

archaeologist Christopher Henshilwood of the South African Museum in Cape Town has been unearthing at Blombos Cave what it believes is proof of modern behavior during the Middle Stone Age period, 250,000 to 40,000 years ago. In the December 2001 issue of the *Journal of Human Evolution*, for example, the team described a cache of elaborately worked bone points—which many researchers consider evidence of the ability to visualize a complex form—found in layers older than 70,000 years. But the ochre engravings, unearthed in 1999 and 2000, could be the best evidence yet that humans were capable of symbolic representation that long ago. The smaller piece, 53 millimeters long, has a series of X-like crosshatches, some struck through by a horizontal line. The larger chunk, about 76 mm long, features many X's traversed by three horizontal lines.

"This is clearly an intentionally incised, abstract geometric design," argues anthropologist Stanley Ambrose of the University of Illinois, Urbana-Champaign. "It is art." French cave art expert Jean Clottes is more circumspect. Although "the geometric design is fully deliberate ... and shows a desire to achieve symmetry," Clottes says he is "far from sure" that "it is an incontrovertible instance of symbolic behavior ... it could also be a kind of doodling." What's not seriously in dispute is the 77,000-year date, pegged to charred stone tools in the same soil layer and sand grains in an overlying dune.

Although many researchers are willing to grant the Henshilwood team's claim that the artist intended to symbolize something, few are ready to embrace a radical new chronology for the spread of modern behavior. "I have a bit of trouble with the argument that this is now the evidence to displace all claims for the earliest modern behavior elsewhere," says anthropologist Meg Conkey of the University of California, Berkeley. Even if symbolic representation did arise in Blombos Cave, it may have been a fluke: a flicker of insight that died with the artist. "There are at least 30 Middle Stone Age sites scattered across the continent that could be expected to show the kinds of things reported ... [in] Blombos Cave," says archaeologist Richard Klein of Stanford University. But they don't, he says, with the possible exception of a site in the Congo. Ambrose agrees: "[Blombos] remains unique in its abundance of evidence for modern behavior."

Henshilwood counters that more Blombos-type discoveries may well turn up at other digs in Africa. "This is just the tip of the iceberg," he predicts. As for the 30 sites Klein refers to, he says, "most were dug in the 1920s, '30s, and '40s and were not dated properly," and most were not well excavated.

If Blombos Cave is an aberration, the task is to try to explain why modern behavior did not appear simultaneously across Africa. Henshilwood suggests that the cave's location overlooking the Indian Ocean—where seafood might have provided a rich diet—provides a clue. "Did those anatomically modern people who ended up in a coastal environment do better?" he asks. "This does seem to be the pattern." The search for such patterns, some experts say, might be more important than pinpointing the precise origin of modern behavior. "These authors don't need to make big, bold claims to convince us that what they have is important," says Conkey. "The interesting question is not so much, 'Is this the earliest?' but 'Why did it happen here?'"

—MICHAEL BALTER

### EVOLUTIONARY BIOLOGY

## Finches Adapt Rapidly To New Homes

Birds of a feather don't necessarily stick together. A study of house finches has demonstrated that in just 30 years, finches newly settled in Montana and Alabama begin to look and act quite different from each other, despite being close kin. Alexander Badyaev, an evolutionary ecologist at Auburn University in Alabama, and his colleagues have also shown that these flourishing avian pioneers improve their chances of success in part by controlling the sex of their eggs as they lay them. In this way, mothers influence the size of their offspring, an important survival trait.

The new work, reported on page 316 of this issue of *Science*, shows that



**Urban invader.** Labeling eggs by birth order helped explain the house finches' (above) widespread success.

**Take It Back** White House budget officials have backed off from a proposal to transfer some \$35 million in research funds from the Smithsonian Institution to the National Science Foundation (NSF) after hearing strong protests from Congress and the scientific community.

The Office of Management and Budget had planned to shift the money as part of the president's 2003 budget request that will be released on 4 February (*Science*, 7 December 2001, p. 2066). Budget officials had argued that the funds, for the museum's astrophysical observatory, tropical research institute, and environmental center, could be better managed by NSF, which would then hold a competition open to all scientists. But shortly before Christmas, Smithsonian officials were told that the plan had been withdrawn.

"The change is as definite as it can be [without a formal budget]," says a Smithsonian official. But the White House may still order up a study on how best to support science at the Smithsonian.

### Human Genome, Take 2

ScienceScope's recent item about an informal vote on the future of the Human Genome Project painted a darker picture than was intended (21 December 2001, p. 2451). National Human Genome Research Institute director Francis Collins invited dozens of researchers attending a December meeting on the sequencing project's future to vote on one of two propositions: "A. We declare victory for the Human Genome Project at the essential completion of the human sequence [in 2003] ... and we will then identify what happens next with some other term, such as 'genome research,'" or "B. We consider the Human Genome Project to be a continually evolving entity, adding new goals and opportunities as the science and its medical applications move forward." Participants voted roughly 3:1 for proposition A.

Prior to the tally, Collins noted in a jovial—not dictatorial—tone that the poll wouldn't be the final word. Afterward, he cracked that some members of his staff probably wouldn't be happy that he'd put the choice to a vote—drawing laughs from the crowd. To see the entire event for yourself, check out [www.nhgri.nih.gov/CONF/beyond01.htm](http://www.nhgri.nih.gov/CONF/beyond01.htm).

“the time scale of decades [not centuries] is really enough for animals to evolve,” notes David Reznick, an evolutionary biologist at the University of California, Riverside. “The idea that the [divergence] could be that rapid is really remarkable,” adds Ben Sheldon, an evolutionary biologist at Oxford University, United Kingdom.

By adjusting rapidly to their new habitats, the finches “reduced mortality substantially in their young,” enabling them to out-compete native species, adds Craig Benkman, an evolutionary ecologist at New Mexico State University in Las Cruces. The enhanced survival that resulted “could easily have been sufficient to make a difference between [this species] spreading or not,” explains William Sutherland, an evolutionary biologist at the University of East Anglia, United Kingdom—and spread they did.

The house finch, *Carpodacus mexicanus*, calls California and deserts in the U.S. Southwest home, but in the early 20th century these birds were also marketed as pets along the East Coast. When sales were outlawed in 1939, pet store owners in New York released their house finch stocks, not realizing how successful these birds would be in that environment. Now, just 60 years later, “it’s one of the most numerous urban bird” in much of the eastern United States, says Badyaev, who wanted to know how the birds could adapt so quickly to diverse environments.

From New York, the finches headed south, reaching Alabama about 25 years ago; California birds moved into Montana about the same time. Immediately, differences in climate began to affect the two populations. Badyaev and Auburn colleague Geoffrey Hill tagged thousands of birds at each site and followed their offspring from hatching through adulthood. Over several years, they also looked at how many birds survived winters and how many offspring the tagged nesting pairs produced.

“Males and females grow differently both within and between populations,” Badyaev found. In Alabama, males grow faster than females and have wider bills and longer tails, whereas in Montana, females grow faster and are bigger overall.

These diverse features result from differential growth patterns in the young, says Badyaev. And those growth patterns indicate that selection for particular adult traits has influenced development, he adds. In addition to climate influences, he suspects that lifestyle differences between the sexes in either state contributed to the differences between males and females and, subsequently, the two populations.

Badyaev then looked into what mechanism might be responsible for altering the growth patterns at each locale. Researchers have long known that female birds can con-

trol the sex of their offspring. And others have shown that in some bird species, the order in which eggs are laid and subsequently hatch influences the size of the resulting adults, with the first hatchlings tending to grow to be the biggest of the bunch. Badyaev found both factors at work in the finches. Alabamian females lay males first; the final egg laid is female. The opposite is true in Montana. Thus in Alabama, males get a jump on their nest mates and grow bigger, whereas in Montana, females have the growth advantage.

“Quite a lovely result,” says Sheldon, who, like Reznick, is impressed that Badyaev carried out experiments to confirm his field observations. By switching eggs in one nest with eggs in others, Badyaev and his colleagues reaffirmed, for example, that the order in which the eggs were laid was most important in determining the relative size of the chicks—more so than, say, competition among nest mates. Overall, by biasing the sex of the eggs and laying them in a particular order, the mother increased chick survival by 10% to 20% over chicks from eggs laid in no particular order, they report. Thus adaptation along different trajectories helped make these finches successful in both states.

—ELIZABETH PENNISI

## ENDANGERED SPECIES

### Fur Flies Over Charges Of Misconduct

Amid cries of “malfeasance of the highest order,” two federal agencies have launched investigations into the actions of seven federal and state biologists 2 years ago. The Washington state legislature and the U.S. Congress are also poised to hold hearings. The concern? That the biologists deliberately tried to skew the results of a federal survey of the threatened Canada lynx in national forests. The biologists, most of whom have not been



**Lynx lair.** Critics charge that a study of lynx habitat was skewed, but scientists say they were just testing the lab.

identified, have denied the accusations, according to *The Washington Times*, which broke the story on 17 December.

The survey of 16 states and 57 national forests, which started in 1999, is designed to guide land management plans by determining where lynx reside. To search for the elusive animal, scientists collect hair left on rubbing posts and then send the samples to a lab for DNA analysis. The survey, coordinated by the Forest Service with help from the U.S. Fish and Wildlife Service and state agencies, has controversial implications: Efforts to protect the lynx could limit timber salvage operations—lynx make their dens in fallen trees—or conceivably prevent expansion of snowmobile areas.

In fall 2000, a Forest Service employee reportedly told superiors about irregularities in the survey protocol. The following February, the service hired an independent investigator. Four months later, according to *The Seattle Times*, the investigator concluded that although the biologists had deviated from the protocol, they were not trying to skew the results. “The integrity of the overall lynx sampling effort is being maintained,” wrote the Forest Service in a 13 December memo requested by Congress.

But some in Congress are not convinced. Not only have Representatives James Hansen (R-UT), chair of the House Resources Committee and an advocate of land rights, and Scott McInnis (R-CO) scheduled a hearing for next month, but they have asked the General Accounting Office, the investigative arm of Congress, to probe the incident.

The Forest Service isn’t commenting on the incident or its earlier investigation, citing the inspector general’s probe, other than to say that the three Forest Service employees are no longer participating in the survey.

But according to Tim Waters, a spokesperson for the Washington Department of Fish and Wildlife (WDFW), part of the flap involves two WDFW biologists who participated in the survey. They sent in fur from a captive lynx and a stuffed bobcat as control samples. Jeff Bernatowicz, one of the WDFW biologists, told *Science* he wanted to check whether the lab could correctly identify lynx hair. There was reason for concern, he says, because another lab’s analysis from an earlier survey had erroneously indicated that lynx were present in Oregon. But, Waters points out, controls weren’t called for in the protocol, nor did the biologists notify other survey researchers about their actions.

If that’s the case, lynx scientists say, the biologists’ actions

CREDIT: JEFF LEPORE/PHOTO RESEARCHERS