

Research in inscriptional palaeography (RIP). Scottish tombstone lettering 1241–1855: methodology and preliminary analysis

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ABSTRACT

A study of lettering on pre-1855 Scottish tombstones was made to investigate possible patterns of geographical and temporal variation. A representative sample of 132 mainland kirkyard sites has been surveyed and data from digital photographic records (using 42 letterform attributes) have been analysed using univariate and multivariate statistical techniques. Research methodology and preliminary results from this analysis and other characteristics of letterform use are reported. These demonstrate clear trends in the interpretation of inscriptional lettering by masons suggesting strong cultural affinities between geographically adjacent sites. This ongoing research project will also help to identify tombstones of palaeographic significance, an aspect of these artefacts hitherto neglected.

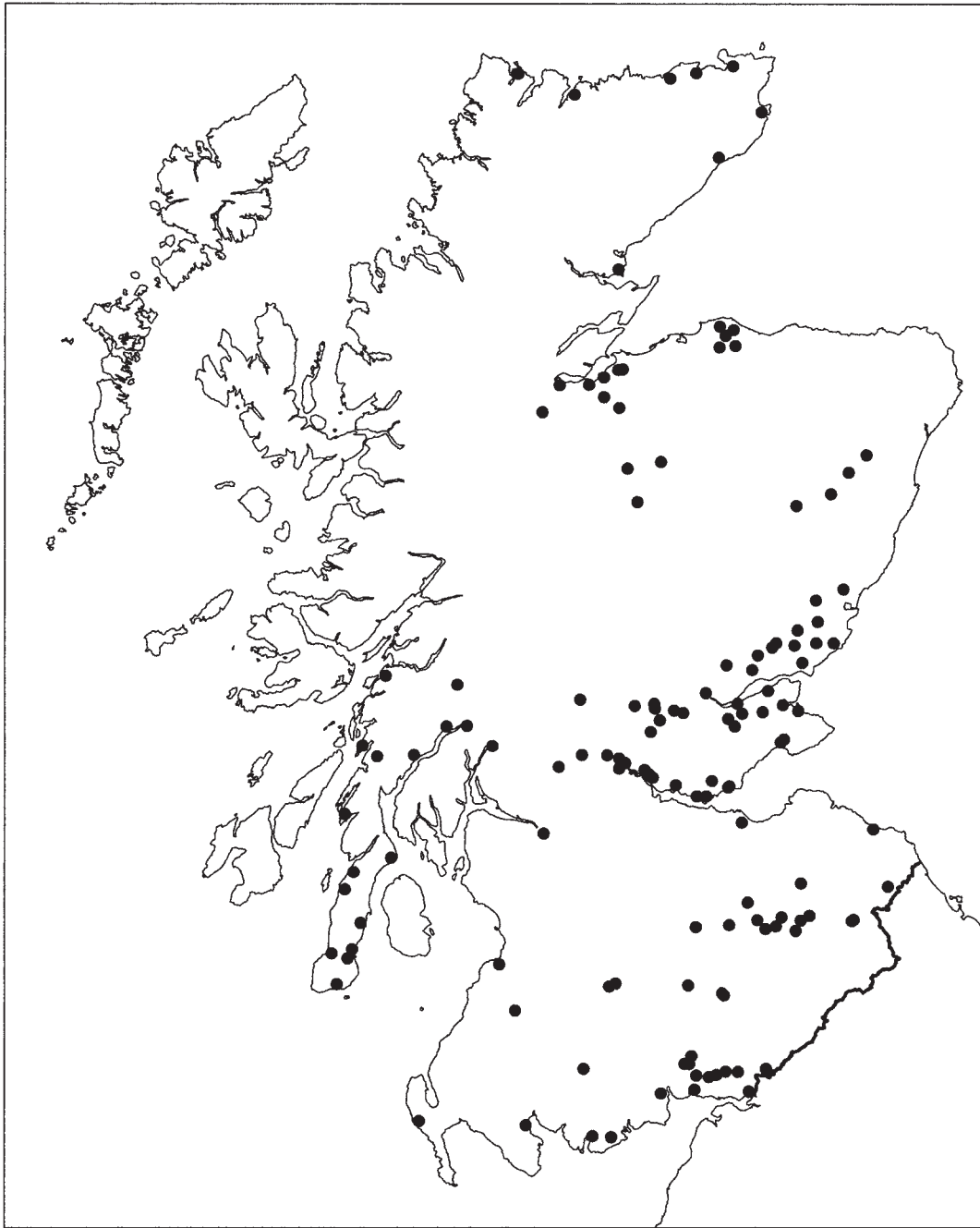
INTRODUCTION

When we consider that a major element of tombstone memorials is the lettering — indeed they tell us nothing without it — it is perhaps surprising that little attention has been given to the use of letterform and its variation, both geographical and temporal. Burgess (1963, 208) recognized the need for research, ‘. . . it is to be hoped that some awareness of the value of these monumental inscriptions may stimulate some systematic and regional research before they fall victims to corroding Time.’

In addition to that of Burgess, many detailed studies have been made of memorial sculpture, iconography, semiotics, epitaphs and the genealogical content of tombstones both in Britain and abroad, especially in the United States of America, through the Association for Gravestone Studies, and in Canada (Millar 1997). There are numerous on-going programmes recording monumental inscriptions and no shortage of detailed advice on how to go about it (Jones 1979; Rugg 1998). In Scotland the work of Willsher (1985a; 1985b; 1996; Willsher & Hunter 1978) is well known and, for more than a century, papers have appeared sporadically in these *Proceedings* describing the content of kirkyards throughout the nation.

Yet in all of this only passing reference is made to lettering style. Burgess and Willsher give generalized outlines of style-change through time. Weaver (1915) romanticizes on monumental lettering in an historical context. A recent local study was made of lettering on incised headstones of North and West Devon and North Cornwall by Beament and Dudley (2000). Bartram (1978)

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ILLUS 1 Location of sample sites

is the only published work dedicated to tombstone lettering throughout the British Isles, although this is not an analytical study and includes only four examples from Scotland. The date ranges reported in this study for the occurrence of a number of attributes, and in particular different

lettering styles from the early 18th century, differ significantly from those given by Burgess for England and Willsher in Scotland.

The much-lamented deterioration of kirkyard monuments through weather, pollution, neglect and vandalism is being addressed only sporadically. The work of the National Committee on Carved Stones in Scotland (NCCSS) should help to nurture the increasing awareness of the importance of these artefacts. However, it is vital that the historical and cultural aspects of the lettering itself is recognized. It is planned that this study will assist in the identification of important stones that will be recommended for protection because of their palaeographic significance. An assessment by the author is being made through a detailed systematic study of pre-1855 kirkyard memorials throughout Scotland. This paper reports the methodology and concepts used in the research and details initial findings and analysis.

METHODOLOGY AND DEFINITIONS

The year 1855, when compulsory registration of births, deaths and marriages in Scotland began, is the end-date used in most surveys of monumental inscriptions and it was also chosen as the end-date for this study. A pilot study confirmed that it was an appropriate date, not an arbitrary one. Victorian tastes and ‘modern’ burial practices (for example the building of cemeteries) had become established. More importantly, it was evident that the choice and use of lettering on headstones had by then become largely mechanistic, the folk-art tradition having been virtually lost.

It was realized at an early stage that, because of the scale of the study, on-site analysis would be impracticable, and therefore a decision was made to employ photography, allowing analysis of the lettering to be undertaken at a later date. Trials with traditional photographic processes showed that they were both cumbersome and expensive and digital methods were tried. These proved to be highly successful: other than the initial equipment outlay, costs were negligible; data could be recorded directly from the computer display into the database; and computer image enhancement was also helpful in revealing details that were otherwise difficult to interpret.

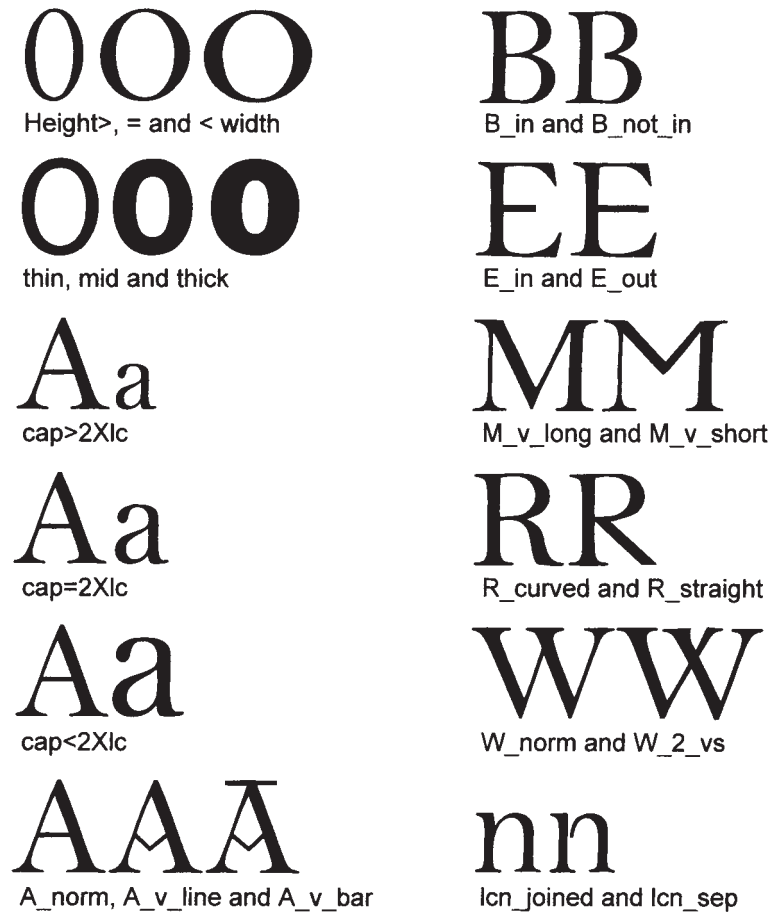
Throughout the mainland of Scotland 132 sites were chosen to represent a range of sizes and types in each area, from the small, rural kirkyard often attached to a pre-Reformation church or chapel, to large cathedral or abbey burial grounds (illus 1). Islands were specifically excluded from this part of the research. A number of other sites referred to in this paper were recorded but not used in the analysis. All legible, dated tombstone inscriptions at each site were photographed and recorded. It was not essential that inscriptions were complete, as only representative letters were necessary for subsequent image analysis and data processing. Sites were grouped into broad geographical regions (see Appendix). The inscription sample sizes from each kirkyard in most cases were large (>100) giving very small standard errors in the computations of frequencies. However, the data from some sites with a very small number of memorials were pooled with those from adjacent kirkyards. A record was made from each separate inscription or style of inscription on each face of the tombstones. The exception to this was when it was obvious that an inscription clearly had been influenced by earlier entries on the stone, in which case the record was excluded. In total 13,016 tombstones were recorded and analysed.

Data were recorded for 42 variables, representing letter attributes selected to characterize the overall nature of the lettering (Table 1 & illus 2). Dates were considered to be estimates, as memorials were not necessarily made in the year of the burial, some being erected and dated before any interments, others being placed on the grave many years afterwards. As this issue

TABLE I
Variables (attributes) and their definitions

Var	Group	Attribute	Definition
1	STYLE	mixed	More than one style on same stone face
2	STYLE	not mixed	Only one style used on same stone face
3	STYLE	gothic	All gothic forms including 'black letter' (illus 5b, 6d))
4	STYLE	versal	letterform characterized by exaggerated entices on verticals and curves, including 'Lombardic' (illus 5a)
5	STYLE	roman	serif letterforms but excluding versal and block serif
6	STYLE	roman caps	inscription in roman capitals only — a subset of variable 5 (illus 5c, d)
7	STYLE	roman caps	inscription in both caps and lowercase — a subset of variable 5 (illus 5e)
8	STYLE	italic	distinguished from script by form of caps (illustration 6a)
9	STYLE	script	all script forms, excluding italic (illus 5f)
10	STYLE	sans	sans serif forms (illus 6b)
11	STYLE	block	all block serif forms, including 'Egyptian' (illus 6c)
12	STYLE	other	all other forms that cannot be placed in 3-9, including outline and aberrant forms (illus 6e)
13	CUT	raised	letters raised with background cut away (illus 5c)
14	CUT	incised	letters cut into stone
15	CASE	caps	inscription in caps only
16	CASE	caps and lowercase	inscription in both caps and lowercase
17	LIGATURES	ligs	at least one ligatured form in inscription
18	LIGATURES	no ligs	
19	PROPORTION	height > width	height of letter greater than width
20	PROPORTION	height = width	height of letter approximately equal to width
21	PROPORTION	height < width	height of letter less than width
22	LINE	thin	letterform approximating to a 'light' typographic style
23	LINE	mid	letterform approximating to a 'medium' typographic style
24	LINE	thick	letterform approximating to a 'bold' typographic style
25	CAP/LC SCALE	cap > 2Xlc	cap height greater than twice the height of the lowercase letters
26	CAP/LC SCALE	cap = 2Xlc	cap height approximately equal to twice the height of the lowercase letters
27	CAP/LC SCALE	cap < 2Xlc	cap height less than twice the height of the lowercase letters
28	CAP FORM	A_norm	'normal' form of caps A
29	CAP FORM	A_v_line	cross bar of cap A in form V
30	CAP FORM	A_v_bar	cross bar of cap A in form V and line across top of letter
31	CAP FORM	B_in	centre line of cap B touching vertical
32	CAP FORM	B_not_in	centre line of cap B not touching vertical
33	CAP FORM	E_out	centre line of cap E approximately equal to upper and lower horizontals
34	CAP FORM	E_in	centre line of cap E shorter than upper and lower horizontals
35	CAP FORM	M_v_long	centre V of cap M reaching baseline
36	CAP FORM	M_v_short	centre V of cap M not reaching baseline
37	CAP FORM	R_straight	'leg' of cap R straight
38	CAP FORM	R_curved	'leg' of cap R not straight
39	CAP FORM	W_norm	cap W 'normal' form
40	CAP FORM	W_2_vs	cap W comprising two Vs
41	LCn	lcn_joined	arch of lowercase 'n' joined to vertical
42	LCn	lcn_sep	arch of lowercase 'n' separate from vertical

applied equally to all sites, for the purposes of the data analysis it was not considered to be a problem. Some very early stones were included in the study where dates within a 20-year period were known. When there was any doubt about the estimated date of an inscription, it was eliminated from the data set. Covenanters' memorials were excluded as many were made or recut long after the date recorded on the stones (Love 1989, 101). Average dates and date classes are those computed from the study material examined. As illegible inscriptions and stones of



ILLUS 2 Some letterform attributes and character states used in the study

questionable date have been excluded, the data presented here do not necessarily represent a comprehensive picture of each kirkyard or area.

Care had to be taken in the recording of badly weathered stones. For example, the lettering on worn stones can give a false impression of the letter weight. However, as only a sample of letters was needed for a record and not necessarily the whole inscription, many samples that for other purposes would have been useless could be included.

As inscriptions were often cut by unskilled craftsmen, in some cases the intentions of the letter cutter had to be interpreted. The less-skilled mason sometimes failed to cut his planned letterform accurately. This was particularly the case with lettering where serifs were frequently poorly formed or lacking in what was clearly a roman style. Hybrid or transitional forms were a problem, especially between versal and roman in the 16th century and between roman and block serif in the early 19th. If a style could not safely be determined, it was classified as 'other.' Outline forms, irrespective of the basic style, were also classified as 'other'.

Statistical analysis was undertaken using Statistica (Statsoft Corporation 1998). A more detailed account of the use of digital techniques and statistical graphics used in this study is published elsewhere (Thomson 2001).

ANALYSIS

ANALYSIS OF THE LETTERFORM ATTRIBUTES

With a few exceptions, all letterform attributes and their variants were in evidence in all sites until 1855 or a little before. Versal forms were not observed beyond 1350 in Fife and 1499 in the West and do not reappear in their 'modern' manifestation in either region. In the North-East, medieval gothic forms were not found and only a single versal inscription dated 1841 was recorded. Attribute A_v_bar did not extend beyond 1760 in the North-East, 1764 in the West, 1785 in the North, 1804 in the South-West and 1827 in Fife.

There was, however, considerable variation in the earliest recorded dates for most attributes (Table 2). Important points to note include the late appearance of roman forms in West Scotland

TABLE 2

Earliest dates for the occurrence of letterform attributes

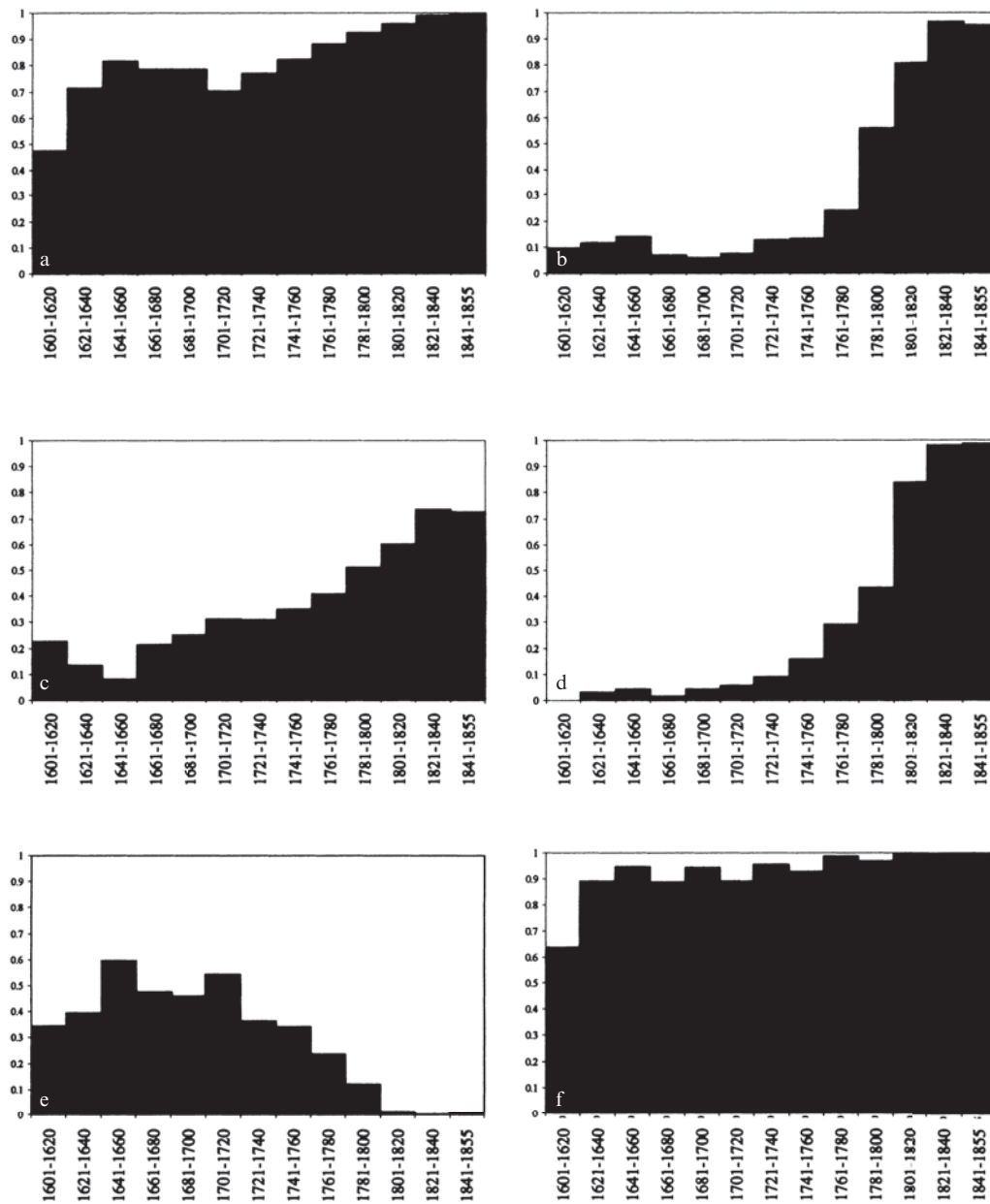
Var	Attribute	All	SW	SE	W	C	Fife	NE	N
1	mixed	1592	1693	1614	1680	1633	1632	1592	1619
2	not mixed	1250	1273	1250	1451	1301	1350	1411	1421
3	gothic	1380	1440	1421	1511	1504	1380	1411	1421
4	versal	1250	1273	1250	1451	1301	1250	1841	1835
5	roman	1476	1516	1574	1666	1602	1500	1476	1588
6	roman caps	1476	1516	1874	1666	1602	1500	1476	1588
7	roman caps and lc	1626	1660	1633	1705	1626	1661	1647	1701
8	italic	1649	1760	1649	1742	1769	1724	1704	1685
9	script	1683	1699	1701	1715	1716	1720	1713	1683
10	sans	1648	1746	1648	1751	1702	1799	1800	1785
11	block	1763	1778	1777	1754	1763	1790	1799	1785
12	other	1644	1660	1644	1680	1824	1697	1730	1801
13	raised	1301	1440	1421	1451	1301	1500	1476	1431
14	incised	1250	1273	1250	1666	1620	1350	1411	1421
15	caps	1250	1273	1250	1451	1301	1350	1476	1588
16	caps and lowercase	1380	1440	1421	1511	1504	1380	1411	1421
17	ligs	1500	1593	1614	1666	1620	1500	1624	1588
18	no lig	1250	1273	1250	1451	1301	1350	1411	1421
19	height > width	1250	1273	1250	1451	1301	1380	1411	1421
20	height = width	1350	1607	1610	1451	1602	1350	1615	1619
21	height < width	1751	1751	1761	1816	1820	1755	1782	1823
22	thin	1250	1347	1250	1670	1620	1380	1592	1464
23	mid	1273	1273	1421	1666	1624	1350	1524	1479
24	thick	1301	1440	1421	1451	1301	1500	1411	1421
25	cap > 2Xlc	1672	1698	1720	1715	1736	1672	1706	1744
26	cap = 2Xlc	1647	1660	1741	1717	1653	1712	1647	1683
27	cap < 2Xlc	1380	1440	1421	1511	1504	1380	1411	1421
28	A_norm	1565	1565	1589	1670	1624	1565	1592	1588
29	A_v_line	1476	1680	1633	1666	1618	1584	1476	1634
30	A_v_bar	1500	1607	1602	1725	1602	1500	1524	1614
31	B_in	1476	1593	1589	1666	1602	1500	1476	1588
32	B_not_in	1603	1644	1658	1681	1624	1644	1631	1603
33	E_out	1500	1607	1710	1672	1616	1500	1597	1616
34	E_in	1524	1593	1574	1666	1602	1565	1524	1588
35	M_v_long	1613	1660	1619	1680	1627	1613	1624	1642
36	M_v_short	1476	1593	1589	1666	1602	1500	1476	1588
37	R_straight	1476	1614	1589	1666	1602	1500	1476	1588
38	R_curved	1593	1593	1616	1722	1620	1613	1683	1603
39	W_norm	1627	1660	1720	1720	1627	1644	1717	1740
40	W_2_vs	1500	1593	1589	1666	1602	1500	1597	1603
41	lcn_joined	1626	1660	1633	1705	1626	1661	1647	1683
42	lcn_sep	1660	1660	1730	1737	1701	1715	1725	1684

TABLE 3
Average dates for the occurrence of letterform attributes

Var	Attribute	All	SW	SE	W	C	Fife	NE	N
1	Mixed	1824	1821	1823	1826	1828	1820	1821	1829
2	not mixed	1786	1777	1788	1790	1781	1785	1791	1793
3	Gothic	1822	1819	1820	1828	1827	1826	1824	1818
4	Versal	1654	1643	1636	1482	1779	1350	1841	1844
5	Roman	1797	1798	1801	1808	1792	1790	1798	1800
6	roman caps	1775	1766	1779	1795	1772	1776	1777	1768
7	roman caps and lc	1815	1811	1813	1814	1819	1813	1817	1824
8	Italic	1823	1821	1821	1817	1829	1823	1829	1822
9	Script	1787	1776	1787	1792	1787	1783	1786	1810
10	Sans	1840	1840	1837	1840	1842	1840	1842	1842
11	Block	1839	1835	1831	1843	1838	1837	1841	1835
12	Other	1822	1792	1727	1897	1841	1826	1826	1840
13	Raised	1720	1689	1695	1642	1716	1727	1758	1707
14	Incised	1810	1806	1809	1816	1809	1808	1811	1810
15	Caps	1799	1797	1802	1811	1797	1792	1805	1797
16	caps and lowercase	1813	1807	1811	1814	1822	1816	1810	1820
17	Ligs	1726	1723	1713	1737	1725	1719	1710	1739
18	no ligs	1811	1809	1811	1815	1810	1807	1812	1817
19	height > width	1799	1795	1802	1805	1796	1798	1798	1797
20	height = width	1819	1813	1822	1828	1817	1809	1823	1829
21	height < width	1833	1835	1820	1840	1841	1819	1821	1835
22	Thin	1785	1780	1789	1796	1783	1782	1784	1786
23	mid	1819	1815	1818	1819	1824	1815	1815	1826
24	Thick	1821	1818	1825	1826	1819	1809	1827	1822
25	cap > 2Xlc	1813	1801	1807	1824	1813	1816	1807	1829
26	cap = 2Xlc	1812	1807	1809	1805	1822	1818	1805	1823
27	cap < 2Xlc	1814	1812	1813	1813	1823	1816	1815	1808
28	A – norm	1812	1806	1810	1820	1814	1809	1816	1811
29	A – v – line	1745	1744	1753	1751	1731	1746	1741	1762
30	A – v – bar	1692	1707	1694	1745	1695	1685	1648	1708
31	B – in	1805	1803	1806	1815	1805	1799	1809	1806
32	B – not – in	1815	1811	1816	1822	1813	1813	1821	1808
33	E – out	1762	1752	1808	1799	1729	1747	1751	1786
34	E – in	1810	1808	1808	1817	1811	1806	1814	1808
35	M – v – long	1825	1821	1822	1828	1825	1823	1830	1827
36	M – v – short	1751	1746	1745	1777	1742	1753	1741	1753
37	R – straight	1795	1782	1798	1806	1797	1783	1787	1804
38	R – curved	1818	1815	1816	1828	1818	1817	1829	1809
39	W – norm	1825	1820	1821	1827	1827	1824	1830	1831
40	W – 2 – vs	1750	1741	1751	1772	1738	1756	1741	1754
41	lcn – joined	1811	1805	1808	1807	1820	1824	1805	1822
42	lcn – sep	1814	1808	1810	1816	1828	1817	1825	1822
	all attributes	1807	1803	1808	1813	1806	1802	1808	1809

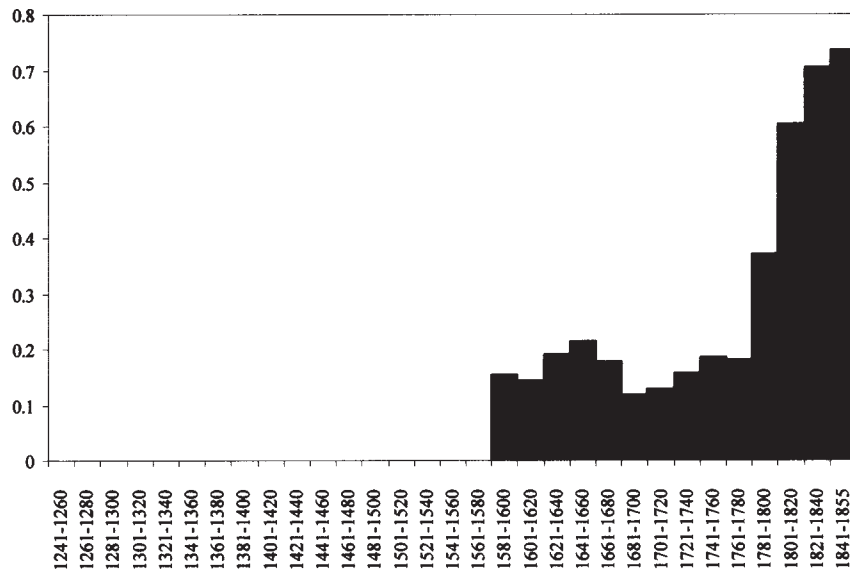
(1666) and of sans serif forms in Fife (1799) and the North-East (1800). The dates recorded for the first appearance of incised, rather than raised lettering in West and Central Scotland were more than 200 years after the other Scottish regions. With a few exceptions average dates for attributes were remarkable similar (Table 3). The early average date for versal in the West (1482) and late date for the East and North were inconsistent with the other regions. The anomalous early and late average dates for versal in Fife and the North-East respectively were based on single inscriptions. Dates of raised inscriptions in the North-East averaged much later than the rest of the country (1758) as did A_v_bar in the West (1745) and E_out in the South-East (1808).

An analysis of the development of inscriptional forms of roman capitals made it possible to designate some attributes as either ‘archaic’ or ‘advanced’. Archaic attributes are considered to



ILLUS 3 a frequency of A_norm 1601–1855; b frequency of M_v_long 1601–1855; c frequency of R_curved 1601–1855; d frequency of W_norm 1601–1855; e frequency of ligatures 1601–1855; f frequency of E_in 1601–1855

be Raised, A_v_line, A_v_bar, B_in, E_out, M_v short, R_straight and W_2_vs. Advanced attributes are Incised, A_norm, B_not_in, E_in M_v_long, R_curved and W_norm. However, archaic forms were in evidence throughout the period studied. The archaic raised roman of the late 16th and early 17th centuries was found much later, as a rarity, at Middlebie, Dumfriesshire



ILLUS 4 The increase in the use of mixed styles 1241–1855

(1685), Straiton (1704 and 1705) and in a less primitive form at Tulliallan (1715 and 1754). Archaic attributes were also used in a modified form to the present day as revivals. The late adoption in the West of more advanced lettering attributes was evident in the case of capital A, B, E and R. These were used between 105 and 190 years after other regions. The archaic and advanced forms of a letter were occasionally noted in the same inscription as at Kilbirnie, Ayrshire where A_{norm} and A_{v_line} were together on the same tombstone.

Illustration 3 shows that changes in the frequency of attributes from 1601 to 1855 were gradual and followed clear developmental paths. This is best seen in the bar charts showing the frequency of use of the advanced forms of cap A, M, R and, most dramatically, of W. The frequency of the use of ligatures, on the other hand, shows a pattern of rise and fall over the period. Mixed styles (illus 4) were not in evidence until 1581 with a dramatic increase in their use from 1780. By 1855, three quarters of all headstones were designed with mixed styles.

STYLE CHANGES

The principal lettering styles are shown in illus 5 and 6. In the medieval period, the complete dominance of versal forms until the end of the 14th century and of gothic from then until the mid-15th was followed by a period of over 100 years (c 1441–c 1560) when the two styles were found with roman. The continued or revived use of versal at this time took place principally, but not exclusively in the West. Steer and Bannerman (1977, 92) refer to this late use of ‘Lombardic’ lettering. Shortly after 1560 roman inscriptions, in their various manifestations, were by far the most commonly used letterform throughout the rest of the period covered by this study (illus 7).

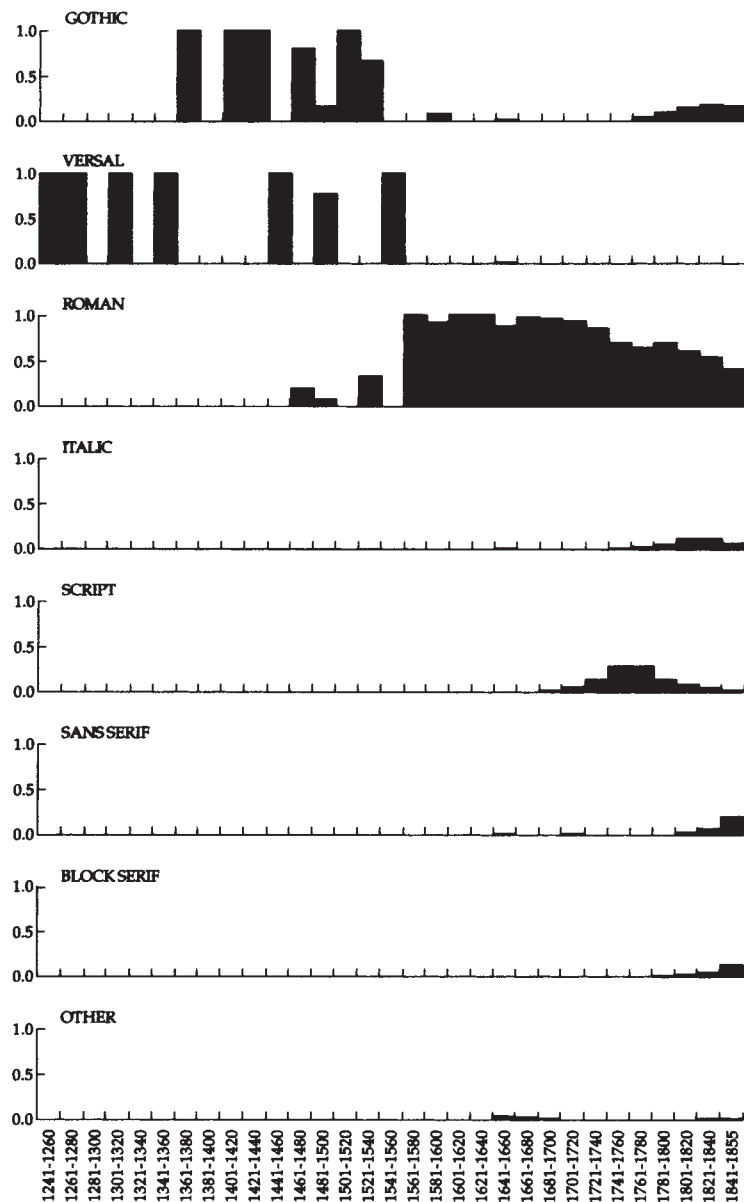
At various times, especially in some of the regions, other styles made inroads to the popularity of this ubiquitous form. Between 1680 and 1855, script was widely used, with a peak between 1741 and 1780. There were large regional differences. Between 1741 and 1780 script inscriptions accounted for 51.2% in the West, 43.1% in the North-East, 39.5% in the South-West and 29.4% in the South-East. Conversely, it was used far less in the rest of Scotland at that time



ILLUS 5 a Versals— Ardchattan Priory, Argyll (1502 restored); b Medieval gothic— Dundrennan Abbey, Kirkcudbrightshire (1490); c Archaic raised roman caps — St Mungo's, Dumfriesshire (1701); d Incised roman caps with ligatures — St Kentigern's (Hoddam), Dumfriesshire (1717); e Roman caps and lowercase — Applegarth, Dumfriesshire (1772); f Script caps and lowercase — Innerleithen, Peebleshire (1766)

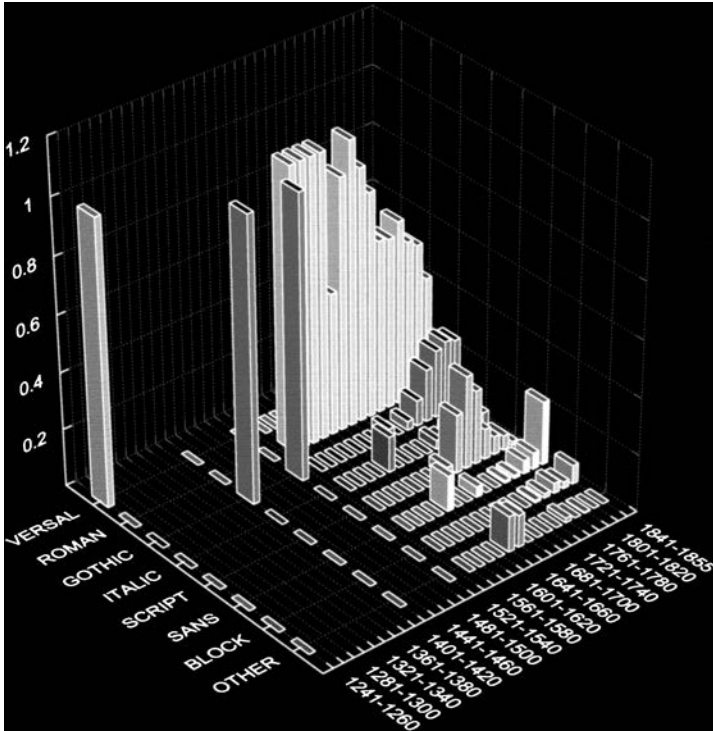


ILLUS 6 a Italic caps (with roman caps and lowercase)— Kirkconnel, Dumfriesshire (1814); b Sans serif caps (with roman caps) — Holy Rude, Stirling (1843); c Block serif caps (with sans serif caps) — Inverkeithing, Fife (1836); d Gothic caps and lowercase (with script and block serif caps) — Alloway, Ayrshire (1828); e Decorated caps ('other') — Ruthwell, Dumfriesshire (1709); f Ampersand with roman caps — Watcarrick (Eskdalemuir), Dumfriesshire (1710)

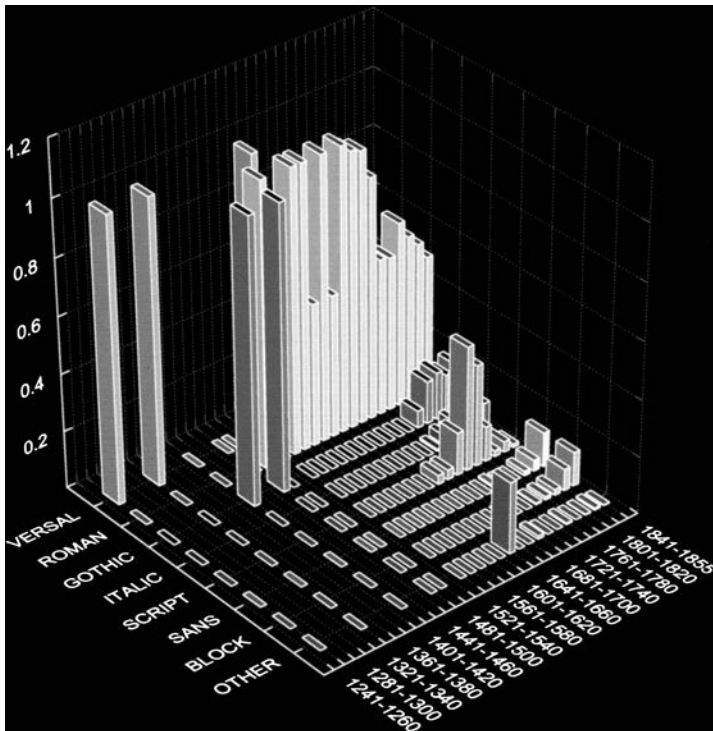


ILLUS 7 Style frequencies 1241–1855

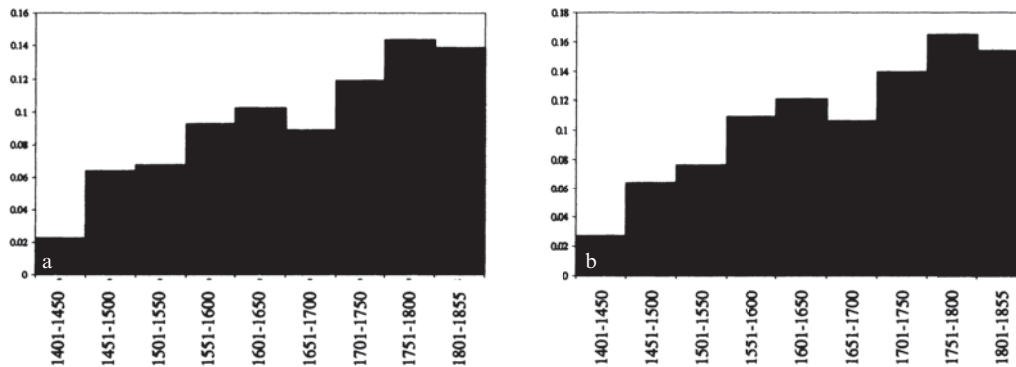
where only 5% in the North, 6% in Central and 8.7% in Fife utilized that style. Italic, although not unknown before, made a strong appearance between 1741 and 1855, being most frequent between 1801 and 1840, usually used in combination with other forms. Gothic, also almost invariably used with other styles, made a revival during the 18th century, although it never really disappeared completely in the 800 year study period.



ILLUS 8 Style frequencies
1241–1855 — South-East
Scotland



ILLUS 9 Style frequencies
1241–1855 — South-West
Scotland



ILLUS 10 a Average variance of all letterform attributes 1401–1855; b Average variance of letterform attributes excluding styles 1401–1855

An unexpected, small but significant rise in the use of styles other than roman, in particular italic, script, sans serif and ‘other’, occurred between 1641 and 1660 in South-East and South-West Scotland (illus 8 & 9). There is no apparent explanation for this sudden and short-lived period of experimentation.

The development of script follows an extremely interesting evolutionary pattern from a ‘sloped roman’, through increasing cursiveness to a ‘copperplate’ form. Although the proto-script forms probably had a different origin, writing manuals almost certainly influenced the use of script on later 18th-century Scottish stones. The metamorphosis was a slow process over a period of almost 100 years. This is a topic for further research.

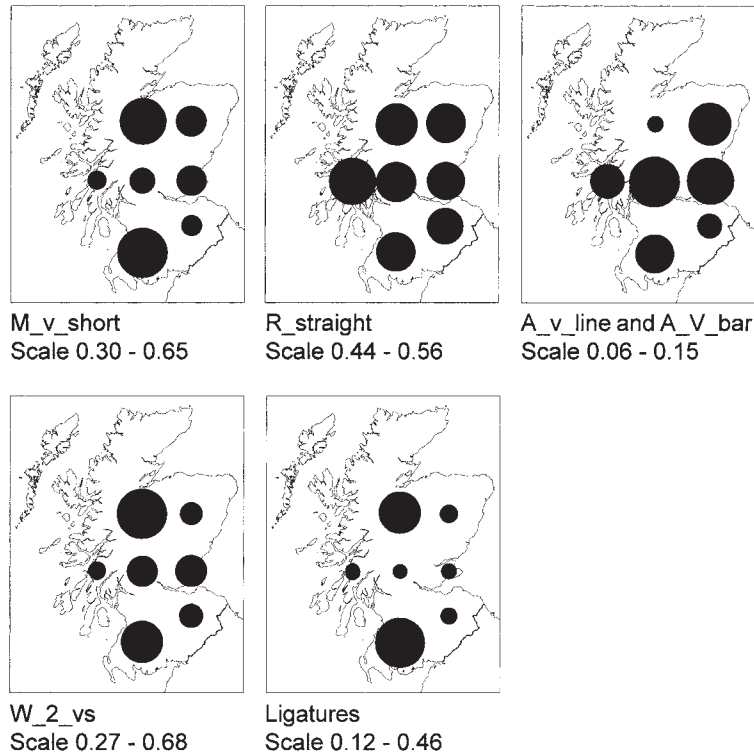
VARIANCE

In empirical terms, the variability of attributes was relatively low, which makes the patterns of variation resolved by factor analysis all the more remarkable. The average variance of all attributes for all Scotland was only 0.150. Regionally there was little difference in the average variance ranging from 0.140 in Central to 0.157 in the South-West.

More importantly, variance increased significantly throughout Scotland from 1401 to 1855 (illus 10a). As time went by it might have been expected that masons would utilize the greater range of forms they would have at their disposal, especially from the end of the 18th century when mixed styles were becoming fashionable. However, eliminating this as a factor by excluding styles from the analysis, the variance from 1401 to 1855 is even greater, indicating that the increased variability was in the interpretation of design rather than the choice of specific alphabetic form (illus 10b). This is the converse of what one would expect. More tombstones survive as we get nearer to the present and this could possibly explain the phenomenon but statistically it only partially accounts for the increase. People would have been far less aware of what was happening elsewhere in the country in the 15th, 16th and early 17th centuries, yet the inscriptions are far more similar in treatment than at a time when a greater standardization of expression would be expected. This can best be explained by increased cultural diversity.

GEOGRAPHIC VARIATION

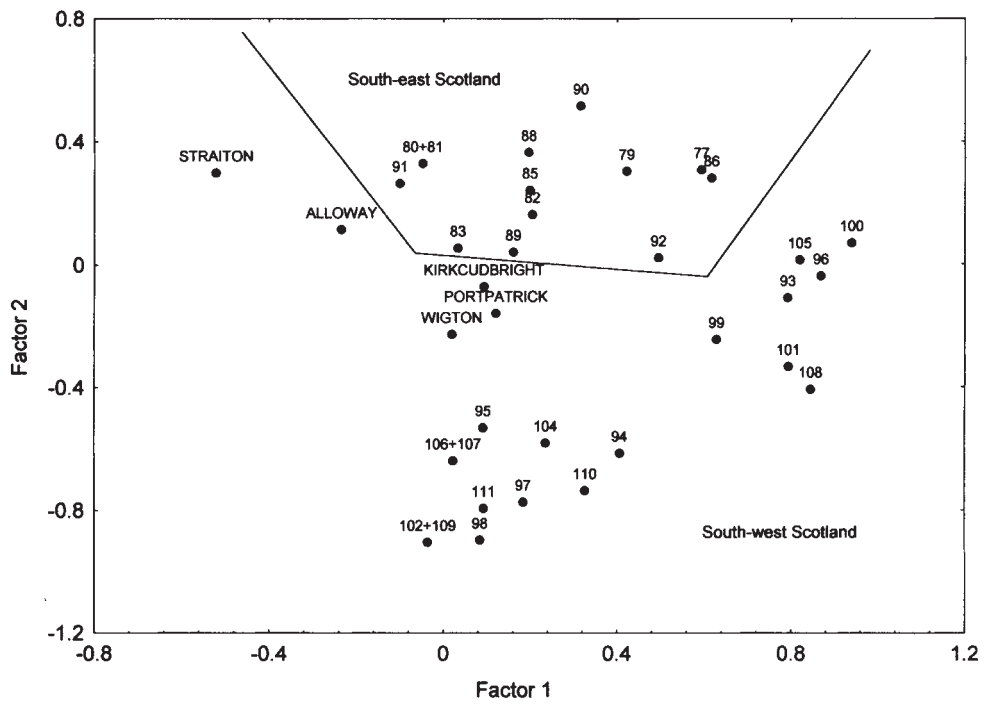
Some regional variation in lettering has already been discussed but the differences in some of the archaic forms of roman capitals illustrate well the clear patterns of geographical tradition (illus



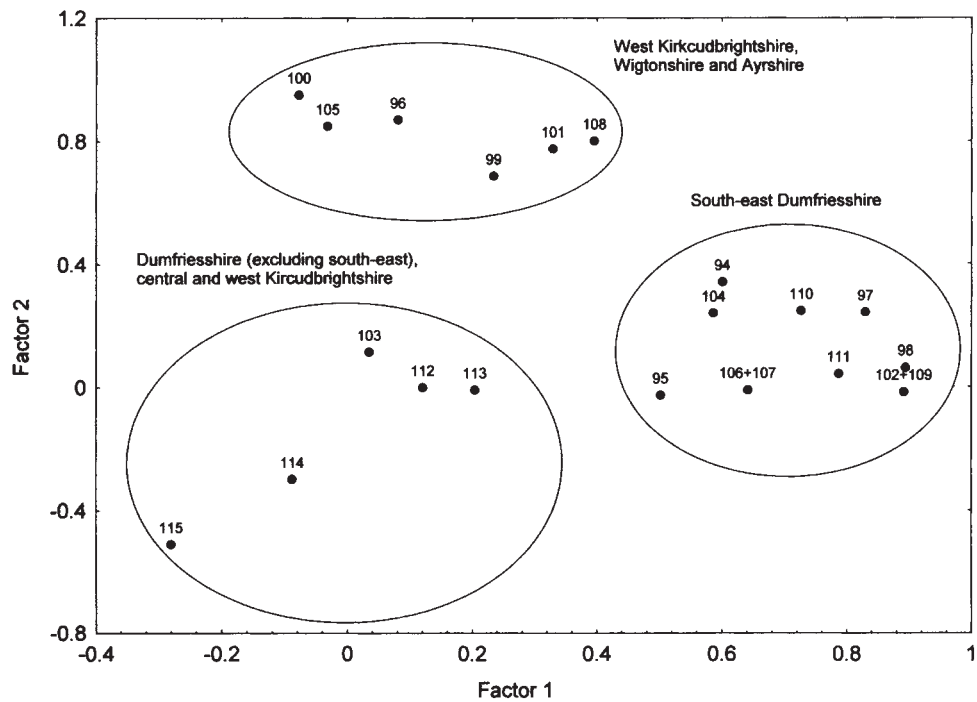
ILLUS 11 The frequency of letterform attributes by region — circle sizes represent scale ranges indicated

11). A_v_line and A_v_bar combined were far less in evidence in the North than in the rest of Scotland, although it was not common in the South-East. Both M_v_short and W_2_vs had their greatest frequency in the North and South-West. R_straight was less common in South-East and South-West Scotland than elsewhere but the differences were small. Most dramatically, the relatively low frequency of ligatures in the North-East, West, Central, Fife and the South-East compared with the North and the South-West was unexpected.

To explore which attributes were contributing most to the difference between kirkyard sites principal components analysis (PCA) was performed on the data from all sites. PCA revealed that the form of roman caps E, M and W, followed by mixed/not mixed, caps/cap and lowercase, height more/equal and the form of roman cap A, were the most important attributes in distinguishing between the profiles of sites. Further analysis was undertaken on frequency data using the first five principal factors and 18 selected attributes that were considered to be most representative of the majority of inscriptions (mixed, style variables, incised, caps, ligs, ht_more, ht_equal, ht_less, thin mid and thick). Plots of factor loadings for all sites did not demonstrate distinct clusters of related sites, although many showed a close statistical association. However, analysis by region using data from 1761 to 1855 only resolved geographical patterns much more distinctly. Principal axis factoring resolved South-East and South-West Scotland quite distinctly, with the exception of the western Galloway and Ayrshire kirkyards (illus 12). Similarly, factoring of only South-West Scotland distinguished three areas, (1) south-east Dumfriesshire, (2) central, northern and western Dumfriesshire and (3) west Kirkcudbrightshire, Wigtonshire and Ayrshire



ILLUS 12 Principal axis factoring: factor loadings — South Scotland; numbers refer to sites in the Appendix



ILLUS 13 Principal axis factoring: factor loadings — South-West Scotland; numbers refer to sites in the Appendix

(illus 13). In the West, plots of factor scores identified Kintyre as distinct from the rest of mainland Argyll with the exception of Inveraray and Minard and, to some extent, Dalmally (illus 14). Taking North and North-East Scotland together, factoring resolved southern Aberdeenshire and Angus as a distinct entity, although Tongue and Durness associated with this group. Distinct clusters were not evident in the more northern part of the region (illus 15). Statistical analysis of Central Scotland and Fife failed to reveal distinct groupings. This identification of a number of discrete geographical groups indicates close affinity of the kirkyards within them in the treatment of inscriptional lettering.

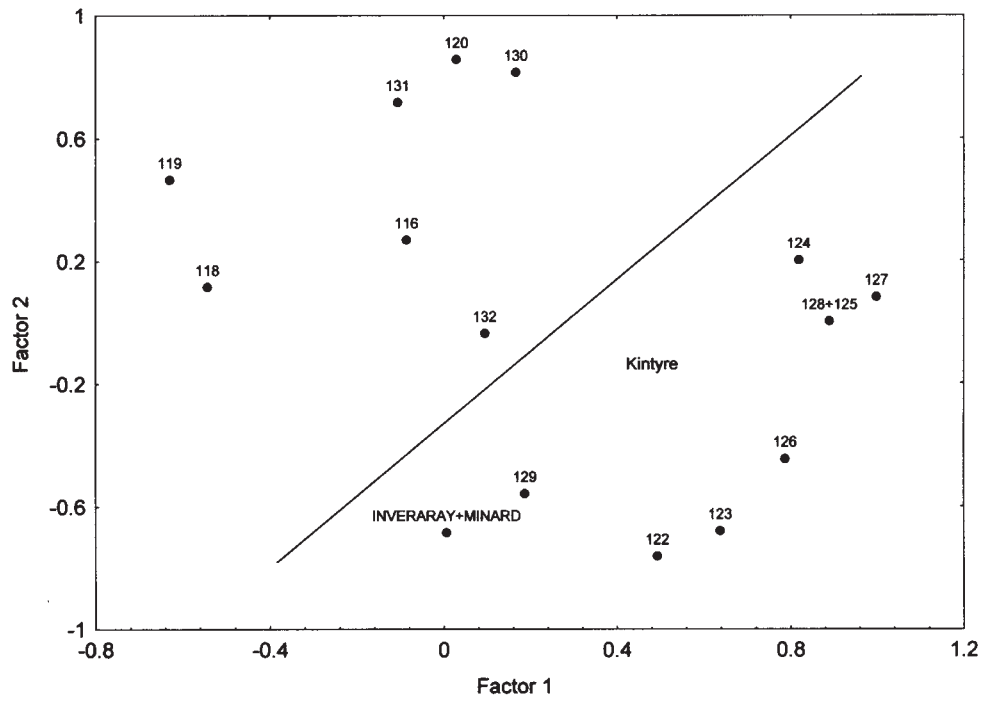
The use of factor analysis as a classification method demonstrates that there are some clear geographical patterns of letterform treatment that can be identified through multivariate analysis of letterform attributes. The distinctive morphological profiles of lettering in groups of geographically adjacent kirkyards noted in South-East Scotland, parts of Dumfries and Galloway, Kintyre and Angus, suggests that subtle similarities and differences in the formation of inscriptional lettering were culturally embedded.

OTHER OBSERVATIONS

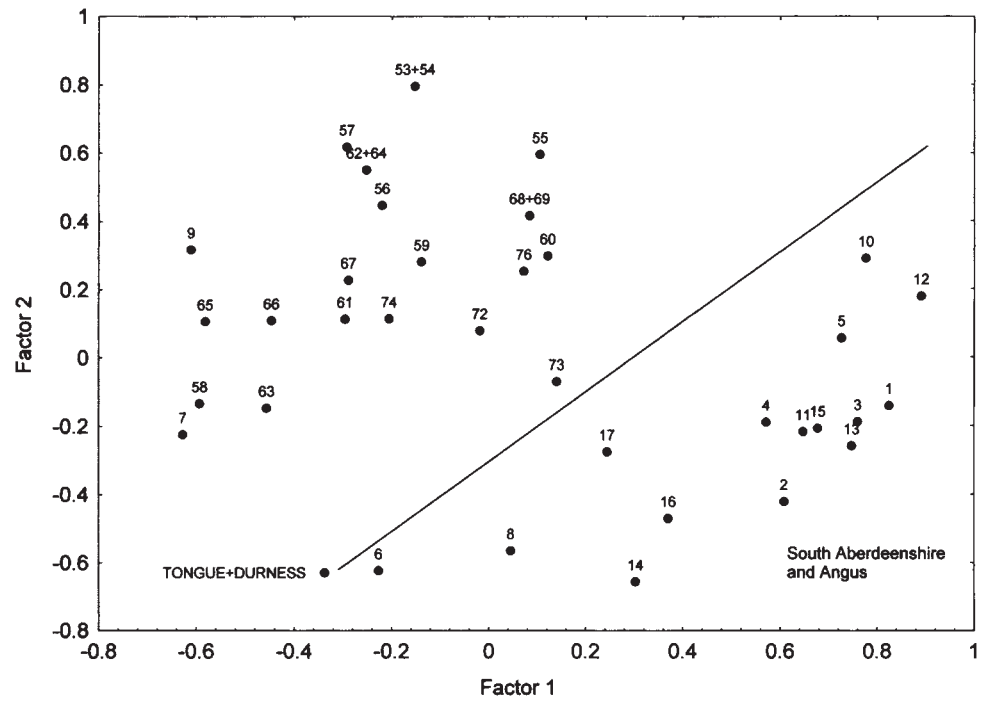
Non-metric analysis of lettering is at an early stage and includes detailed research on ligaturing. However, some observations are worth noting here. Although ligatures were widespread, their use in roman capital and lowercase inscriptions, compared with all-capital texts, was very rare. An example can be seen at Alves (1784). A single example of ligatured numerals appears on a remarkable headstone at Dundrennan Abbey where the date 1685 is elegantly combined. This stone also incorporates some unusual ligatured letters (illus 16e).

A peculiar characteristic of some Scottish memorials, frequently seen in the second half of the 17th century, was the mixing of capitals and lowercase letters within words throughout the inscription. Sometimes this was restricted to a single letter, as on a 1775 headstone in Aberuthven when the lowercase ‘n’ was used in an otherwise capital form. Occasionally, however, the use of mixed case was much more extensive and this can be seen at Kilmartin (illus 16a) and Falkland (illus 16b) on stones dated 1686 and 1653 respectively. This treatment was probably more often due to illiteracy than to creativity, although the Kilmartin and Falkland examples are elegantly cut and appear to be the consequence of design intentions. Similarly, the mirroring of letters and numerals is likely to be due to human error. Reverse capital ‘N’ is common in roman capital inscriptions up to the beginning of the 19th century throughout Scotland. A similar treatment of capital ‘S’ is occasionally seen, as at Kettins (1753). Surprisingly, few other letters were mirrored in this way and only capital ‘G’ at Tulliallan (1741) and lowercase ‘d’ at Spynie (1770) were found. However, the reversed numerals ‘3’ (Foulis Easter, 1663), ‘4’ (Logie, 1804), ‘6’ (Muthill, 1626) and ‘7’ (Rosyth, 1791 and Straiton, 1674) were noted.

The mixing of lettering styles on memorials, which became the norm by the early part of the 19th century, reached a peak before 1855. The greatest number of different styles found on one memorial face was five on an 1842 headstone at Auchterhouse and an 1832 stone at Birse and Feuchside (illus 16c). Gothic invariably constituted a major element of these mixed inscriptions. Some style combinations were uncommon, especially italic capitals with script, found only in 1783 at Alves, and gothic with script found in 1792 at Lochwinnoch, Renfrewshire, in 1795 at Inverarity, in 1830 at Bowden (illus 16d) and in 1834 at Ancrum. Post-medieval inscriptions entirely in gothic were very uncommon. These did not appear until Victorian times, being found only on two stones, both at Burntisland dated 1842 and 1846.



ILLUS 14 Principal axis factoring: factor loadings — West Scotland; numbers refer to sites in the Appendix



ILLUS 15 Principal axis factoring: factor loadings — North and North-East Scotland; numbers refer to sites in the Appendix



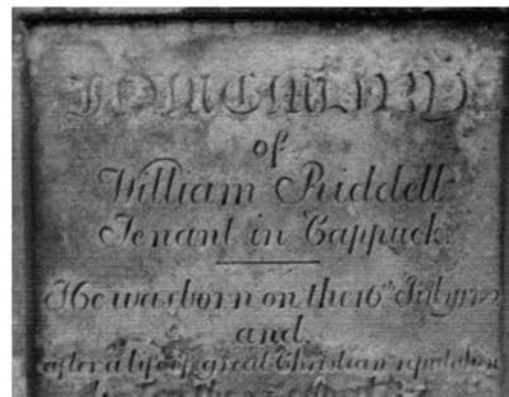
a



b



c



d



e

ILLUS 16 a Mixed roman caps and lowercase — Kilmartin, Argyll (1686); b Mixed caps and lowercase — Falkland, Fife (1663); c Five styles on one stone face (raised outline script, gothic, decorated caps, script and roman caps) — Bowden, Roxburghshire (1833); d Gothic caps with script — Bowden, Roxburghshire (1782); e Ligatured date and roman caps — Dundrennan Abbey, Kirkcudbrightshire (1685)

A distinctive treatment of the ampersand, where it was rotated counter-clockwise through 90 degrees, was noted in a number of kirkyards; the best examples were on a stone of 1747 in Culross and one of 1710 at Watcarrick (Eskdalemuir) (illus 6f). An intermediate form was encountered at Kilbirnie.

Two unique treatments of lettering were noted. The obsolete letter *thorn* (y), was found on only two memorials, one at Portpatrick (1717) and the other at Brechin (1755). A single example of W_2_vs attribute being used in a sans serif form was located at Croy dated 1841.

DISCUSSION

The extent to which masons travelled to undertake their work is not known but relocation potentially could have diluted local traditions in lettercutting. It is suggested that this must have been very limited and certainly more likely in the case of highly skilled craftsmen whose reputations would put them in great demand. Local traditions were probably far more important. It is significant that stones that had obviously been cut by unskilled individuals generally exhibited the same attributes as those in contemporary formal skilled mason's monuments in the same district, indicating that there was a clear awareness of stylistic traditions.

Before the 18th century in particular, widespread illiteracy of the individuals cutting the lettering was apparent and masons may well have actually attempted to copy from other stones or samples. Without standardization of spelling, this led to the quaint spellings that many find so appealing in Scottish tombstones. But there was another side to this. The occurrence of reversed letters and, perhaps even more so, the misplacement of letters in words suggests the possibility that dyslexia, a disability that we tend to think of as a modern phenomenon, was not infrequent amongst the masons.

Evidence from many headstones dated before 1800 indicates that the lettering was considered to be of less importance to the mason than the stone's shaping and sculpturing. Although it is impossible to be certain, it seems likely that the cutting of lettering was looked on as an afterthought and even cut by a less-skilled partner. It is certainly often not given as much attention as other elements on the stone. While in England 'freestone', usually in the form of limestone, was readily available to the building trade, quality material was not so in Scotland. This had a great effect on the building industry. In the 16th and 17th centuries, according to Knoop and Jones (1939, 73–4), when local stone was being used for the erection of buildings, the quality of work done by local workers, who received little or not training, was low. Within a system of small master tradesmen, independent craftsmen employing one or two servants flourished. A similar pattern of employment doubtless applied to memorial work.

Up to the end of the 19th century the mason or his assistant probably had complete control over the style and treatment of the inscription. The 'client' probably would have neither the knowledge nor the interest to contribute much. By the beginning of the 19th century the establishment of firms of monumental masons who began to use mechanical cutting methods and published design books (Willsher 1985a, 12) led to a greater standardization of memorials, although, as has been demonstrated here, there was increased variability in the treatment of lettering chiselled by hand.

Many 18th-century stones (and a few medieval ones) retain the guidelines used by the mason, giving us some indication of his working methods. The lines usually define the upper extent of the capital and ascender, the top and bottom of the x-height (the height of the lowercase letters) and the lower extent of the descender. It appears to have been considered to be 'good

practice' to make the capitals and ascenders equal to twice the x-height and, in the case of roman, to make the 'o' precisely circular in form.

There is a need for detailed study of the influences on the style and use of lettering on tombstones. It is known that some of the late 18th-century letter cutters used or were influenced by writing manuals. This is evident from the use of what were effectively pen forms interpreted as incised script. Later, type-founders' catalogues and specimen sheets were available and contemporary typefaces can be identified on 19th-century memorials. However, there must have been other influences then and before. Certainly much of the stone commonly used in Scotland did not lend itself to fine script or flourishes. The extremely hard whinstone, such as that at Kilsyth, Stirlingshire and the widespread very soft, grainy sandstone, restricted certain approaches, although 19th-century masons often attempted to emulate detailed penwork in this less suitable material. While slate tombstones can be found (eg at Whithorn, Wigtonshire), they were much rarer in Scotland than memorials in other materials. In consequence, we do not often find the exuberant designs that can be seen in the English Midlands, and in Devon and Cornwall. This more restrained Scottish approach possibly also parallels our simpler Presbyterian traditions.

Research is at an early stage and it is recognized that this paper does not address the many potential areas of study that Scottish tombstone lettering presents, such as the use of contractions, detailed analysis of ligaturing, layout and relationships with manuscript lettering, to name but a few. It is also recognized that many of the conclusions presented here are tentative, being based on a broad, though extensive, sample of sites. These and many other aspects of the subject will form part of the on-going research project. It is hoped that through this study tombstone memorials that are of palaeographic significance can be identified and consequently targeted for protection and conservation.

ACKNOWLEDGEMENTS

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APPENDIX: List of sites surveyed by region

NORTH-EAST (n = 1877)

- 1 Brechin Cathedral Kirkyard, Angus (NGR: NO 600 602)
- 2 Carmyllie Kirkyard, Angus (NGR: NO 548 426)
- 3 Guthrie Kirkyard, Angus (NGR: NO 567 505)
- 4 Marykirk Kirkyard, Angus (NGR: NO 686 656)
- 5 St Vigeans Kirkyard, Angus (NGR: NO 638 429)
- 6 Birse and Feughside Kirkyard, Aberdeenshire (NGR: NO 578 958)
- 7 Midmar Kirkyard, Aberdeenshire (NGR: NJ 702 058)
- 8 Kinkell (St Michael's) Kirkyard, Aberdeenshire (NGR: NJ 784 191)
- 9 Monymusk Kirkyard, Aberdeenshire (NGR: NJ 684 154)
- 10 Kettins Kirkyard, Angus (NGR: NO 239 390)
- 11 Kirkden Kirkyard, Angus (NGR: NO 527 480)
- 12 Foulis Easter (St Marnock's) Kirkyard, Angus (NGR: NO 322 335)
- 13 Auchterhouse Kirkyard, Angus (NGR: NO 343 382)
- 14 Monikie Kirkyard, Angus (NGR: NO 518 392)
- 15 Inverarity Kirkyard, Angus (NGR: NO 450 440)
- 16 Eassie Kirkyard, Angus (NGR: NO 353 474)
- 17 Nevay Kirkyard, Angus (NGR: NO 312 441)

CENTRAL (n = 1605)

- 18 Aberuthven (St Kattan's) Kirkyard, Perthshire (NGR: NN 983 152)
- 19 Auchterarder Kirkyard, Perthshire (including Kirkton) (NGR: NN 953 140)
- 20 Blackford Kirkyard, Perthshire (NGR: NN 901 095)
- 21 Comrie and Strowan Kirkyard, Perthshire (NGR: NN 772 223)
- 22 Dunblane Cathedral Kirkyard, Perthshire (NGR: NN 783 013)
- 23 Dunning (St Serf's) Kirkyard, Perthshire (NGR: NO 019 145)
- 24 Govan Parish Kirkyard, Glasgow (NGR: NS 552 658)
- 25 Holy Rude Kirkyard, Stirling (NGR: NS 793 936)
- 26 Kilmadock Kirkyard, Perthshire (NGR: NO 732 021)
- 27 Kincardine Parish Kirkyard (Blairdrummond), Perthshire (NGR: NS 724 988)
- 28 Logie Kirkyard, Perthshire (old and new) (NGR: NS 815 969)
- 29 Muthill Kirkyard, Perthshire (NGR: NN 869 170)
- 30 Port of Menteith Kirkyard (NGR: NN 583 011) & Inchmahome Priory, Perthshire (NN 576 003)
- 31 Thornhill (Norrieston) Kirkyard, Perthshire (NGR: NN 668 000)
- 32 Perth Greyfriars Cemetery, Perthshire (NGR: NO 119 232)
- 33 Tullibardine Chapel Kirkyard, Perthshire (NGR: NN 900 134)
- 34 Innerpeffray Chapel Kirkyard, Perthshire (NGR: NN 164 184)

FIFE (n = 1900)

- 35 Culross Abbey Kirkyard, Fife (NGR: NS 992 865)
- 36 Falkland Burial ground, Fife (NGR: NO 250 074)

- 37 Overton Burial Ground (Tulliallan), Fife (NGR: NS 044 890)
- 38 St Andrews Cathedral Kirkyard and Museum (NGR: NO 515 167)
- 39 Tulliallan Kirkyard, Fife (NGR: NS 933 881)
- 40 Torryburn Kirkyard, Fife (NGR: NT 052 847)
- 41 Auchtermuchty Kirkyard, Fife (NGR: NN 239 117)
- 42 Monimail, Kirkyard, Fife (NGR: NO 302 142)
- 43 Cupar Kirkyard, Fife (NGR: NO 373 144)
- 44 Newburn Kirkyard, Fife (NGR: NO 454 035)
- 45 Upper Largo Kirkyard, Fife (NGR: NO 419 026)
- 46 Beath Kirkyard, Fife (NGR: NT 158 930)
- 47 Inverkeithing (St Peter's) Kirkyard, Fife (NGR: NT 130 830)
- 48 Balmerino Kirkyard, Fife (NGR: NO 362 248)
- 49 Leuchars (St Athernase's) Kirkyard, Fife (NGR: NO 455 215)
- 50 Burntisland Kirkton (St Serf's) Kirkyard, Fife (NGR: NT 234 857)
- 51 Burntisland Kirkyard, Fife (NGR: NT 233 854)
- 52 Rosyth Kirkyard, Fife (NGR: NT 085 828)

NORTH (n = 1877)

- 53 Daviot Kirkyard, Inverness-shire (NGR: NH 720 392)
- 54 Old High Kirkyard, Inverness, Inverness-shire (NGR: NH 666 454)
- 55 Cawdor Kirkyard, Nairnshire (NGR: NH 844 499)
- 56 Croy Kirkyard, Inverness-shire (NGR: NH 797 495)
- 57 Petty Kirkyard, Inverness-shire (NGR: NH 736 499)
- 58 Duthil Kirkyard, Inverness-shire (NGR: NH 936 243)
- 59 Moy Kirkyard, Inverness-shire (NGR: NH 769 353)
- 60 Dalrossie Kirkyard, Inverness-shire (NGR: NH 785 251)
- 61 Alvie Kirkyard, Inverness-shire (including Macintosh Mausoleum) (NGR: NH 864 094)
- 62 Kirkhill Kirkyard, Inverness-shire (NGR: NH 549 456)
- 63 Dornoch Cathedral, Sutherland (NGR: NH 801 896)
- 64 Glenconvinth Burial Ground, Inverness-shire (NGR: NH 513 396)
- 65 Elgin Cathedral, Morayshire (NGR: NJ 220 638)
- 66 Alves Kirkyard, Morayshire (NGR: NJ 135 628)
- 67 Duffus (St Peter's) Kirkyard, Morayshire (NGR: NJ 175 687)
- 68 Michaelkirk Kirkyard, Morayshire (NGR: NJ 189 684)
- 69 Spynie Kirkyard, Morayshire (NGR: NJ 229 655)
- 70 Tongue Kirkyard, Sutherland (NGR: NC 591 571)
- 71 Durness Kirkyard, Sutherland (NGR: NC 604 669)
- 72 Reay Kirkyard, Caithness (NGR: NC 967 649)
- 73 Thurso Kirkyard, Caithness (NGR: ND 117 683)
- 74 Dunnet Kirkyard, Caithness (NGR: ND 220 712)
- 75 Wick Kirkyard, Caithness (NGR: ND 363 509)
- 76 Latheron Kirkyard, Caithness (NGR: ND 203 334)

SOUTH-EAST (n = 1655)

- 77 Ettrick Kirkyard, Selkirkshire (NGR: NT 264 146)
- 78 Greyfriars Kirkyard, Edinburgh (NGR: NT 256 735)
- 79 Innerleithen Burial ground, Peeblesshire (NGR: NT 335 377)
- 80 Kelso Old Parish Kirkyard, Roxburghshire (NGR: NT 733 347)
- 81 Kelso Abbey Burial ground, Roxburghshire (NGR: NT 733 345)

- 82 Melrose Abbey Burial Ground, Roxburghshire (NGR: NT 551 342)
- 83 Selkirk Kirkyard, Selkirkshire (NGR: NT 473 283)
- 84 St Mary's Burial Ground, Selkirkshire (NGR: NT 256 237)
- 85 Tweedsmuir Kirkyard, Peeblesshire (NGR: NT 102 243)
- 86 Yarrow (St Mary's) Kirkyard, Selkirkshire (NGR: NT 358 278)
- 87 Swinton Kirkyard, Berwickshire (NGR: NT 839 476)
- 88 Lauder Kirkyard, Berwickshire (NGR: NT 530 475)
- 89 Bowden Kirkyard, Roxburghshire (NGR: NT 554 303)
- 90 Cockburnspath Kirkyard, Berwickshire (NGR: NT 774 711)
- 91 Ancrum Kirkyard, Roxburghshire (NGR: NT 621 248)
- 92 Roxburgh Kirkyard, Roxburgh (NGR: NT 701 307)
- 93 Watcarrick Burial Ground, Eskdalemuir, Dumfriesshire (NGR: NY 257 967)

SOUTH-WEST (n = 2720)

- 94 Applegarth Kirkyard, Dumfriesshire (NGR: NY 103 848)
- 95 Beattock Kirkyard, Dumfriesshire (NGR: NT 082 011)
- 96 Canonbie (St Martin's) Kirkyard, Dumfriesshire (NGR: NT 395 764)
- 97 Dundrennan Abbey and Burial Ground, Kirkcudbrightshire (NGR: NX 751 474)
- 98 Dalton Kirkyard, Dumfriesshire (NGR: NX 089 747)
- 99 Ecclefechan (St Feachan's) Kirkyard, Dumfriesshire (NGR: NY 191 743)
- 100 Gretna Old Parish Kirkyard, Dumfriesshire (NGR: NY 317 682)
- 101 Hoddam Kirkyard, Dumfriesshire (NGR: NY 185 735)
- 102 Kirkconnel (St Conal's) Kirkyard, Dumfriesshire (NGR: NS 729 123)
- 103 Kirkcudbright Cemetery, Kirkcudbrightshire (NGR: NX 693 511)
- 104 Kells Kirkyard, Kirkcudbrightshire (NGR: NX 632 782)
- 105 Kirkconnel Lea Kirkyard, Springkell, Dumfriesshire (NGR: NY 252 754)
- 106 Lochmaben Kirkyard, Dumfriesshire (NGR: NY 083 823)
- 107 Trailflat Burial Ground, Dumfriesshire (Lochmaben) (NGR: NX 048 841)
- 108 St Kentigern's Burial Ground, Hoddam, Dumfriesshire (NGR: NY 166 727)
- 109 Old Kirkconnel (Old St Conal's) Burial Ground, Dumfriesshire (NGR: NS 726 153)
- 110 Ruthwell (St Cuthbert's) Kirkyard, Dumfriesshire (NGR: NY 101 684)
- 111 Sweetheart Abbey and Burial Ground, Dumfriesshire (NGR: NX 964 664)
- 112 Portpatrick (St Andrew's) Kirkyard, Wigtownshire (NGR: NX 002 543)
- 113 Wigtown (St Machutus') Kirkyard, Wigtownshire (NGR: NX 436 555)
- 114 Alloway Kirkyard, Ayrshire (NGR: NS 330 180)
- 115 Straiton (St Cuthbert's) Kirkyard, Ayrshire (NGR: NS 380 050)

WEST (n = 1678)

- 116 Craignish Burial Ground (Kilmharie), Argyll (NGR: NM 778 014)
- 117 Inveraray Burial Ground, Argyll (NGR: NN 098 093)
- 118 Kilmartin Kirkyard, Argyll (NGR: NR 833 989)
- 119 St Mary's Chapel, Kilmory Knap, Argyll (NGR: NR 702 751)
- 120 Oban Parish Kirkyard, Oban, Argyll (NGR: NM 860 290)
- 121 Minard Burial Ground, Argyll (NGR: NR 988 976)
- 122 Clachan Kirkyard, Argyll (NGR: NR 764 563)
- 123 Killean (St John's) Kirkyard, Argyll (NGR: NR 695 445)
- 124 Kilkivan Chapel, Machrihanish, Argyll (NGR: NR 651 201)
- 125 Kilchousland (St Constantine's) Chapel, Argyll (NGR: NR 751 220)
- 126 Kilcolmkill Chapel, Southend, Argyll (NGR: NR 673 077)

- 127 Kilkerran Cemetery, Argyll (NGR: NR 724 195)
- 128 Saddell Abbey, Argyll (NGR: NR 783 321)
- 129 Kilbrannan Chapel, Skipness, Argyll (NGR: NR 910 575)
- 130 Arrochar Kirkyard, Argyll (NGR: NN 297 038)
- 131 Kilmorich Kirkyard, Argyll (NGR: NN 181 106)
- 132 Dalmally Kirkyard, Argyll (NGR: NN 165 274)