Voices of QMNH

Big, Bad, and Famous:
An Exhibit Review of *T.rex: The Ultimate Predator* at the Royal Ontario Museum

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Earlier this summer, the QMNH team took a field trip to the Royal Ontario Museum to visit some familiar, yet fearsome friends - tyrannosaurs. *T.rex: The Ultimate Predator*, a travelling exhibit now open at the ROM, invites visitors on a journey of discovery about everyone's favourite dinosaur family. As we stood staring at the massive skeletons and life-like models of these prehistoric beasts towering over us, we wondered the very question the exhibit aims to answer; how did *T.rex* get so big, so bad, and so famous?

T.rex: The Ultimate Predator.
https://www.rom.on.ca/en/exhibitions-galleries/exhibitions/t-rex-the-ultimate-predator

BIG

In order to answer this question, we must dig up the past and go back to the very beginning of scientific study surrounding *T.rex*. The first partial skeleton of *T.rex* was uncovered in eastern Wyoming in 1900 by Barnum Brown, assistant curator of AMNH. Two years later, Brown found another skeleton in the Hell Creek Formation in Montana, this one being more complete than the first. Not long after, this skeleton was officially named by Henry Fairfield Osborn. Derived from both Greek and Latin origins, *Tyrannosaurus rex* translates to 'tyrant lizard king'. The name alone tells us that this newly discovered species was presumed to have dominated the dinosaur world.

Adult *T.rex* skeleton on display in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023

Examining the anatomy of this remarkable species, it is not difficult to understand why this presumption was initially made. One of the first large theropods discovered in North America, Brown and his paleontological team were immediately captivated by *T.rex's* terrifying bone structure. The skull was massive, with obvious features of a fierce hunter. It was extremely wide at the rear, but had a narrow snout, allowing for remarkably precise binocular vision. The upper jaw of *T.rex* has a U-shape, increasing the amount of tissue and bone it could rip out in a single bite. The bones themselves were honeycombed, making the skull lighter and allowing for the animal to move more efficiently in pursuit of prey.

The ROM's exhibit introduces visitors to the wider family of tyrannosaurids, allowing us to gain a better understanding of how *T.rex* evolved into the big bad beasts we know them as. It is only in recent years that the field of paleontology has begun to uncover the mysterious ancestry of tyrannosaurs. Throughout the 20th century, a few close relatives of *T.rex* were discovered that were equally as large and impressive as Brown's first find. This meant that *T.rex* was not a rare exception, it belonged to a formidable branch of dinosaur genealogy. But how did these predators get so big in the first place?

Dilong, a member of the tyrannosauroid family on display in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023.

Over the past 15 years, researchers around the world have found nearly 20 new species of tyrannosaur, from the deserts of Mongolia to the frigid tundra of the Arctic Circle. These discoveries have helped to piece together the tyrannosaur family tree and see where *T.rex* fits into it. The tyrant king of dinosaurs actually had rather humble beginnings. For most of their history, tyrannosaurs were human-sized carnivores of little significance, only reaching the top of the food chain during the final 20 million years of their existence. *T.rex* was the last survivor of a long and complex ancestry that lived around the world right up until the end of the dinosaur age 66 million years ago. The most recognizable member of the tyrannosaur family actually makes up a rather small branch of the overall tree. There is actually a greater time difference between the ancestral tyrannoaurs and *T.rex* (100 million years or more) than between *T.rex* and humans (66 million years).

It was sometime between 85 million and 110 million years ago that *T.rex* began its climb to the top of the food chain. During this time, dinosaur ecosystems underwent drastic changes. Allosaurs and ceratosaurs largely disappeared, allowing tyrannosaurs to move into the top predator role, particularly on the northern continents. Dinosaur fossils from this time are incredibly hard to come by, so it is still unclear why exactly this happened. A likely explanation is a mass extinction that took place 94 million years ago, leading to higher temperatures and fluctuating sea levels. The dinosaur world was rapidly shifting and many species struggled to adapt. It was at this point that tyrannosaurs ultimately emerged on top. *T.rex* and its equally humongous cousins reigned supreme in North America and Asia for the final stretch of dinosaur history.

T.rex skull on display in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023

BAD

The qualities most associated with *T.rex* are its fierce and impressive hunting skills. They had a bite force so strong that they easily crushed bone. They had the impressive ability to sniff out and pinpoint prey. And they lived such a violent life that they rarely reached 30 years old.

A key reality that *The Ultimate Predator* highlights is that *T.rex* were not born as the massive killing machines we know them as. Upon entering the exhibit, you are immediately met with the adorable, yet startling likeness of a *T.rex* hatchling. More akin to a fluffy baby bird than the ferocious beasts portrayed in popular media, it is hard to imagine this cute creature growing into the tyrant king of dinosaurs.

Scientific rendering of baby *T.rex*.
https://www.washingtontimes.com/news/2019/mar/30/scientists-reveal-baby-tyrannosaurus-rex-was-an-ad/

Young *T.rex* were small and weak, but if they could beat the odds and survive to adulthood, they would claim their place at the top of the food chain. Though tyrannosaur parenting styles are difficult to study, it is likely that *T.rex* spent the first several years of their lives being fed and protected by their mother. Covering in feathers for warmth, baby *T.rex* were vulnerable to the elements, as well as predators.

Once reaching adolescence, they would start to look more like the image of *T.rex* that we are most familiar with. In a few short years, they would go from teenagers with skinny bodies and narrow snouts to massive adults. Adolescent *T.rex* could not yet take down prey on their own, so they would hunt in packs until reaching adulthood, when they would finally achieve the size and power of an apex predator. This process of growth was not quite as smooth as popular media would have us believe. Throughout their entire lives, *T.rex* would have to contend with injury, disease, food scarcity, and environmental changes. Living a long and healthy life was simply not an option for top hunters like tyrannosaurs.

The violence that *T.rex* is known for is a necessary adaptation to a competitive and brutal world. Much of the fascination and excitement surrounding the world of dinosaurs comes from the heightened intensity of behaviour. Take Scotty the *T.rex* as an example. The largest *T.rex* specimen ever discovered, Scotty is also one of the longest-lived. Reaching nearly 30 years old, Scotty's bones show evidence of a harsh existence. A parasitic infection common among tyrannosaurs left visible holes in Scotty's jaw. A hole near the eye socket, a broken and healed rib, a broken tail vertebra, as well as impacted teeth suggest that Scotty fought regularly with other large dinosaurs.

Skull of Scotty the *T.rex* on display at QMNH.

The ROM's exhibit grounds *T.rex* in scientific reality. It makes us see that these iconic beasts did not have super powers; they faced the same biological challenges that every animal must contend with on their journey to adulthood. We all love the fear factor of *T.rex*, but they were not actually that scary at all stages of development.

The perception of 'badness' that we have about *T.rex* comes just as much from the fame surrounding the species as its actual physical characteristics. While there is no doubt among scientists and dino-enthusiasts alike that *T.rex* was an impressive and remarkable species, its star-status has grown far beyond the hard paleontological evidence. It has become legendary.

T.rex skeleton on display in T.rex: The Ultimate Predator. Royal Ontario Museum. 2023.

FAMOUS

From the moment that the first *T.rex* specimen was unearthed, a public fascination was sparked that only continues to grow. The species has become a scientific and cultural icon, easily recongizable around the world. Everywhere we look, from clothing to film, *T.rex* is firmly fossilized in our collective memory. But what is it exactly that fuels this fascination?

Taking a closer look at the time in which it was discovered reveals why *T.rex's* fame has grown so great. Let's set the scene. It was the early 20th century and dinosaur discovery was just taking off. Prominent institutions, like AMNH, were on the hunt for the latest and largest dinosaur specimens to put on display. The field was dominated by trophy hunters seeking to make a name for themselves and the museum they represented. There was an air of excitement and intensity surrounding dinosaur discovery at the time. Many have described this period as the Wild West of palaeontology; an age when fame and glory was far more important than professional ethics.

Brown (lower left) working in the quarry in 1905 in Hell Creek, Mont., where the first T. rex was found. Brown and his team used horses to pull away layers of soil and rock above the dinosaur bones. Image # 28767/American Museum of Natural History https://www.npr.org/2011/09/14/140410442/bone-to-pick-first-t-rex-skeleton-complete-at-last

Rock formations were blown up with dynamite, specimens were haphazardly excavated, and bones were lost or damaged along the way. Skeletal bones were often overlooked or discarded in favour of skulls, which were flashier and more impressive to mount in museums. The goal was to find more dinosaurs than the competition, and to do so as quickly as possible, regardless of the environmental, cultural, or economic consequences. The line between science and greed was blurred at best.

Barnum Brown himself treated his work like show business. Searching for fossils in the middle of summer wearing a full-length fur coat, Brown made sure to draw as much attention as possible. His eccentric antics managed to earn him a considerable fanbase. During his travels, admirers would flock to his train as it pulled into stations across the country, hoping to meet the famed dinosaur discoverer and hear stories about his *T.rex* find. A celebrity of this sort had never really existed before. The instant fanfare surrounding *T.rex's* discovery catapulted the species to a level of universal fame that no dinosaur had reached before, and very few have come close since.

Barnum Brown doing field work in Montana in his fur coat, circa 1914. / Wikimedia Commons.

A section of jaw bone from one of the first ever *T.rex* finds is displayed in *The Ultimate Predator* exhibit. Peering through the glass, visitors get a small glimpse at this historic discovery. It is a fascinating sight against the backdrop of the entire exhibit, which is packed full of scientific study, specimens, and visual interest. In just over a century, our knowledge and understanding of *T.rex* has grown dramatically. Today, we can only imagine what it might have been like to unearth such an unfamiliar fossil for the first time.

Early *T.rex* fossil on display in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023.

Barnum Brown does not get all the credit, however. He may have initially launched *T.rex* to stardom, but the longevity of the dinosaur's fame is due to consistent scientific and public interest. From the 1910's through to the end of the 1950s, Brown's discoveries remained the only Tyrannosaurus specimens, with the Great Depression and world wars keeping palaeontologists out of the field. A renewed interest in *T.rex* took hold in the 1960s, leading to the discovery of about 42 new skeletons from Western North America. The 1990s saw another resurgence in fieldwork, with nearly twice the number of finds as in all previous years combined. It was in this decade that two of the most complete skeletons were found: Sue and Stan. In 2001, the most complete juvenile *T.rex* skeleton was uncovered in the Hell Creek Formation of Montana. Nicknamed Jane, this specimen has helped us understand the adolescent phase of tyrannosaur development. In recent years, more members of the tyrannosaur family have been discovered, helping to build a more complete picture of this remarkable species and how it came to exist.

Alongside all of these groundbreaking discoveries, *T.rex* has played a consistent role in popular media. Making its first film appearance in 1908 in the Ghost of Slumber Mountain, *T.rex* has been a staple villain in the film industry ever since. Audiences are captivated by the terrifying and exciting portrayals of *T.rex* behaviour. Whether in books, on the big screen, or in a museum exhibit, the thrill of encountering *T.rex* is palpable. Maybe we all crave the same sense of adventure that early palaeontologists were chasing. Maybe we find it exhilarating to imagine a prehistoric world dominated by massive carnivorous beasts. Or maybe our favourite dinosaur movie from childhood inspired a lifelong passion. Whatever the reason, after more than 100 years of fame and popularity, the appeal of *T.rex* has not worn off. In fact, it seems to grow greater and greater with time.

Lights, Camera, Action: Tyrannosaurs in Film exhibit at QMNH. 2023.

T.rex: The Ultimate Predator is a well-rounded exhibit that cleverly incorporates a diverse range of information, interactives, and specimens. It truly has something for everyone to enjoy. If you get the chance, we strongly encourage you to visit the exhibit before it closes next month. Here are our first impressions:

Deanna Way*, Executive Director*

Back in February, David Evans, the ROM's Temerty Chair in Vertebrate Palaeontology and one of our board members, treated the QMNH team to an exclusive tour of the ROM's palaeontology labs. At the time, they were meticulously preparing pieces from the ROM's collection to complement their upcoming travelling exhibit, *T. rex: The Ultimate Predator*. David's enthusiasm significantly heightened my anticipation for this exhibit. When we revisited the ROM in June, the exhibit surpassed expectations. Straying away from the conventional browns and neutrals typical of many natural history collections, the vibrant use of blue, lime green, red, and white immediately captured my eye. The fleshed-out reconstructions presented tyrannosaurs in a refreshing light, feathered and vibrant, underlining the fact that *T. rex* is just one member of the expansive tyrannosaur family. What struck a personal chord for me was the additional section that the ROM added, showcasing the meticulous fieldwork and preparation that goes into making fossils ready for public display. As someone with a background in fossil preparation, this exhibit was not only educational but deeply nostalgic, rekindling my profound love and respect for the field.

'In The Lab' highlights the ROM's fossil preparation work in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023.

Jamie Burton*, Museum Host Volunteer*
This past March, I visited the ROM's *T. rex: The Ultimate Predator* exhibit with my wife and two sons, who are four and two years old. When we arrived, my dino-loving son's attention spans were much shorter than normal after travelling in the car for a couple of hours. Between tiredness and tantrums, it was difficult to absorb the wealth of interesting information. Regardless, we were immediately captivated by all the exhibit had to offer. The sensory-stimulating displays took us on a journey from a baby, to a juvenile, through to a full-grown *T.rex*. We were also introduced to several different members of the tyrannosaur superfamily, including the Dilong, Proceratosaurus, and Tarbosaurus. It was exciting to expand our knowledge of this fascinating group of dinosaurs. We discovered so much in the 25 minutes we spent in the exhibit. We could have easily spent over an hour reading each text panel, observing the displays and models, and trying out the fun interactives. A fun day for the whole family!

Proceratosaurus bradleyi, an early tyrannosaur in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023.

Madeline Hoyle, *Interpretive Coordinator*

The first thing I noticed about *T. rex: The Ultimate Predator* is that it is not just an exhibit of bones. It includes the interesting stories of real people who work behind the scenes to make exhibits like this possible. I was immediately drawn to the area highlighting the ROM's own recent fieldwork uncovering tyrannosaur specimens in western Canada. I found myself entranced by the video showing fossil technicians like Shino Sugimoto working hard to prepare bones for display. This section, added by the ROM to the existing travelling exhibit, brings a human element to the vast and unfamiliar world of dinosaurs. It helps to ground the surrounding scientific research in real human experience.

I really appreciate how the ROM was able to make a travelling exhibit their own by adding personal touches and telling stories about their staff's work. This way, the exhibit will look different and take on a new feel everywhere it goes. Without these added connections and contexts, exhibits are just rooms full of objects. In this day and age, it is nearly impossible to create an original exhibit about *T.rex*, so curators and designers must work extra hard to find a fresh take on these old bones. Personal stories and new interpretations are more important than ever before.

'In The Field' highlights the ROM's recent tyrannosaur finds in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023.

Mikayla Barney*, Creative Coordinator*

Nothing is more addictive than *T.rex*. My first impression upon entering the ROM's new exhibit, *T.rex: The Ultimate Predator*, is that they did their homework. Superimposing a modern colour story and design theme inspired by 3-D printing, visitors are welcomed with an intense green, red, and blue palette. Like the RGB colour model itself, the exhibit's design is simplistic, yet eye-catching. The components of this exhibit are feathery and toothy dinosaurs, representations of contemporary palaeontology field work, and new sensing technology in a visual and interactive form. Utilizing shadow play, cinematic video style, and even touchable screens, I enjoyed how I was able to 'design' my own *T.rex* or 'remix' my own *T.rex* roar. Not only does this exhibit show you the dinos we all know and love, but it adds to an otherwise 2-dimensional story. Visit *T.rex: The Ultimate Predator*, and experience a spectrum of play, a depth of knowledge, and a whole-lotta bite!

The exhibit's vibrant colours and modern design compliment the dinosaur models in *T.rex: The Ultimate Predator*. Royal Ontario Museum. 2023.

Resources

Discover the World of T.rex: The Ultimate Predator. Retrieved fromhttps://www.rom.on.ca/en/about-us/newsroom/press-releases/discover-the-world-of-t-rex-the-ultimate-predator

First T.rex Skeleton, Complete at Last. Retrieved from https://www.npr.org/2011/09/14/140410442/bone-to-pick-first-t-rex-skeleton-complete-at-last

Rise of the Tyrannosaurs. Retrieved from https://www.scientificamerican.com/article/rise-of-the-tyrannosaurs/

T.rex: The Ultimate Predator. Retrieved from https://www.rom.on.ca/en/exhibitions-galleries/exhibitions/t-rex-the-ultimate-predator