Mesolithic 'mastics': a sticky problem
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Hafting materials are some of the oldest synthetic materials known to humans. We can well imagine that it was a short step from producing stone tools, to wanting to haft them to a handle for ease of use. But what were ancient humans using as their 'mastic'?

The formal definition of a mastic is a resin produced by trees of the genus Pistacia or a cement made from lime or powdered brick mixed with tar, resin or bitumen. In this paper, however, I will use the word mastic in a very loose sense, to describe natural products which were used as adhesives and hafting agents in the past. Exactly what material was used depends on the part of the world and the time period studied, but I will discuss mostly Mesolithic material from northern Europe as this is the period and area of my research.

Natural products such as tars, resins and waxes would have enjoyed a wide range of uses during the Mesolithic, not just as hafting agents but as multi-purpose adhesives, waterproofing materials, preservatives, lubricants, constituents of medicinal preparations and even as 'magic' media with ritualistic uses. People could have used all sorts of animal and plant resources and through chemical analysis we should be able to determine which sources they preferred. By studying samples from several different sites we can look for patterns of use, continuity and change, through time and space.

The earliest evidence we have for hafting comes from the Middle Palaeolithic and there is some evidence for hafting at Upper Palaeolithic sites also. In contrast there is much more material from Mesolithic sites, although still perhaps not as much as we might expect. The problem, of course, is that organic matter rarely survives, and that certain conditions such as an anaerobic environment are required to preserve it. Even when conditions are favourable, material is not always recovered, and this could be because it is simply going unrecognised or is being removed and destroyed by over-vigorous cleaning.

We are using chemical analytical techniques including gas chromatography (GC) and gas chromatography/mass spectrometry (GC/MS) to analyse samples of hafting materials from a number of sites in Britain and Scandinavia. The material includes a microlith from Star Carr with hafting tar still adhering to it, and a number of very well preserved slotted bone points (some retaining their microlith barbs) with tar remaining in their grooves from several sites in southern Sweden. Due to the limited Mesolithic material available from British sites, a Neolithic leaf-shaped arrowhead bearing traces of 'glue' from the Sweet Track site (Somerset Levels) was also studied.

In every case so far the mastic used has been found to be birch bark tar. This tar is made by heating the outer bark of birch trees in the absence of air to produce a brown/black sticky tar. How this was achieved in the preceramic Mesolithic is unknown. It seems a little strange that people should have chosen to use birch bark tar which obviously required considerable effort to manufacture. Pine trees were also common during the Mesolithic in northern Europe, and pine resin, which of course is very sticky, can be easily obtained. There must have been some particular reason why birch bark tar was preferred: perhaps its adhesive properties were superior, or perhaps it was considered special for some other reason. There is evidence of tar having been used in the Medieval period for protection against witches. Perhaps it had ritualistic uses in the Mesolithic as well.