Earth Sciences

Successfully predicted earthquake

In May of 1985, seismologists Max Wyss and Robert O. Burford predicted that within a year, an earthquake would occur along a small section of the San Andreas fault located near Monterey, Calif. And on May 31, 1986, a magnitude 4.6 quake shook that specified region. This was the first successful earthquake prediction for the San Andreas fault, report the researchers in the Sept. 24 NATURE.

The researchers based their forecast on a drop in the seismicity of the area—a technique that has been successful in predicting two other earthquakes, says Wyss, from the University of Colorado at Boulder. He and Burford, from the U.S. Geological Survey in Menlo Park, Calif., also calculated that another section of the fault would rupture by May of 1986; this event never occurred.

According to Wyss, the successful prediction was quite accurate in terms of location and size, but the researchers could not pinpoint the time of the quake to less than a year. The researchers say seismologists will use this technique successfully in the future to predict larger earthquakes, "but the major segments of the San Andreas fault near San Francisco and Los Angeles have such low background seismicity rates" that any drop in those rates—which might signal a future quake—would be difficult to detect.

Large warm spot in the Pacific

While conducting temperature and salinity measurements off the coast of Oregon in the summer of 1986, oceanographer Edward T. Baker discovered an unusual warm spot in the ocean. The mere existence of this heated water 500 kilometers from the coast is not what suprised Baker and his colleagues at the Pacific Marine Environmental Laboratory in Seattle, for they were cruising near a seafloor spreading center where hydrothermal vents are known to be active.

But these observations were unprecedented because the researchers had never seen such high water temperatures extend so far above the ocean floor. This temporary region of warm water, dubbed a "megaplume," also proved to be abnormally large, measuring 20 km in diameter and 700 meters thick, report the researchers in the Sept. 10 NATURE. Hydrothermal vents are known to create plumes of heated water, but oceanographers have never observed one on such a grand scale before, says Baker.

The researchers reason that the megaplume resulted from "a brief but massive release of high-temperature hydrothermal fluids" over the course of a few days. Scientists had thought that hydrothermal vents flowed at slow, steady rates for periods of months or years, but it now appears that massive venting can also occur episodically, says Baker.

As for the cause of the massive release, Baker speculates that the venting may be related to episodic rifting at the spreading center, where crustal plates pull apart, creating a gap that is filled by molten basalt.

Lightning increase after Chernobyl

As a legacy of the 1986 accident at the Chernobyl nuclear power plant, certain areas of Sweden suffered high levels of radioactive fallout in the month that followed the accident. It was immediately apparent that this fallout could harm animals and humans, but Swedish researchers are now reporting that the accident also affected the frequency of lighting flashes.

"In areas with high radioactive fallout," say researchers from Uppsala University in Sweden, "an increase in the amount of lightning flashes was observed during the 1986 thunderstorm season." In the Sept. 20 JOURNAL OF GEOPHYSICAL RESEARCH, the researchers suggest that the radioactivity affected the flash frequency by increasing the conductivity of the atmosphere.

Science & Society

Bank balance: Economy and ecology

The World Bank and International Monetary Fund last week held a joint annual meeting in Washington, D.C., amid increased pressure from environmental groups to consider the social and ecological consequences of their development loans (SN: 8/29/87, p.137). As the bank directors began three days of private talks, Sen. Robert Kasten Jr. (R-Wis.) met with representatives of nongovernmental environmental groups from around the world to discuss new strategies for improving the lenders' ecological sensitivities. Kasten is the ranking member of the Senate appropriations subcommittee that is responsible for setting U.S. funding levels for the multilateral development banks.

"In order for development to be successful over the long term economically, it has to be sustainable over the long term environmentally," Kasten said. "All of us have got to be aware of the tremendous dangers there are if we are not able to get a handle on [the development banks'] overall approach to resources, particularly tropical forests."

Congress has for the past three years made U.S. contributions to the World Bank contingent on assurances that bank loans would not contribute to tropical deforestation or other significant ecological destruction. But despite a major policy statement by World Bank President Barber Conable Jr. last May, the bank is continuing to fund projects that threaten to wreak environmental havoc, critics say. It is supporting a 3,000-dam water project in India, for example, despite evidence that the project is ecologically unsound and will displace 1.5 million people, according to Medha Patkar of Narmada Dharan Grast Samiti, an Indian environmental group. The World Bank is financing another huge dam project in Brazil.

The bank has also been slow to hire environmental consultants, despite promises to the contrary, according to Bruce Rich, an attorney with the Washington, D.C.-based Environmental Defense Fund. Meanwhile, Kasten said, other international lending institutions—in particular the Inter-American Development Bank—are to an even greater degree "dragging their feet" over environmental reform.

Legislation now pending in the Senate would place greater restrictions on U.S. funding of projects deemed to be environmentally destructive. It would also encourage greater use of an innovative conservation scheme in which environmental organizations would be encouraged to purchase, at a discount, portions of a nation's foreign debt in return for that nation's promise to protect certain regions from development. A U.S.-based organization, Conservation International, negotiated such an arrangement with Bolivia in July. In return for taking over $650,000 of Bolivia's international debt, the organization received assurances that 3.7 million acres of land would be added to Bolivia's national reserve system.

Travelers give UNICEF a shot in the arm

Some travelers flying between London and the United States are pitching in to provide lifesaving vaccinations to Third World children. Passengers are being asked to donate their unused foreign coins to a "kitty" earmarked for UNICEF's child immunization programs. So far, the collections are limited to flights on London-based Virgin Atlantic Airlines, but UNICEF hopes to expand the program to other airlines as well. According to Lori Levin, Virgin Atlantic's New York manager of public relations, close to $40,000 (U.S.) has been collected since the program began in mid-July. That's enough money to immunize 8,000 children against the six most fatal childhood diseases, UNICEF says.

"It's a lot of work," Levin told SCIENCE NEWS. "The coins are very heavy—especially the ones from the U.K. side. They have tremendous coins over there."