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HENRY WOODWARD, F.G.S., F.Z.S.

HONORARY MEMBER OF THE GEOLOGICAL SOCIETIES OF GLASGOW AND NORWICH; CORRESPONDING  
MEMBER OF THE NATURAL HISTORY SOCIETY OF MONTREAL; AND OF THE LYCEUM  
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ASSISTED BY

PROFESSOR JOHN MORRIS, F.G.S., &c., &c.,

AND

ROBERT ETHERIDGE, F.R.S.E., F.G.S., &c.

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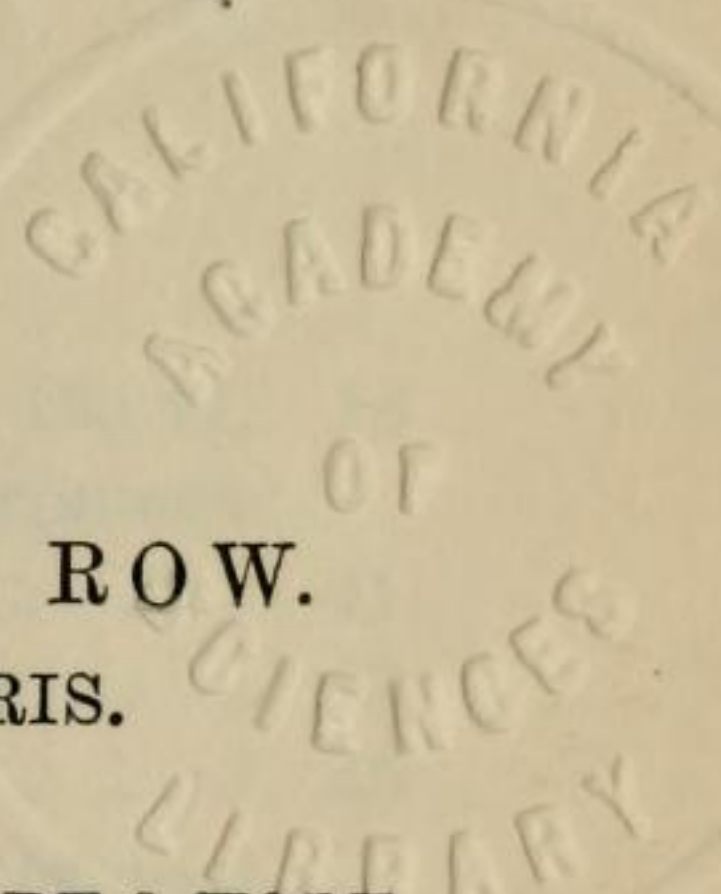
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succeeded by *Elephas* and *Hippopotamus*, and by other Rhinoceroses, with which perhaps the Mastodon still lingered on; whilst these again in turn gave way to yet other species of Elephant and large mammalia, and to these succeeded the historic fauna. These changes in the terrestrial fauna are thus briefly alluded to, in order to draw the line between them and the changes of the marine fauna as indicated by the mollusca, etc. It is a fundamental law of distribution that contiguous marine and terrestrial faunæ are rarely similarly affected by the same cause. Hence, whilst the sea may have undergone such changes as to convert its fauna from one of "Miocene" facies to one of sub-arctic facies, the same great mammals—all or only some—may have continued to hold the land.

In conclusion, I have to record a new Cetacean from the Suffolk Bone-bed, indicated by a flattened foliaceous tooth with a dentate margin, probably belonging to the genus *Squalodon*. I have also further evidence of *Hyæna antiqua*.

### III.—CONTRIBUTIONS TO BRITISH FOSSIL CRUSTACEA.

By HENRY WOODWARD, F.G.S., F.Z.S.

[PLATE XIV.]

I. *PYRGOMA CRETACEA*, H. Woodw.—In my first Report on Fossil Crustacea (Brit. Assoc. for the Advancement of Science, 1865, Reports, p. 321), I called attention to the occurrence, in the Upper Chalk of Norwich, of a sessile Cirripede belonging to the genus *Pyrgoma*. This unique example—for which I proposed the name of *Pyrgoma cretacea*—was discovered by Mr. T. G. Bayfield, of Norwich, who forwarded the specimen to the British Museum where I had the good fortune to detect its character. As no other specimen of this new species has been met with, I have thought it advisable (although only an imperfect example) to place it on record in the hope that better ones may be found. It is represented in the accompanying Plate XIV., Figs. 1 and 2, of the natural size.

The genus *Pyrgoma* was proposed by Leach (Journ. de Physique, tome 85, 1817) for a minute form of *Balanus* obtained living, on the south coast of England and Ireland, Sicily, Madeira, St. Jago, and the Cape de Verde Islands; generally found attached to the edge of the cup of a coral belonging to the genus *Caryophyllia*. The shell is formed of a single piece; the basis, cup-formed or sub-cylindrical; the scutal and tergal valves are articulated together.<sup>1</sup>

The only fossil species hitherto recorded belonging to the genus *Pyrgoma*, are the *Pyrgoma undata*, of Michelotti,<sup>2</sup> from the Miocene Tertiary strata of northern Italy; and the *Pyrgoma anglicum* (Sowerby), from the Coralline Crag of Suffolk, which Dr. Darwin considers to be identical with the recent British species.<sup>3</sup>

The single fossil example we possess consists of about two-thirds

<sup>1</sup> Darwin Foss. Cirripedia, Pal. Soc. Mon., 1854, pp. 35, 36.

<sup>2</sup> Bulletin Soc. Géol., tom. ix. p. 141.

<sup>3</sup> Darwin Foss. Cirripedia, p. 36.



of the circumference of the conical walls of the shell; the opercular valves and base being absent. It would be impossible to speak positively of such a fragment, were it not for the steeply conical form and the rounded approximate, radiating ribs, which mark the surface (Pl. XIV. Fig. 2a). Viewed from above the costæ are more rounded and less prominent than in the *Pyrgoma anglicum* (Plate XIV. Fig. 3), from which it also differs in its larger size and the greater thickness of the shell-walls, and the obliquity of the cone.

Diameter at base,  $4\frac{1}{2}$  lines; at apex,  $1\frac{1}{4}$  line; height of shell, 5 lines.

The ribs are crossed, at regular intervals, by well-marked lines of growth, forming, with the costæ, a reticulated ornamentation on the surface of the shell-wall, there being seven rings of growth in the space of a line.

The shell, if perfect, would probably have displayed about twenty-five or thirty vertical costæ, and about thirty-five transverse rings. The interior of the shell is smooth, and the wall is nearly one line in thickness near its base. No sutures are visible, the parietes having, apparently, all coalesced in the adult, as is the case with the recent species of *Pyrgoma*.

M. Bosquet, of Maestricht, has already figured and described a species of *Verruca* from the Uppermost Chalk.<sup>1</sup>

Dr. Darwin has also shown that the species common to our Red and Coralline Crag, and to the Glacial deposits of Scotland, is identical with the living *Verruca strömia* of our British seas (Mon. Foss. Cirripedia, p. 42, T. 2, f. 9).

We have now another sessile cirripede, embracing the same range in time—in the case of *Pyrgoma*, not parasitic upon shells (like *Verruca*), but fixed to the cup of a coral; and it is interesting to find it associated with the same form of corals, both in the Chalk and in recent seas; serving as an excellent illustration of the principle, so universal in Natural History, that whenever conditions are the same, similar associations of animals recur, even through periods of time, far beyond our powers to estimate.

II. *Necrocarcinus tricarinatus*, Bell.—In Professor Bell's Monograph on the Crustacea of the Gault and Greensand (Palæontographical Soc. Mon. 1862, p. 19,) he adopts the name *Necrocarcinus* for certain forms of Crustacea, from the Chalk-marl and Upper Greensand, figured and described by him, and referred (not, however, without some doubt) to the family of *Corystidæ*. To this genus I wish now to call attention, and especially to the species *N. tricarinatus* (ib. p. 21). The examples figured by Professor Bell are from the Upper Greensand of Cambridge and of Wiltshire. "The margin of the specimen described," writes the author, "is much broken, so that we are left to speculate in some measure upon the exact figure of the carapace; but, following the line indicated by the portions which remain entire, it appears to be less uniformly rounded than in *Necrocarcinus Woodwardii*."

<sup>1</sup> Verhandelingen Geologische Beschrijving en Kaart van Nederland. Haarlem, 1854. p. 12, Plate I., fig. 8-16.



Having lately obtained from the Gault of Folkestone the beautiful crustacean figured on Plate XIV. Fig. 4, I at first inclined to consider it a new species; but after a very careful comparison of it with Professor Bell's *N. tricarinatus*, I am led to conclude that it is only a more perfectly preserved specimen of that species than has been hitherto met with. It is, however, extremely valuable, as serving not only to complete the necessarily imperfect description of the species, but also to demonstrate that, in all probability, its affinities are with the *Portunidæ*, and not with the *Corystidæ*. But, on this point, however, we still need fuller evidence than that to be derived from the form of the carapace, of which, as yet, only the upper surface is known to us.

DESCRIPTION.—The specimen figured on our Plate measures  $1\frac{3}{4}$  inch in greatest breadth, and  $1\frac{1}{4}$  inch in length. The posterior margin is 8 lines in breadth and expands with a nearly straight border laterally to the epibranchial spine, where it is  $1\frac{3}{4}$  inch broad. The latero-anterior border is rounded and is marked by 4 spines, in addition to the epibranchial spine. The orbits have two fissures in their superior margin. The nuchal furrow is distinctly marked and is divided into two branches, laterally, enclosing the hepatic region. Behind the nuchal furrow and separating the urogastric from the epicardiac lobe is a short, strongly-marked transverse cardiac furrow, 3 lines in length, which indents the median ridge or carina, and is then bent forward and outwards for about  $2\frac{1}{2}$  lines.

In decorticated or water-worn specimens (as in those figured by Professor Bell and on the right-hand side of the specimen figured in our Plate (Fig. 4), there is a curved sculptured line between the meso- and meta-branchial lobes strongly marked and resembling impressed letters. A distinct, but not very elevated, carina follows the median line, extending the whole length of the gastric region, and is only interrupted by the cardiac furrow; whilst another less strongly marked granulated ridge marks each branchial region, extending longitudinally on the middle of the meta-branchial lobe. The epigastric and protogastric lobes are marked by tubercles of moderate size; a somewhat larger and more prominent one is seen on each epibranchial, and three minute prominences mark the epicardiac lobe.

After a more careful comparison of Professor Bell's *Necrocarcinus Bechei* and *N. Woodwardii* with *N. tricarinatus*, one cannot but conclude that the two former species are generically distinct from the latter—*i.e.*, of course assuming that it is lawful to differentiate a fossil species of Crustacean upon the carapace alone, without a knowledge of the other parts.

The generic name applied to the original species described by Deslongchamps in 1836 (Mem. Soc. Linn. Norm. V. p. 40, t. 1, fig. 7–9), was *Orithyia Bechei*. The generic name *Orithyia* ought, therefore, to be re-habilitated for *Bechei* and *Woodwardii*, restricting *Necrocarcinus* to the species *tricarinatus*.

Sir H. T. de la Beche has figured an example of *Necrocarcinus tricarinatus* from near Lyme Regis, Dorset<sup>1</sup> (probably from the true Gault). Professor Bell records and figures it from the Upper Greensand of Cambridge and Wiltshire: the specimen in our plate is from the Gault of Folkestone. We have thus evidence of its occurrence in four well-marked British localities.

III. *Palinurina longipes*, Münt. [Plate XIV. Fig. 5].—In Count Münster's Beiträge zur Petrefactenkunde, 1839, Bd. II. p. 36, he proposed the genus *Palinurina* for certain species of *Macroura*

<sup>1</sup> Trans. Geol. Soc., 2nd series, Vol. I. pl. iii. fig. 1, p. 42.



(having a general resemblance to the recent *Palinurus*) found in the Lithographic stone of Solenhofen.

In a paper by Mr. Charles Moore, F.G.S., published in the Proceedings of the Somersetshire Archaeological and Natural History Society, vol. xiii. (Taunton, November, 1867), I have recorded the occurrence, among many others, of two species of *Palinurina* in the Upper Lias of Ilminster, identical with those occurring in the Solenhofen slates described by Münster—namely, *Palinurina pygmæa* and *P. longipes*.<sup>1</sup> I have now to record the occurrence of this last-named species in the Lower Lias of Lyme Regis, discovered by Mr. E. C. H. Day, F.G.S., late of Charmouth, and now of Columbia College, New York, U.S.

DESCRIPTION.—This elegant little Crustacean measures 2 inches in length, whilst the large and rigid antennæ are of equal extent with the entire body. The antennules, not clearly seen in the specimen (fig. 5*b*.) are 8 lines in length, and are divided above the third joint into two multi-articulate setæ of equal length; the outer pair of antennæ have three large and scabrous basal joints, 1 line in breadth, and  $1\frac{1}{4}$  in length, succeeded by stout multiarticulate setæ 20 lines in length, apparently but little flexible, as they are always found lying nearly in a straight line.

The late Dr. Oppel has pointed out that the articuli of the antennæ in the Solenhofen specimens are fringed with very minute hairs:<sup>2</sup> these cannot, of course, be detected in our Lias example. The five pairs of thoracic limbs are all monodactylous, the first pair being the stoutest and somewhat shorter than the succeeding: they are all scabrous like the bases of the antennæ. The surface of the carapace and abdominal segments is finely granulated, the former having a row of rather larger granules arranged in pairs down its centre. The abdominal segments decrease slightly towards the telson, the first being 4 lines and the fifth 3 lines in breadth, by rather more than a line in length. The tail-plates, which were broad and well adapted for swimming, are but imperfectly preserved in any of the specimens I have examined.

Within the past few years an extremely large number of Crustacea have been met with in our Lias, common also to the Solenhofen stone: as many as seven genera and eight species being apparently found in both.

The persistence of such forms as *Eryon*, *Eryma*, *Glyphæa*, and *Palinurina* through the whole Oolitic series, seems clearly to demonstrate that having escaped total extinction in the Lower Lias sea, they migrated from time to time to more favourable areas, and thus were enabled to live on during the periods of time represented by the long series of deposits, from the Lower Lias to the Lithographic stone, in which so many are found fossil.<sup>3</sup>

#### EXPLANATION OF PLATE XIV.

- FIG. 1. *Pyrgoma cretacea*, H. Woodw., Upper Chalk, Norwich (exterior view) natural size.  
 „ 2. *Pyrgoma cretacea*, interior view of the same; natural size.  
 „ 2*a*. „ „ portion of the shell, much enlarged, to show costae.  
 „ 3. *Pyrgoma anglicum*, Sby. (greatly magnified view), Cor. Crag, Suffolk.  
 „ 4. *Necrocarcinus tricarinatus*, Bell, sp. Gault, Folkestone; nat. size.  
 „ 5. *Palinurina longipes*, Münst., Lower Lias, Lyme Regis; nat. size.  
 „ 5*a*. Portion of one of the antenna magnified  $\frac{3}{1}$  (after Oppel).  
 „ 5*b*. One of antennules magnified  $\frac{3}{1}$  (after Oppel).

The above specimens are all preserved in the British Museum.

<sup>1</sup> See also British Association Report for 1867, Third Report on the Structure and Classification of the Fossil Crustacea.

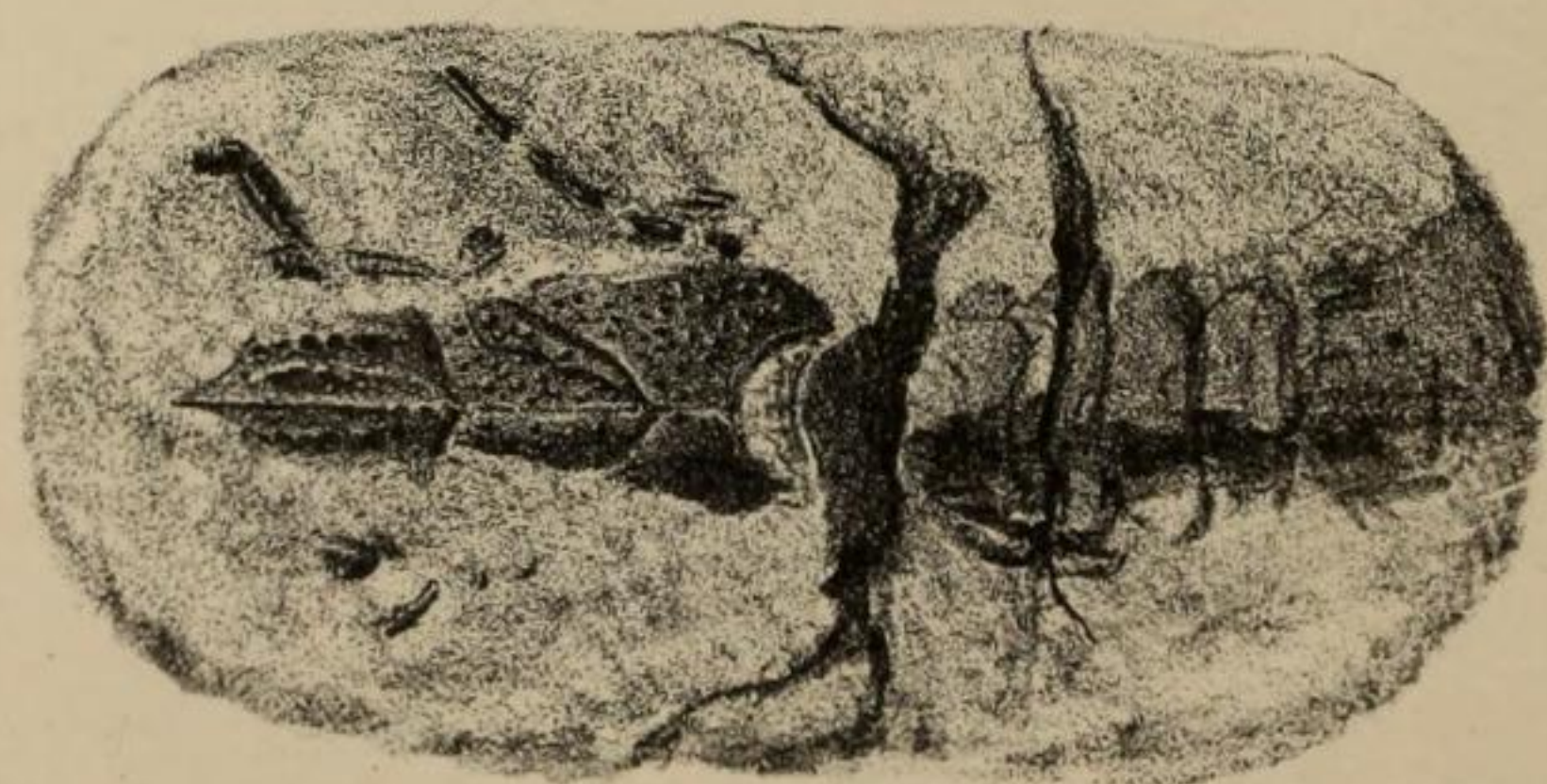
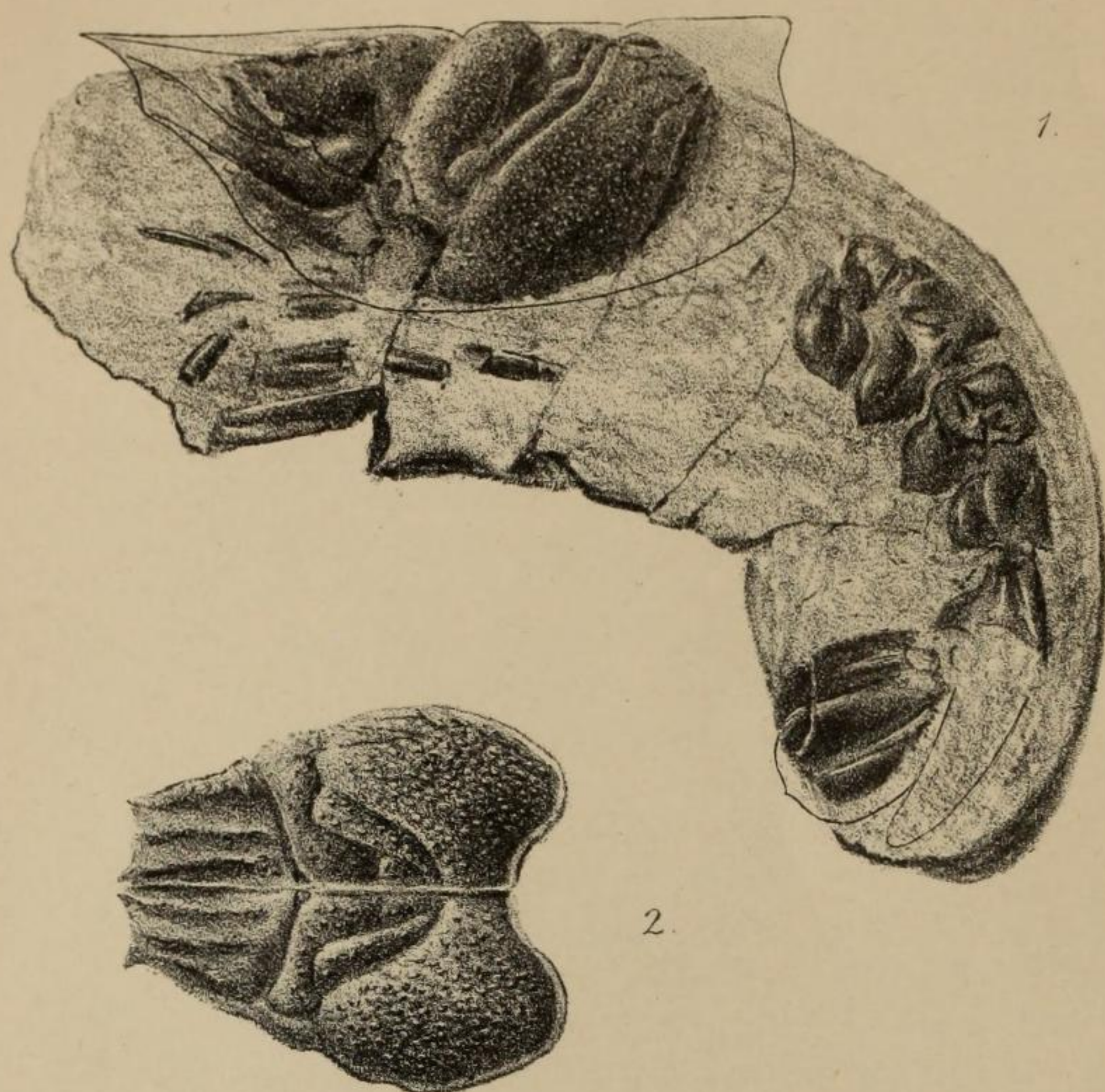
<sup>2</sup> See Oppel's Palæontologische Mittheilungen, etc., Stuttgart, 1852, p. 86, Taf. 24, fig. 1*b*.; see also our Plate XIV., fig. 5*a*.

<sup>3</sup> See Brit. Assoc. Report on Foss. Crustacea, 1867. p. 46.









*W. West imp.*



portion to the writing of the world's history) to subside, we know not how far; while trees, not scanty seaside-herbage, flourished upon the land lately washed by the waves, until a fresh oscillation took place, and the sea resumed its sway; fish swam among the forest boughs and the mollusc tribe dwelt among the roots, and thus the sea continues, eating into the land, winter by winter, until the traces of its former presence will soon be obliterated or overwhelmed.

I conceive this forest to have been contemporary with many of those whose remnants occur in the interior in peat-mosses, and which must have flourished at a period subsequent to that of the low-level drifts, when the land stood at a higher level than now; the marine bed may probably be correlated with those drifts, and thus both might be included in the recent, or human period.

#### IV.—CONTRIBUTIONS TO BRITISH FOSSIL CRUSTACEA.

BY HENRY WOODWARD, F.G.S., F.Z.S.

(Continued from Page 261.)

[PLATE XVII.]

IV. **T**HE genus *Pseudoglyphea* was established in 1860<sup>1</sup> by the late Dr. Albert Oppel, of Munich, for certain remains of Crustacea occurring in the Oolite and Lias formations of Bavaria, &c., previously referred to the genus *Glyphea*, from which, however, he has separated them on account of the difference in the direction of the furrows which mark the regions of the cephalothorax. Whether these characters will be found to be supported by others, or, to be in themselves of sufficient importance to justify the retention of the genus, must be determined by more ample materials and a better acquaintance with the entire animals belonging to both genera than we are at present able to command.

After a careful examination of the large series of Oolitic specimens from the collection of the late Mr. William Bean, of Scarborough, preserved in the British Museum, I think it can be shown, that, in addition to the distinctive characters of the carapace, *Pseudoglyphea* had well-developed claws (chelæ) to the first pair of legs:<sup>2</sup> whereas in *Glyphea* the penultimate joint (from which the opposing fixed ramus of the chela is developed), only bears a small spine; so that the fore-legs in *Glyphea* may be said to be monodactylous. The specimen Fig. 1 in Plate XVII., is from the rich collection of Charles Moore, Esq., F.G.S., of Bath, and was obtained from the Lower Lias of Weston, near Bath. The nodule containing the fossil has been adroitly split open in a line with the body of the animal, and exhibits the left side of the cephalothorax, and five of the abdominal rings, and two of the side-swimming-plates of the telson, but the median plate is wanting, as is also the first abdominal segment.

<sup>1</sup> Palaeontologische Mittheilungen aus dem Museum des Koenigl. Bayer. Staates, von Dr. Albert Oppel, Stuttgart, 1862, p. 51.

<sup>2</sup> Xth. pair of appendages: see table of appendages of Crustacea, in Pal. Soc. Vol. xix., 1865, Monograph on the Merostomata, pp. 4 and 5.



I have little doubt in referring this to Hermann von Meyer's *Glyphea grandis*,<sup>1</sup> (since placed by Oppel in his genus of *Pseudoglyphea*,)<sup>2</sup> from the Lias of Tübingen. The carapace, which is finely granulated, measures two inches in extreme length, and nine lines in greatest breadth of side. Two nearly parallel furrows pass from the dorsal line obliquely across the side of the carapace, separating the branchial from the cardiac region, and terminating in a smooth rounded prominence on the hepatic region. The nuchal furrow, between the cardiac and gastric regions, is short and deeply indented; the frontal portion of the carapace is marked by two lines of small tubercles, converging towards the rostrum, which is short, but pointed (as in *Astacus*); the orbits are shallow. The abdomen is  $1\frac{1}{2}$  inch in length, the segments are granulated like the cephalothorax, the epimera are falcate and finely serrated upon their posterior borders. The plates of the telson are 7 lines in length and 4 lines in breadth; the exterior plate is divided near the lower margin by an oblique suture as in *Astacus* and *Homarus*. The long and slender walking legs can be seen imperfectly preserved, but their terminations are not visible. The anterior pair of legs were chelate but the evidence of this is derived from other examples.

I have already alluded to this example<sup>3</sup> as the *Pseudoglyphea Winwoodi*, sp. nov., but, after a further examination, I am obliged to refer it to H. von Meyer's species, *P. grandis*, which, although founded upon a less perfect example than that figured in our plate, appears nevertheless to be identical.

The following species of *Pseudoglyphea* have been enumerated by Dr. Oppel:—

- Pseudoglyphea grandis*, Meyer, sp. Lr. Lias, Tübingen; Weston.
- „ *Ettaloni*, Oppel, M. Lias, Pegney and Chalindrey.
- „ *amalthea*, Oppel, M. Lias, Boll, Wurtemberg.
- „ *stricta*, Etallon, U. Lias, Corlée, Normandy.
- „ *eximia*, Oppel, Oxfordian, Dept. Meurthe.
- „ *Terquemi*, Oppel, Oxfordian, Dept. Meurthe.

To this genus must also be referred the *Astacus Birdii*, of Bean, MS. from the Inferior Oolite, Peak, Yorkshire, and four other carapaces (to be hereafter figured), 1. from the Oolite beds, railway cutting, near Stamford, collected by Prof. Morris, (Mus. Brit.); 2. from the Lower Lias, Northampton, collection of Samuel Sharp, Esq., F.S.A., F.G.S.; 3. from the Oolite of Shotover, collected by W. Cunningham, Esq., F.G.S., (Mus. Brit.); 4. Middle Lias, Dundas, near Bath, collection of C. Moore, Esq., F.G.S. Two chelae, from the Cornbrash of Chippenham, probably also belong to this genus, but more evidence is needed before the species can be safely determined.

V. The detached cephalothorax (Plate XVII. Fig. 2) is referable to the genus *Glyphea*, as restricted by Dr. Oppel.<sup>4</sup> It was obtained by

<sup>1</sup> Neue Gattungen Fossiler Krebse aus gebilden vom Bunten sandstein bis in die Kreide, von Hermann von Meyer, Stuttgart, 1840, Taf. iv., Fig. 27.

<sup>2</sup> Palaeontologische Mittheilungen, p. 52.

<sup>3</sup> British Association Reports, Dundee, 1867, p. 46.

<sup>4</sup> Palaeontologische Mittheilungen, p. 56.



the Rev. H. H. Winwood, M.A., F.G.S., from the Lower Lias of Weston, near Bath, who kindly obliged me with a cast of it for examination.

The carapace, which measures 13 lines in length along the mesial line, and 13 lines in breadth across the branchial region, is so disposed upon the matrix as to exhibit both sides in nearly the same plane: I have observed several specimens in this condition from the Oolite of Malton, Yorkshire. The surface is finely granulated, the regions of the carapace are tumid, the nuchal furrow is deep and nearly transverse, the part anterior to it is marked by three ridges, disposed nearly parallel to each other, on either side of the median ridge; the cardiac region is separated from the branchial by two furrows, which commencing on the dorsal line  $2\frac{1}{2}$  lines from the posterior border of the carapace, extend forward in two diverging V-shaped lines down either side until they nearly touch the nuchal furrow, when the inner furrow is curved back, uniting with the outer, and encircling the hepatic region, it joins the nuchal furrow near the lateral margin.

I have carefully compared Fig. 2 with a large series of specimens from the Oolite of Yorkshire, Normandy, and Germany, and I find—although at first disposed to consider it specifically distinct—that I must refer it to the *Glyphea* (*Astacus*) *rostrata* of Phillips,<sup>1</sup> which, although usually larger in proportion, has precisely the same disposition of the regions and furrows of the carapace. The species occurs at Malton and Scarboro', in Yorkshire; at Besancon and Ru, near Vesoul, and some localities in Normandy; and Weston, near Bath. (Collns.: British Museum, and Rev. H. H. Winwood, F.G.S., Bath.)

VI. Another species of *Glyphea* (Plate XVII., Fig. 3) is from the Lower Lias of Lyme Regis, Dorset, and was collected by E. C. H. Day, Esq., F.G.S., formerly of Charmouth.

It measures 17 lines in extreme length, of which the carapace is 7 and the abdomen 10 lines. All the legs are monodactylous; the penultimate joint of the fore-leg is broad and flattened, the surface rugose; the rostrum is armed with several short, erect spines; the surface of the carapace on the branchial regions is scabrous; the body-segments are smooth, save near the epimera, when they become slightly rugose; the borders are falcate, and armed with minute spines. The antennæ are not preserved.

Although our specimen differs slightly from Dr. Oppel's figure of *Glyphea Heeri* [Palæontologische Mittheilungen, etc., Tab. 15, Fig. 1, from the Lower Lias, Schambelen by Mülligen, Baden, Canton Aargau], in the form of the distal end of the penultimate joint of the fore-leg, and in the more pointed form of the epimera of the abdominal segments, yet in other respects they appear to agree so closely, that I think it better to await more perfect materials before venturing to separate them. (The original is preserved in the British Museum.)

VII. The fourth crustacean figured on Plate XVII., Fig. 4, also

<sup>1</sup> Geol. Yorkshire, Part 1, Pl. IV., Fig. 20, from the Coralline Oolite.



belong to the genus *Glyphea*, and is from the collection of R. F. Tomes, Esq., who obtained it from the Lower Lias (zone of *Ammonites semicostatus*). Welford Hill, Stratford-on-Avon, Warwickshire.

The specimen exhibits the dorsal aspect in almost a perfect state; and is 2 inches in extreme length, of which the carapace measures 11 lines, the abdominal segments 9 lines, and the telson 4 lines.

The rostrum is 1 line in length; the carapace is strongly indented by the nuchal furrow 5 lines from its frontal border, the part anterior to the nuchal furrow being ornamented by two parallel lines of small tubercles on each side of the rostrum, the interspaces being smooth.

Two furrows, not differing greatly in position from those on the carapace of *Glyphea rostrata*, divide the cardiac and branchial regions, the surface of which is thickly studded with minute tubercles. The legs are slender and appear to be monodactylous. The epimera of the abdominal segments are obtuse and have a raised border; the surface of the segments was smooth and destitute of punctae or tubercles. The lamina of the tail are broad, and the exterior plate is divided transversely near its extremity by a line of suture, as already described in the genus *Pseudoglyphea*.

This elegant little crustacean cannot be referred to any published species with which I am acquainted; it nearly approaches the *Glyphea Münsteri*, of Voltz, from the Oxfordian of St. Scolasse, but they do not agree together in the divisions of the carapace; nor can it be referred to the *G. rostrata*, of Phillips. I have, therefore, fore, much pleasure in naming it *Glyphea Tomesii*, after the discoverer, R. F. Tomes, Esq.

#### EXPLANATION OF PLATE XVII.

- FIG. 1. *Pseudoglyphea grandis*, Meyer, sp. Lower Lias, Weston, near Bath, from the collection of Charles Moore, Esq., F.G.S., Bath.  
 FIG. 2. *Glyphea rostrata*, Phillips, sp. Lower Lias, Weston, near Bath, from the collection of Rev. H. H. Winwood, M.A., F.G.S., Bath.  
 FIG. 3. *Glyphea Heeri*, Oppel, Lower Lias, Lyme Regis. Original in the British Museum.  
 FIG. 4. *Glyphea Tomesii*, H. Woodward, Lower Lias, Welford Hill, Stratford-on-Avon, from the collection of R. F. Tomes, Esq., Corr. Memb. Zool. Soc.  
 [All the figures are drawn of the natural size.]

#### V.—NOTE BY PROFESSOR MORRIS, F.G.S., ON ORGANIC REMAINS IN THE SOMERSETSHIRE COAL-FIELD.

THE occurrence of invertebrate animal-remains in the Somersetshire Coal-field has not, I believe, been very frequently noticed. With the view of drawing attention to the subject, I send a brief notice of a few remains which I had the pleasure of collecting during a visit with Mr. J. Prestwich to this district, hoping that the local geologists, or members of the Natural History Societies, may be induced to record the observations they have made, or further prosecute enquiries into the occurrence of the animal-remains, either vertebrate or invertebrate, which may be associated with the rich and interesting flora of this Coal-field. Casts of bivalve mollusca (*Anthracoptera* ?) were detected in the coal-shale at Twerton, near