Stone Tools Point to Creative Work by Early Humans in Africa

By JOHN NOBLE WILFORD

At a rock shelter on a coastal cliff in South Africa, scientists have found an abundance of advanced stone hunting tools with a tale to tell of the evolving mind of early modern humans at least 71,000 years ago.

The discovery, reported in the current issue of the journal Nature, lends weight to the hypothesis that not only did anatomically modern Homo sapiens emerge in Africa but also, to a previously unsuspected extent, their cognitive capacity for abstract and creative thought and the conception of increasingly complex technologies associated with modern human behavior.

The report describes the stone tools as microliths, thin blades about only an inch long that could be affixed to wood or bone. These tipped projectiles were either arrows propelled by bows or, more likely, spears launched by atlatls, wooden extensions of the throwing arm that act as a lever, imparting greater speeds and distances to the weapon. This technology, the researchers said, may have been pivotal to the success of Homo sapiens as humans left Africa and entered Eurasia some 50,000 years ago, encountering Neanderthals who were limited to hand-thrown spears.

The new evidence appeared to answer some critics who have contended that previous findings of early modern human behavior in Africa have been spotty and short-lived — a "flickering" pattern of experimentation with little or no continuity over time and across regions. The rock shelter excavations at Pinnacle Point, near Mossel Bay, east of Cape Town, show that this micro-blade technology continued over 11,000 years, until 60,000 years ago. The report says the technology was also "typically coupled to heat treatment" processes in shaping sharp and durable blades that persisted for nearly 100,000 years.

In their article in Nature, the researchers conclude, "Early modern humans in South Africa had the cognition to design and transmit at high fidelity these coupled recipe technologies."

One of the authors, Curtis W. Marean, director of the research and a paleoanthropologist at the Institute of Human Origins at Arizona State University, said, "Every time we excavate a new site in coastal South Africa with advanced field techniques, we discover new and surprising results that push back in time the evidence for uniquely human behaviors."

The lead author of the report was Kyle S. Brown, a specialist in ancient stone tools who is associated with the University of Cape Town. Prior investigations showed that this microlithic technology appeared briefly between 65,000 and 60,000 years ago and then seemed to vanish. Such thin blades had not been found in abundance until about 20,000 years ago.

Dr. Marean said in a telephone interview that while some archaeologists were still skeptical of a strong African role in modern human behavior, there was diminishing support for the more Eurocentric
"creative explosion" concept, born of bedazzlement over the cave art and fine tools of Upper Paleolithic Europe, which became widespread after the arrival of modern humans.

"Ninety percent of scientists are comfortable that fully modern humans and human cognition developed in Africa," Dr. Marean said. "Now they have moved on. The questions are, how much earlier than 71,000 years did these behaviors emerge? Was it an accretionary process, or was it an abrupt event? Did these people have language by this time?"

Like many other archaeologists, Dr. Marean and his team have concentrated their investigations in the caves and rock shelters overlooking the Indian Ocean. In a global ice age beginning 72,000 years ago, many Africans fled the continent’s arid interior, heading for the more benign southern shore. Access to seafood and more plentiful plant and animal resources may have increased populations and encouraged technological advances, Dr. Marean said.

The well-preserved artifacts at Pinnacle Point, collected over a recent 18-month period, led the researchers to conclude that the advanced technologies in Africa “were early and enduring.” Other archaeologists who reached different conclusions may have been misled by the “small sample of excavated sites,” they said.

Richard G. Klein, a paleoanthropologist at Stanford University who has favored a more sudden and recent origin of modern behavior, about 50,000 years ago, questioned the reliability of the dating method for the tools, noting that “there is another team that has already argued for a much longer” time period for the toolmaking culture.

The new report, Dr. Klein said in an e-mail, “does illustrate, as have many others, that the archaeological evidence for modern human origins is controversial.”

The hypothesis of earlier African origins of modern human behavior and cognition has been gaining strength over the last decade or two. Two archaeologists, Alison S. Brooks of George Washington University and Sally McBrearty of the University of Connecticut, led the charge with publications of their analysis of increasing evidence of African art and ornamentations expressing a modern cognitive capacity and symbolic thinking.

In a commentary accompanying the Nature report, Dr. McBrearty, who was not involved in the research, wrote that she believed that “modern cognitive capacity emerged at the same time as modern anatomy, and that various aspects of human culture arose gradually” over the course of subsequent millennia.

Dr. McBrearty gave a cautious endorsement of the new research from Pinnacle Point relating complex technologies to the evolution of modern behavior in Africa. She said the findings “go some way to supporting this hypothesis.”