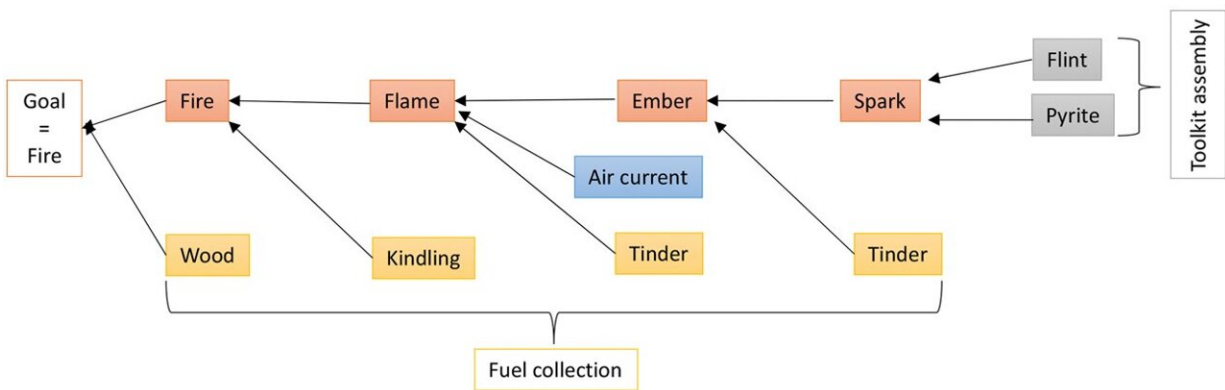


Neanderthal and human fire-making methods suggest different origins, shared intelligence

May 31 2023, by Justin Jackson



A material-and-action sequence for strike-a-light firemaking representing planning depth and prospective cognition. Credit: *Cambridge Archaeological Journal* (2023). DOI: 10.1017/S0959774322000439

Professor Marlize Lombard, University of Johannesburg, South Africa, who has a research focus in stone age archaeology and Peter Gärdenfors, a professor of cognitive science at the University of Lund, Sweden, teamed up to investigate the cognitive implications of early fire-making techniques.

In the paper, "Minds on Fire: Cognitive Aspects of Early Firemaking and the Possible Inventors of Firemaking Kits," published in the *Cambridge*

Archaeological Journal, the researchers make a case for separate inventions of fire-making techniques by Neanderthal and previous modern human cultures, with cognitive implications for each.

The team analyzed the two dominant past hunter-gatherer fire-making techniques, the strike-a-light and the manual fire-drill. The methods were assessed in terms of causal, social and prospective reasoning.

The more complicated technique of the fire-drill kit begins in Africa, where it could only have been invented by modern humans. Here the researchers point out that fire was used for sophisticated technological processes, such as the heat treatment of rocks, to improve their knapping ability in southern Africa since ~160,000 years ago.

Researchers suggest strike-a-light fire-making was most likely invented by Neanderthal populations in Eurasia. Archaeological evidence of fire is relatively regular in Europe ~130,000–35,000 years ago.

There is even indirect evidence of controlled fire use going back ~200,000 years when the world's first manufactured synthetic adhesive, birch tar, was likely [heated for distillation in low-oxygen earth ovens](#).

The cognitive involvement in the strike-a-light method is relatively low in terms of the execution of banging the right rocks together. As Neanderthals were prolific makers of stone tools with flint knapping techniques, the discovery and adoption of what is essentially a flint knapping method of fire creation would not be surprising.

The distribution maps for strike-a-light versus fire-drill fire-making techniques support a hypothesis wherein the strike-a-light method may have been more successful in wetter, high-latitude regions and fire-drills best suited for drier, warmer areas. Regardless of complexity, both groups used the best or most convenient option for their location.

While fire use by early hominids could be millions of years old, the researchers were focused on fire-making with tool sets. The researchers hypothesize that fire-making requires a more complex cognitive process than the ability to use and maintain a natural fire.

Fire-making requires a toolset for ignition, indicating a learned knowledge of the method and the ability to craft or collect such a toolset. The right type of burn materials needs to be collected, from easily ignitable to start the fire to slower burning to keep the fire going once it has started. Once the fire is going, some foresight on how it will be used or contained keeps it from becoming a hazard.

Each of these phases involves different forms of causal thinking, cultural transmission and rehearsal, as well as cooperation in collecting and managing the [fire](#), suggesting that both Neanderthals and their contemporary [modern humans](#) had these cognitive capacities, hinting that such abilities may have pre-dated the evolutionary split between the species over 500,000 years ago.

More information: Marlize Lombard et al, Minds on Fire: Cognitive Aspects of Early Firemaking and the Possible Inventors of Firemaking Kits, *Cambridge Archaeological Journal* (2023). [DOI: 10.1017/S0959774322000439](https://doi.org/10.1017/S0959774322000439)

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Citation: Neanderthal and human fire-making methods suggest different origins, shared intelligence (2023, May 31) retrieved 8 May 2024 from <https://phys.org/news/2023-05-neanderthal-human-fire-making-methods-intelligence.html>

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