A report in the Jan. 28 SCIENCE adds yet another twist. Scientists studying Greenland ice have long thought that rapid temperature changes occurred during the last ice age. Christopher D. Charles of the Scripps Institution of Oceanography in La Jolla, Calif., and his colleagues now challenge that interpretation.

To gauge how Greenland temperatures fluctuated thousands of years ago, researchers traditionally analyze the ratio of two oxygen isotopes in the ice, which is thought to reflect the temperature of precipitation. Charles tested that assumption by using a supercomputer to simulate atmospheric flow and precipitation during the last ice age. The study showed that temperature changes account for only part of the isotopic variations; shifts in the direction of air currents also alter the isotopic ratio.

Charles and his colleagues thus suggest that the isotopic blips during the ice age largely reflect changes in atmospheric flow patterns spurred by waxing and waning of the glacial sheets in North America and Europe.

Charles' findings offer potential comfort for those concerned about rapid climate changes. "If these dramatic changes depend on ice sheets being around, then we don't need to worry about them," says Charles. For now, however, he notes that the question of rapid climate shifts requires more study. — *R. Monastersky*

Experts debate merits of radiation studies

At two congressional hearings in the past two weeks, researchers, federal officials, and people believed to be victims of government-sponsored radiation experiments gave conflicting testimony on the value of the studies, carried out from the mid-1940s to the mid-1970s.

At a Senate hearing Jan. 25, Energy Secretary Hazel R. O'Leary said the Clinton administration's panel investigating the studies will have an interim report on its findings by July 15. The President asked the group to find out whether the research had a clear medical or scientific purpose, included appropriate follow-ups, and met the ethical standards of its day and of today. O'Leary initiated an investigation in December after learning about the federally supported radiation experiments (SN: 1/15/94, p.39).

Some scientists conducting the studies neglected to tell those studied that they would be exposed to radiation, according to experts testifying about the research. But the ethical lapses went beyond failure to provide informed consent, physician David Egilman of Brown University in Providence, R.I., said at a hearing of the House subcommittee on energy and power on Jan. 18. Egilman has studied the history of the radiation experiments.

One study he said fell short of the ethical standards of its time examined how the body retains and excretes plutonium. Although it would provide no medical benefit, scientists injected plutonium into 18 terminally ill patients. Only two patients knew they were being exposed to radiation, said Patricia W. Durbin, who worked at the Energy Department's Lawrence Berkeley (Calif.) Laboratory.

The average dose amounted to nine times the quantity allowed workers by federal regulations, she said. The radiation may have damaged one subject's bones, but none of the subjects died from plutonium exposure, she testified. In fact, nine of the subjects in the study, conducted from 1945 to 1947, lived considerably longer than expected.

Egilman, however, said the medical records reveal that not all of the patients were terminally ill. Moreover, the study had many errors and "didn't provide meaningful information," he asserted.

But Durbin and health physicist Kenneth L. Mossman of Arizona State University in Tempe testified that this experiment, like most of the other radiation studies, provided considerable data for current radiation exposure standards.

Others at the hearing testified that while the plutonium may not have killed any participants, in some cases it made their lives miserable. Elmerine Allen Whitfield said doctors injected her father's injured leg with plutonium and, for reasons that are still unclear, amputated it three days later. Her father, Elmer Allen, often suffered seizures and other illnesses during the 44 years he lived after the injection, she said, though no one has directly linked the two.

Sen. John Glenn (D-Ohio), who chaired the Jan. 25 Government Affairs Committee hearing, asked witnesses what laws nowadays would bring "a rogue operator" doing improper research "before the bar of justice." No one knew, so the committee is now looking into whether a law with criminal penalties is needed to govern human experimentation, a Senate staffer told SCIENCE NEWS.

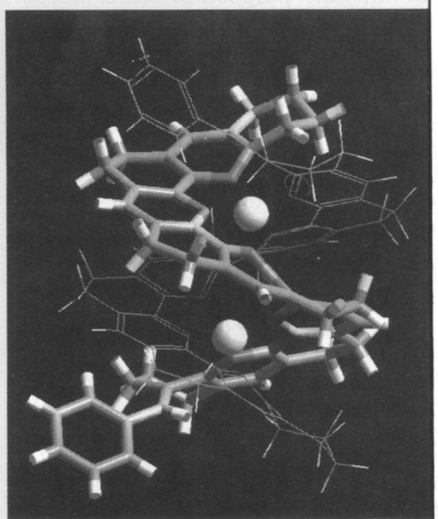
Coincidentally, shortly before Glenn's hearing, the Jan. 15 newsletter SCIENCE AND GOVERNMENT REPORT revealed that the National Institutes of Health is helping to finance vaccine trials in Europe that would be forbidden in the United States. In these studies, designed to test the efficacy of new vaccines against pertussis, or whooping cough, 10 to 25 percent of the child volunteers do not receive the pertussis vaccine.

The trials do meet the legal standards of the two European countries, says David L. Klein, who heads the project. But in the United States, researchers would have provided the new or old vaccine to all volunteers. — *T. Adler*

Self-assembly for sodium helixes

The elegant, sinuous coils of the DNA double helix now rank among biology's most familiar images. The helixes show that naturally occurring large molecules can indeed assemble themselves from smaller ones.

The image above shows a synthetic, self-assembling double helix based on sodium. Designers Thomas W. Bell and Hélène Jousselin, both chemists at the State University of New York at Stony Brook, tell how they made this molecule in the Feb. 3 NATURE. "This is the first molecule known to form double-helical complexes with alkali-metal ions" such as sodium, they explain.



M.G.B. Drew and P.J. Cragg

The winding molecule is made up of pyridine rings joined by bridges of ethylene. The pyridine rings and ethylene bridges alternate, almost like steps on a spiral staircase. That the rings fall so comfortably together into this coiled shape depends on each ring's specially tailored geometry.

"We want to understand why certain molecular interactions favor self-assembly," says Bell. "Very little is known about this process, which is fundamental to life — for instance, how one small molecule's structure controls the gross structure of a large molecule. If we can understand that process, then maybe we can design large molecules by making small ones with the information necessary to control self-assembly."

The coils' ability to channel ions, too, has Bell thinking they might prove useful in biology. "If we can make organic molecules that self-assemble into ion channels able to span biological membranes, then maybe we can kill bacteria, make new antibiotic drugs, or find other uses in pharmacology."