

5. *On a new GENUS of EURYPTERIDA from the LOWER LUDLOW ROCK of LEINTWARDINE, SHROPSHIRE* By HENRY WOODWARD, F.G.S., F.Z.S.

(PLATE XIV. figs. 7a, 7b, & 7c.)

THE specimen which forms the subject of this paper is in the Museum of Practical Geology, Jermyn Street, and through the kindness of Professor Huxley I have been permitted to describe it.

Its discovery was referred to by Mr. J. W. Salter, in 1857 (under the MS. name of *Limuloides*), in the 'Annals and Magazine of Natural History,' in a paper "On some New Palæozoic Starfishes," but the genus has never yet been described (except by myself at the British Association, Bath, 1864). The great interest attached to this new Crustacean is, that it appears to offer just the link we needed to connect the *Xiphosura* with the *Eurypterida*.

Limuli, apparently differing but little as regards the carapace from the recent species of China and America, occur as early as the deposition of the Solenhofen limestone of Bavaria; and in the Coal-measures of England and Ireland several species of *Bellinuri* occur, in which the cephalic shield is composed of the cephalo-thorax; and the segments of the abdomen if not anchylosed in all, are so in most.

But in the specimen under consideration we have the cephalic, thoracic, and abdominal divisions still remaining distinct, and apparently capable of separate flexure. This important character at once separates it from *Limulus* and *Bellinurus*.

I have on this account (*with the concurrence of Mr. Salter*) considered his MS. name of *Limuloides* inappropriate as a generic appellation, and adopted the name of *Hemiaspis* (from *ἡμις*, *half*, and *ἀσπίς*, *a shield*), reserving Mr. Salter's name of *Limuloides* for the specific title of the most perfect specimen of the genus (see Plate XIV. fig. 7a).

But it will be observed that *Hemiaspis* is also, *in general appearance*, strongly severed from the other species of *Eurypterida*, as well as from the *Xiphosura*, in structure.

The three divisions into head, thorax, and abdomen are more strongly marked. The abdomen is reduced to very slender proportions (less than one-third the breadth of the thoracic plates). The telson is nearly one-third the length of the animal (the entire specimen measuring $2\frac{1}{2}$ inches in length by 1 inch in width).

The carapace in general outline resembles *Limulus*, but is more dilated laterally. There is a faint indication on one side of the shield of a facial suture, with a small aperture upon its border, as if to indicate the position of the eye, but it is by no means clearly defined.

The glabella (when perfect) appears from a second specimen to have been ornamented with a semicircle of nine tubercles, and a tenth immediately within the circle upon the elevated front, and two small tubercles at the posterior margin.

Four ray-like corrugations descend on either side of the glabella towards the margin of the shield, and the whole surface of the carapace is minutely tuberculated. The lateral margins of the shield are ornamented with minute spines, and the two posterior angles of

the carapace terminate in a broad triangular point directed backwards. Two lesser spines arm the lateral border of the glabella.

The thorax is composed of six strongly trilobed plates, the epimera being equal in breadth to the central portion of each segment (see Plate XIV. fig. 7*b*).

The first segment is the largest, being 1 line in depth and $7\frac{1}{2}$ lines in breadth, including the epimera, which are pointed at their extremities and slightly overlap the following segment. Three minute tubercles ornament the median portion of each segment. The four following segments have the borders of their epimeral pieces rounded, and gradually decrease in breadth downwards from 9 lines to 7, and increase in depth from $\frac{1}{2}$ line to 1 line.

A section of one of the segments would present an outline like that of *Phacops* among the Trilobites, namely a triple corrugation (Plate XIV. fig. 7*b*).

The sixth thoracic segment is more strongly arched than the preceding ones, and the lateral borders are divided into two rounded lobes on each side: breadth 5 lines, depth 1 line.

The abdomen consists of only three segments each, 2 lines in breadth and $1\frac{1}{2}$ line in depth. The first has no epimera, and appears to move freely at its articulation with the sixth thoracic segment. The second and third segments have small epimeral pieces, which are bilobed with the posterior lobe more pointed. A line of small tubercles runs down the centre of these three joints, which are somewhat raised at their articulations.

The telson is 12 lines in length and $1\frac{1}{4}$ line in breadth where it articulates with the abdomen. It tapers gradually to a fine point.

If we regard the first six body-rings from the head as thoracic, and the remaining three segments as abdominal, we must presume that each of these latter is a double segment, as compared with the segments of the *Eurypterida* proper.

On the other hand, the presence of these three segments precludes our considering the head to be the cephalothorax and the succeeding segments the abdomen, as in the *Xiphosura*.

The smallness of the abdomen, and its reduction from the assumed normal number of six to three, seems to indicate a form by which, with the help of others, we may bridge over the interval that has hitherto existed between these two groups, the *Eurypterida** and the *Xiphosura*.

There are several peculiarities about *Hemiaspis* which seem to offer analogies with the Trilobites, but we know so little of the structure of that very isolated group that we cannot venture to speculate on its affinity to this order.

Note.—Mr. Salter is acquainted with several species of *Hemiaspis*, which have been marked with MS. names by him in the Jermyn Street Museum. They are, however, *extremely fragmentary*. The species are as follows:—

* Among the *Eurypterida*, perhaps *Stylonurus Pouriei* comes nearest in general form; but *Hemiaspis* will be seen to differ widely even from this genus.

1. *Hemiaspis limuloides*, H. W.
2. *Hemiaspis tuberculata*, Salter, MS.
3. *Hemiaspis optata*, Salter, MS.
4. *Hemiaspis sperata*, Salter, MS.
5. *Hemiaspis Salweyi*, Salter, MS.

These will be noticed in the Monographs of the Palæontographical Society.

PLATE XIV. figs. 7a, 7b, and 7c.

(*Illustrative of New Silurian Eurypterida.*)

Fig. 7a. *Hemiaspis limuloides*. Entire specimen: Lower Ludlow Rock, Leintwardine, Shropshire (enlarged one-third).

Fig. 7b. ———. Centre of shield (nat. size).

Fig. 7c. ———. Section of one of the thoracic segments.

JUNE 21, 1865.

Samuel Bailey, Esq., Mining Engineer, The Pleck, Walsall; William Keene, Esq., Sydney, New South Wales; and the Rev. Benjamin Waugh, Newbury, Berks, were elected Fellows.

The following communications were read:—

1. *On the CARBONIFEROUS ROCKS of the VALLEY of KASHMERE.* By Capt. H. GODWIN-AUSTEN. *With NOTES on the CARBONIFEROUS BRACHIOPODA*, by T. DAVIDSON, Esq., F.R.S., F.G.S.; *and an INTRODUCTION and RÉSUMÉ*, by R. A. C. GODWIN-AUSTEN, Esq., F.R.S., F.G.S.

[Communicated by R. A. C. Godwin-Austen, Esq., F.R.S., F.G.S.]

(The publication of this paper is unavoidably deferred.)

[Abstract.]

THIS paper was a continuation of one read before the Society last year, in which the Carboniferous, Jurassic, and Post-tertiary deposits and fossils were described by Capt. Godwin-Austen, Mr. Davidson, and Mr. Etheridge. In this communication Capt. Godwin-Austen confined himself to the Carboniferous formation, which was shown by him to have, in the Valley of Kashmere, a thickness of more than 1500 feet. The upper portion of this mass contained but few fossils, except in one particular bed near the entrance of the ravine above the village of Khoonmoo; but the lowest portion, or Zèwan bed, is made up chiefly of the remains of Brachiopoda and Bryozoa; and a higher stage, though still near the base of the formation, contains abundant remains of *Producta*. The position of a limestone containing *Goniatites* is not very clearly determined, but it is probably a member of the Zèwan series.

The sections in which the relative positions of the different beds were exhibited were described in detail, and plans and a map were given showing their geographical relation.

Mr. Davidson described the Brachiopoda forwarded with the paper, stating that they abound particularly at Barus and Khoonmoo, but are rarely in a very good state of preservation. Among them are several common and wide-spread European and American

