

In shallow northern lakes, the temperature increase already recorded could kill off species of fish and invertebrates that cannot tolerate warm water, the researchers say. These cold-loving species, called glacial relicts, have inhabited the lakes since the retreat of the glacial sheets at the end of the most recent ice age, some 10,000 years ago.

Deeper boreal lakes, such as #239, have long provided a haven for such glacial leftovers because these lakes are stratified with a region of cold water beneath a warmer surface layer. But complex ecological changes in the last 20 years have deepened Lake 239's temperature boundary by several meters, squeezing the habitat of the cold-requiring animals and threatening their survival, Schindler says.

Because of evaporation and precipitation changes, the amount of runoff pouring into Lake 239 declined sharply over the study period, slowing the rate of water replacement. "Whereas that lake flushed itself completely every four to six years at the beginning of our experiment,

it's now taking 20 years," Schindler says.

That effect, along with an increase in forest fires, can concentrate chemicals in lakes and deepen the temperature boundary in stratified waters — two shifts that would stress the ecosystem, say the Canadian researchers.

Some scientists, noting that lakes in warmer regions to the south generally harbor more wildlife than boreal lakes, have suggested that global warming will increase the biological productivity of these northern lakes. Schindler challenges that assumption, calling it too simplistic. If certain species go extinct, he and his colleagues say, "it is by no means certain that fisheries of comparable value or ecosystems of comparable diversity would be reestablished quickly."

Major research programs on climate change have largely failed to study the effects on freshwater habitats, they add. "But when you look at what resources are probably going to limit human activity or ecosystems, the first one we're going to come up against is fresh water," Schindler warns.

— R. Monastersky

## Mealtime aspirin may boost alcohol high

People who attempt to avoid hangovers by popping aspirin before drinking may be in for an unexpected side effect. New research suggests that aspirin, when taken on a full stomach, can get you drunker.

Physicians recruited five healthy men and gave them alcohol-spiked orange juice — the equivalent of 1.25 to 2 glasses of wine, depending on body weight — one hour after a full breakfast. On another morning, the men took 1 gram (two extra-strength tablets) of aspirin along with the same meal and then drank the same amount of alcohol.

The aspirin increased the men's peak blood alcohol level by an average of 34 percent compared with the peak level without aspirin, report Risto Roine, Charles S. Lieber and their colleagues at the Bronx Veterans Affairs Medical Center and the Mount Sinai School of Medicine in New York City. Moreover, the researchers observed that blood alcohol levels rose more rapidly and remained elevated longer after the aspirin dose.

They note that the aspirin-boosted alcohol levels fell below U.S. legal limits for "driving while intoxicated," since the study involved relatively small alcohol doses. However, they write in the Nov. 14 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, "This increase . . . can be of clinical significance for individuals driving cars or operating other machinery that requires a high degree of mental and motor coordination."

During *in vitro* studies of gastric mucosa from rats and humans, the team uncovered a likely mechanism for the enhanced alcohol levels. Aspirin, they

found, halved the activity of gastric alcohol dehydrogenase — an enzyme that helps oxidize alcohol, preventing its absorption into the bloodstream. With enzyme activity subdued, more alcohol reaches the circulation, they assert.

With or without a predose of aspirin, alcohol consumed on an empty stomach also circumvents enzyme activity, passing into the bloodstream so rapidly that the enzyme hardly has a chance to blunt intoxication. Roine adds that taking aspirin *after* drinking probably does not increase blood alcohol levels, since the enzyme has already completed its oxidation task by that time.

Although the breakfast study focused on men, it may have particular significance for women, says Lieber. Earlier this year, the same researchers detected naturally lower activity levels of the gastric enzyme in women compared with men (SN: 1/20/90, p.39). The team began an all-women version of its breakfast study this week and expects early results by January. "We hypothesize that when we give aspirin to women, they may have virtually no gastric [alcohol dehydrogenase] activity," Lieber says.

Roine notes that people who take aspirin with the gastric ulcer drugs cimetidine or ranitidine may face a double whammy from alcohol, since previous studies have shown that these drugs also reduce gastric alcohol dehydrogenase activity. He adds that his group plans clinical tests to verify *in vitro* results indicating that smaller aspirin doses, such as those prescribed to lower heart attack risk, also lower activity of the alcohol-degrading enzyme.

— R. Cowen

## Quick moves claim computer-chess title

After losing decisively last fall to world chess champion Gary Kasparov, chess computer Deep Thought returned to the digital world last week and successfully defended its title as the North American computer-chess champion. But it wasn't easy. Deep Thought lost one game to Hitech — only its third loss to a machine — and had to share the title with Mephisto, a strong contender from Germany, which also lost just one game.

This year's championship, sponsored by the Association for Computing Machinery and held at the Supercomputing '90 meeting in New York City, featured 10 chess machines and computer programs. Belle, world champion in 1980, came out of retirement to participate in the tournament but managed to win only one game.

"That shows how much computer-chess programs have changed and improved," says David Levy of Intelligent Software Ltd. in London, England.

Mephisto ranks as the top commercially available computer-chess player. Last April, a Mephisto computer became the first machine to defeat a former holder of the human chess title when it beat Anatoly Karpov. Even though Karpov was simultaneously playing 23 other opponents, the computer's success remains significant, Levy says.

Last year, Mephisto beat Deep Thought in the final round of the computer-chess championship. This time, Deep Thought won the rematch. "Mephisto played a horrible move in the opening and never recovered," Levy says. "It was a typical computer move, which computers make very often in certain positions, and most people haven't yet worked out how to get it out of their programs."

Deep Thought has remained fundamentally unchanged over the last two years and has a number of weaknesses, says Feng-hsiung Hsu, one of its creators. Now working at the IBM Thomas J. Watson Research Center in Yorktown Heights, N.Y., Hsu and his colleagues are developing a more sophisticated version that can also respond to patterns.

To defeat Deep Thought, Hans Berliner of Carnegie Mellon University in Pittsburgh developed a strategy for giving Hitech a significant advantage at the beginning of the game. That proved enough to overcome Deep Thought's greater speed, which normally provides a clear advantage at the end of a game.

Zerker, a promising newcomer developed at the University of California, Berkeley, can search roughly three times faster than Deep Thought, evaluating up to 7 million moves in 1 second. But damage to the machine during shipment from California forced its withdrawal.

— I. Peterson