

Deep ice stirs debate on climate stability

In some realms, such as musical tastes or gustatory traditions, Europeans are seen as more conservative than their neighbors across the Atlantic. But stereotypes often fall apart. This week, a group of U.S. scientists played the cautionary role when they raised doubts about some extraordinary climate findings reported earlier this year by a European team studying ice buried deep within Greenland's frozen blanket.

Over the last four years, the U.S. and European groups have drilled separate holes through the Greenland ice sheet to collect samples containing clues about the last ice age and the interglacial warm period immediately preceding it. The ice cores can provide such information because the glacial cap built up layer upon layer over hundreds of thousands of years, trapping details about past temperatures, winds, greenhouse gas changes, and other aspects of climate.

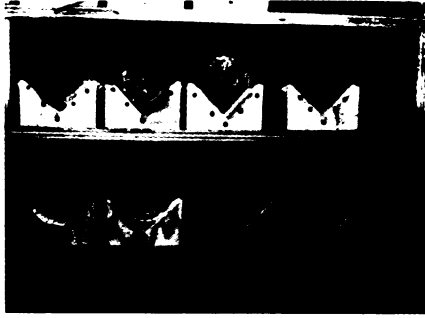
The seven-nation European team made headlines in July when it reported that the last interglacial — called the Eemian stage — had a highly erratic climate that sometimes shifted abruptly into frigid ice age conditions and then snapped back into warmer weather (SN: 7/17/93, p.36). The findings raise concern because scientists had long thought that interglacial spans — such as the current one — were immune from the unstable climate swings that characterize glacial epochs.

American researchers, in collaboration with several European scientists, now raise questions about the evidence of climate instability during the Eemian, which lasted from 135,000 to 115,000 years ago. At a meeting of the American Geophysical Union in San Francisco and in the Dec. 9 NATURE, the investigators report that although the two ice core records yield identical information for the glacial period, they disagree about the Eemian.

"There's clearly a discrepancy between the two cores. We have to sort out what's going on," says Kendrick C. Taylor of the University of Nevada at Reno.

The Europeans drilled their ice core at the summit of Greenland's ice cap, while the U.S. team worked on the flank, 30 kilometers away — an arrangement designed to capture the very differences now surfacing. Taylor and his colleagues announce that the upper 90 percent of the 3,000-meter-long ice cores match almost perfectly: Both show the same rapid shifts in climate during the last ice age and record the remarkable stability of the current interglacial period, which started 10,000 years ago.

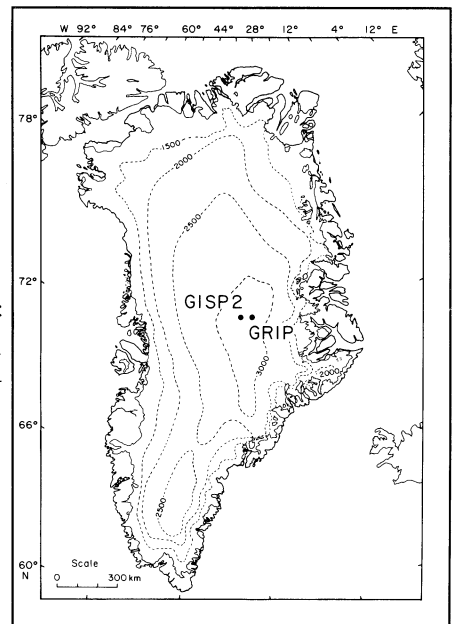
But measurements of oxygen isotopes in the ice and of the ice's electrical conductivity do not match for the lower tenth of the cores. In the U.S. record, this deepest section contains folded patterns



Top: Ice sections in storage. Right: U.S. (GISP 2), European (GRIP) drill sites.

suggesting that layers of ice have overturned as the glacier flowed over hills in the bedrock. Any turnovers would break the chronological ordering of layers and alter the true climate record.

Researchers are divided on how to apply these findings to the European ice. That core also contains evidence of overturning, but such questionable layers appear in ice older than the Eemian period. As yet, the investigators have not found signs of scrambled layers within that crucial interglacial span, says Heinz Miller of the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven, Germany. The integrity of layering plus evidence from chemical and



GISP 2 sci. management office

isotopic studies suggest that the climate actually did fluctuate dramatically during the Eemian, Miller told SCIENCE NEWS.

But some U.S. researchers say more work is needed to resolve the question of Eemian climate instability. "We're not saying they're wrong. We're simply saying it's more complicated than a nice layer-cake situation. Maybe we'll prove that they're right. We'll just have to wait and see," says Taylor. — R. Monastirsky

Steroid injections for eye ailment slow MS

A reanalysis of a study that evaluated the use of steroids to treat inflamed optic nerves provides evidence that corticosteroid injections may delay the onset of multiple sclerosis (MS).

A chameleon among diseases, MS defies both understanding and treatment. This disorder can begin and progress erratically. It is linked to the appearance of patches in the brain where myelin, the nerve cells' protective sheath, has disintegrated. Physicians can treat symptoms, but rarely can they slow the disease's progression (SN: 3/27/93, p.197).

A diagnosis requires the separate development of two neurological problems, such as memory loss, tremors, vision problems, or partial paralysis. Recently, scientists have begun to use magnetic resonance imaging (MRI) to track the progression of this disease.

One of these neurological problems, optic neuritis, leads to sudden temporary loss or impairment of vision. Between 35 and 75 percent of those with optic neuritis later develop MS, says Donald H. Silberberg of the Hospital of the University of Pennsylvania in Philadelphia. At other times, the optic nerve becomes inflamed for different reasons.

From 1988 to 1991, 15 medical centers treated about 450 people diagnosed with their first case of optic neuritis. For two

weeks, the participants got either steroid shots for three days and then pills, steroid pills alone, or pills containing no medication. The study revealed that injected steroids, followed by pills, provided marginal long-term benefit, says Roy W. Beck, an ophthalmologist at the Jaeb Center for Health Research, Inc. in Tampa, Fla. Those receiving injections simply recovered their sight a week or so faster than those who took pills. Eventually, all groups recovered equally well, a result suggesting steroids were unnecessary.

That advice may now change. The researchers have gone back and determined how many of the people who showed no signs of MS at the time they received treatment later developed this disease. "We wanted to look at indicators of risk for MS," says Beck, who headed the research project.

To their surprise, about 7.5 percent of the 135 people who got shots and pills developed MS, while 14.7 percent of the 129 patients who took steroid pills only and 16.7 percent of the 126 who took pills with no medication got MS within two years, the group reports in the Dec. 9 NEW ENGLAND JOURNAL OF MEDICINE.

However, after two years, even those who received steroid shots began developing MS at the same rate as those in the other study groups, Beck says. He and his

colleagues suspect that the shots present the immune system with a high enough dose of steroids to somehow counter the initial inflammatory response and curtail damage. This effect eventually wears off, however.

Some doctors already treat their MS patients with steroids, and a few small studies show that steroids can speed an MS patient's recovery from a flare-up of the disease, Beck says. "Our findings are at least supportive of this use."

Each participant received an MRI brain scan at the beginning of the study. The eye-study data confirm that these scans can help identify those at risk of developing MS, says Beck. Almost 25 percent of participants with abnormal scans had MS within two years, while just 5 percent of those with normal scans did. The more abnormal the scan, the more likely the development of MS.

"[The report] supports treatment with intravenous steroids, particularly [in] people with optic neuritis and abnormal MRI [scans]," comments Stephen C. Reingold of the National Multiple Sclerosis Society in New York City.

However, both Reingold and Silberberg caution that this study was not designed to assess a treatment for MS. Because patients knew when they received injections, the results could be biased, they warn. Also, the number of MS patients in each group was relatively small.

— E. Pennisi

Dioxins meddle with key thyroid hormone

Dioxins appear to tamper with infants' thyroid systems even in low concentrations, spelling potential trouble for babies' psychomotor development, researchers in the Netherlands report.

"It's the first time anyone has really picked up on thyroid status in relation to dioxin concentrations" in humans, comments James D. McKinney of the Environmental Protection Agency in Research Triangle Park, N.C. Other studies have shown that dioxins affect thyroid hormone concentrations in animals.

The new study, published in the November ENVIRONMENTAL HEALTH PERSPECTIVES, finds that babies exposed to greater amounts of dioxins have higher, although still normal, concentrations of a key thyroid hormone in their blood. These infants appeared healthy at 6 months, says Hendrik J. Pluim of the Academic Hospital of the University of Amsterdam, one of the study's authors. But the effect concerns Pluim and his colleagues because of the importance of thyroid hormones to development, he says, so they continue to monitor the infants.

McKinney says that the researchers may not have picked up all of the dioxins' effects. The study looks only at thyroid

Hot answers to some 'bad hair' problems

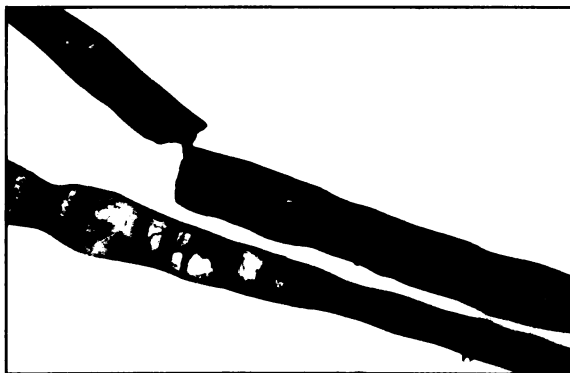
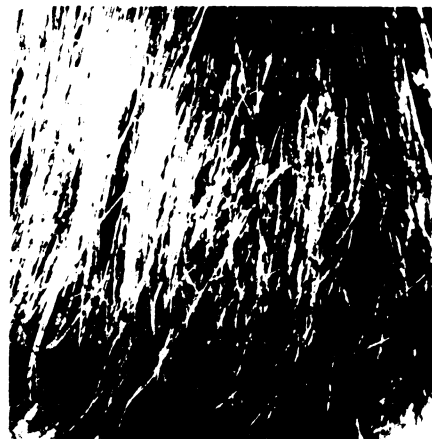
One day you notice a patch of coarse, unmanageable hair. When that bad hair day extends into the next month and the affected area only grows, panic takes hold. You haven't changed your diet, gotten sick, or altered your hair styling habits. So what's going on? The answer may prove as simple as a hairy hair dryer, dermatologists reported this week.

Since 1986, the medical literature has described three women with localized patches of "bubble hair" — strands rendered coarse, kinky, and brittle by the development of internal bubbles. Since the women had been healthy, the reports suggested the bubbles probably resulted from trauma to hair possessing some genetic defect, notes Susan P. Detwiler of the University of North Carolina (UNC) School of Medicine in Chapel Hill.

Last year, Detwiler encountered another case of bubble hair (upper photo). While the patient did not use hot rollers or curling irons, swim frequently in chlorinated pools, or have a permanent wave, she did blow-dry her shoulder-length tresses twice daily.

Watching that patient use her dryer, Detwiler says she "noticed that [the woman] preferentially positioned it near the affected area." Subsequent examination revealed that clogs of matted hair caused the dryer to overheat. Removing the clogs reduced the dryer's output temperature from more than 300° C to roughly 140° C.

Detwiler then exposed hair from 16 adults, a cat, and a dog to heat from a range of sources. At the American Academy of Dermatology meeting in Washington, D.C., this week, Detwiler and Robert A. Briggaman, also of UNC, reported finding that everyone's hair will form gas bubbles (lower photo) — "an intermediate stage of hair combustion" — if exposed to heat in excess of 175° C to 215° C. A report of the work will appear in the January JOURNAL OF THE AMERICAN ACADEMY OF DERMATOLOGY.



Photos: Detwiler

function, whereas "the real issue is what is happening at the level of the cells," he says. Scientists had already found that dioxins can affect the body's immune system and other hormones (SN: 1/11/92, p.24).

In the new study, the researchers measured the concentrations of seven dioxins and 10 dibenzofurans, which have chemical properties similar to those of dioxins, in the breast milk of 38 mothers of newborns. They classified the infants as being in either a high- or low-exposure group, depending on the concentrations of these chemicals in their mothers' milk. Dioxin concentrations in all of the milk fell within the normal range for the population, Pluim says.

The researchers then measured thyroid hormone concentrations and other indicators of thyroid function in the infants' blood at birth and at 1 week and 11 weeks of age.

The high-exposure group showed greater concentrations of T₄, the hor-

more most synthesized by the thyroid gland, one week and 11 weeks after birth. At 11 weeks, the babies also had higher concentrations of thyroid-stimulating hormone (TSH), which causes the thyroid gland to produce T₄, the researchers write. Furthermore, the ratio of T₄ to a protein that transports T₄ was higher, the group notes.

"We postulate that dioxins influence thyroid hormone concentrations in infants by interfering with the thyroid hormone regulatory system," they write. For example, children in the high-exposure group had both higher T₄ and TSH, even though T₄ normally inhibits the release of TSH, Pluim says.

They hypothesize that dioxin encourages the release of T₄ in the pituitary gland. This and other disruptions of the thyroid regulatory system by dioxin could threaten normal psychomotor development and the maturation of the central nervous system, Pluim warns.

— T. Adler