

ART. XLIII.—*On the Ventral Plates of the Carapace of the genus Holonema of Newberry*; by HENRY S. WILLIAMS.

IN the summer of 1890 I exhibited photographs of several plates, associated together on a slab of sandstone which I referred to *Holonema*, one of the plates (*m. v.* of figure beyond) being the same in shape and markings as the original plate described by Claypole as the "ventro-median" or "lozenge-plate" of "*Pterichthys*," and named by him *Pterichthys rugosa*.* Messrs. Cope and Claypole both examined my photograph at the time and remarked upon the close resemblance to the arrangement of plates on the back of *Bothriolepis*. In the account given by Claypole in the American geologist,† the plates are described as dorsal, and their position is reversed, the plate *a. m. v.*, or anterior median ventral, being called "post-dorso-median," although the general shape of the plates is correct, it having been reproduced, mainly, from a copy of my photograph.‡

In the Proceedings of the U. S. National Museum, vol. xiv, p. 256, Cope refers to the same photographs as representing

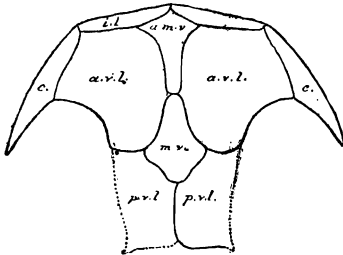
* Am. Phil. Soc., 1883.

† Vol. vi, p. 255, 1890.

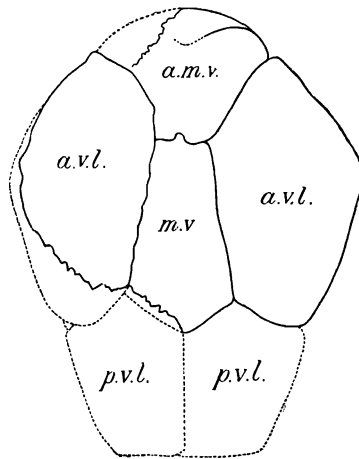
‡ See figure, *ibid.*, page 256.

the posterior part of the carapace, speaking of the plates *a. v. l.* (fig. 2, beyond) as "posterior lateral" dorsals. My first impression was that the plates were ventral; and in a letter from Dr. Newberry the same interpretation of the plates was made. "I imagine your plates are from the plastron," . . . "there should be two other plates in the plastron overlapping the posterior end" of the plate marked *m. v.*, which he spoke of as the "central plate of the plastron;" and he further said, "your plate A (*a. m. v.* of fig. 2) is altogether new." With this conflict of opinion and knowing then of no analogous arrangement of plates by which to settle the question, I left the matter for further light. The restoration of the ventral plates of the carapace of *Phlyctenaspis acadica* Whiteaves, by Traquair,* furnishes the needed clue. Whiteaves had described the dorsal part of the carapace as *Coccosteus acadicus*, and had figured two plates which he referred to the ventral part of the same. His specimens were from the lower Devonian of Cambelltown in Canada.† Dr. Traquair on examining specimens from the same locality discovered a large portion of the ventral shield, with nearly all its plates *in situ*, and

2.



Restoration of ventral plates of *Phlyctenaspis Acadica* Whiteaves, after Traquair. Reduction about $\frac{1}{2}$.



Restoration of ventral plates of *Holonema rugosa* Claypole. Reduced to $\frac{1}{3}$ nat. size.

from it, with the aid of detached specimens, the restoration was made, of which a copy is given in figure 1. Examination of the restoration and its description shows the probable rela-

* Geol. Mag., 1893, p. 148.

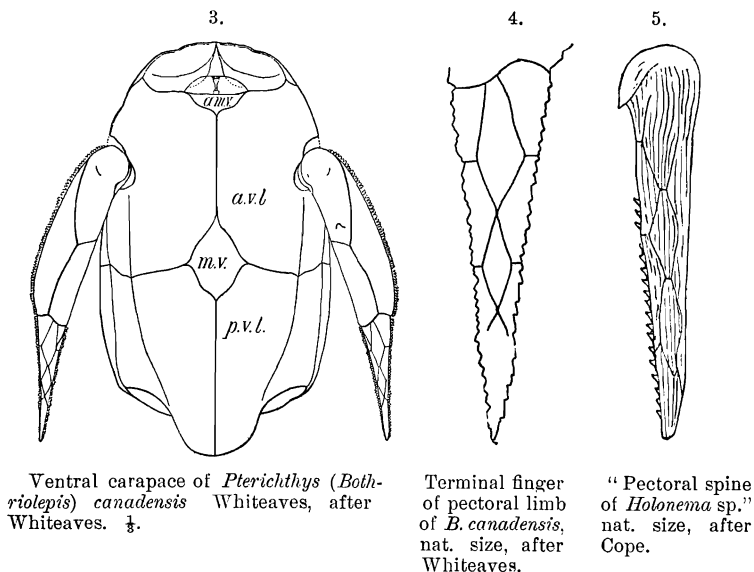
† Trans. Roy. Soc. Canada, vol. vi, sect. iv, p. 3, pl. ix, with a woodcut.

tions of the plates of *Holonema*, as will be seen by comparing figures 1 and 2.*

The corresponding plates are indicated by the same letters in the two figures: *i. l.*, interlateral, *c.*, cornu or lateral spine, *a. m. v.*, anterior median ventral, *a. v. l.*, anterior ventro-lateral, *m. v.*, median ventral, *p. v. l.*, posterior ventro lateral. The continuous lines indicate outlines that are preserved in the specimens, and the dotted lines, the probable outlines of the perfect plate.

On the specimen from which figure 2 is made there are also traces of impressions of heavy spine-like bones, but their shape is not determined; their presence however is sufficient to indicate that the same animal, of which the plates figured are preserved, possessed also either pectoral limbs or, at least, some more massive bones than the thin, flat plates of which the form is distinctly preserved.

The "pectoral limb," or "pectoral spine" as it is called in the description by Cope† (fig. 5), is probably the terminal



* After handing this paper to the editor I have noticed that Mr. A. Smith Woodward had already pointed out Claypole's error of interpretation, saying "The post-dorso-median" plate of Claypole is obviously the anterior median ventral, while the "post-dorso-lateral" and "dorso-lateral" of the same author are the anterior and "posterior ventro-lateral plates respectively." Catalogue of Fossil Fishes, Brit. Museum, part II, p. 315.

† On the pectoral limb of the genus *Holonema* of Newberry; Proc. U. S. N. Museum, vol. xiv.

part of the pectoral limb of *Bothriolepis canadensis*. The "three elongate narrow hexagons," with "sutures extending from the lateral angles of the hexagons to the border of the spine" described by Cope as characteristic of this spine of *Holonema*, correspond so exactly to the sutures of the terminal finger of the limb of *Bothriolepis canadensis* figured by Whiteaves (figures 3 and 4) as to suggest not only generic but specific identity. From the figure given by Cope, with the interpretation of its relations here given, it may be inferred that there was some motion at the joint between the two parts of the arm. Pander's dissection and description of the arm of *Asterolepis* make the movement to have probably been of no great amount.

It is hoped that other bones or plates may be brought to light illustrating the structure of this interesting genus of fishes. The specimen from which the above restoration was made was found by Prof. C. S. Prosser, near Oxford, N. Y. in the Oneonta sandstone, of the lower part of the Upper Devonian.