

Mongolian dinosaurs give up sandy secrets

Ever since paleontologists first discovered dinosaur fossils in Mongolia in the 1920s, they have tried to make sense of how these animals lived and died in what appears to have been an ancient Sahara-like desert with epic sandstorms. When sedimentologist David B. Loope studied the Mongolian rocks recently, he came up with a different image: modern Nebraska.

Loope and his colleagues propose that the richest fossil site in Mongolia once resembled the Sand Hills region of northern Nebraska, a rolling landscape of giant dunes covered with meadows and wetlands that support a rich assortment of wildlife.

Rather than the traditional scene, says Loope, "the picture I would paint would be a much greener one." He presents the findings in the January *GEOLOGY*.

Loope reached this conclusion after analyzing the red sandstone at a site called Ukhaa Tolgod, the richest known fossil locale in Mongolia. Discovered in 1993, this southern Mongolian site has yielded nearly 1,000 lizards, more than 500 mammals, and over 200 dinosaurs, says Mark A. Norell, a paleontologist at the American Museum of Natural History in New York and a coleader of expeditions to Ukhaa Tolgod.

One of the most spectacular fossils found by Norell and his colleagues at the site was an *Oviraptor* dinosaur sitting on a clutch of eggs (SN: 1/6/96, p. 7). The paleontologists originally thought that this specimen and others had died when a sandstorm engulfed them more than 70 million years ago.

Loope noted, however, that the fossil-rich sandstone layers at Ukhaa Tolgod do not resemble eolian deposits, which are formed by wind. Such deposits have rounded sand grains of uniform size laid down in slanted sheets. Although such layers exist at Ukhaa Tolgod, the fossils come from a different type of deposit, one that lacks the sheeted structure and contains large cobbles that could not have been carried by wind, Loope reports.

The picture emerging from this site is one of a variable climate, occasionally dominated by dry, shifting dunes. During wetter times, a thriving community of Cretaceous animals inhabited the site. In these periods, some sort of vegetation may have covered the dunes, although geologists have not found a record of the plants. Modern grasses emerged much later, notes Loope.

The new explanation for Ukhaa Tolgod's sandstone makes sense, says



Paleontologists brush away ancient sands from a Mongolian *Ankylosaur*.

David E. Fastovsky, a sedimentologist and paleontologist at the University of Rhode Island in Kingston. Still, the Nebraska analogy does not explain other fossil sites in Mongolia, where Fastovsky and his colleagues have found clear evidence of eolian deposition.

At a site called Tugrik, for instance, Polish and Mongolian paleontologists discovered a predatory *Velociraptor* and an herbivorous *Protoceratops* locked in what appears to be a violent clash frozen in time. In this and other cases, says Fastovsky, the geologic evidence suggests that sandstorms suffocated the dinosaurs. —R. Monastersky

DNA tests find phony seal penises

For just U.S.\$500, a shop in Toronto will supply a seal penis to anyone who wants to make a tonic for a flagging lover. Just check the shop's gold lamé boxes—labeled "Product of Canada," like its maple syrup.

The buyer had better beware, warns a team of Canadian scientists who have analyzed DNA from supposed seal penises sold in traditional Chinese medicine shops in Canada, the United States, and Asia. The survey turned up some bona fide seal organs, but also parts of domestic cattle, dogs, and what may be protected species.

"When you buy a seal penis, you don't know what it is," grumbles David M. Lavigne of the University of Guelph in Ontario. He worries that the dried tissue and powders are so difficult to identify that Canada's legal trade in seal penises provides a good cover for selling parts of protected species of seals, sea lions, and their relatives.

Lavigne and his Guelph colleague Rick J. Smith worked with other Canadian scientists to identify 21 samples from shops in Toronto, Calgary, Vancouver, and San Francisco, as well as in Bangkok and other Asian cities. The shopkeepers offered a variety of forms of the alleged aphrodisiac: sometimes a bone with preserved

tissue attached, other times sliced cross-sections, even a convenience preparation already mixed into wine.

Tradition prescribes a wine-based tonic, says Lavigne. He recently found a recipe for "three-penis wine," which requires dog, deer, and seal parts. The Canadian research, in the December 1997 *CONSERVATION BIOLOGY*, did not address the efficacy of the potions.

After making many copies of the DNA from the samples, the researchers checked a region of the gene for cytochrome b against reference samples from two seal species or sequences from gene-bank data. Twelve specimens passed the test as legal seal products. Eleven of the samples matched harp seal DNA, and another was probably a hooded seal.

One aphrodisiac, bought in Hong Kong, concerned researchers because its DNA resembled that of the Australian fur seal, which can't be legally hunted. The geneticists caution, however, that reference information is so limited for seals and their relatives that the animal might have been the related Cape fur seal, which is fair game.

The material in the remaining aphrodisiacs did not come from anything related to seals, unless water buffalo get

points for having an aquatic ring to their name. One sample from Bangkok matched gene sequences from domestic cattle. Sketchy reference information kept the researchers from positive identification of the species of the remaining samples. The material that is available, however, suggests that five came from cattle or water buffalo.

The other two specimens proved to be from some type of canine. The researchers note that the closest match was the African wild dog, a protected species.

The identifications looked good to population geneticist Stephen R. Palumbi of Harvard University. He has used similar DNA analysis to see whether dealers are cheating on the origins of commercial whale meat. He, too, worries that legal trade in hard-to-identify animal products invites abuse. "If you've got a trade and it's fairly lucrative, then who is safe?" he asks.

The U.S. Fish and Wildlife Service recognizes the risk. "Within Asian medicinals, there's a tremendous amount of fraud," says Edgard O. Espinoza, science chief at the wildlife service's forensics lab in Ashland, Ore. He can remember finding only three real seal penises in 9 years of analyzing dozens of samples with X-ray and protein-identification techniques. "I think the trade in look-alikes encourages the real trade," he says. —S. Milius