

Medieval timber-lined wells in Elgin

H K Murray,* J C Murray* and W J Lindsay†

ABSTRACT

This report is a brief summary of the results of a series of excavations on three medieval backland properties behind the High Street in Elgin, Morayshire. It includes a full analysis of an important group of timber-lined wells dating from the late 12th/early 13th century to the 14th century. Exceptionally good preservation due to waterlogged conditions has allowed detailed recording of the carpentry and methods of assembly.

Dendrochronological sampling of the timbers not only gives dating independent of the dating of the contents of the wells, but also offers insights into the source of the timbers used. A rare wooden wheel from one of the wells is also illustrated.

INTRODUCTION

The backland properties behind 213–25 High Street, Elgin, Morayshire (also known as Nicholson's Garage) were excavated in a number of stages over a period of nearly 30 years as successive developments on the site placed potential archaeological deposits at risk (illus 1). The first area to be developed was the extreme north end of the properties, farthest from the High Street frontage, which was excavated by Lindsay in 1976–7 prior to the building of the Elgin relief road. In 1981 and 1993, trial excavations by the Urban Archaeology Unit (later SUAT) showed that most medieval levels at the High Street frontage had been destroyed by later buildings but that there were surviving deposits from *c* 40m behind the street frontage (Hall *et al* 1998, 822–3). As a result, prior to the development of a Marks & Spencer store on the site, Murray Archaeological Services Ltd undertook a watching brief in April 2004, and in June 2004 excavated the remaining area of the backland, which was contiguous with Lindsay's

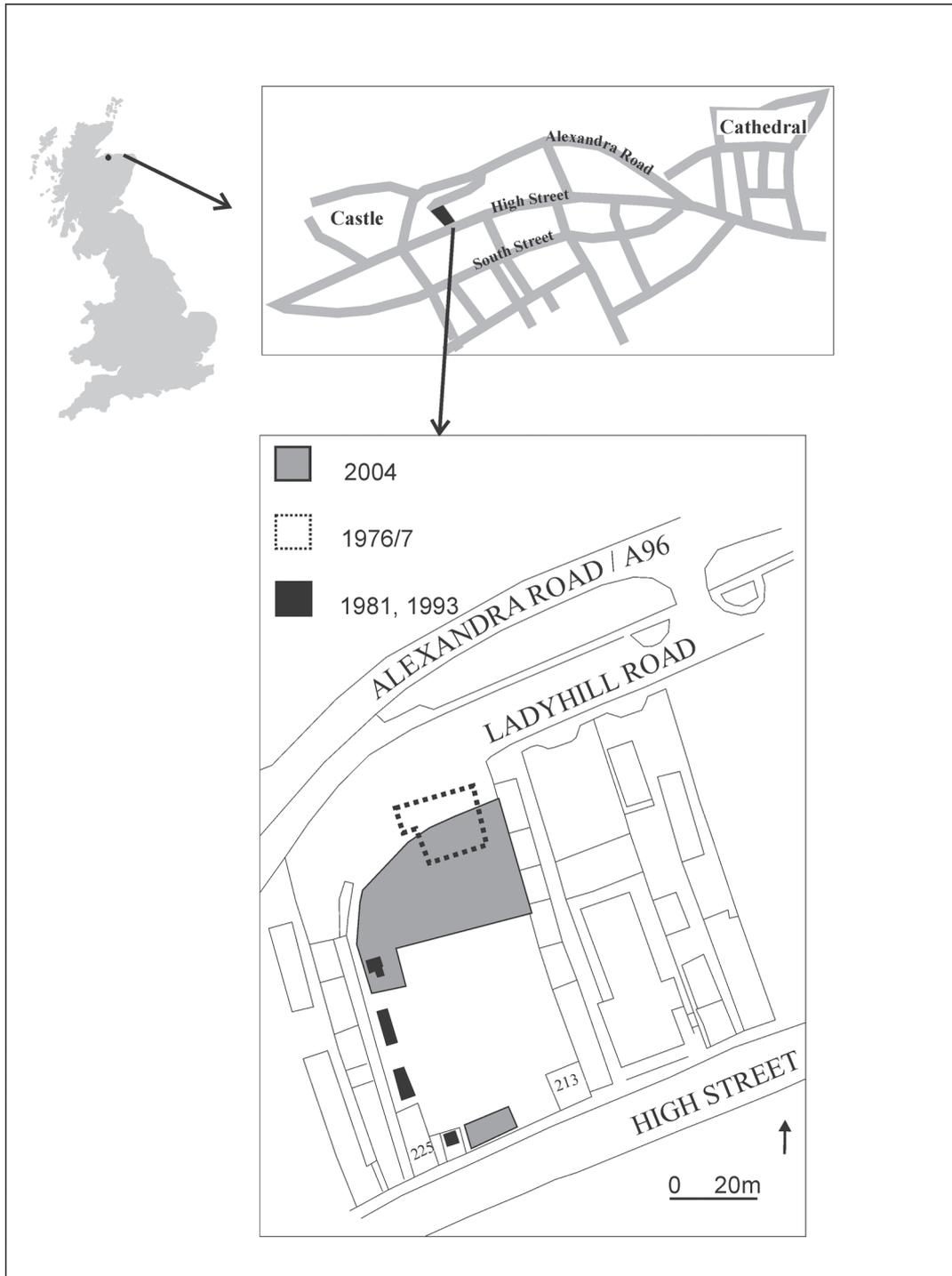
1976–7 site. This report is a brief summary of the results of all the excavations with a more detailed analysis of an important group of excellently preserved, timber-lined wells dating from the late 12th to the 14th century.

THE SITE

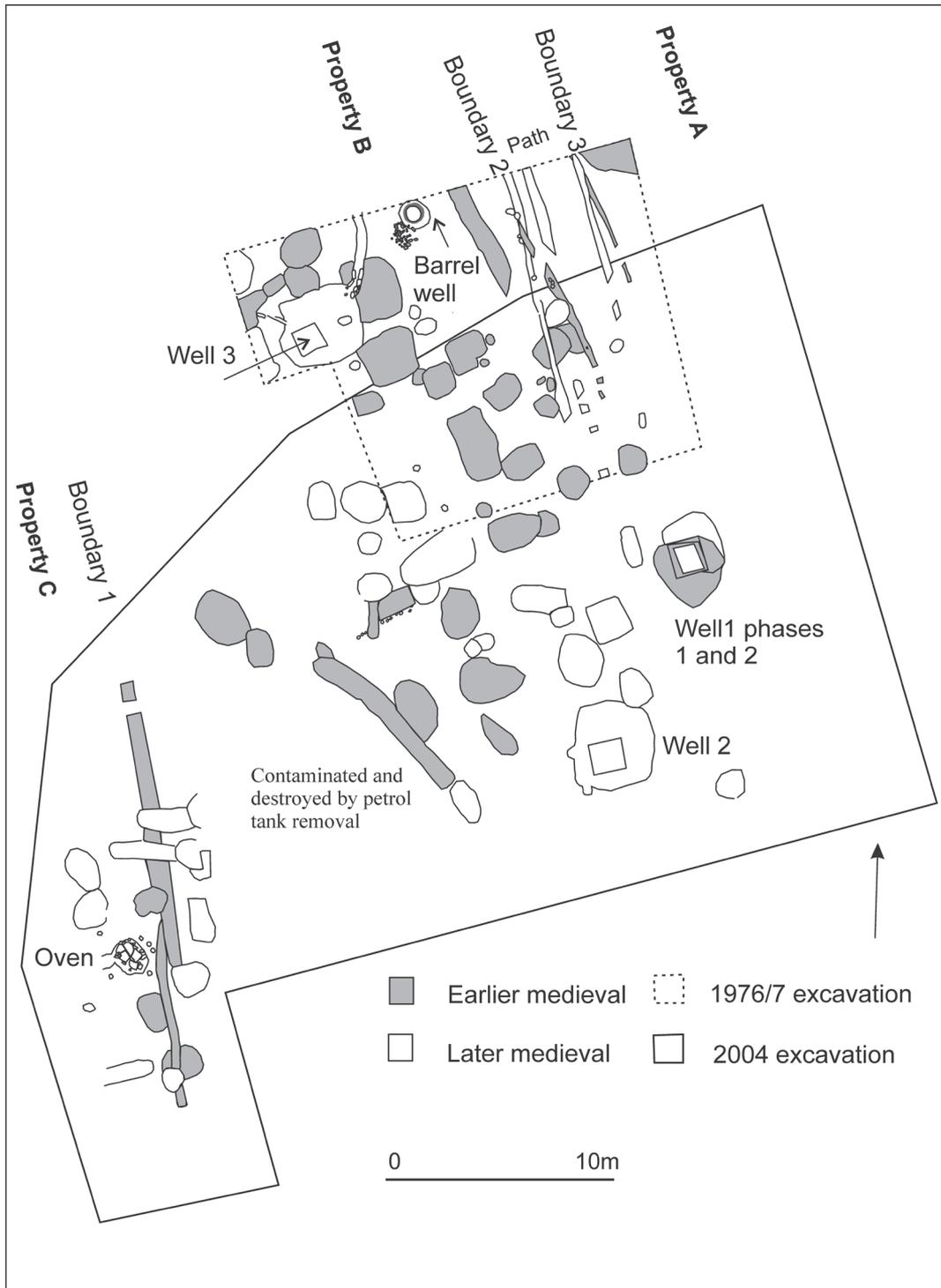
The medieval levels were severely truncated by post-medieval and modern cultivation and as a result the only features that survived were those which had been dug below the cultivation. As many of these features were dug to below the water table there was good preservation of organic materials. In view of the lack of horizontal stratigraphy, the dating is primarily dependant on the relationship of individual features and on the pottery and other finds from pit fills – which may, of course, be later than their original construction. There is also a series of dendrochronological dates for timbers from the wells which are discussed in more detail below.

* Murray Archaeological Services Ltd, Hill of Belnagoak, Methlick, Ellon, Aberdeenshire AB41 7JN

† The White Cottage, Hill of Foulzie, King Edward, Banff AB45 3QD



ILLUS 1 Location of excavations at 213–25 High Street, Elgin



ILLUS 2 213–25 High Street Elgin. Medieval backlands

In the late 12th and 13th centuries the site appears to have covered parts of three backland properties divided by shallow boundary ditches (illus 2, Properties A–C). At the north end of the site, between Properties A and B, there was a path bordered by fences that were later removed. The earliest of the wells (Well 1) was built at the west edge of Property A in the late 12th or early 13th century. Subsequently, the lining partially collapsed and was replaced, probably later in the 13th century. The only other surviving features from this period were a number of highly truncated pits filled with predominantly domestic rubbish and cess.

Later, possibly in the late 13th or 14th century, the boundaries between properties were slightly realigned, with the path possibly falling out of use. A barrel well was constructed by the mid-14th century in Property B. Two timber-framed wells (Wells 2 and 3) were built in Property B during the 14th century, and some of the pits may also have been dug at this time. In Property C a small stone-based oven was constructed, possibly with a sheltering windbreak or light structure around it; this was probably for domestic purposes as analysis of the ash did not reveal any evidence of industrial use and the lack of burnt grains suggests that it was not used for grain drying (Hastie 2004).

There was no evidence of industrial activity having taken place in these backlands – although there was some industrial waste that may have originated from workshops on the High Street frontage. In one of the earlier medieval pits excavated in 1976 in Property A, there was metalworking debris including slag, crucibles and mould fragments. High percentages of cattle and goat horn cores and a number of red deer antler offcuts found in 2004 indicate hornworking, while cat and dog bones are probably associated with skinning (Smith 2005).

The full data for the site is available in an archive report (Murray & Murray 2009), deposited in NMRS and Aberdeenshire SMR. The finds will be disposed by the Scottish Archaeological Finds Allocation Panel.

THE TIMBER-FRAMED WELLS

A total of three timber-framed wells were found on the site, one of which had two successive timber-framed linings, the later one inserted inside the earlier. It is believed that these were wells rather than water storage cisterns as they were all dug to below the water table and all had some form of silt filter at the base. The waterlogged conditions of the site had preserved the timber, allowing analysis of the structural details. All three wells were built with oak of surprisingly good quality; the timber was slow-grown and long-lived, some coming from trees at least 350 years old (Crone 2000; 2005b).

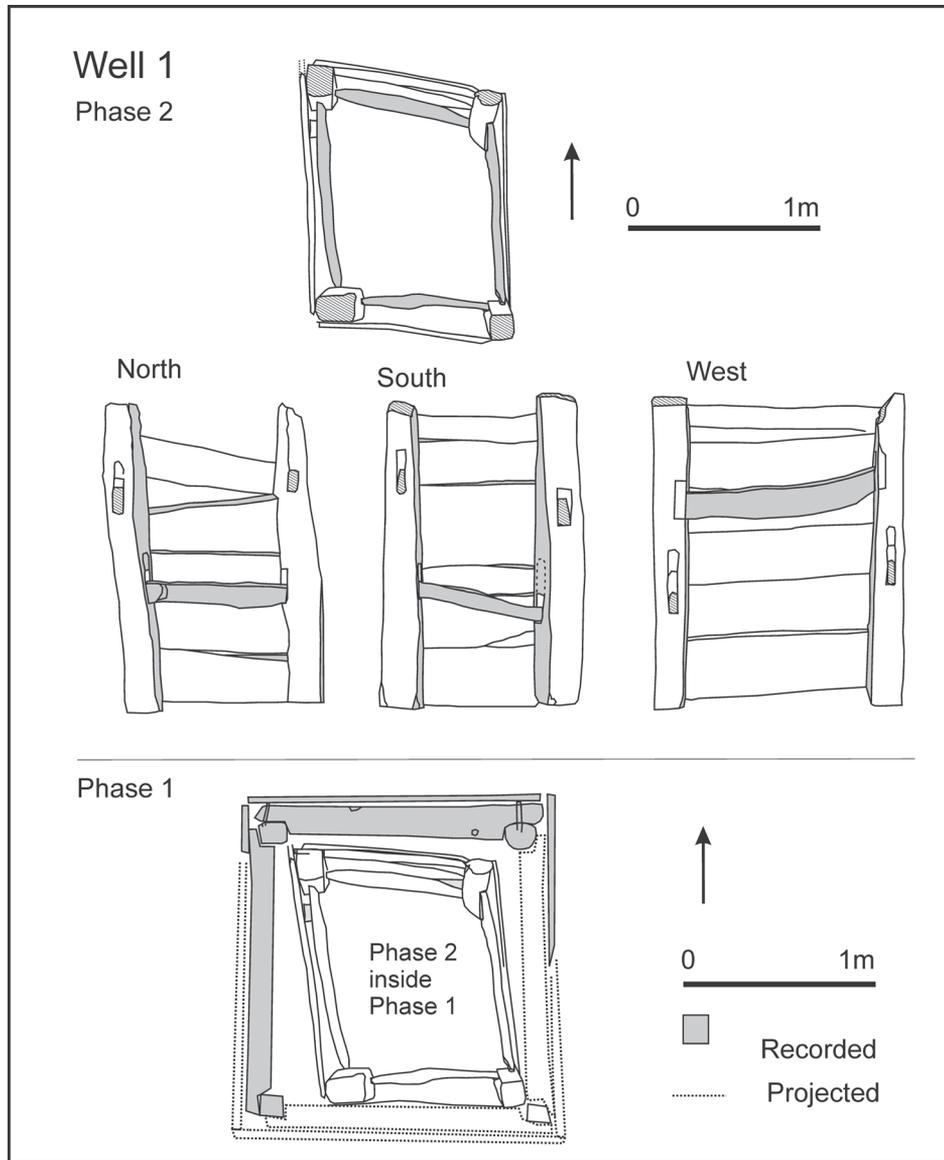
THE STRUCTURE OF THE WELLS (IN PROBABLE CHRONOLOGICAL SEQUENCE)

Well 1, Phase 1 (illus 3)

This well was set in an ovoid pit *c* 2.9m × 3.5m, with a surviving maximum depth of 1.9m.

Within this was a timber-framed lining (*c* 1.3m × 1.3m), only part of which could be excavated or fully recorded as it collapsed when the later inner lining (Phase 2) was removed. The well lining had four corner posts, one of which was roundwood (diam 150mm), the others roughly squared (90mm × 130mm). At the surviving top level these were held apart by four bracing timbers, each lap-jointed and dowelled (from the outside) to the outer sides of the corner posts. Horizontal planks that formed the well lining lay against the outer faces of the bracing timbers. They were held in position by earth backfilled behind them in the construction pit. There is some evidence for re-use of timbers: the north-west post appeared to have a groove; the north brace had a non-functional dowel hole near one end.

At some point, the north-east post appeared to have become unstable with the east side of the lining beginning to collapse inwards. Rather than abandoning the well, a second lining (Phase 2) was constructed. Clay up to 300mm thick sealed



ILLUS 3 Well 1 (2004, F12). Due to collapse, the east side of Phase 2 and parts of Phase 1 could not be fully recorded

the timbers of Phase 1 on the east side of the well – possibly an attempt to consolidate this side.

FINDS: none can be assigned to Phase 1.

DATE OF CONSTRUCTION: late 12th/early 13th century.

Well 1, Phase 2 (illus 3, 4)

The Phase 2 lining had been built inside the existing well; as a result it was smaller and of slightly irregular shape (1.04–1.11m × 1.28–1.32m). The maximum surviving depth was 1.9m, with the timbers surviving to 1.7m.

It had four roughly squared corner posts (130mm × 160mm to 190mm × 200mm) which rested on the base of the pit and were held apart by four bracing timbers set in mortises in the inner faces of the posts. The braces were not fully horizontal but were in two opposing pairs, one set higher than the other. They were irregularly-shaped timbers roughly tapered at the ends; the south brace had been charred prior to being used in the well and would therefore appear to have been re-used. For each brace, the mortise in one end of the post was a regular rectangular mortise, usually about twice the size of the end of the brace – however, the mortise in the other end of the post was of similar size but with a long shallow groove above it. This appears to have been a solution to the difficulties encountered when constructing the lining within the earlier well as one end of each brace could be inserted and the other end then hammered down the groove into the

opposing mortise. No wedges or dowels were used in these joints. This could only have been assembled in the pit – it could not have been pre-fabricated and lowered in. Planks (150–460mm wide and 45–80mm thick) formed the sides, set behind the Phase 2 framework, supported by the earlier (Phase 1) outer lining. In time, the instability of the east side of the earlier lining appears to have caused this secondary lining to begin to collapse inwards.

All the fills in Well 1 must be regarded as associated with Phase 2 or later infilling, as the Phase 2 lining could only have been inserted if the interior of the Phase 1 well was empty of fill other than water. The lowest fill was a layer of stones *c* 1m deep, extending from the base to *c* 1.2m below the surviving top of the well. It is possible that this was simply infilling of the well after it fell into disuse but it may also have been a filter layer – the depth of the layer perhaps also intended as a way of stabilising the lining. Upper fills were comprised of silt with domestic rubbish and a further layer of stones including a single very large boulder.



ILLUS 4 Well 1 (2004, F12), Phase 2, north side

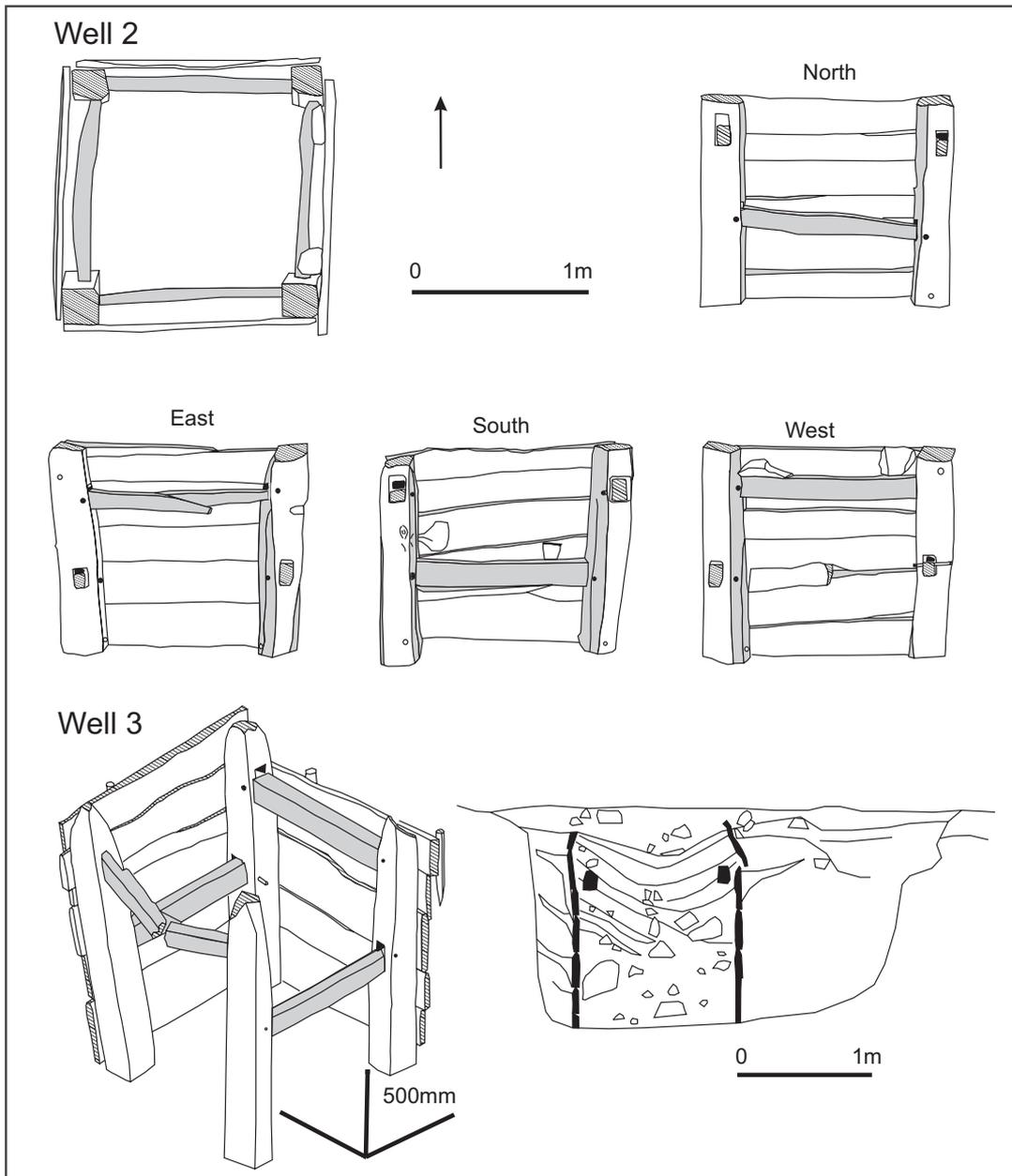
FINDS: there were two fragments of leather shoe of 13th–15th-century type (Thomas 2006) and a wooden dowel.

POTTERY: mainly Scottish Redwares with six sherds of Greyware. 13th/14th-century. Two sherds of glazed White Gritty Ware may be earlier. Vessels were predominantly jugs.

DATE OF CONSTRUCTION: early 13th century.

Wells 2 and 3 (illus 5–7)

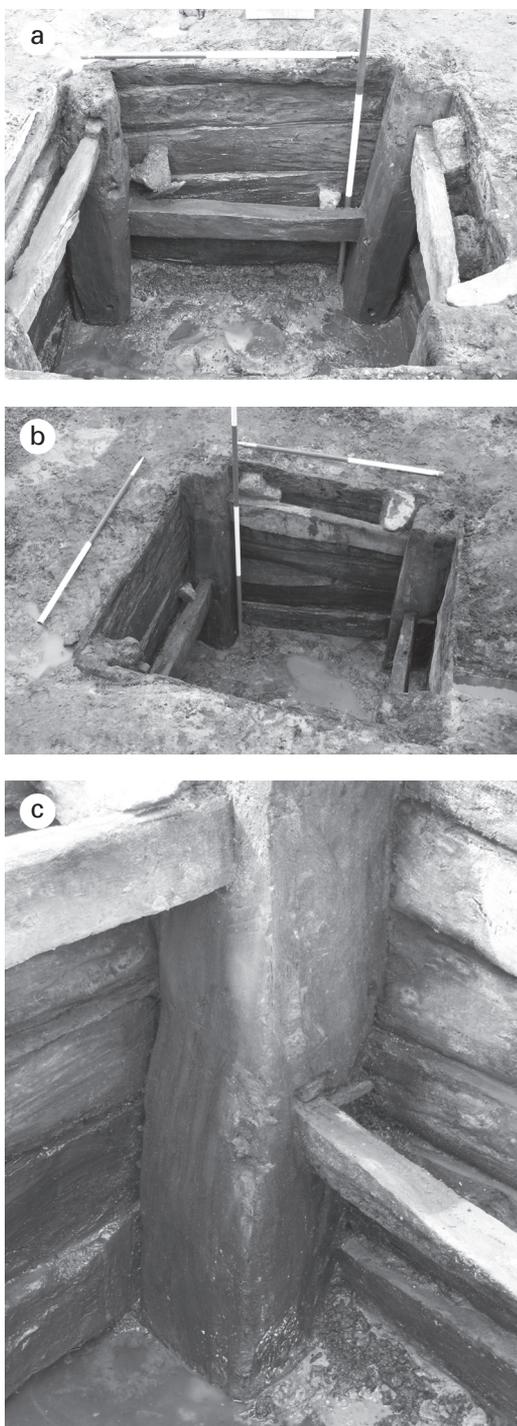
Wells 2 and 3 were set in roughly square construction pits 3.4m and 3.8m across with surviving depths of 1.6m and 1.2m respectively. Within each pit there was a timber-framed lining (Well 2: 1.45m × 1.45m; Well 3: 1.15m × 1.15m) – in Well 2 this lining was backed by <400mm of clay. Each of the linings had four squared corner posts (150mm × 180mm to 210mm × 230mm) held apart by four bracing



ILLUS 5 Well 2 (2004, F1) and Well 3 (1976/7)

timbers set in mortises in the inner faces of the posts. The braces were in opposing pairs, two set roughly one-third and the other two *c* two-thirds up from the base of each well. The ends

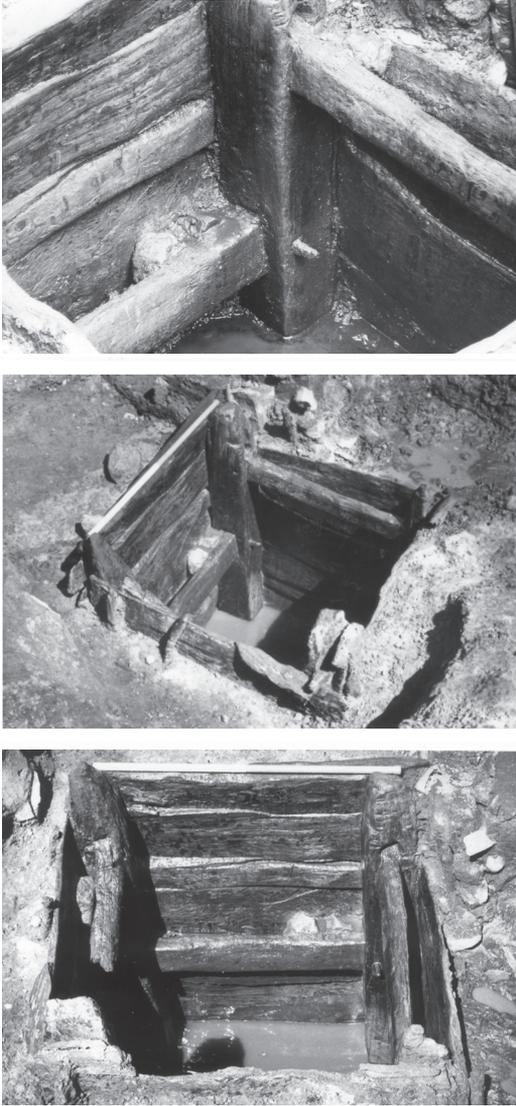
of the braces were adzed to a roughly tapered shape to fit into the mortises. The mortises were rectangular and often larger than the ends of the braces – in Well 2, for example, the south end



ILLUS 6 Well 2 (2004, F1). From top to bottom: (a) south side; (b) looking west; (c) detail of lower brace and north-west corner post

of the east brace was 40mm × 70mm, set in a mortise 130mm × 70mm. In Well 2, three of the mortises had wedges above the brace. All the braces were held in position with dowels, in some cases the angle of the dowel hole was awkward and did not go right through the corner post. Some of the dowels had clearly been driven in from inside the well, the tapered end of the dowel facing the outside. However, when Well 3 was excavated it was considered that the dowels had been driven in from outside the framework before the construction pit was back-filled. In both wells, the horizontal planks which formed the well-lining were set outside this framework, held in position by the earth back-filled behind them. In both wells, stones had been used as wedges between the planks and the outer edge of several of the bracing timbers. In Well 3, small stakes *c* 50mm in diameter had been driven in behind several of the upper planks to secure them further.

Three of the corner posts in Well 2 (SE, SW, NE) had non-functional dowel holes <75mm deep, near their bases. This might suggest re-use, but similar non-functional holes were found in the base of jambs in early medieval Dublin where they were interpreted as being associated with the handling of heavy timbers (Murray 1983, 36; Wallace 1992, 28). It is possible that the Elgin examples may relate to the process of securing timbers during preparation or even during movement to the site – it is unlikely that they relate to lowering the posts into the well, as in that case they would be expected on all four uprights and on the uprights of the very similar Well 3. An empty dowel hole near the rotted, surviving top of the SE post is the only other possible evidence of the timbers of Well 2 being re-used. It was originally suggested (Lindsay 1977) that the over-large mortises in the Well 3 uprights were evidence of re-use but by comparison with Well 2, it is perhaps more likely that this was done to facilitate the assembly of pre-fabricated joints. The ambiguity of the evidence indicating the use of salvaged timbers is important in considering



ILLUS 7 Well 3 (1976/7)

the dendrochronological dates from these two wells.

Well 3 had two associated drains extending from the north-east and north-west corners of the well construction pit (illus 2). Little evidence of their form survived, and most of the alignment of the eastern drain was represented by silty staining, although for *c* 1.3m, stone slabs formed

a narrow V-shaped channel. Much of the western drain consisted of two partially decomposed angled planks. The drains appeared to run from the well down the natural slope of the site; it is likely that they were intended to drain off excess water although it is also possible that the water was channeled off to the north for some unknown agricultural or industrial use.

At the base of Well 2 there was a layer of loose stones (<200mm × 300mm) on which there were a few branches covered by a layer, *c* 200mm thick, of individual cut blocks of peat. Both the stones and peats would appear to have been intended as silt filters but it was not absolutely clear if they had been put in together or if the peats were added after the well had been in use for some time. Peat is still used to purify or soften water in some water treatment systems. On top of, and extending down between the peats in places, there was silt containing domestic rubbish – some of the silt and leather finds came from between the peats to the top of the stones. The lowest fill of Well 3 may also have been intended as a filter. It consisted of sand and a large number of angular sandstone fragments (<100mm × 200mm × 360mm), which appeared to have been deliberately deposited. The upper fills of the well appeared to have been comprised of dumped domestic rubbish.

WELL 2 FINDS: leather shoe fragments from the fill of Well 2 are of types dated to the 14th/15th century (Thomas 2006). Other finds included part of a solid wooden wheel (Appendix 1), fragments of a wooden bowl, a wooden top or awl, barrel fragments and a number of fragments of worked wood, an offcut from a Cu-alloy vessel and two spindle whorls cut from pottery sherds (all described in full in the archive report: Murray & Murray 2009).

WELL 2 POTTERY: the pottery was almost exclusively Scottish Redware (*c* 113 sherds) from some 15 jugs of 13th/14th-century date. Two sherds of mottled green-glazed white fabric are possibly of French origin.

WELL 3 POTTERY: the few pottery finds from within the well were of possible late 14th-century date.

DATE OF CONSTRUCTION OF WELLS 2 AND 3: 14th century.

DATE OF BACKFILLING: later 14th or 15th century.

DATING

There are dendrochronological dates for all four well linings (Crone 2000; 2005b) giving approximate felling dates for the timbers ranging between the late 11th/early 12th century and the early 14th century. However, as noted above, there is evidence that some of the timbers were re-used, so the dendrochronological dates must be regarded as the earliest possible dates of construction, while if the timbers were re-used, the actual date of construction could be considerably later. Indeed, in the context of what appear to be fairly ordinary medieval urban properties without any indications of wealth, oak timbers of the quality of the corner posts are perhaps more likely to have been re-used, possibly from frontage buildings.

Datable finds from the wells (pottery and leather) can be regarded as refuse thrown in the wells when they were no longer in use and can only give an indication of when they became redundant.

Well 1 (excavated in 2004 as F12) was the earliest of the group. Timbers in both phases of this well show some evidence of re-use, complicating the interpretation of the dating. The earlier (Phase 1) lining included timbers with a *tpq* for felling of 1175 and 1194, suggesting, at the earliest, a possible late 12th- or early 13th-century construction. The lining appears to have begun to collapse at the north-east corner and a new lining (Phase 2) was constructed inside the existing well. This secondary lining was structurally more like the 14th-century wells in the neighbouring property, but three timbers (from different well-lining components) that could be dated by dendrochronology – all from

the same tree – gave a felling range of 1094–1130 (Crone 2005b). As it was structurally impossible for this inner lining to have been the earlier phase (its construction has to post-date the timbers from Phase 1), re-use of timbers must be the explanation. A disparate range of sources is suggested by the dendrochronological results, which can also be indicative of re-use. The construction of this phase may be tentatively dated to the 13th century.

Well 2 (excavated in 2004 as F1) and Well 3 (excavated in 1976) were in the same backland property and were so similar structurally it is possible that they were built by the same person. This is supported by the dendrochronological dating of timbers from both structures – the timbers of Well 3 having a felling date of 1301 (Crone 2000) and two timbers of Well 2 having *tpq* for felling of 1308 and 1274 (Crone 2005b). The source of timbers for both wells is likely to be local, although they are not necessarily from the same woodland. Lindsay had originally suggested that the timbers of Well 3 were re-used, the well's contents possibly indicating a late 14th-century date – however, the evidence for re-use of timbers in Wells 2 and 3 is ambiguous as it may relate to the handling or preparation of the timbers rather than recycling timber from an earlier structure. Furthermore, the strong correlation between 15 of the 16 timbers analysed from Well 3 indicated the presence of timber from at least four trees (Crone 2000), and suggests the use of fresh timber rather than recycled timber. It is possible that both wells may have been constructed either in the early 14th century using fresh timber, or later in the 14th century using timber salvaged from a single source. It is also quite possible that they continued in use into the 15th century or were then backfilled with rubbish.

BARREL WELL

A barrel well (illus 8) was found in 1976/7 inserted into a pit *c* 1.25m in diameter and *c* 0.76m in surviving depth with sand, gravel,

clay and small rounded pebbles backfilled around the barrel (Lindsay 1977). The barrel, which was of oak and slightly distorted, had an upper diameter of *c* 0.95m and a basal diameter of *c* 0.80m. The average surviving length of the 28 tapering staves was 0.55m, while their thicknesses varied from *c* 2mm at the top to *c* 10mm at the bottom. Although there was no base in the barrel, a V-shaped rebate, *c* 5mm wide, cut to take a bottom was present *c* 40mm above the angled basal edge. The staves were held in place by a series of 13 closely arranged withies made from quartered birch saplings with finished widths of *c* 30mm. The tapered ends overlapped and were tied tightly together with birch bark bindings. The joins were positioned one above the other on the south side of the barrel.

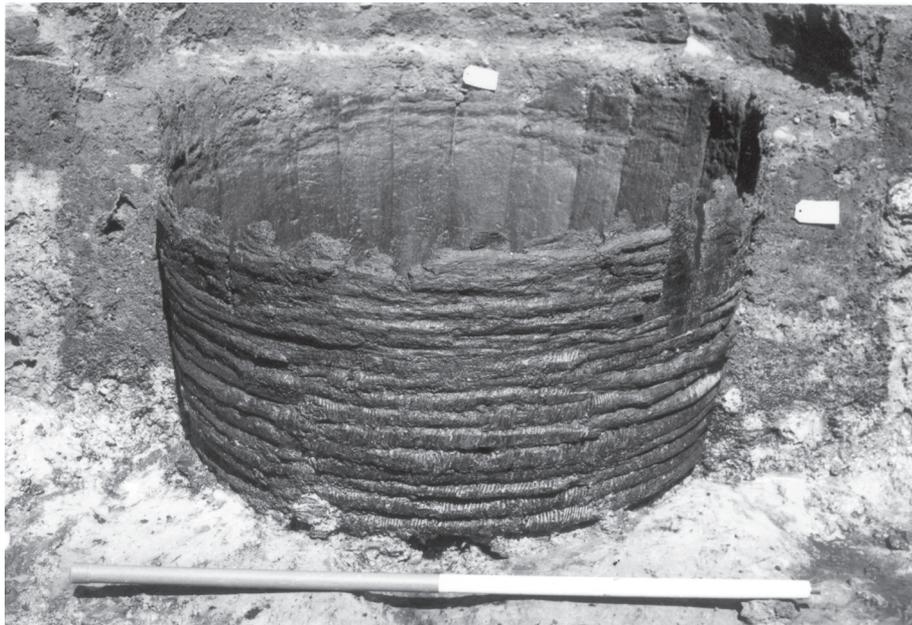
Inside the barrel, softwood fillets, triangular in section, had been nailed near the bottom, presumably to give added strength. Scores and indentations compatible with wear caused by

a lid being pushed into the vessel were visible on the inside of the barrel near the top of the surviving section, and part of an oak lid large enough to seal the opening was found in the fill. Twenty-six stave offcuts, almost certainly cut from the upper-part of the barrel, were also discovered in the fill. As the upper part of the barrel was tapered, the lid could not have been used at the level of the wear marks until the tops of the staves had been cut off, possibly when the function of the barrel may have been changed.

The basal fill consisted of a rich, black, compacted organic deposit. Upper fills consisted of layers of sand, clay and soil.

FINDS: a mid-14th-century Greyware Low Countries pitcher was recovered from the basal fill (Verhaeghe & Lindsay 1983) which gives a *tpq* for the use of the barrel well.

DATE OF CONSTRUCTION: early to mid-14th century.



ILLUS 8 Barrel well (1976/7)

DISCUSSION

Wells and water cisterns would have been common on medieval burgh properties in Scotland as elsewhere in Britain, some being actual wells that were dug into the water table, others being cisterns – sealed containers that held rain water, or water carried from a common well or river, for household or industrial use. Other lined pits may have had specialised functions, acting as watertight containers for liquids such as tanning mixtures. When they collapsed, or possibly became too polluted, many of these wells and pits were re-used as rubbish or cesspits. As a result, dating can be difficult as the fill contents can be considerably later than the construction.

Linings were necessary to prevent water seeping into the surrounding earth, to stop the contained liquid from eroding and collapsing the sides, and to act as a filter. Timber-lining only survives in waterlogged conditions or, in rare instances, as impressions in the surrounding fill. Stone-lined wells often appear to be of later construction, although their durability allows for long use, and the original date of construction may be difficult to determine. Other linings include clay or wattle; a 13th-century well lined with wattle has been excavated at Canal Street, Perth (Coleman 1996, 693–4) and a large pit from another site at Canal Street, Perth, with a post-hole at one corner, had been lined with clay and appears to have held water or other liquid (Spearman 1987, illus 33).

The simplest timber-lining was the use of barrels or casks set partially or fully in the ground. The Elgin barrel appears to date to the early to mid-14th century and fits into this category. Other examples excavated in Scotland include a poorly preserved example from Lossie Wynd, Elgin (Lindsay pers comm), a barrel dated by dendrochronology to the latter half of the 14th century and re-used as a well lining in the early 15th century in Aberdeen (Cameron & Stones 2001, 77, 215–17), a 14th-century example from a backland at 42 St Paul Street, Aberdeen

(Murray 1982, 62), a 13th/14th-century well from the Bon Accord Centre, Aberdeen (Roy 2008a, 11) and another of probable late 14th/early 15th-century date from the same site (Roy pers comm), an example from Perth High Street dated by dendrochronology to *tpq* 1136 and probably manufactured in the latter half of the 12th century (Crone 2005a), and a 14th-century example from Scott Street, Perth (Cox 1996, 797, 808–10). To date, the excavated Scottish examples have all been single casks, however several casks could be used to create deeper wells such as the 14th- and 15th-century three-tiered cask wells excavated in York (Morris 2000, 2237–43).

Timber-framed wells are well known in Britain from earlier contexts. There are Roman examples from London (Wilmot 1982, 23–31) and York (Addyman 1976, 9–11); some simply having the horizontal side planks held back by the corner posts, others with bracing timbers jointed into the corner posts. An 11th-century example found in Billingsgate, London, had the side planks set in vertical grooves in the corner posts (Jones 1980, 16–17). A 13th-century cistern from Wigan had horizontal plank sides held in position by corner posts but not apparently jointed (Jones & Price 1985, 29). A large 14th/15th-century timber-lined cistern excavated in Portsmouth (Fox & Barton 1986, 46–50) had two timber-framed linings, one set above the other. The uppermost was fully framed with corner posts and intermediate vertical timbers on each side mortise and tenon jointed into top and bottom rails – the extra stability being necessary for the very large size of the cistern – some 3m × 3.5m.

In Scotland, a large early 14th-century pit in a backland at 42 St Paul Street, Aberdeen, which had three post-holes at either end and traces of a timber lining (Pit SM: Murray, 1982, 62, and illus 32), may have been a well or cistern. Another timber-lined well was excavated recently at the Bon Accord Centre in Aberdeen (Roy 2008b) and a possible timber-lined well of medieval date has been found in St Andrews

(Coleman 2003, 78). A pit from late 14th-century levels in Canal Street, Perth, had an outer clay lining with an inner lining of horizontal planks supported by four corner posts – only two of the planks survived *in situ* and proved to have been re-used boat timbers (Coleman 1996, 704–6). At Greyfriars Friary in Glasgow, timber shoring had been used in a well shaft around a stone well lining (Dalland forthcoming). Other large pits with secondary rubbish fill may also have been timber-lined wells or cisterns from which the lining had been removed. To date, the Elgin wells are the only examples in Scotland with substantially complete pre-fabricated timber-framed linings.

A 13th/early 14th-century well excavated at the Bishop of Aberdeen's manor at Old Rayne, Aberdeenshire (Murray & Murray 2008), shows that in rare cases considerable detail may survive even when no timber is preserved. In this instance, a pit (only half within the excavated area) 2.7m in diameter held a rectangular framework *c* 1.4m across and 1.6m deep with squared corner posts and horizontal planks; although no wood survived, the 'cast' of the timbers survived in discoloured sand. This example had a wooden pipe (again preserved as a sand cast) leading from one side of the pit at *c* 500mm from the base and draining away into the manor's moat – possibly comparable to the drains associated with Elgin Well 3, although at a much lower level.

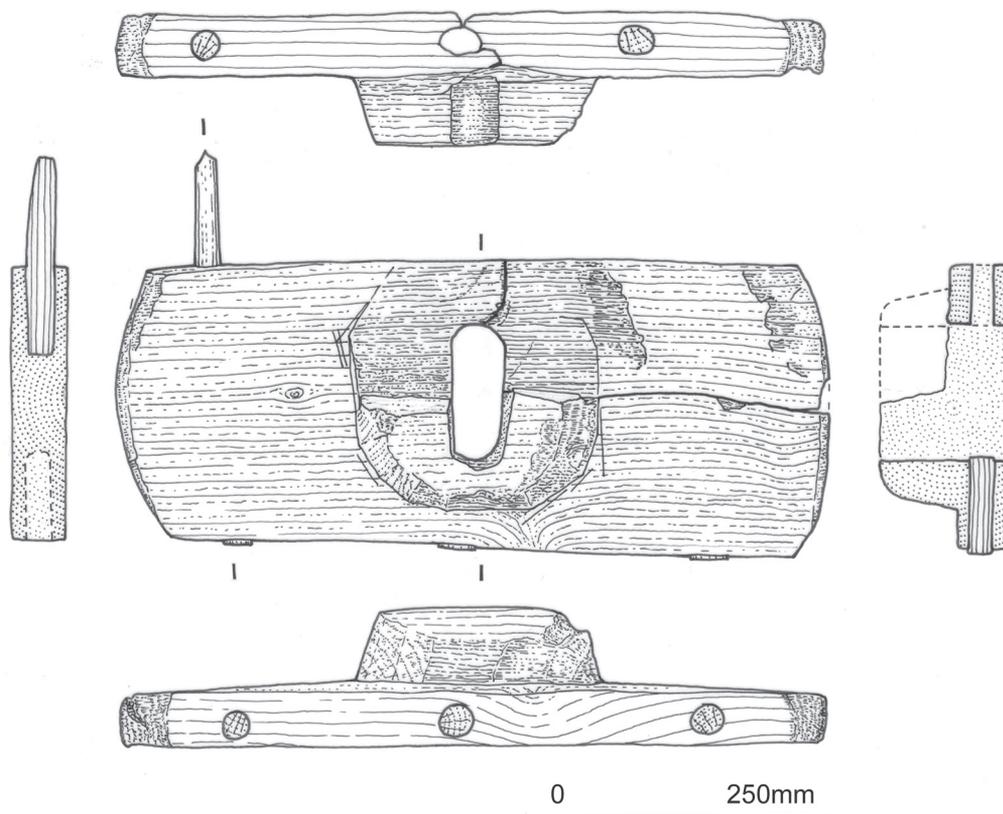
Lined pits capable of retaining liquid could be used for a number of purposes. Large groups of pits with clay linings and traces of wooden linings from 15th–17th-century Northampton have been interpreted as tanning pits (Shaw 1996, 72–83) on the basis of associated bone evidence and chemical analyses showing the presence of materials such as lime and dog faeces, which were used in the tanning process. The late 14th-century lined pit from Perth was interpreted as having been used for malting barley because of its association with a grain-drying oven (Coleman 1996, 704–6). Although some bone with cut marks was identified as

evidence of skinning on or near the site (Smith 2005), there was no other evidence to suggest that the Elgin examples were used for tanning and it appears probable that they were simply water supplies for domestic, or possibly, industrial use. The capacity of Wells 1–3 (based on their surviving dimensions) ranged between Well 3 at *c* 1590 litres (349 gallons) and Well 2 at *c* 3510 litres (772 gallons). There is little to indicate the relative wealth of the inhabitants of these Elgin properties. Access to good timber and proximity to the castle might suggest some degree of prosperity but, with the exception of very small amounts of imported pottery, the finds did not suggest significant wealth. Ownership of private wells was restricted to the rich in some towns in medieval Britain but in others, where there was a plentiful supply of easily accessed underground water (as is the case in this part of Elgin), even relatively poor households might have their own wells (Quiney 2003, 91–3).

These Elgin wells are important due to the details of construction preserved by their excellent survival and the results of dendro-chronological dating of the timbers which offers at the least *tpq* dating for the construction, independent of the dating of the contents. Their timber-framed construction is also a useful reminder that the use of large timbers and relatively sophisticated carpentry was probably far more common in Scottish medieval burghs – especially in frontage buildings – than is generally apparent from evidence largely dominated by wattle buildings in the backlands.

ACKNOWLEDGEMENTS

The 2004 excavations were funded by Robertson Property Ltd. The authors are grateful to Anne Crone for discussing the dendrochronological evidence and for her comments on this paper. We are also grateful to Steven J Allen, York Archaeological Trust conservation department, for the drawing of the wooden wheel.



ILLUS 9 Wooden wheel from Well 2

APPENDIX 1

Wooden wheel (illus 9) from the fill of Well 2. The central plank from a solid tripartite wheel of composite construction. Parts of the dowels which had attached the missing outer planks to the central plank survive. There is a raised central axle boss (diam 220mm) with an ovoid central hole 55mm x 130mm. Wheel: *Alnus* spp. Pegs: *Quercus* spp. Wheel: 655mm diam; 120mm thick.

Another solid wheel of medieval date was found at Huntly golf course, Aberdeenshire, in 1982. It was radiocarbon dated to 1070 ± 60 AD [GU1526] but, as the sample was taken from the centre of the wheel, the actual date is liable to

be later. Unlike the Elgin example, the Huntly wheel was made from a single piece of timber, although broken and mended in antiquity (Shepherd 1982).

REFERENCES

- Addyman, P V 1976 *Excavations in York 1973–74: Second Interim Report York*. York.
- Cameron, A S & Stones, J A (eds) 2001 *Aberdeen: an in-depth view of the city's past*. Edinburgh: Society of Antiquaries of Scotland Monograph 19.
- Coleman, R J 1996 'Burgage plots of medieval Perth: the evidence from excavations at Canal Street', *Proc Soc Antiq Scot* 126, 689–732.

- Coleman, R 2003 '131 Market Street, St Andrews', *Discovery Excav Scot*, new ser 4, 78.
- Cox, A 1996 'Backland activities in medieval Perth: excavations at Meal Vennel and Scott Street', *Proc Soc Antiq Scot* 126, 733–821.
- Crone, B A 2000 'Native tree-ring chronologies from some Scottish medieval burghs', *Med Archaeol* 44, 201–16.
- Crone, B A 2005a 'A Tale of Three Tuns', *Tayside and Fife Archaeological Journal* 11, 70–4.
- Crone, B A 2005b *Dendrochronological analysis of timbers from the wells at 213–25 High St, Elgin*. Unpublished archive report.
- Dalland, M forthcoming 'Excavations of the Greyfriars Friary at Shuttle Street, Glasgow'. *SAIR*.
- Fox, R & Barton, K J 1986 'Excavations at Oyster Street, Portsmouth, Hampshire, 1968–71', *Post Med Archaeol* 20, 31–255.
- Hall, D W, MacDonald, A D S, Perry, D R & Terry, J 1998 'The archaeology of Elgin: excavations on Ladyhill and in the High Street, with an overview of the archaeology of the burgh', *Proc Soc Antiq Scot* 128, 753–829.
- Hastie, M 2004 *Assessment of samples from 213–25 High Street, Elgin*. Unpublished archive report.
- Jones, D M 1980 'Excavations at Billingsgate Buildings "Triangle", Lower Thames Street, 1974', *Trans London and Middlesex Archaeol Soc* Special Paper 4.
- Jones, G C & Price J 1985 'Excavations at the Wiend, Wigan 1982–4', *Greater Manchester Archaeol J* 1, 25–33.
- Lindsay, W J 1977 *213–19 High Street (Elgin)*. Unpublished archive report reproduced in Murray & Murray 2009.
- Morris, C A 2000 *Craft, Industry and Everyday Life: Wood and Woodworking in Anglo-Scandinavian and Medieval York*. York: CBA.
- Murray, H K 1983 *Viking and Early Medieval Buildings in Dublin*. BAR Ser 119: Oxford.
- Murray, J C (ed) 1982 *Excavations in the medieval burgh of Aberdeen 1973–81*. Edinburgh: Society of Antiquaries of Scotland.
- Murray, H K & Murray, J C 2008 'Bishop's Manor, Old Rayne', *Discovery Excav Scot*, new ser 9, 27.
- Murray, H K and Murray, J C 2009 *213–25 High Street Elgin*. Archive report for the 2004 excavation, incorporating discussion of the 1976 excavation. Unpublished report in NMRS and Aberdeenshire SMR.
- Roy, M 2008a 'Bon Accord Centre, George Street', *Discovery Excav Scot*, new ser 9, 11.
- Roy, M 2008b *Bon Accord Centre, Aberdeen*. Unpublished Data Structure Report. AOC Archaeology.
- Shaw, M 1996 'The excavation of a late 15th- to 17th-century tanning complex at The Green, Northampton', *Post-medieval Archaeol* 30, 63–127.
- Shepherd, I A G 1982 'Huntly Golf Course (Huntly parish) wooden wheel', *Discovery Excav Scot*, 1982, 12.
- Smith, C 2005 *The animal bone: 213–25 High Street, Elgin*. Unpublished report in archive.
- Spearman, R M 1987 'Canal Street II', in Holdsworth, P (ed) *Excavations in the medieval burgh of Perth 1979–81*, 59–83.
- Thomas, C 2006 *The leather: 213–25 High Street, Elgin*. Unpublished report in archive.
- Quiney, A 2003 *Town Houses of Medieval Britain*. Newhaven and London: Yale University Press.
- Verhaeghe, F & Lindsay, W 1983 'Low Countries pottery in Elgin'. *Medieval Ceramics* 7, 95–100.
- Wallace, P F 1992 *The Viking Age buildings of Dublin*. Dublin: Royal Irish Academy.
- Wilmot, T 1982 'Excavations at Queen Street, City of London, 1953 and 1960, and Roman timber-lined wells in London', *Trans London and Middlesex Archaeol Soc* 33, 1–78.

