RANDOM SAMPLES

edited by CONSTANCE HOLDEN

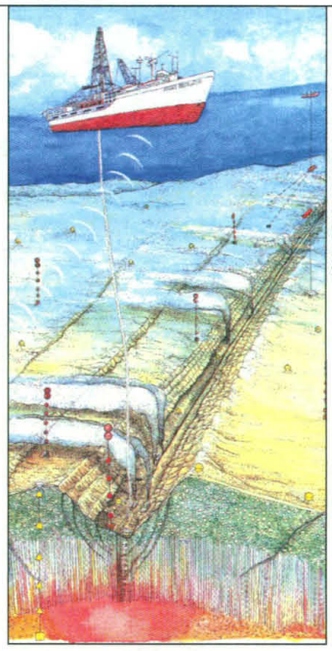
Undersea Observatory

A unique sea-floor observatory will soon be keeping a continuous watch on two undersea volcanoes off the coasts of Washington and Oregon, according to a plan announced last week.

The plan, which could cost $30 million, involves setting up instruments on the sea floor to monitor seismic activity, currents, temperature change, and marine biota at two volcanic sites for years at a time. "Nothing of this magnitude and duration has been done in the deep sea before," says Chuck Fisher, a marine biologist at Pennsylvania State University. Fisher is part of the team, led by scientists at the University of Washington and Scripps Institution of Oceanography, that developed the plan. Currently, says University of Washington oceanographer John Delaney, scientists are only able to study such underwater sites from the surface or in submersible flybys.

Part of the National Science Foundation's RIDGE (Ridge Inter-Disciplinary Global Experiments) program, the observatories, which will take 4 years to set up, will cost between $2 million and $3 million a year for at least 10 years, says Delaney. Some instruments are already deployed at the sites, which lie between 200 and 400 kilometers offshore along the Juan de Fuca ridge, where two of Earth's plates are moving apart. Volcanic eruptions and earthquakes are common in such areas, as magma from the mantle rises to fill the openings. The ridge is also lined with hydrothermal vents, where unusual microbial life forms thrive in superheated, mineral-charged seawater. "The many types of instruments in the observatories will be our time-space 'telescopes' into how volcanoes—in the presence of water—can sustain life without sunlight," says Delaney. Remote-controlled vehicles may eventually be docked at the sites to collect samples and data.

Richard Thomson, a physical oceanographer at the Institute of Ocean Sciences in Sidney, British Columbia, says the plan is "quite exciting, because it focuses people on one area for a significant period of time. We'll get an integrated look at the whole system for the first time."



JOHN DELANEY AND SANDY NOEL

Sea floor plan. Observatory includes seismometers; current meter moorings; cones where instruments can be inserted into Earth's crust; video cameras; positioning beacons; and transponders to measure sea-floor spreading.

AIDS Tumor Bank

AIDS researchers now have a new resource available to them: a bank of AIDS-related tumors with previously hard-to-obtain tissue and fluid samples from AIDS sufferers along with detailed clinical information.

The AIDS Malignancy Bank (AMB), which opened in October, has been a year in the making. Funded by the National Cancer Institute (NCI), it comprises repositories in five sites around the United States.

Cancer biologist Michael McGrath of the University of California, San Francisco, says that almost half of all AIDS patients get some type of malignancy. About 20% will get Kaposi's sarcoma, and 10% to 15% develop some form of non-Hodgkins lymphoma. Yet tumor samples from AIDS patients—especially samples with full clinical and demographic information—are often hard for researchers to get, says Ellen Feigal of NCI's cancer therapy evaluation program, who has been coordinating the creation of AMB. "There are very few people who can do important work on AIDS-associated lymphomas because there are only a handful of sites around the country that see those patients and get biopsy material," says McGrath.

Now the bank will be able to supply "all types of fluid, tissues, cells, and blood products" associated with AIDS tumors and see that every sample is accompanied by "a high-quality clinical pedigree" so researchers will know about patients' treatment and how they responded to it, says McGrath, who heads one of the repositories. He says the bank will also enhance the work of the newly established AIDS Malignancy Clinical Consortium, funded by NCI, which comprises 13 institutions doing "innovative" clinical trials.

Scientists wishing to obtain samples will submit proposals that will go through an independent review board and be as-

(continued on page 1573)

PETER SCHMIDT

Ironmaking the old-fashioned way. Hayas recreate ancient forge.

How Hayas Fired Iron

Recent research into ancient and modern ironmaking in Africa provides new evidence of innovation among early iron workers as they coped with some unusual properties of indigenous materials.

In the November-December issue of *American Scientist*, anthropologist Peter Schmidt of the University of Florida and National Park Service archaeologist S. Terry Childs combine ethnographic and archaeological observations with laboratory analyses to study ancient technology among the Haya of Western Tanzania.

Ironmaking is said to have originated in the Mediterranean region between 1600 and 1200 B.C., spreading to Africa around 600 B.C. Although the Haya stopped iron smelting at least 70 years ago, the researchers found elders who were able to recreate the technology with iron ore from an old mine.

The researchers compared slag and iron from the experimental furnaces to materials excavated from Early Iron Age (600 B.C. to A.D. 600) sites in Tanzania. They were surprised to find both the ancient and modern materials had an unusually high phosphorus content—apparently from the trees and grasses used as fuel. The phosphorus helped in the smelting process, but the impurity made the iron brittle and easily cracked when cold-worked into objects.

The Haya smiths were able to identify the different kinds of iron produced in smelting and found ways to deal with them. They reduced the brittleness by reheating the partially purified "bloom" of iron, steel, and slag. This released carbon, making the iron stronger and more workable. The smiths used iron that was too phosphorus-rich for toolmaking to make simple ritual items.

"The genius of the Haya iron workers in dealing with the difficult materials is much greater than we initially realized," says Schmidt. Chapurkha Kusimba, an archaeologist who studies African iron technology at the Field Museum in Chicago, agrees, saying the research reveals that "inventions were going on as a result of experimentation."

(continued from page 1571)

signed priority scores. Information about the bank can be accessed on the World Wide Web at **http://wwwicic.nci.nih.gov/amb/amb.html**.

EPA Crafts a Strategy For Science

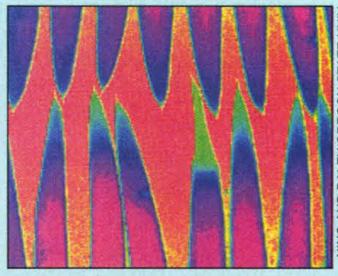
Outside scientists have long urged the Environmental Protection Agency (EPA) to shore up the science behind its regulatory decisions. The agency has been responding—by adding more peer review and boosting extramural grants, for example—and now Robert Huggett, director of EPA's Office of Research and Development (ORD), has drafted a strategic plan that sets research priorities for the agency.

The plan, released 2 weeks ago, calls for EPA to focus its research on "the greatest risks to people and the environment." It identifies six near-term research foci: disinfection of drinking water, chemicals that interfere with endocrine systems, ecosystem protection, models for human health and exposure hazards, particulates harmful to health, and pollution prevention. At the same time, the plan calls for the agency to place less emphasis on routine data collection and low-risk hazards like municipal solid waste, says Joseph Alexander, ORD's deputy science director. EPA will also do more to integrate ecological and human health research.

"I think it's a big step forward. They've matured to ... understanding that there's a necessity to do some basic research," says ecologist Richard Fisher of Texas A & M University. Howard University toxicologist Bailus Walker, who serves on a National Research Council (NRC) panel that reviews EPA's research, agrees, adding that the plan "represents a good synthesis of the advice that has been coming to that agency from all directions" (*Science*, 31 March, p. 1903). EPA is seeking comments from its Science Advisory Board and the NRC panel on the draft, to be finalized next year. Meanwhile, Alexander says the draft plan will be a "pivotal tool" in coping with EPA's 1996 science and technology budget, which Congress wants to cut 10% compared to 1995 levels.

Pathology of a Tree

The Florida torreya, a conifer also called the stinking yew, is a cousin of the yew that produces the cancer-fighting substance taxol. It's also the rarest tree in North America. Although torreyas once flourished in ravines along northern Florida's Apalachicola River, they began to die in the 1950s, and the number has dwindled to a mere 1500. For years, people have proposed culprits for the tree's decline, such as the construction of a nearby dam, which may have warmed the ravine microclimate. Now scientists think they have found the true cause: a fungus that may have become deadly.



NING AND DALEY/OREGON STATE UNIV.

What's eating yew? Needles imaged with fluorometry, which detects photosynthetic activity. Greenish-blue tips show damage from fungus.

Plant pathologist Gary Strobel of Montana State University, Cornell chemist Jon Clardy, and their colleagues collected samples from sick and healthy torreyas and analyzed their fungi. The presence of a fungus doesn't necessarily imply that it is harming a tree; most shrubs and trees contain fungi, says Strobel. But when the researchers took the most abundant of the 30 kinds of fungi found in the wild trees and applied it to cuts made on the limbs of greenhouse torreyas, the cuts soon turned brown and the needles yellowed. "We were able to cause some or most of the [symptoms found] in the field," says Strobel, whose team reports the work in the November issue of *Chemistry & Biology*. Grown in culture, the fungus, *Pestalotiopsis microspora*, produced three chemicals toxic to the torreya, two of which had never been previously identified.

Strobel thinks *P. microspora* may have lived amicably with the torreya until pollution or other stresses made the tree vulnerable to these toxins. Co-author Mark Schwartz, an ecologist at the University of California, Davis, hopes to find out whether treating the remaining torreyas with a fungicide can save them.

The tree's demise would be especially tragic, Strobel says, because the torreya, like its close relative the Pacific yew, may produce unique chemicals that could yield new drugs. Adds Keith Clay of Indiana University, who studies endophytic fungi, "This seems to be a really good case of how extinction could lead to the loss of potentially valuable research."

Eating Like a Greek

For years, physicians have been extolling the "Mediterranean diet"—heavy on fruits, vegetables, cereals, and legumes and light on animal fats—as a way to avoid cardiovascular disease. Now there's evidence from a study of elderly people in rural Greece, who've been on Mediterranean diets all their lives, that these eating habits can also prolong life.

The elderly provide "a living history of past nutrition," says Dimitrios Trichopoulos, an epidemiologist at Harvard School of Public Health and senior author of the study, which appeared in last week's *British Medical Journal*. Elderly Greek villagers "stick to the old customs, as elderly people usually do. ... That allowed us to evaluate, for the first time, the effect of a total diet" on survival rates. Previous studies on diet and longevity have focused on specific nutrients, Trichopoulos explains.

The study tracked 182 Greek villagers over age 70 for 6 years. According to questionnaires examining current eating habits, 57% of them followed traditional, healthy patterns in five or more of the eight food categories measured. Nontraditional eaters—who followed healthy patterns in two or fewer categories, made up 19% of the group. During the study period 53 people died. But those who followed tradition in six or more categories—for example, by eating large amounts of beans or bread, or by using olive oil instead of saturated fats—were only half as likely to die as those who adhered in three or fewer categories. No specific food group showed any relation to survival, but, says Trichopoulos, "taken together, they work." He says the villagers' regime—including whole-grain bread, beans, yogurt, feta cheese, vegetables cooked in olive oil, and moderate amounts of wine—helps explain the "Mediterranean paradox": the relatively long life-spans of people in this region despite their high total fat intake and high rates of smoking.

The study has "a very important message: A pattern of eating that includes all of these factors seems to be the healthiest," says R. Curtis Ellison, an epidemiologist at Boston University. But Dean Ornish, director of the Preventive Medicine Research Institute in Sausalito, California, and an outspoken advocate of a low-fat diet, notes the study doesn't necessarily mean the rest of us should imitate all aspects of traditional Greek dining. "People survived longer despite the olive oil and red wine," he says—"not because of them."

Science Standards: The Final Version

The final version of the National Science Education Standards has, after nearly 5 years of preparation and input from a cast of thousands, become available. The National Academy of Sciences released it on 6 December. The National Research Council has enlisted teams of educators around the country to be available to counsel locals about implementing the standards—a draft version of which (*Science*, 9 December 1994, p. 1637) is already in widespread use—in kindergarten through grade 12 education. The document is available for $23.95 (including shipping), plus 50 cents for each additional copy. Call 1-800-624-6242 or 202-334-3313.