Anthropology

Bruce Bower reports from Oakland, Calif., at the annual meeting of the American Association of Physical Anthropologists

Ethiopian finds and feuds

Separate investigations in Ethiopia last year uncovered the oldest firmly dated hominid stone tools and a largely complete *Australopithecus boisei* skull. But a dispute between two research teams over the boundaries of their excavation areas in Ethiopia erupted at the meeting into public charges of unethical conduct and vigorous denials of the accusation.

The controversy concerns an area known as Gona, which lies next to the Hadar geologic formation. Hadar excavations have yielded 3- to 4-million-year-old fossils of *A. afarensis*, including the famous partial skeleton of Lucy.

Work at Gona from 1992 to 1994 led to the discovery of 21 new sites containing thousands of stone artifacts and ancient animal remains, reported Seleshi Semaw of Rutgers University in New Brunswick, N.J. Numerous sharpened stone flakes, as well as the rocks they were chipped from, date to between 2.5 million and 2.6 million years ago. This is the oldest solid evidence of stone tool manufacture. The estimated age relies on an analysis of argon isotopes in a volcanic ash layer just above the finds and evidence of a previously dated reversal of Earth's magnetic field in sediment just below them.

Continuing research at Gona will address whether hominids used stone implements substantially before 2.5 million years ago, Semaw says. Some scientists argue that a global climate change around that time sparked a relatively sudden shift to stone tool use by hominids.

Excavations in 1993 and 1994 at Konso-Gardula, another group of Ethiopian sites, produced a 1.5-million-year-old *A. boisei* jaw, along with much of that specimen's fragmented braincase, reports Berhane Asfaw of Rutgers. *Homo erectus* inhabited Konso-Gardula at the same time (SN: 1/2/93, p.6).

Excitement over the new Ethiopian discoveries was tempered by the charge, leveled by Semaw and then repeated by Asfaw, that researchers from the Institute of Human Origins (IHO) in Berkeley conducted an October 1994 excavation in Gona outside their official research area and within the area secured by Semaw's team.

Semaw calls the IHO activity "professionally unethical."

According to Semaw, a native Ethiopian, he and Rutgers' Jack W. K. Harris first obtained government permission to work in specific parts of Gona in 1987, although a ban on anthropological research was officially in effect at that time. Semaw's research at Gona will make up his doctoral thesis.

The IHO team, headed by Donald C. Johanson, William H. Kimbel, and Robert Walter, returned to Hadar in 1990, after the research ban was formally lifted. From 1991 to 1994, the IHO project submitted annual proposals to Ethiopian officials for research zones that encroached more and more upon the adjacent Gona permit area, Semaw argues. Last year, IHO scientists worked as many as 12 miles outside their government-sanctioned research zone, he contends.

IHO's Kimbel calls Semaw's accusations "ludicrous and false." IHO received government approval for its proposed permit areas from 1990 through 1994 and did not intrude into the research zones of other scientists, he holds.

Semaw and Harris have filed a complaint with Ethiopian officials and expect a ruling later this year.

This situation follows a bitter organizational split at IHO last year. IHO's board of directors fired the staff of the geochronology laboratory after IHO's single largest donor withdrew his financial backing. Fired IHO scientists formed the Berkeley Geochronology Center (BGC) and have filed suit against IHO to retain the lease for their facilities as an independent research organization.

Paul R. Renne, BGC's president and a former IHO employee, conducted argon dating of volcanic ash from Gona as part of Semaw's research team.

Chemistry

Richard Lipkin reports from Anaheim, Calif., at a meeting of the American Chemical Society

Dyes that kill flies

A blend of two common dyes, long used to color drugs and cosmetics, has been shown to kill some pesky insects. The dyes, phloxine B and uranine — approved by the Food and Drug Administration as red dye #28 and yellow dye #8 — are proving effective against Mediterranean and Mexican fruit flies, says David A. Bergsten, a toxicologist with the U.S. Department of Agriculture.

"These nonindigenous fruit flies have the capacity to destroy economically important crops," Bergsten says. "We're looking for new pest control methods that pose less risk to public health and the environment than traditional approaches."

So far, tests show that the insecticide poses little risk to workers using it, people exposed to it, or those who eat vegetables treated with it. It also presents few hazards to other wildlife, except for a few species of beetles, gnats, mites, and ants. Widely used to tint lipsticks, antacids, and over-the-counter drugs, the dyes have compiled a safe track record regarding human exposure, says James R. Heitz, a biochemist at Mississippi State University.

Sunlight activates the pesticide, Heitz says. After an insect eats the compound, the dye molecules absorb light, then generate oxidizing agents that attack proteins and cell membranes in the bug's tissues.

Death occurs within 12 hours, says Nicanor J. Liquido, a USDA entomologist in Hilo, Hawaii, who has been assessing the compound's toxicity in bugs.

Heitz expects the new pesticide to be environmentally benign. The same mechanism that turns on the dye's toxicity also causes it to break down in sunlight. After several hours' exposure, the compound loses its ability to absorb the sun's energy and becomes nontoxic. Moreover, sunlight turns on the pesticide's toxicity only after ingestion: Casual contact causes no harm.

Researchers believe the new pesticide could effectively replace malathion, now widely used to spray crops for pest control. When spread as a red bait, the light-sensitive toxin is "100,000 times safer than malathion," Heitz says.

Liquido/USDA

A Mediterranean fruit fly dines on bait tainted with the light-activated red pesticide. Within hours, it will be dead.

A quick test for mercury in seafood

Mercury, a substance harmful to growing nervous systems, can dangerously contaminate food, especially fish. But checking for mercury requires lots of time and costly equipment. Now, researchers are developing a simple, portable, mercury-contamination test kit that commercial fishermen could use at sea, reports Lawrence Carlson, a biochemist at BioNebraska in Lincoln.

A seafarer would add a fish sample to a dissolving agent, then put drops of the mixture into coated wells on a test plate. Mercury-tainted samples would turn green. The test responds to methylmercury, a compound formed in waterborne plants and microbes that accumulates in the food chain.

Although natural events such as volcano eruptions release mercury into the environment, the mass production of batteries, munitions, fungicides, and latex paint has furthered its spread, Carlson says.

The scientists adapted the quick fish test from a similar kit used to detect mercury in water and soil at toxic waste sites. So far, the test has worked well with samples of alligator, bass, swordfish, tuna, shark, and scallops, they report.