

ART. XIX.—*A New Armored Saurian from the Niobrara*;  
by G. R. WIELAND.

THE greatest American storehouse of fossil marine vertebrates is doubtless in the Niobrara chalk of western Kansas. But despite the fact that many of the diverse forms there represented must have lived near and frequented the shores of the Niobrara sea, very little evidence of even presumably true land forms has thus far been obtained.

The best known form to be regarded as land, or at least lacustrine or fluviatile, is the *Hadrosaurus agilis* of Marsh from the Smoky Hill river. Though the type of this dinosaur includes considerable portions of the skeleton, only a single individual has ever been recovered. In fact, in the University Geological Survey of Kansas, vol. iv, Professor Williston says, in speaking of the Dinosauria: "But a single specimen (that is *Hadrosaurus agilis*) has ever been found in the state, so far as I am aware, though the animals must have lived here about the shores of the Cretaceous seas in great abundance."

And although collecting in the Niobrara has been especially active during the past ten years, no further examples even doubtfully referable to Dinosauria came within my knowledge until about two years ago. Then I noted amongst turtle material sent to the Yale Museum from the Hackberry Creek region by Mr. Charles H. Sternberg, and referred to me for study, the two paired and presumably caudal, or else cervical, dermal elements shown in figure 7, 7a.

On the basis of such slender evidence it was of course not possible to say whether a crocodilian was indicated, or even some remote progenitor of such a turtle as *Miolania*. Now, however, we are enabled to present some clearer evidence for the presence of a second Dinosaurian genus in the Niobrara.

This last season Mr. Sternberg secured, five miles south of Castle Rock and three miles south of Hackberry Creek, six dermal scutes of a form quite certainly dinosaurian. These plates later came into my possession and have been donated to the Yale Museum. The name *Hierosaurus Sternbergii* is assigned them in honor of their collector. It is thought that other fragmentary specimens have been observed, so that it is probable that further material will yet be obtained.

In the excellent figures 1-7a of the present fossil scutes, drawn by Mr. R. Weber, the principal characters may at once be discerned.

The scutes are all shown one-third the natural size in the figures 1-7a. The bones shown in figures 1-3 are odd, that of No. 3 being merely a tubercle with a fine right-angled striation on its lower surface. Those shown in Nos. 4 and 5 are a pair, but other elements must have intervened; while the two fused elements shown in No. 6 form an isolated asymmetrical

FIGS. 1-7a.

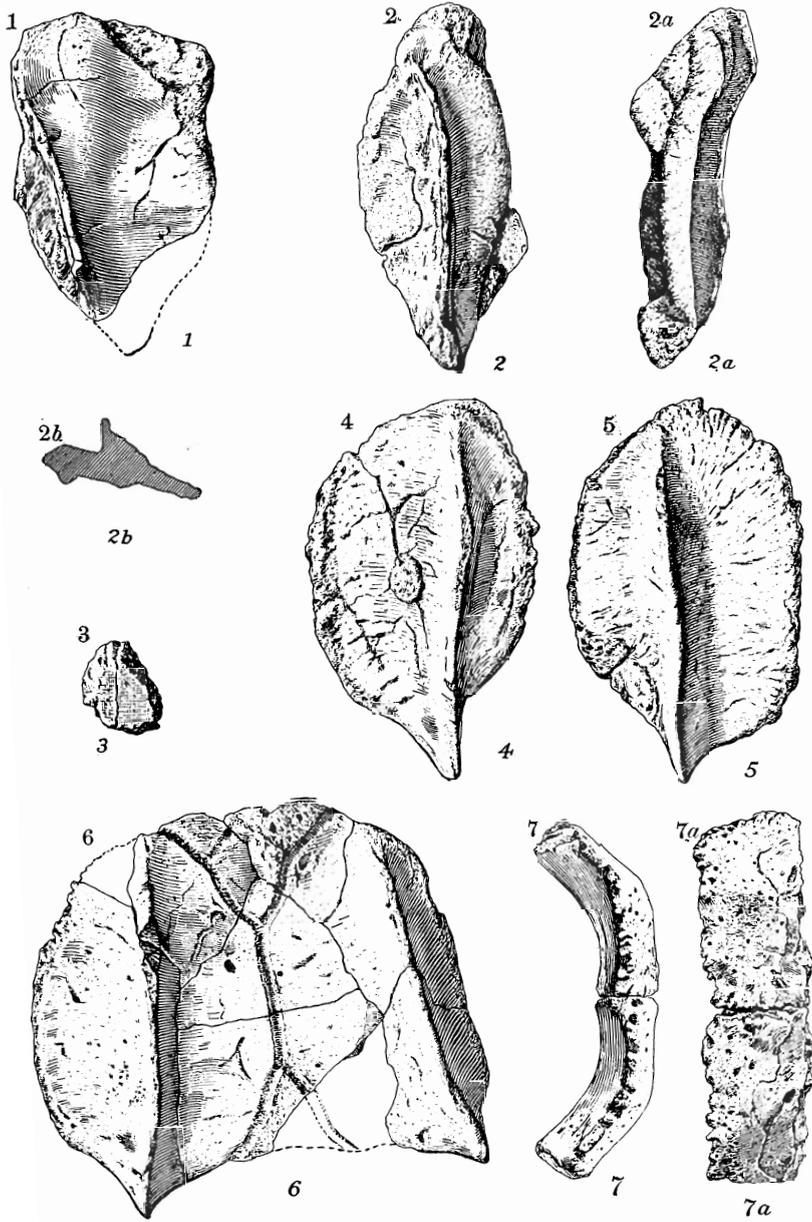


plate. In all the foregoing except the tubercle the thickness is much as seen in the transverse section No. 2*b*. The more or less median ridge is sharp and runs the entire length, being of much the same height throughout its course, and terminating as a sharp backwardly projecting slightly upturned spur. The height of the ridge is from one to one and a half centimeters. Nos. 1-6 are all plate-like and of much the same thickness as shown in the middle transverse section figure 2*b*.

The two elements shown in figure 7, 7*a* are probably a terminal pair that was seated on the proximal caudal or cervical region, as indicated by the broad flat front edge which formed a contact and the free thinner posterior edge which appears to end [if not begin] the series abruptly. But the animal to which these odd bones belonged may not even have been of the same species as that to which the scales of figures 1-6 belong and form the type.

It is pretty clear that the form before us is allied to the Stegosauridæ and is possibly included in the Ankylosauridæ of Brown\* represented by Dinosaurs with large shields and a quite rigid turtle-like back from the Judith River beds near Gilbert Creek, 120 miles north of Miles City, Montana.

The closest relationship within the family Ankylosauridæ so far as the dermal armature affords comparison is afforded by *Polacanthus* as restored by Nopcea and now on exhibition in the British Museum at South Kensington. As there restored there are first free plates and then a more or less perfectly developed carapace only extended as such over the lumbar and hip region.

From the fact that we see the large scales shown in figure 6 so completely fused a lumbar-hip carapace may be supposed present in the Niobrara form. But in the latter there is plainly indicated by heavy sulci the presence of a system of hornshields at least as large as the keeled plates. These characters evidently form a sufficient generic distinction.

It thus seems probable that the Dinosaurs actually paralleled the turtles in the development of keels of dermogene bones enclosed by horny shields and coming near to the formation of a true carapace with a clearly aligned bone and hornshield system primarily comparable to that of *Dermochelys* as it now exists. It is not to be forgotten, however, that the unusual structure of the *Archelon* carapace described in previous pages makes it very likely that ere long a turtle may be found with a neural, pleural and marginal series greatly reduced and mainly replaced by rows of large shields not greatly unlike those now described.

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\* The Ankylosauridæ, a new family of Armored Dinosaurs from the Upper Cretaceous: by Barnum Brown. Bull. Amer. Mus. Nat. Hist., vol. xxiv, Art. XII, pp. 187-201, New York, Feb. 13, 1908. [Though I fail to see why the Nodosauridæ of Marsh are ignored in this paper.]