

RANDOM SAMPLES

edited by CONSTANCE HOLDEN

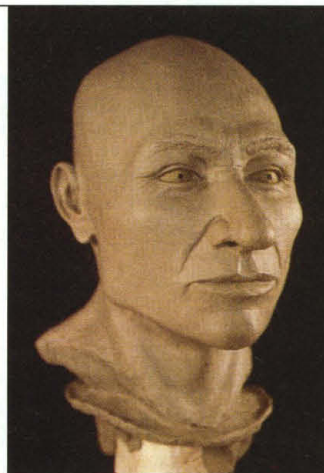
Kennewick Man Realized

A reconstruction of Kennewick Man, the 9300-year-old skeleton discovered in the banks of Washington's Columbia River in July 1996, has him looking like a cross between a Japanese tribesman and actor Patrick Stewart, in his role as captain of the *Starship Enterprise*. While applauding the craftsmanship, experts are somewhat skeptical about the accuracy of the results.

The clay head is the handiwork of anthropologist James Chatters of Richland, Washington, and artist Tom McClelland, who undertook the project because they "wanted to see what his face was like." They built it up from a resin cast Chatters made of the skull before it was confiscated by the Army Corps of Engineers as part of a bitter legal dispute in which American Indians laid claim to the remains (*Science*, 11 July 1997, p. 173).

Chatters admits this was a particularly challenging reconstruction job: Because the man's ethnicity is unknown, no standard facial traits could be assumed. Chatters and McClelland laid clay shaped as facial muscles on the bones, building them up to a thickness that is average for both Caucasians and Asians. They calculated the shape and size of the nose from the length of the nasal spine bone and the width of the bridge. "The nose looked too big, so I was conservative and made it smaller," says Chatters. They had to guess at the type of mouth, eyelids, and ears. Their creation most resembles a member of the Ainu of northern Japan, who have more in common with Caucasoid than Mongoloid Japanese, says Chatters.

The depiction, if accurate, could make it difficult for Amer-



Face job. Reconstruction shows Kennewick man in his prime.

ican Indians—descended from people with Mongoloid features—to argue their connection to Kennewick Man. But the face wouldn't stand up in court. Such reconstruction is "still a cross between art and science," especially with a fossil this old, says Gary Sawyer, an anthropologist at the American

Museum of Natural History in New York, who has done Neanderthal reconstructions. "You can get a general shape, but you can't say this is what Kennewick Man really looked like." Many distinctive characteristics, such as fat, facial wrinkles, eyebrows, and coloring, he notes, can't be captured. The field is still young, adds anthropological artist John Gurche, who does reconstructions for the Smithsonian Institution. For example, there has been little testing of the formula used to model the nose—which, in Kennewick Man's case, Gurche finds im-

probably large. Chatters, meanwhile, is working on a reconstruction showing what the man would have looked like at about 45, shortly before he died. His skin will be more leathery and wrinkled, and he will be grimacing from chronic pain caused by the spearpoint embedded in his pelvis.

Math Whizzes Spurn Reformed Calc

Efforts to make calculus less of a bear may be warming some U.S. college students to the subject while turning off the brightest ones, according to a nationwide survey reported at last month's meeting of the American Mathematical Society in Baltimore.

For more than a decade, math professors have taken a variety of

new tactics to make calculus more appealing, from writing assignments to guided explorations in which students use the computer to discover mathematical laws. But these approaches have backfired with mathematically sophisticated kids who have taken calculus in high school. So says education expert Susan Ganter of Worcester Polytechnic Institute in Massachusetts.

Ganter surveyed 150 professors and reviewed the self-evaluations of all 127 calculus reform projects funded by the National Science Foundation (NSF) over the past decade. Many reviews included student interviews. "The opposition from the very top students is something we've seen over and over," she said. "Why do we have to be guinea pigs?" is a frequent com-

plaint, she says, from those who find the laissez-faire approaches of the new courses frustrating.

Ganter's survey provides additional fuel to critics who say reformed calc is a turnoff. "It was clear that was going to happen," says Richard Askey, a mathematician at the University of Wisconsin, Madison. He explains that some students dislike the new courses because they feel they are being "cheated" of instruction in important skills, while others "are just not interested in grubby 'real life' problems that are clearly artificial." Adds Donald Lewis, director of NSF's Division of Mathematical Sciences: "We're losing math majors left and right."

Backers of calculus reform acknowledge that some good students are getting turned off, but they insist that the new thrust is making math more accessible to others. According to Deborah Hughes-Hallett of Harvard University, author of a widely used

Space archaeology. Newly released radar images of the ruins of the ancient Angkor complex in northern Cambodia have "radically altered our view of the origin and growth" of this vast settlement, archaeologist Elizabeth Moore of the University of London said at a press conference last week. The complex of some 1000 temples covering an area the size of Los Angeles, built between the 8th and 13th centuries A.D., features an awe-inspiring assortment of reservoirs, moats, canals, dikes, and earthworks. But much of the area has been inaccessible to ground expeditions because of dense forest cover and occupation by the Khmer Rouge, the outlawed communist group.



Images taken by NASA's Airborne Synthetic Aperture Radar in 1996 have given scientists a view of Angkor "unprecedented" in scope and detail, said Moore. "I can't emphasize enough how this has changed our study of Angkor." Scientists have so far made two previously undocumented discoveries. One is a temple mound next to, and 300 years older than, the famous temple of Angkor Wat. The other is a complex of mounds northwest of the city of Angkor, including a temple the size of a football stadium (indicated by arrow in picture), that furnish evidence of a civilization predating Angkor by perhaps many centuries.

(continued on page 1139)

(continued from page 1137)

reform textbook, students of average ability often feel "humiliated" by the rigorous demands of the old-style format.

Hope for New Zealand's Clinical Researchers

After years of pressure from scientists, the government of New Zealand has moved to beef up its health research with an \$11.6 million boost over the next 4 years. It's hoped that the new funds will resuscitate New Zealand's ailing hospital-based clinical research programs.

The government has traditionally provided funding only for direct costs—staff and materials—for health research, most of which is carried out at universities. But in 1993, budgetary reforms at hospitals dealt researchers a body blow by cutting away infrastructure support. They were "already squeezed by tight budgets; the reforms reduced the flow to a trickle," says John French, of New Zealand's prestigious Greenlane Cardiovascular Research Unit.

The new policy puts health research on the same footing as

other areas and means that the government will pay overhead as well as direct costs on grants. But according to Bruce Scoggins, director of the national Health Research Council, which administers most government health funding, the research infrastructure of hospitals has eroded so much over the past 3 years that shoring it up will be a "slow process."

Double Duty for Satcher

The Senate's approval last week of David Satcher for U.S. Surgeon General will reclaim the nation's

Saving the Leech

They aren't as cuddly as panda bears or as majestic as bald eagles, but leeches have found a champion. The pharmaceutical company Glaxo Wellcome has donated £54,000 (\$88,500) toward the well-being of the medicinal leech, a threatened species in the U.K. The money, which will be split over 3 years, will be used to identify existing leech populations and to protect the 20 known populations.

Physicians have used the medicinal leech, *Hirudo medicinalis*, to reduce swelling, prevent blood clots, and heal bruises for more than 2000 years. The 8-centimeter-long leeches were once abundant throughout freshwater streams and ponds of Western Europe, where they fed on blood from amphibians or mammals. But numbers declined during the mid-1800s, when heavy use by doctors and drainage of wetlands for agriculture wiped out many natural populations. Ignored for most of this century, leeches have enjoyed a recent boost in popularity,

thanks to a resurgence of medicinal leech use in neuroscience research, plastic surgery, and draining pooled blood in finger or toe reattachment.

Glaxo announced last month that it would become a "species champion" on behalf of the leech, under the British government's biodiversity action plan. "It's a good fit," says Nancy Pekarek, communications manager at Glaxo Wellcome in Greenford, England. "We are a medical pharmaceutical company, and the leeches have been used medicinally for centuries."

Peter Maitland, a biologist at the Fish Conservation Center near Edinburgh, says that Glaxo Wellcome's money "will let us do quite a bit of useful work." It's not easy to monitor the reclusive leeches, he says, as the animals hide out for many months after feeding. He has been devising ways to keep tabs on the population by counting the number of egg sacs the leeches leave on shore. He has also been reintroducing captive leeches back into the wild.

bully pulpit for public health, vacant for 3 years since the departure of Joycelyn Elders. Satcher, director of the Centers for Disease Control and Prevention (CDC) since 1993, will also serve as assistant secretary for health in the Department of Health and Human Services (HHS). Some Senate Republicans objected to his appointment, citing in particular his opposition to a ban on late-term abortions. But medical groups, as well as some prominent Republicans, backed Satcher, a physician with a Ph.D. in cytogenetics.

As surgeon general, Satcher is

expected to push for legislation to promote antismoking education. As assistant health secretary, he will advise HHS Secretary Donna Shalala and oversee offices on AIDS and scientific misconduct. Also under Satcher's purview is the Office on Women's Health—until recently headed by psychiatrist Susan Blumenthal, who left last fall after a controversy over her handling of breast cancer research issues. That job was filled last week by a Satcher colleague: public health expert Wanda Kaye Jones, previous head of the CDC's women's health office.

Dino Fins More Like Humps?

Spines jutting from dinosaur backbones are usually depicted as having supported flat, webbed fins or "sails." But some back fins were probably more like humps, according to a new analysis, suggesting that such dinosaurs may have been more adaptable than had been thought.

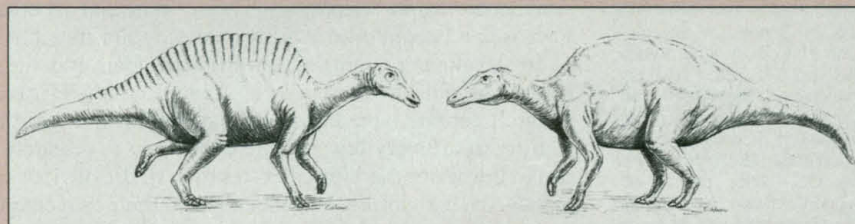
Skin sails are thought to have originated some 270 million years ago in dinosaur predecessors called pelycosaurs. The fins presumably served as heat collectors for these small, cold-blooded reptiles. Over the last decade or so, the pelycosaur model has been extended to several large, spiny dinosaurs that lived in Africa roughly 100 million years ago and may have had fins to help warm or cool their blood. More recently, though, the need for such structures has been questioned, according to Jack Bowman Bailey, a paleontologist at Western Illinois University, Macomb. In big animals living in hot climates, sails could

lead to overheating, he says.

Bailey has done an analysis that he believes shows such dinos as more like humpy bison than spiny lizards. He compared the length of spines from *Ouranosaurus*, a herbivore, and *Spinosaurus*, a carnivore, with two other measurements: chest depth and the height of a vertebral disc. He then measured the same ratio in several sail-backed pelycosaurs as well as in the hump-backed bison and in two extinct animals, a giant humped deer and a giant camel, which—unlike the modern camel—had spiny arrays supporting their humps. The ratios in the spiny dinosaurs turned out to be much closer to those of the mammals than those of the pelycosaurs, Bailey reported in the winter 1997 *Journal of Paleontology*. So he thinks the spines of the dinosaurs, like those of the bison, supported humps of fatty tissue. The back fat would have acted

both as an energy reserve when food was scarce and as a heat shield, says Bailey, who notes that this would have made the animals capable of long-distance migration.

Bailey's interpretation is both novel and plausible, says dinosaur expert Paul Barrett of the University of Cambridge, England. He says he's happy to see the sail idea in spiny dinosaurs "demolished and the space filled up with muscles." Barrett adds, though, that it will be tough to prove, as it's rare to find any preserved tissue in a dino.



Old and new models. *Ouranosaurus* (l) as sailback; (r) with high, bisonlike hump.

ROBERT E. JOHNSON