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ORIGINAL ARTICLES.

I.—CONTRIBUTIONS TO BRITISH FOSSIL CRUSTACEA.

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of the British Museum.

(PLATE XXII.)

VERY few deposits containing organic remains have yielded more beautiful Fossil Crustacea than our London clay formation. In evidence of this, one has only to turn to the beautiful series of plates which illustrate Professor Bell's Monograph, published by the Palæontographical Society (vol. x. 1857), illustrative of 15 genera and 19 species chiefly from the London area and the Isle of Sheppy.

Among the specimens which have lately come under my own notice, is a beautifully preserved example of the rare genus *Scyllaridia* of Prof. Bell, of which a single species, *S. Koenigii*, has been already described and figured by that gentleman.¹

The Crustacean which is figured on Plate XXII., Figs. 1, 2, is much smaller than *S. Koenigii*, and when perfect, probably did not measure more than two and a quarter inches in length, and not quite an inch in the breadth of its carapace; less, in fact, than half the size of *S. Koenigii*; both the upper and under surfaces are preserved in a very good state, as may be seen by referring to the enlarged Figs. 1a, and 1b, in our Plate, most ably drawn by Mr. A. T. Hollick.

Having carefully compared the fossil, both with the original description and with specimens of *S. Koenigii*, I am satisfied of its specific distinctness; and in naming it I beg leave to pay a tribute of respect and regard to my friend, Professor Bell, of Selborne, to whom I am indebted for much kindness in past years.

Scyllaridia Bellii, sp. nov. (Pl. XXII., Figs. 1 and 2.)

Description.:—Carapace very nearly as broad as long; finely granulated; frontal margin straight, equal in breadth to one-half the broadest part of the carapace; orbits occupying the latero-anterior angles of carapace, apparently less inclosed than in *S. Koenigii*, upper and inner orbital margin elevated; cervical furrow transversely dividing the cardiac and gastric regions near the

¹ See Monograph Fossil Malacostracous Crustacea of Great Britain, by Prof. Bell, F.R.S., F.G.S., Part I., "Crustacea of the London Clay," 1857, pl. viii., figs. 1, 2, 3, Palæontographical Society's Monographs, vol. x.

middle of the carapace for about one-third of its breadth, then passing in an oblique direction outwards and forwards, reaching the lateral margin in a deep and broad depression behind the orbits; gastric region strongly ridged, having one large and very prominent median tubercle midway between the rostrum and cervical furrow and two small lateral ones; hepatic region marked by one central tubercle, margin indented; cardiac region with a strong median ridge, ornamented with numerous small tubercles along its most elevated part; branchial region ornamented down the centre by a raised line marked by from four to five tubercles, border slightly tuberculated; basal joints of antennules small; those of external antennæ broad and flattened, as in other genera of this family; posterior border of carapace deeply arched; abdomen rounded, raised along the centre, epimera rounded and deeply grooved within the margin, surface finely granulated; segments decreasing in breadth from the second to the fifth (sixth and seventh segments wanting). Portions of the external maxillipeds only preserved; the three first joints of nearly all the five pairs of ambulatory limbs (coxopodites) have been preserved; near the base of the third pair may be seen the apertures of the efferent ducts of the ovaries; sternum somewhat deeply corrugated transversely, and relieved by five pairs of rather prominent tubercles, corresponding to the five thoracic somites which bear the five pairs of coxopodites or walking feet, from the bases of which latter they take their rise; the first pair of tubercles are very minute, and closely approximate to each other on the median line, each succeeding pair of tubercles increases in size and in distance apart just as the sternum increases in width from its anterior to its posterior border; they present the appearance of a double row of *mammæ*. The feet decrease in size from before backwards and are somewhat flattened in section, as in the recent *Scyllaridæ*.

Dimensions:—Length of carapace along the median line, 10 lines; length along the branchial and hepatic region, 1 inch; breadth at widest part, 10 lines; breadth of anterior border of carapace, 6 lines; breadth of posterior border, 8 lines; thickness from sternum to dorsal ridge, 7 lines.

Scyllaridia Bellii is readily distinguished from *S. Koenigii*, not only by its size, its more strongly-marked carapace,—rising to a very elevated ridge along the centre (see Fig. 2),—its more expanded branchial region and deeply-curved posterior border; but also in the relative openness of the orbital fossa in the former (in this respect offering an approach to *Thenus*, a genus allied to *Scyllarus*) as compared with the more perfectly inclosed orbit in the latter. Nor do I see any reason to doubt that the specimen here described is an adult individual. So far as its remains have been preserved to us, *Scyllaridia Bellii* is one of the most beautiful macrouran crustaceans found fossil, and when examined with a pocket-lens its minute details of structure are seen to be remarkably well preserved. It was obtained from the London-clay of Sheppy, and is now in the British Museum Collection.

I am indebted to my friend James Carter, Esq., of Cambridge, for sending me, some seven years since, a drawing of the caudal segments of a Crustacean, preserved in the Woodwardian Museum, which was believed to be, and was published at the time (with a note of interrogation), as referable to the genus *Squilla*.¹

This specimen was obtained from the chloritic marl (Lower Chalk) near Cambridge. About the same period, my late lamented brother, Dr. S. P. Woodward, F.G.S., when on a visit to Mrs. Smith, of Tunbridge Wells (shortly before the death of that venerable lady, and most excellent naturalist), obtained for me further evidence of this same Crustacean, in Mrs. Smith's museum,² from the Grey Chalk of Dover. Since that time, by the kind interest of W. Whitaker, Esq., F.G.S., of H. M. Geological Survey of England and Wales, I have obtained the loan of two other specimens of this fossil from the Hard Chalk-rock of Luton, in Bedfordshire, collected by J. Saunders, Esq., of that place.

Having since been kindly allowed by Professor Sedgwick to examine and compare the Cambridge example with those subsequently obtained, and also with the recent genus *Squilla*, I arrived at the conclusion that it was not among the Stomapods, but among the Isopods, that we must look for the allies of our Cretaceous fossil.

All the four fossil specimens exhibit, under a pocket-lens, the same peculiar pitted and wrinkled ornamentation which the artist has attempted to convey in Plate XXII., Figs. 3-6. This peculiar kind of ornamentation I found especially repeated in the *Ægidae*, the species belonging to which family are amongst the largest known Isopods, and are distinguished by "having their antennæ fixed in front of the head, the basal joint of the anterior pair being very broad and flat, and uniting together to form a margin in front of the head, not being concealed beneath the advanced cephalon; the outer foot-jaws have the basal joints moderately dilated, with three or four terminal joints, which are rarely palpiform; the *pereiopoda* (thoracic feet) are of moderate length, the anterior pair being generally the strongest, and fitted for prehension, being terminated by a robust curved finger, acute at the tip; whilst the hind-legs are gradually elongated and fitted for walking. The five segments of the *pleon* (abdomen) are very short, each on its underside supporting a pair of double foliaceous plates for respiration, whilst the last segment of the *pleon* (*telson*?) is large and flat, and bears on each side, near the base, a pair of flat appendages, scales arising from a basal joint, of which the inner angle is sometimes produced into a long style."³

I have figured an example of this family, the *Æga monophthalma*, Johnston (Pl. XXII., Fig. 7), for comparison with the fossil remains.

¹ See Salter and Woodward's Chart of the Genera of Fossil Crustacea, section Stomapoda, etc., fig. 19. Engraved by J. W. Lowry, and now sold by J. Stanford.

² The specimen was presented at the time by Mrs. Smith, of Tunbridge Wells, to the British Museum.

³ C. Spence Bate and J. O. Westwood, Hist. Brit. Sessile-eyed Crustacea, Part 17, June, 1867, p. 275. 8vo. Van Voorst.

In examining a large number of genera of recent Isopoda in the British Museum Collection, I noticed that the presence of a median ridge or keel to the telson or terminal joint was of rare occurrence in any species, the one figured in our plate being almost the only example met with. This character, combined with the finely dentated border of the telson, and the characteristic, punctate, and wrinkled ornamentation of the surface of the segments, led me to the conclusion that the genus *Æga*, offered the nearest living analogue to this fossil crustacean; and I therefore propose to name it *Palæga*, adding the specific name of *Carteri*, in honour of my friend James Carter, Esq., through whom I first became acquainted with this interesting fossil.

Description.—(Head and four anterior segments wanting.) Fifth, sixth, and seventh, thoracic, and five abdominal segments and telson present in Figs. 3, 4, and 6 (Fig. 5 uncertain, the telson being absent). Greatest breadth of body nearly equal to the length of eight segments, the relative proportion of length to breadth being about the same as in the living genus *Æga*. The abdominal segments preceding the telson are, however, slightly longer in proportion, in the fossil than in the recent form.

A line divides the thoracic segments transversely into two parts, the anterior being smooth and devoid of ornament, so as to admit of the free movement of the preceding and overlapping segment upon it, the posterior part being finely punctate and wrinkled; where not crushed, as in Fig. 3, the remains indicate that the terga were strongly arched as in *Æga*; the epimeral pieces are pointed and curved backwards; the fifth abdominal segment (that immediately preceding the telson) has no epimera visible; the telson is semi-circular in outline, somewhat broader than long, and has a slightly raised keel or ridge passing down its centre and terminating posteriorly in a small spine; the posterior margin is dentated; the lateral margin is ornamented along the border with a series of raised *plicæ*. None of the appendages are visible, save in Fig. 6, in which the pair of foliaceous plates attached to the terminal segment are clearly to be seen occupying the same position as in Fig. 7.

It is much to be hoped that further research may bring to light more perfect remains of this interesting group, of which we know so little in the fossil state, but which, from their abundance at the present day, were in all probability well represented in past times.

A form closely allied, if not identical with *Palæga Carteri*, occurs in the Miocene of Turin, and has been described by Sismonda under the recent genus *Sphæroma* as *S. Gastaldi*.¹

A comparison of the two recent genera, *Sphæroma* and *Æga*, with the fossil species, confirms me in the conclusion that *Palæga*, as already pointed out, is more nearly allied to the latter than to any other living genus of Isopods.

In *Sphæroma* the epimeral pieces are less recurved; the margin of the telson is less circular, and it is destitute of the median ridge

¹ Sismonda, Eug. Descrizione dei Pesci e Crostacei fossili nel Piemonte Taf. iii. fig. 10, in Mem. Accad. Torino, 2 Ser. Tom. 10. 1849.

or keel seen both in the recent *Æga monophthalma* (Plate XXII., Fig. 7), and the fossil *Palæga Carteri* (Plate XXII., Figs. 3-6). We prefer therefore to introduce the generic name *Palæga*, by which to distinguish the fossil forms, than to adopt the very objectionable alternative of referring to a recent genus, a doubtful and but partially known fossil.

Should Mr. Billings's discovery of the existence of legs in *Asaphus platycephalus* be found capable of general application to the *Trilobita*, we have in this group the earliest representatives of the *Isopoda*. Whilst admitting the desirability of the union of *Trilobita* and *Isopoda*, it should, however, be borne in mind that between these two groups important structural differences exist that cannot be lightly passed over: such, for instance, as the facial suture, the position of the eyes, and the trilobed character of the body-segments.

EXPLANATION OF PLATE XXII.

FIG. 1. *Seyllaridia Bellii*, sp. nov. dorsal aspect natural size (Coll. Mus. Brit.), London Clay, Sheppy.

2. *Seyllaridia Bellii*, side view of same, nat. size.

1a. " " dorsal aspect (enlarged) o, o, the eyes.

1b. " " ventral aspect (enlarged), m. position of maxillipeds, e. position of efferent orifice.

3. *Palæga Carteri*, sp. nov. Grey Chalk, Dover, nat. size (Coll. Mus. Brit.).

4. " " Chloritic Chalk, near Cambridge (Woodwardian Mus. Cam.)

5, 6. " " Chalk Rock, Luton, Beds. (Coll. J. Saunders, Esq., Luton).

7. *Æga monophthalma*, Johnston, N. British Coast, attached to Codfish (nat. size).

[In Fig. 3, the keel of the telson is not well seen, the surface of the tail segment being a good deal abraded, but the margin shows the mucro and the characteristic dentated border observable in the Cambridge specimen, Fig. 4.]

(To be continued.)

II.—NOTES UPON THE OCCURRENCE OF THE POST-PLIOCENE DRIFT OF CHARNWOOD FOREST.

By W. C. LUCY, F.G.S., Gloucester.

DURING the investigations I made on the "Post-Pliocene Gravels of the Severn, Avon, and Evenlode, and their extension over the Cotteswold Hills," the result of which I embodied in a paper read before the members of the Cotteswold Club in the early part of 1869, and is now published in their "Proceedings," many of the boulders found by me, on examination by R. Etheridge, Esq., of Jermyn Street, were determined to be syenite and granite from Charnwood.

Being naturally anxious to see the rocks *in situ*, from which they were derived, I recently made an excursion to the Forest, taking up my quarters at a central position, the picturesque village of Woodhouse Eaves.

My first walk was to Mount Sorrel, and on my way I was much surprised to see a good deal of flint and drift, having heard that there was no distinct evidence that that part of the country had been submerged since the deposition of the New Red. After visiting the quarries, under the able guidance of the manager, Mr. Hamblyn, I