 40.

Pantiles

Though no attempt was made to reach an absolute total, pantiles were quite the most common type of tile to be found. From ph. 1, R.A. 2, 59, R.A. 3, 50, A2 3c; ph. 2, R.A. 1, 39, R.A. 3, 37, 39; ph. 3, R.A. 1, 30, 31, R.A. 2, 5; B.R.T., R.A. 1, 18, 19, R.A. 3, 45. None were found in Bldg. A.

Stone Flags
Five pieces of sandstone flag were found in Bldg. A, 210, 211, 216, 218.

BUILDING STONE
A fragment of sandstone moulding was found in Bldg. A, 229.

PLASTER
Lump of white plaster which has been applied to a projecting corner, i.e. has two faces approximately at right-angles to one another. Building A, 216.

STONE OBJECTS

Small flint ball, spherical with flattened ends, in one of which is a small ragged socket. Maximum diam. 40 mm, height 35 mm. Possibly natural. It has such a heavy patina that identification (by A. M. Tynan) was only possible by breaking it. R.A. 2; core of bastion wall 10.

Fragment of an object of alabaster (calcium sulphate, identified by A. M. Tynan). Roughish under surface, smoother upper surface which is broken towards the curved outer edge. This, if continuous, would have a diam. of 160 mm. It is decorated with two incised lines. R.A. 2, 17th-century context.

Disc of micaceous sandstone (identified by A. M. Tynan), raggedly but deliberately shaped. Diam. 52 mm, thickness 5 mm. A toy? Ph. 2, R.A. 3, 39.

Hone, at 65 mm rather broader than usual, tapering from 30 to 20 mm on the narrow face. One broad face has been used for sharpening points. Very fine grained micaceous sandstone (A. M. Tynan). Ph. 1, R.A. 3, 52.

COINS

G. D. Robson

Æ English medieval penny; perhaps a William II "cross in quatrefoil type" of 1090–93.
Building A, 218.

Æ fragments of a coin.
Ph. 2, R.A. 3, 39.

Æ (20 mm–1·48 gm) 14th-C jeton, probably French.
Ph. 2, R.A. 3, 39.

Æ (30 mm – 3·97 gm) shilling, Elizabeth I, mint mark tun (1592–1595).
Ph. 2, R.A. 3, 39.

Æ or base Æ (20 mm – 1·02 gm) 14th-C jeton, probably French.
Ph. 2, R.A. 3, on 39.

Æ (20 mm – 2·17 gm) jeton of Tournai.
Ph. 3, R.A. 3, 35.

Æ ¼d, probably Charles II, 1672–79.
Ph. 3, A2, 4.

Æ (20 mm – 1·58 gm) 14th-C jeton, probably French.
B.R.T., R.A. 3, 27.

METAL OBJECTS

Lucy Whittingham

COPPER ALLOY

105. Lace tag. Bldg. A, 218.
106. Object of unknown function. Bldg. A, 221.
107. Annular ring, probably from a brooch. Ph. 1, R.A. 3, 50.
Fragment of decorative rod, and sheet fragment, gilded? Ph. 1, R.A. 1, 46, R.A. 3, 52.
Lace tag, a possible dress fastener and a lump of rods/wire. Ph. 2, R.A. 3, 42, R.A. 1, 39.
108. Lace tag. Ph. 3, R.A. 1, 27.
Small tubular object, flat fragment, broken pin, broken tab end, oval pennanular ring. Ph. 3, A2, 3 and 4.

LEAD

109. Small roof clip. Ph. 1, A2, 3f.
Window came, ragged trimming from lead sheet. Ph. 1, R.A. 3, 53, A2, 3f.
Window came. Ph. 2, R.A. 3, 42.

IRON

In the robber trench of Building A, 211, 213, 216, were found two broken blades; a short length of rectangular-sectioned bar; a small nail like a tack, with broad flat, roughly circular, head and short square shank (Goodall Type A);[160] and fourteen fragments of nails, some with broad, flat, roughly circular heads, some with square shanks.

The bastion ditch and robber trench produced eighty-one fragments and objects of iron. Many of these were heavily corroded and distorted by iron concretions. Twenty-one artefacts were examined by fluoroscope but were too corroded to reveal any further information.

The ironwork reflects very closely the function of the site as a rubbish tipping area, comprising structural and building ironwork, binding strips and odd fragments of objects. There is no significant distinction, however, between the type of ironwork being deposited in each phase.

The finds will be discussed by phase.

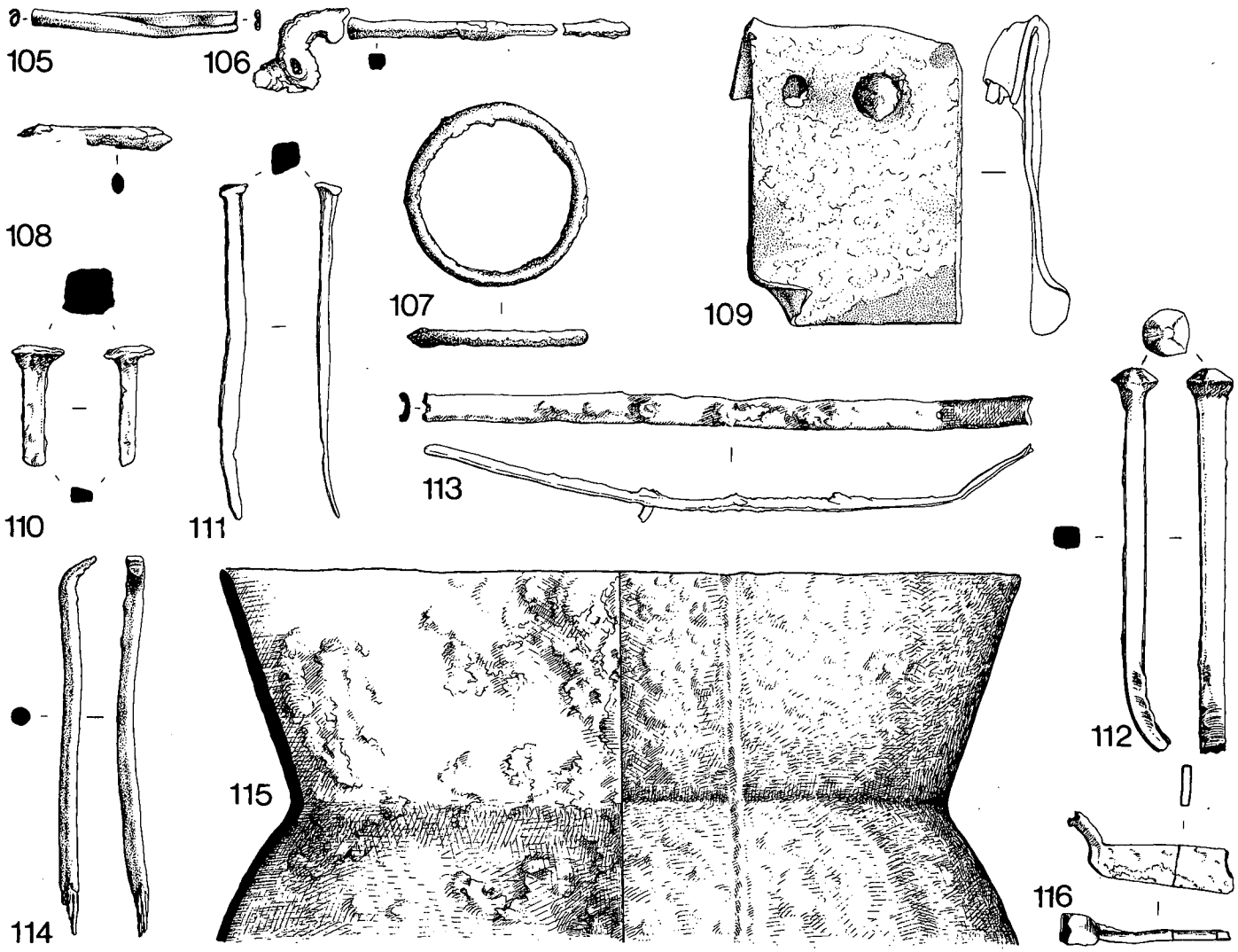


Fig. 16. Metal objects: nos 105–109, $\frac{1}{1}$; nos 110–116, $\frac{1}{2}$.

Phase 1 of the Bastion Ditch Filling
Fourteen nails, of which eight can be divided into Goodall Types B, C and D on head shape, size and proportion to shank length.

110. Nail of Type B. Four fell into this category, having square shanks and broad, flat, roughly circular heads, the width of which is one quarter or less of the shank length. There were no complete examples from this phase; the head sizes range from 13 – 16 mm in diam.
111. Nail of Type C. There were three in this class, of much finer proportions than B. This type has a rectangular-sectioned shank, one complete example being 95 mm long. The heads are very small in comparison to the length of the nail and are a thickened, flat-topped expansion of the shank, ranging in size from 7 – 11 mm.
112. Nail of Type D. Only one example in phase 1, with a roughly circular faceted head expanding out of the thick rectangular shank.
Also from phase 1: two lengths of narrow binding strips with rivet holes, and a piece of rectangular-sectioned bar.
113. Length of narrow binding strip curved in section, with three rivet holes, one rivet remaining in position. R.A. 3, 59.
114. Possible implement with round shank turned at one end and flattened. R.A. 3, 91.
115. Rim of vessel, cast in a mould. R.A. 3, 58.

Phase 2
Seventeen nails which could not be classified; a complete example of nail type B, 60 mm long; two incomplete nails, type B; u-shaped staple; long bar, 190 mm, possibly in two sections joined by a collar of iron; length of bar of rectangular section; length of wide binding strip with three rivet holes.
116. Unidentified hollow object. R.A. 3, 39.

Phase 3
Nine nails which could not be classified; an incomplete nail of type B; possible chisel; short length of narrow riveted binding strip; length of wide binding strip with ends curved round to the back of the strip; possible wedge.

Bastion Robber Trench
Six nails which could not be classified; an incomplete nail of type B; two nails, one the size of a bolt, the other a smaller example, both attached and sandwiched between layers of wood; one nail with circular sectioned shank, preserved from corrosion on lower part of shank by wood, the stain of which is still present; fragment of strap or blade; fragment of blade; part of an angular ring; two flat strips of iron joined to form a blade-like object, with a double-headed rivet protruding 7 mm on either side of the blade at one end, and traces of wood grain and staining 3 mm thick on one side.

MILITARY FINDS OF THE ENGLISH CIVIL WAR

Stephen Goodhand

117. POTTERY GRENADE
Ph. 2, R.A. 2, 55.

Fragment of a pottery grenade. Although the vessel is very thick it was clearly wheel-thrown, the base and lower body being subsequently shaped by knife-trimming. The fabric is the common redware type but rather unrefined, containing occasional large (2 mm) inclusions of multi-crystalline quartz. All but the outer 2–4 mm is a dark red colour and large cracks occur on the inside of the vessel. The cracks could have occurred during firing in the kiln, in view of the thickness of the body, but the red colour is characteristic of burning, and suggests an intense internal heat which may also have been responsible for shattering the vessel. There is no sooting visible.[161]

General Construction and History of the Grenade

A typical grenade of the English Civil War era would fit the following description: a basic powder-filled sphere, 2¾–3 inches in diameter with an average weight of 2½ pounds,[162] of earthenware or cast-iron construction. (Examples from the 16th century display an even greater variety of constructional materials, including bronze, wood and thick glass, in addition to the two mentioned already).[163] It would be sealed by a wooden plug that had a slot cut in its side, sufficient to allow the fuse to pass into the interior of the grenade.

As an effective weapon of war the basic structure outlined above had certain drawbacks. Paramount among these was the difficulty of correctly judging the required length of fuse; too short and the thrower ran the risk of the grenade exploding too soon, or worse in his hand; too long and the enemy would have time to throw it away.

In an attempt to overcome this, later Civil War grenades were to incorporate two significant differences. Firstly the wooden plug was altered to incorporate several holes instead of a single slot at the side, one of these still housed the fuse but the others had small twigs inserted into them. The latter functioned as a rudder in a manner akin to an arrow's feathers, and also ensured that the fuse was kept to the rear during flight. Secondly the fuse now had a bullet attached to the end inside the grenade, so ensuring that the momentum of the latter during flight, acting upon the bullet, would pull the lighted end of the match inside on impact with the ground or target.

Certain observations can be made when putting the grenade into some kind of military perspective. Generally speaking its use was confined to siege warfare, at least in the late 16th and 17th centuries, and even after this time a confined area was crucial to maximize its explosive power. In the terms of reference given to siege operations the grenade formed part of the equipment of the assault troops storming a breach in the defences.[164] Thus we have a reference to this role in the storming of the fort

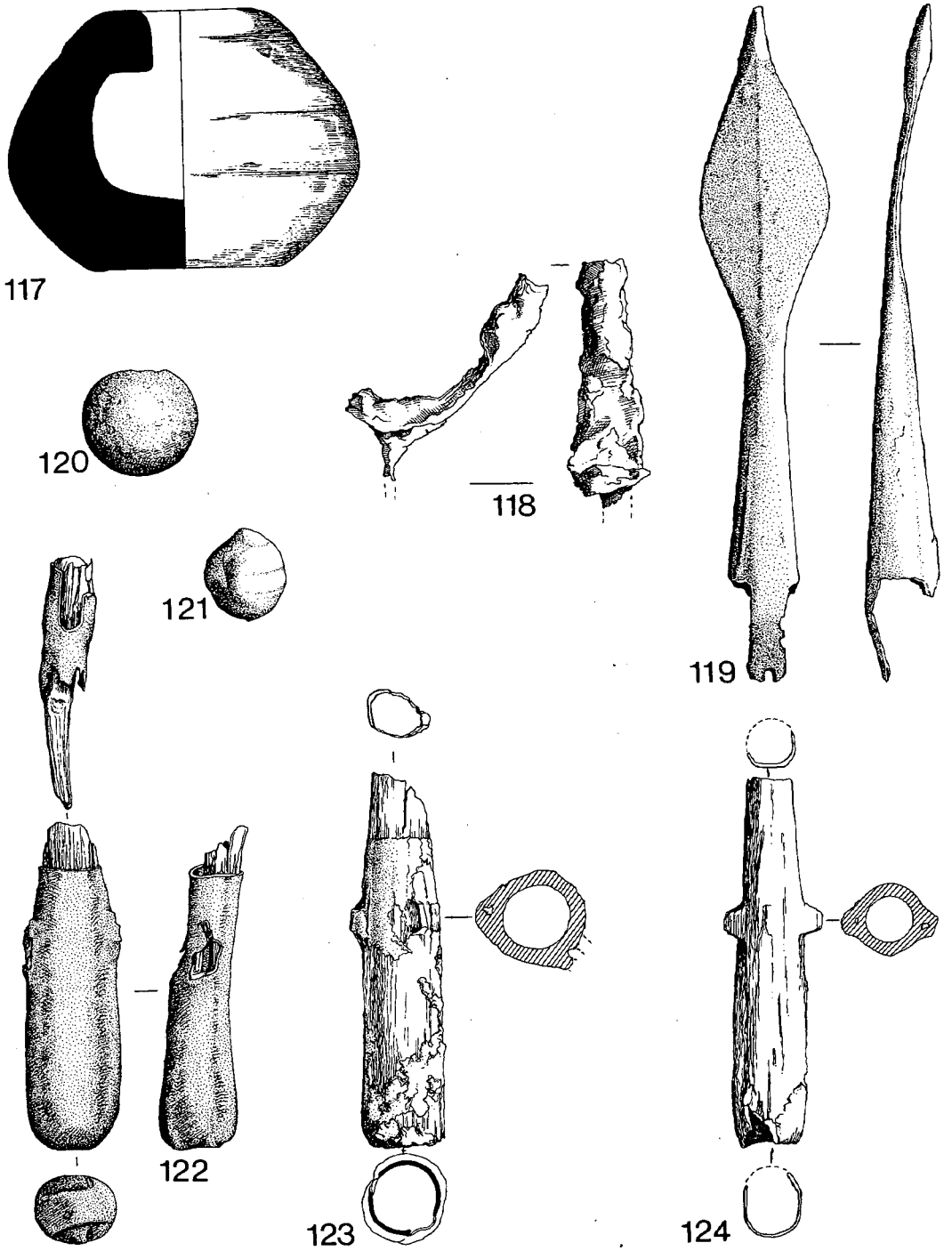


Fig. 17. Military finds of the English Civil War, ($\frac{1}{2}$ except for 120 and 121, $\frac{1}{1}$).

at Limerick by the New Model Army, when we are told of the assault troops:

"They were armed with back, breast and head-piece,
and furnished with hand grenades...."[165]

As a weapon it continued on from a long tradition of hand missiles used in sieges, and brought this type of armament into the gunpowder age, thereby superseding a variety of more inflammatory substances. Finally it gave its name to a distinct type of soldier, who gradually appeared in all the European armies between the years 1650 and 1700; he was the grenadier. Indeed the latter remained when the weapon he was named after dropped from military use in the later years of the 18th century.

118. MUSKET REST

Ph. 2, R.A. 2, 20.

Half of the forked end of a 17th-century musket rest, in which the gun's barrel would have rested during firing. It would have been attached to a wooden staff, made of ash or some equally tough wood.[166] The base would have a point, made of iron as was the U-shaped retaining arm at the top, to allow the rest to be planted in the ground. A more sophisticated version of the basic rest, known as a swine-feather, had a point protruding from the middle of the forked arm to serve as a defence against cavalry. (These would have been imported from the Continent, and as such would not have been common during the Civil War.)[167]

The need for a rest arose out of the sheer size and weight of the matchlock muskets in use then, despite the fact that they had been reduced considerably from the 16th-century models. (A typical example of which would have been 6 feet long and weighed 16 to 20 pounds.) English Civil War muskets were based on the "Dutch" pattern, with a barrel length of 4 feet and a weight of up to 16 pounds. The barrels had to be long in order to achieve greater range and accuracy over the earlier arquebuses (musket being a name applied to the longer barrelled types of arquebus).[168] Given these statistics, and the fact that a musket ball was inaccurate over 50 yards,[169] along with the high rate of misfires (30–40% according to Kellie in Pallas Armata 1627),[170] a rest represented the only insurance for a reasonable degree of accuracy. When not in use it was carried in the musketeer's right arm, or hung from the latter by means of a loop.[171]

In conclusion, though, we should note the gradual decline in the use of the rest that went hand in hand with the ongoing reduction in the weight of the musket. Certainly at the start of Charles I's reign it was in general use. For example, the trained bands gathered to face the Scots in 1639 were ordered to provide themselves with rests from the king's magazine at Hull at a cost of tenpence each. Yet by 1649 a Lt. Col. Elton represents the English soldiers as saying "... our rests are of little or no use.... in time of battle both troublesome and cumbersome".[172] Certainly the evidence for later years of the New Model Army suggests an abandonment of the rest, due to a reduction in musket weight and new mechanisms that allowed a less "robust construction" to be used.

119. IRON BLADE

Ph. 1, R.A. 3, 91.

An iron blade from some form of pole arm. There is now only one metal strap or "languet" leaving the base of the shaft, but there is no doubt that there was originally one on the other side too. The thinness of the blade and general shape of this item show it to be of poor quality.

Problems arise when we try and assign a function to it. Spears were no longer used in the Civil War, although this does not exclude this blade from falling into the category of improvised weapons used by both sides in the Civil War. (Poor quality weapons in this category exist in the collection of the Newcastle Society of Antiquaries.) Certainly the blade cannot be a pike head, partly because the metal straps are too short, they would normally run 18 inches down the length of the shaft.[173] The latter would also be 18 feet long (16 at the very least), and the diameter of the bore of this blade is too small to house the thickness of shaft required for such a length. A slightly more plausible suggestion would be that of the head of a colours standard; nevertheless these, although light, were still carrying a flag, in the case of infantry some 6 feet square, and again the diameter of the staff fitting this blade would be very small. Cavalry standards were smaller, 2 feet square generally, and therefore needed a less robust staff, but there are no references to cavalry being involved in the Siege of Newcastle.

LEAD SHOT

120. *Musket Balls*, four examples.

Two from Ph. 1, R.A. 3, 70, 74, and two from Ph. 2, R.A. 3, 37/39.

Average diameter 17 mm; average weight $\frac{7}{8}$–1 oz.

121. *Pistol Ball*, one.

Ph. 1, R.A. 2, 221.

Diameter 12·5 mm; weight $\frac{3}{8}$ oz.

In dealing with weapons of the Civil War it is important to remember that standardization was really a non-existent element in the material used by both sides. Thus although the measurements given above approximate to the figures given by various authorities on the subject (12–14 musket balls to the pound[174] and 34 pistol balls),[175] allowance must be made for the variations that would exist in reality. Some impression of this can be gathered from the ancillary equipment used by musketeers and by contemporary views on the standard of the ammunition used.

Military thought of the period saw a ratio of 12 to the pound as being the correct weight for a musket ball, and indeed this was the weight fixed in the regulations of Charles I and Charles II for the militia. However a ratio of 14 to the pound was used and evidently tolerated, one reason being that the smaller bullet speeded up loading when it came to ramming it down the barrel.[176]

Significantly the latter operation highlights the crux of the problem, namely the great diversity in the bores of the muskets used, with the result that Gush tells of how a musketeer would often carry "both a mould to make bullets for

his particular gun and a 'pruning-iron' for scraping down issued or captured shot to fit!"[177] Firth tells of the horrendous practice of soldiers being "forced to gnaw off much of the lead" to make them usable. It is with some degree of exasperation that we hear Lord Orrey say of the English army in Ireland in a series of recommendations:-

> "That all our muskets be of one bore, or at most of two sorts of certain bores ... for want of this I have seen much hazard undergone; for generally our musket shot is of one certain size and the bores of muskets are of various sizes ... and barrels of musket balls being opened, few of the shot in them would fit the muskets but were a size too large.... the soldiers were forced to gnaw their bullets; in which much time was lost, the bullets flew a less way and more uncertainly; and which was worse so many pauses animated the enemy by making him think our courages cooled".[178]

122–4. THE "TWELVE APOSTLES"

From Ph. 1, R.A. 3, 53, 91. No. 123 was identified by Alison Donaldson as being made of *fagus* (beech).

These three items represent the remains of part of the essential equipment of a 17th-century musketeer: the holders for carrying the charge powder for his musket. They take the form of a wooden tube, tapering towards the neck; all three of them have portions of their original leather covering still present, though to varying degrees. No. 122 is the most complete in this respect, it also retains the stopper that would have sealed all the tubes, though again this is incomplete. Two of the "Twelve Apostles" (nos. 123 and 124) would appear to be simple tubes, the bevelled edge at the bottom of each of them does not suggest any sort of breakage having occurred at the base. In these examples therefore the leather covering, evident on all of them, must have served as the bottom. However examples are known where a solid base was preserved by only drilling the tube so far.[179] No. 122 indeed seems to show this, although without removing the leather this could not be stated with absolute certainty. Each of the tubes displays in varying states of preservation the grooves/holes near the neck, one either side, which originally housed the cords suspending them from the musketeer's shoulder belt.

General Usage and History

These powder flasks were commonly referred to as the "Twelve Apostles"[180] as a result of there being twelve normally carried, nine in the front and three round the back of the musketeer.[181] They seem to have been made from a choice of three materials: wood, leather or tin,[182] similar variety was present in the choice of covering, (very necessary in order that the powder be kept dry). The wooden containers might have been varnished, or given a thin leather covering, or indeed painted;[183] the State Papers of April 1649 record £100 paid for "1000 collars of bandoleers, blue-painted in oil", and £75 for another 1000 painted black.[184] A note on terminology here: the word bandolier (bandoleer) sometimes just referred to the shoulder belt, but often the term encompassed the belt and all the items suspended from it.[185] As mentioned above a hole either side of an "Apostle" served to hold the cord which went through

a similar provision in the top, and by means of the latter it was not necessary for the soldier to hold the top separately while loading his musket. In addition to the twelve charge holders, the bandolier would also carry a bag for bullets and a wooden flask or powder horn containing fine priming powder; a second flask might also be carried to replenish his charge holders. Each of the latter carried sufficient common powder to discharge one shot. A factor to be reckoned with in this period was the heavy charge of powder required for each bullet, something in the ratio of half the weight of the ball in fine powder and two-thirds of its weight in common powder.[186]

In service the "Twelve Apostles" proved often to be a troublesome if not dangerous encumbrance. For instance they rattled so loudly in the wind that their noise could prevent the soldiers hearing words of command, and they also effectively negated any opportunity for surprising the enemy. Far more serious was the danger of their catching fire accidentally, not uncommon in view of the need to carry a match lit at both ends in close proximity to the person, "and when they take fire they commonly wound and often kill him who wears them, for likely if one bandolier takes fire all the rest do in that collar", (Lord Orrey).[187]

These charge holders are thought to have originated in the Low Countries though it is difficult to give an exact date to their appearance. Reference can be drawn to their depiction in Jacob de Gheyn's *Le Mainiement d'Armes* published in Amsterdam about 1608, and there is an earlier record in a woodcut of a landsknecht arquebusier by Sebald Beham (*c.* 1498–1549).[188] An English musketeer from the Funeral Roll of Sir Philip Sydney, 1586, also shows their use as part of his equipment.[189]

OBJECTS OF BONE AND IVORY

125. Handle? One end is closed and ends in a spiral groove, or screw; the other is open as for a whittle tang, and also has a screw end.
Ivory. Ph. 2, R.A. 3, 42.
126. Small knife. The fine turned and moulded handle is hollow at both ends, the lower end housing the whittle tang of a straight-backed blade, and the upper end holding a stopper. John Cherry has suggested the stopper may have been the handle of a now missing toothpick. Bone. The handle turned from the metatarsal or tibia of a sheep or similar sized animal. Ph. 2, R.A. 3, 37.
127. Handle for a knife blade with whittle tang. Ivory. Ph. 3, R.A. 1, 31.
128. Two fragments of a small cylindrical object. There is a spiral groove on the inside of one end. From the long bone of a large animal such as a cow. Ph. 3, A2, 3; A2 unstratified.
The material of the objects has been identified by James Rackham.

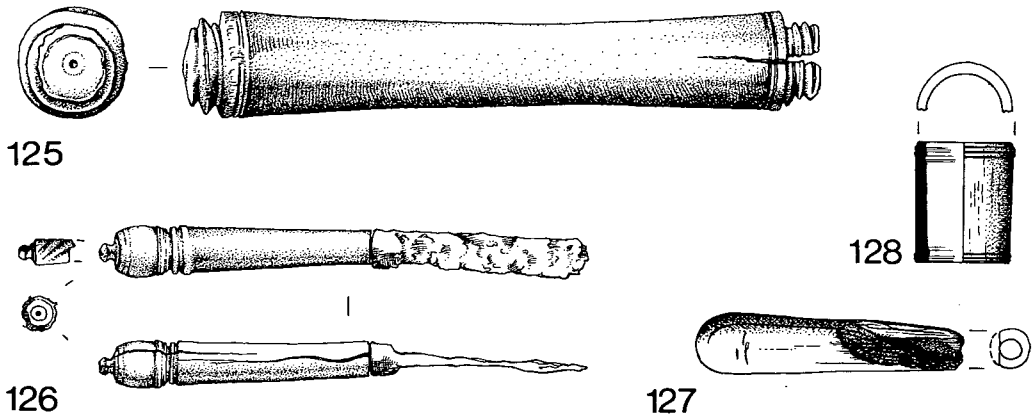


Fig. 18. Bone objects, (no. 125 $\frac{1}{1}$, 126–8 $\frac{1}{2}$).

THE LEATHER

Janet E. Vaughan

The vast bulk of the leather came from Railway Arch 3 and was in the form of offcuts and small fragments. Layer 39 in Phase 2 had a particularly large deposit 15·3 kilograms in weight, of which the illustrated items form only a small proportion. Layers 37 and 42, also Phase 2, produced 3·35 and 3·65 kilograms respectively, while in Phase 3 layer 35 contained 4·6 kilograms of leather. Apart from layer 39 these quantities included only a handful of identifiable shoe fragments. These four deposits would appear to represent mainly concentrated disposal of workshop waste by shoemakers. The Phase 1 material was from a much larger number of considerably smaller deposits. Offcuts were present but formed a smaller proportion of the total. In all phases the illustrated shoe leather was probably discarded by cobblers. Cobblers would salvage what they could from old shoes which were past repair themselves before throwing them out. So we find, for example, nos. 136 and 143 where the uppers have been cut away leaving just a strip round the seam. No. 176 from R.A. 1 has also been cut down. The slashed decoration on what is left of the upper would have made this part difficult to reuse.

The other leather objects illustrated all came from Phase 1 although there were three possible sheaths in layer 39.

THE SHOE LEATHER[190]

Uppers were, generally speaking, present only in small uninformative fragments. Apart from the recycling mentioned above, being made of less substantial leather, uppers may be more liable to disintegrate than soles, insoles, and heels, especially if they had been lying around elsewhere before ending up in the bastion ditch. This might

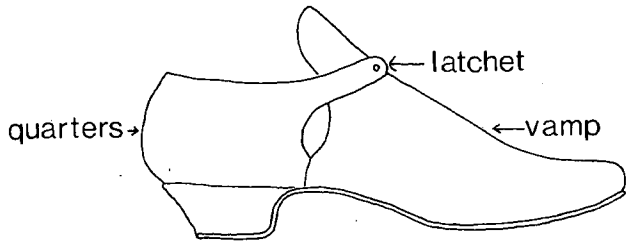


Fig. 19.

apply to at least some of the Phase 1 deposits. Three upper fragments from R.A. 3/39 were from shoes with open sides, and there were latchets in this context and in R.A. 1/39. These two features were standard on shoes throughout the first three-quarters of the 17th century (see fig. 19). Latchets are straps attached to, or extensions of, the top fronts of the quarters. They were joined across the instep with a ribbon or laces. Buckles were introduced to fasten these straps in 1660, though ties continued to be used for a time. The slashing on the vamp of no. 176 has already been mentioned. This form of decoration really belongs to the 16th century and had virtually died out by 1615 in England, but the Scots continued to use it. In the historical and geographical contexts it should not be surprising to find a Scottish element in styles worn in Newcastle.

The soles and insoles are all "straights", i.e. no left and right, and show a range of shapes which, in terms of English fashions, could cover most of the first three-quarters of the 17th century. Rounded or oval toe shapes like nos. 132, 134 and 135 were fashionable up to about 1635/40 but the square toe which replaced them had been introduced earlier than this, and lasted throughout the 17th century. Most of our soles and insoles have variations of the square toe. From Phase 1 the tapering, narrow square no. 138 and the forked toe of no. 136 are forms which are most common after 1660 but do occur earlier. In Phase 2 no. 175 is possibly the forked upper of a long narrow-toed shoe. This is from layer 39 which produced soles and insoles with several different versions of the square toe, including the very long narrow-toed insole no. 160, and also no. 152 which is a sole with a round toe. Insoles can be misleading as to the shape of the sole and upper of a shoe, which may, for example, be much wider. However, most of the shoes represented here have been made with rands and this construction does seem to mean that sole, insole and upper follow much the same shape.

No. 152 illustrates the rand method of construction, see also no. 140. The rand is quite a wide strip to which the insole and upper are attached. The rand is then folded over and braced across the underside of the insole (many of the insoles have the impression of the bracing thread) and the sole is attached with a row of fine small stitches through the fold. In this shoe the sole continues down the heel breast and forms part of the heel top-piece. Wooden pegs fix the leather top-piece to the wooden heel, which is missing in this case.

Wooden heels occurred in Phases 1 and 2, those in Phase 2 were more fragmentary. The two highest come from the earliest leather producing layer, R.A. 3/91. There were also lower, much thicker ones. These heels have a leather cover, which takes the place of the rand round the heel seat, and a top-piece (the part which rests on the ground) of several layers of leather (see no. 131). Some of the heels have one central peg or nail hole. There were some bone pegs in layer 91. Heels made only of leather, stacked heels, were concentrated in Phase 2, although the heel-lift, no. 141, would have come from a shoe with such a heel. In this kind of heel not all the layers, called lifts, are complete heel shapes. Some have the middle cut out or are a horseshoe shape. In fact the shoemaker would use up lots of scraps to complete the heel. Lifts like no. 141 would make the finished heel lighter than a solid leather one, an advantage on a heavy pair of boots. Most of the stacked heels are held together with wooden pegs but there are a few which are nailed.

Several of the soles, and even insoles, have peg holes or pegs through the forepart. These were probably to attach repairs rather than being original. They are often irregularly spaced.

Alison Donaldson reports as follows on the wooden heels and pegs: "The heels were all of similar construction. The grain was along the length of the shoe. Of the seven complete heels, five were of *Alnus glutinosa* – alder, and two were of a *Populus*, poplar species. Where present the pegs in the base were all *Pinus sylvestris*, Scot's pine. Two broken pieces of heel were again alder and poplar.

"Neither alder nor poplar timber are used very much today but it is interesting to see how they are suitable for this function. Alder's chief use has always been in turnery and because of its durability when wet it was often used for footwear. It is the wood traditionally used in the manufacture of Lancashire clogs. Poplar wood is exceptionally light yet fairly strong. Its use in footwear is probably because of its ability to withstand splintering and abrasion. Traditionally it was used for carts and wagon bottoms, where heavy loads being thrown in could do no damage, and as brake blocks. Pine timber has a wide variety of everyday uses and being a softwood could easily be split lengthways into pins and pegs."

In the description of the shoe leather several factors related to dating have been mentioned. Conclusions can only be tentative. The pre-1640 shapes in Phase 1 could possibly be residual as many of the other finds are. On the other hand the known English fashion trends cannot be too rigidly applied, as is demonstrated by the slashed decoration on no. 176. It is also interesting that on this shoe alone the later technique has been used of stitching the rand to a ridge set in a little way from the edge on the underneath of the insole rather than to the edge itself. This does suggest that the shoe was imported on the foot of a visiting Scot for, judging by the rest of the insoles, the local shoemakers were using the edge/flesh seam. The more extreme versions of the square toe are most likely to be later than the Restoration, yet their existence in layer 39 side by side with more restrained forms is a reminder that virtually all the shapes illustrated here could have been worn contemporaneously.

The treatment of the leather as far as conservation is concerned has not been consistent. Besides this some things were drawn or measured soon after excavation and

some not till 1982. It was interesting to note that some of the former, on being re-examined, were found to have shrunk by as much as 16%, but this was not at all constant. These factors must be borne in mind and where measurements have been omitted it is because they might be particularly misleading in that instance.

R.A. 3: SOLES, INSOLES AND HEELS

Most of the insoles are drawn from below and show the ridge created by the edge/flesh seam. The foot rests on the grain side and where this is shown it is noted as from above. No. 129 shows both sides.

Phase 1

129. Insole with square toe, leather covered wooden heel, forepart of sole with peg holes. Insole 22·2 cm long, stitches 6 mm–8 mm long. Heel about 3 cm high. (layer 91).
130. Wooden heel with leather cover. The stitch holes down each side of the heel breast (for sole attachment) are 2 mm–3 mm apart. The stitch holes for insole attachment are 5 mm–8 mm apart. Heel 6 cm high. (layer 91)
131. Wooden heel with leather cover and part of the sole still attached. Wooden pegs through the top-piece. Insole seam has 7 mm–10 mm stitches. (layer 91)
132. Insole with oval toe and impression of bracing thread. 23·6 cm long. Stitches 7 mm–8 mm long. (layer 87)
133. Wooden heel with leather top-piece. 3·5 cm high. (layer 71)
134. Insole, similar shape to no. 132; wooden heel and half of leather heel cover. Insole 19·7 cm long, stitch lengyh 8 mm–10 mm. Heel about 3 cm high. (layer 72)
135. Sole with round toe, insole, fragments of rand and heel cover. Insole about 20 cm long, stitch length 14 mm. Sole seam stitch length 4 mm–5 mm, heel about 2·2 cm high. (layer 70)
136. Insole with forked toe. The upper has been cut down to the seam margin and is gathered round the toe. Insole 23·8 cm long, stitch length 9 mm–10 mm. (layer 52)
137. Insole with toe missing but appears to be similar to no. 179, R.A. 1/39. There were five from R.A. 3/39 similar. (layer 52)
138. Insole (forepart) with tapering square toe. R.A. 3/39 had five of similar shape. (layer 52)
139. Insole with square toe and impression of bracing thread. 26 cm long. Stitch length 12 mm–14 mm. (layer 53)
140. Piece of rand. Insole seam stitch length 5 mm–6 mm. Sole seam (through the fold) 3 mm stitch length. (layer 53)
141. Heel lift (see text). (layer 53)
142. Heel seat with peg holes. (layer 50)
143. Insole with square toe (from above). Seam margin of upper and rand still attached. Insole 21·5 cm long, stitch length 6 mm–10 mm. (layer 47)
144. Large leather covered wooden heel. (layer 43)

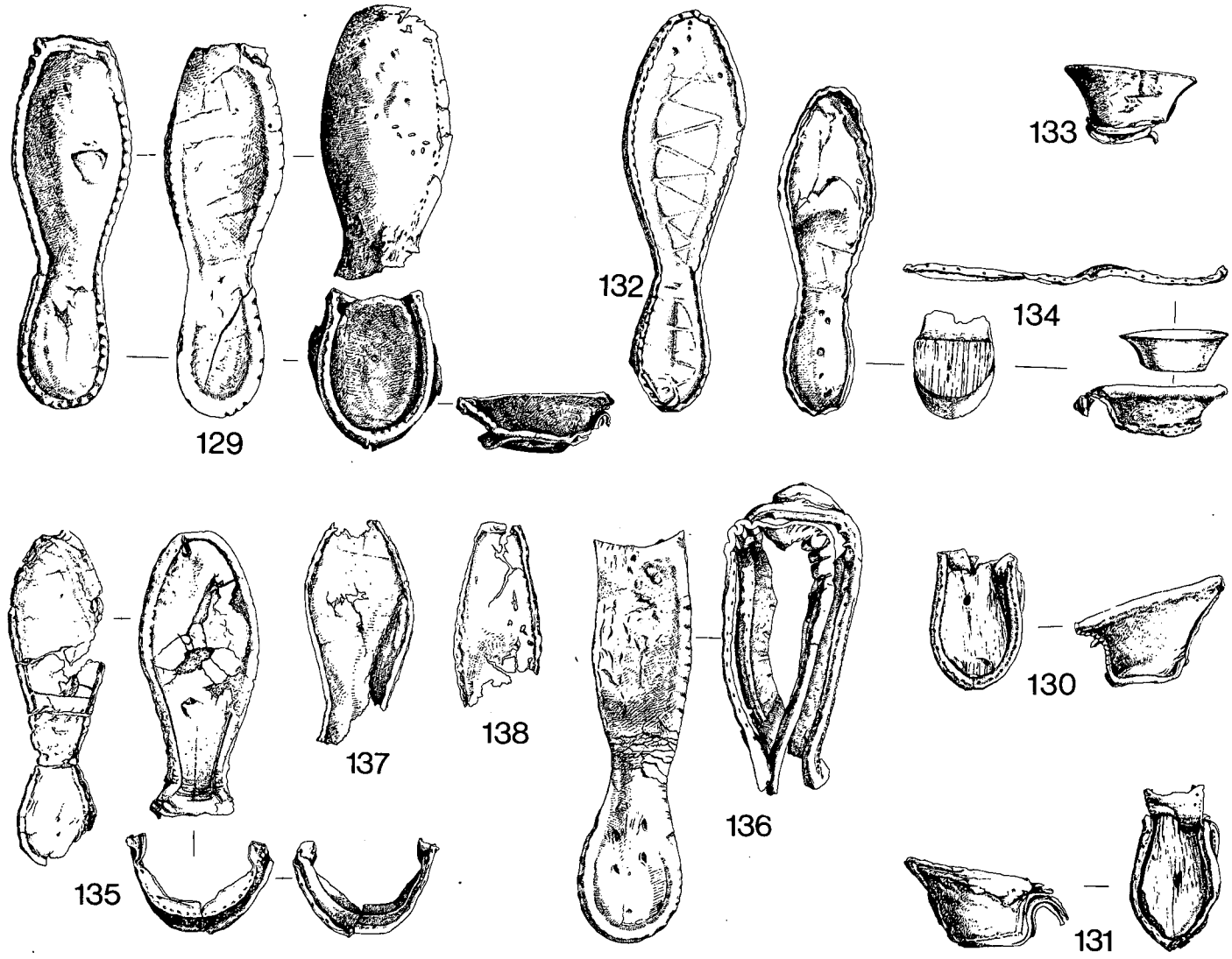


Fig. 20. Shoes ($\frac{1}{4}$).

Phase 2

145. Insole (from above) with square toe and heel cover. (layer 42)
146 and 147. Stacked heels with wooden pegs. (layers 42 and 39)
148. Stacked heel with iron nails. (layer 39)
149. Fragmentary sole and insole from shoe with stacked heel. Peg holes in forepart, probably for a repair. (layer 39)
150. Wooden heel with leather top-piece. (layer 39)
151. Wooden heel with central nail or peg hole. (layer 39)
Fragment of sole with iron nails. Not illustrated. (layer 39)
152. Sole of wooden heeled shoe (see text). The drawing is simplified. Insole seam stitch length 8 mm–10 mm. Sole seam stitch length 3 mm. (layer 39)
153. Part of sole of wooden heeled shoe. (layer 39)
154. Sole with piece of welt round heel and impression of bracing thread. Low stacked heel (three or four lifts). The pair of this was also found. Sole 16 cm long. (layer 39)
155. Sole with square toe. 13·4 cm long. Stitch length 3 mm–5 mm. (layer 39)
156, 157 and 158. Toes of soles. (layer 39)
159. Forepart of sole with wooden pegs. Stitch length 2 mm. (layer 39)
160. Insole, heel seat missing, with long narrow square toe. Stitch length 7 mm–8 mm.
161. Insole, 23 cm long. Stitch length 8 mm–9 mm. (layer 39)
162. Insole of child's shoe. Peg holes in forepart. 13·6 cm long. Stitch length 8 mm–10 mm. (layer 39)
163. Insole (one of a pair) with square toe and peg holes in forepart. 18 cm long. Stitch length 7 mm–8 mm. (layer 39)
164. Forepart of a square toed insole made in sections (the edge/flesh seam goes all the way round), piece of rand. Drawn from above. (layer 37)
165. Wooden heel with pegs, piece of leather cover still attached, about 3·7 cm high. (layer 37)
166. Stacked heel with pegs. (layer 37)
167. Wooden heel with one large peg or nail hole. (layer 37)
168. Stacked heel with holes for pegs. (layer 37)

Phase 3

169. Sole of child's shoe, 11·8 cm long. Stitch length 5 mm–6 mm. (layer 35)

R.A. 3: OTHER FRAGMENTS OF SHOE LEATHER

170. These six pieces are presumably bits of uppers but have not been positively identified. (layer 91)
171. Piece of thong. (layer 53)
172. Latchet cut in one with quarters. There was another similar piece. Butted seam stitch length 4 mm. (layer 39)
173. Piece of buckle strap (?). (layer 39)
Three pieces of quarters, not illustrated. See sketch (fig. 19) and text. (layer 39)

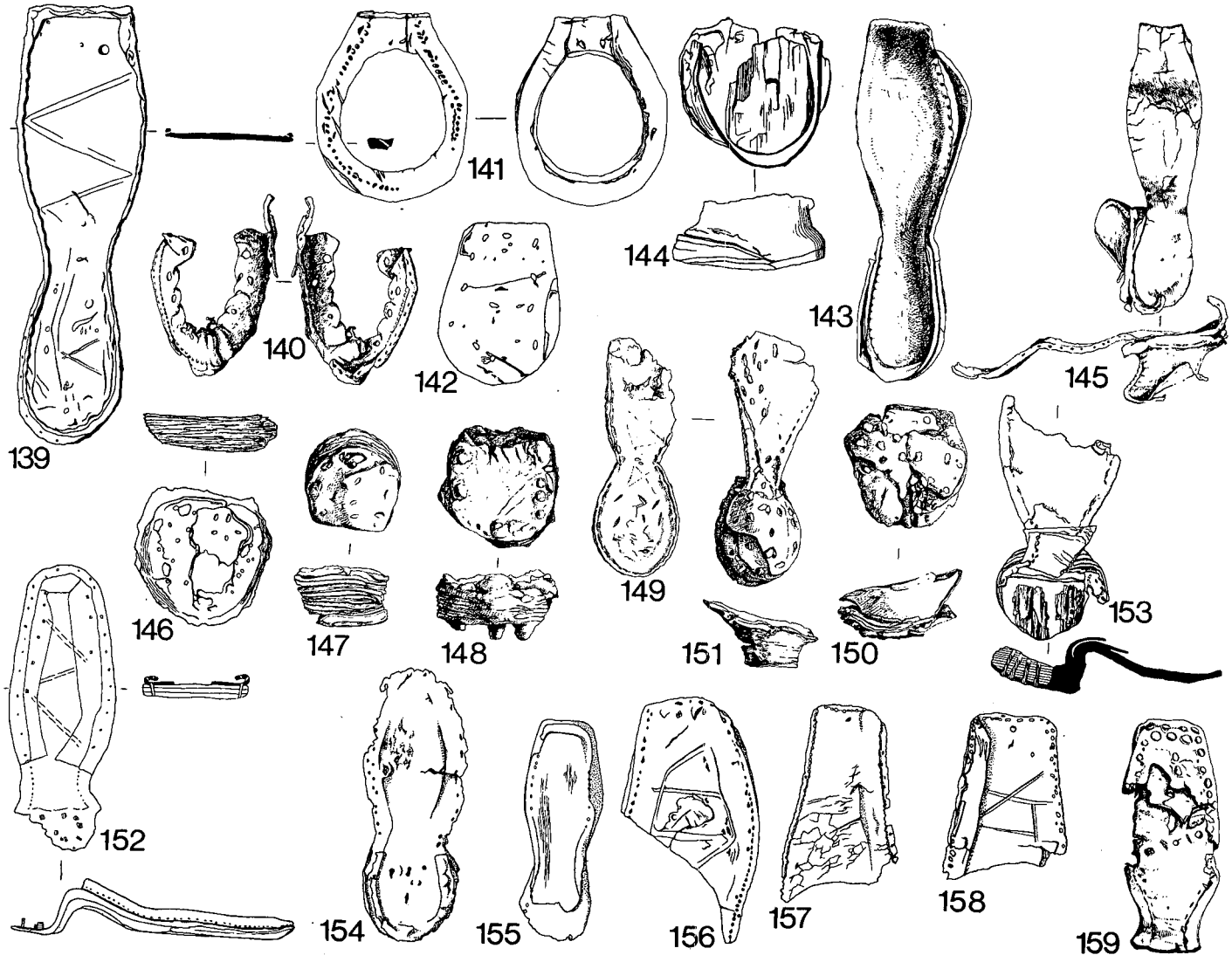


Fig. 21. Shoes ($\frac{1}{4}$).

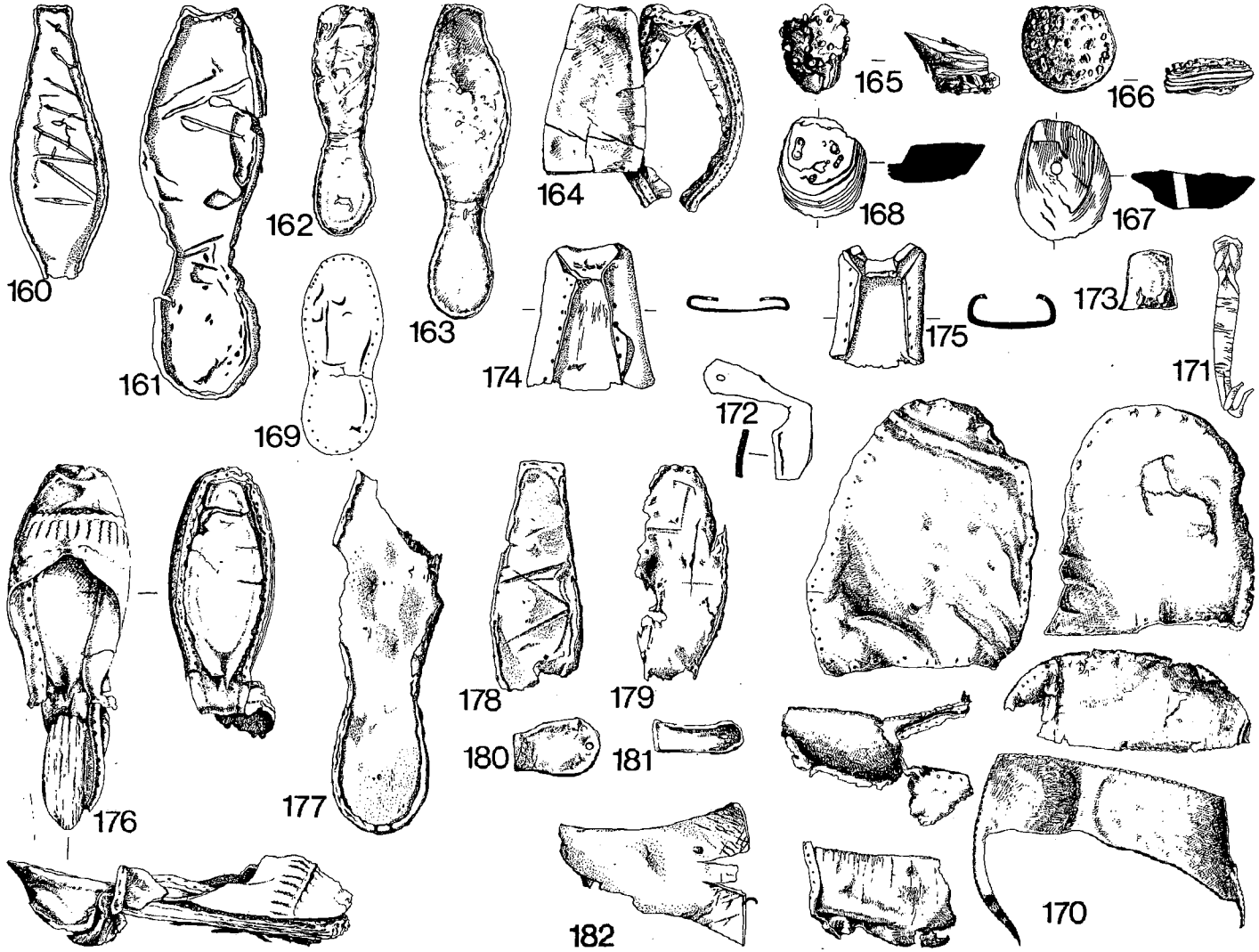


Fig. 22. Shoes (¼).

174. Probably toe of upper. Stitch length 7 mm–10 mm. (layer 39)
175. Possible forked toe (see text). (layer 39)

R.A. 1: ALL SHOE LEATHER

Phase 1

176. Shoe with square toe, wooden heel and slashed decoration on the vamp (see text). Pieces of the quarters have been omitted from the drawing to leave it clearer. Approximate length 20 cm. Heel 3·5 cm high. (layer 44)

Phase 2

177. Insole with toe missing. Stitch length up to 12 mm. (layer 39)
178. Forepart of insole with tapering square toe. (layer 39)
179. Insole similar to insole of 177. (layer 39)
180 and 181. Latchets. (layer 39)
182. Tongue? (layer 39)

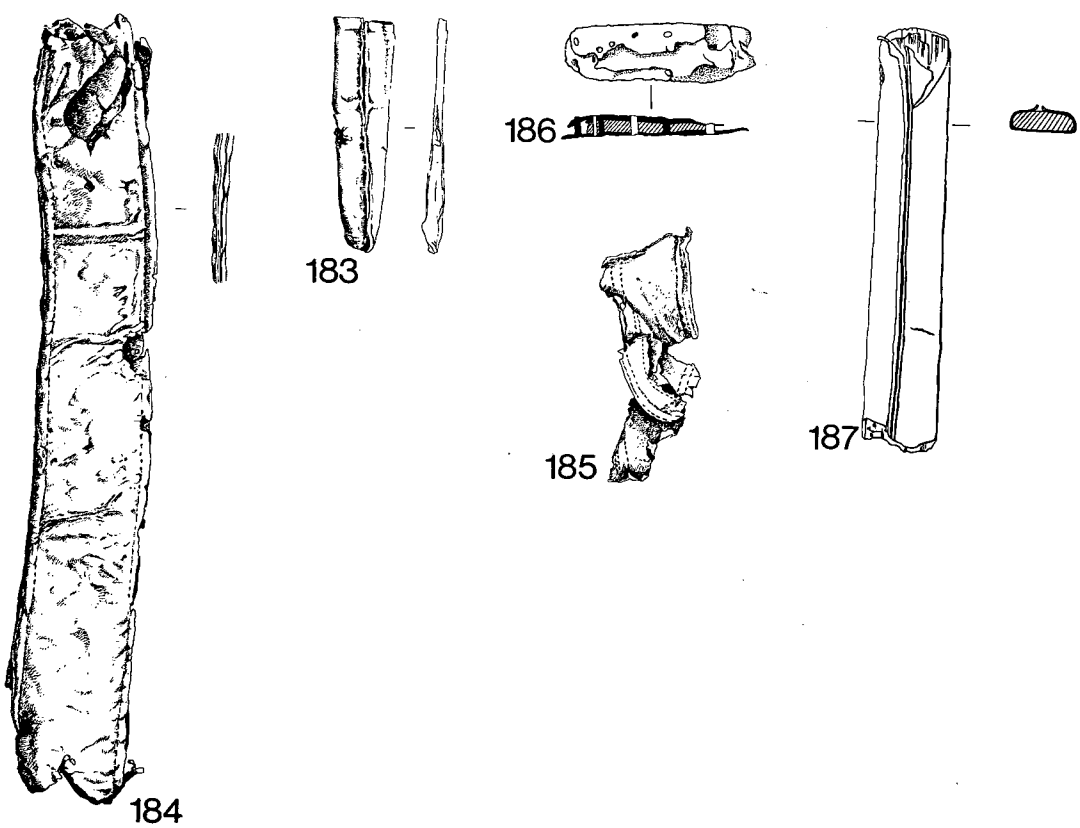


Fig. 23. Leather (¼).

R.A. 3: OTHER LEATHER OBJECTS

183. Knife sheath, seamed up the middle. 12·2 cm long. (layer 91)
184. Scabbard, incomplete length. Seamed at sides. (layer 91).
185. Fragment of clothing? with narrow hems and rows of stitching. (layer 59).
186. Piece of iron between two layers of leather, pegged together through the metal. Unidentified. (layer 50)
186. Leather-covered wooden object. There was another similar in layer 50. (layer 53)

THE TEXTILES

Penelope Walton

The wool textile trade in the 17th century has been given considerable attention by historians due to its importance to the English economy at the time. The general trends in the industry such as the expansion of the worsted branch with increased production of finer "stuffs", the improvement in finishing techniques and the use of new dyestuffs, have all been described, and contemporary accounts provide useful information on more specific aspects of the technology of the industry. However, remains of the actual cloth which these records describe have been rare and this sizeable group of fragments provides flesh to the bare bones of the documentary evidence.

A small number of complete costumes from the 17th century have survived in the peat bogs of Scotland and Ireland, providing some parallels with these finds. However, much of the cloth from these burials appears to come from a tradition quite different from that of the English industry, and the 15th–16th century finds from the nearby Black Gate ditch[191] proved to be a more useful source of comparative material.

THE FINDS

289 pieces of textile were recovered from two trenches excavated into the infill of the ditch outside the Civil War bastion. T1–T256 were found in a single deposit in Phase 2, R.A. 1, 39, and T257–T289 in six different deposits in R.A. 3, viz. Phase 1, 53, 59, 70, 91; phase 2, 42; phase 3, 35. These groups of finds have been kept separate from each other in the catalogue although there was no significant difference between them, and the archaeological evidence suggests that they were all of similar date, probably the third quarter of the 17th century. Of the total number of finds, 272 are woven (rather than knitting, yarn or raw fibre), but a proportion of these are clearly fragments of the same cloth and statistics have therefore been calculated on a total of 213 different woven finds. T290 is a single fragment from a 19th-century pit (R.A. 2, 30) and has not been included in the calculations.

Raw materials

97% of the total number of finds are made from wool and 3% (six fragments) from

silk, as compared with 99% wool and less than 0·5% (one fragment) silk in the earlier finds from the Black Gate ditch. There are no textiles of vegetable origin such as linen, as was to be expected, since such fibres rarely survive on wet sites.

Silk was, as it always has been, a luxury item, although it was more common in the mid-17th century than it had been a century earlier, due to rising standards of living.[192]

It was being imported in its raw state, and as yarn and manufactured silks, mostly from the Mediterranean area, but also increasingly from the new East Indies markets.[193]

Wool on the other hand would mainly have come from local sources, with the exception of fine Spanish wool which was having to be imported for quality woollens,[194] since the sheep of England were now rarely of a type which would yield the finer shortwool fleeces.[195] The hill sheep of northern and western England supplied the wool for coarser woollens, while the longwools which had replaced the finer fleeces in the Midland Plain provided raw material for the worsted industry.[196]

The terms "woollen" and "worsted" are used to indicate fabrics made from wool which has been hand-carded and combed, respectively. These are easily distinguished from each other, the former being softer and fluffier, more suitable for having a nap raised on it, the latter presenting a smooth and even surface with no loose fibre-ends curling up. A high proportion of the textiles in this group are woollens, although worsteds are better-represented than they were in the earlier Newcastle finds (15th-16th century 90% woollens, 9% worsteds, 17th century 79% woollens, 18% worsteds). This is a small but significant change and one which is supported by the documentary evidence (see below, Trade and Industry).

Although wool textiles are often used as a source of information on the evolution of the fleece, it was felt that in a 17th-century group, the wool in the textile would not adequately reflect the fleece of the sheep, as by this time fleeces were being sorted almost fibre by fibre,[197] occasionally mixed,[198] and, moreover, with the boom in the worsted industry, the finer fibres left over from combing were increasingly being re-used for yarn.[199] There was therefore no attempt to measure the wool fibres in order to establish fleece types.

Yarn

If a thread is held vertically, it can be seen that the fibres lie diagonally across the yarn, their direction to left or to right depending on whether the thread has been twisted clockwise or anti-clockwise. The letters Z and S are used to designate these two different directions of spin, the alignment of the fibres corresponding to the middle stroke of the letters. The direction of spin of the yarn in both systems (i.e. warp and weft) has been recorded for each fragment of textile, together with the number of threads per centimetre (in general a higher thread-count can be taken to indicate a finer fabric). Analyses of these results are given in tables I and II.

Several similarities between the 17th-century textiles and the earlier Black Gate finds have emerged from these analyses. First of all Z-spinning predominates in the worsteds and S-spinning in the woollens, although in the later finds there are an increased number of woollen tabbies and worsted twills with mixed spinning, that is

with Z-spun yarn in one system, probably the warp, and S-spun in the other (indicated ZS).

Secondly, in the woollens of both groups of finds, textiles made from S-spun yarn are on average coarser than ones made from Z-spun or mixed spinning. Although the rule of finer ZZ fabrics and coarser SS is not without exceptions, it is consistent enough to be considered significant. It is reflected in the diameters of the yarns which for the 17th-century group average out at 0·78 mm for S-spinning and 0·64 mm for Z-spinning (and in the worsteds 0·45 mm for S-spinning and 0·41 mm for Z-spinning): although a woollen yarn is a difficult thing to measure with absolute accuracy, the overall trend of coarser S-spinning is clear, as it was in the earlier finds.[200]

It can therefore be said that in the woollen tabbies the move from SS to SZ yarns marks a change towards finer fabrics. A similar trend in the opposite direction may be present in the worsteds, but there are not a sufficient number of finds to make this matter clear: however, it is true to say that amongst the worsted twills, where there is a significant move from ZZ to ZS, there is a corresponding change from finer to coarser fabrics.

In the Gunnister find from Shetland, dated to the late 17th century,[201] there were three woollen twills similar to the Newcastle finds, and here the thread counts, one for SS and two for ZS fit the pattern of S-spun yarn only for coarser woollens. However the striped and checked twills of other Scottish and Irish finds have little in common with the English textiles and generally use Z-spun yarn, whatever the quality.

There are several possible explanations for the trends noted above. It was pointed out in the earlier report that Z-spinning in the worsteds may be the result of the use of the more primitive drop-spindle and this may still be true of these 17th century finds, as spindle and distaff were still in use alongside spinning wheels in 1698 when Celia Fiennes visited East Anglia.[202] However the small flyer spinning wheel was increasingly being used for combed wool (the resulting yarn being called "jersey" to distinguish it from the coarser worsted yarn spun with the drop-spindle[203]) and this does not have such an obvious bias to Z-spinning. The use of yarns with different twist may also be a design feature, since worsteds woven with mixed spinning have a softer appearance than the hard lines of ZZ (or SS) fabrics.

It was also suggested in the earlier report that tradition dictated that better quality yarns be Z-spun, as they are in many medieval textiles. The increased use of mixed spinning in the woollen tabbies may, then, be the result of the move to finer fabrics, requiring the traditionally finer Z-spun yarn. However, it has been pointed out that mixed spinning allows all the fibres in a fabric to lie in the same direction, making it easier to raise a nap on the surface.[204] Since the 17th century was a period when more attention was being given to finishing processes, this may also be put forward as an explanation for the change.

Silk is made from such long filaments that it is not necessary to spin it in the same way as wool yarn. However, the warp is often twisted to give extra strength, while the weft is sometimes left untwisted to reflect light evenly, giving silks their lustrous appearance. Both S and Z twist as well as non-twisted yarns have been used in these silks.

TABLE I. Analysis of the 17th-century textile fragments according to weave and yarn type. Figures for the 15th–16th-century finds from the Black Gate ditch are given in brackets.

	SS	SZ	ZZ	Total
woollen tabbies	102 (226)	53 (10)	0 (2)	155 (238)
worsted tabbies	1 (0)	1 (0)	1 (2)	3 (2)
woollen 2/2 twills	5 (55)	1 (4)	2 (12)	8 (71)
worsted 2/2 twills	1 (1)	7 (0)	22 (14)	30 (15)
worsted 2/1 twills	0 (0)	2 (0)	0 (0)	2 (0)
worsted satin	0 (0)	0 (0)	1 (13)	1 (13)
total worsted	2 (0)	10 (0)	24 (29)	36 (30)
total woollen	107 (281)	54 (14)	2 (14)	163 (309)

A further 8 (21) pieces could not be included in this table, as they were too fragmentary for full details to be recorded.

TABLE II. Thread-counts (number of threads per centimetre) of the 17th-century textiles. Mean figures for the 15th–16th-century finds from Black Gate are given in brackets.

	SS		SZ		ZZ		overall	
worsteds:	range	mean	range	mean	range	mean	range	mean
tabby	13–20	16·5 (–)	18–24	21·0 (–)	24–42	33·0 (22·8)	13–42	23·5 (22·8)
2/2 twill	20–50	35·0 (16·0)	14–28	26·6 (–)	16–42	25·5 (43·9)	14–42	26·0 (42·0)
2/1 twill	–	– (–)	22–32	26·5 (–)	–	– (–)	22–32	26·5 (–)
satin	–	– (–)	–	– (–)	28–40	34·0 (36·2)	28–40	34·0 (36·2)
overall	13–50	25·8 (16·0)	14–32	26·0 (–)	16–42	26·1 (39·0)	13–42	26·1 (38·3)
woollens:								
tabby	5–14	8·8 (7·2)	5–20	12·2 (12·1)	–	– (–)	5–20	9·9 (7·4)
2/2 twill	9–12	10·7 (15·8)	18·26	22·0 (15·2)	14·22	18·0 (14·4)	9–26	13·9 (15·5)
overall	5–14	8·9 (9·1)	5·26	12·4 (12·9)	14–22	18·0 (14·4)	5–26	10·1 (9·5)

Weaves: (i) wool tabby and twill

The four different weaves represented in the wool finds are tabby (plain weave), 2/2 twill, 2/1 twill and 5-end satin (fig. 24), all executed in worsted yarns, but only tabby and 2/2 twill in woollen. By far the most common is the woollen tabby and it became clear during cataloguing that there is a "standard" type of cloth, a heavily napped fabric woven in tabby, either from S-spun thread or from mixed yarns (ZS), with thread-counts equal in warp and weft, generally in the range 9–18 per cm. A small number of woollens have been woven in 2/2 twill, on average finer than the tabbies, but usually only lightly napped or fulled and never given the heaviest types of finishing.

The increase in the use of tabby weave, from 77% of the 15th–16th-century woollens to 95% of the 17th-century ones, is probably related to the increase in heavy finishing. Although a twill weave gives greater strength and elasticity to a cloth, a tabby, which has no floating threads, especially if it has an equal thread-count in warp and weft, presents a firmer, more even surface when it comes to raising the nap, and there is therefore less chance of breaking threads. A tabby is also much easier to weave,

requiring only two shafts on the loom, as opposed to three and four in 2/1 and 2/2 twill.

It was interesting to see the return of 2/1 twill in these finds (three examples, two fine worsteds, T43–44 and T45, and one, T261–2, in a hard smooth yarn, but possibly not worsted). This weave was extremely popular in the Middle Ages, particularly for fabrics which were to be napped on one side only, but with increased napping of both faces, the balanced 2/2 twill appears to have taken its place.

2/1 twill is well-represented among the Scottish 17th-century finds and T261–2 has a similar threadcount and yarn twist to several of the examples from Dava Moor, Morayshire and Quintfall Hill, Caithness.[205] However its presence among the finer worsteds may have more to do with the proliferation of new types of worsted which began at the end of the 16th century in and around Norwich. This became the main production centre for a wide variety of lighter stuffs, including at least one, called bustian, which was worked in three-shaft twill (2/1).[206]

Most of the worsteds are woven in 2/2 twill, but within this category there are several different types of fabric. A range of thread-counts, from 14 to 68 per cm, with differing proportions of warp to weft (from 1:1 to almost 1:3) together with different combinations of Z and S yarns, has given variety to the same basic weave by altering the angle and clarity of the diagonal and the weight and texture of the fabric. Most surprising amongst these finds is the presence of a group, T55–61, which has been lightly teasled, giving a soft and "hazy" appearance to the fine twill. Although it is known that half-worsteds, containing a combed warp and a carded weft, were sometimes napped and sheared, I know of no evidence for the finishing of pure worsteds in this manner.

There are no half-worsteds among the finds, but there is one fragment which may be an example of a similar diversification of the worsted industry. The find consists of many fine worsted yarns lying parallel to each other, clearly originally woven, from the regular waves in the threads, but now without any cross-threads. Most probably this is a piece of the "new draperies", mixed fabrics, half wool, half silk, linen or cotton.[207] Of course silk would have survived, but, as mentioned earlier, the vegetable fibres linen and cotton would have decayed rapidly after burial, leaving behind only the wool warps.

Undoubtedly all of these fine worsteds and "new draperies" would have been known by one of the many documented names, such as buffins, duroys, pearls of beauty, philiselles, alepines and russells. These terms are well-known to the historian, but it is a pity that they have not been thoroughly researched from a technological viewpoint.

Among the 2/2 twills are also two fragments (T53–54) which are quite unlike any of the others. They are a strong madder-red with narrow cream stripes in warp and weft, woven from a Z-spun yarn which is hard, smooth and coarse-fibred, but not apparently combed (similar in fact to the yarn of the 2/1 twill T261–2 mentioned above). The fragments are too small to be sure of the overall pattern but one warp stripe has survived, crossed by three weft stripes, two close together and one further away.

There are many checks in a range of colours amongst the Scottish and Irish finds, occurring in both 2/2 and 2/1 twills, generally in Z-spun yarn, with similar

thread-counts to this example. Three line-checks one on 2/2 and two on 2/1 twill, were found on a 17th-century skeleton at Dava Moor, Morayshire[208] and others on 2/2 twill were amongst the patches on the mantle of the early 17th-century Dungiven costume from Ireland.[209] Dr Bennett informs me that although the Scottish cloth industry was poorly developed in the 17th century, plaiding was being exported and was sometimes used in England for furnishing. Of course Newcastle is so close to the border that these fragments may have come from the dress of a visiting Scot.

This checked twill is one of the few instances of colour surviving well enough to be visible to the naked eye. In only one other case (T114–5) is colour patterning recognizable, in a coarse woollen tabby with chestnut-coloured warps and blue-black weft. The fragments have also been fulled so that the small checking produced by this type of weaving is blurred. This was also noted in some of the 16th-century finds from Black Gate.[210]

Weaves: (ii) wool satin

Probably the most interesting find consists of two fragments of a figured worsted damask in 5-end satin. The simplest form of satin is based on a unit of five warp threads, of which every fifth thread is raised when passing the weft, to give a weft-faced weave (fig. 24d). If instead the first four warps are raised and the fifth lowered, the resulting weave shows its warp face (fig. 24e). In a damask these two types of satin are combined so that a pattern is formed by the different reflections of light from the warp face and the weft face (fig. 25); the pattern also shows in negative on the reverse of the cloth. The weft is often closer-set than the warp, as in this case, and the weft-face figures therefore stand out more clearly against the warp-face background.

On analysis there were found to be three different dye-stuffs present, indigotin (blue), ? brazilwood (red) and oak galls (a tannin-containing substance which darkens the shade of the dye it is mixed with). Used together these would have given an overall black, but if used separately for the warp and weft, as is often the case with comparative silk damasks, the pattern would have shown a difference in colour between the figures and the background, either red-brown against blue or red against black, depending on which dye was mixed with the oak galls.

The design of the damask includes a stylized pomegranate and Miss Natalie Rothstein of the Victoria and Albert Museum suggests that originally there were probably alternate rows of fat sprigs facing right and left, perhaps with a stem between. She further comments that such designs can be found in many silk collections and portraits dating to 1630–1660, although a version in wool may be later. These fragments are also well-worn, and may have been in use for some time before they were thrown into the ditch.

The 5-end construction is typical of silk satins up to the early 18th century (Rothstein pers. comm.) and there were several examples of unpatterned 5-end worsted satins among the mid-16th-century finds from Black Gate. These had a range of weft thread-counts, from 30 to 80, as compared with the 40 per cm of this figured damask, while all had warp counts in the region of 28 per cm, as here, although none had

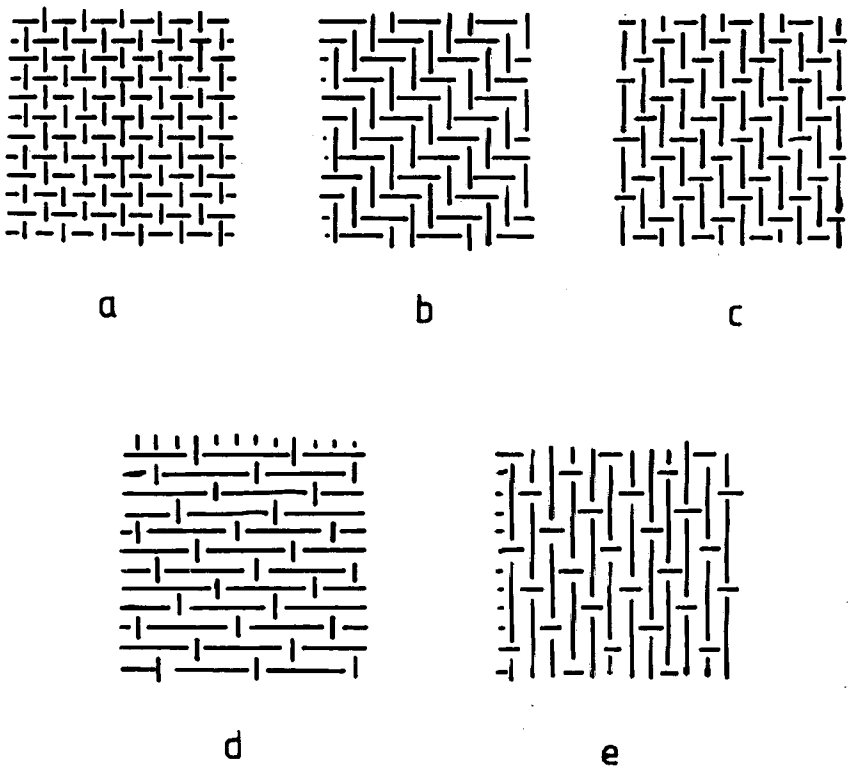


Fig. 24. weaves a) tabby; b) 2/2 twill; c) 2/1 twill; d) 5-end satin, weft faced; e) 5-end satin, warp faced.

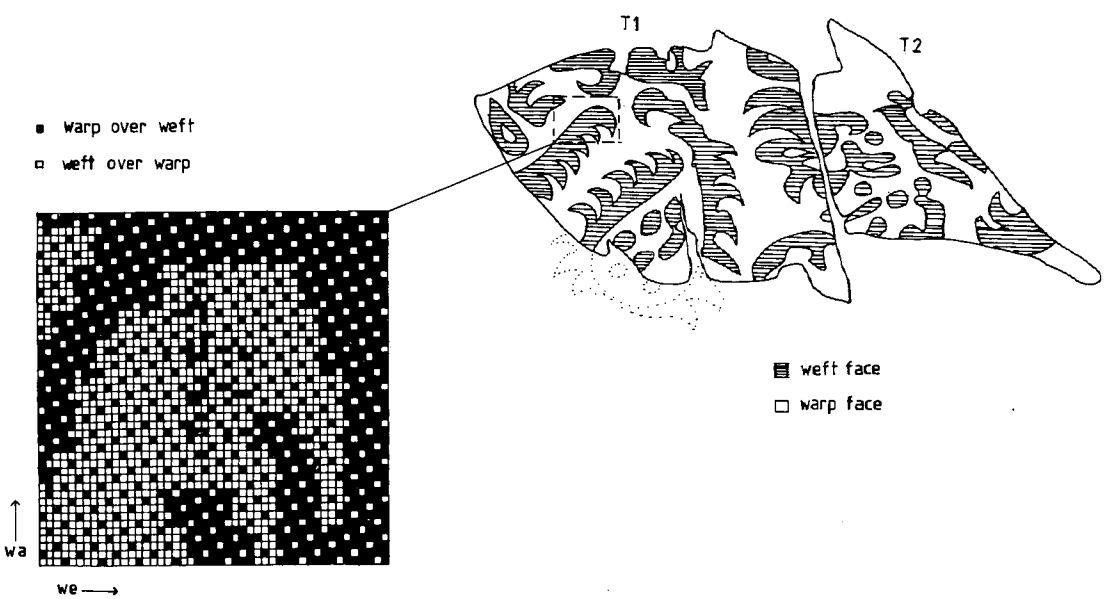


Fig. 25. Design of worsted satin damask T1–T2, with reconstruction of stylised pomegranate and weave diagram of part of T1 (including weaving faults).

the plied warps of these two fragments. The weaving of figured damask requires a sophisticated loom and the rise and fall of the complex patterning equipment puts a considerable strain on the warps, which a plied yarn could better withstand. These finds are almost certainly English, probably from the Norfolk or Kidderminster areas, both of which are known to have been producing worsted damasks in the 17th century.[211]

Weaves: (iii) silk velvet and tabby

There are six fragments of silk amongst these finds, four in tabby and two velvet (fig. 26). T267 is a long strip of cut velvet in excellent condition, but T257 is very worn and it is impossible to say whether the pile was originally cut or uncut; neither shows any sign of patterning. Of the tabbies, T264 is ribbon 2·5 cms wide, T250 is a tiny fragment of extended tabby, worked with paired threads in one system and groups of five yarns in the other, and T263 and T270 are simple tabbies.

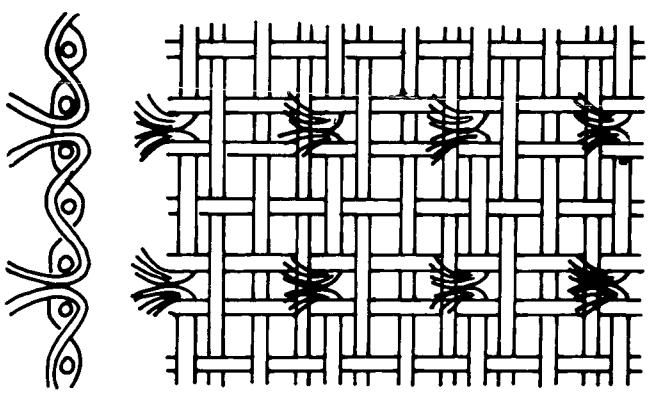


Fig 26. The construction of cut velvet.

There was no English centre for the weaving of the more complex silks until the late 17th century and the velvets would have been imported, most probably from Italy (Rothstein pers. comm.). However, the origin of the silk tabbies is more open to discussion. There are two records of silk weavers in Newcastle, one in St Nicholas' Register in 1599 and the other in All Saints' Register in 1623.[212] Perhaps these were only ribbon weavers, but in my own opinion it does not seem impossible that they were producing silk cloth. There is no great technical difficulty in producing a silk tabby, and silk was certainly being woven into mixed fabrics by English weavers at this date.[213] The major problem would have been the availability of the yarn, since the attempts to introduce silk-worms into this country during James I's reign proved unsuccessful, and throwing mills for the mechanized twisting of silk filaments, did not reach England until the early 18th century.[214] However, the imports of raw silk

and silk yarn are listed as being greater in value than the imports of manufactured silks in the third quarter of the 17th century[215] and some woven silks were also being exported at this time (exports are distinguished from re-exports in these trade tables). It is therefore suggested that some of the silk tabbies from this site may have been woven in the town.

Borders

A number of borders have survived on woollens, worsteds and silks, on tabby and twill weaves (fig. 27). The selvedges on the woollens have, with two exceptions, been reinforced with extra plied warp threads, while the silk tabbies and most of the worsteds have no such strengthening threads. The reason for this difference lies in the finishing processes given to woollens, in particular stretching on cloth tenters, which put considerable strain on the edges.

One of the teasled worsted twills (see below) has the remains of what appears to be a reinforced border worked in extended tabby weave (IIIb, fig. 27), while another woollen selvedge seems to be of the same type, although none of the main body of the cloth is present (IIIa). The problem of whether these are side borders or closed starting borders of the Scandinavian type was discussed at length in the earlier report,[216] but the presence of this kind of border in a fine worsted, almost certainly English and therefore worked on a loom incompatible with closed starting borders, forces one to the conclusion that they are specially constructed side-borders.

Finishing

A proportion of the woollens, generally the coarser fabrics, have rough, uneven surfaces, some slightly and some heavily matted (indicated by one and two asterisks in the catalogue). Over half of the woollens, however, have a smooth even surface, resembling modern billiard-cloth, with the weave either partially or totally obscured by a dense springy layer of fibres (three and four asterisks). These two different finishes correspond to the two techniques for thickening cloth, fulling and teasling. A cloth was fulled by beating with hammers in a fulling mill, the longer the treatment, the more matted the cloth; alternatively, the nap could be raised with teasles and then cut back with cropping shears to give a smooth surface, the process being repeated several times to give a dense finish. The light teasling of worsteds is described above, and marked T in the catalogue.

When compared with the earlier finds from Black Gate, it can be seen that a much higher proportion of the 17th-century textiles have been given the heaviest type of napping. However all of these later fabrics are relatively thick and heavy and there are none of the very fine, soft cloths found in small numbers in the earlier group. In the mid-16th century England sold much of its cloth undyed and without finishing to Europe. When war closed this market, the English clothiers found themselves obliged to improve their own finishing techniques in order to sell their cloth elsewhere. At the same time fashions had moved away from superfine heavily milled broadcloth, towards the lighter worsteds and "new draperies", and the heaviest finishing was now given to the heavier coat and cloak fabrics rather than the dress-weight materials.

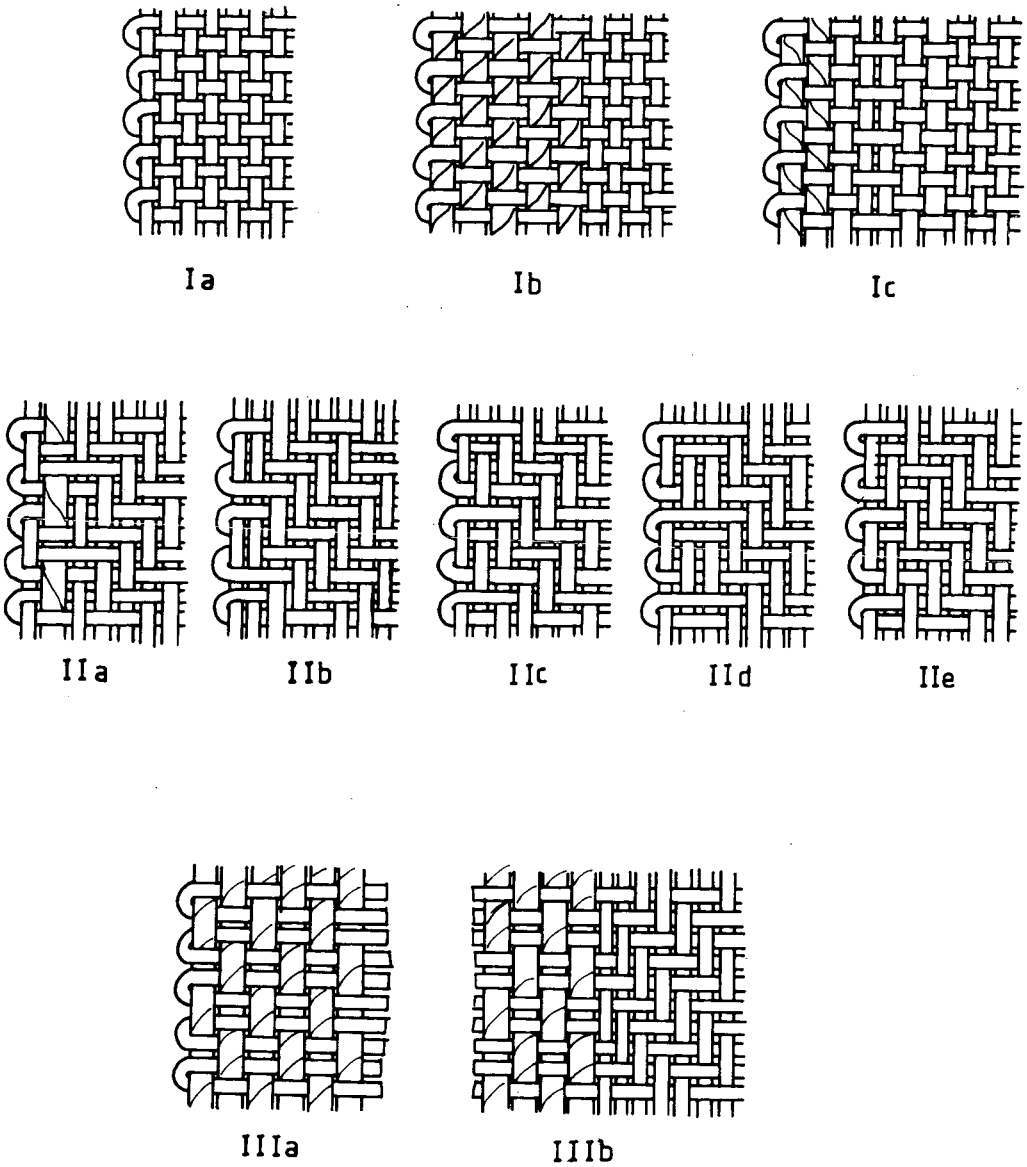


Fig. 27. Borders. Ia: T114, T264, T270, T277, T47; Ib: T116, T120, T218; T165, T194 are similar, but with different numbers of plied warp threads; Ic: T130; IIa: T10; IIb: T20, T40; IIc: T25; IId: T53; IIe: T64; IIIa: T198; IIIb: T57.

Dyes

A random sample of 45 fragments, that is 28 woollen, 12 worsted, 3 silk and 2 knitting, were tested for the presence of dyestuffs by extracting with solvents, measuring the absorption spectrum, and checking the results with paper chromatography. Out of these 45, 12 woollen, 10 worsted and one silk gave positive results – although this does not mean that the remaining 22 were undyed, but rather that any dyes which were present originally have decayed in such a way as to be undetectable. It may be significant that such a high proportion of the worsteds gave positive results, but it is not clear whether this is because they were dyed more effectively or because the colours produced by dyes which survive well were more popular for the worsteds than for the woollens.

Of the 23 positive results, 18 proved to be indigotin, the blue dyestuff present in both the woad and the indigo plants. This is a much higher proportion than was found in the contemporary Zeeuwse Uitkÿk graves of the Dutch whaling settlement at Spitsbergen (unpublished work) and suggests that the fashions of post-Civil War Newcastle were much less garish than those of the Dutch sailors. Indeed, in three cases indigotin had been combined with a dyestuff resembling oak galls, which would have darkened the colour to a near-black. In two other fragments indigotin had been mixed with a yellow dye for a green.

Some of the indigotin-dyed pieces appeared to contain a relatively high concentration of indirubin (Taylor pers. comm.) which occurs as an impurity in indigo and is particularly strong in Javanese indigo, highly prized for its deep purplish tinge.[217]

Reds and yellows were found in only a small proportion of the sample, but these colours were represented by a wider range of dyestuffs than was the case with blue. Only two fragments, one of them the checked twill described above (weaves i) were dyed with madder, the red dye so very common on wool textiles in the Middle Ages.[218]

However, another red dye, similar to modern brazilwood, was found along with indigotin and oak galls in the worsted damask (T1–2), and one piece of silk gave a weak red result which may have been kermes or cochineal. The two yellow dyes which were mixed with indigotin were in such low concentrations that it was not possible to identify them, but one yellow was found on its own and this proved to be old fustic, *chlorophora tinctoria*.

Most of these dyes would have been imported, either from Europe or further afield. Only the indigotin-containing woad was grown commercially in England in the 17th century (in East Anglia and the Salisbury region),[219] but by the second half of the century even this home product was being superseded by indigo from East India and the West Indies.[220] Madder and Brazilwood ("brasil") both appear among the imports of the Newcastle Merchant Adventurers, although their port of origin is not indicated.[221] Most probably the madder came from Holland, the main producer at this time, while brazilwood, which in the Middle Ages had been brought in from the East Indies, was now being imported from South America, along with the relatively new dyewood, fustic. Cochineal also only became available after the discovery of the Americas, although its relative, kermes (both are insect dyes) could be obtained from the Mediterranean region. The dye thought to be oak galls was identified by

comparison with English oak apples, but it is more probable that the dyestuff in the textile is in fact the more effective Turkey or Aleppo galls (found on *quercus infectoria*), which are recorded as being imported into Europe for use in dyeing blacks and other dark shades.[222]

Knitting

There are five fragments of knitting, two of which are worked in stocking stitch, two in alternating stocking stitch (two rows purl, two rows plain) and one in stocking stitch with two ribs of alternating stocking stitch at the lower edge. Most are only small fragments and none has any shaping to indicate its use. It is interesting that three of the fragments appear to be worked with yarn which has not been plied, since this is not considered good practice in the present day, although some thick Icelandic knitting is worked with single yarn. By the 17th century knitting was well established in this country, being used in particular for hats and stockings.

The large collection of knitted hats from the cemetery of the Spitsbergen settlement (17th–18th century) included some hats worked in stocking stitch, with ribs of alternating stocking stitch at the lower edge (E. van Dienst, R.O.B., Holland, pers. comm.)

Costume

Many of the textiles are tailors' offcuts, new cloth which has never been worn, but a number of fragments show signs of wear and stitching, and two groups of finds were able to provide information on details of costume. The first consists of five strips of woollen cloth with crossways slits at regular intervals. The strips, which have been cut with the grain of the cloth, measure between 3·8 and 5·2 cm wide and are a variety of lengths from 7·0 to 34·0 cms; the slits are between 3·0 and 4·0 cms long and 2·0 and 2·5 cms apart. None of the fragments is complete, since all have either one or both ends torn across a slit, but the two broadest pieces have an end cut on the slant, and one of the longer, narrower pieces has been cut at right angles. On one side the nap has been worn away, and on this face only there are some stiff grey remains of stitching around the slits, with in one place a type of knotting which is seen in buttonhole stitch; the longest strip, and perhaps the others too, has the remains of stitching, probably backstitch along one of the long edges. The stitching in both cases proved to be of bast fibre, probably flax, set in a pale almost colourless substance.

These strips have been identified as inside facings for buttonholes, the longer strip being from the front opening of the coat and the wider pieces with angled ends probably from buttoned pocket flaps. Coats and waistcoats with closely-set buttons first appeared in the 1660's and were worn until the 1690's when the buttons became wider-spaced.[223] Such a design may be seen in the late 17th-century coat from Gunnister, Shetland, which has facings at the edges and behind the pocket slits, which appear not to have been functional.[224] The face of the Newcastle strips which is worn would have been the side towards the body, and thus the buttonhole stitching would have survived on this side only, the remaining half being on the outer face of the coat itself. Possibly this thread was waxed and this is why the vegetable fibres have survived.

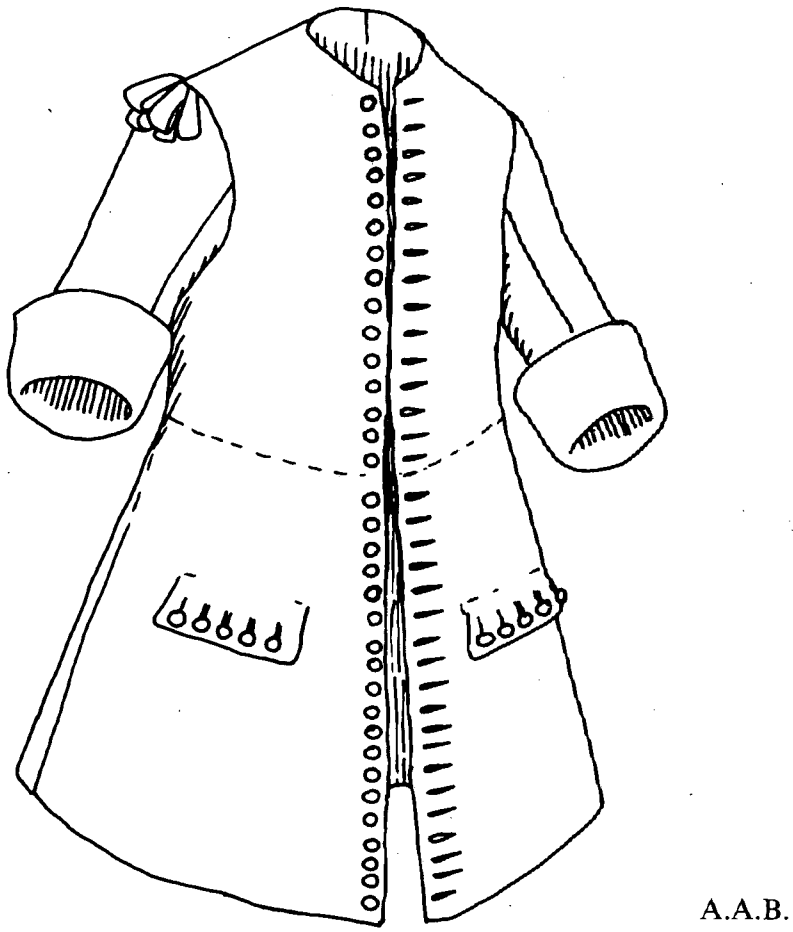


Fig. 28. Coat with closely-set buttons and ribbon loops.

Secondly, two pieces of silk ribbons (2·5 cms wide) stitched side by side with remains of a third on top of one of the others, may be identified with the ribbon loops called "fancies", which were popular for male attire from the mid-17th century to the 1680's. While women generally preferred bows, the men used ribbon loops to decorate the lower edges of breeches and doublets, or wore them in clusters at the knee, the shoulder, on their hats, gloves or shoes.[225]

The Newcastle Merchant Adventurers were shocked at such frivolities amongst their apprentices and in 1649 pronounced that they should wear "neither fancies nor ribbins att their hatt bands"[226]

Trade and Industry

Almost a century had elapsed between the depositing of textile fragments in the ditch in front of the Black Gate (15th–16th century) and the filling in of the 17th-century ditch outside the Civil War bastion, from which the fragments currently under discussion were retrieved. During this time several changes had occurred in the wool textile industry. In the 16th century the majority of English clothiers were concentrating on the production of woollens, a high proportion of which were being sent undyed and undressed for finishing in the Low Countries.[227]

By the end of the century however, changes of taste away from heavily finished broadcloth to lighter finer worsteds and "new draperies" had led to the expansion of the old worsted industry, centred around Norwich, to include these new fabrics. Ready supplies of good combing wool from the Midland Plain fostered their manufacture and in the early 17th century demand for new draperies was further increased by improved trade-links with the Mediterranean after the peace with Spain and the decline of Italian competition.[228] As a result several areas such as the Western peninsula, the Coventry–Kidderminster region, Suffolk, Hampshire and Kent, which had formerly produced medium-quality woollens, were by the late 17th century manufacturing worsteds.[229]

The woollen industry on the other hand, suffered from the closure of its markets in northern Europe due to the Thirty Years War, and from competition from the new draperies, imported silks and calicoes, and, later in the century, Dutch woollens.[230] New markets were sought in the colonies of North America[231] and attempts were made to improve finishing and dyeing techniques in order to produce more marketable cloth.[232] Both branches of the industry benefited from the new techniques such as tin-mordanting[233] which gave brighter colours, and from the new dyestuffs such as indigo, brazilwood and cochineal which had become available with the opening up of trade with the East Indies and North America. New types of cloth, such as "medleys" made from Spanish wool, were also tried in the West of England manufacturing area, but even here, as in Yorkshire, worsteds were being produced alongside woollens.[234]

However although woollens may have been rivalled by worsteds in the export trade, on the home market they were still much in demand for warm outer clothing and the everyday wear of the lower classes and country people.

In Newcastle the period was marked by a shift in trade, away from raw wool to cloth export.[235] Some half-worsteds such as bays and perpetuanas were being exported, but the bulk of the trade was in coarse woollens, such as kerseys, dozens and "cottons." A certain amount of weaving was carried out in the town at least in the early part of the century, but the Newcastle Merchant Adventurers claimed that their trade was of benefit to the poor producers of the five northern counties[236] and so it is quite probable that by this time it was largely a rural occupation, as it was in Yorkshire. To supply this industry, the Adventurers were importing cards for wool preparation, and dyestuffs such as madder, indigo and brazilwood.[237]

The coarse local cloth would have been available for sale in the town, but when it came to finer fabrics, these had to be brought in from other parts of the country

and the Merchant Adventurers themselves record how in 1686 they sent to London for samples of cloth for cloaks for their society.[238] The fabric would then have been made up into garments by the local tailors, some of whom may have been actually working in the castle itself, as they were in the 18th century.

CONCLUSION

The silk velvets can be identified as imports and a small number of finds seem to have more in common with the Scottish finds of the same date, but the majority of the finds were most probably supplied by the English market. Although it is rare for textiles to provide definite evidence for dating, it can be said that the design of the figured damask and the costume details are compatible with the suggested date of the third quarter of the 17th century. When this group of finds is compared with the earlier textiles from the castle, it can be seen that the differences between the two are reflections of the developments in the cloth trade between the 16th and 17th centuries. The increased use of worsteds and silks caused by changing tastes and a rising standard of living, the more frequent heavy finishing of cloth as techniques improved, the new dyestuffs as trade was developed with lands outside Europe – all these trends can be seen in the textiles.

Acknowledgements

I am extremely grateful to Dr. G. W. Taylor for his advice on the results of the dye tests and to the York Archaeological Trust for the use of their spectrophotometer and other laboratory equipment. Thanks are also due to Natalie Rothstein of the Victoria and Albert Museum for help with silks and worsted damask, to Dr. Helen Bennett for information on Scottish textiles and to Tony Barton for advice on costume details and for the drawing, figure 28. Figure 26 is adapted from D. K. Burnham *Warp and Weft* (Toronto, 1980).

CATALOGUE: WOVEN FRAGMENTS, MADE FROM WOOL

No.	*Dimensions in cms*	*woollen worsted*	*Thread-count* (warp first, where known)	*Spin*	*Weave*	*border*	*finishing*	*Dyestuff*	*offcut seam*	*Other details*
Ph. 2, R.A. 1, 39										
T1	9·5 × 7·0	*	28 × 40	2-ply S-twist × Z	5-end satin damask	–	–	indigotin, (+ indirubin), ? brazilwood, oak galls.		
T2	10·0 × 4·0									
T3	3·0 × 2·0	*	40 × 24	Z × Z	2/2 twill	–	–			
T4	4·0 × 4·0									
T5	3·0 × 1·5									
T6	2·5 × 1·5									
T7	1·0 × 1·0									
T8	4·0 × 1·0									
T9	3·0 × 1·0									
T10	7·5 × 4·0	*	23 × 20	Z × S	2/2 twill	IIa	–	indigotin (+ indirubin)		
T11	7·0 × 1·0									
T12	2·0 × 1·5	*	22 × 18	Z × Z	2/2 twill	–	–			
T13	13·0 × 2·0	*	20 × 16	Z × Z	2/2 twill	–	–			
T14	8·0 × 0·5	*	22 × 20	Z × Z	2/2 twill	–	–		*	
T15	5·0 × 1·0	*	14 × 16	Z × S	2/2 twill	–	–			
T16	1·5 × 1·0	*	24 × 20	Z × Z	2/2 twill	–	–			
T17	2·5 × 1·0	*	42 × 22	Z × Z	2/2 twill	–	–			
T18	4·0 × 1·5	*	20 × 18	Z × Z	2/2 twill	–	–		*	
T19	2·5 × 1·0	*	36 × 20	Z × Z	2/2 twill	–	–			
T20	3·0 × 1·0	*	22 × 16	Z × Z	2/2 twill	IIb	–		*	
T21	27·0 × 26·0	*	16 × 19	Z × S	2/2 twill	–	–			remains of dart
T22	23·0 × 2·0	*	18 × 18	Z × Z	2/2 twill	–	–	indigotin (+ indirubin)		
T23	32·0 × 21·0	*	28 × 24	Z × S	2/2 twill	–	–	indigotin		
T24	8·0 × 6·0									
T25	20·0 × 2·5	*	23 × 19	Z × Z	2/2 twill	IIc	–	indigotin	*	
T26	18·0 × 7·0									
T27	14·0 × 12·0									
T28	27·0 × 8·0	*	18 × 16	Z × S	2/2 twill	–	–	indigotin		
T29	5·0 × 3·0									
T30	1·5 × 1·0									
T31	5·5 × 1·0									
T32	1·5 × 1·5	*	36 × 24	Z × Z	2/2 twill	–	–			
T33	1·5 × 0·5									

T34	2·5 × 1·0										
T35	2·0 × 1·0		*	40 × 24	Z × Z	2/2 twill	–	–			
T36	1·5 × 0·5										
T37	2·0 × 1·0										
T38	6·0 × 0·5		*	24 × 20	Z × Z	2/2 twill	–	–		*	
T39	3·0 × 0·5										
T40	2·0 × 1·0		*	26 × 16	Z × Z	2/2 twill	IIb	–		*	
T41	2·0 × 1·0		*	40 × 28	Z × Z	2/2 twill	–	–			
T42	1·5 × 0·5										
T43	13·0 × 3·0		*	30 × 22	Z × S	2/1 twill	–	–	negative		
T44	8·0 × 1·0										
T45	6·0 × 2·0		*	32 × 22	Z × S	2/1 twill	–	–			
T46	7·0 × 3·0										
T47	9·0 × 4·0		*	24 × 42	Z × Z	tabby	Ia	–	indigotin (+ indirubin)	*	
T48	4·0 × 2·5										
T49	2·0 × 1·5										
T50	4·5 × 2·5										
T51	2·0 × 1·0		*	20 × 13	S × S	tabby	–	–			
T52	2·5 × 1·0										
T53	10·0 × 3·0	*		16 × 14	Z × Z	2/2 twill	IId	–	madder		red with cream line-check
T54	9·0 × 3·0										
T55	6·0 × 1·0		*	26 × 26	Z × Z	2/2 twill	–	T		*	
T56	5·0 × 0·5		*	24 × 24	Z × Z	2/2 twill	–	T		*	
T57	42·0 × 2·5		*	20 × 50	S × S	2/2 twill	IIIb	T	indigotin + oak galls		
T58	18·0 × 7·0		*	32 × 24	Z × Z	2/2 twill	–	T	indigotin	*	
T59	21·0 × 3·0		*	24 × 62–68	Z × Z	2/2 twill	–	T		*	
T60	11·0 × 6·0		*	26 × 64–68	Z × S	2/2 twill	–	T		*	
T61	15·0 × 1·0		*	28 × 24	Z × Z	2/2 twill	–	T	? indigotin + oak galls	*	
T62	16·0 × 4·0	*		11 × 10	S × S	2/2 twill	–	*	indigotin		
T63	15·0 × 4·0	*		22 × 20	Z × Z	2/2 twill	–	*	negative	*	
T64	20·0 × 2·0	*		26 × 18	Z × S	2/2 twill	IIe	*		*	
T65	7·0 × 1·5	*		9 × 9	S × S	2/2 twill	–	*			
T66	5·0 × 1·0	*		12 × 12	S × S	2/2 twill	–	***		*	
T67	6·0 × 1·0	*		10 × 10	S × S	2/2 twill	–	***		*	
T68	34·0 × 4·2										
T69	10·0 × 3·8										
T70	7·0 × 5·0	*		10 × 8	S × S	tabby	–	***	negative	*	facing for buttonholes
T71	18·5 × 4·8										
T72	18·5 × 5·2										
T73	5·0 × 4·5	*		12 × 12	Z × S	tabby	–	****		*	
T74	16·5 × 2·0	*		13 × 11	Z × S	tabby	–	****		*	
T75	13·0 × 0·5	*		? × ?	S × S	tabby	–	****		*	

CATALOGUE: WOVEN FRAGMENTS, MADE FROM WOOL—*cont.*

No.	*Dimensions in cms*	*woollen worsted*	*Thread-count* (warp first, where known)	*Spin*	*Weave*	*border*	*finishing*	*Dyestuff*	*offcut seam*	*Other details*
T76	10·0 × 0·5	*	9 × 6	S × S	tabby	–	***		*	
T77	12·5 × 0·3	*	? × ?	S × S	tabby	–	****		*	
T78	7·5 × 0·3	*	? × ?	Z × S	tabby	–	****		*	
T79	2·0 × 0·5	*	8 × 6	S × S	tabby	–	*			
T80	2·5 × 1·0	*	8 × 8	S × S	tabby	–	*			
T81	2·0 × 1·0	*	9 × 9	S × S	tabby	–	*			
T82	4·0 × 0·3	*	?9 × 8	S × S	tabby	–	*		*	
T83	3·0 × 1·0	*	9 × 9	S × S	tabby	–	*			
T84	2·0 × 1·0	*	8 × 6	S × S	tabby	–	*			
T85	4·0 × 0·5	*	11 × 5	S × S	tabby	–	*		*	
T86	6·5 × 4·0	*	9 × 9	S × S	tabby	–	*			
T87	9·5 × 4·0	*	8 × 9	S × S	tabby	–	*			
T88	2.0 × 0.5	*	8 × 11	S × S	tabby	–	*		*	
T89	5·0 × 1·0	*	8 × 7	S × S	tabby	–	*		*	
T90	2·0 × 1·5	*	9 × 8	S × S	tabby	–	*			
T91	3·0 × 0·5	*	9 × 8	S × S	tabby	–	*		*	
T92	6·5 × 0·5	*	9 × 7	S × S	tabby	–	*		*	
T93	2·5 × 1·5	*	7 × 6	S × S	tabby	–	*			
T94	5·5 × 0·5	*	10 × 7	S × S	tabby	–	*		*	
T95	2·0 × 2·0	*	5 × 10	Z × S	tabby	–	*			
T96	2·5 × 1·0	*	8 × 8	S × S	tabby	–	*		*	
T97	5·5 × 0·5	*	8 × ?7	S × S	tabby	–	**		*	
T98	4·0 × 1·0	*	9 × 9	S × S	tabby	–	*		*	
T99	4·0 × 1·0	*	11 × 7	Z × S	tabby	–	*			
T100	4·0 × 3·0	*	11 × 7	S × S	tabby	–	*			
T101	3·0 × 1·0	*	9 × 8	S × S	tabby	–	*		*	
T102	3·0 × 1·0	*	8 × 6	S × S	tabby	–	**		*	
T103	3·0 × 1·0	*	9 × 8	S × S	tabby	–	*		*	
T104	5·0 × 0·5	*	?10 × 8	S × S	?	–	*		*	
T105	1·5 × 1·0	*	9 × 8	S × S	tabby	–	–			
T106	2·0 × 2·0	*	7 × 7	S × S	tabby	–	*			
T107	11·0 × 7·0									
T108	4·0 × 3·0	*	4–5 × 5	S × S	tabby	–	–			
T109	4·0 × 2·0									
T110	14·0 × 3·5	*	12 × 6	S × S	tabby	–	*	negative	*	
T111	5·0 × 5·0	*	9 × 9	S × S	tabby	–	*			
T112	2·5 × 1·5	*	9 × 7	Z × S	tabby	–	*			
T113	4·0 × 1·5									

T114	34·0 × 2·0	*	6 × 6	S × S	tabby	Ia	*	indigotin	*	warp different colour from weft
T115	36·5 × 2·0									
T116	10·0 × 4·5	*	10 × 12	S × S	tabby	Ib	***	negative		
T117	14·0 × 18·0	*	5 × 6	S × S	tabby		*	negative		
T118	13·0 × 9·0	*	10 × 8	S × S	tabby	–	*			
T119	19·0 × 10·0									
T120	19·0 × 1·0	*	6 (2-ply) × 13	S- and Z-twist × S	tabby	Ib	*	madder	*	selvedge only
T121	12·0 × 1·5	*	6 × 9	Z × S	tabby	–	*		*	
T122	9·0 × 1·5	*	8 × 9	S × S	tabby	–	*		*	
T123	7·5 × 3·0									
T124	20·0 × 4·0									
T125	14·0 × 9·0	*	10 × 7	S × S	tabby	–	*	indigotin		*
T126	4·0 × 4·0									
T127	5·0 × 3·5									
T128	5·0 × 5·5									
T129	10·5 × 6·0	*	10 × 7	S × S	tabby	–	*	negative		*
T130	13·0 × 3·0	*	7 × 10	S × S	tabby	Ic	**			
T131	8·0 × 2·0	*	10 × 12	S × S	tabby	–	***		*	
T132	3·0 × 2·0	*	18 × ?12	S × Z	tabby	–	***		*	
T133	6·5 × 5·5	*	18 × 14	S × Z	tabby	–	****	indigotin	*	
T134	4·0 × 2·0	*	11 × 10	S × S	tabby	–	***/****		*	
T135	3·5 × 0·5	*	14 × 14	S × Z	tabby	–	**		*	
T136	11·0 × 1·0	*	12 × 20	Z × S	tabby	–	****		*	
T137	5·5 × 0·5	*	11 × 9	S × Z	tabby	–	****		*	
T138	5·0 × 0·5	*	16 × 12	S–Z × Z	tabby	–	***		*	
T140	10·5 × 0·5	*	10 × 10	S × S	tabby	–	****		*	
T141	1·0 × 0·5									
T142	1·0 × 0·5	*	11 × 12	S × Z	tabby	–	**			
T143	2·0 × 1·0									
T144	5·5 × 1·0	*	8 × 8	S × S	tabby	–	**		*	
T145	8·0 × 5·0									
T146	5·5 × 2·0	*	11 × 10	Z × S	tabby	–	**		*	
T147	2·5 × 1·0									
T148	7·0 × 1·5	*	14 × 12	Z × S	tabby	–	**		*	
T149	6·0 × 1·0	*	9 × 9	S × S	tabby	–	**		*	
T150	22·0 × 2·0	*	8 × 6	S × Z	tabby	–	**	negative	*	
T151	2·0 × 0·5	*	6 × 5	S × S	tabby	–	**			
T152	3·0 × 1·5	*	11 × 9	S × S	tabby	–	**		*	
T153	2·5 × 1·0	*	?15 × 10	Z × S	tabby	–	****		*	
T154	23·0 × 4·0	*	9 × 7	S × S	tabby	–	***	indigotin	*	
T155	8·5 × 2·0	*	12 × 10	S × S	tabby	–	**/***	indigotin + yellow	*	
T156	10·0 × 1·0	*	12 × 8	S × S	tabby	–	***	negative	*	

CATALOGUE: WOVEN FRAGMENTS, MADE FROM WOOL—*cont.*

No.	*Dimensions in cms*	*woollen worsted*	*Thread-count* (warp first, where known)	*Spin*	*Weave*	*border*	*finishing*	*Dyestuff*	*offcut seam*	*Other details*
T157	10·5 × 1·0	*	18 × 14	Z × S	tabby	–	****		*	
T158	4·0 × 1·0	*	10 × 10	S × S	tabby	–	***		*	
T159	4·0 × 1·0	*	?12 × 8	S × S	tabby	–	***		*	
T160	9·0 × 1·0	*	11 × 11	S × S	tabby	–	***	negative	*	
T161	7·0 × 5·0	*	11 × 8	S × S	tabby	–	**/***			
T162	4·0 × 1·0	*	12 × 9	S × S	tabby	–	**/***		*	
T163	6·0 × 1·0	*	10 × 10	S × S	tabby	–	***		*	
T164	2·5 × 1·0	*	9 × 8	S × S	tabby	–	**		*	
T165	1·5 × 1·0	*	5 (2-ply) × 6	Z-twist × S	tabby	Ib	***/****			selvedge only
T166	10·0 × 0·5	*	10 × 10	S × S	tabby	–	**		*	
T167	7·0 × 0·5	*	9 × 8	S × S	tabby	–	**		*	
T168	2·0 × 0·5	*	10 × 8	S × S	tabby	–	**		*	
T169	10·0 × 0·5	*	9 × 7	S × S	tabby	–	***		*	
T170	8·0 × 6·0	*	8 × 8	S × S	tabby	–	**/***		*	
T171	8·0 × 0·5	*	10 × 10	S × S	tabby	–	**		*	
T172	7·0 × 1·5									
T173	9·0 × 1·5	*	6 (2-ply) × 16	Z-twist × S	tabby	–	**		*	
T174	4·5 × 1·5									
T175	5·5 × 1·5	*	5 (2-ply) × 13	Z-twist × S	tabby	–	**	negative	*	
T176	19·0 × 3·5	*	16 × 16	Z × S	tabby	–	***/****	indigotin	*	
T177	8·0 × 5·0	*	8 × 8	S × S	tabby	–	**/***	negative		
T178	40·0 × 2·0	*	12 × 7	S × S	tabby	–	****		*	
T179	23·0 × 3·0	*	15 × 11	S × Z	tabby	–	****	negative	*	
T180	13·0 × 3·0	*	11 × 10	S × S	tabby	–	***/****		*	
T181	10·0 × 1·5	*	12 × 10	S × S	tabby	–	***/****	fustic	*	
T182	19·0 × 2·0	*	9 × 7	S × S	tabby	–	***		*	
T183	20·0 × 1·5	*	20 × 20	Z × S	tabby	–	****		*	
T184	6·5 × 4·5	*	20 × 18	Z × S	tabby	–	****		*	
T185	32·0 × 0·5	*	9 × 6	S × S	tabby	–	***		*	
T186	9·5 × 1·0	*	12 × 10	S × S	tabby	–	****		*	
T187	7·5 × 0·5	*	10 × 10	Z × S	tabby	–	***		*	
T188	4·0 × 1·0	*	8 × 8	S × S	tabby	–	**		*	
T189	2·0 × 1·0									
T190	6·5 × 0·5	*	8 × 8	S × S	tabby	–	***		*	
T191	37·0 × 1·5	*	13 × 11	S × Z	tabby	–	****		*	
T192	6·0 × 0·5	*	10 × 10	S × Z	tabby	–	***		*	
T193	8·0 × 7·0	*	11 × 9	S × S	tabby	–	**		*	*

T194	21·0 × 1·5	*	7 (2-ply) × 12	Z-twist × S	tabby	Ib	**	*	selvedge only
T195	23·0 × 1·0	*	16 × 11	Z × S	tabby	–	***	*	
T196	13·0 × 1·0	*	12 × 8	S × S	tabby	–	***		
T197	4·0 × 3·5								
T198	15·0 × 1·0	*	6 (2-ply) × 4 pairs	Z-twist × S + S	tabby	IIIa	**	*	selvedge only
T199	5·5 × 1·0								
T200	17·0 × 0·5	*	12 × 10	S × S	tabby	–	****	*	
T201	7·0 × 1·5	*	10 × 7	S × S	tabby	–	***	*	
T202	6·0 × 0·5	*	10 × 10	S × S	tabby	–	***	*	
T203	21·5 × 1·0	*	14 × 12	S × Z	tabby	–	****	*	
T204	16·0 × 1·5	*	9 × 7	S × S	tabby	–	***	*	
T205	22·0 × 0·5	*	8 × ?	S × S	tabby	–	****	*	
T206	12·5 × 1·0	*	8 × 8	S × S	tabby	–	***	*	
T207	16·0 × 0·5	*	12 × 8	Z × S	tabby	–	****	*	
T208	16·0 × 0·5	*	10 × 8	S × S	tabby	–	***	*	
T209	9·5 × 0·5	*	11 × 9	Z × S	tabby	–	***	*	
T210	8·5 × 0·5	*	10 × ?	S × ?	tabby	–	***	*	
T211	4·5 × 0·2	*	8 × ?	? × ?	tabby	–	***	*	
T212	6·5 × 0·5	*	18 × 16	Z × S	tabby	–	****	*	
T213	4·0 × 3·5	*	14 × 14	Z × S	tabby	–	***	negative	*
T214	26·0 × 3·0	*	12 × 10	S × S	tabby	–	***/****	negative	*
T215	23·0 × 4·0	*	12 × 10	S × S	tabby	–	***/****	negative	*
T216	7·0 × 4·0	*	12 × 12	Z × S	tabby	–	****	indigotin + yellow	
T217	8·0 × 4·0								
T218	18·0 × 1·5	*	8 × 16	Z × S	tabby	Ib	**/***		*
T219	3·0 × 1·0	*	8 × 6	S × S	tabby	–	**/***		*
T220	18·5 × 0·5	*	11 × 9	S × Z	tabby	–	***		*
T221	46·5 × 0·4	*	14 × 12	Z × S	tabby	–	***		*
T222	7·5 × 0·4	*	9 × 6	S × S	tabby	–	**		*
T223	9·5 × 0·5	*	9 × 9	Z × S	tabby	–	***		*
T224	8·0 × 0·5	*	10 × 10	Z × S	tabby	–	***		*
T225	13·0 × 0·4	*	9 × 6	S × S	tabby	–	**		*
T226	23·0 × 0·2	*	? × ?	Z × S	tabby	–	***		*
T227	15·5 × 0·3	*	10 × ?	Z × S	tabby	–	***		*
T228	10·5 × 0·4	*	10 × 8	S × S	tabby	–	***		*
T229	9·0 × 0·5	*	10 × 10	S × S	tabby	–	***		*
T230	2·5 × 0·5	*	10 × 10	Z × S	tabby	–	***		*
T231	5·5 × 0·4	*	8 × ?	S × ?	tabby	–	***		*
T232	2·0 × 0·4	*	12 × 10	S × S	tabby	–	***		*
T233	7·0 × 0·3	*	? × ?	Z × S	tabby	–	***		*
T234	5·5 × 0·2	*	? × ?	Z × S	tabby	–	***		*
T235	2·0 × 0·4	*	? × ?	Z × S	tabby	–	***		*
T236	7·5 × 0·3	*	? × ?	S × S	tabby	–	***		*

CATALOGUE: WOVEN FRAGMENTS, MADE FROM WOOL—*cont.*

No.	*Dimensions in cms*	*woollen*	*worsted*	*Thread-count* (warp first, where known)	*Spin*	*Weave*	*border*	*finishing*	*Dyestuff*	*offcut*	*seam*	*Other details*
T237	14·0 × 0·3	*		? × ?	S × Z	tabby	–	***		*	*	
T238	5·5 × 0·2	*		? × ?	Z × S	tabby	–	***		*		
T239	9·0 × 0·3	*		? × ?	Z × S	?tabby	–	***		*		
T240	5·5 × 0·2	*		? × ?	Z × S	tabby	–	***		*		
T241	4·5 × 0·5	*		9 × ?	Z × S	tabby	–	***		*		
T242	5·0 × 0·3	*		? × ?	S × S	tabby	–	***		*		
T243	7·0 × 0·4	*		12 × 12	Z × S	tabby	–	**		*		
T244	4·5 × 0·3	*		? × ?	S × S	tabby	–	***		*		
T245	6·0 × 0·4	*		14 × 12	S × S	tabby	–	**		*		
T246	3·0 × 0·4	*		? × ?	Z × S	tabby	–	***		*		
T247	3·0 × 0·2	*		? × ?	S × ?	?tabby	–	***		*		
T248	3·0 × 0·3	*		? × ?	S × S	tabby	–	**/***		*		
T249	2·0 × 0·5	*		10 × 7	S × S	tabby	–	**		*		
Ph. 1, R.A. 3, 59.												
T258	4·5 × 3·5	*		15 × 12	S × Z	tabby	–	*	indigotin			
T259	4·0 × 2·5											
T260	4·0 × 2·0											
Ph. 1, R.A. 3, 91.												
T261	3·0 × 0·8	*		12 × 6	Z × Z	2/1 twill	–	–				
T262	3·0 × 0·8											
Ph. 3, R.A. 3, 35.												
T275	12·0 × 4·0		*	22 × 24	Z × S	2/2 twill	–	–				
T276	3·5 × 1·5		*	26 × 18	Z × Z	2/2 twill	–	–				
T277	25·0 × 5·5		*	24 × 18	Z × S	tabby	Ia	–	negative	*		
T278	26·0 × 11·0	*		13 × 11	S × S	2/2 twill	–	*	negative	*	*	
T279	8·0 × 8·0											
T280	13·0 × 2·0	*		15 × 10	S × S	tabby	–	*		*	*	T283 is a strip tied in an overhand knot
T281	6·5 × 1·5											
T282	11·0 × 2·0											
T283	3·5 × 1·5											
T284	5·5 × 1·0	*		9 × 8	S × S	tabby	–	**		*		T285 is a strip tied in an overhand knot
T285	7·0 × 1·0											
T286	11·0 × ?		*	? × ?	Z × ?	?	–	–				One system is no longer present
R.A. 2, 30 (19th century)												
T290	14·5 × 9·0	*		14 pairs × 14 pairs	Z + Z × Z + Z	Extended tabby	–	*	indigotin (+ indirubin)		*	Both systems worked in pairs

WOVEN FRAGMENTS, MADE FROM SILK

No.	*Dimensions in cms*	*Thread-count*	*Twist*	*Weave*	*border*	*Dyestuff*	*offcut*	*Other details*
Ph. 2, R.A. 1, 39.								
T250	6·5 × 0·3	16 pairs × 14 bundles	Z × Z	extended tabby	–		*	One system worked in pairs, other in bundles of five yarns
Ph. 1, R.A. 3, 70								
T257	4·5 × 3·5	60 × 34	S × Z	velvet	–			Pile worn away
Ph. 1, R.A. 3, 91								
T263	6·0 × 4·0	60 × 40	S × no twist	tabby	–	?kermes or cochineal		Two pieces the same, stitched to each other with T283
T264	11·0 × 5·0	48 × 26	S × no twist	tabby	Ia	negative		Three pieces of ribbon stitched to each other with T284.
T267	30·0 × 1·5	44 × 42	S × no twist	cut velvet	–	negative	*	Strip tied in overhand knot.
Ph. 1, R.A. 3, 53								
T270	8·0 × 1·0	32 × 18	S × S	tabby	Ia			

KNITTED FRAGMENTS (WOOL)

No.	*Dimensions in cms*	*tension per 5 cms*	*yarn*	*dye-test*	*Other details*
Ph. 2, R.A. 1, 39					
T251	3·0 × 2·5	25 sts × 40 rows	single ply, S-spun		stocking stitch (2 rows knit, alternating with 2 rows purl)
T252 }	5·0 × 3·0 }	25 sts × 40 rows	single ply, S-spun		
T253 }	3·5 × 2·0 }				
Ph. 3, R.A. 3, 35					
T288	15·0 × 8·0	17 sts × 18 rows	2-ply, Z-twist, S-spin	negative	stocking stitch with two bands of 2 rows knit, 2 rows purl.
T289	11·0 × 4·0	15 sts × 23 rows	2-ply, Z-twist, S-spin	negative	stocking stitch

YARN AND STRING

Ph. 2, R.A. 1, 39

T254 silk yarn, 4 cms long, 2-ply, S-twisted from Z yarns, approx. 0·8 mm diameter.
T255 worsted yarn, 5·5 cms long, 2-play, S-twisted from Z-spin, approx. 0·5 mm.
T256 silk yarn, 3·5 cms long, 2-ply, S-twisted from nontwisted yarns, approx. 0·7 mm.

Ph. 1, R.A. 3, 91

T265 silk yarn used to stitch T263, 2-ply, S-twist from ?Z-twist yarn, 1.0 mm.
T266 silk yarn used to stitch T264, 2-ply, S-twist from Z-twist yarn, 0·8 mm.

Ph. 1, R.A. 3, 53

T271 silk yarn used to stitch T270, 2-ply, S-twist from Z-twist yarn, 0·7 mm.
T272 two lengths of wool yarn, 16·0 and 11·5 cms, 2-ply, S-twisted from Z-spun yarn, 0·8 mm diameter.
T273 string made from coarse vegetable fibre, 4·0 cms long, 4- or 5-ply, S-twisted from Z-twist strands, 10·0 mm diameter.

Ph. 2, R.A. 3, 42

T274 five lengths of ?silk yarn, 9·0–29·0 cms long, 2-ply, S-twist, Z-spin, 0·8–1·2 mms diameter.

Ph. 3, R.A. 3, 35

T287 ten pieces of woollen yarn, 6·0–9·0 cms long, single ply, Z-spun, 2·0–3·0 mm diameter.

UNSPUN FIBRES

Ph. 1, R.A. 3, 91

T268 compacted pad of mid brown animal fibres; above half are heavily pigmented and a small percentage have medullas: probably a coarse wool.
T269 several compacted pads of animal fibres; the fibres are less well-preserved than T268 but are also heavily pigmented and probably coarse wool.

THE ANIMAL REMAINS

James Rackham

The faunal material analysed in this report is derived from the three 17th-century features discussed above in the excavation report and POTTERY RELATED TO THE SITE. The material from contexts in R.A. 2, which was not clearly attributed to either the bastion ditch or the robber trench, although catalogued, has not been included in this analysis.

In the areas A2 and C3 the small collection of bone was catalogued as one unit and not separated into phases and in R.A. 2 the sample was catalogued in two groups—one containing most of the phase 1 deposits and a second containing largely phases 2 and 3. This failure to separate into phases resulted from some of the material from these areas being catalogued when the medieval collection was being studied.

The previous excavations at the Black Gate have yielded a large collection of late medieval bones from the Castle Ditch[239] and a small group of 17th-century material from the 17th-century pit[240] and the results from this analysis will be compared with these.

From the discussion above of the 17th-century features, it is apparent that some contexts are more useful than others as samples of the periods involved. Phases 2 and 3 in the ditch are likely to be largely primary deposits although the quantity of derived pottery in each phase varies between the excavated areas of the ditch. In phase 3 particularly the deposits from R.A. 2 contain a lot of residual pottery whereas those from R.A. 3 contain very little. The presence of preserved textile and leather in ph. 2 and 3 R.A. 3 is possibly also an indication of little disturbance and suggests primary deposition of the material in these layers. On the other hand, the quantity of derived pottery in ph. 1 and the robber trenches makes it probable that none of the excavated material was in a primary context, it can therefore have little use for the economic interpretation of the site. It may still in the less contaminated layers be of interest in the context of a sample from the town. The archaeological nature of the features themselves precludes the possibility that the bone sample can be interpreted in terms of local site activities, since the features must be to some extent remote from the source of the material that fills them, and for which we have no archaeological information.

TABLE 1. Species and Fragment counts for the seventeenth-century levels at the Black Gate. Mammals.

Bastion Ditch Fill	Phase 1				Phase 2			Phase 3			Phases 1–3 A2 &	
	RA1	RA2	RA3	*Total*	RA1	RA3	*Total*	RA1	RA3	*Total*	C3	RA2
Man	31	5	22	58		5	5	3	4	7	1	3
Horse					1	2	3		1	1		1
Cattle	24	14	97	135	94	95	189	75	42	117	24	80
Pig	2	4	15	21	18	23	41	14	20	34	3	7
Sheep	1	3	13	17	9	22	31	6	8	14	7	10
Sheep or goat	38	11	88	137	136	275	411	157	178	335	6	119
Dog			2	2	6	10	16	4	1	5	1	
Cat					19	6	25		4	4	1	6
Fallow deer					1		1	2	2	4		1
Seal, cf grey			1	1								
Hare, Brown			1	1		3	3	2	1	3	1	
Rabbit		1	5	6		4	4	6	16	22	1	2
Rat, sp.									3	3		
Large mammal	21	10	35	66	37	58	95	45	21	66	10	21
Large ungulate	20	6	53	79	47	84	131	48	52	100	26	52
Small ungulate	7	6	54	67	78	162	240	84	118	202	16	34
Indet. mammal	16	9	22	47	46	89	135	77	54	131	2	17
	160	69	408	637	492	838	1330	523	525	1048	101	353

TABLE 2. Species and Fragment counts for the seventeenth-century levels at the Black Gate. Fish and Bird bones.

Bastion Ditch Fill	Phase 1				Phase 2			Phase 3		
	RA1	RA2	RA3	*Total*	RA1	RA3	*Total*	RA1	RA3	*Total*
Chicken	2	2	12″	16	8	12	20	13	4	17
Goose, domestic	2	2	8	12	2	13	15	3	7	10
Turkey			1	1	1		1	1		1
Duck sp. indet		1	2	3					1	1
Grouse, Red					1		1	2		2
Woodcock						1	1	1		1
Curlew cf.								1		1
Blackcock, c.						1	1			
Large bird			1	1	1	2	3	1	1	2
Bird indet.			4	4	1	3	4	2	3	5
				37			46			40
Cod, *Gadus morhua* L.					2				1	
Ling, *Molva* cf. *molva*					1			1		
Cod family, Gadidae.			50 +			2				
Turbot, *Scophthalmus maximus* (L.)						1(2)				
Indeterminate fish						2				

+ *circa* 50 fin rays from a large gadid fish.

″Partial skeleton.

TABLE 3. Species and fragment counts for the seventeenth-century levels at the Black Gate.

Bastion Robber Trench				*C17th Robbing of Building A*
	RA1	*RA3*	*Total*	
Man	6	6	12	7
Cattle	48	14	62	41
Pig	7	2	9	13
Sheep	4		4	3
Sheep or goat	102	22	124	162
Dog	3	2	5	5
Cat	1	2	3	
Fallow deer	1		1	
Roe deer	1		1	
Red or Fallow deer	1		1	
Hare, Brown				2
Rat, sp.				1
Rodent, sp.				1

	Bastion Robber Trench			*C17th Robbing of Building A*
	RA1	RA3	*Total*	
Large mammal	27	5	32	42
Large ungulate	25	12	37	57
Small ungulate	79	17	96	121
Indet. mammal	63	10	73	88
	368	92	460	543
Chicken	9		9	8
Goose, domestic	10	1	11	6
Turkey	1		1	
Duck sp. indet.				1
Jackdaw				3
Pigeon family				4
Large bird, indet.	1		1	1
Bird indet.				2
			22	25
Cod, *Gadus morhua* L.				3
Haddock, *melanogrammus aeglefinus* (L.)				2
Gadidae				2
Fish, indeterminate				2
				9

TABLE 4. Shell fish from the seventeenth-century deposits at Black Gate, Newcastle.

	Phase 1			Phase 2		Phase 3		Phl-3	Bastion R.T.		Building A R.T.
	RA1	RA2	RA3	RA1	RA3	RA1	RA3	RA2	RA1	RA3	
Oyster	3	3	67	15	18	13	14	1		1	15
Mussel, common		1	1		1						
Cockle, common		1	18	3	13	4	14			1	1
Periwinkle		3	3	4		3			3		3
Limpet			1		1	1	1				
Edible crab			1								
Crustacean frag			4								

Method of study

The identification of the bones has been effected by comparison with reference material of known species. Ribs and vertebrae have not generally been identified to species in the case of the artiodactyls but catalogued as large ungulate (cattle, red

and fallow deer) or small ungulate (sheep, goat, roe deer and pig). Bone fragments of unknown species were catalogued as large mammal (ox-sized animals) or indeterminate mammal (mainly sheep-sized animals). The material was catalogued within its smallest archaeological units except for that group processed with the medieval collection (see above). Measurements were taken whenever possible as long as it was ascertainable that the bone was either an adult or a juvenile; if this was not determinable, for instance the proximal half of a radius, no measurements were taken. Specific identification of sheep were only made on the appropriate skull fragments and horn cores. A metrical and descriptive archive of the collection is available from the Biological Laboratory, Department of Archaeology, Durham University.

Recovery

All the animal bones and shells identified were recovered during the manual excavation of the site. No sieving was carried out. This does now however invalidate the sample or its analysis. There is some suggestion in the absence of small sheep bones (carpals, tarsals and phalanges—Table 8) that small items had a lower recovery level. This is unlikely to affect the analysis of the major species but will certainly have influenced to some degree the abundance of the smaller mammal, bird and fish bones. Since little of the material is in a context which can be associated with contemporary activities on or adjacent to the site its interpretation is limited to its analysis as a sample of unknown origin from post-medieval Newcastle. Quantitative data for the smaller and rarer species is not readily interpretable.

TABLE 5. Percentages of the major domestic species in the phases of the Bastion ditch fill.

	Phase 1	2	3	Total	A2 & C3 + RA2 phl–3	Total (all areas)
Cattle	43	28	23·4	29·7	40·6	31·3
Sheep	5·5	4·6	2·8	4·2	6·6	4·5
Sheep or goat	44	61	67	59·5	48·8	58
Pig	6·7	6	6·8	6·4	3·9	6·1
	99·2	99·6	100	99·8	99·9	99·9
N =	310	672	500	1482	256	1738

Percentages of the major domestic species in the deposits of the Bastion wall robber trench and the robber trench of Building A.

	Bastion Robber Trench	Robber Trench of Building A
Cattle	31	18·7
Sheep	2	1·3
Sheep or goat	62	73·9
Pig	4·5	5·9
	99·5	99·8
	N = 199	219

Percentages of the major domestic species in the late medieval deposits from the castle ditch (Rackham, 1981) and a seventeenth century pit (Rackham, 1979).

	Phase 17 Castle Ditch	Seventeenth-century pit
Cattle	33·8	37·8
Sheep	12·9	6·2
Sheep or goat	47·0	48·0
Pig	6·3	7·9
	100	99·9
	N = 1042	177

TABLE 6. Percentage of identified bone fragments in each area.

	RA1	RA2	RA3	A2 & C3	Building A
Phase 1	60%	55%	59·8%		
Phase 2	57·7		53·1		
Phase 3	51·4		53·3		
Phases 1–3		64·9		44·5	
Bastion R.T.	47·3		52·2		
Med. Building				43·3	

TABLE 7. Table of the incidence of cattle bones in each area and phase:

	RA1	RA2	RA3	Phase 1	RA1	RA3	Phase 2	RA1	RA3	Phase 3	RA2	A2 & C3	All
	ph1	*ph1*	*ph1*	*Total*	*ph2*	*ph2*	*Total*	*ph3*	*ph3*	*Total*	*ph1–3*	*ph1–3*	*phases*
Skull	2		18	20	6	10	16	2	3	5	6	1	48
Horn core	1	3	4	8		2	2		2	2	1		13
Mandible	2	1	5	8	6	13	19	5	3	8	4	1	40
Teeth		1	5	6	2	4	6	12	2	14	2	2	30
Atlas		1	5	6	1	1	2	4		4	2		14
Axis						2	2				1	2	5
Lumbar vertebra					3		3						3
Sacrum			1	1	2	1	3						4
Scapula	3	2	10	15	6	9	15	4	3	7	7		44
Humerus			6	6	3	3	6	2	2	4	4		20
Radius	2		7	9	5	6	11	6	1	7	5		32
Ulna	1		3	4	2	4	6	1		1	1	2	14
Carpals		1	1	2		3	3	2		2			7
Metacarpals	1		3	4	8	2	10	5	7	12	1	4	31
1st phalanx	1		5	6	6	7	13	2	2	4	7	2	32
2nd phalanx		1	2	3	6	5	11	2	3	5	1	1	21
3rd phalanx			2	2		1	1	3		3		1	7
Innominate	4	1	5	10	14	2	16	7	2	9	6		41
Femur	3	1	5	9	5	3	8	1		1	6	2	26
Tibia	2		2	4	4	6	10	6	3	9	13	2	38
Tarsals	1	1	5	7	3	7	10	4	4	8	10		35
Metatarsals	1	1		2	8	2	10	4	3	7	3	4	26
Patella			1	1	1		1		1	1			3
Hyoid			1	1	1		1		1	1			3
	24	14	97	135	92	95	187	72	42	114	80	24	976

TABLE 8. Table of the incidence of sheep (and or goat) bones in each area and phase:

	RA1	RA2	RA3	Phase 1	RA1	RA3	Phase 2	RA1	RA3	Phase 3	RA2	A2 & C3	All
	ph1	*ph1*	*ph1*	*Total*	*ph2*	*ph2*	*Total*	*ph3*	*ph3*	*Total*	*1–3*	*ph1–3*	*Phases*
Skull		2	11	13	9	14	23	7	9	16	3		55
Horn core	1	3	8	12	9	14	23	8	4	12	8	7	62
Mandible	1		7	8	11	23	34	10	8	18	6		66
Teeth	3	1	1	5	6	8	14	15	6	21	4		44
Atlas	1		2	3	1	2	3	2		2	3		11
Axis			1	1	2	6	8	3	1	4	1	1	15
Cervical Vertabra						1	1	1		1			2
Lumbar vertebra									1	1			1
Sacrum						2	2		2	2			4
Scapula	5	2	9	16	13	35	48	17	16	33	12		109
Humerus	2		9	11	12	18	30	8	11	19	17		77
Radius	4		8	12	17	30	47	14	17	31	9	1	100
Ulna	1		4	5	1	8	9	2	4	6	2		22
Metacarpale	5		8	13	12	21	33	18	11	29	14	1	90
1st phalanx		1	2	3		2	2	4	2	6	3		14
2nd phalanx								2	1	3			3
Ilium	2		2	4	6	10	16	10	5	15	7		42
Ischium			2	2	2	7	9	1	5	6			17
Pubis			2	2	2	1	3	3	2	5			10
Innominate	1		3	4	2	8	10	4	6	10	5		29
Acetabulum					1	2	3		1	1			4
Femur	2	2	3	7	12	13	25	7	24	31	6		69
Patella									1	1			1
Tibia	4		7	11	18	42	60	13	29	42	20	3	136
Calcaneum			3	3	1	3	4	5	6	11			18
Astragalus			1	1		4	4	2	6	8			13
Tarsals		1		1									1
Metatarsals	7	2	7	16	8	22	30	7	6	13	8		67
Hyoid			1	1					2	2			3
	39	14	101	154	145	296	441	163	186	349	128	13	2029

Analysis

An analysis of the composition of the samples in each area and phase illustrates that this is variable. If the species alone are considered the material from the Bastion ditch fill falls into two groups. Phases 2 and 3 have an abundance of sheep (or goat) remains that is not reflected in the material from Phase 1 and areas A2 and C3. Even within phases there is some variation between the areas. RA3 in phase 1 has a greater species diversity (Tables 1, 2 & 4) than the other trenches in this phase and the trench in general has a relatively greater abundance of shellfish, bird and wild mammal remains than any other group of deposits on the site.

Over 15% of the identified mammal bones from phase 1 are human and since the ditch is cut through a Saxon cemetery it is probable that these bones derive from

earlier deposits on the site. This evidence combined with the high proportion of residual pottery suggests that the phase 1 deposits are not a "good" seventeenth-century group.

The relative incidence of domestic mammal fragments from each of the Railway Arches and within phase has been compared using Chi^2 tests. Small sample size necessitated the amalgamation of the R.A. 1 and R.A. 2 figures in phase 1. The phase 1 deposits, R.A. 1 and 2 and R.A. 3 show a similar pattern with no significant deviation at $p > 0{\cdot}5$. The phase 2 deposits on the other hand show more variation. R.A. 1 has a less than 5% probability ($p > 0{\cdot}01$ & $< 0{\cdot}05$) and R.A. 3 a less than 10% probability ($p > 0{\cdot}05$ & $< 0{\cdot}01$) that they derive from a homogeneous sample of their combined figures. However in phase 3 the incidence of the major domestic animals suggests similarity at $p > 0{\cdot}1$ ($< 0{\cdot}5$). Both phase 2 and 3 are different from the phase 16 deposits of the Castle ditch[241] and the seventeenth-century pit.[242]

The nature of the deposits appears to change from phase to phase and fig. 29 indicates that the majority of the phase 1 deposits are layers containing only small groups of bone with a tendency towards a higher proportion of identifiable pieces than other phases. In contrast phase 2 consists of a small number of layers containing large collections of bones. Phase 3 is somewhat in between with a wide range of group sizes but generally the groups are larger in this phase than in phase 1 and the majority are substantially smaller than those in phase 2. This perhaps suggests that during the deposition of phase 2 and part of phase 3 the ditch is actively being used as a dumping area with rapid or single event filling. The Building A robber trench deposits exhibit a similarity in group size to phase 3 but a lower proportion of identifiable remains, while the Bastion robber trench also shows a wide variation in group size.

In order to test for contamination of the bone sample by earlier derived material measurements of the sheep bones from the more heavily contaminated (on pottery evidence) layers have been compared with those from other areas and phases (figs 30–33). Unfortunately the wide variation of the specimens from all phases and areas has prohibited the identification of any bones as possibly residual although within phase variation does suggest some dimorphism which may be due to sex or residual material. The data however is not readily interpretable in the absence of well dated comparable material from Newcastle.

Therefore despite the prior knowledge of some degree of contamination it is not possible to recognize the observable differences between areas and phases as due to residual material rather than contemporary variation, although in the light of the pottery evidence it would be possible though not necessarily correct to interpret this variation in terms of differential contamination from different periods within each phase. A glance at the section drawings on fig. 5 illustrates immediately that the individual phases of the ditch fill would be unevenly contaminated by the deposits forming its bank and that phase 1 contamination may be from all periods whereas in phase 3 contamination is likely to be from the sixteenth century only.

The taphonomic problems associated with this analysis negate the interpretation of this material within any chronological framework (site chronology) and further

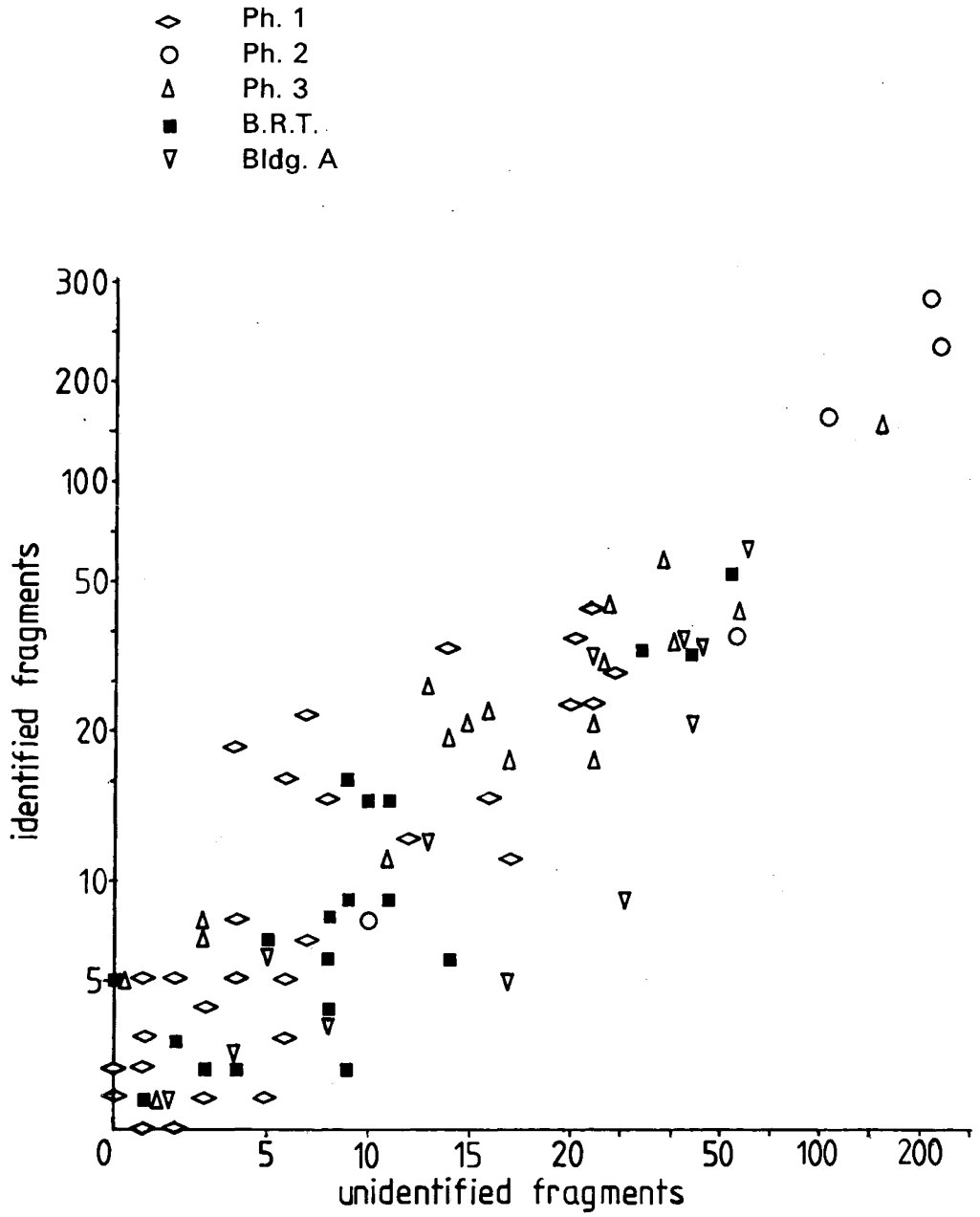


Fig. 29. Numbers of identified and unidentified bones in each layer, for each phase.

discussion will be restricted to those phase 2 deposits of moderately large size that suggest rapid dumping and perhaps therefore a low level of contamination and the groups from phase 3. The phase 3 deposits do however have a wide variety of group sizes (from layers) and a large number of groups, which suggests a variety of origins and increases the likelihood of contamination. On the other hand the deposits of phase 3 exhibit similarities to phase 2 (see below) and show insufficient variation between R.A. 1 and R.A. 3 to suggest that the differences in abundance between the domestic species are significant.

Skeletal selection

The possible loss of small bones has already been referred to above. In order to test for any differential selectivity of bone element in each phase a Chi^2 test was conducted on sheep bones from phases 2 and 3 by comparison with the total from all the phases. These two phases were selected since they were the only ones that offered sufficient numbers for the test to be useful. Phase 2 showed no significant deviation from the total for all phases ($p > 0{\cdot}9$) whereas phase 3 showed greater variation ($p < 0{\cdot}5$, $> 0{\cdot}1$) but still acceptable. The bulk of this variation in phase 3 is caused by deviation from the expected frequency of the bones of the hind limb particularly the tarsals and metatarsals. The latter being under-represented and the former over represented, a reverse of the pattern in phase 2. The evidence is however suggestive of a similar source for the material in these two phases.

The sample can also be tested against expected numbers of elements (i.e. if whole carcasses were being disposed of), to determine variation due to butchery, disposal etc. Using only those bones of the carcass that were unaffected by recovery procedures and occurred in sufficient numbers for the statistic to be valid, the following results were obtained. Phases 2 and 3 show a deviation ($p < 0{\cdot}001$) from expected numbers that indicates that the carcass bones have been subjected to pre- and possibly post-depositional bias. These are reflected in relatively high numbers of front limb bone fragments, tibiae and jaws in phase 2 with a similar pattern in phase 3 except for diminished numbers of jaw bones and increased numbers of femori. These are largely meat associated elements of the skeleton and this evidence suggests that the sample is mainly domestic refuse rather than the industrial rubbish found in the sixteenth-century deposits of the Castle ditch.

Although the incidence of cattle bone fragments are presented in Table 7 these are not discussed in detail owing to smallness of sample, few bones in phase 3 occurring in more than single figures. However the meat bearing bones can be seen to be the most frequent remains in the total for all the phases.

With the conclusion that the material from the least contaminated layers (phase 2 and 3) is largely domestic the species in the collection can now be analysed in more detail.

Cattle

The different frequency of the skeletal elements has already been discussed above. The sample is too small for any analysis of sex but the information relating to the

age at death of the animals is listed in Table 9. The data on tooth eruption and attrition is minimal, however six jaws have the molar 1 unerupted (< 6–9 months old) and fourteen have this tooth erupted, and eleven jaws have the molar 3 unerupted (< approx. 4 yrs.) with eight in which it is erupted. This contrasts somewhat with the epiphyseal fusion data (Table 9) which indicates, except for two calf bones that few of the bones definitely derive from cattle slaughtered before the end of their third year; only the later fusing epiphyses (3½–4 years) show the juvenile condition.

A number of the cattle bones are chopped, particularly the innominates and some of the vertebrae have been chopped axially and dorso-ventrally suggesting that the carcasses had been butchered into sides. Scarring and slight lipping of the proximal articulation occurs on some phalanges and this and the exostosis and scarring of the distal articulation of a metatarsal bone may have been stimulated by excessive load on the feet such as occurs when an animal is used for draught. No other pathological features were noted on the cattle bones.

TABLE 9. Epiphyseal fusion data for cattle and sheep from phases 2 and 3.

	Phase 2			Phase 3		Phase 2			Phase 3	
	U	F	*Cattle*	U	F	U	F	*Sheep*	U	F
Acetabulum	1	4				3	24		6	19
Scapula, tuberosity	1	3			3	3	21			15
Humerus, dist.		2				1	18		3	10
Radius, prox.		6			1		26		1	14
Phalanges, prox.		24			4		2		2	7
Metacarpus, dist.	1	5			3	10	7		5	9
Tibia, dist.		2			1	5	25		3	23
Metatarsus, dist.		2			5	7	10		4	4
Calcaneum, prox.	3	3		1			4		4	7
Humerus, prox.		2		1	1	6	2		2	
Radius, dist.		3		1	2	12	10		6	7
Femur, prox.	1	3				4	4		5	1
Femur, dist.	1	2				3	1		8	(1)5
Tibia, prox	2	1		1	1	8	(1)4		5	(1)4
Vertebral epiphyses	8				1	3	6		2	(1)4

() specimen in which the fusion has only just occurred.

Sheep

Very few goat bones were identified among the 20,000 bones from the Castle Ditch deposits and there is a complete absence of identifiable goat bones from the seventeenth-century levels. All the skull bones, metapodials and innominates indicate sheep and it may be presumed that virtually all if not all of the bones in this collection assigned to sheep or goat are sheep.

The data on the age at death of the sheep in this collection (phases 2 and 3) is summarized in Tables 9 and 10. Since many of the sheep jaws are incomplete, the

TABLE. 10
Eruption state of the Sheep jaws.

	Unerupted	Erupted	Age at eruption
Molar 1		37	approx. 6 months
Molar 2	5	34	12–18 months
Molar 3	10	24	2–3 years

(The ages are bracket ages for the period of eruption based on Silver, 1969.)[243]

ages represented by them have been assessed in terms of how many carry erupted or unerupted molars (Table 10).

The epiphyseal fusion and the tooth eruption data appear to be in agreement, and suggest that a few sheep are slaughtered in their first two years but an increase occurs at approximately 2–3 years of age. This is younger than the age that would be expected if sheep were being kept for wool production and indicates the probability of a mutton farming element in the sheep farming of the area. A proportion of the animals survive beyond three years and the wear patterns on the teeth indicate continued slaughters up to a fairly advanced age, but the tooth attrition has not been quantified.

The butchery pattern of the sheep has not been analysed in detail but as in the cattle many of the vertebrae have been split down the middle suggesting division of the carcass into "sides". The sample has not been analysed for sex, however the graphs showing measurements of some of the more common bones of sheep (figs 30–33) do suggest some dimorphism, with possibly three groups indicated by the distal tibiae in phase 2 (fig. 30). A more detailed analysis of this aspect of the bones will be carried out during the study of each species from all the Black Gate excavations (see below).

There is very little pathological information available from the sample.

Other domestic animals

These are all in very low numbers (Tables 1 & 2). Pig, the most common represents less than 6% of the identified mammal bones in phase 2 and 3. A few bones of dog and cat occur including a partial skeleton and other individuals represented by more than one bone. Domestic chicken, goose and turkey occur, but the duck bones are probably from a wild species.

Non-domestic animals

The fallow deer, hare and rabbit are food animals whose remains were also found in the earlier deposits of the Castle Ditch. The wild bird species in these deposits (phase 2 and 3) are all food animals and these along with the fish species must have been fairly readily available in post-medieval Newcastle. It is unlikely that fish are seriously underrepresented in these samples (due to recovery) unless the bulk of the fish eaten in Newcastle during this period were small varieties such as herring, mackerel and some flatfish whose bones may have been missed during excavation, but certainly those identified (Tables 2 & 3) are from large fish whose bones are unlikely to have been missed during excavation.

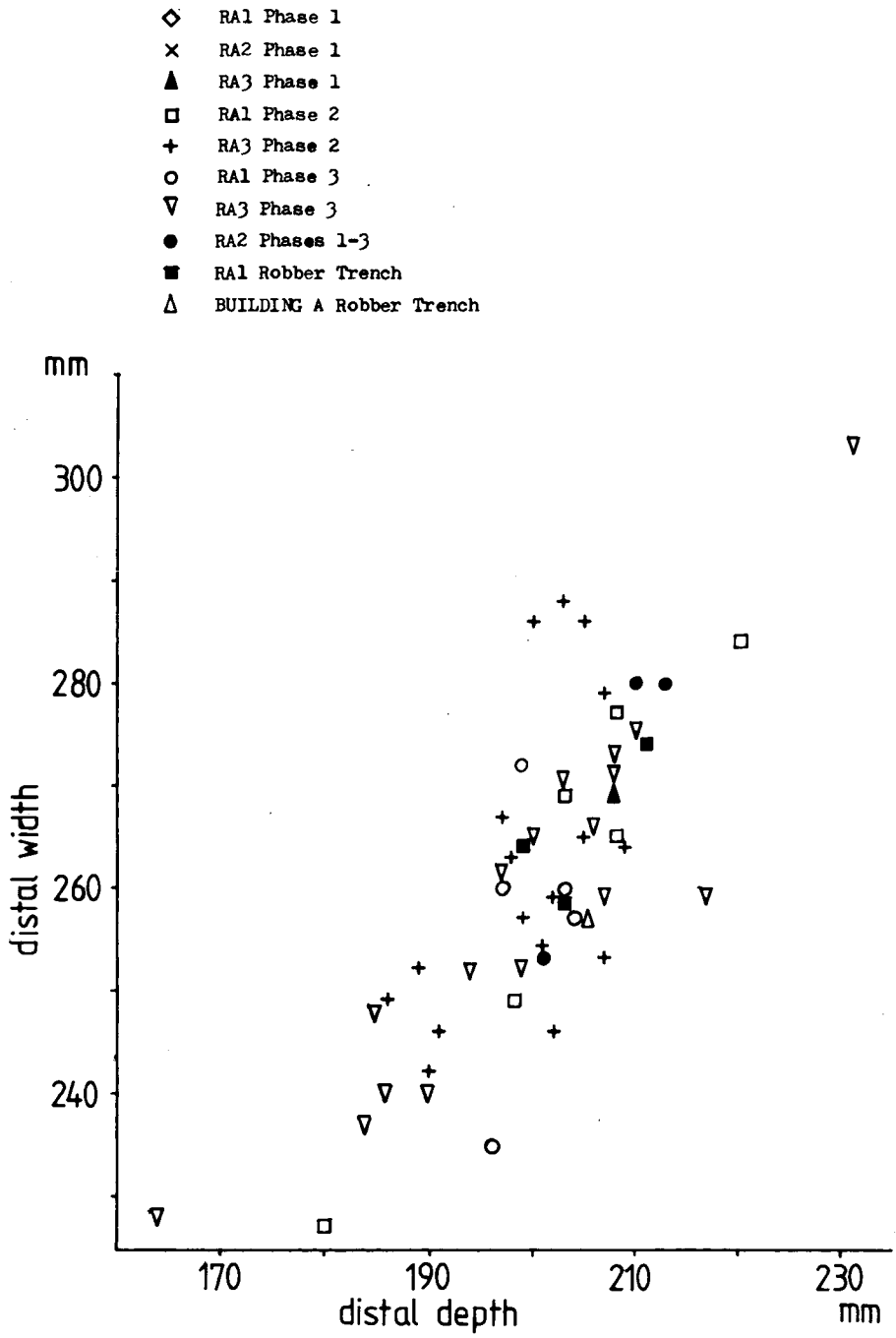


Fig. 30. Distal breadth (Bd in von den Driesch, 1976)[244] and depth (Dd) of sheep tibiae from each trench and phase.

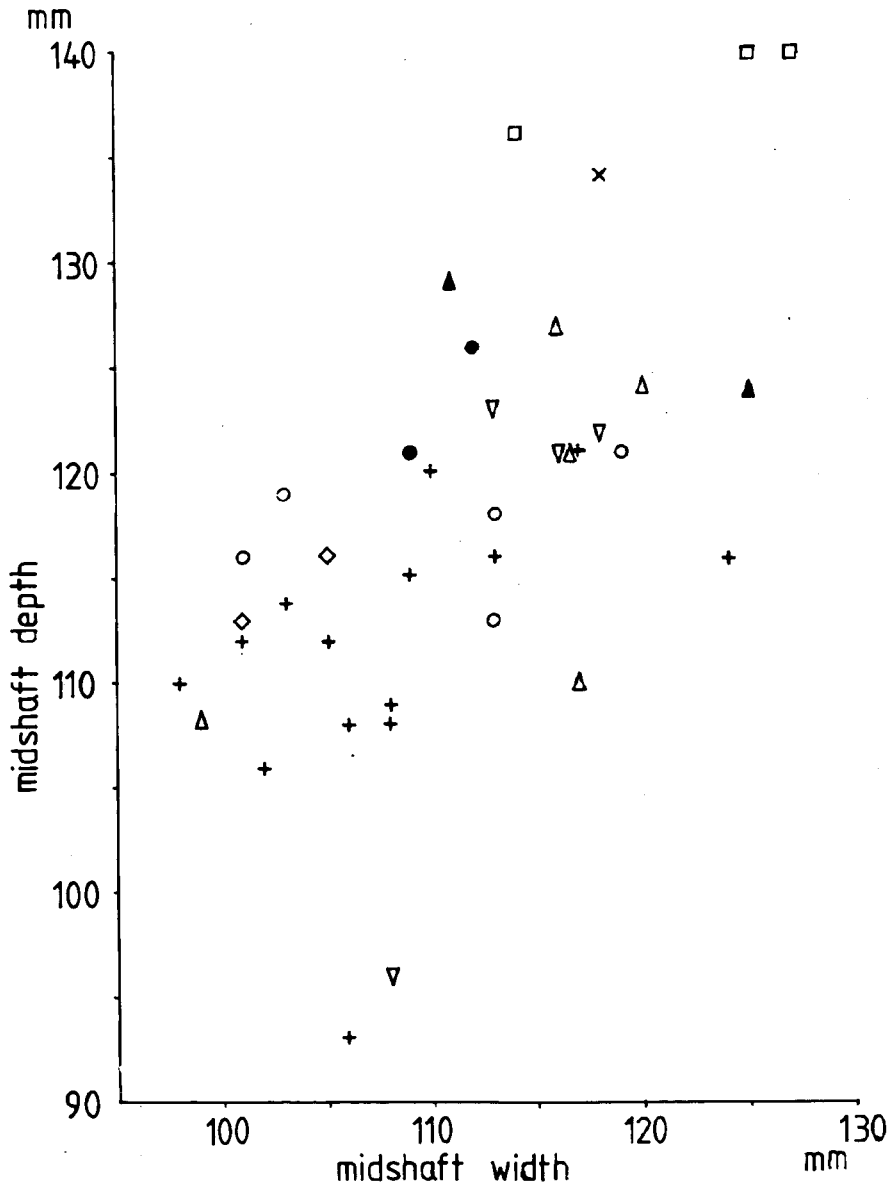


Fig. 31. Midshaft depth (at measure SD) and midshaft breadth (Sd in von den Driesch, 1976) of sheep metatarsals from each trench and phase (Key as in figure 30).

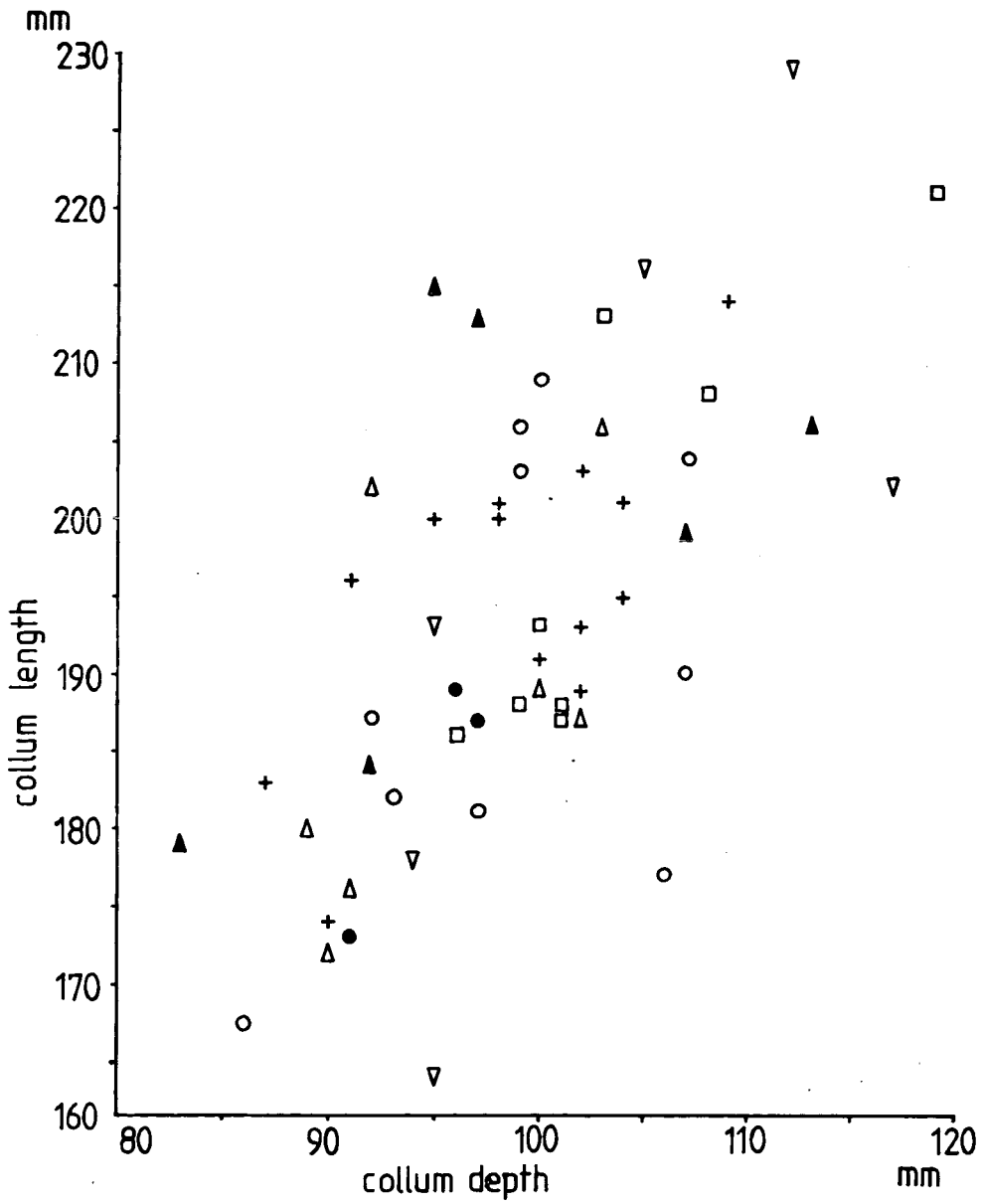


Fig. 32. Collum length (SLC in von den Driesch, 1976) and depth (minimum) of sheep scapulae from each trench and phase. (Key as in figure 30).

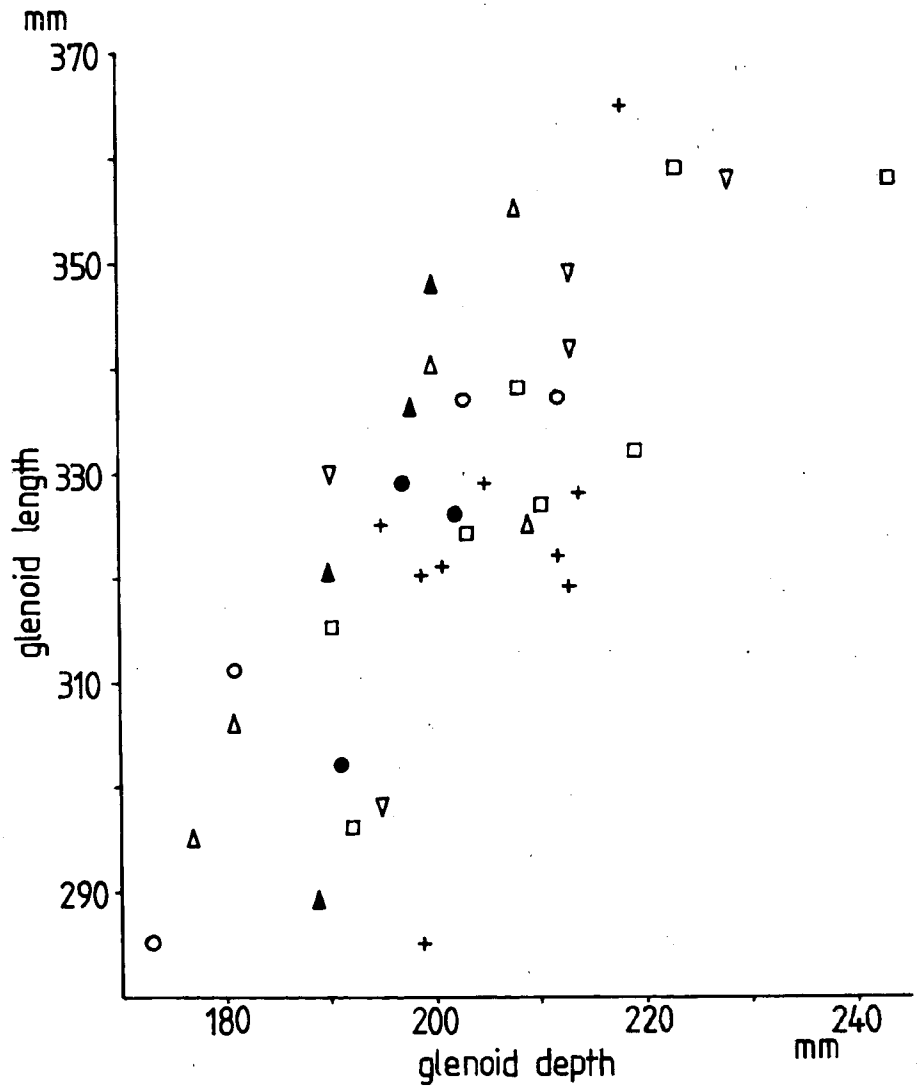


Fig. 33. Length (GLP in von den Driesch, 1976) and depth (BG) of glenoid cavity of sheep scapulae from each trench and phase (Key as in figure 30).

Shellfish

It must be presumed that all the shellfish remains (Table 4) are dietary in origin since it is unlikely that they would have found their way into these deposits if procured for fish bait.

Summary

In summary only the material from phase 2 and 3 can be considered sufficiently well stratified to justify analysis; the results of which suggest a collection of domestic dietary rubbish of middle seventeenth-century date. Minor variations between phases and trenches can be discerned but in the absence of associated archaeological occupation these cannot be interpreted.

This collection is being subjected to a more detailed morphometric study of the individual species along with the previous collections of medieval and post medieval animal bones from the Black Gate excavations. These analyses will be published elsewhere as and when they are completed.

Acknowledgements

I should like to thank A. K. G. Jones of the Environmental Archaeology Unit, University of York, for his identifications of the fish bones from these excavations.

WOODEN OBJECTS

188. Part of a double-sided simple comb.[245] The solid zone between the teeth tapers, however, giving the object an asymmetrical appearance. Ph. 2, R.A. 3, 37.
189. Fragment of a double-sided simple comb, with remarkably coarse teeth. Ph. 1, R.A. 3, 53.
    Part of a small disc of unknown purpose. Diam. 22 mm, thickness 2 mm. Ph. 1, R.A. 3, 53.
190. Two lumps of wood in which holes have been cut with a twist bit. Professor L. Beadle considered these had been made by someone either practising or playing about. Not securely stratified, but probably ph. 1, R.A. 3.

BOTANICAL REPORT

Alison M. Donaldson

DITCH DEPOSITS INCLUDING 17th CENTURY ?NIGHT SOIL.

2 kg of this dark silty material containing a considerable amount of ash was washed and subjected to paraffin flotations. The following plant remains were extracted:

Atriplex patula L./ *hastata* L.—Orache	2 seeds
Carex spp.—sedges	18 nutlets
Chenopodium album L.—Fat Hen	16 seeds
Galeopsis tetrahit L./*speciosa* Hull—Hempnettle	1 nutlet

Gramineae—grasses	5 caryopses
Polygonum aviculare L.—Knotgrass	12 fruits
Prunella vulgaris L.—Self Heal	5 nutlets
Ranunculus sect. Ranunculus—Buttercup	7 achenes
Raphanus raphanistrum L.—Wild Radish	1 seed
Rubus fruticosus aggr.—Blackberry	1 achene
Rumex, crispus T.—Dock	1 nutlet
Stellaria alsine Grimm.—Bog Stitchwort	1 seed

The blackberry pip could be of faecal origin, but, from this sample at least, it would seem that fruit was not a major component of the diet. The seeds of Fat Hen and Knotgrass were both eaten in prehistoric times, but are more likely in this case to represent simply the remains of plants growing locally.

The majority of species are weeds of waste places and are commonly found in deposits from urban sites. Fat Hen is frequent on nutrient-rich soils, while Knotgrass,

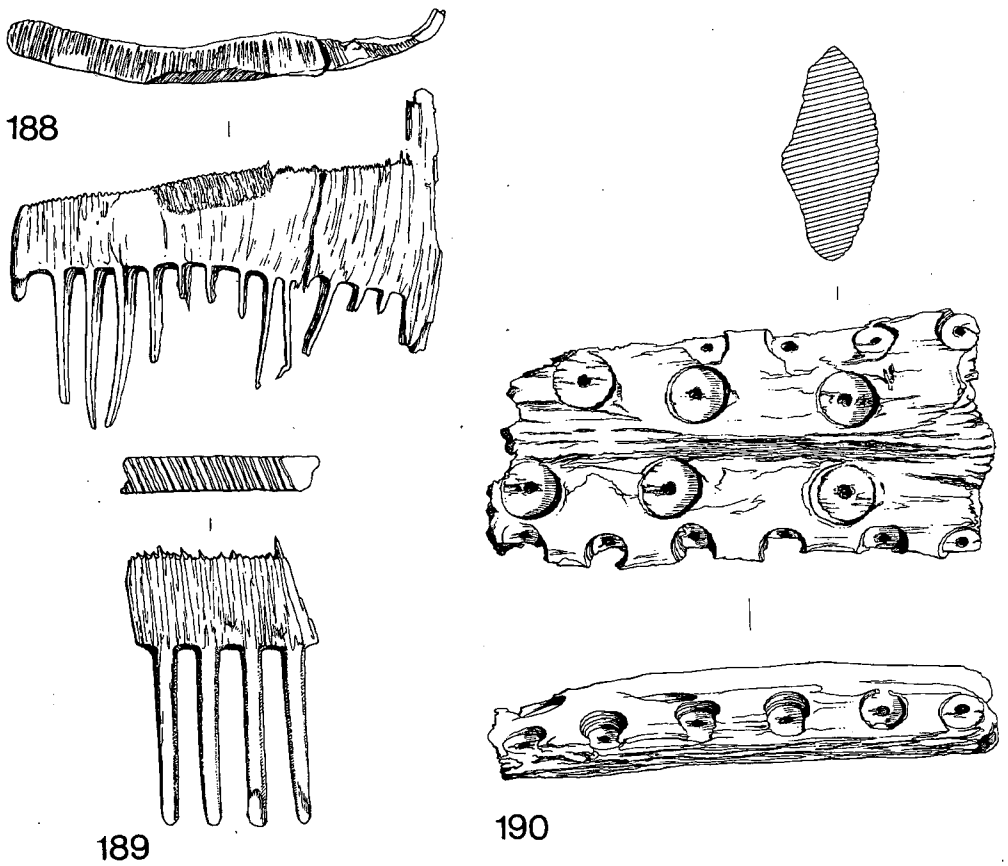


Fig. 34. Wooden objects Nos. 188, 189 $\frac{2}{1}$; No. 190 $\frac{1}{2}$.

because of its creeping habit, is common in well-trodden areas. Orache, hemp nettle, docks, buttercups and self-heal are common in waste and grassy places. Damper conditions are indicated by the bog stitchwort and the sedges.

WOOD FRAGMENTS RECOVERED IN THE GENERAL SAMPLE

In addition to the wooden heels and pegs associated with shoes (see leather above) three fragments of *Quercus* sp. oak and another hardwood fragment (too dried to identify further) occurred and two softwood fragments, *pinus sylvestris* (pine) and *picea abies* (spruce). The latter is possibly a fragment of a mortice.

All samples are from the fill of the bastion ditch. It is interesting to note the use of softwoods (conifers). Even the native pine is likely to have disappeared from the region by this date. The presence of softwood on the site must surely represent an early use of this cheap, quickly-grown timber for rather non-specific purposes e.g. pegs, and it was probably imported from Scandinavia or, in the case of pine also from Scotland.

NOTES

[1] Tyne and Wear Archives Department (hereafter TWAD), 285/602, map accompanying the Act for the Newcastle to Berwick Railway, 1844.

[2] A suggested line for the northern section of the west curtain is shown on fig. 1. This takes account of the Norman tower to the south, the remains of the 12th-century gate to the north, and the ditch in front. It corresponds fairly well, perhaps by accident?, with a property boundary which was first surveyed by John Bell in 1777, (Newcastle Central Library, Seymour-Bell Collection folio 7, nos. 3 and 4), and part of which survived even the chaos of the railway building. The date of origin of the boundary, however, remains unknown.

[3] W. H. D. Longstaffe, "The New Castle upon Tyne", *Arch. Ael.* 2, IV (1860), 77–8.

[4] *Ibid.*, 70.

[5] In spite of having given a categorical answer in the previous report I now incline towards caution. Barbara Harbottle and Margaret Ellison, "An Excavation in the Castle Ditch, Newcastle upon Tyne, 1974–6", *Arch. Ael.* 5, IX (1981), 94.

[6] TWAD, Long Box 7, 14/2/52.

[7] Longstaffe *op. cit.*, 79–80 and n. 64.

[8] Richard Welford, "The Walls of Newcastle in 1638", *Arch. Ael.* 2, XII (1887), 231. It is likely that the taking down of the meeting house of the Barber-Surgeons' Company over Pandon Gate was part of the 1638 operations, though it is possible that it did not happen until after Astley's visit in 1639. The last certain meeting of the company in the tower was on 11 October 1637, and from 25 October 1638 onwards they met in members' houses. The earliest minutes to record the loss of their meeting house were dated 4 August 1648, "... their usual place of meeting over Pandon Port having been taken down and made use of otherwise for defence of the town ...". TWAD, 786/1, Minute Book of the Company of Barber Surgeons and Chandlers of Newcastle upon Tyne, Vol. I, 1616–86. The relevant sections are published in Dennis Embleton, "The Incorporated Company of Barber-Surgeons and Wax and Tallow Chandlers of Newcastle upon Tyne," *Arch. Ael.* 2, XV (1892), 241–9.

[9] Welford, *op. cit.* See also "Instructions for Sir Jacob Astley, Knt., Sergeant Maior General of his Majesties Army commanded by My Lord General, to make his speedy repaire to Newcastle", *Arch. Ael.* 2, VII (1876), 87–8.

[10] Welford, *op. cit.*, 232–4.

[11] C. S. Terry, "The Visits of Charles I to Newcastle in 1633, 1639, 1641, 1646–7, with some notes on contemporary local history", *Arch. Ael.* 2, XXI (1899), 98.

[12] *Ibid.*, 96.

[13] This was to replace an earlier one, Welford, *op. cit.*, 232.

[14] Christopher Duffy, *Siege Warfare: The Fortress in the Early Modern World 1494–1660* (1979), 157, points out that the construction of "free-standing bastioned forts" outside towns was quite

a common practice, and he cites examples at Reading, Worcester, Newark and York.

[15] C. S. Terry, "The Scottish Campaign in Northumberland and Durham between January and June, 1644", *Arch. Ael.* 2, XXI (1889), 159. An eyewitness of a skirmish early in 1644 recorded "a little Sconce", and "a sharper work near the Windmill", the latter taken to be Shieldfield Fort. Terry, in the third of his three consecutive articles, "The Siege of Newcastle-upon-Tyne by the Scots in 1644", *Arch. Ael.* 2, XXI (1889), 212, quotes a description and dimensions of the fort. Oliver's map of Newcastle of 1830 and R. J. Charleton, *Newcastle upon Tyne* (1885), 371, locate it.

[16] See Appendix for a note by Christopher North.

[17] Welford, *op. cit.*, sketch no. 2 opp. 234.

[18] Royal Commission of Historical Monuments (England), *The Defences of York* (1972), 22–4.

[19] Terry, *op. cit.*, 189. Payments were made to a carpenter for work at Pilgrim Street Gate, White Friar Tower and other places towards the end of 1642. TWAD, 543/27, Chamberlain's Account Book (1642–5), f. 182v.

[20] H. Bourne, *History of Newcastle upon Tyne* (1736), 119n.

[21] Terry, *op. cit.*, 220; J. Brand, *History of Newcastle upon Tyne* I (1789), 159.

[22] Terry, *op. cit.*, 192.

[23] *Ibid.*, 150.

[24] *Ibid.*, 189.

[25] TWAD, 589/6, Calendar of Newcastle Common Council Books 1656–1722, f. 60.

[26] Margaret Ellison, Margaret Finch and Barbara Harbottle, "Excavation of a 17th-century Pit at the Black Gate, Newcastle upon Tyne, 1975", *Post-Medieval Archaeology* 13 (1979), 153–81.

[27] Barbara Harbottle, "Excavations at the South Curtain Wall of the Castle, Newcastle upon Tyne, 1960–61", *Arch. Ael.* 4, XLIV (1966), 96.

[28] *Cf.* Hull, garrison to be maintained 12 August 1645; walls to be repaired 17 November 1646: Carlisle, when it had been rendered up an English governor and garrison to be placed there, 23 June 1645; the Scots garrison there without parliamentary approval to be removed, 3 July 1645. *Journals of the House of Commons* 4, Session 1644–6, 183, 194, 239, 723.

[29] Terry, *op. cit.*, 251.

[30] TWAD, 543/27, f. 192v.

[31] Brand, *op. cit.*, 160.

[32] Longstaffe, *op. cit.*, 70, 134–5.

[33] *Ibid.*, 106–7, 134–5.

[34] TWAD, 544/76, Newcastle Enrolment Book 1653–9, ff. 42r, 54v, and 544/72, Newcastle Enrolment Book 1659–69, ff. 6r-v.

[35] TWAD, 589/5, Calendar of Newcastle Common Council Books 1650–59, ff. 102, 105; 589/6, Calendar of Newcastle Common Council Books 1656–1722, f. 28.

[36] TWAD, 589/5, f. 241.

[37] *Ibid.*, f. 200.

[38] TWAD, 47/1/52. It has not been possible to check this reference as this document is not available at the present time.

[39] Longstaffe, *op. cit.*, 137.

[40] TWAD, 544/72, ff. 37r–38r, 40v–41r.

[41] Longstaffe, *op. cit.*, 137.

[42] M. H. Dodds, ed., *Extracts from the Newcastle upon Tyne Council Minute Book 1639–1656*, Newcastle upon Tyne Records Committee Vol. I (1920), 200–2. I am indebted to Christopher North for drawing my attention to this reference.

[43] TWAD, 589/5, f. 381.

[44] TWAD, Long Box 36, 72/17/50.

[45] Duffy, *op. cit.*, 157.

[46] R. M. Butler, "The Civil War Defences of Nottingham", *Trans. of the Thoroton Soc. of Notts.*, LIII (1949), 26–8.

[47] Michael Aston and James Bond, *The Landscape of Towns* (1976), 127.

[48] Anthony Kemp, "The Fortifications of Oxford during the Civil War", *Oxoniensia* XLII (1977), 242, 244.

[49] Canon Rupert H. Morris, "The Siege of Chester, 1643–1646", *Journal of the Chester and North Wales Archaeological and Historic Society*, New Series, XXV (1923), end-paper map. I am indebted to Ian Dunn for drawing my attention to this reference.

[50] Bourne, *op. cit.*, 231–2.

[51] R. Howell, *Newcastle upon Tyne and the Puritan Revolution* (1976), 180, states that Carr was in his 80s when forced to resign from the Corporation in 1657, and therefore he must have been born sometime before 1577. His burial is recorded in All Saints Burial Register, 7 August 1658.

[52] R. Welford, *History of Newcastle and Gateshead* (1887), III, 421.

[53] Howell, *op. cit.*, 164.

[54] Welford, *op. cit.*, pp. 337 *passim*. TWAD, 543/27, f. 39a, a debt of over £940 was still outstanding in Oct. 1643, "had in Sir Peter Riddells

yeare towards the Releiffe of the poor Infected people in the time of the sicknesse". Sir P. Riddell was mayor when Carr was sheriff, Oct. 1635-Oct. 1636.

[55] Welford, *Arch. Ael.* 2, XII, *op. cit.*, plate XIII, 230.

[56] *Ibid.*, plate XIV, 234.

[57] TWAD, 589/12, Calendar of Newcastle Common Council Minutes, 1699–1718, ff. 80–80a, Dec. 1703.

[58] Ordnance Survey Map, first edition (1859), 10·56 ft. = 1 mile, sheet XCVII.8.11.

[59] TWAD, 589/12, ff. 80–80a.

[60]. The precise location of Carr's Battery is obtained from the following: TWAD, 544/18, Enrolment Book 1801–1810, 316–18, April 1807; 544/20, Enrolment Book 1816–35, 77, Dec. 1827; 285/81, Th. Oliver's *Handbook* (1831) to his large-scale Map of Newcastle, 1830, 30.

[61] Terry, *op. cit.*, 186.

[62] C. H. Firth, *Cromwell's Army* (1962), 150.

[63] W. Lithgow, *A True Experimentall and Exact Relation upon That Famous and Renowned Seige of Newcastle* (1645), 15.

[64] *Ibid.*, 18.

[65] *Ibid.*, 20.

[66] TWAD, 543/27, f. 193, Week 3, April 1645.

[67] E. Mackenzie, *A Descriptive and Historical Account of Newcastle* (1827), 183n.

[68] TWAD, 589/12, ff. 80–80a, Dec. 1703.

[69] TWAD, 589/14, Calendar of Common Council Minutes, 1743–66, f. 100, March 1748.

[70] TWAD, 544/18, 316–18, April 1807.

[71] TWAD, 285/81, 30.

[72] M. Ellison, "The Pottery" in M. Ellison, M. Finch, B. Harbottle, *op. cit.*, 1979, 159.

[73] M. Ellison, "The Pottery" in B. Harbottle, M. Ellison, *op. cit.*, 1981, fig. 6, phase 17.

[74] Ellison *op. cit.*, 1981, 95.

[75] Ellison *op. cit.*, 1981, 95.

[76] J. U. Nef, *The Rise of the British Coal Industry* (1932), II Appendix D.

[77] Nef *op. cit.*, II, 23–5.

[78] Nef *op. cit.*, II, 28–9.

[79] Graham Dawson "Pottery Classification" in Brian J. Bloice, "Norfolk House, Lambeth: Excavations at a Delftware Kiln Site, 1968" *Post-Medieval Archaeology* 5 (1971), 99–159.

[80] I am grateful to Peter Archer, Keeper of Ceramics at the Victoria and Albert Museum, for an explanation of this phenomenon and the suggestion for reversing the process by heating in oxidising conditions. This was carried out successfully with two sample sherds.

[81] Ellison *op. cit.*, 1981, 159.

[82] Information Walter Davey.

[83] K. J. Barton, "Some Evidence of two Types of Pottery Manufactured in Bristol in the Early 18th century", *Transactions of the Bristol and Gloucestershire Archaeological Society* LXXX, (1961), 164–67.

[84] J. G. Hurst, "A Wanfried Dish from Newcastle" *AA*[4]L (1972), 259–62. Sarah Jennings, "Werra Slip Decorated Ware" in "Eighteen Centuries of Pottery From Norwich" *East Anglian Archaeology* 13 (1981), 78–9.

[85] J. G. Hurst, "Weser Slipwares from Britain and North America" in Hans-Georg Stephan *Coppengrave—Studien zur Töpferei des 13. bis 19. Jahrhunderts in Nordwestdeutchland* (1981), 144, taf. 140, 1.

[86] J. G. Hurst and D. S. Neal, "Catalogue of Netherland Weser Ware" in Stephan *op. cit.*, 1981, taf. 129, 4 & 5; taf. 131, 2, 4, 5; taf. 132, 2 & 4.

[87] Ellison *op. cit.*, 1981, 108.

[88] Ellison *ibid.*, 156, fig. 52.

[89] Ellison *ibid.*, fig. 7 phase 17.

[90] G. J. Dawson, "Excavations at Guys Hospital, 1967", *Surrey Archaeological Society* Research vol. 7 (1979) fig. 6.

[91] Jeremy Haslam, "Excavation of a 17th Century Pottery Site at Cove, East Hampshire, *Post-Medieval Archaeology* 9 (1975) fig. 8, nos. 86, 89, 90.

[92] Ellison *op. cit.*, 1981, 131.

[93] S. Moorhouse, "Finds from Basing House (*c.* 1540–1645)", *Post-Medieval Archaeology* 4 (1970) fig. 10 no. 3.

[94] For an illustrated example, see C. Platt and R. Coleman-Smith, *Excavations in Medieval Southampton* vol. 2 (1975) no. 1252.

[95] Ellison *op. cit.*, 1981, 147.

[96] S. Grieg, *Middelalderke Byfund fra Bergen og Oslo*, Norske Vindenskaps-Akademi i Oslo, (1933), fig. 162 and P. B Molaug "Pottery from Mindets Tomt" in H. I. Hoeg, H. Linden, A. Liestol. P. B. Molaug, E. Schia, C. Wiberg, "Feltet 'Mindets Tomt'," *De Arkeologische Utgravinger i Gamlebyen*, Oslo, Bind 1 (1977) fig. 13 4/2.

[97] Ellison *op. cit.*, 1979 type 2, 164–5.

[98] Ellison *op. cit.*, 1979, no. 3.

[99] Ellison *op. cit.*, 1979, no. 12.

[100] P. C. D. Briers, *The English Country Pottery, its History and Techniques* (1971), 31 fig. 12 and

F. W. Holling, "A Preliminary Note on the Pottery Industry of the Hampshire-Surrey Borders", *Surrey Archaeological Collections* LXIII (1971), fig. 3 no. E3.

[101] Information F. Verhaeghe.

[102] Ellison *op. cit.*, 1981, nos. 199, 200.

[103] Ellison *ibid.*, no. 201.

[104] Ellison ibid., nos. 180, 309.

[105] Kevin Blockley, "The Pottery Report" in Sylvia Pryor and Kevin Blockley "A 17th Century Kiln Site at Woolwich", *Post-Medieval Archaeology* 12 (1978), fig. 17 no. 94.

[106] J. G. Hurst, "Martincamp Flasks" in David S. Neal, "The Palace of Kings Langley" *Medieval Archaeology* XXI (1977), p. 156–7 and J. G. Hurst, "Imported Flasks", in C. V. Bellamy, "Kirkstall Abbey Excavations 1960–1964", *Thoresby Society* LI (1966), 57.

[107] Dawson *op. cit.*, 1971, fig. 53, no. 20.

[108] Dawson *ibid.*, fig. 53.

[109] F. W. Holling, "Seventeenth-Century Pottery from Ash, Surrey", *Post-Medieval Archaeology* 3 (1969), fig. 5, B5 and 4.

[110] Haslam *op. cit.*, 1975, fig. 6, no. 46.

[111] J. G. Hurst, "Spanish Pottery Imported into Medieval Britain", *Medieval Archaeology* XXI (1977), 89–96, and imformation from J. G. Hurst.

[112] Information from Gail Larrabee and Hans-Georg Stephan, "Werrakeramik und Weserware" in Hans Peter Mielke *Keramik an Weser, Werra und Fulda* (1981), 73–5.

[113] Information Walter Davey.

[114] Blockley *op. cit.*, 1978, 44.

[115] G. Liverani, *Five Centuries of Italian Maiolica* (1960), pl. 81 and B. Rackham with emendations and additional bibliography by J. V. G. Mallet, *Victoria and Albert Museum, Catalogue of Italian Maiolica* (1977), no. 1075, 1077.

[116] Ellison *op. cit.*, 1981, 140.

[117] Blockley *op. cit.*, 1978, fig. 7, no. 8.

[118] Ellison *op. cit.*, 1979, 16, no. 5.

[119] J. G. Hurst, D. S. Neal and H. J. E. van Beuningen, "North Holland Slipware", Rotterdam *Papers* II (1975), figs. 1–4.

[120] Dawson *op. cit.*, 1971, fig. 53, nos. 48–50.

[121] Rackham *op. cit.*, 1977, 65–80, 124–27, 141–5.

[122] Information from Rose Kerr, Assistant Keeper Far Eastern Department, Victoria and Albert Museum.

[123] Haslam *op. cit.*, 1975, fig. 4, nos. 14–21.

[124] J. H. Kelly, "Post-Medieval Pottery from Newcastle St. Burslem, Stoke-on-Trent", *City of Stoke-on-Trent Museum Archaeological Society Report* 8 (1975), fig. 2, no. 8.

[125] Dawson *op. cit.*, 1971, fig. 54, no. 64.

[126] Haslam *op. cit.*, 1975, fig. 8, no. 83.

[127] Haslam *ibid.*, 170.

[128] B. Beckmann, "The Main Types of the First Four Production Periods of Siegburg Pottery", *Medieval Pottery from Excavations, Studies Presented to Gerald Clough Dunning* (1974), edit. Vera I. Evison, H. Hodges, J. G. Hurst, no. 135.

[129] Platt and Coleman-Smith *op. cit.*, 1975, no. 1263.

[130] E. Klinge, *Deutches Steinzeug der Renaissance und Barockzeit* (1979), no. 121.

[131] Dawson *op. cit.*, 1971, fig. 54.

[132] Briers *op. cit.*, 1971, 37.

[133] Ellison *op. cit.*, 1979, fig. 5, no. 19.

[134] M. Ellison, "The Glass" in M. Ellison, M. Finch, B. Harbottle *op. cit.*, 1979, 167–74, including Table 2.

[135] Ellison *ibid.*, 169.

[136] M. Ellison, "The Glass" in B. Harbottle, M. Ellison *op. cit.*, 1981, 166.

[137] Ellison *ibid.*, 166–7.

[138] R. J. Charleston, "The Glass Vessels" in D. W. Crossley and F. A. Aberg "Sixteenth Century Glassmaking in Yorkshire. Excavations at Furnaces at Hutton and Rosedale, North Riding, 1968–71", *Post-Medieval Archaeology* 6 (1972), fig. 66, no. 102.
J. Stuart Daniels, *The Woodchester Glass House* (1950), pl. IV no. 24.

[139] Charleston *op. cit.*, 1972, fig. 66, no. 93.
Daniels *op cit.*, 1950, pl. VII, no. 48.

[140] Ellison op. cit., 1979, no. 45. Charleston *op. cit.*, 1972, fig. 63, nos. 45 & 48. Moorhouse *op. cit.*, 1970, fig. 29, no. 46 and p. 68.

[141] Charleston *op. cit.*, 1972, fig. 63, nos. 46, 49–52. Moorhouse *op. cit.*, 1970, fig. 28, no. 30. R. J. Charleston, "The Glass Vessels" in D. W. Crossley, "Glassmaking in Bagots Park, Staffordshire, in the Sixteenth Century" *Post-Medieval Archaeology* 1 (1967), fig. 20, nos. 1–3.

[142] Charleston *op. cit.*, 1967, fig. 20, nos. 13–15.

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