Cold fusion: Searching for hidden helium

For 20 seconds on the night of May 11, the University of Utah went dark. A raccoon had crawled into a transformer, electrocuted itself and briefly killed the power, even in the cold-fusion laboratory of B. Stanley Pons and his British colleague Martin Fleischmann. The shutdown erased some of the computer data harvested by the researchers in their attempt to defend against the tsunami of skepticism from scientific peers.

At about the same time, the prognosis was brightening for Steven E. Jones of Brigham Young University in Provo, Utah, and his cold-fusion research team. Though he withheld specifics, Jones told SCIENCE NEWS he has obtained new data to support his earlier claims of observing neutrons from seemingly low levels of fusion in metal electrodes immersed in heavy water at room temperature. Since April 28, Jones has supervised cold-fusion experiments at the Los Alamos (N.M.) National Laboratory. Legal delays have short-circuited, at least temporarily, a similar Los Alamos collaboration with Pons and Fleischmann, according to James J. Brophy, vice president for research at the University of Utah in Salt Lake City.

Three days before the raccoon setback, Pons and Fleischmann admitted at a Los Angeles meeting of the Electrochemical Society that their earlier measurements of helium and neutrons — two expected by-products of the alleged new type of cold fusion — were mistaken. They also reported observing 50 times more heat emerging from their electrochemical cells than could be attributed to the electrical energy they put in or to chemical reactions. Several scientists reported evidence from their own experiments supporting Pons and Fleischmann; others retracted earlier tentative confirmations. The only critic allowed on the panel, chemist Nathan Lewis of the California Institute of Technology in Pasadena, repeated a damaging critique he first aired against the University of Utah work a week earlier.

Unlike Jones' team, which used actual — albeit controversial — neutron measurements to argue that they have found a new fusion route, Pons and Fleischmann continue to defend their claims without reliable positive evidence. "If the amount of heat produced is so large that you cannot account for it in terms of a chemical process," Fleischmann told reporters at the Los Angeles meeting, "what else are you going to believe?" But without evidence of fusion products, critics say, simply observing heat doesn't necessarily imply fusion. Remarks Jones: "I light a match, and I get more heat than I put in with friction."

Stronger evidence may come from a search for helium, an expected fusion product that some theorists predict should accumulate inside Pons' and Fleischmann's palladium electrodes. Scientists at the British precious metals company Johnson Matthey, which supplied the palladium, are performing the tests.

"We will be doing an exhaustive analysis of the rods," says David T. Thompson, who is supervising the effort. Thompson says he obtained some rods during a visit to the University of Utah in early May and carried them to the British lab on May 15. The analyses will be performed over the next few weeks. — *I. Amato*

Acid rain: Lowdown on health of lakes

A large share of northeastern U.S. lakes may be suffering severe — and potentially unrecognized — ecosystem damage from acid rain, a new study indicates. While the most vulnerable species tend to be ones humans consider relatively unimportant — such as leeches, mollusks and insects — they are integral to a lake's overall health. Indeed, according to the new analysis, their dying out not only is a symptom of the ecosystem's decline, but also sets the stage for the loss of more prized species, such as trout, pike and sunfish.

In 1976, David W. Schindler and his colleagues at the Canadian government's Freshwater Institute in Winnipeg, Manitoba, initiated an unusual experiment. Over eight years, they systematically added sulfuric acid to a small Canadian lake, dramatically lowering its pH from a nearly neutral 6.8 to a very acidic 5. As the acidification progressed, the researchers carefully monitored its impact on plants and animals in the lake. They found that crustaceans and many phytoplankton disappeared, fish ceased to reproduce and new algae appeared.

Schindler and his colleagues have now correlated these and related data — from studies comparing species diversity in normal and acidified lakes — with chemical assessments for 6,351 U.S. lakes identified in the Environmental Protection Agency's Eastern Lakes Survey as being acid-sensitive (having soft water). Their findings, published in the May ENVIRONMENTAL SCIENCE AND TECHNOLOGY, suggest many of these lakes have already suffered serious biological impoverishment.

For example, the researchers' analysis indicates that mountain lakes within the Adirondacks, Poconos and Catskills may have lost 69 percent of their leeches, 45 percent of their insects (especially mayflies, dragonflies and damselflies), 50 percent of their mollusks (such as clams), 18 percent of their crustaceans (such as crayfish) and 25 to 30 percent of their algae. But those are "median" estimates for these large regions. Highly susceptible lakes within these areas may already have witnessed a complete elimination of their leeches and mollusks, most of their insects and crustaceans, and more than half of their rotifers (drifting plankton) and fish.

In the past, biological assays of acid rain's effects on lakes have focused largely on sport fish. This analysis is the first to predict a region's full range of losses from acid rain, notes Mark D. Mattson at the New York Botanical Garden's Institute of Ecosystem Studies in Millbrook, N.Y. The study's greatest value, suggests University of Toronto zoologist Harold H. Harvey, may be in shifting the focus from fish to the more vulnerable but ecologically important species farther down the food chain.

Because Schindler's group used summer lake-pH values in making its predictions — and not the much lower spring-snowmelt values — their assessments may in fact seriously underestimate species losses, Mattson and Harvey point out. "Even just a few days of very low pH might have a greater effect on the lake than a whole summer's worth of moderately low pH," Mattson explains.

— *J. Raloff*

EPA plans daminozide ban

Interim data from a new study show that a metabolite of daminozide — a plant-growth regulator used primarily on apples — causes blood-vessel tumors in mice, according to Jack Moore, acting deputy administrator of the Environmental Protection Agency. This metabolite, known as UDMH, forms during cooking or digestion of treated fruit. Moreover, new survey data have tripled — to 15 percent — EPA's estimate of the number of U.S. apples treated with daminozide (under the trade name Alar) last year. Calling the new data "a cause for concern," EPA officials announced this week they are resuming an orderly cancellation of the chemical's uses on food crops — a process they say may take 18 months.

On the basis of the new data, EPA now estimates the human lifetime risk of cancer from UDMH — primarily from eating daminozide-treated apples — to be up to five persons per 100,000 exposed. Childhood exposures (SN: 3/4/89, p.133) will account for much if not all of this risk, EPA says. Moore says an emergency ban is not needed because short-term risks of eating foods contaminated with daminozide are insignificant and pose no imminent cancer threat.

This week, the association representing U.S. apple growers announced it's asking members to phase out daminozide by fall. □