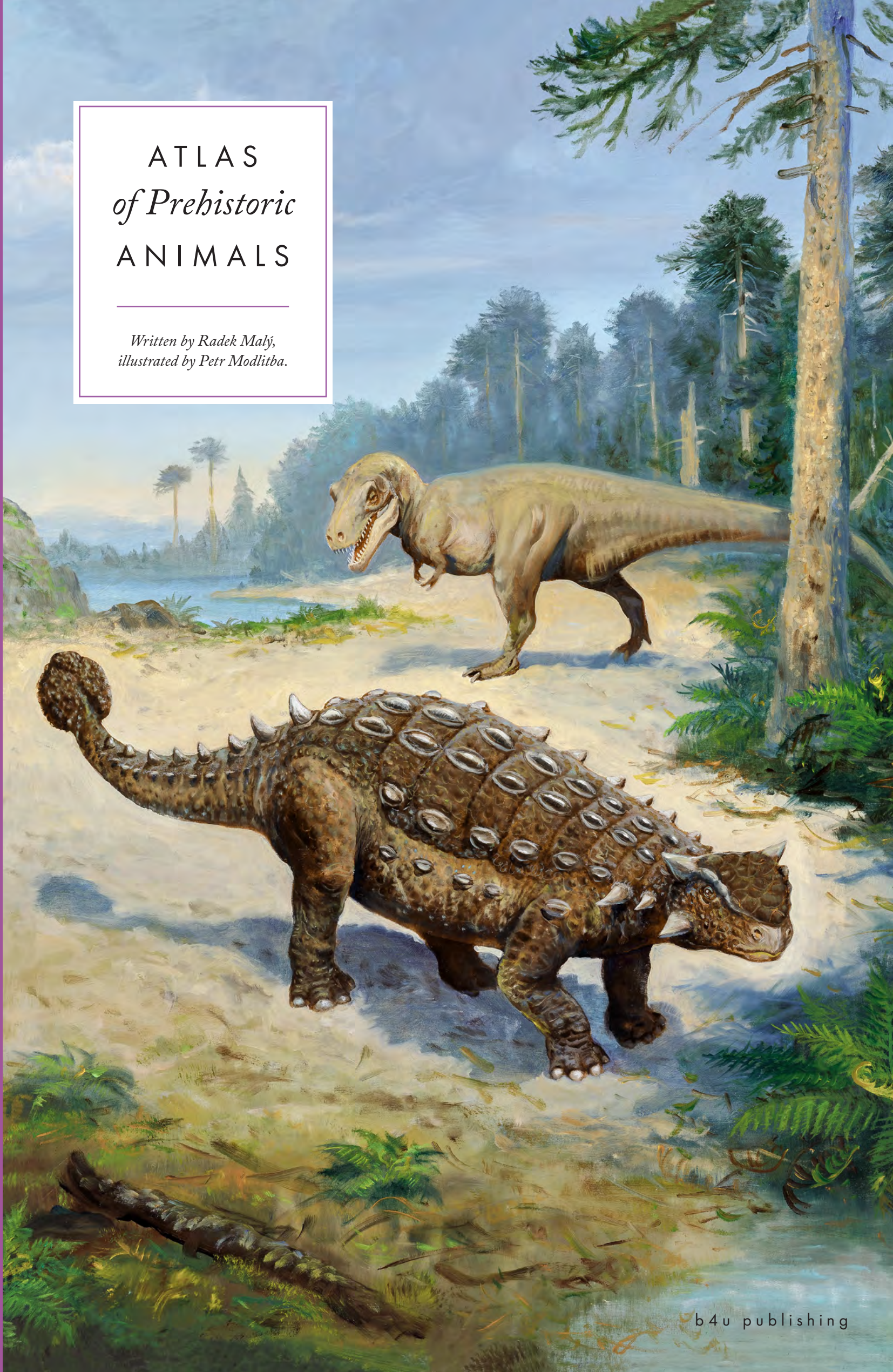


# ATLAS of Prehistoric ANIMALS

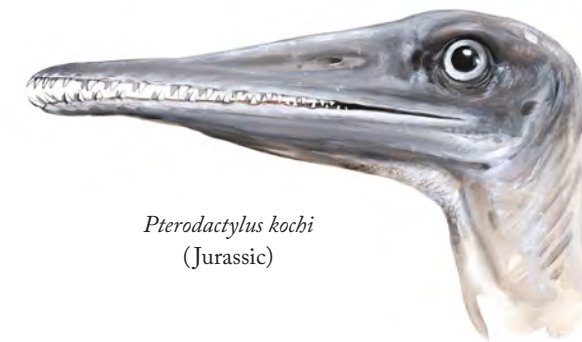
*Written by Radek Malý,  
illustrated by Petr Modlitba.*



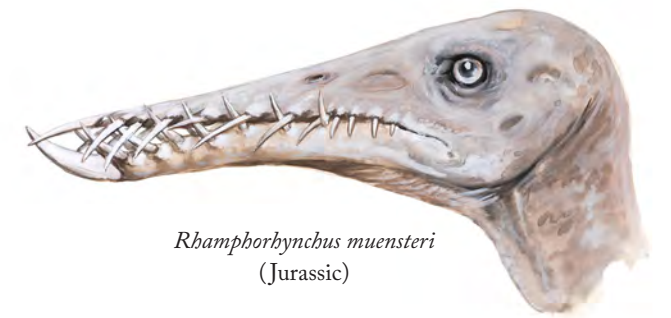


## DIMORPHODON MACRONYX

*Mesozoic · Jurassic*



*Pterodactylus kochi*  
(Jurassic)



*Rhamphorhynchus muensteri*  
(Jurassic)



*Anurognathus ammoni*  
(Jurassic)

**WING SPAN:** 1,4 m

**WEIGHT:** cca 2 kg



Pterosaurs are a well-known group of reptiles often confused with dinosaurs. Although pterosaurs are of an independent evolutionary branch, they share the dinosaurs' fate, and their members include similarly fascinating creatures. It is quite possible that finds of pterosaur skeletons in ancient times led to the idea of the mythical dragon. One of the European pterosaurs we have known about longest is *Dimorphodon*.

First, let us address a few facts about pterosaurs. They are the earliest vertebrates in the history of Earth, and they were capable of active flight. They lived in the same period as the dinosaurs, i.e. from the Middle Triassic (245 million years ago) to the end of the Cretaceous (66 million years ago). Their wings were leathery membranes that stretched from the body to the forelimb, which had a lengthened fourth finger. To date, over 120 pterosaur genera have been described. We find pterosaur fossils on all continents – including Antarctica, where finds were first scientifically described in 2019. The smallest pterosaurs had a wingspan of only about 25 centimetres, while the largest – with a wingspan of over ten metres – were surely the largest flying creatures of all time. Like dinosaurs, they were probably warm-blooded. At the end of the Cretaceous period, they were probably displaced in the evolutionary chain by the true flying dinosaurs – i.e. birds, which are still with us as a class today.

The first fossil remains of *Dimorphodon* were found by palaeontologist Mary Anning in Dorset on the south coast of England in December 1828. Named the Jurassic Coast, this area is a famous site for prehistoric fossil finds to this

day; it was the first natural monument in England to be added to the UNESCO World Heritage list. Early scientific descriptions insisted on assigning the fossil finds in question to the genus *Pterodactylus*. Then, in 1858, celebrated palaeontologist Richard Owen announced the discovery of further specimens.

Owen's description led to the determination of a new genus, named *Dimorphodon*, which in translation means 'two-form tooth'. (The presence of two types of teeth is a rare phenomenon in reptiles.) Subsequently, certain other knowledge about this animal was reassessed.

*Dimorphodon* had a wingspan of about 1.4 metres. It had a remarkably long tail and a bulky skull the front of which resembled a parrot's beak. All over the body, and on the skull in particular, we find numerous openings which served to lighten the body. In terms of its construction, *Dimorphodon's* skull can be said to resemble a complicated vaulted bridge. The front part of the upper jaw contained fang-like teeth; behind these and on the lower jaw were flatter, smaller teeth. *Dimorphodon* was at first believed to be an insectivore; scientists later surmised that it fed mainly on fish. Today, we believe, because of its movements and ability to fly, that the principal component of its diet was small vertebrates.

It may surprise you to learn that *Dimorphodon* was probably not a good flyer. It climbed trees like a squirrel, swooping down on its prey in short, swift bursts. It took off from the ground only with difficulty, probably in the manner of the pheasant of today.



## UINTATHERIUM ANCEPS

*Cenozoic · Eocene*



*Megacerops platyceras (brontotherium)*  
(Oligocene)



*Gobiatherium major*  
(Eocene)



*Arsinoitherium zitteli*  
(Oligocene)

**HEIGHT:** 1,5 m  
**WEIGHT:** over 2 t



This animal was possibly the largest mammal of its time and probably the first mammal to weigh over a ton. Add to this the unique, downright bizarre shape of its skull and we understand why *Uintatherium* is such a popular prehistoric creature. Its fossil history is interesting, too.

At first glance, *Uintatherium* may remind you of the present-day rhinoceros, not least because of its robust figure. We believe that it was four metres long, over a metre and a half tall, and over two tons in weight. Its most striking feature is its massive skull, which was about 75 centimetres long and equipped with outgrowths of bone (ossicones) reminiscent in shape of the horn-like growths on the skull of the present-day giraffe. Scientists continue to dispute the purpose of these 'horns'; they were most likely used in ritual fights between the male and the female, as is evidenced by the fact that they are more developed in the male.

The prominent twenty-centimetre long teeth protruding from the upper jaw resembled the canines of the sabre-toothed tiger. These teeth were not dangerous, however: *Uintatherium* probably used them to pluck aquatic plants from the marshes to feed on. At first, only one species of *Uintatherium* that lived in North America was

known and described, and this was *Uintatherium anceps*. In the early 1980s, the discovery in China of a *Uintatherium* skull was a cause of great surprise; it led to description of *Uintatherium insperatus*, a species somewhat younger in evolutionary terms than *U. anceps*.

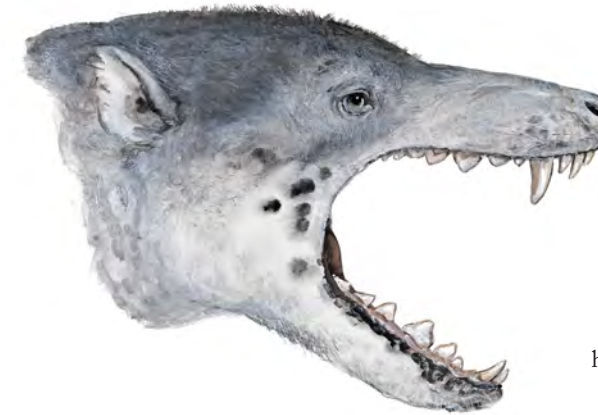
After discovery of the first fossils in the US state of Wyoming in 1870, *Uintatherium* became an unwitting subject of the so-called 'Bone Wars'. This refers to the ruthless competition between palaeontologists Othniel Charles Marsh and Edward Drinker Cope for which of them would discover and correctly describe more species of extinct animals. Occurring at a time when settlers from Europe were fighting Native Americans for territory, competition in the 'Bone Wars' became so fierce that the teams led by the two scientists began to slander and intrigue against each other. With the benefit of hindsight, we now see that their work resulted in a huge growth of interest in palaeontology as a field of science and description of over a hundred dinosaur species.

But how did *Uintatherium* come by its strange name? The answer is simple: it is named for the place of its occurrence. *Uintatherium* translates 'beast of the Uinta Mountains'.



# ANDREWSARCHUS MONGOLIENSIS

*Cenozoic · Eocene*



head and cranium



*Sinonyx jiashanensis*  
(Paleocene)



**LENGTH:** 2 m  
**WEIGHT:** more than 2 t

**F**or mammals to evolve into countless forms inhabiting a wide variety of environments and feeding on everything imaginable, hundreds of millions of years had to pass. *Andrewsarchus*, one of the first mammals, was a giant predator known to us only from the discovery of a single skull. Even so, scientists have attempted to describe and reconstruct it.

In terms of appearance, *Andrewsarchus* probably resembled the wolves and hyenas of today. It was similar, too, in terms of lifestyle. Some scientists believe it to have been a much-feared predator and scavenger. Surprisingly, however, *Andrewsarchus* was not a beast of prey but a prehistoric ungulate. It may well have been omnivorous and wouldn't have turned its nose up at plant roots or molluscs, as its dentition attests. It had massive jaws and strong teeth that went through bone and shell like butter. We can state with certainty that it was one of the largest known predatory land mammals of all time. It is estimated to have been between four and six metres long; we cannot be sure because we do not know how large the body was in relation to the head. It may have been almost two metres tall, while esti-

mates put its weight at up to 600 kilograms. At the ends of its short, strong limbs it probably had a small hoof on each of five 'toes', rather than claws.

All we know about *Andrewsarchus* comes from the discovery of a single skull and the later find of fragments of several bones. At 83 centimetres in length and 56 centimetres in width, this skull is about twice as large as the skull of a grizzly bear. It was discovered in 1923 in the Gobi Desert in inner Mongolia by members of an expedition led by Roy Chapman Andrews. Andrews, who gave *Andrewsarchus* its name, was an American palaeontologist and adventurer who was adept at promoting his own work. It is said that the fictional character Indiana Jones is based on him.

The Greek word *archus* means 'ruler'. The *Andrewsarchus* skull is today one of the treasures of the American Museum of Natural History in New York. We still await the discovery of a complete skeleton of this animal.

It was long believed that *Andrewsarchus* was an ancestor of the modern whale. Today we know this to be the case only through its sister line. It is also possible to trace a line leading to the present-day hippopotamus.

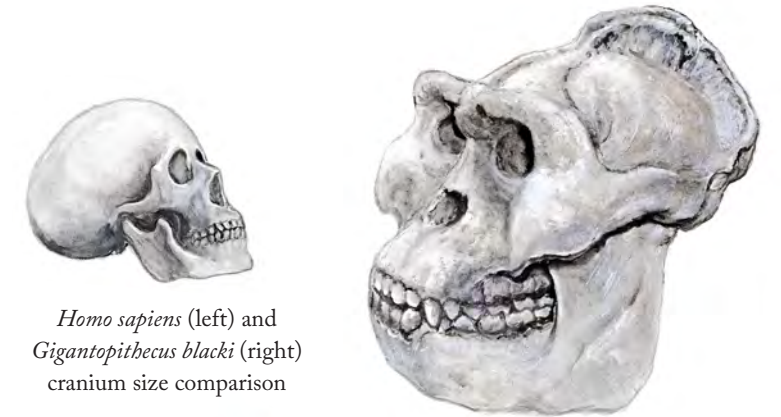


## GIGANTOPITHECUS BLACKI

*Cenozoic · Pliocene – Pleistocene*



*Gigantopithecus blacki*  
(Miocene – Pleistocene)



*Homo sapiens* (left) and  
*Gigantopithecus blacki* (right)  
cranium size comparison



*Gigantopithecus blacki*  
lower jaw



**HEIGHT:** 3 m  
**WEIGHT:** 550 kg

Surely everyone has heard of the yeti, commonly referred to as the Abominable Snowman, a mythical, caveman-type creature from the Himalayas that is reportedly up to two and a half metres tall. If we accept its existence, which is disputed by experts, it could be that this creature is *Gigantopithecus*, the largest great ape our world has ever known. The problem with this hypothesis is that scientists believe that *Gigantopithecus* became extinct 100,000 years ago.

We have very little information about *Gigantopithecus*, and what we do have is derived exclusively from finds of teeth and jaws. The genus of this giant extinct primate was first described in 1935, by German-Dutch palaeontologist Ralph von Koenigswald, on the basis of his discovery of an unusually large molar in a Chinese pharmacy in Hong Kong. This tooth was displayed alongside other bones and advertised as a dragon's tooth, a treatment in traditional Chinese medicine. The tooth's discoverer named the species *Gigantopithecus blacki* in honour of the Canadian palaeontologist Davidson Black. Later, following finds in other Asian localities, the existence of a smaller, even older species was established. This was given the name *Gigantopithecus gigantea*.

The size of the tooth finds leads us to believe that *Gigantopithecus* was almost three metres tall and weighed about 550 kilograms, making it about three times larger than the gorillas of today. As such a size would surely prevent it from moving from tree to tree, we can conclude that

it lived on the ground, and that it probably moved about on all fours. In 2019, analysis of protein extracted from its tooth enamel proved its closest living relative to be the orangutan, a find that leads us to believe that it may have had a rust-coloured coat. The protein from the tooth was analysed by proteomics, a method that is likely to make more ground-breaking discoveries in the field of palaeontology in the foreseeable future.

The thickness of the tooth enamel suggests that this creature was a herbivore with a liking for solid foodstuffs like bamboo and tree branches. It may be that this food preference led to its extinction in a relatively recent period: perhaps it failed to adapt in time to changes in climate. Another theory suggests that its extinction was helped along by competition from the giant panda. Ancestors of modern-day humans were competitors of *Gigantopithecus*, too; they shared a living space with it for a million years. While it is unlikely that proto-humans hunted *Gigantopithecus*, they occupied its territory and used its bamboo for their own needs.

*Gigantopithecus* inhabited the Himalayas at a time of intensive growth and the retreat of high-altitude glaciers, which may have resulted in preservation of isolated populations. Some cryptozoologists theorize that giant hominids may also have existed in other parts of the world (e.g. Bigfoot in Canada) thanks to a land bridge that connected Asia with North America.

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Life on Earth, which all of us take for granted, began to develop 3 900 million years ago – a time so distant that we cannot conceive of it even in our wildest imagination. The first organisms visible to the naked eye appeared about 600 million years ago, but almost nothing has survived of them. A further 60 million years had to pass before the first organisms with hard shells and skeletons arrived, and these would reach down the ages as mementos of how life on our planet was formed. It is these first, oldest animals that are discussed in this part of Radek Malý's narrative encyclopaedia series. It takes readers on a journey through prehistory featuring the best-known animals of those times as well as some they will encounter for the first time. The story of each species is accompanied by beautiful narrative illustrations by Czech artist Petr Modlitba.

