

## Anthropology

Bruce Bower reports from Washington, D.C., at the annual meeting of the American Anthropological Association

### Africa's ancient cultural roots

Human ancestors in Africa exhibited a flair for complex cultural behaviors, such as sophisticated tool making, symbolic artwork, and the exploitation of far-flung resources, as early as 240,000 years ago, contends Sally McBrearty of the University of Connecticut in Storrs. An African find earlier this year indicated that tool making originated at least 90,000 years ago (SN: 4/29/95, p.260). These finds seriously challenge the traditional view that major cultural innovations first appeared around 40,000 years ago in Europe, McBrearty asserts.

McBrearty and her coworkers have uncovered a handful of long, thin stone blades near Kenya's Lake Baringo. The blades lie in sediment located just beneath a layer of volcanic ash dating to approximately 240,000 years ago. Considerable planning went into the production of the carefully shaped artifacts, which were struck from hard, volcanic rock and bear evidence of repeated sharpening, she says.

Another site in Kenya from the same period has yielded artifacts made of obsidian obtained from a source more than 100 miles away, according to McBrearty. This suggests that human ancestors who lived there either maintained a large home range or traded goods with other groups, she says.

Related evidence comes from several African sites dated to more than 130,000 years ago, before the earliest skeletal evidence of anatomically modern humans, McBrearty adds. Stone spear points used in the hunting of large animals, as well as pigments and rhinestones apparently employed in symbolic rituals, have been discovered at separate locations. Stylistic differences in stone artifacts from different parts of Africa also indicate that complex thinking strategies originated early on, according to the Connecticut archaeologist.

"The shift toward sophisticated cultural behaviors was not sudden and did not occur in one place or at one time," McBrearty argues. "Many of these behaviors appeared in Africa tens or hundreds of thousands of years before they have been documented in Europe."

### Small-scale survivors of big blasts

Major volcanic eruptions periodically rained destruction on ancient societies in southern Mexico and Central America. Emerging data indicate that small, egalitarian groups coped much better with these crises than large societies characterized by political and social hierarchies.

"Simpler societies were much more resilient to sudden, massive stress than I would have predicted," asserts Payson D. Sheets of the University of Colorado at Boulder.

Excavations that Sheets directs near Puerto Rico's Arenal volcano indicate that small villages suffered short-term setbacks after five major eruptions that occurred between approximately 1800 B.C. and A.D. 1450. Volcanic activity in Mexico's Tuxtla Mountains in A.D. 150 and A.D. 400 also led to brief abandonment of nearby villages, Sheets reports.

In contrast, several societies headed by warring chiefs in western Panama left the area for 200 years after a volcanic eruption around 2,000 years ago, he asserts. Large societies also fell apart after volcanic blasts in the Tuxtla area around 1250 B.C. and in El Salvador about A.D. 260, Sheets holds.

Small, mobile groups could have recovered quickly from volcanic destruction through foraging, hunting, and trading with nearby groups, Sheets suggests. Stratified societies proved less flexible in the face of such tragedies, he argues, because they comprised dense populations that consumed mainly maize grown in fields and that relied on massive, immovable structures for food storage and bureaucratic operations.

Moreover, since neighboring complex societies often engaged in warfare, a natural disaster that befell one group would have invited attacks from its rivals, Sheets adds.

## Biology

### A treatment plant-fish hatchery in one

Chinook salmon are spawning in the East Chicago Sanitary District Wastewater Treatment Plant near Lake Michigan, scientists announced in October.

This is the first reported case of salmon spawning in a treatment plant, Peter S. Baranyai of the sanitary district and his colleagues assert in an unpublished report. They first noticed the fish in the plant in 1993. Previous attempts by fishery managers to encourage salmon reproduction in Lake Michigan's southern basin had failed.

A tertiary treatment plant such as this one makes a sensible spawning area, says ecologist William K. Hershberger of the University of Washington in Seattle. Only very clean water flows through the areas the salmon use. As in the wild, the salmon must swim upstream and jump up a wall of water.

To get to the plant, the salmon travel from Lake Michigan up the Grand Calumet River to the plant's 40-foot-wide, 700-foot-long effluent channel. Most swim up that channel; through a 12-foot-wide, 150-foot-long pipe; over a 4.5-foot-high wall; and into a 260-foot-long chamber, where they lay their eggs. Some salmon spawn, instead, in the channel leading to chamber.

The salmon's offspring leave by the reverse route. Preliminary genetic tests suggest that salmon born in the plant in previous years have returned there to spawn.

In June, Baranyai and his colleagues saw as many as 50 salmon in the channel at one time and 15 in the chamber.

### Courtship style: Blame it on his genes

Some dates bring flowers and whisk you off to the theater. Others arrive late and turn on the television. Veterans of dating must ponder the cause of such differences.

Scientists have a special interest. Many animal species have two types of males, which differ considerably in their approach to wooing females (SN: 10/21/95, p. 266). Environmentally regulated factors—not genes—usually determine how a male courts. Only in the swordtail fish and a marine isopod had researchers found evidence of inherited mating styles.

Now, David B. Lank of Simon Fraser University in Burnaby, British Columbia, has added another species to that short list: the ruff, a migratory sandpiper (*Philomachus pugnax*) that travels throughout Europe, Asia, and Africa.



The two types of male ruffs, an independent (left) and a satellite (right).

About 84 percent of the males are so-called independents. They attract females to their patch of ground, or lek, and defend it from other independents. They welcome "satellites," nonaggressive males that fly from lek to lek, sometimes accompanied by females. Both types of males reproduce.

Lank and his colleagues took blood samples from wild ruffs and removed their eggs from nests, they report in the Nov. 2 NATURE. They hatched the eggs, bred those birds, and monitored whether satellites and independents produced offspring of the same ilk.

They found that the difference in the male ruffs' courtship techniques is due to simple genetic variation, says Lank. Fully 25 of 27 sons of independents and 14 of 30 satellites' sons behaved like their fathers, indicating "a strong effect of paternal inheritance," the researchers say.

Female ruffs may also be able to express male mating behavior, Lank says. Females injected with testosterone behave like either satellites or independents, results from an unpublished study suggest.