Dima: A mammoth undertaking

Last June an expedition searching for gold in an ancient Siberian riverbed dug up Dima instead. To Allan C. Wilson, an evolutionary biochemist at the University of California at Berkeley, Dima is gold. Dima, so dubbed by its discoverers, is a baby mammoth that apparently loped into a lake or bog about 44,000 years ago and has been frozen ever since.

Last week Wilson received from Moscow a frozen ounce of the mammoth (certainly not a mammoth amount), from which he will try to extract the proteins and nucleic acids to study their structure. The immediate goal is to learn what changes have occurred in these molecules in the evolutionary path that led from mammoths that roamed northern latitudes in the last Ice Age to their modern relatives, elephants in India and Africa.

Changes are not expected to be great. For every one hundred amino acids in an average protein, only one will change every 5 million years, just about how long ago elephants and mammoths diverged. But with the lessons learned on how to extract and treat the nucleic acids and proteins, Wilson hopes to be able to analyze far more ancient fossils and to trace the evolution of key molecules. All other attempts to do this have failed.

Wilson received a piece of thigh muscle and a sample of frozen blood from an artery. He told SCIENCE NEWS that preliminary studies testing enzyme activity and immunological reactivity have shown that, as feared, the proteins are not active. Another major problem is the insolubility of the proteins. He predicted it might be months before any definite results would be known. The formidable problems of solubilizing the proteins and attempting to reverse changes that have inactivated them must be solved. No attempt to study the nucleic acids has been made.

Dima was a rare find, the first complete mammoth to be found since 1839. More important for Wilson and Russian scientists examining the mammoth, after it was extricated from the permafrost, it was never thawed. Previously, none of the incomplete mammoths found in this century were kept frozen. When tissues thaw, nucleic acids and proteins degrade readily. Wilson had analyzed samples from a partially preserved baby mammoth found in 1948 near Fairbanks, Alaska, and now at the American Museum of Natural History in New York. Results were disappointing, perhaps because the tissue had not been kept frozen.

"I've been desperately waiting for another chance, but a mammoth is found something like every hundred years. I didn't think I'd be around," Wilson said.

Because the mammoth tissue might harbor ancient bacteria unaffected by modern antibiotics, Wilson has agreed to keep the tiny bit of mammoth flesh and its derivatives in solution. □

Skylab: Possible orbit-prolonging maneuver

Eight days of "conversation" between the orbiting Skylab workshop and flight-control engineers in Bermuda have indicated that the long-dormant space station may be healthy enough to attempt a life-prolonging reorientation maneuver as early as next month. There have been fears that the nearly 100-ton Skylab, unoccupied since its third and final astronaut crew left it early in 1974, might reenter the atmosphere before a space shuttle crew can shift it to a higher, longer-lasting orbit late next year.

The proposed maneuver would have the station fire its attitude-control thrusters to reorient it so that it would be less subject to atmospheric drag. Officials were thus relieved last week to discover—in the first data from Skylab in four years — that the attitude-control system was still pressurized, that its batteries could still take and hold a charge from its solar panels and that telemetry systems would still work.

In addition, an on-board computer was successfully turned on in the station's observatory section, known as the Apollo Telescope Mount, and a tape recorder in the airlock was activated. (The recorder played back its last entry, which consisted of about two minutes of data from around the time of the final crew's departure.) A faulty DC-to-DC converter was also switched over to a functioning backup component, which allowed real-time telemetry data to be sent to the Bermuda receiver.

These data are now being studied by Skylab officials at NASA (some of whom had had to spend months brushing up on the old command sequences and hardware before the reactivation attempt). On March 13, the station was turned off again except for some battery charging, leaving it in virtually the same state in which it had spent its four empty years. It could be reactivated as early as mid-April, says flight controller George Guthrie of the NASA Johnson Space Center in Houston, and if all is well (additional long-untried systems remain to be turned on), the reorientation maneuver could be attempted shortly thereafter.

The reduction of atmospheric drag could add several precious months to Skylab's uncertain lifetime, which otherwise could end in a fiery descent—with equally uncertain chances for pieces to reach the ground — before the shuttle astronauts can reach it. NASA is now planning to have the astronauts send a remotely controlled booster rocket to dock with the station, after which the rocket would be fired to put Skylab into a loftier orbit while its future is decided. NASA has just awarded two contracts to study the possibilities of re-using the workshop (although the space shuttle's huge, expendable fuel tank is also being evaluated for possible low-cost space-station applications). Or, Skylab ultimately could be deliberately sent back into the atmosphere, but with a controlled reentry path that would dump any surviving pieces into the ocean. □

Patenting biology: DNA and oil-eaters

More than a year ago a representative of Stanford University wrote the director of the National Institutes of Health asking for the official policy on patents arising from recombinant DNA research. The Institutes solicited, received and analyzed comments and had that analysis reviewed by the Federal Interagency Committee on Recombinant DNA Research. On March 2, Stanford was sent the answer: Recombinant DNA inventions may be patented under the same policies that apply to other research funded by the Department of Health, Education and Welfare.

However, the patent policy will attempt to extend observation of NIH safety regulations. NIH Director Donald S. Fredrickson recommends that each of the current 72 patent agreements between HEW and an institution be amended to include the stipulation that institutions only license use of recombinant DNA techniques to those who promise to comply with safety standards set forth in the NIH guidelines. Still, Fredrickson states, "Use of the Institutional Patent Agreement as a means of obtaining compliance with the NIH guidelines is not an adequate substitute for legislation."

The analysis rejected the argument that the U.S. government should itself hold the patents for recombinant DNA techniques developed with federal funds. Under the Institutional Patent Agreements, the institution has the first option to own inventions, but those working under government direction may use them without paying royalties. Among the governmental agencies NIH queried, only the Department of Justice supported making a special policy to deny financial returns to inventors of recombinant DNA techniques. Fredrickson argues there is no reason to distinguish those inventions from others (such as vaccines and treatments) developed with public funds.

While NIH can make agreements about ownership of patent rights, deciding what

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