and later declared bankruptcy, Pianelli says. If the suit is successful, though, it could cost Baylor even more. Angelides has accused the university and its staff of slander and breach of contract, arguing that it ended his tenured professorship without due process.

University officials also declined to comment. But in court filings, Baylor's attorneys maintain that the university simply acted as an agent of the federal government, which requires that allegations of scientific misconduct be fully investigated. Soon, that interpretation of the handling of the charges against Angelides will be vindicated or rejected by 12 citizens of Texas and an appeals board in Washington, D.C.

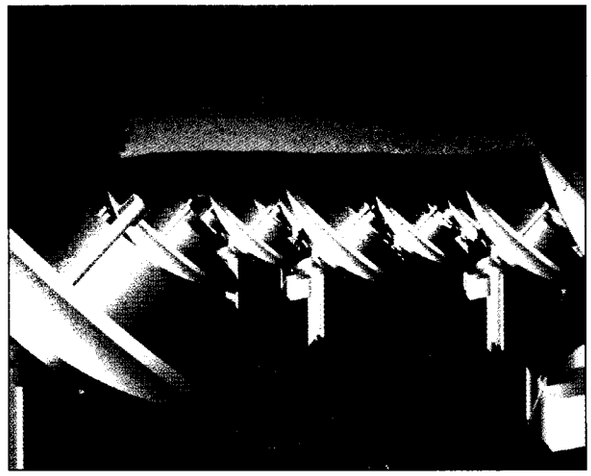
Whatever the outcome, cell biologist Jeffrey Rosen of Baylor, who acted as Angelides's volunteer faculty adviser during the investigation, argues that the 7-year process leading up to these pending verdicts didn't serve the scientists or the university very well. "I question whether it might not be better to conduct [such inquiries] from the start as legal proceedings," Rosen says, because that would give the accused a better chance to confront the accusers. Instead, the investigation involved a baroque academic process in which all of Angelides's questions to his accusers had to be directed through the chair of the investigative panel, who often rephrased them. Rosen is also unhappy about the amount of time, energy, and money it has taken to referee this quarrel, saying he would "never again" offer to get involved. **–ELIOT MARSHALL**

ASTRONOMY

New Telescope Will Turn a Keen Ear on E.T.

BERKELEY, CALIFORNIA—Astronomers listening for radio signals from other intelligent life may soon get their own ear on the cosmos. SETI, the Search for Extraterrestrial Intelligence, has subsisted for decades on small amounts of observing time at radio telescopes built for other purposes. Last Monday, however, the SETI Institute of Mountain View, California, a private advocacy group that supports and carries out SETI studies, and the Radio Astronomy Laboratory at the University of California, Berkeley, announced that they are teaming up to build the first major telescope largely dedicated to searching for other civilizations.

The privately funded telescope, called the One Hectare Telescope or 1HT because it will measure 100 meters on a side, has a design as ambitious as the search it will conduct. To be built in the next 5 years or so, probably at Berkeley's Hat Creek Observatory in northern California, it will match the sensitivity of a single giant dish by combining the signals from 500 or more dishes just 3.5 to 5 meters across—essentially off-the-shelf satellite TV antennas. The design will allow the telescope to be expanded as additional funds become available. And it will cost a fraction as much as a comparable single-dish telescope: about $25 million,



Talk to me. An artist's conception shows some of the 500 or so dishes that will make up the new radio telescope.

CREDIT: SETI INSTITUTE

which the SETI Institute is now raising from private sources. "We're planning to put as little money as possible into the antennas and instead to keep making [the system] better at the back end," says Jill Tarter, the science team leader at the SETI Institute.

SETI researchers have long dreamed of having a telescope of their own, able to devote large amounts of time listening for potentially meaningful signals from other sunlike stars in the Milky Way galaxy. And Berkeley was a natural collaborator. William "Jack" Welch, the former head of the radio astronomy laboratory, has just been named to the newly created SETI chair in the astronomy department and is also the vice president of the SETI Institute. Berkeley will design the instrument and pay operating costs; in return Berkeley astronomers will get telescope time for more conventional studies.

The 1HT should let both sets of observers collaborate seamlessly, because its design will allow "multibeaming." By interweaving the signals from its individual dishes in sophisticated ways, the array will make high-resolution observations simultaneously in 100 directions or more to monitor an array of stars for signals from an extraterrestrial civilization while also studying pulsars, the intergalactic medium, and the cosmic background radiation. And to cast the broadest possible net for meaningful signals, the telescope will monitor each source across a wide range of radio frequencies, from 300 MHz up to 10 gigahertz.

The biggest design challenge, says Welch, is the sophisticated signal-processing circuitry and software needed to combine and analyze hundreds of wide-band signals at once. "We couldn't [build] this before now," says Welch, "but we have every reason to believe that it can be done in the next year or two," when 1HT designers hope to install a prototype array of a dozen or so dishes at Hat Creek. Other radio astronomers say it won't be easy. But "if anyone can do it, Jack Welch is the one to pull it off," says Woodruff Sullivan, a radio astronomer at the University of Washington, Seattle.

If the funds can be raised and the design challenges overcome, 1HT will allow SETI researchers to search the sky 100 times more efficiently than with the 100-meter radio telescope now nearing completion near Green Bank, West Virginia. The 1HT will also sharpen radio astronomers' dreams of constructing a square-kilometer arrangement of radio antennas, two orders of magnitude larger than the 1HT, capable of detecting signals—from alien cultures or the inanimate cosmos—fainter than any other telescope on Earth. But even more visionary designs will be needed: With current technology, the cost of a square-kilometer array would rise into the billions of dollars. "The challenge is to build a complete array for less than the square-meter cost of an expensive carpet," says Tarter. **–DONALD GOLDSMITH**

Donald Goldsmith's most recent book, *Voyage to the Milky Way*, will appear in May to accompany the two PBS television programs with the same title.

SCIENCE IN SOCIETY

Plan for Divulging Raw Data Eases Fears

Congress dropped a bombshell on the scientific community last fall, when it quietly passed a law that appeared to open up to public scrutiny the data of all federally funded researchers. Now the Administration has drawn up a blueprint for implementing this law that would limit its reach to "published" data used to develop policy. Although relieved, agency officials and scientific groups say the Administration must still clarify gray areas in a rule that threatens to undermine scientists' sovereignty over one of their most precious resources: raw data.

Slipped into the 1999 omnibus spending bill by Senator Richard Shelby (R–AL), the directive requires that the White House Office of Management and Budget (OMB) amend

its rules for extramural grants such that "all data" collected using federal funds would be accessible under the Freedom of Information Act (FOIA). Until now, only data already in an agency's possession have been subject to FOIA. Shelby and others, backed by several business groups—including one that in 1997 tried unsuccessfully to get its hands on data from a federally funded air pollution study—argue that data paid for by taxpayers and used to craft regulations ought to be made available whenever a citizen demands it.

Many voices in the scientific community have registered deep concern about the new law, with organizations ranging from the National Institutes of Health (NIH) to the Association of American Universities citing worries over the law's apparent reach (*Science*, 15 January, p. 307). Among other things, these groups argued, the law could deprive researchers of the chance to analyze and publish their data before it becomes public; it might lead to invalidated clinical trails by allowing subjects to find out what treatment they are getting; and it could give companies access to privileged information. In a letter to OMB last month, Bruce Alberts, president of the National Academy of Sciences, argued that the law would bring "an enormous change in federal policy" that "will have serious, unintended consequences for the nation's research enterprise."

Some of those concerns were addressed in OMB's proposed rule, which appeared on 4 February in the *Federal Register*. The Administration's proposal would apply only to data from "published research findings produced under an award that were used by the Federal Government in developing policy or rules." Furthermore, agencies would have broad powers to withhold data under FOIA guidelines that aim to protect national security, proprietary information, and individual privacy. "They've taken a very constructive first step in drawing some boundaries," says Wendy Baldwin, NIH deputy director for extramural research.

The Administration acknowledges that the plan leaves many issues unresolved. "We're publishing our first cut," says an OMB spokesperson. Yet to be worked out is how to define "data"—whether to include lab notebooks, for example—and whether the term "published" should include, say, data described at a talk or in a press release. Another ambiguity is where to draw the line on data used to develop public policies: Could it include an entire "body of research?" Baldwin asks. The public has 60 days to submit comments on the proposal before a final version is hammered out. "The community needs to think very seriously about what the implications of this would be," Baldwin says.

Don't expect the final rule to be the last word. The Administration's narrow interpretation is likely to be challenged in court "by anybody who wants more information than they can get," Alberts told *Science*, a process that could drag out for months or years.

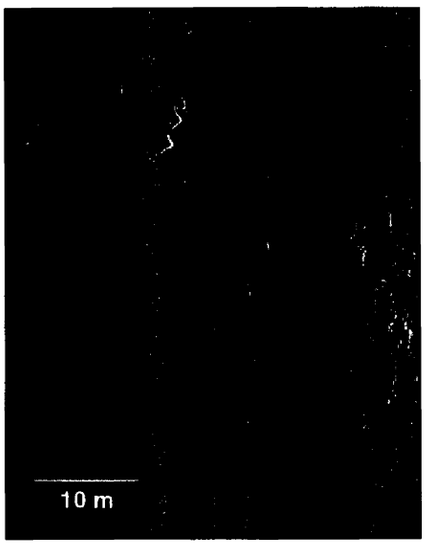
–JOCELYN KAISER

ARCHAEOLOGY

Black Sea Flood Theory to Be Tested

CAMBRIDGE, MASSACHUSETTS—Scientists plan to mount a major expedition this summer to look for remains of ancient settlements submerged in the Black Sea, a team including Robert Ballard, discoverer of the *Titanic* wreck, announced here on 30 January. The archaeological treasure hunt is meant to test a controversial theory that fast-rising waters some 7500 years ago drove coastal dwellers inland at a dizzying 1 to 2 kilometers a day, a cataclysm that some researchers say could have spread farming into Central Europe and perhaps even account for the biblical tale of Noah's ark.

In late 1997, oceanographers William Ryan and Walter Pitman of the Lamont-Doherty Earth Observatory in Palisades, New York, published evidence from sediment cores that about 5500 B.C., the rising Mediterranean Sea topped the shallow Bosporus straits and began gushing into the nearby Black Sea, until then a landlocked lake. The flood raised water levels 15 centimeters a day; by the time it ended, the sea was up about 150 meters and an area the size of Florida was underwater (*Science*, 20 February 1998, p. 1132). Many oceanographers consider this flood scenario credible, but archaeologists are



Shipshape. Last year's expedition found what may be a Turkish warship sunk in 1854.

CREDITS: (TOP) JACK DYKINGA/USDA; (BOTTOM) MARINE SONIC TECHNOLOGY LTD.

ScienceScope

Racing the Genetic Clock Science diplomats are scrambling to hammer out some last-minute compromises on a controversial international agreement to regulate the global traffic in transgenic organisms. A United Nations committee will convene next week in Cartagena, Columbia, to finalize a Biosafety Protocol to the 1992 Convention on Biological Diversity. The protocol is intended to prevent engineered organisms, such as crop plants, from escaping into the wild or transferring their implanted genes to other species; ministers plan to sign it later this month.

But some observers wonder whether the negotiators will run out of time before finding common ground. Some European and developing countries, for instance, want the pact to cover transgenic organisms and foods, drugs, and vaccines derived from them. On the other hand, U.S. officials—who will just be observers at the meeting because the Senate hasn't ratified the biodiversity treaty—fear such sweeping coverage could hurt the U.S. biotech industry. Says one U.S. diplomat: "Never in international negotiations have I seen a draft with this many key issues waiting to be resolved."

From Classroom to Boardroom In hopes of stimulating Japan's flagging economy, the nation's Ministry of Education (Monbusho) wants to change a law that prevents national university professors from serving as officials of private corporations. "There has been a lot of discussion over how Japan can encourage the creation of venture businesses as America does," says a spokesperson for Monbusho, which plans to ask the Diet, Japan's parliament, to end the ban. "We think Monbusho must do its part."

Removing the prohibition would be "a very good thing," agrees Ryozo Yoshizaki, a cryogenic engineer who heads an industry liaison office at the University of Tsukuba. But he cautions that a change is unlikely to have an immediate impact. "Professors are very happy to have their research benefit society, but most aren't interested in actively participating in the necessary commercial development," he believes.

Contributors: Bruce Agnew, Robert Koenig, Jeffrey Mervis, Martin Enserink, Dennis Normile