Modern Humans May Need Redefining

Many paleoanthropologists contend that fragmentary fossils found in caves at the mouth of South Africa's Klasies River represent anatomically modern humans who lived in Africa more than 80,000 years ago. Thus, the Klasies River Mouth specimens — consisting of several partial lower and upper jaw bones, about a dozen cranial fragments, a number of isolated teeth and four lower-body bones — provide critical support for the theory that modern human populations originated in Africa around 200,000 years ago and then spread throughout the Old World, replacing groups such as the Neanderthals.

But two scientists at the University of Michigan in Ann Arbor argue that the Klasies folk were probably a transitional form of *Homo sapiens* preceding anatomically modern humans. In a controversial presentation at the meeting of the American Association of Physical Anthropologists last week in Miami, Rachel Caspari and Milford H. Wolpoff reported that the South African remains differ in important ways from anatomically modern humans living in southern Africa several thousand years ago.

Anatomical variation is apparently the rule both in the Klasies fossils and in today's human populations, the researchers assert. They note that the thickness and breadth of the lower jaws and the size of molar teeth vary markedly in the Klasies finds, and that modern people living in some regions, such as Asia, have smaller, lighter cranial bones than those living elsewhere, although Asians are not necessarily more anatomically modern.

"It's hard to say what 'anatomically modern human' really means because of geographic variations in modern human anatomy," Wolpoff says.

These variations often obscure trends toward modern human anatomy in the fossil record, Caspari adds.

Despite this confusion, the new analysis of the Klasies River Mouth bones adds fuel to the theory, championed by Wolpoff, that modern humans evolved simultaneously in several parts of the world (SN: 2/27/88, p.138). In this scenario, ancestral populations of *Homo erectus* independently evolved into archaic *Homo sapiens* and then into fully modern humans.

Caspari and Wolpoff compared the Klasies River Mouth skull remains with 36 human crania from a nearby site dating to between 1,000 and 9,000 years ago. Although the two samples share some anatomical features, the Klasies fossils display a surprising number of "archaic" characteristics, they note. For example, bones from the lower jaw, the inner eye and the cheek are considerably thicker in the Klasies specimens. One Klasies jaw bone shows clear evidence of a chin, but three others do not. An analysis of dental roots — empty sockets that once held teeth — indicates that two Klasies individuals had significantly larger teeth in the front of their mouths than anyone in the comparison group.

Although some investigators maintain that the age of the Klasies River Mouth caves remains in question, Caspari and Wolpoff say several converging lines of evidence — including electron spin resonance data and the presence of extinct animal remains — convincingly date the site to about 100,000 years ago.

Their conclusions were immediately challenged by G. Philip Rightmire of the State University of New York at Binghamton. "If the Klasies remains were compared to other modern populations, they would still fall within the range of anatomically modern humans," Rightmire contends.

C. Loring Brace of the University of Michigan echoes Rightmire's point, suggesting the Klasies bones may show considerable similarities to those of modern Eskimos.

Even if those predictions are accurate, Caspari says, the Klasies specimens depart significantly from the cranial remains of modern people who evolved in the same part of Africa.

Rightmire also challenges the reliability of estimates of tooth size derived from empty roots in a jaw, but Wolpoff says root dimensions correlate closely with tooth size in living humans.

The bottom line, according to Wolpoff, is that the anatomical definition of "modern human" may need revision. A commonly accepted view, proposed in 1988 by Christopher B. Stringer and Peter Andrews of the British Museum in London, emphasizes skeletal contrasts between Neanderthals and modern humans but does not account for the tremendous anatomical variation among different regional strains of so-called modern humans, Wolpoff asserts.

"Stringer and Andrews' definition of anatomically modern humans excludes about one-sixth of the modern Australian skeletons we've studied," he says.

— B. Bower

Ultraviolet levels climb in Swiss Alps

Measurements made in the crisp air of the Swiss Alps indicate that levels of ultraviolet-B (UV-B) radiation there have increased during the last decade, apparently due to a thinning of the stratospheric ozone layer. Scientists still cannot say whether UV-B is increasing in urban areas in Europe or the United States. In fact, one study has suggested that ozone pollution in cities may actually overcompensate for ozone loss in the stratosphere.

But at a remote research station high in the Alps, UV-B climbed by 0.5 to 1 percent per year between 1981 and 1989, report Mario Blumthaler and Walter Ambach of Austria's University of Innsbruck. UV-B radiation — with wavelengths between 290 to 330 nanometers — causes sunburn and increases the risk of skin cancer and cataracts.

"If this were to continue to rise at this rate, it would become a very serious problem," Blumthaler told SCIENCE NEWS. He and Ambach describe their findings in the April 13 SCIENCE.

Scientists expect increasing UV-B levels to reach Earth's surface as human-made chlorine chemicals thin the stratospheric ozone layer, which normally absorbs most UV-B. Between 1969 and 1986, stratospheric ozone over the northern midlatitudes, including the United States and Europe, dropped by about 3 percent on average. Yet measurements taken two years ago at a network of U.S. stations indicate UV-B *decreased* between 1974 and 1985 (SN: 2/20/88, p.119).

Experts are unsure how to explain the decrease. Levels of harmful ozone pollution have been rising in many cities, and some researchers suggest such pollution may absorb the extra ultraviolet light streaming down through the thinning stratospheric ozone layer.

Others question the reliability of the Robertson-Berger meters used in both the U.S. and Alps studies. "I don't regard the Robertson-Berger measurements as being necessarily correct," says F. Sherwood Rowland of the University of California, Irvine.

John DeLuisi of the National Oceanic and Atmospheric Administration in Boulder, Colo., contends the meter was not designed to measure long-term trends in UV-B and says those who use it have yet to prove the device can sustain its accuracy over many years. He and his colleagues are now attempting to resolve whether the U.S. network of Roberston-Berger meters has remained accurate.

— R. Monastersky