

Ancient reptile rises from Alberta oil sands

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One of the oldest and most complete plesiosaur fossils recovered in North America, and the oldest yet discovered from the Cretaceous Period, represents a new genus of the prehistoric aquatic predator according to University of Calgary palaeontologists who have formally described the creature after its remains were uncovered in a Syncrude Canada Ltd. mine near Fort McMurray in 1994.

In a paper published in the current issue of the German research journal *Palaeontographica Abteilung A*, former U of C graduate student Patrick Druckenmiller and biological sciences professor Anthony Russell have named the 2.6-metre-long plesiosaur *Nichollsia borealis* in memory of the late Elizabeth (Betsy) Nicholls. Nicholls was a renowned palaeontologist and U of C alumna who is credited with transforming the understanding of prehistoric ocean life by describing the largest-ever marine reptile, a 23-metre-long ichthyosaur, discovered in northern British Columbia in 1999.

“We chose this name because Betsy was a key player in the study of marine reptiles, a mentor to me, a former student of Tony, and a great person,” said Druckenmiller, who is now Curator of Earth Sciences at the University of Alaska Museum of the North in Fairbanks, Alaska. “We felt it was a fitting way to honour both her memory and her accomplishments in palaeontology.”

Nicholls was the Curator of Marine Reptiles at the Royal Tyrrell Museum in Drumheller (1990-2004) and earned her MSc and PhD degrees at U of C. She passed away in 2004. Her husband Jim Nicholls,

a retired U of C geoscience professor, said his family is touched by the decision to name the genus in Betsy's memory.

“This is a great tribute because Betsy worked on many of the fossils recovered by Syncrude over the years and this specimen is a direct result of the connection she had with the company for many years,” Nicholls said. “We are very proud that her work will be remembered in the scientific record in this way.”

The fossil was discovered by machine operators Greg Fisher and Lorne Cundal in 1994 during routine mining operations at Syncrude's Base Mine, about 35 kilometres north of Fort McMurray near the Athabasca River. Amazingly, the specimen was serendipitously exposed by one of Syncrude's 100-ton electric shovels approximately 60 metres below ground surface. It is complete except for its left forelimb and shoulder blade. It was transported to the Royal Tyrrell Museum, where it was prepared for research observations and exhibit and studied by Druckenmiller and Russell.

“We owe a lot to the excellent work Syncrude does of salvaging the fossils they find”, says Don Brinkman, assistant director of research and collections at the Royal Tyrrell Museum. “Because of this kind of partnership we are able to learn a lot more about marine reptiles from the Cretaceous Period.”

“This is exciting because it is truly palaeontology on an industrial scale,” Russell said. “Syncrude deserves a lot of credit for recognizing the importance of this specimen and assisting in preserving it. They worked around excavating in the area for 24 hours to ensure it was properly handled and continue to be involved in helping researchers further understand the geology and paleontology of the region.”

Nichollsia borealis is one of the most complete and best preserved North

American plesiosaurs from the Cretaceous Period and lived approximately 112-million years ago. Although not classified as dinosaurs, plesiosaurs lived in the seas at the same time that dinosaurs roamed the land throughout the Jurassic and Cretaceous Periods (205 million – 65 million years ago). They were a diverse group of carnivorous aquatic reptiles that reached lengths of over 12 metres. Fossil remains of dozens of plesiosaurs have been recovered around the world since the early 1800s and are among the first fossil vertebrates to be scientifically described. *Nichollsia* is also very significant because it fills a 40-million-year gap in the plesiosaur fossil record and greatly increases the understanding of the ancient seaway that once split North America in two and whose shores abounded with dinosaurs.

“This individual was a pioneer in the marine waters that would eventually become the Cretaceous Western Interior Seaway, which ran the length of North America during much of the Cretaceous and was home to one of the world’s most diverse communities of marine reptiles,” Druckenmiller said. “It represents the oldest known forerunner of this amazing period in North American prehistory.”

The excellent condition of the fossil has also proven to be a gold mine for palaeontologists, who often rely on scattered and incomplete examples for classifying and reconstructing plesiosaur prehistory.

“This specimen was preserved in sandstone and was not crushed as much as most specimens, which have typically been found in shale,” Druckenmiller explained. “Because of this, I was able to have its three-dimensional skull CT-scanned so we can see the details of the insides of its braincase. This has helped us understand this animal in more detail than almost any other plesiosaur ever found.”

Russell said researchers have worked with Syncrude to study the ancient sea floor that is now being mined for oil sands, in order to better

understand the prehistoric ecosystem and to help predict where future fossil finds might occur.

“We are getting to look at a relatively large area of the ancient sea bed over many hectares, which is very unusual for a field site,” he said. “It allows us to create models and hopefully predict where other remains might turn up, which Syncrude and other oil sands operators can be aware of when working in a certain area.”

Nichollisia borealis is currently on display in the Discoveries Gallery at the Royal Tyrrell Museum.

Source: University of Calgary

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