by touch, some researchers speculated. But they assumed that a fish's wake would vanish too quickly to help the seal stalk its prey over longer distances.

Skeptical, Dehnhardt's colleagues at the University of Bonn decided to test real fish in real water. As they reported last year in the *Journal of Experimental Biology*, a goldfish leaves behind swirling vortices that can linger for up to 30 seconds. In addition, the water in the goldfish's wake continues to flow significantly faster than the surrounding water for as long as 3 minutes. Based on these results, they calculated that the larger fish that seals favor (such as herring) might leave trails as long as 180 meters. These wakes might serve as the underwater equivalent of a bloodhound's scent trail—if a seal had the sensory equipment to detect it.

Dehnhardt and his colleagues tested this possibility by training two harbor seals to chase a miniature, propeller-driven submarine. After the seals had learned the task, the team placed a mask over their eyes and headphones over their ears before launching the sub. After shutting off the sub's motor to eliminate acoustic clues, the researchers removed the headphones and allowed the blindfolded seals to begin their search. Even without the use of their eyes, the seals quickly began tracking the sub. Several lines of evidence suggest that the seals were relying solely on their whiskers. They closely followed the wake of a sub taking a curving path, even though sound waves and electrical fields would have guided them in a straight line instead. Moreover, once a seal found the sub's wake, it lost it in only 3% of the trials. To eliminate the possibility that the seals were actually following some chemical taste, the researchers masked the seals' whiskers and left only their mouths uncovered. Significantly, the seals always failed these trials.

"Fascinating work," says Paul Nachtigall of the University of Hawaii, Manoa. "Dehnhardt is picking up an old problem that was a huge controversy but that nobody ever really explained. And his idea makes good sense."

Markus Horning of Texas A&M University in Galveston calls the work "a huge step forward in pinniped foraging behavior and ecology." It can, for example, explain some of the observations that Horning and his coworkers have made of Weddell seals hunting under the antarctic ice (*Science*, 12 February 1999, p. 993). Cameras placed on the back of the seals showed them swimming along curving paths just before catching fish. "The path that the seals take is what we'd expect if they were following a hydrodynamic trail," says Dehnhardt.

Seals may not be the only animals that follow hydrodynamic trails to hunt in murky waters. "Only the toothed whales such as dolphins and sperm whales have sonar systems," Dehnhardt points out. "And it's interesting that all the other [marine mammals] have well-developed whiskers." Far from simply being vestigial hairs, whiskers may ultimately prove to be the eyes of the ocean.

–CARL ZIMMER

Carl Zimmer is the author of *Parasite Rex* and *At the Water's Edge*.

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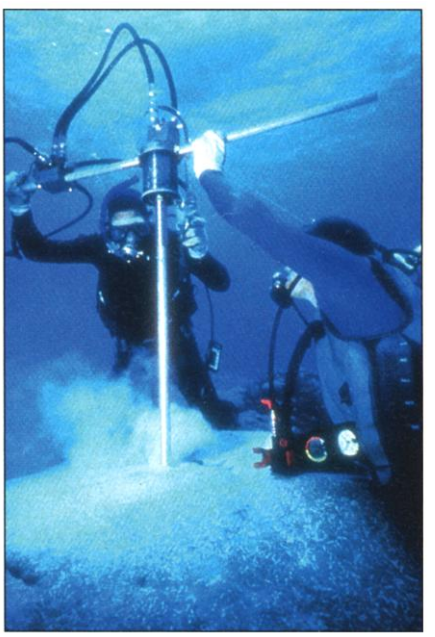
CLIMATE CHANGE

Experts Urge Speedup To Mine 'Archives'

BERN, SWITZERLAND—The disappearance of tropical ice caps, giant coral heads, and old-growth teak forests is taking its toll on present-day ecosystems. But a group of prominent scientists say that such environmental assaults also rob them of an important source of data about past climates—and they want international action before it's too late.

"Unfortunately, some of the most valuable paleoclimate archives are being rapidly destroyed, largely as a result of human influences. We cannot afford such an irreversible loss," the researchers write in a letter published on page 47. In the letter, and in a session planned for an international meeting on global change next week in Amsterdam, the scientists propose a Global Paleoclimate Observing System (GPOS) for gathering indirect "proxy" data on climate change.



Threatened. Dying corals could erase centuries of paleoclimate data.

Bits and pieces of such data are already being collected through various national and international research programs, but the major international climate observation systems have no significant paleo component. And because no one can stop ice caps or glaciers from melting, researchers want to tap data-rich ice cores and other proxy samples or data before they disappear. Raymond S. Bradley, one of the main organizers of the paleoclimate initiative, who heads the geosciences department at the University of Massachusetts, Amherst, likens it to rescuing deteriorating books or magnetic tapes. But instead of being in library basements, the proxy paleoclimate archives are scattered across the globe, from the sea floor to alpine glaciers.

"It is a major scientific loss if we have not sampled 500-year-old trees that are being cut down to make furniture, or corals being blown up to make room for piers, or rapidly melting ice caps," Bradley says. By analyzing such sources, he explains, scientists can obtain a long-term view of climate change that is lacking in present-day measurements.

The researchers concede that their proposal lacks details. Some want to see new networks of paleoclimate experts—each specializing in specific climate systems—that would help coordinate research and share data through the existing World Data Center for Paleoclimatology in Boulder, Colorado. Others, such as geoscientist Lonnie G. Thompson of Ohio State University's Byrd Polar Research Center in Columbus, suggest a "virtual institute" to coordinate detailed regional studies of proxy archives. Keith Alverson, who directs Past Global Changes, a Bern-based group that promotes international paleoclimate research, says researchers in different countries should adopt standards that make it easier for them to pool their data. One way to do that would be to persuade U.N.–sponsored climate-monitoring programs—the Global Climate Observing System, Global Terrestrial Observing System, and Global Ocean Observing System—to add paleo data to their efforts, he suggests.

Although other paleoclimate experts embrace the intent of the letter, some question the need for a new structure. David J. Verardo, director of the paleoclimate program at the U.S. National Science Foundation—perhaps the world's top funder of such research—says that the U.S. Global Change Research Program already supports efforts to recover and store the sort of information GPOS's advocates are concerned about. More money for existing research programs may be all that is needed, he says.

But GPOS advocates want a more systematic approach. "We have to prioritize the vanishing archives and retrieve as much of the data as we can now," says Alverson, who thinks an international effort is necessary. "An awful lot of irreplaceable information is being lost. A decade from now, it may be too late."

–ROBERT KOENIG