Humans Tamed Fire by 1 Million Years Ago

Kate Wong April 2, 2012

Image: matthewvenn via Flickr

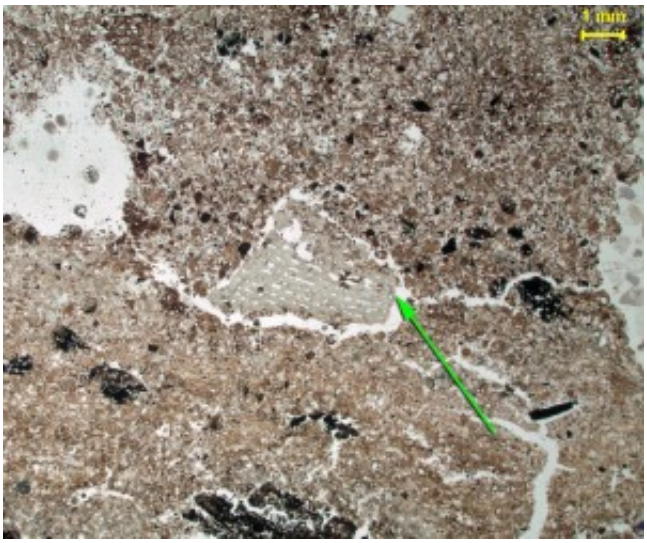
The ability to control fire marked a major milestone in human evolution, helping our ancestors stay warm in the cold, enhance the nutritional value of their food and keep predators at bay, among other uses. But exactly when humans mastered flame has proved difficult to establish. The oldest signs of fire in association with human activity date to around 1.5 million years ago, but because they come from open-air settings (as opposed to caves), the possibility exists that they represent wild fires instead of anthropogenic ones. Pretty much all of the unequivocal evidence of habitual fire use seemed to be less than 400,000 years old, the handiwork of Neandertals and anatomically modern humans. Until now.

Wonderwerk Cave, located in South Africa's

Researchers excavating the Wonderwerk Cave site in South Africa's Northern Cape province have uncovered burned remains that, at a million years old, precede those Neandertal and modern human hearths by a long shot. In a report detailing the finds, published online today in the *Proceeding of*

Northern Cape province, has yielded evidence of human-controlled fire dating to one million years ago. Image: Courtesy of M. Chazan

the National Academy of Sciences USA, Francesco Berna of Boston University and his colleagues say that the discovery is, to the best of their knowledge, "the earliest secure evidence for burning in an archaeological context."



Micrograph shows burned bone from Wonderwerk Cave. Image: Courtesy of P. Goldberg

Berna's team obtained blocks of sediment from a layer in the cave that contains stone tools made in the so-called Acheulean tradition, which is believed to have originated with the early human ancestor *Homo erectus*. Studying thin sections of the sediment blocks under a microscope, the scientists observed lots of ashed plant remains and tiny fragments of burned bone. Further analysis of the thin sections using Fourier transform infrared microspectroscopy, which reveals molecular structure, showed that some of the bones had been heated to temperatures of around 500 degrees Celsius. Preliminary data suggest that leaves and grasses, rather than wood, fueled these ancient fires. All told, the burned remains appear to have been the products of repeated, local combustion episodes that occurred in the vicinity of where the remains were

discovered, 30 meters in from mouth of the cave.

The authors observe that their findings stand as "the most compelling evidence to date offering some support for the cooking hypothesis," an idea put forth by Richard Wrangham of Harvard University. Wrangham has argued that the advent of cooking enabled the ballooning of human brain size that began around two million years ago in *H. erectus,* because it liberated more calories for energetically demanding brain tissue to use. A lack of indisputable evidence for human control of fire more than 400,000 years old has posed a major problem for this scenario. The findings from Wonderwerk Cave help to bridge that gap, yet the discovery still leaves another million years of cooking undocumented. But Berna and his collaborators suggest that microstratigraphic analyses of the sorts they conducted—studies that were previously restricted to much younger sediments--could reveal more evidence of fire use among our ancient forebears.

The views expressed are those of the author(s) and are not necessarily those of Scientific American.