

'Millstone Making at Penallt, Monmouthshire'

Offprint from

Industrial Archaeology

The Journal of the History of Industry and Technology

Vol. 8, 1971



DAVID & CHARLES NEWTON ABBOT

D. G. TUCKER

Millstone Making at Penallt, Monmouthshire

Introduction

PENALLT is a large parish, just south of Monmouth, with a small and scattered population of between three and four hundred. It lies high above the River Wye on the west bank, and the greater part of it is at an altitude exceeding 600ft. It is a scenically exciting area. Steep slopes abound, and one of the most impressive is that seen directly from the south-east side of Monmouth, the great wooded scarp of Livox Wood rising 500ft from the river bank in 1,000ft on the ground. Much of the parish is dominated geologically by quartz conglomerate, a hard sandstone containing a mass of quartz pebbles, otherwise known as 'Breccia', 'Jack-stone' or 'Pudding-stone', the last name being a very apt description of it. This rock has been quarried for building houses, cottages and walls—many of the last-mentioned being very ancient—and there are several small and large quarries where it outcrops mainly on the parish margins. All of these have been disused for a long time and are much overgrown with trees and bramble. No doubt also much building stone was merely taken from the hillsides over which huge blocks of pudding-stone lie scattered at random. There are disused sandstone, brownstone and limestone quarries too, but we are not here concerned with them.

It is rather puzzling that in a book on the geology of the region, Dreghorn should say, in reference to quartz conglomerate: '... what quarry worker in his senses would want to work at a tough rock like this'¹—and goes on to explain that at Trellech Common (not far from Penallt) exceptional conditions apply, for the quartz conglomerate has in that place so excessively weathered that it can be dug out with a

shovel. There is, as we have made clear above, no doubt at all that quartz conglomerate has been extensively quarried in the Penallt area, no doubt because of, and not in spite of, its tough nature.

Another use for the quartz conglomerate was for millstones. Walking around the area one cannot help being struck by the large number of old millstones, now used frequently as garden ornaments, made of this pudding-stone. Apparently the Penallt millstones represented an important local industry.

A close-up view of part of an abandoned cider-millstone is shown on p 321 to demonstrate the nature and texture of the conglomerate.

The millstone industry

Probert² draws attention to this industry and quotes Charles Heath³ who wrote about it in 1803:

On an eminence, on the right bank of the river, about 1½ mile from Monmouth, stands the Parish and Church of Penalt. This place, which is surrounded by a fine open and extensive Common, is celebrated for the production of the *Breccia*, or Pudding Stone, formed more or less compact. Very excellent mill-stones are cut in dove-tailed burrs, and many millers pronounce them equal to the valuable French stones.

The way in which French burr stones were cemented together and bound by an iron band is discussed later, and one must suppose that Heath intended to infer that the Penallt stones were similarly dealt with. Note that Heath's spelling of Penallt with only one 'l' is a recognised anglicisation of the name which is frequently used even today. Correctly spelt, the name is the Welsh for 'top of the wooded hill'.

It is, of course, clear from Heath's mention of millers that he was referring to millstones for corn-grinding. But in this area (as in much of the surrounding country) cider mills have for a very long time greatly outnumbered corn mills; and being required for only a short period each year, the cider mills have been adequately powered by horses or ponies and so have had no special requirements regarding site. Cider mills differ basically from corn mills in being crushing and not grinding mills; they use a rolling stone on a stone base in much the

same way as crushing mills used for preparing minerals. They also use stones for the cider-presses.

Even at the time Heath wrote, the millstone industry was quite ancient, and, indeed, probably within seventy years of its end. Probert quotes William Rees's *Historical Maps of South Wales and the Border in the Fourteenth Century* as showing that it was quite famous in the fourteenth century.

Field investigations

As we know of no other documentary evidence, apart from a reference by Bradney discussed later, a field investigation was undertaken to try to determine how widespread the millstone industry was at Penallt, and what form its products took. The conclusion is that it was very widespread over the parish, it was a sizeable industry, and that it made stones for both cider mills and corn mills.

We found five main areas of quarrying. In each case the quarries took the form of numerous relatively small excavations (compared with modern quarries) dispersed over an area, but it will be convenient to refer to each group of excavations as a quarry. Quarry A (Grid ref SO 525105) near Penallt Old Church, was apparently an area of small activity, with very tiny excavations, although large boulders of conglomerate are here so common that probably a great deal of material was obtained without excavation. Quarry B (SO 515095) above the hamlet of Pen-y-Garn, was a larger affair with deeper excavation into a hillside. Quarry C (SO 508086), to the west of Common Farm, was also large, but took the form of excavations in a piece of level land. Both B and C are marked as 'Old Quarry' on the 25in Ordnance Survey map,⁴ and C is shown on the map in Probert's pamphlet as 'Old Millstone Quarry'. Quarry D (SO 530100) was another hillside area, above and to the south of Birchtree Well; it is not marked on the OS map, but is referred to (although not in connection with millstones) in the Geological Survey Memoir.⁵ Finally, Quarry E (SO 532087) was a very extensive area of great activity, stretching for many hundreds of yards along the hillside in Graig Wood,⁶ below the house

called 'The Generals', about 150–200ft above the River Wye. There is also a sixth quartz conglomerate quarry in which evidence of millstones exists, just outside the Penallt Parish boundary on the west (SO 503092).

With so much of the area within and around the parish now thickly wooded, one can have no confidence that there are not also other millstone quarries. In addition there are places where millstones have been made without any sign of quarrying at all; for example, in Manor Wood, just over half a mile beyond the southern extremity of Penallt parish (SO 525062), can be seen several unfinished millstones (in quartz conglomerate) although there are no quarries evident there. Quarries B to E have several features in common: entrance passages or gullies neatly walled with stone blocks, remains of stone shelters or tool-stores, and neatly made heaps of waste stone. In all cases the stone excavated was obviously quartz conglomerate, although at the northern extremity of Quarry E the density of quartz pebbles was low and the stone was effectively a plain sandstone with only a few pebbles here and there.

One thing is certain: Heath's reference to the common at Penallt cannot mean what is marked on the ordnance maps⁷ as Penallt Common, for this small area, although extensively quarried, was quarried for limestone, and this is made clear by the markings on the 25in OS map, 'Old Limekiln', in two places, and by the name of Limekiln Farm at the edge of the common. There is no trace of quartz conglomerate there. A good deal of the enclosed land in Penallt was once common, however, as indicated by the name Common Farm close to Quarry C, and Church Hill Common (now afforested) near Penallt Old Church and Quarry A. Heath's 'common' was evidently a large part of the higher regions of the parish.

In all the quartz-conglomerate quarries we found evidence of the working of stones clearly intended for cider or corn mills, with the possible exception of B, where we found only two semicircular stones of nearly 6ft diameter, with a 1ft-wide channel cut in them extending over only about 170° of the 180° of the semi-circle (see p 321). One of

these stones was finished and apparently undamaged; the other was only partially worked and no doubt abandoned through breakage. These stones are the size of the base-stones of a cider mill, but could hardly have been used for this purpose.

At this stage it is advisable to give a description of cider-mill and corn-mill-stones, so that our quarry findings can be identified. As can be seen from the photographs of cider mills (p 322), the rolling stone has a convex outer face, is around 3ft 6in diameter and 12in thick on its rolling surface, with a square hole. The base-stone is between 6 and 7ft diameter and typically made in two semicircular halves; and the press-stones are very variable, are often in sandstone and not quartz conglomerate, but always have an outer channel and lip to carry the juice to the receiving vessel. Corn-mill-stones (p 323) are about 3ft 6in diameter, but only 8–9in thick, and flat.

It seems, incidentally, that the correct names for what we have called the base and rolling stones are 'chase' and 'runner', for Rhys Jenkins says of Herefordshire that, 'The apples were crushed in edge-runner mills having runners and chases of stone.'⁸

In quarries A, C and D we found stones evidently intended as rolling stones for cider mills. In A we found two stones only very roughly shaped, and another propped up on small pieces of stone to make it level and with two diametric channels about 4in wide cut at right angles in its top surface. The bottoms of these channels (see p 324) lie in a plane, so it is very likely that they were cut by the masons as guides indicating the level to which the rest of the stones had to be reduced. In C we found a finished stone, and in D no less than six finished but broken stones. The finished stones at any rate could be identified as stones for cider mills by their thickness (12–13½in) and by the convex outer face, although the stones in D had round holes, which was puzzling.

In quarry E we found one abandoned cider-mill-stone, but numerous unfinished stones of only about 8 or 9in thickness which must have been intended for corn mills (see p 324). One finished stone of this kind we found also, but it was of almost pure sandstone and had hardly

enough pebbles in it to be called conglomerate. The others were all genuine conglomerate.

Nowhere did we find any abandoned or partly worked base-stones for cider mills, nor any stones for cider-presses. In view of the large number of millstones found, this is very surprising.

One thing is clear: the stones were fashioned and finished at the quarries, and not removed to a separate mason's shop elsewhere.

Segmented millstones

We found no evidence of the burrs or segments mentioned by Heath and, in view of the positive evidence that conglomerate millstones for corn mills as well as for cider mills were commonly made in one piece, we feel some scepticism as to whether millstones in this area were made in segments; it seems a difficult way of doing the job when such a hard rock is involved. Certainly it would be quite inappropriate for cider-mill-stones, but might apply to corn-mill-stones. We were able to consult Mr Wilfred Pick on this matter; he has lived in the area for upwards of eighty years and has been in touch with most local activities. Like all the other people we asked, he is quite clear that he has never seen a millstone composed of segments, although admittedly the manufacture of millstones had died out before he was born. We were also greatly helped by Mr A. D. Du Heaume, who has lived in Penallt for a very long time and owns the remains of a former corn mill which stood by the Cadora Brook, and is still recognisable by its former mill-pond, by the wheel pit, and by the remains of a millstone presumed to have come from it. Quite definitely the millstone is of quartz conglomerate in one piece; and the grooves on the remaining portion (about three-quarters of the whole) leave no doubt that it was a corn-mill-stone and not a cider-mill-stone. Forbes says of millstones for corn-milling in the sixteenth to eighteenth centuries:

... the mill-stones had to be obtained from special quarries. Local stone was used, but English millers preferred those obtained from Andernach on the Rhine, and the French millers those from La Ferté-sous-Jouarre and Bergerac, near Paris, which were even exported to America.⁹

Stowers says, of roughly the same period:

Years ago there used to be three main varieties of mill-stone: (a) solid Peak stones, quarried in Derbyshire; (b) French burr stones, produced from French quarries in small blocks which were cemented together with plaster of Paris to form the required size; and (c) blue stones or cullin stones, which were solid German stones quarried at Cologne, whence their name.¹⁰

Russell gives some specific information about the French stones:

French burr stone . . . is a chalcedonic hornstone or freshwater quartz found among beds of freshwater limestone that lie above the chalk. Quarried in small pieces it is sorted for quality according to colour. . . . The irregularly large and small cavities in which the quartz forms a kind of network or skeleton, keep the grinding edges renewed as the stone is worn down. The small blocks are shaped rather in the manner of stones for an arch and are cemented together with plaster of Paris, which wears equally with the stone, to form a round stone bound round the edge with hoop iron; the working face is dressed level and the back, which has been left irregular, is smoothed off with plaster of Paris.¹¹

It is possible that Heath was confused about the burrs, for although some French stones which were used in the area were made this way, it does seem rather unlikely that the Penallt stones were. Apparently other writers have been confused on this matter, for Wailes¹² quotes an example where corn-grinding stones of millstone grit are wrongly stated to be built up of segments.¹³ On the other hand, Rees refers to burrs in Wales.¹⁴ In late medieval times, 'The cost of hauling the millstones fell upon the tenants. In Kidwelly this service was, in later centuries, described as *bourows*, so called from the "burrs" or small Welsh Mill-stones.' Note, in passing, that the Oxford English Dictionary defines 'burrs' merely as 'siliceous rock capable of being employed for millstones' and says 'origin uncertain'.

Millstones elsewhere

Millstones made of conglomerate are known elsewhere. Addison and Wailes report that in Dorset watermills 'several stones of an old red sandstone conglomerate were met with. . . . These stones are also to be found in Somerset, as for instance, at Ashton windmill, . . . but so far

the quarry, probably in the Quantocks, has not been located'.¹⁵ Could it have been at Penallt, Monmouthshire, just across the Bristol Channel?

Although not concerned with conglomerate stones, the paper by Radley gives a great deal of information about millstone-making in another area, and may not be irrelevant to the present discussion.¹⁶

Transport

Quarry A has been described as being really a series of very small quarries on a rock-strewn hillside. An interesting feature of this hillside is the existence of two terraces on the slope, forming smoothly graded paths of about 100 yards in length. A similar terrace exists on our own rocky hillside nearby, where also there are two or three small quarries, although no evidence of millstones. One feels that these terraces must have been constructed to assist the removal of the millstones (and other stone products such as building blocks), some of which at least it is known were taken down to the River Wye for transport by barge to other regions. A very full account of these barges or 'trows' is given by Farr,¹⁷ yet curiously no mention can be found of millstones as one of their cargoes, nor of Penallt quarry-owners among their numerous owners. One concrete piece of evidence in this matter of river transport, however, is the existence of a number of millstones in the river, presumably dropped during attempts to load them on to barges. Coxe, in giving a schedule of exports from Chepstow during 1791-7 includes 26 tons of 'grindlestones' (ie grindstones) in 1796, but none in any other year.¹⁸ Whether these were millstones from Penallt is uncertain. We are indebted to Mr Ivor Waters for references to old documents showing that millstones and grindstones were exported from Chepstow during the seventeenth and eighteenth centuries to Ireland and North Devonshire. It is, however, as with Coxe's reference, not at all certain that these came from Penallt. At Quarry D there is a deeply worn channel down the steep hillside below the quarry which was obviously the path by which stones were lowered to the road at the bottom. At Quarry E there is a similar channel down to the river. Very

deep gully-paths are also found in association with the brownstone quarries in Livox Wood.

Scale of the industry and its decline in the nineteenth century

It is extremely difficult to make an estimate of the size of the millstone industry at Penallt with any reasonable accuracy. One method would be to survey the country for remains of conglomerate millstones, but the labour would be out of all proportion to the importance of the matter, and the accuracy would still be low, since many stones must have been buried or broken up. However, an upper limit to the size of the industry can be obtained by estimating the amount of rock removed from the quarries, assuming that not more than about 5 per cent would be usable for millstones. A very rough estimate of the output of the quarries obtained in this way suggests that the total number of millstones made could not have exceeded a few thousand, 10,000 at the most.

Some useful information on the scale of the industry in the nineteenth century can also be obtained by an examination of the Penallt Parish Church Registers. From 1837 the Register of Marriages shows the occupation of bride, groom and the two fathers. Unfortunately the place of residence is shown only for the bride and groom, and there is therefore a great uncertainty as to whether the fathers lived in Penallt parish or not. It is probably safe to assume that where the bride and/or groom lived in the parish, there was a better-than-even chance that the fathers did also. There is also some doubt about the location of some of the place-names entered. Any deductions from the registers are therefore only reliable in showing the order of magnitude of a particular occupation in Penallt.

Over the twenty years from 27 August 1837 to 3 August 1857 there were six local men married who were quarrymen, masons, or stone-cutters, and there were nine fathers in the same trades, ie fifteen men who were associated with the quarrying, though not necessarily with the millstone industry. There were altogether about 180 local men named in the register, which would have been nearly all the working

male population of the parish. We may, therefore, fairly safely assume that the total number of men associated with millstone-making could not have exceeded fifteen at any one time during this period. This number is corroborated for an earlier period by an examination of the Registers of Baptisms, which also show the father's occupation, and over the years 1813–33 show six local stone-workers out of about 100 fathers registered.

In the marriage registers there is no local stone-worker registered after 3 August 1857 right up to the present day. In the baptismal registers, however, there are two stone-workers (one mason, one stone-cutter) entered between 1870 and 1885 and four more between 1905 and 1914, then no more.

Bearing in mind that there were also quarries other than those used for millstone making, it seems safe to conclude that the millstone industry must have effectively come to an end about a century ago. It is now perhaps appropriate to quote from Bradney who, writing about Penallt presumably about 1910, said:

Another industry which flourished *till recently* [present author's italics] was the cutting of mill-stones, both for grist and cider mills, the conglomerate stone which abounds forming excellent material. The grist mill-stones were known as Welsh stones, as opposed to those of composite manufacture, which were used in the mills for the production of fine wheat flour. The introduction of iron rollers driven by steam in flour mills has caused this industry to decline.¹⁹

Although contrary to the testimony of the oldest living inhabitants, it is thus just possible that the millstone industry in Penallt continued sporadically until the turn of the century.

An interesting additional piece of evidence in support of this is that in *Kelly's Directory* for 1884 Noah Hudson is shown as 'mill stone maker', trading in Penallt. The parish records show that he was born in 1849 and died in 1926; in 1914 he was a 'Tin Worker', presumably at the Tinplate Works at Redbrook, just across the River Wye. The credibility of the description 'mill stone maker' is somewhat stretched by the fact that it continues to appear in *Kelly's Directory* as late as 1920!

References

- 1 W. Dregghorn, *Geology Explained in the Forest of Dean and Wye Valley*, Newton Abbot (1968), 117.
- 2 Y. R. H. Probert, *Parish of Penallt* (second edn 1966), pamphlet purchasable at Penallt Old Church or at Penallt Vicarage.
- 3 C. Heath, *Historical and Descriptive Accounts of . . . Tintern Abbey*, Monmouth (1803).
- 4 25in Ordnance Survey Map, County Series (1921), Monmouthshire sheet XIV 12.
- 5 F. B. A. Welch and F. M. Trotter, *Geology of the Country around Monmouth & Chepstow*, HMSO (1960), 53.
- 6 25in Ordnance Survey Map, County Series (1921), Monmouthshire sheet XV 9.
- 7 25in Ordnance Survey Map, County Series (1921), Monmouthshire sheet XIV 16, or 1in OS map, Grid ref SO 518 081.
- 8 Rhys Jenkins, 'Industries of Herefordshire in bygone times', *Trans Woolhope Club* (1936), 70 (see p 73).
- 9 R. J. Forbes, 'Food and Drink: Section IV, Milling', in *A History of Technology*, vol 3, ed C. Singer et al, Oxford (1957), 15.
- 10 A. Stowers, 'Watermills c 1500–c 1850: Section IX, Varieties of Millstone', in *A History of Technology*, vol 4, ed C. Singer et al, Oxford (1958), 212.
- 11 J. Russell, 'Millstones in wind and water mills', *Trans Newcomen Soc*, 24 (1943–4), 55.
- 12 R. Wailes, 'Some windmill fallacies', *Trans Newcomen Soc*, 32 (1959–60), 93.
- 13 Hemming, *Windmills in Sussex* (1936).
- 14 William Rees, *South Wales and the March, 1284–1415*, Oxford (1924), 238.
- 15 J. Addison & R. Wailes, 'Dorset watermills', *Trans Newcomen Soc*, 35 (1962–3), 193.
- 16 J. Radley, 'Peak millstones and Hallamshire grindstones', *Trans Newcomen Soc*, 36 (1963–4), 165.
- 17 G. E. Farr, *Chepstow Ships*, (The Chepstow Society, 1954).
- 18 William Coxe, *An Historical Tour through Monmouthshire*, Brecon (1904).
- 19 J. A. Bradney, 'A History of Monmouthshire', *The Hundred of Trelech*, vol 2, pt 2 (1913), 155.

Acknowledgements

The author wishes to acknowledge the enthusiastic assistance of his wife in the fieldwork; the kindness of Mrs Dorothy Lloyd for drawing his attention to the partially cut stones and to the cider-mill remains on her property; and the co-operation of Mr Wilfrid Pick, Mr A. D. Du Heaume, Mr & Mrs Hector Frost, Mrs M. Sadler and Mr Downes, all of Penallt, in answering questions and demonstrating their stones or cider mills. Thanks are also due to the Rev and Mrs W. R. Rhys for making the parish registers available and for other help and advice.

For plates, provided by the author, see pp 321–4



Page 321 (above) *Close-up view of part of an abandoned cider-mill-stone (or 'runner') to show the nature and texture of the quartz conglomerate used for millstone making at Penallt; (below) a curious stone found in Quarry B at Penallt. The ruler laid on the stone is 1ft long*
See D. G. Tucker, 'Millstone Making', pp 229-39



Page 322 (above) *The runner in an old cider mill, belonging to Mr Downes of Penallt, which is still in working order; (below) base-stones (or 'chase') of a derelict cider mill at Penallt, showing the construction in two semicircular pieces*
See D. G. Tucker, 'Millstone Making', pp 229-39



Page 323 (right) *Cider-press at a cottage in Lone Lane, Penallt, showing the timber frame, screw press mechanism, press-stone and receptacle. The press board itself is missing; (below) the major part of a corn-mill-stone now used as part of a garden ornament at 'The Generals', Penallt. The near-radial grooves, although largely worn and weathered away, can still be seen clearly*
See D. G. Tucker, 'Millstone Making', pp 229-39



Page 324 (above) *Abandoned unfinished stone at Quarry A at Penallt, showing the two crossed channels cut into the top, presumably as guides for the dressing of the whole surface;*
(below) *abandoned unfinished stone (almost certainly for a cornmill) at Quarry E at Penallt*
See D. G. Tucker, 'Millstone Making', pp 229-39

