EARTH SCIENCES

Arctic: Cincinnati of the north?

Ah, the Arctic, a last frontier, unpolluted, unspoiled by humans. Not so, according to Kenneth Rahn of the School of Oceanography at the University of Rhode Island. The "Arctic haze" first noted during weather flights in the 1950s is man's polluted stamp on the Arctic wilderness, he said at a recent conference on urban aerosols at the New York Academy of Sciences.

Since it was first noted, inaccessibility has hampered attempts to determine the cause of the haze, which Rahn says is comparable to "Cincinnati in the 1960s." When Rahn and co-worker G. Shaw first began taking measurements in 1975 at Barrow, Alaska, they believed the haze to be caused by wind-carried dust from China. But the discovery that the major component is aerosol (particles of) sulfate — one of the lingering products of the breakdown of industrial pollution — made the researchers suspect humans were responsible. They were still reluctant to pin it on humans until further sampling showed the presence of vanadium — a product of heavy fuel oils like those used in industrial heating. Just whose industry is responsible is another matter. Rahn suspects the source is northern Europe because air masses from North America and Japan, China and Korea are "cleaned" when they pass over the oceans.

By contrast, the Antarctic is not prey to such problems. Compared with the northern hemisphere, relatively little pollution is emitted in the southern hemisphere. In addition, any pollution is carried over a broad zone of water where winds "wash things out," Rahn said. And, unlike the somewhat flat Arctic, Antarctica rises to an elevation of 10,000 feet; as air is carried over the rough terrain, more pollution is removed.

Says Rahn, "It just says that, environmentally, the world really is a small place; that the Arctic really can come under the influence of aerosols transported 13,000 kilometers."

Reservoir induced quakes

The possibility that the filling of man-made reservoirs might trigger earthquakes was first seriously considered in 1936 when local seismicity increased after the filling of Lake Meade behind Hoover Dam. It is supposed that, in a seismically susceptible area, high water pressure from the filling of reservoirs spreads to the rocks surrounding the reservoir as a pressure pulse. Combined with the weight of the water on the rock, this pressure wave produces more stress in an already active area, and may trigger earthquakes.

Now, Tousson R. Toppozada and Chris H. Cramer of the California Division of Mines and Geology report an "empirical relationship between changes in lake level and seismicity" near Lake Mendocino, located near the California coast about 150 km north of San Francisco.

Reporting in the December 1978 California Geology, they found that the number of earthquakes within a 90-km radius increased after the lake was formed in 1959. In addition, of the seven events having a magnitude greater than 3.5 that occurred since 1959, four followed "within six months of the three largest changes in water level in the lake's 20-year history." Immediately after it was first filled, a 3.6 magnitude quake occurred, followed by a magnitude 3.5 event six months later. An earthquake of magnitude 5.2 occurred in June 1962, less than four months after the largest refilling of the lake to that date. The greatest refilling was in December 1977, following the 1976 to 1977 drought, and a 4.5 magnitude quake was recorded in March 1978.

Despite its relatively small size (10^8 cubic meters capacity), the researchers believe Lake Mendocino is able to induce seismicity because of its location near an active fault called the Maacama fault.

BEHAVIOR

The 'mommy tapes': Early perception

Because infants can't talk, learning about their early perceptions is always a difficult research task. But now a University of North Carolina at Greensboro psychologist has devised a test to determine if infants can recognize their mothers' voices within three days of birth.

The results indicate that babies not only recognize voices, but show a preference for their own mother's, says Anthony J. DeCasper, assistant professor of psychology. Moreover, infants appear capable of learning to perform a simple task in order to hear tape recordings of mothers reading a story.

During the last three years, DeCasper has tested 150 to 200 newborns. The infants were placed in bassinets and small headsets were fitted loosely around their ears. In order to hear their mothers reading a Dr. Seuss book, each infant had to continue sucking on a nipple at a prescribed rate — either fast or slow. If the child deviated from that rate, another woman's voice would begin reading the story.

"The great majority of infants — at least 85 percent — not only preferred their mothers' voices, but they were able to retain the sucking pattern [at intervals] for the entire day," DeCasper says. The psychologist says he is not sure of the mechanisms of the phenomenon but adds that the results indicate that infants "are able to control their sucking reflex in order to hear the voice they prefer... even at the age of only 24 to 36 hours."

In addition, newborns seem to be able "to remember the speed at which they must suck the nipple," he says, "an indication that memory is in operation, although limited." DeCasper hypothesizes that infants either have well-developed perceptual and auditory capabilities intact at birth or learn the sound of their mothers' voices "while still in the womb." The latter represents a possibility, he says, because the human ear is well developed and functional around the seventh month of gestation.

F-f-finals? Wwhatt f-f-f-finals?

It appears as though college final exams are making a growing number of students sick. According to a Harvard University study, there has been a fourfold increase in medical excuses from final exams over the last five years.

The study — based on reports from Harvard faculty members — cites the "alarming trend" that gives an "unfair advantage... to those who gain extra time to prepare for exams by claiming an illness which is not, in fact, serious." Students who request a medical excuse usually have a low grade average in the course at the time of the exam, according to a report of the study in the Jan. 12 Harvard Gazette. But taking a makeup enables students to raise their grade to the level of those in their other courses.

The report also notes that medical excuse requests rise sharply from freshman to senior years, then drop sharply in the second senior semester, and the largest number of makeups was granted in courses where great weight was given to finals.

Sex and drinking don't mix

Drinking may hamper sexual performance, but apparently you can't convince many alcoholics of that. In a study of eight chronic male alcoholics, researchers found that increased alcoholic intake had a "negative linear effect" on "penile tumescence" measured during erotic and non-erotic films. In contrast, the subjects uniformly reported alcohol would have no effect or increase sexual arousal. The study, reported in the December Journal of Abnormal Psychology, was performed by G. Terrence Wilson and David B. Abrams of Rutgers University and by David M. Lawson of the University of British Columbia in Vancouver.