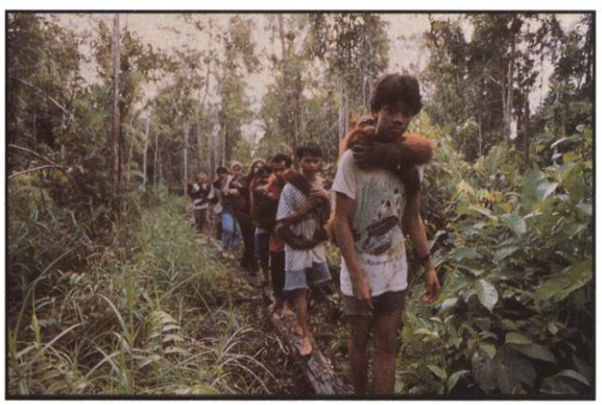
work—the researchers found that the population had dropped from 12,000 to 6500. The survey, in press at *Oryx*, is likely to be accurate, says primatologist David Chivers of Cambridge University, and "it's great reason to be horrified." Indeed, the entire world population of the red apes was calculated at just 27,000 in 1998, down from an estimated 315,000 in 1900, according to a book published last year by primatologists Herman Rijksen and Erik Meijaard.

Confounding matters, taxonomists have recently agreed that the Bornean and Sumatran orangutans, which have been separated for thousands of years, differ enough in appearance, behavior, and genetic makeup to be classified as separate species. Each is critical to conserve, but the task will be even harder given the small sizes of both populations.



Repatriation. Volunteers return orphaned orangutans to the wild.

The Sumatran species is in critical danger because its last stronghold, Gunung Leuser National Park, is being actively and illegally logged, says van Schaik. The situation is not much better on Borneo, says conservation biologist Jatna Supriatna, who directs the Indonesia program of Conservation International. Although the orangutan population on Borneo is larger, habitat is disappearing fast. In the past 20 years, 4 million of the 13 million total hectares of forest were converted to palm-oil plantations, mostly run by friends of former president Suharto, Supriatna says. While still in power Suharto ordered the conversion of another 1 million hectares of peat swamp forest, prime orangutan habitat, to replace the disappearing rice fields on the overcrowded island of Java. The massive Indonesian forest fires of 1997 also took a huge toll, claiming 8 million hectares on Borneo, part of which had been previously logged. Poverty drives habitat destruction on both islands, as local people log the lucrative timber, Supriatna says.

As the forests go, so do the orangutan groups, and with them a unique opportunity to understand the dawn of human culture, van Schaik says. Researchers have learned only recently that different populations of orangutans, like chimpanzees, exhibit signs of what some primatologists call culture: behaviors unique to the population that are learned from other group members (*Science*, 25 June 1999, p. 2070). For example, all orangutans near the Suaq Balimbing research station in Gunung Leuser National Park make Bronx cheer–like sounds with their mouths as they build their nightly nest high in the canopy. None of the orangutans near the Ketambe station, 70 kilometers away, do. "It's irrelevant behavior that doesn't affect survival," says van Schaik, but "it's culture in the making."

Other orangutan cultural behaviors, however, could offer substantial benefits. For example, apes in a swampy forest on the east side of the Alas River harvest the oil-rich seeds of the woody neesia fruit by ripping open the fruit with their hands. But orangutans on the other side of the river use a peeled stick to pry open the fruit. Because those apes can spend up to 70% of their feeding time harvesting the fruit when it is in season, the more efficient stick users save lots of time and energy.

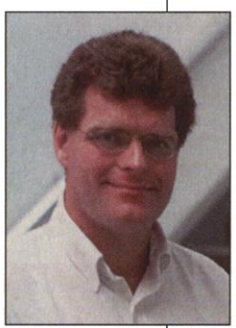
Alarmed by the new survey data, field researchers and zookeepers at last week's meeting hammered out an action plan, launching a group called the "Orangutan Network," led by van Schaik, to conserve the species. They plan to scatter new study sites in the remaining areas of healthy forest, staffed by researchers and students, because a research presence is known to dramatically boost local conservation efforts. They hope to increase interest in orangutan conservation by enlisting individual zoos to "adopt" (and help fund) a research site.

In the field, Galdikas has expanded her focus from research to saving as many of the apes as she can. A conservation group she directs, the Orangutan Foundation International, operates a rescue and rehabilitation center in Tanjung Puting National Park in Borneo that saves young orangutans orphaned by logging, fires, or hunting. About 500 orangutans are housed at such centers. So far, about 800 apes have been successfully returned to the wild. But the apes need intact forest, so Galdikas uses money from supporters to pay 100 local Dayak and Melayu men—"left out of the economic pie," she says—to patrol the forest, recycle, plant trees, and educate their neighbors. As a result, the illegal loggers have not touched a 50-km^2 patch of forest near her research station.

Although the situation is indeed grim,

ScienceScope

Sanger Taps Homegrown Talent After nearly a year's search, the Sanger Centre, a major genome sequencing institute near Cambridge, U.K., has found a new director. Mouse geneticist Allan Bradley (below), 40, of Baylor College of Medicine in Houston will replace outgoing Sanger chief John Sulston on 1 October.



For Bradley, a pioneer in the use of stem cells to study mouse development, the move will be something of a homecoming: The British-born scientist did his undergraduate, graduate, and postdoctoral studies in Cambridge. He says that he intends to take Sanger, which is mostly funded by the Wellcome Trust and is currently sequencing about one-third of the human genome, to the next stage of genome research, called functional genomics. "There will be a huge opportunity in discovering [gene] function," Bradley says. He will also continue some of his mouse research in Cambridge, although he realizes that running his own lab and a center with 550 staff members will not be easy. Sulston, he predicts, "will be a hard act to follow."

Sulston, who has directed Sanger since 1992, says he has "no plans" for his next step, but adds: "I shall be looking around."

One for All The world's science academies agreed at a 14 May confab in Tokyo to establish an international version of the U.S. National Research Council. The new InterAcademy Council (IAC) will organize expert panels to provide scientific advice to the United Nations, World Bank, and other international organizations on issues ranging from food safety to emerging diseases (*Science*, 11 February, p. 943).

The IAC, to be based at the Netherlands Academy in Amsterdam, will produce peer-reviewed reports by scientists who serve without compensation, and who will communicate mainly via e-mail. The enterprise "is envisioned as an electronic one," said U.S. National Academy of Sciences president Bruce Alberts. The council's budget is still uncertain, but reports will be paid for by commissioning organizations. Member academies will chip in to cover the salary of an executive director, to be hired after an international search. Alberts says the IAC's "first few projects will be critical" to determining its success.

CREDITS: (LEFT TO RIGHT) MICHAEL TURCO; SANGER CENTRE

are already under way: Scientists are now using mtDNA sequences to distinguish between populations of southern and eastern black rhinos. But this appears to be the first time that a biotech firm has leaped into the field as a partner. "It's encouraging to see a major molecular biology company putting effort into conservation research," says William Jordan of the Institute of Zoology in London.

The CRES-Amersham team will exploit what may be the world's biggest collection of DNA samples from endangered species: cell lines from more than 4300 individuals representing 370 species and subspecies. Since 1976, CRES staff have been snipping pea-sized patches of skin from animals in the zoo and extracting fibroblasts, tissue-repairing cells that happily divide in the test tube, even after being stored for years in liquid nitrogen. The research effort has helped solve some puzzles in captive breeding. For instance, CRES researchers, frustrated that a dwarf antelope called the dik-dik often produced sterile offspring, found after examining the animal's chromosomes in the late 1980s that two outwardly indistinguishable dik-dik species at the zoo were attempting to mate. Putting them in separate pens by chromosome type fixed the problem.

The new effort will specialize in the underdogs of the animal kingdom. "We'll choose rare species over common ones," says CRES geneticist Oliver Ryder. Obvious choices, he says, include the peccary, the okapi, and the three-banded armadillo. CRES's Frozen Zoo, with DNA from more than 100 mammalian families, will provide a strong foundation. "To start from scratch would take years and years," says Ryder. And his group is forging collaborations with other centers to find DNA from mammals poorly represented in the Frozen Zoo. For instance, Robert Baker's laboratory at Texas Tech University in Lubbock has agreed to provide DNA samples from select rodents and bats.

The team expects it will take about a year to generate the mtDNA sequences, which run to about 16,000 base pairs each. All the data will be made freely available to the public. Shining a spotlight on rare animals could aid conservation efforts, says Wildt: "The project will help increase public awareness of the need for much more biomedical research directed at wildlife species."

According to Ryder, the sequencing project points up the value of DNA banks, which he and several colleagues have urged the scientific community to expand through an ambitious effort to compile DNA samples of all endangered animal species (*Science*, 14 April, p. 275). He emphasizes, however, that gathering genetic data on endangered species must go hand-in-hand with measures to preserve habitats. "That is the only way to really save species," he says.

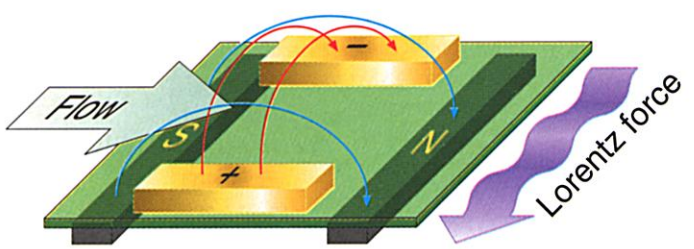
Amersham declines to reveal how much it plans to invest in the project. But even though Amersham is giving away the data, says Robert Feldman, production sequencing and collaborations manager, the high-throughput DNA sequencing company does have something valuable to gain: experience. "We're looking to work on as many different kinds of DNA as we can get our hands on," he says. "That will help us understand our customers' needs better"—not to mention the needs of peccaries, okapis, and three-banded armadillos.

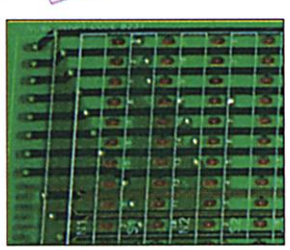
–RICHARD STONE

HYDRODYNAMICS

Electromagnetic Tiles May Cut Turbulence

Turbulence is as expensive as it is inevitable. Whether it is a submarine sneaking around the bottom of the ocean, an airplane bouncing overhead, or oil bubbling through a pipeline, the turbulent eddies that form when a fluid streams over a fast-moving surface drag against the surface like sandpaper scraping over wood. Overcoming this drag force requires fuel, and fuel costs money—lots of it. By some estimates, a general method of reducing turbulent drag by 10% could save billions of dollars and eliminate tons of burnt-fuel pollutants.





Making waves. Electrodes and magnets create turbulence-busting forces where tile meets water.

With that kind of money at stake, many scientists are searching hard for such a method—so far, with little success. But on page 1230 of this issue, mechanical engineer Yiqing Du of the Massachusetts Insti-

ScienceScope

Pole Researcher Dies A young astrophysicist has died at the South Pole. The loss has devastated the remaining nine scientists, who are part of a 49-member team wintering over at the pole, and has left a telescope out of operation.

Rodney Marks (right), 32, died on 12 May of heart failure hours after experiencing breathing problems that began as he walked from a research building to the station. Marks had passed all physical exams before heading to the pole last October, and he had wintered over before, in 1998. The cause of death won't be known until his body is flown out in November, when the station becomes accessible.

Marks was the sole operator of the Antarctic Submillimeter Telescope and Remote Observatory (AST/RO), which is mapping emissions from atomic carbon and carbon monoxide in the Milky Way. Before he died, Marks had been fixing a tricky problem with one of the telescope's receivers, which must be chilled to near absolute zero. "We don't yet know how hard it will be for others to put things back into working order," says AST/RO project manager Adair Lane of the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts.

The Science of Diplomacy Acting on the recommendations of a National Academy of Sciences panel, Secretary of State Madeleine Albright this week announced that her agency will do more to stock up on science-savvy diplomats. Last October, the panel's report concluded that technical controversies were moving to the top of the diplomatic agenda just as the State Department was losing knowledgeable staff (*Science*, 15 October 1999, p. 391).

To reverse that trend, on 15 May Albright released a plan for following up on the panel's dozen recommendations, including appointing a top-level science adviser and completing by this fall a study that will identify embassies in need of scientific talent. But improvements could take years, she cautioned: "It doesn't take a physicist to know that change is harder than inertia." Indeed: Several candidates have already turned down the adviser's job, sources say.

Contributors: Michael Balter, Robert Koenig, Erik Stokstad, David Malakoff

CREDITS: (TOP) A. HARPER/CENTER FOR ASTROPHYSICAL RESEARCH IN ANTARCTICA; (BOTTOM, INSET) G. KARNIADAKIS *ET AL*/BROWN UNIV