School Project Sheet

Combe Mill Wheelwrighting

Issued ~ 22 September 2013

Educational visits to Combe Mill are organised jointly by the Combe Mill Society and the Blenheim Palace Education Department.
Contact details can be found at the end of this document.

WHEELWRIGHT TOOLS

It was quite usual for wheelwrights to buy the parts for wheels from their local sawmill. Combe Mill was one of these suppliers and here in our Pattern Shop you can see how the **naves** and **felloes** were made.

Hammering ash felloes onto spokes (1941)

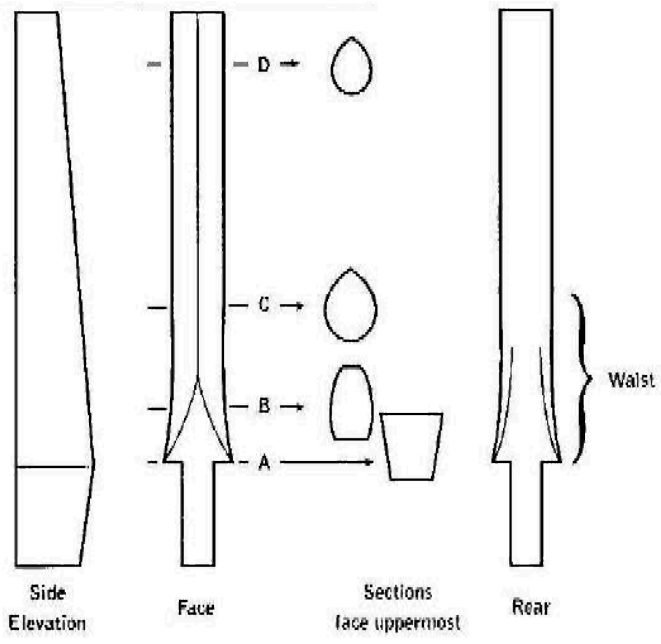
Felloes are the curved segments that fit together to form the rim of a wheel. You can see several templates for these that were used to mark out the shapes on timber before they were cut out using the belt-driven band saw.

Naves are the wooden wheel hubs into which the axle end of the spokes fit and through which the axle runs. An inner metal bearing fitted inside the nave and an example can be seen. The naves were turned from elm on our old belt-driven lathe.


Wheelwright hammering felloes onto spokes, Devon

On the left a wheelwright assembles a wooden wheel.

WHEELWRIGHT TOOLS



Spokes were shaped to provide strength and elegance to the wheel. The hub end carried a rectangular tenon and the outer end had a round (dowel) tenon to fit into the **felloes**.

Oak **spokes** were probably also made here although we have no templates. You can see examples of rounding planes that were used to form the round tenons on the spoke ends.

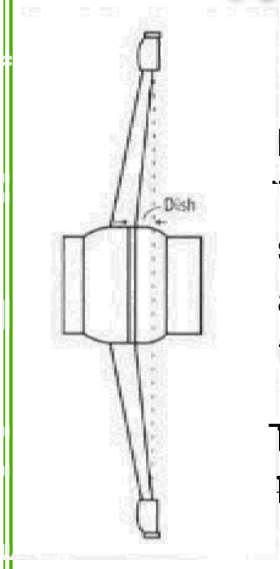
Materials used: The qualities of the different woods determined which parts they are used for. The **nave** (hub or centre) of the wheel is always elm. Elm wood has an even grain that gives it a uniform strength that does not split, even when the spokes are fitted into the mortices around the hub.

The **spokes** need to be strong and rugged so they are made from oak, which will take the knocks and jolts of a journey.

The wooden rim is made up using individual pieces of curved ash, each known as a **felloe**. Ash is used because it is tough but has an inbuilt flexibility. These felloes are sawn to shape from a template and will form a perfect circle, each joined to its neighbour by a strong oak peg or dowel.

The outer rim (r tyre) was made of iron and shrunk into place to hold the whole wheel together.

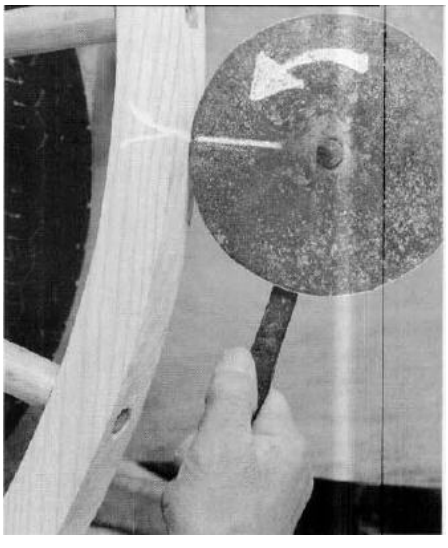
WHEELWRIGHT TOOLS



If you look edgeways at a typical wooden wheel it is seen to be dished, just like a saucer.
This gives the wheel lateral strength needed against natural sideways movements and jolts. The spoke between the ground and the hub though, will always run completely vertically as it turns and so fully carries the weight of the wagon and its load.

The whole wheel is held together with a tyre made from iron. It was shaped using a tyre-bending machine which is a set of rollers operated by a handle that bent the bar into a perfect circle.

After welding the two ends of the bar to form a ring by hammering red hot ends on the anvil, the tyre was heated in a circular fire to a dull red colour.



It was important that the circumference of the tyre was measured carefully.

A 'traveller' was used to 'measure' the length of the wheel rim. And was then transferred onto the metal strip of the new tyre.

The length of strip required to make a tyre was a little shorter than the circumference of the wheel it was to fit. However, if the tyre was too tight there was a danger that excess pressure would distort the wheel.

Generally, a tyre would be about one inch 'tight' or shorter than the wheel's circumference for a wagon wheel, and half-inch tight for a gig wheel.

WHEELWRIGHT TOOLS

Meanwhile, the wheel was mounted on a tyring platform - usually a large stone or metal plate - using a clamp to hold the hub of the wheel.

When the tyre was ready it was swiftly carried from the fire with tongs, and placed over the rim of the wheel.
After hammering into position, water was poured onto the hot metal to cool it before the wood of the wheel became burnt.

Some of this text was drawn from an article itself reproduced from "The Blowing Stone" Autumn 1985.
Some photos are from the Museum of English Rural Life at Reading
or from publications of the defunct Countryside Commission.