RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Genes Confirm Archaea's Uniqueness

Biologist Carl Woese of the University of Illinois upended the microbial world in 1977, when he argued that a newly discovered group of primitive-looking micro-organisms weren't really bacteria—but were so different genetically that they belonged in a new domain which he labeled Archaea. And last month, genome sequencing gave Woese's judgment a hearty second.

The ringing endorsement came from The Institute for Genomic Research (TIGR) in Gaithersburg, Maryland, where researchers have just sequenced the genome of *Methanococcus jannaschii*, a member of the Archaea family that lives near undersea hot vents. This unusual organism thrives at near-boiling temperatures (around 100°C), replicates using only inorganic compounds, and emits methane as a byproduct.

Carol Bult, leader of the research team, announced on 30 January that her group has decoded all 1.7 million base pairs in the *M. jannaschii* genome, and the great majority of the genes have no equivalent in other organisms whose genes have been deposited in public databases. She made the announcement at a meeting in Santa Fe hosted by the Department of Energy.

"This is a wonderful development," says microbiologist Norman Pace of Indiana University, Bloomington. "It defines the Archaea as a unique phylogenetic domain," he says, and it raises the hope that genetic analyses will soon define a progenitor organism for both bacteria and Archaea. Declares Woese: "We're opening the doors to a whole new world" of primitive life.

M. jannaschii is only the third free-living organism whose genome has been sequenced, the others being the bacteria *Haemophilus influenzae* and *Mycoplasma genitalium*.

MIKASA CITY MUSEUM

Dental remains. Dinosaur's tooth root and crown can be seen (*arrow*).

On the Dinosaur Trail

While the earliest dinosaurs have been traced to South America 200 to 300 million years ago, two major groups, including armored beasts called ankylosaurids, appeared in Asia during the Cretaceous era 100 million years later. From the spotty evidence available, it appears that in time, these creatures migrated outwards from Asia, to Europe and, via Greenland, to North America. There has never been any evidence that dinos migrated into Asia from elsewhere.

But a new find in Japan may change that picture. An amateur paleontologist has found a late Cretaceous-era fossil of a dinosaur whose family may have traveled to Asia from North America. "It now looks like the migration of dinosaurs between Asia and North America was in fact two-way," says Kenneth Carpenter, a paleontologist at the Denver Museum of Natural History.

The fossil, a partial skull with 10 teeth, was unearthed last June in the northern island of Hokkaido by Eijiro Goto, a local businessman, who turned his find over to the nearby Mikasa City Museum. Curator Hiroshi Hayakawa, a paleontologist, asked Carpenter to help identify the fossil. They pegged it, on the basis of its large teeth, as a nodosaurid ankylosaur, a member of a family of plant-eaters sporting armor plating and covered with boney spines—not to be confused with ankylosaurid ankylosaurs, dino-

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Antarctic Dictionary

For most polar researchers, the Antarctic experience begins with a Kodak attack on a bergy bit and ends happily with a greenout. In between, you may suffer bouts of bigeye, run afoul of the A-factor, and risk getting slotted in a bliz.

Need a translation? Help is on the way. While summering at Australia's Antarctic Casey Base, biologist Bernadette Hince, from the Museum of Victoria in Melbourne, has been compiling a Dictionary of Antarctic English ("DANTE"). Hince is making good use of her bouts of bigeye—sleeplessness due to haywire circadian rhythms that afflicts sojourners to this land of perpetual summer sunshine—combing through nearly a century's worth of books and documents for Antarctic words and phrases. Hince defines a "Kodak attack" as one's excited response to seeing one's first small iceberg ("bergy bit") on the voyage south from Hobart, Tasmania. Once ashore there is always the danger of getting "slotted," which means falling down a crevasse, during a blizzard.

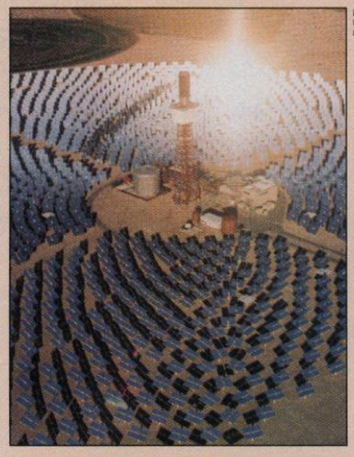
The A (for Antarctic)-factor is Murphy's Law on ice. The dictionary supplies an example in reminiscences from one veteran: "... We had about five different brands of fire alarm panels...from the early 1960s up to the 1990 type, so nothing interacted. That's the A-factor."

After a tour of duty, Antarcticans return to Australia, where they experience "greenout"—after Antarctica's perennially white landscapes, grass and trees swamp the starved senses. Hince says returnees can even detect the scent of Tasmania's eucalyptus tree forests when still several hundred kilometers out to sea.

Some words are fading with the changing times. One is "memory aids," or pin-ups, which, with the increasing presence of women in Antarctica, are becoming a thing of the past.

Piping in the Sun

Next month in California's Mojave Desert, researchers plan to switch on what they call the most advanced solar power plant in the world. Solar Two, sponsored by the U.S. Department of Energy, Southern California Edison, and other utilities, will use 2000 motorized mirrors to focus the sun's rays on a 91-meter metal tower containing molten nitrate salt. The salt, after being heated to 565°C, will boil water to drive a 10-megawatt steam turbine linked to the electricity grid of Southern California.



DOE

California already has commercial power plants that capture heat with oil. And Solar Two's predecessor, Solar One, collected heat with water. Salt, however, provides something "that you can't do with any other solar technology"—storage, says Solar Two team member Craig Tyner, a chemical engineer at Sandia National Labs. Unlike oil or water, which cool down quickly, molten salt stays hot for 2 to 12 hours. That means Solar Two will be able to supply power during peak demand in the evening. The designers hope the $49 million, 3-year project will serve as a model for future commercial power plants.

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saurs whose tails ended in clubs that have been found in both Asia and North America. The nodosaurids, with no tail club, are believed to have evolved in Europe, later migrating to North America. Now it seems they may have migrated back to their ancestral roots.

Not all scientists are convinced. "I don't think you can distinguish nodosaurids only on the basis of the teeth," says Makoto Manabe, a paleontologist at Tokyo's National Science Museum. Better evidence may emerge when the museum finishes extracting the fossil from the encasing rock, as the two types also differed on the number of plates covering their skulls.

If scientists all agree it's a nodosaurid, they'll be able to move on to other controversies. For example, biologist Walter Coombs, an ankylosaur specialist at Western New England College in Springfield, Massachusetts, notes that the Hokkaido fossil would be the latest of several nodosaurid fossils found in marine deposits, challenging the belief that it was strictly an inland beast.

PNAS Opens Up Submission Process

You couldn't get in if you didn't know a member: That was the rule for many years at the august *Proceedings of the National Academy of Sciences* (*PNAS*), which required all papers to be sponsored by an academy member. But last month the twice-monthly journal changed its policy. Now articles can be submitted directly to the *PNAS* office, without a member as liaison.

PNAS Editor-in-Chief Nicholas Cozzarelli says his main motivation in suggesting the change was to "level the playing field," by sparing authors from having to scratch around to find NAS members willing to sponsor their papers. The reception to the new policy from academy members has been "overwhelmingly favorable," says Cozzarelli. That may be because it relieves the burden on members to handle—and sometimes reject—the papers of their friends and close colleagues, a policy that Cozzarelli says "some members say has lost them friends."

Under the new procedure, a paper can be sent in to *PNAS* directly, and the board of editors will refer it to an academy member who then acts as editor, soliciting opinions from outside reviewers. That member remains anonymous if the paper is rejected; if it is published, the member is named on the paper as its sponsor. To make room for these outside submissions, however, the number of papers each member can contribute annually from their own labs or from colleagues has dropped from five to four.

In another policy change, academy members no longer must declare whether they have a conflict of interest when they communicate a paper to *PNAS*. Cozzarelli says there was "no way of enforcing [the rule] in a uniform fashion," because members do not agree on what constitutes a reportable conflict of interest. The academy must work to formulate a clear definition before the journal can institute a policy with any teeth in it, says Cozzarelli.

Journal of Plague Years

In the publishing world, plagues are hot. First, in 1994, came Richard Preston's *The Hot Zone*, a thriller about an outbreak of deadly Ebola virus in a suburban Washington monkey house. Then came Laurie Garrett's *The Coming Plague*, an exhaustive chronicle of research into infectious diseases. Now a scientist takes his turn at the word processor.

A memoir by one of America's most famous virus researchers, Joseph B. McCormick, former head of the special pathogens branch of the U. S. Centers for Disease Control and Prevention (CDC) in Atlanta, is scheduled to be rolled out this June by Turner Publishing Inc. Geography seems to be playing a major role in this publishing saga: The publisher, a creation of the CDC's friendly neighborhood media mogul—Atlanta-based Ted Turner—has ordered up a $150,000 marketing push heralding the release of a massive 100,000-copy first printing. And a 4-hour documentary tie-in will be aired on TBS, a Turner-owned cable network.

McCormick wrote the 288-page book, *Level 4: Virus Hunters of the CDC*, with his wife, epidemiologist Susan Fisher-Hoch and novelist Leslie Alan Horvitz. "The book is meant for lay readers—it is not a scientific treatise," McCormick said via e-mail from Pakistan, where he is working on a public health project.

The book covers his adventures from his years in the Public Health Service, including 9 years as chief of CDC's Special Pathogens Branch, from 1974 to 1991. For instance, when he flew to Sudan in response to the first Ebola outbreak in 1979, he accidentally stuck himself with a needle apparently smeared with Ebola-laden blood while treating patients and collecting serum. Little was known about the virus then except that it was deadly. So McCormick had a colleague inject him with plasma from earlier Ebola survivors—a virtually untested therapy—and followed that by drinking a half bottle of whiskey (it turned out he wasn't infected anyway).

CDC is all agog in anticipation. "We're very anxious to see what he has to say," says CDC spokesperson Bob Howard. "It's always interesting to see how we're portrayed by scientists, rather than journalists."

Bear Facts

A globetrotting polar bear recently caught the attention of researchers at the National Biological Service (NBS) in Alaska when it hit the arctic road and traveled more than 4800 kilometers. Most female polar bears like to stay in a home area of several hundred kilometers in diameter, but "this bear took off and never looked back," says NBS researcher Steven C. Amstrup. "Why she did it is beyond our present power to explain." It does, however, suggest that polar bear populations may not be as segregated as biologists previously believed.

S.C. AMSTRUP

Roving genes? Alaskan mum with cubs.

Scientists captured the bear and her two cubs in May 1992. They fitted her with a radio collar—tagged with #20365—that beamed her location back via satellite. She then traveled from the north Alaskan coast to the North Pole in less than 3 months, averaging almost 34 kilometers a day. Amstrup believes her cubs died, unable to keep up the pace. Her trek continued beyond the North Pole and down the other side of the globe to Greenland, where she spent most of 1993. The batteries in the bear's transmitter failed in April 1994, and the researchers, who tell their story in the December 1995 issue of *Arctic*, have not found her since.

Scientists had previously thought Arctic polar bear populations remained segregated, each keeping to its own gene pool in regions of Alaska, Greenland, Canada, and elsewhere. Bear #20365 showed researchers that there might be more traveling, and hence more genetic mixing. The notion of stay-at-home bears came from collar transmitter data, says NBS researcher George M. Durner, but those transmitters only last a couple of years, while a polar bear can go on for 25 years—and untold distances.