

FOSSILS IN FOCUS



The Museum's collection is vast and diverse, with the majority of fossils found in Alberta. Only a fraction of our research collection is on display. *Fossils in Focus* highlights significant fossils from our collection, with new specimens reflecting current research added each year.

2021–2022 SPECIMEN FACT SHEET

EXPLODED SKULL

- Individual bones in a skull provide valuable information that can be used to identify a dinosaur species and determine its nearest relatives.
- The 41 fossilized bones of this *Daspletosaurus* skull were found separate from each other and uncrushed.
- Casts were made of some elements. The more delicate and complex bones were digitized and 3D printed so that they could be displayed in this manner.
- Although many bones were collected the first year after their discovery, crews returned to the area for 10 years to find all of them.

HEADS AND TAILS

- Dinosaur Provincial Park UNESCO World Heritage Site has been a hotspot for fossil collection for over a century. About 500 major specimens from the Park are now housed in museums and universities around the world.
- A crew from the Royal Tyrrell Museum came across fossils from an ankylosaur (armoured dinosaur) and began excavation of the specimen in summer 2018.
- Senior Technician Darren Tanke noticed old quarry trash during the dig, and identified the site as a former quarry worked on by the American Museum of Natural History (AMNH) in 1913.
- AMNH collected much of the front two-thirds of a *Euoplocephalus tutus* from this quarry between 1913-1914.
- The Royal Tyrrell Museum collected fossils from the back end of the same animal between 2018-2019, including this beautifully preserved tail club.





CANADA'S OLDEST TYRANNOSAUR

- Tyrannosaur fossils have been found around the world, representing some of the largest predatory dinosaurs to walk the Earth.
- While studying fossils in the Royal Tyrrell Museum's collection in 2018, Jared Voris, a graduate student at the University of Calgary, noticed features in this specimen that were unlike any other tyrannosaur known from Alberta.
- The dinosaur had distinct ridges along its upper jaw, likely used for display.
- These jaw fossils had been collected by ranchers John and Sandra De Groot along the Bow River in 2008 and were brought into the Museum's collection in 2010.
- The dinosaur was recognized as a new species and named *Thanatotheristes degrootorum*, a name derived from Greek meaning "reaper of death" and honouring the De Groot family for finding the fossil.
- At 79.5 million years old, this is the oldest of five tyrannosaur species known from Alberta. It lived 11 million years before its famous cousin, *Tyrannosaurus rex*.
- This is the first new tyrannosaur species discovered in Canada in over 50 years.



ONE FISH, TWO FISH

- A large inland seaway covered much of Alberta during the Late Cretaceous, preserving many marine animals in a rocky layer known as the Bearpaw Formation.
- The Royal Tyrrell Museum has collected many important specimens from this rock formation, including ammonites, marine reptiles, and fishes.
- Routine mining operations near Lethbridge uncovered this well-preserved fish skeleton in 2001. Although it resembles other species of the ray-finned fish *Dercetis*, this skeleton is four times larger.
- Another large *Dercetis* sp. specimen was uncovered at the mine in 2017, providing further evidence of the potential for this to be a new species.
- These fossils are the first and only known examples of this genus of fish from North America.



DRILLING DOWN TO THE CORE

- The Fort McMurray oil sands are mined year round for important energy resources, and they are also home to fossils of extinct creatures.
- During exploratory drilling in 2016, workers reported bone fragments in a core sample. Collection of the fossils had to wait until 2019, once mining had reached the level of the initial core sample.
- The crew found this jumbled skeleton of a marine reptile known as an elasmosaur (long-necked plesiosaur).
- The bones were likely scattered during decay and scavenging after the animal's death, as evidenced by the recovery of two teeth from a rare, six-gilled shark nearby.



FEASTING ON FERN FRONDS

- Our *Borealopelta markmitchelli* specimen is the best-preserved armoured dinosaur ever found, with intact skin, armour, and stomach contents.
- A soccer ball-sized mass from its stomach is filled with spherical rocks that are likely gastroliths (ingested stones that aid with digestion).
- Researchers from the Royal Tyrrell Museum, Brandon University, and the University of Saskatchewan analyzed this thin section from the stomach contents under high magnification.
- The findings revealed plant fossils from conifers, cycads, and horsetails, but most abundant were fern leaves. The presence of charcoal also suggests that the animal was eating young ferns in a forest recovering from a recent wildfire.



DINOSAUR DISEASE

- The Royal Tyrrell Museum's Senior Technician Darren Tanke has been recording occurrences of pathologies in fossils for decades.
- Darren noted several unique abnormalities along these tail vertebrae belonging to a hadrosaur (duck-billed dinosaur) collected from Dinosaur Provincial Park in 2011. He contacted Dr. Bruce Rothschild of the University of Kansas to learn more.
- Dr. Rothschild immediately recognized the pathology as Langerhans Cell Histiocytosis, a bone disease also observed in humans.
- These fossils are the earliest examples of this disease, evidence of immune system cells building in the body, eventually forming painful tumors in the bones.
- The Royal Tyrrell Museum houses the world's largest collection of dinosaur specimens with bone pathologies.

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