Anthropology

Bruce Bower reports from the annual meeting of the American Association of Physical Anthropologists in New York City

Split that species

It has long been accepted that large-brain hominids that lived in Africa, Asia and Europe between about 1.6 million and 300,000 years ago should be classified as a single species, *Homo erectus*. But this rule of thumb, says Robert V. Moore of the University of California at Berkeley, has obscured *H. erectus*. "You can't lump diverse groups of fossils together simply because they're in the same broad time range," he contends.

Moore reports that early *H. erectus* specimens from Africa show marked differences from later Asian remains. He proposes that the Asian fossils represent *H. erectus*, while the African fossils present features of an intermediate species between *H. erectus* and its predecessor, *H. habilis*.

Moore's interpretation comes on the heels of a similar claim made in the JOURNAL OF HUMAN EVOLUTION last year. Scientists have underestimated the number of species in the hominid fossil record, argued Ian Tattersall of the American Museum of Natural History in New York City. Fossils classified as *H. erectus* may have been from several species, he said, only one of which was ancestral to later hominids.

Uncovering life by an ancient lake

The 700,000-year-old Olorgesailie lake basin in Kenya has yielded large accumulations of stone hand axes and animal bones that have been proposed by some investigators as markers of hominid "home bases" and butchery sites. The hand axes, however, have turned up mainly at sandy stream channels, suggesting that they were moved considerable distances by water, and most of the thousands of animal bones are poorly preserved.

Last summer, Richard Potts of the Smithsonian Institution in Washington, D.C., and his colleagues excavated along an outcrop by the ancient lake basin in search of better-preserved bones and stone tools in undisturbed sediments. A number of these assemblages turned up, reports Potts, including the skeleton of a now-extinct elephant surrounded by stone hand axes. There appear to be tool-cut marks on many of the recovered bones, but closer inspection of the fossils with scanning electron microscopes will help to clarify whether the animals were butchered.

Surprisingly, says Potts, hand axes were abundant at digging locations farther away from the lake, but few were uncovered near the lake shore. Several obsidian and quartzite tools were also found. Since these materials are not available in the immediate vicinity of Olorgesailie, he notes, hominids at the site probably made use of a fairly wide range of terrain.

More carnivore fossils were found than in previous excavations at Olorgesailie, says Potts, but carnivore gnawing is rare on bones associated with stone tools. "While hominids were very active near the lake," he explains, "carnivores were not active at the same places."

This entire pattern of hominid land use contrasts with evidence for hominid activities 1.8 million years ago at nearby Olduvai Gorge in Tanzania, observes Potts. Olduvai hominids appear to have used only local materials for tools, and there is evidence of extensive carnivore gnawing on animal bones associated with stone tools.

In a related presentation, Pat Shipman of Johns Hopkins University in Baltimore said that the differences between cut marks made by tools and those made by animals trampling on bones found at Olduvai are becoming clearer. Trampling marks are usually located on bone shafts, she says, while the placement of tool marks is "highly variable." Many cut marks on Olduvai bones are placed without reference to major muscle masses, she points out. This renders the hypothesis that hominids scavenged at the site "plausible, but far from certain," says Shipman.

Biomedicine

Toward a TB vaccine and a leprosy link

Vaccinating against tuberculosis has been largely a hit-or-miss affair. While the bacillus Calmette-Guérin (BCG) vaccine used for the last 50 years has been protective in some places, it's been ineffective in others. Tuberculosis remains a major health problem, with about 10 million new cases occurring per year, according to the World Health Organization (WHO).

In the hope of developing a more effective vaccine, WHO has been working to systematically identify antibodies against the mycobacterium that causes tuberculosis. Recent work by Robert N. Husson and Richard Young at the Whitehead Institute for Biomedical Research in Cambridge, Mass., may help WHO move toward its goal of an improved vaccine.

In the March 31 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, Husson and Young report that they have identified the genes that direct the mycobacterium to produce five major protein antigens. This will help them to determine the importance of these antigens in stimulating an immune response against the tuberculosis mycobacterium.

The researchers suspect that one particular antigen, having a molecular mass of 65,000 daltons (Da), does play an important immunological role in tuberculosis. Moreover, they found this same antigen on a related mycobacterium that causes leprosy. Since the BCG vaccine has been shown in some cases to protect against leprosy as well as tuberculosis, says Husson, it's possible that the 65,000 Da "may be one of the antigens present in BCG that's involved in providing protection against [both diseases]."

Why does gold help arthritics?

For decades, physicians have regularly prescribed compounds containing gold for patients suffering from rheumatoid arthritis. But scientists, while having a number of theories, have yet to understand how the gold compounds work against the crippling disease. A group of chemists at Harvard University now offers a possible explanation to ponder.

In the April 3 SCIENCE, Elias J. Corey and his co-workers posit that gold, in at least one therapeutic compound, prevents the oxidation of cell membranes by dioxygen molecules that are in a high-energy, electronically excited state. In general, oxidation processes damage cell membranes and are thought to play an important role in rheumatoid arthritis. Excited dioxygen molecules have yet to be detected in humans. But Corey's group has shown for the first time that another molecule, superoxide ion — which *is* known to form in the body during respiration and immune responses — can be converted to the excited dioxygen under conditions similar to those of the body.

Equally important, Corey's group also showed that gold rapidly quenches excited dioxygen molecules, bringing them down to a low-energy, harmless state. Corey notes that gold may be working in other ways, such as inhibiting enzymes that break down proteins. "So we can't say that this is *the* mechanism of the beneficial effect," he says. "But it's one interesting possibility that could be used as a working hypothesis to generate new substances for therapeutic study."

Heart transplant guidelines

The U.S. Department of Health and Human Services, having decided that heart transplants are no longer experimental procedures, now allows Medicare coverage of the surgery. According to its guidelines, issued April 6, a heart transplant facility applying this year for Medicare approval would have to show that it had already performed at least 36 transplants, with 12 of them in 1986 and 12 in 1985. In addition, 73 percent of a facility's previous heart transplant patients should have survived the first year after surgery and 65 percent should have lived through their second year.