

# earth sciences

## The Arctic is getting colder

Analysis of upper air data in the northern Canadian Arctic confirms that temperatures have become markedly colder during the past two decades as a result of changes in atmospheric circulation across the area.

Raymond S. Bradley of the University of Colorado's Institute of Arctic and Alpine Research reports in *NATURE* (Vol. 243, No. 5407) that July freezing temperatures have been occurring at much lower altitudes at nine monitoring stations in the Canadian Arctic Archipelago during the past nine years. A similar pattern is apparent for the summer months as a whole.

Bradley's data supports previous observations of the cooling. One study found that the summers of 1963-66 on Ellesmere Island "were the coldest sequence of summers since before 1925" and that the elevation at which glaciers remained in equilibrium was now 300 meters lower. Another recent study documents a marked change toward more severe ice conditions in Baffin Bay and Davis Strait since 1963.

"In conclusion," says Bradley, "the Canadian Arctic has recently experienced a significant climatic deterioration. Any further fall in freezing level heights or the persistence of recent conditions will undoubtedly result in increased glaciation throughout much of the eastern and northern upland area." He urges careful monitoring of climatic conditions in the next few years.

## Sea-floor history of the Pacific

Scientists aboard the *Glomar Challenger* have obtained 120-million-year-old cores of Pacific Ocean sediment that help redefine the pattern of development of the southwestern Pacific in relation to motions of the Pacific sea floor and the Australian crustal plate. The scientific group on Leg 30 of the Deep Sea Drilling Project was led by James E. Andrews of the University of Hawaii and Gordon Packham of the University of Sidney (Australia).

They further found that a minor divergence in the movement of the southwestern Pacific sea floor and the Australian plate appears to have resulted in the growth of a series of sedimentary basins east of Australia. These include the Coral Sea basin, New Hebrides basin and the South Fiji basin. Subsequent convergence of the Pacific and Australian crustal plates created the deep ocean trenches and volcanic arcs prevalent in that area today.

The voyage recovered a total of 3,818 feet of sea-floor cores, drilling in water as much as 15,331 feet deep. At one point the drill penetrated 4,100 feet of sediments.

## Jet-like current in the Indian Ocean

At the surface of the Indian Ocean along the equator a narrow jet-like current flows eastward at high speed during both transition periods between the two monsoon seasons. The jet is apparent in monthly maps of surface currents but until now has not been reported in the scientific literature, says University of Hawaii oceanographer Klaus Wyrtki in the July 20 *SCIENCE*.

Wyrtki says the wind-driven jet is the only ocean surface current that flows eastward at the equator. He estimates that water rises off Africa to feed some 13 million cubic feet a second of water to the current and that about the same amount of water piles up at its eastern terminus off Sumatra. "This demonstrates that a time-variable current can have profound effects in changing the mass-structure of the ocean."

# natural sciences

## New cautions on recycled drinking water

Oddly enough, drinking water is subject to less rigid standards than food on what foreign materials it can contain. The U.S. Public Health Service lists only 20 water-borne chemicals for monitoring, compared to the Food and Drug Administration's list of a hundred-odd restricted chemicals. The dangers of inorganic substances was recently reported to the American Chemical Society (SN: 4/21/73, p. 254) and now two related papers outline the hazards of organic materials left in water, especially after recycling sewage for drinking.

Four specialists from the California Department of Public Health writing in *JOURNAL AMERICAN WATER WORKS ASSOCIATION* warn that if water were subject to the same regulations as food, "some present water-supply sources would likely be rejected." Out of some 500 organic chemicals likely to be found in recycled water, only 66 have been positively identified—22.5 percent of them capable of causing cancer in animals. The problem is even more subtle when synergistic effects are considered: one pollutant, benzopyrene, alone seems innocuous; but combined with detergents, it produces cancer. Until more research is done, the authors conclude "recycled waste water should be out of the question for drinking."

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Hillel Shuval and Nachman Gruener, writing in the July *ENVIRONMENTAL SCIENCE AND TECHNOLOGY*, outline a rigorous program of research to precede waste-water recycling. The problem is that some synthetic compounds are dangerous in concentration of parts per billion, while most advanced waste-water renovation technology can reduce their concentrations only to about 10 parts per million. Even detection of hazardous substances may not be adequate, as in the case of viruses, which also resist conventional disinfection processes.

Before recycling waste water for drinking, the authors say, daily intake limits must be set for individual compounds and follow-up studies conducted to determine long-term and synergistic effects. They urge study of populations now drinking treated water from polluted sources, such as the Ohio River, which contains about 15 percent fully or partially treated municipal and industrial waste water. Other research, they suggest, might question why New Orleans has three times the bladder cancer rate of cities with less polluted water sources.

## Exposed bait traps endanger eagles

Exposed bait traps designed to catch bobcats and coyotes may be endangering the survival of eagles. Thomas J. Harper, a U.S. game management agent based in Las Vegas, found that in his district of a few Nevada counties nearly 2,500 eagles were accidentally trapped last winter. He estimates that at least 600 of them died.

According to an article in *CONSERVATION NEWS*, Harper concluded that "another season like this one will seriously threaten the survival of the golden eagle." The southern species of the bald eagle, also found in the traps, is already officially listed as an endangered species. Between 700 and 1,000 other birds of prey were also trapped and suffered an even higher mortality rate.

The traps in question are snares made of a spring-loaded steel strap baited with a piece of jackrabbit. The traps are set to catch bobcat, whose pelt worth has risen sharply to \$60 each, and coyote, worth \$20 a pelt. Harper estimated as many as 10,000 bobcats were taken in his area last year, threatening a serious depletion of the species.