ANTHROPOLOGY

Anthropologists 1, Army Corps 0

American anthropologists won a round in an important legal battle last week, when a U.S. District Court in Portland, Oregon, ordered the Army Corps of Engineers to reopen the case of a 9300-year-old human skeleton found on federal land in Washington state. The corps, which has jurisdiction over the skeleton—one of the oldest in the Americas—had planned to turn it over to American Indian tribes for reburial last October under the 1990 Native American Graves Protection and Repatriation Act (NAGPRA). But scientists sued to prevent the handover until they had studied the bones.

Now, although the court stopped short of allowing study of the skeleton, it opened the door for future research by recognizing that the scientists have a legitimate claim that must be considered. "It's a landmark ruling," exulted Alan Schneider, the Portland attorney for the scientists. "This is the first case where a court has held that a third party like a scientist has standing to challenge a government agency's overenforcement of NAGPRA."

The male skeleton, known as "Kennewick Man" for the town where it was discovered in the bank of the Columbia River last summer, is a rare representative of the earliest people to inhabit the Americas. It also had a projectile point embedded in its pelvis and facial features that may be Caucasoid-like, offering clues about early Americans (*Science*, 11 October 1996, p. 172).

As soon as the skeleton was discovered, Smithsonian Institution skeletal biologist Douglas Owsley sought permission to study it, and a team at the University of California, Davis, extracted ancient DNA from a bit of its finger bone for analysis. Owsley and others say that without scientific study it's impossible to know whether the skeleton has a biological or cultural tie to any living people—knowledge needed to determine which tribe, if any, should receive it.

But Owsley says he was told by the corps "flat-out that there would be no scientific study." The corps ordered a halt to the DNA work as soon as it learned of it in October, and announced that it would hand over the skeleton to the Confederated Tribes of the Umatilla Indian Reservation under the auspices of NAGPRA, which requires remains or cultural objects to be given to a culturally affiliated tribe. It later rescinded that order but has kept the skeleton locked away and unavailable for study. Court documents suggest that corps officials were concerned about alienating the Indians. In an 18 September 1996 e-mail message, a corps official wrote: "All risk to us seems to be associated with not repatriating the remains."

In the new decision, U.S. District Court Magistrate John Jelderks invalidated all the corps' orders in the case and criticized the "flawed" procedures used by the agency, which he said "acted before it had all the evidence or fully appreciated the scope of the problem." Jelderks also asked the corps to report back to him with its decision on the case and to answer several questions, including whether repatriation under NAGPRA required a biological or cultural link between bones and living tribes, and how such a link would be determined.

Corps attorney Daria Zane declined to comment for the record. As for the scientists, although they still can't study the skeleton, they're pleased. "Hopefully, the Army Corps will come to its senses," says Owsley. "They are using government lawyers and taxpayers' dollars to argue against academic freedom."

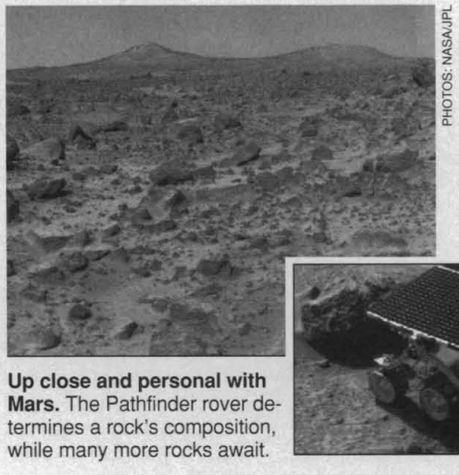
–Ann Gibbons

PLANETARY SCIENCE

Pathfinder Strikes a Rocky Bonanza

As exhausted but exuberant scientists got their first closeup look at the surface of Mars in 21 years earlier this week, the Mars Pathfinder mission could already boast a long list of successes. Team members had picked a safe spot to drop their lander, demonstrated a new means of putting instruments on Mars, and exercised the first "mobile geologist" on another planet. With the $196 million price tag of the mission, they had also justified NASA's new commitment to "faster, better, cheaper" missions to the planets and made the Jet Propulsion Laboratory (JPL), long known for multibillion-dollar "bigger is better" missions, a player in the new era of planetary exploration on the cheap. Even if the mission never extracted much science from its rock-strewn landing site, it would have proved out the technology and philosophy likely to dominate future planetary missions.

But team scientists were already doing impressionistic science on images from the site, finding evidence that it was swept by one of the largest floods—or mud slides—in solar system history. Images from the Viking craft that orbited Mars in 1976 had made it obvious that something had flowed across Ares Vallis, the vast plain that contains the site. That added to the appeal of the site by suggesting it would hold a wide variety of rock types, and the Pathfinder team has not been disappointed. "It really looks like we have a grab bag suite of rocks," says project scientist Matthew Golombek of JPL. "This site is completely different from either site" visited by Viking landers in 1976. At press time, Pathfinder's rover had begun nuzzling nearby rocks with the alpha proton x-ray spectrometer in its snout, collecting data on composition.



PHOTOS: NASA/JPL

Up close and personal with Mars. The Pathfinder rover determines a rock's composition, while many more rocks await.

Meanwhile, planetary scientists—some of them practicing armchair geology on images broadcast via CNN—were debating the nature of the event that had deposited the rocks. Golombek and his colleagues believe that the first images confirm their suspicion that billions of years ago a great flood of a billion cubic meters per second swept the region for weeks, carrying a variety of rocks from distant highlands. Determining what could have unleashed the water, which was presumably stored beneath a dry surface, is one of the enduring mysteries of Mars.

At Monday's daily Pathfinder press conference, team member Michael Malin of Malin Space Science Systems Inc., in San Diego, pointed out 4-meter-high ripples in the nearby terrain, spaced 20 meters apart—the type of marks left by the late stages of a catastrophic flood. The direction of flow suggested by the ripples matched the alignment of several large boulders stacked against each other, as if by a flood. The flow direction Malin infers from Pathfinder images is also the same one suggested by Viking orbiter images. The coincidence of all three directions is "one piece of evidence that water flowed through here," says Malin. Once he gets some sleep after 24 hours of watching images come down from Pathfinder and planning

the next round of activities, he expects to calculate just how catastrophic the flood would have been.

But planetary scientists Raymond Arvidson of Washington University in St. Louis and Kenneth Tanaka of the U.S. Geological Survey in Flagstaff, Arizona, weren't convinced by early Pathfinder results. The Viking images had suggested to Arvidson that after the flood came volcanic activity, which masked the flood deposits and left relatively monotonous lava rock for Pathfinder to inspect. Tanaka, for his part, has trouble imagining that the meter-size boulders Pathfinder is seeing could have been carried that far in a flood of water; a water-rich slurry of rock, sand, and mud seems more likely to him.

Even before Pathfinder delivers a verdict about Mars's past, it has offered a good omen for NASA's future. Vice President Al Gore lauded NASA Administrator Daniel Goldin and JPL for putting together a mission "in one-third the time and at one-tenth the cost of the first Viking mission to Mars some 2 decades ago." That's music to the ears of NASA managers, grappling with space station cost overruns and the crisis onboard the orbiting Mir laboratory while the House is slated to vote on NASA's 1998 budget next week.

JPL needed a boost as well. Its coup at Mars should help it make the transition from multibillion-dollar spacecraft like the Jupiter-orbiting Galileo to low-cost Discovery missions like Pathfinder. JPL is already field testing the descendants of the Pathfinder rover for a long-ranging rover mission in 2001, and Pathfinder's success may prompt a reprise of its airbag-cushioned crash landing for missions early in the next century.

–Richard A. Kerr

With additional reporting by Andrew Lawler.

PUBLIC HEALTH

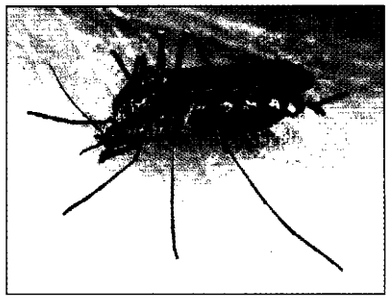
Resurgent Mosquitoes, Dengue in Cuba

Once again the mosquito is the victor. If ever a disease-causing mosquito might be controllable, it seemed to be *Aedes aegypti*, which, unlike most other species, breeds only in and around houses in humanmade containers. And if ever a government should be able to control the mosquito, it is the totalitarian government of Cuba. But the Cuban effort, like every other attempt to wipe out a mosquito species from a country, appears to have failed. According to local reports, an epidemic of dengue fever, a viral disease spread by *Aedes aegypti*, has reappeared in Santiago, Cuba's second-largest city, and spread to the middle and west of the island. As one *Aedes aegypti* expert put it, "Cubans have been able to maintain war on [the mosquito]. They may have lost it."

The epidemic is testimony to the perseverance of *Aedes aegypti*, which virtually every country in the Western Hemisphere has tried to eliminate over the last 50 years, without success. After a devastating epidemic of dengue fever swept through Cuba in 1981, the Cuban government went after the mosquito with what public health experts describe as paramilitary zeal and soon claimed victory. But now the toll from dengue, a severe, flulike illness that can take a potentially fatal form known as dengue hemorrhagic fever, is rising again. Estimates of the number of cases range from 838, the last official government number, to as many as 30,000. The number of deaths has been reported variously from three to 20.

Meanwhile, CubaPress, an independent news agency in Havana that publishes over the Internet, has also reported that Cuban police have arrested Dessy Mendoza, the founder of the Independent Medical College in Santiago de Cuba, apparently for disseminating information on the epidemic to foreign journalists. CubaPress quoted Mendoza as saying shortly before his arrest: "Without a doubt, they are looking for me so that I don't keep revealing to the national and international public the true magnitude of the dengue epidemic in Santiago."

The war against *Aedes aegypti* in this hemisphere goes back to 1947, when the Pan-American Health Organization (PAHO) (then the Pan-American Sanitary Organization) spearheaded a hemispherewide campaign to eradicate the mosquito. The PAHO campaign was finally abandoned in the early 1970s, when most of the countries that had managed to get rid of the mosquito—some 22 at the program's peak—were already suffering from reinfestations as the mosquito slipped in from countries that had never eradicated it, including the United States. Dengue is endemic once again in much of Latin America and the Caribbean. In the wake of the PAHO failure, medical entomologists questioned whether any government could completely eradicate *Aedes aegypti*.



R. WALTERS/VISUALS UNLIMITED

Vector victorious. *Aedes aegypti*, which spreads dengue, is back in Cuba.

But after the 1981 dengue epidemic in Cuba, one of the most devastating on record—with 350,000 cases and 158 deaths, mostly among children—the Cubans tried. "There's no government except the one in Cuba that was going to take the action necessary to completely eliminate the mosquito," says Gary Clark, head of a U.S. Centers for Disease Control and Prevention (CDC) dengue laboratory in San Juan, Puerto Rico. "A political decision was made. It's not, 'Will you clean up your backyard and eliminate the containers that can produce the mosquito,' but 'You will ...'" The Cuban government mobilized 24,000 military and nonmilitary personnel in a campaign that also included spraying pesticides both indoors and outdoors, from the air.

"They drove the mosquito almost to extinction right away, within a period of 1 year," says Mike Nelson, an *Aedes aegypti* expert with PAHO. While the government never claimed a complete victory, it did claim to have eradicated the disease by suppressing the mosquito population to numbers far too low to sustain an epidemic.

When it lost control is still a mystery. Neither PAHO nor the CDC experts say they know anything more about the current epidemic than what CubaPress has disseminated and the little the Cuban government has made officially available. But Duane Gubler, director of the CDC's division of vector-borne diseases in Fort Collins, Colorado, says he and his colleagues had suspected for some time that a problem was building.

As early as the winter of 1996, the Cuban government apparently contacted the international aid group Doctors Without Frontiers, asking for insecticide to kill larvae, plus backpack sprayers for killing adult mosquitoes indoors. By the spring of last year, travelers from Cuba were talking about dengue outbreaks, but until early this June, there had been no official confirmation from the government.

Those familiar with dengue and *Aedes aegypti* aren't surprised by their resurgence. "The problem with the Cuban program," says Gubler, "and those that rely on a paramilitary type of organizational structure is they have no sustainability. Once support and funds dry up, the program falls apart and the disease will come back with vengeance." The only hope, he says, is a program in which individual communities take responsibility for clearing out the mosquito—but that has yet to succeed in Cuba or anywhere else.

–Gary Taubes