THE HALL OF DINOSAUR

BY

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Horned Dinosaur Triceratops

As reconstructed by Charles R. Knight. In the distance a pair of the contemporary Trachodonts.

THE HALL OF DINOSAURS

By FREDERIC A. LUCAS

A DINOSAUR is a reptile, a member of a group long extinct, having no near living relatives, the crocodiles, though closer than any other existing forms, being but distantly connected; neither are the great lizards froms Komodo Islands, which have attracted so much attention recently under the title of dragons, nearly related.

The name Dinosaur, terrible reptile, was bestowed on these animals because some of those first discovered were big, powerful, flesh-eating forms, but while we are apt to think of Dinosaurs as huge creatures yet there were many kinds of dinosaurs and they ranged in size from big Brontosaurus, with the bulk of half-a-dozen elephants, to little Compsognathus, no larger than a Plymouth Rock chicken.

The Dinosaurs lived mostly during the periods that geologists call Jurassic and Cretaceous, periods of many million years, six at least, more probably nearer thirty. The race started a little before the Jurassic, some 35,000,000 years ago, and came to an end with the Cretaceous about six million years ago. In their day they were found over the greater part of the world, Europe, Asia, Africa, America, and Australia. It was a strange world in which they lived, a world peopled by reptiles, the Age of Reptiles, as the time is called; besides the Dinosaurs there were crocodiles and turtles; flying reptiles, with a spread of wing greater than that of any living bird, and little pterodactyles about the size of a robin; in the sea during one period there were reptiles like porpoises and, later, they were succeeded by those something like great iguanas, but with paddles instead of feet, while with them were giant turtles far larger than any sea turtles of to-day; there were a few birds, some that flew and some that swam, but they differed from existing birds in having teeth.

There were no mammals in this ancient world, or at least only little ones something like small opossums.

There were no Elephants or Rhinos, no Buffalo or Deer, no Lions, Tigers, or Bears. Instead there were Dinosaurs, Dinosaurs everywhere, big lumbering creatures as big as many elephants, wading in the streams and lakes, feeding on water plants, smaller dinosaurs stalking by the water side or splashing into the water and swimming hastily away upon the approach of some big flesh-eating dinosaur looking for his dinner, or supper and little dinosaurs scurrying out of the way.

At the close of the Cretaceous great changes took place in the face of the earth and brought about changes in climate and in animal and plant life.

The reign of reptiles came to an end, the mighty dinosaurs and their little relatives passed away, and the mammals, hitherto few and small, began to increase and multiply until they became the possessors of the earth.

These changes did not take place suddenly but extended over many thousands of years, gradually the mountains rose, the climate became drier and colder, the lakes and marshes dried up, and the reptiles adapted to a warm climate and easy life did not change with them, but fell by the wayside and perished, leaving their bones to testify to their former presence.

Many died on land, where, under the attacks of sun and rain, frost and snow, their bones went to pieces and crumbled into dust leaving nothing to show of their former existence. But some sank to the bottom of lakes or streams, and some were swept into the ocean; in such places they were covered with mud or sand that as ages passed became beds of rock while the bones themselves changed to stone, became petrified, as it is popularly termed.

Millions of years later came man, puny and weak from the dinosaur view point, but possessed of a brain and hand that soon made him the ruler of the earth. And as he gradually increased in intelligence he became interested in learning about the races that had preceded him in time and finding the bones of dinosaurs began to collect and study them and to gather them into places he called museums. And so it came to pass that after millions of years these former lords of creation were brought from their sepulchers and placed in the HALL OF DINOSAURS to arouse the wonder of visitors.

While Dinosaur bones have been found in various parts of the earth, yet the places where they are really abundant and accessible are comparatively few in number, the best hunting grounds so far discovered being in Wyoming, Montana, and Alberta. In some localities, like the Connecticut Valley, we know dinosaurs were common because they have left their foot prints on what was once the shore of an arm of the sea, but very few of these bones have been found, they were probably swept out to sea and buried beyond our reach.

THE DINOSAURS

Many books and many articles, mostly scientific, have been written about Dinosaurs, this leaflet deals only with a few of them, those displayed in the Hall of Dinosaurs.

On the right and left of the entrance are two good-sized, lightly but powerfully built, flesh-eating dinosaurs known to science as **Gorgosaurus**. As shown by their build and hollow bones, they were doubtless swift and fierce and preyed upon their smaller, feebler fellows as Lions and Tigers to-day prey upon, Zebra, Antelope, and Deer. The big, strong hind legs, with a stride of ten to fifteen feet, carried them swiftly over the ground, and their great claws were fitted for holding and tearing their prey. The diminutive fore legs, also armed with sharp claws, helped to tear up their food.

Near them are examples of a rather small dinosaur whose legs and general build suggest an Ostrich with a long tail, and called on account of this resemblance **Struthiomimus**. This animal far from being a "terrible reptile" was toothless, and his fingers were long and slender, not at all fitted for tearing anything. It has been thought that they were adapted for carrying eggs which were stolen from the burying places of other dinosaurs, the long, slender legs enabling the thief to run away from any pursuers.

Triceratops, big, lumbering, huge-headed, stupid creature was a plant eater, probably of coarse vegetation. His jaws ended, or began, in a great horny beak for clipping off branches and rushes, and his back teeth were adapted for champing them. These back teeth were arranged in many rows and were all the time pushed upward by new teeth forming below, so that as fast as teeth wore out they were replaced, a point in which Triceratops might well be envied. The fore legs, bowed outward at the elbows, enabled the animal to reach the ground with ease and the big "frill," suggesting a fireman's helmet, was not alone for protection, but served as a counterweight to the head and jaws, so the skull almost balanced on the condyle, or ball joint by which it joined the neck.

Triceratops had numerous relatives who rang all possible changes on their frills and horns, some of the frills being mere margins of bone, some with plain edges, some decorated with star-like points like the head of a giant horned toad; some had, as the name implies, three horns, others like *Monoclonius*, under the window, only one. Triceratops suggests a Rhinoceros, but has no relationship whatever with that animal—it is a case of appearance only, what is called analogy, not homology.

Across the way from Triceratops is a group of Dinosaurs which seems to have been very abundant in their day, **Trachodon** and his relatives, **Corythosaurus**, **Saurolophus**, and others. Among these is

one of the rare prizes that sometimes full to the lot of the collector, a specimen in which a large part of the skin has been preserved, so that we are certain as to the covering of the animal. The reptile is supposed to have died on land, been baked in the hot sun and thens wept into the bed of a stream by a freshet and buried in the sand. What the antelopes

A bit of the skin of a Duck-billed Dinosaur, about natural size

are to Africa, these creatures were to North America, the characteristic animals of the country. They rang the changes in the shape of their heads, which varied in an extraordinary fashion. They were water-dwelling animals with powerful, compressed tails and webbed feet, this last we know from the "mummied" specimen. Like the carnivorous dinosaurs, they were three-toed animals and walked erect; that they did *not* drag, their tails is shown by the fact that there is no groove, or furrow, between the footprints; the tail acted as a balance or counterpoise to the body, and the many slender bones along the sides of the vertebræ show that there were many strong muscles that carried the tail off the ground without any exertion on the part of the animal.

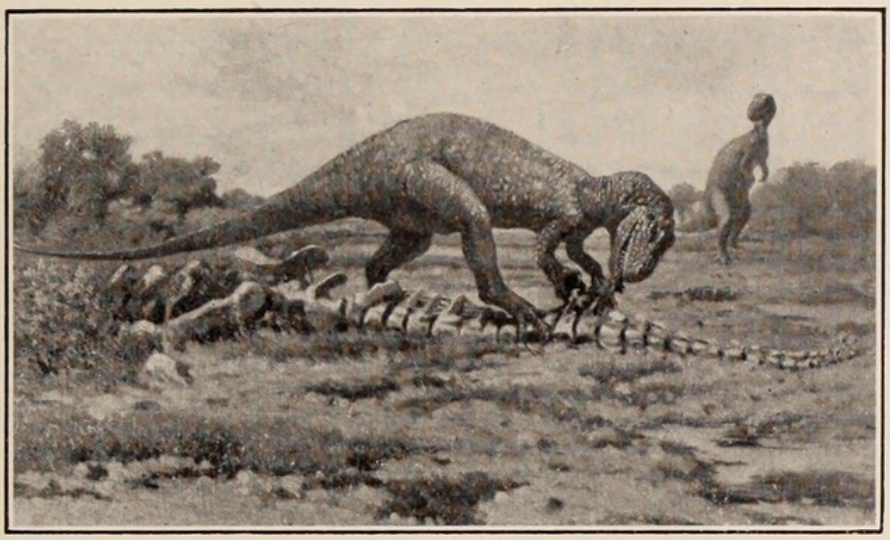
Many of the Dinosaurs which at a much earlier date (Triassic) dwelt in what is now the Connecticut Valley and left their footprints in the sand of time also walked on their hind legs, with their tails clear, and as there was no mark of a tail it is not surprising that the footprints were thought to be those of gigantic birds and so described and named.

Towering above the others, his head eighteen feet from the ground, is **Tyrannosaurus** the well-named King of Reptiles, whose terrible jaws and tremendous claws placed all contemporaries at his mercy, though a too careless attack on Triceratops might result disastrously and **Ankylosaurus** and **Palaeoscincus** might often defend themselves successfully.

Looming up in the distance is **Brontosaurus**, the Thunder Reptile, big-bodied, small-headed, with massive limbs whose joints, in life covered with gristle, indicate that he was largely a water dweller, where the great weight of his body, 25 to 30 tons, would be supported.

The small head and feeble teeth tell that Brontosaurus was a vegetable feeder, and looking at the big body one feels that it must have kept the head busy to supply it with needed nourishment.

Near-by Brontosaurus in **Allosaurus**, apparently turned into a fossil while munching on the tail of a defunct relative of that big beast; looking closely ones sees that the tops of the vertebræ are scored with grooves where some millions of years ago it was feasted upon by some flesh-eating



Allosaurus in the role of a Scavenger feeding upon part of Brontosaurus

contemporary. It is not necessary to suppose that Allosaurus killed the huge creature on which it is feeding, just as there were active, vicious carnivores so there may have been those who played the role of Hyænas and fed upon anything they found dead. Of course it is not at all certain that this particular Allosaurus feasted upon this very Brontosaur, but their skeletons were found within a half mile of one another, so that it is quite possible that they were associated in life as in death.

Two very extraordinary armored dinosaurs are represented by only parts of their skeletons, **Ankylosaurus** which Dr. Lull has called "the most ponderous animated citadel the world has ever seen" had its head and body protected by thick plates of bone, while the tail instead of tapering to a point ends in a great ball of bone.

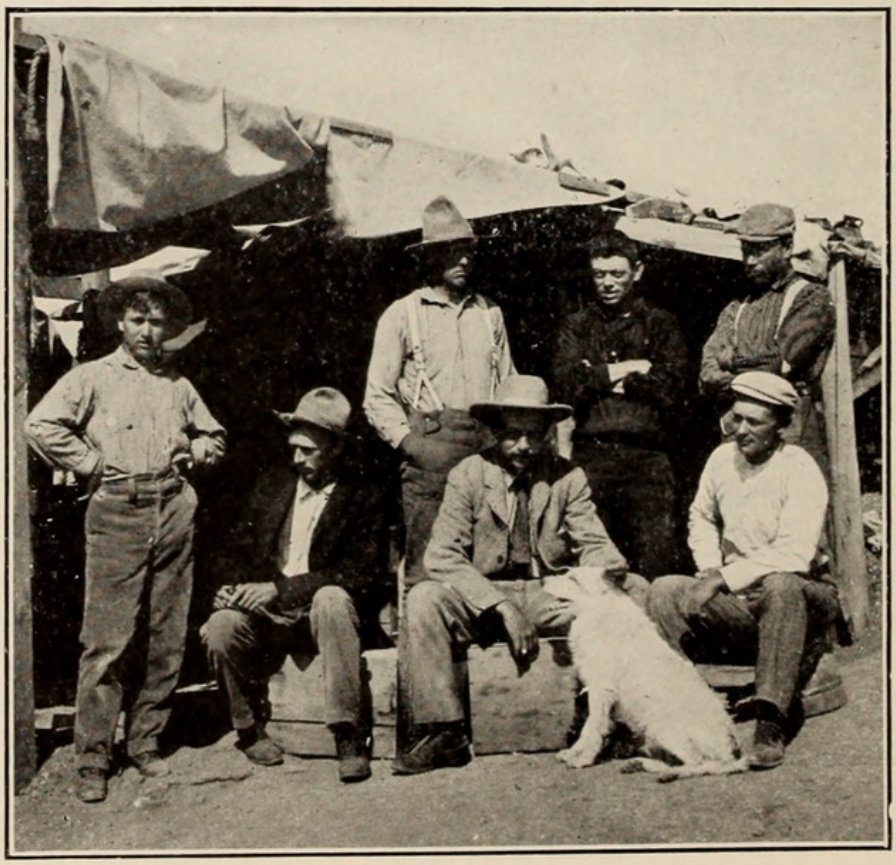
We can imagine that when attacked Ankylosaurus flattened himself along the ground and wagged his tail. Now the carnivorous Dinosaurs had no big hind toe, such as is found in birds of prey, so while they could

tear, they could only grasp downward and the big claws would find it a difficult matter to get hold of an armour-clad back, and if a leg or tail came in contact with the big knobbed tail of Ankylosaurus it would assuredly be smashed.

Beside Ankylosaurus is the fore part of **Palaeoscincus** whose sides bristled with huge, bony spines and whose back was protected by bony plates so that he too was well able to defend himself.

Perhaps some readers may feel as did the good old lady who said she did wonder how they knew the names of these old animals when they found them, or if not may wonder why they have such long names.

It was long ago discovered that not only did so-called common names mean nothing, but that there would not be enough for all the animals that would be discovered. So a Swedish naturalist, Linnæus, devised the plan of giving every kind of animal two names, the first a general, or generic name, that should be borne by him and his relatives, the other a special, or specific name, that should apply to that particular kind or



American Museum party at Bone-Cabin Quarry, 1899. Seated, left to right Walter Granger, Professor H. F. Osborn, Dr. W. D. Matthew; standing, F. Schneider, Prof. R. S. Lull, Albert Thompson, Peter Kaison. This was a famous locality for Dinosaurs

species. These names, usually taken from the Greek or Latin, as a rule allude to some apparent character of the animal to which they are applied, as shown by those which follow

Allosaurus, leaping reptile. From its supposed active habits in springing upon its prey.

Ankylosaurus, fused reptile. In allusion to the manner in which the bony plates are fused, or ankylosed, with the bones of the skeleton.

Brontosaurus, thunder reptile, so heavy that the earth trembled beneath its tread.

Corythosaurus, helmeted reptile. From the shape of the skull which suggests that of a cassowary.

Deinodon, terrible tooth.

Gorgosaurus, fierce reptile.

Lambeosaurus, Lambes reptile. Named in honor of Dr. Lambe of the Geological Survey of Canada.

Monoclonius, single conqueror. In allusion to the single horn on the nose.

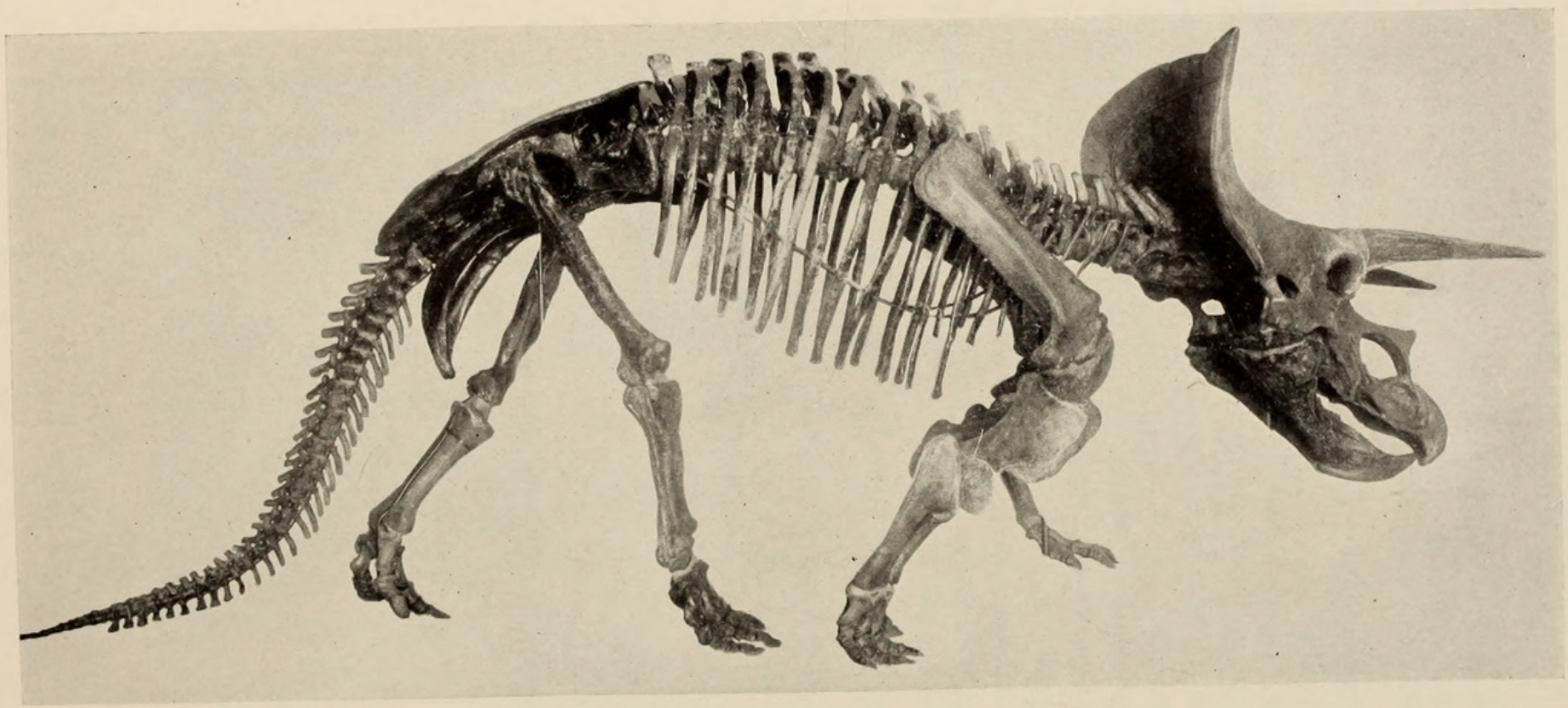
Ornitholestes, bird robber, at one time supposed he might be sufficiently active to catch birds.

Struthiomimus, ostrich mimic. From the resemblance of its skeleton to that of an ostrich.

Trachodon, rough tooth. In allusion to the ridges on the side of the teeth.

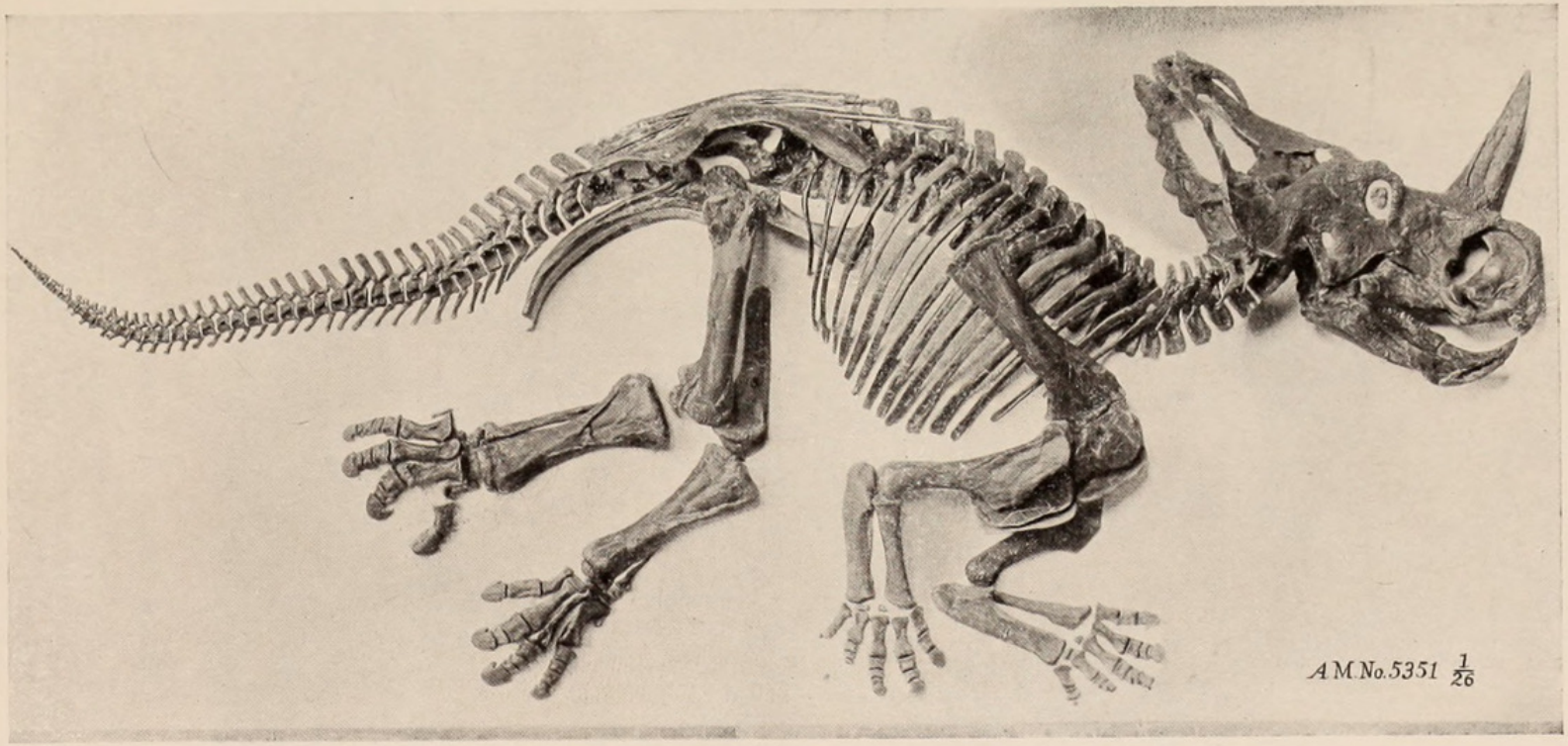
Triceratops, three-horned face.

Tyrannosaurus, tyrant reptile.



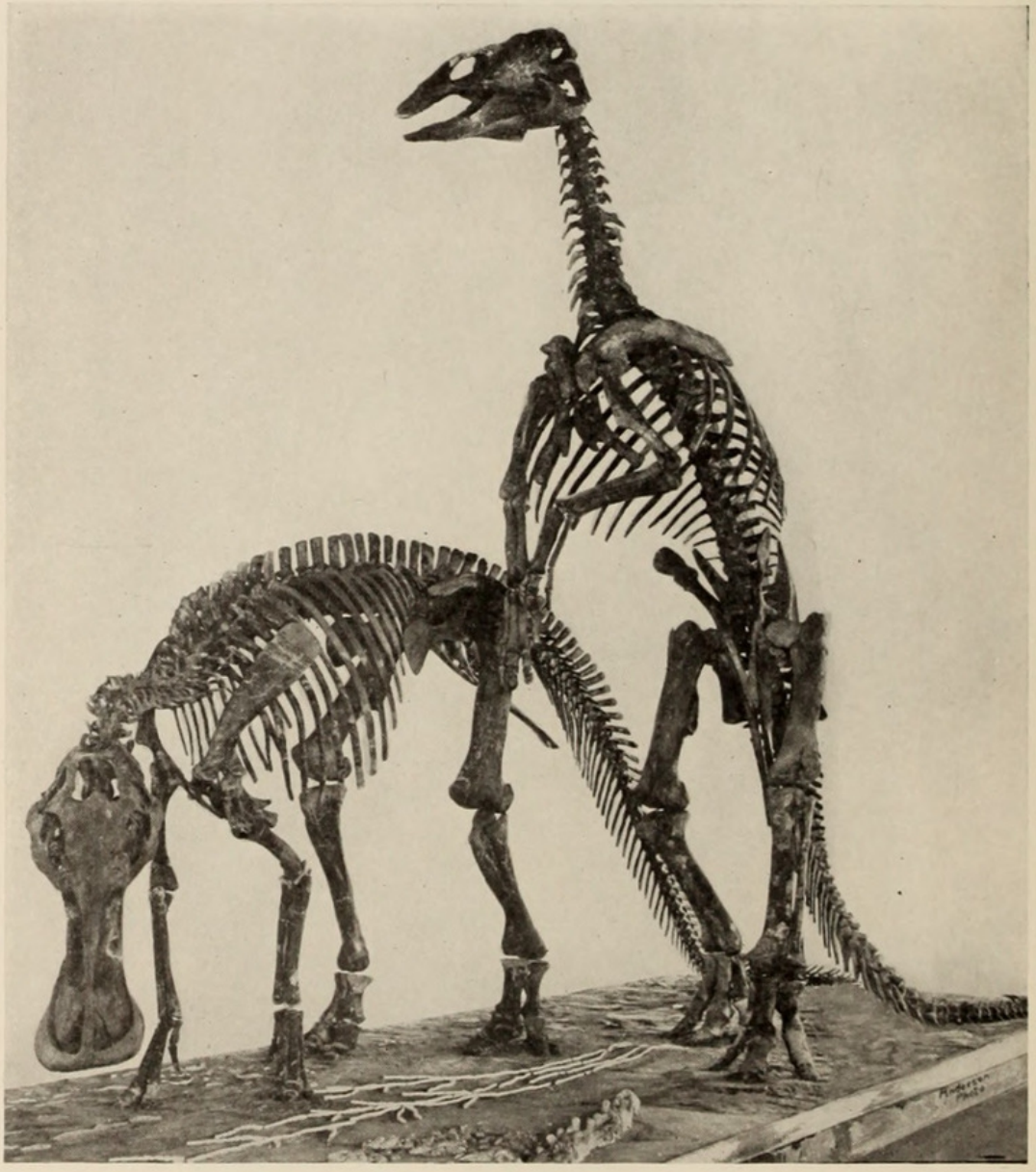
Horned Dinosaur Triceratops

A Cretaceous Dinosaur from Montana. Length 24 feet, height 7 feet 9 inches, weight when alive about nine or ten tons, twice the weight of an average Indian Elephant.



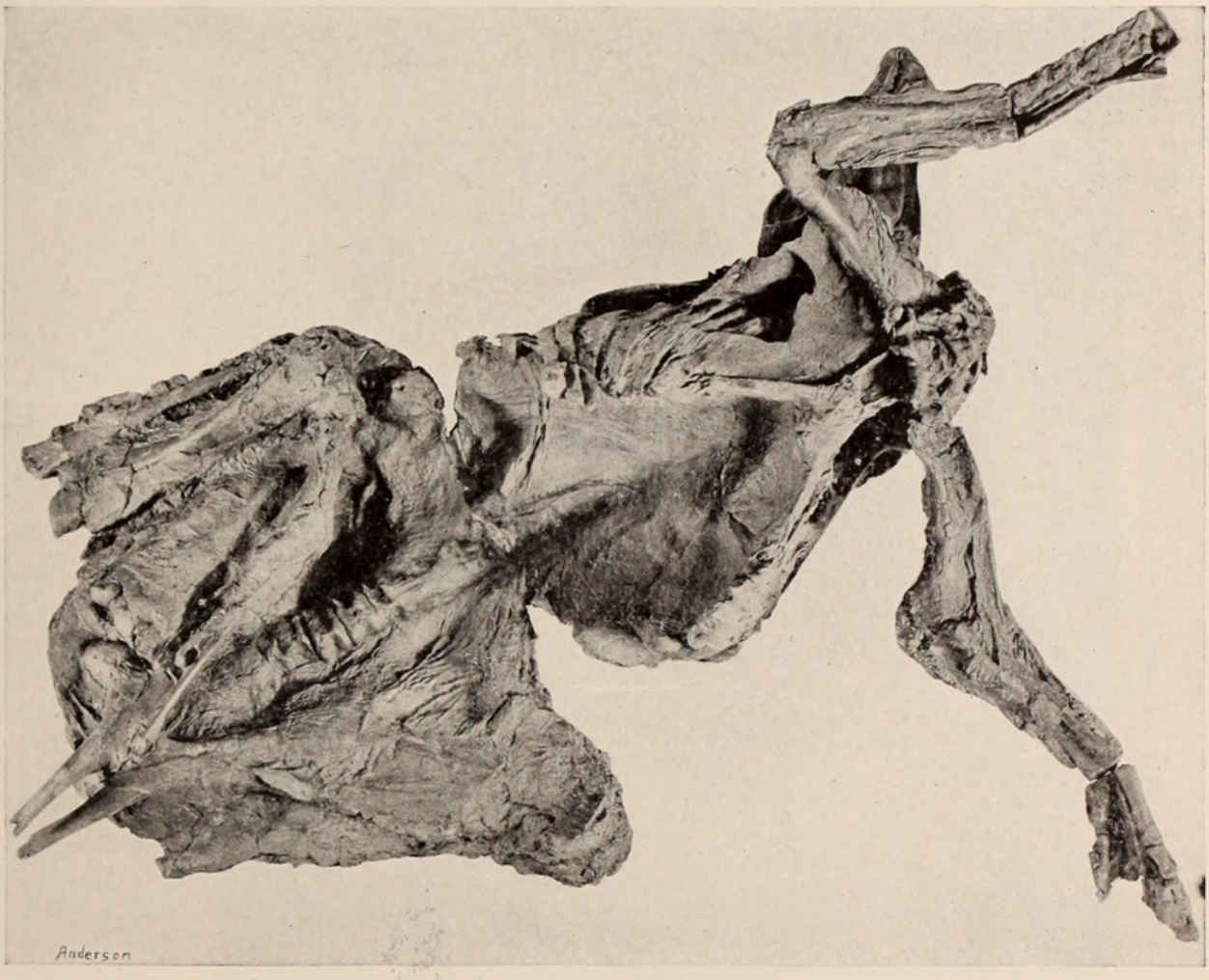
Monoclonius

A relative of Triceratops from the Cretaceous of Alberta



Duck-billed Dinosaurs, *Trachodon*

From the Cretaceous of Montana and South Dakota. 33 feet long, stands 17 feet 6 inches high. This was one of the most abundant of the dinosaurs, apparently as common as deer are to-day

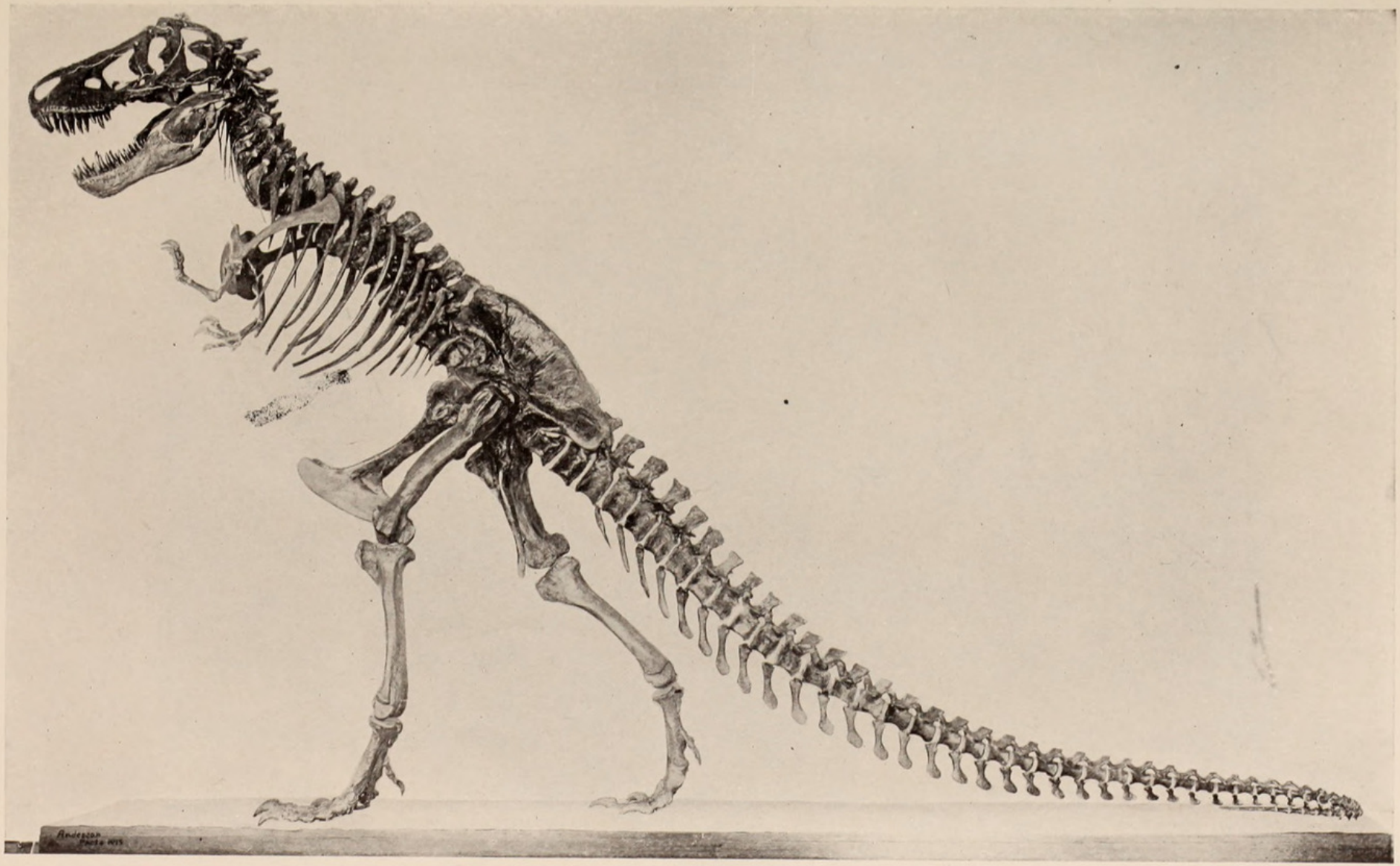


"Mummied" Dinosaur Trachodon

From the Cretaceous Rocks of Wyoming. By a fortunate combination of circumstances a great part of the skin of this animal has been preserved for millions of years. See cut in text.

Duck-billed Dinosaur Trachodon

From the Cretaceous of Wyoming, as reconstructed by Charles R. Knight.
In walking the tail was carried clear of the ground

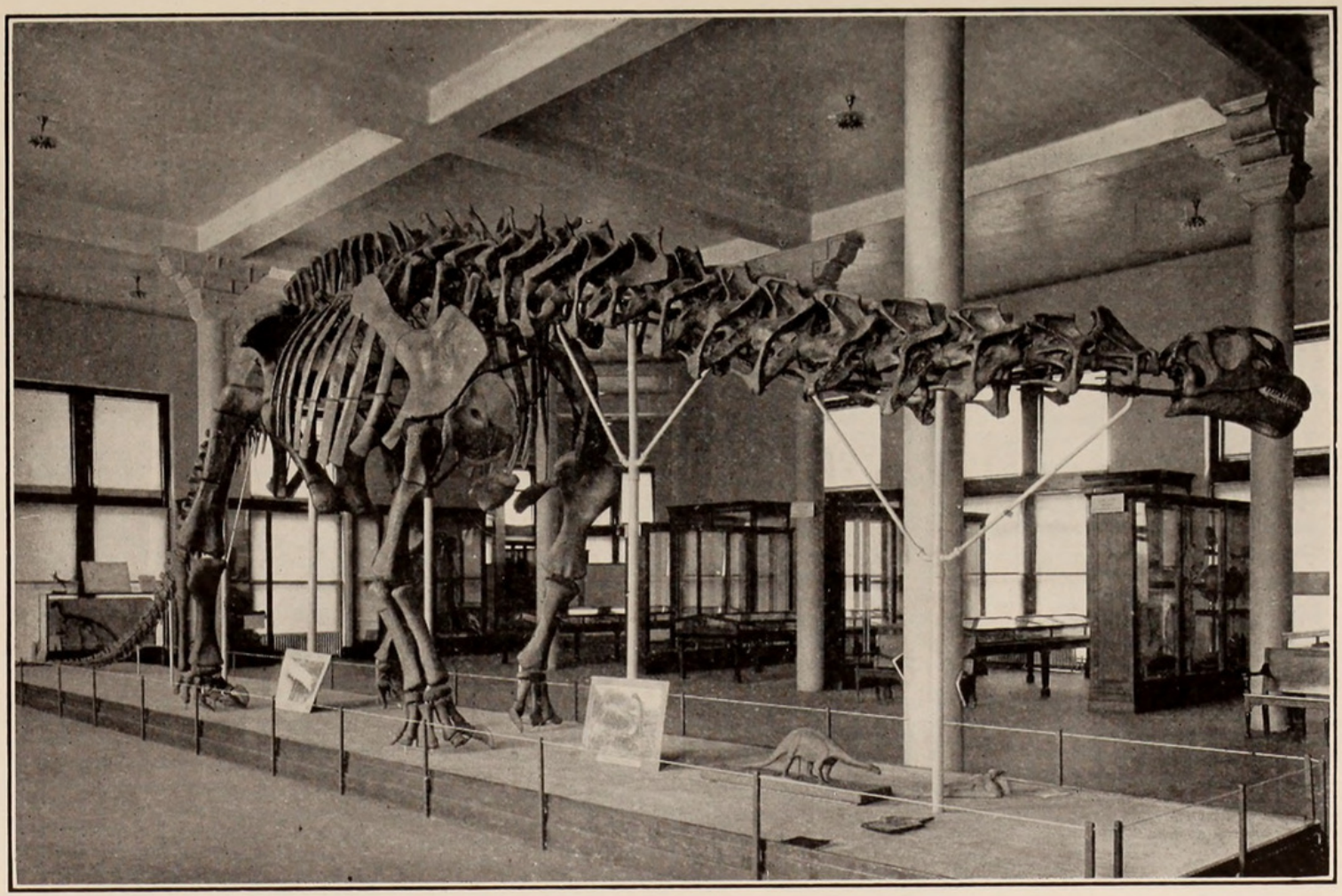


The King of Reptiles *Tyrannosaurus rex*

Forty-seven feet long, 18 feet 6 inches high as he now stands. From Montana. Lived in the Cretaceous Period

Skull of Tyrannosaurus

This skull is four feet long, the largest of the double-edged teeth are six inches long. As in other reptiles the teeth when broken, or worn out were replaced by others; new teeth are seen coming into place in the back of the upper jaw

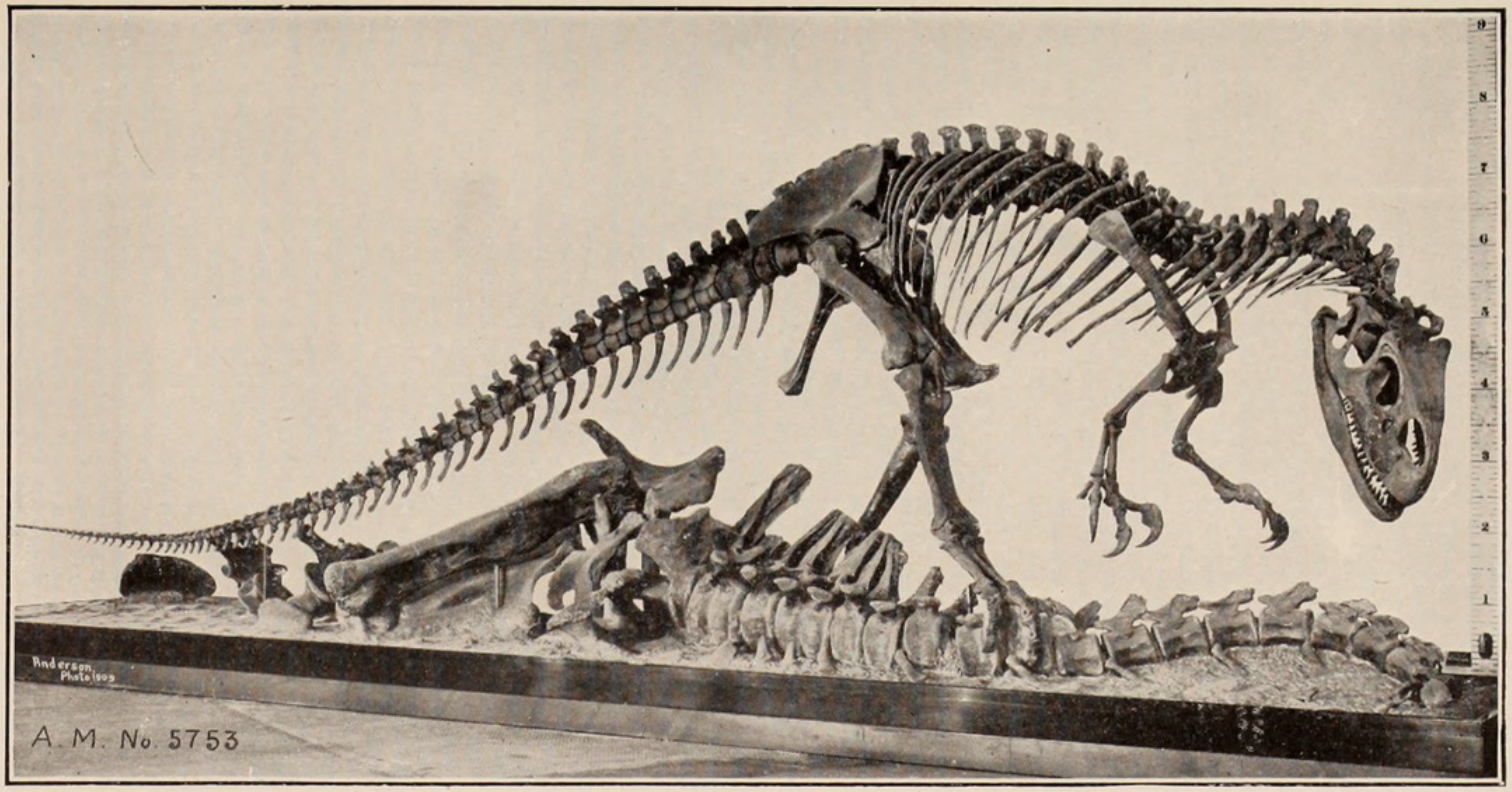


Brontosaurus, the Thunder Reptile

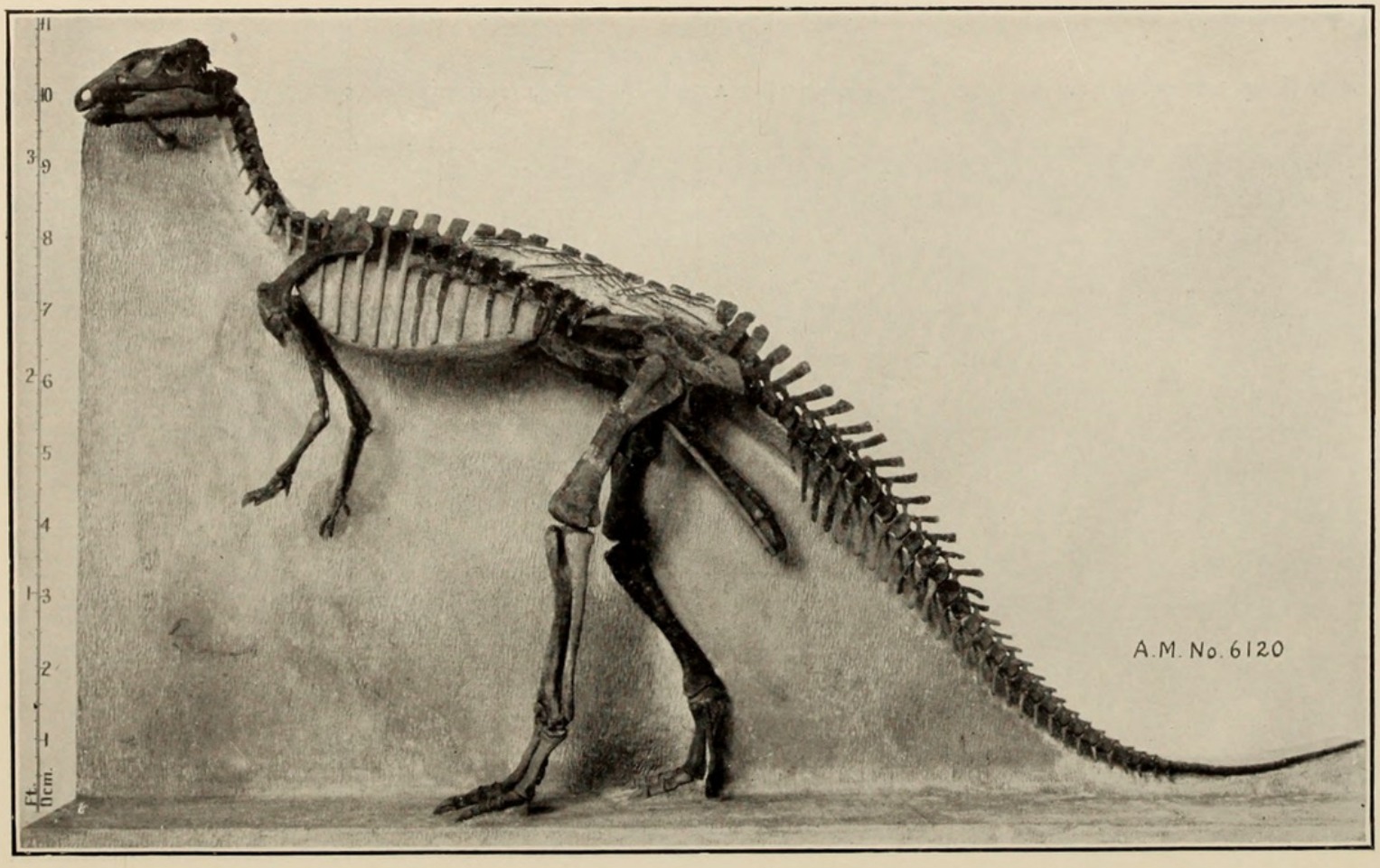
From the Jurassic of Wyoming. Sixty-six feet long, 15 feet high, weighed in life from 30 to 35 tons; a big Asiatic Elephant weighs 5 tons. This was the first large dinosaur to be placed on exhibition; the preparation and mounting of the skeleton occupied the better part of six years.

Brontosaurus, the Thunder Reptile

Reconstruction by Charles R. Knight. Shown as dwelling in the water in which these great creatures are supposed to have passed most of their time, feeding upon water plants



ALLOSAURUS, a Jurassic, flesh eating dinosaur, possibly a scavenger though well provided with teeth and sharp claws



Camptosaurus.—A small Jurassic Dinosaur, A plant eater standing about four feet high

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