Ritual clues flow from prehistoric blood

Never mind conventional wisdom; you *can* get blood from a stone. Anthropologists have extracted the blood of humans, sheep and an extinct form of cattle from the surface of a stone slab at an approximately 10,000-year-old agricultural village in Turkey. Analysis of hemoglobin in the samples leaves them with intriguing clues and questions about the ritual activities of early farmers.

The polished slab lies among the remains of a structure known as the "skull building," which contains more than 90 human skulls and several complete and partial human skeletons.

"We don't know exactly what was going on in the skull building, but human and animal blood was abundant on the slab," says Andrée R. Wood of the University of Chicago's Oriental Institute. "It reinforces an argument for at least its occasional use for the cutting up of humans as well as of animals."

Human sacrifice is one grisly possibility, Wood notes, or human bodies may have been carted to the building after death and placed on the slab for some type of preburial ritual. The skulls show no evidence of decapitation.

Whatever took place in the building, it now appears that one of the world's earliest known farming villages had developed surprisingly complex traditions by that time, she contends. Previous estimates place the emergence of such villages no farther back than 10,000 years.

Blood from the slab, dated with an advanced technique called accelerator mass spectroscopy radiocarbon dating (SN: 12/16/89, p.388), is about 9,000 years old, say Wood and Thomas H. Loy of the Australian National University in Canberra. They describe the study in the winter JOURNAL OF FIELD ARCHAEOLOGY.

Their method for removing blood from stone was described by Loy in 1983 and has since been used in the laboratory with artifacts dating from as early as 100,000 years ago. But the new study, conducted at the village of Çayönü Tepesi, marks the first time researchers have removed, stored and undertaken preliminary analysis of blood in the field. This capability offers a great advantage when labs are far away and artifacts cannot be taken out of their country of origin, Wood and Loy maintain.

Loy's technique involves locating suspected blood residue with a low-power microscope, then analyzing it with a coated paper strip sensitive to hemoglobin. Confirmed blood deposits are scraped off and crystallized. The size and shape of hemoglobin crystals differ among animal species, allowing researchers to match a sample with a particular species.

Initial work at the slab identified human and sheep blood, as well as the blood of an unknown, nonhuman species. The team later obtained blood from bone fragments of an extinct cattle species unearthed at the site and found that its hemoglobin crystals matched those of the unknown species taken from the slab. This is the first identification of the blood of an extinct species, they say.

After analyzing the blood, the researchers excavated from the building a number of skulls and horns belonging to the extinct cattle. They also uncovered a large flint knife whose blade held traces of cattle and human blood. Wood says it may have been used in human sacrifices or mortuary rituals, but she notes that toolmakers' blood often ends up on sharp tools as a result of accidental cuts.

Ritual activity at Çayönü remains largely a mystery, says Robert J. Braidwood of the Oriental Institute. Nonetheless, he says, the cultural complexity hinted at by the skull building and other structures at the site strengthens his "gut feeling" that humans crossed the threshold to a village-farming life more than 10,000 years ago. *– B. Bower*

Asian roaches enjoying Florida vacation

Florida's infestation of flying Asian cockroaches has begun to resemble a bad dream scripted by Franz Kafka. The airborne intruder, *Blattella asahinai,* has spread to as many as 18 Florida counties since its U.S. introduction in 1984. And while federal researchers say they're on to some promising repellents, new insights into the roach's genetics suggest control will be difficult at best.

In parts of Florida, roaches are no longer a mere household hassle. *B. asahinai* has become a major pest in gardens and commercial spaces such as shopping malls, says Richard J. Brenner, a research entomologist with the U.S. Department of Agriculture in Gainesville, Fla. Transplanted to a climate resembling their native Okinawa, "these roaches are in hog heaven," he says.

Unlike the familiar German cockroach, which keeps all six feet on the ground and has a well-known predilection for lurking in the shadows, *B. asahinai* is attracted to light and enjoys a reasonable measure of aeronautical ability (SN: 7/11/87, p.23). "They are extremely strong fliers," sometimes staying aloft for hundreds of meters, Brenner said last week at the annual meeting of the Entomological Society of America in San Antonio, Tex.

Moreover, since the Asian roaches live in leaf litter and in the shade of sprawling citrus groves, they maintain a relatively impregnable outdoor base from which to launch their nightly invasions of well-lit buildings. Researchers estimate the insects have reached population densities exceeding 100,000 per acre in parts of the state.

Pest control businesses find the cockroaches a major economic liability because nearly a third of the residents in treated buildings call back within days to report new infestations, Brenner says. Houses built near orchards – once coveted for their pastoral views – are especially hard hit. "And if you're really unfortunate, you have a street light outside," he adds. "That really brings them into your neighborhood."

On commercial sites, where liability concerns require that buildings remain well-lit at night, customers commonly spot the critters along shopping aisles, inside vending machines and even in such "nontraditional sites" as bridal shops, says Brenner. And although the insects so far have not exacted substantial agricultural tolls in the state, backyard farmers report increasing damage to such varied crops as grapes, corn, tomatoes and strawberries.

Though the species is far more insecticide-sensitive than the German cockroach – which has developed strong resistance to most insect poisons – its maintenance of large outdoor populations makes traditional pest control strategies impractical. "You can't spray every square inch of Florida," Brenner says.

Moreover, adds Richard S. Patterson of the USDA's Agricultural Research Service laboratory in Gainesville, recent experiments indicate that hybrids of Asian and German cockroaches retain both the Asian ability to fly and the German resistance to insecticides. These crosses were performed in the laboratory, and entomologists have yet to see such hybridization in nature. However, says Patterson, "we haven't been actually searching [for hybrids], either."

Brenner says he and his colleagues have developed several novel roach repellents that show promise against German cockroaches and that should help deter Asian roaches as well. Rather than relying on biological poisons, the new repellents contain substances that physically irritate the roaches. "German cockroaches would rather stand under bright lights without food and water and starve to death than go into these [treated] areas," Brenner says. Details on the repellents remain proprietary for now.

Until such products hit the market and prove useful, the Asian cockroach problem is bound to get worse, Brenner concludes. Last year, 35 million people visited Florida, he notes. Seventeen million arrived by car and drove back to their home states. So, while scientists have yet to sight the pest beyond Florida's borders, "it would be foolish to think it's not elsewhere," he says. *– R. Weiss*