

IV.—ON A NEW SPECIES OF *ERYON* FROM THE UPPER LIAS,
DUMBLETON HILL.

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VARIOUS forms of Macrourous Decapod Crustacea referable to the genus *Eryon* have attracted my attention from an early date,¹ and in the GEOLOGICAL MAGAZINE for 1888² I gave a summary of all the then known species. The following seven species are British:—

- Eryon* (*Coleia*) *antiquus*, Broderip, sp., 1840. Lower Lias, Lyme Regis.
- E. Barrovensis*, M'Coy, 1849. Lias, Barrow-on-Soar.
- E. Brodiei*, H. Woodw., 1866. Lower Lias, Lyme Regis.
- E. crassichelis*, H. Woodw., 1866. Lower Lias, Lyme Regis.
- E. Wilmcotensis*, H. Woodw., 1866. Lower Lias, Wilmcote.
- E. Moorei*, H. Woodw., 1866. Upper White Lias, Ilminster.
- E. Stoddarti*, H. Woodw., 1881. Stonesfield Slate, Oxfordshire.

The sixteen species given below are all foreign:—

- Eryon* (*Escheri*), Oppel, 1862. Lower Lias, Schambelen, Switzerland.
- E. Edwardsi*, Moriere, 1864. Upper Lias, Calvados.
- E. Calvadosi*, Moriere, 1883. Upper Lias, Calvados.
- E. Hartmanni*, v. Meyer, 1862. Upper Lias, Boll, Württemberg.
- E. Perroni*, Etallon, 1858. Oxfordian, Haute Saône.
- E. arctiformis*, Schlot., 1820.
- E. bilobatus*, Münst., 1839.
- E. elongatus*, Münst., 1839.
- E. longipes*, Fraas, 1855.
- E. Oppeli*, H. Woodw., 1866.
- E. orbiculatus*, Münst., 1839.
- E. propinquus*, Schlot., 1822.
- E. Redenbacheri*, Münst., 1839.
- E. Schuberti*, v. Meyer, 1836.
- E. spinimanus*, Gernar, 1827.
- E. Neocomiensis*, H. Woodw., 1881. Lower Cretaceous, Silesia.

} Kimmeridgian Group, Lithographic
Stone, Solenhofen.

I have recently received from Mr. Linsdall Richardson, F.R.S.E., F.G.S., the Honorary Secretary of the Cotteswold Naturalists' Field Club, Cheltenham, a specimen of *Eryon* from the Upper Lias of Dumbleton Hill, near Beckford, Gloucestershire (see Fig. 2), which appears to represent a species of that genus new to this country, but closely allied to a small group comprising three species, namely, *Eryon propinquus*, Schlot., sp., *E. orbiculatus*, Münst., and *E. elongatus*, Münst., all from the Lithographic Stone of Solenhofen, in Bavaria, and of Kimmeridgian age, characterized by the more rounded form of their carapaces when compared with such species as *E. Barrovensis*, M'Coy, *E. Brodiei*, H. Woodw., *E. antiquus*, Broderip, sp., and *E. arctiformis*, Schlot., sp.

We subjoin a figure of the under-side of *Eryon propinquus*, Schlot., sp. (Fig. 1), from the Lithographic Stone of Mörsheim, near Solenhofen, Bavaria (see Oppel's *Pal. Mittheil.*, 1862, tab. i, fig. 2). In this specimen all the appendages are most beautifully preserved—indeed, quite as well as in a living form. Two specimens, almost equally perfect, may be seen in the Haberlein Collection, also from the Lithographic Stone of Solenhofen, in the British Museum (Nat. Hist.), Department Geology, Gallery VIII, Wall-case Crustacea.

¹ See Quart. Journ. Geol. Soc., vol. xxiii, p. 493, pls. xxiv, xxv, 1866.

² pp. 433–41, Pl. XII and Text-figs.

Dr. W. T. Calman¹ places the Eryonidea under the

Sub-order 2. REPTANTIA, Boas (1880).

“Body not compressed, often depressed; rostrum often absent, depressed if present; first abdominal somite distinctly smaller than the rest; legs strong, the first pair usually, the others never, stouter than their fellows, basipodite and ischiopodite almost always coalesced in the first pair, generally also in the others, two fixed points in the carpo-podal articulation, exopodites never present, podobranchiæ often on some of the first four pairs; male genital apertures on coxopodites or on sternum; pleopods often reduced or absent, not used for swimming.”

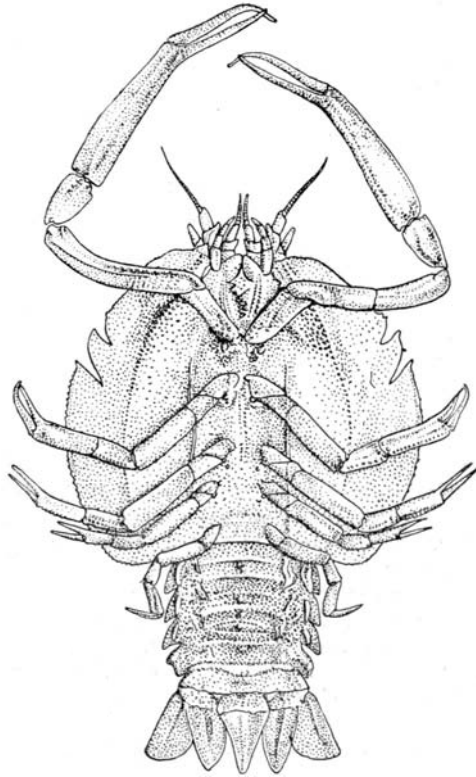


FIG. 1. *Eryon propinquus*, Schlot., sp. Lithographic Stone: Solenhofen, Bavaria.

[Reproduced by permission from Sir Ray Lankester's *Treatise of Zoology*, pt. vii, Appendiculata, fasc. iii, Crustacea, by Dr. W. T. Calman, p. 308, fig. 185.]

Section 1. PALINURA.

Tribe 1. ERYONIDEA.

“Antennæ with exopodite, first segment not fused with epistome, first four pairs, or all the legs, chelate, first pleopods present.”¹

¹ See in Lankester's *Treatise of Zoology*, pt. vii, Appendiculata, fasc. iii, Crustacea, by W. T. Calman, 1909, p. 312.

Condition of the specimen.—The Dumbleton specimen is a natural counterpart of the under-side of the carapace, carrying with it the greater part of the test, and thus exposing an inner view of it and of the three anterior segments of the abdomen attached to it; the minute punctate ornamentation of the surface being caused by the observer

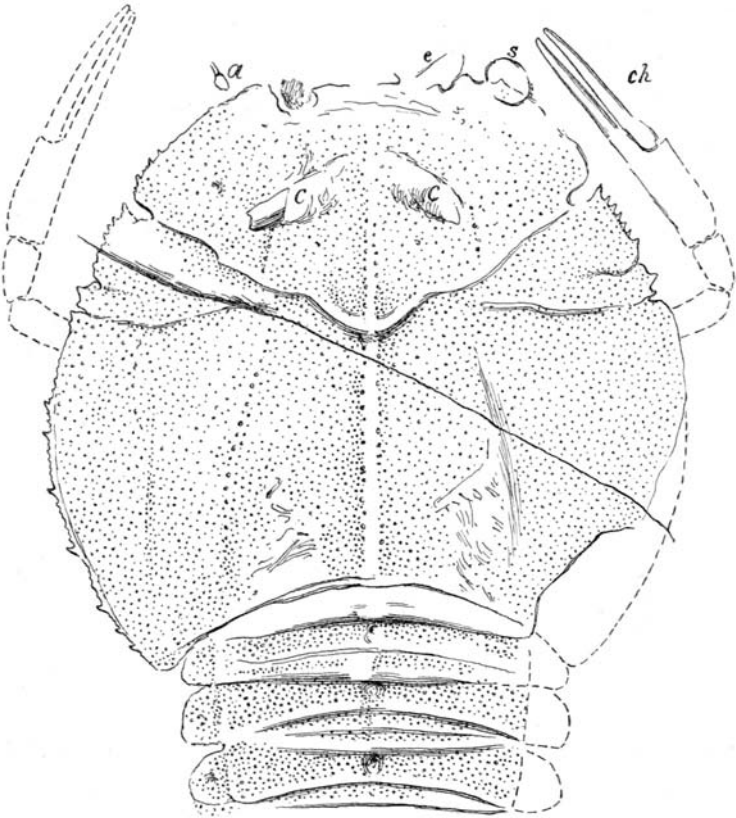


FIG. 2. *Eryon Richardsoni*, sp. nov. Nat. size. Upper Lias: Dumbleton Hill, near Beckford, Gloucestershire. *a*, portion of one of the antennules detached; *e*, scale at base of right antenna; *s*, section of a broken limb detached and displaced; *c, c*, part of basal joints of large chelæ; *ch*, portion of large chela on right side (the missing parts of both chelæ are restored in dotted lines).

seeing the under-side of the finely tuberculated free surface, which is still partly adhering to the matrix and partly to the other corresponding slab which is evidently missing. The breadth of the carapace is rather greater than the length, its contour being nearly circular; the posterior border is arcuate and broadly incurved, the postero-lateral border is rather contracted, and its angles slightly produced

backwards. The margin along the branchial region is entire, broadly and gently rounded, its border finely serrated, having five or six rather larger spines at irregular intervals. The carapace contracts slightly in breadth towards the cervical ridge¹ where the first marginal indentation is seen, in front of which is a small, rather obtuse, marginal tooth, marked by a slight notch in front and by a branch of the cervical 'furrow' behind; this is succeeded (anteriorly) by a second roundly incurved marginal tooth, twice the breadth of the last one, with a rounded border and sharply pointed spine directed forwards and marked off anteriorly by a well-defined notch and by the superior branch of the cervical 'furrow'.¹ The margin again expands slightly, and then curves rapidly inwards until it forms with a spine the outer angle of the orbital fossa. The anterior frontal border (with the antennules and antennæ) has been much crushed and can only be imperfectly defined. The eyes are not preserved, but on the right side there is a portion of one of the large chelæ seen in section lying in the orbital fossa (*s*). Width of the anterior border of carapace, 3 cm.; width across the broadest part of the carapace (behind the cervical ridge¹), 9 cm.; width at posterior border, 6 cm.; length of carapace along the dorsal line, 7 cm. The cervical ridge occupies its centre and forms a concave curve backwards 15 mm. in breadth, being $3\frac{1}{2}$ cm. behind the anterior and $3\frac{1}{2}$ cm. in front of the posterior border. It bifurcates at 10 mm. on either side of the dorsal line, enclosing between its branches the two tooth-like serrations on the lateral border. Two curved furrows² cross the posterior portion of the carapace, the inner pair at 15 mm. distance on either side of the straight dorsal line at the hinder border, but converging to 10 mm. at the cervical furrow; the outer pair are more faintly marked. The dorsal ridge and the two lateral lines nearest to the dorsal line (marked by slightly larger tubercles) extend from the cervical furrow to the anterior margin of the carapace.

Traces of the basal joints of the large anterior pair of chelate legs are seen on the anterior part of the carapace at *c*, and one of the chelæ is seen upon the slab in its normal position (*ch*). The three anterior abdominal segments still remain attached to the cephalothorax, and measure together $3\frac{1}{4}$ cm. in length and 5 cm. in breadth. Each segment is broadest near its margin, and is strongly corrugated transversely, the back and front ridges of each segment converging on the dorsal line, and each segment is marked by a very prominent tubercle which we see as a hollow on the under-side. These transverse ridges and furrows give attachment to the muscles for flexing the abdominal segments and the rhipidura or tail-fan in swimming. The central portion of each segment is ornamented with minute tubercles, but the interlocking and overlapping anterior and posterior borders are smooth.

¹ This would, on the exposed upper surface of the carapace, be seen to be a furrow, but is here seen from beneath as a ridge.

² But for the fact that we are looking at the under-surface, both the dorsal and lateral furrows would appear as ridges upon the upper surface of the carapace, whilst the cervical furrow (which is really a furrow) appears as a ridge when seen from underneath.

When compared with other species of the genus, so far as its imperfectly preserved condition admits, we notice that the Dumbleton specimen (Fig. 2) has a small additional posterior tooth upon the margin of the carapace near the cervical furrow, and that the cervical furrow is distinctly bifurcated. This is seen to be the case in *Eryon Moorei*, H. Woodw. (Q.J.G.S., vol. xxii, p. 499, pl. xxv, fig. 3, 1866), in *E. Brodiei*, H. Woodw. (op. cit., p. 498, pl. xxiv, fig. 2); probably also in *E. crassichelis*, H. Woodw. (op. cit., p. 497, pl. xxv, fig. 2), and in the recent *Pentacheles euthrix*, W. Suhm, "Challenger" Report (see also GEOL. MAG., 1888, p. 439, fig. 2), but not noticeable in the other species of this genus.

Although the above characters may be considered minor distinctions, yet, taken along with the fact of the extremely rounded contour of the carapace in the Dumbleton specimen (Fig. 2), a feature observed only in three, or possibly four, other species (for *E. crassichelis* may perhaps also have had a rather circular carapace), and being probably the first of these circular forms of *Eryon* observed in our English Lias, I venture to designate it as *E. Richardsoni* after its discoverer, Mr. Lindsall Richardson, F.R.S.E., F.G.S., the energetic Secretary of the Cotteswold Club, to whom I am indebted for the opportunity to figure and describe it.

The specimen is to be placed in the Cheltenham Town Museum, and forms a part of the 'Holland Collection'.

REVIEWS.

I.—A NEW VULCANOLOGY.¹

(Concluded from the June Number, p. 273.)

WE now come to the portion of the book which will attract most attention, the portion, that is, which deals directly with the function of water in volcanic phenomena. An account is given of the methods employed in the *quantitative determination of water in natural volcanic emanations*. Two methods are used in the field—(1) condensation, (2) hygrometry. Specimens are also taken in sealed tubes to the laboratory, and there examined either hygrometrically or by absorption over phosphoric anhydride.

The wealth of experimental and observational data which follows may be illustrated by a few selected examples. Brun's main thesis is that paroxysmal eruptions are *anhydrous*, while solfataric eruptions owe their *aqueous* character solely to the invasion of volcanic foci by superficial waters as soon as the temperature of the latter falls sufficiently.

A summary of observations made at *Vesuvius* in April, 1906, may be taken as typical.

1. Near the crater the ashes fell quite dry. They continually gave rise to avalanches, and once they were mixed with the air in this manner they entrapped myriads of bubbles, forming an emulsion which

¹ *Recherches sur l'exhalaison volcanique*, by Albert Brun, Chemist, L.Sc.Ph. Sorbonne, D.Sc.Ph. (*honoris causa*) Geneva. A large quarto volume, 227 pages, 16 text-figures, 27 photographic plates, and 7 panoramas. Price 30 francs.