RANDOM SAMPLES

edited by CONSTANCE HOLDEN

The Last of the Cahokians

All gone. Cahokia settlement, circa 1100. Only mounds are left.

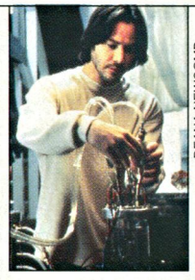
W. ISEMINGER/CAHOKIA MOUNDS STATE HISTORIC SITE

Cahokia, a city of 15,000 people that thrived at the confluence of the Mississippi and Missouri rivers in Illinois in the 12th century, is believed by many archaeologists to have been the most impressive city in the Americas north of Mexico, with vast public plazas, wooden sun calendars, a city wall made of about 20,000 logs that was rebuilt three times, and huge ceremonial mounds. But within 300 years Cahokia had mysteriously vanished, leaving nothing but the mounds. Now scientists are saying that the Cahokians brought about their own end—with shortsighted use of natural resources.

Last winter, geographer Bill Woods, of Southern Illinois University, Edwardsville, digging to a depth of 1.5 meters upstream of the mounds, found silt from flooding covering ancient crop lands and settled areas. This, he says in work being prepared for publication, suggests that intense use of woodlands for fuel, construction, and defenses led to deforestation. Subsequently, the plant cover was inadequate to stem flooding of the city and of adjacent fields of squash, corn, and other grains, he says. And "several seasons of total crop failure would be disastrous," he says. Timber depletion is also suggested by earlier studies of charcoal at the excavation site, by ethnobotanist Neil Lopinot of Southwestern Missouri State University in Springfield. He found that the quality of wood used in construction degenerated over time, indicating that choice trees were getting scarce.

Geographer William Doolittle of the University of Texas, Austin, says the Cahokia work is one of a growing number of archaeological projects, such as studies of salinization in Mesopotamia, that relate a society's well-being to its use of the environment. Of the Cahokians, says Doolittle, "by the time the people realized they had a problem, it was too late to do anything."

Hollywood Chain Reaction



DEANA NEWCOMB

Hot science. Keanu Reeves boils up a pot of energy.

Researchers still have much to learn about sonoluminescence, a phenomenon in which small amounts of light are produced when sound waves are sent through water. Hollywood has nonetheless made the technique the subject of an upcoming action movie, *Chain Reaction*, starring Keanu Reeves and Morgan Freeman as scientists who discover that sonoluminescence can end the world's dependence on fossil fuels.

In the film, Reeves watches, awestruck, as an electrified container of bubbling water puts out enough energy to run the world. Real-life scientists have found that the manipulation of sound frequencies can generate a stable bubble in water that may be as hot as 1 million kelvin (*Science*, 16 December 1994, p. 1804). But making the leap to usable energy production is a lot more problematic than Reeves makes it appear.

If the film's premise is off the wall, the producers have at least taken pains to provide other dimensions of authenticity. Parts of the movie, scheduled for release in August, were filmed at the University of Chicago and at Yerkes Observatory in Williams Bay, Wisconsin. Moviemakers took hundreds of photos and videotapes of real labs to guide their set designers, says Joseph Young, a physics graduate student at the University of Chicago who picked up a quick $1000 for 3 days of work as science adviser for the film. For props, the producers also bought $10,000 worth of outdated laboratory equipment stashed in a basement at the University of Illinois. "We are going to give the audience a taste of what it's like to be a scientist, and it's pretty appealing," says producer Arne Schmidt.

History Standards Embrace Science

Eighteen months ago, proposed voluntary standards for teaching U.S. history in the public schools sparked outrage among scientists. Robert Park of the American Physical Society, following a word search of the standards, announced that the only mention of "science" therein "was in a list of professions from which women were ... excluded."

Scientists weren't the only critics; educators and politicians—including the U.S. Senate, which condemned the document in a 99–1 vote—also accused the drafters of excessive "political correctness." So the National Center for History in the Schools of the University of California, Los Angeles, which had taken on the job, went back to the drawing board. On 3 April it came out with a fresh set of standards that everyone now seems to like.

That includes Park, who reports that the revised version contains a brand-new section relating to "major discoveries in science and technology" and how those changes have affected the economy and daily life. Whereas the old document contained the names of no scientists, the new one mentions Benjamin Franklin and the Wright brothers—which Park thinks is fair enough considering that the new document is more general than the old one and contains fewer names overall. "I think they did a pretty good job," says Park. Indeed, "I'm really quite astonished that they did as good a job as they did considering the attitude of historians toward science."

Spying on Marine Micro-Organisms

A 1-millimeter-long copepod—a shrimplike plankton—is greatly enlarged in this image from a new underwater holography system that, its developers say, makes it possible to study the movements of water and its occupants in three dimensions. The system, presented at the American Geophysical Union's Ocean Sciences Meeting in San Diego in February, uses lasers to take holograms of cylinders of water that are 6.3 centimeters wide and up to a meter long. Double or multiple exposures make it possible to track movement in the cylinder over time. Back in the lab, scientists can zero in on any part of the hologram with a high-magnification camera allowing them to scrutinize critters that are just 10 micrometers long.

Mechanical engineer Joseph Katz of Johns Hopkins University and biological oceanographer Percy Donaghay of the University of Rhode Island developed the system. Wave mechanician Ron Adrian, a pioneer in doing 3D measurements of water turbulence in the lab, notes that it's a step forward in particular for biologists, for whom "it's very clear it's important to do the measurements in situ." Indeed, Donaghay plans to use it to test theories about the distribution and predator-prey behavior of tiny things such as diatoms, copepods, and fish larvae. "Every time there's a lab experiment, critics want to know if the turbulence and distribution of organisms are appropriate. We've had no tool to [measure] that," he says.