

ambulacral ossicles and the two adjoining adambulacral plates, and not through the body of the ambulacral ossicle itself. Hall has claimed to have discovered traces of a disc in Billings's type specimens of *Teniaster*, and if so, this distinction falls to the ground; but, in regard to the two other points, the collection of specimens of *P. Miltoni* in the British Museum Collection confirm the correctness of Salter's views. The differences are, therefore, valid ones, and both genera must be retained, as has been done by Zittel. This new species differs from *Teniaster* in the presence of the disk, though, as we have seen, this distinction may possibly not hold good, and in the structure of both arms and oral pentagon. It undoubtedly differs from the other species of *Protaster* in many important points of structure, and herein agrees more closely with *Brisinga* than does any *Protophiuroid* yet described; to mark this resemblance the specific name has been given. But the other species of *Protaster* differ among themselves in equally important points, and the genus is apparently constituted by a group of species which careful revision and further knowledge of their structure would probably relegate to more than two distinct genera. The necessity for such a revision has been recently urged by Sturtz,¹ and to this with a discussion of some questions in their anatomy and the significance of some points in the structure of *P. brisingoides*, I hope subsequently to return. Till such has been done, it seems advisable to include this species in the comprehensive genus *Protaster*.

VI. — NOTE ON THE GENERA *TRISTYCHIUS* AND *PTYCHACANTHUS*, AGASSIZ.

By Dr. R. H. TRAQUAIR, F.R.S., F.G.S.

SOME years ago,² in showing that the spines supposed by Hancock and Atthey to be dorsal spines of *Gyracanthus* were merely young and unworn specimens of lateral spines of the same genus, I called attention to the general fact that young examples of *Selachian* spines could not be expected to represent the older ones in miniature, and *vice versa*.

For as the spine increases in size by growth at the base, the young one is consequently represented only by the distal portion of the adult. And as in the process of growth, differences in sculpture and proportions may supervene, the general characters may be so altered, that if the distal portion be lost by attrition, the old and young individuals may be with difficulty recognizable even as belonging to the same genus.

Such an instance may, I think, be found in the spines named by Agassiz respectively *Tristychius arcuatus* and *Ptychacanthus sublaevis*, both from the Lower Carboniferous rocks of Central Scotland.

In very young specimens of the former the surface of the exerted portion is entirely covered with longitudinal ridges and sulci, and

¹ B. Sturtz, Beitrag zur Kenntniss paläozoischer Seesterne, Palaeontographica, vol. xxxii. Stuttgart, 1886, p. 79.

² Ann. and Mag. Nat. Hist. ser. 5, vol. xiii. 1884, p. 37.

there is scarcely any posterior area, the two rows of marginal denticles being placed close to each other and alternating. As the spine increases in length, the ridges begin to drop off behind, so that in examples of from three to four inches in length, like Agassiz's type,¹ only the tip is ridged all round, while three ridges, one median and two lateral, persist beyond the other along the front, whence the name *Tristychius*. Along with this change in sculpture, the two posterior rows of denticles diverge from each other, and a well-marked area is formed between them as in *Ctenacanthus*.

In still larger spines the sulcated tips become entirely worn off, leaving only the three anterior ridges, which in turn also finally disappear in examples which have been subjected to any considerable amount of wearing. A somewhat short, gently-curved, bluntly-pointed spine now confronts us, destitute of ridges or sulci, and with the surface covered only by very close and delicate striæ. Such spines are indistinguishable from Agassiz's description and figure of *Ptychacanthus sublævis*,² of which the original seems unfortunately to be lost, for although Agassiz states that it belonged to Professor Jameson, I have never been able to find it in the Edinburgh Museum.

Ptychacanthus sublævis then represents to my mind nothing but an adult *Tristychius arcuatus*, with the point broken off, and the general surface a little worn, and this view is, I consider, not only corroborated, but proved by a series of specimens of undoubted *Tristychius* in the Edinburgh Museum.

NOTICES OF MEMOIRS.

- I.—*AMBLYPRISTIS CHEOPS*, NOV. GEN. ET. SP., AUS DEM EOCAEN AEGYPTENS. By Prof. Dr. W. DAMES. Sitzungs. Ges. naturf. Fr. Berlin, 1888, No. 6.

THIS paper forms an interesting contribution to our knowledge of the fossil vertebrate fauna of Birket-el-Qurūn, in Fajum, for which we are already indebted to Dr. Dames (Sitzungs. königl. Akad. Wiss. Berlin, 1883, pt. i.). The evidence of the new Saw-fish (*Amblypristis Cheops*) consists in some detached rostral teeth, differing from those of the existing *Pristis* in their shortness and great relative breadth. One example is figured; and Dr. Hilgendorf adds a brief note on the structure of the rostral teeth of the living genus, as compared with the fossil.

- II.—ON SOME DEVONIAN CRUSTACEA. By Rev. G. F. WHIDBORNE, M.A., F.G.S.³

BESIDE species of Crustaceans already described from Woulborough and Lummaton, several new species are found there, as the following: *Phacops batracheus*, which differs from *P. fecundus*, Barr., in the rearward position of the eye and more overhanging glabella; *Proetus batillus*, which has a flatter glabella than *P.*

¹ Poiss. Foss. tome iii. tab. 1a, fig. 9–11.

² Op. cit. tome iii. tab. 5, fig. 1–3.

³ Revised abstract of paper read at the British Association.