A new wave of fossils reveals the oceans' prehistoric giants.

Sea Monsters

By Stephen Fraser

Way back when *Tyrannosaurus rex* shook the ground, another giant reptile lurked in the prehistoric oceans. A 50-foot predator, *Mosasaurus* was a real sea monster.

Mosasaurus and *T. rex* never battled or even met. But the marine giant is now stealing some of the spotlight that *T. rex* and its fellow dinosaurs have enjoyed for so many years. A new wave of findings has drawn some amazing portraits of the aquatic denizens of the Age of Reptiles.

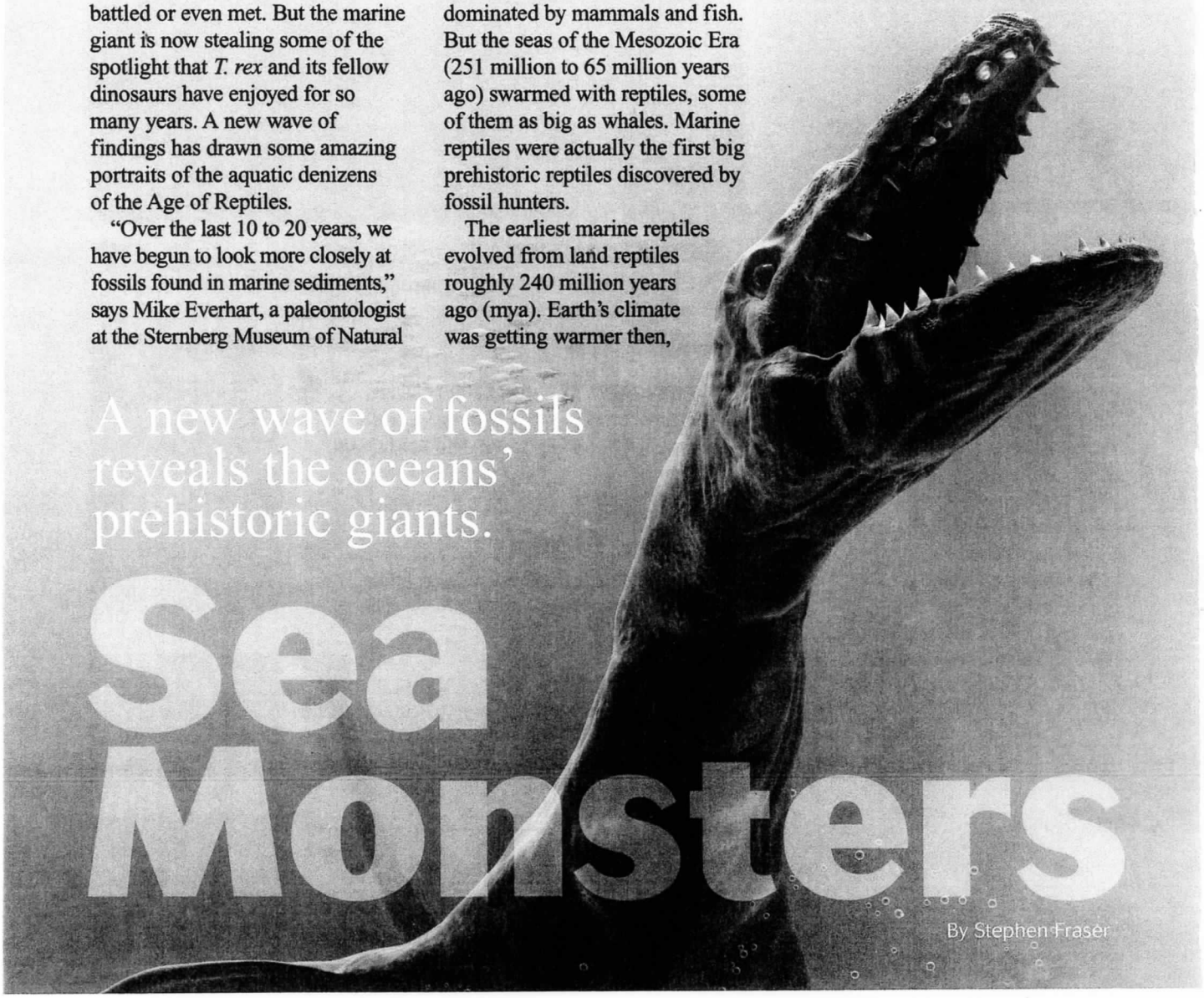
"Over the last 10 to 20 years, we have begun to look more closely at fossils found in marine sediments," says Mike Everhart, a paleontologist at the Sternberg Museum of Natural History in Hays, Kan. "In doing so, we've discovered that some of these creatures were very large, very scary predators—something you wouldn't want to share your ocean with!"

FROM LAND TO SEA

Only a few reptiles—turtles, sea snakes, and saltwater crocodiles—inhabit today's oceans, which are dominated by mammals and fish. But the seas of the Mesozoic Era (251 million to 65 million years ago) swarmed with reptiles, some of them as big as whales. Marine reptiles were actually the first big prehistoric reptiles discovered by fossil hunters.

The earliest marine reptiles evolved from land reptiles roughly 240 million years ago (mya). Earth's climate was getting warmer then, and so were the oceans, which favored the evolution and spread of the *ectothermic* (cold-blooded) reptiles.

Unlike most of today's reptiles, the prehistoric marine reptiles were *viviparous*—the females produced live offspring instead of eggs. "The reason is simple," says Mike Caldwell, a paleontologist at the University of Alberta in Canada.



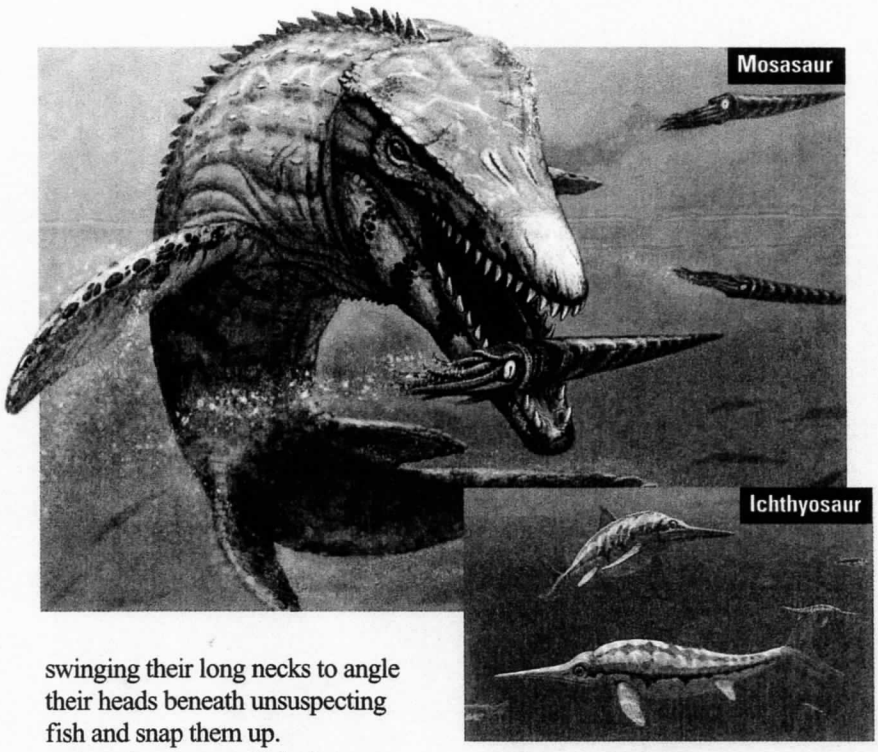
Name/Period/Date

Article Questions: Sea Monsters

1. How long was Mosasaurus? Where did it live?
2. What was the Era that marine reptiles dominated?
3. When did the first marine mammals evolve?
4. Define viviparous.
5. Describe two characteristics of Ichthyosaurs.
6. Name one example of a Plesiosaur.
7. When did Mosasaurs become extinct?
8. List two questions that still remain about these animals.

"If you give live birth you can live anywhere in oceanic environments and are not bound to come ashore to lay eggs." One fossil of a prehistoric marine reptile, now on view in a German museum, shows the animal giving birth.

No longer tied to the land, the marine reptiles could fully adapt to living in the ocean and compete with sharks and other big fish. "The interesting fact is that just about every animal in the ocean is a predator—from the smallest minnow to the biggest mosasaur—while almost all land animals are *herbivores* [plant eaters]," says Everhart.



THREE GROUPS

Paleontologists have sorted the prehistoric marine reptiles into three main groups.

Ichthyosaurs. The first group was the *ichthyosaurs*. The earliest ones had long, supple bodies and probably rippled through the water like eels. Later ichthyosaurs evolved fins and tails and "looked like our present-day dolphins," says Caldwell. Ichthyosaurs were built for speed.

The largest known marine reptile was a whalelike ichthyosaur, *Shonisaurus*. It was as long as two school buses.

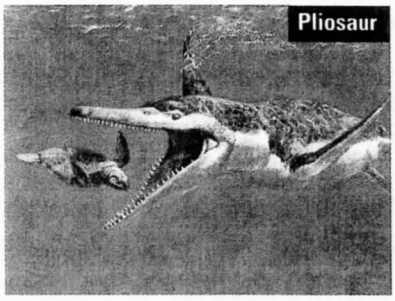
Plesiosaurs. Next to evolve, about 200 mya, were the *plesiosaurs*. Plesiosaurs moved like turtles: They flapped their paddle-like limbs to propel themselves through the water.

Plesiosaurs had small heads, broad bodies, and short tails. Over time, many of them evolved fantastically long necks. One of them, the 14-meter (46-foot) *Elasmosaurus*, had a neck that was half the length of its entire body and contained 72 *vertebrae* (bony segments). Today's mammals—even giraffes—have just seven neck vertebrae.

The long-necked plesiosaurs were slow swimmers. They probably cruised just below the ocean surface, swinging their long necks to angle their heads beneath unsuspecting fish and snap them up.

Another group of plesiosaurs, the *pliosaurs*, evolved in a whole different direction. Their necks remained short, but their bodies grew bulkier with heads like those of crocodiles. "These guys were the big, hulking monsters of the group, with huge teeth and a bone-crushing bite," says Everhart. They preyed on fish, ichthyosaurs, and other plesiosaurs.

Mosasaurs. The ichthyosaurs and pliosaurs disappeared about 90 mya. Replacing them at the top of the food chain were the *mosasaurs*, huge lizards related to today's Komodo dragons. Mosasaurs had long heads, short necks, and long, sinuous tails, which they used to propel themselves like snakes. "More than likely, mosasaurs were very aggressive animals, capable of pursuing and killing all kinds of prey," says Everhart.



If mosasaurs were still alive, "ocean travel would be safe in larger vessels," he adds. "But you wouldn't want to go fishing, sailing, surfboarding, windsurfing, or just plain swimming anywhere mosasaurs lived."

ENDLESS QUESTIONS

Along with the dinosaurs, the giant marine reptiles became extinct 65 mya. But their fossilized remains are abundant around the world.

"Mosasaurs were first discovered in Europe, but the most and some of the best have been found here in Kansas, which used to lie under a prehistoric sea," says Everhart. "The first major fossil I ever collected turned out to be a mosasaur that I named *Tylosaurus kansasensis* in 2005."

What remains to be learned about the prehistoric ocean-goers? "Did they have a four-chambered heart like a crocodile or a three-chambered one like a lizard? Did they live together in family groups like whales or porpoises? Did they care for their young? How long did they live?" says Everhart.

"It is an endless list of biological questions," adds Caldwell. CS

Clockwise from left: Simon Danaher; Thomas Miller; Chris Butler/Photo Researchers, Inc.; Dan Varner