CONTEXT

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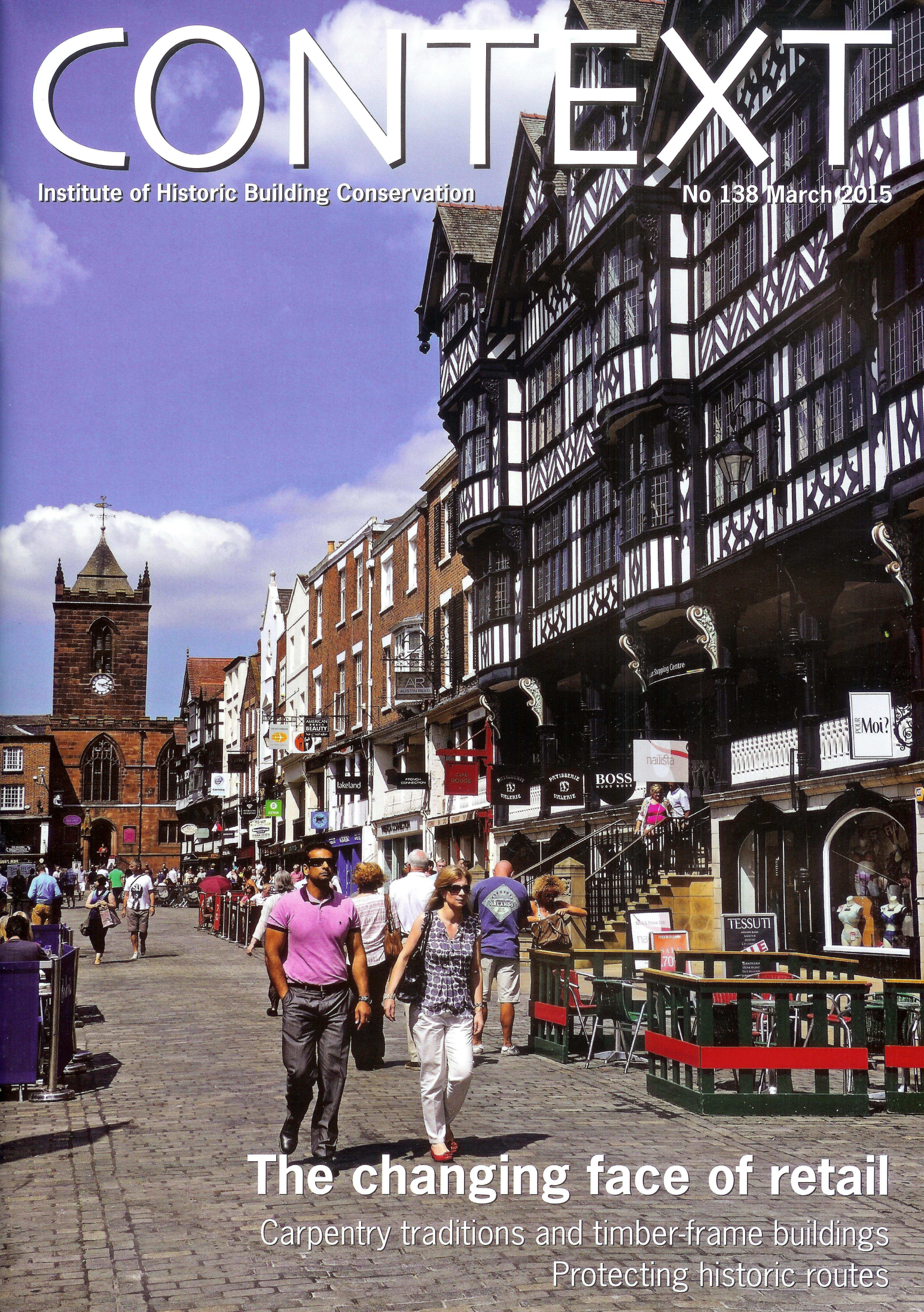


The changing face of retail

Carpentry traditions and timber-frame buildings

Protecting historic routes

CHARLES HIPPISLEY-COX

Carpentry traditions and timber-frame buildings

The complex relationships between Britain's oaks, landscapes, woodland management and water resources contributed to shaping historic industries and architectural traditions.

The oak tree, icon of the British landscape

No other tree features more prominently in the folklore and psyche of the inhabitants of Northern Europe. This respect for the oak is probably based on the strength and durability of the timber for construction and ship building, but the wood can be used for tanning leather and smaller branches can be converted into charcoal. The longevity of the individual trees and an association with fertility give the oak a prominent place in folklore and legends such as the green man, who is usually depicted with boughs of oak emerging from his mouth. There are many examples of oaks over 500 years old. Some (often with a history of being pollarded and/or coppiced) may be twice that age and have a girth of up to 12 metres.

The short-stemmed leaves of the pedunculate oak

There are two predominant types of oak tree in the British Isles. Of the 25 European species, these two have dominated the temperate deciduous forests of Northern Europe since the end of the last ice age. First there is the common 'robust' or 'pedunculate' oak, *Quercus robur,* and, second, the 'sessile' or Durmast oak, *Quercus petraea*. The vast areas of forest dominated by these two trees once covered large areas of Europe but the trees now remain only in small pockets within an agricultural landscape.

The overall tree shape differs, with the pedunculate oaks tending to have twisted, gnarled branches and a rounded silhouette with a broad-domed crown above a relatively short sturdy trunk. The sessile oaks tend to have a longer trunk with straighter branches and a narrower crown.

Pedunculate oaks tend to prefer neutral or slightly lime-rich soils, and can also thrive on loams and heavy clays. The sessile oak is more tolerant of acid soils and has the capacity to thrive on higher ground. In Scotland the distribution shows some sessile oaks in the wetter north-west, despite the deliberate planting of the robust oak during more recent times. In mountainous areas and parts of Scotland where the climate is harsher, oaks are less common, but some sessile oaks thrive on lower parts of south-facing slopes.

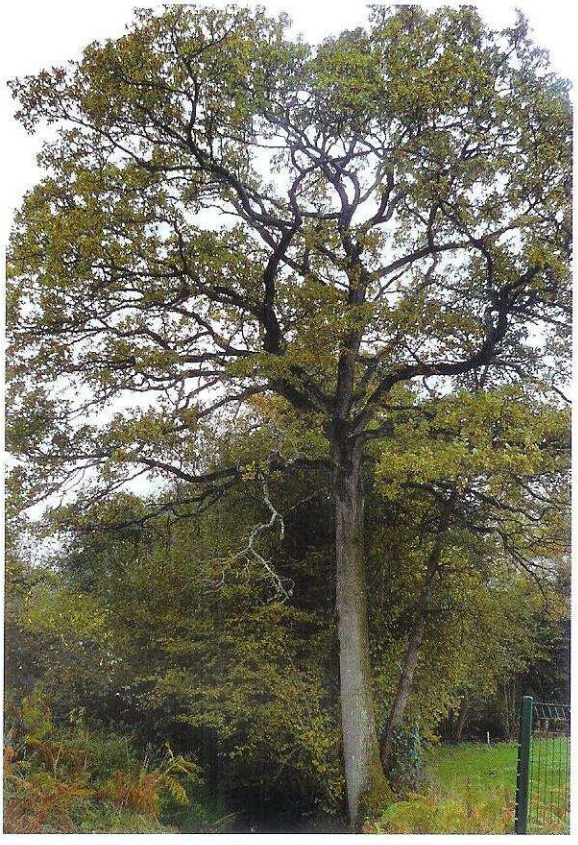
Despite much of the forest being cleared in advance of agricultural expansion, areas of oak woodland have been managed as a valuable resource passed on from one generation to the next. The longevity of oak trees has required long-term planning. Depending on circumstances, this would have happened historically within family groups, or perhaps on a communal basis as part of the feudal system.

Apart from buildings and boats, the next most significant contribution of the oak is the production of charcoal. With pedunculate oak this has normally been achieved by pollarding, with the bole or trunk being left at about four or five metres. The harvested poles/

A robust oak near Sept Forges, France, with evidence of old pollarding

Acorns of the robust oak

Far right: A good example of a slender sessile oak, ideal for converting into cruck blades



The long-stemmed leaves of the sessile oak

branches would then be converted to charcoal in what are known as clamps. The importance of charcoal lies in its contribution to smelting and forging iron, both on a local basis for smiths and on a regional basis once industrialisation began.

Around the vicinity of the small, proudly named village of Sept Forges, France, almost all the oaks older than 150 years show evidence of having been pollarded or coppiced. The regeneration and subsequent spread of the crowns suggest that the pollarding within this part of Normandy stopped about 100 years ago. The oaks are predominantly pedunculate and the traditional buildings (both timber-framed and stone built) have dimensions determined by the length of the timber from the trunks of these pollarded oaks and sweet chestnut managed in a similar fashion.

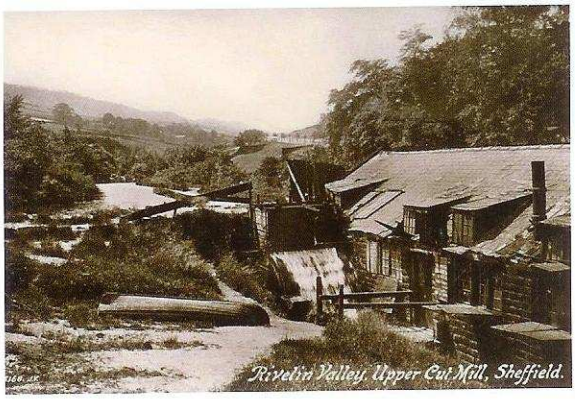
The height of the pollarded oak is of considerable significance, especially when there is a need for the trunk to be converted into timber for construction. Lengths of 3–4 metres are particularly useful for both box and post-and-truss frames. Longer pieces of timber are required for cruck frames, so the taller sessile oak is much more suitable for these.

The sessile oak usually needs relatively little attention, apart from the occasional removal of unwanted side branches if a long trunk is needed. Depending on the density of the planting within suitably managed woodland, a sessile oak can easily produce a useful trunk of between 10 and 15 metres. If a curved timber is required, another strategy is to tether the young tree to control the growing habit of the main trunk. This practice is particularly relevant to the production of timber for cruck frames.

Traditionally timber would have been cut down and prepared using axes, with wedges used for splitting and adzes for finishing surfaces. Oak has the advantage of being quite soft when 'green'. That is the why some oak-frame buildings seem twisted. The oak would have been converted, drilled and pegged together while still quite fresh, and the timber would have completed the seasoning process in situ.

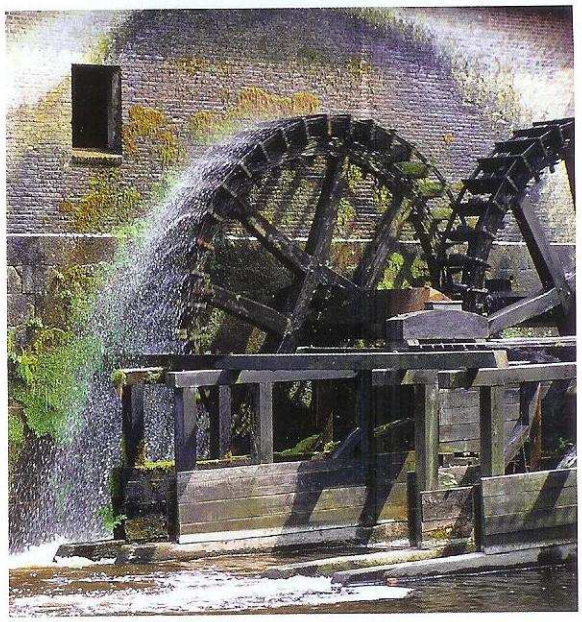
Wrought iron was shaped and toothed to form saws. Most saws depicted in early manuscripts show artisans working in pairs at either end of a long blade. Sometimes the least fortunate of the pair (presumably the young apprentice) is underneath in a pit as the rip-saw works along the length of the prepared tree trunk.

Prior to the introduction of circular saws in the 1840s, sawmills used a vertical movement for converting the trees into timber. The mills were traditionally powered by water, with the rotary motion of the wheel being transferred by a crank shaft to a rip-saw blade mounted in a vertical wooden sash.



The sash-frame would be attached to a crank which pushed it up and down with a motion akin to the opening and closing of a window sash. Some mills used gravity-driven weights to advance the timber, while others had more sophisticated ratchet mechanisms, with the timber mounted on a cogwheel-driven carriage. The water-powered blade would move at about 150 strokes a minute, converting between 500 and 3,000 feet of timber in a 12-hour day.

One of the type-areas for cruck-framed buildings is the slopes of the Pennines between Sheffield and Huddersfield. Survey work by the South Yorkshire County Archaeology Unit found a close relationship between the distribution of cruck-frames and the natural occurrence of the sessile oak. On one level this could be a simple exploitation of a natural resource, as the sessile oak is known to be more tolerant of poor upland acid soils. But there could also be a conscious woodland management system, with trees being planted and maintained across the generations.



Far left: The Shepherd Wheel on the River Porter, Sheffield

Denecamp Sawmill, Netherlands

One of the other surprises from the work in South and West Yorkshire was the late dates associated with some of the cruck frames confirmed either by date stones and/or dendrochronology. Many examples were from the 17th and 18th centuries. By this time the swiftly flowing tributaries to the Don, Colne and Calder were already busy with early industrialisation.

Sheffield, where six rivers and eight smaller brooks join the River Don, was an ideal place to harness water power. Associated essentially with powering tilt-hammers and grindstones, the motion could easily be adapted to the conversion of timber. There is also an early association of water power with the mechanical pounding of wool as part of the fullering process. The earliest water mills on the rivers Holme and Calder are also likely to have been for processing fleeces, with origins in the monastic grange system in the Middle ages.

For example, the Hind family ran a mill in the Rivelin valley to the west of Sheffield as early as 1581. Eventually there was a whole series of water-driven mills on the Rivelin, including the Wolf (around 1722) and the one with the largest wheel of all, known as Old Groggy, at Grogham's Mill at the confluence with the River Loxley. Saw blades were produced in the Sheffield area from as early as the 17th century.

Upper Cut Mill, Rivelin, Sheffield

The industrial revolution and the re-use or re-modelling of individual mill sites is likely to have obscured their origins and the various uses to which the power was directed. Changes in methods of converting timber to steam power and circular saw blades, combined with changing construction methods, caused water mills to cease to produce cruck blades. They reverted to more specialised industrial processes, such as hammering and grinding.

The absence of surviving examples of sawmills within the industrial landscape of South and West Yorkshire is partly explained by poor documentation, and the fact that mills often had more than one function and would (in the case of Sheffield) have defaulted to tilt hammers and/or mills for grinding and polishing.

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