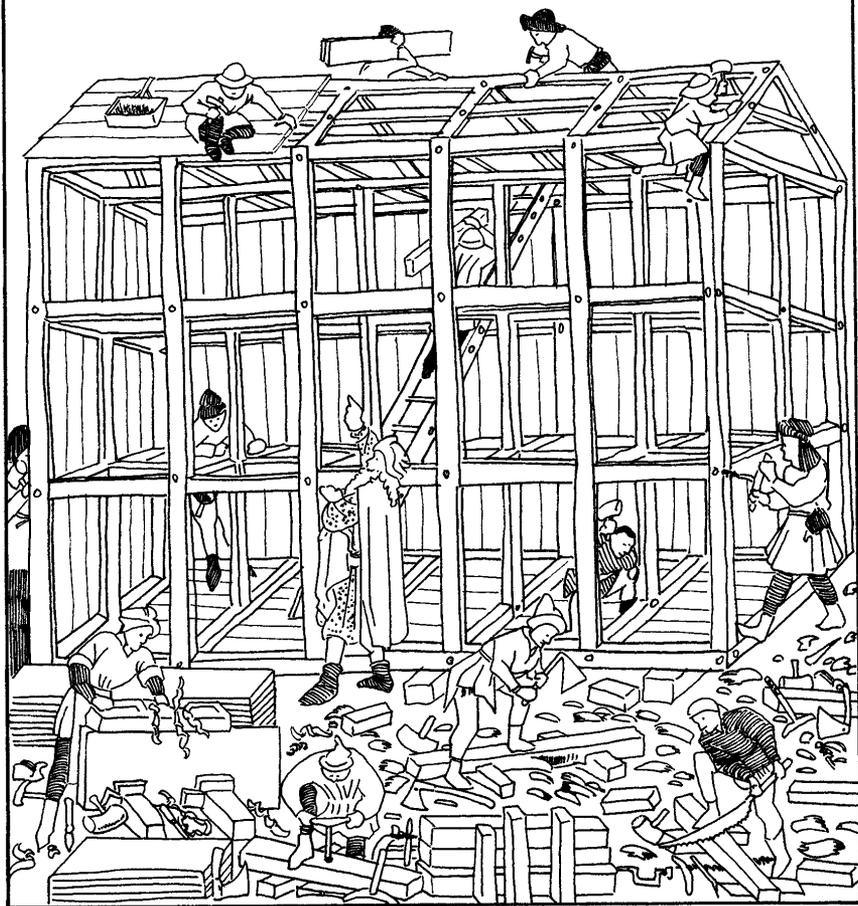


A CARPENTER'S CHEST: TOOLS OF THE 15TH CENTURY

Lord Findlaech mac Alasdair

As originally published in The Oak,
The Arts and Sciences Newsletter
for the Kingdom of Atlantia, Issue #12.



For those who would recreate the past, it is an unfortunate fact that many common articles of everyday life, whether hand tools, household goods, or underwear, often do not survive their age. While the material culture of the courts and high clergy were cherished and preserved, a simple item such as a carpenter's chisel was used until it could be used no more, then discarded or taken to the local smith for remaking into something else¹.

Recreating the artifacts of an era poses a challenge: not only must we catalog those objects, we must also root out how those objects were made. Learning medieval carpenters' techniques tells us not just about the artifacts they produced, but also something about their daily lives. It also helps us produce objects that are closer in form and function to the original. An oak chest styled after a medieval artifact, while a beautiful and useful piece of furniture, is still glaringly modern if it is cut, shaped, joined, and finished with modern tools and techniques.

To a modern tool user, relying on a handful of iron and wooden tools may sound daunting. Few medieval carpenters are around to tell us how they hewed their timbers and joined their planks. Fortunately, at least two craftsmen of note did leave their mark. Noah and Joseph were both carpenters (if we include shipwrights) and popular subjects for medieval illustrations. These Biblical figures are often depicted at work with their tools. Artists in the Middle Ages tended to draw what they saw in everyday life, and just as the ancient Greeks were portrayed in full Gothic plate armor, Noah and Joseph were shown using the chisel, plane, and saw of the medieval carpenter. Period illustrations are therefore a promising source for the artifacts that did not survive, especially when compared to contemporary descriptions and surviving artifacts from somewhat later eras. Until the 19th century and the rise of industrial production, tools evolved slowly—a refinement of shape here, a more resilient material there. By examining 15th century illus-

tations and literature, and comparing them with surviving artifacts, we can come of a fair approximation of what medieval tools looked like, and develop reasonable theories about how they were used.

A picture of Noah building the Ark in the early 15th century Bedford Book of Hours is particularly illustrative of medieval tools². While Noah and his sons are ostensibly depicted constructing the ark, the picture more likely depicts the construction of a timber frame building, joined with wooden pegs and topped with a wood shingle roof. What makes this picture remarkable is the range of tools represented. All the tools shown are common to carpenters as well as shipwrights, and its likely that building construction, rather than a ship dock, was the inspiration for this illustration³.

AXES

In a world without precut lumber, a carpenter needs to shape and fit timbers on any job, and for this he would use the axe

and its close cousin the hatchet. The Bedford carpenters use at least four axes of differing sizes to hew timbers square and fit the ambiguously illustrated joints.



Axes generally fall into two types: felling axes and broad axes. As the name implies, the felling axe, or *belte*⁴, is used to bring down trees and cut logs to length, as well as notch the sides of logs in preparation for shaping them into square timbers. The cutting edge of a felling axe is beveled on both sides, like a knife edge. This lets the edge cut across the wood fibers.

The broad axe, or side axe, is used for squaring the sides of timbers and for precise shaping along the direction of the wood's grain. The broad axe differs from a felling axe in that the

blade is beveled on one side only. Such an edge is used for cutting with the grain, separating the fibers along their lengths. The carpenter squaring a timber at his feet is probably using a broad axe. The broad hatchet (hatchett or chip ax), a smaller version of the broad axe, is used for both rough and fine shaping of smaller pieces of lumber.



Medieval axes have a head made of iron, with a steel bit

embedded in the edge so that it will hold an edge and not deform as would an all-iron head⁶. All Noah's axe heads have sockets to receive the axe handle; in more modern axes the handle passes through the head and is held in place with a wedge.

CHISELS AND GOUGES

The chisel is close kin to the broad axe. Medieval chisels are easily recognizable to modern eyes; the form has changed little in 500 years. Noah's chisels are, like his axes, probably made of iron with a steel bit to hold

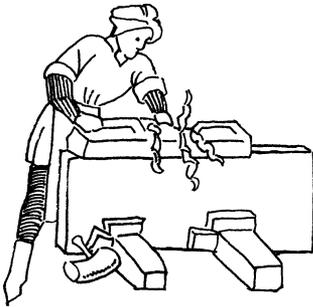
the edge. The blades are set in handles of a hard-wearing wood such as beech. Chisels come in all sizes, from small joinery tools to large framing slicks.

Chisels are usually beveled on one side, though they can also be beveled like a knife. A one-sided edge can be used to shave smoothly along the grain, or chop across the grain to make a precise hole, or mortise. When the chisel has a curved cutting edge, it is called a gouge. Most chisels depicted in period illustrations have a rounded fish-tail shape, with the end of the chisel being somewhat convex, as opposed to the square end normally found on modern chisels. This can make it difficult to tell if the tool is a chisel, gouge, or knife.

PLANES

A plane is, in essence, a chisel held in a wooden block. By keeping the blade (called an iron) at a constant angle to the wood, its relatively easy to produce a smooth surface. Planes date back to at least the ancient Romans, and perhaps earlier⁷.

Few specimens of medieval planes are known to survive, but the planes in “Building the Ark” bear an uncanny resemblance to those commonly used into the 20th century⁸.



Planes can perform a myriad of functions: smoothing flat surfaces, squaring edges, creating intricate shapes for moldings, and cutting slots (dados) for joinery. Noah’s crew uses two types of planes—a large joiner’s plane and two smaller bench-planes. One carpenter uses the joiner’s plane to square the edge of a large panel. The plane’s length lets it take down high spots without riding the contours of the surface. Such planes are essential when trying to join two boards by their edges or create a smooth surface. The smaller planes lying on the ground are used for fitting joints and finishing surfaces.

SAWS



Noah’s crew uses two kinds of saws. One is a curved blade set on a wooden handle, not unlike a large version of a modern pruning saw. A worker, somewhat improbably dressed in parti-colored tights, uses it to cut a timber to length. Early saws of this type cut on the pull stroke so that the blades would not kink or bend⁹. By the 15th century, iron and steel were sufficiently strong that blades could be made to cut on the push stroke, as do most modern saws.

The other style of saw in the illustration is a bow saw. A bow saw uses a wooden frame to hold the ends of the blade under tension. This tension is adjusted by means of a twisted cord parallel to the blade. Keeping the blade under tension allows for a thinner and more delicate blade, and prevents the blade from bending if it gets caught. A bow saw may allow the blade to be turned relative

to the frame, permitting the user to move the frame out of the way of the piece being cut.

Both of Noah's saws are crosscut saws, meaning that they are intended to cut across the grain of the wood. Crosscut saw blades are actually a series of knives, slicing through the wood fibers. This contrasts with a rip saw, which is used to cut along the grain of the wood, as when ripping boards from a timber. Rip saw blades are more like chisels, separating the fibers by cutting a channel parallel to them. Noah's timbers may have been ripped with a two-man pit saw, but no pit saws are included in the illustration.

AUGERS, GIMLETS, AND BRACES



Noah's Ark is held together with wooden pegs, and the auger

is the tool the carpenters use to bore holes for the pegs. A simple tool, it consists of a bit attached to a perpendicular handle. A man drilling a hole

might start it with a small chisel, or a smaller version of an auger called a gimlet or *wymbylle*¹⁰. He then carves out the hole by turning the auger's handle in a circular motion, stopping frequently to remove the shavings that accumulate in the hole. Unlike modern drill bits, his auger is not shaped like a screw; instead, it is similar to a gouge or to the spoon bit still used by chair makers. Augers were common tools in ship and house building, wearing out often and requiring frequent replacement¹¹.



Another tool used to drill holes was the brace and bit (or piercer). Believed to have been brought back to Europe by returning Crusaders¹², the brace and bit is recognizable to modern eyes; its modern metal-and-plastic descendant is readily available at most hardware stores. Unlike augers, the bits of piercers could often be removed when they wore out or the user needed a different size bit¹³. None of Noah's piercers are being used, perhaps they are reserved for finer work.

MALLETS AND HAMMERS



Striking tools such as mallets and hammers were a necessity for a medieval carpenter. Several of Noah's workers use mallets to drive home the pegs (trenails or trunnels) that hold the timber framing. Mallets have wooden heads, in contrast to hammers, which have an iron striking head. Hammers are used primarily for setting nails, such as the roofing nails for the Ark. Because iron nails are soft, a pilot hole is often made with a gimlet. Contrary to popular myth, nails were not rare in medieval carpentry. In 1413, Henry IV's storehouse inventory reported 10,902 nails in store⁴. The English had at least 50 names for differing types of nails (though the same nails may have had different names for different uses)⁵. But nails were not cheap; in the 15th century, one hundred nails might cost the equivalent of several days wages for a skilled tradesman⁶.

CONCLUSIONS

The local smithy is long gone, and the neighborhood hardware store isn't likely to be forging axe heads out back. But fortunately, the tools of the medieval carpenter, joiner, cooper, and shipwright were relatively few, and many have modern approximations. Learning to use even a few of these tools can enable you to build simple medieval furniture such as chests and benches. Often antique tools can be found at auctions, flea markets, and estate sales. If you cannot find a source for old tools (or reproduce them yourself), you might try these sources for modern counterparts:

Highland Hardware

1-800-241-6748

Broadaxes and hatchets, bow saws, spoon bits, chisels, gouges.

Lee Valley Tools

1-800-8771-8158

Cut iron nails, square-shanked copper rosehead nails with roves.

Horton Brasses

1-800-754-9127

Hand-forged iron hinges, latches, and pulls. Cut wrought head nails and rosehead clinch nails.

William Alden Company

1-800-249-TOOL

Wooden bodied and metal planes, spokeshaves, drawknives, auger bits to 1-1/4 inches, bow saws and blades.

BIBLIOGRAPHY

Bealer, Alex W. *Old Ways of Working Wood*. Castle Books, Edison, NJ, 1980.

Friel, Ian, *The Good Ship; Ships, Shipbuilding, and Technology in England, 1200-1520*. The Johns Hopkins University Press, Baltimore, Maryland, 1995.

Hack, Garrett, *The Handplane Book*. The Taunton Press, Newtown, Connecticut, 1997.

Long, Pamela (ed.), *Science and Technology in Medieval Society*. Annals of the New York Academy of Sciences, Volume 441, New York, 1985.

Underhill, Roy, *The Woodwright's Work Book*. University of North Carolina Press, Chapel Hill, North Carolina, 1986.

Virgoe, Roger (ed.), *Private Life in the Fifteenth Century*. Weidenfeld & Nicolson, New York, 1989.

NOTES

- 1 For a discussion of medieval recycling of iron tools, see Long, pg. 40.
- 2 Friel, pg. 60, Hack pg. 12.
- 3 While shipwrights had recognized guilds, carpenters often contributed to ship construction by building deck structures and cabins, and were often better paid than shipwrights. Friel, pg. 45.
- 4 Underhill, pg. 6
- 5 Underhill, pg. 6.
- 6 Underhill, pg. 10
- 7 Hack, pg. 15.
- 8 Underhill, pg. 12.
- 9 Bealer, pg. 83.
- 10 Underhill, pg. 6.
- 11 Friel, pg. 59.
- 12 Underhill, pg. 10
- 13 Underhill, pg. 10
- 14 Friel, pg. 172.
- 15 Friel, pg. 72.
- 16 Friel, pg. 72, Virgoe, pg. 46.

ARTISTS

Front Cover: Lord Michael Limner, Noah Building the Ark. From the Bedford Book of Hours. Friel, Ian. *The Good Ship: Ships, Shipbuilding, and Technology in England, 1200-1520*. The Johns Hopkins University Press, Baltimore, Maryland, (1995). p. 60.

Pages 2-7: Lord Michael Limner, *ibid.*

Page 6: Lord Findlaech mac Alasdair, Piercer.