

## The Ice-Man's Toolkit of Materials Splendor During the Late Neolithic

Erika and Helmut Simon made an extraordinary discovery on September 19, 1991. During their annual hiking holiday in the Alps along the Austrian-Italian border, the retired couple stumbled across the remains of a man protruding from the ice. Radiocarbon dating proved that he had not perished this century—or even last century—but during the Late Neolithic Period, some 5,000 years ago.

The ice-man's clothes were predominantly of fur and consisted of a cap, jersey, loin cloth, leggings, plaited-grass cloak, and a pair of shoes stuffed with straw for warmth. His body was exceptionally preserved, even showing the presence of parallel-line and cruciform tattoos over his lower back and legs. The tools and weapons that he carried on his ill-fated trip were also well preserved and discovered around him just as they were left. The inventory included a backpack, belt-pouch, net, bow-stave, quiver of arrows and arrow-production equipment, flint dagger and scabbard, retouching implement for flint tools, bone awl, fire-lighting equipment, two birch-bark containers, three flint tools, and a copper ax. Some birch fungi and sloe were found in the containers.

Public curiosity is always piqued by mummies. Beyond the goulish attraction, bodies seem to elicit more empathy than site foundations or artifact assemblages. Unfortunately, the amount of information actually provided by stray bodies tends to be minimal because their contexts usually reveal little of their personal history. For instance, we could not determine who the ice-man was, why he was traveling across the Alps, where he was going, whether he was traveling alone or in a group, or why he was lost. Even his tattoos could not be definitively decoded. Ethnographic parallels can provide some indication of what they may have represented, but their deeper significance and symbolic meanings could not be discerned without knowing more about the world from which he came.

The ice-man is exciting to archaeologists interested in ancient technologies, however, because of the diverse and perfectly preserved toolkit discovered with him. People tend to carry only the basic necessities when hiking through inhospitable places. Thus, the artifacts found with the ice-man must comprise the range and types of objects that a person living during the Late Neolithic period would have considered essential for survival. When

viewed in this manner, the types of artifacts—and the materials from which they were made—take on greater significance.

---

If Neolithic people  
were so sophisticated,  
however,  
why was the *ax*  
made of copper?

---

The yew bow-stave measured 182-cm long. It was unfinished, suggesting that the ice-man had broken his previous bow and was carving a new one. Yew is a tough, flexible wood and one of the finest natural materials for bows. A finished bow of this type could have shot an arrow approximately 60 m. Most of the 14 arrows found in the quiver with the bow were made from viburnum wood and measured between 84.5 and 87.8-cm long. Two of the arrows were finished, with leaf-shaped flint arrowheads and three-feather fletchings. The tangs of the arrowheads were glued into slits at the ends of the shafts with birch tar. The fletchings were also glued onto the shafts and further secured with sinews. One of the arrows measured 90.4-cm long and was composed of two types of wood. The front section measured 10.5-cm long and was made of cornel wood. The ice-man attached it to the rear viburnum-wood section by sharpening the butt of the front section, inserting it into a corresponding hollow in the rear section, and then gluing them together with birch tar. Whether the ice-man intended for the front end of the arrow to break off in his prey or was merely salvaging two broken arrows is not known.

The dagger consisted of a 6.4-cm-long flint blade in an ash handle. The blade was embedded in a slit in the haft and secured by wrapping animal sinews around the handle. A sinew was also attached to the butt of the handle to allow the dagger to be hung from a belt. No adhesives were used to bond the blade to the handle, simplifying the process of blade replacement. Ash is an excellent material for hafts and is still used for handles today.

The ax consists of a 9.3-cm-long copper blade embedded in an angled, yew handle. The haft was carved from a natural fork in a tree. The copper blade has a

trapezoidal profile that tapers to sharpened ends. Although metallurgical analysis is still being conducted, the blade may have been cast in an open mold and finished by cold-working. The butt of the blade was then embedded into the handle and secured by wrapping sinews around the haft. Unalloyed copper is soft, and thus the blade would have required repeated sharpening during use.

The ice-man's toolkit reveals two things about materials usage during the Late Neolithic. First, it shows a high degree of sophistication in both the selection of materials for particular tasks and the production of tools composed of different materials. Second, it reveals the extent to which copper and flint tools co-existed during copper's introduction. Although archaeologists have assumed that flint remained the main material used until copper became sufficiently common to replace it, a toolkit had not previously been found to support their assumption.

If Neolithic people were so sophisticated, however, why was the *ax* made of copper? The dagger would have required less metal and been easier to cast. There are two possible reasons for making the *ax* of copper. First, it was mechanically advantageous. Axes require resilient materials that can sustain successive blows. Copper is far more impact-resistant than flint and therefore would have endured wood-working and animal-butchered better. Second, axes possessed special significance in Neolithic society, and materials for functional and ceremonial axes were traded over great distances. For example, Neolithic ceremonial axes made from an Alpine source of jadeite have been discovered as far away as Britain and Ireland. The edges on these axes were so thinly ground and highly polished as to be functionally useless. Axes may have attained special significance because of the increase in land clearance with the advent of subsistence farming during the Neolithic period. Since axes are integral to tree removal, it may have become a symbol of humankind's dominance over the environment and thus worthy of the most valuable materials.

ROBERT M. EHRENREICH

FOR FURTHER READING: R. Bradley, *The Passage of Arms* (Cambridge, Cambridge University Press, 1990); K. Spindler, *The Man in the Ice* (New York, Crown Trade Paperbacks, 1994).