

Human Origins Recede in Australia

People go way, way back Down Under. That, at least, is the contention of scientists who have uncovered preliminary evidence that humans lived in Australia far earlier than previously thought, sometime between about 116,000 and 176,000 years ago. What's more, the researchers report having found the oldest known artistic renderings, with an estimated age of 58,000 to 75,000 years.

Humans may have traveled over water from Southeast Asia to Australia when an ice age lowered sea levels and narrowed the gap between those land masses, prior to 135,000 years ago, assert archaeologist Richard L.K. Fullagar of the Australian Museum in Sydney and his colleagues.

Fullagar's group presented its findings at a press conference last week in Sydney and is slated to publish them in the December *ANTIQUITY*.

Until now, investigators had placed the earliest human occupation of Australia at around 60,000 years ago. The oldest art had been considered a set of 33,000-year-old cave paintings in France (SN: 1/28/95, p. 52).

"These [new dates] are surprisingly early for a human presence and the making of rock art in Australia," remarks Christopher Chippindale, an archaeologist at Cambridge University in England and the editor of *ANTIQUITY*. "More work will need to be done to confirm the dates."

Fullagar and his coworkers have conducted excavations since 1992 at a northwestern Australian site called the Jinmium rock shelter. A massive stone

wall there contains thousands of small, circular engravings arranged in rows.

The group dated sediment at the site with thermoluminescence, a technique in which soil samples are heated to measure the amount of radioactive energy they have accumulated over time.

Stone artifacts, including some with sharpened edges, and starch grains turned up in soil sandwiched between dates of approximately 116,000 and 176,000 years old. More stone implements and starch remains, as well as red ochre, appeared in sediment dated to 75,000 to 116,000 years old.

The excavations also uncovered a fragment of sandstone containing circular engravings like those on Jinmium's huge stone wall. This find dates to the period from 58,000 to 75,000 years ago, making it the oldest rock art in the world, Fullagar contends. This age estimate indicates that artistic expression extends back either to a transitional, or archaic, version of *Homo sapiens* or to early members of modern *H. sapiens*, the Australian scientists argue.

Paul S.C. Taçon, a rock art researcher at the Australian Museum who has examined the Jinmium material, concurs that Fullagar's group has found the oldest known example of art. However, the abstract nature of the engravings leaves open the question of whether they are art in the same sense as ancient rock and cave depictions of animals and events, Chippindale holds.

The doubling or tripling of age estimates for the settlement of Australia also

adds a new twist to the scientific debate over modern humanity's origins (SN: 6/20/92, p. 408), Chippindale adds.

Those who argue that *H. sapiens* arose independently in several parts of the world over at least the past 2 million years welcome the new evidence.

"If these dates hold up, they definitely support the multiregional hypothesis," asserts Milford H. Wolpoff of the University of Michigan in Ann Arbor, a leading proponent of the idea.

Australian fossil evidence suggests that the region's earliest inhabitants resembled archaic *H. sapiens* in Indonesia, whose fossils date to at least 100,000 years ago, Wolpoff holds. Combined with Fullagar's results, he proposes, this indicates that art, language, and other cognitive achievements usually attributed only to modern humans could have emerged in geographically dispersed groups, each with distinctive skeletal variations on an *H. sapiens* theme.

Scientists who theorize that modern humans evolved in Africa and then spread throughout the world remain steadfast.

"If these new dates are accurate, they offer remarkably early evidence of modern human behavior," says Ian Tattersall of the American Museum of Natural History in New York. "But that doesn't cause me to question the theory that there was a single, African origin of modern *Homo sapiens*."

In contrast to Wolpoff, Tattersall argues that the Australian fossils display modern human features rather than those of an archaic form. — B. Bower

Detecting a sound heartbeat

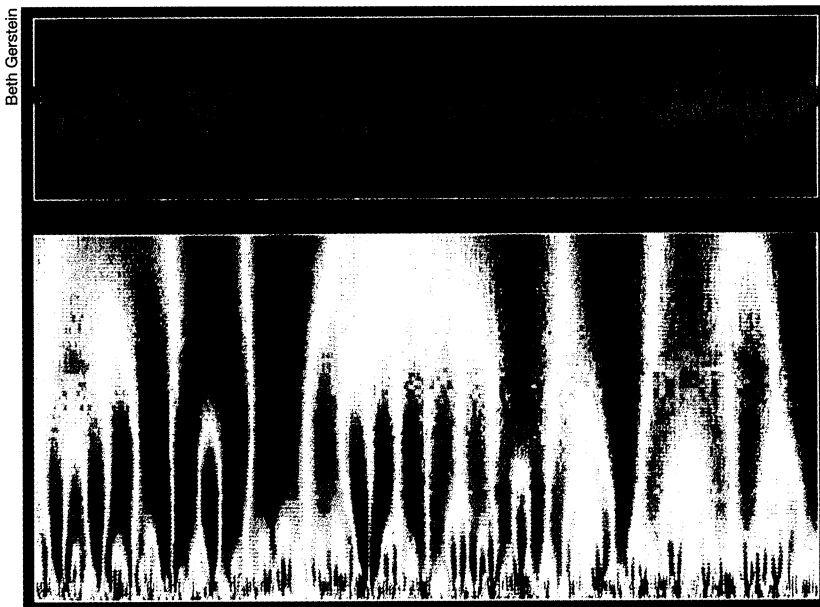
At roughly one beat per second, the rhythm of the human heart can serve as a reasonably steady timekeeper. Subtle variations in that rhythm, however, may signal whether or not a heart is healthy.

Reporting in the Sept. 26 *NATURE*, Plamen C. Ivanov of Boston University and his coworkers have developed a mathematical technique for finding patterns in a sequence of beat-to-beat intervals. These patterns enable the researchers to distinguish between healthy people and those suffering from certain heart irregularities.

Ivanov and his colleagues start by measuring for each person the time intervals between successive beats on an electrocardiogram (EKG). These values, derived from 6 hours of heartbeat data, are then plotted against time (top).

The researchers use a technique, based on mathematical forms called wavelets, that enables them to identify large-scale patterns even when the signals change as a result of background influences. For a healthy heart, these correlations appear as arches in plots displaying the wavelet analysis (bottom). Data from sick hearts lack these arches.

—I. Peterson



Beth Gerstein