New evidence for the earliest intentional human fire-making

Philip Guelpa
21 December 2025

The controlled use of fire was a key part of the development of human technology with a range of uses that greatly expanded human cultural evolution. Although evidence at a number of archaeological sites suggests the use of fire dates back over a million years, it is unclear whether the fire at these sites were created by the intentional, controlled ignition by human ancestors, the occasional exploitation of naturally occurring fire, or merely a coincidental co-occurrence. Newly published archaeological research, conducted by a multi-national team, provides strong indications that at least one group of human ancestors possessed the knowledge and the technique to create fire as needed, 400,000 (400 ka) years ago.

The article, published in the journal *Nature*, "Earliest evidence of making fire" (December 10, 2025), reports on the discovery of a site, known as Barnham, in Suffolk, the UK, where fire-cracked flint hand axes were found along with two pieces of iron pyrite near a buried layer of heated sediments. Iron pyrite has in more recent times been used to create sparks when struck by a piece of flint in order to ignite a fire. Since geological investigation indicates that iron pyrite is rare in the site's vicinity, the strong implication is that the pyrite was intentionally brought to that location in order to use in making a fire. The site dates to approximately 400,000 years ago. Previous substantial evidence of intentional fire making has been found at sites in France dating to around 50,000 years ago.

Other sites in Europe of similar age to Barnham include evidence of the use of fire but none has yet been found to have clear indications that the fire was intentionally created.

The area of heated sediment is concentrated in one portion of the site, with indications of repeated heating, suggesting the creation of a succession of fires in a delimited "hearth" location. This contrasts with the pattern of naturally occurring fire, which would be expected to be more widespread.

The knowledge of how to produce fire when needed represents a key advance, on par with the development of stone tool technology, in human evolution. As in the latter, there is cognitive leap from simply exploiting unmodified elements of nature, such as using a large pebble to crack open a nut, to intentionally modifying a natural object for a preconceived later use. By contrast, reliance on random, naturally occurring fires would have been unpredictable and of extremely limited potential for further development.

The contrast is depicted in the 1981 film *Quest for Fire*, in which a group of Neanderthals who do not know how to make fire lose the small flame they have been preserving and are forced to conduct a search for a new source of fire. They eventually encounter a group of modern humans who can make fire. Although no human remains have been found at Barnham, the age of the site suggests that it was occupied by Neanderthals, some of whom at least, based on the new research, did know how to make fire.

Other, unrelated research is reinforcing the interpretation that far from being driven to extinction by the migration of modern humans out of Africa, much interbreeding occurred between the two human populations, who were not as genetically distinct as previously thought. If the modern humans did not already have fire-making technology, they would certainly have acquired it from the Neanderthals.

The benefits of being able to create fire as needed are many and varied. Prominent among these are cooking, warmth, protection from predators and the extension of activities beyond the end of daylight, among others. Cooking would have expanded the range of foods that

would have been available and made more easily digestible. The availability of a source of warmth has obvious advantages, especially for occupation of colder regions. Furthermore, the ability to gather around a fire in the evening would have enhanced social interaction and cultural knowledge transmission.

Both Charles Darwin and Frederick Engels identified the use of fire as a key element in human evolution. Darwin stated that the making and using of fire was "probably the greatest [discovery] excepting language, ever made by man." Engels specifically refers to the importance of fire in "pre-digesting" meat as an important addition to the human diet in his *The Part Played by Labor in the Transition From Ape to Man.*