can go down 6500 meters, about 2000 meters deeper than *Alvin* goes. "The information helps to determine where we should dive," says Susumu Honjo, a WHOI geophysicist.

Bolstered by Japan's increased networking capabilities, *Mirai* has allowed JAMSTEC to become a full partner in the international Tropical Atmosphere Ocean buoy array. In addition to servicing the current array, maintained by the U.S. National Oceanic and Atmospheric Administration through its Pacific Marine Environmental Laboratory (PMEL) in Seattle, *Mirai* will set up 21 additional buoys to measure current along with ongoing readings of temperature, winds, and humidity. GOIN is also forcing Japan to modernize its data-handling systems. "GOIN is having a real impact on how Japanese research organizations handle their ocean data," says Nancy Soreide, PMEL's associate director for information management.

Shoichiro Nakamoto has seen that process at work. A former observational oceanographer at JAMSTEC, Nakamoto last spring moved to the Earth Science and Technology Organization, a new agency formed to help Japan's Science and Technology Agency participate in GOIN and other international programs. "It is not an easy task to unify the databases in Japan because there are many institutions involved in ocean sciences and observations," he says. But Japan's growing international connections, he adds, make that task imperative.

Tapping the KEGG. Japan's belated entry into the world of networking has also been a boon to geneticists. "The most useful information for us is electronic mail from collaborators," says Hidetoshi Inoko, a professor of molecular life sciences at Tokai University's School of Medicine in Isehara. "And the next is outcomes from analysis tools like GRAIL and BLAST/FAST," he adds, referring to tools for searching genetic databases for sequence homologies.

Inoko, who is exploring a 1-megabase region on chromosome 6 suspected to be involved in the immune response, leads one of four Japanese teams that last year received human genome sequencing grants (*Science*, 15 September 1995, p. 1504) from the government. The others focus on band 21.3 of chromosome 3, the Down syndrome region of chromosome 21, and the immunoglobulin-2 and cat's eye syndrome regions on chromosome 22. Data from the four projects will be posted on Japan's GenomeNet database, adding to the cDNA and *Bacillus subtilis* databases that are among the few unique genome databases in Japan.

U.S. scientists who rarely use Japan's GenomeNet now because they can find similar information at home expect the four sequencing projects to yield some unique databases, notably on chromosome 21. "Chromosome 21 is a very competitive area, and the cooperation of the international scientific community will be absolutely essential," says David Patterson, president of the Eleanor Roosevelt Institute in Denver, who is collaborating with Yoshiyuki Sakaki, a molecular biologist at the University of Tokyo's Human Genome Center. "The biggest problem we must confront is how to use the information [being collected]."

Inoko and others say that Japan can make a special contribution to science by helping to solve that problem. "What we need is bioinformatics software that will enable us to decipher the function of a novel gene," says Inoko.

KEGG, part of the second, 5-year phase of Japan's Genome Informatics Project, aims to take that great leap. Each gene will also be linked to entries in existing databases. "I will look at data in terms of binary relations—how this gene affects that gene or how this molecule affects that molecule, and synthesize how a network of interactive molecules will be formed," says Kyoto's Kanehisa. Kanehisa's group is also developing an integrated database retrieval system, called DBGET, to retrieve entries on 17 different GenomeNet databases by combining a database name and an entry name.

While most scientists expect the government's 5-year plan for science to benefit networking, some worry that officials will seek quick fixes rather than permanent improvements. "It may be spent like the money won in Las Vegas casinos and not generate a long-lasting infrastructure for networking and archiving," says physicist Tsuneyoshi Kamae of the University of Tokyo, who administered the TISN network for government labs that was folded into IMnet last spring. An important part of that infrastructure is the talent to run it, says Yusuke Nakamura, director of the Human Genome Center at the University of Tokyo's Institute of Medical Science. "Although computer science in the life sciences is getting more and more important," he says, "the number of Japanese scientists interested in [biological informatics] is very low." Raising those numbers is essential, he says, for Japan to take full advantage of the rest of the new world of science being delivered via electronic networks.

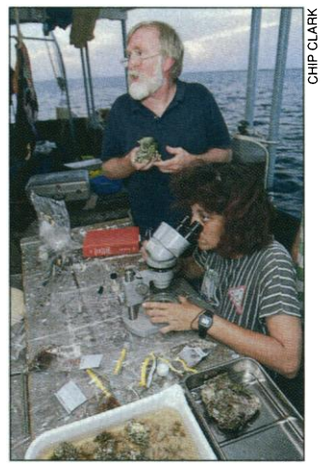
–Lori Valigra

Lori Valigra is a science writer in Cambridge, MA.

NATURAL HISTORY MUSEUMS

A Plea To Protect Threatened Collections

CAMBRIDGE, U.K.—As species after species slide into extinction around the globe, natural history museums, with their vast repositories of specimens, provide an increasingly important record of past biodiversity and a source of data for future studies. But the central message from the Second World Congress on the Preservation and Conservation of Natural History Collections, which convened here last month, is that the museums themselves are a threatened species. Many collections, particularly in developing countries, may even become extinct without a concerted effort to preserve them. "If nothing is done, there's a good chance of losing both in situ organisms and collections in the tropics," says Richard Leakey, the Kenyan paleontologist turned politician.



CHIP CLARK

Cuban connection. Smithsonian project aids Cuban marine collection.

The concern is not new. Four years ago, the first in this series of high-profile congresses, held in Madrid, Spain, drew attention to the problems, and delegates resolved to develop a number of initiatives. High on the list was the setting up of an international coordinating organization, says geologist Chris Collins of Cambridge University, who coordinated last month's meeting. But no effective organization has been established, and many researchers at the Cambridge meeting were disappointed at what had been achieved. "Some of the original drive appeared to have evaporated," says Steve Blackmore, head of the botany department at the Natural History Museum in London. Yet many felt that international coordination is needed now more than ever.

Take the situation in Kenya. With a rapidly rising population of 20 million, increasing infant mortality, and an ever-growing number of AIDS cases, there is little money for museums. "Is it possible to say that biodiversity is more important than medical treatment?" Leakey asked the conference. And even in industrialized countries, economic pressures are forcing museums to turn to private sources for funding. The Natural History Museum in London, which was wholly government funded 8 years ago, now finds one-third of its income elsewhere. "It is no longer sufficient for us simply to assert our importance;

we have to prove it by our actions," says the museum's director, Neil Chalmers. "Collections by themselves are of little value unless they help answer questions important for society," says Gerald Fitzgerald of the Canadian Museum of Nature in Ottawa.

Economic upheaval in former communist countries is also putting many of their collections in jeopardy. "Russia holds some of the world's most important collections," says Blackmore. But botanist Demitry Geltman of the Komorov Botanical Institute in St. Petersburg says the Russian Academy of Sciences has so many institutes to maintain on a limited budget that collection management has a low priority. Part of the roof at the Komorov Institute collapsed in 1993, damaging some of the collections. This has now been repaired with a grant from the International Science Foundation, but the collections are still deteriorating because of poor control of temperature and humidity. With few private sponsors coming forward to help out, Geltman says "international collaborations are vital to maintain the collections." The demise of the Soviet Union also had serious implications for Cuba, home to the richest biota in the Caribbean and some invaluable collections. The sudden end of Soviet funding has forced the closure of its natural history museum indefinitely, says Gilberto De Silva, vice director of the National Museum in Havana. "Proper care of the collections is impossible," he adds.

Museum officials who attended last month's meeting did see some rays of hope, however. Many museums are making their collections accessible remotely through the World Wide Web—which greatly expands the value of individual collections—and collaborations have begun to spring up between Western institutions and museums in developing countries. In Cuba, U.S. organizations such as the MacArthur Foundation and the Smithsonian Institution are providing funds to help maintain Cuban collections. And in Kenya, Joseph Mutangah, a biologist at the National Museums of Kenya in Nairobi, looks longingly at these collaborations. "International partnerships would be really valuable and help raise the profile of museums within [Kenya]," he says.

The Cambridge meeting resolved to have another stab at creating an effective body for coordinating activities and setting global priorities. The effort to create it will be led by Des Griffin of the Australian Museum in Sydney and Mohammed Isahakia of the National Museums of Kenya. "After the Cambridge meeting, I feel much more positive that something will happen," says Blackmore. Creation of an international organization, he adds, would at least remove one potential problem: "At the moment, even if the World Bank or some other agency wanted to help fund natural history collections, where would they send the check?"

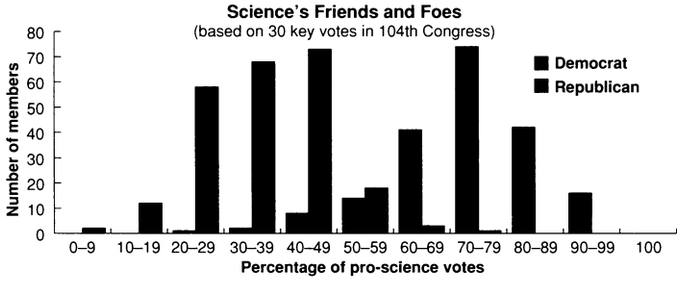
–Nigel Williams

SCIENCE POLICY

Congressional Scorecard Sparks Furor

A scorecard of lawmakers' votes on science-related issues, released last week by a group of distinguished scientists, has provoked a storm of criticism on Capitol Hill and among some science lobbyists who believe its conclusion—that Democrats are far more pro-science than are Republicans—could do more harm than good in building political support for their cause.

The study was done by Science-Watch Services Inc., a new Washington-based organization chaired by Roland Schmitt, a past chair of the National Science Board, and headed by Martin Apple, who is also the president of the Council of Scientific Society Presidents. The group chose 30 floor votes taken in the past 2 years by the House of Representatives—mostly on proposed cuts in a variety of research programs—and assigned ratings to lawmakers. The more frequently



Making the grade. Democrats ranked much higher than Republicans did in a controversial analysis of 30 science-related votes in the House.

one voted in favor of measures considered pro-science, the higher the score. "Our eyes were on those votes that had an effect on the well-being of science," Schmitt says.

The results, presented last week at a press conference, were a surprise to Apple, Schmitt, and others who follow science policy. Only one Republican receives a rating above 70%, while 132 Democrats do. And while only three Democrats score below 39%, 140 Republicans do. Sixteen members—all Democrats—received a grade of 90% or higher, while 14 members—all Republicans—scored below 20. The top scorers, with 97%, are two Democrats from Texas—Representatives Ken Bentsen and Sheila Jackson-Lee—while Representative Jim Ramstead (R–MN) ranked last, with 4%.

The exercise was designed to stimulate a grass-roots effort among researchers to educate their representatives about the importance of science, says Schmitt. "Until now the science community has been able to take care of its business inside the Beltway," he says. "That era is passing."

That activist message, however, was lost on many who count themselves friends of science in Washington. In a scathing letter to Apple, House Science Committee Chair Robert Walker (R–PA) rejects the report's "overt subjectivity" and accuses Apple of succumbing "to the temptation to further politicize science." Apple's choice of floor votes is flawed, says Walker, because it equates preserving the scientific status quo with support for science and excludes many unrecorded voice votes where members demonstrated their support for research. "The bottom line of this survey is that if you're a big spender, you get an 'A,' " says Walker. "But if you're an honest student, do your homework, and make the hard decisions about good science, you fail." Walker received a grade of 40% in the survey.

Schmitt dismisses that criticism, saying that it is impossible to include unrecorded votes in a scorecard and that the votes were chosen without regard to ideology. A vote to abolish the congressional Office of Technology Assessment, as the House and Senate did last year at the urging of Republican lawmakers, is an anti-science action because there was broad scientific support for the organization, he says. As for partisanship, Schmitt notes that he was appointed to the science board by Republican President Ronald Reagan.

Democrats quite naturally were delighted by the scorecard. "This could become a very useful tool for the science community to better identify who their friends are," Representative George Brown (D–CA) told *Science*. It could also be a tool to "convert or replace those who don't understand the importance of research," adds the ranking minority member on the House Science Committee, who scored 93%.

That thinly veiled partisan reading of the survey is what worries some congressional staffers and science lobbyists. They fear Science-Watch's effort could backfire by alienating generally supportive Republicans. "It is a serious mistake and may anger members of Congress who have been among the best friends of scientific research," warned Cornelius Pings, president of the Association of American Universities, in a memo to AAU presidents and chancellors. Pings was particularly disturbed by the fact that Representative John Porter (R–IL), chair of the