



The Norfolk Industrial Archaeology Society

LEATHERINGSETT

The Industrial History of a Norfolk Village

By
David W. Durst.

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Foreword

The Norfolk Industrial Archaeology Society, from its start in 1971, has seen as important the publication of the work of the Society and its members.

Letheringsett is a small rural village. It has a number of industrial buildings and other structures of historical importance surviving. Within some of these buildings much original machinery and equipment exists or existed when recorded by the Society. Other buildings contained clues as to their original use. As a result the village has deservedly received much attention from the Society.

The unique archives of documents and images, not least the Mary Hardy Diaries, add flesh to the bones of the surviving buildings. They expand considerably our understanding of how the buildings and other remains were used and changed over time.

It is 38 years since I photographed, and helped an architectural student to do measured drawings of, the water mill. Since then many members have participated in the investigation and recording of sites in Letheringsett. We gratefully acknowledge the co-operation of owners and tenants in enabling this work. We also thank others who have allowed their work and collections of material to be used to add to this publication and our understanding of the past.

The Society has been fortunate in that David Durst has taken on the role of coordinator of much of this effort. He has brought together his and the work of many others. For 20 years the Society's Journal has published papers written by David on Letheringsett.

With this publication we bring together those Journal papers. They have however been updated to incorporate much new information and understanding. Repetition of material has been eliminated where required, and major maps brought to the front.

The opportunity has been taken to include more and better illustrations than in the original articles.

Philip Tolley,
Chairman, Norfolk Industrial Archaeology Society

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Preface

The original references for the articles that appeared in the Journal of the Norfolk Industrial Archaeology Society (referred to hereafter as J.NIAS) are: -

- Chapter 1 J. NIAS.1993 revised in J. NIAS 2007 pages 78 - 82
- Chapter 2 J. NIAS 1994 pages 223 - 268
- Chapter 3 J. NIAS 1995 pages 345 - 362
- Chapter 4 J. NIAS 2004 pages 5 - 40
- Chapter 5 J. NIAS 2006 pages 80 - 91
- Chapter 6 excerpts from J.NIAS 2007 pages 58 - 77; J.NIAS 2008 pages 81 - 90 and J.NIAS 2010 pages 24 - 25

List of Maps

Note: maps and plans in this publication are not reproduced to their original scale.

Page 3

- 1903 ½inch to mile with River Glaven highlighted and village circled.
- 1834 Joshua Mannings Map,
Courtesy Savills

Page 4

- OS plan 1886 - section covering Letheringsett

Page 5

- OS plan 1906 - section covering Letheringsett

Page 8

- Tithe map of 1834
- Tracing of map of 1811

Page 23

- Location map for Hall Farm, from 1906 OS Plan.

Rear Cover

- !837 Tithe Map (Colour)
Courtesy James Oxley-Brennan

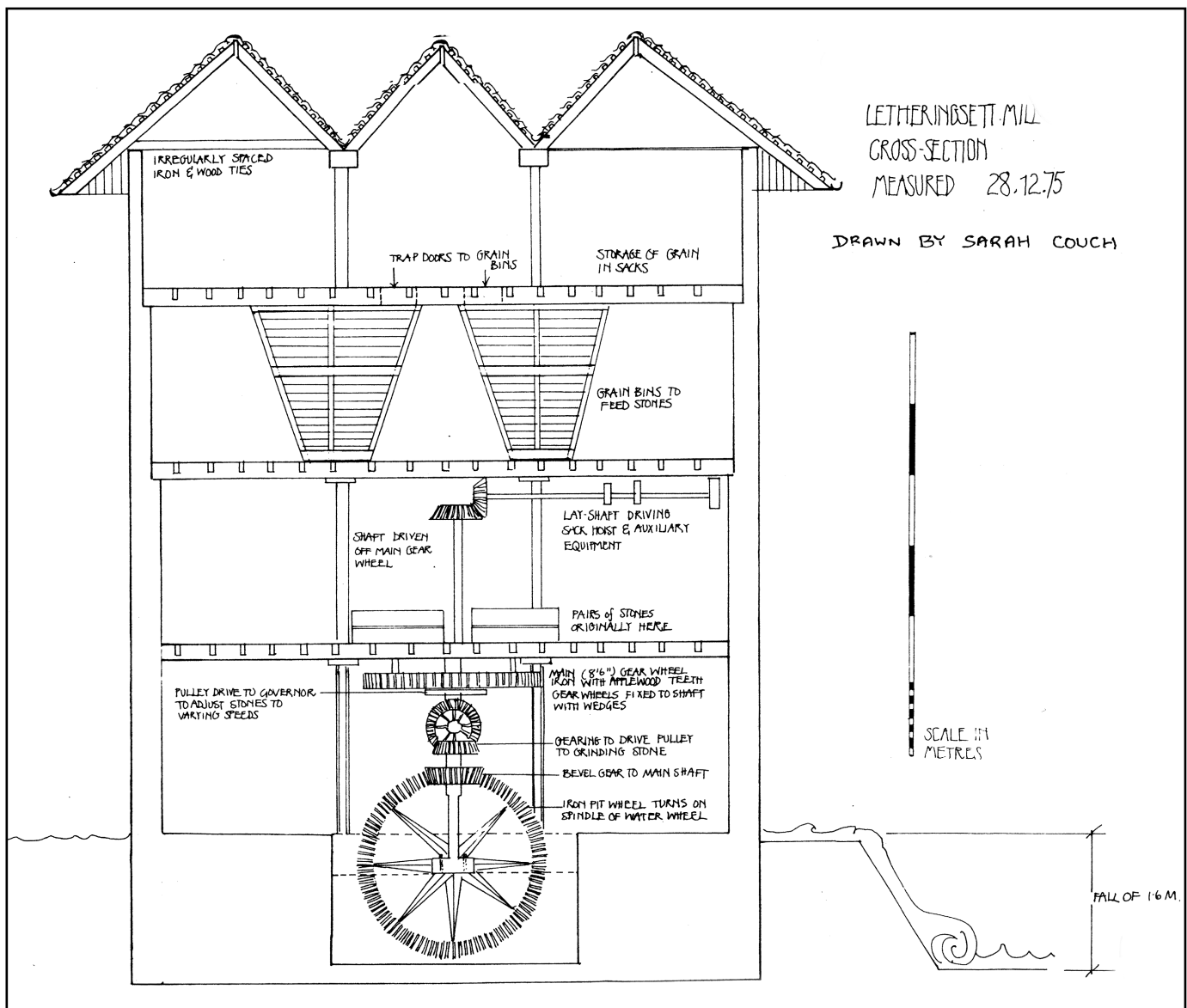
Credits, references and maps consulted have been grouped together at the back of this publication. When first published in J NIAS 1993 a map also included a lime kiln at TG 070384, and a tan office (on the site of the present sewage works) at TG 069389.

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two pairs were used. In 1975 the hurst-frame was seen to be semi-enclosed against dust by wooden doors which were not replaced. Power for auxiliaries is provided by a pinion can be brought into mesh with the great spur wheel and also through a pair of bevels directly from the vertical shaft.

B4. The stones

One pair of grit stones has been brought back into use, and a pair of french burrs is joining it. Where components have been renewed, the traditional design has been copied. The miller does his own stone-dressing.

Adjustment to the spacing between stones (tentering) is at present done manually, but the gear is complete on two sets for automatic control from a governor. This tentering control follows standard contemporary milling practice. The governor geometry was questioned, but analysis found that its design is theoretically feasible —this is enlarged on in Appendix 5.

B5. The auxiliaries

Power is used for a number of purposes other than driving the stones. There is a hoist to take bags of corn to the top floor, and means to hoist into the lucan over the front door. These were driven from line shafting, which in turn was powered through a vertical shaft from the great spur wheel. A mixer and a dresser were known to have been positioned on the upper floors. Further pulleys exist on the line shafting.

As an alternative power source to the line shafting, and perhaps then also to the stones, there was a diesel engine. This was made by Ruston of Lincoln and delivered to the installation contractors, F Flowerdew & Son, in February 1946. It is still capable of running but its fumes might pollute the high quality flour now being produced.

There is an additional separate drive through a pair of bevels from the vertical main shaft, as detailed on drawings. From this came a belt to a grindstone and a hoist to the upper floors, mounted above the waterwheel outboard bearing.

B6. Historical evidence from site

While measuring the machinery, the building was examined. There was no sign of extension, or fire damage, or phased construction, nor proof that the foundations were older than the walls. However, the first floor timbers indicated that the machinery had been rebuilt since the building was first erected. The waterwheel axis had been moved by 400mm. The 1765 water level stone was the only date found, and no maker's marks of any kind, prior to 1940, were seen.

The materials of construction provide some pointers. Brick and lime are widely used, in preference to timber. Cast iron is also preferred where other mills might use wood, e.g. the axletree and main shaft, gearwheels

Lefdt: Mill exterior from SW, 1975,

Below: The waterwheel as seen from the exterior of mill.

Below Right : The Oil Engine

(Photographs 1975 - P Tolley)



and bridge beams. The buckets are sheet iron. The iron-framed windows are distinctive and no similar ones were seen in the parish, nor reported elsewhere in the neighbourhood. There were no significant points of similarity with Mill House (Glavenside), the house nearby which Rouse built for himself around 1800.

The overflow channel has sidewalls and an end pillar which are capped with cast iron. There is a strong resemblance to those used in like manner on the main road bridge in the village, which is date marked (in cast iron) WH 1818.

B7. Restoration

On the initiative of David Mayes in 1982, the estate started the process of return to traditional milling.

All working parts required overhaul. Replicas, where needed, were made as near as practicable to the originals. The waterwheel required replacement of ten buckets - those which had been kept wet by leakage through the ill—fitting sluices. By removing a jammed baulk of timber behind the guide plate, the wheel was enabled once more to be used, when wanted, in the undershot mode. It would appear that for many years it had been operated only in the breastshot mode.

At some stage a loose wallower had been neglected and its teeth, and those on the pitwheel, became seriously worn. New components were cast and fitted. For ease of handling the pitwheel was made in more segments than its predecessor. For the first pair of stones to be refurbished, numerous new parts were needed, including the stone nut shaft and tun assembly. The second pair (french burrs) followed.

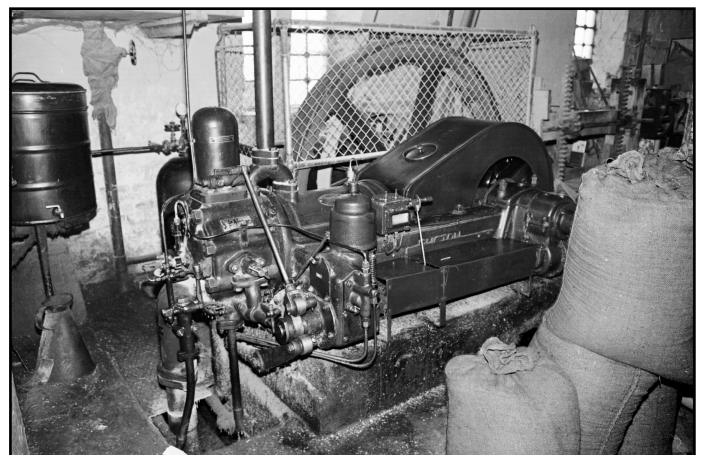
The building required attention to brickwork and replacement of the roof, maintaining the two lead—lined valleys as before. Later, some beams and stanchions as well as the lintels over various lower windows had to be replaced. For renewal of flooring, oak from the estate was used.

The standard of workmanship was high, and the quality was recognised by the receipt in 1984 of the Graham Allen Award for Conservation in North Norfolk District. Credit lies with the following: David Mayes (liaison), Pat Matthews (builders), Richard Matthews (steelwork), Thurton Foundries (casting), Peter Warwick (engineer), Michael Thurlow (miller), George Rudd and Ernest ('Nibs') Rawlins (craftsmen).

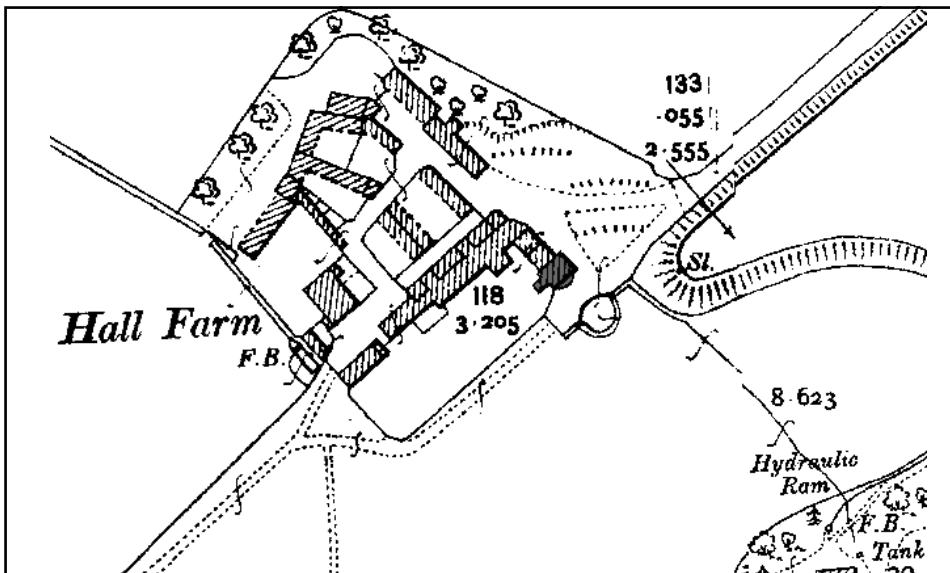
SECTION C: INTERPRETATION

The evidence implies that the original mill was upstream in *Mill Holm*. Priest replaced a mill which had been burnt in 1744. Colls bought this mill in 1757, established the water level stone in 1765, and his heirs sold to Rouse in 1791. Rouse made improvements to the mill in 1802. Then Hardy purchased in 1826 and made further expensive alterations. Thereafter there was little change until 1946.

There are four events whose dates are less certain; the change of site, the erection of the present building, re-alignment of the waterwheel, and construction of the overflow channel.



CHAPTER 3 - HALL FARM SAWMILL



Hall Farm 1905
Sawmill marked in dark gray.

Introduction

Hall Farm lies on the northern fringe of the village at TG 063 392. The estate turbine driven sawmill is located at the south east extremity of the main farm barn complex.

In accordance with modern practice, metric units have been used for survey work, but the calculations have all been done in imperial units (feet, inches and pounds) since these were the units used in the historic drawings and books being interpreted.

A Outline history

The history of the village in general, and Hall Farm in particular, was extensively researched and written up by Basil Cozens-Hardy for his book *The History of Letheringsett*.

The dynasty at Letheringsett was founded by William Hardy, who arrived there in 1780. His son, also William Hardy, took over in 1797 and died in 1842. The estate then passed to a nephew, William Hardy Cozens-Hardy, who deserted the law to pursue an interest in the estate. His eldest son, Clement, went to live at Cley Hall, and continued there after William's death in 1895. Herbert Hardy Cozens-Hardy, the second

son, rose to be Master of the Rolls and Lord Cozens-Hardy; he used the Hall for vacations, then retired to live there as tenant until his death in 1920. Estate ownership passed in 1906 to Clement's son, Arthur Wrigley Cozens-Hardy of Cley Hall. Arthur's son Raven was killed in the war, and his daughter Gladys had in 1906 married her cousin Edward, the second son of Lord Cozens-Hardy. Edward Cozens-Hardy (1873-1956) was an engineer; in 1919 he acquired the Letheringsett estate and in 1924 became the third Lord. He figures later in this chapter.

Hall Farm is sited on land where the manor of Laviles once stood. Cozens-Hardy in his book named numerous owners and probable occupiers, from Norman times until 1800, when William Hardy Junior bought it. Tenants are listed and include the Sadler family, who are first mentioned in 1912 and who are still running the farm today. The Old Hall Farmhouse was largely rebuilt in 1871. There are other farm buildings, including another and older barn, on the property.

A map of 1783 shows a small barn in the yard at Hall Farm; the tithe map of 1834 (page 8) depicts a much larger barn. A new range of barns is considered to have been built in 1843; as these appear to have been superimposed on the previous barns, it is possible that this was a rebuild, an enlargement or a refacing of the visible frontage.

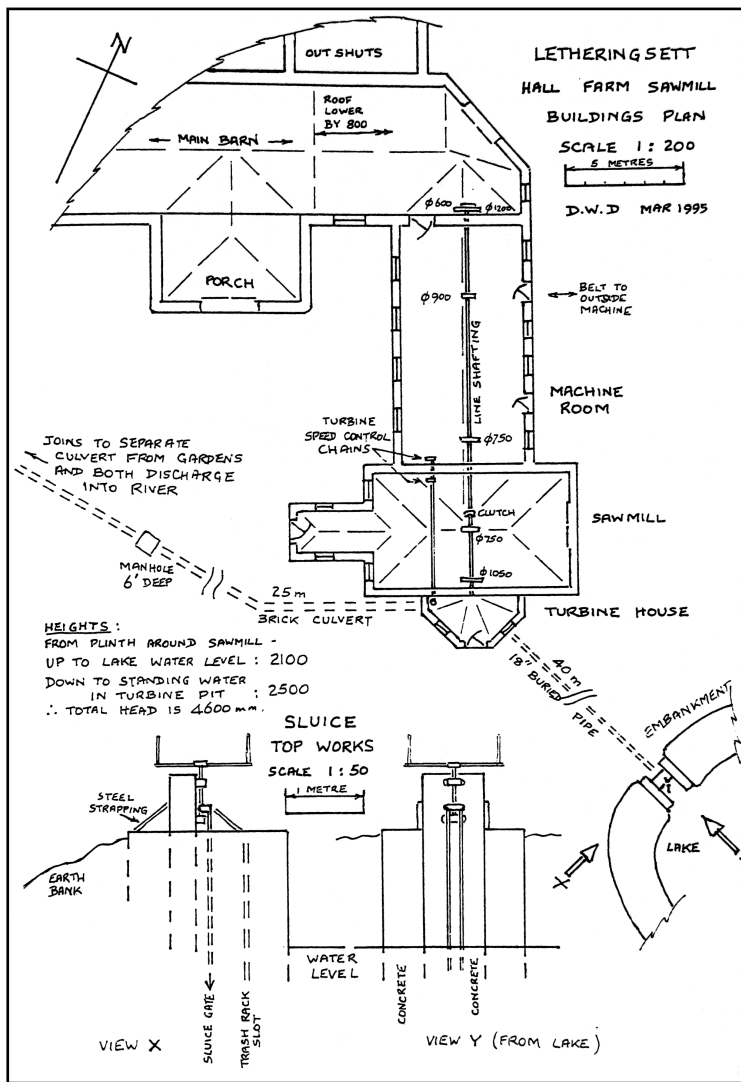


Sawmill Buildings (1991 D Manning)

An extension at right angles terminated in a purpose-built structure for a sawmill. The pit for a water turbine was designed as part of this building, and the turbine required a head of water which came from an artificial lake.

B The buildings

The existing main barn range is built in brick with good attention to detail; bullnose bricks were widely used in the exterior faces for quoins and reveals. The roof is slate. Interior walls incorporate much traditional brick/flint rubble in lime mortar. At the eastern end of the main barn there is a section whose roof has been lowered a few feet, and from here the range continues at right angles to the south. In this arm there is an open room, intended for machinery, then the sawmill and turbine.



C The saw bench

A circular saw bench is still in the building. The blade slot length implies a maximum blade diameter of 40ins. It carries a maker's nameplate Sparke & Co. It is depicted in drawings and photographs. However, an inspection of the main casting revealed that the nameplate was rivetted on, partially covering a different name which had been cast-in and then carefully ground flush. Where the skin of the casting had been removed rusting was greater and the exposed letters BEAUMO could just be discerned. The rest of the name was under the existing plates which, after much debate, were carefully detached. The complete name was Beaumont & Steel - Reading.

Directories in Norfolk and some in Suffolk were searched in vain. The only known family link to the name Beaumont is that a Cozens-Hardy (Sydney) married one Jessie Beaumont of Wilmslow, Cheshire, in 1892. Enquiries to Reading Museum of Rural Life turned up no reference to Beaumont & Steel, and the only entry found was in Macaulay's Reading Directory for 1860 where W H Beaumont of 23 Friar Street was listed as an ironfounder. Presumably here was a short-lived firm of which no record survives, and perhaps Sparke & Co were opportunists who bought up some bankrupt stock and then did their best to conceal the fact from their customers.

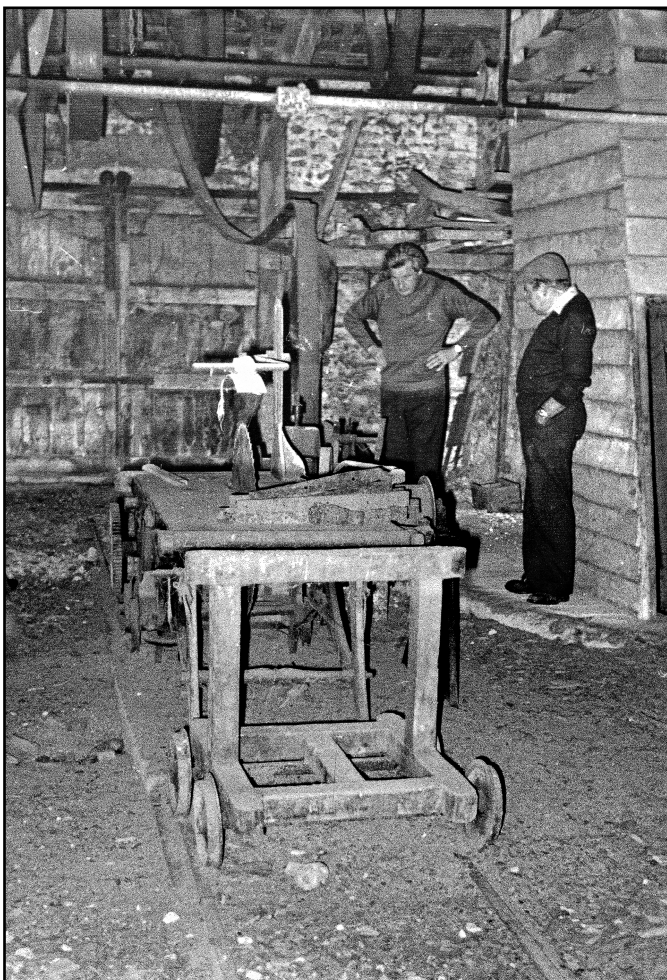
White's Directory of 1845 lists Sparke & Co as agricultural machinery makers and ironfounders in Thorn Lane, Norwich. By 1863 they were described as saw manufacturers. An entry in 1867 appears to be their last. Thorn Lane was an alley off King Street which was later swallowed by Morgans Brewery as described by Derek Manning in J NIAS 1990.

Roger's Norwich trade Directory of 1859 carries two of Sparke's advertisements illustrated above. Under a claim of "Royal Letters Patent" there are illustrations of an imposing circular saw (rather like that at Gunton Park, bought from Holmes & Son, Norwich, in 1864) and a heavy vertical multibladed saw. Beneath is a list of thirty four satisfied customers. Among the sixteen Norfolk addresses was W C Hardy of Letheringsett Hall. Some enquiries among the other local names have so far revealed no other identifiable surviving saws. The foundry was sold by Sparke & Co in 1844. Brass nameplates engraved Sparke & Co have been seen on other saw benches. If this saw was made after 1842, then the advertisement should correctly have said *W H Cozens-Hardy*, not W C Hardy. There is a remote possibility that it was bought at an earlier date and then the sawmill built to accommodate it.

The saw bench was used for many years and was photographed in place and reasonably intact in 1977. Then it vanished but was found in 1988. NIAS recovered it and put it back on its original cast-in floor bolts. It is improbable that the concrete pad holding these bolts is of the same age as the bench.

Left: Sawbench and drive shaft (1995 M Durst)

Below Sawbench (1995 M Durst)



***The Brewery Buildings in 2012
shortly before conservation and
conversion work started.***

Right: Bridge and kilns of maltings

*Centre Top: Tun room and stables
exterior*

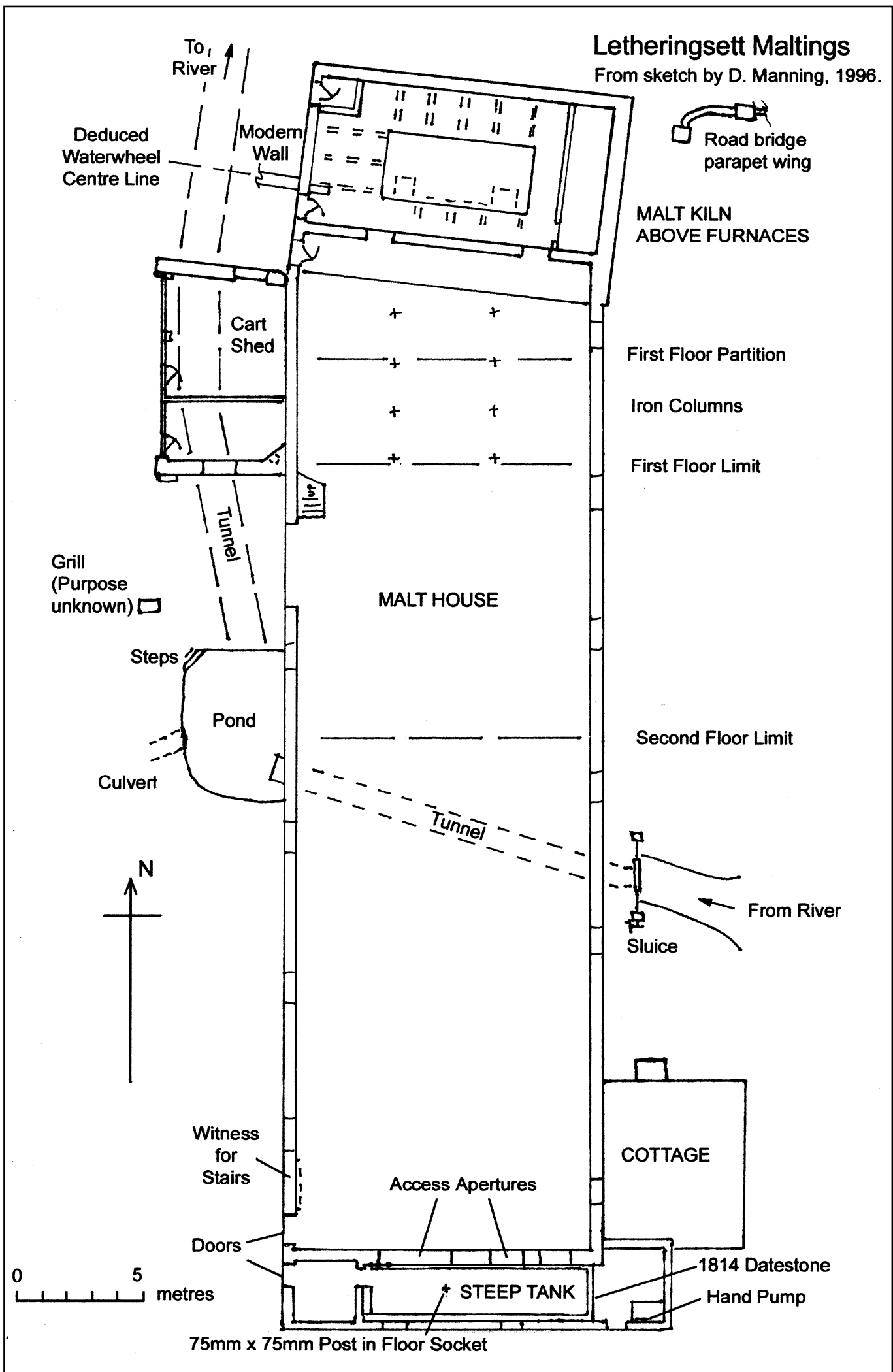
*Centre Bottom: The Maltings looking
east, S. end fallen.*

*Bottom: Panoramic view looking
south from where the former
brewhouse stood , maltings on left,
tun room right and stables to rear.*



Letheringsett Maltings

From sketch by D. Manning, 1996.



CHAPTER 5 - WATER SYSTEMS

Introduction

Previous chapters have dealt with the cornmill, the sawmill and the brewery. Water was involved in each of these, as a source of power, or as an adjunct to the process. There were also domestic uses. The River Glaven flowed through the estate, and various tributary streams joined it, augmented by natural springs issuing from the surrounding hills. Our wonder is excited by the many and varied ways this natural bounty was used, both for profit and for pleasure.

Places mentioned in the text are shown on the map.

A1 The River Glaven

When it reaches Letheringsett this river is trending north towards the sea. The Cornmill chapter mentioned the various mills built along it, and some of the quarrels that resulted; the article then concentrated on the surviving mill which was built about 1798. The river entered the parish heading roughly north-east. It then swung north beneath the '1818' Bridge (formerly a ford), and turned north-west to continue its meander down towards Cley and the sea. The Hall, The Brewery and much of the estate that William Hardy bought in 1780 lay on the west bank; however Hall Farm with its Sawmill, and the The Pleasure Gardens lay to the north-east.

The Brewery chapter relates that Hardy needed power for machinery to modernise his brewery, and that he found a useful fall existed between the river to the south and that to the north. The direct route was through the brewery just to the west of the existing Maltings. Hardy therefore dug a straight channel, perhaps reopening an old river course, and installed a Waterwheel (now lost) just to the west of the kilns. This was commissioned in 1784, and its discharge was led under the road and back into the river not far below the ford. Following disputes, it became necessary to reroute the mill race, and to reinstate the broken river bank. In due course the mill race came to pass under the malthouse into a pond formed from the lower part of the old channel. When the 1818 bridge was built, a new weir and cascade were installed beneath it, sized to retain an adequate head for the waterwheel.

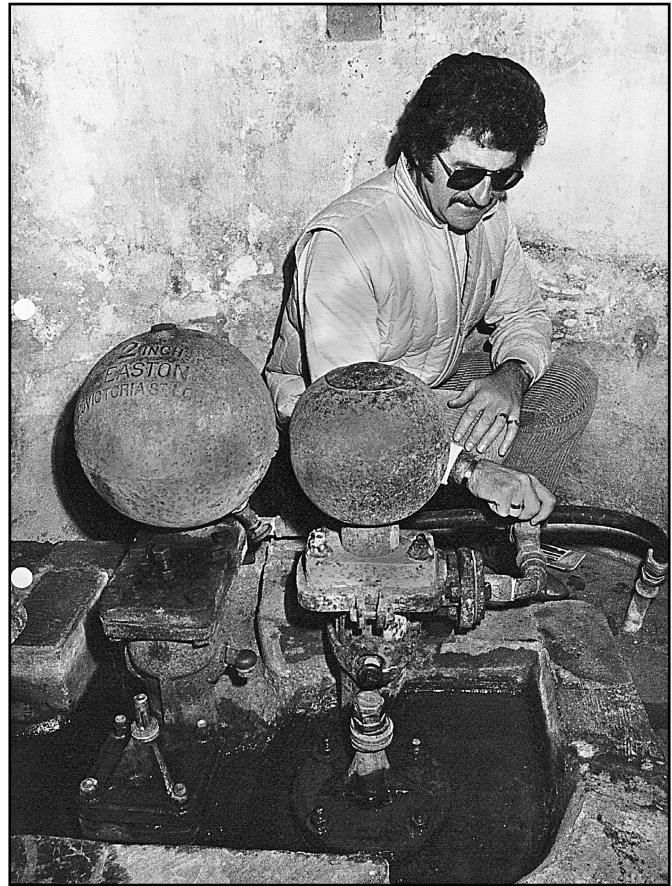
A2 The Water Lane tributary

Two tributaries are of relevance, both coming from the east. The northern one flowed beside Water Lane down a shallow valley from the north-east, under Workhouse Lane and continued in front of Hall Farm before joining the river. Near where it crossed the lane a Brickyard was sited; its exact location is lost, but the map in Basil Cozens-Hardy's (BC-H) book shows that it was just to the east of the road junction. Reports speak of a waterwheel, presumably to drive a pug-mill, and this explains the canalisation of this stream, perhaps with an inverted syphon under the lane. Building works were almost continuous from 1780 through to 1840. The house style used both red and gault (white) bricks, so the quality of the clay must have been good. Praise was given in a report of 1823, as mentioned in the Brewery chapter.

It is known that some bricks for the east front of the Hall, rebuilt 1832-34, came from Swanton Novers, so it is probable that the brickworks fell out of use before then; perhaps it became uneconomic, or the demand fell off; maybe the kiln became decrepit, or the best clay seams ran low.

A3 The Fram Beck tributary

When W H Cozens-Hardy (WHC-H) inherited in 1842, his interests turned to modernising the Hall Farm. The big barn was built with a sawmill tacked on, as described in the Sawmill chapter. It needed motive power, and a simple turbine of advanced design was installed. Hence the Lake (13) was built, to provide the requisite head and continuity of supply. The site and shape of the Lake is that of a field shown on a map of 1783 called Butt Close, the name implying use at some period for archery



Interior of ram house, showing the hydraulic ram in situ.

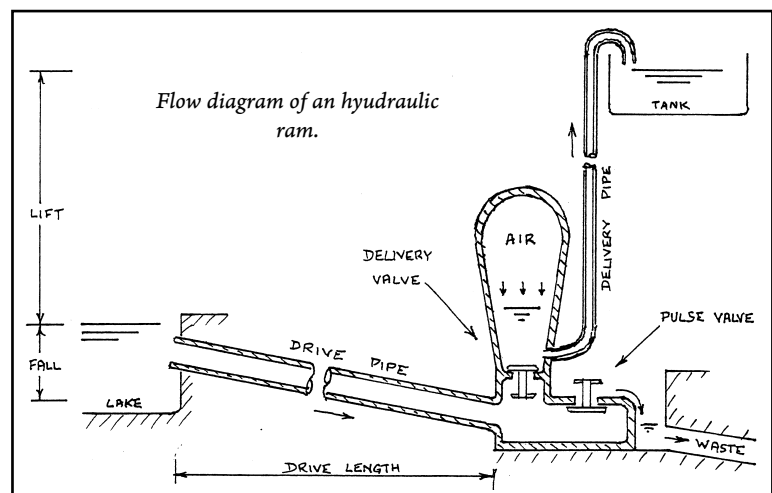
Photograph M Durst

practice. The Lake was started in 1851 and finished by 1853, and the turbine was replaced by a much improved Gilkes design in 1899.

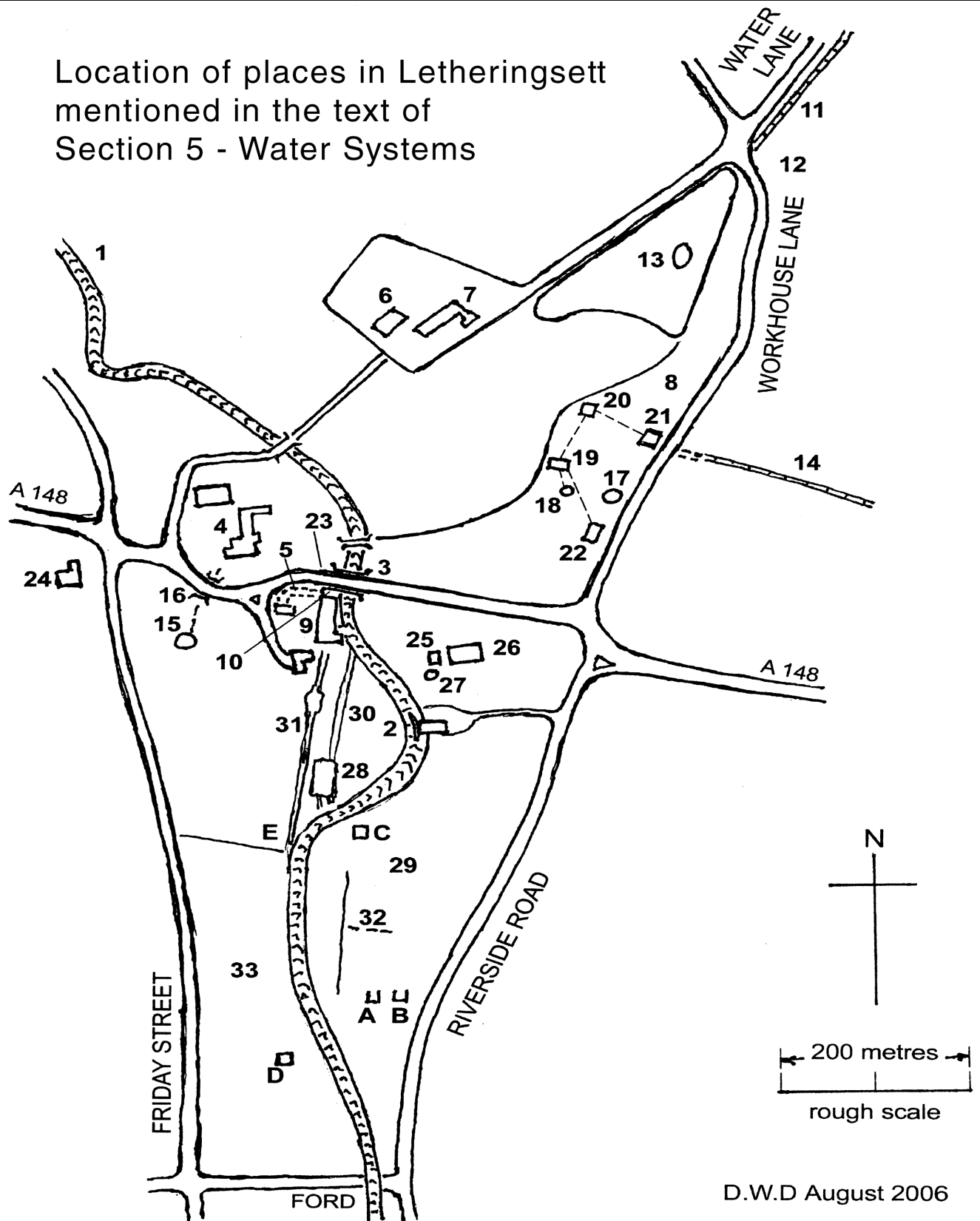
The area to the south of the new Lake was then developed as Pleasure Gardens. Its previous uses are uncertain, but hops had been grown on one part. The second tributary, Fram Beck, to the south of the first, came down a valley from the Spout Hills, where it had provided much of Holt's drinking water. A catchment pond was formed to filter out the mud and debris, and from it an iron trough took the water into the garden. From here the Lake and garden were supplied. BC-H indicated in his map that the old course of Fram Beck had aimed for the old Workhouse which lay opposite the southern end of the Lake.

B The Reservoir (15)

In 1805 a pond, sometimes referred to as the Lily Pond, was dug on high ground to the west of the Brewery. William Hase laid the pipes between it and the Brewery, and the position where they passed beneath the outer wall has been located. Communication to the Hall was provided



Location of places in Letheringsett mentioned in the text of Section 5 - Water Systems



D.W.D August 2006

- | | | |
|--------------------------|------------------------------|-------------------------------|
| 1. River Glaven | 12. Brickyard site | 23. Brewery ram house |
| 2. Cornmill | 13. Lake | 24. The Lodge |
| 3. 1818 Road bridge | 14. Fram Beck | 25. Glavenside ram |
| 4. Hall | 15. Reservoir (or lily pond) | 26. Glavenside |
| 5. Brewery site | 16. Footway tunnel | 27. Glavenside pond |
| 6. Hall Farm | 17. Summerhouse | 28. Spring water holding pond |
| 7. Sawmill | 18. Fountain | 29. Osier carr |
| 8. Pleasure gardens | 19. Conservatory | 30. East stream |
| 9. Maltings | 20. Garden ram house | 31. West stream |
| 10. Waterwheel site | 21. Fram Beck header tank | 32. Causeway |
| 11. Water Lane tributary | 22. Greenhouse | 33. Mill Holme |

CHAPTER 6 - NOTES ON JOHNSON JEX

Johnson Jex (1778-1852) was a reclusive blacksmith, a self-taught watchmaker and man of science, who spent most of his life in Letheringsett. For completeness an article about Jex was written, and the research for this set a course which strayed from Letheringsett into matters of countrywide interest, which were then further developed in a second article the following year. Extracts are summarised here to illustrate his connections, or perhaps the lack of them, to the principal characters who figured in previous Chapters. The details and source references can be found in J.NIAS 2007, 2008 and 2011. The horological aspects are discussed in detail in *Antiquarian Horology* Vol 31, No. 3 p 320 March 2009.

A. Upbringing

Johnson Jex ('J.J.') came of a merchantile and craft background; a number of his forebears were prosperous enough to have voting rights. Johnsons were tanners and lime-kiln owners, and the Cook family (his mother's maiden name) ran a Cley firm of coal merchants. Grandfather John Jex was born in Stody, and became a blacksmith in Letheringsett; he died aged 52 in 1797. His son William had moved to a smithy at Billingford, near East Dereham. Johnson was born there in 1778, and learnt the blacksmith's trade from his father. School did not suit him, for he preferred to visit a Foulsham watchmaker, William Mayes, from whom he quickly learnt how to make watches. He made at home a copy of a gearcutting machine he had only been allowed to look at, but not to touch, this was much admired. When Mayes died in 1820 he left J.J. a legacy of £50. Later J.J. taught himself to read, write, draw and calculate.

B. The early years at Letheringsett.

By 1802 J.J. had left Billingford and taken over his grandfather's old smithy at Letheringsett. He never married, but lived with his mother (who died in c.1832). He continued for the rest of his days on the plot of land on which Foundry House was later to be built by his cousin Corbett Cook, a surgeon of Cley. Doubtless he earned his crust from local work, but the only surviving record is a 1847 bill for minor repairs. In 1811 he completed a watch for Sir Edward Astley with an escapement of his own design, and later its authenticity as all his own work was certified by William Hardy junior (WHj).

C. The later years

Somewhere around 1817 J.J. became self-employed, and started to take on workmen to do the practical smithing. He developed his facilities for casting both in iron and brass, and built himself an extensive set of tools for fine watchmaking. The foundry is marked on the 1886 OS plan. Then he saw the need to extend his machine-tool capability, and acquired and modified a large lathe, which still exists. In 1822 he advertised for work for the lathe. Meanwhile by extensive reading he had widened his scientific knowledge: even at the age of 60 he taught himself French in order to understand a book in its original language. His surviving notebooks are not easy to interpret, but illustrate the great width of his interest.

D. His decease

A stroke in 1845 and another in 1851 preceded his death in 1852. There was a large sale of his possessions, and a copy of its catalogue has survived. The oration at his funeral in the parish Church brought attention to this remarkable recluse who had lived amongst them; the words of William Cozens-Hardy (WH C-H) were set in print a few years later, and read widely. A bust was put up in the Church, and his tombstone has an interesting inscription, describing him as a "scientific anchorite".

E. His character

In his oration WH C-H was unstinting in praise for honesty and application. He was a late developer, but became an expert self-teacher, with great powers of concentration and endurance. He was said to be of average height and well proportioned. He later claimed that long hours in the forge had turned a poor physique into a man with strength. His

hand-eye coordination must have been highly tuned, and his drafting skill is seen in his notebooks. He had an aptitude for music. By reading, he had acquired the scientist's analytical mind, which led to the required result, but not always by the most inspired route; his writing also reflected his lack of formal schooling. As is not uncommon amongst the very talented, absolute concentration was applied to each problem in turn, but interest faded as soon as it was solved, or the prototype worked. A reluctance when dealing with people: a shyness, made him unambitious and reclusive; this was sad because an unknown number of his ideas or inventions died with him. His critic, the Rev Linnell, picked on this point, along with his lack of conventional religious faith. But as WH C-H mentioned, he had beliefs in the tenets but not the ritual of the established Church. It is interesting to ponder on what would have become of him had he been born 200 years later.

F. Other practical interests

As a lad Jex learnt about farm machinery, and applied himself to various improvements for farm implements. It was these that had in 1800 so impressed Arthur Young, the agriculturist, who then wrote about them. In 1806 Jex invented a dibbling machine for sowing wheat. WH C-H recounts the story in his eulogy, that Jex was persuaded to show this at the annual "Holkham sheep shearing", the forerunner of all County Shows. Surviving letters provide some details of the secrecy needed on an unpatented idea. His work was not appreciated, and he declared he would never again bring his inventions before the public.

By 1825 Jex was interested in growing "pine trees" from seed (perhaps these were for pineapples - there were books on "pine apples" listed in the Sale Catalogue). These required a constant temperature, so he installed his own self-regulating ventilation in his greenhouse. In another letter the form of his thermostatic window-opener is not described, but gravity circulation to hot water radiators is mentioned. He appears to have had no interest in publicising this, and so it was left to others to found the vast heating and ventilating industry we know today.

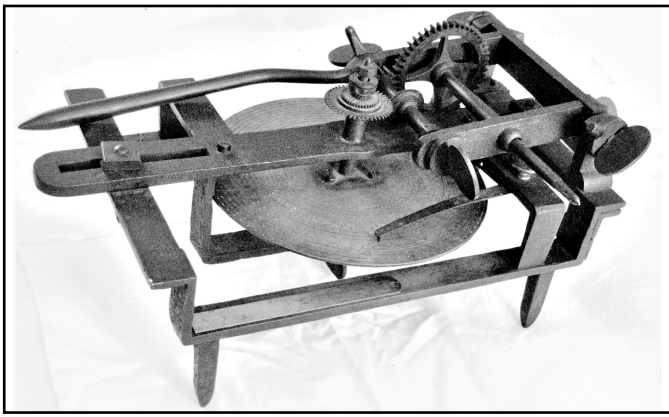
From WH C-H we learn that Jex made mathematical instruments, barometers, thermometers, gun barrels and other instruments. He understood astronomy, and could calculate the time from the fixed stars. He made telescopes, both refracting and reflecting, and had studied chemistry and electricity. A story relates that he was annoyed by repeated visits from a local dog, so he baited a piece of meat with a wire connected to his electrical machine, and the dog ran away for ever. Interested in the properties of steam as a lad he had put some water in a gun barrel, plugged the end and put it in the forge; then from the force with which the plug was expelled he developed his understanding of the potential of steam.

G. Watches and Clocks

Much detail is to be found in the Bird's book on "Norfolk & Norwich Clocks and Watches". Writing in 1978, Leonard Miller puts Jex's horology into some perspective, summarising the known evidence. Since there had always been an unpublicised wholesale trade in components for clocks and watches, the professionals had belittled his efforts; but Jex preferred to make everything himself, and this extended to his own tools and jigs.

H. The dial in Holt Church

St Andrews, the Parish Church of Holt, has a tower at the west end and in it is a clock made by Isaac Nickals in 1733. This drove single handed dials both inside and outside the Church. The interior (Preacher's) dial was later replaced by one with a minute hand. Presumably Jex did this, and used a 20" diameter brass dial with, as is common practice, the required motion work (gearing) on the back. The dial bore his name; maybe this dial was originally made for some other purpose. A gallery was built in 1828 just under the clock, and an organ installed there. Maybe it was usual for the organist to signal when to start a service, thus a dial large enough for the parson to see from his seat was not needed. The organ was removed in 1851, the gallery closed in 1857



Wheel cutting machine, probably made by Jex as a boy

Right Top: Watchmakers lathe made by Jex

Photographs Graham Smith



and taken away in 1863. A new outside dial was needed in 1907, and it is understood that the old outer one was refixed inside, covering up the Jex dial. In 1967 this old dial was repainted and in 1997 when, a new gallery was installed, the Jex dial was revealed and then covered by a new dial. This story has been deduced from a miscellany of sources.

J. The brewhouse clock

The Letheringsett brewhouse was rebuilt in around 1820 (see Chapter 4). A cupola was put on its roof, and in it a turret clock. RH Clark writing in 1937 says that Jex made it, but it is likely his informant had jumped to conclusions. It was brought down in the 1936 fire, and a grainy photo has survived to show the mechanism in its distressed state. William Hase of Saxthorpe also made turret clocks (see JNIAS 1996 page 78); that at Oulton Hall he signed and dated "Hase 1814". Comparing these two, the broken bits look slightly more Hase than Jex. Hase was prone to buying-in components, Jex was not. Maybe WH C-H believed that Jex did not make the brewhouse clock, hence it is not mentioned in his funeral oration. Surviving records imply that the owner William Hardy junior had a closer working relationship with Hase than with Jex. On balance, it is improbable that Jex made the clock. It is sad that so few other things he made have been identified.

K. Machine tools

Perhaps before he died he had given away some of his tools. Those relating to the smithy doubtless were retained, as it continued in use for a number of years. All those remaining were sold off by auction soon after his death. The catalogue for this sale is now in the Bridewell Museum in Norwich. His micrometer has its end screw calibrated for 0.020 inches per turn, and over its range it can be read to 0.001 inches. The watchmakers lathe is an outstanding example of his craftsmanship; the beam beneath it is under 6 inches long; the faceplate has three-point attachment for the work, and the compound slides offer both linear and angular adjustment, some by calibrated micrometer.

The "Triple Prismatic" lathe now in the Bridewell is the most remarkable. RH Clark, the writer on historical engineering and transport, published an article in 1937 about it. He found it in a house in Weybourne, and made a determined effort to set it to work; he failed, and so did a friend, an experienced machinist. In 1942 it had been donated to the Bridewell with all possible loose bits bolted on wherever there was room. For the following 60 years the machine was seen as an inexplicable jumble of bits, but now it has been recognised as a clever kit of parts capable of rearrangement for a number of different applications well suited to Jex' aspirations.

The Museum has other Jex items. In 1950 a wheel cutting engine was bequeathed to the Bridewell without provenance. This is thought to be the machine Jex made as a lad when he won the respect of Mr Mayes. They also have two notebooks in Jex's own handwriting.

L. The advertisement

The Norfolk Chronicle printed the following in 1822:

*"TRIPLE PRISMATIC ENGINE LATHE : JOHNSON JEX
Informs the Proprietors of Mills and Manufactories
that he turns Axles, Shafts, Spindles, Cylinders, working Barrels,
Valves, Dutch Cones, Spherical and Plane Surfaces, Pyramids,
Circles, Squares, Pentagons, etc., divides and cuts pinions and
Wheels. Patterns with any number of Teeth from 6 to 2000 and
upwards and cuts screws of all kinds from a Watch Screw to the
largest Brass Screw, left or right, single, double or treble square
or angular thread cylindrical or conical and to any required
number of turns to foot or inch. The accuracy with which all
these operations can be performed by the above Lathe is highly
deserving of the attention of all persons who employ Mechanism
in the Manufactories. Johnson Jex casts Mill Brasses by a new
and superior process which can only be had at his Foundry at
Letheringsett, near Holt."*

M. Provenance for the Triple Prismatic

For interpretation and background we were fortunate to be able to enlist the help of Don Unwin, a retired research engineer, and model maker, whose interests include the history of machine tools. NIAS members will know him as the man who straightened the frame of the historic turret clock at Gressenhall Museum after it accidentally fell through the floor.

The style of design pointed to Henry Maudslay (1771-1831), and a close resemblance in the legs focussed attention on the famous suite of block-making machinery which Maudslay made in 1802-6 for Portsmouth Dockyard: a world-first purpose-made production line to surmount a bottleneck in naval expansion in the midst of war. Enquiries at Portsmouth revealed that Maudslay set up a temporary workshop on site in which his men could finish castings made to his patterns at the dockyard foundries. A versatile and transportable lathe was needed there, and this Maudslay (or one of his pupils) would have made in around 1802. At the end of the project, about 1808, it was sold on.. This fits well to our machine, but lacks corroboration.

From calculations in the notebooks we know that Jex made the large dividing head; the rest is less certain. Evidently he did not use it extensively, and the advertisement brought little response. The buyer after his death also scarcely used it.

N How did the lathe get to Jex?

There was no direct evidence, so the Norwich Directories were searched, and the least unlikely route described. This involved a man named Charles Cawdron whose firm was later listed as lathe-makers, and under his son-in-law's name of Edward Hines continued until recently. Then in 2013 we first heard of a gentleman turner Simon Wilkin of Cossessey, near Norwich, who in 1813 commissioned one Biyan Donkin of Bermondsey to make him a lathe. Donkin was a friend of Maudslay; they had a joint patent for an ingenious way to couple up a lathe for screw-cutting. Maybe Wilkin was already strapped, so bought Maudslay's bargain lathe. Then in 1816 Wilkin was insolvent and his possessions were auctioned off. Jex could have ridden the 20 miles to Cossessey, and