ROTATING PLANET PRODUCTIONS
SCIENCE & DISCOVERY

THE INCREDIBLE WORLD OF

Ancient Baby Beasts

For the first time, science and innovative technologies are revealing the mysterious world of dinosaur and ice age babies, changing what we know about how they survived in a world out to get them

IMAGES:
-A perfectly preserved 57 thousand-year-old wolf pup discovered by miners in the Yukon
-Artist rendition of a dinosaur embryo discovered inside an egg in China.

Short Synopsis

Ancient Baby Beasts journeys through the age of reptiles past their cataclysmic end to the dawn of mammals, focusing on their forgotten young ones. Over hundreds of years, as scientists unearthed long-extinct creatures from fossil beds and museums competed over remains from towering tyrannosaurs to woolly mammoths, a ‘bigger is better’ bias meant every museum wanted the biggest bone rack. Fossils of their smaller young were harder to find, but also ignored, making their lives a mystery. Now, exciting discoveries from tiny claws and teeth to fossilized and mummified kid meals mean we’re peering with new eyes at these mighty juveniles. With fresh attitudes and cutting-edge technology, we see the terrible tots and teen tyrants we missed, spotlighting their fascinating little lives.

The Lost Years of Little Lives

A small but deadly claw; the tiny teeth of a mysterious mammal; a perfectly preserved egg about to hatch; fossilized snacks; mummified kid meals. From the creators of *Aging in the Wild*, *Stay at Home Animal Dads*, and *La Préhistoire du Québec* comes a new series that showcases new discoveries about the ancient creatures that one roamed our planet, zooming in on an enigmatic phase of their lives: their early years.

For centuries in paleontology, there’s been a bias that bigger is better. Every museum wanted the biggest bone rack to boast about. A focus on the giants was partly because the fossilized bones of smaller dinos and mammals are harder to find. Smaller bones more easily wash away, get ignored, or are misidentified. But now we’re looking harder at the small but mighty young dinosaurs and ancient mammals we missed, bringing together stories long ignored. From tot to toddler to teen, what challenges did they face to survive and grow up? *Ancient Baby Beasts* pieces together clues revealed for the very first time!

“Live Fast Die Young”

Our journey begins as sun shines through a gap between bright green ginkgo trees and conifers on the marshy shores of an inland sea. An amazing event is unfolding on the ferny forest floor. Pecking and clawing its way slowly out of an egg the size of a beachball is a creature that gazes up, wide-eyed, from the mossy carpet to the tall trees above. This baby is vulnerable - but not helpless. It’s a tiny tyrannosaur, a five-kilo package ready to hit the ground running even before the last eggshell fragments fall from its back. T-rex junior constantly scans for cover to cunningly avoid danger. One false move and she’s a snack for marauding meat eaters. Baby T-rex may be small, but her survival skills are massive. It’s live fast or die young in this world full of giants. If she survives, this tiny T-rex could one day grow large enough to tower over the trees, and dominate everything else.

If there’s one certainty in the mysteries of these ancient tyrants, it’s that to get big, they have to start small. “When we think of dinosaurs, we think of giants,” says Kat Schroeder, a paleontologist at Yale University. Over its lifetime, assuming a dinosaur survives from infancy to adulthood, “The change in size is immense,” says Kat. The differences in bones and behaviours between babies, juveniles and adults is so extreme that it’s sparked bitter battles among scientists that are only now being settled. Turns out, smaller fossils once attributed to entirely different species are the same tyrannosaur species growing up. Showing the extreme size difference, the baby Tyrannosaur tooth in Kat’s right hand is the size of a human molar. The adult Tyrannosaur tooth in her left: the size of a banana. That huge size difference between babies and adults is true not just for these apex predators, but many herbivores too. “Even an eight-ton plant-eating sauropod has to start the size of a border collie,” she says, “because eggs have a maximum size.”

Teenage Tyrants

Many of the world's young tyrannosaur fossils have been found in the 79-million year-old badlands of Alberta. Canadian paleontologist Greg Funston at the Royal Ontario Museum in Toronto is one modern day detective reconstructing their lives from clues like CT scans of a tiny toe claw. He suspects it came from a baby tyrannosaur inside its egg. Leftovers of tyrannosaur eggs themselves are still elusive, perhaps because their eggs were soft-shelled. But taking clues from the eggs of other therapod species like Oviraptors, paleontologists aren't giving up the search just yet.

Paleontologist Darla Zelenitsky at the Royal Tyrell Museum in the heart of Alberta's fossil strewn badlands, takes us down a trail right outside the museum, along an escarpment of eroded sandstones exposing greyscale layers covering millions of years. Her eyes light up describing one incredible find in particular: a 5-year-old Gorgosaurus with a belly full of drumsticks. Its 'frozen' dinner young chicken-sized vegetarian dinosaurs called Citipes. From this fossil find, her team saw that young tyrannosaurs had small teeth, weak jaws, and ate off the kid's menu - a different diet than adults. They ran speedily and grew fast – some 45 pounds per week. As they bulked up, it was payback time. Now they could eat tots the size they once were.

"I would not want to meet a hungry teenage tyrannosaur," says Schroeder. "That would be a very scary thing." We, however, can hang out with this voracious tyrannosaur teen with a bad attitude through the magic of CGI, plus recreate a whole nursery of baby Mussaurus, Argentinian herbivores discovered in vast Patagonian bone beds whose mamas took good care of their babies. We also explore the world imagined for a few thousand communally living Centrosaurs, unearthed in one of the largest bone beds in the world.

Dawn of the Mammals

But big or small, vegetarian or carnivorous, young or old, dinosaurs didn't stand a chance with the next thing life on Earth threw at them. An asteroid strike about 66 million years wiped out three quarters of Earth's plants and animals. The earth's atmosphere was blanketed in massive clouds of greenhouse gases, sulphuric acid fell as rain, the ocean acidified, and temperatures likely plunged. The after-effects spelled curtains for dinosaurs. But over time, a new climate and lack of large reptiles heralded the flourishing of mammals, including dog-sized rodents called Pantolambda, and eventually more familiar species like wolves and woolly mammoths who ruled the Ice Age's northern tundra.

Fast forward to now, and our planet's climate has transitioned again, from unusually cold to rapidly warming, with profound effects for life now and in the future. That recent warming is bringing new discoveries quite literally to the surface. Yukon permafrost is an incredible source of fossil bones of Ice Age animals, which keep popping up from the ground as temperatures rise. Over 2000 kilometers north of Alberta's badlands, another ancient baby has birthed from the melt. One amazing recent discovery was a 57-thousand-year-old, perfectly preserved wolf pup that melted out of the permafrost, found near Dawson City by young gold miner Neil Loveless.

Zhùr means "wolf" in the language of the Tr'ondëk Hwëch'in Indigenous people of the region. Much rarer than gold, Zhùr's mummified body was preserved intact by the cold dry Arctic conditions. Yukon government paleontologist Grant Zazula describes it as like looking at a taxidermized puppy, "It's got a little tail, hair, paws, eyelids and lips. It's spectacular," says Zazula, our enthusiastic guide. Tests revealed that Zhùr descended from ancient wolves in Russia, Siberia, and Alaska and that her last meal was fish. Zazula and Tr'ondëk Hwëch'in collaborators continue to unravel the mummified mysteries of her young life.

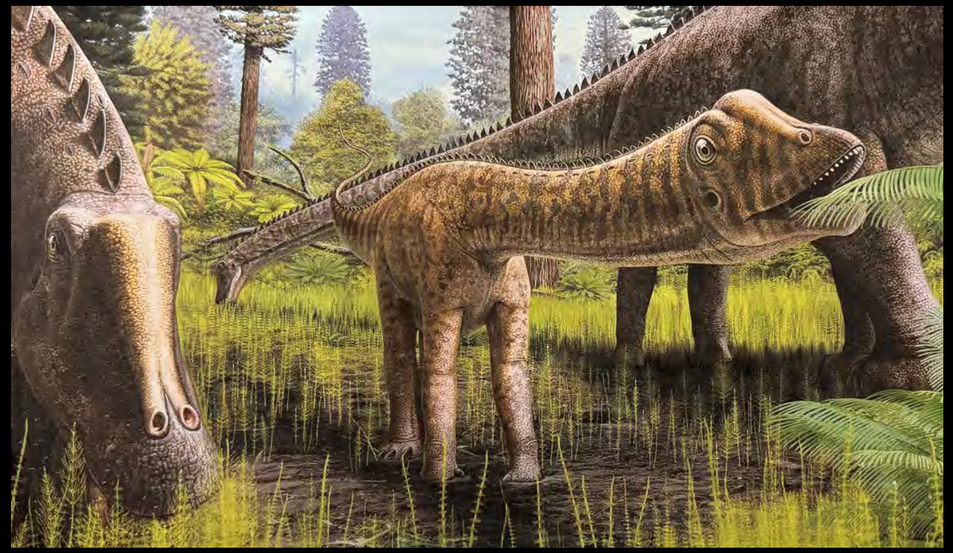
Ancient Ancestors

Zhùr the Wolf Pup and another recent find -- Nun cho ga the baby mammoth – hold special significance for the First Nation on whose traditional territory they were found. More valuable than just a ‘scientific specimen,’ the Tr□ondëk Hwëch□in believe these ancient babies deserve reverence and respect. Knowledge holder Debbie Nagano, Director of Tr'ondëk Hwëch'in Heritage, takes us on a journey back in time, using traditional storytelling and CGI to imagine the world that was. We explore how modern technology and traditional Indigenous knowledge provide “two-eyed seeing” and compassionate care for specimens that the Tr□ondëk Hwëch□in consider their ancestors. Nun cho ga is helping to paint a clearer picture of the Ice Age Yukon, including its babies, forging bonds between the Tr□ondëk Hwëch□in, miners, and scientists today.

First Instincts

Nearly 400 kilometres north of Dawson in the rapidly warming hamlet of Old Crow at the confluence of the circuitous Crow and Porcupine Rivers, the life of another young but long-extinct creature has recently been revealed. Here, by examining the teeth of baby and mother woolly mammoths that grazed grasses here over 40,000 years ago, scientists Zazula and Jennifer Metcalfe of Lakehead University discovered that though nursed by their mothers like mammals today, mammoth babies had a challenging time. Stable isotope chemistry revealed that baby mammoths exclusively drink mother’s milk for two years, unlike their modern-day elephant relatives that begin eating solid food at three months. Metcalfe suggests that this extreme mama-dependency might have made mammoths more vulnerable climate change.

Depending on mom for nutrients and protection is what baby mammals have done for more than 63-million years, including for the strange-looking vaguely cat-like Pantolambda, one of the many mid-sized creatures that expanded into the niches left behind by dinosaur extinction. For the first time, baby Pantolambda behaviour is being revealed by Gregory Funston, carefully examining thin sections of a 2.5-month old’s upper milk tooth. Vaporizing tiny samples of tooth with a laser to test its chemical composition, Gregory, with help from a team of young paleontologists from the U.K., France, and the U.S., are recreating the story of this baby’s birth, early life, and death, from toothy chemical changes.



Conclusion

As we explore the remarkable and little-known lives of ancient youngsters, we travel through time and space with our expert scientists and First Nations guides to imagine these worlds with CGI, dig in Alberta, China, and Argentina, peer at prizes plucked from the permafrost in the Yukon, and go under the microscope in labs and museums to view eggs, teeth, claws, skulls and bones with CT scanners and synchrotrons. We spy on a whole host of tots, like Tyrannosaur youngsters that likely ate bugs before developing more meaty tastes. We see baby Albertasaurs, Mussaurus, and communally living Centrosaurs, visiting the largest bone beds in the world. Finally, with privileged access, we journey north to see the baby wolf pup and mammoth, exposing these magnificent ancient mammals frozen in time.

How did these tiny ones survive in a world full of hungry giants? Each day, dig and detail reveals new answers; critical life or death clues. Did these babies have caring, tender parents? Or go it alone? As our ancient baby beasts grow from tiny to towering, we get a front row seat to the cutting-edge discoveries helping piece together tales of the young beasts of the deep past, bravely growing up in a big scary world. Roaar!

“We’ve barely scratched the surface at these sites,”
and we’re finding more each year.” -Paleontologist Evan Johnson-Ransom

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Access to Collections, Digs and Consultants Worldwide

Through our past projects and relationship with the The Alliance of Natural History Museums of Canada (ANHMC) we have ready access to stories, experts, researchers, technology, new digs and extensive on-site collections where specimens long filed away are now being re-examined for new insights. These exciting storeroom collections, not open to the public, are comprised of thousands of specimens offering endless opportunities for new discoveries in addition to upcoming digs.

Paleontologist Greg Funston
Royal Ontario Museum

Dr. Gregory Funston is a palaeontologist studying anatomy, growth, and evolution of dinosaurs and mammals as well as the ecosystems they lived in. He is currently finishing his post-doc at the Royal Ontario Museum in Toronto and regularly conducts field work in Alberta, Northern Ontario, and throughout the U.S. His most recent discoveries include the first baby tyrannosaur claw bone.

CONSULTANTS

Debbie Nagano, Director, Tr’ondëk Hwëch’in Heritage

Debbie is a Tr’ondëk Hwëch’in citizen and a member of the Wolf Clan. Her family have long made a living off of the land and she continues to spend significant amounts of time on the land with her husband and children. She has worked for Tr’ondëk Hwëch’in Government for most of her adult life, primarily in areas with a focus on culture and well-being. Debbie is currently the Director of Heritage. She is also a skilled artist.

We have an established relationship with the Tr’ondëk Hwëch’in heritage department due to our collaoration for Animal Nation, a 7-part wildlife series currently in production with APTN. We have plans to film with Debbie, Grant, and Zhur the wold pup this summer 2024.

Yukon Paleontologist Grant Zazula

Dr. Zazula is a renowned expert on Ice Age animals, known for his research on mammoths and the recent study on a perfectly preserved 57 thousand year old wolf pup. He is the go-to paleontologist for discoveries in this fossil-rich region of Canada and works as well with local Indigenous communities. He has also served as a contributor for numerous television projects including as scientific adviser for Hollywood’s 2018 Ice Age film, *Alpha*.

CONSULTANTS

Canadian Museum of Nature
Paleontologist Jordan C. Mallon

Dr. Mallon studies the evolution and ecology of dinosaurs. He travels regularly conducting fieldwork and has contacts world-wide that have uncovered young, prehistoric fossils and specimens.

Royal Tyrrell Museum
Palaeoecologist Darla Zelenitsky

Dr. Zelenitsky is a paleontologist at the University of Calgary and the Royal Tyrrell Museum known for her research on dinosaur reproductive biology and fossilized eggs.

Yale Peabody Museum
Paleontologist Kat Schroeder

Dr. Kat Schroeder is currently studying extreme growth in carnivorous non-avian dinosaurs. Using dental microwear analysis, multivariate analyses and game theory she hopes to elucidate some of the long standing questions concerning dinosaur behavior in paleontology.

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North

'Nun cho ga,' the rare baby mammoth found in Yukon, heads to Ottawa

Animal found in 2022 near Dawson City being escorted by delegation of Indigenous elders

CBC News · Posted: Mar 02, 2024 9:55 AM MST | Last Updated: March 2

A whole baby woolly mammoth, believed to be the first found in North America and second in the world, was discovered south of Dawson City, Yukon, in June 2022. A delegation of Tr'ondëk Hwëch'in elders is travelling with the animal to Ottawa this weekend. (Government of Yukon)

Smithsonian MAGAZINE

HISTORY

Cool Finds

Well-Preserved, 30,000-Year-Old Baby Woolly Mammoth Emerges From Yukon Permafrost

The mummified creature is helping to heal the rift between the Tr'ondëk Hwëch'in people and the miners and scientists who came to their lands

Diane Selkirk

History Correspondent

July 8, 2022

The trunk, ears and tail of this baby woolly mammoth, named *Nun cho ga*, are almost perfectly preserved.

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22 December 2020

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A wolf cub that was found mummified in northern Canada lived at least 56,000 years ago, scientists say.

ABOUT US

ROTATING PLANET PRODUCTIONS

Rotating Planet Productions has been producing wildlife, science, biography and social interest films and series for over 20 years. We're known for our unique approach to projects, access to experts and locations, and our ability to explore important connections between animals, humans and the natural world.

We have extensive experience filming in the field across four continents and have relationships with award-winning CGI and animation experts through our large catalogue of projects produced for Arte, Bravo, CBC, Discovery Asia, The Documentary Channel, ICI Explora and other broadcasters worldwide.

Producers of Animal Social Networks (5 x 1h) , Aging in the Wild (5 x 1h) and Stay at Home Animal Dads (1h special) and recognized by festivals word-wide including Green Screen, Wildscreen, Life Sciences Film Festival and the International Wildlife Film Festival

We are currently in production with a 7-part wildlife series entitled Animal Nation with our sister Indigenous-led production company, 2Ducks Media.

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