

120,000-year-old necklace tells of the origin of string

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People living on the Israeli coast 120,000 years ago strung ocher-painted seashells on flax string, according to a recent study in which archaeologists examined microscopic traces of wear inside naturally occurring holes in the shells. That may shed some light on when people first invented string—which hints at the invention of things like clothes, fishing nets, and maybe even seafaring.

Seashells by the seashore

Picking up seashells has been a human habit for almost as long as there have been humans. Archaeologists found clam shells mingled with other artifacts in Israel's Misliya Cave, buried in sediment layers dating from 240,000 to 160,000 years ago. The shells clearly weren't the remains of Paleolithic seafood dinners; their battered condition meant they'd washed ashore after their former occupants had died.

For some reason, ancient people picked them up and took them home.

Shell collectors at Misliya seemed to like mostly intact shells, and there's no sign that they decorated or modified their finds. But 40,000 years later and 40km (25 miles) away,

people at Qafzeh Cave seemed to prefer collecting clam shells with little holes near their tops. The holes were natural damage from scraping along the seafloor, but people used them to string the shells together to make jewelry or decorations. Tel-Aviv University archaeologist Daniella Bar-Yosef Mayer and her colleagues examined five shells from Qafzeh and found microscopic striations around the edges of the holes—marks that suggest the shells once hung on a string.

Archaeologists even have a good idea of what that 120,000-year-old jewelry looked like. Wear marks around the holes suggest hanging on a string, and other wear marks on the edges of the shells suggest that the shells rubbed against each other, so they probably hung close together. And four of the shells still carried traces of red ocher pigment. The only thing missing is also the most interesting piece: the string.

String theory

To find that missing piece, Bar-Yosef Mayer and her colleagues collected some seashells of their own. The archaeologists rubbed their modern clam shells against sand, wood, clay, stone, leather, reeds, and several different kinds of fibers, and then they used a scanning electron microscope to examine the patterns of pits, polishing, and striations left behind. They even made strings of wild flax and hung shells—with natural holes—on them, then examined the resulting wear marks under a microscope.

The tiny marks left behind by a flax string rubbing against the edges of the hole looked just like the marks on the Qafzeh shells. Even though the string itself didn't survive, the wear marks on the shells reveal its presence.

One hundred sixty millennia ago, people were collecting shells but, apparently, not doing much else with them. By 120,000 years ago, people had started stringing shells together and decorating them with red ocher. What changed in that 40,000

years? According to Bar-Yosef Mayer and her colleagues, someone invented string.

If you're not an archaeologist, dating the invention of string might sound esoteric. But twisting plant or animal fibers into thread is the key to a lot of other technologies, from clothes to seafaring.

"When one makes a string, you can make it much longer than a leather strip. This would allow you, for example, to make a rope that will tie together wooden logs to make a raft (or to tie a rigout to a canoe)," Bar-Yosef Mayer told Ars. String also means people can make things like fishing nets, more complicated kinds of animal traps, and new kinds of clothing and bags. Dating the invention of string also hints at when people could have invented those other important technologies.

Maybe it was a tie

But which people? "We do not know who invented string—*Homo sapiens* or Neanderthals," Bar-Yosef Mayer told Ars.

The oldest actual piece of thread we know of so far came from a Neanderthal site called Abri du Maras in France, and it's around 50,000 years old. *Homo sapiens* didn't reach Western Europe until a few thousand years later, but the two species had probably interacted in the Levant for tens of thousands of years (*Homo sapiens* and Neanderthals seem to swap places a few times in the archaeological record at sites like Qafzeh, Misliya, and Skhul caves). Either species could have borrowed the idea of thread from the other. But who deserves credit for the original invention?

The case for Neanderthals rests partially on a fragment of fiber—which may or not actually have been thread—found clinging to a 130,000-year-old eagle talon at the Krapina rock shelter in Croatia. Elsewhere in Europe, Neanderthals removed eagle talons, and one possible explanation is that they were

making jewelry or some other kind of ornament. And at Cueva de los Aviones in Spain, archaeologists found seashells decorated with red and yellow pigment—with holes deliberately punched in them. But without looking for the same kinds of wear marks as the ones on the Qafzeh shells, it's impossible to say whether the Cueva de los Aviones Neanderthals were using string or leather.

On the other hand, archaeologists have found seashells with naturally worn holes in them at sites in South Africa and Morocco, ranging from 115,000 to 70,000 years old. "It would be reasonable to assume that much like the Qafzeh shells, these were also strung in order to be displayed," wrote Bar-Yosef Mayer and her colleagues. So far, no one has examined those shells for traces of wear from string, however.

It's going to take more evidence to unravel the origins of string and all the technologies that tie into it. But Bar-Yosef Mayer is optimistic. "It is only in the last decade or so that we started finding these finds, due to increased use of microscopy in archaeological research," she told Ars. "So I'm confident there is more to come."

A note from Ars Technica

Archaeologist Ofer Bar-Yosef, a co-author of the study, died in March 2020. He spent nearly 60 years researching Paleolithic archaeology in the Levant, China, and the Republic of Georgia. At the time of his death, the study had been completed and the paper was still awaiting publication.

His wife, the study's first author, Daniella Bar-Yosef Mayer, told Ars, "I know he would have been very happy and proud to see this paper out."

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