

New dating methods amongst the Top 10 Scientific discoveries of the Year

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New methods were used to date the Hofmeyr skull. Credit: Luci Betti-Nash

Time Magazine has named a study by Oxford researchers, using new dating techniques on a human skull to help find out where our most recent common ancestor came from, as one of the Top 10 Scientific Discoveries of the Year.

The skull was discovered more than 50 years ago near the town of Hofmeyr in the Eastern Cape Province of South Africa. It is thought to be 36,000 years old, according to a study published in the journal *Science* in January 2007. The finding by Oxford researchers in collaboration with Stony Brook University, New York, supports a growing body of

genetic evidence which suggests that humans originated in sub-Saharan Africa and migrated into the Old World around this date.

The international team used a new application of dating methods developed by Dr Richard Bailey and his colleagues from the School of Geography and the Environment, the Research Laboratory for Archaeology and the Department of Earth Science. Traditional radiocarbon dating of the Hofmeyr skull was not possible because so much carbon had been leached from the bone while it lay buried in sediment.

Instead the researchers measured the amount of radiation that had been absorbed by sand grains that filled the inside of the skull's braincase. Measurements of radioactive isotopes in the sediment, combined with a sophisticated radiation transport model using data from a CT scan of the skull, allowed them to calculate the yearly rate at which radiation had been delivered to the sand grains. From this, the researchers were able to determine that the Hofmeyr skull had been buried for 36,000 years.

Commenting on Time magazine's recognition Dr Bailey said: 'It's great to see it in this Top Ten for 2007. The work we did was a genuine team effort and all involved deserve equal credit. I'm looking forward to seeing the results of this work used and also to applying our methods in new contexts. There's still lots to be discovered!

'Many problems we face in understanding the evolution of humans and the evolution of the wider natural environment can be expressed in terms of hypotheses related to the timing of key events. This is why the range of dating techniques available to us is so important in so many areas of science.'

The discovery is key to knowing more about a critical period in human evolutionary history, given the lack of human fossils in sub-Saharan

Africa between 70,000 and 15,000 years ago. During the middle of this period sophisticated stone and bone tools and artwork first appeared in sub-Saharan Africa, and anatomically modern people are seen for the first time in Europe and Western Asia in what archaeologists refer to as the ‘Upper Paleolithic’ period.

Research conducted in the Max Planck Institute in Leipzig, Germany, established similarities between the Hofmeyr skull and contemporaneous Upper Paleolithic skulls from Europe. These findings, combined with the new dating evidence, provide strong support for the genetics-based ‘Out of Africa’ theory, which argues that modern humans inhabiting Western Asia in the Upper Paleolithic period should also be found in sub-Saharan Africa from around 36,000 years ago. The skull from South Africa should provide the first fossil evidence in support of this argument.

Source: Oxford University

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