and now—argues for water travel, says Sandweiss. "If you had watercraft, then you could carry water and you could move more quickly" than traveling overland, he says.

Even researchers who have invested their careers searching for the earliest South Americans in highland sites are now giving the maritime idea serious consideration. "I've long pushed the idea of people moving down the flanks of the mountain zone all the way from the Isthmus of Panama down the Andes," says archaeologist Tom Lynch, director of the Brazo Valley Natural History Museum in Bryan, Texas. "But it may be that people actually came along the coastal fringe." **–HEATHER PRINGLE**

Heather Pringle is a writer in Vancouver, British Columbia.

ANIMAL EXPERIMENTATION

Strict Rules Rile Indian Scientists

NEW DELHI—Proposed rules to create a government-run system to regulate research using animals have triggered a fierce debate in India. Drafted by a committee chaired by social justice minister Maneka Gandhi, an outspoken animal-rights activist, they are set to go into effect on 8 October. But research groups are trying to block them, arguing that they are extreme and threaten valuable research.

PALLAVA BAGLA

Government guardian. Social justice minister Maneka Gandhi says rules are meant to protect "my animals."

Issued last week, the proposed rules would require all labs doing animal experimentation to register and obtain prior written approval from the government. They would effectively ban animal testing and other contract work for foreign institutions and companies by prohibiting any research done on behalf of unregistered institutions. Registered labs would also need to provide quarterly updates on their activities and could neither transfer nor acquire animals without permission. Gandhi describes the proposed rules "as conforming to well-established norms adhered to in the West."

The new system would be run by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), which Gandhi chairs. It would supplant voluntary guidelines issued in 1992 by the Indian National Science Academy. Last week the committee released a survey done by a private advocacy group that found that many of the country's leading research labs haven't been following even those guidelines. "Why should my animals be subjected to cruel tests for the sake of Western companies?" Gandhi said in an interview with *Science*. "I am very happy that there will be more paperwork [for the scientists]. ... They are used to doing whatever they feel like. Now they will have to fall in line."

Perhaps, but not quietly. Last week officials from the National Academy of Sciences urged Prime Minister Atal Bihari Vajpayee to prevent the implementation of the proposed rules. A dozen heads of biomedical labs and secretaries of government scientific departments also met last week and called for more discussion. "They are fraught with serious consequences to the progress of biomedical research in India toward new vaccines and new drugs," says Vulimiri Ramalingaswami, a pathologist and former chief of the Indian Council of Medical Research (ICMR). International research would also be jeopardized, says Chhitar Mal Gupta, director of the Central Drug Research Institute in Lucknow, which has a long-running project with the U.S. Walter Reed Army Institute of Research testing new therapeutics against malaria. "This collaboration will fall apart and drug development will be shattered," he says.

Each year Indian scientists at 5000 laboratories use more than 5 million animals—ranging from frogs and rats to monkeys and buffaloes—at a cost exceeding $10 million. India has traditionally been a major source for experimental Rhesus and Bonnet monkeys caught in the wild, and several international pharmaceutical companies stepped up their animal testing facilities in the country after a 1978 ban on exports. Experts say that such tests cost one-tenth as much as they would in the West.

Institutions are supposed to follow the academy's voluntary guidelines, which lay down broad policies on housing and feeding of animals and proper experimental procedures. They specify that all institutions should have animal ethics committees that must include at least one outside scientist and one member of the public. Whereas ICMR Director-General Nirmal Kumar Ganguly says that "all Indian institutes are conforming to the [academy] guidelines," a new survey carried out at the behest of the CPCSEA found otherwise.

The survey released last week found that of 30 labs sampled (including many national research institutes, pharmaceutical companies, and at least one veterinary college), only half had any form of animal ethics committee, and only two had any outside members. In fact, *Science* has learned that

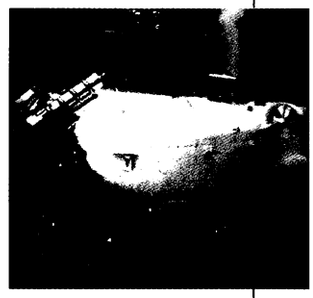
ScienceScope

VINTAGE SUB AWAITS FATE

Scientists are trying to decide whether to retool a new gift to science—a Cold War submersible—or strip it for parts. Either way, they say, U.S. oceanographers could profit.

Last month, the U.S. Navy delivered *Sea Cliff* to the Woods Hole Oceanographic Institution (WHOI) in Massachusetts. The submersible has cruised to 6000 meters below the surface—the deepest of any U.S. sub—while on military search-and-recovery operations. Now, engineers are evaluating how much it would cost to outfit the vintage-1968 craft for civilian research.

WHOI



Sea Cliff. Spare parts?

If making the switch proves too expensive, researchers may transfer the *Sea Cliff*'s sturdy lights, arms, and other gear to WHOI's underwater flagship, the *Alvin*. But the retrofit can't impair *Alvin*'s reliability, says Dick Pittenger: "In trying to make *Alvin* better, we don't want to lose what we've got."

CANADA'S UNIVERSITIES SHY AWAY FROM FASTER INTERNET

Who should be using Canada's next-generation Internet? That question is being debated in the wake of a review claiming that too few academics are taking advantage of the high-speed data pipeline.

In a report obtained by *Science*, external reviewers found that only 28 of Canada's 80 universities are linked to the CA*net II electronic backbone, which became operational in 1996 and can transmit data at speeds reaching 100 megabytes per second. The panel concluded that high hookup costs—which schools must bear by themselves—are keeping many universities off-line.

Bill St. Arnaud of the Canadian Network for the Advancement of Research, Industry & Education (CANARIE), a CA*net II architect, says the network was never intended to lure academic users. Rather, he says, it is designed to foster Internet commerce. Scant university use, however, could prove problematic when CANARIE makes its pitch later this year for $80 million in government funds to complete the third phase of its networking projects. One government official's ironic take on the issue: "We built it and no one's using it—there's a real incentive to support phase 3."

ICMR's premier institution, the National Institute of Communicable Diseases in New Delhi, does not have an animal ethics committee and that the National Institute of Immunology in New Delhi formed its panel only this summer. "If they [research labs] don't even have a semblance of an animal ethics committee, how can you expect them to self-regulate?" asks primatologist Iqbal Malik, who conducted the survey as head of Vatavaran, a New Delhi–based advocacy group.

Although many Indian scientists agree that there is room for improvement, they say the proposed guidelines will merely add to an already heavy administrative burden. "There is an urgent need to have a pragmatic animal-testing policy [because] we may not have done well in the past," says Raghunath Anant Mashelkar, director-general of the Council of Scientific and Industrial Research. "But over-regulation does not help anybody."

Some researchers admit, however, that the stick of government regulation may work better than the carrot of voluntary compliance. "Who bothers to implement guidelines given out by an academic body?" says entomologist Vinod Prakash Sharma, director of the Malaria Research Center in New Delhi. "Only guidelines given out by the government have any hope of ever being followed." —PALLAVA BAGLA

Pallava Bagla is a correspondent in New Delhi.

SCIENCE EDUCATION

Graduate Admissions Down for Minorities

When California voters approved an anti–affirmative action referendum in 1996, and a district court that same year banned affirmative action at universities in Texas, Louisiana, and Mississippi, educators feared that minority university admissions would suffer in those states. A report* released last week by the American Association for the Advancement of Science (AAAS, publisher of *Science*) shows the situation to be even worse than many expected: Minority enrollments in graduate science and engineering programs dropped precipitously in 1997, not just in Texas and California but across the country. The report's authors attribute the fall to the uncertainty the laws and legal challenges have bred about what forms of affirmative action are legally allowable.

Coincidentally, that gloomy news came out within a day of the publication of *The Shape of the River*, a new book by William Bowen, president of the Mellon Foundation, and former Harvard University President Derek Bok, documenting the achievements of past affirmative action programs. Published by Princeton University Press, it concludes that such policies at top undergraduate colleges and universities have largely been successful in giving black undergraduates a boost toward financial success, professional and graduate study, and leadership positions.

"The society is fortunate that these two reports appear at the same time," says Luther Williams, assistant director for Education and Human Resources at the National Science Foundation (NSF). The detailed data gathered in both reports, he says, will "provide a factual basis" for new plans to recoup losses and increase minority enrollment in science and engineering programs. Federal support for such a plan was already evident last week: At a White House ceremony honoring mentors for minorities in math and science, President Clinton instructed the National Science and Technology Council (NSTC), an interagency committee that reports to the White House, to "develop recommendations within 180 days on how to achieve greater diversity throughout our scientific and technical workforce."

The authors of the AAAS report reached their conclusion by analyzing admissions data for the past 4 years from science and engineering graduate programs at 93 major research universities. They found little change in black graduate admissions and a slight increase in Hispanic admissions from 1994 to 1996. But in 1997, black admissions declined 20% and those of Hispanics dropped 18%. Report co-author Shirley Malcom, director of Education and Human Resources Programs at AAAS, attributes the plunge to a lack of clear direction from the federal government. "Administrators are feeling really uncertain because they don't know what is allowed and what is not," says Malcom. The report says that uncertainty often translates into "lukewarm attention to minority recruitment and retention" and heavier reliance on GRE scores for admission, which hurts underrepresented minorities.

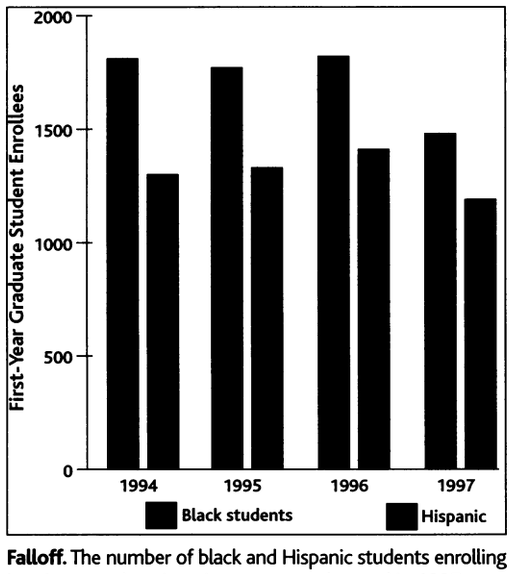
The president's new initiative should help in that regard, says Arthur Bienenstock, associate director for science at the White House Office of Science and Technology Policy: "That directive will necessarily lead the NSTC to provide clarification in this issue of what can and cannot be done in the targeted admission of minorities." NSF, which is mandated by a 1980 law to work to boost the participation of women and minorities in science and engineering, also plans to help clarify the situation by revamping its minority programs (*Science*, 28 August, p. 1268). Williams says he doesn't know yet what the changes will be but will look to the book and the AAAS report for guidance as to what approaches will work best.

As those efforts seek to reclaim lost ground, Bowen and Bok's book documents how successful race-sensitive admissions can be. The authors studied admissions and student performance data from 28 highly selective undergraduate institutions, as well as survey responses from 31,000 students who entered those institutions in 1976 and 1989. Their findings challenge several commonly held negative beliefs about affirmative action.

For example, their data refute the idea that affirmative action promotes minority students beyond their ability to succeed. Bowen and Bok compared black students with identical SAT scores at different institutions. They found that the students graduated at a higher rate from the more selective colleges, where the average SAT score was up to 200 points higher than theirs, than from less selective colleges where the average SAT score was more like their own.

The success of those black students at the top schools wasn't achieved by avoiding tough majors. At the schools surveyed, the same percentage of black students as whites (20%) majored in science and engineering. "That is so different from the myths one hears, that [blacks] are all majoring in African-American studies," says Bowen. Moreover, 40% of the black students completed a professional or doctoral degree, compared to 37% of their white counterparts.

Bowen says he hopes the book will help warm the current chilly climate toward affirmative action and encourage policy-makers to endorse race-sensitive admissions. But given the growing list of legal strictures, NSF and NSTC must walk a fine line in pursuit of their goal. —MARCIA BARINAGA



Falloff. The number of black and Hispanic students enrolling in science and engineering programs dropped in 1997.

* From "Losing Ground: Science and Engineering Graduate Education of Black and Hispanic Americans." Ordering information available at ehrweb.aaas.org/ehr/order-exec.html