RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Australians Seek to Stem Fossil Thefts

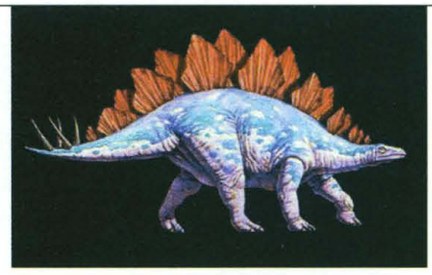
Thieves armed with professional rock-cutting tools stole a set of 120-million-year-old dinosaur footprints from a remote site in Broome, on the north coast of Western Australia, 2 weeks ago. The theft has led to calls for new legislation to protect ancient sites, and has spurred fears among paleontologists that aborigines will deny them access to their lands.

Paleontologists are upset at the loss of the only evidence of the thyreophorans—quadrupedal, plant-eating dinosaurs armored with spikes or plating—in Australia, says paleontologist Tony Thulborn of the University of Queensland. Thulborn had only recently gained full access to the site, a rocky area sometimes submerged under seawater, after 5 years of negotiation with local aborigines, for whom the area is sacred.

Amateur collectors and illegal traders are taking a growing toll on Australia's fossils. For example, 5 years ago, a gang removed fossil jellyfish and other sea life from Flinders Ranges National Park, says Ben McHenry of the South Australia Museum. The same crew used dynamite to blast trilobites out of a cliff on Kangaroo Island, South Australia, he says.

At present, the main law protecting fossils is the national Movable Cultural Heritage Act. Originally intended for art, it carries a maximum fine of only $500 and 3 months in jail. The law contains no structure for licensing or regulating trade in fossils, with the result that the marketplace is a free-for-all, with amateur fossil-hunters hawking their choicest finds over the Internet.

But the latest theft has spurred the Western Australia state government to draft a more protective law. Written with the aid of Ken McNamara, curator of invertebrate paleontology at the Western Australia Museum, it would require licenses for fossil-hunting and would automatically make all fossils property of the Western Australia government until examined by paleontologists. Fines would be increased and the use of explosives or heavy equipment for obtaining fossils would be banned. "You'd still have the problem of policing, but at least everyone would know where they stand," says McNamara.



COURTESY JEFF POLING/J. TUCCIRONE, ARTIST

Did he make tracks? Stegosaurus.

Salt Mine Safe for Hot Waste

The Waste Isolation Pilot Plant (WIPP), a network of salt caverns in Carlsbad, New Mexico, has been in the works for about 20 years now as the country's first storage site for "transuranic" waste from nuclear weapons production. The plant was completed 8 years ago, but critics, including the state of New Mexico, have blocked its opening for 3 years, claiming Environmental Protection Agency (EPA) safety standards are too lax.

But the Department of Energy hopes WIPP will be able to open its caverns for business next year now that it has the blessing of the National Academy of Sciences (NAS). The NAS says in a report released last week that the plant is indeed a safe repository, although it cautions that further steps must be taken to prevent people many centuries in the future from disturbing a site that is supposed to be secure against radioactive emissions for 10,000 years.

The NAS panel, headed by engineer Charles Fairhurst of the University of Minnesota, examined the DOE's plans for the $1.8 billion facility, designed to hold contaminated clothing, machine parts, and other radioactive waste, and concluded there was "no credible or probable scenario for release of radionuclides" as long as the repository is sealed and left undisturbed. If anyone drills into the site, radioactive releases can be prevented by taking measures such as surrounding WIPP with crushed minerals to trap radionuclides, the report says.

DOE was expected to send EPA its final safety plan for WIPP this week; EPA has a year to respond.

Chemical Linked to Hypertension in Blacks

U.S. blacks have much higher rates of hypertension than whites, a difference that has been attributed at least in part to differences in diet and stress levels. Now researchers have fingered a possible genetic cause as well: A protein, endothelin, that constricts blood vessels has been strongly implicated in high blood pressure, particularly in blacks.

Researchers at the University of Georgia, Athens, used a new antibody test specific to endothelin to measure levels of the chemical in 100 men and women of both races, half of whom have high blood pressure. They found that healthy blacks and whites have about the same levels of endothelin-1. But blacks with high blood pressure have four times as much of the potent protein as whites with high blood pressure, and eight times the amount of endothelin as healthy blacks, according to a study in last month's *Hypertension*. "We weren't expecting such a big difference," says molecular biologist Adviye Ergul, leader of the Georgia team.

The magnitude of the difference suggests that genes have a role in causing blacks to produce high levels of endothelin-1, says Ergul. That notion is bolstered by the fact that blacks develop hypertension, and complications from it, earlier than Caucasians, Ergul says. While whites' blood pressure tends to increase in midlife, blacks often undergo a sudden soaring of blood pressure in their 20s and 30s that may go undetected until it causes a stroke or organ failure.

Other studies have linked endothelin-1 to hardening of the arteries and asthma, but the actual role of endothelin in the development of disease is still unknown. Cardiovascular epidemiologist John M. Flack of the Bowman Gray School of Medicine in Winston-Salem, North Carolina, calls the study "an interesting start" but warns that it is still not proved that endothelin causes—rather than accompanies—hypertension. Ergul agrees but believes endothelin will prove to have a hand in the development of hypertension. "Endothelin is not the only substance involved, but it's a big part of it," she predicts.

To Be or Knot to Be

When is a knot not a knot? In protein chemistry, it's a tangled question, as illustrated by a report in the 18 September issue of the *Journal of the American Chemical Society*, where chemist Fusao Takusagawa of the University of Kansas and a colleague claim to have found the first "real" knot in a protein.

It all began when the scientists were studying a computer model of the structure of S-adenosylmethionine synthetase (MAT), an enzyme that helps make a protein that contributes methyl groups during many biochemical reactions. Proteins are apt to glom up like loose yarn clamped in a fist, but the structure of this one also seemed to contain a knot.

Knot sightings have been claimed before in proteins. Princeton University chemist Kurt Mislow and colleague Chengzhi Liang last year reported a half-dozen knot structures from an analysis of a large database of protein structures. But the Kansas researchers argue that Mislow's

(continued on page 727)

(continued from page 725)

structures are only "pseudolinks" and "pseudoknots" because they include bonds with metal atoms (as in metalloproteins) or sulfur-sulfur linkages that are not strictly part of the protein's backbone.

So whose knots really are knots? The mathematical definition of a knot is a closed curve that never intersects itself, Mislow points out. His structures fit that definition, but the newly reported MAT structure does not. "Novelty is lacking here," he says. "End of story."

Takusagawa says the MAT structure's knot is more like what you get when you form a loop with a string and then pull one end through the loop—except it's at the end rather than in the middle. "Ours is more of a common knot," he says.

"Mutant" Chimp Gets Gene Check

Scientists at the University of Chicago have undertaken a genetic analysis of Oliver, a chimpanzee who in the 1970s gained notoriety as a possible "missing link." They hope to settle once and for all whether or not he's pure chimp.

The 30-ish Oliver, 1.2 meters high and 50 kilograms, arrived from Western Africa about 25 years ago. Impressed into the animal show circuit, he caused viewers to marvel at his upright posture, his small head—which, shaved, had an eerie humanoid quality—and his unusually rank odor. It was said that he could cry, and could not only mix drinks but spot when people needed refills. Other chimps didn't seem to care for him, which added to his mystique.

STEWART F. HOUSE/

Hybrid? Oliver, without head shaved, looks a lot like a chimp.

Oliver sank out of sight in the '80s, spending some unemployed years at a Pennsylvania research animal supply company. Last spring, he was retired to Primarily Primates, a reservation near San Antonio, run by "primate rehabilitator" Wally Swett.

Now Oliver is garnering a few more headlines thanks to Gordon Gallup, a professor of evolutionary psychology at the State University of New York, Albany, who says he's been fascinated by the creature ever since he first read about him in 1976. Gallup has arranged for medical geneticist David Ledbetter of the University of Chicago to have a good look at Oliver's chromosomes and find out if he's "nothing more than a mutant chimpanzee" or something more interesting—a hitherto unknown combination of chimp and bonobo (pygmy chimp), a brand-new subspecies—or, yes, even a "humanzee."

There have been vague reports that Oliver's chromosomes were once counted in Japan and came to 47—exactly between the 46 for humans and 48 for chimps—but Ledbetter says he has no doubt that it will be 48: "Then the question will be is there any other explanation for why he's unusual."

Primatologist Steven Suomi of the National Institute for Child Health and Human Development says Oliver doesn't sound like anything special; rather, the reports of his small head and high-pitched vocalizations are consistent with his being a bonobo. But at least one expert—primatologist George Schaller, who examined Oliver in 1976—has adjudged his unusual posture, which includes standing with shoulders back and knees locked, to be "well worthy of study."

Cybersocieties: A New Tool for Science

Artificial-life researchers are making a bid to get out of the curiosity shop and into the tool bags of working social scientists with a computer model of social interactions that one of them, Robert Axtell, calls "the most comprehensive version of artificial life for human societies yet."

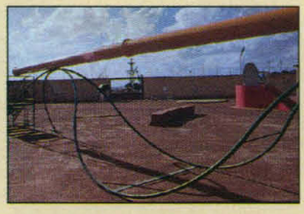
In a demonstration at the Brookings Institution, a think tank in Washington, D.C., Axtell and Joshua M. Epstein, complex-systems theorists at Brookings, wowed an audience including social scientists, policy analysts, and economists with a series of computer-generated movies depicting social phenomena, such as trade between communities, evolving in a gridlike virtual environment. Each evolution in the "Sugarscape" model—so-called because its staple virtual commodity is digital sugar—begins with a population of dotlike agents who reproduce, burn up resources (sugar) at various rates, engage in trade, and follow whatever rules the designers have set up for interacting with each other or the environment.

The initial goal, the Brookings analysts say, is to see how different community interactions in different environments lead to "emergent structures" such as segregated populations, cultural assimilation, or runaway population growth. Sugarscape indeed can mimic life well: When the modelers program agents to engage in trade, for example, the population booms, but the rich get richer and the poor get poorer.

Outside experts say that computer models like Sugarscape can serve as research tools for demonstrating the societal effects of different mixes of economic conditions like free trade, human behavior like military aggression, and environmental factors like the depletion of resources. Ironically, though, warns economist Thomas Schelling of the University of Maryland, a pioneer in modeling social structures, the more complex and therefore realistic the model becomes, the harder it will be to discern cause-effect relationships—just like life.

Naples Science City

An ambitious new "City of Science" is currently under construction in Naples, Italy, and last month saw the opening of the project's centerpiece: an interactive museum called the Living Science Museum. Planners hope the 65,000-square-meter City of Science will help pull southern Italy out of its chronic economic slump by promoting technological innovation and luring high-tech industry to the area, where unemployment averages 15%.



Hands-on. Science gym.

The museum itself is state of the art: It includes a planetarium with a moving-parts solar system; a geology exhibit on next-door Vesuvius; a space ship that transports visitors inside a giant human intestine; and a "science gym" where people can "work out" with trainers, doing environmental measurements or exercises that illustrate principles of physics and math.

Scheduled to be completed by 2000, the City of Science will occupy old chemical and steel works situated on the Bay of Naples. Costs to date are 20 billion lire ($13 million) and another 120 billion lire are forthcoming from the European Commission and other state and private sources. The array of attractions puts the City of Science among a handful of multitheme megacenters like the San Francisco Exploratorium, the Deutshes Museum in Munich, and La Villette in Paris.

The project was conceived by the Naples-based Institute for Promotion of Scientific Culture (IDIS) whose director, physicist Vittorio Silvestrini, says: "The project aims to act as a motor to drive a far-reaching industrial transformation." IDIS has already established a consortium of over 60 small enterprises, and several communications companies have set up shop in the City of Science. The city is also providing "incubators" for fledgling enterprises, furnishing space, technical services, and pooled facilities under special terms until businesses are ready to leave the nest.