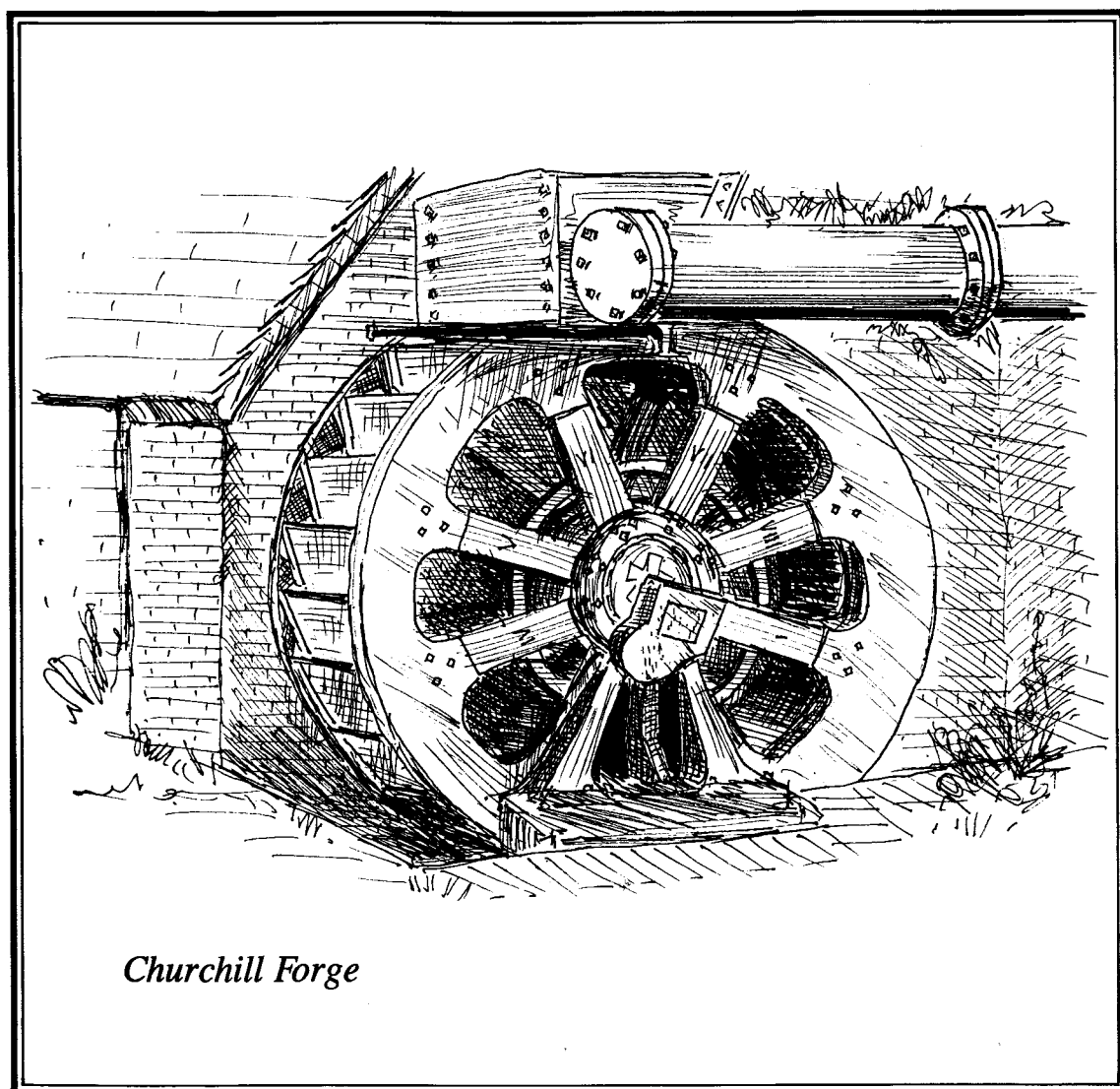
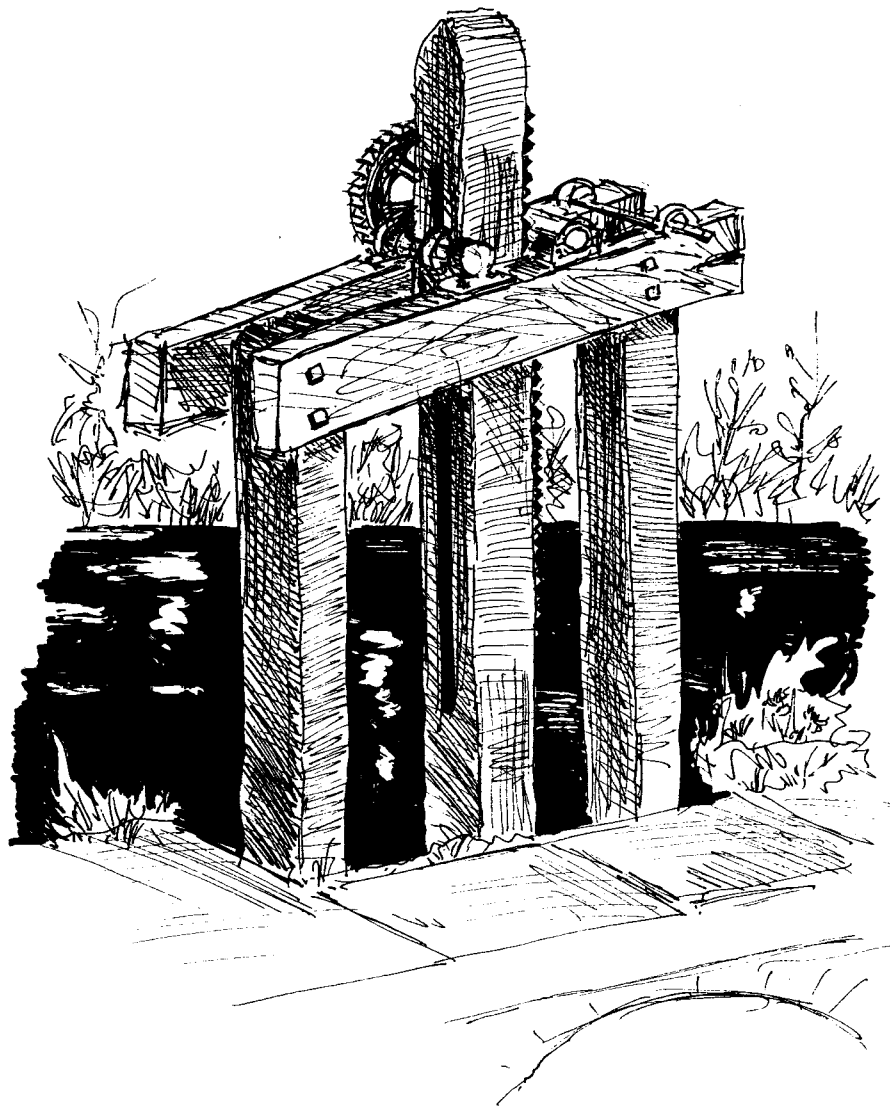


# WATER MILL SITES IN NORTH WORCESTERSHIRE



*Churchill Forge*

HAGLEY HISTORICAL AND FIELD SOCIETY, 1993



*Sluice at Upper Broadwaters Mill, Kidderminster*

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### ACKNOWLEDGEMENTS

The project, which set out to locate the sites of water mills on two streams and to describe their present-day condition, has resulted in this small book being written.

The help received has come from many directions and our thanks go to all who assisted in any way.

Special thanks must go to all the landowners and the occupiers of the many sites who readily gave their permission to investigate, and added to the fund of information that has developed.

Thanks are also due to the County Archaeological Service, particularly the Sites & Monuments Records Officer, Hilary White, for the co-operation and encouragement throughout the project.

The members of the Hagley Historical and Field Society (Archaeology Section), who went out and got wet; cold; stung; bitten; dirty etc., and actually collected the data, are to be congratulated for completing the work they set out to do.

They are:-

Rick Cooper	(Maps)
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Special thanks to my wife, Bronwen Pagett, who word processed, revised, modified and got the book to its final state.

Tom Pagett

Project Leader/Editor

July 1993

## SOME WATER MILLS OF NORTH WORCESTERSHIRE

### INTRODUCTION

This book is written by people with a degree of curiosity about the environment around them and in particular the sites of some forty water mills on two streams rising in the Clent Hills and joining the river Stour, north and south of Kidderminster.

Others have written about individual mills or, in the case of the scythe makers, a whole group of mills. Our aim was to compare the mills on two similar streams, starting by examining the physical remains still to be seen. In some instances these remains are very limited; in others there is still much to be seen. Both buildings and the water supplies were recorded and, at the same time, attempts were made to deduce how each site might have developed.

Historical records for mundane operations whether they are milling corn, making shovels or scythes, fulling or weaving cloth, or making paper are very poor and give very occasional glimpses into the work being carried out. Even when there is a fair amount of detail it is rare to find an accurate location given.

Some of the sites have easy public access, or at least can be seen from a road or footpath while others are on private land and the owners do not welcome hoards of visitors.

The sites are listed in appendices 1 & 2, with a six figure grid reference based on the ordnance survey sheet SO 87/97 and are graded according to their accessibility.

The notes on each site are intended to identify points of interest but if there is nothing left but two bricks and a muddy patch, the reader will be told just that.

When this investigation began, early in 1991, there were no guidelines on the way this particular subject should be approached.

This book attempts to put in some sort of order the results of the investigations and the way in which they should have been tackled, based on that useful attribute, hindsight.

The main sections of the book first of all suggest the evidence that may be found on the site of any water mill. The second and third sections describe the sites found on the two streams, Belne Brook and Wannerton Brook and the final section attempts to explain how the sites have probably developed.

Throughout, facts and hearsay have been separated, and there is very little of the latter. Probabilities and possibilities are referred to cautiously. Local gossip too is identified as such. With this approach it is hoped that the work to date will be a basis for others to build on.

#### GLOSSARY

Buckets - the containers holding the water from the pen trough, placed around the circumference of overshot and high breast wheels.

Dendrochronology - a system of dating based on the annual growth rings of trees.

Flock - material for stuffing or quilting made of wool refuse or torn up cloth.

Fulling - cleaning and thickening of cloth.

Head - a head of water is the height of the water in a pool or race above the point on a water wheel where it fills the buckets.

Leat - (O.E. -gelaet) channel, see race below.

Paddles - the flat blades fixed radially on most undershot wheels.

Pen pool - a small pool, usually at the end of a head race and adjacent to the mill.

Pen trough - a storage tank with valve gear that controls the delivery of water onto the water wheel.

Plating - the operation of forging together the sandwich of steel between two layers of iron which is used to make scythes and other cutting tools.

Race - (O.N. ras) channel. A head race is upstream from a mill and a tail race is downstream.

Ram - an hydraulic water raising machine

Sluice - a sliding gate or other device for controlling the flow of water.

Water wheel types - see sketch No.2

Wheel pit - a pit below floor level, usually brick lined and large enough to house the lower half of the wheel.

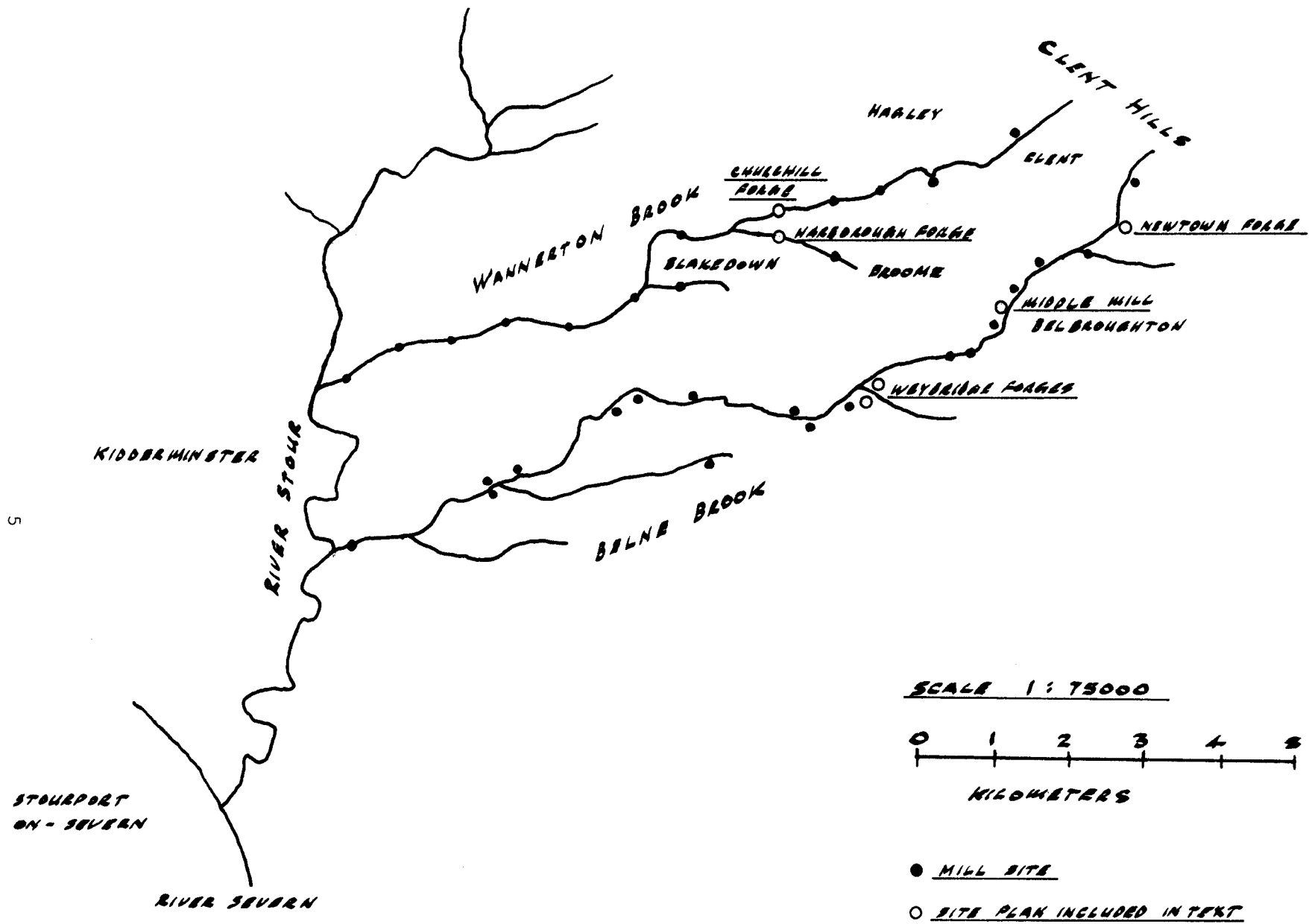


Figure 1: Location of Water Mills Project

## SECTION 1: LOOK AND SEE

The invitation to look and see is a deliberate choice of verbs. If you are asked to look at something you may or may not understand what you are expected to get from your action. However, by looking and seeing the details and the surroundings of your visual target then you are a long way to understanding what "it" is and where it fits into the total pattern of your investigation.

These notes are based on forty or so water mills in north Worcestershire, but the general approach to tackling any field-work project with a reasonably sized sample to look at is going to be very similar.

Firstly, a list of all probable sites must be drawn up and the help of the local Sites and Monuments Records Office (S.M.R.) is a good start. Their records will probably indicate the use i.e. corn grinding, fulling etc., and the grid reference based on the Ordnance Survey maps. Experience has shown that the same site has been used for different activities at different dates and has been recorded with two slightly different grid references. Of course, this may be true but, more likely, it is the result of two individuals taking readings with lack of care, or a figure has been transposed from card index to computer carelessly. Another warning: failure to find a site listed on official records does not mean it does not exist. It just means that it has never been put on the S.M.R.

A valuable source of uses and dates is the range of maps and plans produced by the Ordnance Survey since the early nineteenth century and also by others for the enclosures, tithes and the owners of large estates. Study as many as possible of the same site from different dates. The local County Record office, or a reference library, will be a good source of information. While searching for maps, also check documents relating to estates; quite often plans are attached to the documents.

Primary sources, those maps and documents drawn up for legal or official reasons, can normally be relied upon. However, secondary sources, where fact, opinion, hearsay, legend and wishful thinking are not clearly labelled and are woven together should be treated with more than a little care. Antiquarians of the eighteenth and nineteenth centuries are often quoted, but unfortunately their thoughts were not always based on clear and logical thinking using hard facts. Some twentieth century writers continue to suffer from the same problem, so the advice is select your sources with caution. Incidentally, the bibliography for this book includes some sources where the 'wheat' and the 'chaff' have to be sorted out.



Old photographs can be useful, especially if they are labelled and dated at the time they were taken. Again there is a need to be careful, millers' cottages have been known to become mills. Paintings can be good sources but unless the artist has a reputation for accuracy over detail the usual warning is offered.

Once the preparatory work has been completed, choose a site that has good documentary records. This should make the field-work easier, in as much that there are a number of facts to check on site. In practice it often turns out that the written evidence and the evidence on the ground vary in some way, and reasons need to be sought. If a pool has shrunk in size; is it silting up or is there a lowering of the water level?

Having arrived on site with a blank piece of paper, and some ideas of the potential evidence, take time to stand and stare, look and see. What are you looking for? Water, buildings, machinery, equipment and the general landscape.

Mill pools being man-made will have a dam which will be high enough to give the required head (height) of water to turn the chosen design of water wheel. These dams will have at least two gaps in them, one to take the water to the wheel and another one to lead surplus water away when the mill is not working. Pools can be drained and leave a marshy area or revert to pasture making them difficult to identify. Dams on the other hand, are normally visible, although they can also be obliterated.

On some sites there will be two or more pools in tandem and very occasionally, pools in two valleys joining at their confluence.

Early sites, and sites on rivers, providing a good, continuous supply of water for most of the year will have a by-pass, a channel parallel with the stream and with controls to divert the water towards the mill when required.

Another form of supply is via a head race, which is a man-made channel diverting water from the stream, often several hundred metres upstream. The word race is used throughout, although "leat" is used by some as an alternative. The origins of both words are early; one is Norman the other old English.

Head races are sometimes fed from the stream and often end in a pen (storage) pool. In other cases the stream enters a pool and the race is linked to the pool. In cases where the use of the race has been discontinued it is frequently damaged because of the needs of agriculture, road makers etc.

Frequently pools have been preceded by head races, which have been subsequently drowned by the water in the pool. However there are examples where the race is higher on the valley side than the pool water level and can be traced back. In one example the posts in the bank of the race just show above the water level of recently created fish ponds.

In looking for evidence of water, the real thing will be obvious but also keep an eye open for former water courses, pools and even the sites that are devoid of physical clues. The fact that a mill building is sitting on the valley side means that water got to it sometime, somehow.

The control of water is extremely important to any water mill operator today and, essentially, he will use the same basic principles as his forbears did. The amount of water pushing the paddles or filling the buckets controls the speed of rotation, which in turn, operates the machinery efficiently. Too fast or too slow is not efficient.

A simple sluice is a gap in the dam wall or the division between a stream and the head race, and the gap is blocked by a number of wooden planks on top of each other. These planks are removed, one or more at a time, to achieve the desired flow of water.

The practice in more recent times has been to use large valves with cast iron or steel bodies, fitted into a similar size of pipe. Similar methods are used to deal with the spent water and the locations of all sluices, valves, etc. should be measured both in plan and in their relative height to a suitable datum point.

Most mill wheels with buckets have the water discharged into them via a pen trough, which is usually a box shaped container made of metal with a device opening a flap to allow the water out at the required rate. The control of this flap is positioned so that the miller can stop or start the wheel without too much walking. To achieve this the cranks and levers used often show a great deal of ingenuity.

The examination of water wheels provides very useful information about the power available and also on the development of the mill. In addition to the measurement of the wheel diameter and its width, the numbers of spokes and buckets or paddles should be recorded, together with details of the latter if indeed they still exist.

Notes should also be made about the main materials used. It may be found that the wheel was totally made of wood, or alternatively of metal (cast iron, cast steel, forged or rolled steel) or indeed a hybrid mix of wood and metal.

The position at which the water strikes the wheel gives a series of type names. When the water is taken over the top of the wheel it is called an overshot wheel and will have buckets. High breast, or pitch back wheels also have buckets and the water is applied above the horizontal centre line. Low breast and undershot wheels usually have paddles and the water strikes them well below the centre line. (See fig. No.2)

Buildings often give tips on both dating and the uses to which they have been put over the years. Record as much detail as possible. Note the main dimensions and also the building materials used for the walls, roof and windows. Careful recording of brick sizes and the bond used can be useful in dating and will certainly indicate how a building has developed. (See fig. No.3)

The number of storeys and the lay-out and numbers of windows are well worth noting. Not every building on a site will have had water power provided, so the more detail recorded the better the chance of correctly defining the use or uses in the past. Examples are brackets for shafting, bolts set in the floor for securing machinery and mangers for animal feed.

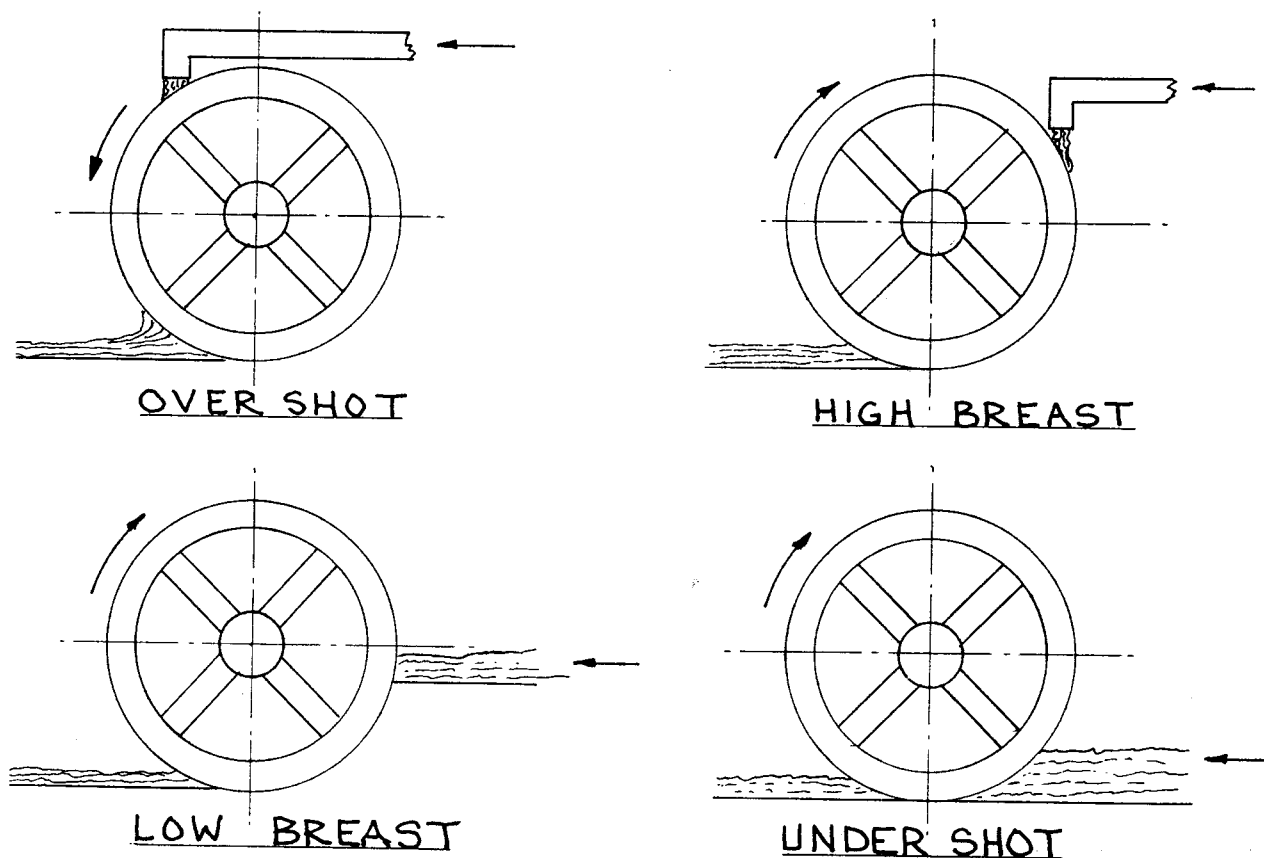
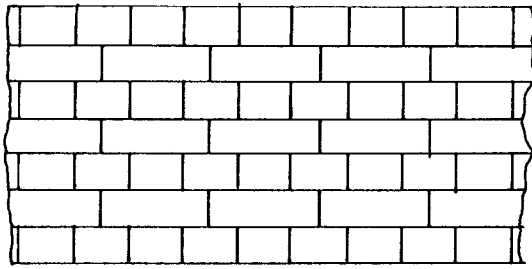
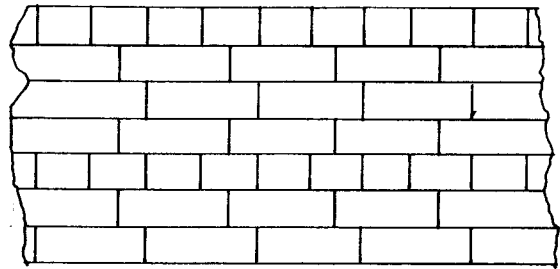


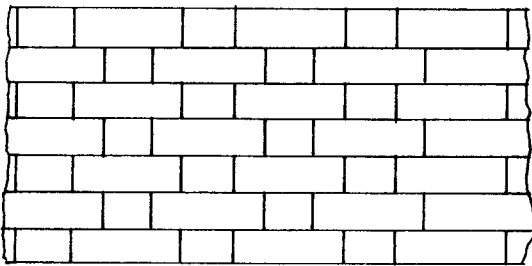
Figure 2: Wheel types



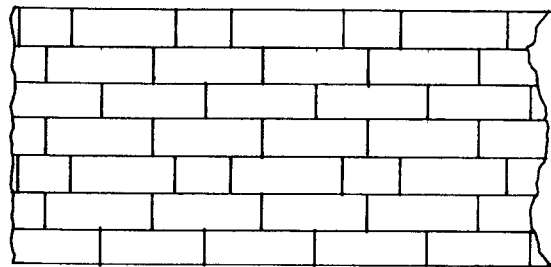
ENGLISH BOND



ENGLISH GARDEN WALL



FLEMISH BOND



FLEMISH GARDEN WALL

Figure 3: Common brick bonds

Floors are worth investigating for signs of wear or heat. If they are wooden, then evidence is often more interesting below the boards.

Machinery and other equipment may still be in place and easily identifiable with regard to their functions. Quite often a mill has been stripped out for scrap metal, or simply because a new use has been found for the building. Nevertheless, clues can be found on or near the site, such as grinding wheels. These come in two types, first for grinding corn and will be 1.00m - 1.37m (4'0" - 4'6") diameter and the second will be for grinding metal and will be worn down to 0.5m (1'6") diameter.

Changes in harnessing the water via a water wheel will be seen by the use of a water turbine for driving machinery or generating electricity, or applied to a ram to pump water to dwellings and farms in the vicinity.

At the beginning of this section the reader was invited to look and see. Having done this, it is necessary to record the information gleaned from each site visited.

There is a built-in hazard with designing a form for completion on site. It may leave important information off and will seek answers to questions to which there is no immediate answer, thus wasting space. From experience it is suggested that a simple form is prepared with the following data:

Site name  
S.M.R reference no.  
Parish  
District  
Map reference, with eight figures  
Owner, with address and telephone number  
Occupier, with address and telephone number  
plus any pre-visit notes on uses, dates etc.  
gleaned from old maps and documents that can  
be checked on site.

In addition, build up a checklist of questions that require answers that, in turn, will become the basis of your report. The checklist will develop with experience but if the points raised in this section are included it should give you a good foundation. How and where the answers are recorded is a matter of personal choice and experience will refine your methods.

A couple of practical points. Metric measurements are the accepted standard used by professional archaeologists, so in writing for publication put the metric size first and the imperial conversion in brackets. The second point is the matter of keeping your valuable records dry on site in the rain, near the edge of muddy pools. Plastic bags are the cheapest answer.

## SECTION 2: THE BELNE BROOK SITES

### **SHUT MILL**

Shut Mill - "Shut" probably meaning a swift rush of water - is on private land in Romsley. It has been admirably described up to 1985 by E.P.Wills in her "History of Shut Mill Valley". It was grinding flour from at least the thirteenth century until the nineteenth when it went over to grinding bones for fertiliser. From 1932-54 the pool drove a hydro-electric plant.

Where the mill once stood, a garage has now been built and the wheel on its eastern side has disappeared. The mill cottage has been sensitively modernised. The mill pool remains, fed by the Shut Brook from the Romsley Hills with its three tributaries and the springs which occur on this brook and in the pool itself. The dam now forms an attractive rockery, with two sluices and a pen trough which once carried water through the dam on to the mill wheel. The right hand sluice still carries overflow water away from the pool down towards Sling Pool.

Another source of water was taken from the stream running parallel to Shut Mill Lane, in a head race. This is still visible in parts.

### **NEWTOWN FORGE**

The stream leaves Shut Mill, flows west of Great Farley Wood and into Sling Pool. (Fig.4). Below this pool evidence was found of a dried up race in the form of a depression about 2m (6'0") wide against the bank. Some of this has been obliterated by the footpath to Gorse Green Lane opposite Isaac Nash's old house (now modernised).

There is only a trace of the race which once crossed this lane but it is still possible to see the pen trough which it filled. This is a pipe 0.75m (2'6") in diameter which emerges from a steep bank behind the mill. This bank is supported by a retaining wall made of early twentieth century bricks.

The forge building was Isaac Nash's scythe mill in the nineteenth century. Examination of the brickwork showed a variety of different brick bonds indicating a number of building periods in the life of the mill. Radical changes, converting the mill to domestic use, in 1992 revealed the sites of two furnaces and hammers, but this evidence has been covered again .

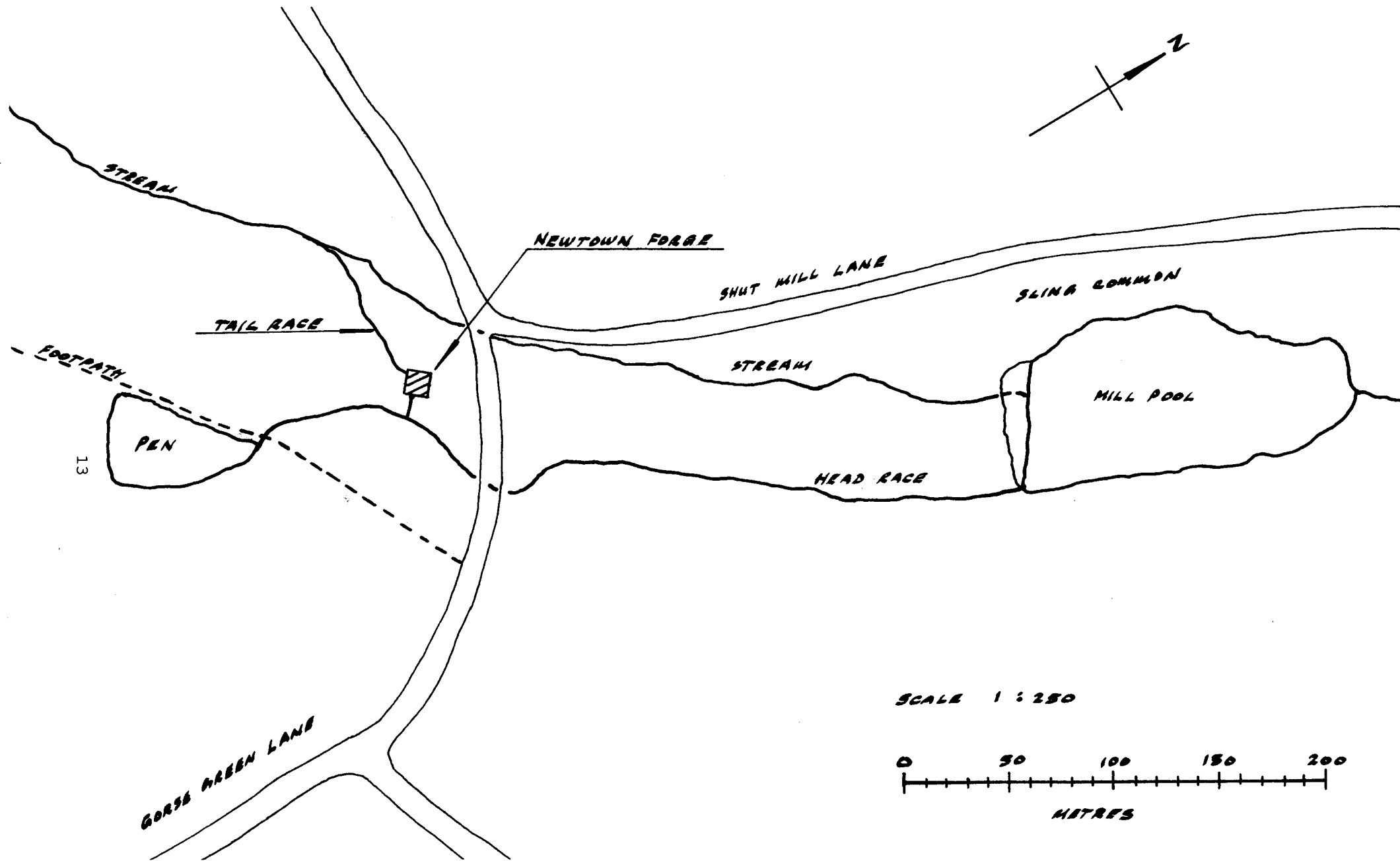


Figure 4: Newtown Forge

### **BELL END MILL**

Bell End is a small area of great historical interest. It has been a thriving and noisy industrial area in the peaceful countryside, worth a book on its own.

It was a corn mill until the early twentieth century when it became a scythe grinding mill up to 1949 when it ceased to operate. The buildings and the mill pool were largely demolished in the road widening scheme of 1963.

The mill pool had various sources of water. The Bell Brook travelled, as it still does, under the road to the north of the pool and on to other mills, but the race from Newtown forge was the main source. It is suggested that the race might also have fed the two small pools which the 1836 Bell Hall estate map (County Record Office, Worcester) shows next to the main pool as a back up in dry periods. This idea is supported by the fact that Mr. Blundell, who owned the mill, also owned the smithy garden, through which the race passed.

East of the Bell Inn is another pool that has been drained and a disused dam. This pool was built later than the main pool when demand for water increased but it went out of use before the main pool.

The main pool was on the opposite side of the main road at its intersection with Hartle Lane. The dam, still visible, 4m (13') above the road, lies almost parallel to the road and between them there remains an old, much altered, storage building. Behind this again an adjoining building is of older date as its larger bricks confirm; this is reached by steps up the side of the dam. This used to house the hydraulic ram which pumped water up to Bell Hall. The mill buildings themselves housed the wheel thus protecting it from the weather, but these disappeared when the feeder road to the motorway was built.

### **BELL HALL FORGE**

W. Gwilliam lists this site as one of the forges of the Stour Valley but no other reference to it could be found. Interested and very helpful local people at Belbroughton Historical Society had no recollection of any mill working there or even of mill ruins in the sixty or more years that is spanned by their own memory and that of older people they had talked to in their childhood. They had a hazy recollection of a pile of bricks on the south side of the road and this supports the claims of Dorothy Cope in her "Scythemen of Belbroughton". There is, however, no water there and so there cannot have been a water-powered mill on this steeply rising ground unless it was destroyed when Hartle Lane was re-routed in about 1840.



Upstream from the above sites and just beyond the entrance to the Hall, there is a brick-built tunnel using large 3" bricks laid lengthways in the stream. It is probable that they formed a bridge into the field.

More bricks extended 1.5m (5'0") above and 5m (16'0") below the bridge. The purpose of this brickwork is far from obvious and any attempt to suggest a use would be mere speculation.

### **GALTON'S (OR SAVAGE'S) MILL**

This mill is near the intersection of Galton Lane and Hartle Lane. At first this operated as a corn grinding mill, (Savage's Mill) until the Napoleonic wars when the Galtons of Birmingham took it over to grind gun barrels, roughly made at their Birmingham factory, hence the name change.

In the mid 19th century the mill was used by Isaac Nash for scythe grinding, which continued until 1942.

Bell Brook flows towards Galton Lane into a large pool which is badly silted up. Water was then controlled by two sluices, the first, visible from Hartle Lane, is an overflow through which water still continuously falls.

From the pool the water flows via a pen pool into a metal pen trough 2.40m (8') in length and on to an overshot wheel. Gearing attached to an arm, still to be seen going into the roof, controlled water from the inside of the mill. (See Fig.No.5).

The wheel, only visible by entering the opening made for the shaft, is a hybrid wheel with 48 buckets in total. Including the buckets the wheel has a diameter of 4.73m (15'6") and a width of 1.30m (4'3"). It probably owes its survival to the wheel house remaining intact and largely covering it.

A metal gear wheel still exists, although in 1942 it broke down causing the mill to close.

The tail race travels underground, under Galton Lane, joining the stream below the bridge.

Galton's mill originally consisted of two buildings of similar size according to a 1945 survey. The buildings are now used as an engineering works which occupies most of the original mill and is kept in sound condition.

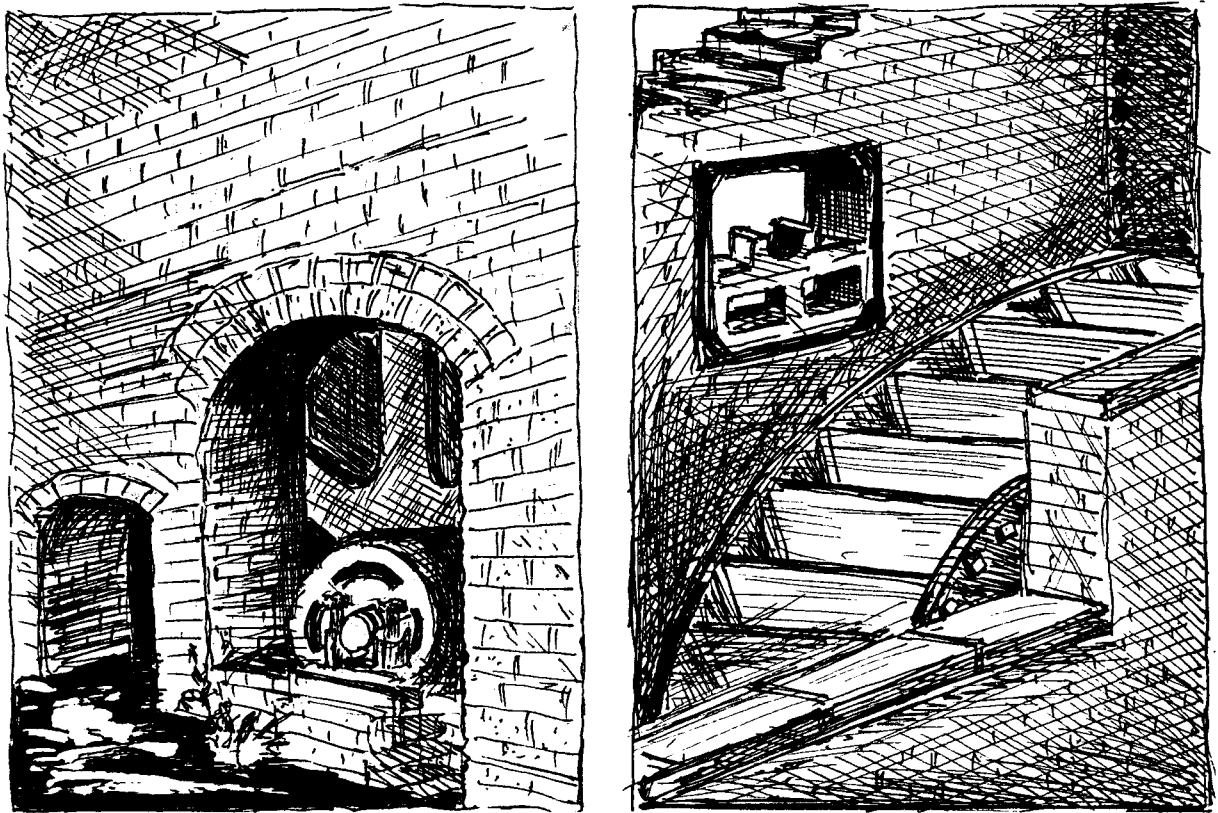


Figure 5: Galton's Mill: external and internal views of the wheel

The wheelhouse is roofless but has two walls remaining. Additions to the original building are a lower, flat-roofed building added to the wheelhouse. Another flat-roofed building extends to the rear of the main mill house, roughly covering the underground tail race.

The main building has been extended, the chimney stack demolished, some windows blocked in and some remade.

#### MIDDLE MILL

Between Galton's mill and Belbroughton are three artificially, and recently, made fish pools, and the remains of Middle Mill are to be found between the second and third of these. It is said that it had been a plating mill operated by Mr. Eddie Moore until 1953. It is astonishing that so little can remain of a mill which was working so comparatively recently.

The most conspicuous feature now is the mill race (see fig.No.6) which shows as a series of posts just above the water level some 2 metres from the left bank of the second pool. This leads to a large dam which has modern developments including a gas pipe running through it. The sluice is still in good condition a few metres from the mill race, where the mill wheel would have been.

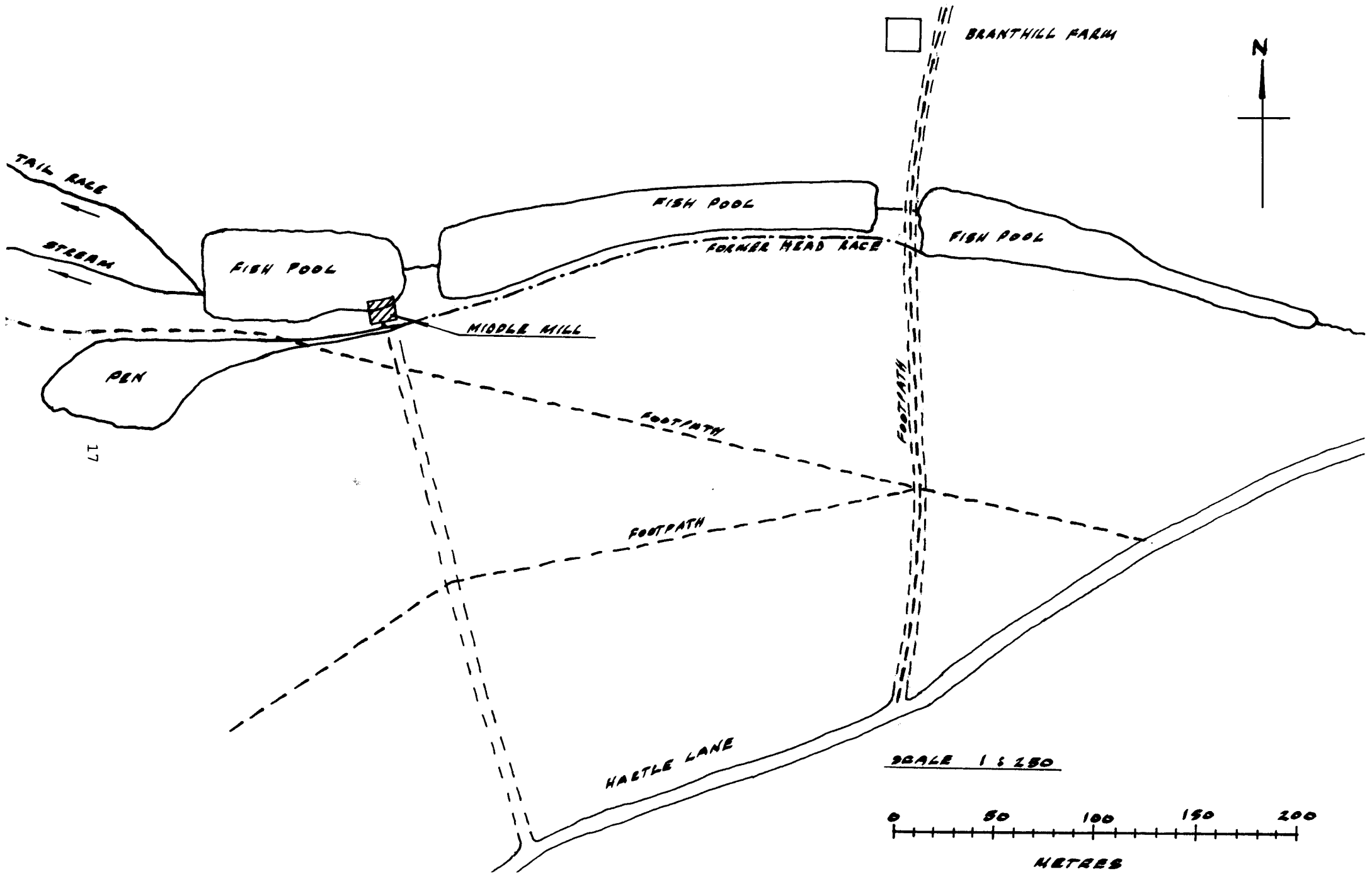


Figure 6: Middle Mill

The vestiges of the mill house are found almost covered by grass and moss. The remaining, large, bricks suggest a date between 1784 and 1850. Nearby, a green track can be seen going straight to Hartle Lane and it is said that this road from the mill was once paved with worn grinding wheels, but these have now all disappeared.

#### **BLADE MILL**

Little remains of this blade grinding mill, the site of which is on private land. Records show it existed in the early 19th century linked to the scythe making trade.

The water supply is fed from the tail race of Middle Mill and a stream coming from Moor Hall, near Walton Pool. Both race and stream enter a pool before going into the area of the former mill.

After its life as a blade mill, the water supply was used to power a turbine to create electricity for Yew Tree House, and finally some of the water was diverted to fill a swimming pool.

#### **BELBROUGHTON CORN MILL**

The mill ground corn from at least the early 19th century until the early 20th century. It was demolished at some time after 1947 although dates suggested do vary.

A photograph of a building in some publications is labelled as the corn mill, but examination of the Belbroughton tithe map, and the actual remains adjacent to the mill pool strongly suggest that it was in fact the miller's cottage.

The mill pool is in the garden of Yew Tree House and the sluices and wheel pit can still be seen adjacent to the dam.

Little else remains, although by peering from the boundary on Dark Lane, a weir can be seen in the stream built from disused grinding wheels, probably from the blade mill.

#### **BELBROUGHTON SCYTHE MILL**

The former Nash Main Works located behind the Old Horseshoe Inn, in the centre of Belbroughton, one time mecca of the scythe-making industry was once known as Belbroughton Forge. This was for many years in the possession of the Waldern or Waldron family and was engaged in the manufacture of scythes and hooks over many generations. It was a Thomas Aston Waldron who first harnessed local water power to drive his scythe-making machinery in the late eighteenth century; and it

was another Thomas Aston Waldron who was the last of the line to work the forge before selling it to Isaac Nash in the early 1870's when trade began to decline.

However, the name of Waldron appears to have been so prestigious that according to W.B.Woodgate in his book, "Reminiscences of an Old Sportsman", Nash paid Thomas an annuity of £200 for the option of using it on the products he made. As business boomed, so Nash bought or rented many local properties to expand his enterprises. He also acquired the Somerset scythe-making firm of Frussells in 1897 (Robin Athill "Old Mendip"); but it is possible that he held shares in the business for some years before that. As a result of the take-over it is likely that several Frussells' key workers migrated to Belbroughton for employment.

In its heyday the works boasted two main forges, each with a water wheel and rows of finishing shops where work done at Weybridge and Middle forges could be brought for further processing.

Today little remains of the original scythe-making activity - or indeed of the watermill itself. The mill stream is diverted, the mill race blocked off and a factory office stands on the filled-in mill pool while several small businesses occupy the outbuildings of the old works. However many grinding stones are in evidence and the works are remembered in the names of modern housing developments on the site. Some years ago a Black Country businessman purchased the tilt hammer frame, tup and anvil and these are now stored at Churchill Forge.

#### **LOWER BELBROUGHTON MILL**

The nearby Lower Belbroughton Mill was demolished in 1928 and the site is now an attractive rockery in the middle of the stream adjoining the Queen's Hotel. Local historians assert that it was once engaged in the manufacture of a coarse cloth known as "nogs"; later it became a corn-grinding mill and was apparently in the occupation of a certain Mr.Maiden and his son Eli when Isaac Nash bought it in the early 1880's to convert it into a scythe and hook grinding, glazing and polishing works. It seems to have reverted to a corn-grinding mill at the turn of the century.

Apart from the rockery, all that remains of the original site is an enormous quantity of grindstones alongside both banks of the stream.

Numbers 2 & 11 Drayton Road, Belbroughton

It is reported that mills once existed at Nos.2 and 11 Drayton Road, Belbroughton. No.2 is the house adjacent to the stream

feeding Lower Belbroughton Mill but no evidence could be found to support this, although the occupant said she had been told that it had once been a mill, later a public house and then a tearoom.

No.11, lower down and on the opposite side of Drayton Road has a stream flowing at the bottom of the garden and there are a number of grindstones lying among the flower beds, but these could have been brought from another site years ago. Certainly, neither the present owner, nor the previous one, who had lived there for a considerable time, could throw any light on the matter.

### WEYBRIDGE UPPER & LOWER MILLS

It is believed that Weybridge Upper Mill was once a corn-grinding mill but it is marked on Isaac Taylor's map of 1800 as a Forge. By 1821 it had become a Gun Mill according to Greenwood's map. Once rented by the celebrated Waldron scythe-making family it was later acquired by Isaac Nash as a plating forge.

The water supply for the Upper Forge was led from a pool just outside Belbroughton along a head race. The Lower Mill had its own pool, now filled in. (See fig.No.7)

In 1938, the entire site was purchased for £1,300 by an Oldbury firm which cleaned and reconditioned industrial boilers. The Upper Forge, now demolished, was used to reclaim lubricating oil during the last war. In the latter half of the nineteenth century Isaac Nash is reported to have pulled down the old Lower Weybridge Mill to build some scythe-making works of his own and these acted as his H.Q. for some time.

The Lower Mill had an interior water-wheel and belt driven hammers and grinders for scythe making when they were "blown up" by the Oldbury firm to clear the area. On investigating the site evidence was found of two, possibly three, wheels. Part of the original mill was in good condition and had 2 interior forge hearths. The water for one wheel was fed through a metal tube which is still in place but no wheels or fittings remain. Although the mill pond has been filled in a filter by a sluice gate is still in situ.

A boundary wall running alongside the stream has utilised many fragments of broken grinding stones in its construction.

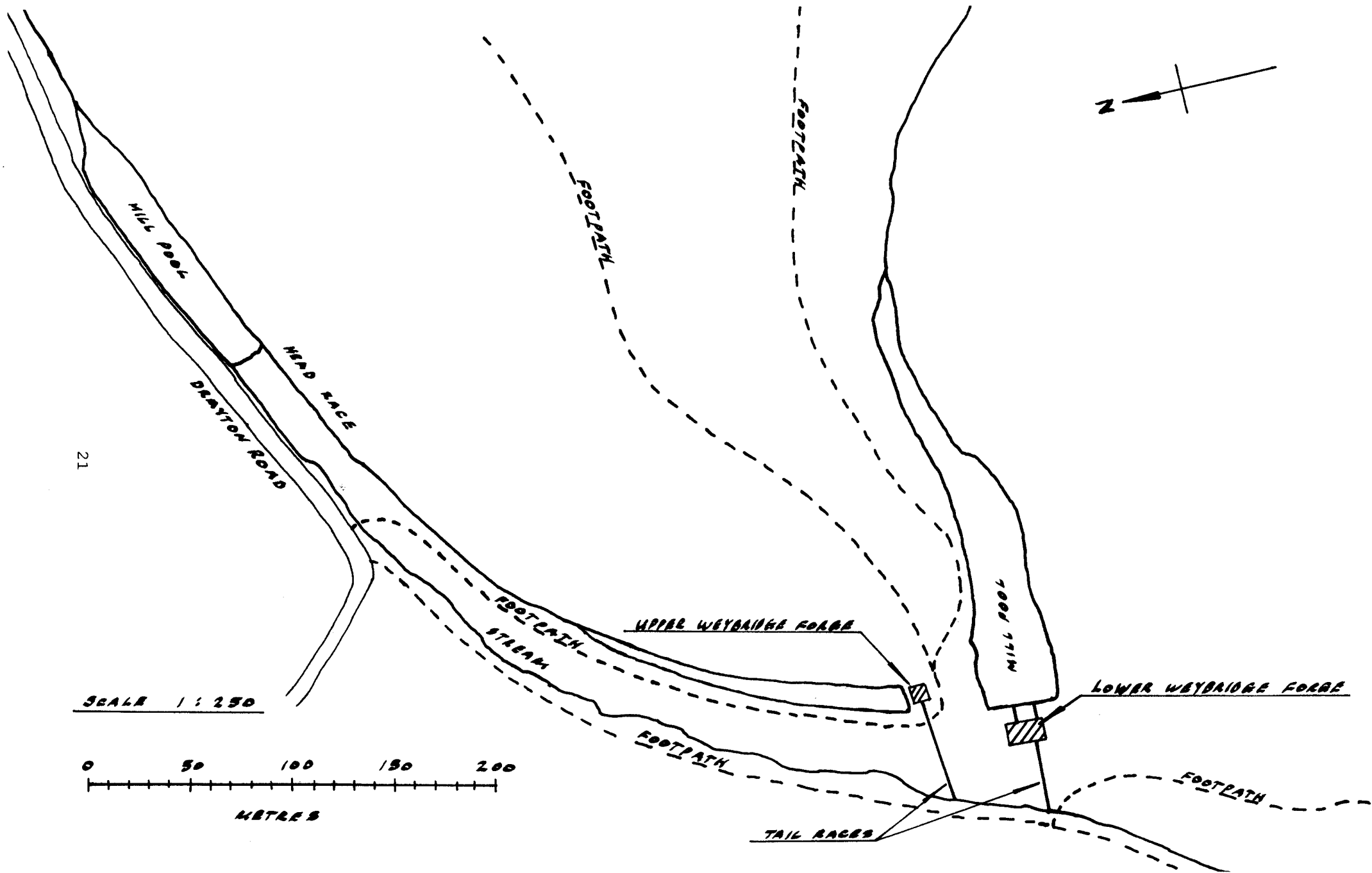


Figure 7: Weybridge Forges

### **DRAYTON MILL**

400m (440 yds) downstream from Weybridge Forge stands Drayton Mill. Easily viewable from the road it is a long, low rectangular building, 2-storeys high and with a manager's house, complete with works bell, at one end. Today the main buildings are occupied by a number of small firms; the pool still remains a beautiful and tranquil reminder of a busier past. There is evidence that the premises were used by Brintons as a spinning mill for the Kidderminster carpet trade in 1783 but by 1835 they were being described as "a water corn-mill with two wheels, lately used as a wire mill by J.W.Philipson" (M.K.Holden 1985, unpublished). The wire would probably be used in the carpet industry. By 1839 it had apparently reverted to a spinning mill for worsted and flax and had gas equipment for lighting. Isaac Nash rented it around 1865 for his scythe making activities - mainly finishing processes.

Inside the building the drive shaft ran its entire length and at right angles to the dam. The cast iron shaft supports can still be seen. In 1929 the overshot wheel at the east end of the building, and parallel to the dam, collapsed and was replaced by an Armfield Water Turbine, later ruined when cement used in relining the dam seeped into it. It was replaced by a diesel engine which ran until the 1950s. Under the floorboards the position of the turbine can still be seen.

In part of the building occupied until recently by a motor cycle parts dealer, an old furnace and hearth were discovered.

### **HILL POOL MILL & FORGE**

During the investigations, Brintons, the Kidderminster carpet firm kindly supplied information on these mills from their archives. Included was a coloured reproduction of a painting of Hill Pool village in its heyday, bustling with industrial activity, factory buildings and smoke. A far cry indeed from the sleepy little hamlet of today. However, the accuracy of the scene could not be guaranteed as very little evidence was found to support it.

Brinton's written records are more reliable and show that there was a fulling mill there in the seventeenth century; that the mill was part of the estate of John Oldnall which was surveyed in 1704 and the site was referred to as a "walk" mill (another term for fulling mill). In 1781 it was leased to Richard Lowe, but shortly afterwards the fulling of cloth, which had been carried on continuously for over a century, ceased and on June 10th 1783 William Brinton began spinning yarn there for the Kidderminster carpet industry. When the lease expired in 1802 Brinton concentrated his whole business



in Kidderminster itself.

Between 1802 and 1836 the mill was used as a forge, possibly for hand-drawn wires for the carpet trade, but more likely for the Belbroughton scythe industry. Isaac Nash used both mill and forge buildings for a short time in the mid nineteenth century but the firm had abandoned them in the 1860's, probably because of the distance from its centre of activity in Belbroughton.

The mill is now a private residence, so altered that its original use is not evident. At Hill Pool Forge it is said that the pool up the hill has been filled in and the premises demolished to build a garage. The overshot wheel had been broken up and sold for scrap in 1942.

### **BARNETT MILL**

In contrast to Hill Pool, there is a wealth of evidence of the previous activities at Barnett Mill.

The present mill was working until 1955 as a corn mill, but probably with the grinding of edge tools as a side line. It is now a private residence but has been sympathetically restored to retain many original features.

The overshot wheel (see fig.No.8) on the east side of the building is intact, 'though inoperable. In its heyday, water from a pen trough turned the wheel in an anti-clockwise direction. It is a metal wheel with a wooden axle 4.27m (14') in diameter, 1.83m (6') wide with 8 spokes mounted on a .28m (22") wooden shaft, but with no buckets remaining. The dam has disappeared and 'though the pen pool is evident it cannot retain water, which would originally have come from Hill Pool and was carried via a 3.66m (12') wide head race, brick lined in parts, running 650m (710 yds) from the footbridge at Hill Pool. There is a difference of 9.14m (30') in 1200m, a sluice gate to equalise the level of the water and a gate on the left hand side to control it. In 1988 clay pigeon shooting equipment had been installed in the sluice. Behind Spring Cottage there was a large tube to divert water but this had been sealed off in 1955.

There is the date 1830 on the 3-storey mill building which has been incorporated into the dwelling and the original brick built house reputedly dates from 1700, but timber framing at the rear suggests it could be older.

Inside, the interior gearing of the wheel forms a background for the billiards room on the first floor and a lounge on the second - although some alterations to floor levels were necessary to make this possible. There were many millstones in the landscaped gardens.

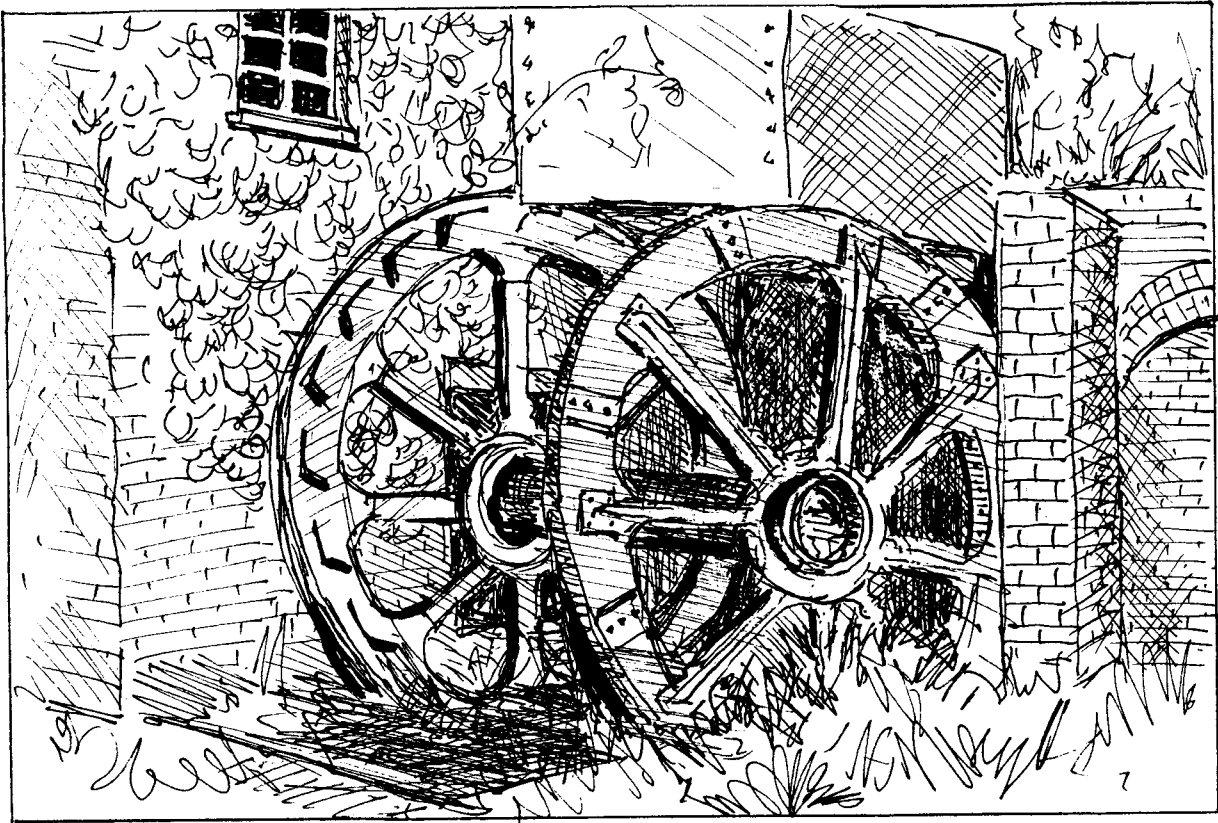


Figure 8: Barnett Mill: pen trough and derelict wheel

### BELLINGTON MILL

Bellington Mill must have been almost identical in appearance to Barnett Mill.

It was a corn-grinding mill and according to records, was owned by Mr. John Perrins in 1815; in the last quarter of the nineteenth century a Mr. Cook and a Mr. Dickinson were reputedly millers there. In 1920 the wheel and mill machinery were sold by the then owner and today, although the shell of the 3-storey brick building survives, there is no evidence of the wheel or fittings. There are, however, the remains of a wooden grain chute from the first floor.

The pool at the south east corner, which apparently fed the overshot wheel through a pen trough, has been filled in and the ground levelled.

### **LOWER BELLINGTON MILL**

Lower Bellington Mill has virtually disappeared. In the past it had been a corn mill but was later known by locals as the Gorse Mill. This suggested it had been grinding gorse for cattle feed. On the 1884 6" O.S. map it is marked as "Corn Mill disused".

Nettles were cut down to look for evidence and the outline of the building 7m (23'0") by 6m (19'7") was discovered, with part of one wall still standing.

The mill had 2 narrow brick-arched bridges leading to it, one of which had collapsed.

Both mills at Bellington required much thought and speculation to determine the line of the mill races.

### **HARVINGTON FORGE**

The building facing the A.450 road in Harvington, known as Forge Cottage, is probably on the site of the original forge and may even contain part of the original work.

The pool supplying water to the mill wheel lies at the rear of the forge and is now dry. This pool was fed from the stream that fills the moat at Harvington Hall and in drier periods, the operation of the water wheel must have been difficult.

Evidence from maps shows a short life in the 19th century. However, it is quite possible that it is the site of a smithy existing over a long period but operated by manpower rather than water power.

### **HEATHY MILL**

The next mill downstream is Heathy Mill in Stone parish, possibly on the site of a mill documented in 1086. In 1831 the mill was used for spinning woollen yarn but before 1845, on the expiry of the lease, was converted to corn-grinding. Richard Brewster, the last miller was a tenant of the Earl of Dudley until 1863; subsequent tenant farmers used the premises to grind for themselves and their neighbours. In 1936 the machinery became unreliable and the pit gear and upright shaft were removed and replaced by an electric motor.

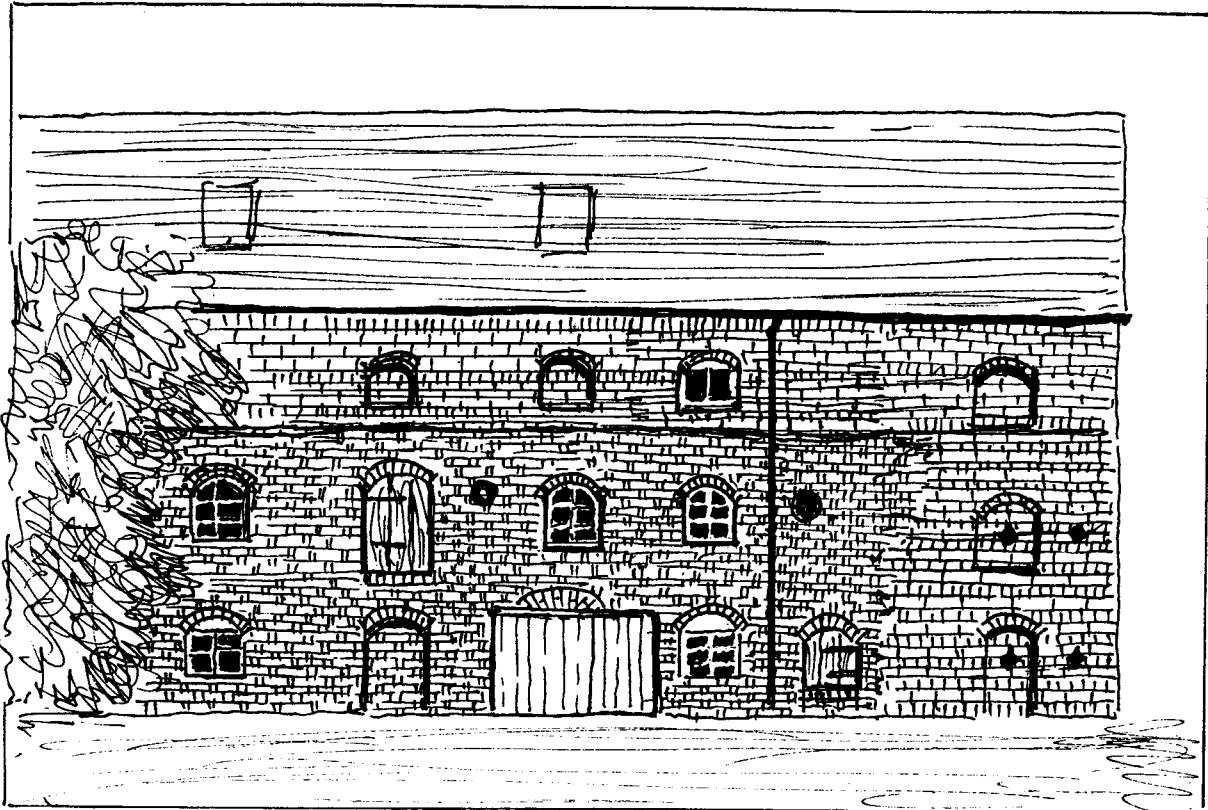


Figure 9: Heathy Mill. Three different brick bonds have been used. The wheel was to the right of the downspout

The mill and the mill house are still occupied. (See fig.No.9) They are of 3-storey brick construction, with an addition at one end of the mill and evidence that the third storey was added at a later date, perhaps when first used for corn grinding. The buildings are now a farm. The mill house has been converted into flats. The mill is used for the grinding and blending of cattle foods, using electric power, for there are no remains of the wheel or machinery. The pool has been filled in, the stream culverted and diverted and the sluice gates buried.

#### **SPENNELL'S CORN AND TAPESTRY MILLS**

A large recreation field has been created on the sites of Spennell's pool and the two mills destroying most of the evidence of the industrial activities.

On the south side of Spennell's Valley Road there is a bank 2.50m (8'0") high x 200m (220 yds) long. This was part of the dam of Spennell's Pool, fed from the stream flowing from Heathy Mill .

The textile mill was an imposing four-storey building destroyed by fire in 1880 after a life of about 50 years.

At the opposite side of the field, near the exit into Wood Road, is the probable site of the corn mill. From old maps it is thought to have been fed by a head race from Spennell's Pool.

#### HOOBROOK MILL

Hoobrook mill was both a paper mill and a corn mill in turn. It lay to the east of the railway viaduct but a small industrial estate has obliterated any sign of the mill.

It was fed by a pool which is shown on the O.S. map of 1951, but has now been destroyed.

The tail race (see fig.No.10) for the mill can be seen 200m (220 yds) to the west, near the war memorial and the public house but only as a dry ditch lying between willow trees.

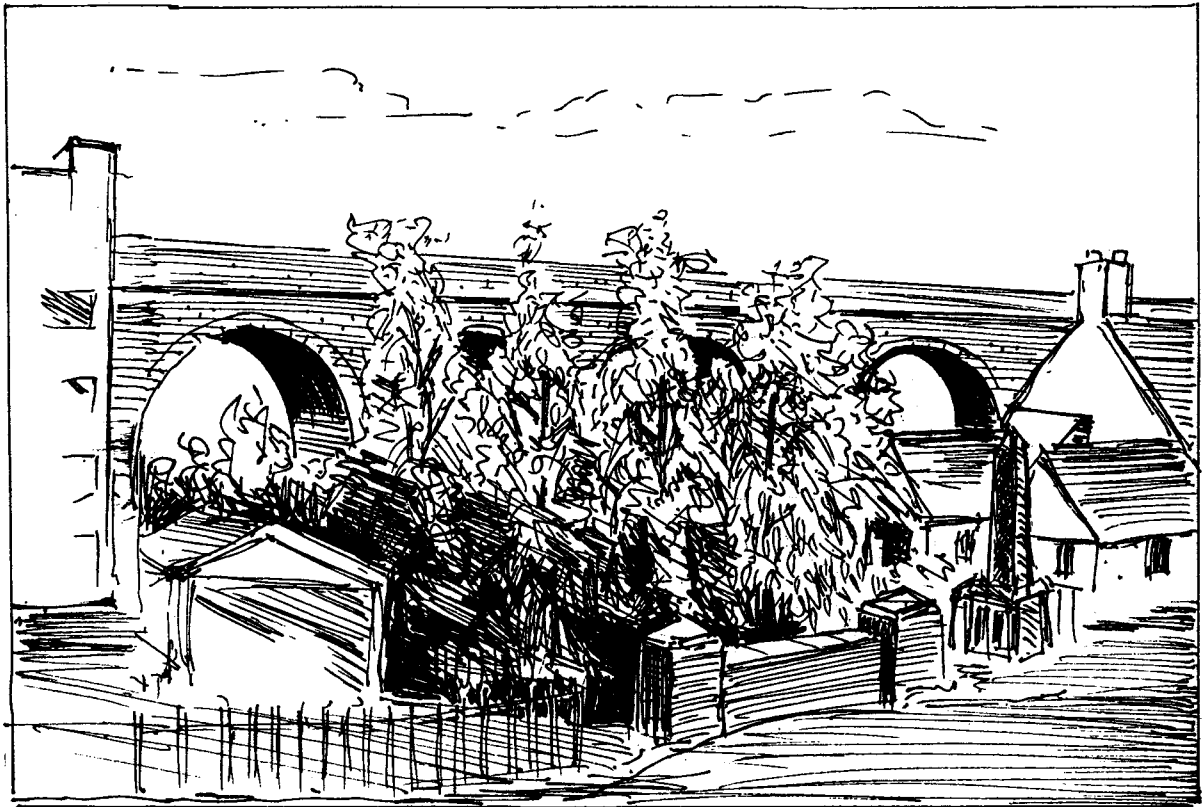


Figure 10: Hoo Mill lay behind the viaduct. The tail race was adjacent to the willow trees.

### SECTION 3: THE WANNERTON BROOK SITES

#### **CLENT OR VINE MILL**

Clent Mill, also known as the Vine Mill was adjacent to the Vine Inn. It took water from a pool immediately above it, now a muddy hollow and Dark Pool, still a pleasant lake with an earth dam. An early photograph shows the tall chimney and boiler house of an adjoining steam mill and there is a reference that in 1849 Thomas Pearson was miller of both. (See fig.No.11). The water mill ceased working at the turn of the century and the wheel and machinery were apparently dismantled in 1930; the steam mill continued its operations until the late 1920's. Obvious traces of the chimney have disappeared but three small brick arches in the Vine outbuildings on the West side were probably connected. Nearby, in the garden, is a flight of steps, composed entirely of grindstones, which leads to the remains of the dam.

On the opposite side of the road is Glen Cottage, a partially timber framed building which may have been associated with a mill. The cottage overlooks a dam behind which is a lake, a dry hollow of similar size and finally another lake. The water from this series of pools is now culverted under the road and is said to pass beneath the Vine Inn.

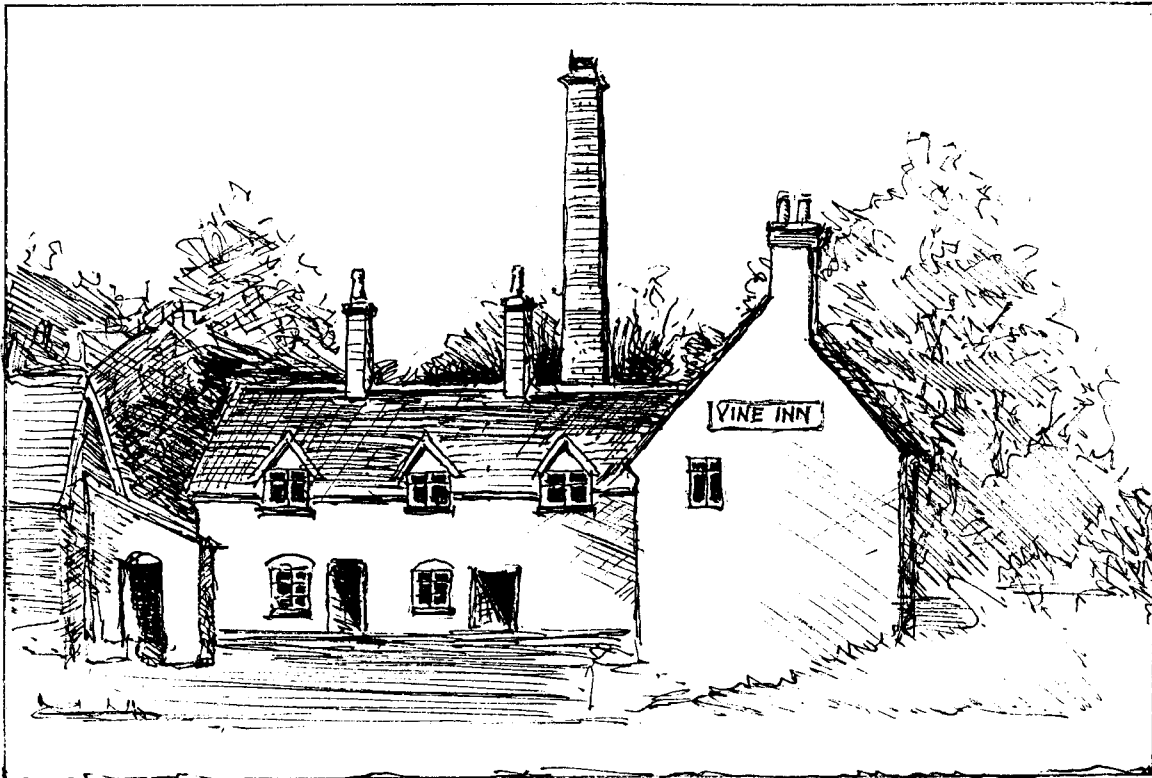


Figure 11: Clent or Vine Mill

### OLDNALL/OLD MILL

In his History of Clent, written in 1890, John Amphlett, the village squire, suggests that a mill existed at Oldnall in Clent on the old Bromsgrove Road at Oldnall Farm just before the sandstone cutting. No evidence of a mill site could be found and two village elders who had lived there all their long lives could throw no light on the matter either.

It is suggested that Oldnall is a corruption from O'The Hall or Hill.

### SPOUT MILL

The site of Spout Mill, shown on the first editions 1" O.S. Map of 1830 is well-known to Hagley residents. At Mill Pool Close, the pool was used as a lido until the Second World War but has now been filled in and built upon. The stream has been landscaped and runs through pleasant, sloping gardens. The water flows into a modern brick sump to the right of Mill Pool Close entrance and is culverted under the A456 road; early photographs show the mill stood at, or slightly to the left, of this entrance, but today only the names of the Close and Spout Mill Cottage opposite give a clue to its existence. The mill ground corn up to the First World War. (See fig.No.12)

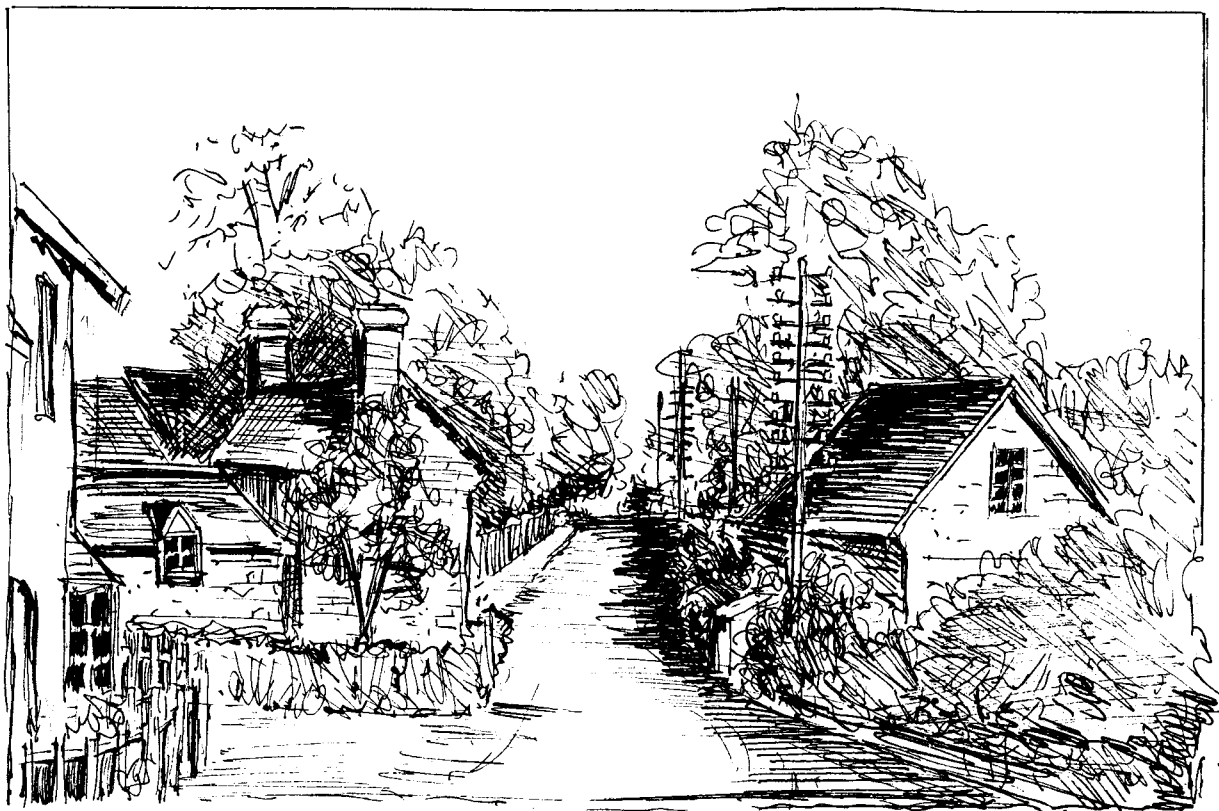


Figure 12: Spout Mill

### **BRAKE MILL**

The stream flows on to Brake Mill. In 1543 the Lord of Hagley, Sir John St. Leger gave a Sparry permission to create two pools - Sweet Pool and Brake Pool. The railway embankment altered the shape of the pool in the mid nineteenth century and the east end is silted and now a wetland nature reserve. The mill building, brick built and originally dating from c1780, has recently been restored as a private dwelling with a new water wheel added for decoration. It is situated at the centre of the dam which is approx 100m (110 yds) long. At the end of Brake Mill dam are a sluice and stream and some 20m (22 yds) downstream, the remains of a cellar, presumably belonging to an earlier mill-house; a nicely finished arch suggests that this was the end of the building. There is also an old apple tree near the drive entrance of the restored mill which could have been associated with an earlier building.

### **STAKENBRIDGE FORGE**

Stakenbridge is just past the difficult turn under the railway bridge. A mill stood at the foot of the railway embankment, again at the edge of the dam, and its remains are sunk in the pool which was created when the modern house was built. There is a sluice at this point. The householder said that the orchard was the site of Stakenbridge House which had an adjoining spade and shovel mill. It is believed that gun-barrels were also manufactured there during the 1870 Franco-Prussian War.

The race is still flowing into the new lake and a waterfall in the garden was part of the flow driving the two wheels which, together with other machinery, were buried on the site.

The original builder in c1750 was apparently a member of the Bache family, a descendant of whom married Penelope Willetts c1787, of Churchill Forge.

### **CHURCHILL FORGE**

The stream flows on to Churchill Forge, built about 1800. It is situated on the middle of the dam, but it is possible that an earlier mill was positioned at one end, where a sluice still exists. Some years ago the pool was drained revealing an earlier dam plus a wooden race. More recently maintenance work on the grounds of Churchill House adjoining the pool, revealed a nineteenth century sewerage channel which might originally have been the head race of the earlier mill. It is hoped to investigate these developments. (see fig.No.13).



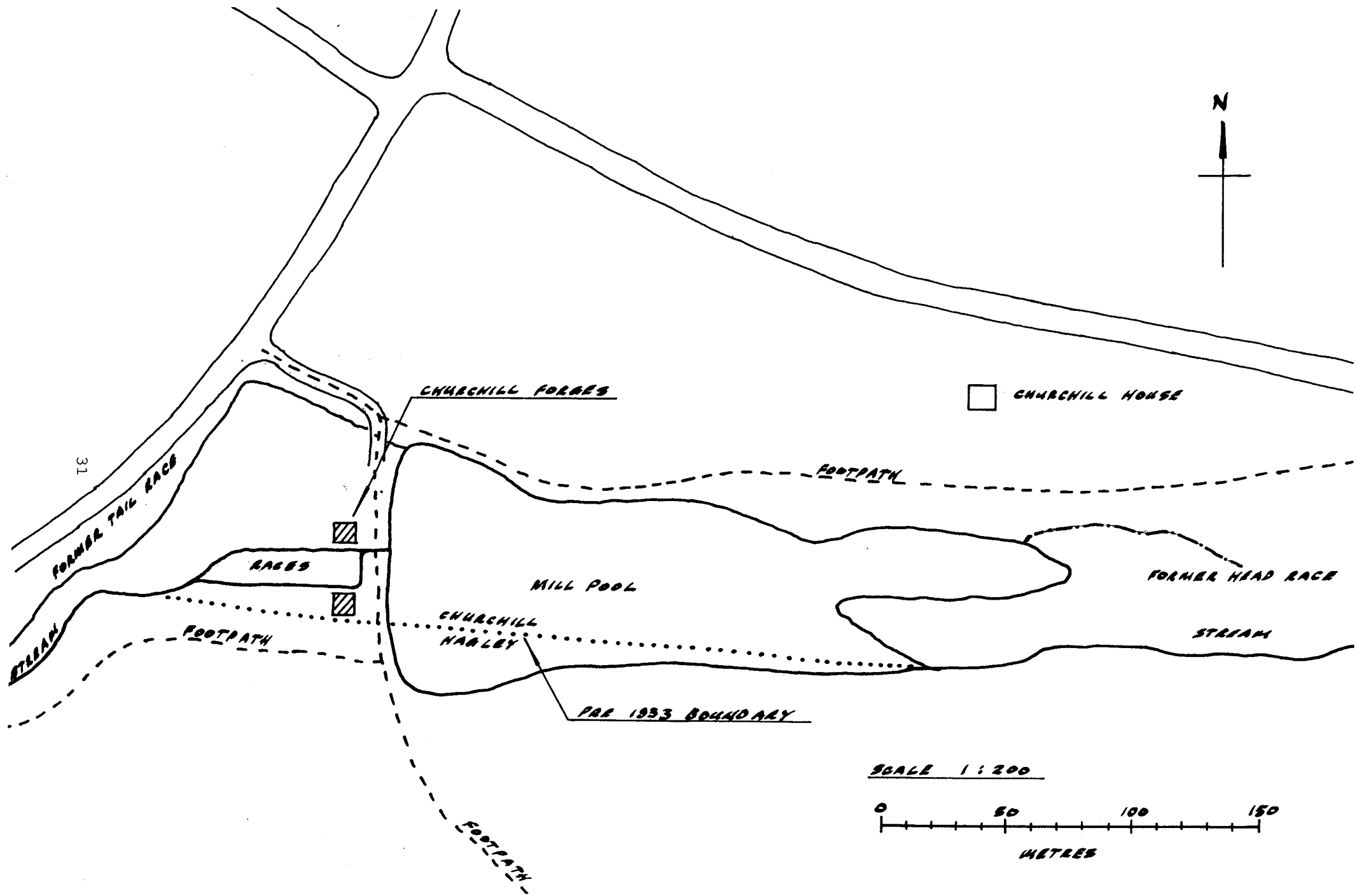


Figure 13: Churchill Forge

There are two wheels still intact, the main one, an overshot oaken wheel with iron buckets and axle, has a diameter of 4.88m (16'0"). (See front cover) It drove the machinery for the manufacture of edge tools and industrial ladles until production ceased in the early 1960's. It is fed by a pipe to a pen trough and the flow of water to the wheel is controlled by a long pole inside the forge. The older wheel, 4.7m (15'4") in diameter, is an unusual seven-spoked cast iron, high breast wheel with a wooden axle which drove the furnace blower.

The Forge, whose history is well documented elsewhere, is now a Charitable Trust and has Open Days at intervals throughout the year.

### **CHURCHILL CORN MILL**

Churchill Mill is the next downstream. It is now a private residence. In its working life it had been a corn mill. The quantity of small grindstones lying around also indicates involvement with the edge-tool industry. It boasted a long race to feed the small header pool which fed the water to the wheel. The position of the race suggests that the wheel was not overshot as some researchers suggest. The mill pool itself was dry, and 'though no evidence of a channel was found, there was a trickle of water coming from the race. The dam survives; a 52m (57 yds) horse-shoe of brick and earth construction. Brick sizes varied; smaller ones at the bottom suggesting that it had been altered from time to time. Another opening in the dam West of the existing mill could have been an overflow for the present site or the site of another mill.

The machinery in the mill building was sold for scrap in 1940, when the wheel situated on the east side of the 3-storey brick building had been dismantled preparatory to the conversion of the property into a private dwelling. Window arches suggest an early nineteenth century date.

In the garden there are large and small grindstones, suggesting corn-milling and edge-tool activities.

### **BROOME MILL**

A tributary of Wannerton Brook, the Ganlow Brook boasted two mills, the first of which was Broome Mill of which very little remains. The mill-house has been extensively modernised and there is no sign of the original mill or its overshot wheel. The dry pool and the dam of dressed stone and brick are the sole reminders of the site's past history.

### **HARBOROUGH HALL MILL**

Harborough is the second of the Ganlow Mills. It was fed by a string of four pools. (See fig.No.14). The large pool on whose dam the mill was situated is the only one now filled with water. Walking up the driveway, on the left, just before the rise of the A456 into Blakedown, one is surprised to find a beautiful lake with attractive timber-framed buildings at its side. The mill was situated in the centre of the dam, which was of brick, earth and dressed stone construction and had been much altered, reinforced by a substantial wall on the mill side, presumably to cope with heavy farm traffic. A sluice is still visible; the sluice at the other end of the dam is puzzling, standing as it does 3.0 - 3.6 m (10-12 ft) out into the water but it is understood that it is a plug to empty the lake and not a mill feature. South Staffs Water have recently sunk a bore-hole for 130m (142 yds) and pumped millions of gallons of water into the lake.

A brick lined wheel-pit, c1.4m (4'6") wide, was discovered in the dam on the A456 side of the lake. A race on the north side of the valley would have fed an earlier mill located at the end of the dam.

Intriguingly no grindstones were found which was an unusual experience based on the investigation and recording of the other water mills.

### **SPRING BROOK FORGE**

The remains of Spring Brook Forge are situated on private land near the centre of Blakedown village. It was expanded by Mr.Samuel Bradley of Springbrook House to include an ironworks from 1856 onwards.

In his "History of Churchill and Blakedown", Mr.E.J.D.Swabey gives an interesting account of the industry here. First, glass was made and then cast axles for South Africa. It is hard to visualise that 150 men once worked in this now quiet area of Worcestershire. This industry continued here until 1913. A chimney had been erected when steam had largely superceded water power and this was demolished about 1920.

The pool, the mill and the wheel can still be seen here. Ladies Pool is held back by a 4m (13'0") dam and there is an unconfirmed story that it was built by prisoners of war during the Napoleonic wars. From the pool, the water was fed through a sluice into a dried up race and a mill pool, also dry. From here water went through another sluice into a pen trough to drive the mill wheel.

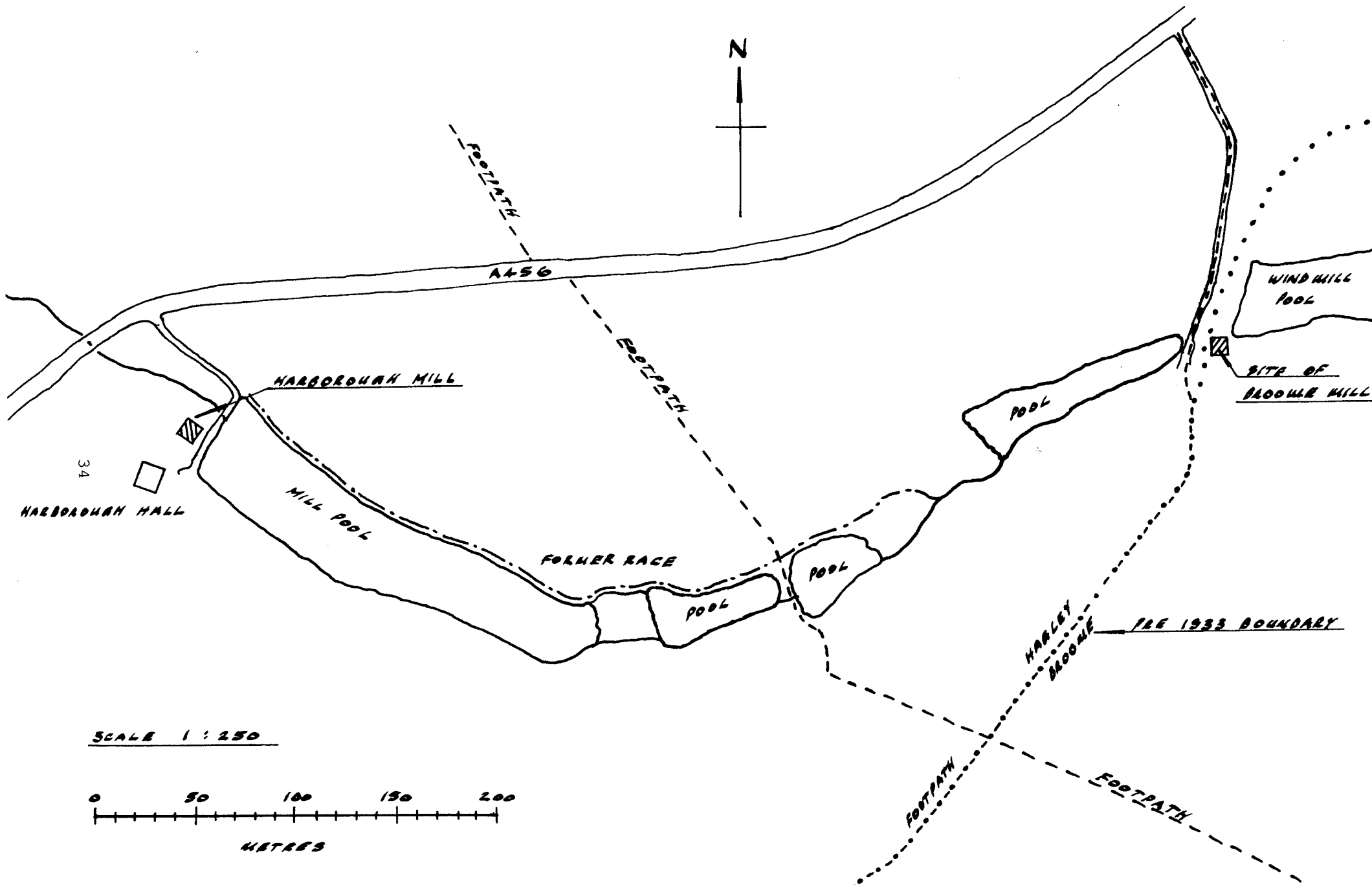


Figure 14: Harborough Mill

Excess water used to flow from the race through a still visible brick sluice under a raised path and into Forge Pool, also called Wheatmill Pool on the eastern side. This pool now receives no water either from this overflow or from Ladies Pool and so is almost dry except for seepage.

The overshot mill wheel can still be seen on the side of the mill which is now a listed building. This wheel rests in a wheel pit 2.80 metres (9'0") deep and has ten spokes, each originally having six buckets. The metal gearing with its shaft going into the mill building can still be seen.

Used water fed into a tail race which flowed under Forge Lane to Swan Pool.

#### **BLAKEDOWN MILL/FOUNDRY**

This mill was situated at the junction of the main A.456 and Churchill Lane. It disappeared during road widening in 1920.

All that is to be seen now, in the garden of Mill Cottage, is a dried-up brick conduit which used to bring water under the road from Swan Pool. The conduit leads into a dry race in the cottage gardens. The race is said to have burst its banks and the water flowed straight to join the Wannerton brook.

#### **SAW MILL**

This mill is situated beyond the viaduct over the Churchill Road on private land. It lies between the race which used to flow from Blakedown Mill and the stream coming from Churchill, thus lying on its own island.

At one time it had made axle heads and other iron products and iron slag lying about in profusion confirms this work. In the 1918 Sale of Hurcott Estate it was advertised as a Saw Mill and it continued as such until 1950. A creosote tank where the wood was treated is still to be seen in the garden.

The wheel was removed in 1951 and the Mill building is now used for storage.

### **WANNERTON FORGE**

Wannerton forge is on private land on the Kidderminster side of Blakedown.

Water flows from a large, picturesque pool through a sluice into an old wheel pit 1.05m (3'6") wide where there was probably an overshot wheel which has been replaced in this century by a turbine which produced electricity for the area. Water here was strained through charcoal, of which there is still a store near the sluice, probably for purification, before pumping it on to outlying farms and houses.

The present building 10m (33'0") by 6.30m (20'6") forms part of the pool dam with its adjoining wall strengthened at the base. The bricks are of mixed sizes from 2 3/4" to 3 1/8", implying a new building re-using old bricks. This theory is supported by the use of old tiles on the roof and the re-used timber trusses of the queen post roof. This roof now has a large hole in the north side.

Modifications to the building were made in the early part of the 20th century when the water power was used to turn the turbine.

Outside the building is an extra sluice, at the north side of the dam. This allows the water into a channel built of blue engineering bricks, which turns the water through 90 degrees parallel with the dam before allowing the water back into the stream. One suggestion is that it was built after the damage caused by flooding in 1827 when a dam at Clent broke or alternatively in 1848 when a dam at Blakedown collapsed.

### **PARK HALL**

Between Wannerton and Hurcott, an interesting and previously unrecorded site was found on the Park Hall Estate. Extensive old, large size brickwork dammed the stream and three culverts of different sizes carried the stream on towards Hurcott. The two larger culverts were probably built circa 1850. The most northerly culvert has partially collapsed under the weight of a tree and, taking the estimated age of the tree and the sizes of the bricks together, it is suggested that the culvert dated back to at least 1780.

No certain evidence could be found that this was a mill site, perhaps this was a pool as a back-up to Hurcott Mill, or maybe just for fishing.

Like Wannerton it has an overflow system that diverts the water through a sharp angle at the south end of the dam in order to slow flood water down.

### **HURCOTT PAPER MILL**

Hurcott Paper Mill is sited on Hurcott Lane off the main A.456. According to Tomkinson and Hall "Kidderminster since 1880", a paper mill has been here since the seventeenth century. Its history is well documented and from 1715 on the names of the millers, including one woman, are known. It continued to operate until the 1960's and was used as a furniture store until 1974 when a fire destroyed it and occasioned the death of two Kidderminster firemen.

Walking along Hurcott Lane, on top of the dam, a sluice can still be seen which once controlled water piped under the lane into a pen stock, or small pool, to drive a turbine which ran the mill in later years.

At the northern side of the pool is another sluice which was built to maintain the height of the water and to release overflow water into a race which rejoined the stream before reaching Podmore pool.

The mill itself has been converted into luxury flats, as have the workmen's cottages on the south side of the mill and the workshops on the north.

### **PODMORE MILL**

Podmore mill is on a particularly beautiful site in Broadwaters. Since the early eighteenth century it has been a saw mill, a forge, a corn mill, a paper mill and a flock mill.

The water supply comes down from Hurcott to Podmore where it is dammed to form a pool and the drive to the mill is carried along the top of the dam. A wood and metal sluice opposite the mill still controls the flow of water from the pool, under the dam and on to the two wheels which, according to the owner, once turned at the main and secondary mill houses.

The main mill has been sensitively modernised as a private house. It is a 3-storey building with English and English garden wall brick bonding. Two arches, under which the water flowed into a header tank to feed the wheels, are still just visible between the two mills but a large concrete platform has almost obscured the one nearer to the mill. A gear wheel is visible protruding from the facing wall of the secondary mill.

### UPPER BROADWATERS MILL

From Podmore mill, water flows on through an area which was marsh until the seventeenth century. Mills were established here using Wannerton Brook since at least the thirteenth century. They were built and rebuilt and their use changed many times - corn, fulling, iron, paper and flock mills. In 1937 Kidderminster Town Council developed the area to the north of the A.449 on the Kidderminster side of the Wolverhampton - Stourbridge junction as a public park and so this site can be viewed easily. The bridge carrying the road over the stream still bears this date.

The stream has been widened and its banks tidied as it enters what is now a public park. Part of this stream flows on behind the old mill buildings and trickles through the last two of these where two mill wheels once stood. (See fig.No.15) Collapsed stone blocks are to be seen here as well as the blocked up holes where machinery once came through the English bond walls from the mill house; this is the first of the four buildings and is now a public shelter. The water here probably once formed a back-up pool on the ground now occupied by St.Oswald's church and the Rose Theatre car park.

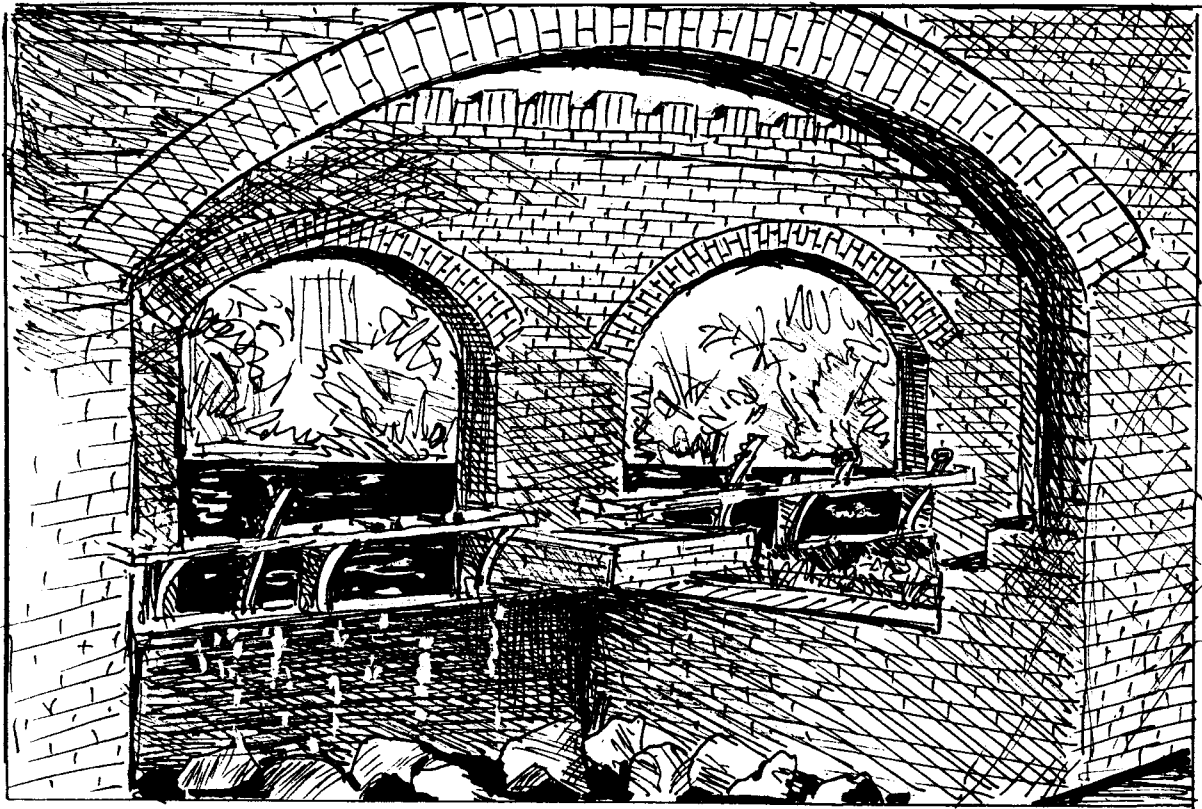


Figure 15: Upper Broadwaters. Two wheels were positioned in these adjacent wheel pits



Before these buildings, the other part of the stream overflows into a tail race and falls down in front of an old wooden sluice to flow on through the park and under the main road towards Lower Broadwaters.

#### **LOWER BROADWATERS MILL**

The Wannerton brook, here sometimes called Broadwaters Brook, continues under the road and on the right of the public footpath which goes between housing estates towards the pool.

At one point there is a modern concrete foot bridge over this stream. This is held by brick supports on which the sides of an older metal sluice gate are still to be seen. This suggests that the stream was controlled before entering the pool or reaching the mill but nowadays this stream does not flow into the pool. Indeed it is baffling to be unable to find the source of the water for this pool.

A grassed-over area between the road and the mill pool has willow trees on its edges defining the site of a second pool. A pen pool lies at the side of the main pool and is divided from it by a substantial dam, wide enough to walk on.

A tall chimney is a striking feature in the pool, known locally as Stack Pool. The level of the water must have risen since the days when the mill was operating as the water is now so high that it almost isolates the chimney. Its presence indicates that a steam engine must have taken over from water wheels or at least supplemented it. (See fig.No.16)

Brickwork on the margins near to the chimney indicates the probable position of mill buildings, although these have been tidied up and made safer in the landscaping of this area in 1937.

Water overflows through a small aqueduct into a canal arm used as a loading bay.

The stream passes under Brindley's canal (1766-71) through a brick culvert on its way to the river Stour.

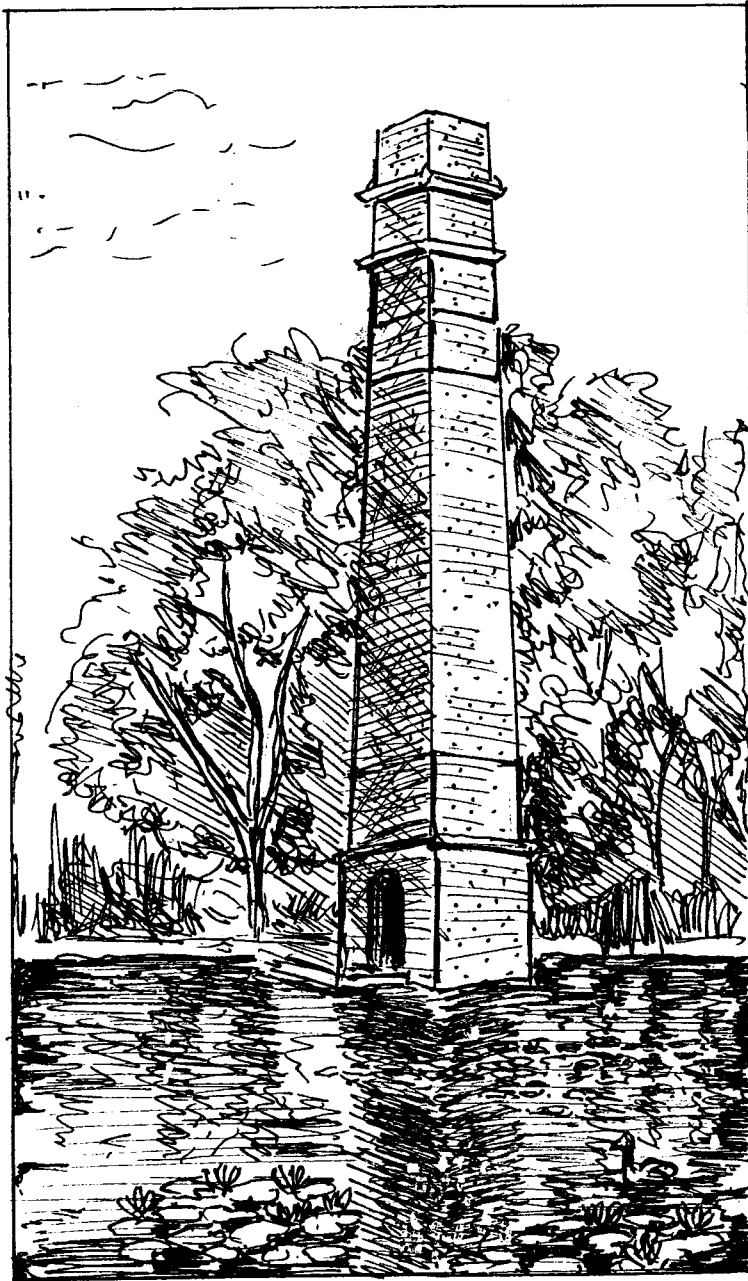


Figure 16: Chimney Stack, Lower Broadwaters Mill

#### **SECTION 4: RESULTS AND EXPLANATIONS**

In this final section an attempt is made to examine the material accumulated for all the sites and to offer some explanations for the anomalies that have been recognised.

The two streams which formed the basis of the projects for the purpose of the book are called Wannerton Brook and Belne Brook. Other names are used by people living along their courses and alternative names have crept into the text but it is hoped that confusion will be minimal.

#### **DOCUMENTARY SOURCES**

Wannerton appears in the Domesday book as an outlier of Kidderminster. The -ton suggests a mid-Saxon date but no ideas are offered for the first element.

Belne is the name of the brook and of the area known as Bell End. It could come from the old English "bellan", a bellowing sound, perhaps describing the noise of rushing water.

Clatterbach, the name of the stream at the source of Wannerton brook is again old English and means a clattering stream. Descriptions of sound seem to go with water on the move.

Stakenbridge in a 17th century document is Stakenbroc, or -brook. The first element could refer to stakes forming part of the dam for the forge at that site.

Hoo mill and brook near the end of Belne brook derives from hoh, a spur of land which in fact lies north of the stream.

The occupiers of many mill sites claim that their site is recorded in the Domesday book. In fact, of the nine settlements listed in 1086 covering the area of the survey, only seven mills are recorded; three in Kidderminster, three in Chaddesley Corbett and one in Stone. No attempt has been made to match these with any of the sites looked at. It is probable that they could have been, like the one recently excavated at Tamworth with a vertical shaft, or would have had an undershot wheel with paddles in a bypass to the stream and no head of water. In both cases, the whole structure would have been entirely of timber. All the mills investigated had wheels with an overshot or high breast supply (see fig. No.2) and would have required an adequate head of water created by a head race or a pool.

Occasional references to mills are picked up from early documents but rarely does the wording enable a researcher to say that such and such is probable. Possible is usually the strongest word that can be applied.

Burton's "History of Kidderminster" 1890 p.106 refers to the Rector of Kidderminster holding Hurcote mill in 1393 and a pool is also noted. The limitations of the present day site suggest that the last 600 years have seen little change but as there is no archaeological evidence, it is only a possibility.

Reference to the Lyttelton Charters, edited by I.H.Jeayes 1893, include two sites on Wannerton Brook. Charter No.10 is a grant of Churchill manor for 6s 8d (33p) per annum payable to the Priory of Dudley and for the mill 20s (£1.00) to Robert de Haggelege c.1220. Examination of a large scale map pre-1933 shows the boundary between Hagley and Churchill following the stream, with the head race, pen pool and the corn mill all on the Hagley side. Whatever the reasons for the location of the mill, the new tenant was left with a hefty rent to pay.

In 1543 John Seintleger, Lord of Hagley and Clent granted (Charter No.437) permission for two pools to be made. These are the pools that provided water for Brake Mill. Again the parish boundary still goes through the centre of the pools following the course of the stream, and permission could only be given because the one man was lord of both manors.

### **WATER SOURCES**

Streams formed manorial boundaries in many cases and the steps taken to extract water on one side of a valley via a head race for use down stream demonstrates the effort that was put into maintaining boundaries in traditional form and using the resources fully at the same time. Examples of this practice can be found at Shut Mill, Weybridge, Churchill Forge, Churchill Mill, Podmore and both the Broadwater sites.

Various editions of maps have proved very useful in establishing the development of many of the sites. Harborough Mill (see fig. No.14) is shown in 1822 as having a stream with a small pool below Broom Mill. By 1832 there is a flight of four pools.

Weybridge (see fig. No.7) in 1822 was fed by a headrace and access was from the east. By 1840 there was a new pool and different access from the north.

From work on site, it can be said that in many cases the mills were supplied by water from races with small pen pools adjacent to the mill.

Newtown mill is one example where the water is gathered in a pool upstream on Sling Common and runs to the mill and a small pen pool nearby.

Bell End mill was originally supplied solely by a race, but the supply was increased from another stream at its confluence with the first one and then a second pool was created upstream.

Middle mill (see fig.No.6) took water from the stream into the head race and a pen pool. In modern times, three fish pools have been made and the posts forming the reinforcing in the race bank can just be seen protruding above the water.

The Blade mill took water via Middle mill's tail race, which became the former's head race running into a pool, also fed by another small stream.

At least a third of the sites were fed at some stage of their working life by head races of varying lengths up to 600m (660 yds). It has not been possible to date any of the sites with races. The principles of building races were demonstrated at Bordesley Abbey, Redditch, in the 12th century, so there is no reason to reject the hypothesis that some of the head races in the north of Worcestershire should not date from around the same time.

The sites where the streams have been dammed to create pools have mills sited on the valley side and also near the centre of the dam. It is believed that the original mills were positioned on the valley side at the end of the dam. Subsequent rebuilds were often sited in the middle of the dam. Brake mill is a probable example of this.

Harborough is another example. The head race runs on the valley side and above the level of the line of three of the flight of four pools. The top one has a sluice which controlled the input to the race. When the stream was dammed, the new mill was built in the centre of the dam, thus allowing a larger wheel and a greater head of water to be utilised.

At Churchill Forge (see fig. No.13) there is a further example of a manorial boundary dividing the pool between Churchill and Hagley. The two manors were held jointly by the Lytteltons after 1606. At the head of the pool on the Churchill side, is the remains of a race some 50m (55 yds) in length. It is probable that it followed the northern bank of the pool down to the present overflow where the wheel would have been positioned. When the pool was created, subsequent mills would have been placed centrally. It is known from the time when the pool was last drained in the later 1960's, that another dam lay some short distance back from the present one.

Examination of dams shows differences in their design. The modern fish pools by Middle mill are curved with the radius pointing up stream. Traditional dams are straight with rare exceptions. Churchill Forge has two straight lengths; roughly 1:3 and 2:3 of the total and pointing down stream. Perhaps the shorter length on the north side was a part of the pen pool fed by the race mentioned above.

It also appears that older dams have steeper banks. Clatterbach pool at Clent breached its dam in 1827 and Ladies pool, Blakedown, did the same in 1848. Both caused damage downstream, although no lives were lost.

Modifications to the overflow channels of dams at Wannerton and Park Hall pools are probably an attempt to slow down flood water. On both pools the overflow sluice is a typical design; thick boards positioned in grooves in the brickwork of the sluice. The boards are removed to achieve the level of water in the pool required for whatever reason. Normally, if a lot of water is released at the same time, it will take the easiest path and that is forward. If the channel into which water escapes is brick lined, deep and at right angles to natural flow, it will have the effect of slowing the water down and reducing the damage to some degree.

#### **GHOST SITES**

It was noted in the previous section that the site of Park Hall pool showed no evidence of a mill, although the tenant was told when he originally took the site over that there had been a spade mill there. This is not the only "ghost" site that has been investigated.

One named as Bell Hall Forge and given a position below the Norman chapel at Bell End has no written or cartographic evidence to support its existence. Examination on site failed to find anything like a race or pool.

Another site is Oldnall, or Old Mill, which is dealt with in the previous section. With these "ghost" sites, every effort was made to keep an open mind but when there is no documentary or field evidence, it is difficult to give the site a "possible" rating let alone a "probable".

OPERATION	BELNE BROOK	WANNERTON BROOK
CORN GRINDING	13	9
SCYTHE MAKING	10	
OTHER FORGES, etc	9	9
FLOCK		1
TEXTILES	5	
PAPER	1	2
BONE	1	
GORSE	1	
SAW		2

Note : Less than half the mills had a single use.  
One had five different uses during its life.

## Analysis of Operations carried out on each of the brooks

Figure 17: Uses of Water Mills

### WATER WHEELS

Water wheels were in short supply with only six of the sites having any evidence to record. There were no wheels made entirely of wood. In fact, the majority were hybrids. That is a mixture of wood and metal. Where the shafts were made out of tree trunks, it would be easy enough to date them by dendrochronology. (tree ring sampling). Spokes could also be dealt with in the same way. Looking at the design of castings used on some wheels, rather like Telford's bridge at Ironbridge, one can see where wood has been converted to cast iron by the pattern maker, without any change of shape. In other words, these hybrids are developments made when repairs became necessary. Once metal was acceptable in both performance and cost, the complete wheel would be made from it.

## **BUILDINGS & BRICKS**

Building materials have proved to be an interesting study in themselves. The early mills would have been timber framed, as were the majority of vernacular buildings in Worcestershire before the 18th century. Some bricks have been found on a few sites that could be 17th century. These are hand made and about 9½" (0.24m) x 4 ¾" (0.12m) x 2½" (0.06m) in size, and laid in English bond (see fig No.3 ). As time went by, bricks improved and modified in size. For a period between 1784 and 1850 bricks were taxed, based on numbers, therefore to achieve the optimum results, brickmakers increased the size of their products.

Fashions also changed in bonds. Flemish bond was popular in the late 17th and 18th centuries and, in turn, was followed by Flemish Garden Wall and English Garden Wall. It would also appear that if canal or railway work had been taking place at the same time as a mill was being worked on, then there could be a reversion to English Bond, which was favoured by the big construction engineers of the time. (See fig.No.3)

## **USES**

Heathy mill is an example of change of use that could be identified without documentary evidence (see fig.No.17). As it stands, it was built for textiles, extended on one end, and then with a change of use to corn milling, a third storey was added with some blank windows. The latter might be dated pre-1845 when the window tax was abolished.

As a guide, three storeys suggest corn milling, a long building could be textiles and a single storey building with plenty of ventilation is probably a forge of some sort.

The range of uses for the mills on the two streams is shown on figure No.17

## **AFTER THE WATER-WHEEL**

Mention has been made in the previous sections of modifications to the ways that water power is utilised and to changes in use to the buildings.

Two sites, Clent and Lower Broadwaters, had steam power and the stacks are shown on sketches (fig.Nos.11 & 16). The latter is still visible, although its base is in water. It is not known whether this steam power supplemented or superseded the water power .



On other sites, Armfield turbines, water driven turbines, replaced the water wheels, some, as at Brake mill, continuing to grind corn, others used to generate electricity for the local community.

Out of the forty sites, nine are used as domestic residences, six for industrial and storage purposes, one is being restored (Churchill Forge) and of the remainder, the archaeologist has a challenge on his or her hands

### **SUMMARY**

Taking documentary evidence, together with the field work undertaken, a far better understanding of the sites on the two streams has been achieved.

Little physical evidence that can be dated exists prior to the mid-18th century. If the earthworks associated with the pools and races could be dated by clear documentary evidence it would probably take the origins of the sites further back. As already suggested, dendrochronology tests on wheel timbers would prove interesting.

The storage, control and movement of water has left the most evidence and more work can be done on this area without very sophisticated equipment.

To anyone else considering a similar project, you will find with different conditions and needs, the outcome will also be different. We are at least convinced there is no average mill site.

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APPENDIX I: SITES ON THE BELNE BROOK

<b>NAME</b>	<b>GRID REFERENCE</b>	<b>ACCESS</b>
SHUT MILL	948 786	b
NEWTOWN FORGE	946 776	b
BELL END MILL	938 772	a
BELL HALL FORGE	935 773	b
GALTONS MILL	932 773	b
MIDDLE MILL	927 773	a
BLADE MILL	925 774	b
BELBROUGHTON CORN MILL	922 774	b
BELBROUGHTON SCYTHE MILL	919 772	c
LOWER BELBROUGHTON MILL	918 771	a
UPPER WEYBRIDGE MILL	911 765	b
LOWER WEYBRIDGE MILL	911 764	b
DRAYTON MILL	907 761	b
HILLPOOL MILL	898 760	b
HILLPOOL FORGE	896 761	b
BARNETT MILL	889 365	b
BELLINGTON MILL	885 769	a
LOWER BELLINGTON MILL	879 770	a
HARVINGTON FORGE	874 746	b
HEATHY MILL	848 754	b
SPENNELLS CORN MILL	845 751	a
SPENNELLS TAPESTRY MILL	843 752	a
HOO MILL	837 747	a

a - Public access to site

b - Private property but can be seen from an adjacent road or footpath

c - Cannot be seen without owner's permission

**APPENDIX II: SITES ON THE WANNERTON BROOK**

<b>NAME</b>	<b>GRID REFERENCE</b>	<b>ACCESS</b>
CLENT OR VINE MILL	930 795	b
OLDNALL/OLD MILL	922 792	b
SPOUT MILL	900 797	b
BRAKE MILL	892 798	b
STAKENBRIDGE FORGE	888 796	c
CHURCHILL FORGE	883 795	b
CHURCHILL CORN MILL	877 787	b
BROOME MILL	892 788	b
HARBOROUGH HALL MILL	884 787	c
SPRING BROOK FORGE	879 781	c
BLAKEDOWN MILL/FOUNDRY	876 782	c
SAW MILL	875 782	b
WANNERTON FORGE	869 782	c
PARK HALL	858 779	c
HURCOTT PAPER MILL	881 778	b
PODMORE MILL	884 780	c
UPPER BROADWATERS MILL	842 780	a
LOWER BROADWATERS MILL	834 779	a

a - Public access to site

b - Private property but can be seen from an adjacent road or footpath

c - Cannot be seen without owner's permission