Tide mill

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A **tide mill** is a water mill driven by tidal rise and fall. A dam with a sluice is created across a suitable tidal inlet, or a section of river estuary is made into a reservoir. As the tide comes in, it enters the mill pond through a one way gate, and this gate closes automatically when the tide begins to fall. When the tide is low enough, the stored water can be released to turn a water wheel.

Tide mills are usually situated in river estuaries, away from the effects of waves but close enough to the sea to have a reasonable tidal range. These mills have existed since the Middle Ages, and some may go back to the Roman period.

A modern version of a tide mill is the electricity generating tidal barrage.

Tidal mill at Olhão, Portugal

Contents

Early history

Possibly the earliest tide mill was located in London on the River Fleet, dating back to Roman times.[1]

In recent years, a number of new archaeological finds has consecutively pushed back the date of the earliest tide mills, all of which were discovered on the Irish coast: A 6th century vertical-wheeled tide mill was located at Killoteran near Waterford.[2] A twin flume horizontal-wheeled tide mill dating to c. 630 was excavated on Little Island.[3][4] Alongside it, another tide mill was found which was powered by a vertical undershot wheel.[3][4] The Nendrum Monastery mill from 787 was situated on an island in Strangford Lough in Northern Ireland. Its millstones are 830mm in diameter and the horizontal wheel is estimated to have developed 7/8HP at its peak. Remains of an earlier mill dated at 619 were also found at the site.[5][6]

The earliest *recorded* tide mill in England was in Dover harbour, mentioned in the Domesday Book (1086). The book also mentioned the mills on the River Lea at Three Mills Island, now in London's docklands (see

House Mill). By the 18th Century these had become the largest in England. There were about 76 tide mills in London, including two on London Bridge.


Tidal mill at l'île de Bréhat

Woodbridge Tide Mill, an excellent example, survives at Woodbridge, Suffolk, England. This mill, dating from 1170 and reconstructed in 1792, has been preserved and is open to the public. It was further restored in 2010 and re-opened in 2011 in full working order, and became the second working tide mill in the United Kingdom regularly producing flour. Carew Castle in Wales also has an intact, but unused, tide mill. The first tide mill to be restored to working order is Eling Tide Mill in Eling, Hampshire. Another example, now only visible in historic documents, is the mill in the hamlet of Tide Mills, East Sussex. Traces of a tide mill may be seen at Fife Ness, the site of an archaeological survey.[7]

A mediæval tidemill still operates at Rupelmonde near Antwerp, and there are several still in existence in the Netherlands.

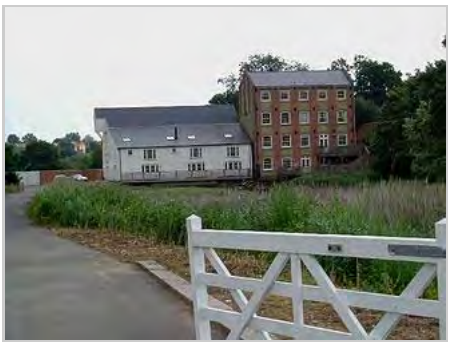
At one time there were 750 tide mills operating along the shores of the Atlantic Ocean: approximately 300 in North America,[8][9] including many in colonial Boston over 150 years,[10] 200 in the British Isles, and 100 in France.[11] The Rance estuary in France was also home to some of these mills.

By the mid 20th Century the use of water mills had declined dramatically. In 1938, an investigation by Rex Wailes discovered that of the 23 extant tidal mills in England, only 10 were still working by their own motive power. Of one of the few remaining by the 1940s, at Beaulieu, H. J. Massingham wrote, "Part of the mill is built on piles into the riverand is weatherboarded, while the rest of the building is a warm red brick roofed with lozenge-shaped and rounded tiles which I believe are called fish-tiles. All the interior is of wood - ladders, bins for the meal, floor-boarding, square pillars, beams, narrow passages, fittings, shaft rising to the first floor and all. So ramshackle is the arrangement of the props and supports that it is a wonder that the whole edifice does not tumble about the miller's ears like a pack of cards. The point is that it has stood in this way for something like six centuries, and that gives the explorer into its dusky depths a more penetrating notion of how the old builders could build, more than does a Gothic church or even a cathedral. The pulse and swing of the great wheel sets the whole building in an ague, but it will still be standing when all the flimsy excrescences of development between Beaulieu and Poole have fallen down."[12]

Modern examples

Newer types of tidal power often propose a dam across a large river estuary. Although it represents a source of renewable energy, each proposal tends to come under local opposition because of its likely impact on coastal habitats. One proposal, which came to fruition in 1966, is the Rance barrage which generates 250MW. Unlike historical tide mills which could only operate on an ebb tide, the Rance barrage can generate electricity on both flows of the tide or it can be used for pumped storage depending on demand. A less intrusive design is for a 1MW free standing turbine, constructed in 2007 at Strangford Lough Narrows - also close to an old tide mill.

Surviving tide mills in Britain


Fingringoe Tide Mill

- Fingringhoe Tide Mill, Fingringhoe, Essex (house converted)
- Thorrington Tide Mill, Thorrington, Essex
- Eling Tide Mill, Eling, Hampshire (working)
- Three Mills tide mill, Bromley-by-Bow, London
- Woodbridge Tide Mill, Woodbridge, Suffolk (working order)
- Tide Mills, Newhaven, East Sussex (sluice only)
- Carew Castle tide mill, Pembrokeshire
- Pembroke tide mill, Pembrokeshire (mill ponds only)
- Place Mill, Christchurch, Dorset (working order, restored)

See also

- Watermills in the United Kingdom
- Windmill
- Horse mill

References

1. Spain, Rob: "A possible Roman Tide Mill", Paper submitted to the *Kent Archaeological Society* (http://www.kentarchaeology.ac/authors/005.pdf)
2. Murphy 2005
3. Wikander 1985, pp. 155–157
4. Rynne 2000, pp. 10, fig. 1.2; 17; 49
5. McErlean & Crothers 2007
6. Recently discovered Tide Mill from 787 AD at Nendrum Monastic Site (http://www.nendrum.utvinternet.com/tmill/)
7. *Day of Archaeology* (http://www.dayofarchaeology.com/category/arch-prosp/page/7/)
8. Peveril Meigs, "Historical geography of tide mills on the Atlantic coast," *American Philosophical Society Yearbook 1970* (Philadelphia, Pennsylvania: American Philosophical Society, 1971), pages 462-464.
9. Peveril Meigs, "Tide mills on the Atlantic," *Old Mill News*, no. 7, 1979
10. http://thewestendmuseum.org/exhibitions/tide-power-in-colonial-boston/
11. Minchinton, W. E. : "Early Tide Mills: Some Problems", *Technology and Culture*, Vol. 20, No. 4 (Oct. 1979), pp. 777-786
12. Skelton, C.P. *British Windmills and Watermills*, Collins, 1947

Sources

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Further reading

- Minchinton, W. E. : "Early Tide Mills: Some Problems", *Technology and Culture*, Vol. 20, No. 4 (Oct. 1979), pp. 777–786
- Rynne, Colin: "Milling in the 7th Century – Europe's earliest tide mills", in: *Archaeology Ireland* 6, 1992

External links

- Tide Mills in England and Wales (http://victorian.fortunecity.com/holbein/871/) - catalogue of tide mills by county
- Nendrum Monastery mill (http://www.nendrum.utvinternet.com/tmill/) - detailed documentation of excavation
- Tide Mills of Western Europe (http://molinosdemarea.googlepages.com/) (Spanish)
- Tide Mill Institute (http://www.tidemillinstitute.org/)

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