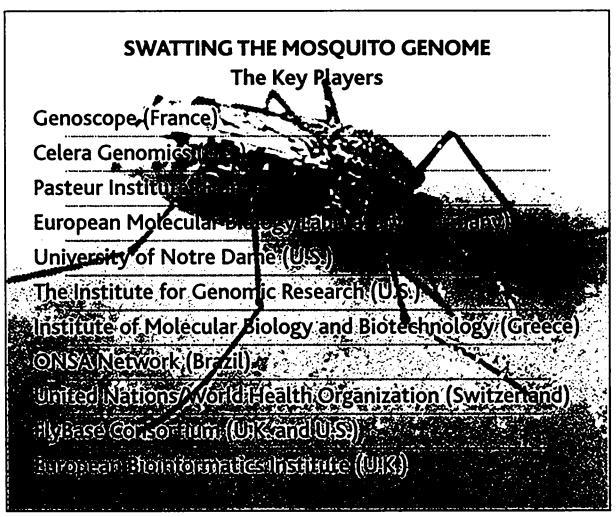
MALARIA RESEARCH

Sequencing Set for Dreaded Mosquito

PARIS—Scientists have agreed to terms on a long-awaited effort to sequence the genome of the mosquito *Anopheles gambiae*, the main vector for the malaria parasite in sub-Saharan Africa. Meeting at the Pasteur Institute here on 3 March, representatives from 20 research centers in 12 countries started laying plans for the project. Like the rat sequencing project (see previous story), it will include Celera Genomics of Rockville, Maryland, and feature unrestricted public access to data.



Sequencing of the *Anopheles* genome is expected to begin in the next 6 months. Because some of the partners—including the Pasteur and the French gene-sequencing center Genoscope—have already begun preliminary gene mapping and sequencing, a "rough draft" of the full sequence could be completed by year's end. Revealing the mosquito's 260 million DNA base pair sequence—together with those of the human genome and the malaria parasite *Plasmodium falciparum* now nearing completion—should open up new strategies for controlling the deadly disease, which kills some 1.5 million people each year, mostly African children. This genetic treasure trove will allow researchers "to get to the parasite at every possible level," says Fotis Kafatos, director of the European Molecular Biology Laboratory in Heidelberg, Germany.

The initial sequencing and genome assembly should run "significantly less than $10 million," says Kafatos, who initiated the project with *Anopheles* expert Frank Collins of the University of Notre Dame in Indiana (*Science*, 23 July 1999, p. 508). Additional funds will be needed to fine-tune the sequence and begin detailed analyses of the genes and their functions.

Together with Genoscope, Celera will perform the initial sequencing using the "whole-genome shotgun" approach it unleashed on the human genome. Although not all the financing is in place, the French government has pledged to cover Genoscope's participation in the initial sequencing. Celera has submitted a grant proposal to the U.S. National Institutes of Health to cover at least part of its costs.

Researchers who have campaigned for years to have the mosquito's genome sequenced are delighted that the big guns of modern gene technology will at last be brought to bear on *Anopheles*. "We are really excited," says Kafatos. "A unique global collaboration has finally crystallized." —MICHAEL BALTER

ARCHAEOLOGY

Heavy Damage Feared After Taliban Decree

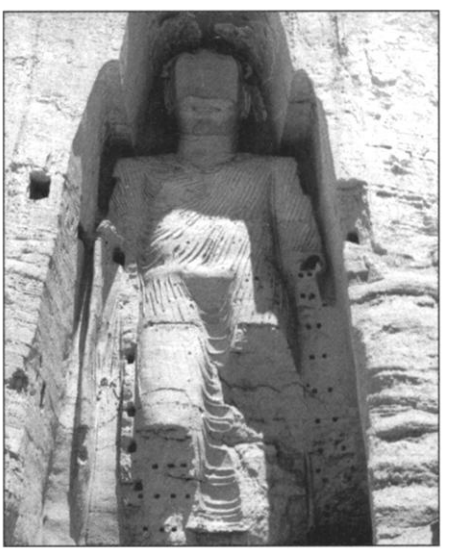
Two ancient Buddhas captured the world's attention last week, as Afghanistan's Taliban leaders began to carry out a decree to demolish all carvings and statues of animals and humans. The government-sponsored destruction extends even to artifacts from its own, Islamic tradition, as well as thousands of lesser known items that experts say combine Western and Eastern traditions in unique and irreplaceable ways. The Taliban, which few governments recognize as legitimate rulers, believes animal and human representations are antithetical to Islamic teaching.

Archaeologists are stunned by the decree's breadth. "It is a most enormous tragedy," says Norman Hammond, a Boston University archaeologist who worked in Afghanistan in the 1970s and has written about its treasures. Afghanistan's special archaeological heritage derives from its position as the ancient crossroads of Asia. Alexander the Great left behind artisans who built Greek-styled statues at cities such as Alexandria Oxiana, now Ai Khanum, on the Oxus River. Chinese caravans crossed Afghanistan's rugged terrain heading west. Buddhist influence seeped in from India to the southeast, and Islam swept the region from the west. The result was often a rich blending of styles. A Kabul Museum collection of panels from the first century, for example, show clear Mediterranean, Chinese, and Indian influences.

The two giant Buddhas, which stand 37 and 54 meters high in the sandstone cliffs of Bamiyan and date from the third and fifth centuries, have become symbols of the new policy. But the decree apparently also would cover objects in the Kabul Museum, such as a 1000-year-old copper dish bedecked with mythical animals and a Koran quotation. Hammond also fears the worst for frescoes in Islamic-era palaces at Lashkair Bazar and at Ghazni, which includes a building decorated with a stone frieze.

How much of the Kabul collection was intact even before last week's decree is unclear, however. The museum, closed to Westerners for years, already has been severely damaged and at least partly looted.

The Taliban leaders so far have rejected pleas by the United Nations to rescind the decree and have mocked offers by museums such as New York's Metropolitan Museum of Art to rescue smaller objects in danger. "I



Under siege. Taliban has targeted this stone Buddha and other artifacts.

CREDITS (TOP TO BOTTOM): SINCLAIR STAMMERS/WHO/TDR (MOSQUITO); UNESCO

ask Afghans and the world's Muslims to use their sound wisdom," Taliban chief Mullah Mohammed Omar was quoted as saying on 4 March on official radio. "Do you prefer to be a breaker of idols or a seller of idols? Is it appropriate to be influenced by the propaganda of the infidels?"

As *Science* went to press, the destruction of the Buddhas had begun. Government officials also boasted that two-thirds of the thousands of offending objects had been smashed. Nevertheless, a special envoy from the United Nations was trying to broker a solution, and other Islamic nations expressed outrage over the decree. –ANDREW LAWLER

ASTROBIOLOGY

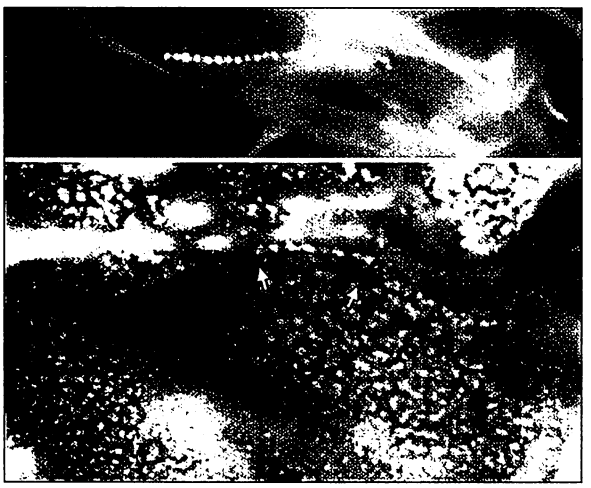
Are Martian 'Pearl Chains' Signs of Life?

Life on Mars jumped back into the headlines last week with the publication of two papers claiming that nanoscale mineral grains in the famous martian meteorite ALH84001 were left by ancient martian bacteria. One paper was old news to researchers (*Science*, 22 December 2000, p. 2242). The other got a generally cautious reception when it was reported in the media, but now many experts are turning downright incredulous as they get a chance to inspect the published images. One of the two papers "defines a new low in the great ALH84001 debate," says microscopist John Bradley of MVA Inc. in Norcross, Georgia, a longtime critic of martian microbe claims. Even the fence sitters are unimpressed: "There's a lot of subjectivity" in the analysis, says geologist Allan Treiman of the Lunar and Planetary Institute in Houston. "They've gone too far in interpreting the images" as signs of life.

Meteorite ALH84001 first made headlines in 1996, when a group of researchers claimed that the chemical, mineralogical, and isotopic makeup of the meteorite—and some buggy-looking microscopic features—spoke of ancient life back on Mars. All but one of those lines of evidence have been withdrawn or discounted as not definitive, singly or collectively. The remaining evidence is grains of the iron-oxide mineral magnetite a few tens of nanometers in size, the same sort of particles that some earthly bacteria form, stringing them into long chains to make magnetic compasses.

In one of the 27 February *Proceedings of the National Academy of Sciences* (*PNAS*) papers, microscopist Kathie L. Thomas-Keprta of Lockheed Martin in Houston and colleagues argue that about one-quarter of ALH84001's magnetite is indistinguishable from the magnetite of a particular terrestrial magnetotactic bacterium, and therefore the martian magnetite probably has a bacterial origin, too. Thomas-Keprta made the same argument in another paper late last year. Other researchers agreed about the resemblance but concluded that the evidence was not extraordinary enough to prove such an extraordinary claim.

Now comes the claim that some of ALH84001's magnetite is arranged in chains like pearls on a string, just the way some bacteria form magnetite on Earth. In the second *PNAS* paper, Imre Friedmann of NASA's Ames Research Center at Moffett Field, California, and colleagues present scanning electron microscopy (SEM) images of what they believe are chains of magnetite grains produced by bacteria. In a mode of SEM operation that highlights heavy elements such as iron, images show bright blobs of presumably iron-rich material lined up across the surface. "The chains we discovered are of biological origin," says Friedmann, because the fuzzy blobs have a uniform size and shape within a chain, have consistent gaps between them, are aligned end to end when elongated, and can bend in curved chains, just like magnetite chains of earthly bacteria.



The real thing? Iron-rich blobs seem to form chains in a martian meteorite (bottom) that resemble the magnetite chains of earthly bacteria (top).

CREDIT: I. FRIEDMANN/NASA AMES RESEARCH CENTER

Initial news reports quoted vague reactions from experts who had yet to see the images or had seen them in faxed versions only, but the real McCoys are getting a decidedly cool reception. Microscopist Peter Buseck of Arizona State University in Tempe is among the most receptive. "It's an interesting paper," he says. "I have no problem dismissing some of the [chains]. There are others that seem to come close to a real [bacterial magnetite

ScienceScope

Can-Do Genome Canadian genomics research kicked into a higher gear last week as the federal government increased its contribution to a national genomics initiative by $95 million, to $202 million. "Genomics promises tremendous quality-of-life benefits for all Canadians, especially in health, and will be a key economic engine in the 21st century," said Industry Minister Brian Tobin in a news briefing.

The contribution will bring Genome Canada closer to its target of $400 million (*Science*, 10 March 2000, p. 1732). The program has already collected $160 million from the provinces and the private sector, with the rest expected over the coming year. The governing board is reviewing 31 projects that have survived an initial review and hopes to announce the winners after its next meeting on 23 March.

The additional funds should make more scientists happy, says chief executive officer Martin Godbout. He says it will also help Canada keep up "not just in sequencing, but the next step, which is functional genomics."

Training Tumult The National Institutes of Health (NIH) is about to propose new guidelines on training graduate students and postdocs that it hopes will defuse growing criticism of current policies. Last August, a National Academy of Sciences panel recommended that NIH fund more young researchers through general training grants, and fewer through research grants to specific investigators, as a way to improve the quality of their education without increasing the competition for jobs (*Science*, 8 September 2000, p. 1667). Last week, some of the same issues were debated as the academy held a day-long symposium to promote a September report that fingered NIH's current training stipends as contributing to the economic plight of postdocs.

NIH officials say the new guidelines, the product of a lively 6-month debate on the Bethesda, Maryland, campus, aim to balance the educational needs of students and the research requirements of investigators. But the issue of raising salaries is complex, says Marvin Cassman, director of the National Institute of General Medical Sciences, who was under fire at last week's symposium from both angry postdocs and harried administrators. Any boost in stipends, he noted, would lower the number of students and postdocs NIH could support, unless Congress or administrators substantially increase the agency's training budget.