Discovering when the first early modern humans left Africa

Previous evidence suggested that early modern humans left Africa 60,000 to 120,000 years ago, but new evidence has shown this event may have occurred much earlier. Professor Mina Weinstein-Evron (University of Haifa, Israel) and Professor Israel Hershkovitz (Tel Aviv University, Israel), together with their colleagues, have found a modern human fossil at Misliya cave in Israel, which dates to between 177,000 and 194,000 years ago. These might be the first modern humans outside of Africa. They have also discovered a collection of shells, a variety of stone tools, abundant remains of hunted animals, and evidence for repeatedly used hearths.

It is accepted that Homo sapiens (humans) originated in Africa, as did all other hominins. Hominins are the group containing humans and human-like species, including Neanderthals and other relatives of Homo sapiens. Humans are the only extant member of the group of hominins. This is a subsection of hominoids, which are all the great apes including chimpanzees, gorillas and orangutans, as well as humans. Humans left Africa to settle all across the world, probably multiple times, and to do this they would have travelled the Levantine corridor. This makes the Mount Carmel - Galilee area of Israel one of the richest in the world for Middle Pleistocene Homo fossils.

THE LEVANTINE CORRIDOR

The Levantine corridor is the narrow stretch of land in the Eastern Mediterranean region, at the crossroads of Africa, Asia and Europe, which would become the Mediterranean region, at the crossroads of Africa, Asia and Europe, which would become the Mediterranean Sea and deserts, the Levantine corridor is the ideal location to search for evidence of early human movement due to the restricted area. There are several archaeological dig sites of importance in the corridor, and many interesting finds with significance for human evolution. Professor Weinstein-Evron and Professor Hershkovitz and their colleagues, have been investigating a site known as Misliya cave on the slopes of Mount Carmel, Israel. They believe they may have found evidence of the earliest modern humans outside of Africa.

HUMAN FOSSILS

The most significant find at the Misliya cave site was the discovery of half a human upper jaw (maxilla) with attached teeth. Three different dating methods were used at three different laboratories to determine the age of the fossil. The first was uranium-thorium dating (also called U-series dating), which uses the rate of radioactive decay of uranium to calculate the age of calcium carbonate materials such as bone. The second method was combined U-series and electron spin resonance dating, which calculates the age of tooth enamel by the level of radiation uptake in the material. The final method used was thermoluminescence dating, which dates burnt flints by the amount of radiation they have absorbed since they were last heated. All three methods gave consistent results, dating the jaw as being between 177,000 and 194,000 years old.

Analysis of the physical features of the jawbone and teeth confirmed that this fossil belonged to an anatomically modern human. Using the term anatomically modern humans distinguishes Homo sapiens from earlier human species as determined by the physical characteristics. Ancestors of modern humans (earlier members of the Homo genus, such as Homo erectus) left Africa before Homo sapiens’ appearance. However, the morphology of the Misliya upper jaw and the attached teeth is consistent with belonging to an anatomically modern human. There are features present that can occasionally be found in members of earlier or even contemporaneous (such as Neanderthals) hominin species, but the combination of features exhibited by the Misliya Homo is specific to Homo sapiens.

This discovery is therefore evidence that early modern humans left Africa at least 177,000 to 194,000 years ago (probably as early as 250,000 years). This is considerably earlier than any other finds indicative of modern humans outside of Africa. Up until the Misliya fossil discovery it was estimated from fossils found at the nearby Shihul and Qafzeh caves, that early anatomically modern humans left Africa 90,000 to 120,000 years ago. Notably, these dates already challenge our understanding of the time-span of Homo sapiens evolution, which must have occurred much earlier. If modern humans started traveling out of Africa around 200,000 years ago, they must have originated in Africa much earlier than previously appreciated – somewhere between 500,000 and 700,000 years ago.

PIECING TOGETHER THE PUZZLE

Importantly, the finding that the Misliya fossil dates back 177,000 to 194,000 years ago changes our understanding of the time sequence of Homo sapiens evolution, which must have occurred much earlier. This finding turns our previous understanding of the time-span of Homo sapiens evolution, which must have occurred much earlier. This finding turns our current understanding – of modern human dispersal and the history of modern human evolution – on its head.

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This discovery is evidence that anatomically modern humans left Africa at least 177,000 years ago. At Misliya cave, the earliest evidence of anatomically modern humans outside of Africa, researchers have also described a number of other interesting finds at the Misliya cave site. One of the first is the evidence of the use of fire. A number of small hearths as well as one large repeatedly-used hearth have been discovered at the site. The hearths are visually distinguishable as areas where the sediment is of a different colour from the surrounding area, and analysis of the spatial taphonomy of mammal remains reveals the presence of ashes and burnt bones or fossils. The large size, density and state of burnt remains, and recurrent mode of space use around it characterise the one hearth which was used repeatedly over a considerable length of time. This is unique evidence of long-term, repeated occupation of this site by early humans, compared to the apparent short-term occupation of other locations.

Research Objectives

The research of Mina Weinstein-Evron and Israel Herkowitz centres on the prehistory of the Levant and Old World.

References


In your opinion, which of the finds at Misliya cave is the most important or the most exciting?

The Misliya upper jaw represents the earliest known evidence for the presence of Homo sapiens outside of Africa. Deciphering the Misliya migrants’ intricate relationships with local populations as well as ensuring hominin dispersals, such as the Neanderthals, are the main challenges of our future research. The jaw was found within an extremely rich archaeological layer providing comprehensive views on the lifeways, technological innovations and ancient environments of the cave’s inhabitants. The Misliya people were capable hunter-gatherers and highly advanced technologically, introducing such innovations as sophisticated pre-determined methods for tool manufacture (Levallois method), fist projectiles and hafting. Marine shells herald such practices in much later sites, when they were also used as decorative elements.