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Excavations of part of the Medieval City Wall at Grand Parade, Cork

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INTRODUCTION

Cork Corporation decided to preserve a portion of the medieval wall of Cork as a feature in a city centre amenity park.¹ Plans for the park, showing the approximate position of the wall, were drawn up by Messrs Green, McCarthy, Stansfeld. These were based on the position of the city wall as uncovered on an adjacent site (Hurley and Power 1981) (Fig. 1a). In May 1984, Messrs Green, McCarthy, Stansfeld approached the Department of Archaeology, UCC, to enquire about the archaeological requirements for this site. Professor Peter Woodman and I suggested that it was necessary to carry out a complete archaeological excavation on both sides of the wall before any development work could begin.

In July, Cork Corporation began work and the Department of Archaeology was called upon to supervise the clearance of rubble from the upper levels of the site. In the course of this work (under the supervision of Ms R.M. Cleary) the outline of the wall² was located. The top of the wall and the upper extant levels of the outer wall face were exposed. At the northern end of the site, a substantial stone structure abutted the outer face but did not appear to be bonded into the wall. The position of the structure coincided with the location of Hopewell Castle as shown on maps of 1560 and 1602.

Ms Cleary pointed out to the representatives of the Corporation that it would be necessary to suspend all operations until a properly conducted archaeological excavation could be organized. For this purpose, funding was re-

quested from the Corporation. However, while preparations were being made, the Corporation continued construction work on the outside of the wall and the structure which may have been the base of Hopewell Castle was demolished. Since it was not possible to examine this structure in detail, the sad fact is that we can now never be sure of what it was.

When Cork Corporation agreed to fund partially the archaeological excavation, a subsidy towards the cost of labour was sought from the National Manpower Youth Employment Agency.³ The Corporation provided a mechanical digger and lorries to remove the spoil, and on 29 August work began on the archaeological horizons on the western (inner) side of the city wall (Fig. 1b). The excavation and planning were completed on 25 September 1984.

HISTORICAL BACKGROUND

A discussion of the lay-out of the medieval city and the position of the city wall is contained in a previously published paper (Hurley and Power 1981). A correlation of this evidence with that uncovered in the excavation described here is contained in the discussion.

THE EXCAVATION

A cutting 5m wide by 22m in length was excavated on the western side of the wall. A second wall (Wall 2) running at right angles to the city wall (Wall 1) was uncovered at *c.* 75cm lower than the top of the city wall (Fig. 1b). The archaeological stratigraphy found at one side of Wall 2 was very different from that

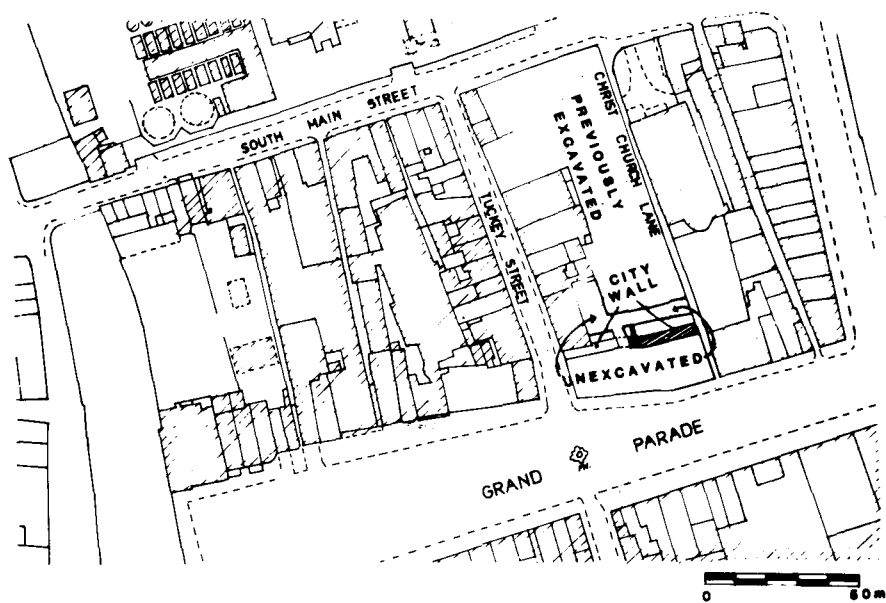
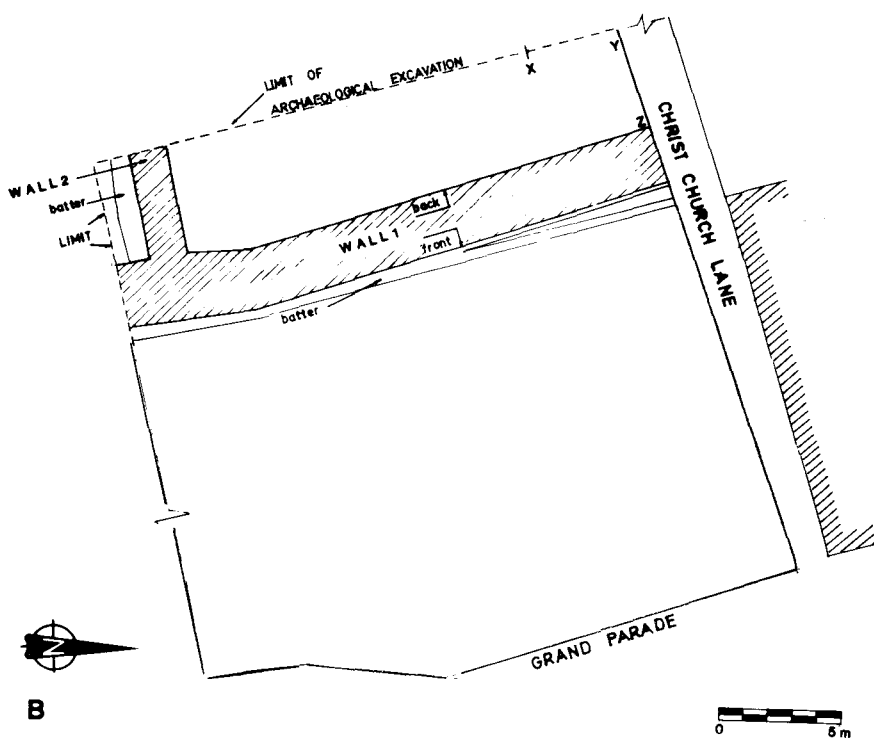
**A****LOCATION MAP****B****SITE PLAN**

Fig 1

found on the other. On the northern side of Wall 2 it consisted of sedimentary layers naturally deposited by water. On the southern side, several layers of human occupation debris dating primarily from the mid-thirteenth to the late fourteenth century had not been disturbed since that time.

THE WALLS

Wall 1 (Figs. 2 and 3)

The city wall was exposed for a length of *c.* 22m. The outer and inner facings were built of dressed limestone with red sandstone infill and the core was filled with rubble stone and mortar. The wall was, on average, 2·20m wide. The upper portions had been demolished when it had gone out of use at some time after 1690. The level surface of the wall was then used to provide a good foundation for houses. A modern property boundary followed the line of the wall and incorporated part of the inner wall face (Fig. 2). Apart from this tiny portion, the top of the wall as excavated was more or less of uniform height.

Wall 1 was built in at least two separate stages. A straight joint occurred at *c.* 5·50m from the southern baulk. The stones of the wall were bonded on the eastern (outer) face, but not in the centre or at the western (inner) side. The wall turned slightly at this point. On the southern side of the joining, it was more substantially built and continued to a far greater depth, i.e., more than twice that of the northern portion.

Wall 1 north of the joining. The joining was disguised on the eastern (outer) wall face which presented a uniform appearance (Fig. 3). The dressed limestone blocks were laid in uneven courses and the appearance of the whole was similar to that of the adjacent previously-excavated portion of the wall (Hurley and Power, 1981). The outer wall face was battered. It stood to a height of *c.* 2m above a stepped stone plinth.⁴

It is the western (inner) wall face that provides the sharpest contrast at either side of the joining, with the southern part similar to the previously excavated portion of wall (*ibid.*) while that on the northern side is very different. North of the joining, the western wall face stood less than 1m in height. It consisted of a vertical wall, plastered with lime mortar, above a single-course stone footing set on the estuarine sand (Figs. 3 and 6). The estuarine clays were compressed under the weight of the wall (Fig. 6) which had tilted backwards, causing a corresponding backward slip at the same level on the eastern outward wall face (Fig. 2, sections A-C). The resultant cleavage produced a step on the otherwise uniform outer face. A trench had obviously been excavated in the estuarine clay to allow the building of a uniform outer face, while the inner part of the wall was set on the clay at a much higher level. It is apparent that on this length the outward appearance of the wall was of greater importance than the intrinsic strength of the structure.

Wall 1 south of the joining. This part of the wall increased in width from 2·50m to 2·70m towards the south. The eastern (outer) wall face was identical with the rest of the wall but the western (inner) face was a much more substantial structure (Fig. 3). It stood vertically to a height of over 2m (Fig. 2, section J-J) above a substantial projecting stone plinth. It was built of large dressed limestone blocks which were roughly coursed and it had never been plastered. This portion of the wall was built to incorporate the already existing Wall 2. The western face of Wall 1 was also substantially different on either side of Wall 2 (Fig. 3). To the north of Wall 2, the limestone blocks were roughly hewn, presenting an uneven surface. The northern face of Wall 2 was bonded into Wall 1. This portion of Wall 1 was not excavated to its full depth due to constant flooding. The rough appearance of this part of

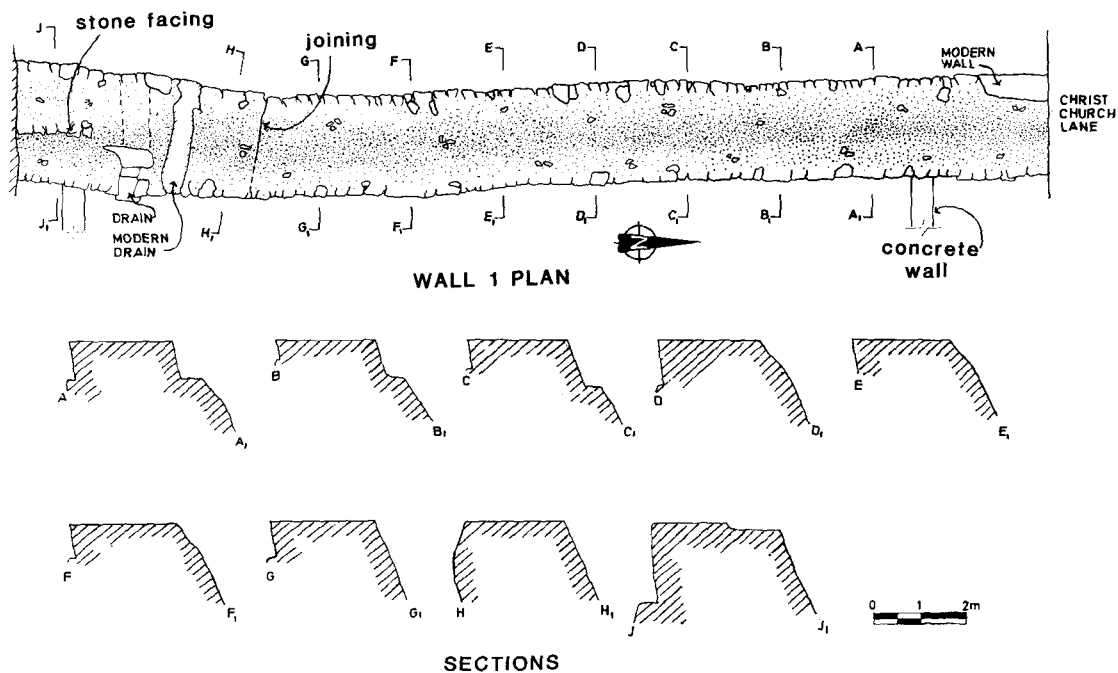


Fig 2

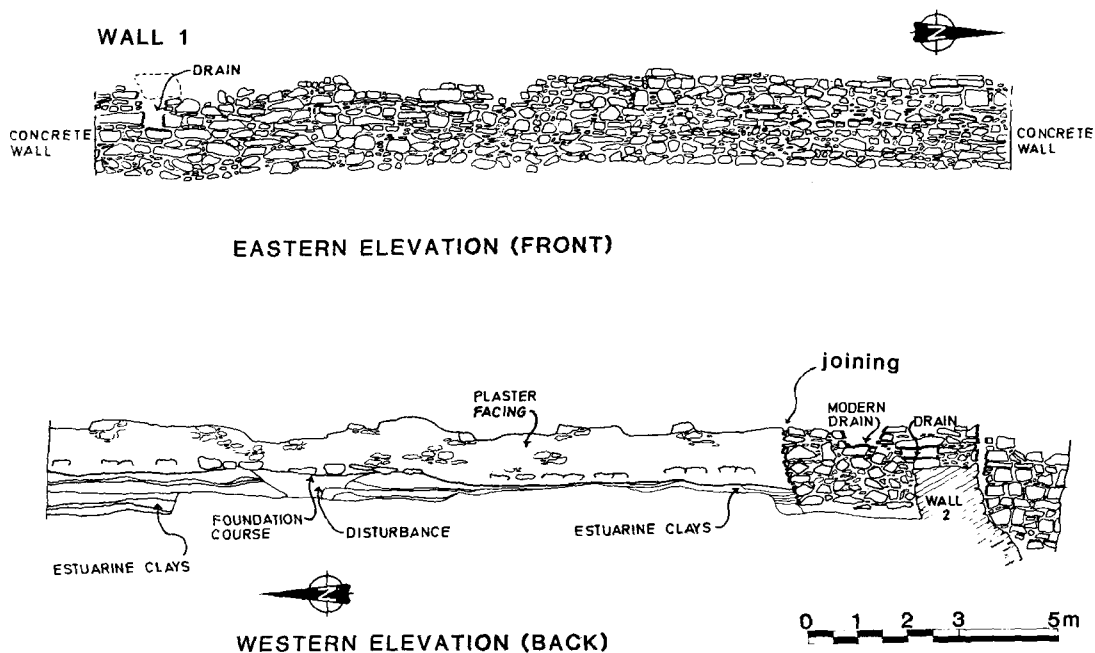


Fig 3

Wall 1 suggests that it was never intended to provide a visible surface (Fig. 2, section H-H).

Another straight joint occurred at the southern side of Wall 2. Wall 1 was built flush against Wall 2 but not bonded into it. The weight of Wall 1 rested against the battered face of Wall 2, causing it to tilt towards the north and allowing a vertical split to open in Wall 1. The building sequence is difficult to interpret. However, it is apparent that Wall 2 was built prior to Wall 1 and had, in fact, been reduced to its present height at that stage. A large stone-built drain incorporated into Wall 1 (and of contemporary date?) partially overlay Wall 2 and could not have functioned had Wall 2 stood to a greater height (Fig. 3). Above this, a modern drain had been cut into the upper levels of Wall 1.

A stone facing occurred (Fig. 2) in the centre of Wall 1 and extended for *c.* 2m from the southern baulk. This was a curious feature and its purposes remains unsolved, for it was not possible to demolish any part of Wall 1 which was to be conserved by the Corporation.

Wall 2 (Figs. 4 and 5)

Wall 2 extended in an east-west direction, at right angles to Wall 1, and pre-dated the building of Wall 1. It was exposed for a length of 4.50m and the upper portion had been levelled prior to the building of Wall 1. The top of Wall 2 was level and *c.* 1.25m wide. The northern wall face was vertical but had tilted slightly northwards. The upper 50cm of the southern face was also vertical but below this level it was battered (Fig. 4, sections A-C).

Both wall faces were built entirely of rubble limestone blocks, set in irregular courses. The core of the wall was filled with limestone rubble. The weight of Wall 1 rested on the battered face of Wall 2 and compressed its eastern side, causing it to crack (Figs. 3 and 4). Wall 2 was not exposed to its full depth on the northern face because of flooding. Although a far greater amount was exposed on the southern

face, the gradual increase in wall width prevented complete excavation because of the narrowness of the area available to us for excavation. The base of Wall 2 was at a lower level than the stepped plinth of Wall 1 (Figs. 3 and 4).

The purpose of Wall 2 can only be speculated upon as no map or historical reference known to the author shows or describes such a structure in this part of the city. A map of Cork⁵ dated 1560 shows a recess in the city wall between Tuckey Street and Christ Church Lane. At the time of the excavation, it was not possible to excavate Wall 2 further to the west. Such an excavation may provide further evidence relating to this wall. Extensive excavations of the area to the west of the city wall carried out during the 1970s did not uncover any comparable structure (Twohig, pers. comm.). Wall 2 cannot extend in a straight line to the west for more than 10m. If Wall 2 ever formed part of a dock on the city wall, then it is likely that another wall ran to the north at a right angle to Wall 2, within the unexcavated *c.* 5m wide strip to the west of the present cutting (Fig. 1a). The unexcavated 5m length of the city wall (Fig. 1a) may also contain information relating to the purpose of Wall 2. The archaeological stratigraphy excavated in a 1.5m wide trench to the south of Wall 2 (Fig. 5) also indicates that a substantial amount of information may be derived from a full excavation of this area.

THE ARCHAEOLOGICAL STRATIGRAPHY

North of Wall 2 (Fig. 6, a and b)

The area excavated to the west of Wall 1 and north of Wall 2 was more or less archaeologically sterile. About 1.30m of modern rubble was removed by a mechanical excavator. This rubble consisted chiefly of mortar and brick as well as household refuse accumulated over the last century or so, but mostly since the demolition of the surrounding buildings during the 1970s. A small amount of

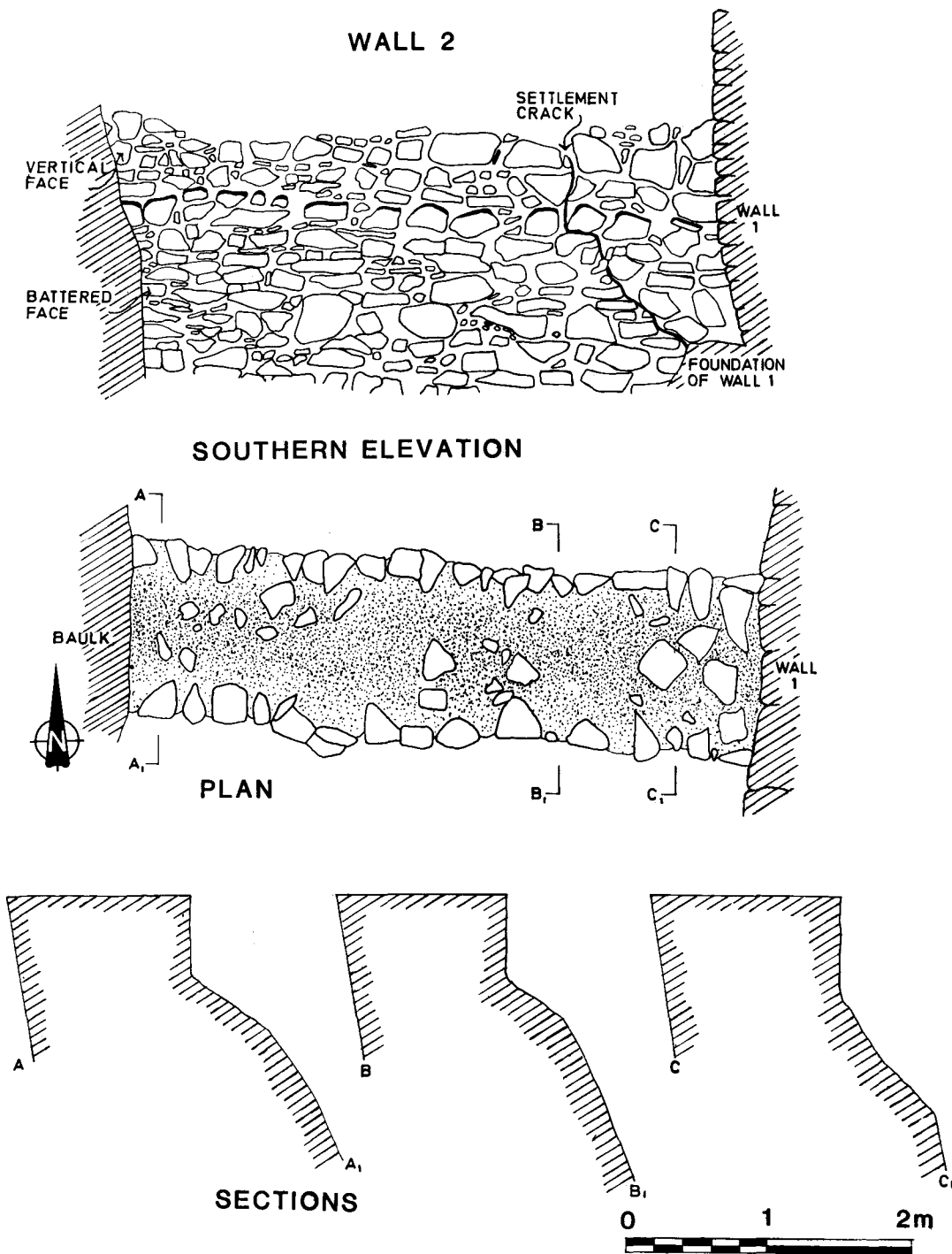


Fig 4

seventeenth to nineteenth-century pottery and some clay pipes were found in the lower levels of this rubble. Incorporated in the late nineteenth-century material was a pit which had filled with sumped or redeposited human bones (Appendix 4). These bones were probably removed during the clearance of a local crypt or cemetery and dumped in vacant ground behind the houses fronting Grand Parade. In another area, a large pit had been cut into the rubble (Fig. 6a). The fill of the pit was similar to the surrounding rubble but it also contained a small dump of oyster shells. A stone-built drain lined with thick blue slates extended in an east-west direction to the north of Wall 2. It was at a slightly lower level than the top of Wall 2 and the finds suggest that it was seventeenth-century in date. Beneath the rubble were archaeologically sterile layers of estuarine clays and sands (Appendix 2).

South of Wall 2 (Fig. 5)

A limited area was excavated to the south of Wall 2 (1.60m long × 4m wide). This area contained several layers of human occupation debris, dating from the mid-thirteenth to the nineteenth century.

Approx. 1.30m of modern rubble (Context 1) overlay a relatively homogeneous layer of humus-enriched soil (Context 17) *c.* 1.2m deep and uniformly covering the excavated area. The upper 20cm contained sherds of seventeenth-century pottery. Below this, all the pottery was medieval in date and consisted of Saintonge green-glazed wares, locally-made pottery and a single sherd of Saintonge sgraffito ware. A large dump of straw and vegetation material was also recorded in Context 17.

All of the layers beneath this humus-enriched soil extended up to the north side of Wall 2. However, a certain amount of disturbance of the layers was apparent adjacent to Wall 1. A 20cm wide and almost 1m deep band of redeposited clay overlay the plinth of Wall 1. This may represent the backfilling of a narrow trench. The disturbance of the layers

and the excavation of this trench may have been due to a partial rebuilding or refacing of Wall 1. However, the plinth of Wall 1 must have been in place by the late thirteenth century. Apart from the narrow trench, adjacent to Wall 1 a layer (Context 25) containing late thirteenth-century pottery and a bronze candlestick (Fig. 12) was undisturbed above the plinth.

A *c.* 8cm deep layer of compacted straw (Context 22) beneath the humus-enriched soil (Context 17) is interpreted as a trampled floor. The floor contained pottery of late thirteenth to mid-fourteenth-century date. This floor covered a carefully set layer of overlapping blue slate (Context 23). The slates were between 12 and 20cm square and did not seem to be roofing slates as they were not holed for nailing. They were set in a 2-3cm deep layer of river sand and appear to have been laid down to provide a dry level floor which was covered with straw and subsequently occupied. The evidence suggests that this floor was occupied towards the middle of the fourteenth century.

A 20cm deep layer of gravel, wood, straw and other organic material, including animal bones (Context 24), underlay the slates and sand. This layer probably represents a deliberate dumping to raise the floor above the level of the tide. It contained a large amount of late thirteenth to early fourteenth-century pottery, mostly Saintonge green-glazed ware, one sherd of Saintonge polychrome, and a few sherds of wheel-thrown Bristol pottery.

A second floor (Context 25) of compacted straw, bracken, wood-shavings, horse-hair and twigs which still bore their needles (particularly Yew, *Taxus baccata* L.) was *c.* 20cm deep. The layer consisted of at least 2-3 re-floorings. The finds were few — mostly pottery, Saintonge green-glazed and polychrome ware, a piece of well-preserved fabric (No. 326, Fig. 12 and Appendix 3) and thirteenth-century bronze candlestick (Fig. 11).

This floor overlay a 30cm deep band of redeposited clay (Context 26). The

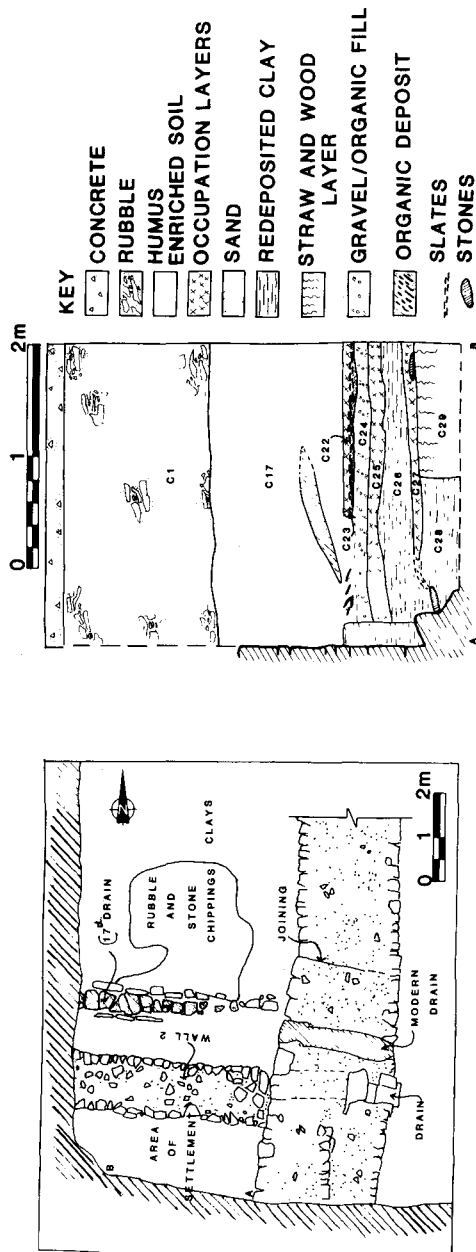


Fig. 5: Plan of intersection of Walls 1 and 2 and section through medieval occupation south of Wall 2.

The composition of this clay is very different from the estuarine clays to the north of Wall 2. Although it did not contain any pottery, a mixture of organic materials — including bracken, straw, moss, bones etc. — were found throughout the layer. This clay represents an earlier introduction of soil to raise the general level prior to occupation (Context 25).

A third trampled floor (Context 27) underlay the clay. This 10cm deep layer of compressed straw, sand, bracken, leaves and twigs was similar to Context 25. It also contained a large amount of horse-hair. The layer was disturbed adjacent to Wall 1. It contained a small amount of Saintonge green-glazed pottery, iron objects, shoe leather and woollen fabric (No. 327, Fig. 12 and Appendix 3).

Beneath this floor, a distinct division was apparent between the eastern (Context 28) and the western (Context 29) halves of the excavated area. The western half consisted mostly of straw, twigs and bracken and contained only one sherd of pottery, a mid-thirteenth-century Ham Green (Bristol) strap handle. The eastern half consisted of redeposited clay, containing a small amount of vegetative material, animal bones and an assortment of Saintonge green-glazed pottery and Bristol pottery of mid-thirteenth-century date. This redeposited clay may be material excavated from a trench in which the plinth of Wall 1 was built. This would suggest a date in the latter half of the thirteenth century for the building of the base of the city wall. However, it is possible that the wall (Wall 1) above the plinth represents a later rebuilding. The sequence of layers in the lower levels is similar in many respects to the occupation material excavated inside the city wall on the Grand Parade/Tuckey Street site (Hurley and Power 1981, 3-6). However, on the Tuckey Street site, the occupation material was not disturbed close to the western (inner) wall face as was the case on this site.

Discussion

A sharp contrast exists between the

stratigraphies excavated to the north and south of Wall 2. North of Wall 2, the estuarine clays and silts have been deposited at *c.* 1.50m higher than the lowest occupation material excavated south of the wall. It can be assumed that the thirteenth-century occupants of the city were not living below high tide level. It is also unlikely that the area to the south of Wall 2 had sunk down or settled to a greater depth than the area to the north. It is evident that when the area south of Wall 2 was occupied, the area north of the wall was not, but remained subject to tidal flooding and consequent deposition of silt and clay. In the absence of datable evidence for the rate of estuarine silt build-up, the suggested rate is estimated to be gradual and over hundreds of years (Appendix 2). Further research based on pollen analysis of samples taken from the silts and clays⁶ may provide evidence for dating which could be correlated with the datable stratigraphy to the south of the wall.

The area to the north of the wall contained no evidence of medieval occupation. It is possible that Wall 1, north of the joining, was not built until the sixteenth or seventeenth century. A good stone-mason could easily have disguised the joining of the old and new walls on the eastern (outer) wall face. Little attention was paid to the western (inner) face and, for this reason, the whole structure was weak. By the sixteenth century, the primary purpose of the city wall must have been of token value rather than defensive. By the middle of the seventeenth century, the wall had been allowed to fall into disrepair and houses had been built against it close to what is now Grand Parade (Buckley 1916).

If the interpretation offered is correct, the question then arises as to where the city wall ran prior to the sixteenth/seventeenth century building. Perhaps the city was never completely enclosed by walls during medieval times. The earliest maps showing the walled city of Cork date to the sixteenth century. If an

earlier wall existed, then the only possible siting for it lies within the unexcavated portion to the west of Wall 1 (Fig. 1a). If this is so, then it may be that Wall 2 formed the southern wall of a dock for ships which could have sailed up the channel (now built on as the Grand Parade) during medieval times. This interpretation is supported by the map of 1560 which shows a recess or dock in the wall in this area. When this dock silted up, Wall 1 may have been built across the mouth, thus continuing the city wall in a straight line.

To the south of Wall 2, at least three distinct floor levels (Contexts 27, 25 and 22) were occupied successively between the mid-thirteenth and the mid-fourteenth centuries. Between occupations, layers of clay and any available refuse were introduced to raise the habitation floor. It is interesting to speculate that the need for constant reflooring may have been necessitated by periodic flooding — perhaps by the flood waters which deposited the silts to the north of Wall 2.

Wall 2 contained one very peculiar feature, *i.e.*, the inner wall face was battered (Fig. 4, sections). Previous excavations have shown that the outer face of the city wall was battered and the inner was vertical, *i.e.*, Tuckey Street (Hurley and Power 1981). The base sections of castle walls usually splay outwards on the outer wall face, but not on the inner. These base batters added solidity and stability to the wall and also served a military purpose by causing missiles dropped from above to rebound outwards upon assailants (Leask 1977, 20). On quay walls, the batter would also have strengthened the wall against the lapping water. A batter on the inner wall face merely stabilizes the wall and at the cost of taking up valuable living space — always at a premium in a medieval town. Two possible explanations for this unusual feature are that Wall 2 represents a modification of an earlier structure which was never completed or, more likely, that it was intentionally built like this so that a straight wall

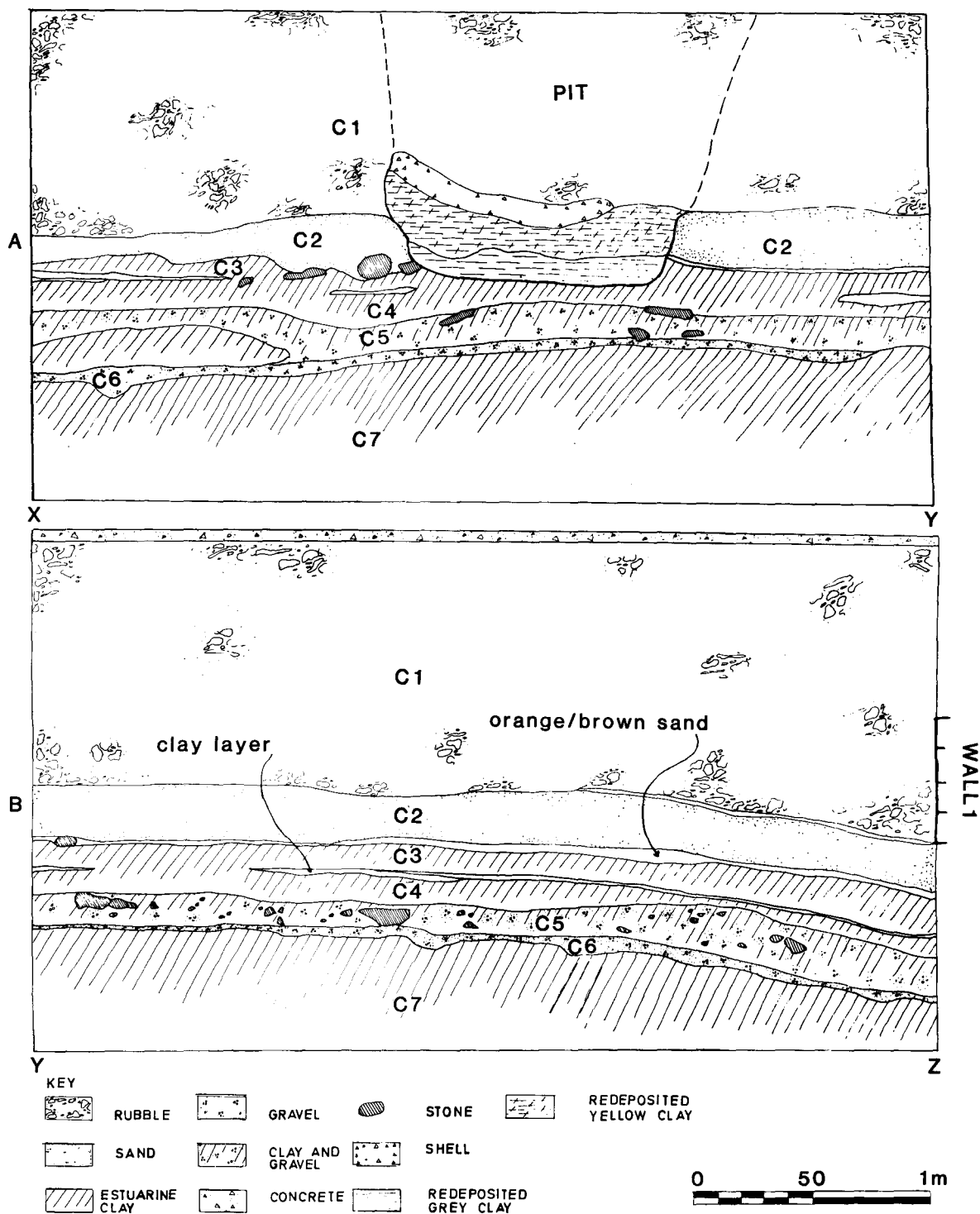


Fig. 6: Sections through estuarine clays north of Wall 2.

(northern face) faced the dock, thus providing an easy tie-up for ships.

THE FINDS

The finds are housed in the Cork Public Museum and are registered under the National Museum of Ireland registration number E292, 1 to 327. A correlation of museum registration numbers and figure numbers used in the text is given in Appendix I.

Normandy red painted ware

Three sherds of Normandy gritted ware, two of which have traces of red paint, were found in the occupation material south of Wall 2. The painted sherds (Nos. 135 and 171, Context 17, not illus.) bore broad red/brown brush strokes. No. 286 (Context 28, not illus.) is part of a base. The sherds from Context 17 are almost certainly residual and must belong to an earlier phase on the site. The fabric is gritty, grey in colour, covered with a buff slip. Normandy gritted wares were found in late eleventh and twelfth-century contexts at Southampton (Platt and Coleman-Smith 1975, 124-126) and twelfth-century contexts in Dublin (Wallace, pers. comm.). However, these wares have also been found in southern English ports in thirteenth-century contexts (Allen 1983, 196-197). Small amounts were found in recent Cork city excavations (Hurley and Power 1981, 10 and 11, incorrectly identified as locally-made ware; and Hurley, in press) in thirteenth-century contexts.

South-west French ware (Fig. 7)

Pottery from the Saintonge region of south-west France was by far the most common type of ware found in the medieval levels — 136 sherds in all or 75% of the total assemblage.⁷ Among these are 10 rims, 4 strap handles, 3 spouts and 7 bases. The remainder are mostly small sherds from the bodies of jugs. Of these, 92 sherds are green-glazed, 4 have polychrome decoration and 9 are unglazed. Another 5 sherds may have originated in other areas of

south-west France outside the Saintonge region.

The Saintonge ware consists mostly of fine hard cream or white pottery with an external green glaze. The green colour was produced by the addition of copper filings to a lead glaze. On the polychrome jugs a clear lead glaze was applied over painted decoration.

All of the rim forms found on the site are illustrated (Fig. 7, Nos. 1-8). The strap handles are illustrated in section only (Nos. 9-11). The handles are from green-glazed jugs and are rolled over or 'hooked' on one side. Fragments of two pouring spouts (Nos. 13 and 14) belong to jugs of the type illustrated, i.e., Nos. 1-3. Four sherds have flattened applied decorative strips; three of these are illustrated (Nos. 15-17). Nos. 18-21 are bases of jugs. Green-glazed jugs were manufactured in great numbers in the Saintonge region of S.W. France from the early thirteenth until the mid-fourteenth century (Chapelot 1983, 49-53). Polychrome jugs were produced in smaller numbers. The pottery appears to have reached Britain and Ireland as a by-product of the Gascony wine trade (Dunning 1968, 45). The outbreak of the Hundred Year War in 1337 caused a disruption of this trade and a consequent fall-off in the pottery exports (Clarke 1983, 19). The general economic decline of Britain and Ireland, in which Cork fared badly (O'Sullivan 1937, 41-57), during the fourteenth and fifteenth centuries resulted in a virtual collapse of trade and fewer imports of pottery from S.W. France into Cork.

No. 12 is a sherd from the body of a polychrome jug. A dark-brown stripe separates an area painted in copper-green from the grey background. Brown stripes outlined the designs which were usually bird or heraldic shield motifs (Platt and Coleman-Smith 1975, 138-144; and Plate 151). Polychrome decorated ware can be closely dated to between c. 1280 and c. 1310 (Dunning 1968, 45). Based on more recent evidence, Allen (1983, 200-201) extended this date range to the

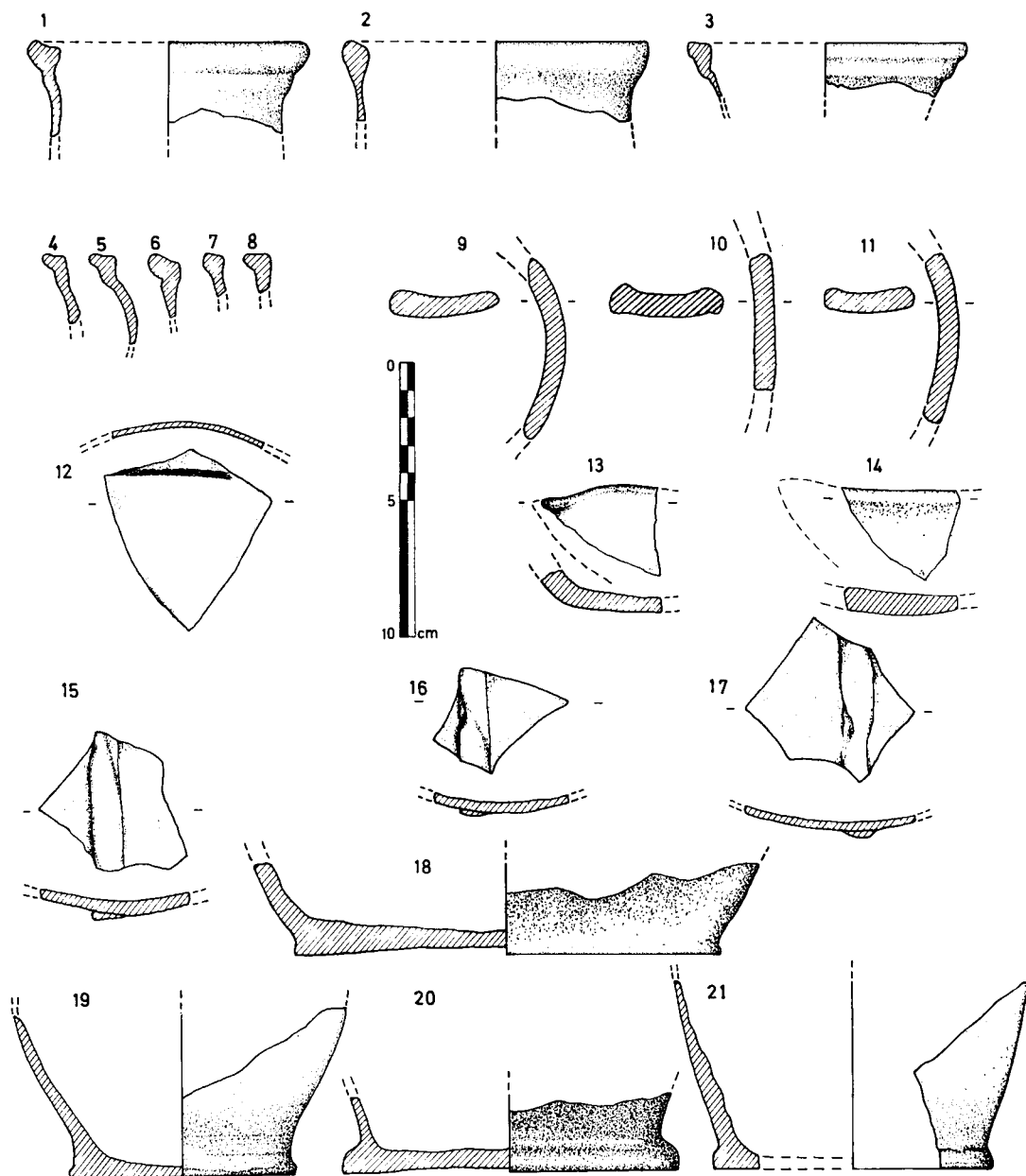


Fig. 7: W. French Saintonge ware, mid 13th-mid 14th century.

1330s. A single sherd of Saintonge sgraffito ware (No. 154, not illus.) from Context 17 is probably of fourteenth-century date. This type of pottery generally dates from the late thirteenth to the mid-fourteenth century (Platt and Coleman-Smith 1975, 138-140; and Allen 1983, 202). However, two sherds of Saintonge sgraffito ware were found in mid-thirteenth-century contexts at Cornmarket Street (Hurley, in press).

Saintonge green-glazed pottery was found at almost every level in the occupation material south of Wall 2. The general fill (Context 24) produced more than 70% of it. This would suggest that the layer was built up with general domestic refuse from a number of dwellings, as the habitation floors (Contexts 22, 25 and 27) produced less than 5% of the Saintonge pottery. The amounts increased from Context 27 to Context 22, showing that a greater amount of Saintonge pottery reached Cork in the fourteenth than in the thirteenth century. One sherd of it was found in Context 28. The remainder was found throughout Context 17 and this may have been disturbed at a later date. Saintonge polychrome ware was found in Contexts 24 and 25 and in a disturbed area close to Wall 1 (Context 27/28).

English Ware (Fig. 8)

Fourteen sherds (8.5%) of the medieval pottery are of English origin, mostly from the Bristol area. Finds of English pottery are greatly outnumbered by Saintonge ware. Quantitative data from such a small area of excavation is of questionable value in view of the extensive data from the nearby Tuckey Street/Christ Church Place excavations where roughly equal amounts of French and English pottery were recovered (Twohig, pers. comm.).

A single sherd of Bristol Ham Green pottery (Fig. 8, No. 1) was the only object found in Context 29. Ham Green pottery of this type is generally dated from the mid to late thirteenth century (Barton 1964, 124). A wide strap han-

dle springs from below a flat-topped rim. It is decorated with three slash marks below the rim and a row of slashes diagonally down the centre of the handle. The fabric is fired to a grey colour, over which an even dark-green glaze was applied. The fabric and form correspond closely to Ham Green 'B' pottery (Barton 1964, 95-126).

No. 2 (Fig. 8) is a body sherd from a jug found in Context 28. The jug is hand-made and the fabric fired to a grey colour. The outer surface is decorated with raised vertical bands and applied pads. The pottery is probably from the Ham Green kiln in Bristol and dates to the latter half of the thirteenth century. A small sherd, No. 285 (not illus.), of similar type to No. 2, was found at the same level in Context 28. No. 5 (Context 28) is hand-made and probably from Ham Green and of mid to late thirteenth-century date. Nos. 3, 4 and 7 are decorated sherds of wheel-thrown early to mid-fourteenth-century Bristol pottery. The fabric is fired to a grey or buff colour and is decorated with applied vertical lines and pads. The pads are glazed and metallic in appearance, except for one on the left-hand side of No. 7 which is unglazed. The sherds came from the habitation floor (Context 22). Nos. 6 and 8 are undecorated body sherds of Bristol pottery. No. 6 (unstratified) is fired to a grey colour with a buff inner surface. The external surface is rough and covered with a patchy dark-green glaze. No. 9 (Context 24) is a small fragment of a 'tree' motif from the neck of a decorated Bristol jug. The grey fabric is covered with an overall green and brown glaze. A larger fragment of similar type was found at Cornmarket Street (Hurley, in press). This type of jug dates from the early to mid-fourteenth century (Ponsford 1979, 49-55).

Irish Ware (Fig. 8)

Twelve sherds (7%) have been identified as Irish ware. The pottery is generally grey or pink/buff in colour with a patchy external

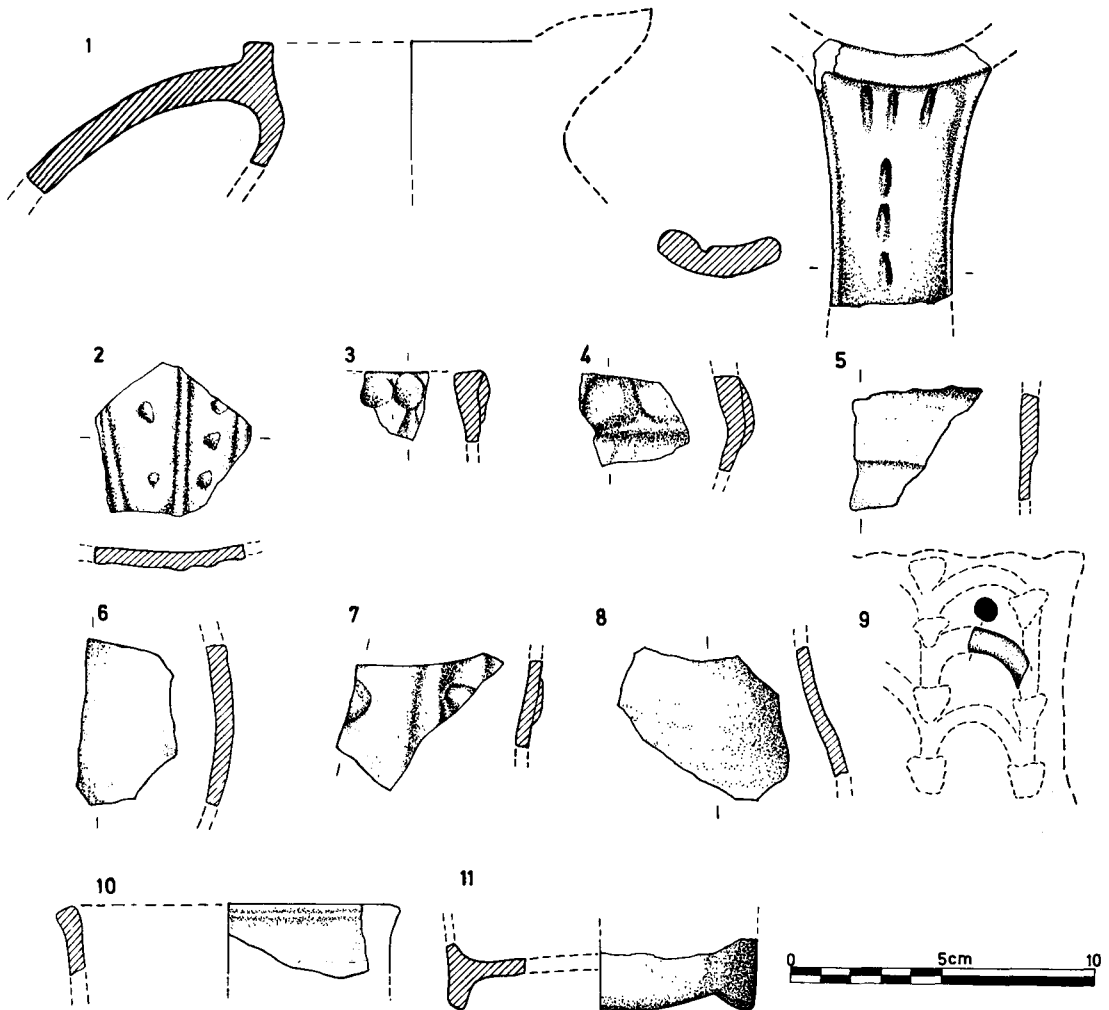


Fig. 8: Nos 1-9 English Ware (13th-14th century); Nos 10-11 Irish Ware (14th century).

green glaze. Two sherds are illustrated (Fig. 8, Nos. 10 and 11). Both are from disturbed levels of Context 1. The pottery is fired to a pink colour with a grey core. No. 11 has an unusual pinched ridge under the base.

As well as the glazed jugs, two sherds of micaceous cooking ware were found. These are probably of south Leinster origin and may have reached Cork by coastal trade with Waterford or Wexford. Nos. 227 and 228 (not illus.) came from Context 24 which also produced a large amount of imported pottery dating

primarily to the first half of the fourteenth century. Small amounts of this cooking ware were found in other Cork city sites (Hurley, in press). It has been found in large quantities in south Leinster (Ó Floinn 1976; Hurley, forthcoming). The pottery is hand-made, coarse, and contains large amounts of mica. The base is pitted, with the characteristic 'sand-marked' appearance.

Post-medieval pottery (Fig. 9)

A small amount of post-medieval pottery and

roof tiles were found in Context 1 and associated with the drain to the north of Wall 2. The majority of the sherds (35 pots and 2 roof tiles) were of smooth earthenware which was either unglazed or had a brown, green or black internal glaze. Black internal glazes are typical of Buckley-type pottery (Davey 1975). Earthenwares were produced in enormous quantities in western England from the seventeenth century onwards and large amounts are generally found in the post-medieval levels of Cork city excavations. A pouring spout (No. 7) is an unusual feature on this type of pottery.

West English gravel-tempered pottery (Nos. 1 and 2) is commonly found in association with the smooth wares. Heavy moulded rims are a

usual feature of gravel-tempered ware. North Devon sgraffito pottery is a more decorative form of earthenware for general domestic use, particularly as tableware (Nos. 3 and 4). Large quantities of north Devon pottery were imported into Cork in the second half of the seventeenth century (Grant 1983, 101-3). Five sherds from decorated platters were found as well as a single sherd from a west English slip-trailed dish. A similar range of post-medieval pottery is found on other coastal sites in the south of Ireland, e.g., Ballyhack Castle, Co. Wexford (Fanning and Hurst 1975) and Dunboy Castle, Co. Cork (Gowen 1978).

An oval ceramic knob (No. 8) is probably from a Saintonge chafing-dish of late sixteenth

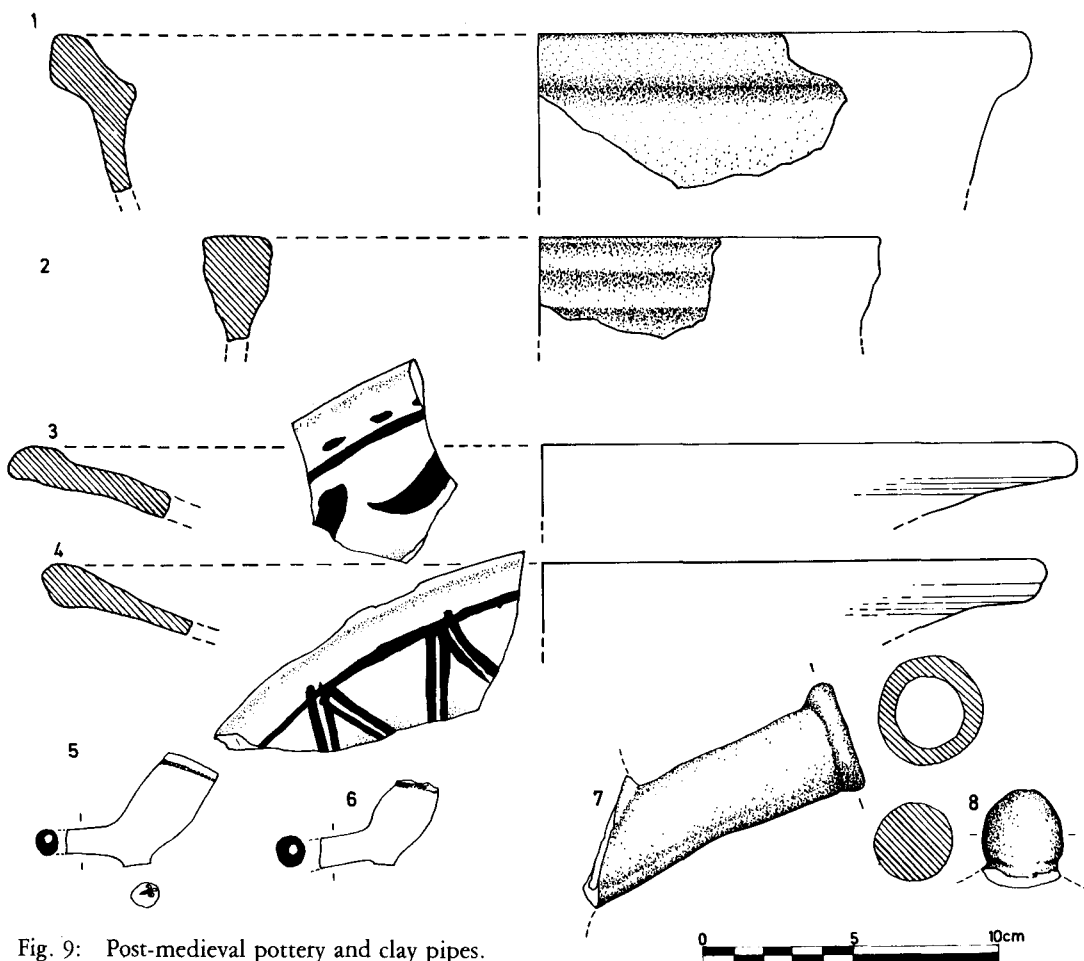


Fig. 9: Post-medieval pottery and clay pipes.

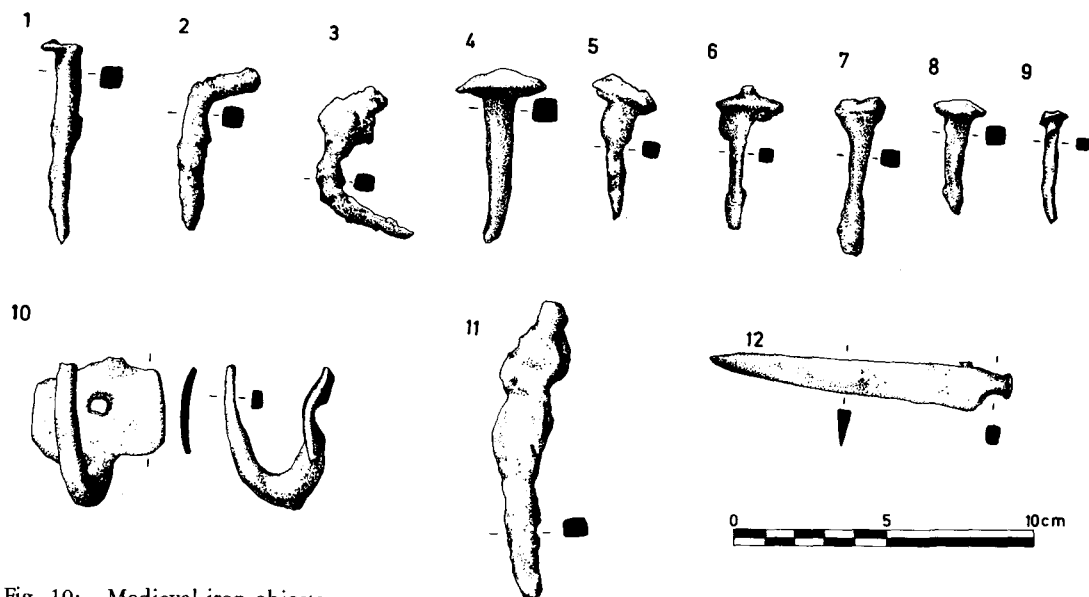


Fig. 10: Medieval iron objects.

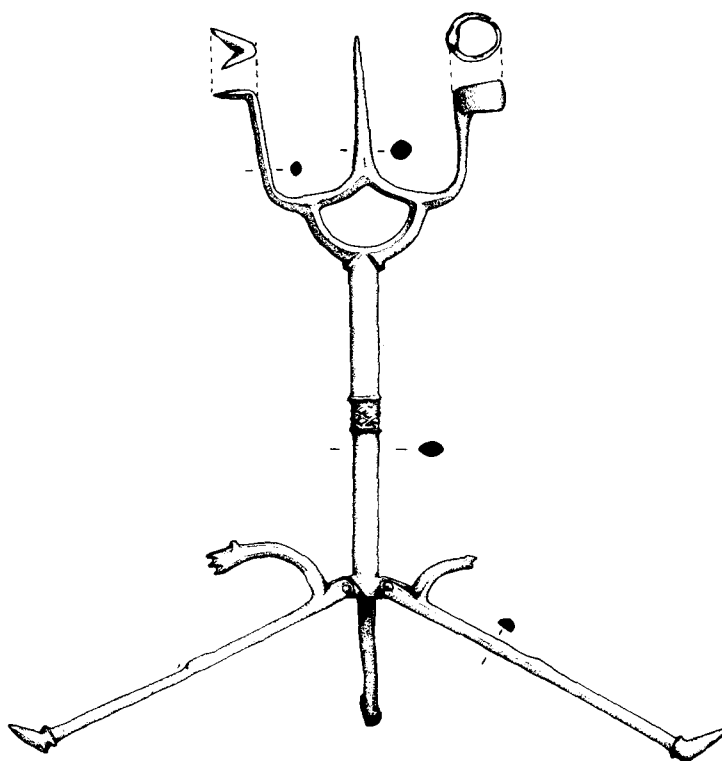


Fig. 11: Bronze candlestick-13th century.

or early seventeenth-century date. Similar knobs were found in Plymouth (Hurst 1974, 245-246, Fig. 9, Nos. 42-46). A sherd of Westerwald stoneware and a sherd of Beauvais slipware were also found.

Glass

One complete eighteenth-century wine-bottle and 11 bases and necks of seventeenth and eighteenth-century bottles were found as well as 4 fragments of clear bluish glass. A clear glass neck and rim is similar to late seventeenth-century hour-glass necks from Cornmarket Street (Hurley, in press, Fig. 26, no. 7) and from Southampton (Platt and Coleman-Smith 1975, 225, No. 1597).

Clay Pipes (Fig. 9)

Thirteen stem fragments and two bowls from clay pipes were found in post-medieval contexts. No. 5 (Fig. 9) is a Cork-made pipe of 1690-1750 AD. No. 6 (Fig. 9) is of a mid-seventeenth-century type and probably imported.

Iron (Fig. 10)

Nine nails of various shapes and sizes were found in the occupation material south of Wall 2. These date from the mid-thirteenth to the mid-fourteenth century. Most were found in the habitation layers (Contexts 22, 25 and 27) and some in Context 28. All were square in section. No. 1 (Context 27) has a broken circular head. Nos. 2 and 3 (Context 27) are heavily corroded and the heads have broken off. No. 4 (Context 28) is a large nail with a circular (2.8mm in diameter) domed head. Similar nails were found in twelfth and thirteenth-century contexts in Southampton (Platt and Coleman-Smith 1975, 276-293, Nos. 2079-2081). No. 5 (Context 22) and No. 6 (Context 25) have roughly circular heads. Nos 7-9 came from the lowest excavated levels (Context 28, *c.* mid-thirteenth century). These have circular heads but the head and shaft of

No. 9 are broken. No. 10 was found in the habitation layer just above the slate floor (Context 22). It is a wall-plate and hook. The plate is rectangular, 4.4cm × 3cm, and pierced with a central hole, through which it would have been riveted to the wall. No.11 (Context 28) is heavily corroded and covered with accretions. It is a square-sectioned wall spike. No. 12 (Context 28) is a tanged knife. The flat-backed, single-edged, straight-sided blade is triangular in cross-section. It is 9cm long. The rectangular-sectioned tang is 1cm long and flattened at the back. It is difficult to distinguish between many medieval domestic knives and weapons and most knives served as both dagger and utensil. Short, straight-sided, heavy blades of triangular cross-section were derived from the Saxon scramasax-knife, and the form remained basic throughout the middle ages (Ward-Perkins 1976, 50-54).

Bronze Candlestick (Fig. 11)

A bronze pricket-candlestick with folding legs was found in a habitation layer (Context 25) to the south of Wall 2. It was found in association with Saintonge green-glazed pottery and a single sherd of Saintonge polychrome ware. This type of candlestick is believed to have been used by travellers (Hildburgh 1920, 132-135). The folding legs were lighter than a solid base and easily packed. Originally, the legs may have stood at an angle of 50° to a line projected vertically from the shaft, but the hinges have loosened and they now open to an angle of 70°. When standing as originally intended, the feet are flat on the ground. The legs are D-shaped in section and each foot terminates in a 'pointed toe shoe'. The purpose of the hooks on the tops of the legs is unknown; they may be merely decorative. One hook is broken; one (right) terminates in what appears to be a serpent's head; the other widens into three forks with a notched crest on the upper side. These features may be depictions of the owner's blazon. In the middle

ages, candlesticks were frequently decorated with enamelled heraldic devices and armorial bearings (Hildburgh 1920, 132-135). The legs are hinged to the shaft with bronze rivets flattened at both ends. The shaft is lentoid in section with a central band of chevron decoration in relief.

The central spike, or pricket, was used to impale a wax candle. The loop could have been used as a socket which gripped the body of a small candle or it may have contained a rush light. This could have been used if a candle was not available, and was better adapted to the poor quality candle in everyday use in medieval times (Ward-Perkins 1975, 177-182). The opposite arm terminates in a V-shaped projection, the use of which is unknown. Ward-Perkins (1975, 182) notes that a candlestick in the *Musée de Cluny*, Paris, has a central spike and two V-shaped notches.

This type of candlestick may have been in use from early medieval times (Ward-Perkins 1975, 179-182, Fig. 561), and the form continued in use at least until the mid-fourteenth century (Hildburgh 1920, 132-135, Fig. 8). The stratigraphical context suggests that the Cork candlestick was lost/discarded in the last quarter of the thirteenth or early in the fourteenth century. The wearing of the hinges suggests that it had been in use for some time before this.

Wood, Antler and Leather (Fig. 12)

Two objects of worked wood were found south of Wall 2.

No. 1 (Context 25) is a Yew twig (*Taxus baccata* L.) which has been cut with a knife at both ends and pared to remove some of the bark. It was used as a tally-stick as six shallow, V-shaped notches have been cut at one end. A tally-stick, almost entirely covered with notches, was found in the Tuckey Street/Christ Church Place excavations (E146: 27178). No. 2 (Context 28) is a slender wooden pin which is also similar to a pin found in a late thirteenth-

century context at Tuckey Street (E146: 27202).

Two antler needles (Nos. 3 and 4) were found in Context 25. Neither has an eye and it is possible that they have broken below the eye. The needles have been pared, filed and highly polished.

Seven fragments of shoe leather were found in Contexts 25, 27 and 28. They consist mainly of fragments of uppers (vamps and quarters) and straps. A long fragment of a rand⁸ (No. 313, not illus.) is from the forepart of a pointed thirteenth-century turnshoe.

ACKNOWLEDGEMENTS

Special thanks are due to Cork Corporation for permission to excavate, for all the facilities given, and for a generous contribution towards the financing of the excavation. I would also like to take this opportunity to congratulate Cork Corporation for its far-sighted approach towards preserving part of the city wall in the central city amenity park. Thanks to Messrs Green, McCarthy, Stansfeld, Consultant Engineers, for their advice and assistance; National Manpower Youth Employment Agency for a generous grant towards the cost of the project; the Finance Office, UCC, for administration; Mr Eamon Young, Cork National Manpower Office, for making available an excellent staff; everybody who worked diligently on the site, particularly Ms Addie McCarthy, site supervisor; Ms Cleary for her supervision of the clearance of the site and subsequent advice relating to many aspects of the work and the preparation of the drawings and report; Mr Dermot Twohig for information on the adjacent excavation and on the pottery; Ms Sheila Lane for her comments on the clay pipes; Ms Libby Heckett for her extensive research and report on the textiles; Ms Penelope Walton, 12 Bootham Tce., York, for her analysis of the fabric dye; Mr Paddy Sleeman for identification of wool fibres and human hair; Mr Barra Ó Donnabháin for his comments on the human bones.

The finished plans were drawn by Ms Ita O'Brien and the location plans by Mr Dominic Casey; the finds drawings are by Mr Sean Durack. Many thanks to Ms R.M. Cleary for reading and commenting on this paper and to Ms Angela Desmond for typing it.

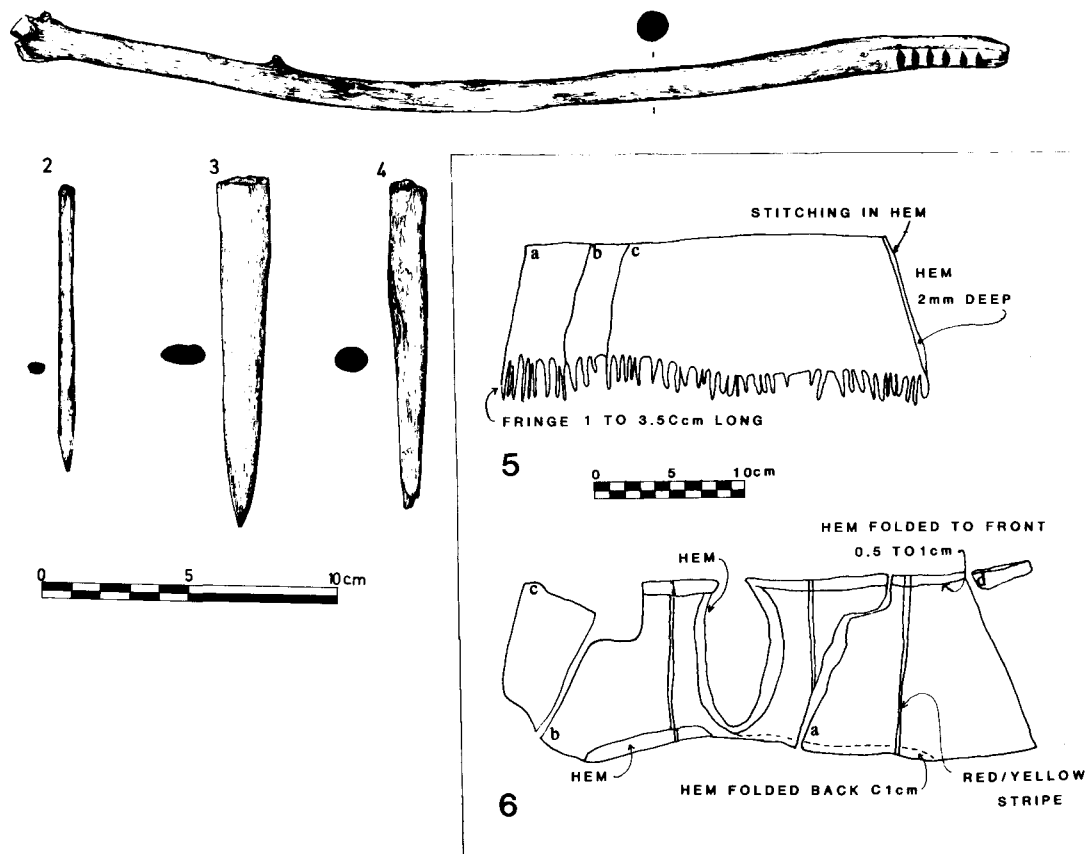


Fig. 12: Medieval worked wood, bone and fabric.

NOTES

1 Cork Corporation intends to provide a city centre amenity park between Grand Parade, South Main Street, Tuckey Street and Christ Church Lane.

2 Exact location: O.S. 6" scale sheet No. 74. 28.4cm from S. margin; 40.6cm from W. margin. Municipal Borough of Cork, Central Ward; Ph. Christ Church; Co. Cork.

3 The excavation was partially funded by the Department of Labour, Youth Employment Agency. The scheme was administered by the Finance Office, University College, Cork.

4 Prior to the commencement of the excavation, a plan of the outer face of the city wall (Wall 1) was drawn by the author, assisted by Ms Sheila Lane, Ms

Ita O'Brien and Mr Dominic Casey; the structure was photographed by Ms Mary Sleeman. The plinth was not planned because it had already been covered with concrete when the plan was drawn.

5 Map of 1560, in Library of Trinity College, Dublin. (Copy in Cork Public Museum).

6 A core was extracted from the clay and is presently being analysed for pollen content by Dr Robert Devoy, Dept. of Geography, UCC.

7 The percentages were estimated by sherd and rim count.

8 A rand is a long narrow strip of leather of roughly triangular cross-section, inserted between the upper and the sole to make the shoe more waterproof or decorative.

APPENDIX 1: Correlation of Museum numbers and figure numbers

The finds are registered under E292:

Fig. 7	Fig. 8	Fig. 9	Fig. 10	Fig. 12
1 215	1 290	1 47	1 301	1 320
2 277	2 275	2 34	2 303	2 318
3 205	3 74	3 37	3 302	3 316
4 262	4 177	4 102	4 305	4 317
5 191	5 282	5 123	5 298	5 326
6 270	6 179	6 39	6 300	6 327
7 232	7 165	7 24	7 308	
8 208	8 276	8 61	8 306	
9 35	9 246		9 304	
10 36	10 102		10 297	
11 204	11 30		11 296	
12 281			12 307	
13 261				
14 77				
15 197				
16 201				
17 211				
18 92				
19 214				
20 268				
21 202				

APPENDIX 2: SOIL ANALYSIS

(Dr Mark Cooper, Dept. of Geology, UCC)

The layers of estuarine silts and clays occupied all of the excavated area to the north of Wall 2, on the western (inner) side of Wall 1. Each layer was sampled by Dr Cooper. The following is a report prepared by him on the analysis. The sequence of layers is illustrated on Fig. 6 (a,b).

Layer C1

This layer comprises made ground of rather heterogeneous lithology.

Layer C2

Layer C2 is the highest natural deposit preserved in the excavation, a silty sand with no internal structure and lithologically homogeneous. The sediment shows no sign of having undergone weathering processes. The layer is medium-brown in colour in its natural, water-saturated condition and shows a slight cohesion when excavated, coming away in

lumps. At the base of the unit the sand becomes orange-brown in colour but is lithologically identical. This may well be due to deposition of iron oxides leached from the sand above. Deposition would be likely to occur at the base as the sand is underlain by relatively impermeable clayey silts. The colour of the C2 sand changes to a light yellowish-brown once air-dried. The mineralogy of the grains is dominated by quartz ranging from medium sand to fine silt grade. The sediment is poorly sorted with the coarser particles given cohesion by a thin coating of finer particles. The quartz grains are equidimensional and sub-angular to sub-rounded with a smooth surface. There is also a small percentage of carbonaceous fragments, rich in organic matter, which are angular and range through the same grain sizes as the quartz.

The sediment is certainly water-lain but the lack of internal structure and the poorly-sorted character suggest that current activity was limited.

Layers C3, C4 and C7

As these layers are lithologically indistinguishable

from one another they will be described together. The sediments are unweathered clayey medium silts. The silt is firm and homogeneous with good cohesion; there are no internal sedimentary structures. The colour varies from greenish-brown when dry to dark grey-brown when in its natural water-saturated condition. In the excavation, the silt had dried out somewhat and was displaying shrinkage cracks. The grains are predominantly of quartz and range from medium silt to clay grain size. The grains are well-rounded, equidimensional and smooth. The clay content is estimated to be *c.* 30%. There is also carbonaceous material occurring as flaky or fibrous patches of coarse sand size but these are heterogeneously distributed through the silt. The organic content is *c.* 5%. There are also smears of blue colouration throughout the silt. This is believed to be basic copper carbonate deposited from percolating groundwaters. This silt is of estuarine origin (Dr R. Devoy pers. comm.); although it has been termed Estuarine Clay, this is a misnomer given the dominant grain size. The total observed thickness would suggest that the sediments represent a considerable interval of time — (centuries rather than decades).

The Calcy Layer

This occurs as a thin discontinuous layer above C4 (Fig. 6). It is the only well-cemented layer exposed in the excavation. It comprises fine quartz sand and silt cemented by a calcium carbonate cement. There are also gravel-size angular to sub-rounded clasts of purple red Devonian shale (of local derivation) occurring within it. The layer clearly represents rather higher energy conditions than the silts above and below and possibly represents a storm event in the estuary. As the layer would have far higher permeability than the silts, it would have acted as a preferential pathway for groundwater movement within the silts and this may explain why it is unique in being well-cemented.

Layers C5 and C6

These layers are lithologically identical. They consist of coarse sand to cobble-sized clasts of locally-derived bedrock set in a matrix of silt with the same characteristics as the estuarine silts described above. The clasts are predominantly sub-angular to well-rounded. This is again thought to be a storm-

generated layer, the storm event producing high water-flow and enhanced load-carrying potential of the river.

General Points

It is highly unlikely, given the well-stratified nature of the sediments, that they comprise made ground of unnatural origin. Age dating would confirm this. It is possible that they represent reclaimed land in the sense that if drainage channels were constructed, they would lower the water table in the sediments, enabling the construction of the wall to be undertaken. It is interesting to note the differential compaction of the sediments underneath the wall. The C2 sand layer does not change thickness as the wall is approached; it is likely that the settling is due to de-watering of the silts over a period of time. This is not unexpected as fine-grained sediments often have a high porosity but low permeability. However, under load, permeability would be enhanced by virtue of water-flow to regions under less pressure thus creating a small-scale hydraulic gradient and de-watering leading to settlement over a period of time.

APPENDIX 3: THE TEXTILES

(Ms Libby Heckett, Dept. of Archaeology, UCC)

Introduction

Three pieces of woven woollen cloth were recovered from a mid to late thirteenth-century occupation floor (Contexts 25 and 27). The whole area is waterlogged, lying below tidal levels, and in this sealed, anaerobic deposit, conditions for the preservation of organic material were exceptionally good. It would seem probable that these fragments were discarded after a period of use, and became absorbed into the refuse accumulating on the occupation floor.

Conservation and Methods

After recovery, approximate dimensions of the pieces were recorded and samples for dye analysis were taken. Piece A was assessed for colour before washing. The textiles had been sealed in polyethylene bags on site and conservation procedures were undertaken immediately. Each piece was

washed in a very weak solution of Synperonic NDB detergent and de-ionized water, being supported on glass and allowed to dry slowly at room temperature after the threads had been straightened.

The finds were measured for colour by the use of the Munsell Colour Chart for Hue, Value and Chroma to provide as objective an assessment as possible of the actual colours present.

Dye samples were tested by Penelope Walton by extracting the dye with a variety of solvent systems. The resulting extracts were run on a Perkin-Elmer 402 U-V/visible spectro-photometer and the spectra obtained compared with known dyestuffs.

DESCRIPTIONS

(A: Reg. No. 326 (Fig. 12, 5))

Dranae cloth - fringed and felted

Fibre: wool

Weave: 2/1 twill

Colour: before washing - exterior of fabric Red 2.5YR 3/6; interior Red 2.5YR 4/6; after washing — dark reddish-brown 2.5/4 YR

Dimensions: overall -c. 11cm × 28cm (a) 4.5cm × 10cm; (b) 3cm × 10cm; (c) 20cm × 11cm

Spin direction: Z/S

Degree of twist: tight/loose to medium

Yarn diameter (mm): 0.35-0.40/0.46-0.47

Sett per cm: 12/8 - very difficult to count due to fulling

Selvedge: two. Fulling makes this difficult to establish

Fringes: at one end — length of fringe 1cm-3.4cm and Spliced

Dye: madder

Sewing: stitches inside hem — appears to be self-stitching. Upper edge cut?

(B: Reg. No. 327 (Fig. 12,6))

Worked textile with red stripe: possible original dimensions 9-11cm × 35cm.

Fibre: wool

Weave: 2/1 twill

Colour: main body of textile — 10YR very dark greyish-brown 3/2 to dark-brown 3/2, fading to dark greyish-brown 4/2; stripe — reddish-brown 5YR 5/4 to light reddish-brown 5YR 6/4

Condition: very good to deteriorated

Dimensions: (a) 9.5cm × 14cm (b) 9.5cm × 19cm (c) 8cm × 6cm (d) 4cm × 1.5cm

Spin direction: main textile — System 1 Z/System 2 S + Z; stripe — S. twisted — two strands to each stripe

Degree of twist: loose/tight to loose

Yarn diameter (mm): 0.40-0.43/0.33-0.45

Sett per cm: System 1 (Z) 13-14; System 2 (S) 8-9

Selvedge: none

Fringes: none

Dye: main textile — negative; stripe — madder and unidentified yellow dye (weld?)

Sewing: sewing thread still in hem of (d); 2mm thick; black

(C: Reg. No. 327 (Fig. 12,6))

Scrap of fabric

Fibre: wool

Weave: 2/1 twill

Colour: dark reddish-brown 5YR 3/3

Condition: good

Dimensions: 5.5cm × 2.5cm

Spin direction: Z/S

Degree of twist: medium/loose

Yarn diameter (mm): 0.35/0.50

Sett per cm: 12-15/8-10

Selvedge: Two? If so, this is a remnant of a band

Fringes: none

Dye: madder

Sewing: none

Wool Preparation and Spinning

The yarn used (with one exception) is of the worsted type; before spinning, the wool is combed so that the fibres are closely aligned and can be spun into a smooth, strong thread. However, the yarn used for the red stripe and for some other threads in Piece B is of the woollen type; the wool roughly aligned between carders or hand-teased, so that a soft, bouncy thread is produced.

Weave and Finish

The pieces are woven in a 2/1 twill, although the weave is difficult to establish due to surface finishing or matting. In two cases, the warp yarn, which is stretched under tension during weaving, is Z spun (it has been twisted to the right) and the weft yarn is S spun (it has been twisted to the left). In the third, the probable warp is Z spun but the weft contains both S and Z spun thread. The choice of a twill weave, and yarns spun in opposite

directions is often related to the type of cloth required. If it is to be thick and heavy, with a felted or thickened finish, the fabric will be spun and woven in this way (Oelsner 1915, 13 and 25). Three shed twill weaves begin to be found in northern Europe after the eleventh and twelfth centuries; this may be connected with the introduction of the horizontal loom at this time in succession to the vertical loom (Hoffman 1974, 200-204). It is known that a taste for heavily-fulled and finished cloth developed from the eleventh century onwards in contrast to the crisply-woven fabrics (with Z spinning in both directions) favoured by the Anglo-Saxons and the Vikings (Crowfoot 1975, 336). The finish on Piece A seems to be a deliberate thickening of the cloth so that a blanket effect is produced. The matting on Piece B and Piece C may be intentionally produced or it may be the result of lying saturated in Cork's marshy ground for so long. Finishing processes of hand woven tweed have been carried out in Ireland within living memory (Mitchell 1978, 21 and 47; Lucas 1968).

Dyeing

Dye tests showed that traces of red dye were present on Piece A, Piece C and on the stripes of Piece B whilst the main portion of that piece reacted negatively to the tests. The stripes of Piece B also showed a possible yellow dye. The red dye used is of vegetable origin and is from the madder plant, *Rubia tinctorum*. This is not native to Ireland or Britain but is believed to have been cultivated in England at least by Anglo-Saxon times (Page 1970, 94) and generally in western Europe by the middle ages (Hofenk-de Graaff 1983, 76). At that time, madder seems to have been a popular choice; of 179 textiles from medieval London that showed positive dye reactions, 48% had been dyed red with madder (Walton forthcoming). It is possible that cloth was being dyed in Ireland in the thirteenth century using imported dried madder roots — these have been found in Viking York (Hall 1984, 59). Madder requires the use of a mordant before dyeing to set the dye fast. At this time, alum was generally used to produce various shades of orange and red.

The traces of yellow dye in the striped fabric could

not be linked with a specific dyestuff but weld or dyer's rocket (*Reseda luteola*) is believed to have been in use by this period (Ponting 1981, 178). Under the microscope, faint traces of a yellow shade in the stripes can be detected.

A feature of Piece A was the bright orange colour remarked by the excavators when it came into the light. This colouring has not persisted but it is interesting to note that the faded pieces of material to be seen in museums can in no way represent the original strong colours of medieval times.

Piece A would appear to have been dyed in the piece since the dye is far stronger on the thickened surface than on the inner woven layers.

Sewing Details and Possible Function

Piece A with its one fringed edge, original bright orange colour, hem at one side and blanket-like appearance seems to be complete and not a fragment of some larger article. The fringing represents the warp threads from one end of the woven piece and has been left hanging to form a decorative feature. The edges appear to have been cut. It would be difficult to hazard a guess as to its function. It would relate to an article of dress or perhaps to some part of a horse's trappings or to a decorative aspect of a hanging or article of domestic use. Its original function is not known.

Piece B may represent some part of an item of dress with small hem on both long edges and a hemmed 'keyhole' opening in one long edge. What part of dress may be represented here is difficult to suggest; a speculation would be that it is some part of a collar or a facing on a tunic. There must have been many details of undergarments unfamiliar to modern people that would have been designed to lessen the strain of wearing body armour; for example, extra cloth layers may have been needed to protect the collar bone. Hairs caught in the surface of the fabric have been identified as human, and came from a dark-haired individual (P. Sleeman, Dept. of Zoology, UCC, pers. comm.).

Textile remains have also been found in close proximity to the Grand Parade site. Some pieces were recovered from the Tuckey Street excavations carried out by Mr Dermot Twohig in the 1970s.

APPENDIX 4: HUMAN REMAINS

(Barra Ó Donnabháin, Dept. of
Archaeology, UCC)

The human remains submitted for study consist of the commingled remains of at least 23 individuals. All but one were adults. Most fragments are part of the shafts of various longbones. Table 1 shows the minimum number of individuals count for each bone. Most of the bones are in a fragmentary state with much post-mortem deterioration. Many have a weathered appearance. It was not possible to determine the sex of most of the remains though tentative estimations are given with some of the pathological descriptions below. Only 2 fragments of bone from a juvenile were found.

The condition of the bones and the fact that most of them are the more resilient longbones suggest that this deposit is the result of graveyard clearance. Such a deposit would contain those bones less susceptible to decay; remains not easily broken up during grave digging and yet large enough to cause offence if left on the surface. The weathered appearance of some suggests that they were indeed exposed to the elements for some time prior to their collection and reburial.

These bones presumably originated in the cemetery attached to Christ Church which is adjacent to the site. Normal gravedigging disturbance or a single event such as the last phase of building at Christ Church (1720s) could have produced this collection of remains.

Dental Remains

The only teeth recovered were a 7 and 567 from 2 adult males.

Fragments of 3 mandibles were found and all belonged to adults. Two of these were the probable males mentioned above.

Among the 3 mandibles, 29 erupted positions were observable. Of these, only one tooth (an 8) was lost ante-mortem. The 4 teeth recovered had moderate attrition and slight deposits of dental calculus (tartar). None had caries (tooth decay).

*Pathology**Skull*

(a) One of the two fragments of juvenile bone is the left half of a frontal. The child was aged be-

tween 3 and 6 years and had cribra orbitalia. This pitting of the anterior portion of the orbital plate is generally recognized as being a result of severe and chronic anaemia (Wells 1982). In this case, the disease is in the second degree of a 3-point scale.

(b) A fragment of adult frontal from the region of the coronal suture has porotic hyperostosis of the outer table alone. This may be the early stages of Paget's disease (*Osteitis deformans*), a bone condition of unknown cause, usually found in older adults (Robbins *et al* 1981). Similar bone changes of the skull are sometimes found in association with nutritional deficiencies (Ortner and Putschar 1981).

(c) A fragment of both parietals with the obelionic portion of the sagittal suture has new bone growth on the endocranial surface. The fragment belonged to an adult skull. The new bone growth is in a band, 30mm wide, along the sagittal sulcus. This is probably due to an infectious process such as meningitis.

Femur

(a) Two unsided femoral shafts have slight lateral bowing. This is suggestive of a mild form of rickets — a disorder caused by a lack of Vitamin D or of calcium — and is probably due to an inferior diet.

(b) The shaft of a left femur, probably from a male, had a 10cm long band of periosteal reactive bone surrounding the distal end of the bone. The bone has a bloated appearance in the affected area. Central to this band of new bone growth, on the lateral side, is a D-shaped perforation which also penetrates the underlying cortical bone. This perforation, measuring 21mm by 13mm, does not have the appearance of a drainage cloaca usually associated with osteomyelitis. It is more likely to be the result of trauma, perhaps a stabbing injury to the lateral side of the left leg. This would have pierced the bone and the overlying soft-tissues. The type of gross infection seen here would be consequent to such a wound being invaded by micro-organisms.

Tibia

(a) One fragment of a right tibial shaft, probably from a female, has superficial periostitis on the medial side of the bone. This may be the result of some minor trauma. This area of the bone is subcutaneous so it lacks the protection of overlying muscle.

(b) A fragment of adult left tibia is slightly bowed

medially, perhaps also the result of rickets. The medial surface of the bone has some superficial osteitis and thickening. This is suggestive of an infectious process.

(c) The shaft of a right adult tibia has a bulbous swelling on the anterior crest, about half-way down its length. The swelling measures 22mm supero-inferiorly, 13mm antero-posteriorly and rises 5mm from the surrounding bone. The swelling is reminiscent of a callus but there is no sign of a fracture. This may be due either to trauma (an ossified haematoma) or a benign tumour of the bone (an osteon).

Osteoarthritis is conspicuous by its absence from this list of pathological changes in an analysis of approximately 100 longbones. This is due to the fact that the remains consisted mostly of long bone shafts. Only a few articular surfaces were preserved. None of these had any pathological changes.

Table 1: Minimum number of individuals represented by each bone

Adult

Skull vault:	6
Mandible:	3
Right humerus:	12
Left humerus:	14
Right ulna:	8
Left ulna:	1
Radius:	4 (side determination not possible)
Right innominate:	1
Left innominate:	2
Right femur:	22
Left femur:	16
Right tibia:	6
Left tibia:	12
Fibula:	4 (side determination not possible)

Juvenile

Skull vault:	1
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