TIDE MILLS OF THE SOUTH COAST

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This interim report forms part of a long term research project which it is hoped will encompass Southern England and Wales. The area covered by this report is generally within the counties of Hampshire and Sussex, including the Isle of Wight, as shown in Fig.1.

Like any historically-based research, original material of substance and accuracy is difficult to obtain and sometimes laborious to transpose and assimilate. My first tasks were therefore to list current information and prepare chronological data for each site. This has revealed a mixed bag of facts and a lot of associated information. For the purposes of this report, the time period ranges from the 12th century to the early 19th century.

Starting from the earliest times, the Domesday Survey is our most reliable record, although very little would pertain to any current observation, nor does it define whether a watermill is tidal. The founding or construction of early tidal mill sites were generally by monastic or religious institutions of the day. We therefore find that Wootton or Wootton Bridge on the Isle of Wight was founded ca 1131 from Quarr Abbey. Chapel Mill, Southampton, on the River Itchen has a foundation date of 1225 and continued in regular use up to 1838. Place Mill, Christchurch was founded contemporary with the adjacent Priory in the 12th century. This mill is tidal assisted only, having a river-fed mill leat of considerable length.

At this point it is perhaps useful to classify the main forms of tide mill construction, as numerous variations or deviations from the norm exist, due to site location, geology, subsequent land or sea encroachment, and tidal range.

1) Dam and Pond: Visually on plan, similar to many conventional watermill sites. Only the mill pond is totally within normal tidal limits, and may be assisted by fresh water from a stream or river.

2) Freshwater/Tidal Assisted: Usually a conventional watermill, so sited that high tide obstructs the tailrace, and is therefore not workable when the tide is above Mean Sea Level.

3) Impounded Lagoon: The later capital-intensive and advanced form of tide mill, being wholly tidal, without direct freshwater input.

In the many years leading up to ca 1740, tide mills can be regarded as generally simple in design and often primitive in engineering. Very few tide mills from this era survive, nor are they carefully documented. Perhaps Place Mill, Christchurch, and Beaulieu in their earliest forms represent the nearest approach to the pre-industrial age in any surviving visual form.

It was in the early 1700's that engineering innovation, the use of iron and an improving economic climate led to general advances in millwrighting and waterpower engineering. As the 18th century progressed, flour milling became financially lucrative for many, with a growth in population and a shortfall in grain production. We therefore find that considerable rebuilding and repair, together with the capital development of new virgin sites increased and

continued up to the early 1800's. The sites are diversified, but the greater number are of the "impounded lagoon" form.

A number of examples illustrating this development are listed below, of which three are from Sussex.

Slipper Mill, Emsworth (Sussex bank, River Ems); rebuilt 1735.

Gosport, adjacent Chapel Common; new construction 1741-43.

Eling; three main rebuilding phases between 1740 and 1785.

Kings Mill, Portsmouth. Earlier mill demolished in 1744 and rebuilt for £7000. Further modified in 1789.

Quay Mill, Emsworth; new construction on 13 acres of mud flats from 1759.

Siddlesham, Sussex. New construction in 1755 under direction of Benjamin Barlow - engineer.

Bishopstone Mills, near Newhaven, Sussex. Possibly the most highly developed of all tide mill sites. A new construction from 1761 on a virgin site. By 1791 it had 5 pairs of stones capable of grinding 130 quarters of wheat per week and taking vessels up to 140 tons. Further developed by increasing millstones to 16, and enclosing an additional millpond.

St. Helens, Isle of Wight; new construction ca 1780 and enlarged in the 1790's

East Medina or Botany Bay Mill, Isle of Wight. New construction ca 1790, grinding up to 30 loads of wheat per week and taking vessels up to 70 tons.

Yarmouth, Isle of Wight. New construction ca 1790. Grinding 15-20 loads of wheat per week and taking vessels of up to 60 tons.

West Medina Mill, Isle of Wight. A new construction ca 1796. Never fully operational and became a barracks by 1800.

From this period onwards, newly developed sites are rare, and although most of the existing tide mills continued to prosper for a few decades, the high point of tide mill development was past. The advent of better land transport, the development of steam power and the economics of the smaller tidal mill were against the traditional miller.

Many tide mill quays became coal wharfs, and millers became purveyors of beer and other commodities to remain profitable. By the mid-19th century the railway era had arrived and some tidal ponds were lost to development, ranging from log or mast ponds, railways, or port and harbour expansion. I hope that continued interest and research in tidal mills will lead to a better understanding of both tidal power and watermills of all types.

Discussion

JONES I have a few observations on Emsworth. Slipper Mill is the only tide mill I have seen in commercial operation. It was surprisingly primitive, with a wooden clasp-arm waterwheel....

PLUNKETT Clasp-arm? similar to Beaulieu?

JONES Much bigger. And clasp arm; Beaulieu is compass arm.

PLUNKETT Yes, well, Beaulieu is small by any standard.

JONES The rest was conventional; wooden upright shaft, cast-iron gear, and three pairs of stones. The wheel was controlled by an inclined gate lifted by a rack and pinion, but the pinion was turned directly by a loose bar. The pond bottom shelved gently on the east side, but was quite steep against the embankment to the west.

PLUNKETT It wouldn't stay square, of course.

JONES In some cases it did; Quay Mill on the other side of Emsworth had a square section pond, formed entirely by retaining walls.

PLUNKETT St Helen's was almost the same, except for the landward side, which was natural.

JONES What of the sizes of the various ponds?

PLUNKETT I tried to work out the normal impounded area from maps, but they vary too much. If you take into account the depth, their capacity is probably about the same.

A.BRYAN I would like to comment on the materials used for waterwheels in tide mills. Mr Jones remarked on wood being used at Emsworth, but after seeing the amount of corrosion of both cast and wrought iron at Eling and at Beaulieu, I would have thought that wood was probably the best material in the presence of salt water. It should give as much life as cast iron, and probably be cheaper.

PLUNKETT Cast iron is resistant; it is mild steel that is the problem.

A.BRYAN But the corrosion on the pitwheel at Beaulieu.....

JARVIS Cast iron can corrode very badly under seawater conditions. To look at it, it seems all right, but what happens is, the iron gets leached out or corroded, leaving the graphite and corrosion products. It still looks like iron, but you can chip it away like chalk. I have seen examples where you could chip away 12 mm or more of what appeared to be good iron.

PLUNKETT I think the quality of castings was a bit variable in days gone by. Certainly the original wheel frame at Eling, cast by Armfields, has nothing wrong with it. They took it away, sand-blasted it and

put it back again. Only cracks or wear caused problems. Cast iron doesn't wear very well - on the teeth for instance.

JONES At the original inspection of Eling, before restoration, I went down the pit and found the pitwheel teeth worn away to practically nothing, but the frame was sound. What had really suffered was the wrought iron; I have never seen corrosion like it. The wrought iron upright shaft had swollen where the slag planes were radial, as though it were about to burst.

JARVIS That probably explains why the cast iron was sound. When wrought iron and cast iron are together, in electrical contact, the wrought iron will corrode electrolyticly and protect the cast iron. That is a technique for protecting cast iron; to attach chunks of wrought iron to it as a sacrificial anode.

JONES I am surprised they are far enough apart in the electrochemical series for that to work.

JARVIS I can assure you that it is a recognised technique. Another more powerful one is to attach blocks of zinc, which can be used on things like piers, but I have seen wrought iron satisfactorily used for cast iron.

A.BRYAN Concerning the windmill at Bishopstone; the use of an auxillary windmill at a tide mill makes sense. It could drive a sack hoist when no other power was available.

PLUNKETT That is what I consider was its most viable use; as a sack hoist.

JONES Somewhere I have seen it stated that it was used as that; by Rex Wailes, I think.

A.BRYAN Frank Gregory did some research, and stated that. Are there any records of tide mills having other forms of auxillary power?

PLUNKETT Yes, Eling for one. It had a Blackstone oil engine. I don't know of a case of one having steam power, but no doubt there were a few. Wootten Bridge perhaps.

JONES Wootten Bridge had an oil engine; I saw it working. The second Slipper Mill certainly had a chimney. Whether the steam plant was ever installed, I don't know, but presumably it was. When I first saw it, the pond was being used as a timber pound, but the gate openings were clear. All that was left ot the mill was foundations with two or three courses of wall, and a complete brick chimney.

Sources

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Turnpike Trusts.

Hydrographic Service, Taunton.

Hampshire Chronicle, Winchester.

Hampshire Courier from 1812-16 (amalgamated with Hants Chronicle).

National newspapers.

County Record Offices.

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Ordnance Survey, Southampton.

Admiralty Charts.

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Church and Parish Registers.

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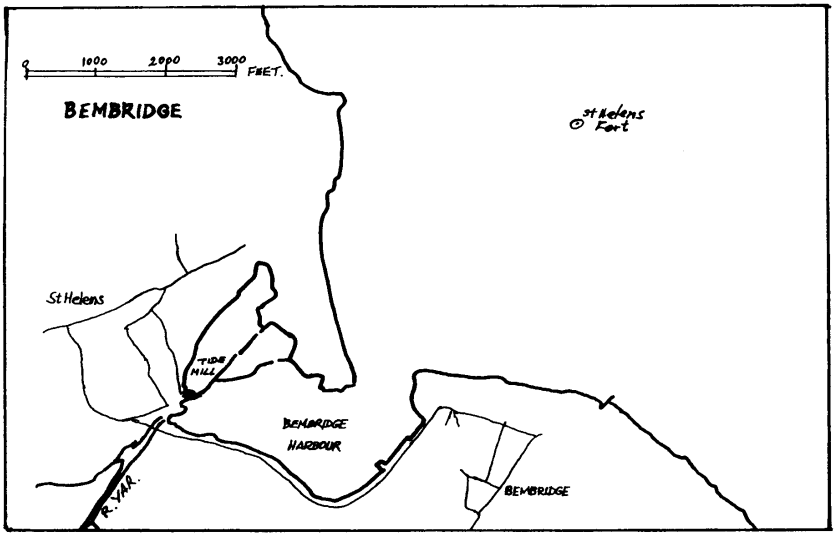
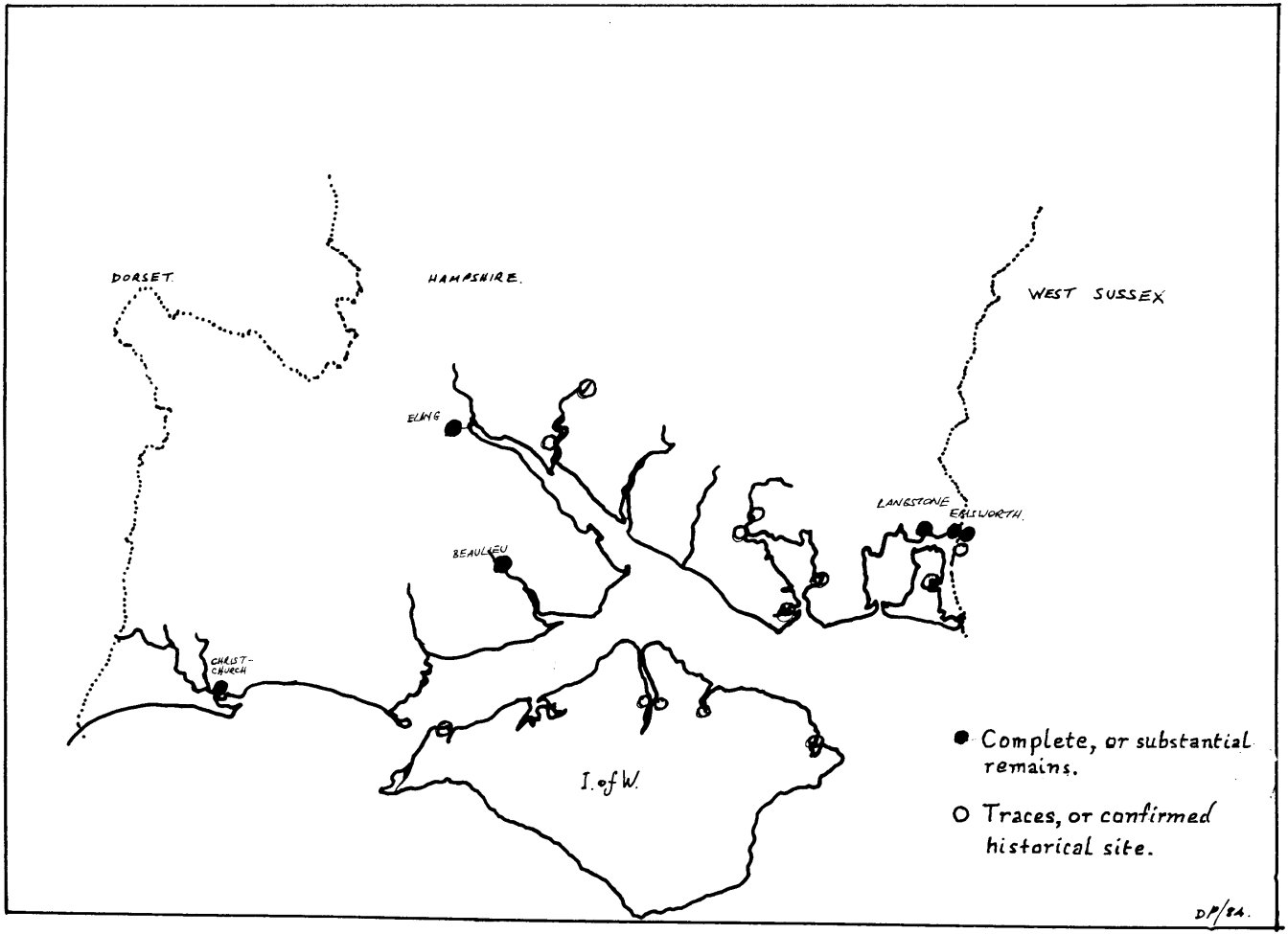
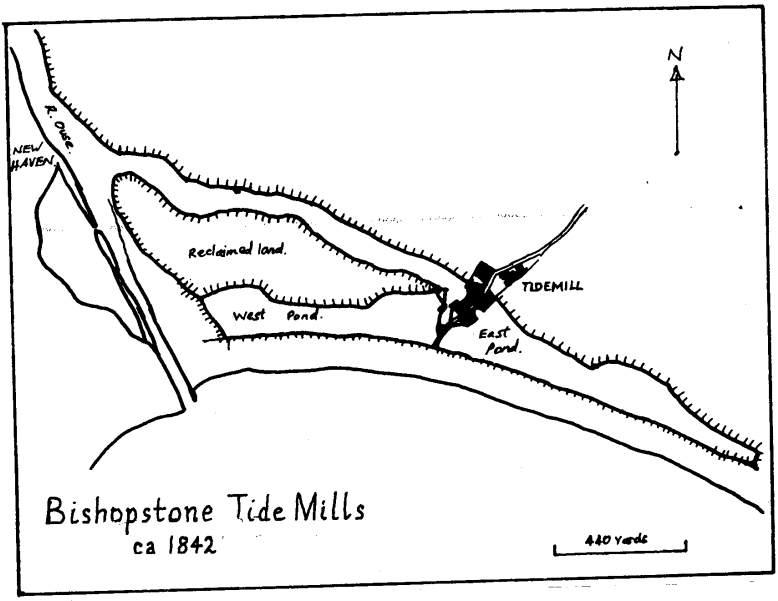
Manor Court Rolls.

The Miller.

Various I.A. publications, national and local: S.P.A.B. (Wind- and Watermill Section), regional Mill Groups, Mills Research Group (Watermill Index), Newcomen Society Trans.




DORSET
HAMPSHIRE.
WEST SUSSEX
ELING
BEAULIEU
LANGSTONE
EBSWORTH.
CHRIST-CHURCH
I. of W.
● Complete, or substantial remains.
○ Traces, or confirmed historical site.
DP/84.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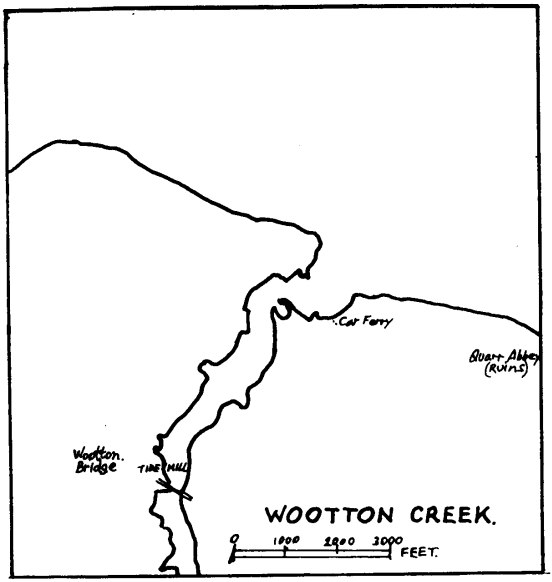
R. Ouse
NEW HAVEN
Reclaimed land.
West Pond.
TIDEMILL
East Pond.
Bishopstone Tide Mills
ca 1842
440 yards


Car Ferry
Abbey (RUINS)
Wootton Bridge
TIDE MILL
WOOTTON CREEK.
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FEET.