THE MIDLAND WIND AND WATER MILLS GROUP

(affiliated to the Society for the Protection of Ancient Buildings)

This Journal is published by the Midland Wind and Water Mills Group, which is concerned with the study of the history and technology of mills, and, in principle, with their preservation and restoration. Its area is the region loosely defined as the Midlands, especially the central counties of Staffordshire, Worcestershire and Warwickshire.

The Group, which functions as an autonomous society, holds monthly indoor meetings, with talks and discussions, during the winter, and arranges several tours to mills during the spring and summer. Members periodically receive a Newsletter and the Journal, and can purchase other publications at preferential prices.

For further particulars, please contact the Hon. Secretary, John Bedington, 188 Merrivale Road, Smethwick, West Midlands, B66 4EA.

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Wind and Water Mills

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Number 1
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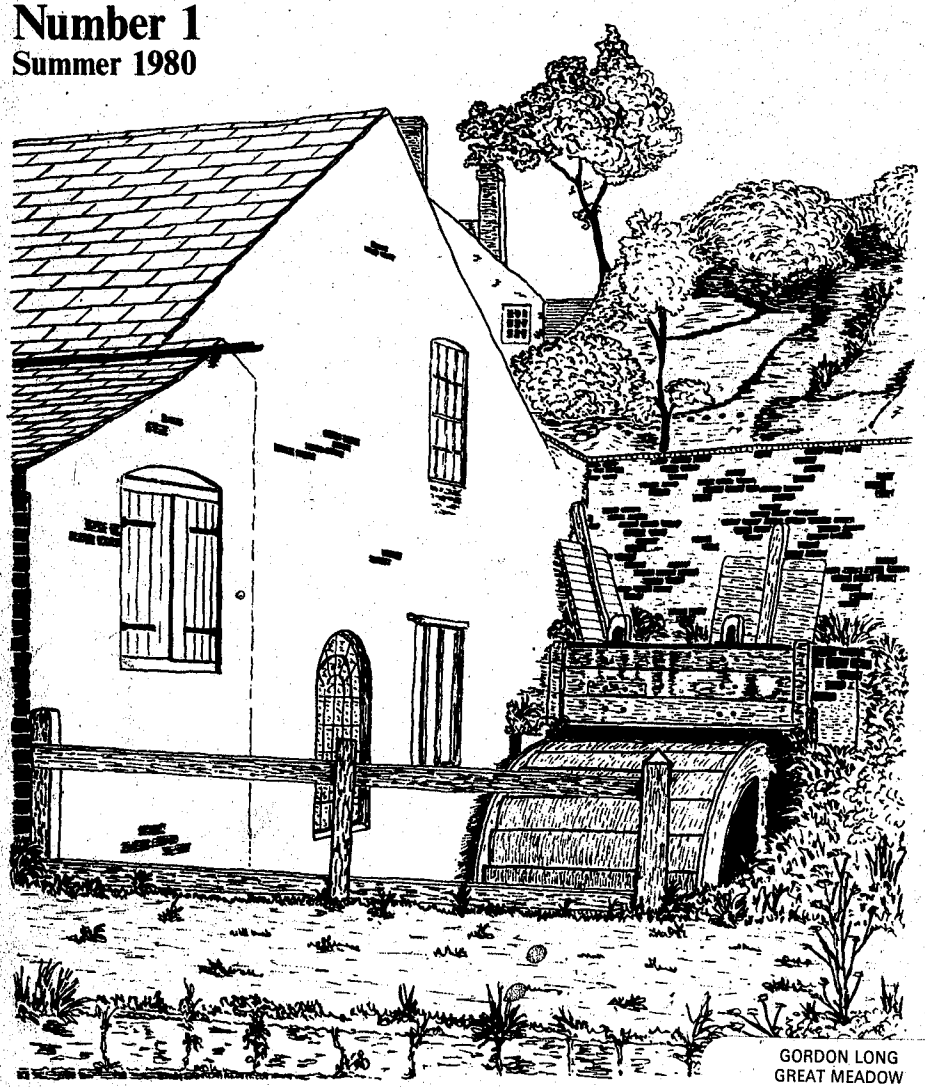

INTRODUCTION
by
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Chairman of The Wind and Watermill Section
of the S.P.A.B.
Chairman of the International Molinological
Society.

'I AM PLEASED TO WELCOME THIS JOURNAL OF THE MIDLAND WIND AND WATER MILLS GROUP AND I WISH IT WELL. THE PUBLICATION OF JOURNALS OF THIS TYPE IS A TREMENDOUS VENTURE FOR IT ENABLES ALL THOSE WHO LOVE OUR MILLS TO LEARN OF THE MILLS OF OTHER AREAS, THEIR HISTORY AND THEIR PRESERVATION.'

Cover Drawing: Hillpool Forge c.1890

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The editors will be pleased to consider contributions of articles and drawings for inclusion in future issues.

'BOUNCING BESS' TOWER MILL
Rowington Green, Warwickshire
by W.A. SEABY

If we accept the post mill at Pinley Nunnery (1348)[1] and another recorded as on the road to 'Nonold Gate' (1636)[2], both sites originally in Rowington although Pinley now comes under Shrewley, we can account for at least eight windmills working within the parish[3] between 1300[4] and the later nineteenth century.

Although the ground at Rowington is relatively high, mostly between 300 and 400 feet O.D. (91 - 122m.), the water shed streams are small and sluggish so, as might be expected, windmills here predominate over watermills. There is evidence for at least four windmills having been sited on Rowington Green from the later years of the eighteenth century. Three of these were given fancy names: 'Grinning Jenny' at Windmill Farm[5], 'Tom-o-the -Wood' near the house called The Felden[6], and 'Bouncing Bess' (perhaps the second of that name), the only brick tower mill and the only one on the Green to have survived into the present century (Grid Ref. SP 205702)[7]. It stands at the highest point approximately 420 feet (128 metres).

The tower mill seems to have been built by 1789 when Yates completed his survey, published as a one-inch map of the county in 1793. A windmill is shown, conventionally as a post mill, in this position, so one cannot be absolutely certain that it was a tower mill at this date since no documentary evidence has yet been traced recording its erection. Both Yates's map and Sherriff's map of 'Twenty-five miles around Birmingham', published in 1796, show another mill slightly to the west of Bouncing Bess which is likely to have been a post mill, but it is not seen on the preliminary O.S. map of 1814, on Greenwoods's map of 1822 or on any subsequent map. This windmill could have been the discarded forerunner of Bouncing Bess. Just possibly it was a former locality for Tom-o-the-Wood or Grinning Jenny, neither of which is shown by Yates or Sherriff in the positions they occupied latterly.

John Bradbury (1750 - 1835) who in a lease of 1818 is styled 'Miller and Farmer', then aged 68 and living at the adjoining Quarry Farm, was an early owner of the windmill. But from at least the mid-1820s John Barnett is givien as miller in the Rowington baptismal register, since he and his wife had numerous offspring although not all of them out-lived childhood. In the 1841 Census Barnett, aged about 50, is the only miller recorded at Rowington; he was living there with his wife Sarah, aged about 40, and six children from the age of 15 to one year. Although it is not absolutely certain that Barnett was miller of Bouncing Bess, John Bradbury being obviously too old to work the mill by himself in 1825, the other two windmills seem to have been owner-occupied, David Buffery at Grinning Jenny and Thomas Avern (who died aged 79 in 1852) at Tom-o-the-Wood. Furthermore both the post mills from advertisements and other evidence were known to have been declining trade when the Tithe Apportionment was made six or seven years later.

The property, and certainly the milling, had passed to William Bradbury before 1845 according to the directories and as given in the Tithe Schedule of 1847; and, although only styled as a farmer in the 1841 Census he is put down as farmer/miller in the 1851 and 1861 Census returns. From hereon the directories give some idea of the change of occupier during the later years of the nineteenth century. W. Bradbury's name occurs in 1863, John King in 1872 and 1876. Thomas Avern, presumably a grandson of the miller who had died during 1852, appears in 1880 and 1882. E. Andrews is recorded as mill manager and John Bradbury as farmer/miller in 1883 and 1884, with William Hibberd also in 1884. James M. Bryan took over from about 1887 to 1892 with T.M. Bryan, presumably a relative, given as miller and corn dealer, The Mill, from 1893 to 1895.

From an estimate for work to be carried out on the mill dated 30 November 1886 (see below) we learn that John Bradbury, supposedly a grandson of the former John, was then owner. Thereafter deeds and documents of title still extant trace

the conveyance of the brick tower on Rowington Green to its present owner-occupier. On 24 November 1896 Bradbury sold the mill, then working solely under steam, to Thomas F. Smith of Turner's End Farm who was already in occupation as miller. In November 1916 when it is believed to have ceased milling altogether the tower and paddock were conveyed to John W. Ryland of Shakespeare Hall close by. It was this same owner who wrote Records of Rowington in two volumes, in the second of which on page 140 there is reference to 'Bouncing Bess' as being in existence in 1821. On 1 November 1933 the executors of the late J.W. Ryland sold the old mill by auction when it was bought for £220 by John Wheatley; and in March 1934 it was purchased by H.E.Wilson who also occupied Shakespeare Hall. Thereafter it descended by inheritance to his son, Lt.-Col. Edward C. Wilson. In 1977 Mr. John M. Jennings, Birmingham solicitor, purchased the property, and during 1978/9 the architect, Mr. David H. Robotham of Warwick, supervised the modification of the mill body, converting it into the core of a unique residence in which John Jennings and his wife, Jennifer, now live.

So much for the ownership and millers at present traced. We have very little knowledge of the building as a working windmill but we can make some inspired guesses. The sails were almost certainly four commons, and luffing appears to have been by tailpole with cartwheel attached at the end to assist in winding the boat-shaped cap. This wheel is believed to have finished up in the orchard of the Smith's farm at Turner's End during the present century. The windshaft, brake wheel and wallower have long since disappeared; they may well have been removed soon after the mill had ceased by the last decade of the nineteenth century, since they would only have added strain on the cap and main shaft, especially in bad weather, once the mill had come solely under steam power.

A few copy letters and estimates regarding work on Rowington Mill by the millwrights, Robert and his son, Alfred Henry Summers of Tanworth-in-Arden, are extant. I am indebted to Mr. D.T.N. Booth, a fellow member of the Midland Mills Group, who not only traced them, when he was making his survey of Warwickshire watermills, but who sent me transcripts, as well as other detailed costings relating to windmill repairs in the western midlands. Those for Rowington are here set out in full.

Tanworth, Hockley Heath
November 30th 1886

Rowington Windmill

Sir,

I beg to say that I have estimated for the work as follows. For a new peak runner stone 4' 4" diameter, faced, furrowed, delivered at the mill, the irons out in (?put on), the old runner put down as a bed stone and the bush put in and curbing round the stone and put ready for work. Also for putting and fitting on a plank circle underside the crown wheel fixed on with bolts and nuts turned up and a new friction pinnion and necessary repairs to the sack hoist.

The whole of the above work will cost £18 10s. If you will favour me with the order I will put it in hand and do it at once. The expense of the sack hoist will be the same whether the wheels are geared or put to a friction hoist. The latter will be the best as the cogs are always breaking by striking into gear. The friction hoist will lower the sacks down as well. Waiting your order which shall have my best attention.

I am, Sir,
Your obedient servant
Robt. Summers

J. Bradbury Esq.

Calculations:

new stone	£4 14s.
Facing and furrowing	£1 5s.
Carriage of stone	£1 10s.
Corn	£1 15s.
Putting in	£2 2s.
Curbing	15s.
Carried down	£12 1s.

Sack Hoist

timber		15s.			
making	£2	8s.			
turning chain roller		3s.	6d.		
line pulleys and frames		7s.	6d.		
frame roller		10s.			
lever		7s.		£6	9s.
fixing	£1	10s.		£12	1s.
	£6	9s.	contract took at	£18	10s.

If wheels are geared

40 cogs 1/9	£3	10s.	
19 " "	£1	13s.	3d.
	£1	10s.	altering bevel
	£6	13s.	3d.

Say £7 5s. 0d. either way for gearing or friction

Stones etc.	£10	10s.	0d.
	£ 7	5s.	0d.
	£17	15s.	0d.

Estimate sent in £18 10s.
N.B. this should be put with the letter that was sent for the estimate.

On the night of 9 June 1888, during a violent thunderstorm, the sails (and cap?) of Rowington windmill were damaged. Although a copy of the letter accompanying the estimate for repairs as submitted by Summers exists, the actual report on the damage cannot now be traced. A search has been made amongst the large volume of documents from Campbell, Brown and Ledbrook (successors to Brabazon Campbell), now housed at the Warwick County Record Office, but without success. The estimate sent to Warwick, soon after the accident, is likely to have been for an insurance claim in the first instance.

Tanworth, Hockley Heath
June 15th 1888
Too late for post
Sir,

I beg to say by instructions received from Mr. Bradbury I herewith enclose a report and cost of the damage done to Rowington windmill by lightning on the ninth instant.

Trusting that it will satisfy all parties interested as I have very carefully and impartially gone through it in detail.

I am, Sir,
Your obedt. Servt.
Robert Summers

Brabazon Campbell Esq., High Street, Warwick

Whether the claim failed or whether it was agreed 'by all parties' to work the mill solely by steam power from this date is not quite certain, but the late H.E.S. Simmons, who discussed the matter with the grandson of Robert Summers[8], wrote in his notes:'For a short while after the loss of the sails the mill was worked by a steam engine; eventually it was bought by Thomas F. Smith of Turner's Green who used it first with steam and later with oil, and finally the mill closed down, etc.' However, certain small repairs had been carried out four months after the storm damage as set out on the copy of this account.

Ordered September 13th 1888

	£	s.	d.
4 sheets of wire to dressing machine and brushes strengthened	1	16	0
regearing pinion	3	0	0
wedging both wall boxes, and shouldering spur wheel cogs	0	12	0
new wheel to tail pole, old spokes to be used	5	10	0
	10	18	0

contd.

	£.	s.	d.
gearing pinion	3	0	0
the two last items done	6	0	0
part of work ordered in first estimate	12	1	0
part of work done to hoist	3	3	0
	24	4	0

See day book

The new sack hoist which was estimated for in November 1886 at a cost of £6 9s. 0d. seems not to have been completed in September 1888. Perhaps only repairs to the existing one were made. But the following 'cri de coeur' from the miller, ten years later, suggests that the millwrights may not have installed a new friction drive windlass before the end of the century. Certainly the one found there in 1977 was in a remarkably good state showing little wear. Note the name of the mill at this date.

Memorandum

From T.F. Smith
Miller and Corn Dealer
Rowington Steam Mill,
Warwick

To
Mr Summers
Millwright
Tanworth

Aug. 5, 1896

Dear Sir,

Will you kindly come and put oist(!) up to day as we have a lot to grind and have to carry it up.

Yours truly
T.F. Smith

In possession of the Smith family who still live at Turner's End Farm are a number of account and receipt books, one each of which were kindly presented to the County Museum, Warwick, on 15 July 1977 by Messrs. N. and M. Smith. The Account Book is headed:

ROWINGTON STEAM MILLS
Near Warwick

Dr. to T.F. SMITH, Corn Merchant

Each page has the following cereals, but listed vertically: Indian Corn, Wheat Flour, Bean Flour, Barley Meal, Bran, Sharps, Oats, Beans, Peas, Indian Meal, Cake. SACKS 1/-

Numbers run from 501 (dated Jan. 30, 1906) to 750 (June 1, 1906). Typical entries read:

1 sk Barley Meal	13/-	Mr Badger
3 sks Oats	1/17/6	Mr Huggins
1 sk Indian Corn	14/-	I. Moore, Cock Inn
1 bag Wheat	13/-	
1 sk Bran	6/-	Mr Wale
1 sk Sharps	10/-	Chessetts Wood
2 sk Oats	1/5/-	16 March '06'
½ Beans	8/-	

The small Receipt Book is headed:

ROWINGTON STEAM MILL NR WARWICK

The numbers run from 1556 to 1600 and the dates from 12 May to 26 July 1906. Typical entries read:

1551 Received from Mr Beeve, Chadwick End 2/6 (signed) W. Corbet
1553 Received from Messrs Mitchells & Butlers, Cape Hill, Birmingham
£92/10/11 per cheque

1554 Received from Midland Vinegar Brewery, Aston Cross, B'ham £17/6/- per cheque
Both signed W. Corbet/T.F. Smith

A photograph taken of the mill by R. Hancock in 1911 for the Warwickshire Photographic Survey, now housed in the Department of Local Studies at the Birmingham Reference Library, shows the tower with boat cap and apron over the curb. The original weather boarding had then been sealed over with metal sheeting to save timber repairs, and the hatch at the back of the cap is seen to be closed by a vertically boarded door. If, as has been said, there was once a tailpole in place of the much more usual wheel and chain winding gear all trace of it had gone when Hancock took his photograph[9]. Shown on the far side of the tower are what appear to be a boiler with chimney and, between it and a workmen's hut[10], an early form of oil engine(?) on wheels. Also seen is a lay shaft set at a slight slope from the engine towards the tower behind which it disappears. There it must have been geared to a secondary shaft, which entered the mill through a 'drain pipe' above the doorway, and its pinion would have engaged with the face gear set on the underside of the spur wheel.

It is believed the mill ceased operation and the external prime movers were withdrawn early in the First World War, certainly by the time it was sold to John Ryland in 1916. During the later phases of the war German prisoners occupied the mill plot and the tower was used as their dormitory. Fortunately neither Ryland nor the Wilsons appear to have interfered with the machinery in the mill and, apart from some patching of the roof and securing of the double doors on the ground floor, it remained for over fifty years much as it had been when last in service. Simmons, writing in 1943, states that Mr. Wilson intended converting it into a cottage but the scheme never materialised. And it was not until 1976 that proposals were put forward to convert the tower into part of a house complex and Col. Wilson agreed to sell the property. Although local objections to the scheme were raised, the Warwickshire Planning authorities granted permission for modifications to the mill and erection of circular structures around part of it to form a house, since it was realised that if this listed building were allowed to decay further it might become dangerous and have to be pulled down.

Shortly before the builders, Warwick Construction Company, took over, Mr. Jennings gave permission for a team of enthusiasts from the Midland Wind and Watermills Group to make a survey of the tower for record purposes. We knew he was most anxious to conserve all the existing gear in the area of the ground floor but that the cap and curb would have to be removed, as well as the upper portion of the upright shaft, the sack hoist, and most probably both pairs of stones. Therefore, when measurements and photography were carried out during two week-ends, it was in the upper floors that most of the work was concentrated.

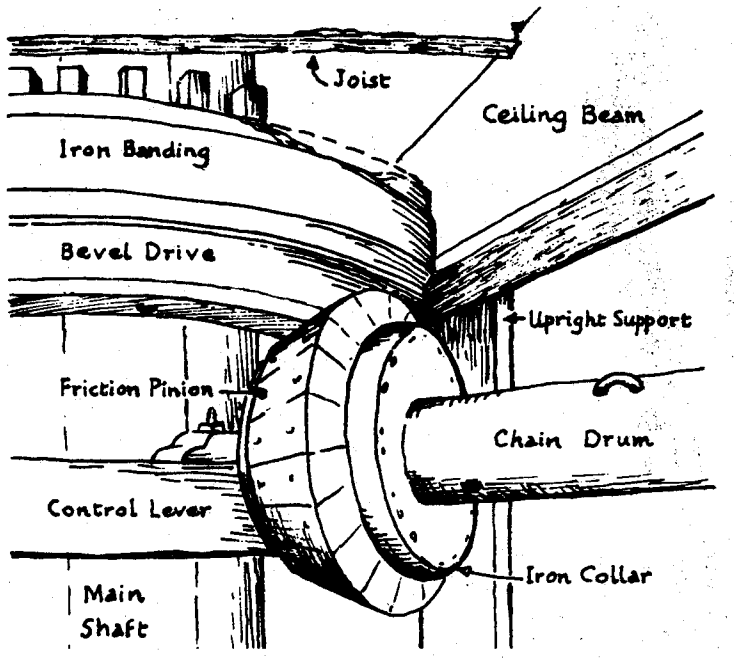
The following were the principal dimensions recorded on 17/18 September 1977:

Rowington Tower Mill	ft.	in.	metres
Vertical height of mill, including cap:	39	4	(11.99)
Vertical height to top of brickwork:	28	4	(8.74)
Height of Cap and Dust floor:	12	4	(3.76)
Height of Bin floor:	7	8	(2.34)
Height of Stone floor:	8	0	(2.44)
Height of Meal or Ground floor:	11	4	(3.45)
Interior diam. of curb (set back 6 inches):	15	2	(4.62)
Diam. at top of brickwork (outside):	17	8	(5.38)
Diam. at top of brickwork (inside):	14	2	(4.32)
Diam. of Bin floor:	16	8	(5.08)
Diam. of Stone floor:	18	6	(5.64)
Diam. of Meal or Ground floor:	20	10	(6.36)
Exterior diam. at ground level:	24	4	(7.42)

The depth of the brick footings below ground level was not determined but when the ground floor boarding had been removed it was noted that the four brick walls running E-W across the interior and supporting the floor joists went down at least three feet (0.91m.) so the tower brickwork is likely to be much deeper.

The machinery remaining in the mill is mostly seen in the elevation shown partly in the round and partly in section. Cap details are given in the Appendix by John Bedington who carried out measurement and made the drawings. Here is given

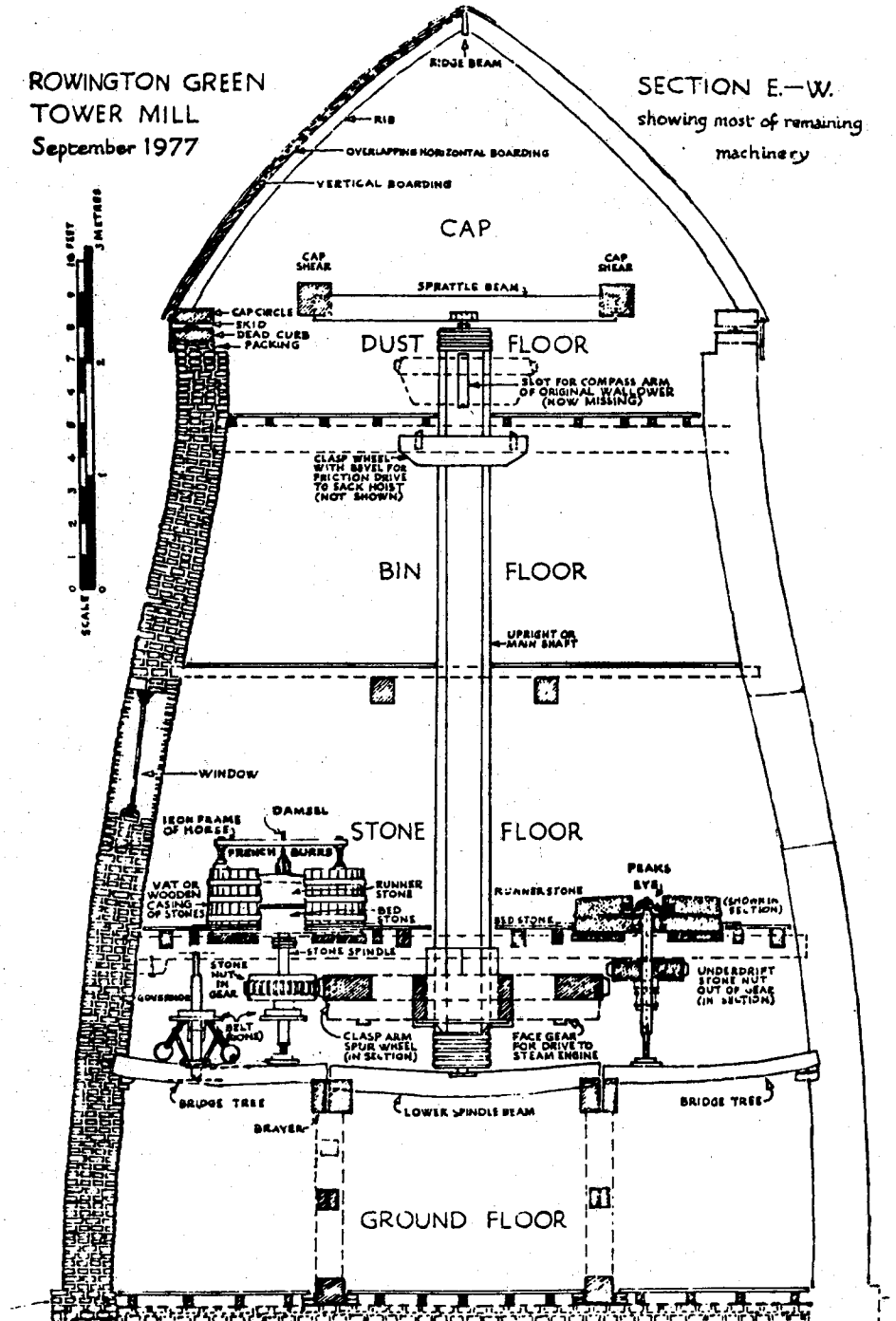
such basic information on the rest of the building as it was possible to gather in the time at our disposal. The main shaft, held in position by bearings on the sprattle beam and on the lower spindle beam, was 22ft. 9in. (6.93m.) in length, octagonal in section, having a width of 18in. (0.45m.) at the top and 21in. (0.53m.) at the base. Below the three iron bands holding the head were cross slots 22in. (0.56m.) deep to take the arms of the missing compass type wallower. Immediately beneath the Dust floor and close to the ceiling of the Bin floor was a sectioned wooden clasp wheel ('plank circle' as given by Summers) set on the main shaft, having a diameter of 3ft. 9in. (1.14m.), with (originally) 32 teeth above and a bevel below. It had a wide iron banding around the girth.



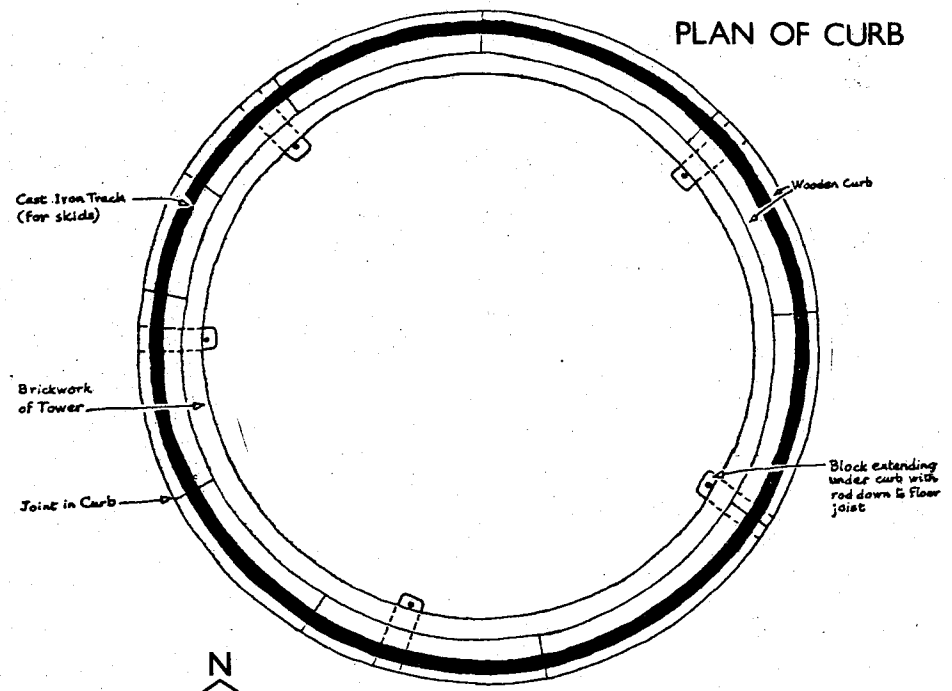
This was the friction drive for the sack hoist which was still in position and was undoubtedly the one constructed by Summers, the millwrights. The overall length, including the spindles was 5ft. 10in. (1.78m.), the windlass or chain drum itself being 4ft. 6in. (1.37m.) with a diameter of 6in. (0.15m.). The bevelled head or pulley, made up of some 20 bolted wooden blocks and held in position on the drum with iron-banded collars on either side had a diameter of 19in. (0.49m.) tapering to 15in. (0.38m.). The hoist had its bearings on cross timbers, the inner one being the control lever, themselves held in slotted supports morticed or otherwise fixed to the two ceiling beams. The friction drive was brought into play by a cord, attached to a perforation at the distal end of the pivoted control lever, and carried over a shear block in the ceiling down through holes in the floors to the miller with sacks of grain at ground level. The control cord and sack chain had both gone, as indeed had most of the woodwork of the grain bins. Low arched windows faced N. and S. at this level.

ROWINGTON GREEN
TOWER MILL
September 1977

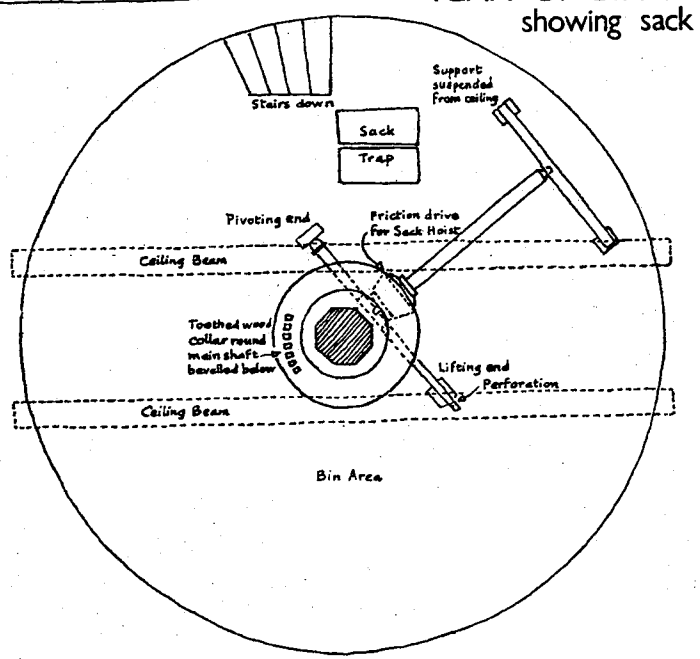
SECTION E.—W.
showing most of remaining machinery



PLAN OF CURB



PLAN OF BIN FLOOR
showing sack hoist



In the Stone floor parts of the grain chutes remained but the hoppers and shoes etc. were absent, and only one horse, of cast iron, made by R.G. Handley, Moor Street, Birmingham, was extant. This, carrying through a perforation in its central bar the spindle of the four-barred damsel, was still in its original position, set on the internal rim or flange of the vat surrounding the French burrs, which were positioned on the east side of the room. The height of the vat from the floor was 1ft. 9in. (0.53m.) and the wooden staves were held in place with the usual three iron bands; its diameter at the outer rim was 4ft. 6in. (1.37m.). The stones had a diameter of 4ft. (1.22m.) and, with their plaster covering, rose to a height of 1ft. 3½in. (0.39m.) above floor level; the eye of the runner stone being 10in. (0.27m.).

There was no vat, horse or damsel existing with the pair of peak stones. The bed stone was seen to have been well set into the floor with a brick curb surrounding it, and the two stones, sitting one on the other, only rose to a height of 1ft. 0¼in. (0.31m.) above floor level. The diameter of the peaks was 4ft. 4in. (1.32m.) and the eye again 10in. (0.27m.). Similar low arched windows, originally having two horizontal iron bars across the wooden frames, faced E. and W. on this floor.

Very much more remained, and still mostly exists, in the Meal floor of this underdrift mill, now the kitchen/breakfast room of the house. The wooden spur wheel is of clasp-arm construction and has a diameter of 8ft. 6in. (2.59m.), excluding the 96 projecting morticed teeth. To the underside of this wheel is bolted a cast iron circular face gear having 144 teeth which, as mentioned above, was driven through lay shaft and pinion from an auxiliary engine housed outside the mill.

The stone nuts, also wooden, with reinforcement iron rings, have diameters of 2ft. (0.61m.), excluding the 24 morticed teeth. The spindles are square-sectioned where they pass through the nuts, being held in or out of gear with wedges. The lower spindle beam taking the weight of the main shaft and spur wheel, as well as the two bridge trees, taking the lower bearings of the nuts, are considerably bowed downwards; and there is packing beneath the ends of these trees where they enter squared cavities in the tower wall. There are also massive cross timber braces in the body of the ground floor to take the other ends of the bridge trees and the spindle beam.

A centifugal governor, set on its own timber support with the upper spindle in a blister bolted to one of the main ceiling beams, once controlled the speed of the nut operating the French burrs. This tentering gear included steel yard, fulcrum, tentering screw and brayer, so that even today only the belt between the drives on the two spindles is missing.

Other features on this floor originally included doorways N. and S., each 3ft. 3in. (0.99m.) wide and 7ft. 6in. (2.28m.) high, having double wooden doors. The top of each opening was a low arch and the surrounds were carried out in rounded-off brickwork. It was not possible to retain either of these openings as doorways in the present house plan; the one to the south has been mostly bricked up and that to the north has been half closed leaving the upper part to form a kitchen window. New doorways have been cut through, that to the east leading to the central hall of the house and the west one as a back door to the garden. Windows, one 2ft. 10½in. (0.88m.) high by 2ft. 6in. (0.76m.) wide, set at 4ft. 4½in. (1.33m.) above floor level, were placed just E. of the N. door and just W. of the S. door, but both had been bricked up earlier this century, probably to prevent vandalism. The north one has now been re-opened. Internally just beyond the windows were two fireplaces with chimneys running up through the wall. One of these, having a charming crested frontal to the grating, has been preserved and inserted in a similar position using the same chimney, on the first floor sitting room of the house.

The main timbers and cross braces supporting the machinery have been strengthened and retained. The woodwork was all sand-blasted and immediately thereafter the ironwork red-leaded to prevent further rusting. In the upper floors some of the main oak floor beams were also preserved; when the decayed ends had been cut away they were re-inserted in the new ceilings. The original wall stairways between

floors having average 8in. (0.20m.) treads, as well as joists and (many missing) floor boards were taken into account during the survey, but all were removed owing to their worm-eaten or otherwise rotten condition.

It only remains to thank those who have helped in carrying out this survey. On the historical side, Lt. Col. E.C. Wilson, members of the staff at the County Record Office, Mrs. Joy Woodall, who is writing up the history of Rowington, and Mrs. Eileen Measy, Keeper of Folk collections at St. John's House, Warwick, have together kindly supplied much data. On the technical side my thanks go to my Midland Mills Group colleagues: Mr. Tim Booth (as set out above); also Mr. Barry Job, Mr. Cyril Johnson and Mr. John Bedington, all of whom risked life and limb to photograph and measure details of the mill. Very sincere thanks also go to Mr. and Mrs. John Jennings for willing co-operation and much practical help.

REFERENCES AND NOTES

1. V.C.H. (1945), p.154
2. Warwick County Records VI (1941), p.28
3. W.A.Seaby, Warwickshire Windmills (Warwickshire Museum Abstract No. 1, 1979) p.25
4. J.Woodall, From Hroca to Anne (1974), pp.11-13
5. Preliminary O.S. map, c.1814; Warwickshire Advertiser (7 June 1823); Greenwood's map, 1822; O.S. map 1831; Tithe map, 1847-9; Midland Counties Herald (2 Nov. 1848)
6. Warwickshire Advertiser (28 Oct. 1815 and 11 Nov. 1815); recorded in Rowington Rate Book for 1834; Tithe map, 1847-9. Not shown on Yates, Greenwood or O.S. maps.
7. Yate's map, 1793; Sherriff's map, 1796; Preliminary O.S. map, c.1814; Greenwood's map, 1822; O.S. map, 1831; Tithe map, 1847-9; O.S. 6", 1886 and 1905; V.C.H. III (1945) p.147
8. The millwrighting business had largely been taken over by Robert's son, Alfred Henry Summers, in the late 1880's; the vast collection of notes on wind and watermills, collected by the late Herbert Simmons of Shoreham-by-Sea is now housed in the Science Museum, S.Kensington, but these need to be used with much caution.
9. This photograph, as indeed several others in the collection, has been printed from the wrong side of the negative, showing the tower the opposite way round.
10. Mr. Jennings informs me this hut or shed still exists in the grounds of Shakespeare Hall.

ROWINGTON TOWER MILL: THE CAP
by JOHN BEDINGTON

The cap was of the design, common in Warwickshire, known as 'boat-shaped'. It was approximately 18ft. wide at the widest point of its base and, as seen in 1977 was 18ft. long, though it is conceivable it may have been slightly truncated, since as mentioned below, the back of the cap was modified in later years. It measured approximately 9ft. 6in. from the cap circle to the roof ridge at the highest point of the ridge.

As can be seen from the drawing, a basic wooden cap circle was extended outwards at the front and back to give a boat shaped base and from this base rose 12 ribs (ie. rafters) on each side of the cap terminating at a bow shaped ridge beam and carrying horizontal overlapping wooden boarding overlaid (presumably at a later date) by vertical wooden boarding. The roof ridge was capped with galvanized iron and the cap had a 'petticoat' of tongue and groove boarding some 1ft. 6in. deep.

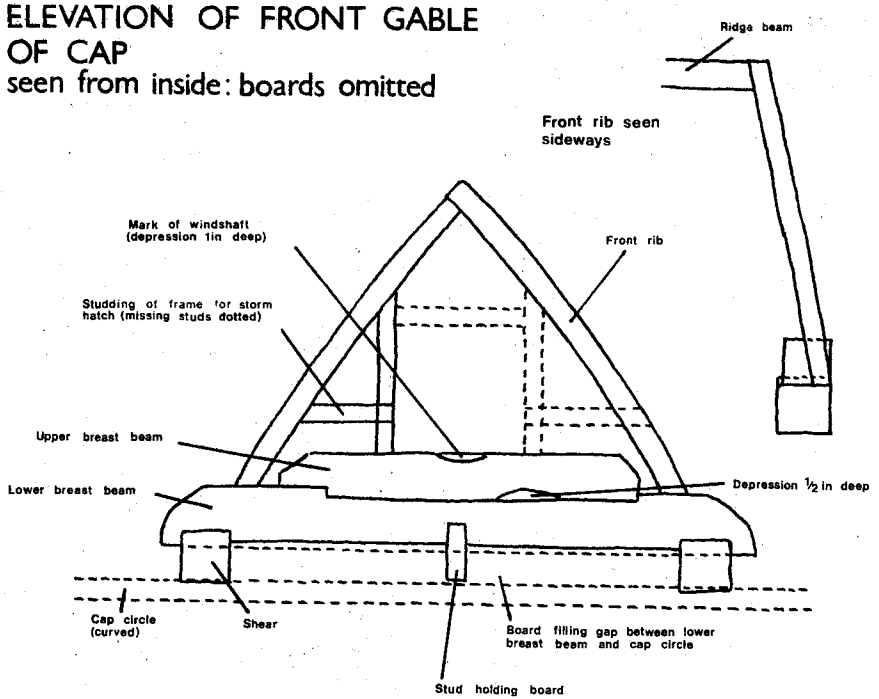
The cap turned on 10 iron skids running on an iron track: the skids are closer together at the front where the weight of the windshaft and sails had to be borne. It was evidently centred by 6 wheels running against the inside of the curb in the usual way but only the mortices for the blocks which held these wheels remain.

The neck bearing of the windshaft was carried on a breast beam supported by a 'lower breast beam' which straddled the shears at the front; the upper breast beam itself seems (from a depression cut in the lower side) to have originally been used the other way up.

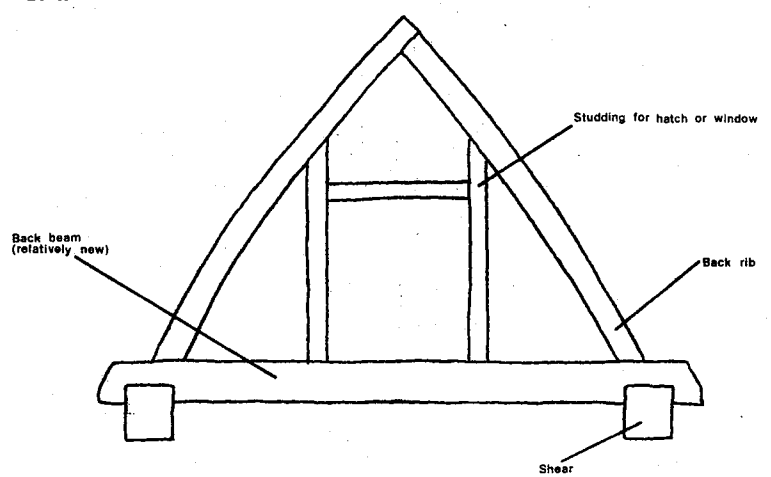
The back 4 feet or so of the shears (with the back beam that they carry) have been sliced on at some stage (apparently after the mill stopped working by wind). This is a shame as it would have been nice to know how the tailpole was fixed. The complete absence of any toothed rack (or pegs for an internal winch) seems to prove that tailpole winding must have been used to the end of this windmill's working days.

Although the windshaft, brake, brake wheel and wallower had gone at the time our drawings were made in 1977, the position of notches in the shears for the brake, and of mortices in the shears for the beam that had supported the tail bearing of the windshaft allowed us (as can be seen from the drawings) to calculate the position, and certain other details, of the windshaft, brake wheel and wallower within a matter of inches:- the length of the windshaft from tail bearing to neck bearing inclusive was approximately 14ft., the overall diameter of the brake wheel 8ft. and the overall diameter of the wallower (which at least at one stage was compass arm) 4ft.

ELEVATION OF FRONT GABLE OF CAP
seen from inside: boards omitted



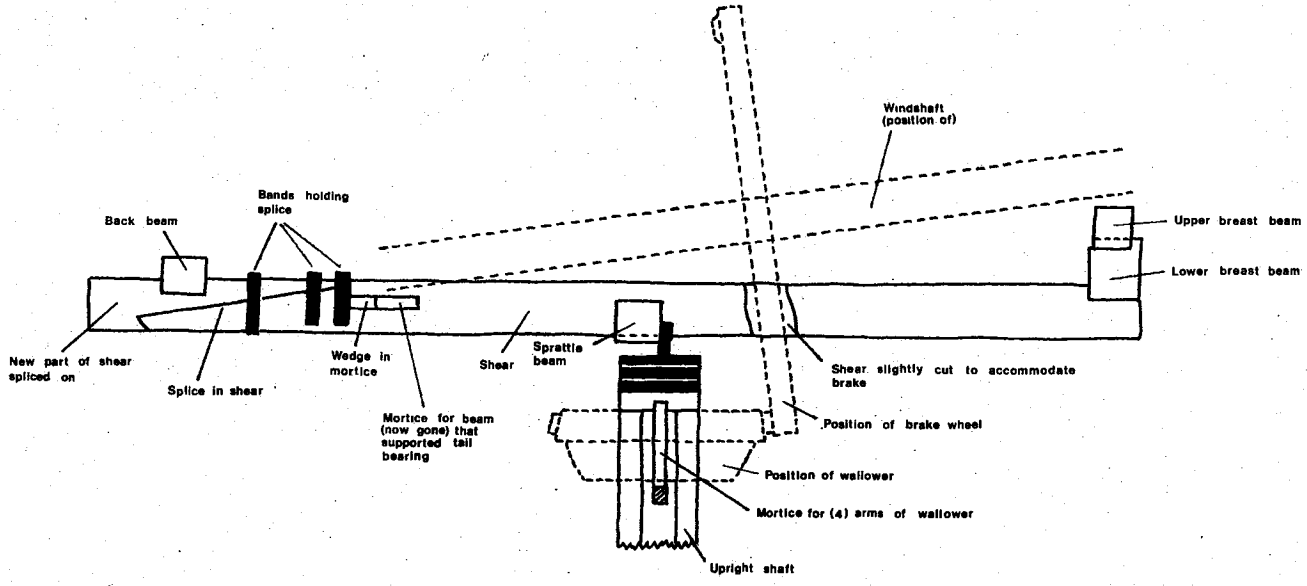
ELEVATION OF BACK GABLE OF CAP



Sept. 1977

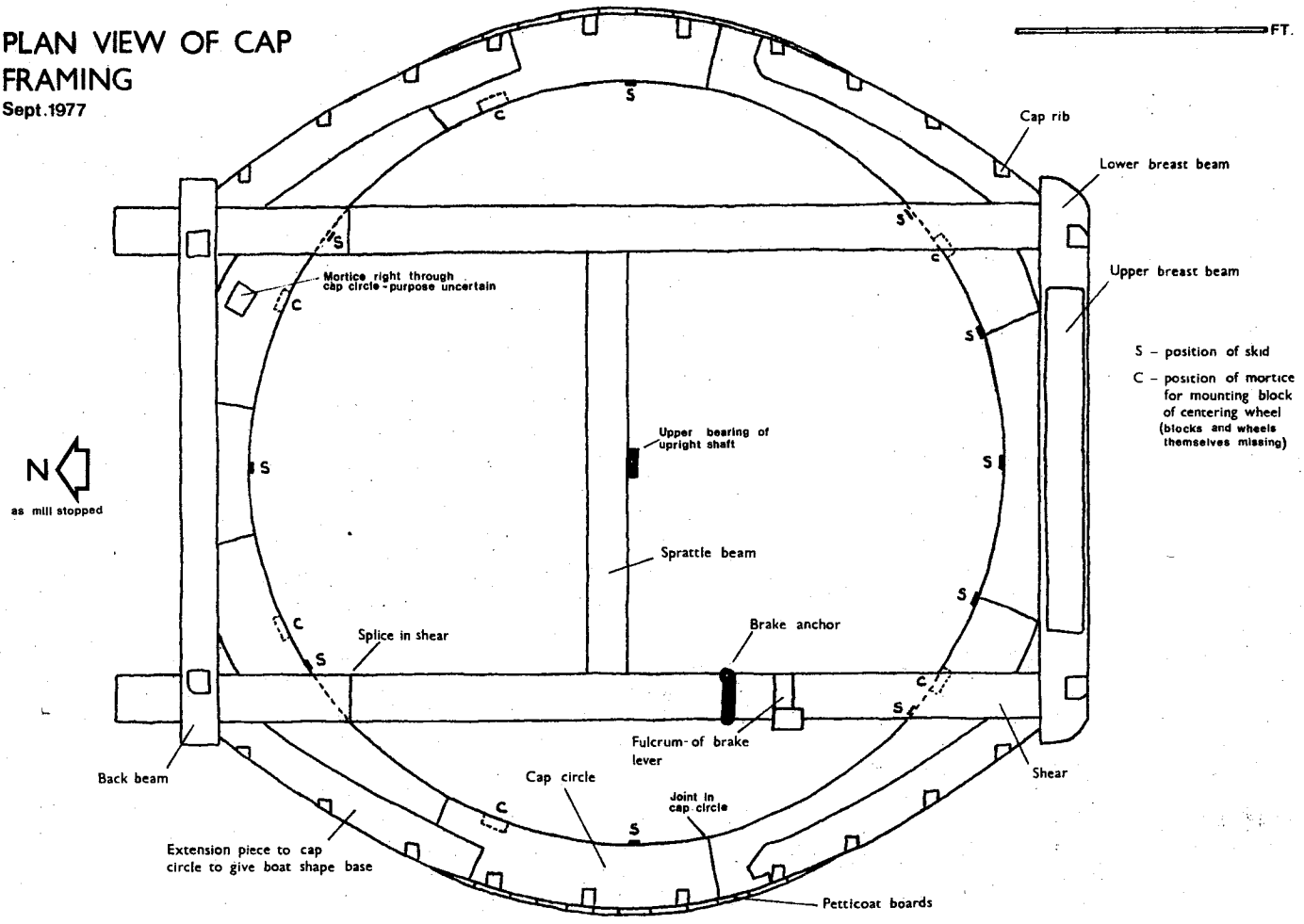
ELEVATION OF TOP OF UPRIGHT SHAFT AND SHEAR BEHIND IT

Sept. 1977



PLAN VIEW OF CAP FRAMING

Sept.1977



MILLSTONE MAKING IN ANGLESEY

by GORDON TUCKER

The sources of supply and the making of millstones, especially those of monolithic type (as opposed to those fabricated from small pieces of stone cemented together), have received little study, especially in comparison with the vast attention paid to the mills in which they were used. My recent general survey of the subject [1] seems to have aroused a good deal of interest, as did my earlier article on the millstone quarries at Penallt, near Monmouth.[2] These quarries at Penallt produced what were known as 'Welsh stones', made from the old red sandstone/quartz conglomerate, or 'pudding stone', which outcrops there. As similar stones were made in Anglesey, it was decided to make a study of the Anglesey millstone industry.

Roberts,[3] writing on the mills of Anglesey, has just one paragraph on millstones :

> '...it is noteworthy that from Benllech to Penmon were to be found the best millstone quarries in Britain and the one at Bwlch-gwyn near Benllech was probably the best known. The Rev.Nicholas Owen of Llandyfrydog in a Supplement to the Mona Antiqua informs us that from these quarries millstones were exported as far as the Baltic States. Again, one item in the records kept by the keeper of the Royal Mills, Dublin, in the year 1314 was a millstone worth 28/9d imported from Mathafarn (Benllech presumably)..'

The claim of 'the best millstone quarries in Britain' may be rather sweeping, but it is clear that Anglesey millstones were widely known.

It is believed that the distribution of millstone quarries in Anglesey was rather less dispersed than Roberts suggests. The sandstone with quartz pebbles, or conglomerate, from which millstones were made, outcrops in only quite small patches, mostly concentrated in the few square miles to the west of Benllech on the mid-eastern side of the island. It is here that the three quarries that I have been able to find and investigate are situated. (See Fig.1). It is true that in Ref.1 I refer to the making of millstones in the Penmon area (see map of Fig.1) in the 17th century, and Eames [4] quotes Lewis Morris as saying in 1748 that 'at Penmon there are several quarries of millstones of the grit kind of which great quantities are shipped off there.' However, as far as I could discover there is only a very small outcrop of conglomerate at Penmon (at SH 637810), and it is so overgrown with gorse, heather, etc. that it proved impracticable to determine whether millstones had been made there. That this rock had been quarried at least for other purposes may be adduced from the fact that some of the old Priory buildings at Penmon seem to have been constructed with it. Superficially it appears to be the same as the conglomerate occurring at the known millstone quarries, although it is about 10 miles distant from them and quite isolated.

In dealing with the sparse references to the millstone quarries, difficulties arise over their names. One reference [5] refers to 'the large [millstone] quarries of Ynys, Llyn Cadarn'; yet a modern work [6] indicates millstone quarries at Ynys and Llyn Cadarn over a mile apart, this location of Ynys appearing to be the Bwlch-gwyn mentioned by Roberts, quoted earlier. On the 1st-edition one-inch O.S. maps, Pen'rallt Millstone Quarries and Tan'rallt Millstone Quarries are marked, the former being at the location marked Brynteg on the modern 1:50,000 O.S. map and marked Rhos Fawr on the 1-inch O.S. map of c 1900; the latter marking is a few hundred yards south of the quarry near Cors Goch and Llyn Cadarn. Rhos Fawr quarry is mentioned by Hagerty [7] as the source of millstones exported to Scandinavia over a long period. To avoid further confusion, the three millstone quarries to be discussed here will be defined as follows :-

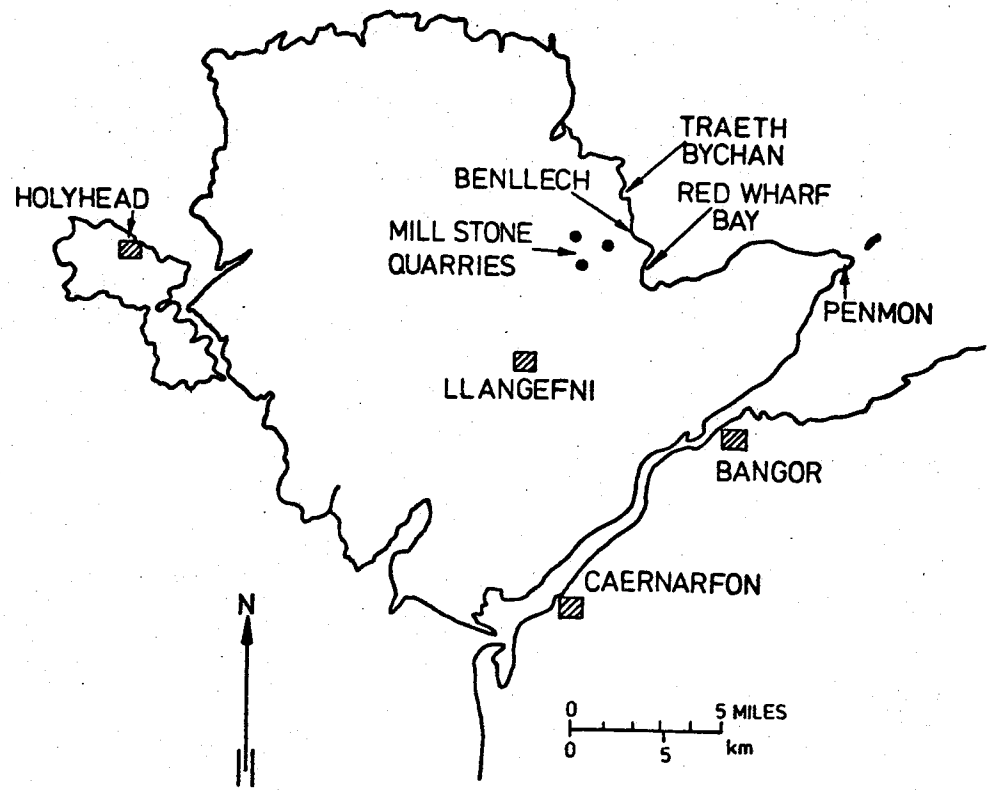


Fig.1. Map of Anglesey showing location of millstone quarries

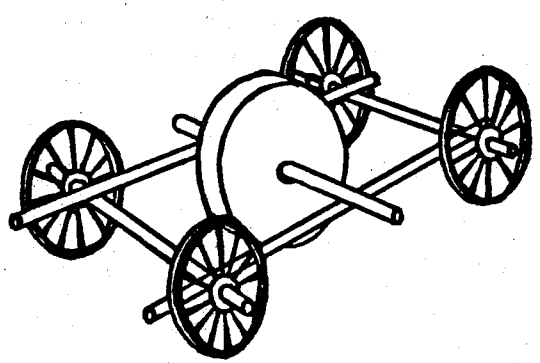


Fig.2. Method of transport of millstones

Pen'rallt: SH 493828, in parish of Llanfairmathafarneithaf.

Cors Goch: SH 494810, in parish of Llanddyfnan.

Bwlch Gwyn: SH 507-510 easting / 819-820 northing, in parish of Llanddyfnan.

Pen'rallt is alias Rhos Fawr. Cors Goch is alias Llyn Cadarn or Tan'rallt. Bwlch Gwyn is alias Ynys.

THE QUARRIES

The quarry at Pen'rallt shows the most extensive hollowing. The excavated part measures about 150 yards x 30 yards, and has a rim of rock more-or-less all round it. On the eastern edge of the quarry there are the ruins of a stone building, of external dimensions about 15 feet x 12 feet. Still lying in the quarry are 12 finished millstones, all with circular holes (or 'eyes'); three of them are flat on both faces, while the remainder are convex on one face. The dimensions of nine which could be measured are given in the table. The range of diameters from 48 inches to 61 inches is notable. Indeed, the range of dimensions generally is surprising. There is another stone, only roughly shaped and evidently unfinished, which appears to be still attached to the parent rock-mass. None of these stones had iron bands. However, lying at the northern end of the quarry is a very badly weathered stone of 52 inches diameter with a rusted iron band around it; possibly an old stone dumped there. One of the stones was propped up on smaller pieces of stone presumably to facilitate the finishing process.

It is rather a puzzle why so many finished millstones should be lying in the quarry. As they did not have iron bands round them, they may have been rejected as faulty in some way before banding; or they may have proved unsaleable at the final run-down of the industry. In any case, this is a feature of old millstone quarries generally; the quarries at Penallt (Monmouthshire),[8] the Peak District (Derbys/Yorks border),[9] and Craigmaddie Muir (Stirlingshire, Scotland) [10] are examples.

TABLE

Analysis of stone sizes at Pen'rallt Quarry

Diameter (inches)	No.of flat faces	Diameter of hole (in.)	Thickness at edge (in.)	Thickness at centre (in.)
48	1	10	10	14
49	1	9	9	13
51	2	9	12	12
51	1	9	10	?
52	1	10	10	12
53	1	13	11	14
55	1	9	10	?
56	2	10	12	12
61	2	9	12	12

The quarry at Cors Goch is in an isolated outcrop of conglomerate standing out from the rather flat heath around it. This outcrop is only about 50 yards wide, and roughly circular, and there appears to have been much less excavation than at the Pen'rallt quarry. On the northern edge are the ruins of a stone building very much the same as that at Pen'rallt. There are no finished millstones to be seen, although there is so much overgrowth of gorse and heather that it cannot be inferred that there are none in existence there. There is one unfinished millstone, 56 inches diameter, with no hole yet cut. There is also part of an unfinished millstone still attached to the parent rock on the rock face of one side of the quarry; a circular groove about 2 feet deep has been cut in the rock to define the edge of

the millstone, and the upper face has been roughly dressed, but what should be the other face is still partially attached to the main rock. A large part of the stone has broken away, presumably during the undercutting operation.

The quarry at Bwlch Gwyn is based on a long narrow outcrop of conglomerate about 300 yards x 100 yards, and the quarrying seems to have been mainly along the edge. The place has been 'tidied up' to make it into a caravan site, but there are still two finished but broken, and two unfinished, millstones to be seen. One of the finished stones was measured; it is 55 inches diameter with a circular hole of 8 inches diameter, 10½ inches thick at the edge and 14 inches in the centre.

No claim can be made that all the sources of millstones in Anglesey have been found. Millstone quarries are generally small, taking the form of shallow hollows in the top of a hillock-shaped outcrop. They would be hardly detectable from a distance even if not completely overgrown. Making a comparison with the other source of Welsh stones at Penallt in Monmouthshire, there are there some eight old millstone-quarrying areas, but some are so difficult to find and recognise that at least two of my correspondents failed to find them even though given six-figure grid references !

METHODS

We were fortunate in being able to have a talk with Mr.R.W.Morris of Pen-llyn, near the quarry at Cors Goch, followed by very useful correspondence. He is old enough to remember very clearly how the millstones were made when he was a boy, and stated that the work went on up to about 1910. He is certain that the millstones were made by shaping while still attached to the parent rock: 'they picked around the rock to the right size and depth'. He said that suitable pieces were not first broken off and then cut to shape. When the stones were finished, iron bands were fitted around them. There was a smithy for repairing tools and making iron bands, etc. There was no crane at the quarry. The stones were hauled away on a four-wheeled frame wagon as shown in Fig.2. (This sketch was made on the basis of Mr.Morris's oral description, then corrected after he had commented on it.) The wagon was drawn by four horses; arrangements for steering and haulage are not included in the diagram as they were not discussed. The immediate destination in Mr.Morris's day was Benllech station on the Anglesey Central Railway. This branch was opened in 1909 (and finally closed completely in 1950),[11] and evidently the carriage of millstones by this railway was short-lived. Probably, before the railway came the stones were shipped from Red Wharf Bay.

Mr.Jones of 'Gernant', near the Pen'rallt quarry, who has lived there all his life - and his father before him - said the millstones used to be taken (inter alia) to Barmouth, where his grandmother had lived in her early days.

The sketch of Fig.3 has been based on an old photograph found in the Anglesey Archives Office.[12] Nothing is known of its date and origin except that it shows a millstone quarry 'at Traeth Bychan'. No other reference to a millstone quarry as far north in Anglesey as this has so far been found, the one-inch geological map of c 1900 does not show any sandstone/conglomerate at a position to correspond to that in the photograph, and it is not impossible that it is actually one of the quarries described in this article. It is clearly a quarry of the same type, i.e. worked on an outcrop of conglomerate. Several things in the picture are noteworthy. The frame wagon is clearly of the type described by Mr.R.W.Morris in relation to the Cors Goch quarry and outlined in Fig.2. That the millstone was carried vertically as he said, on a pole or beam, is confirmed by the millstone just in front of the wagon with a pole through its eye. The iron bands which Mr.Morris said were fitted to the stones are seen on the stones in the bottom right-hand corner. Four workmen are seen, two of whom are wielding picks. The second man from the left is standing on a piece of rock which appears to have been detached from the parent rock before shaping into a millstone. The large millstone in the centre is curious; it is apparently at the upper extremity of size, and has its edge finished and fitted with an iron band before the back has been dressed. Perhaps the fitting of an iron band at a very early stage helped to prevent shattering or cracking of the stone as it was handled and picked. Even so, the stone seems too thin where it is standing on the ground to make a millstone of common type.

Fig.3. Sketch made from old photograph of millstone quarry in Anglesey

PEOPLE

A limited amount of information about the millstone industry may be obtained from the manuscript census enumerations of 1841, 51, 61 and 71.[13] In statistical terms they show 6 millstone makers in 1841, 2 in 1851, 3 in 1861, and none in 1871. (N.B. The returns for all likely parishes have been searched.) This would indicate that the peak of the industry had been passed by 1841. Doubtless, competition from French burr stones had by then become very serious.

In personal terms, we see the Parry family involved as millstone makers over three generations. Owen Parry of Tyddyn Tytodion (probably the house shown by that name on the 1st edition one-inch O.S. map about 600 yards south of Pen'rallt) was 50 in 1841, 62 in 1851, [14] and absent (probably dead) in 1861. John Parry of Ty Coch (probably the house of that name about 200 yards further south) was 25 in 1841, absent in 1851, and 49 in 1861. His son, aged 19 in 1861, lived with his father and was also a millstone maker. Thomas Parry, aged 30 in 1841, was probably another son of Owen Parry, but his residence Cae'r gaseg has not yet been located, and he does not appear in later returns. The Parrys all lived in the parish of Llanfairmathafarneithaf and almost certainly worked the Pen'rallt millstone quarry. My local informant, Mr.R.W.Morris, told me that it was a Robert Parry who was working the quarry in 1910. It seems very probable that the Parrys worked this quarry for a century or more.

Henry Williams of Pen'rallt (aged 30 in 1841) was a millstone maker in 1841 and 1851 but not thereafter. He too must have worked at the Pen'rallt quarries.

The only entry which suggests working at the Cors Goch millstone quarry is John Hughes of Pen-y-llyn, aged 53 in 1861; he does not appear in any other return. His house is probably the 'Pen-llyn' near Cors Goch quarry where our informant Mr.R.W.Morris (referred to elsewhere) now lives. In this case the parish is Llanddyfnan.

Operation of the Bwlch Gwyn millstone quarry is indicated by William Thomas of Bwlch Gwyn, aged 50, in the 1841 return for Llanddyfnan parish and by William Lewis of Bryn-y-felin, aged 25, in the 1841 return for Llanfairmathafarneithaf parish. Lewis's residence is about a quarter of a mile north-east of Bwlch Gwyn, so it is reasonable to suppose he worked there. There are no entries of millstone makers in the vicinity of Bwlch Gwyn in subsequent returns, so it is possible that this was the first of the three quarries to be abandoned.

Obviously these small numbers of millstone makers must represent only the masters or foremen. In most of the parishes, the enumerations show large numbers of quarriers; the majority are entered as slate quarrymen, and were no doubt workers at the Caernarvonshire slate quarries who were spending the week-end at home in Anglesey (N.B. the censuses were taken on a Sunday). But of those not shown as specifically concerned with slate, some might well have been workers at the millstone quarries. It is just possible that a study of the church and chapel registers would throw some light on this matter, but my experience in trying this source in Monmouthshire suggests it would not be worth the effort.

The working of the millstone quarries in Anglesey in the later part of the 19th century was probably, and in the early 20th century was certainly, on an intermittent basis. Mr.Morris thinks that only about two stones a year were produced at the Cors Goch quarry in the period just before 1910.

DISCUSSION AND CONCLUSIONS

The main features of millstone making that have been observed at the Anglesey quarries are

1. The millstone was sometimes, and possibly even usually, cut into shape before being detached from the parent rock.
2. The millstone was completed (except for the cutting of furrows - a task presumably left to the millwright or miller) at the quarry.
3. Iron bands were fitted to the millstone at the quarry, and most, if not all, millstones had such bands.
4. The stones were cut to a variety of dimensions.
5. There is no indication of the use of cranes at the quarries and the stones must have been lifted by manpower (the typical weight was 15 cwt or 0.75 ton).

6. Transport from the quarry was by horse-drawn frame wagon with the millstone carried upright on a pole through its eye.
7. A single stone building was provided at each quarry and used as a smithy.

It is useful to try to compare these features with what is known of the practice at other millstone quarries. Unfortunately little has been recorded of such practice.

There are records of feature (1) at Barnacarry in Argyllshire, Scotland [15] and Craigmaddie Muir in Stirlingshire, Scotland.[16] Against this is the fact that I have observed no sign of it at Penallt (Monmouthshire) or in the Peak District. It was, however, a common practice in the German millstone quarries and mines near Cologne,[17] though not in those in Thuringia.[18]

Feature (2) seems to have been universal; I know of no case where pieces of rock were transported to be made into millstones elsewhere. (This applies only to monolithic millstones, of course; French burr millstones were made in factories from pieces imported in the rough from France.)

Feature (3) is probably a variable practice. The fitting of iron bands to prevent shattering is obviously sensible, but I have come across no case of it with Penallt millstones, although quite common with Peak stones. At Trefin Mill in Pembrokeshire the runner stone had an iron band, but the bedstone did not; there is some logic in this, as only the runner is subject to centrifugal forces and other forces due to motion; both stones were of conglomerate, but the geographical origin was not known. In quarries in Thuringia in Germany, where the stone was a form of quartz porphyry, iron bands were fitted.[19] It must be remembered that many millstones (i.e. among those not intended for corn mills) were to be used as edge-runners, and for these iron bands would be unsuitable; either bare stone or complete iron casings would be used. For example, a large proportion of Penallt millstones were used in cyder mills, and for crushing apples the bare stones were invariably used.

Feature (4) is normal, and is found at most millstone quarries.

For feature (5), I have no data for other quarries.

For feature (6), practice must have been very variable. At Penallt there is ample evidence that stones were rolled down narrow gully paths to the riverside, whence transport was usually by barge. Some transport by cart is recorded, but no information on the type of vehicle is available. Evidence is rather vague for the Peak District according to Radley.[20] Definite evidence of the use of a frame wagon rather like those used in Anglesey is available for the German quarries, photographs showing them clearly, but with the millstones laid flat [21] - not carried upright as was reputedly the case in Anglesey.

For feature (7), I have no evidence at other quarries. At some of the large ones (e.g. in the Peak District) one would also expect covered workshops to be provided for the finishing of the stones; this was certainly done in Germany.[22] (The provision of a smithy and a dressing workshop was, of course, normal practice in even quite small slate quarries.)

There is also a negative side to the conclusions; no evidence was found in Anglesey of the practice reported from both Penallt and the Peak District of dressing the face of the stone with cross grooves, the bottom of the grooves marking the level to which the rest of the face must be reduced.[23] My informant Mr.R.W.Morris (previously quoted) was asked specifically about this, and said he had never seen it done.

ACKNOWLEDGEMENTS

Thanks are due primarily to Mr.R.W.Morris who gave me such useful information from personal recollection. The unfailing courtesy of the many people questioned is worthy of record. The staff at the County Library at Llangefni were very courteous and helpful. I am particularly indebted to Mrs.V.Bradford of the Anglesey Archives Office for help during my visit, and for undertaking searches for me subsequently. As usual, my wife Mary managed to discover evidence that I would probably have overlooked. I am grateful to my son Roger for making the sketch in Fig.3.

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9. See ref.2.
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21. Gleisberg, loc.cit.
22. Ibid.
23. See ref.1, espec. Plates IX and X therein.

THE TURTONS OF KIDDERMINSTER
Iron Founders, Engineers and Millwrights
by D.T.N. BOOTH

The Caldwall Iron and Brass Foundry was established by the brothers George and Richard Turton in 1831. Within a few years they were casting an impressive range of products, including ploughs, fire-bars, stoves, standard weights, tailors' irons, columns and palisades for gardens and tombs. Alongside this general trade the Foundry specialised in four main areas. For the Staffordshire and Worcestershire Canal Company they produced many lock fittings, sluice gates and at least two cast iron bridges. Street furniture, mainly road grates and kerb plates, was to provide much business until well into the twentieth century. From the earliest days they manufactured a complete range of water pumps, cisterns and pipework for all domestic, public and commercial needs. However, until the end of the nineteenth century, the most important product of the Foundry was the driving machinery for watermills and factories. They cast innumerable shafts, gearwheels and pulleys, and well over one hundred and fifty waterwheels in the first forty-five years alone.

Certainly in the early years the Turtons could have been described as millwrights as well as founders. George Turton inspected many mills to produce estimates for potential customers, while his brothers Richard and Jude Turton carried out some installations. However, the majority of waterwheels and gearing were made to the orders of millwrights from all over the West Midlands and as far away as South Wales. That they were used by many millwrights must be a tribute to the Turtons' reliability and the quality of their products. More than forty millwrights were regular customers, and many others used them occasionally. Even those with their own foundries often ordered much machinery from the Turtons. Notable examples of this practice were successive members of the Bate family of Himley, and later Compton near Wolverhampton, who had large numbers of castings made at the Caldwall Foundry over a period of approximately seventy years, and the Summers of Tanworth-in-Arden. It was almost certainly cheaper to order 'off the shelf' from the Turtons rather than spend valuable time and money on the making of patterns. Even waterwheels were ordered this way when possible, although the Foundry cast many to the individual designs of their customers. A fine example is the undershot waterwheel at Blyth Mill, near Coleshill, which was designed by Robert Summers and cast at the Caldwall Foundry in 1860. Understandably this wheel has Summers' name cast on the rims, but many wheels designed by the Turtons carried only the name of the millwright who ordered and installed them.

The Turtons soon produced a standard design of waterwheel which could be adapted to suit most requirements. It had ribbed arms bolted to the hubs and shrouds or rims. The number of arms varied according to the diameter of the wheel - six, seven or eight per ring being the most common. While not the most elegant design, it was certainly strong and reliable, several examples surviving to the present day. Few bear the Turtons' name, but they are easily recognisable by similarities in their components. In the early days they tried an 'all-in-one' casting for undershot wheels, with rim, arms and hub cast together. Each ring was made in two parts, and bolted together at the rim and hub. One such wheel, ordered in 1837, survives at Newnham Mill near Tenbury Wells. A further design allowed for wooden arms, with deep 'boots' cast on the hubs. The shape of the hubs varied according to the choice of axle. George Turton favoured a hollow cylindrical axle with four raised ribs. Although good design, strength and reliability were of utmost importance to mill owners and millwrights, cost must have been an important factor in their choice. Unfortunately surviving accounts of millwrights' work are rare enough to make comparisons difficult. However, the popularity of the Turtons' waterwheels must be a good indication of their competitiveness. The following examples, taken from the Order Books and Memoranda/Letter Books give some idea of the variety and price of their products.

April 10th 1838
Mr. Godfrey, Heathy Mill.
Water Wheel Shrouding 14ft. dia. to be cast in 7 parts to have 42 Ladles 4ft. 2in. on the Breast. Soling Pins and Rivets etc. complete for £41 10s. Cast Iron Pentrough 9ft. long 4ft. 2in. wide and 4ft. 2in. deep open at the end next to the Pool for £20.
Wrot Iron Grate for the mouth of Trough for £2.

December 7th 1838
Mrs. Rogers, Rock
1 Water Wheel 11ft. dia. 4ft. 2in. wide 36 Wrot Iron Ladles and Soling Naves 21½in. dia. to be erected for £50. Mrs. Rogers to convey it to the Mill and find a Millwright to take out the old Wheel and hang the Naves of the new one.

June 27th 1846
William Hodges
Dear Sir,
On the other side is a plan and elevation of the Water Wheel etc. for Busselholme Mill showing the way it would take the water. I propose to put in a Water Wheel 14ft. dia. 8ft. wide and shaft 14ft. 3in. long between the journals. New Pit Wheel and Wallower, Forbay, etc. The cost here would be about £178. I think the old Wheel would be worth about £30 to be taken from the above amount.

Yours very respectfully,
George Turton

P.S. I have no doubt if the alteration is made that the mill will do double the work it is now capable of. G.T.

May 12th 1847
Henry Miller Old, Piddletrenthide
Nr. Blandford, Dorset
Sir,
Our price for an Overshot Water Wheel 10ft. dia. and 4ft. wide, Wrot Iron Shaft 4in. square 7ft. long and Carriages and Brasses for do. delivered at Bristol will be £50. The Pit Wheel and Pinion we can deliver at 16/- cwt. We could not ascertain the expense of carriage to Weymouth but concluded Bristol was the cheapest route. Your order will oblige,

Yours respectfully,
G. & R. Turton

May 27th 1848
George Turton will make and erect an Undershot Water Wheel 17ft. dia. 4ft. 2in. wide with Wrot Iron Starts, Screw Pins, etc. Elm Ladle Boards, Cast Iron Cylindrical Shaft 12ft. long, Turned Journals, for the Sum of £56 12s.
Mr. Foley carrying it to Meadows Mill

Particulars

Shaft 12ft.					£14	10	0
2 Naves	5	0	0				
12 Arms	10	0	0				
12 Segments	13	0	0				
	1	8	0	0 at 14/-	£19	12	0
72 Wrot Iron Starts					£ 8	0	0
Pins and Fitting					£ 4	0	0
36 Ladle Boards 4ft. 2in. x 1ft. 6in.					£ 4	0	0
1 Casting for Pit Wheel					£ 1	10	0
Putting in and Hanging Pit Wheel					£ 5	0	0
					£56	12	0

September 1849
Water Wheel 16ft. dia. 3ft. wide erected at Alveley for Mrs. Brettell for £52

16 Segments	12	2	22				
16 Arms	11	1	1				
2 Naves	4	1	2				
	28	1	4	at 14/-	£19	16	0

64 Ladles	12	1	15	at 20/-	£12	7	8
24 Soling Plates	5	1	27	at 20/-	£ 5	9	10
96 Pins			50	at 6d.	£ 1	5	0
640 Small Pins				at 1d.	£	13	4
Rivets			20	at 6d.		10	0
Jude Turton &. T.Taylor 2 days each						17	0
Mr. Horne for repairing Pentrough & hanging Wheels					£ 4	0	0
					£46	18	10

Cr. by old Naves & Pins 10 0 24

March 9th 1852
J.Bill Hardwick, Burcote
Undershot Water Wheel 19ft. dia. 12ft. wide 32 Ladles 20in. deep and 8in. along the Soling 3/16in. thick. Wrot Iron Starts 4 sets of Rings and Arms. Eyes in Naves.....dia.
1 Shaft 17½in. dia. 17ft. long beside the Necks so...

with 4 ribs
2 Carriages and Brasses for do.
to be fixed for £130 Mr. H. conveying it there and taking out the old one.

January 20th 1871
James Philips, Priory Mill, Abergavenny
1 Overshot Water Wheel 16ft. dia. 4ft. 6in. wide 56 Ladles and Soling. Wrot Iron Arms 4½in. x 5/8in. Eye in Naves 26in. dia.
Head of Water 5ft.
Delivered at Abergavenny for £55.

Although the Turtons could hardly be described as innovators in their own right, they did help to spread new ideas or improvements in mill machinery. George Turton kept a close eye on developments put forward in such publications as The Engineer, and recommended their use when applicable. An example of this occured in the installation of a new waterwheel at Knighton Mill.

December 2nd 1847
Mr. Banks,
Sir,
It would be much best for me to see the Mill you require alterations to, and if you favour us with the order we will not charge you going over. If you wish me to come please give me a few days notice that I may arrange it, and think you will find it much the best. The plate of Mr. Fairbairn's Breast Water Wheel is in No. 18 of The Engineer.
Waiting your reply I remain, Dear Sir,
Your very obedient servant
George Turton

May 6th 1848
William Banks esq.
Dear Sir,
I enclose you a sketch of Water Wheel 14ft. dia. and 7ft. wide with two sets of outside Shrouding (to save expense of cementing the sides of the race true) and one set of do. in the centre with Wrot Iron Starts and Ladles, Cast Iron Shutt and Forbay with drawing apparatus delivered at Ludlow and erection included for £90. Cast Iron sheeting will cost about £10 more. If you cement the sides of the Wheel Race you won't require outside Shroudings which will lessen the expense of Wheel £8 as we shall only require two lots of inside Shroudings, etc. I am sorry I have so long neglected sending this, but have had so many things to arrange that caused the delay. I hope you will be able to

understand the sketch and any further information I shall be happy to give.
I remain, Dear Sir,
Your obedient servant,
G. Turton

May 13th 1848
Wm. Banks Esq.
Dear Sir,
In answer to yours of yesterday I beg to say that the water is intended to be taken from the surface of the pool by lowering the Shuttle with Racks and Pinions so as to allow the water to flow over. In answer to your 1st. question you cannot have a close Bucket Wheel to make more than 4 revolutions per minute while your present one is making 9 revolutions which would require an alteration of double the speed in the inside machinery and the Wheel ought to be at least 12ft. wide and would cost £50 more. 2nd. I would get a close Bucket Wheel ready in four months and one like the sketch in three months. A short time since I saw a Wheel like the sketch 14ft. dia. and 7ft. wide and with about 7ft. of head in fall with the water taken from the surface making about 8 revolutions per minute and driving three pairs of stones. The ends of the Buckets were open which I think will be necessary in yours in order to get as great width as you can.
I remain, Dear Sir,
Your obedient servant,
George Turton

Fairbairn's sliding hatch had been in use for more than twenty years, but was obviously novel enough to confuse Mr. Banks. However, George Turton's persuasive turn of phrase paid off and the order was placed on May 19th 1848. One cannot help feeling that he had the parts of just such a wheel left on his hands from a previous cancelled order. 'Unavoidable delays' prevented completion of the wheel until late October and it was finally installed early in November 1848. A similar arrangement was erected for Lord Wrottesley at Trysull Mill near Wolverhampton in 1861. This waterwheel and the guide vanes which directed water onto the wheel survive but the sliding hatch was replaced by a conventional lifting gate many years ago.

For internal machinery the Turtons made every conceivable size of gearwheel, pulley, drum and shaft. Other mill fittings included columns and bed plates to support the millstones. These became quite popular in the region as they simplified the process of levelling the bedstones, which could be effected by adjusting three screw pins through the base of the plates. When columns were added from the solid ground floor of a mill to the plates, this isolated the stones from any movement in the structure of the mill. However, the Turtons rarely made the machines which their waterwheels and gearing were to drive. Isolated items do occur, such as a bone mill and a 'paper machine'. Equally they themselves seldom fitted more than the primary driving machinery, that is, waterwheel, axle and pitwheel. If further work was required the services of an outside millwright were called upon. George Turton did once tender for the total re-fitting of a mill, but was unsuccessful.

May 2nd 1848
Thomas Turner Esq.
Dear Sir,
I enclose you a plan and elevation of a portion of your Mill to show the Gearing and the Shafting to drive the Machine and I have guessed at not knowing the situation or length. The Upright Shaft will require to be very long, unless the bottom floor can be lowered. I have reckoned it 2ft. above the centre of Water Wheel. I can make and deliver at Kington an Iron Water Wheel 12ft. dia. and 12ft. wide. Cast Iron Shaft for Do. 17ft. long, 2 Pedestals and Brasses for Do. Cast Iron Forbay and Sink Shutt complete, Pit Wheel 10ft. dia. and Pinion, Spur Wheel and 4 Pinions and Boxes. Mill Spindles and Centre Irons, Crown Wheel and Pinion and Upright Shaft 16ft. 4in. long. Wrot Iron shafting, Pedestals and Brasses for driving Machines. 4 Columns, Bridge Trees, and 2

Wall Boxes. Fix the Stones and all Machinery. Find Wood and make Hoops, Hoppers, Meal Troughs, etc. Timber to be found by you for all Cills, and for the Mill Stones to lay on for £333. If you favour me with the job I will come over to see the mill and take every particular necessary.

Your obedient servant,
George Turton

May 31st 1849
Thomas Turner Esq.

Sir,

I am disappointed respecting your Mill Job for I made sure no one could do it for less of Iron. As Mr. Meredith is doing the work, please to return the Sketch I sent, it may be of use another time.

Your obedient servant,
George Turton

Sadly, when large numbers of small, water-powered mills ceased operating towards the end of the nineteenth century, many of the Turtons' best customers went out of business. At the beginning of the twentieth century the bulk of their income came from supplying castings to local carpet mills and iron works. The last waterwheel was cast in 1906. In 1911 the Turtons sold their interest in the Caldwall Foundry to Francis Bradley of Glensmore Foundry, Kidderminster. The Company became known as Bradley and Turton, and continued to supply mills when required, while building up other aspects of the trade. Road grates for many Midland Councils, and large pipework contracts for the National Telephone Company and various gas supply companies provided much work.

In more recent years the Company turned to manufacturing pumps and hydraulic presses for the plastics industry. All casting at the Caldwall Foundry ceased in 1973 but these machines continued to be assembled there until the Works closed down on March 23rd 1979.

The Turtons' contribution to the continuing use of water power in the West Midlands can be judged by the quantity of machinery cast at the Caldwall Foundry which still survives. Although much has now gone to the scrap merchants, the Order Books make it clear that the majority of mills in the region, and many elsewhere, contained at least one gearwheel or pulley cast at the Foundry. The list below shows where some more complete examples of the Turtons' work can be found.

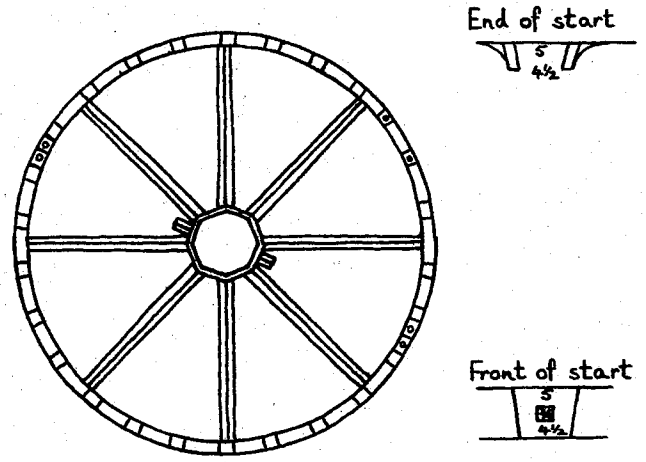
Newnham Mill, near Tenbury Wells (SO 641691) - undershot wheel c.15ft. x 4ft. 1837 - shaft and gearing c.1927
Blyth End Mill, near Coleshill (SP 210907) - undershot wheel 17ft. 10in. x 5ft. 10in. 1860 (designed by Robert Summers)
Blackford Mill, Henley-in-Arden (SP 153651) breast shot wheel 15ft. x 8ft. 1853 (altered by Robert Summers 1879)
Trysull Mill, near Wolverhampton (SO 852945) breast shot wheel 17ft. 6in. x 6ft. (originally fitted with Fairbairn's sliding hatch) 1861
Cleobury Mill, Cleobury Mortimer (SO 679757) low breast shot wheel 16ft. x 7ft. 1876 - gearing
Burford Mill, near Tenbury Wells (SO 575684) high breast shot wheel 12ft. x 4ft. 4in. pentrough etc. 1853, overshot wheel 10ft. 6in. x 5ft. 6in. 1854, all gearing
Wodehouse Mill, Wombourn (SO 886937) pitchback wheel 17ft. x 3ft. 6in. - part gearing
Little Mill, Llanddewi - Sgyrrid, near Abergavenny (SO 353156) overshot wheel c.18ft. x 2ft. 6in. pre. 1848

All the information for this article has been taken from the surviving Order Books and Letters/Memoranda Books which date from 1837. Although they were known to exist, for some years it appeared unlikely that these books would ever be made available for study. However, just prior to the closure of the Works, contact was made with the manager, Mr.Ray Tunks, who showed great interest

in the firm's history and was instrumental in arranging with the new owners, Francis Shaw & Co. of Manchester, that the Books should be preserved. All those which remained at the Works were transferred to my care, pending eventual permanent placement in a Public Record Office. One Letters/Memoranda Book was later aquired by the Kidderminster Museum and Art Gallery from another source.

I am greatly indebted to Mr. Tunks for his help in securing the future of these records, for without his cooperation they would almost certainly have been destroyed. Equally, I am grateful to Mr. M. Dwight of Kidderminster Museum and Art Gallery for loaning me the Book in the Museum's collection, and for giving up much time to discuss Kidderminster and its industries, about which he has seemingly limitless knowledge.

Order for new waterwheel at Newnham Mill - March 18th. 1837



Mr. Chas. Bury, Newnham Mill
2 Rings Arms & Naves cast together for an Undershot Water Wheel 12ft. 6in. Dia. Ring 5in. wide 1½in. thick Eyes 22in. Octagon 6in. deep 1⅝in. thick 8 Arms in proportion for 26 Starts, to be cast in two parts as per Sketch per Order of Mr. Philip Hodges. Also 2 sets of Centre Irons Eyes 2in. square. Water Wheel 16/- per Cwt. Flange on outside from Start to Start to screw back board to.

THE MILLS AND WATERCOURSES OF THE BELNE BROOK
An introduction to the 1945 script of the late H.E.S. Simmons
by JONATHAN BRIGGS and GORDON TUCKER

The late H.E.S.Simmons studied wind and water mills throughout the country and compiled a massive collection of notes and scripts and other material which, on his death a few years ago, was donated to the Science Museum Library in London. His Midlands material was particularly comprehensive, as he had personally visited nearly every mill in the region. Among his collection was a typescript article of 1945 on the mills of the Belne Brook in North Worcestershire. This group of mills was of exceptional interest, as so many of them were concerned with the making of scythes for the national and international markets and kept working until comparatively recently. An abridged version of the article was published in The Miller, June 1947, pp.492-4. The full version is being published, it is believed for the first time, in the following pages of this Journal. It is an excellent article and it appears here without any revision although with annotations by us; but it has two small weaknesses, namely: (a) the locations of the mills as given by Simmons are generally rather imprecise, and (b) it misses three sites which we know about. Moreover, Simmons hardly discussed the watercourse arrangements, and we feel these are important and interesting enough to be recorded. Thus what we give in this introduction are (1) a complete list of the 24 mill sites of which we are aware, with their 6-figure grid references, together with a note of the present condition of the mill or site, and (2) a diagram of the watercourse and pond arrangements, mainly as derived from our study of the Tithe Awards of c1840.

The Mills

Numbering as on our diagram. Names (as far as possible) as given by Simmons.

1. Shut Mill. SO 948786
   Site exactly as described by Simmons, pond in good order.

2. Newtown Forge. SO 946776
   Building still stands, used as stables. Wheel was internal, and arch remains with one axle-bearing support. Pentrough with circular pipe remains, and leat traceable from pond, now dry.

3. Bell End Mill. SO 938773
   Mill and pond gone (obliterated by road widening), but an interesting old building remains, with arched timber beam above wide doorway, surmounted by brick arch.

4. Bell Hall Mill. SO 935773
   This had evidently disappeared before 1840, as the Tithe Map shows no mill, although it does show the old leat to it.

5. Galton Mill. SO 933773
   Most of mill building remains, northern section largely intact, southern section largely rebuilt to house BELBRO Precision Engineering. Wheelhouse, with wheel, remains intact. Pond and dam in good order, but no water power used.

6. Middle Mill and Forge. SO 927774
   Mill completely gone and a series of new fish ponds constructed. The bridle road leading to the site is still paved with a double line of old grindstones.

7. Blade Mill. SO 924774
   Site shows no remains of mill, but triangular pond remains.

8. Belbroughton Mill. SO 922774
   No sign of mill itself, but the pond is now an ornamental pond in garden.

9. Belbroughton Forge. SO 919772
   Site now houses an untidy collection of old and new buildings, used by various small firms. Collectively still referred to as the 'Nash Works'. Old iron gates with name ISAAC NASH survive, and many old grindstones about. Pond dry and derelict.

10. Lower Belbroughton Mill. SO 917771
    No sign.

11. Lower Belbroughton, Early Mill. SO 918770?
    No sign, and it was not shown on Tithe Map.

12, 13. Weybridge Forges. SO 911765
    Site much altered, used for other purposes, including the dumping of dozens of old boilers and tanks. Two old buildings survive, one presumably part of the Top Forge, containing a derelict oil-burning boiler and with an oil-fired brick furnace outside. Pond gone. Leat from Belne Brook survives except for last 400 yards where its embankment has been widened and flattened to make roadway and dumping ground.

14. Drayton Mill. SO 906760
    The large mill building is in good condition and used by five different firms, although not as a mill. The turbine and water-driven machinery was removed as recently as 1979. The pond and dam are in excellent condition.

15. Hillpool Mill. SO 898760
    The large mill building still stands, and wheel pit is still detectable at eastern end. Roof timbers, supported by iron pillars, seem in good condition. A piece of layshaft and some wood and iron pulleys remain in the roof space at eastern end.

16. Hillpool Forge. SO 896761
    Only the walls, a roof timber and a cast-iron window frame remain.

17. Barnett Mill. SO 889765
    Mill still stands, but used as part of residence, to which it is now linked. Remnants of the waterwheel are preserved in situ, and are now external to the building, the eastwards extension of the mill mentioned by Simmons having been demolished. The lucam remains. Terminal pond and leat remain, but mostly dry. A nice little brick bridge about 200 yards from mill carries the leat-side footpath over the overflow sluice and channel. Beyond the mill the main road is carried over the brook by a delightful masonry bridge with gracious curving abutments.

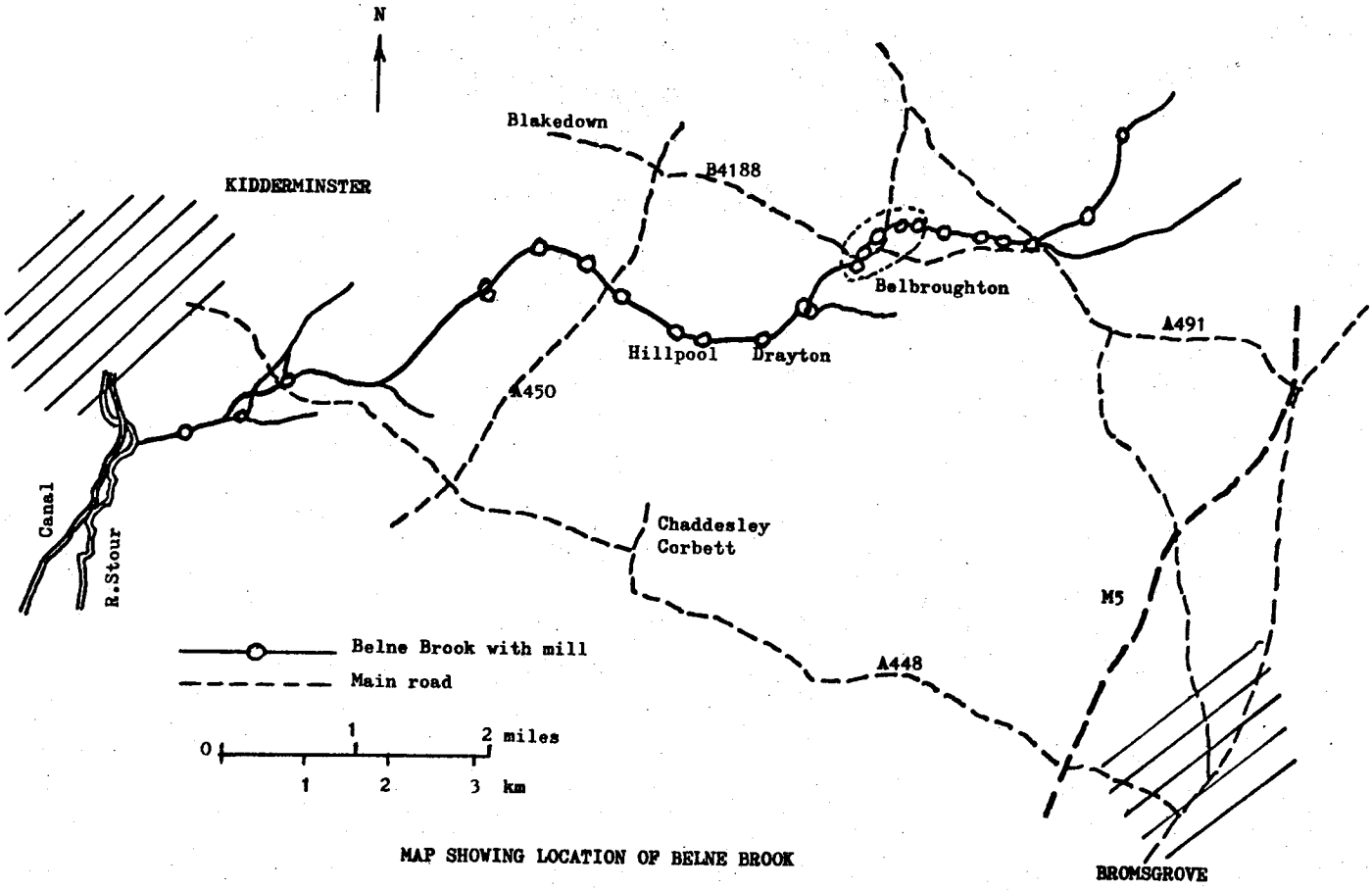
18. Bellington Mill. SO 885769
    Building still stands, but contains only a modern electric pump, now out of use, but formerly used, probably, for pumping water from the brook to a house or farm building.

19. Lower Bellington Mill. SO 879771
    Completely ruinous.

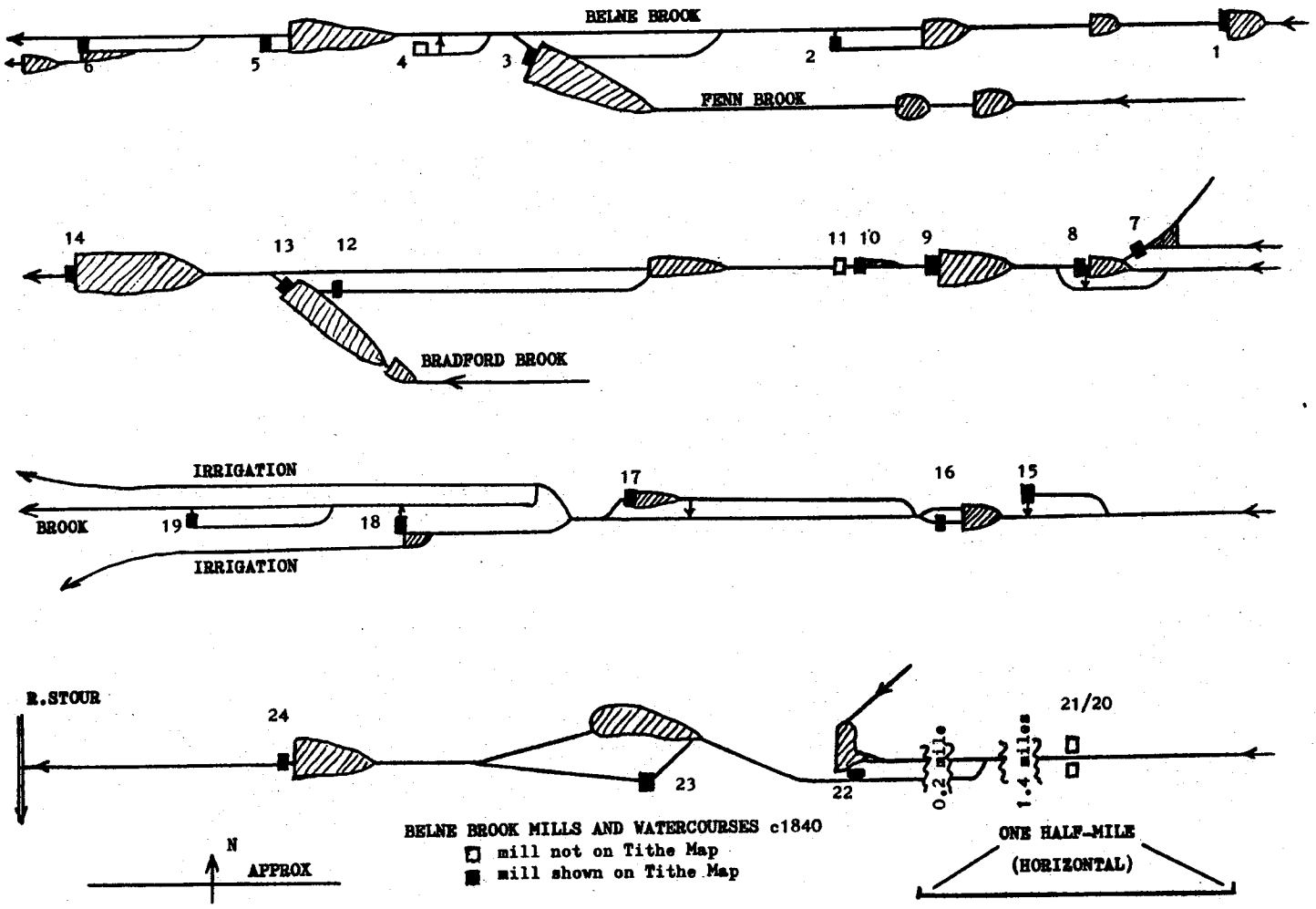
20, 21. Two 'Old Mills'. SO 873766
    Sites not recorded by Simmons, but shown as 'Old Mills' on a plan of 1737 in the County Record Office at Worcester (ref. BA844-f970.5:92). One was 'The Old Mill (formerly belonging to Major Braud, purchased of him by Lord Foley) in Parish of Kidderminster'. The other was 'The Old Mill place (formerly belonging to Lady Yates and at this time to Sr Robert Throckmorton as Heir to her Ladyship) in Parish of Chadsley'.

22. Heathy Mill. SO 848754
    The large 3-storey mill is still in use. Driven electrically for producing feedstuff. No sign of former water supply.

23. Spennell's Mill. SO 845751
    Not mentioned by Simmons, so had probably gone well before 1945. Not shown on 6-inch O.S. of 1883, but definitely shown on Tithe Map of 1841. Site now submerged by modern housing development.



MAP SHOWING LOCATION OF BELNE BROOK



BELNE BROOK MILLS AND WATERCOURSES c1840

□ mill not on Tithe Map

■ mill shown on Tithe Map

24. Hoobrook Mill. SO 837747

What appears to be an early mill building on site is now being demolished; fine old timbers lie among the rubble. Mill House also derelict. Mill surrounded by modern development - factories on two sides, housing on another. The brook has been given a new course.

The Watercourses and Ponds

Our diagram of these should be reasonably self-explanatory, except for the irrigation channels shown beginning after Barnett Mill, No.17. Mrs.Berkeley, in her paper in Trans.Worcs.Archaeol.Soc., Vol.11 for 1934, p.19, says these were part of 'an extensive system of irrigation ... carried out in the 17th century'. This may be partly or entirely true, but the plan of 1737 which we previously referred to (see Mills 20 and 21) shows the two channels as New Cuts, and the plan appears to have been drawn expressly to show them. The northern channel extended round the contour to beyond Upper Dunclent Farm (SO 865765), and the southern channel to beyond Mearse Farm (SO 876762). The northern channel is still in fair condition and can be readily traced, but, while carrying water at the beginning, is dry for most of its course. The southern channel has disappeared between Bellington Mill and the road at SO 879765, but can still be traced from that point onwards.

The 1737 plan makes it clear that the Belne Brook itself, in this stretch of its course, was straightened at some earlier date, presumably to prevent flooding of the valley floor, for the old course was extremely tortuous.

For convenience, we (like Simmons) have named the brook 'Belne' throughout, but traditionally the names Barnett Brook and Hoo Brook have been used for the appropriate lower stretches.

WATERMILLS AND FORGES ON THE BELNE BROOK
by the late H.E.S. SIMMONS

(Editorial Note. This script was written in 1945 and is based on visits made in April of that year. It comes from the Simmons Collection, is copyright, and is reproduced by permission of the Science Museum, London.)

The Belne Brook rises in the south-east side of the Clent Hills and flows through the parishes of Belbroughton, Chaddesley Corbett and Stone,* joining the Stour between Kidderminster and Stourport. It is a notable stream, turning some of the most interesting mills to be found in Worcestershire, mills engaged in the scythe-making industry of which this district is almost the last stronghold.

Skirting the north side of Great Farley Wood, the stream worked the first mill within about half a mile of its source. This was

SHUT MILL, Romsley. 1 m. S.W. of Church. Foundations remain.

Shut Mill was a flour mill with three pairs of stones and in 1821 was occupied by Mr.Samuel Barker. In 1834 it was being used by Mr.John Parkes, and from 1860 until 1880 by William Green. It was last used as a bone mill by Mr.George Dealey and closed down in 1886. The wheel was removed about 1920 together with a good deal of the machinery, shortly after which the mill was demolished, leaving only the foundations and parts of the walls, which still remain. The mill cottage still stands. The wheel was an overshot, on the east side of the building, fed by a pipe since extended to feed a small turbine which drives a dynamo for supplying the nearby Farley Cottage with electric light. Farley Cottage is the home of Professor Wills who acquired the mill property in 1926.

A mill known as Schute Mill was standing here or hereabouts in 1295; in 1500 it went by the name of Shet Mill, and in 1571 there is a reference to Shutmylle in Romsley.

* Also Romsley - Eds

Continuing southwards and passing a long narrow pool we come to

NEWTOWN FORGE, Belbroughton. 1.3/4 m. N.E. of Church. Dismantled.

At Bell Heath on the southern fringe of Sling Common stands Newtown Forge, a small red brick ancient looking building consisting of one storey which contains the wheel and where all the work was done, with a small addition at the west end just large enough to house the fire and bellows.

It is shown on Taylor's map of 1800, and Greenwood twenty-one years later names it Newton Forge. In about 1835 Isaac Nash took over the forge and so became the founder of a celebrated firm of agricultural edge tool manufacturers who still trade under that name and whose wares are known and held in high repute in all parts of the world. Furthermore, at all the mills occupied by Messrs. Isaac Nash and Sons, water power is still used, most of the work still done by hand in precisely the same manner in which it was carried out a hundred years ago, and the old-fashioned tilt-hammers are still in use.

When Nash first started at Newtown a large amount of his business consisted of finishing off work sent down in the rough by Wood of Cradley, a firm now extinct but whose name is still used. Nash's cottage still stands on the bank overlooking the forge, and on the opposite side of the lane are two smaller ones once occupied by his workmen.

A pleasant surprise here as one enters this somewhat dilapidated building is the large wheel close up against the east wall, a 20ft. by 4ft.3in. overshot which fits closely against the sloping roof, the iron pentrough filling the space between the top of the wheel and the roof ridge. This wheel has a 13in. iron rim, iron buckets, wood sole, eight decaying arms aside, of wood, each measuring 6ins. by 3ins. and secured by four bolts in bosses on a 2ft.6in. circular nave; and the iron water-shaft is 10ins. square. There is no inscription on the wheel, but a trade plate on the massive iron stand bears the name of M.& G.Grazebrook of Dudley. This stand, which takes the inner bearing, was put in roughly fifty years ago and the wheel is said to be much older. All other machinery was cleared out soon after the mill stopped working in 1926. It was last used by Messrs.Nash who in the 'sixties called this their Newton Bell works, and the forgeman was Mr.Arthur Moore, whose son Edwin worked with him for some years and of whom we shall hear more about when we come to the Middle Forge, to which mill he went in 1919. When Newtown Forge was in working order the water shaft extended slightly beyond the bearing stand to accommodate a large toothed wheel of some 6in. face, engaging a smaller wheel which turned the heavy shaft carrying the two cam-rings by which the hammers were lifted.

Mr.Waldron who now has a small holding there uses the forge as a stable and store.

From Newtown Forge the stream crosses the main road at Bell End, where it forms a large pool which is fed by small streams coming from the east and south.

BELL END MILL, Belbroughton. 1 m. 1 f. E.N.E. of Church. Standing, at work.

Standing on the left hand side of the Belbroughton road near its junction with the main Bromsgrove to Stourbridge road, Bell End Mill was for many years a flour mill used by the Blundell family, William Blundell being in occupation from 1831 until his death in 1864, followed by his son Frederick until 1879 when it was taken over by William Overton. It afterwards became a gristing mill worked by a man named Bills who gave it up in about 1898, and after standing idle for a while it was converted into a scythe-grinding mill by W.R.Nash. There are now no floors in the mill above ground level, and the machinery is simple, comprising an iron pit wheel geared to a shaft across the mill which drives two wooden belt-wheels operating three grindstones on a similar shaft at the other end of the mill.

The wheel, fed by the pond at the back of the building, is at the west end in a separate compartment and is an all-iron overshot 16ft. by 4ft. with a 9in. rim, eight arms aside measuring 6 inches wide bolted into 8in. by 6in. sockets on an octagonal nave. The iron shaft is also octagonal. The mill is in almost daily use for scythe grinding.

BELL HALL MILL, Belbroughton. 1 m. E.N.E. of Church. Demolished.

Tradition, according to Mr.Edwin Moore of Middle Mill, says that a mill used to stand about two hundred yards beyond Bell End Mill, on the Bell Hall estate,

where a small part of the bank is now cut away on the south side of the road and which contains a little water. This was before the present road was cut in 1847, and it is believed that the site was covered when the road was being made. There is, incidentally, a 16th century reference to a Blade Mill in Brians Bell, which is the former name of Bell End.

From this site the brook begins to open out to form Galton Pool.

GALTON MILL, Belbroughton. 7f. E.N.E. of Church. Disused.

Galton Mill is said to take its name from a Birmingham family of gun-makers who made the barrels at Birmingham and sent them to Belbroughton to be ground during the Napoleonic Wars, and although the mill does not figure on maps earlier than 1821 there is said to be on the wheel the date 1793. The wheel, however, fits very closely against the walls of the wheel-house, and as only a small portion of it is viewable I am unable to confirm the existence of this date which if it does exist would make this wheel a notable one.

The mill stands in a hollow on the right going towards Belbroughton, and comprises two small old brick buildings placed side by side. The wheel is an enclosed overshot 12ft. by 4ft. with eight arms 5 inches across, and large naves, mounted on a 2ft. diameter octagonal metal shaft which at the outer bearing has a heavy collar of 2ft.3in. diameter. It is a massive wheel and its bearing is mounted on a heavy baulk of timber. Unfortunately the only means of inspecting this wheel is by the opening made for the shaft, and two further openings in the brickwork partly below water level in the small pool which collects the cascading water from a small waterfall in the jagged moss-covered rock alongside.

There is a 12ft. 8-arm pit wheel, very massive and in two sections, with 6½in. face driving a 2ft. wheel and shaft. On this shaft, which is at ground level between the two buildings, is a small toothed sprocket with chain upwards to a similar but double sprocket on a bracket mounted against the wall above and behind, with another chain conveying the drive to the main shaft which runs the length of the grinding shed, and on which shaft are mounted five grinding stones, with built-in draining troughs below.

The mill was used for scythe-grinding by Messrs.Nash, but closed down in 1942 when a breakage in the pit wheel occured, and although otherwise in excellent working order the mill has not been repaired owing to the firm not having sufficient labour to keep all their mills fully at work. But the mill will no doubt be set to work again eventually. Mr.Portman was latterly in charge here.

The approaches to the mill are paved with numerous discarded grinding stones.

MIDDLE MILL AND FORGE, Belbroughton. 3/4m. E.N.E. of Church. Working

A little to the west of Galton Mill, approached by a narrow track which for some distance is paved with a double row of some four hundred worn down grinding stones, stands Middle Mill and Forge, two ancient looking one-storey buildings, one almost square and used as the forge the other a rectangular building formerly used as a workshop and hobbing shed. Both have overshot wheels placed side by side in a compartment which is sandwiched between the two buildings. This mill and one of the Weybridge pair are the only two forges of the Belne Brook now operated by water power. Here scythes of various patterns are hammered out in large numbers by Mr.Edwin Moore, the only surviving member of three generations of forge-men whose family records go back for at least a hundred years. Edwin's grandfather came to Belbroughton from a forge near Sheffield, and his father who died at the age of seventy-nine worked the Newtown Forge until he was seventy-six, having previously worked at Belbroughton and Weybridge.

The wheel operating the hammer is an 11ft. diameter by 5ft. wide, with a 10in. rim, 7ft.6in. naves with large sockets so that the six 4½in. by 7in. wooden arms are exposed for only eight inches. The pentrough is a long one and 2ft.6in. deep. The water shaft is 3ft. diameter, iron and ribbed for strength.

There are two cam rings, the one nearest the wheel and the only one now in use is 5ft. diameter and 1ft.5ins. wide, the other, at one time operating a hammer for welding, being 6ft.6ins. and 10½ inches wide. The cogs on both rings have wood packing to a depth of four inches.

The present hammer operates in a hurst frame of iron, the helve being a square timber 10ins. by 11ins. and 8ft long with an iron tail-collar (that part which is

caught by the cogs on the cam ring) and hammer head. The hammer strikes the butt which rests on the block. When Mr.Moore first came to Middle Mill in 1919 both hammers were in use. The process is extremely simple; the rotating cam ring on its massive shaft forces down the tail of the helve and tilts the hammer up, the pivoting point being slightly more than two thirds behind the head, and the hammer falls by its own weight as soon as the cog has passed by, to be lifted again when the next cog comes in contact. With a normal flow of water the speed at which this hammer works varies from 184 to 190 beats per minute, and with the larger cam ring welding was faster. When one realises that to complete the operation before the metal becomes too cold to work the scythe blade has to be shaped complete with rib at the back and the cutting edge hammered to almost cutting thickness in about forty seconds, one can appreciate the skill of such craftsmen as Mr.Moore who works this forge entirely on his own.

The process of scythe making is interesting; a piece of hard steel is sandwiched between two slightly longer lengths of mild steel and the three layers are heated and lightly hammered together, and the crew (the projection with which the blade is fitted to the handle) roughly shaped. At this stage the metal represents a bar about one and a half inches wide and three-quarters of an inch thick by about two feet long. The whole is then heated and after a few deft hits with a hand hammer to give the required curve the operator, sitting on a flat seat suspended by a long swinging iron rod in front of the hammer, with his feet firmly placed against the block so that his body has freedom of movement in all directions, releases the water by a long wooden rod, sets the hammer in motion and holds the now dull red bar of metal on the butt and it is hammered out to about three and a half inches wide, with a fine point at one end and a rib on the outer edge. Although this operation, from the time the red hot bar leaves the fire to the time when the shapely article is stood against the pile of others is barely a minute, the skill of the operator is such that six scythe blades taken at random and placed one on top of the other were found to vary in shape not more than one-eighth of an inch ! These blades are sent to one or another of the various grinding mills on the same stream and finally to the main works where after a variety of processes they emerge as we see them in the shops, handsome tools and the products of men who are indeed masters of their trade.

The wheel for the grinding shed also measures 11ft. diameter but is of much lighter construction and only 4ft.6in. wide; it has an 8in.rim, iron buckets and pentrough, 3ft.6in. circular naves and six wooden arms 5½ins. by 2ins., and the round metal shaft is 15 inches diameter. Taking the place of the normal pit wheel is a thin 6ft. all iron cogged wheel operating a wooden drum which belt drives a single grindstone at the other end of the shed.

There is a third wheel, known as the fan wheel, situated at the extreme north of the forge, a narrow overshot which operates the fan or blower which replaces the old-time bellows. This wheel is 9ft. diameter, by 1ft.9ins. wide, has six ribbed arms of 3½ins. section and a 1ft.9ins. octagonal iron nave on a 4in.square shaft, with the usual iron pentrough fed by a 12in. pipe. This wheel turns a 6ft. thin cogged wheel which at one time was face geared to a wooden belt wheel, but the teeth are now covered by a thin iron band and the drive is operated by a return belt.

Middle Forge is said to be and certainly looks an ancient property, but does not appear on maps earlier than the 6-inch ordnance survey of 1884.*

BLADE MILL, Belbroughton. 3½f. N.E. of Church. Demolished.

Continuing westwards the brook again narrows until it passes beneath a little bridge and flows through a delightful wooded glen bordering the north side of Ram Alley or, as it is locally known, Dark Lane, which leads into the main road north of the village of Belbroughton. Some 150 yards from this road is the site of a forge or blade mill which is shown on both Greenwood's map of 1821 and the first ordnance map of 1831, which according to a sale notice of 1819 was at that time

* This is a curious error on Simmon's part, for this forge appears on the first-edition 1-inch O.S.map (c1830); and on the Tithe Map of 1840, as Plating Forge, owner and occupier Edward Waldron - Eds.

in the occupation of Mr.Waldron.* The mill must have been demolished many years ago, probably a century, but the remains of a very old and overgrown wooden pentrough with sloping pipe and traces of stonework still exist, and the spot has been utilised for the erection of a small brick structure housing a turbine to supply Yew Tree House with electric light.

BELBROUGHTON CORN MILL. 3f. N.E. of Church. Standing in ruins.

The remains of this red brick mill together with the ruined mill house adjoining stand at the village end of Ram Alley only a short distance from the site of the Blade Mill, and like the latter, was the property of Yew Tree Estate. In 1819 it was described as having two water wheels and four pairs of stones, in the possession of Mr.John Hooper of Yew Tree Farm, but for as long as can be remembered only one wheel was in position, which was outside at the east end of the building. A later notice of sale, dated 1852, gives the occupier as Mr.George Bate and at this period three pairs of stones were in use. George Bate continued in occupation until 1877 when he was followed by Maria Bill and her son, whilst a directory of 1888 gives Arthur Bill as the miller, and up to 1896 John A.Bill.

A Mr.Bate of Wolverhampton, having presumably no connection with the earlier tenant of that name, afterwards took the mill and made some improvements, but used it only a few years. The mill stopped working shortly before the 1914-18 war and for a little while afterwards Joe Price the blacksmith occupied the house; but house and mill have now been empty and derelict for twenty-five years or more, the roof is off and rubble and broken timbers lie heaped on the floors.

The machinery is said to have been taken out bit by bit and the wheel removed about 15 years ago, the latter taken it is believed to another mill, although enquiries over a wide area give no confirmation of this. As indicated by the remains of a pentrough this wheel was an overshot, but of the machinery the only evidence is a peak stone 4 feet in diameter.

BELBROUGHTON FORGE. 1/4m. N of Church. Standing at work.

In 1841 Thomas and William Waldron were in possession of these works, which are situated in the centre of the village of Belbroughton. Isaac Nash and Sons had them for many years afterwards and today the proprietor is Mr.C.F.N.Boulton who trades under the name of his predecessors. These "main works" as they are known, which no doubt have been added to from time to time, now comprise a collection of shops, forges etc., and prior to the war employed about fifty men.

There are two main forges, one, on the right as one enters the yard, has an overshot wheel enclosed at the north end of the building measuring 12ft. diameter by 4ft.8ins. wide, with a 12in. rim and 6ft.6in. octagonal naves. This is a massive wheel with a 2ft.6in. square shaft and large iron pentrough, but has been disused for about five years and the present hammers are electrically operated and used only for light work; but the principle is the same as for the original water driven type. One of these is a Bradley welding hammer, and the shears are by Pratt of Stourbridge.

The shed adjoining is another forge, worked by a moss covered outside wheel 13ft. by 5ft. wide, with 12in. rim and 8ft. naves. The shaft is 2ft.3ins. diameter, round, and inside the building the cam rings are 5ft. and 7ft. diameter respectively. One hammer is complete, the other has been removed. The shears here are working continuously by rod and cam and small toothed wheel.

A third wheel is on the outside west wall of a nearby building. Entirely uncovered, it is an 11ft. by 1ft.9in. overshot with a 9in. rim, two sets of six ribbed arms, iron buckets and a deep narrow pentrough, together with a 4½in. square iron shaft, with its bearing mounted on a tall stand.

The shopping each side of the yard at the south end of the works is made up chiefly with finishing shops on one side, including a large modern one housing fourteen grinding stones seven aside, and a line of single hand forges on the other, these latter being no longer in use. One shop contains a simple but effective device for putting whilst the blade is hot the correct curve on bill-hooks.

Work done at Weybridge and Middle forges is brought to these works to pass through further stages of their manufacture prior to being sent to the grinding

* In 1840 the occupiers were William and Thomas Waldron - Eds.

mills and finally, on their return, to be finished off ready for use.

First they are heated and put in what is known as a gathering machine, a minature tilt hammer which, with the blade passing through a slotted opening hammers up and puts the finishing touch to the rib on the outer curve or back of the blade to give it strength. From there to another shop the point is finished off and the crew given its proper shape and angle. Then trigging; thence to another department for hardening and tempering; then straightened and set and later to enter the grinding shop at the main works or to Bell End or Drayton. In the process of grinding the outer layers of iron are removed leaving only the steel; a close inspection of a scythe or good quality hook will reveal metal of a darker shade half an inch up from the cutting edge. The last stages include polishing and oiling, and in the case of small tools the fitting of handles, fixing of transfers and finally packing for transit.

LOWER BELBROUGHTON MILL. 1f. N.W. of Church. Demolished

Taking a footpath at the rear of the works and following the brook the short distance to the Queens Hotel at the lower end of the village brings one to the site of Lower Belbroughton Mill which figures on Greenwood's map of 1821 and which according to the late Mrs.Berkeley in the Worcester Archaeological Society Transactions, Vol.14, is traditionally believed in its early days to have been used for making a coarse kind of cloth or sacking. But for many years it was a corn mill and from at least 1860 to 1880 was in the occupation of Eli Maiden. He was the last to use it as a corn mill, and it finished its days as part of the scythe works, being pulled down about fifteen or sixteen years ago when the bricks were used in the construction of the row of houses on the Mount nearby, and the site is now represented by a rockery in the bed of the stream made up with stone work from the old mill. This adds a picturesque touch to the village approach at this end, a small parapet being formed by grindstones cut in half.

LOWER BELBROUGHTON, EARLY MILL. 3/4f. W.N.W. of Church. Demolished

From the site of Lower Belbroughton Mill the stream takes an underground course beneath the street, passing the houses of Mr.Middleton and Mr.Priest, between which is the approximate site of a mill also shown on Greenwood's map but otherwise unrecorded. At the time of the publication of Lewis's directory in 1820, however, there were at least three corn millers in Belbroughton, Mr.Charles Davis, George Campion and John Moore. One of these is almost certain to have had the mill in Ram Alley, another possibly the Lower Belbroughton mill, and it is not improbable that the mill under notice was held by the third; but there is of course Bell End Mill to be considered.

WEYBRIDGE, TOP FORGE, Belbroughton. 4½f. S.W. of Church. Standing, at work.

Continuing down the Chaddesley road with the Belne Brook now flowing serenely on our left, we come in less than half a mile to a sharp bend in the road and a footpath leading straight on, this bringing us to the first of the two Weybridge forges known respectively as Top and Lower Forges and collectively as the Weybridge Works.

It is said to have been used for corn until the end of the 18th century, but is named Weybridge Forge on Taylor's map of 1800. In 1821 Greenwood marks it "Gun Mill".

In 1849 a notice of sale definitely describes the premises as plating forges "let under lease to the representatives of the late John Ryland Esq. and now in the occupation of Messrs.Waldron". The name of Waldron is well known in Belbroughton, and in the Belbroughton and District Illustrated Almanack for 1881 we read that three hundred and fifty years ago there lived in the village one John Waldron, a Scythesmith, son of Alexander Waldron. John was buried on the 29th of August 1588, and in his will he leaves his shop and shop tools to his son Francis. The same will shows that a George Smalman owed him £5-8-0 for scythes; the following debts are also mentioned: 3 dozen scythes at Quinton £3-4-0, 6 scythes at Alveley 12 shillings, and by one Lebbryge for two scythes 4 shillings.

Definite evidence of scythemaking in the village in the 16th century* is provided by the Parish Registers in which the following occur:

* The Victoria County History of Worcestershire, Vol.2, 1906, p.271 states that the earliest mention of scythe-making in this area occurred in 1564 - Eds.

1591. Died, Gilbert Cole of the Mow Myle
1593. Died, Henery Cole, a Myllner
1777. Burial of Joyce, wife of James Wall, Forgeman
1782. The burial of Cissey, Daughter of Thomas and Sarah Leban, a forgeman
1782. The burial of Wm.Griffis, Stocktaker at Weabridge forge
1786. The burial of Anne, wife of Samuel Lewis, forgeman

Top Forge, a block of low built weather worn buildings, is made up of three separate forges under one roof. In the first the wheel is a low breast in a separate compartment on the east side, 12ft. by 6ft.3in. wide, with a 13½in. rim, wood sole, six 8in. by 3/4in. iron arms on 4ft.6in. naves mounted with packing on a 2ft.6in. hexagonal wooden shaft, one of the largest wooden shafts known, but its predecessor, discarded in quite recent times and of which portions are still to be seen in the yard, was even larger and measured 2ft.9in. across. It has done useful work as its aged and worn condition shows.

There are the usual two cam rings, each 5ft. diameter and 9in. wide, both entirely of wood and packed with wood into which many lengths of steel have been hammered; and between them and the wall is mounted an 11ft.6in. heavy iron fly wheel. One of the rings, incidentally, is in two sections, bolted together.

There is also the usual double hurst frame, but only one hammer is in use, the helve in this case having the addition of a baulk of timber of similar dimensions strapped on to its top side to prevent vibration and known to the workmen as a "monkey".

In all other respects the interior arrangement conforms largely to the lay-out of Middle Forge, this also being used only for plating.

The fan wheel is in a covered in compartment on the west side, and there is an 11ft.6in. by 2ft. low breast with six iron arms and a 6in. square iron shaft. There are no wheels in the adjoining buildings, which for some years now have been more or less disused.

It was from this forge that Mr.Arthur Moore went to Newtown about fifty years ago. The present forge man is Mr.Charles Priest.

WEYBRIDGE, LOWER FORGE. 5f. S.W. of Church. At work.

Standing just below on a much lower level is Lower Forge, a group of similar buildings, but more fortunate in being as yet complete with wheels in each of the three buildings; the power, though, derived from the used water from the forges above and not from the pool direct,* is not so good and these departments are used for welding and cutting only.

The wheel of the first forge is inside at the east end; it is massive and measures 15ft. by 5ft.4in., has a 13in. rim, 11in. by 7½in. wooden arms deeply socketted into a 7ft. nave with a 4ft. ring packed to accommodate the 2ft.6in. round and ribbed iron shaft. The sole is wood, the pentrough iron.

There are two cam rings, one is 7ft. diameter by 8ins. wide by 4½ins. thick, the other being 8ft. diameter by 8ins. wide by 5ins. thick. Both are iron castings, each packed with wood. On the same shaft a 4ft.8ins. toothed wheel engages a 10in. nut for a grindstone.

At one time there were the usual two frames side by side, but now only one and this without its hammer. Mr.Moore tells me that in his father's time these frames were of wood. The wheel was last used about two years ago, and the hammer was dismantled some six to eight months ago.

The fan wheel for the adjoining or middle forge is in front of the main wheel of the first building, screened by a dividing wall and fed by a pipe coming along the wall opposite; it is a 13ft. by 1ft.9in. iron overshot of similar design to the first, with a wood sole and 4½in. square shaft, and bears the inscription "Titton,**Kidderminster".

The driving wheel for the middle forge is an all iron high breast complete with pentrough and measures 14ft. by 7ft. wide, with an 8in. rim and 8in. square shaft.

* This statement is very puzzling, as all the map evidence indicates direct feed from the pond - Eds.

** Presumably a typing error - Simmons must have meant Turton - Eds.

There is a 10ft. pit wheel all iron in two sections, with 7in. face gear engaging a 4ft.6in. wheel on a 1ft.3in. square iron shaft which carries a massive and oval spoked 11ft. fly wheel and two iron cam rings, these latter being 4ft. and 3ft.9in. diameter respectively and each 14 inches wide. The latter is now without cogs. There are two iron frames, the hammer of one only remaining. The shears here are worked off the main shaft by a large cranked rod.

The forge at the extreme east of the building, known as the End Forge, has a 14ft. by 4ft. high breast wheel with a 7ft. nave and 4ft.6in. inner ring, and has six 10½in. by 4in. wood arms and a wooden sole. As in the middle forge the drive is not on the main shaft direct, but via a 10ft.6in. pit wheel with 8in. face gear engaging a 4ft. similar wheel on a 15in. square iron shaft. The fly wheel here is not so heavily constructed but is of larger diameter, namely 15ft., and the cam rings are 3ft.6in. and 4ft. respectively, with an 8ft. toothed wheel for the shears worked by a cranked rod. The fan wheel is enclosed, but from what little can be seen of it, it appears to be similar to the other two. This forge could if necessary be put to work, but is used mainly for the shears and cutting apparatus. The foreman here is Mr.J.Moore, a cousin of Edwin of Middle Forge further up-stream.

DRAYTON MILL, Chaddesley Corbett. 1.3/4m. N.E. of Church. Standing, at work.

A little more than a quarter of a mile downstream, at the southern end of Drayton Pool, stands the long rectangular brick built and two floor Drayton Mill which in 1783 was used for spinning yarn in connection with the Kidderminster carpet trade. In August 1835 it is described as a water corn mill with two wheels lately used as a wire mill by J.W.Philipson, a bankrupt who had by that time vacated the mill, his stock of brass, steel and iron wire etc. having been disposed of by his assignees two months earlier. On June 13th, 1839, we read of a violent storm when 530 small panes of glass were broken at Mr.G.B.Lea's spinning mill at Drayton. Early in 1842 the premises were again for sale, this time described as a water corn mill then in use for worsted and flax spinning and complete with gas apparatus for lighting purposes. Apart from being described as a corn mill there is no substantial evidence that it was ever used as such at any time during the period of 1835 to 1842, or even afterwards, but it seems fairly definite that there was an earlier period when it was used wholly or partly for grinding.

For many years now it has been utilised by Nash's for scythe grinding and finishing, and up to 1929 a water wheel of exceptional power was in use there. This wheel, which eventually gave a lot of trouble and finally broke down altogether, was replaced by an Armfield turbine for which a new water inlet has been cut in the wall at the bottom end of the wheel pit. The wheel was a pitch-back overshot 30ft. by 9ft. wide and the shapely pentrough is still mounted beneath the ceiling.

The building is in two halves, the ground floor of the northern half is taken up entirely as a grinding shop, operated by the turbine, with the upper floor removed, and the southern half is used chiefly for glazing and finishing, the power for which is a Tangye oil engine conveyed by line-shafting. Here can be seen, in a small part occupied as a forge, an excellent specimen of the old-fashioned leather bellows worked by hand. The upper floor is a series of small shops where the finishing touches are attended to, fitting of handles, testing the blades, placing of transfers etc., and one larger compartment devoted entirely to packing which is almost an art in itself. Straw is the usual packing, but for American export a special wood shaving wound in the form of half-inch rope has to be used.

A mill called "Scythemill" belonged to the Manor of Chaddesley Corbett in 1481. In 1544 a water mill called Walke Mill or Heth Mill in Chaddesley with certain lands was granted to John Maynard and William Breton, who sold it in the same year to Thomas Vaughan of St.Albans.

HILLPOOL MILL, Chaddesley Corbett. 1.1/4m. N.N.E. of Church. Disused.

From Drayton the stream turns due west and by taking a field path which follows closely its course we reach in another half mile the first of two interesting mills which ended their days in the scythe industry. This mill, known as Hillpool or Upper Mill, is really the eastern half of some low pitched farm buildings, which in the 18th century was used as a cloth mill. In 1775, when Matthews and Powell were the occupiers, we read of ten yards of Claret dyed cloth being stolen from it and

a reward awaiting the person who could give any information as would lead to the apprehension of the culprits. Later it developed into a spinning mill for carpet making, and finally as a grinding mill.

The wheel is still in situ, at the east end of the buildings and entirely uncovered, but it is now in very poor condition. It is an all iron pitch-back overshot 12ft. diameter by 10ft. wide, with three sets of six arms, ribbed and tapering from 4½ inches to 4 inches, the inner and outer ends widened to 6 inches and bolted into flanges of the rim and nave. The rim is 9 inches deep and the round ribbed shaft is 13 inches across. It was fed by a long pentrough.

The fitting of the pit wheel here is quite an unusual practice for Worcestershire, being keyed on to the shaft in the limited space between the water wheel and the wall; it is 9ft.6in. diameter with 6in. face gear engaging a small nut on a 4in. round shaft at ground level, which drives two belt wheels each in its own pit, the first being a 5ft. by 11in. flanged metal drum for driving a grindstone, and the second, almost in the centre of the mill, where the shaft terminates, a 7ft. by 14in. by 13ins. deep wooden rim with six iron arms strengthened by four arms each side. This latter does not appear to have been used for grinding, but for an overhead line shaft which is still in position with various small pulleys attached and an old wooden drum for belt connection, seemingly a relic of the old cloth or yarn spinning days. It is clear that the mill in those days had an upper floor.

The mill is now in a very dilapidated state, lumbered up with odds and ends and disused farm implements, the windows are broken and the slated roof is tumbling down in places, whilst the wheel and pentrough are now partly hidden in dense undergrowth.

Messrs.Nash used this mill only a year or two, renting it off the Pages who have been owners and occupiers of the farm for many years, and gave it up quite forty-five years ago. In their day Joe Portman and George Weston were grinders there. Standing disused for a long while it was set to work again by Mr.Bache of Stakenbridge Forge, Hagley, for finishing off shovels and spades, and then after another period of idleness Mr.Page himself used the wheel for farm stuff and sawing, but about twenty years ago the dam broke, the stream which fed the mill drying up in consequence, and the wheel has without doubt come to rest for all time.

HILLPOOL FORGE, Chaddesley Corbett. 1½m. N.N.E. of Church. Partly demolished.

Leaving Upper Mill the stream used to flow into a small pool against the road, from the south-west corner of which a water course took a sweeping turn past a cottage and under the road some fifty yards to the south to drive a mill whose roof barely reached the level of the road against which it stood. This was Lower Mill, known in earlier days as Hillpool Forge. In 1831 when the proprietor whose name is not stated was about to retire from business, the contents of the mill which included "Shears, Tilting Blocks, Hammer Helves, Scythe Maker's Anvils, Bellows etc.", were advertised to be sold and the mill to be let.

Latterly it was for many years a scythe grinding mill, last used by Nashes and vacated by them about the same time as Upper Mill. It never worked again, and after some twenty to twenty-five years the heavy slate roof had become so weak that the owner decided to take it down, leaving only the four walls standing. The interior machinery had by this time been removed, but the wheel remained until 1942 when it was broken up and taken away for scrap. This wheel, situated outside at the south end, was an overshot measuring some 12ft. by 10ft. wide, with three sets of arms; and the 12in. square shaft complete with 3ft. naves still remains, as does the iron pentrough above. An inside pit wheel engaging a smaller one drove a shaft running across the east wall, with belts to the stone shaft at the west end.

Mr.Oldnall of Sion House was the owner from whom Nashes rented it, but the present owner is Mr.Watts who had the machinery removed, and in doing so had the pit wheel carted to Sion House where he intended to have it placed on the roof to form a substantial base for a flag mast; but during the process of hauling it up it fell and smashed to pieces. Mr.Watts' gardener is the present occupier of the cottage in whose grounds the remains of Hillpool Forge are situated. Since the breaking of the dam above Upper Mill no water has flowed into the pool, this now being quite dry and overgrown, and the water course between there and the mill has been filled in.

BARNETT MILL, Chaddesley Corbett. 1m. 6½f. N.of Church. Standing disused.

Two fields away stands Barnett Mill,* on Barnett Mill Farm which lies just over to the right of the Worcester to Stourbridge road before it commences the climb to Barnett Hill, and along this stretch the stream is known as Barnett Brook. Except for the wheel the buckets and sole of which are now decayed and broken with rust, this corn mill is in perfect order and complete and would no doubt still be working had not the dam broken at Hillpool and drained the lower pool, for Barnett Mill has no pool of its own.

Lewis's Directory for Worcestershire for 1820 gives the names of two millers for Chaddesley Corbett, Thomas Aingsworth and William Cox, one of whom was in all probability the occupier of Barnett Mill since the nearby Bellington mills were at this period let under one tenancy. From 1854 to 1864 John Bate was in occupation followed in 1872 by John Cruser Giles, and in 1876-80 by William Wheatley, whilst in the period 1884-88 the owners of the estate Joseph Corbett and Son seem to have been running the mill. In 1892 and up to 1900 Henry Langley had it, Thomas Parkes in 1904 and Joseph Jackson in 1908. From then onwards tenant farmers used it for their own work, the mill finally coming to rest in 1934, in Joseph Payne's time, when the stream got too low to be of any use. At the present time it is occupied by Mr.Freeth who took the property in 1936.

Barnett Mill Farm comprises three main buildings, first some stables and sheds, then the house and further along the mill which is a well built rectangular three floor cream-washed brick and tiled building. At one time the wheel was outside, at the east end, but the mill has been extended to about almost double its original length leaving the wheel in what is now a roomy and otherwise empty compartment. It is an all iron overshot 14ft. by 6ft. with 10in. rims, eight 5in. ribbed arms, iron sole and plain naves, mounted on a 1ft.10in. wood shaft which has an 8in.wide collar near the bearing. This shaft terminates underneath a baulk of timber supporting the foot-brass.

The pit wheel is 7ft.6in. all iron, the wallower 2ft.6in. and the iron spur 5ft. diameter. The three pairs of 4ft. French stones are placed N. S. and W. worked by 16in stone-nuts on square spindles with screw tentering, and all have octagonal casings. The north stones are inscribed "Clarke & Dunham, 1859".

The 10in. iron upright shaft carries a 5ft.6in. taper arm iron crown wheel, a large crack near the boss being strengthened by heavy bands and bolts. On the west side a 2½in. line-shaft off a small nut extends the full length of the centre of the mill, whilst the sack gear is from a similar nut with belt drum close together hard up against the east wall.

BELLINGTON MILL, Chaddesley Corbett. 2m. 1f. N of Church. Standing disused.

On the other side of the road directly opposite the approach to Barnett Mill Farm a stoney lane leads to Bellington Mill, tucked away in a hollow between the lane and Bellington Farm and disused for many years. It is an old mill with its completely rebuilt north wall contrasting sharply with the mellow brickwork of the original.

Three mills at Chaddesley Corbett rendering 12 horse-loads of grain belonged to Eadgifu, lady of the manor at the time of the Domesday Survey. In 1290 Roger Corbett held only two mills, but another mill possibly belonged to his mother Ada Corbett who had one third of the manor in dower. Humphrey Pakington had three mills near Barnett-brook in Chaddesley and Moorhall Bell in 1604, and "certain mills" in Chaddesley belonged to Lady Mary Yate in 1675, and Sir Robert Throckmorton in 1747. These probably survive in Bellington, Lower Bellington and Barnett Mills.**

Both Bellington and Lower Bellington Mills were being held by Mr.John Perrins in 1815. John Richardson was the occupier of both in the 'seventies and 'eighties, later millers being Mr.Cooke and Mr.Dickinson. The present owner is Mr.Mole who took Bellington Farm from Mr.Phesey in March 1944. It was the latter who sold the wheel and all the machinery in 1920.

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* This mill was a Salt Mill in 1737, according to a plan in Worcester C.R.O. (ref.BA844-f970.5:92) - Eds.

** See note re two 'Old Mills' (Nos.20 and 21) in our Introduction. Note also that both Bellington and Lower Bellington Mills were Blade Mills in 1737 - Eds.

The wheel was enclosed at the east end; it was an overshot apparently about 10ft. diameter by 5ft.6in. wide. It was fed by a pool some fifty yards across at the south-east corner, on a level with the stone floor, the water flowing to the pentrough by a 20in. iron pipe which is still there. The pool is now filled in and the ground levelled.

At some time late in its history the mill was partly rebuilt and refitted judging by the modern brickwork, new stairs, hand-rails and other timbers, and the insertion of a few iron girders. There were three pairs of stones one of which a 4ft.4in. peak still remains.

LOWER BELLINGTON MILL, Chaddesley Corbett. 2 m. 2½ f. N.N.W. of Church. Derelict.

A pleasant walk through a delightful glen beyond Bellington Mill brings us to Lower Bellington Mill which is much smaller than its near neighbour and has a small cottage adjoining. Both mill and cottage are entirely deserted.

This mill, comprising a ground and upper floor only with an arched double doorway occupying about half its width, is known locally as the Gorse Mill, used for grinding gorse for cattle feed, to which purpose it was put after it had ceased to be a corn mill for some years. It is marked "Corn Mill, disused" on the 1884 6-in. ordnance map, and John Richardson was the last miller to grind corn there. It has not been used for at least fifty years.

HEATHY MILL, Stone. 6½ f. W.N.W. of Church. Standing, at work.

Flowing south-westwards for a mile or two the Belne Brook crosses the Kidderminster road at Spennells where on its north side, is a corn mill still in use but no longer by water power. In 1831 it was used for the spinning of worsted and woollen yarn on a 21 years lease dating from 1820 at a rent of £60 per annum. At the expiry of this lease it was converted into a corn mill which in the late 'forties was taken by Richard Brewster who as tenant to the Earl of Dudley used it until 1893. He came from Broadwaters Mill north of Kidderminster, and for a while previously had occupied the nearby Podmore Mill. He was the last miller to hold Heathy Mill, successive tenants being farmers who used it for their own and local grinding. Eventually it became the property of Mr.Hall, one-time mayor of Stourbridge, and in 1920 it was bought by the present occupier Mr.Blakeway* who used it until the machinery started to give trouble and after spending £60 on unsatisfactory repairs had the pit gear and upright shaft removed in 1936 and an electric motor installed in its place. The stones remain, two 4ft. French and one 4ft.2in. Peak. The wheel is still in, enclosed at the north end. It is a 13ft.6in. by 4ft. overshot working in reverse with two pentroughs one in front of the other. The circular naves are 3ft.9in. diameter accommodating the unusual number of seven arms aside, 5in. wide; the rim is 9in deep. The shaft is octagonal wood 1ft.9in. across. The building is of three floors with mill house combined.

A mill at Stone worth three ounces of Silver belonged to the manor in 1086. Another mill in the parish called "the water mill of Stone" appears to have belonged to the manor of Dunclent for it was given by Edmund de Dunclent to his brother John in 1351. This latter mill, probably on the same site as the earlier one, was also in all probability a predecessor of the present Heathy Mill.

HOOBROOK MILL, Stone. 1 m. 4½ f. W.S.W. of Church. Standing converted.

The last mill on this interesting stream is Hoobrook Mill, only a short distance from where it joins the Stour. It is a large low-built three floor whitewashed building of brick standing alongside the viaduct at the back of the Crown Inn on the main Kidderminster to Droitwich road.

From 1820 to 1841 it was leased along with Heathy Mill and used for the same purpose, after which it became a paper mill which by 1883 had become disused and remained so for many years until utilised for yarn spinning in connection with the Kidderminster carpet industry; it is still used as such, by turbine.

* The owner in 1980 is still a Mr.Blakeway - Eds.