Hands On Learning
with Reading Museum Service

POST MILL H219/A



The first windmills in England seem to have been built towards the end of the twelfth century. Like the example in this box they were 'Post Mills' that is, the body of the mill that houses the machinery is mounted on a huge wooden post, so that it can be turned to bring the sails into the wind. These mills were used for grinding corn.

The picture below shows details from the funeral brass of Adam Walsokne, of Kings Lynn, Norfolk, who died in 1349, which has on it the first known picture of an English windmill. Interestingly, the mill is of the same kind as the example in this box.



SECTION OF A BRASS IN ST. MARGARET'S CHURCH, KING'S LYNN, SHOWING THE EARLIEST KNOWN REPRESENTATION OF A WINDMILL

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In some parts of Europe, where the wind usually blows from the same direction each day, fixed windmills can be used. The photograph on the right shows such a windmill on a Greek Island in the Aegean Sea. In England, where wind directions vary from day to day, you have to be able to turn the blades to face the wind to make efficient use of the mill.



Turning the mill to face the wind could involve hard work. If the mill was small enough this could be done by a couple of people. The photograph on the left shows two men at Stevington Mill, Bedfordshire, demonstrating how this was done there. One of the two men is seen with the end of the tailpole secured over his shoulders. Once the ladder had been lifted off the ground by attaching it to the tailpole with the aid of a metal chain, the tailpole could be moved thereby pivoting the mill's body into the wind.



However, the bigger the mill the more power you could get from the sails and the more grain you could grind. Larger post mills, therefore, often had a wheel attached to the tailpole to make it easier to turn the main body. Such a wheel can be seen on this model. Many also had a smaller set of sails attached to the wheel, called a fantail, which caught the wind and turned the mill automatically. The photographs on the right are of Garboldisham Mill, Norfolk, which has such a fantail.



As can also be seen from Garboldisham Mill, in some cases a structure known as a roundhouse was built beneath the body of the post mill to protect the wooden trestle and to provide storage.

At some point it was realised that rather then turning the entire body of the mill it would be easier if only the cap at the top of the mill needed to be moved. This led to the development of smock and tower mills.



A smock mill is a wooden tower in which only the cap and sails turn to face the wind. A tower mill is similar, except that the tower is of brick or stone rather than wood. Early examples are known, though this form did not become popular until the late eighteenth century. A photograph of a smock mill at Upminster, Essex, can be seen on the right. Because only the cap of such mills needed to be turned, the main structure could be made much taller, allowing the blades to be made longer. Longer blades enabled the mill to provide useful work even in low winds.

The miller's skill consisted in manipulating the sails so that the wind was used to turn the grindstones as efficiently as possible, neither too fast nor too slow. In high winds the miller had to make sure that the sails were not destroyed by the force of the blast!

In order to do this, the amount of sailcloth exposed to the wind was adjusted. A brake would be applied to stop the sails turning and then the miller could clamber up the laths of wood that made up each blade and tie the sail in a way that suited the wind conditions. Each of the blades on the model has its sail adjusted to a different degree to show some of the patterns that were possible - the weaker the wind, the more sail that was exposed. If a storm was approaching the sail cloth would be completely furled.

Until the nineteenth century the brakes in most mills consisted of a wooden wheel that clamped around the drive shaft. Unfortunately, if a piece of wood is rubbed energetically against another piece of wood it can result in a fire and this sometimes happened to windmills. In 1760 a gale caused five windmills near Winslow, Cheshire, to be burned to the ground.

Mills usually had four sails, but five, six, and eight-sailed mills were also built. As windmill design advanced, cloth sails were replaced with sails with shutters. In 1807, William Cubitt invented a sail which could be adjusted while the sails were turning. The shutters of this sail worked in a similar way to venetian blinds.

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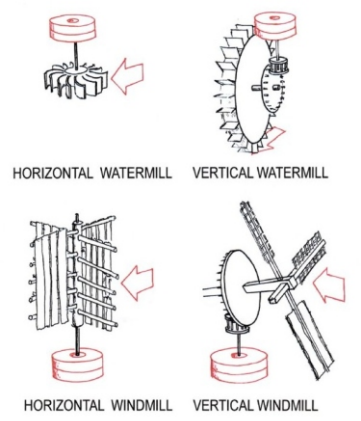
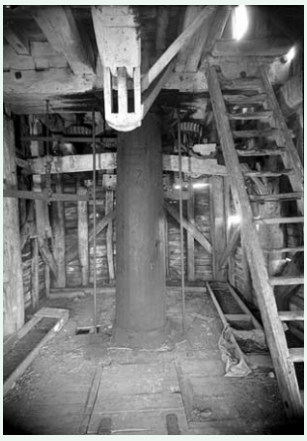
Flour for bread is made by grinding corn grain between two heavy stones known as quern stones. Operating a quern required lots of muscle power and was also a very slow means of grinding flour. People soon tried to apply other forms of power to the quern in order to save human effort. For example, a horse or other animal was harnessed to the upper stone of the quern and walked around it in a circle. The upper stone rotated above the lower stone and as grain was gradually fed between the stones it was ground between them.

The different ways in which the flow of water or air was utilised to turn the quern stones is illustrated in the diagram on the right. The quern stones are drawn in red. The earliest windmills - for example, those which are known to have existed in Persia in the ninth century - are thought to have been of the kind shown on the lower left. Vertical windmills, as they are called, which are shown on the lower right, are thought to have been invented in northwest Europe. They use the wind more efficiently, as all of the blades catch the wind's energy continuously.



The machinery inside the mill to grind the corn often looks very complicated, but the basic process was quite simple - grain was fed by gravity into a hole in the centre of the upper quern stone. As it was ground, the flour was pushed to the edge and fell through a chute into a bin. The photographs below show some of the machinery inside Moreton post mill, Essex.





When the blades were turning and the stones were grinding the whole mill would shake and rattle, like a sailing ship speeding across a turbulent sea.

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The main disadvantage with natural sources of power is their unreliability. Rivers can dry up in warm weather while calm periods with no wind are frequent. In the nineteenth century other forms of power began to be used to drive mills, such as steam power and, more recently, electricity.

The number of mills in existence peaked during the mid-nineteenth century in several regions of Britain. In Essex, 275 windmills existed during the 1840s. Altogether as many as 10,000 windmills may have existed in England during this period, although only fifty or so are capable of operating today.

It should be remembered that cereal milling was not the only task that windmills were used for. Other uses include timber sawing, land drainage, gunpowder manufacture, metalworking, grinding animal feed, stone crushing and even snuff grinding - anything which needed power to operate a machine. A photograph of a ruined windmill, once used for pumping water on the Norfolk Broads, can be seen on the right.



During the twentieth century most windmills fell out of use and were abandoned. Many fine examples collapsed or were bulldozed to the ground. From the 1930s onward, the preservation of windmills became a matter of concern to enthusiasts and a number are now preserved in working order.

In the late twentieth century windmills used for the production of energy began to spread across the English landscape. The photograph below shows a wind turbine in the Greenpark Industrial Estate, near Reading.

