

Configuration and dimensions of burgage plots in the burgh of Edinburgh

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ABSTRACT

A study has been made of the configuration and dimensions of the burgage plots in Edinburgh using cartographic analysis. The plot widths are found to fall into groupings, the basic, most common group having a unit width and being accompanied by others differing by quarter fractions of this width. The unit width is found to have the same value in the whole of the main street, apart from the section between the castle and the parish church of St Giles'. Angular changes in the alignment of the plot boundaries have also been measured and related to the corresponding changes in the street line. The results are discussed in the light of present historical, architectural and archaeological evidence as to how the burgh developed.

INTRODUCTION

Studies of the history and development of the Scottish burghs have intensified in the last two decades, with contributions from historical and architectural analysis (Stell 1980; Lynch 1987; Lynch et al 1988; Ewan 1990), town plan analysis (Conzen 1960; Brooks & Wittington 1977; Spearman 1988) and archaeology. A recent paper provides an overall summary of the archaeological activity in Scottish burghs (Coleman 2004a). A number of articles and surveys have also been published in recent years covering particular burghs, including Aberdeen (Dennison & Stones 1997; Dennison et al 2002a), Dunbar (Torrie 1990), Dunfermline (Perry 1999), Elgin (Hall et al 1998), Inverness (Perry 1998), Musselburgh (Dennison & Stones 2006) and Perth (Bowler 2004). Several of these studies are included in the Scottish Burgh Survey, which covers many burghs in Scotland. In Edinburgh, a number of archaeological studies have been undertaken (Holmes 1975; 1980; 1986; Schofield 1975). In addition, a recent paper has discussed the

impact of the topography on the development of Edinburgh (Dennison & Lynch 2005). There has not, however, been a systematic study of the configuration and dimensions of burgage plots in the burgh. This paper reports such a study.

THE BURGHE OF EDINBURGH

In common with other Scottish burghs, the layout of the Royal Burgh of Edinburgh was strongly influenced by features of the local landscape (Dennison et al 2002b, 14–17; Dennison & Lynch 2005, 26). The main street, on an east/west orientation, is located on the crest of a long, inclined and relatively straight ridge. The street connects the castle at the western extremity with Holyrood at the east, with sections known as Castle Hill, the Lawnmarket, the High Street and finally the Canongate. There is a 70m height loss over the distance (Makey 1987, 200). Somewhat over half of the route is within the burgh, terminating at the site of the Netherbow Port. Apart from some Edinburgh

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property on the south side of the street, property to the east is within the bounds of the Burgh of Canongate (Dennison 2005b). Development of Edinburgh, and routes in and out, was initially restricted on the north of the street by a stream passing through marshy ground which was subsequently dammed to form the Nor' Loch. A second stream was located in a narrow valley to the south, having the Cowgate Loch part way along. This loch was drained in the 15th century (Dennison & Lynch 2005, 26). The Cowgate, approximately parallel to the main street, passed down this valley, continuing eastwards as what is now Holyrood Road. At its west end

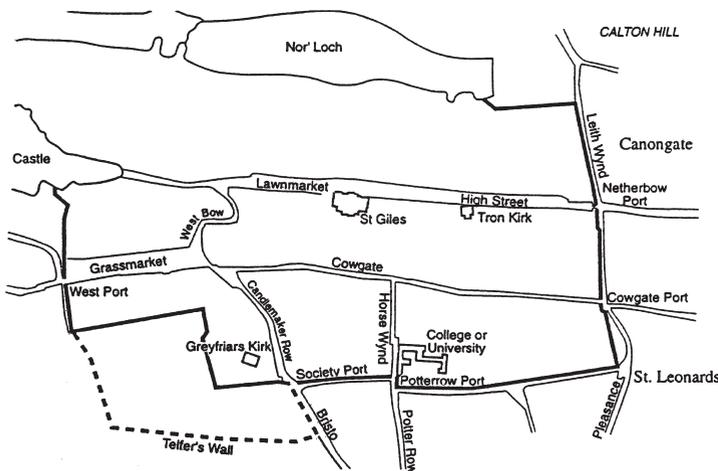
main street. Orientated usually at right angles to the street frontage, they sloped steeply away from the street with inclines of around 1 in 3 at the west end of the burgh, decreasing to less than 1 in 12 at the east end (Makey 1987, 200). The present study concentrates on these plots, although there are indications of others within the burgh to the south of the Cowgate and around the Grassmarket.

The owners of the individual burgage plots in Edinburgh, as elsewhere, needed a passageway, later known as a close, in order to access their backlands from the public street. Such access will have been of increasing importance as backland

properties multiplied (Ewan 1990, 24; Torrie 1990, 52). Two basic situations can be envisaged. In the first, the plot owner established his own passageway. This had the advantage of affording good control of access and egress to and from the plot, for both humans and livestock. The passageway is seldom mentioned in the legal Protocol Books, but when it is, it appears as an integral part of the plot or tenement (see for example Durkan 1985, no 355).

Illus 2a shows a plot with the passageway located on the right hand side of, and within the bounds of, the plot.

It is usually clear which side (if either) of the passageway is located on a plot boundary, as this side will be relatively straight, providing little or no access to neighbouring properties. In contrast, the other side will be less regular, and in later times will have a number of buildings of varying lateral dimension facing into the passageway and gaining access from it. The 1635 Edinburgh housemaills listing (Edinburgh City Archive) almost always provides clear further supporting evidence, at least of the situation at that date.



ILLUS 1 Edinburgh and the Canongate. (Courtesy of P G B McNeill and H L MacQueen (eds) 1996 *Atlas of Scottish History to 1707*, 257, Scottish Medievalists Conference. Drawing by M Lynch)

the Cowgate joins the Grassmarket, which is located to the north of the castle and castle rock. The West Bow connected the Grassmarket to the west end of the Lawnmarket. The main features of the burgh are to be found in illus 1.

BURGAGE PLOT PATTERNS

The majority of the long narrow tofts or burgage plots were located to the north and south of the

The configuration shown in *illus 2a* is frequently encountered in Edinburgh. Alternatively, the passageway can sometimes be located part of the way across the foreland, an arrangement that might be attractive if the owner happened to possess an ‘oversize’ plot (*illus 2b*).

Another common arrangement is that in which the passageway is located between two plots with access from either side. This two-sided access may perhaps have originated when two neighbouring plots had adjacent passageways that were subsequently combined into one. In this case, the total width of the land holdings and the passageway would add up to two plot widths (*illus 2c*).

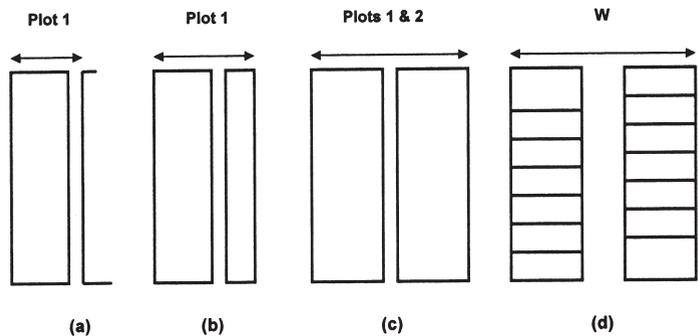
Shared access could also be into a public rather than a private passageway. In this case the size of frontage is unrelated to plot width as these properties do not own burgage plots ‘behind’ them. A parcel of land of sufficient width (*w*) to accommodate the public passageway and the properties on either side will have been utilized (*illus 2d*). This width can be measured using the same method as for the configurations in *illus 2b* and *2c*. In the three situations, referred to here for simplicity as pairs of plots, this overall dimension is the only one that can be measured between well-defined boundaries.

The presence of both single and paired plots results in a variation of the spacing of the closes and wynds, a variation apparent on direct visual inspection of the street frontage. Closer examination reveals other variations as well.

IDENTIFICATION OF BURGAGE PLOT BOUNDARY LINES

Archaeological evidence suggests that early plot boundaries were marked by lines of

posts or stones, fences, ditches, turf walls or even markers as transient as midden heaps or clothes lines (Ewan 1990, 14; Dennison 2003, 77; Coleman 2004a, 290–2). Such markers would not provide stable and unambiguous position indicators, and boundaries may well have shifted. With the increasing development of the backlands, more stable boundaries were provided by a wall of a building or a free-standing boundary wall (Dennison 2005b, 11). An example of a stone boundary wall dating to 1348 is reported by Ewan (1990, 14). By the early 16th century, backlands in Edinburgh frequently had three or four substantial



ILLUS 2 Burgage plot configurations (a) and (b) for single plots, (c) for a pair of plots with shared access and (d) for a wynd

buildings on them. For example, by 1535, there were four backland properties on each side of Craig’s Close, four on the east side and two on the west side of Advocate’s Close, five in Gladstone’s Close and three in Trunk’s Close (Tait unpublished). There are many records of disputes over boundary positions being investigated, resolved and enforced. In 1509, complaints were made to the Dean of Gild involving the building of a gable wall and of the demolition of a boundary wall close to where Gladstone’s Land now stands (Scottish Record Society 1940, no 583). An examination of the modern maps of Edinburgh indicates that clear boundary alignments involving substantial built features can still be identified in many cases.

METHODOLOGY

The study is based on the 1:1056 Ordnance Survey (OS) Map of 1849–53, supplemented by various earlier documentary sources. The OS map was selected as being the first reasonably accurate cartographic survey of the burgh, and has the advantage of pre-dating much Victorian development within the burgh. Using a digitized version of the map, the positions of the plot boundaries were determined and, with this information for guidance, plot widths were measured, normally immediately behind the foreland building – frequently pends passing through the foreland building were found to be slightly out of alignment with the remainder of the boundary. Angular changes in the direction of plot boundaries were also noted and measured. These, combined with measurements of changes in the street line, were found to provide further information.

Before accepting a plot for inclusion in this study, firstly it was considered essential to identify the close or wynd involved unambiguously. A descriptive paper by Boog Watson (1923), listing the closes and wynds of Edinburgh, was found helpful in this respect. The appropriate boundaries were identified on the OS map and consistency cross-checked with the 1635 housemaills listing (Edinburgh City Archive). The measurements involved are discussed in the Appendix.

RESULTS

Many close alignments were found to contain walls of buildings that were mutually unrelated and of varying age. It seems safe to assume that these are indeed very close to the early plot boundaries, but it should be pointed out that there is archaeological evidence in some burghs for a degree of relocation of plot boundaries as the burgh developed (see for example Murray 1982, 77–81; Spearman 1987, 68; Bowler 2004, 27). Also, caution was needed in interpretation

where extensive rebuilding has taken place, for example following a major fire.

The accuracy of the measurement procedure was studied in some detail. The checks are explained in the Appendix, where it is shown that the original OS map, rather than the present measuring system, contributes the dominant uncertainties. Inaccuracies of less than $\pm 0.3\text{m}$ in delineating a 10m feature are predicted in about two thirds of measurements. The average of several boundary widths will tend to even out such inaccuracies to some extent. Changes of direction of boundaries, or angles between boundaries are accurate to about $\pm 1^\circ$.

The survey includes the whole of the main street from the Castle Esplanade eastward to the site of the Netherbow Port, together with that south-west section of the Canongate that was part of the Burgh. It contains 33 single plots and 16 pairs of total width 527m, about 32% of the early frontage. Many later developments, such as the Church of Scotland Assembly buildings, the City Chambers, the old Midlothian County Council buildings and roads such as the Bridges, Bank Street and George IV Bridge, exclude large sections of the frontage. Smaller scale developments and ambiguities of identification caused other plots to fail the acceptance criteria.

It was found convenient to sub-divide the study into five sectors as a means of checking consistency or otherwise in the characteristics observed and also as an aid to the location of various features described in the text. The sectors are as follows (see *illus 1*):

- Sector 1: Castle Hill and the Lawnmarket on both sides of the street.
- Sector 2: The short section on the north side of the High Street opposite St Giles'.
- Sector 3: Both sides of the High Street from east of St Giles' to just east of the Tron Kirk.
- Sector 4: Both sides of the street from the Tron Kirk to the Netherbow.
- Sector 5: Eastwards to the old Burgh boundary on the south side of the Canongate.

TABLE 1
 Single plots

<i>Sector</i>	<i>Number of plots</i>	<i>Largest width (m)</i>	<i>Smallest width (m)</i>
1	5 (9)	7.1	6.2
2	0	–	–
3	9	9.0	5.1
4	12	10.1	5.9
5	7	9.1	7.1

The single plot measurements are summarized in Table 1. Only five plots and their boundaries could be clearly identified in Sector 1, but another four plots, for which the overall boundaries are clearly identifiable, were included. There were no single plots in Sector 2.

All but one of the 33 plots in Table 1, covering all the sectors, has the passageway on the east side. The excluded plot, at Paisley Close in Sector 4, may in fact have been one of a pair

with the plot to the east for which the boundary is longer identifiable.

The pairs of plots are listed in order of descending width in Table 2. The table indicates whether the passageway is normally referred to as a wynd or a close.

Angular changes of two types were noted. In the first, the plot is slightly wedge-shaped so that the width increases with distance from the foreland (a positive angle), or decreases

 TABLE 2
 Pairs of plots, in descending order of width

<i>Location</i>	<i>Sector</i>	<i>Title</i>	<i>Width (m)</i>
St Mary's	5 south	Wynd	20.5
Craig's	3 north	Close	16.8
Blackfriars	4 south	Wynd	16.5
S Foulis'	4 south	Close	16.5
Todric's	4 south	Wynd	15.3
Advocate's	2 (north)	Close	15.1
Conn's	3 south	Close	14.7
B Fyfe's	4 north	Close	14.2
Gillon's	5 south	Close	14.2
Dickson's	4 south	Close	13.8
Strichan's	4 south	Close	12.8
Skinner's	4 south	Close	12.6
Borthwick's	3 south	Close	11.8
Roxburgh's	2 (north)	Close	11.8
Kintyre's	2 (north)	Close	11.0
James' E	1 north	Close	10.6

TABLE 3
Angular changes of plot boundaries and of the street line

<i>Case</i>	<i>Sector</i>	<i>Location</i>	<i>Angle of divergence or bend</i>	<i>Angle change of the street line</i>
1	1 north	James Court East Gladstone's Close Lady Stair/s Close Baxter's Close	+3° +2° +3° +3°	9° north
2	5 south	Coutt's Close proceeding east to Pirries Close	Mean of 4 11° east	9° south
3	4 north	Monteith's Close Trunk's Close Hope's Court	+2° – –7°	14° south 20° north
4	2 (north)	Byer's Close Advocate's Close	5° west	11° north 7° south

(a negative angle). This occurs at changes in direction of the street frontage, allowing the boundaries to remain at right angles to the frontage. Case 1 in Table 3 is an example of this type. It is on the north side of the Lawnmarket in Sector 1 where the street line curves inward at the western termination of the market area. The change in angle of the street line is measured as 9°, while the total change of orientation of the sides of the four plots is 11°, in reasonable agreement. Due to the long, narrow shape of the plots, there is a large increase in plot area involved, typically 55% for a +3° angle. Wedge-shaped plots are to be found in large numbers in Dumbarton where the form of the burgh is dominated by the course of the river Leven (Coleman 2004b, 329).

The second type of angular change is used to compensate for a change of direction of the street line while keeping the plots on the same orientation as those before the direction change. The angular change is applied to each complete plot. With the plots aligned approximately north/south, such angular changes will be to east or west. Case 2 (Table 3) is an example. There is

a change of direction proceeding eastwards at the start of the Canongate in Sector 5, measured to be 9° south. The average angle for the first four plots is 11° east, again agreeing reasonably well, and maintaining the alignment of the plots with those in Sections 3 and 4. The plots further east, in the Burgh of Canongate, have a clearly different orientation.

Case 3 involves the northern street line curving southward towards the termination of the High Street at the Netherbow in Sector 4 north and then re-orientating the plots to be approximately parallel to Leith Wynd, beyond, to the east. The street line has a rapid 14° change south and a change of +2° between the sides of one plot. A 20° northwards turn in the street line follows, with a –7° angle between the plot sides. The overall change in the direction of the street line is 6° north which agrees reasonably well with –5° for the plot sides.

In Case 4 (Table 3), the northern street line approaching St Giles', at the junction of Sectors 1 and 2 from the west, abruptly turns 11° north, and after some 26m, a second slightly lesser turn of 7° south, 4° north overall. A 5° west change in

TABLE 4
Plot lengths and areas

<i>Sector</i>	<i>Unit plot width (m)</i>	<i>Approx plot length (m)</i>	<i>Plot area (sq m)</i>	<i>Plot area in acres (UK)</i>
1n	6.6	135	891	0.22
2n	7.6	125	950	0.23
3n	7.8	125	975	0.24
3s	7.8	136	1061	0.26
4n	7.7	133	1024	0.25
4s	7.7	150	1155	0.29
5s	7.6	160	1216	0.30

direction of the sides of the plot at Byer’s Close partially compensates for the first of these turns, and also aligns the east side of the plot with those beyond.

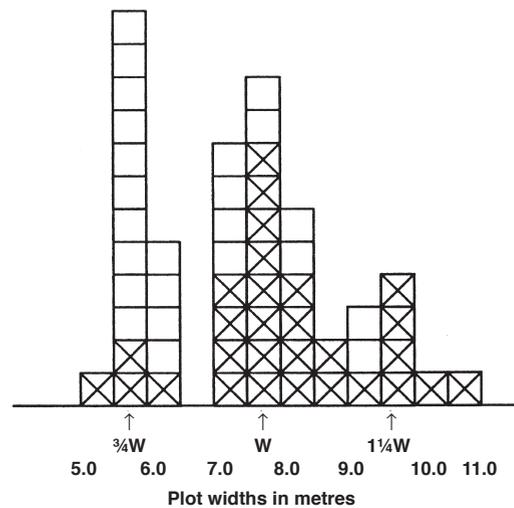
A number of other smaller angular changes were encountered, but are not listed.

Estimates of plot area are provided in Table 4. The plot end-boundaries are well-defined in the Protocol Books (Macleod 1930; Scottish Record Society 1940; Wood 1953; Durkin 1985) by the early 16th century and these boundaries have been accepted here. On the north side of the street, the plots terminated at the Nor’ Loch, and further east, at the boundary of Trinity College Yard. On the south side of the street, termination was at the Cowgate and the continuing route eastwards. No accurate information is available on just where these features were located and there may well have been large changes caused by the formation of the Nor’ Loch and the draining of the Cowgate Loch. Thus plot length estimates taken from the OS map with guidance from earlier maps are necessarily approximate. In addition, on the south side, there is a possibility that at one time the plots only extended part of the way down the slope (Schofield 1975, 181; Dennison 2005a, 265). If this was so, however, the present study shows that subsequent extension southwards maintained the plot boundary alignments to a high degree of accuracy. Unit plot widths were

used in estimating plot area. These are discussed later.

DISCUSSION

Table 1 indicates that the single plots in all sectors have a considerable range of widths. Care is needed in interpreting small groups of numbers, but Sector 1 does appear to contain



ILLUS 3 Widths of plots in Sectors 2–5. Those derived from a pair of plots are represented by unmarked squares; those from single plots are marked with an ‘x’

a smaller range than the other sectors. The spread in widths is clearly greater than would be expected from inaccuracies of the OS map. The width of all single plots in Sectors 3–5 are displayed in *illus 3*, indicated by squares marked with crosses. The pattern observed is notable. A central group presents a clear peak with smaller peaks on each side. The central peak provides an average width of 7.7m, described here as the unit width. Plots measuring $\frac{3}{4}$ and $1\frac{1}{4}$ times this unit width will be 5.8m and 9.6m, a good match to the two subsidiary peaks.

As with the single plots, there is a very large variation in widths of pairs of plots (*Table 2*). Excluding for a moment those labelled ‘wynd’, it is possible to account for all the other pairs as being composed of two single plots with a shared passageway (*illus 2c*). It is assumed that the plots in pairs are also limited to the same fractional sizes, but scaled to give the correct overall width for each pair. Those from Sections 2–5 have been added to *illus 3*, indicated by unmarked squares, and are seen to fit well into the scheme. Contributions to the width of the peaks may come from inaccuracies in setting out the burgage plots together with any subsequent boundary movements, and from surveying and engraving the OS map.

Sector 1 was not included in the previous discussion. The single plots there all appear to conform to a unit width of 6.6m. These would provide a peak almost exactly midway between the left hand pair of peaks in *illus 3*. The one twinned pair, at James’ Court East, then fits the scheme as two plots of $\frac{3}{4}$ width, although the pathway is well offset from the centre line.

The unit plot widths for each sector individually are listed in *Table 4*. These are the values used to estimate areas. The differences in the unit width between Sectors 2, 3, 4 and 5 are very small and could well be due to map inaccuracies. Thus the whole of the burgh to the east of St Giles’ is likely to have been set out to the same principles and dimensions. The smaller unit width in Sector 1 relative to the others is certainly real, and justifies the omission of Sector

1 from the histogram (*illus 3*). Differences of this type have been associated, for example in St Andrews and Perth, with different development phases of the burgh (Brooks & Wittington 1977, 288; Spearman 1988, 57). An archaeological investigation in Edinburgh found plot widths averaging 25ft (7.6m) in Sector 3 south (Schofield 1975, 168).

Studies at Alnwick, Perth and elsewhere already indicate the existence of fractional plot widths (Conzen 1960, 32–3; Spearman 1988, 57). In the Alnwick paper, Conzen suggested that all plots may have initially been set out to the unit width and that the present fractional widths had followed in later years from agreed transfers of quarter strips of land between plot owners. This mechanism cannot be ruled out for the Edinburgh burgage plots. It is not consistent with *illus 3*, however. In a situation where, in addition to the unit width plots, only $\frac{3}{4}$ and $1\frac{1}{4}$ plots are present, these two should be present in equal numbers. This is clearly not so.

The simple scheme shown in *illus 3* may not be unique, however. For example, the narrowest pairs of plots in *Table 3* might have been originally laid out as single plots $1\frac{1}{2}$ units wide and subsequently converted into pairs. This would add a third peak to *illus 3*. Wider pairs could be involved in a similar way, adding additional peaks; Spearman (1988, 45) has discussed this point. Introduction of larger size plots in this way might in some circumstances produce a configuration consistent with the Conzen theory.

In Edinburgh, the fractional plots tend to be scattered amongst unit size plots, so in many cases multiple transfers would be needed to reach the present configuration. For example, the series of plots near North Foulis Close in Sector 3 north has the following configuration:

$$\frac{3}{4} \quad 1 \quad 1\frac{1}{4} \quad 1$$

This can be attained from a situation containing only unit width plots by the transfer of a quarter plot from left to the right, firstly to the second

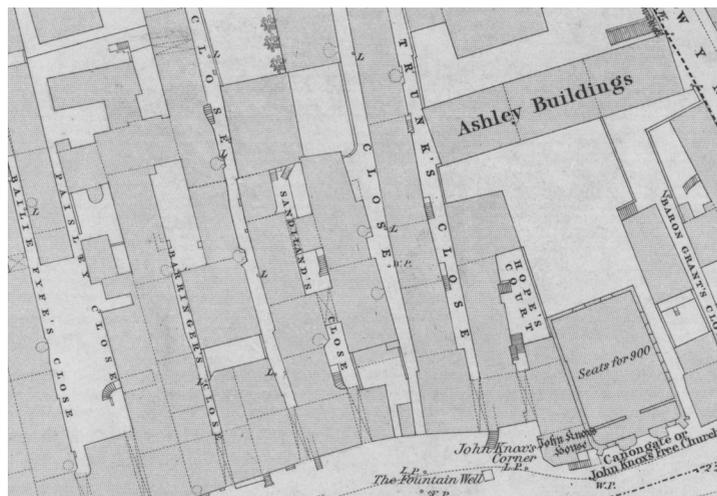
left plot, and then from there to the next plot. The second plot from the left thus becomes a $1\frac{1}{4}$ size plot, then reverts to a unit plot shifted a quarter of a plot width (1.9m) to the left as the quarter is passed to the third plot. Such overall plot position changes must have taken place before foreland buildings occupying the full width of the frontage had been built, otherwise mismatches between plot boundaries and foreland buildings would be apparent. Small mismatches, typically of 0.25–0.5m, are not uncommon, but ones of 1.9m were not found in the present survey.

A simpler explanation of the presence of fractional plots is that they were set out to these widths in the first place. The scheme of *illus 2a* is now acceptable, as an equal number of $\frac{3}{4}$ and $1\frac{1}{4}$ size plots need not be present. Several interpretations are thus available as to why the burgage plots have their present configurations. Archaeology may well be able to provide important input to a better understanding of the situation.

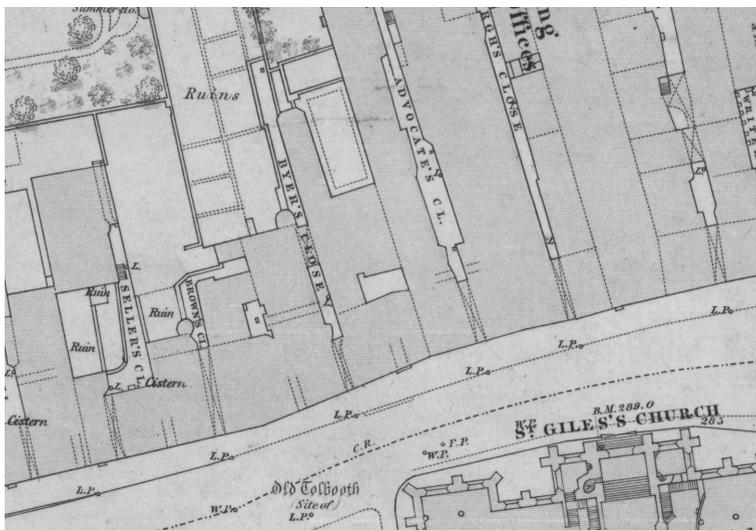
A number of the topics discussed here regarding burgage plot boundaries have arisen some years ago in the archaeological study of

the Canal Street site in Perth (Spearman 1987). The study provided an opportunity to examine the site of a set of burgage plots as it evolved over a period of several centuries. The plots had been laid out systematically with a spacing of 7m, the boundaries being marked by gullies, but with sections marked at some stages by paths, fences or the walls of structures. A number of the boundaries survived over a long period, but there were examples of two plots being permanently incorporated into a single oversize plot and of lateral displacement of complete boundaries by about a metre in later years. Some access paths served only a single plot, others were shared by two.

There were at least 12 passageways consistently called wynds in Edinburgh. In contrast to the closes, these wynds held their present names from relatively early times; three are included in the present survey. Reference to Blackfriars, Forester's, Libberton's, Niddrie's, Peebles and St Mary's Wynds is encountered as early as 1477 (Scottish Burgh Record Society 1869, 34–5), and to Todric's Wynd in 1487 (Boog Watson 1923, 82). Again, in contrast to closes, wynds are frequently referred to in documents



ILLUS 4 Segment of the 1849–53 OS map, sheet 35, showing the northern street line in the vicinity of the John Knox House (© National Library of Scotland)



ILLUS 5 Segment of the 1849–53 OS map, sheet 36, showing the northern street line in the vicinity of Byers' Close. The east side of the close follows the line of the plot boundary (© National Library of Scotland)

using the term *vennel*, as in a protocol of 1500, 'the *vennel* of St Mary's Wynd' (Macleod 1930, no 57). The OS map indicates that the widths of the wynds are typically 3–6m, compared with 1.5–3m for the closes. The overall width taken up (illus 2d) of the three that were studied puts them near the top of Table 3, not surprisingly in view of the wide passageway. Most of the wynds within the burgh are notable in being parallel to neighbouring plots, suggesting that they were created at the time the plots were marked out, or that existing plots were taken over to form them, as observed in Perth (Coleman 2004a, 297).

As regards angular changes, those of Cases 1 and 2 (in Table 3) are relatively uncomplicated. In Case 3 (illus 4), the purpose is clear, but the result of the changes is that one foreland building, the Knox House, has no backland or associated plot. The land behind it including Hope's Court is part of the plot to the west. This can be verified by reference to the relevant protocols, which consistently refer to the Knox (Reidpath) property as a land (*terra*) rather than a tenement (*tenementum*) [see for example protocols of

1511 (Scottish Record Society 1940, no 750) and of 1527 (Wood 1953, no 831)].

Case 4 is shown in illus 5. The northern street line is sloping gradually inwards, thus slowly narrowing the street on the easterly approach to the parish church of St Giles'. A deflection northward, followed by a slightly smaller one southward, adds 4.8m to the width of the street and halts the narrowing. The angle between plot sides at Byer's Close does not extend a great distance back from the foreland before the alignment appears to revert, at the location of some ruined buildings, to the orientation of the plots further west. The pattern suggests that new plot boundaries had replaced earlier ones within this region. A rearrangement of plot boundaries, dated to the late 13th century, was found during an archaeological excavation in Aberdeen, although in that case the objective was to replace plots of apparently haphazard development with new, regular ones (Murray 1982, 78).

In general, the angular adjustments found at various locations in the street indicate the care with which the laying out of the plots took place. The change of direction just west of St Giles'

is consistent with the main street of the early burgh having terminated in the vicinity, with subsequent extension eastward as the burgh developed; this finds support in the observation that the unit plot width changes between Sectors 1 and 2. A settlement having close proximity to the castle, from whence goods and services might be provided to the castle, and a degree of security obtained in exchange, is found in a number of Scottish burghs, for example at Aberdeen, Dundee and Perth (Torrie 1990, 50–1; Dennison 2002, 8; Bowler 2004, 25). Indeed, a main street stretching from castle to church is not uncommon, as at Inverness and Elgin (Ewan 1990, 9–11; Hall et al 1998, 820; Perry 1998, 849). Subsequent extension of the street in a similar way, beyond the church, took place at Elgin (Hall et al 1998, 756). The order of development presently suggested is in line with the scheme set out and discussed in a recent paper (Dennison 2005a, 259–62).

It has been pointed out that Edinburgh existed long before the royal grant of burghal status by David I, between 1124 and 1127 (Dennison & Lynch 2005, 24). The orderly layout of the plots in Sector 1, with subsequent control of the boundary positions, suggests that the plot layout post-dated the royal grant, and there is a mention in a charter of David I dated between 1143 and 1147 of a grant of the yearly rent from ‘unum toftum in Burgo meo de Edwinesburgh’ to the Abbey of Holyrood (Marwick 1870, 6). There is no other documentary evidence as to when the Edinburgh burgage plots were set out, or by whom.

An account of excavations at St Giles’ has been prepared recently (Collard et al 2006). An extensive ditch, thought to be a section of a boundary marker for the church precinct, was found. This was located to the east of the site of the early Romanesque church but passing through the east end of the later medieval building. Evidence suggests that construction of the early church commenced at a date close to that of the royal grant to the burgh, and that the ditch was created at a similar period. It is notable

that the ditch is orientated at right angles to the street line, rather than to the axis of the medieval church and probably of the earlier one – there is a difference of about 4° between the two. The bounds of the church precinct may well have been determined at the same time as the early phase of burgage plot layout.

Further east, the plots on the south side of the street continue with the same alignment as the boundary ditch. Archaeological evidence of dating for layout and development is sparse, however. In Sector 3 south, there is evidence of two backland buildings with signs of occupation dating to the early 14th century. On the foreland, where earlier development might have been expected, any evidence had been obscured by later building activities (Schofield 1975, 180). The preliminary report on an excavation at the Cowgate/Blackfriars site just to the south of this has disclosed evidence of agricultural activities probably pre-dating plot layout, together with subsequent phases of development (Will & Radley 2006, 28). Dating of artefacts is underway but is not yet complete. This information may help to provide a better understanding of the timescale for the layout and development of this part of the burgh.

CONCLUSIONS

1. The possibility of identifying plot boundaries with so much clarity suggests that they were consistently maintained to a high degree of precision over a number of centuries. There is evidence of the careful and systematic use of angle adjustments to plot boundaries at changes in direction of the street line.
2. The plots are found to have groupings of widths, a main group of unit plot width, accompanied by others differing from this by quarters of this width.
3. The plot pattern observed is consistent with exchange of quarter units of land having taken place between plots that had been set out initially to the unit width. There is no

evidence of a significant mismatch between plot boundaries and the position of the corresponding foreland buildings which might have so resulted however. The pattern is also consistent with the simpler explanation that fractional plots were included in the initial layout process. Archaeology may help to clarify this situation.

4. Changes of plot boundary alignment and unit width support the idea that the burgh developed from a settlement located between the castle and the parish church, later extended eastwards as the burgh expanded.
5. The preponderance of single plots having their passageways on the east rather than the west side is notable.
6. The wynds, with their relatively wide passageways, took up considerable areas of land. Most of those within the burgh are found to be accurately aligned with the neighbouring plots. In cases where plot layout may have preceded the establishment of a wynd, two plots would have been needed to provide the necessary land.

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APPENDIX

The online display system provides distances measured in pixels. The first step in checking was to determine the pixel length using the scale at the foot of the map. This was marked in (UK) links (1 link equals one hundredth of a survey chain of 22 yards). Scale marks separated by 20, 50, 100, 200 and 400 links were measured, the map magnification being varied to suit each measurement. The 50-link measurement was taken at two magnifications. There was no apparent systematic variation in results with number of links or magnification. The mean calibration obtained was 1 pixel = 68.1 ± 0.3 mm (SD), corresponding to about ± 0.04 m (SD) in measuring a distance of 10m.

This calibration was used to check the accuracy of the map itself by comparing lengths of nine actual features, measured with a good quality measuring tape, against their counterparts on the map. All were

in the range 5–10m in length, two were located on the foreland in each sector of the area studied, apart from Sector 5 where one was involved, this being located just into Sector 4 close to St Mary's Street. The results have been converted to 10m standard length, providing a mean result of 9.92 ± 0.34 m (SD). This is clearly the dominant uncertainty, rather than that of the online measuring system. The central peak in illus 3 has a width of ± 0.5 m (SD).

In determining the plot boundaries, both the length of boundary identified and the maximum deviation of built features from this line were noted. Of all the plots included in the study, the shortest boundary accepted was of length 22.2m with maximum deviation 0.10m, while the longest was 146.3m with maximum deviation 0.34m.

Changes of direction along a boundary or angles between boundaries were noted and measured. The measurement accuracy was of the order of $\pm 1^\circ$.