– have been delayed by officials of Monterey County, where the proposed test plot is located (SN: 1/25/86, p. 56). In the field test, a plot of strawberry plants is to be sprayed with bacteria, which AGS calls Frostban, from which scientists have removed the gene responsible for triggering ice formation during light frosts.

The company showed "a real lack of wisdom" in not seeking EPA approval of the rooftop tests, John Bedbrook of AGS told the House committee. "With hindsight," the company now can see the EPA position, he says, and will "conduct our future work accordingly." But Bedbrook argues that the rooftop tests were as safe as those performed in a greenhouse, since the microbes were first contained within a syringe and then injected into the trees themselves. However, no provisions were made to prevent insects from picking up the sap.

EPA has not specified criteria for laboratories and greenhouses, but the agency says tests are to be conducted in facilities designed to prevent dispersal of microbes. "We don't regard a tree as a contained facility," says Steven Schatzow of EPA.

In the next month, EPA plans a "full investigation of all allegations involving AGS," Schatzow told the House hearing. The agency will conduct "an audit of AGS records and facilities," he says. "The agency has no evidence at this time to suggest that the AGS data are invalid or to call into question the agency's finding that a limited field test would not result in any foreseeable risk to human health or the environment."

The House committee questioned both Bedbrook and Schatzow about a statement obtained from a former AGS technician suggesting that the testing procedure for the rooftop trees was not adequate and that damage to the trees was not reported to EPA. Bedbrook said he could not explain the details of the testing procedure because he is not a plant pathologist. "But I have no question about the validity of the results reported to EPA," he says. Schatzow says that if the EPA investigation provides evidence that Frostban is a plant pathogen, EPA may withdraw or alter its permit. *–J. A. Miller*

The 'wetter' side of hominid tools

Some of the oldest known tools manufactured by human ancestors, dated at 2 million to 2.5 million years old, have been discovered in a rain forest in Zaire. The nearly 300 quartz tools, found with a number of animal bones and teeth, indicate that humans did not originate solely in the dry savannas of eastern Africa, according to investigators who uncovered the artifacts last summer.

The Zaire fieldwork was led by Noel T. Boaz of the Virginia Museum of Natural History in Martinsville, John W.K. Harris of the University of Wisconsin in Milwaukee and Alison S. Brooks of George Washington University in Washington, D.C. They described the find last week at the National Geographic Society in Washington, D.C., one of several organizations that funded the expedition.

"This is the first indication of early hominids [direct ancestors of modern humans] in Africa's Western Rift Valley," says Boaz. "We expect to find remains of *Homo habilis* in the same deposits when we return this summer."

The dense vegetation and rain forests of the Western Rift Valley begin in Zaire and stretch to the Atlantic Ocean. Only two other sites yielding hominid tools, both in Ethiopia in the arid savannas of the Eastern Rift Valley, are thought to be older than the Zaire site. They are considered to be 2.3 to 2.6 million years old.

Tools uncovered at the Zaire site are simple cobbles, flakes and cores similar to the tools at the Eastern Rift sites, says Harris. It is too early to tell whether they were used to kill animals or butcher carcasses, he adds.

William DeKay/National Geographic Society

Noel T. Boaz (left) and John W.K. Harris study a number of stone tools found in Africa last summer.

The absence of volcanic rock at the site makes precise dating difficult, but animal species found in the same sediments provide clues to the time the bones were deposited. Remains include those of pigs, antelopes, giraffes, elephants and an ancient three-toed horse.

"This discovery tells us that reconstructions of the human story in Africa have been biased toward sites in the dry areas of eastern and southern Africa," says Brooks. "A significant part of the story is in wetter environments."

Furthermore, she adds, a number of other sites representing early human ancestors have been located within 10 miles of the excavation. Brooks estimates that the sites date from almost 1.5 million years ago to about 20,000 years ago. *– B. Bower*

A starry origin for sandy compounds

Silicon is the most abundant element in the surface of the earth; silicates are the most abundant compounds there. Silicate dust also pervades interstellar space, and silicates are common in such things as meteorites and comets. The origin of silicon and silicates, like that of other elements and many compounds, must lie somehow in the stars or in processes associated with stars. Now, for the first time, astronomers have found an exploding star – a nova – that produces silicates. This nova is a star of unusually large mass for a white dwarf and so is likely to cause some changes in the generally accepted theory of stellar evolution.

Most novas, which are periodically exploding white dwarf stars, produce carbon dust. According to infrared spectroscopy done by Robert Gehrz of the University of Minnesota in Minneapolis and Gary Grasdalen of the University of Wyoming in Laramie, this nova is rich in silicon, magnesium, neon and oxygen. In the constellation Vulpecula, it is designated nova Vulpecula 1984, number 2.

Novas are supposed to be located in close binary systems with more or less ordinary stars for their companions. The very strong gravity of the white dwarf draws material from the companion. As this material falls on the surface of the white dwarf, it builds up an unstable condition that eventually triggers an explosion. This cycle repeats after a period of centuries or longer.

The nova explosion spews material from the white dwarf into space. It generates a shock wave moving outward from the star. Gehrz believes that the silicate compounds are made in this shock wave, but he says the silicon itself has to come from inside the white dwarf. A white dwarf that produces silicon is unique. Most of them operate on a cycle that makes carbon, oxygen and nitrogen.

To produce silicon, it seems that this white dwarf has to be much more massive than white dwarfs are expected to be, and that poses a challenge to stellar evolution theory. According to theory, a white dwarf is one of the things a star should become at the end of its life, but that particular fate should come only to fairly small stars, those the size of the sun or less. A star more than two or three times the sun's mass should undergo a supernova explosion and become a neutron star.

This silicon-producing white dwarf has to be about 15 times the sun's mass. If a white dwarf that size can exist, it presents a serious challenge to the theory, or, in Gehrz's words, "severely constrains it." *– D.E. Thomsen*