

GREAT AYTON COMMUNITY
ARCHAEOLOGY PROJECT

MILLS IN AYTON

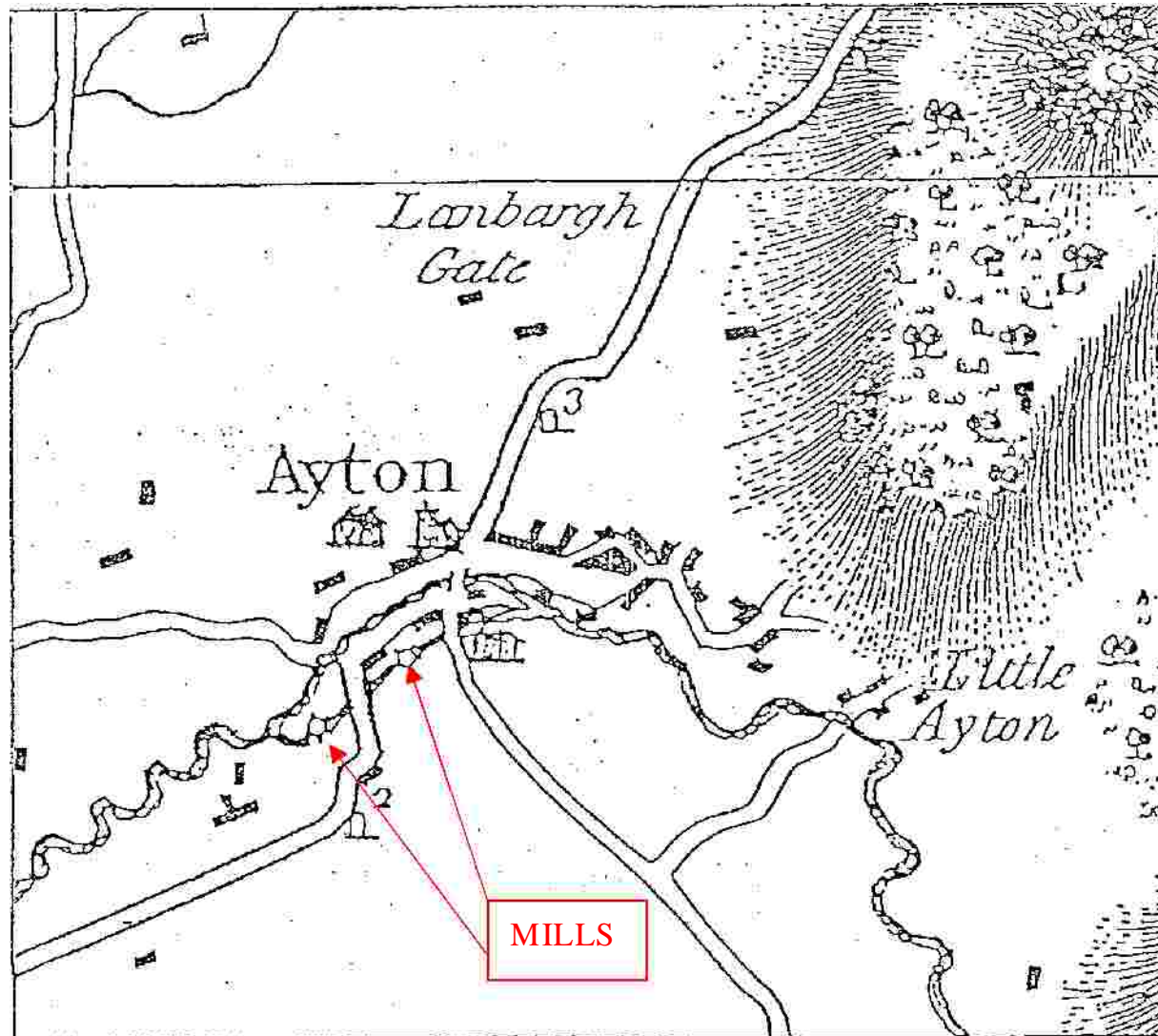
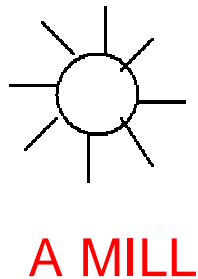
PRESENTED
BY
PETER MORGAN

USING INFORMATION FROM THE REST OF THE GROUP
BUT BASED ESPECIALLY ON ORIGINAL RESEARCH BY
JOHN K HARRISON

GREAT AYTON IN 1772

From Thomas Jeffreys' Map Of Yorkshire

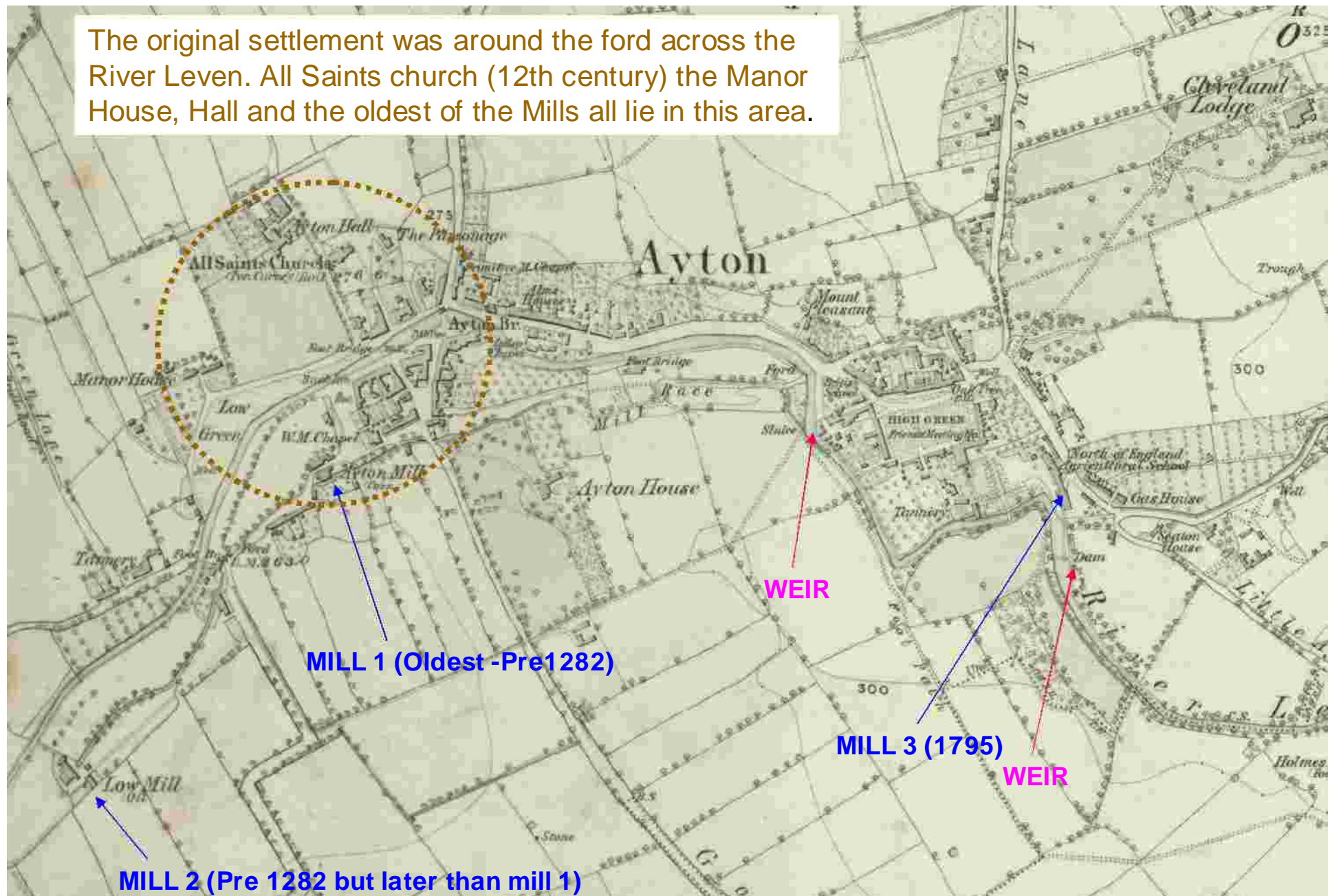
This map shows a lot of detail. Many village features can clearly be seen – All Saints Church, the Hall, Manor House, Ayton House, along with the later development around High Green. It shows Ayton mill & Low (Grange) mill in their correct locations and on the same race. There is, however, no indication of a third mill in the village at this time.



Original 1" to 1 mile – This section enlarged

..... OUTLINE OF ORIGINAL SETTLEMENT

The original settlement was around the ford across the River Leven. All Saints church (12th century) the Manor House, Hall and the oldest of the Mills all lie in this area.



O. S. MAP of AYTON 1856

AYTON'S TWO ANCIENT MILLS

We are first going to consider the two ancient mills which we know to have been there since before 1289.

They have the unusual feature of sharing the same Mill Dam & Race.

The only explanation of this is that below the present dam the river banks become too low and the flat land on either side too broad to make it suitable for constructing a second dam where it would be needed to take off water for the lower mill.
(This would obviously have had to be below the point at which the Tail Race from the first mill returned its water to the river)



THE POSITION OF THE DAM FOR THE EARLIER MILLS

Medieval mill races were often long (plenty of labour at the disposal of the Lord of the Manor for initial digging and subsequent maintenance) thus giving an adequate head at the mill despite a relatively small rate of fall along the river.



The initials of Thomas Richardson on the far parapet record that it was through his generosity that the dam was rebuilt.

Without it the two lower mills would have remained idle for much longer.



WEIR (DAM) IN WATERFALL PARK – This is likely to be the location of the old medieval mill dam as, although mill buildings and machinery were frequently modified and replaced as technology changed, the watercourses, once established, were reused.

This weir was last rebuilt in 1840 after it had been destroyed in a devastating flood on July 22nd of that year.

Village folk often complained that for 6 days a week ALL the water was diverted down the mill race leaving an empty river bed through the rest of the village. It could get a bit smelly as Skitterbeck, which entered the river just below the weir, was highly polluted!

USABLE WATER HEIGHTS FOR MILLS

FALL IN RIVER (DAM à GRANGE MILL TAIL RACE) ~ 20 ft.
(contours on 6" map)

HEIGHT OF DAM (above water level) ~ 7 ft.

TOTAL approx. 27 ft.

INCLINATION (Essential to keep water flowing) approx. 0.25%
LENGTH OF RACE 3500 ft. therefore FALL (due to this) 8 ft.

Thus POTENTIAL HEIGHT EXPLOITABLE BY MILLS 19 ft.

AYTON MILL SITE SHOWS FALL IN GROUND LEVEL OF ~ 7 or 8 ft. -..
(HIGH OR LOW BREAST WHEEL possible depending on the diameter of the wheel)

THIS LEAVES ABOUT 12 ft. for GRANGE MILL.

However if its Tail Race were at river level water back
would retard the water wheel when the river was at all high therefore
it is likely that 1 à 2 ft. fall may be needed here.

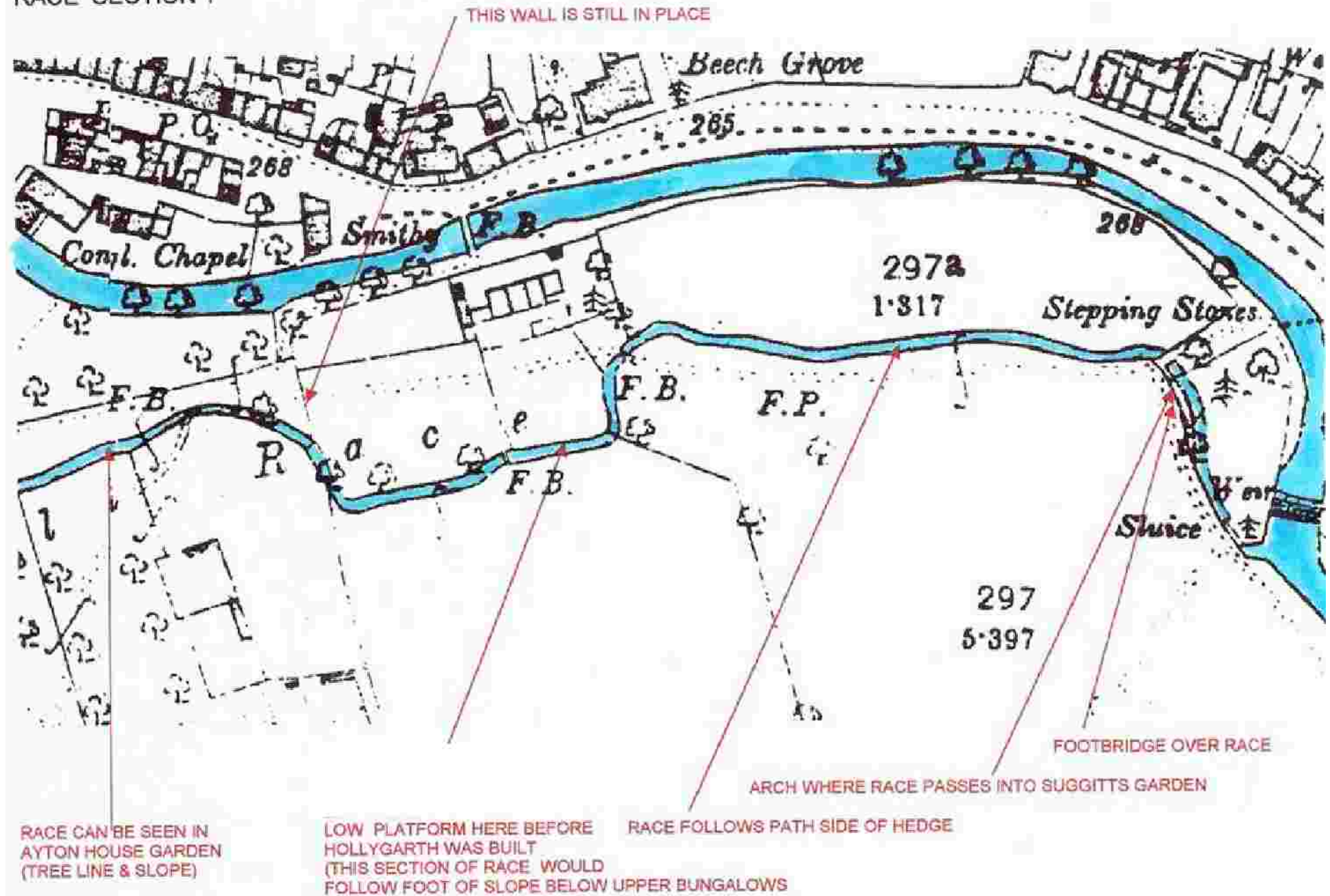
THEREFORE GRANGE MILL HAS ABOUT 9 or 10 ft. available.

With a wheel pit suitable for a 14ft. Diameter Water Wheel it is likely
to have been a BREAST WHEEL.



The SLUICE GATE in Waterfall Park– by which water was allowed to flow from above the dam into the mill Race.

RACE SECTION 1





IN WATERFALL PARK THE NARROW TERRACE SHOWS THE POSITION OF THE MILL RACE



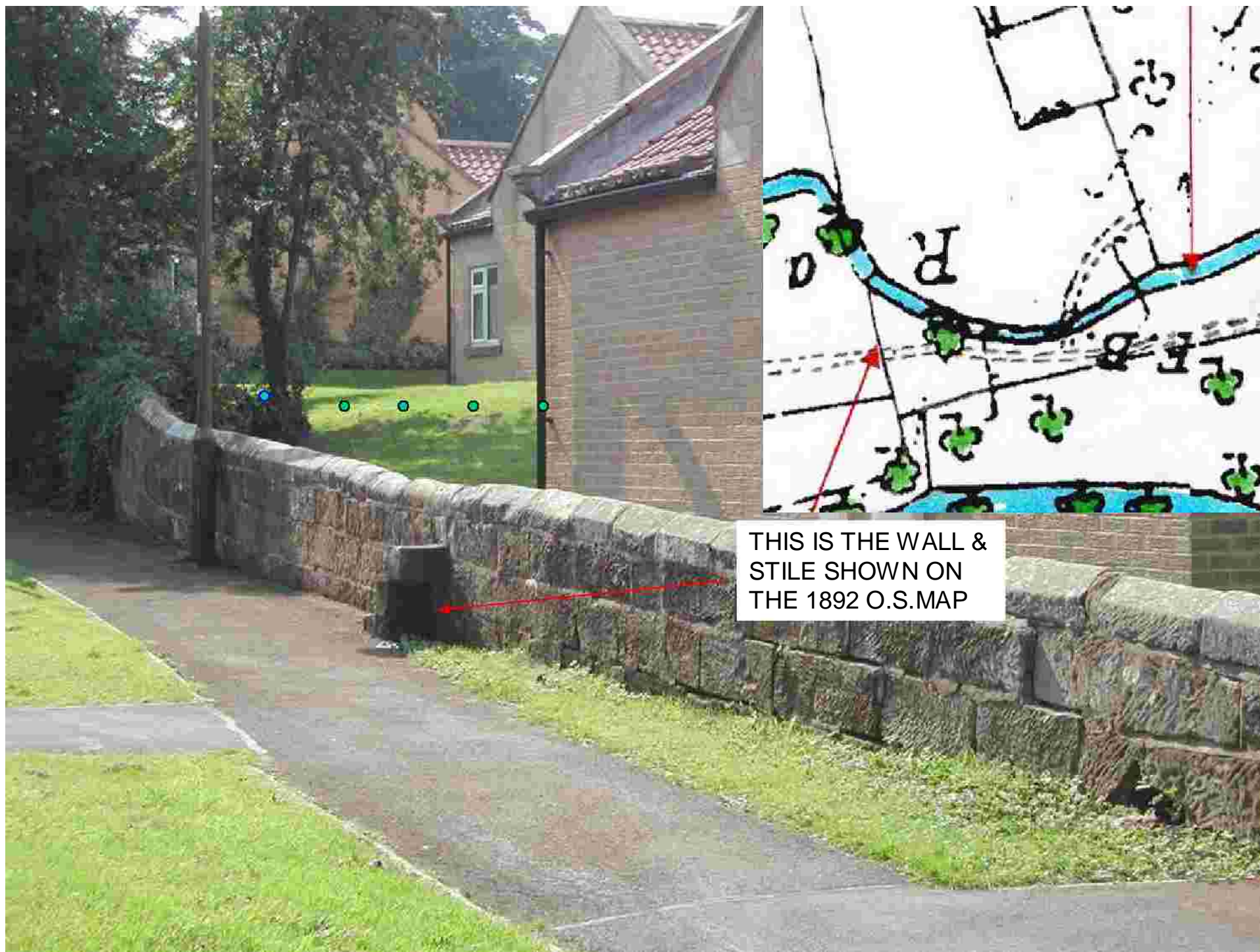
STILL IN WATERFALL PARK
A PUBLIC FOOTPATH BRIDGED THE RACE
– THE TOP OF THE ARCH CAN STILL BE SEEN



THE RACE FOLLOWED THE LINE OF THE HEDGE
- THE FOOTPATH IS THE ONE SHOWN ON THE 1892 O. S. MAP



PRIOR TO THE CONSTRUCTION OF HOLLYGARTH SHELTERED HOUSES THE RACE FOLLOWED THE CONTOUR AROUND THIS SLIGHT DEPRESSION THEREBY MAINTAINING ITS HEIGHT.



THIS IS THE WALL & STILE SHOWN ON THE 1892 O.S.MAP

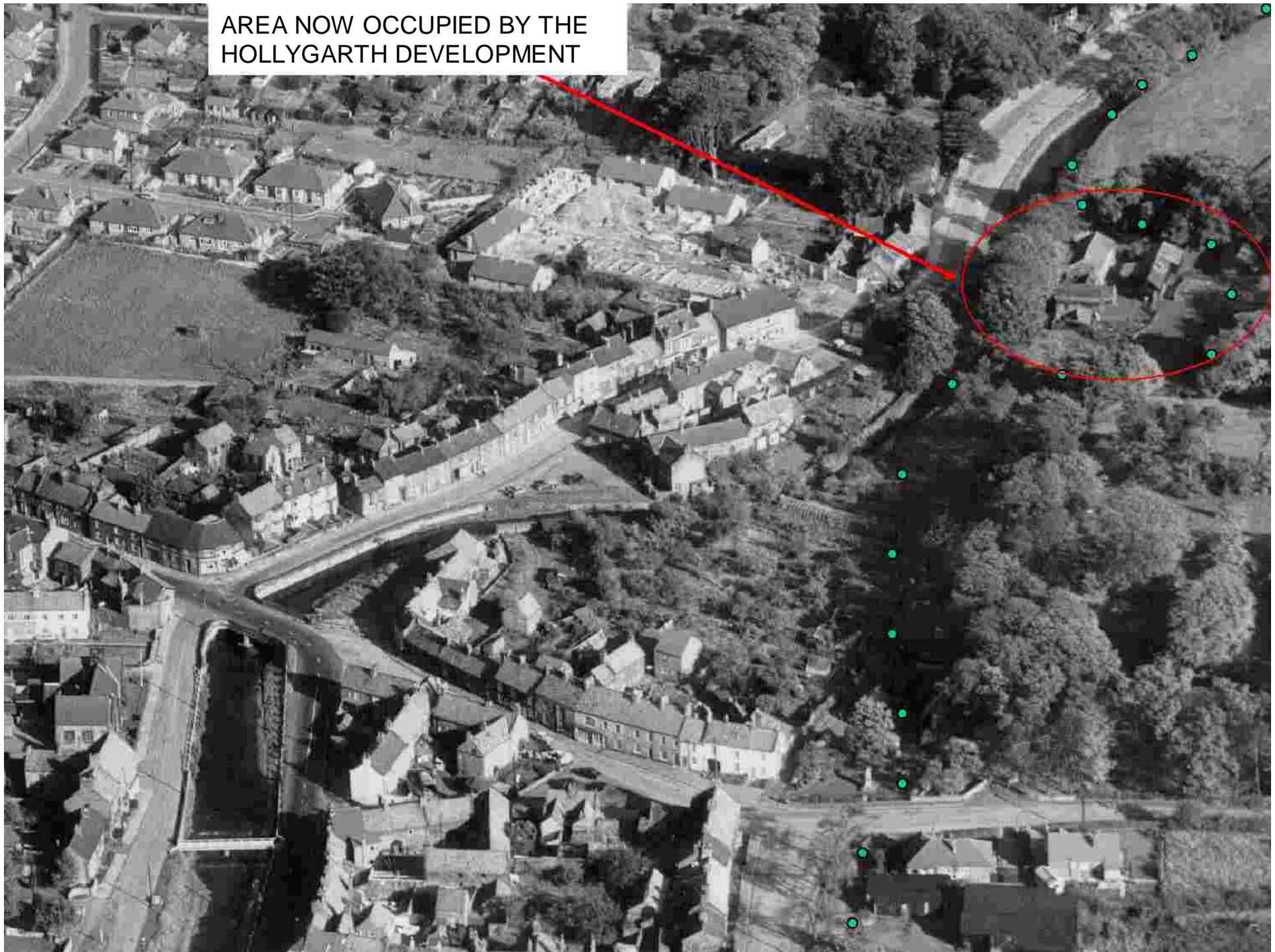
LOW (GRANGE) MILL CONTINUED TO FUNCTION INTO THE LATE 1950s OWING TO THE INSTALLATION OF A TURBINE FOR THE GENERATION OF ELECTRICITY; THIS WAS BEING SUPPLIED TO THE GRANGE – A LARGE HOUSE CLOSE BY.

IT IS RUMOURED THAT DURING THE CORONATION THE VOLTAGE STARTED TO DROP CAUSING A SHRINKING OF THE TELEVISION PICTURE AT THE GRANGE – A MAN WAS SENT ON HIS BICYCLE TO OPEN THE SLUICE BY THE DAM WIDER – AS HE CYCLED BACK HE SAW THE RIVER DRYING UP AS ALL THE WATER WAS NOW PASSING ALONG THE RACE!

THE FOLLOWING SERIES OF AERIAL PHOTOGRAPHS WERE TAKEN IN 1964, SHORTLY AFTER THE RACE HAD STOPPED BEING USED AND CLEARLY SHOW ITS COURSE.

MARKED • • • •

AREA NOW OCCUPIED BY THE
HOLLYGARTH DEVELOPMENT





RACE BEYOND SNOWDEN'S 1964

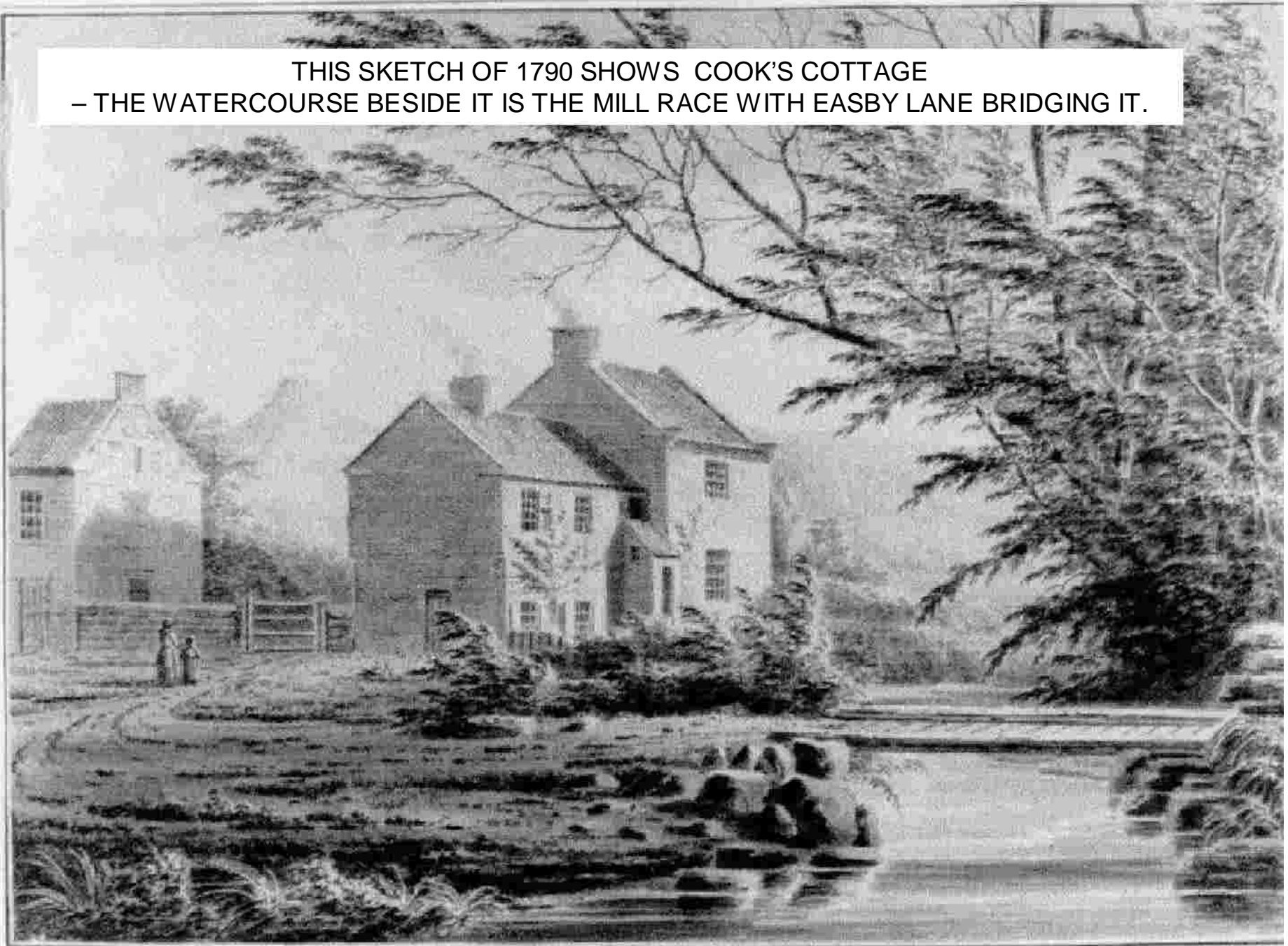


LEAT BEYOND OLD CHAPEL



PRESENT DAY EVIDENCE OF COURSE OF THE RACE ACROSS THE GROUNDS OF AYTON HOUSE

THIS SKETCH OF 1790 SHOWS COOK'S COTTAGE
– THE WATERCOURSE BESIDE IT IS THE MILL RACE WITH EASBY LANE BRIDGING IT.



— First picture of a house at Great Chilton which was built by Capt Cook's Father. British House No. 18
shows the going to live as a house

1790



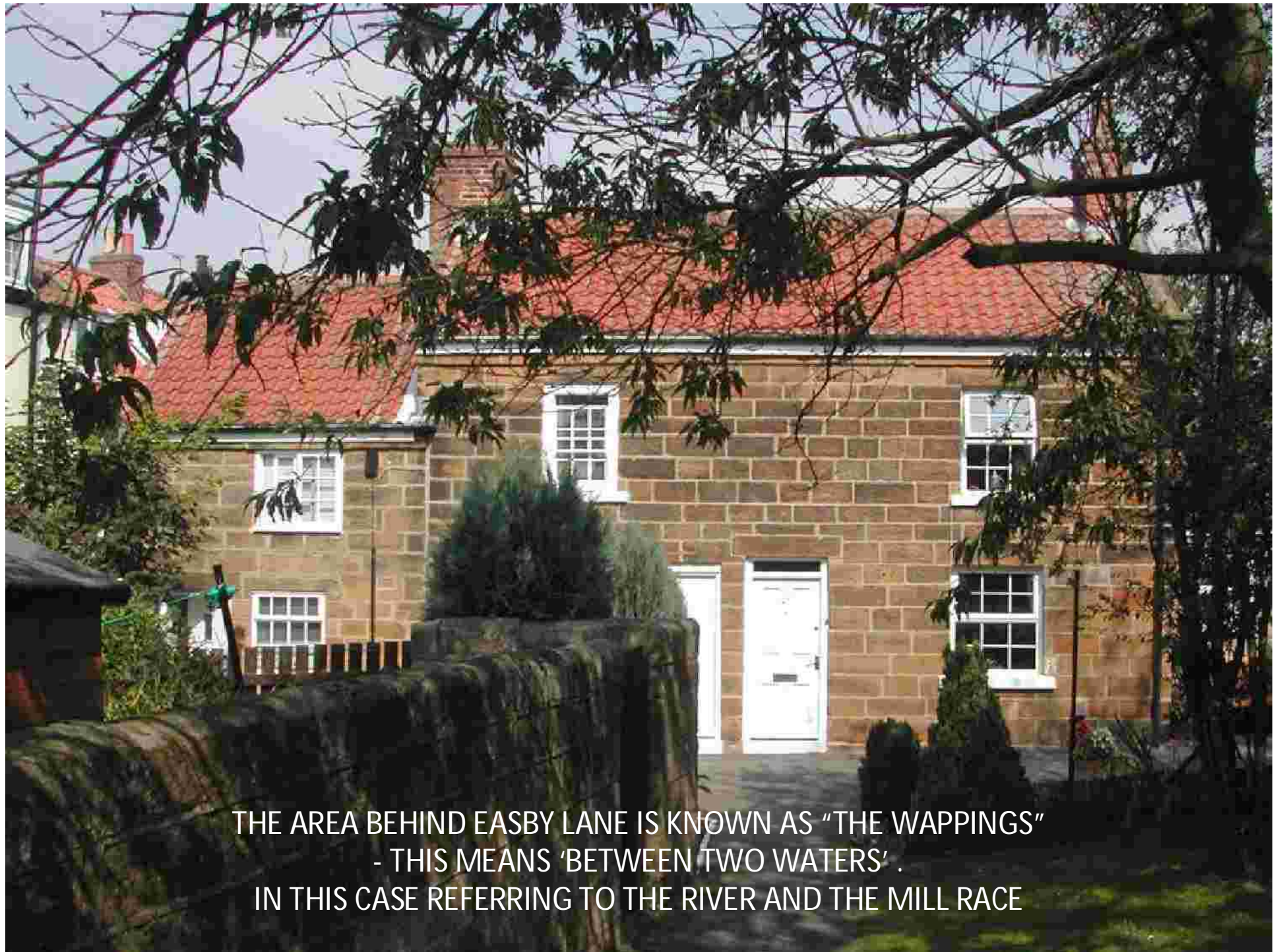
OBELISK MARKING THE SITE
OF COOK'S COTTAGE

POINT WHERE THE
MILL RACE PASSED
UNDER EASBY LANE

COOKS COTTAGE WAS SOLD TO THE VICTORIAN GOVERNMENT IN 1933 DISMANTLED AND
SUBSEQUENTLY TRANSPORTED TO AUSTRALIA WHERE IT WAS RE-ERECTED.

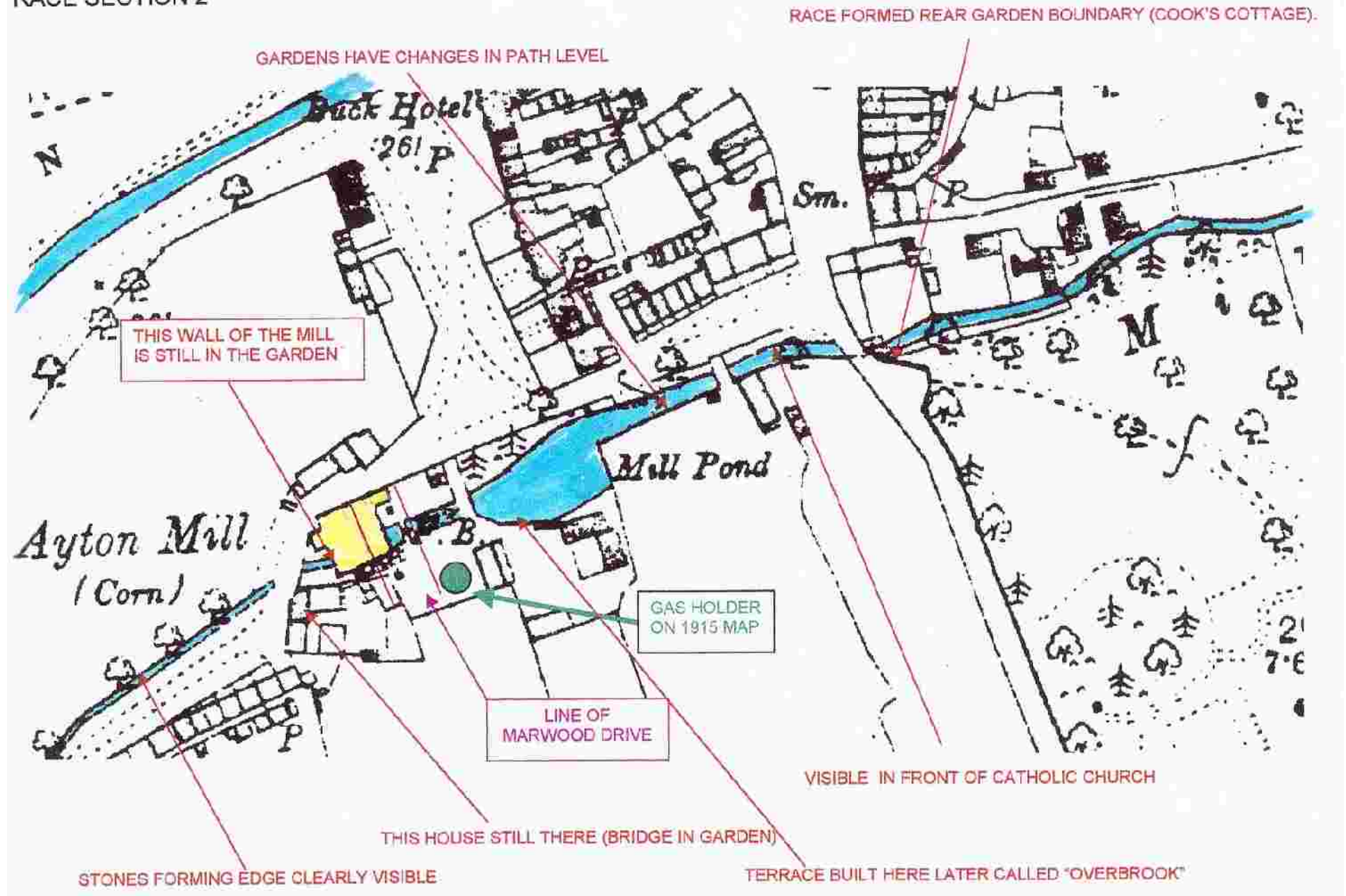


ON THE OTHER SIDE OF EASBY LANE THE
PARAPET OF THE BRIDGE OVER THE RACE
IS STILL THERE AND DATED



THE AREA BEHIND EASBY LANE IS KNOWN AS "THE WAPPINGS"
- THIS MEANS 'BETWEEN TWO WATERS' .
IN THIS CASE REFERRING TO THE RIVER AND THE MILL RACE

BASED ON 1892 O.S. MAP
RACE SECTION 2





RACE BY CATHOLIC CHURCH 1964



RACE TERRACE

UNTIL RECENTLY A DEPRESSION COULD CLEARLY BE SEEN ALONG THIS VERGE
– THE NEW ACCESS TO THE CATHOLIC CHURCH NOW DISGUISES IT.



THE CONCRETE PARAPETS OF THE BRIDGE CARRYING THE ROAD TO SUNNYFIELD TERRACE OVER THE RACE ARE, HOWEVER, STILL THERE.



IN THE GARDENS OF OVERBROOK THE DEPRESSED AREA IN THE LAWN INDICATES WHERE THE MILL POND STARTED.

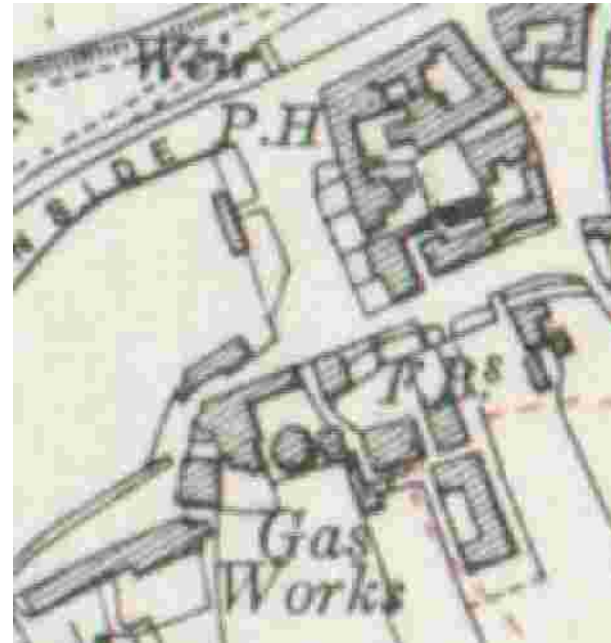


AYTON MILL WAS ON THE AREA NOW OCCUPIED BY THE ENTRANCE TO MARWOOD DRIVE
THE LAND FALLS AWAY QUITE STEEPLY AT THE BOTTOM OF MARWOOD DRIVE.
THIS PROVIDES THE DROP NEEDED FOR THE WATERWHEEL TO DRIVE THE WATERWHEEL.

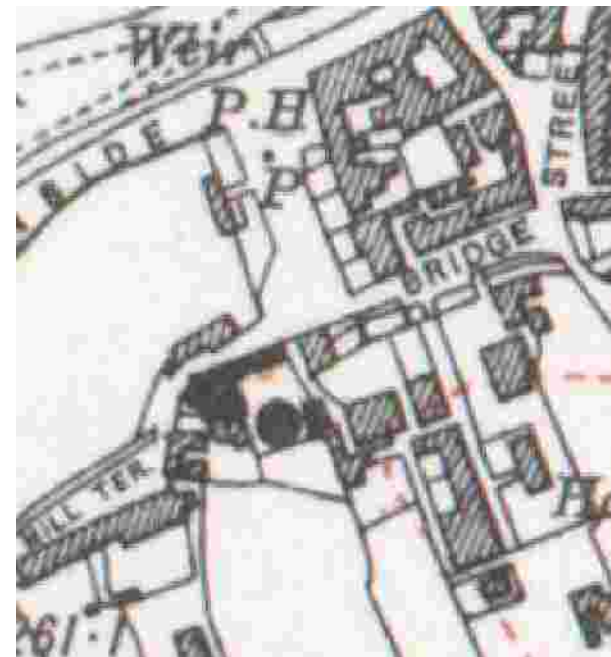
O.S. MAP
1856



O.S. MAP
1913



O.S. MAP
1892



O.S. MAP
1930

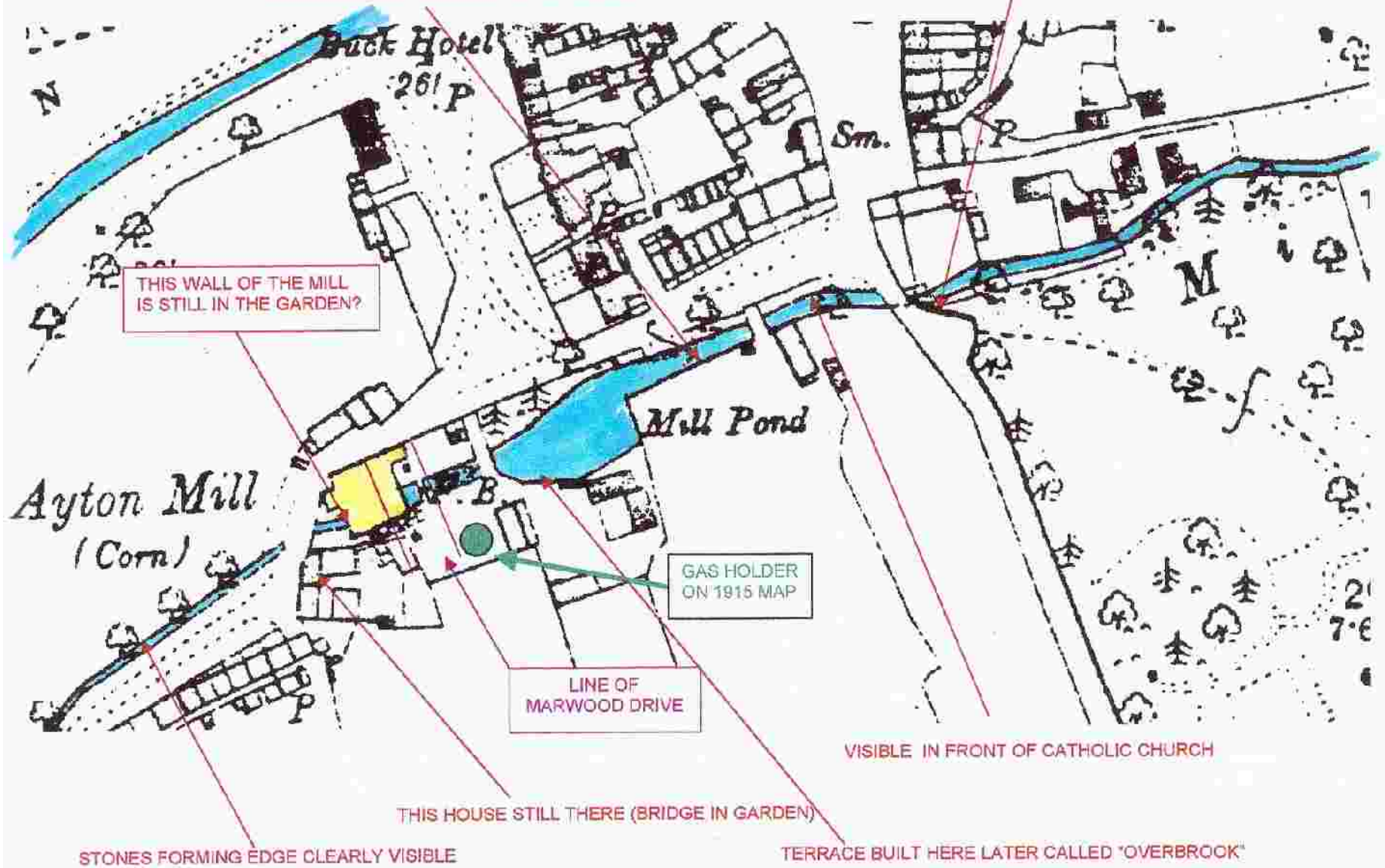
AYTON MILL SITE;-1856 / 1892 / 1913 / 1930

RACE SECTION 2

1892 O.S. MAP

RACE FORMED REAR GARDEN BOUNDARY (COOK'S COTTAGE).

GARDENS HAVE CHANGES IN PATH LEVEL

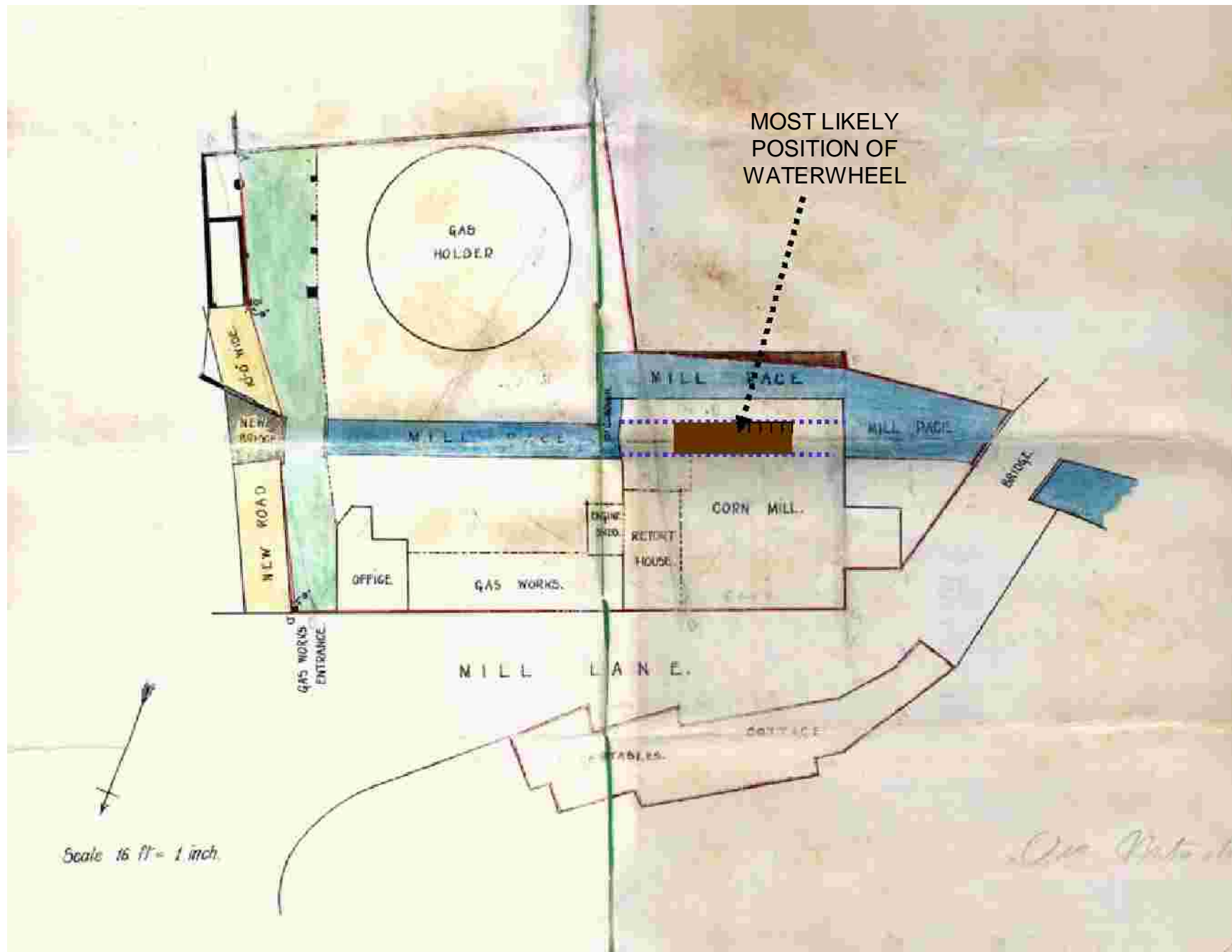


AS SEEN FROM THE MAPS, AFTER THE MILL STOPPED WORKING IN 1910
THE VILLAGE GAS WORKS WERE ESTABLISHED ON THIS SITE.

INITIALLY IT HAD BEEN THOUGHT THAT THE MILL BUILDING HAD BEEN
DEMOLISHED TO MAKE ROOM. HOWEVER, PLANS OF THE GASWORKS
CLEARLY SHOW THAT THEIR ACTIVITIES LEFT THE MILL BUILDINGS
INTACT.

DURING THE WHOLE LIFETIME OF THE GASWORKS THE MILL RACE
CONTINUED TO FLOW AS IT WAS STILL SUPPLYING GRANGE MIL .

PLAN OF GASWORKS – provided by Carol Hudson



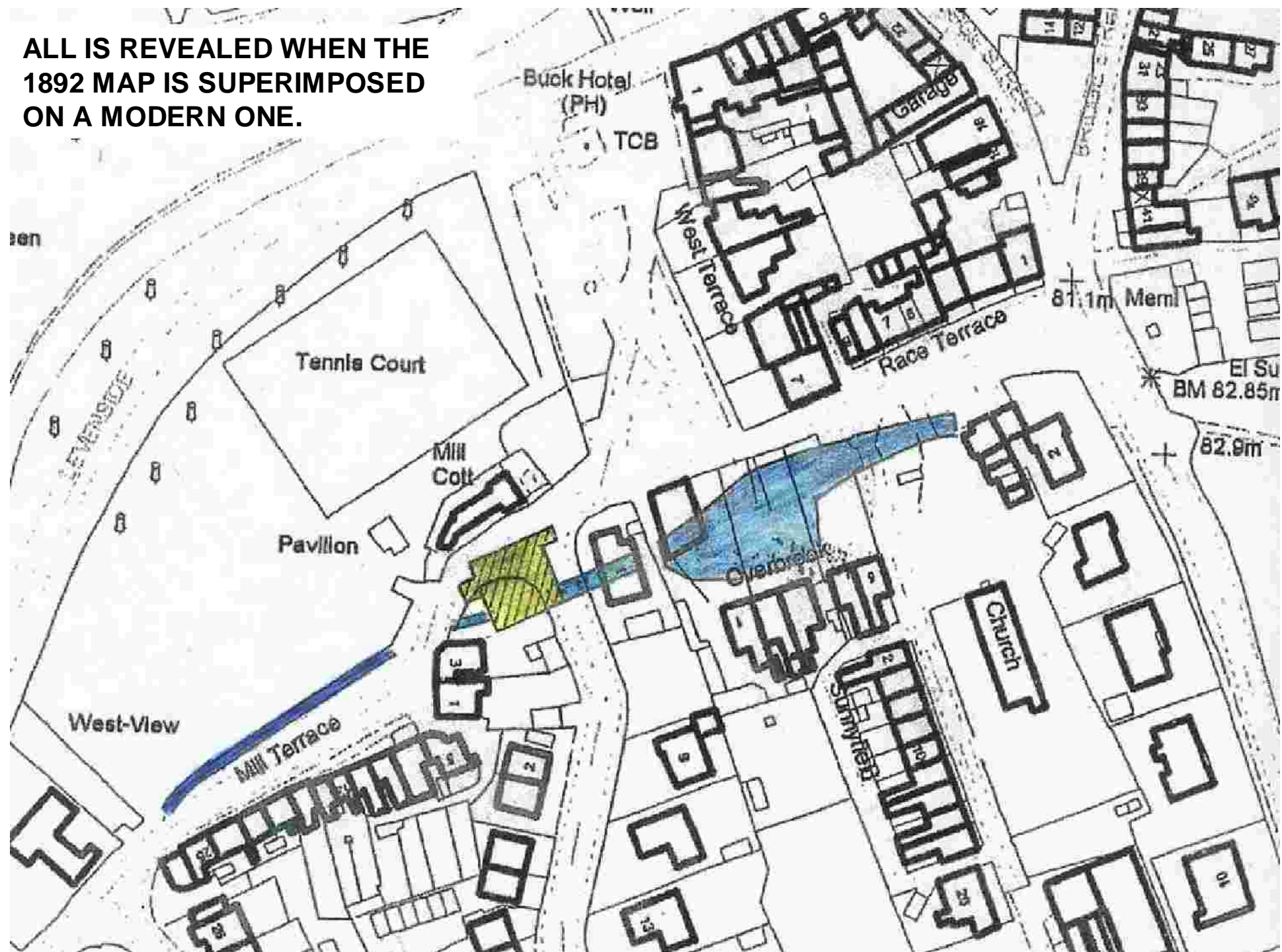
GAS WORKS – FROM MILL TERRACE Photo from Barbara Gray
This is the only photograph of Ayton Mill we have been able to find.

AYTON MILL?

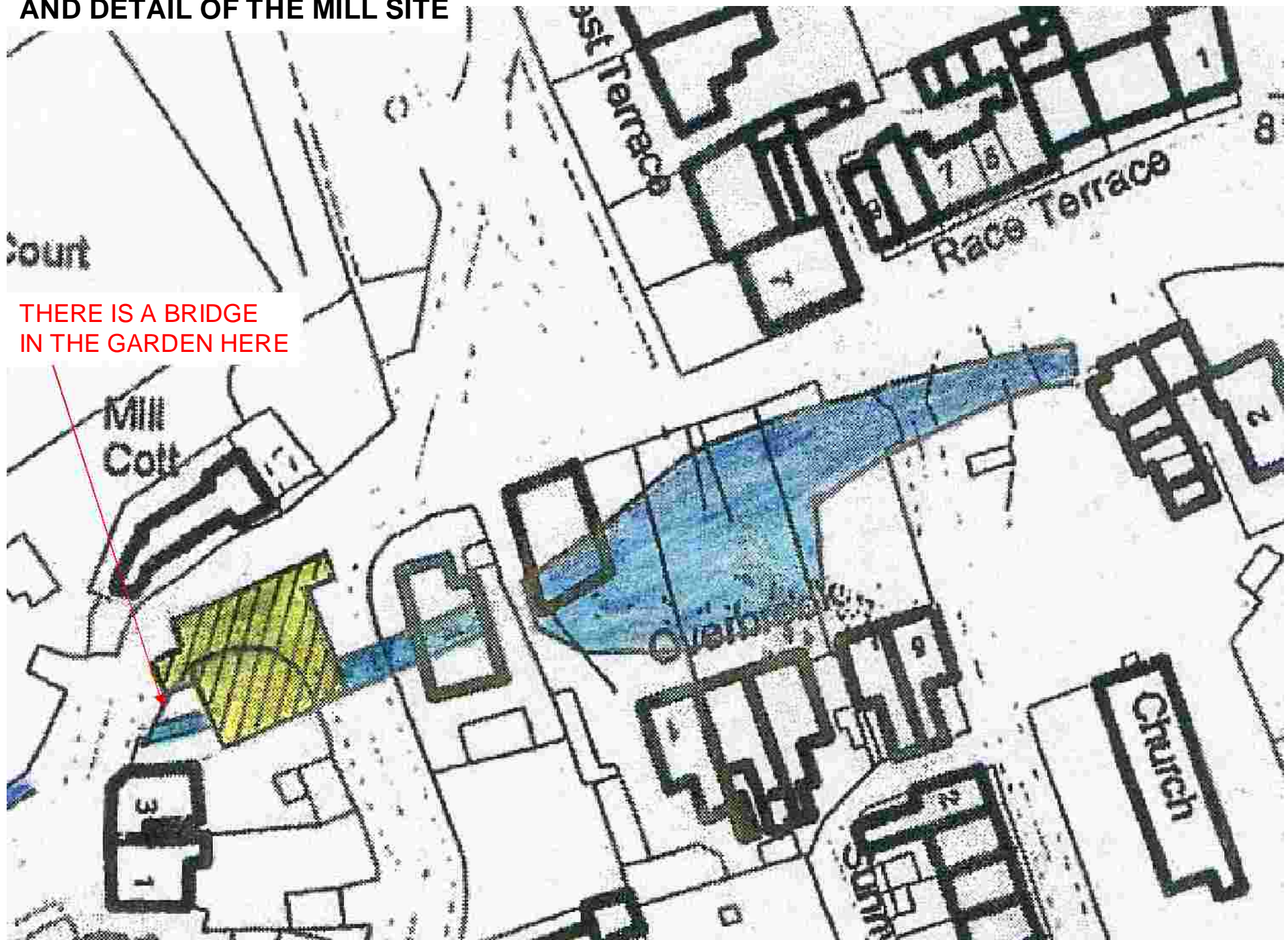
GAS HOLDER FRAME



**ALL IS REVEALED WHEN THE
1892 MAP IS SUPERIMPOSED
ON A MODERN ONE.**



AND DETAIL OF THE MILL SITE



THIS IS MOST LIKELY THE
END WALL OF THE MILL.



THE TOOLING ON THE STONE IS IN KEEPING
WITH IT BEING OF EARLY DATE

TOOLING ON STONES OF AYTON MILL



IMPRESSION OF REAR OF AYTON MILL —based on a description by Peter Watson



POSITION OF FOOT -
BRIDGE IN GARDEN

STONWORK ABOVE ARCH STILL EXISTS AS
GARDEN REVETMENT WALL

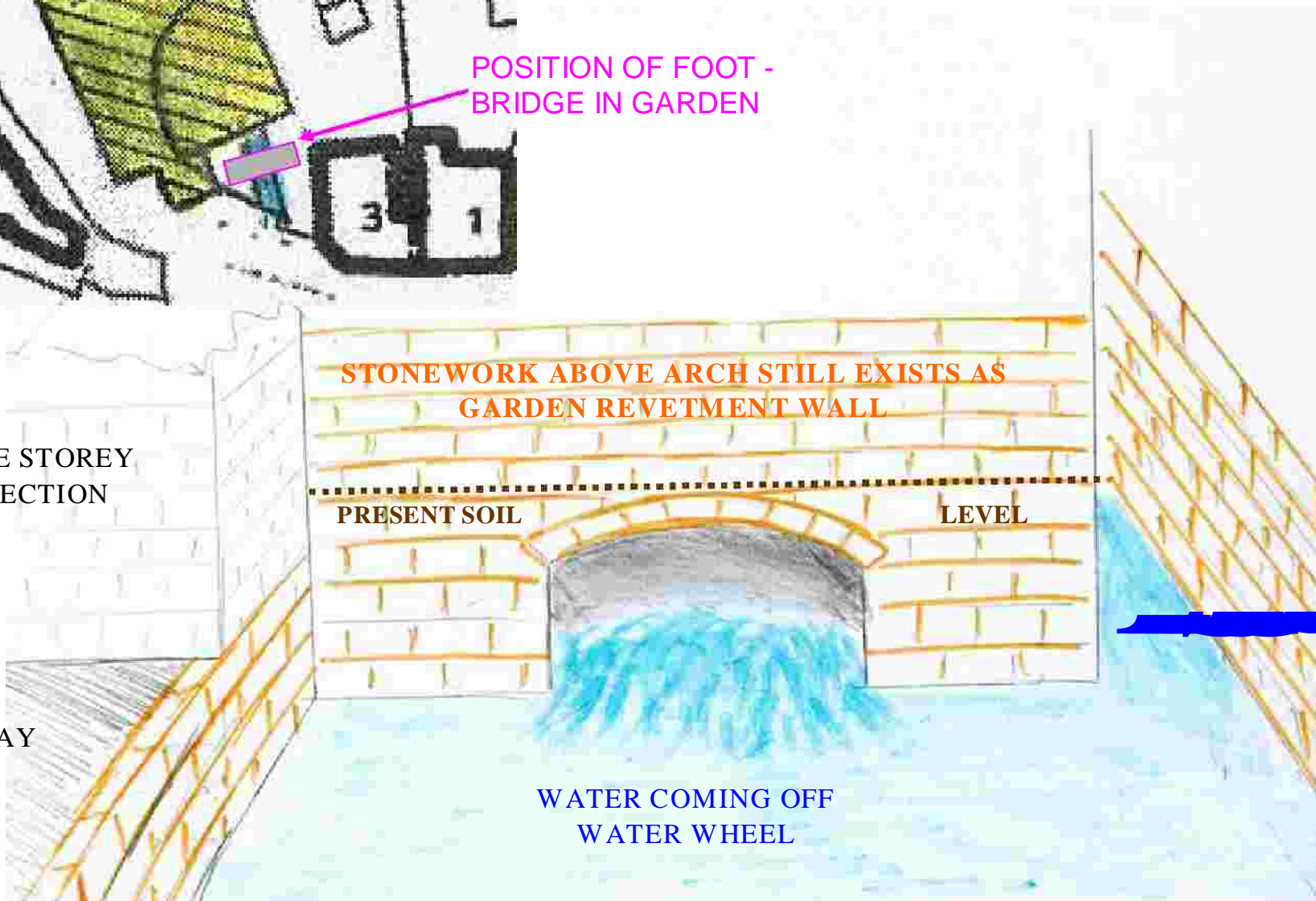
SINGLE STOREY
PROJECTION

PRESENT SOIL

LEVEL

ROADWAY

WATER COMING OFF
WATER WHEEL





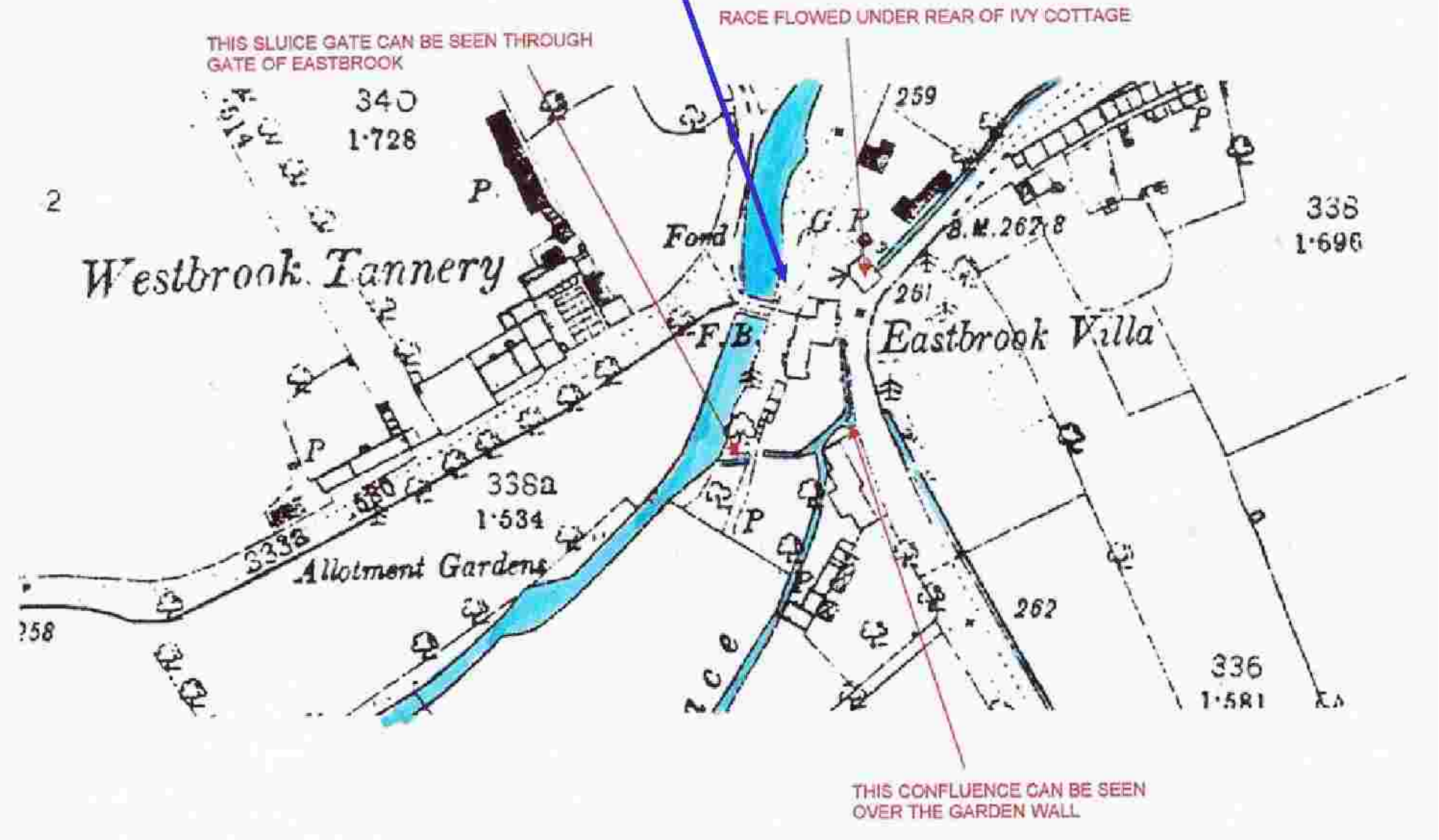
THE TAIL RACE FROM AYTON MILL
PASSED UNDER THE ROAD AND
THEN FLOWED ALONG THE VERGE.

HERE A STONE WALL SHOWS ITS
EDGE.

BASED ON 1892 O.S. MAP

IT IS LIKELY THAT WHEN AYTON MILL WAS FIRST BUILT THE TAIL RACE WOULD HAVE RE-ENTERED THE RIVER AT THIS POINT

RACE SECTION 3





IVY COTTAGE

THE ENIGMA OF IVY COTTAGE

AT THE END OF MILL TERRACE THE RACE PASSED UNDER PART OF IVY COTTAGE. THIS WAS DIRECTLY ACROSS THE MAIN ROAD FROM “EASTBROOK” AN OLD RAMBLING HOUSE, NOW DEMOLISHED.

THE REAR PART OF IVY COTTAGE HAD MANY STABLE-LIKE FEATURES:-

REMAINS OF STALLS,

A STABLE SLATTED WINDOW,

A STABLE DOOR IN TWO HALVES,

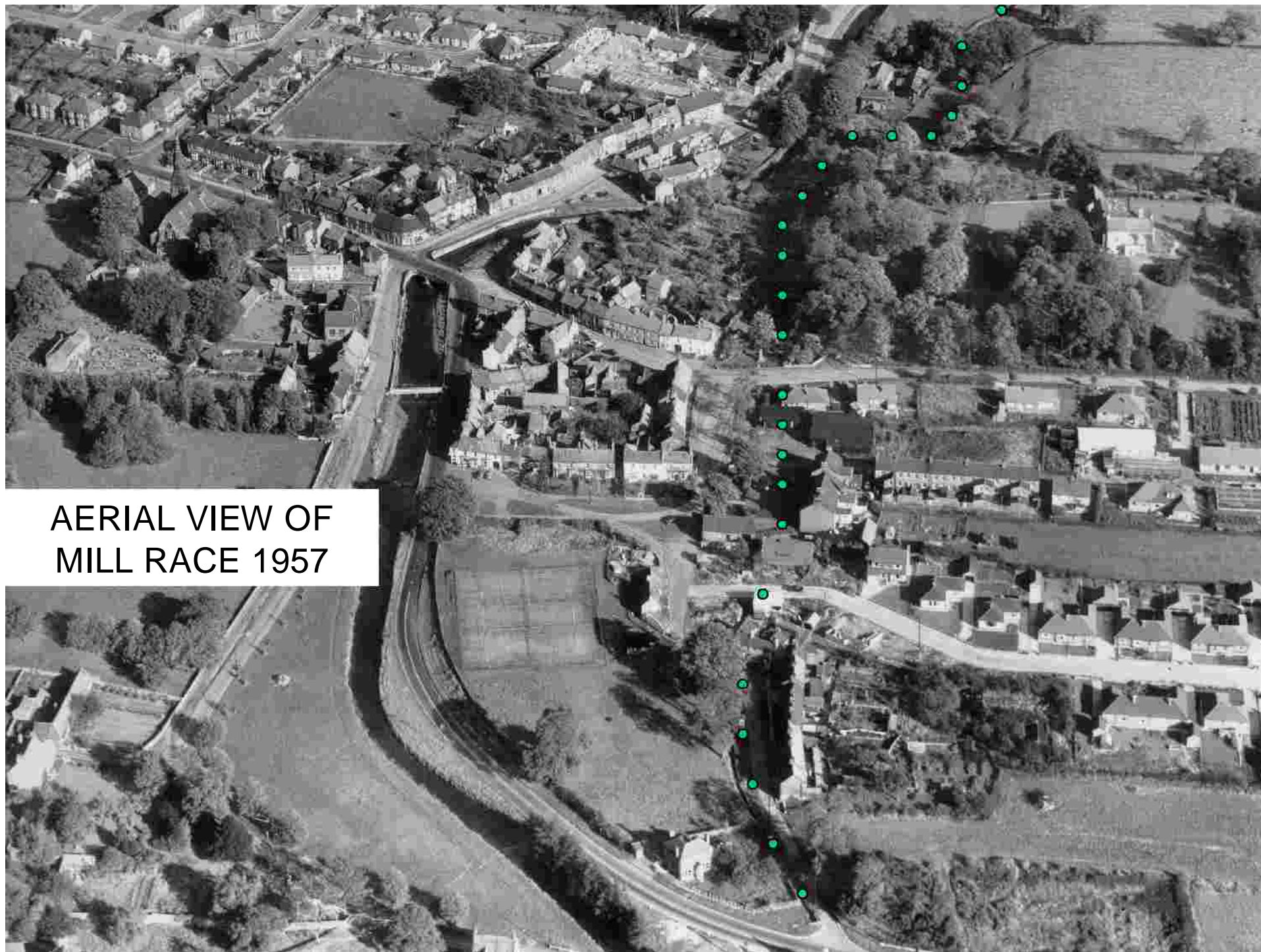
AND ABOVE WAS AN UPPER ROOM WHICH HAD A HAYLOFT STYLE DOOR OPENING FROM IT SOME 12FT. ABOVE MILL TERRACE,

THE LIVING ROOM HAD PANELLING TO A HEIGHT OF 3FT.

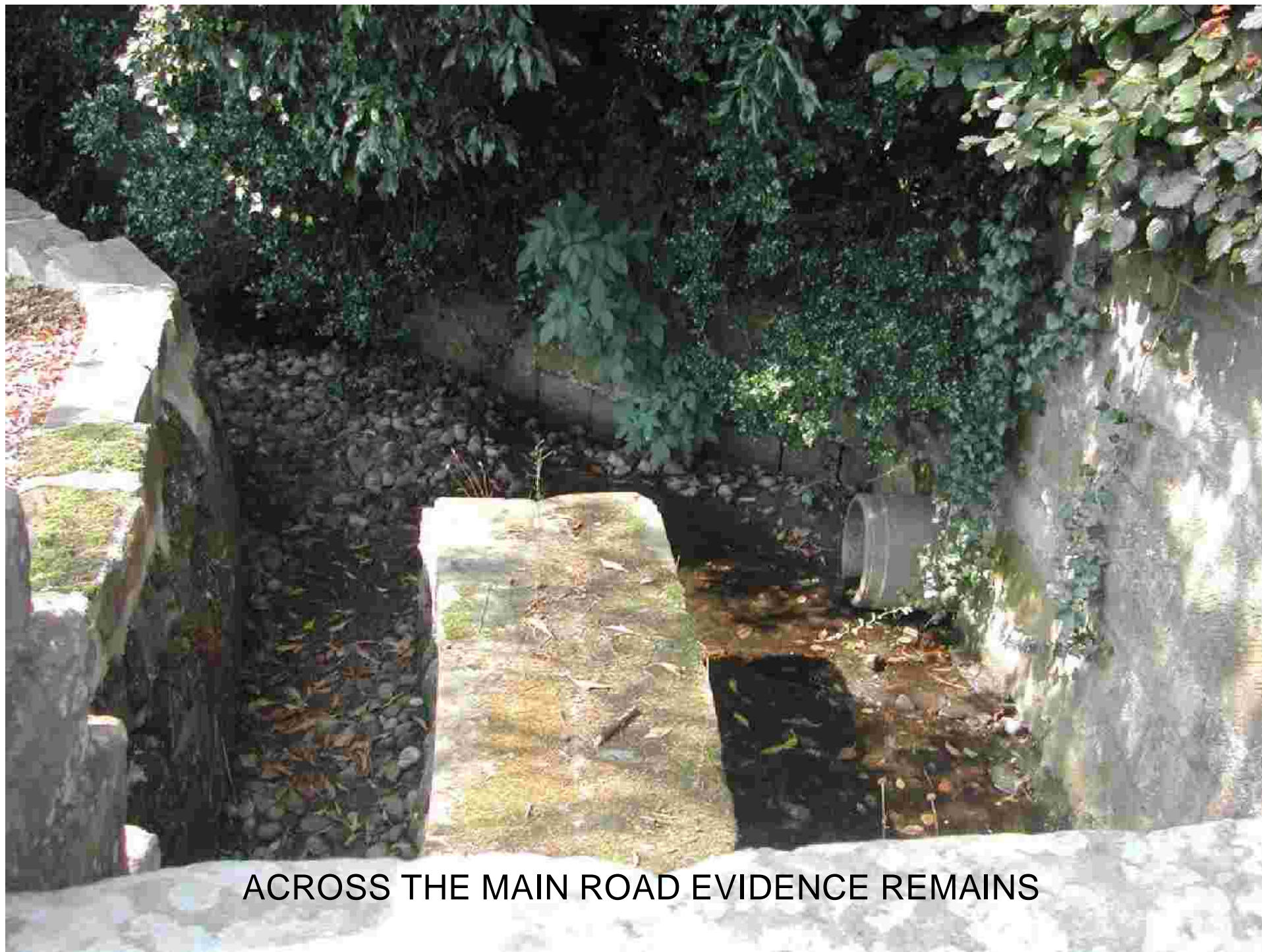
(WALL PROTECTION IN A PUBLIC ROOM?)

WAS IVY COTTAGE A POSTING STATION? STABLING FOR EASTBROOK?
MOST LIKELY IT WAS “GUINEA PIG INN” – POSSIBLY THE ELUSIVE 5TH PUB OF THE 1850’s?

IVY COTTAGE WAS DEMOLISHED IN 1956 FOR ROAD WIDENING



AERIAL VIEW OF
MILL RACE 1957



ACROSS THE MAIN ROAD EVIDENCE REMAINS



THE RACE
TO GRANGE
MILL

'SPILL WAY' TO GET
RID OF ANY
SURPLUS WATER

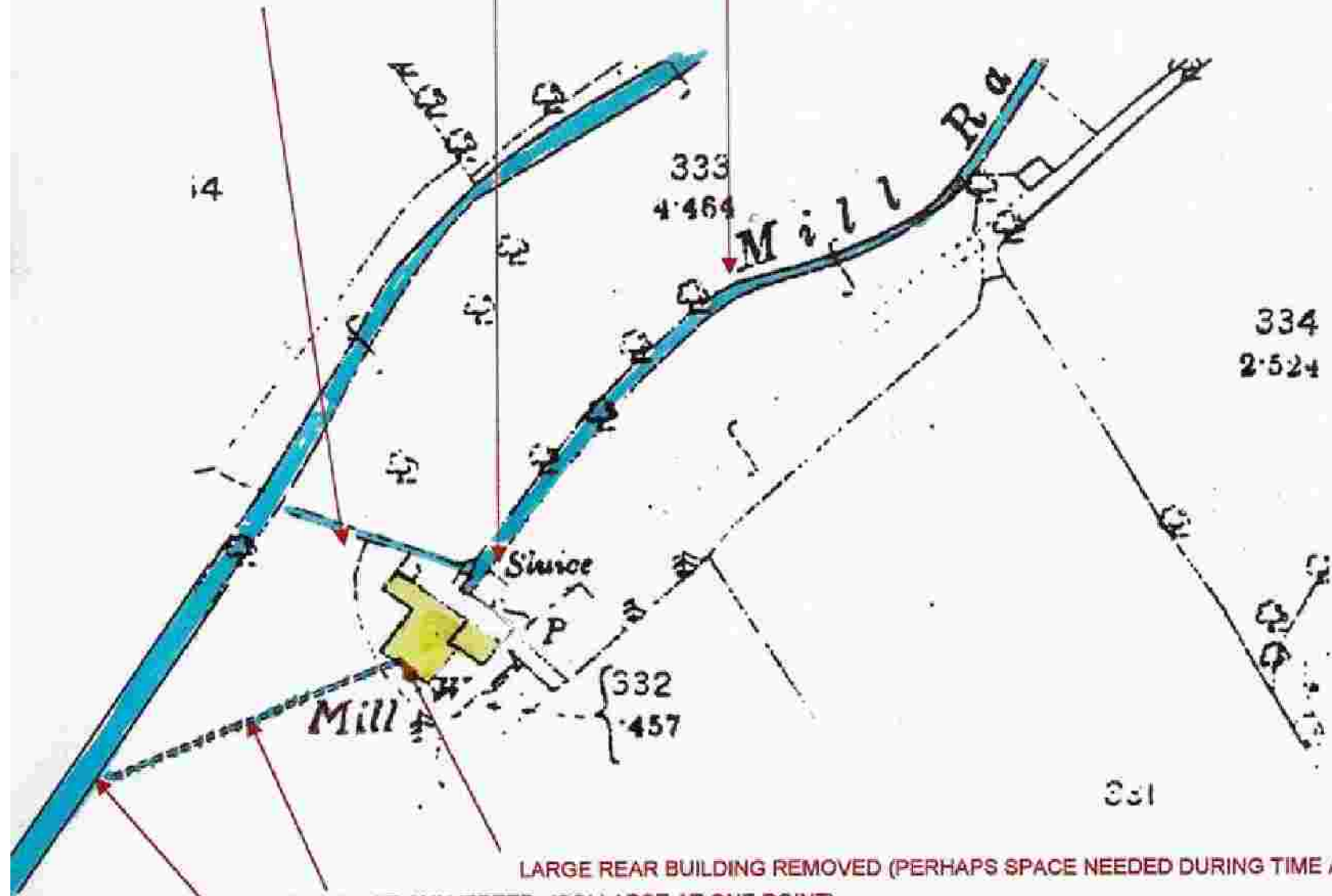
MILL RACE – EASTBROOK TO GRANGE MILL 1964

RACE SECTION 4

NOTE THAT NO MILL POND SHOWN ON MAP

SLUICE STILL PRESENT

ESCAPE RACE (STONE LINED)



LARGE REAR BUILDING REMOVED (PERHAPS SPACE NEEDED DURING TIME AS OIL MILL

TAIL RACE CULVERTED (COLLAPSE AT ONE POINT)

EXIT TO RIVER NEAR GRANGE HOUSE BRIDGE



GRANGE MILL SLUICE GATE 1972



GRANGE MILL 1972

GRANGE MILL (“LOW MILL” on 1856 OS MAP)

-THIS IS THE ANCIENT “WESTMULN”

1282 CORN MILL (part owned by BALDWIN WYKE)

1765 OIL MILL (JOHN RICHARDSON - Lord of the Manor)

1859 REVERTED TO CORN MILLING

1871, 1891, 1901, STONES PUT IN BY HAUXWELLS OF YARM (Millwrights)

1909 THEY DID “GENERAL REPAIRS”

1944 TURBINE FROM FRIENDS SCHOOL MILL INSTALLED TO GENERATE
ELECTRICITY

1957 ACTIVITY CEASED.

A MUCH ALTERED BUILDING WITH A RAISED PAIR OF CRUCKS BUILT INTO
THE ROOF STRUCTURE. HAND MADE BRICKS ON A STONE BASE.



GRANGE MILL (front before alterations)



AFTER ALTERATIONS



SLUICE MECHANISM
AT GRANGE MILL.
WHEN OPENED THIS
ALLOWED WATER TO
PASS DOWN THE
'ESCAPE RACE'
DIRECTLY INTO THE
RIVER.
THIS WAS ESSENTIAL
WHEN THE MILL WAS
NOT IN USE.



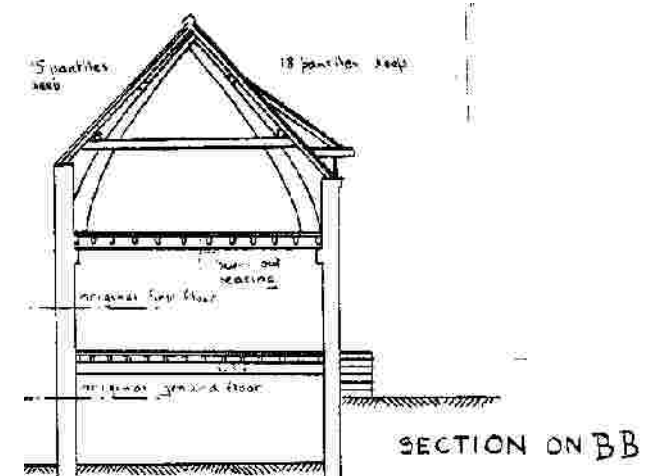
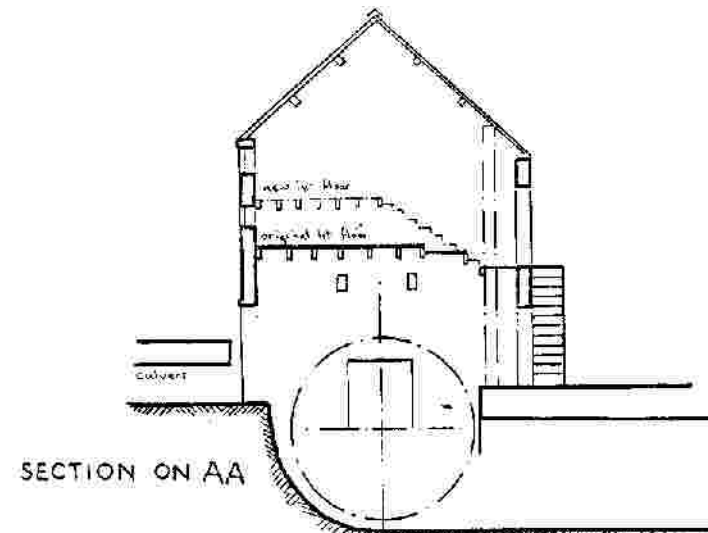
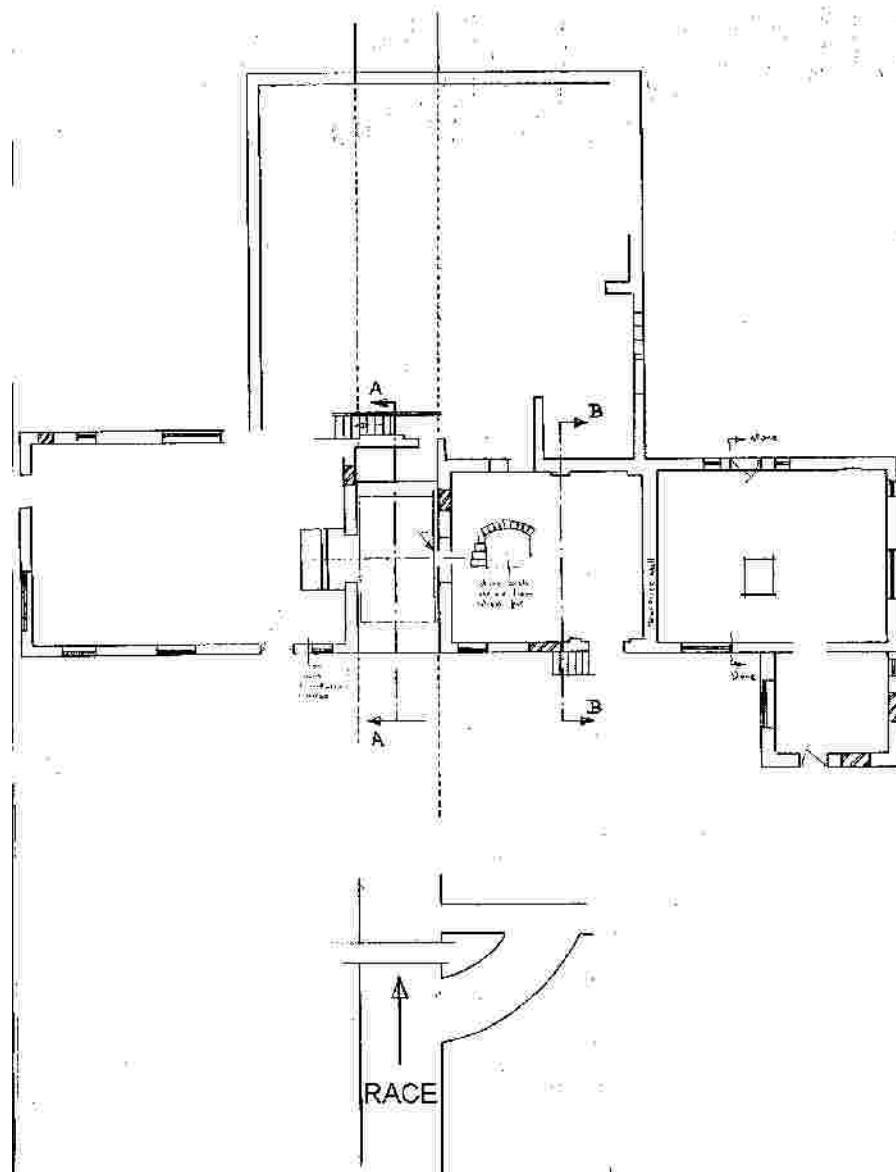
ESCAPE RACE



GRANGE MILL 1972



GRANGE MILL - REAR before alterations



GRANGE MILL SURVEY 1972 J.K.HARRISON & ESTON GRAMMAR SCHOOL

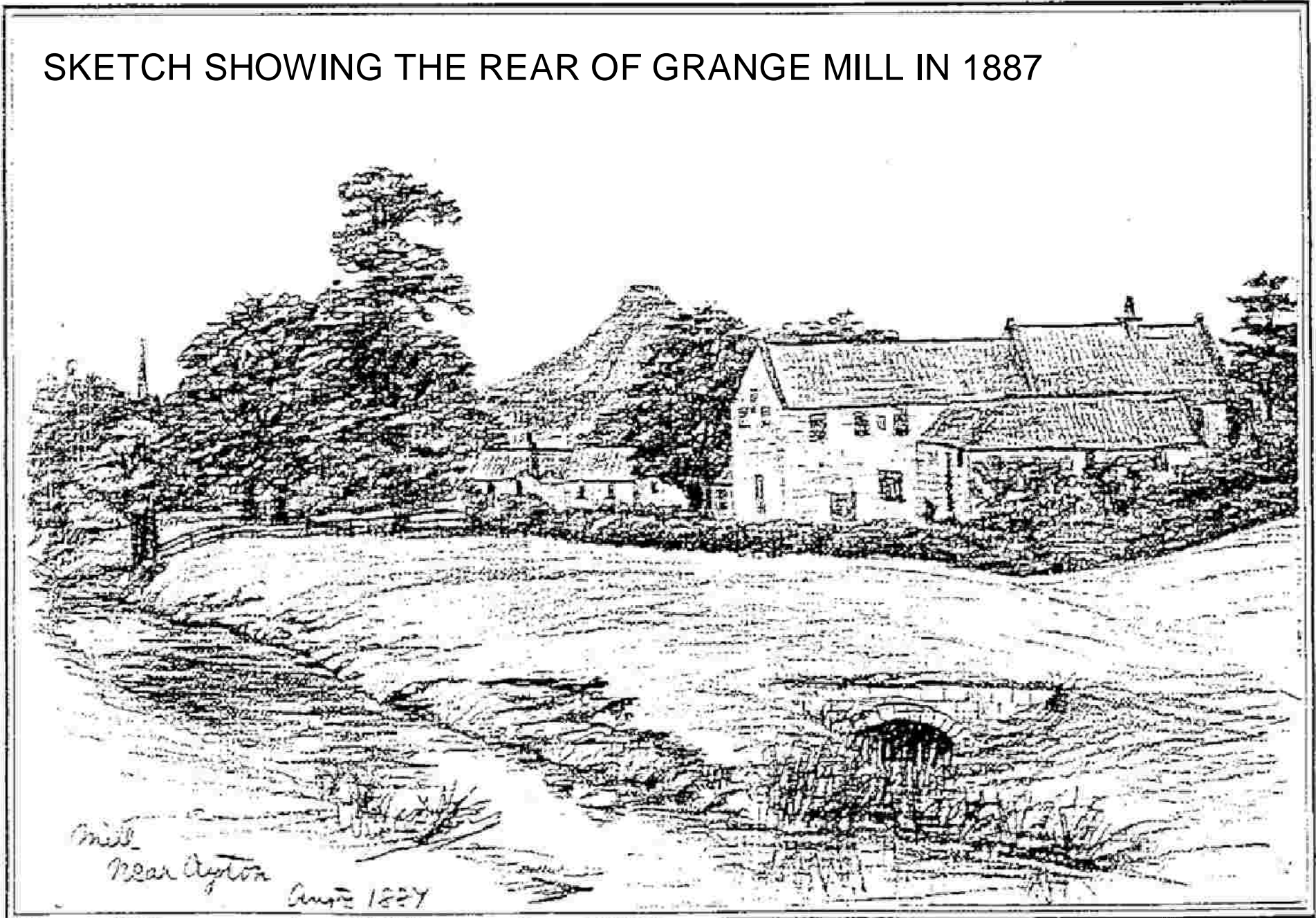
WHEEL PIT:- 8ft.6in. WIDE **DROP 10ft.**
WATER WHEEL:- Diameter ~14ft. **Width ~8ft.**

GRANGE MILL
 GREAT AYTON
 NZ 553103
 PLAN 1/8" = 1 FOOT
 RECORDED January 1974
 SOUTH PARK SIXTH FORM
 COLLEGE
 J.K.H.



BACK OF GRANGE MILL –
THIS ARCH WAS WHERE
THE 'TAIL RACE' EMERGED
FROM UNDER THE LARGE
REAR EXTENSION WHICH
WAS IN USE WHEN IT WAS
AN OIL MILL

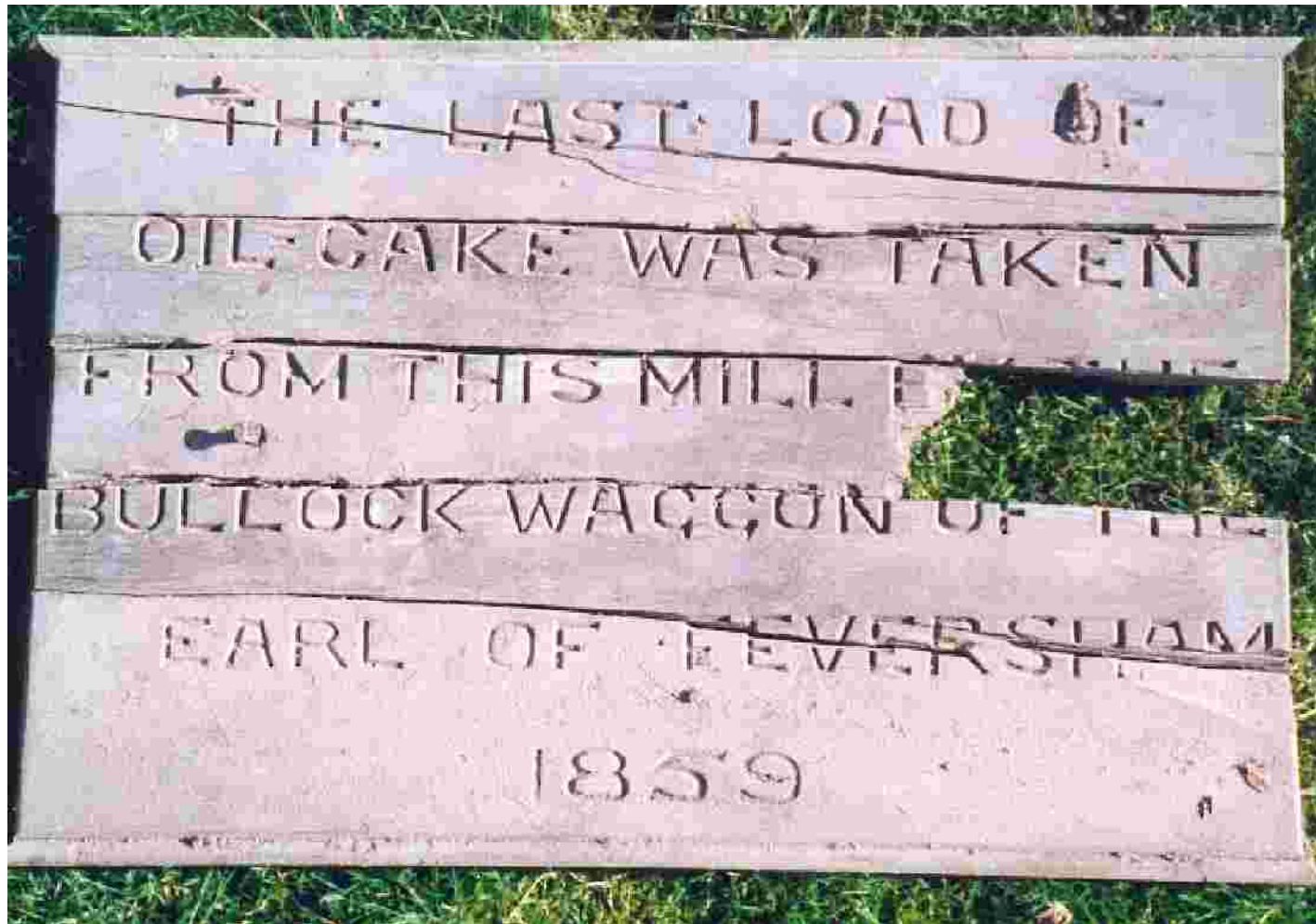
SKETCH SHOWING THE REAR OF GRANGE MILL IN 1887



The tail race was culverted right back to the river – this made the land behind the mill far more useable.



EXIT FROM TAIL RACE CULVERT



THE HYDRAULIC PRESS WAS INVENTED BY JOSEPH BRAMAH IN 1785.
ITS EVENTUAL APPLICATION TO THIS PROCESS HAD BROUGHT THIS
ANCIENT METHOD OF OIL EXTRACTION TO A CLOSE.



MILLWRIGHT'S COMMEMORATIVE PLAQUE
(now at TOCKETTS MILL, GUISBOROUGH)



ARCH & SLUICE AT GRANGE MILL



**SLUICE GATE ON SPILLWAY SEEN
FROM BESIDE THE FOOT BRIDGE.**

The third mill was not established until the late 18th century.

There was at this time a flourishing textile industry in the village. This involved weavers working on their looms at home organised by 'Manufacturers' who supplied their raw materials and disposed of their finished products.

It is known that the cottages of Race Terrace had 'shops' in the gardens behind, which housed the weavers' looms.

This last mill was initially established to automate part of the textile business.

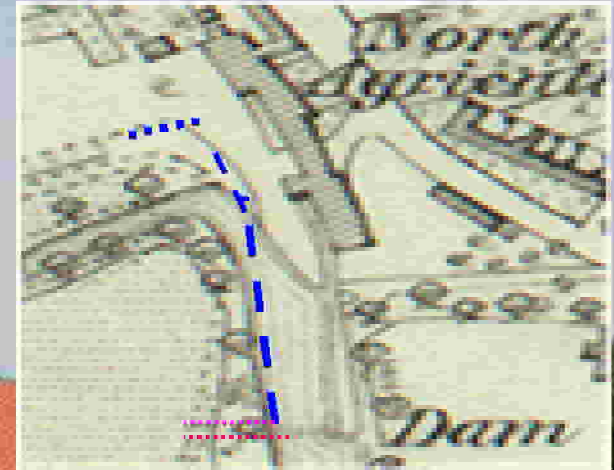
The name "Heselton's Mill" relates to its owner in the early 19th century who had built up an extensive estate in the village. This was the estate that was bought, along with its mansion house, to form the basis of the North of England Agricultural College. (Later known as the 'Friends' School')



HIGH GREEN 1856

The position of Heselton's Mill, with its Dam, Race & Tail Race. The low lying area (in blue) is thought to be where water was retained –causing problems for the lower mills. Note the Gas House – the influential Quakers in Gt. Ayton were closely linked to the emerging industries in nearby Middlesbrough. The School had gas lighting by 1850! Ayton was not a backward village.

During the development of the school site by Wimpeys the remains of the mill (by then the Arts & Craft block) were found to be unsafe and this building was erected on the original footprint.



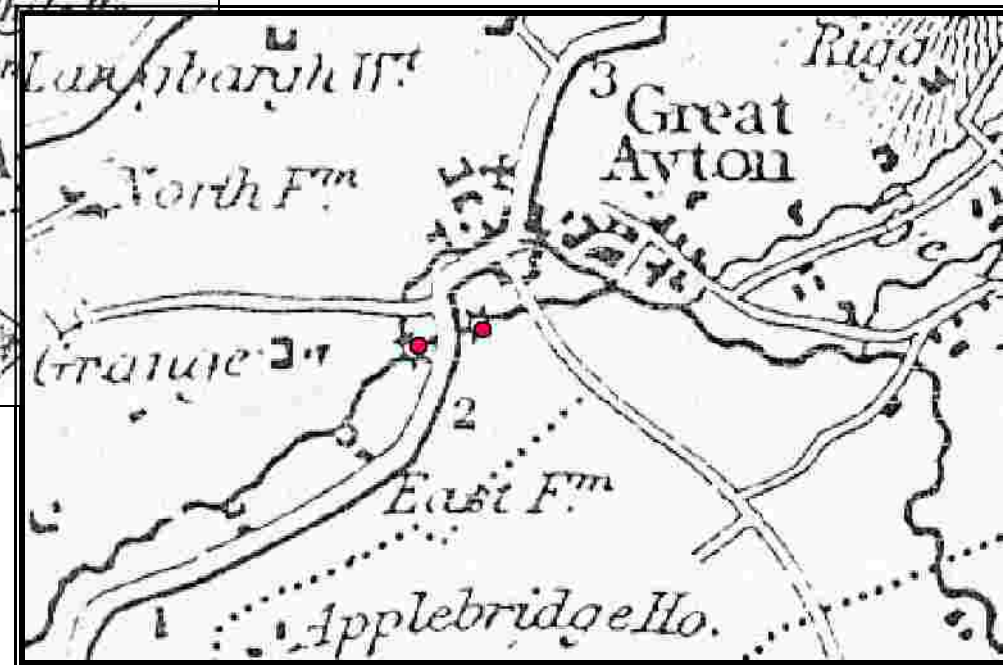
FRIENDS' SCHOOL MILL (formerly Hesleton's Mill) - FRONT



CROSS / ORD 1843

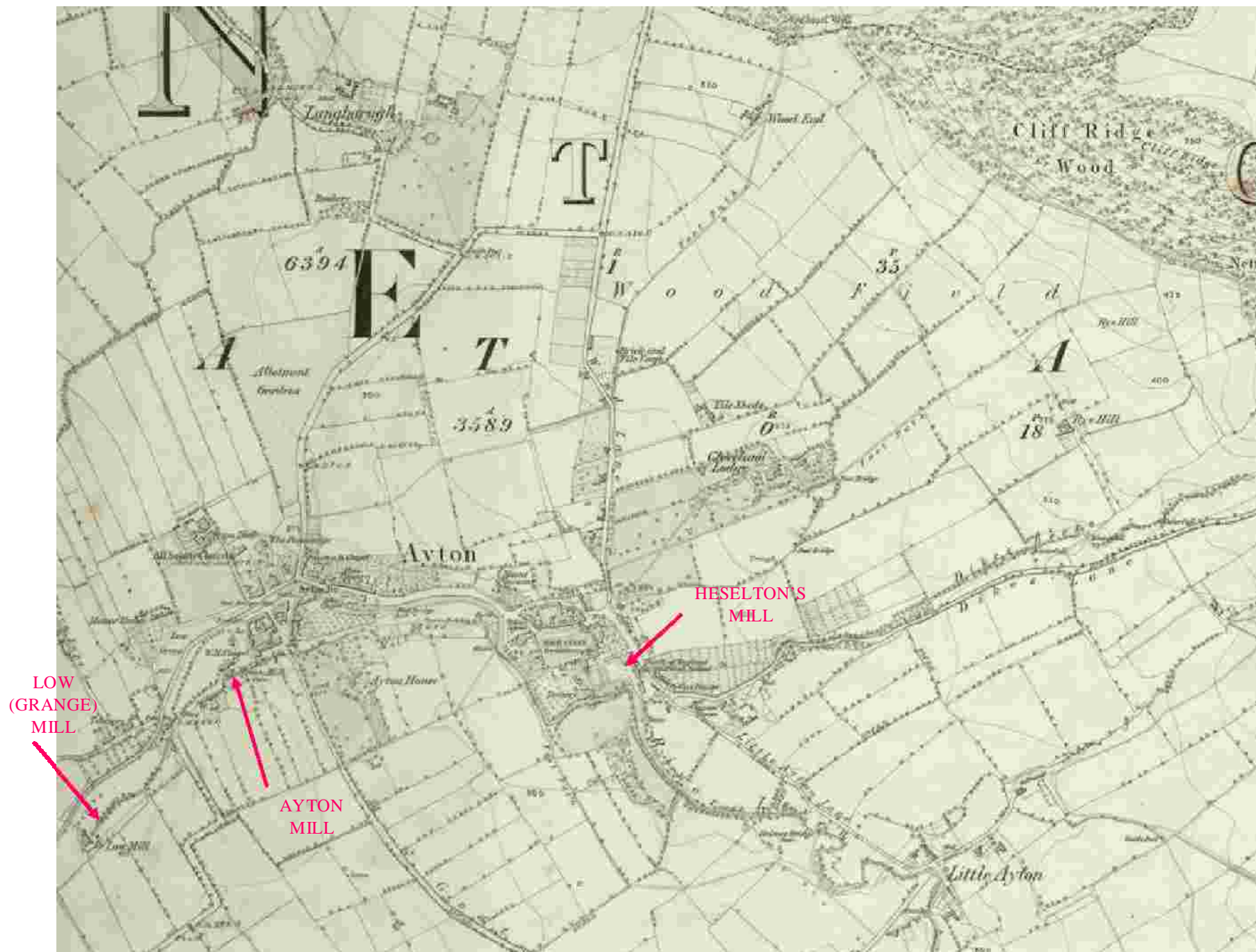
This map, although looking more sophisticated than that of Jeffreys, is less accurate in the positioning of Ayton mill – it has been put beside the mill dam. The correct position is the red dotted circle.

NOT ALL MAPS ARE RELIABLE



HOBSON 1843

HOBSON shows the positions correctly



AYTON & LANGBAURGH 1856

HISTORY OF HESLETON FLAX MILL

- c.1750 WILLIAM RICHARDSON BUILT A “BREW HOUSE & MALT KILN” FOR HIS SON NICHOLAS, WHO OPERATED IT AS A “COMMON BREWER” FOR ABOUT 30 YEARS.
- 1788 ONCE INVENTED NICHOLAS INSTALLED MACHINES FOR SPINNING LINEN YARN. **HE BUILT A DAM UPSTREAM** AND A MILL RACE TO PROVIDE POWER. (I.E. IT IS NOW A MILL).
- 1792 MILL RENTED TO JAMES DAVISON – CONVERSION TO COTTON SPINNING.
- 1801 JD’S TENANCY ENDED ON NR’S DEATH, MILL PASSED TO NR’S SON-IN-LAW, WILLIAM ROUNTREE.
- 1803 WR ALTERED MILL TO AN “OIL MILL”, - BY COMPRESSION OF LINSEED. **LAW SUIT WITH HENRY RICHARDSON (OWNER OF AYTON CORN MILL)**
- c.1810 A RELATION, PHILIP HESLETON, TOOK OVER THE MILL FROM W .
- 1826 ON PH’S DEATH, MILL LEASED TO SAUNDERS & WEATHERAL (OF STOCKTON)
- 1840’s NEW HYDRAULIC TECHNIQUES FOR OIL EXTRACTION - MILL OBSOLETE. BOUGHT BY FRIENDS’ SCHOOL, CONVERTED FOR CORN GRINDING, THRESHING & SAWING.
- 1856 RENTED TO JOHN DIXON, SON OF HEAD, OPERATED AS CORN MILL.
- 1936 INSTALLATION OF TURBINE FOR GENERATION OF ELECTRICITY
EVENTUALLY BECAME SCHOOL ART & CRAFT BLOCK

THE NATIONAL SCENE

Prior to mechanisation of spinning process it required
10 SPINNERS to produce the thread needed by each WEAVER.

1767 Hargreaves develops SPINNING JENNY

1771 VERY 1st COTTON SPINNING MILL (Arkwright using his 'Water Frame')

1775 – 82 American War of Independence. Cotton Supplies affected

1779 Crompton makes an improved SPINNING MACHINE

1788 Nicholas Richardson set up LINEN Spinning mill in Gt. Ayton

1792 James Davison converts it for COTTON Spinning

After SPINNING was mechanised output increased
WEAVING was then the slower stage

1789 Cartwright develops the POWER LOOM

**IN 1795 – 7 JAMES DAVISON HAD THE MILL
INSURED WITH THE ROYAL EXCHANGE
INSURANCE COMPANY**

James Davison of Great Ayton in the North Riding of the County of York, Cotton Manufacturer. On his clockmaker's Work in his cotton mill situated at Great Ayton £600. In his stock in trade in the same £200.

“Clockmaker's work” meant Machinery involving gears.

AN ACCOUNT OF SEED CRUSHING AND OIL EXTRACTION

by GEORGE DIXON (HEADMASTER OF THE AGRICULTURAL COLLEGE)

“ a pair of edge stones crushed the seed which was heated in small iron pans over a slow fire, and kept from burning by revolving knives; when hot it was put into hair bags and placed between ade of beech wood, the upper ones driven down by heavy stampers lifted by a revolving shaft, and allowed to fall on the wedge. When this was driven home the bag was taken out and the crushed linseed was found pressed into a flat mass called oilcake, and sold to the farmers for feeding their cattle. The oil ran down into tanks below the wedge. In this state it was called “raw linseed oil”. This oil, when pumped into tanks and boiled with sulphuric acid, was called “boiled linseed oil”, and was in great demand for mixing with paint. The external appearance of the mill was rather unsightly, but the fall of the stampers produced a **sound rather pleasant to the ear as it echoed from the distant hills - - - - -**

The cottage in which we lived was connected by solid walls with the mill buildings and every fall of the stamper caused them to oscillate and we felt the motion in the bed on which we slept”



3. STAMPERS & WEDGES



2. HEATING PAN



4. EXTRACTED OIL



1. CRUSHING ROLLERS



5. OIL CAKE

- . PHOTOGRAPH OF OIL MILL INTERIOR- De Zoeker Holland

**INNER STONE 8"
CLOSER TO CENTRE**

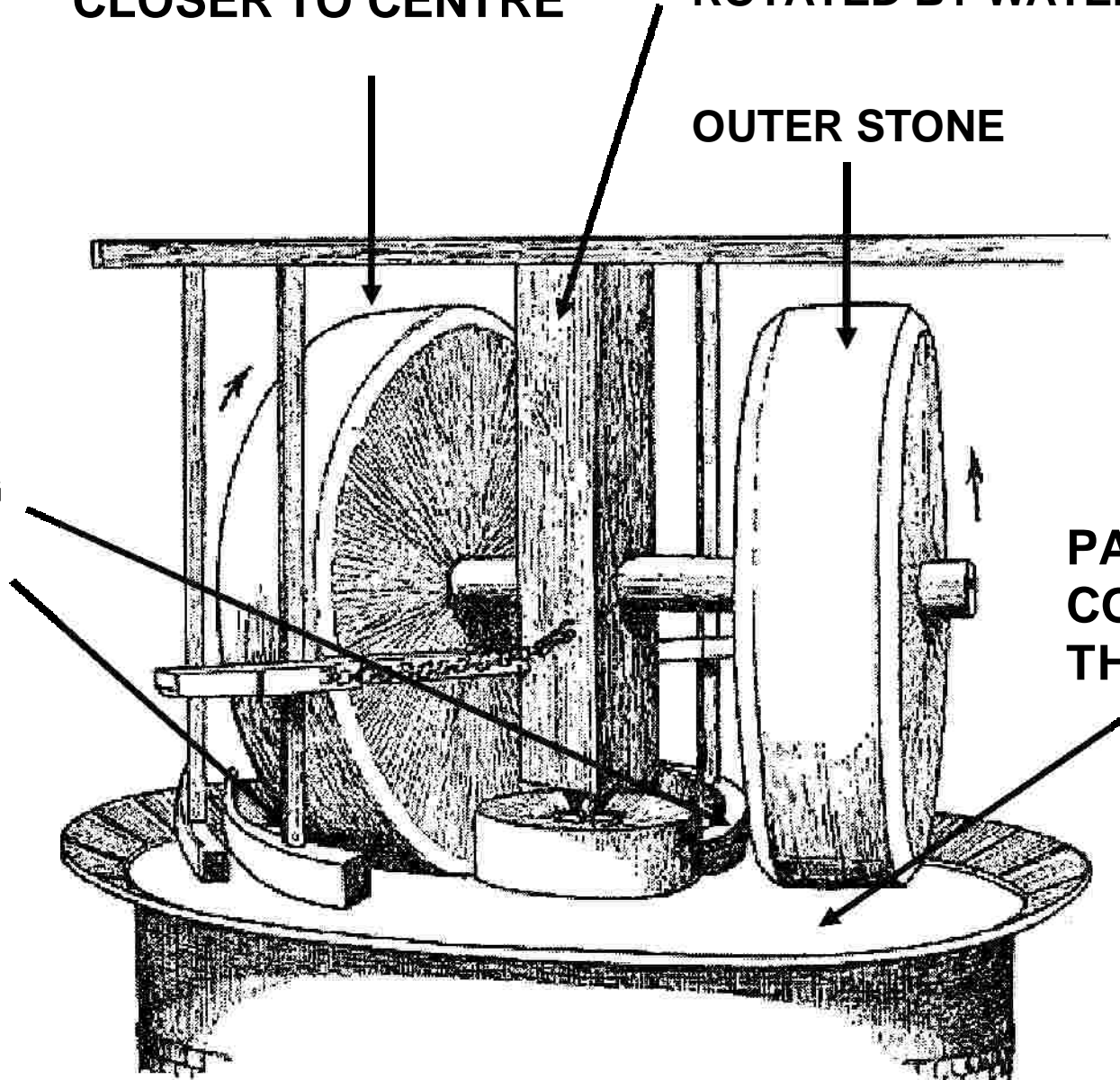
**CENTRAL STONE SPINDLE
ROTATED BY WATER WHEEL**

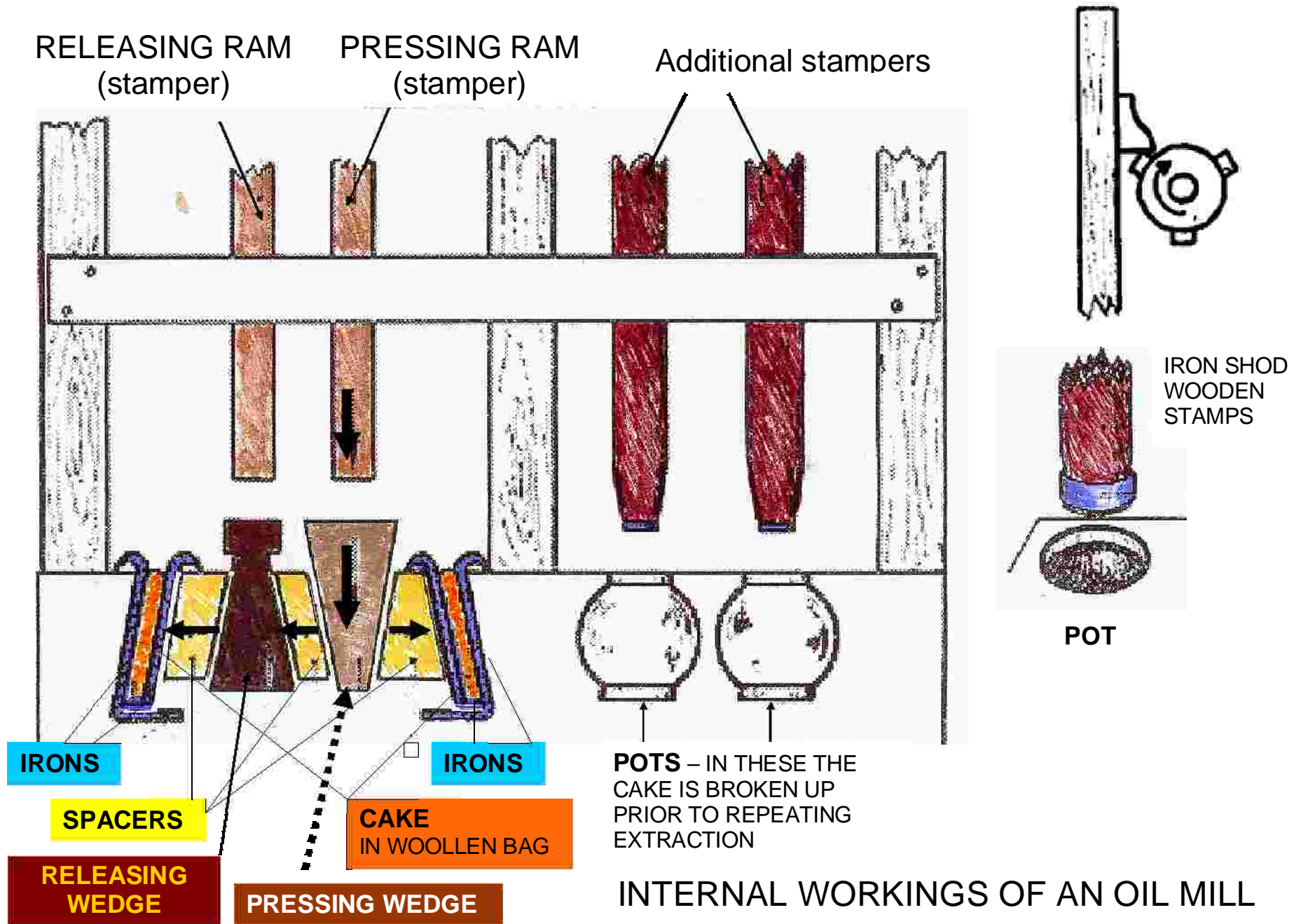
OUTER STONE

**WOODEN
GUIDES
DEFLECTING
SEEDS INTO
PATH OF
FOLLOWING
STONE**

**PAN
CONTAINING
THE LINSEED**

EDGE STONES FOR CRUSHING LINSEED





The Stampers, on falling, strike the wedges driving them in deeper, thereby producing a lateral force which compressed the bags containing the linseed in order to extract the oil.

The stampers and wedges were made of beech wood.

It is said that three large beech trees growing on the opposite side of Little Ayton lane to the mill had been deliberately planted so that wood might be available for replacement parts in later years – they certainly planned ahead!

The introduction of Hydraulic presses to the process in the 1840's provided a much simpler way of squeezing the linseed and therefore the old technology became obsolete.

TAKE-OVER BY NORTH OF ENGLAND AGRICULTURAL SCHOOL

- **TOTAL COST WAS £700**
- **£500 FOR THE BUILDING & £200 FOR THE EQUIPMENT**

THEY SUBSEQUENTLY REMOVED AND SOLD:-

A COPPER CAULDRON, LEAD TANKS, EDGE STONES & OTHER OIL EQUIPMENT

THEY INSTALLED:-

A NEW WATERWHEEL WITH MACHINERY FOR THRESHING & GRINDING

The North of England Agricultural College had been set up by The Society of Friends (Quakers) in 1841 to provide suitable education for the children of Members who had 'married out'. Girls were taught household skills whereas boys learnt how to tend the land. It involved the purchase of an estate from Philip Heselton, including the mill, using money provided by wealthy local Quakers, especially Thomas Richardson.

It has always seemed to me remarkable that William Richardson built his “brew house & malt kiln” at exactly the right level and position to exploit water power from the river thus enabling its subsequent conversion to a mill.

There was a natural drop in river level which, combined with the construction of a dam, provided adequate head to drive a mill.

The position of this new mill was sensitive in that it upstream of the other already established mills with the potential, therefore, to interfere with their water supply.

I think that the timing of the resulting law case was highly significant as it coincided with the mill's conversion to an oil mill.

Spinning was relatively light work and the natural flow of the river would probably provide adequate water to power the waterwheel throughout the year.

Oil milling, however, required much more energy and this could, at times of low river levels, only be achieved by holding the water back for ile, its later release adequately augmenting the river's natural flow. Unfortunately this ‘pulsing’ of the water supply would dictate when there was an adequate flow for the lower mills to operate.



THE AYTON MILLS; A CASE FROM 1803

THIS DISPUTE WAS OVER WATER RIGHTS BETWEEN HENRY RICHARDSON OWNER OF THE **ANCIENT** AYTON CORN MILL & ALSO LOW MILL AND WILLIAM ROUNTREE THE OWNER OF THE **RELATIVELY NEW** OIL MILL **UPSTREAM**.

INTERESTING POINTS REVEALED:-

MILLS CARRIED “RIGHTS OF WATER” -- TRANSFERRED ON SALE.

NEW MILL ACQUIRED SUCH RIGHTS AFTER ABOUT 25 YRS.

THE RIVER LEVEN HAD ADEQUATE FLOW TO POWER A MILL IN WINTER BUT DURING THE SUMMER MONTHS WATER HAD TO BE STORED UP ie. THERE WAS INSUFFICIENT FLOW FOR CONTINUOUS RUNNING.

THE “RIGHT TO FIRST WATER” WAS THEREFORE JEALOUSLY GUARDED AS ANY MILLS LOWER DOWN A STREAM WERE INFLUENCED BY RETENTION (IN MILL PONDS) BY ANY MILLS UPSTREAM.

REFERENCE TO “TWO DAMS & A RESERVOIR” AT HESLETON’S MILL. IT SEEMS THAT AN OIL MILL REQUIRED MORE WATER POWER THAN THE PREVIOUS COTTON MILL – THIS IS WHAT BROUGHT MATTERS TO A HEAD.

THE RELATIONSHIP BETWEEN “AYTON MILL” AND “GRANGE (LOW ”



This is DYKES BECK which carries water down from the hills – although close to the building it has NOTHING TO DO WITH THE MILL.



LAKE SLUICE – We think the school lake was the 'Reservoir' mentioned in the court case.

SCHOOL LAKE – The old mill reservoir?





SITE OF SCHOOL LAKE



FRIENDS' SCHOOL MILL DAM - TODAY



MILL DAM 1936 – The boards (which could be lowered into position) would raise the water level sufficiently to fill the reservoir and also provide adequate head for the working of the mill. The Race was just the other side of the far parapet.

SOME MILLING BACKGROUND

AS NONE OF THE MACHINERY REMAINED IN ANY OF THE MILLS WE
HAVE TO SPECULATE AS TO ITS NATURE.

WE HAVE ALREADY SHOWN THE MOST PROBABLE APPARATUS
FOR EXTRACTING LINSEED OIL.

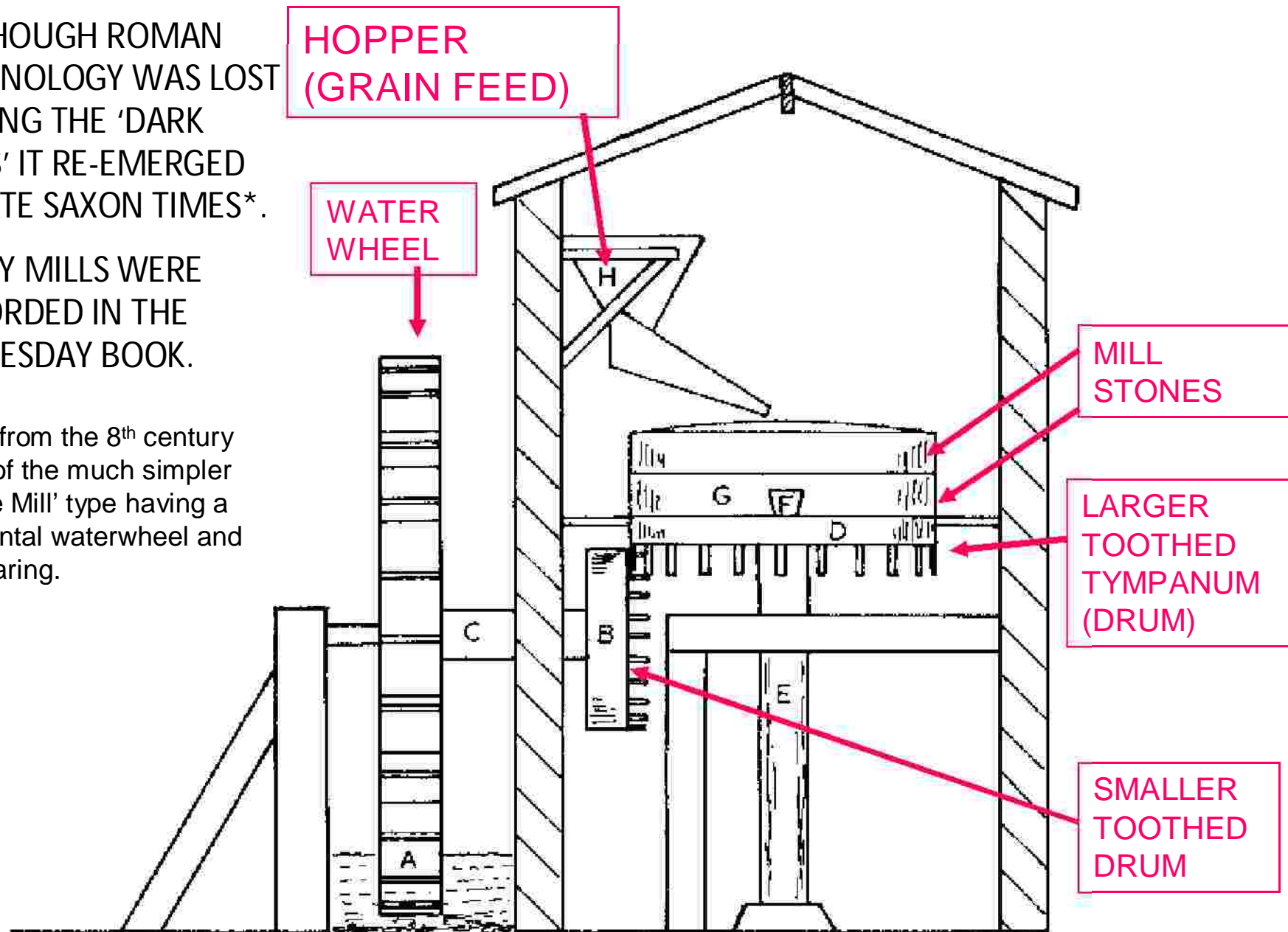
THE MACHINERY IN CORN MILLS HAS EVOLVED OVER MILLENNIA
DRIVEN BY INCREASED DEMAND AND A CONSTANT STRIVING FOR
A LIGHTER FLOUR AND THEREFORE A MORE EDIBLE LOAF.

IN THE FOLLOWING VERY BRIEF OUTLINE WE ARE ONLY
CONSIDERING THE MAJOR CHANGES IN WATERMILL TECHNOLOGY
SINCE MEDIEVAL TIMES.

ALTHOUGH ROMAN TECHNOLOGY WAS LOST DURING THE 'DARK AGES' IT RE-EMERGED IN LATE SAXON TIMES*.

MANY MILLS WERE RECORDED IN THE DOMESDAY BOOK.

*Mills from the 8th century were of the much simpler 'Norse Mill' type having a horizontal waterwheel and no gearing.



ROMAN MILLS – AS DESCRIBED BY VITRUVIUS 27 BC

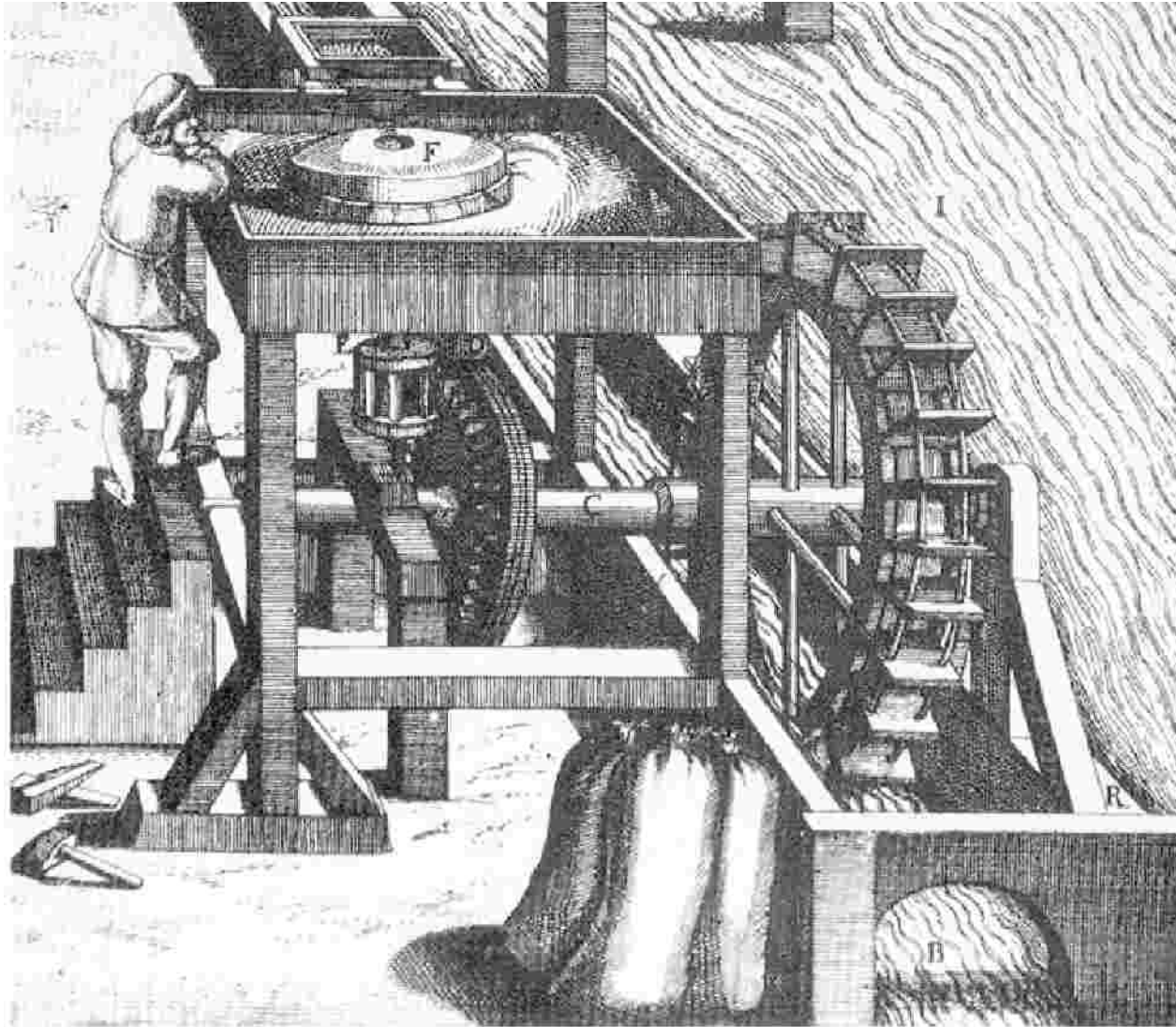


THESE FOLLOW THE ROMAN
PATTERN i.e.

A VERTICAL WATERWHEEL
GEARING, THUS AN
INCREASE IN THE SPEED OF
THE MILLSTONES (BETTER &
FASTER MILLING).

ONE WATERWHEEL TO EACH
SET OF MILLSTONES

EARLY MEDIEVAL MILLS



1662 ILLUSTRATION OF MILL

MILLS WERE USUALLY SMALL & SINGLE STOREY, THE MILLER'S HOUSE WOULD NOT BE ATTACHED.

A mill of 1282 would be like this.

The waterwheel would drive a single set of millstones.

If a second pair of millstones was required another waterwheel would be built to drive it.

There would be no auxiliary machinery. The miller only milled the grain, any processing of the meal was the responsibility of the baker

The practice was for the farmer, or baker to bring **his** grain to the mill and take **his** meal away when it was ready; there was therefore no need for storage at the mill.

MILLING WAS USED AS A FORM OF TAXATION.

SOKE – WAS THE REQUIREMENT FOR ALL A LORD'S TENANTS TO HAVE THEIR GRAIN MILLED AT HIS MILL – EVEN IF ANOTHER WAS NEARER.

MULTURE- PAYMENT IN KIND – THE MILLER WOULD RETAIN A PROPORTION OF THE MEAL (USUALLY A 16TH) AS PAYMENT.

D.I.Y. WAS SEVERELY DISCOURAGED AND ANY HAND QUERNS WERE SMASHED (OR OWNERS FINED) AS THIS WOULD REDUCE THE WORK DONE AT THE MILL AND THEREFORE THE AMOUNT THE LORD OF THE MANOR COULD GAIN BY RENTING IT OUT TO THE MILLER.



SOKE RIGHTS & THE SUPPRESSION OF QUERNS

ESKDALE MILL AT BOOT – STILL A DOUBLE MILL

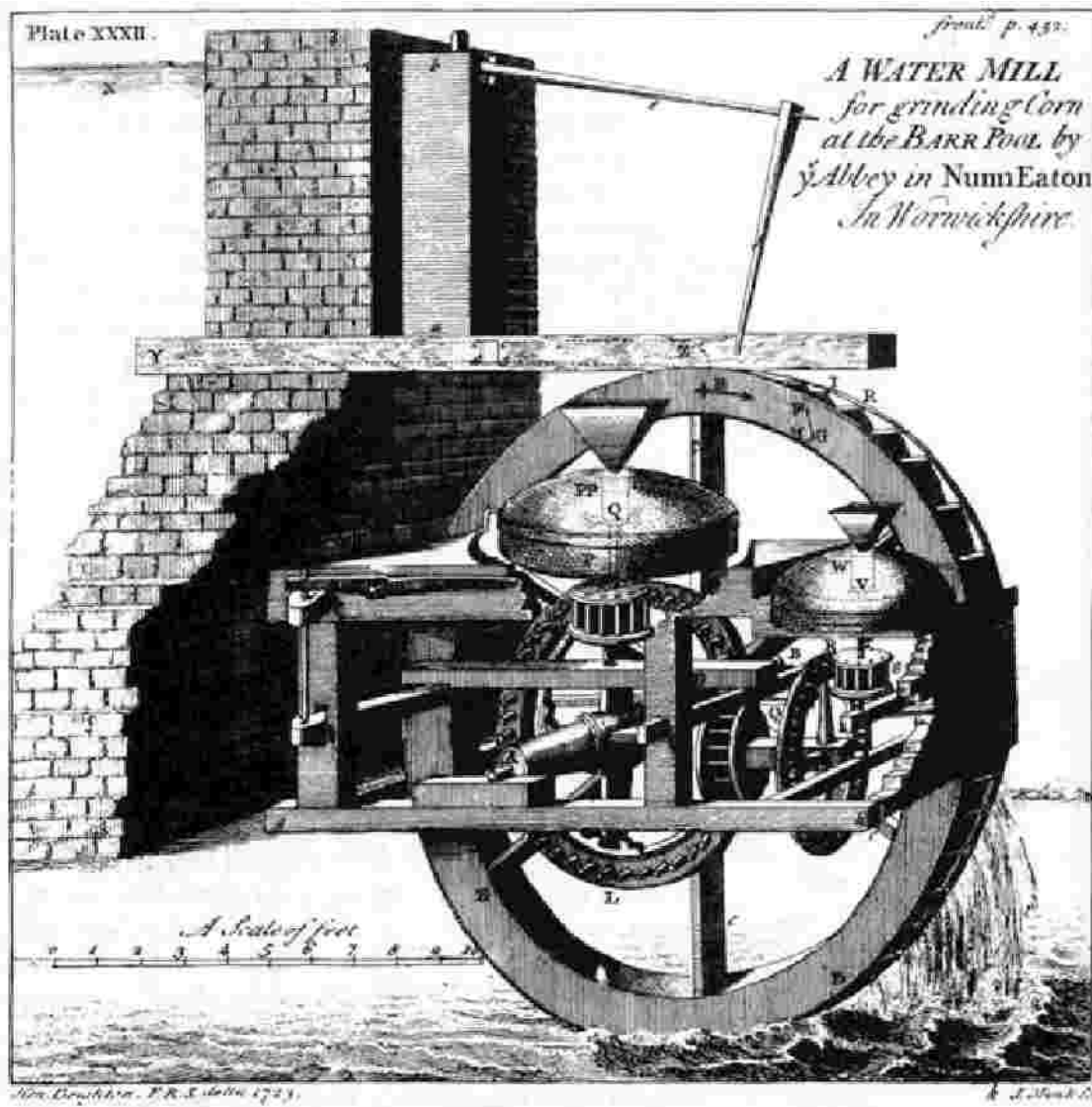


TWO OVERSHOT WATERWHEELS



STONENUT DRIVEN DIRECTLY FROM THE PITWHEEL

HENRY BEIGHTON'S ENGRAVING OF THE MILL AT NUNEATON 1723



Here we have a major development – the waterwheel now drives two sets of millstones.

The additional gearing needed to drive the 2nd set of stones enables their speed of rotation to be increased.

As it is the peripheral speed of the millstones which is important in the milling process these 2nd stones can therefore be of smaller diameter.

At this time most millstones in this country were made from millstone grit. These had a rough texture throughout and therefore ground down the fibrous bran as well as the white amorphous endosperm. This made it very difficult (and expensive) to remove the bran later to produce a “white” loaf. Soft white bread was the province of the super-rich!

However, this smaller 2nd set was often imported basalt ‘bluestones’ from Germany. These ground down the endosperm but left the bran in larger flakes making its removal by sieving easier.

COULTON MILL – HORIZONTAL SHAFT



IN THE 'BACKWATERS' OF THE NORTH YORKSHIRE MOORS THERE ARE STILL EXAMPLES OF MILLS WHICH SHOW THESE EARLY FEATURES.

THIS IS A MODEL MADE BY JOHN HARRISON, LAST MILLER AT COULTON, WHO LATER BECAME A MILLWRIGHT.

THE SPURWHEEL

The next major development took place in the 2nd half of the 18th century when the pit wheel, instead of just driving the pinion for a set of millstones, engaged with a pinion on an upright shaft. This shaft then carried a very large spur wheel which could engage with a number of drives to individual pairs of millstones.

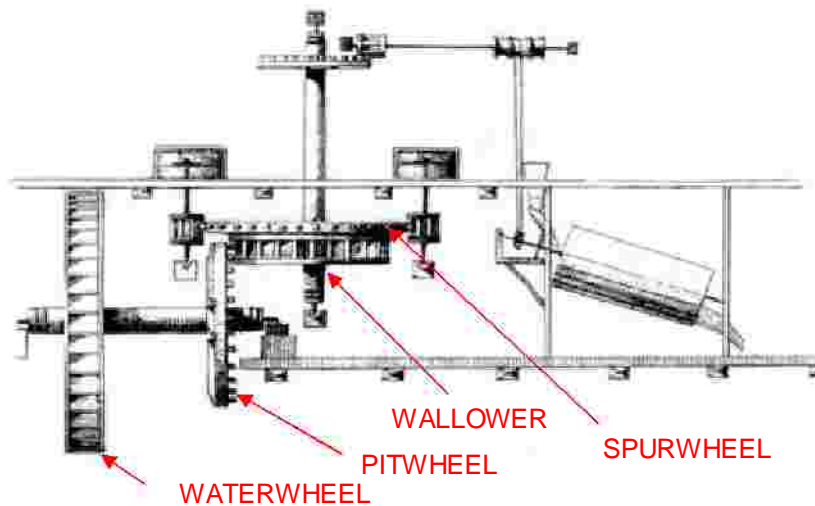


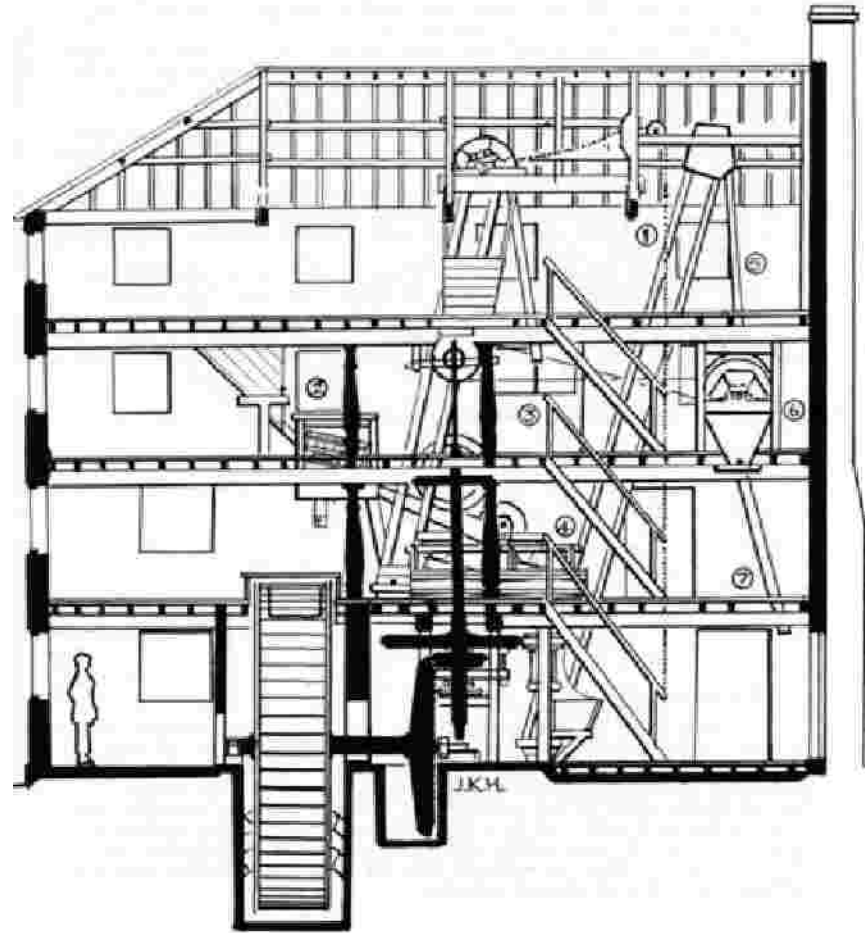
Figure 13. Angerstein's drawing of Mr Hall's watermill at Newcastle, 1754.

This enabled mills to have more than one type of stone, giving greater versatility. The introduction of the French burr stones also took place about now – this, like the blue stones before them, was a means of producing that elusive white flour.

This upright shaft could also be extended upwards to drive additional machinery- here it is driving a mechanical flour grader.

Millers by this time are not just grinding the grain but also processing the meal to produce a variety of flours.

TOCKETTS MILL, GUISBOROUGH



The introduction of the upright shaft meant that the drive extended to upper floors. Mills were also by this time storing grain - millers were buying in grain and selling flour rather than the medieval practice of grinding the client's grain. Whereas the previous horizontal arrangement of the gearing had caused mills to be long and squat, these new factors caused mills to become taller. Tocketts Mill shown here is a good example.

The height of Ayton Mill in the earlier photograph we have would suggest that it would have a similar configuration.

Tocketts shows the culmination of mill technology immediately prior to the introduction of roller mills and the use of steam power – but that is definitely another story!

CLEVELAND STEAM MILL, THORNABY – THE FINAL CHAPTER



Before the end of the 19th century country corn mills were already in decline; the increase in urban populations, the repeal of the corn laws (allowing the importation of more foreign grain), and the use of steam power all made it more efficient to mill at the ports. Finally the introduction of roller milling which wasn't only much faster but also could separate off the bran with ease FINALLY making WHITE BREAD available to all. That, of course, is why we now pay a premium to have the more nutritious WHOLEMEAL BREAD which still has the bran and wheat germ in it! How perverse is human nature!!!

What is always fascinating about the history of an area is trying to trace the remaining evidence 'on the ground'. This presentation was produced as a precursor to a walk around the village so that people could see these features for themselves.

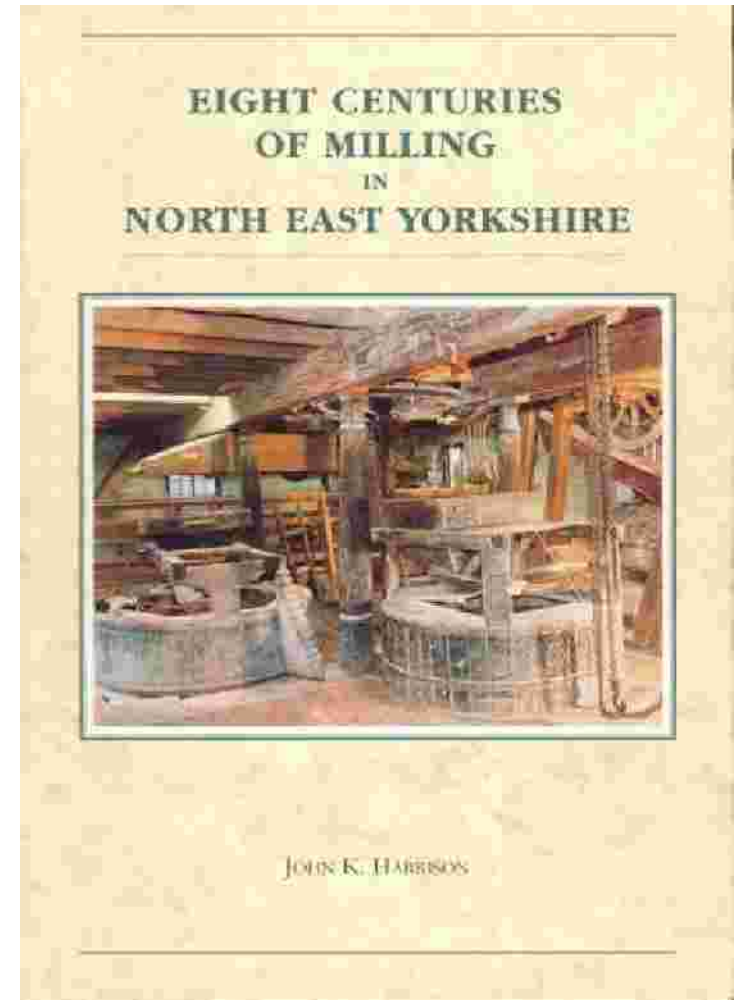
Although it is therefore of most use to local people who can use it as a guide to interpret the physical remains, I have tried through more extensive captions and explanatory notes to make it of interest to a wider audience.

We have looked at the mills in a single village – for a comprehensive view of mills, and the development of corn milling in this part of England the most authoritative work is that by John K. Harrison and is based on over 30 years of personal field work. His book is well worth obtaining.

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YORKSHIRE**

(2ND EDITION)

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This is RACE TERRACE – weavers had their looms in the gardens behind. The house built in white brick dates from the late 1800s and fills a gap previously left so that the weavers could easily carry their bulky cloth to & from these shops.

