

It came from N.J.: A prehistoric croc

Scientists' rare find will go on display.

Tom Avril INQUIRER STAFF WRITER

About 65 million years ago, when most of South Jersey was underwater and the rest was a fetid swamp, a crocodile died in present-day Gloucester County and sank to the bottom of the sea.

Scientists from Drexel University and the New Jersey State Museum know this because they found what remains of the reptile lying submerged in the greenish, sandy clay known as marl.

It is one of the most complete skeletons yet recovered of *Thoracosaurus neocesariensis*, a fish-eating crocodile whose remains usually consist of a stray tooth or two. The fossil, discovered in April, will be displayed in Drexel's Stratton Hall, starting Jan. 23, for about a year before heading to the state museum in Trenton.

The creature helps give scientists a sort of back-to-the-future view of what the world might look like some day with a continued increase in global warming.

Levels of carbon dioxide, a heat-trapping "greenhouse gas," have never been higher than when this croc walked the earth. Likewise, sea levels and temperatures stood at record levels. The climate was up to 15 degrees warmer, on average, than it is today. New Jersey was lush with mangroves.

Although the Earth has changed dramatically, crocodiles have not.

The Gloucester County creature, for example, resembles certain crocodiles in modern-day India and Africa - its remains a bony testament to the staying power of an animal that has evolved little since the time of the dinosaurs.

"Their business model works," quipped Drexel paleontologist Kenneth Lacovara.

The first bit of bone was found by Bill Gallagher, a state museum paleontologist who was fossil-hunting in a mining pit with three University of Delaware students.

The pit is owned by Inversand Co., which sells marl - correctly called glauconite - for use in water-treatment plants. Company officials asked that the exact location not be disclosed to discourage intruders from clambering over the unstable terrain, but it is within a few miles of the New Jersey Turnpike.

Museum officials, on the other hand, have been allowed on the Gloucester County site for decades and have found bits of prehistoric turtles, clams and sharks.

Gallagher said that during his visit in April, he first found a piece of bone and a scimitar-shaped tooth. Then, underneath a small waterfall, he spotted a narrow snout protruding from the wet sand.

"I thought we might have something big," he recalled.

He and the students uncovered a few bones but realized they needed to return with a bigger crew - and fast, before the bones were washed away. He contacted Lacovara, who was on the scene the next day with a dozen Drexel students.

Whenever they dug out some sand, the hole filled up with water, so half of the students were put to work digging little canals to divert water away from the fossil.

"It was muddy and wet and hot," sophomore Alison Moyer said.

The bones were photographed and wrapped in special plaster-coated cloth that forms a cast when treated with water - a product originally designed for medical use by Johnson & Johnson.

All told, the team recovered most of the vertebral column, parts of the skull, 30 teeth and 30 scutes - the armorlike plates that are embedded in a crocodile's skin.

The specimen was prepared with the help of staff at the Academy of Natural Sciences, where the Drexel students used dental picks and miniature jackhammers to remove sediment. The near-completeness of the skeleton will help scientists refine where the species fits in the evolutionary tree.

The 15-foot creature lived at the end of the Cretaceous period, just as the dinosaurs were about to become extinct. It was not especially large as crocodiles went. One larger species, which also lived in what is now New Jersey, grew to 45 feet and ate dinosaurs.

Thoracosaurus, on the other hand, ate fish, its narrow snout handy for slashing quickly through the water to grab prey.

Its curved, pointy teeth were designed not for chewing, but for carrying fish on land so they could be swallowed whole.

"Teeth like this had only one job, and that was to grab and immobilize prey," said Lacovara, an associate professor in Drexel's department of bioscience and biotechnology.

New Jersey once was a prominent fossil-hunting ground, as Gallagher described in the book *When Dinosaurs Roamed New Jersey*.

The first nearly complete dinosaur skeleton - the plant-eating Hadrosaurus - was found in 1858 in what is now Haddonfield.

That fossil, too, was found buried in marl, a marine deposit that lends its name to nearby Marlton.

An early Thoracosaurus bone was found in 1842 in Gloucester County, along Big Timber Creek. The species name, *neocesariensis*, means New Jersey. ("Jersey" is derived from "Caesar.")

The state would be a treasure trove of fossils today if it were not so covered with development and vegetation, said Lacovara, who does most of his digging in remote locales.

"I am positive there are fossils not 10 miles from Drexel across the river in New Jersey," Lacovara said. "I have to go to places like Argentina and Egypt and China to find them."

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If You Go

The *Thoracosaurus neocesariensis* fossil can be seen, starting Jan. 23, at Drexel University's Stratton Hall (32d and Chestnut Streets), on the ground floor in the main central hallway.



Academy of Natural Sciences

In his reconstruction, Jason Poole placed *Thoracosaurus* in a mangrove.

AKIRA SUWA / Inquirer Staff Photographer

Student Kim Magrini watches fossil preparer Jason Poole assemble the crocodile at Drexel. The 15-foot creature lived at the end of the Cretaceous period.

AKIRA SUWA / Inquirer Staff Photographer

Drexel University professor Kenneth Lacovara, who led a team of students in unearthing the specimen, with a skull fossil. All told, the team recovered most of the vertebral column, parts of the skull, 30 teeth and 30 armorlike plates that are embedded in a crocodile's skin.

AKIRA SUWA / Inquirer Staff Photographer

The *Thoracosaurus neocesariensis* specimen, which lived in South Jersey 65 million years ago, is put together for display at Drexel by (from left) Kim Magrini, a Drexel graduate student, and Ken Newman and Jason Poole of the Academy of Natural Sciences.

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