Bronze Age Cemetery Emerges in Syria

What began as a muddy chasm in a farmer's field in 1993 has now become a source of unexpected insights into the Early Bronze Age people who once flourished in what is now northern Syria.

Excavations in April at Tell es-Sweyhat, on the banks of the Euphrates River, uncovered a group tomb dating to between 2500 B.C. and 2250 B.C., according to initial estimates. Discoveries in the tomb, which may have been a family burial, set the stage for exploration of a surrounding cemetery that contains as many as 150 similar tombs, according to project director Richard L. Zettler, an archaeologist at the University of Pennsylvania Museum in Philadelphia.

"This ancient cemetery covers at least 2 acres and hasn't been looted," Zettler says. "It has great research potential."

Until now, knowledge of Early Bronze Age life in northern Mesopotamia, the land between the Tigris and Euphrates Rivers, came largely from prior finds at Ebla, Zettler notes. That ancient Syrian site includes a royal palace and thousands of tablets bearing written administrative records. Urban civilization first arose in southern Mesopotamia around 3400 B.C. (SN: 3/3/90, p.136).

The number and quality of goods in the Tell es-Sweyhat tomb suggest that people buried there were not royalty, Zettler asserts. They may have lived at a nearby town now being excavated by his team.

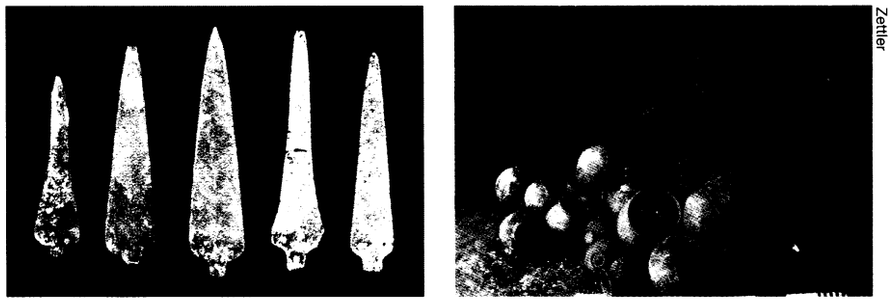
Work at the settlement began in 1989. Irrigation of a nearby field by a farmer 2 years ago caused the collapse of a sinkhole, offering the first peek at the tombs. This year, researchers dug about 10 feet through soil that had filled in a tomb shaft. There they found an oval burial chamber about 12 feet long and 15 feet wide.

Inside rested the bones of at least 10 people. One intact female skeleton and the partial remains of another person lay near the entrance to the chamber. Most of the rest of the bones were piled against a rear wall or scattered nearby. Bodies were probably thrown there "with apparent callous disregard," Zettler contends.

Various objects were buried with the bodies. These include pottery vessels, beads, shells, copper or bronze daggers, axes, javelin points, and a model chariot with wheels.

The tomb also yielded the bones of a whole pig and other animals.

The inclusion of what appear to be offerings to the dead signifies belief in an afterlife, Zettler says. For that reason, he finds it puzzling that most of the bodies were unceremoniously thrown together in a heap.


Zettler

Bronze Age tomb yielded several daggers (left) and a pile of pots.

A survey of other sinkholes that have opened up in the field indicates the presence of another 100 to 150 burials of similar size, he adds.

Ongoing work at other Early Bronze Age sites in Syria has unearthed monumental tombs built for royalty, suggesting that a range of burial types existed at that time, says Glenn M. Schwartz, an archaeologist at Johns Hopkins University in Baltimore.

"But Zettler's site is very promising because, unlike so many others in this region, none of the graves has been looted," he asserts. — *B. Bower*

How climate perturbations can plague us

Two years ago, a deadly respiratory syndrome emerged in New Mexico and radiated to 19 other states. The culprit—a new strain of hantavirus spread by symptomfree rodents—eventually claimed the lives of nearly half of the 94 people stricken.

Now, researchers report that this deadly outbreak appears to have been triggered by climate irregularities associated with the most recent El Niño, that occasional warming of waters in the tropical Pacific.

If true, says Paul R. Epstein of Harvard Medical School in Boston, the episode illustrates the infectious fallout that extreme regional climate perturbations can spawn.

In fact, it may provide a useful analog of the sort of health consequences that can be anticipated under any global warming, Epstein and other scientists argued last week at the Conference on Human Health and Global Climate Change. The Institute of Medicine and the President's National Science and Technology Council sponsored the meeting in Washington, D.C.


Parmenter

Deer mouse that can carry hantavirus.

Until 1993, hantaviruses around the world had been linked to the development of hemorrhagic fever. But the variant that rose to infamy in the Four Corners area of New Mexico, Arizona, Colorado, and Utah provoked a new disease with quickly debilitating flulike symptoms, then respiratory failure.

This hantavirus undoubtedly resided in deer mice, its primary carrier, for a long time—and probably even caused isolated cases of human disease, suspects virologist Steven Morse of Rockefeller University in New York City. It went unrecognized until May 1993, he says, "because there hadn't been a critical mass of cases."

But early that year, area mice were experiencing a population boomlet, notes ecologist Robert R. Parmenter. He now suspects that spring cleaning may have jump-started the outbreak by exposing humans to urine-laced dust and droppings from infected mice that had spent the winter indoors.

Parmenter and his coworkers at the University of New Mexico in Albuquerque had been counting populations of rodents at Sevilleta National Wildlife Refuge, some 50 miles south of Albuquerque, since 1989. In the fall of 1992, deer mouse populations exploded. Where normally researchers would have found just one to three mice per hectare, they now saw up to 30. "Certainly," Parmenter told SCIENCE NEWS, "we saw a typical expansion in all

our sites of at least 10-fold."

Moreover, capture rates the next spring showed that rodent populations had not experienced a typical winter dieback.

Why was 1993 unusually mousy?

Parmenter says that mouse populations tend to boom after El Niños and the abundant spring rains they can bring. In 1992, the El Niño's influence brought heavy, unseasonable rains months before the monsoon season began in July.

"So we had an incredibly green year in the desert," he says. With extra food, rodent populations took off. By the summer of 1993, those populations began declining—perhaps with a resurgence of predators. In seeming lockstep, the number of new hantavirus cases also began to fall.

Since the Four Corners also experienced a rainy spring, anecdotes of heavy mouse infestations there make sense, Parmenter says. In contrast, rodent populations stagnated in Utah's Canyonlands National Park, an area 300 miles away that the El Niño rains bypassed.

"So while we can't prove a causal effect, the relationship with these El Niños looks pretty good," Parmenter says. His team hopes to publish data on this association soon.

It's hard to predict precisely where or when El Niño's climate variations will deliver their characteristically erratic patterns of severe rains, notes J. Michael Hall, director of global programs for the National Oceanic and Atmospheric Administration in Silver Spring, Md. But by mapping such altered precipitation patterns worldwide, he says, climate researchers should learn where to alert local individuals—be they physicians, government officials, or missionaries—to look for outbreaks of disease.

Currently, however, disease analysts "are not well coordinated," Morse says, and globally "our surveillance capabilities have severe limitations." But a 2-year-old nongovernmental organization that he chairs, with members in 80 nations, hopes to change that. Called ProMED, it collects and disseminates word of such outbreaks on the Internet. Interested parties can subscribe to these reports by E-mail (majordomo@usa.healthnet.org). Morse also encourages people worldwide to report outbreaks by E-mail (promed@usa.healthnet.org). —*J. Raloff*

Making big mountains out of tiny bacteria

The Dolomites, a mountain range spectacularly carved by erosion, symbolize an enduring riddle in geology. For more than two centuries, scientists have pondered how Earth constructs dolomite, a mineral that makes up more than 10 percent of all sedimentary rock, including much of the rock in these northern Italian peaks (SN: 11/30/85, p.343).

In the laboratory, using the high temperatures typical of the planet's interior, geologists can synthesize dolomite with ease. But they have never been able to manufacture the mineral at the much lower temperatures of Earth's surface, where geological evidence indicates that the vast majority of dolomite formed. Dolomite, or calcium magnesium carbonate, is a close cousin of limestone (calcium carbonate), and geologists suspect that most dolomite forms when limestone somehow incorporates magnesium ions derived from seawater.

Now, with the aid of unusually small bacteria found in sludge from a lagoon in Brazil, researchers from Switzerland have finally created dolomite in the laboratory at low temperatures.

"What they've found is tantalizing.... We've focused on trying to explain [dolomite] with classical inorganic chemistry. This upsets the applecart," says Lynton S. Land of the University of Texas at Austin.

Judith A. McKenzie of the Swiss Federal Institute of Technology in Zurich and her colleagues took sludge samples from a lagoon in Brazil where modern dolomite has formed. They placed samples of bacteria from the sludge in vials, along with a growth medium similar to the lagoon's water. After refrigerating the vials for a year, the researchers found dolomite crystals encrusting the bacteria. "Lo and behold, they produced dolomite. If we don't have bacteria [in the vial], nothing happens," says McKenzie. The team's results appear in the Sept. 21 NATURE.

McKenzie notes that Robert L. Folk, a retired geologist, recently revived the century-old idea that bacteria help make the mineral after he had examined high-magnification images of dolomite that geologists think formed relatively recently. "I saw tiny bacteria in the dolomite crystals," says Folk.

McKenzie and her colleagues suggest that their bacteria might help explain another mystery surrounding dolomite: The mineral is much more abundant in ancient rocks than in modern ones. Conceivably, McKenzie says, dolomite-producing bacteria are less widespread today.

Some geologists, however, categorize the Brazilian bacteria as a curiosity. "I think [their discovery] really doesn't have a lot to do with the dolomite problem. Most dolomite doesn't form in lakes," says Bruce H. Wilkinson of the University of Michigan in Ann Arbor.

In addition to looking at how the bacteria make dolomite, McKenzie and her colleagues hope to develop probes that will enable them to determine whether similar bacteria exist at other modern dolomite formations. "I could spend the next 10 years on the dolomite problem," says McKenzie. —*J. Travis*

Amount of virus sets cancer risk

Physicians may soon have a way of determining which women with "abnormal" Pap smears will develop cancer of the cervix. Researchers at the Albert Einstein College of Medicine in New York City have found that human papillomavirus (HPV) infections that persist over time are far more likely to develop into cervical cancer than transient infections with the virus.

Pap smears first gained acceptance in the 1950s as a way of identifying abnormalities in cervical cells—known as dysplasia—before they developed into invasive cancers. In the 1980s, researchers learned that HPV, which causes warts, is involved in approximately 90 percent of all cervical cancers, as well as a great many noncancerous changes.

But because some 50 percent of all mildly dysplastic lesions, or collections of abnormal cells, regress back to normal, physicians discovering HPV-associated cervical lesions had to decide whether close monitoring or aggressive therapy, such as cryotherapy, laser therapy, or surgery, was appropriate. "Clinicians may be overtreating women for [abnormal Pap smears] for a variety of reasons," says study collaborator Gloria Y.F. Ho.

To help resolve this quandary, Ho and her colleagues monitored 70 female volunteers with mild to moderate dysplasia every 3 months for 15 months. At each visit, the researchers gave the women a Pap test, examined their cervices under a microscope, and tested cells from the lesions for the virus' DNA.

As the researchers report in the Sept. 20 JOURNAL OF THE NATIONAL CANCER INSTITUTE, 30 percent of all moderate dysplasia spontaneously regressed; moreover, the amount of viral DNA present enabled the team to identify the lesions that would regress. "Women whose lesions contained large amounts of HPV were likely to have their lesions persist," says Ho.

Mark H. Schiffman of the National Cancer Institute in Bethesda, Md., who wrote a commentary accompanying the report, told SCIENCE NEWS that the New York group's work is a "satisfying piece of evidence that the virus and the [cervical] changes are so tightly linked that they are in fact the same thing."

Ho points out that the sophisticated DNA analysis her group used isn't routinely available to clinicians, but since the largest amounts of HPV were associated with persistent lesions, physicians could confidently monitor patients for the virus with currently available tests for several months before deciding to treat the condition more aggressively.

— *L. Seachrist*