

Broughton Manor Farm Staddle barn and attached Watermill

Gavin Bowie and Alan Stoyel, 26 January 2010

This brief unreferenced report concentrates on the watermill machinery, and follows a site visit by Alan Stoyel, 5-11-09

The staddle barn was probably built in 1791-92 soon after the completion of the parliamentary enclosure of the parish in 1790. It was built for storing sheaves of grain (mainly wheat) after the harvest, and for threshing the sheaves by hand with the flail during the winter months. It is clearly evident from construction features of the watermill building that it was added to the barn at a later date. It will be suggested here that the watermill building and its internal machinery were probably added 1805-10. A local informant believed that the waterwheel ceased to be used in about 1890.

The watermill was built to drive a fixed threshing machine in the adjacent barn, and a single set of millstones when required. The drive to the threshing drum was taken from the great spur wheel of the mill's main gearing and this remains, its shaft cut off at the point where it enters the barn. Nothing remains of the threshing machine itself. There is a considerable body of literature about this first generation of threshing machines, and their impact on rural society in Hampshire – essentially they replaced skilled labour (mainly male) with cheaper unskilled labour (mainly women and children). There is no evidence that this particular threshing machine was attacked / damaged during the Swing Riots, 1830 – 31.

The mill building has 3 levels – the undercroft, the hurst floor (the main gear room of the mill), and the millstone floor. The latter can also be described as the top loft – it contains the drive shafts for the sackhoist and other ancillary machinery.

In the undercroft the compass-arm waterwheel, in the wheel pit, survives in remarkably good condition; a massive wooden sluice gate remains, which gave a mid-breast water feed. The waterwheel is completely wooden, on a massive oak shaft. This shaft carries two sets of six compass arms. The rings, starts, sole-boards and floats are all of wood. The style of the wheel is typical of the 18th and early 19th centuries. The oak shaft is supported by a brick pillar which has been built in the wheel well (now dry); this was probably built soon after the waterwheel went out of use.

The pitwheel and the wallower are of cast-iron. The style of the castings, the profile of the wallower teeth, and, most important of all, the 3½ in. pitch of the gears, are all typical of about 1810. The cast-iron arched support for the footstep bearing of the upright shaft is also consistent with this date.

The mill gearing is of the conventional 2-step great spur wheel type. The main upright shaft supports a great spur wheel at hurst floor level, and there is an all-wood stone nut drive linking with one set of millstones on the floor above. The drive from the great spur wheel to the threshing machine remains – its horizontal square-sectioned shaft has been cut off at the point where it enters the barn.

Normally the main upright shaft is continued up to the next floor, but here there is a secondary upright shaft instead; this is driven by a spur gear linking with the great spur wheel. This secondary upright shaft, and the gears, drives and machinery it operates, are clearly an addition, as the components are largely made in an imported softwood as distinct from the oak

used for the primary gearing. However the need for this ancillary drive would have been evident before the installation of the primary gear was complete, so it would have been installed very soon afterwards.

The millstone floor / top loft has a low platform above the main gearing below, and the one set of millstones is located on it; no stones' furniture remains, except a wooden tun. The millstones comprise a French burr runner on a conglomerate bedstone, and it is evident that they had been made to produce animal feed / provender rather than wheat flour.

The crown wheel at the top of the secondary upright shaft is located in a small hurst frame / cage that is "suspended" – that is fixed each end to the roof timbers. The crown wheel links with a horizontal drive shaft which carries one small pulley wheel – what it drove is not known. There is a second horizontal drive for operating a "crash gear" sack hoist; most of the sack hoist mechanism remains, including 2 fixed pulleys for the sack hoist rope in the roof apex.

It can be concluded that the watermill was added to the existing staddle barn in about 1805-1810, and that its machinery appears not to have been altered since its construction. In particular the compass arm waterwheel constitutes a remarkable survival of considerable importance, and great care is required to conserve it for the future. The survival of the wheel and shaft over such a long period in damp conditions is remarkable. If any major replacement has occurred, the work appears to have respected good traditional millwrighting techniques and details.