



PARIETAL CREST OF CENTROSAURUS APERTUS.

(One-Sixth Nat. size.)

# THE OTTAWA NATURALIST

VOL. XXIV. OTTAWA, DECEMBER, 1910

No. 9

## NOTE ON THE PARIETAL CREST OF CENTROSAURUS APERTUS AND A PROPOSED NEW GENERIC NAME FOR STEREOCEPHALUS TUTUS.\*

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The defensive frill or crest of *Centrosaurus*, so singular in its general form and contour, has lately been found to be even more grotesque than it appeared to be at the time of its discovery.

This crest, made up almost exclusively of the coalesced parietals, was originally (1902†) described as appertaining to the species *Monoclonius dawsoni*, Lambe, but was later (1904‡) made the type of the genus *Centrosaurus*. When found by the writer in 1901 in the Judith River (Belly River) formation, on the west side of Red Deer river, Alberta, a short distance below the mouth of Berry creek, a straight, laterally compressed bone, tapering toward one end was with it immediately beneath its lower surface. This bone was at the time supposed to be a horn-core and was described as such in the original reference to the crest and when the genus *Centrosaurus* was established, the parietal crest and the so-called nasal horn-core constituting the type material of the new genus. The discovery during the past summer of the true nature of the "horn-core" is of interest and calls forth the following remarks.

In my description of the crest in the paper published in the *Transactions of the Royal Society of Canada*, vol. X, 1904, the following references to the hinder portion of the specimen are to be found: "The parietal expansion, for the purpose of descrip-

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†Geological Survey of Canada. *Contributions to Canadian Palaeontology*, vol. III. (quarto), part II., On Vertebrata of the Mid-Cretaceous of the North-west Territory, p. 58, 1902.

‡THE OTTAWA NATURALIST, vol. XVIII., p. 81, On the squamoso-parietal crest of two species of horned dinosaurs from the Cretaceous of Alberta.

tion, may be said to consist of a longitudinal or axial part, a transverse portion forming the posterior border, and lateral or alar extensions that complete the sides and front margin. . . . The posterior bar near the median line presents a backwardly directed vertical face, which becomes rounded and less robust in the neighbourhood of the hooked processes; it is not, however, quite bilaterally symmetrical, its transverse section near the left hooked process being nearly circular, whilst in the corresponding position on the other side it is decidedly thickened next to the fontanelle. . . . A shallow groove, g, more clearly shewn on the right side of the specimen, extends on the anterior side of the posterior bar from the upper surface near the median line downward and then upward in a regular curve, ending at a point in advance of the base of the hooked process. Above this groove the face of the bar presents a broken surface. On the left side the corresponding groove is only faintly indicated, and the bone above it is intact." It is this broken surface on the anterior right margin of the posterior bar which is of special interest at the present time. To this surface the lower broken base of the "horn-core" fits exactly in perfect contact. To Mr. Barnum Brown of the American Museum of Natural History, New York, belongs the credit of having made this discovery whilst on a visit to the Geological Survey at Ottawa during the past summer.

What was at first considered to be a nasal horn-core is thus proved to be a strong, forwardly directed outgrowth or spur from the anterior surface of the right lateral half of the posterior bar passing directly across and over the right fontanelle, the front end of the spur being about one inch only above the surface of the bone forming the anterior border of the opening. Thus the above-mentioned groove, g, passes beneath what is now known to be the base of the robust outgrowth. What is surprising is, that there was no corresponding outgrowth from the posterior bar on the left, the surface of the bone there being quite smooth, as already stated.

The figure of the parietal crest accompanying this notice shews the newly discovered outgrowth in its proper position somewhat marring the symmetry of the specimen, but certainly providing food for speculation as to its true nature.

The hooked processes on the posterior margin of the crest of *Centrosaurus* were probably of some use in a protective sense. Projecting beyond the back of the frill, and with a horny covering, they would play an important part in the marginal armature of the frill. The outgrowth over the fontanelle, however, as it lay but little above the general plane of the lateral expansion of the crest was probably enveloped by the covering of the frill and did not shew to any extent above its surface; to be of use

as a spine for defensive purposes it would have projected freely above the crest. Centrosaurus and Monoclonius are regarded as antecedent to forms in which the size of the fontanelles is much reduced, culminating in Triceratops with an entire frill. We could scarcely, however, consider the spur of bone crossing the fontanelle a little above its general plane, as an attempt on the part of Centrosaurus to reduce the size of the opening, although if we accept a Monoclonius-Triceratops phylum as one of the two lines of descent in the Ceratopsia,\* we would expect a strong tendency to close the parietal fontanelles in both Monoclonius and Centrosaurus. The presence of the outgrowth on one side of the crest only, further inclines one to the belief that this spur has no morphological significance, but has been induced rather by an inherent tendency on the part of the species to add to the defensive armature in this part of the skeleton.

The figure here given is from the drawing reproduced in plate 1, Transactions Royal Society of Canada, vol. X, 1904, in the writer's paper "On the squamoso-parietal crest of the horned dinosaurs Centrosaurus apertus and Monoclonius canadensis from the Cretaceous of Alberta," to which is added the outgrowth from the posterior bar in its true position, the original drawing for figure 3 of the above plate being used; one-sixth natural size; *a*, squamosal suture; *b*, post-frontal suture; *g*, groove passing beneath base of bony outgrowth.

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#### THE GENERIC NAME EUOPLOCEPHALUS PROPOSED IN PLACE OF STEREOCEPHALUS (PREOCCUPIED).

In 1902 the writer described a new genus and species of herbivorous dinosaur from the Judith River (Belly River) beds of Red Deer river, Alberta, under the name *Stereocephalus tutus* (Contributions to Canadian Palæontology, vol. III. [quarto], part II., p. 55). As the term Stereocephalus has been already used for a genus of insects it is necessary to suggest another generic name for the species from Red Deer river represented by the upper part of a heavily armoured cranium and a transverse, semicircular series of five keeled scutes from the neck or tail. Euoplocephalus (Gr., *euoplos*, well armed, and *kephale*, head) is therefore now proposed as an appropriate name for the genus to take the place of Stereocephalus as applied to the Cretaceous stegosaur *S. tutus*.

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\*Monographs of the United States Geological Survey, vol. XLIX The Ceratopsia by John B. Hatcher, based on preliminary studies by O. C. Marsh, edited and completed by R. S. Lull.