

Paleontology

Richard Monastersky reports from Drumheller, Alberta, at the annual meeting of the Society of Vertebrate Paleontology

Holzmaden's clues to ancient birth

With a shape similar to tuna and mackerel — among the fastest fish alive today — ichthyosaurs were the reptile group most highly adapted to life in the water. These long-extinct “fish reptiles,” contemporaries of the dinosaurs, were so aquatic they actually bore live young in the water, rather than crawling up on land and laying eggs like modern turtles. Now, researchers from the University of Rochester (N.Y.) suggest they have deciphered another secret of ichthyosaur reproduction: In a manner similar to modern-day whales, ichthyosaurs seem to have frequented breeding or birthing areas.

Paleontologists Judy A. Massare and Jack M. Callaway base this theory on a study of ichthyosaur fossils found near Holzmaden in southern Germany. Of the numerous complete fossils discovered in this quarry, a large fraction are either babies or mothers carrying young, they report. As many as 10 percent of the females have fossilized embryos preserved inside, estimates Massare. Other answers for the accumulation do not explain all the evidence, she says. Sometimes, waves or currents can sweep bones into a small area. However, many of the Holzmaden fossils are preserved in perfect order, indicating the bones were not moved. Layering of the fossils also shows that the animals returned to the small geographic area repeatedly. This means that no sudden factor, such as disease, can explain the mass grave.

Get them while they're small

Since 1979, Colorado's Dry Mesa quarry has provided scientists with some of the world's largest known dinosaur bones, attributed to as-yet-unclassified animals called “super-saurus” and “ultrasaurus,” which were oversized members of the sauropod dinosaurs. Lumbering vegetarians that walked on all fours, the sauropods included the well-known *Apatosaurus*, popularly called *Brontosaurus*. While the quarry is renowned for its large sauropods, one researcher recently identified a tiny jaw fragment at Dry Mesa that he believes belonged to a baby sauropod. Worldwide, paleontologists have uncovered few fossils of baby sauropods, and this is the first reported from North America.

Only about 3.5 centimeters tall, this fragment comes from the front part of an upper jaw and contains four teeth, which are the key to identifying the animals, says Brooks B. Britt from the Tyrrell Museum of Palaeontology in Drumheller, Alberta, who is studying the fossil. According to Britt, characteristic grooves in the enamel of the teeth show the animal belonged to the sauropods, and was most likely a *camarasaur*.

Early dinosaurs found in Argentina

Just what makes a dinosaur a dinosaur? Fifteen years ago, paleontologists thought they had a clear answer, but fossil finds since then have muddied the issue. One of the problems, says researcher Paul C. Sereno from the University of Chicago, is that scientists working in northwestern Argentina uncovered primitive dinosaur ancestors that had developed features thought to be unique to dinosaurs. Hoping to fill in the details about some of the earliest dinosaurs, Sereno traveled to Argentina earlier this year and excavated in the Ischigualasto formation near San Juan along with colleagues from Argentina and the University of Chicago.

Among other finds, the group discovered several important pieces of the primitive dinosaur *Herrerasaurus*. Previously, scientists had only some vertebrae, a pelvis and a hind limb from the animal. But this year's finds have filled in all the missing parts, Sereno says. “With this information that we have found this year we will be able to know much more about the skeleton of these primitive dinosaurs. We will therefore be able to define what a dinosaur is more precisely.”

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Technology

Microwaving 'A Moveable Feast'

Library patrons sometimes give back more than they borrow — and librarians are not happy about it. Returned books can carry cockroaches, termites and other insects that munch away at pages or binding glue. Or people who love reading and eating at the same time may leave crumbs or grease spots on the pages, feeding insects already in the library that feel similarly about consuming books and food together.

Libraries can fumigate, leave poison bait, spray insecticide or irradiate the books, but all of these options can be expensive and time consuming. The best method for controlling book pests may be tossing all returned books in the microwave, suggests Jerome Brezner of the State University of New York in Syracuse.

In a paper presented last week at the Technical Association of the Pulp and Paper Industry's 1988 Paper Preservation Symposium in Washington, D.C., Brezner suggested that after libraries first fumigate or spray for bugs they should proceed to microwave all books and magazines in the library for about a minute each. After that, the librarians should “microwave all book returns as a regular practice so that new infestations will be prevented.”

Sensor sniffs fish freshness

Objectively measuring the freshness of fish is important for quality control measures in the fish processing industry. One of the most widely used methods of testing for freshness — chemically measuring breakdown products of ATP-related compounds in the fish's muscle tissue — requires a great deal of effort and time.

Japanese researchers now suggest that it may be easier to use a special sensor to measure gases produced as a fish decomposes. A titanium oxide/ruthenium semiconductor sensor, heated to 500°C, is very sensitive to the ambient concentrations of trimethylamine (TMA) and ammonia, gases given off during fish deterioration, say Yasuhiro Shimizu and colleagues of Nagasaki University in Japan.

When exposed to increased levels of TMA and ammonia, the electrical resistance of the semiconductive sensor decreases, the group reports in the October *JOURNAL OF THE ELECTROCHEMICAL SOCIETY*. Because the sensor is only exposed to the fish's “odor,” the technique may offer a much more “rapid, nondestructive analysis of freshness” than current methods, the researchers say.

Superconductivity research initiative

In late September the Department of Energy opened three pilot centers to foster collaborative research between industry and national laboratories in “high temperature” superconductors. The pilot centers, located at Los Alamos National Laboratory in New Mexico, Argonne National Laboratory in Illinois and Oak Ridge National Laboratory in Tennessee, will each receive \$2 million in the current fiscal year to help industry discover new applications for ever-advancing superconductor technology.

Collaboration between government and industry could include joint projects between scientists in each sector, work contracted by industry and pursued at the national laboratories, staff exchanges or the licensing of superconductivity patents for commercial application, says Secretary of Energy John S. Herrington.

In a related development, the federal government announced this month the first licensing of a superconductivity patent from a national laboratory to a private company. Argonne National Laboratory licensed a process for making thin, superconducting films to American Superconductor Corp. of Cambridge, Mass.

287