

A DINOSAUR SKELETON WITH SKIN, 3,000,000 YEARS OLD.

BY BARNUM BROWN.

Nearly complete skeletons of duck-billed dinosaurs have been found, some with fragments of the epidermis also preserved. Not long ago two were mounted in the American Museum of New York city, an account of which appeared in the SCIENTIFIC AMERICAN for April 11th, 1908.

A third specimen, incased in nearly complete epidermis, has just been added to the collection, thus completing our knowledge of these interesting creatures, so that few, if any, of the extremely ancient prehistoric animals are at present as well known as the members of the family Trachodontidae.

These creatures in slightly modified forms are found in the rocks of several geological formations, covering a long period of the earth's history, but all became extinct at the close of the Laramie Cretaceous period, conservatively estimated to be three millions of years ago. They were not exclusively American, for a few representatives have been found in rocks of the Wealden age in England and Hungary. But they reached their maximum development in America, where they were widely distributed over the eastern and western United States and southwestern Canada.

Plant remains, leaves, fruits, and wood are sometimes found with the fossilized bones, and by comparing them with modern plants, we are able to determine with considerable accuracy the climatic conditions of the past geologic age. Palm leaves, fig fruits, and banana leaves have been found with Trachodonts in Montana, which show that the climate of the United States, as far north as Canada, was warm temperate to sub-tropical at the close of the Cretaceous period.

The Trachodonts were aquatic dinosaurs, and spent most of their

lives in fresh water lagoons, which were then abundant over the low interior lands. Their remains have also been found in sea deposits that were formed near the shores. It is not a difficult matter to picture one

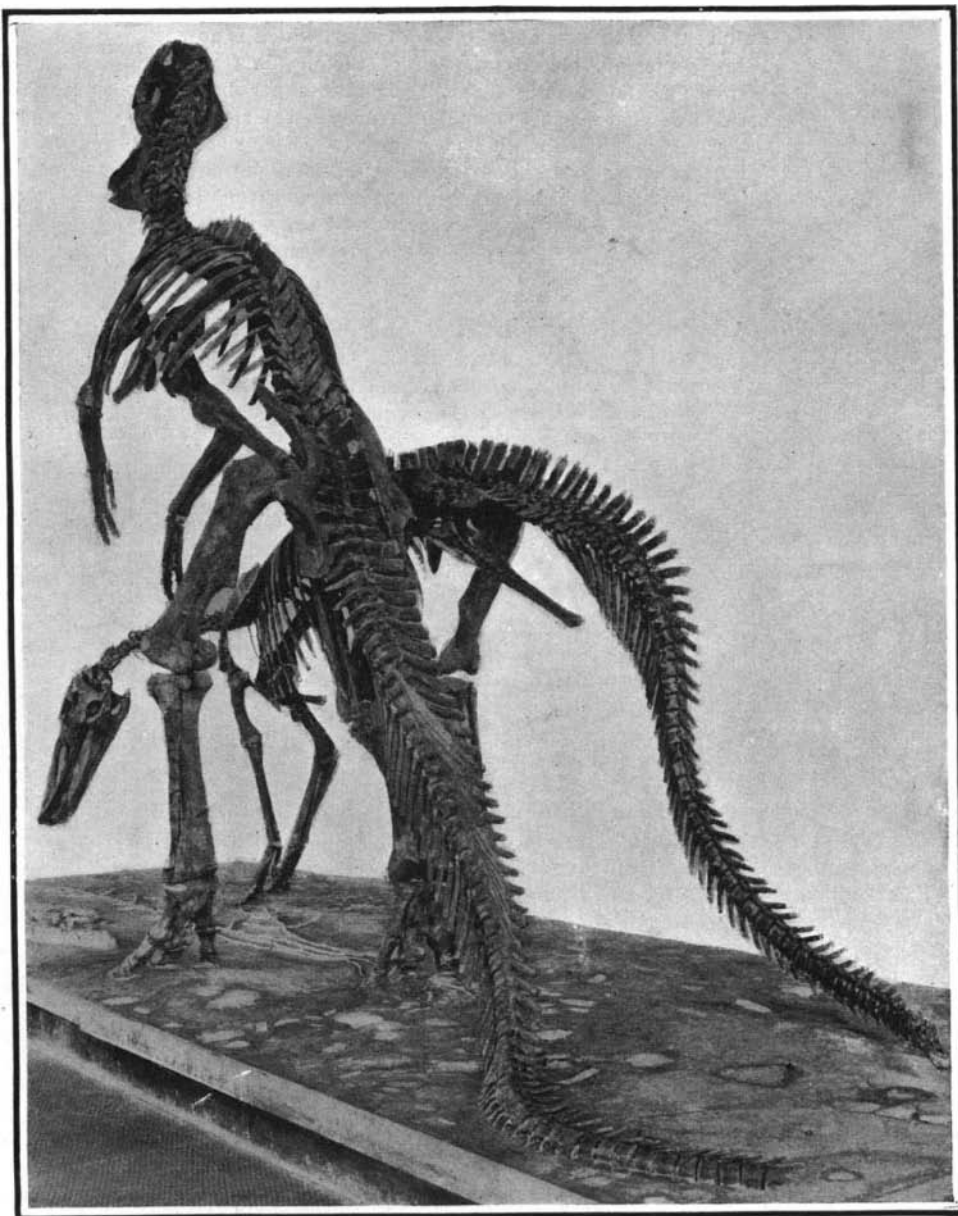
of these sylvan marshes of the Cretaceous period with stately palms bordering the lakes; the rapacious Tyrannosaurus, king of the flesh-eating dinosaurs, lurking among the trees to capture a meal; the Trachodonts disporting themselves out in deep water, their only safety from foes.

The numerous remains of these huge creatures that have been recovered attest their great numbers during life. A comparative study of their anatomy leaves little doubt that they were oviporous; that is, reproduced from eggs, which may well have been hatched in the warm sands bordering the shores.

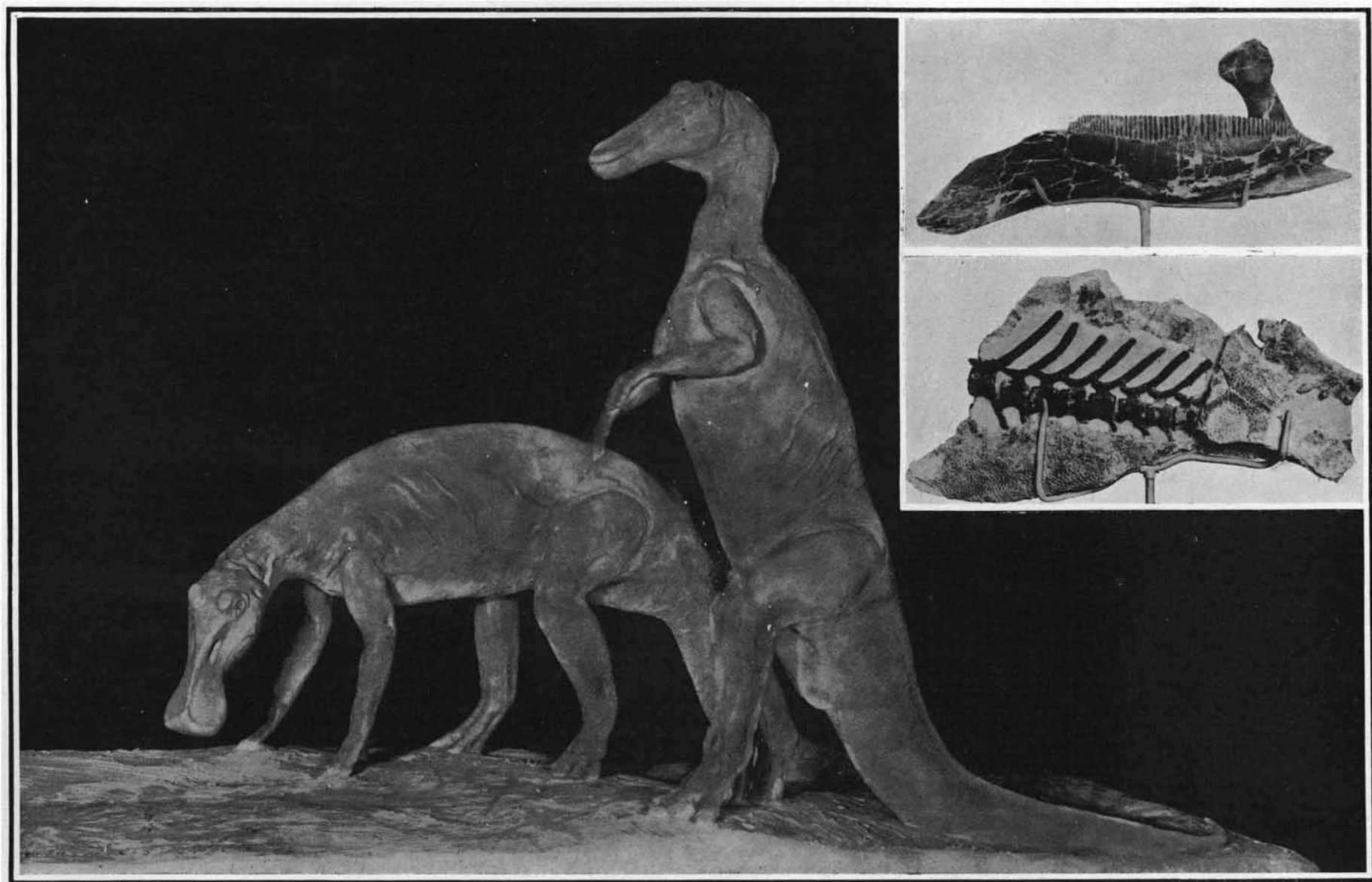
They combine some anatomical characters of both lizards and crocodiles, but have no near living relatives and left no descendants. They were kangaroo shaped, with long hind legs and reduced fore legs and a long deep powerful swimming tail. The peculiar expanded beak, resembling a duck's bill, was covered by a horny mass, denticulate in form, which was undoubtedly used in gathering its vegetable food, the nature of which is still conjectural. The teeth, situated farther back in the jaws, are the most highly specialized of any known. There were about 1,000 altogether, massed in a solid pavement; that is, about 500 in each jaw, distributed in 45 to 60 vertical rows, according to age and species, with from 10 to 14 teeth in each row. The teeth have enamel on one side only, the inside of the lower and the outside of the upper jaw, so that the enamel edges on the opposing jaws passed across each other obliquely, like the blades of shears, and were used apparently to cut the food in sections.

There is reason to believe that this group of dinosaurs at least swallowed stones like birds, which aided in grinding their food.

The new specimen is unique in many ways, and adds much to our (Concluded on page 75.)



Trachodon group. Three-quarters rear view. Tendon bones preserved as found along tail of the erect specimen.



Trachodon group restored.

Trachodon lower jaw with pavement-like mass of teeth. Trachodon tail partly covered with fossil skin.

A DINOSAUR SKELETON WITH SKIN 3,000,000 YEARS OLD.

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Wrench attachment, monkey, F. Fisher	964,346
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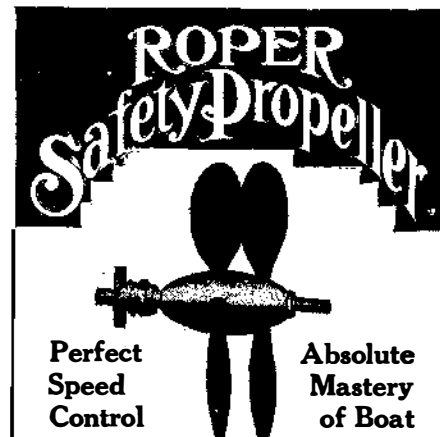
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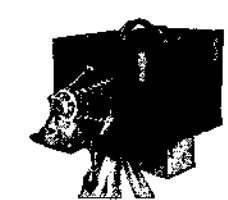
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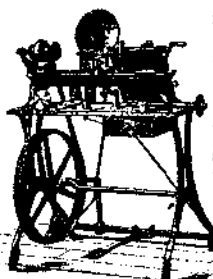
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A DINOSAUR SKELETON.

(Concluded from page 65.)

knowledge of the group. It lies on its back as found, with arms outstretched and neck twisted to the right side, with the skull under the right arm. The tail is missing, but otherwise it is complete from the tip of the nose back to the hips, with the body almost completely incased in its skin. To be more exact, it is a cast of the skin, for when examined critically, there proves to be no organic substance, simply an imprint of the tubercles formed in fine-grained sand. The tubercles or scales are non-imbricating, that is, do not overlap, like those of a snake, and are roughly pentagonal in form with flat tops. These grade into small irregular tubercles in different parts of the body, forming patterns. It is probable that genera of the same family were in life readily distinguishable by the different skin markings, as among modern lizards.

On its belly, chest, and sides there are rosettes or clusters of large tubercles separated by small pointed tubercles.

Near the mid-ventral line they are from one to one and a half inches in diameter, slightly elongate, and consist of large scales near the center, which gradually decrease in size to the periphery, where they are small irregular pointed tubercles. These small tubercles allowed of creasing or folding of the skin during life. The rosettes are distributed in more or less regular alignment, apparently in rows, with frequent intercalated rosettes. Distinct folds in the skin are still preserved, running down the sides of the body at right angles to the vertebral column. Probably the most important part of the epidermis preserved is that covering the front legs. It is unbroken on the front and the back and shows one foot to have been webbed more completely than in any water bird.

The thumb is absent, so that the four toes present are II., III., IV., and V. II. and III. terminated in small hoofs; the other toes in small round ossicles, but all were completely covered by membrane. No pads are present, and the delicate texture of the scales is strong evidence that the foot was used chiefly as a paddle, and not for walking.

Part of an ornamental dorsal frill is preserved, overlying the neck, and consists of uniformly large tubercles that outline, and at least in some places extend above the spines of the eighth, ninth, tenth and eleventh cervical vertebrae.

The large tubercles were separated by small ones between the spines. Doubtless this resembled in prominence the frill of the living iguana.

In another specimen, representing a different genus, the scales that cover the tail are uniformly large with flat tops and fluted sides, but not differentiated into patterns. In general, the epidermis appears to resemble that of the geckos more nearly than any living lizard.

In résumé, it would appear that the ventral side of the body or belly was covered by small rosettes or clusters in more or less regular lines, which increased in size over the sides and were uniformly large on the back and tail and on the outer side of the limbs. Small tubercles not differentiated into clusters marked the inner sides of the limbs and in the folds of the skin, where there was friction. A short erect dorsal frill ornamented the neck, and possibly a part of the back. That the skin was pigmented seems probable, but nature would not have made a defenseless bulky creature of this size more conspicuous by brilliant colors.