African fossils flesh out humanity's past

Scientists have announced the discovery of 2.5-million-year-old fossils in East Africa belonging to a new species in the human evolutionary family. The evolutionary status of the species, dubbed *Australopithecus garhi*, remains unclear, although it may represent an ancestor of the *Homo* lineage, to which modern humans belong.

The same 2.5-million-year-old sediment that yielded these fossils contains animal bones bearing the earliest known traces of butchery, reports a team headed by anthropologist Berhane Asfaw of the Rift Valley Research Service in Addis Ababa, Ethiopia. Either *A. garhi* or an as yet unknown but related species of that time used stone tools to remove meat and marrow from antelope and wild horse carcasses, the scientists assert.

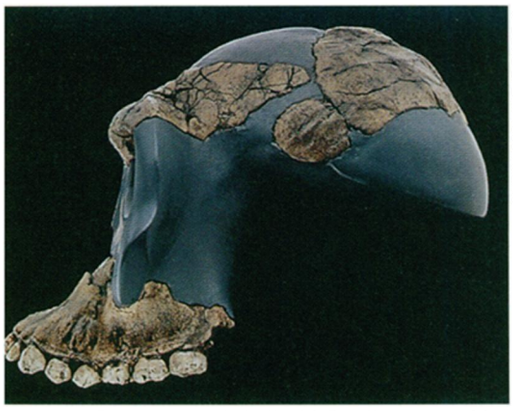
The find signals an early shift to meat and marrow consumption for obtaining the energy needed to support long-range migrations of human ancestors, Asfaw and his coworkers contend in the April 23 SCIENCE.

"The development of stone-tool technology allowed for this dietary revolution," says team member Tim D. White of the University of California, Berkeley. "This is the earliest evidence of a key adaptation that let our ancestors spread beyond Africa."

A meager fossil record exists for human ancestors that lived from 3 million to 2 million years ago. Attempts to reconstruct their evolutionary relationships and pinpoint the roots of the *Homo* genus routinely trigger scientific disputes (see story, p. 267).

The new discoveries come from a site in Ethiopia's Middle Awash research area, where three desert valleys intersect. Beginning in 1996, team members found limb and skull fossils in soil located next to what was once an ancient lake.

The remains show novel combinations of anatomical traits, inspiring the species' designation as *A. garhi*. The word "garhi" means "surprise" in the language of Ethiopia's Afar people.



Reconstructed skull of 2.5-million-year-old Ethiopian species, Australopithecus garhi.

The new species possesses much larger teeth than *Australopithecus afarensis*, the species best known for the specimen called Lucy. *A. afarensis* lived in East Africa from 4 million to 3 million years ago. Much like *A. afarensis*, *A. garhi*'s face projects forward and its small braincase features a crest.

Lower-body fossils from the Ethiopian site include a long, apelike forearm and a relatively long upper leg similar to that of later human ancestors. These finds have not been firmly assigned to the same species as the skull remains.

Analyses of volcanic ash just below the finds, bones of extinct animals found near them, and remnants of Earth's magnetic signal trapped in soil layers at the site independently confirm the fossils' age.

Numerous bones of antelope and wild horses dating to the same time as *A. garhi* exhibit incisions made by stone tools during meat removal as well as breakage attributed to marrow extraction. Stone tools previously found at a nearby 2.5-million-year-old site were also probably used to extract marrow, the researchers suggest (SN: 4/15/95, p. 237).

Anthropologist Daniel E. Lieberman of George Washington University in Washington, D.C., calls the new finds "exciting," but he cautions that "it's still anybody's guess" as to the position of *A. garhi* in the human evolutionary family. —*B. Bower*

Nutritionists debate soy's health benefits

The simple soybean is turning into one of nutrition's biggest puzzles.

Scores of presentations at the Experimental Biology '99 meeting this week in Washington, D.C., examined the relationship between soy products and cancer. In almost all cases, the researchers agree, soy seems to be a cancer fighter. However, a soybean component that has been touted for its health benefits is not living up to expectations. For postmenopausal women, the story may be even more complicated.

Reaffirming soy's potential health value, several studies at the conference reported that diets rich in the legume protect rats against colon cancer, breast cancer, and prostate cancer. Moreover, men who ate 39 grams of soy protein each day for 1 year had fewer colon cells in the process of dividing than did men who didn't eat soy, reports Deepa Thiagarajan of Michigan State University in East Lansing. With fewer cells proliferating, the men stand a better chance of avoiding colon cancer, she says.

Soy compounds called isoflavones mimic the hormone estrogen. These soy constituents might disrupt hormone-dependent cancers, such as many prostate and breast cancers, scientists have reasoned (SN: 10/11/97, p. 230).

More than 100 companies sell supplement pills or foods fortified with genistein, one of the most hyped isoflavones, says nutrition consultant and author Mark Messina of Port Townsend, Wash.

In one new study, genistein slowed the growth of human prostate tumors grafted into rats, reports Jin-Rong Zhou of Beth Israel Deaconess Medical Center in Boston.

However, unlike complete soy, genistein alone does not protect mice from breast cancer, says Ruth S. MacDonald of the University of Missouri-Columbia. Even more troubling, Maurice R. Bennink of Michigan State University finds that adult rats fed genistin, which is metabolized into genistein, are more likely to develop colon cancer than those fed standard diets.

The contradictory results may reflect genistein's malleable role in the body, says Martin J. Ronis of the Arkansas Children's Nutrition Center in Little Rock. It can serve as either an estrogen or an antiestrogen, depending on how much natural estrogen is circulating, he suggests.

In a rat study designed to mimic the hormone balance in postmenopausal women, genistein promoted cancers that need estrogen, Clinton D. Allred of the University of Illinois at Urbana-Champaign reports. Fifty to 60 percent of all breast cancers are estrogen-dependent. In the study, researchers removed the rats' ovaries and implanted human breast cancer cells under the skin. When the rats received estrogen supplements, the tumors grew. Tumors in rats given genistein but not estrogen also grew, but less dramatically. Without estrogen or genistein, the tumors shrank.

Timing may explain some conflicting genistein results, says Bill Helferich, also of the University of Illinois. Soy fed to animals early in life protects them against many kinds of cancer, he says. At that stage, soy may affect how cells differentiate. Later on, however, in the absence of other estrogens, genistein or other soy components could stimulate cancer-cell proliferation.

No one knows if genistein or soy helps estrogen-dependent tumors grow in postmenopausal women, Helferich says.

As for whether people should take genistein supplements, most researchers recommend eating soy foods instead, a practice endorsed by the Food and Drug Administration as a way to reduce cholesterol.

"If you're eating soy or soy flour, that's fine," Bennink says. "I wouldn't take pills."

David Heber of the University of California, Los Angeles agrees, "Food is not just a vehicle for delivering genistin." —*L. Helmuth*