

Millstones north and south of the Scottish border

D. Gordon Tucker

Summary: *It is perhaps surprising that there should be very considerable differences in the practices of millstone-making in Scotland on the one hand and in England and Wales on the other. However, it has been emerging from recent studies and discussions, that such is the case. Both those millstones incorporating pieces of imported French burr and those made entirely from indigenous rock show differences between the two national regions. The purpose of the present short article is to draw attention to the nature of these differences as so far observed, and to encourage further reporting and discussion on such an interesting topic.*

Differences in segmentation of French burr millstones and the use in Scotland of centre-pieces of indigenous rock

During the nineteenth century there was a great increase throughout Britain in the use of French burr millstones, fabricated from a number of more-or-less small pieces of stone imported from France, almost invariably from the quarries at La Ferté-sous-Jouarre about 50 km east of Paris. This stone had, among other qualities, a hardness and suitability for fine milling that made it superior to any native British stone for the production of the fine flour that was in growing demand. Although monolithic millstones made from French burr were not entirely unknown, they were rare, and almost all French burr millstones in Britain were made in urban millstone manufactories by the cementing together of from about ten to as many as thirty or even forty pieces of French burr stone. A plaster back was provided to give a smooth finish to the non-grinding surface, and iron bands shrunk around the periphery to give strength and prevent shattering under centrifugal forces.

In England there were many manufacturers of French-burr millstones; one or more were to be found in many of the larger towns,¹ and they were particularly numerous in London. In Scotland, in contrast, there appear to have been such manufacturers only in Edinburgh and Glasgow, and indeed, only two of significance: the Reids of Glasgow and the Smiths of Edinburgh.² (In passing, it should be mentioned that none are known

for Wales.) Some of the French burr millstones were fitted with maker's name-plates, but when millstones remain *in situ* in the mill it is rarely possible to get a view of these; likewise with millstones standing against a wall or laid in a path. Consequently data on the distribution of the products of the various makers is as yet sparse and not very useful. It is also very difficult with the majority of millstones *in situ*, to see the pattern of the make-up, i.e. the way in which the individual pieces have been assembled; thus only random samples of make-up patterns are available. There are quite enough samples available, however, to be quite sure that there is a basic typological difference between millstones of English and Scottish manufacture.

For convenience, we can refer to the make-up patterns as the *segmentation* of the millstone. The basic national differences are that English-made French burr millstones are generally:

- (a) composed entirely of segments of French burr,
- (b) built around a roughly-square central part made up of four roughly-rectangular segments so placed as to leave a central hole or 'eye', and
- (c) completed with outer segments, which have a random distribution of size and shape within quite a wide range, assembled in a pattern of largely random appearance.

In contrast Scottish-made stones are generally:

- (a) composed of two distinct parts, the central one being of a single geometrically-shaped piece of a cheap local stone, e.g. sandstone, and only the outer ring of segments being of French burr, and
- (b) systematic, if not necessarily uniform, in their radial segmentation.

In parts of Scotland easily reached from England, English-made stones may be found in Scottish mills, and these are of the English type of segmentation.

The distinctive styles of segmentation described above will be understood more clearly from an inspection of the diagrams in Figs. 1 and 2, showing a selection of observed patterns from England and Scotland respectively. In these examples the square holes indicate bedstones and the circular holes indicate runner stones; the square is required to take the conventional square iron casting which carries



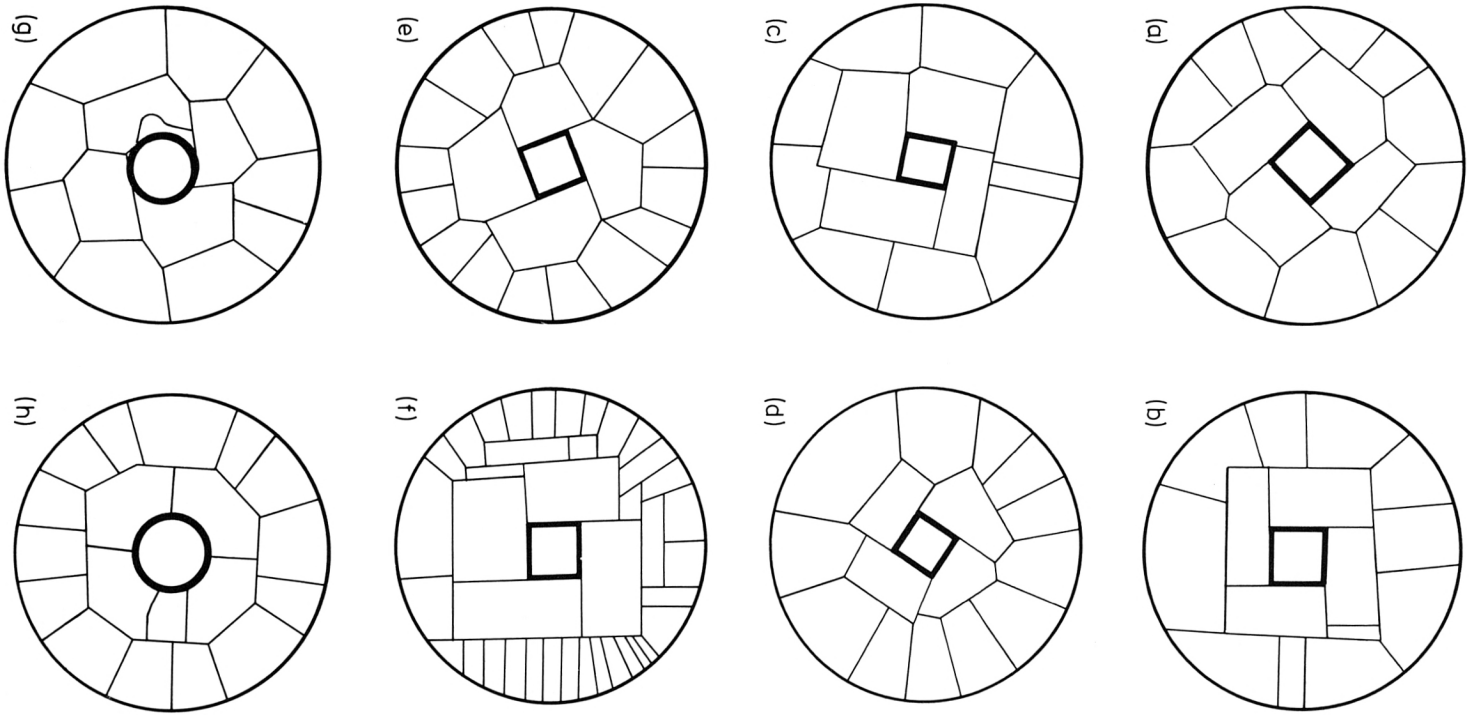


Fig. 1. Some segmentation patterns of English-made French-burr millstones. (a) Keward Mill (ST 541449). (b) Sarehole Mill (SP 098818). (c) Middle Mill, Hoarwithy (SO 538299). (d) Sambrook Mill (SJ 714249). (e) Mildenham Mill (SO 853608). (f) Fladbury Mill (SO 997460); in this case the small outer pieces are almost certainly second-hand, probably being worn-down pieces from an old stone, now used sideways. (g) Prior's Mill, Astley (SO 783674). (h) Skenfrith Mill (SO 457203). Makers unknown for (a) - (g). Maker for (h) was Huxham & Brown of Exeter. All diameters in range 44-48 in. All recorded by the author.

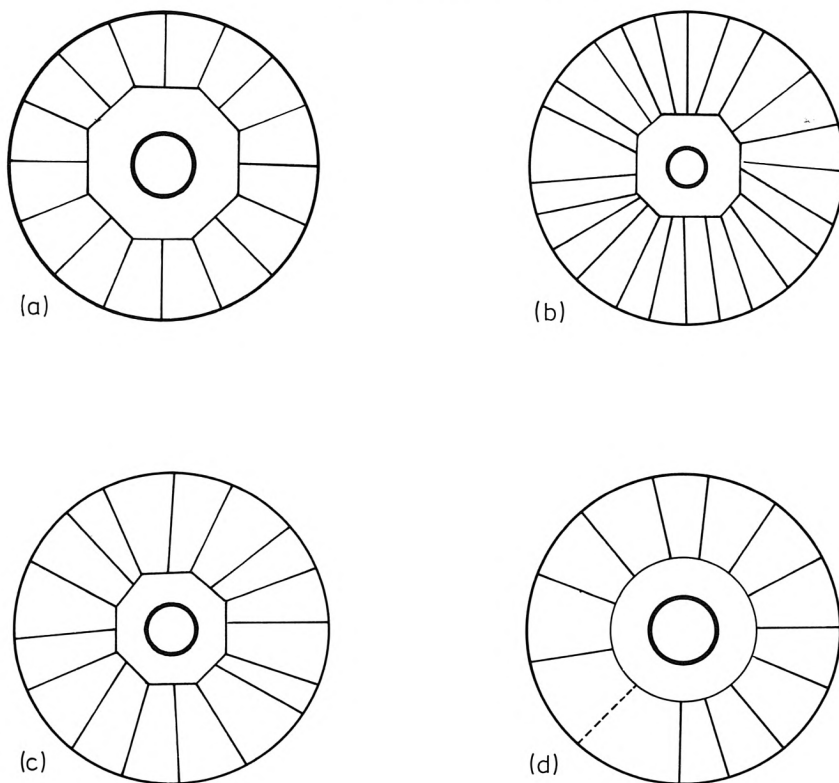


Fig. 2. Some segmentation patterns of Scottish French-burr millstones. (a) Old Bridge of Ur Mill (NX 776677); maker unknown; recorded by the author. (b) Formerly at Kier Mill, Bridge of Allen, and now in damaged condition at Blair Atholl Mill (NN 871651). Maker unknown. Recorded by G.J. Douglas. (c) Blair Atholl Mill (NN 871651); made by Smith of Edinburgh. Recorded by G.J. Douglas. (d) From New Cumnock Mill, preserved at Crown Hotel (NS 617134). From photo supplied by G.D. Hay; RCAHMScot. photo No. AY/1359. All diameters in range 46-53½ in.

the bearing for the stone spindle, and the circular hole is better for carrying the rynd and for feeding the grain. However, the distinction is not without ambiguity, for exceptions may be found. For example, there are two square-holed runner stones (with rynds) at Charlecote Mill, Warwickshire (SP 259573).

That the pattern of numerous thin radial segments of burr around a circular or octagonal centre-piece was the norm for Scotland is clear from Smiths' advertisements, one of which is reproduced in Fig. 3. The use of a centre-piece of relatively-cheap local stone is sensible, for the surface of the millstone is shaped in the dressing process so that there is a greater gap between the runner and the

bedstone in the inner parts and all the real grinding is done on the outer parts of the surface; thus the expensive imported French burr is used only where its special qualities are needed. On the other hand, the English style of segmentation permits a selection to be made of the imported blocks, those of inferior quality being used for the central square, and only those of superior quality being used for the outer segments. One might suppose, therefore, that on average the English-made millstones were superior to those made in Scotland, but no information is available on this matter.

Regularly-segmented French burr millstones *were* sometimes made in England, and not necessarily with any central piece or group of pieces of stone.

SCOTTISH
Wine Clerk & Millstone Manufactory,
 ESTABLISHED 1823.



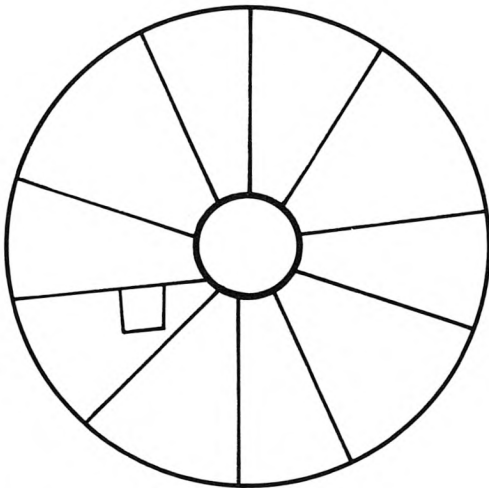
J. SMITH & SON,
WIRE WORKERS AND WEAVERS, MILLSTONE BUILDERS,
AND IMPORTERS OF FRENCH BURR BLOCKS,
219, HIGH STREET, EDINBURGH.
 107 S 59

Fig. 3. Advertisement by J. Smith & Son of Edinburgh; from Slater's Directory, 1860.

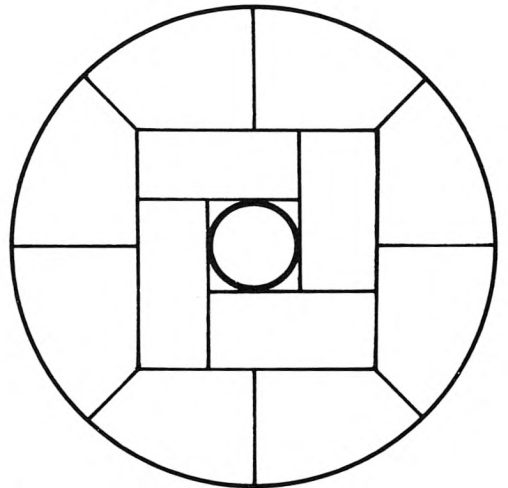
Fig.4(a) shows one with ten not-quite-uniform radial segments (plus a small patching-piece) and no centre-piece, made by Gardners of Gloucester. Fig.4(b) shows one of near-perfect symmetry with a 4-piece square centre, maker unknown. Both these stones are the only ones of their pattern known to the author, although a range of increasingly imperfect versions of that of Fig.4(b) are known. An advertise-

ment by Hughes of London (Fig.5) shows stones similar to that of Fig.4(a) under construction, the central pieces visible in the sketch being probably wooden formers used to assist the assembly process. That millstones with regular segmentation around a single or multiple centre stone were sometimes made by Gardners is clear from their advertisement shown in Fig.6; and that an octagonal sandstone or grit-stone centre was occasionally used in England seems probable from the survival of such a centre-piece, now mounted in a wall, at Salwarpe, Worcestershire (SO 874620). But there is, of course, no proof that in these latter cases the outer segments were of French burr. There is, however, one example, now unfortunately disintegrated, (at Charlecote Mill, Warwickshire, SP 259573) where it is definite that a millstone of 48 in. diameter was made from 9 or 10 pieces of French burr set around a domed 10-sided centre piece made of millstone grit and measuring 36 in. between opposite sides; the amount of French burr in the millstone was thus quite small — much smaller than in the Scottish millstones.

It is worth pointing out that the regularly-segmented millstones shown in the English advertisements might have been for vertical mills, as in Gardners' advertisement, at any rate, the stones appear to be of a relatively small diameter, say about 3 ft. Compact vertical mills in cast-iron housings and frames were coming into use in the later part of the nineteenth century, and they used smaller stones



(a)



(b)

Fig. 4. (a) Radically-segmented French-burr millstones of about 4 ft diameter made by Gardners of Gloucester; at Sutton's Mill, Cranham, (SO 893122). (b) Symmetrically and regularly segmented French-burr runner stone of about 4 ft diameter at Norton Mill, Radnors., (SO 306668). This stone is apparently very old, certainly worn very thin, and with cavities filled with lead.

J. HUGHES & SONS,
217, GREAT DOVER ST., & SWAN ST., LONDON, S.E.
Are Exhibiting at the Smithfield Cattle Show, Stand No. 117, in the Gallery
Specimens of their French Burr Millstones, and all
other articles required by Millers.

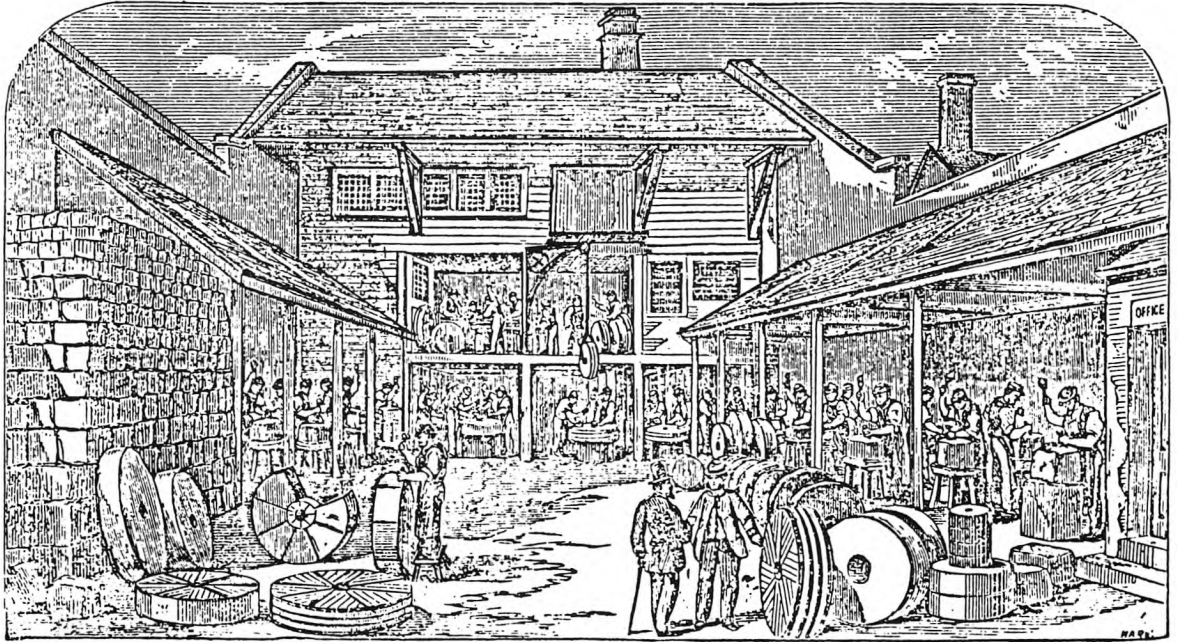


Fig. 5. Advertisement by J. Hughes & Sons; from *The Miller*, 6 December 1875.

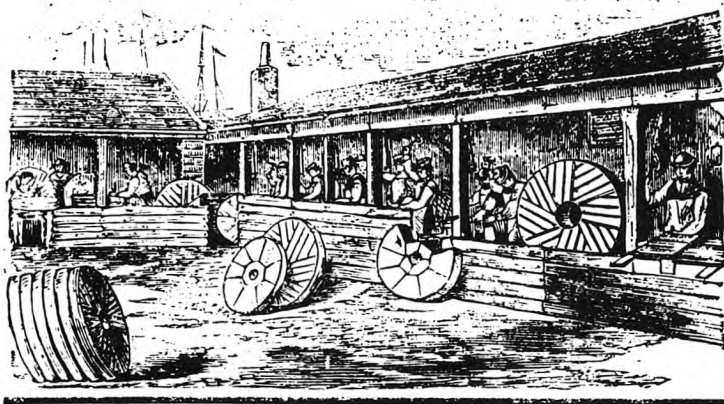


Fig. 6. Advertisement by Wm. Gardner; from *Kelly's Directory*, 1870.

WM. GARDNER,

Importer of French Burrs, and
Manufacturer of Millstones for
Grinding all kinds of Grain, Bones,
Paint, Cement, Coprolite, Chemi-
cals, &c. Peak and Welsh Mill-
stones direct from the Quarries.
Flour Dressing and Smut Ma-
chines, Bolters and Brushing Cloths,
Machine Wire and Brushes, Cast
Steel Mill Pecks, Metal Provers
and Staffs, Sack Trucks, and all
kinds of Millers' Tools may be had
on the shortest notice. Prices of
any of the above may be had on
application. All orders for ex-
portation and by post promptly
attended to.

Llanthony Road, Docks,
Gloucester.

each made up of regular radial segments of French burr. An example now to be seen at Skenfrith Mill, Gwent (SO 457203) is a small mill made by Jeffery and Blackstone of Stamford, dated 1884, with a pair of 5-segment French burr stones of 30 in. diameter. Similarly-compact cast-iron horizontal mills were also made, and an example (reported by Mr G. J. Douglas) at Cawdor Mill, Nairnshire (NH 847503), used 33 in. millstones each with ten radial French burr segments.

A very unusual curiosity of southern French burr millstones is also to be found at Skenfrith Mill. A bedstone at that mill is shown in Fig. 7; it is made up of two rings of small radial French burr segments, numbering about 40 in all. No other stone like this is known to the author. An interesting point is that the stone, already illustrated in Fig. 1(f), which also has a vast number of small pieces of burr, is also a bedstone. It may be doubted whether such stones could stand up to the stresses of rotary motion if used as runners. On the other hand, the highly-segmented Scottish stones in Fig. 2(b) and (c) are definitely runner stones. In general, it is evident from Fig. 1 that similar segmentation patterns are used for runners and bedstones.

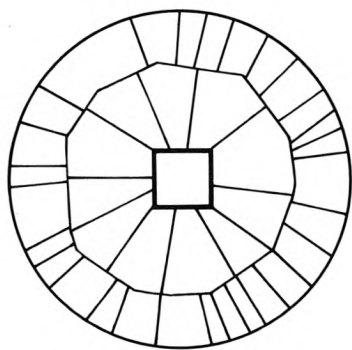


Fig. 7. French-burr bedstone about 4 ft diameter at Skenfrith Mill, Gwent (SO 457203).

In Scotland, a departure from the typical pattern is recorded by the RCAHM Scotland in their photograph No. AY/1360, where a stone at New Cumnock (NS 617134) was rather like the typical English stones of Fig. 1 in having eight outer pieces of French burr around a 4-piece centre, with the important difference that the centre was of sandstone, roughly octagonal in form. Another atypical pattern from Scotland, reported by Mr G. J. Douglas, who thinks

the makers were probably Smiths of Edinburgh, is shown in Fig. 8; all 31 pieces, including the central four, are of French burr, and it is, of course, this feature which makes the stone so exceptional if it really was made in Scotland.

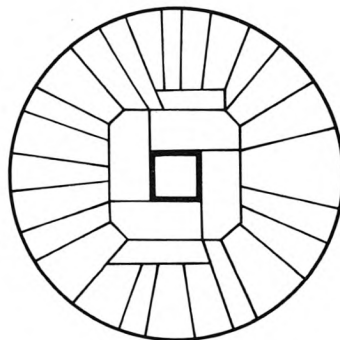


Fig. 8. French-burr bedstone, about 4 ft 6 in diameter, at Strathfountain Mill, Berwickshire (NT 749629), believed to have been made by Smith of Edinburgh; here even the central 4 pieces are of French burr.

Monolithic and segmented millstones made from indigenous rock, with particular reference to Kaim Hill stones

Millstones made from local rock must have been used in earlier centuries, but it is certain that some particular sources of rock became widely known for the suitability of their product for millstones, having the necessary qualities of hardness, coarseness and toughness, and being able to provide pieces large enough to make monolithic millstones free from flaws which might lead to shattering. Such monolithic millstones frequently had iron bands shrunk on to help prevent shattering under centrifugal and other strains. No indigenous British rock became more famous than the millstone grit of North Derbyshire and millstones from 'The Peak' were transported in large numbers over great distances, and exported overseas. 'Welsh stones' of a quartz/sandstone conglomerate from Anglesey and Monmouthshire also acquired a good reputation and were transported widely.³ There were many other sources of millstones in England, Wales and Scotland.⁴

Millstones made from indigenous rock were normally monolithic, i.e. made in one piece, and as far as the author is aware there is no archaeological evidence of any other practice in England and

Wales, although there are literary references to the making of segmented millstones.⁵ However, what was almost certainly the most important (possibly the only important) Scottish millstone quarry, quite definitely made segmented millstones, and this therefore does seem to represent another distinctively Scottish practice. The quarry concerned was at Kaim Hill in Ayrshire (NS 220530), and is poorly documented. Millstone-making there was certainly active in the eighteenth century, and continued into the early years of the twentieth century. Compared with the Derbyshire millstone quarries, the extent of the workings was small, but it was comparable with those of Anglesey and Monmouthshire. Kaim Hill millstones were advertised by Reids of Glasgow⁶ and were stated to have been 'sent all over Britain and exported to markets as distant as Australia'.⁷

The fact that Kaim Hill supplied segmented millstones was stated by Lamb in 1899:⁸

They are generally made in six or eight pieces, bound together with Roman cement round a central stone, the whole being firmly welded together with iron hoops.

However, much more important is the fact that the archaeological evidence remains on Kaim Hill. The author found clear evidence (shown in more detail in reference 2) that at least three kinds of millstone were made there: monolithic, 9-piece and 4-piece. The design of the two latter types is shown in Fig. 9. The rock is a quartz/sandstone conglomerate rather similar to the Welsh stone referred to earlier. Abandoned samples of the segments of the 4-piece and 9-piece stones were found, together with octagonal centre-pieces, and also at least one broken monolithic stone. It cannot be stated that the monolithic and 4-piece stones were less commonly made than the 9-piece, but this seems to be indicated from Lamb's comments quoted above. No evidence was found of 6-segment (i.e. 7-piece) millstones, but this does not infer that Lamb was mistaken.

Small millstones for horizontal mills

The millstones so far discussed were used in the normal kind of corn-mill with vertical water-wheel on a horizontal axle and geared drive to the millstones, and have been typically of about 4 ft diameter and 1 ft thickness. In England and Wales there is little evidence of the former existence of the small ungeared corn-mill with horizontal water-wheel on a vertical axle.⁹ But in northern Scotland, and particularly in Shetland, mills of this so-called Norse-mill type (actually an almost world-wide type) were in use until only a few decades ago. They

used millstones made almost exclusively of local rock, and of relatively small size, averaging 32 in. diameter and about 5 in. thickness. This then represents another type of exclusively Scottish millstone as far as Britain is concerned.

Conclusions and acknowledgements

It is clear that there have been some distinct differences in the practice of millstone making between

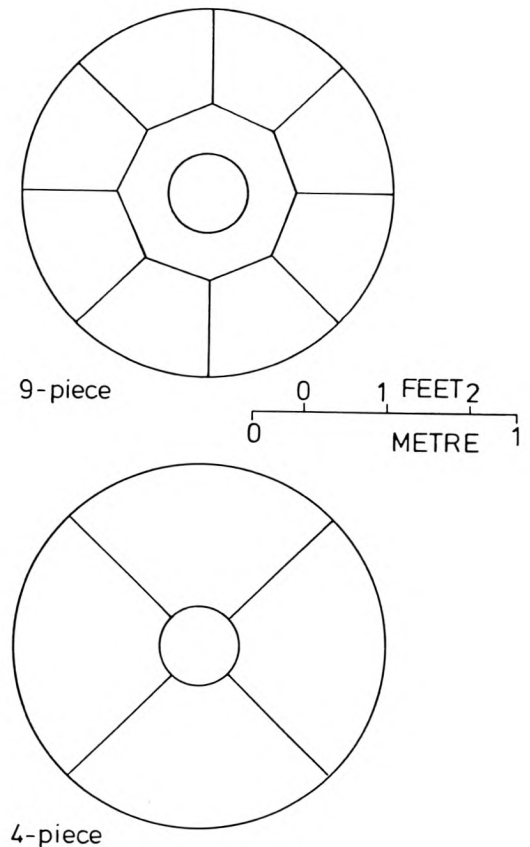


Fig. 9. Segmentation patterns of Kaim Hill millstones.

Scotland on the one hand and England and Wales on the other. Both in regard to French burr millstones made in urban manufactories, and in regard to millstones made from indigenous rock in rural quarries, Scotland appears to have had its own distinctive methods, relating primarily to the segmentation or pattern of the millstones. More evidence needs to be assembled, however, and for the present some of the statements made in this article must be regarded as tentative.

While many friends have helped me over the years in studying millstones, I am particularly indebted in this study to Mr G. D. Hay of the Royal Commission on the Ancient and Historical Monuments of Scotland, and to Mr J. R. Hume and Mr G. J. Douglas of the University of Strathclyde. They have provided photographs and drawings which have added very materially to the evidence I have collected myself, and they have helped greatly in discussion. Without their help, this paper could not have been written.

References

1 A preliminary list was given in D. G. Tucker, 'Millstones,

- quarries and millstone makers', *Post-med. Archaeol.* 11(1977), 1-21 plus Plates I - XIV.
- 2 Discussed more fully in D. G. Tucker, 'Millstone making in Scotland', (forthcoming, *Proc. Soc. Antiquaries Scot.*)
- 3 D. G. Tucker, 'Millstone making at Penallt, Monmouthshire', *Industrial Archaeol.* 8(1971), 229-39; and 'Millstone making in Anglesey', *Wind & Water Mills* 1(1980), 16-23.
- 4 See refs. 1 and 2.
- 5 Discussed in ref. 2.
- 6 See Glasgow directories for second half of nineteenth century.
- 7 T. Lang (ed.), *Glasgow, Kyle and Galloway* (London, 1953), 213.
- 8 J. Lamb, *West Kilbride and Neighbourhood* (Ardrossan, 1899), 50-51.
- 9 The one case discovered was at Tamworth: see P. A. Rahtz, 'Medieval milling', in *Medieval Industry*, ed. D. W. Crossley, C.B.A. Research Report 40 (1981), 1.

