

WATER POWER AT BROWNWICH FARM, TITCHFIELD

By EDWIN COURSE

INTRODUCTION

On 20th December 1981, a small group from the Southampton University Industrial Archaeology Group visited Brownwich Farm, in response to an invitation on behalf of the owners, Hampshire County Council. The purpose was to find if there was anything left of a water power installation believed to have been in use on the farm. Despite the distraction of a minor blizzard, it did prove possible to begin excavation at, what seemed to be, the most likely site. This was under a leanto adjoining the barn, and was suggested by the tenant farmer who had experienced flooding in the area. Another six visits were

made to the site, during which excavation slowly revealed the outlines of a water power system. Once it became clear that the site of a water wheel had been discovered, the need arose for more equipment, and we were grateful to the County Architect's Department for constructing a hoist and shoring up the excavation to ensure safe working. On reaching the level of the abandoned water course, flooding became a problem, and we much appreciated the free loan of an electric pump from Flyght Pumps Limited, and also financial assistance from the County Council to meet the cost of hiring a generator.

Once we had ascertained that a water power



Fig 1. View of the pond which was the source of power for the Brownwich Farm installation. Photo: author.

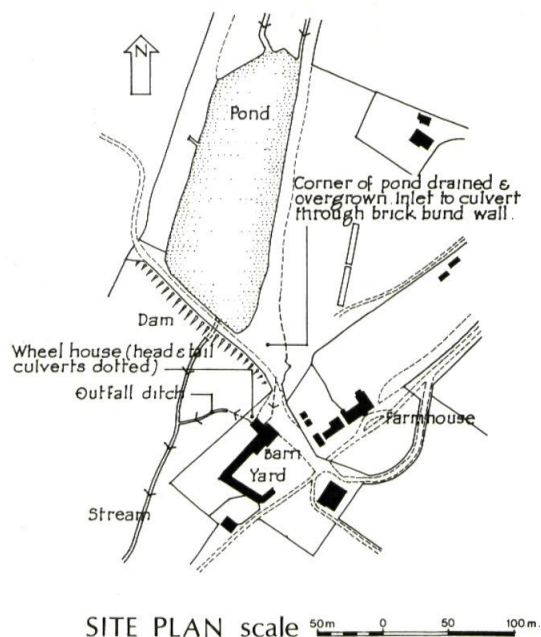


Fig 2. Brownwich Farm: site location plan. Drawn by John Reynolds.

installation had existed, in parallel with archaeological excavation, we sought information from both documents and people. Maps and plans were unhelpful, because not only was the water wheel under cover, but the head race that led water to it, and the tail race that drained the water away were both underground. The only documentary evidence of significant value was a reference to the equipment in a Sale Catalogue of 1911. We appealed for information from people, in the press and on local radio. Local historians provided general information about the site, but detailed recollections came from two people. Mr Mortimer was born on Brownwich Farm, and lived there until he moved to Privett in 1938. He was good enough to make a tape recording of his memories of Brownwich, including comments on the water wheel, and also to visit the site to confirm our interpretation of the archaeological evidence. Mr Bartholomew also remembered the wheel in use. In March 1982, with much of the excavation completed, we suspended operations pending a decision by the County on the

future of the site. At this time we were still uncertain about the line followed by the tail race. A trial trench was dug in an endeavour to locate a culvert, but without success. However, on the evening of 23rd April, a quantity of dye was placed in the wheel pit and a series of visits made to the site on 24th April, rewarded by the appearance of the dye at a point leading into a stream where the end of the culvert was expected to be. After due consideration, the County Council as owners of the site, decided that the remains of the water power installation should remain on view, so in the autumn of 1982 excavation was completed.

DESCRIPTION OF THE INSTALLATION

While a very good water wheel remains at Durford Abbey Farm just over the border with Sussex, few examples of farm machinery driven by water power are known in Hampshire. The wheel at Hockley Mill, near Twyford, once drove a threshing machine, but the only example comparable to that at Brownwich is at Abbotstone Farm, north of Alresford. The installation at Brownwich seems to have been constructed in the Victorian period, and went out of use in the early part of the Second World War, when the power takeoffs from tractors provided an alternative source of power. During the time when the wheel was in use, the farms at Meon, Chilling and Brownwich were worked as a single unit with an acreage of about 2,000. The rich soil produced good crops, and supported large numbers of sheep. Various machines, including chaff cutters, winnowers, root cutters, crushers and cake crackers were installed in the barn at Brownwich, being used mainly for the preparation of food for the livestock. One man was responsible for the operation and maintenance of both the machinery and the water power installation which drove it.

The source of water was the large pond adjoining the farm, believed to have been a fishpond of Titchfield Abbey (Fig 1). The outline of the pond is shown on a number of maps, and these indicate the way in which the



Fig 3. Brownwich Farm: view of the barn and the leanto over the wheelpit. Photo: author.

south east corner has been separated from the main expanse of water and has been drained (Fig 2). The water for the wheel was drawn off through a sluice, in what is now the 'dry' section. In fact, water does leak through, and to remove this a concrete pipe was provided from the old sluices to the point at which the tail race discharged into the stream. This by-passes the old culverts and wheel pit, which should be left dry but, in practice, quantities of water still leak into the old system. All that remains *in situ* of the sluice are the vertical guides, but there is sufficient to indicate a conventional arrangement, with rack and pinion gearing.

The brick pipe joining the pond to a chamber adjoining the water wheel was circular in section, with a diameter of 530mm (1'9") at the point of discharge. The length was 43m. The culvert which carried the water away from the

wheel pit was covered by a segmented brick vault 1219mm (4'0") wide, and 550mm (1'10") from the bottom to the crown of the vault. Its length was 22m. The provision of culverts in connection with farm water wheels is not rare, but their substitution for an open leat does merit explanation. First, if the provision of a breast shot wheel of about 16 feet diameter is taken for granted, then the vertical difference in level of the two culverts is fixed. The relevant levels would be the normal level of water in the pond, the position of the chamber adjoining the wheel pit, and the level for the tail race. On this basis, the depth of the tail race below ground level would justify the greater cost of constructing a culvert rather than an open leat. However, the top of the culvert carrying the head race was, at its deepest point, only about 720mm (2'4") below ground level, and the choice of a culvert is

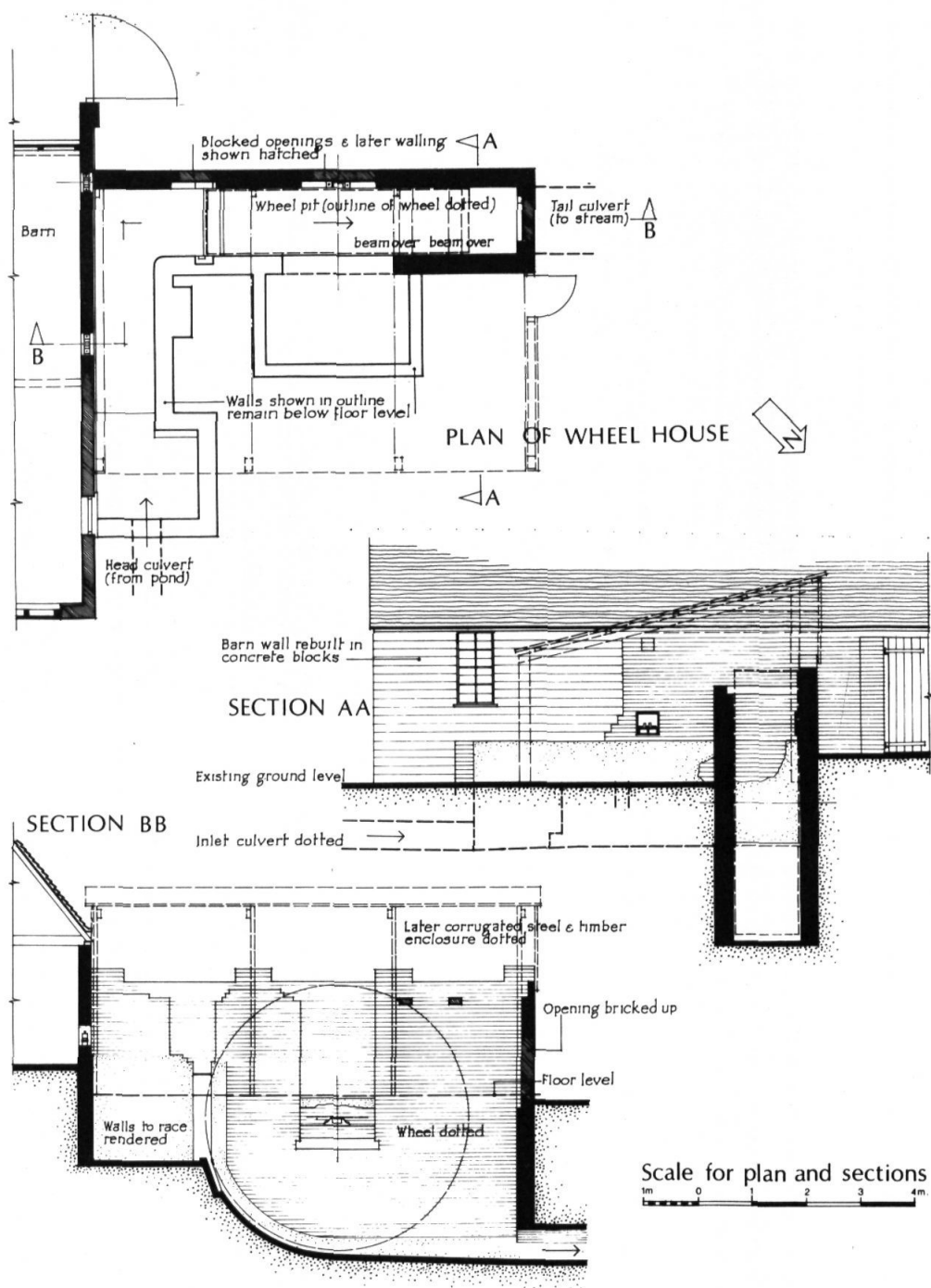


Fig 4. Brownwich Farm: plan and sections of the wheel house. Drawn by John Reynolds.

harder to explain. Probable explanations would be the desire to avoid any obstruction to movement in the vicinity of the farmyard, and also to guard against any possibility of livestock falling into the water.

The accompanying drawing (Fig 4) shows the general arrangement of the chamber and wheelpit. These were constructed of brick and concrete. For the greater part of its length, the chamber measured 1092mm (3'7") wide, 6080mm (20'0") long, and 1219mm (4'0") deep. The wheel pit was 1219mm (4'0") wide, 5700mm (18'9") long, with a maximum depth of 3m (10'0"). One end of the bottom of the wheel pit was curved to fit the wheel, and was also designed to house the sluice which regulated the flow of water from the chamber on to the wheel. The sluice was apparently operated by a rod which passed through the wall of the barn, enabling the wheel to be controlled from a point accessible to the operator of the machinery.

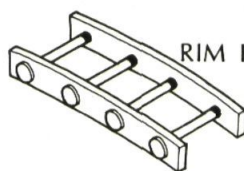
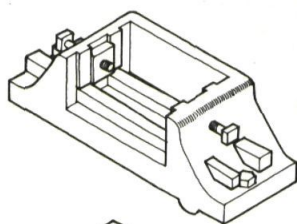
The general arrangement is as puzzling as the provision of culverts, for a right angled bend between the chamber and breast shot wheel would have diminished the hydraulic efficiency of the installation. One possibility is that a mistake was made over the levels, and that the original intention was to instal an overshot wheel. There is evidence that there were adjustments to the point at which the water struck the wheel, but in the final stage this was at '8 o'clock'. The low breast shot wheel was made largely of wood with the floats arranged as shown in the accompanying drawings (Fig 5). Although only parts were found, these were sufficient to show that the width was 1.168m (3' 10") and that the diameter of the wheel was about 4.900m (16' 0"). On the drawing, an iron axle is shown, with sockets for the wooden spokes, but this is conjectural. Unfortunately, no parts of the axle were discovered, although one of the bearings remained *in situ*, and the other was found in the pit. The method of transmitting the power from the wheel to the machinery in the barn was not established. Surviving brickwork suggested the existence of a conventional pit wheel, and sufficient remains of the wheel

were found to ascertain that there was no provision for a direct drive from the rim. Of the two holes surviving in the wall of the barn, one of which contained a half bearing, one must have carried the drive shaft, and the other, possibly, the rod for operating the sluice.

The most difficult feature to explain is the placing of the wheel pit at right angles to the barn, and the consequent flow line of its water supply. This could arise from the desire to avoid having the wheel and its associated pit too near the barn, which was already old when the wheel was installed. Other farm installations either have the wheel at a considerable distance from the barn or else separate the two by a pit wheel. The fact that part of the barn wall had been rebuilt in blockwork suggests the possibility of problems with subsidence. Alternatively, as suggested above, the original plan might have been designed for an overshot wheel.

The only remains in the barn itself were the two holes mentioned above, with metal frames marked 'W Wheatley, Wickham Hants', one of which contained a bearing, and some rough knees or brackets for supporting an upper floor of which no other traces remained. Beyond this, all the evidence for the machinery in the barn was either oral or documentary. Mr Mortimer and others described the insertion of the upper floor on which the machinery was placed, and the arrangement of lay shafting which drove it. The Sale Catalogue of 1911 listed various machines including crushers, cake crackers, and root and chaff cutters. Various objects were found, most of which were not clearly related to the installation. In the pit, in addition to remains of the wheel, there were five bottles, one hinge strap, one hame from a set of harness, and part of a cart, none of which were unexpected. More surprising were a damsel (Fig 5), associated with milling, and a grappling iron which might have come from the nearby beach. Finally, the open-sided leanto butted on to the barn, with one side of brick, and the end of brick and corrugated iron. We recorded the recollection of a local farm worker who had removed a

Scale for isometric details: 100mm 0 200 400 600 800mm



RIM FISH PLATES

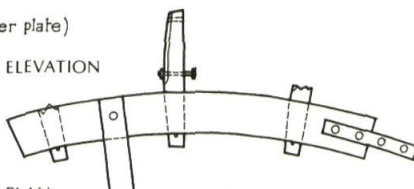
DAMSEL



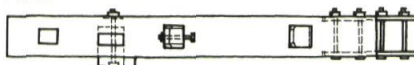
Below: TYPICAL FRAGMENT OF RIM

Scale: 100mm 0 500 1m

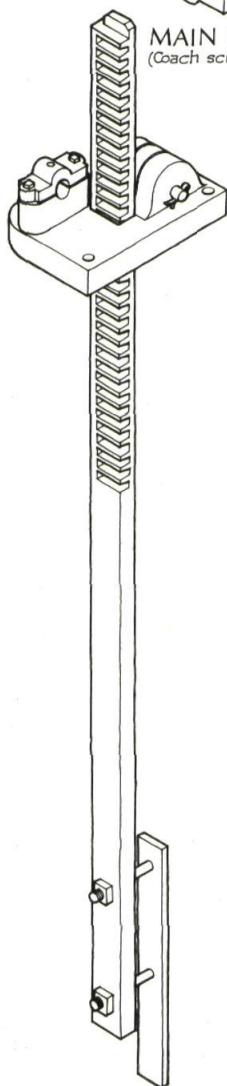
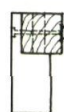
ELEVATION



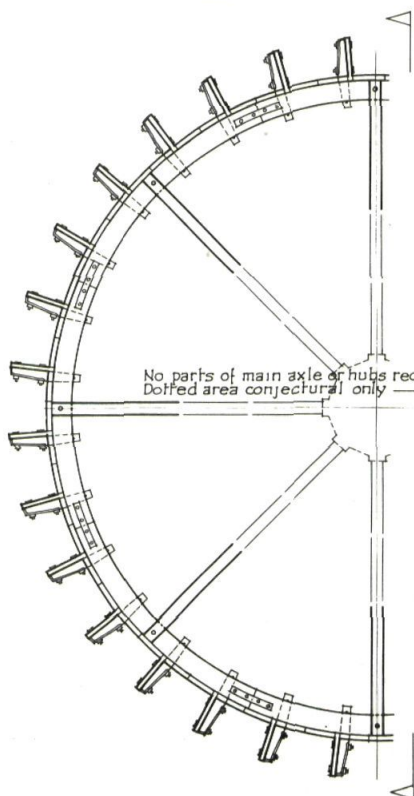
PLAN



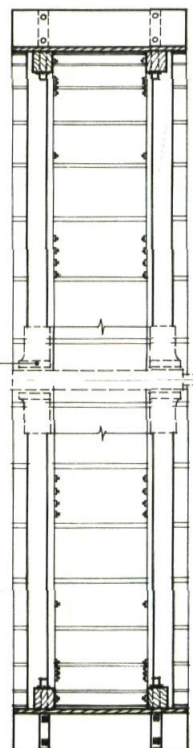
SECTION



MAIN BEARING
(Coach screwed to timber plate)



No parts of main axle or hubs recovered
Dotted area conjectural only



RACK & GUIDE
(from main hatch)

RECONSTRUCTION OF WATER WHEEL

Scale: 1m 0 1m 2m

Fig 5. Brownwich Farm: objects removed during excavation, and a reconstruction of the water wheel.
Drawn by John Reynolds.

thatched roof 'many years ago', and recalled complete brick walls on all sides.

CONCLUSION

While a number of questions arising from the investigation still await definitive answers, enough information has been gathered to confirm the existence of the water powered installation, and to cast some light on its character. Hampshire County Council, the owners of the site, are leaving the wheel pit, the chamber and the ends of the two culverts open for the time being, so the principal archaeological evidence remains open for interpretation. In conclusion, members of the Southampton University Industrial Archaeology Group would like to thank the various

people and organisations who contributed to their work. In particular, Messrs Flyght Pumps, who lent pumping equipment without charge, and the Hampshire County Council, who provided both financial and practical assistance. Many local people helped, but of particular value was the information provided by Messrs Mortimer and Bartholomew, and also by the local historian, Mrs Sally Hall. The excavation of considerable quantities of mud mixed with sump oil discarded from tractors proved an unenviable task for members of the Group. However, we now look forward to both further comment on the installation at Brownwich Farm, and also to the discovery of similar sites in Hampshire.

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