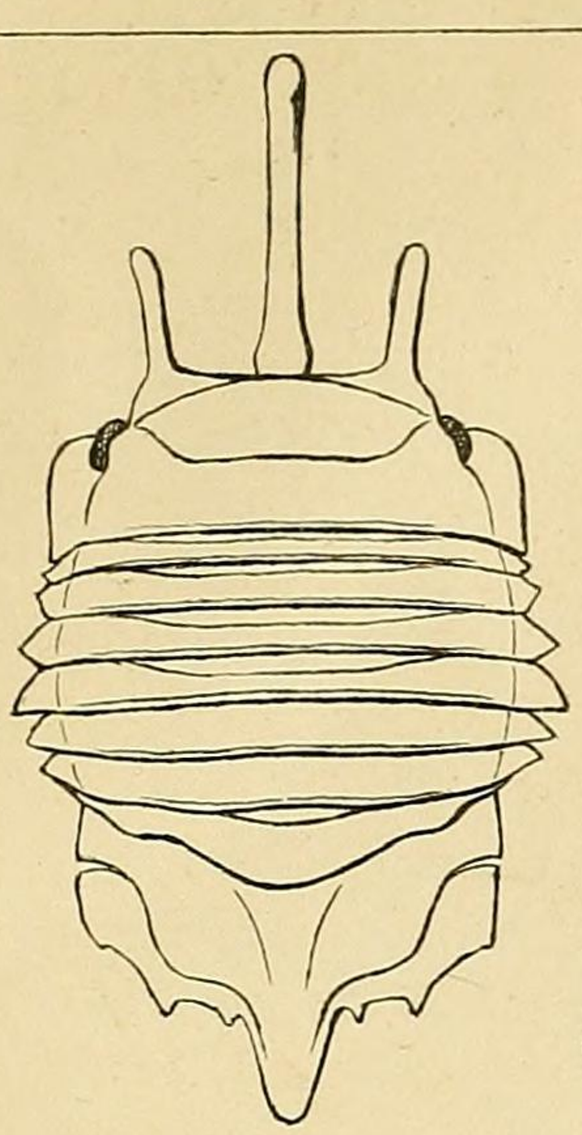

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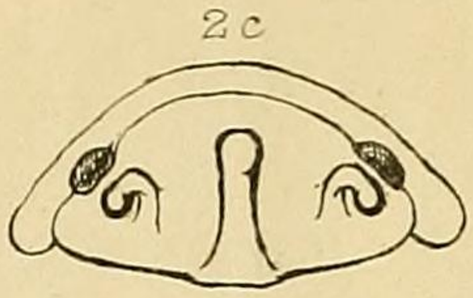

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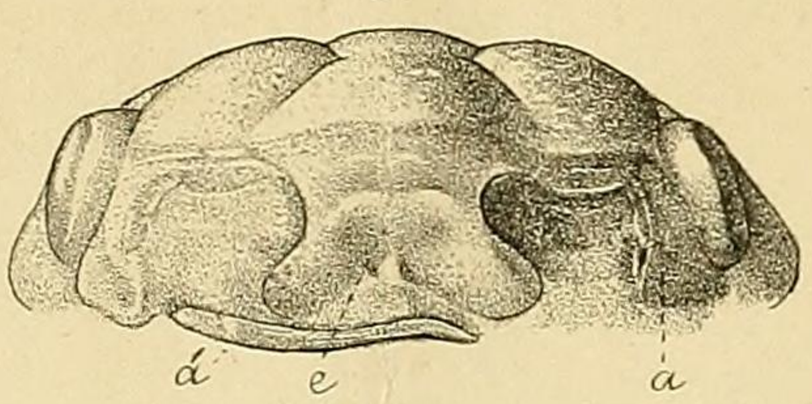

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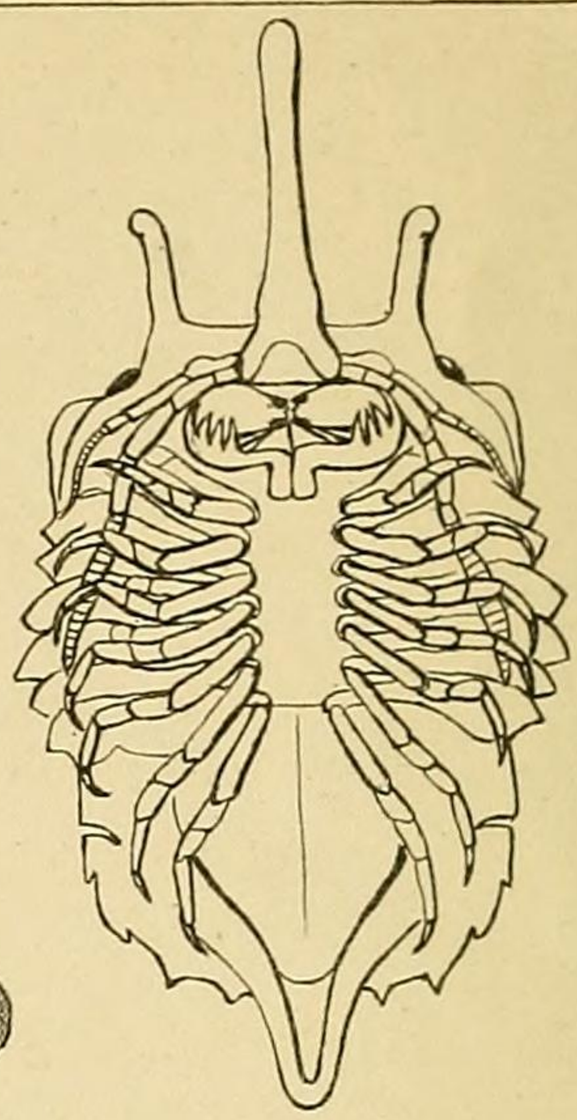

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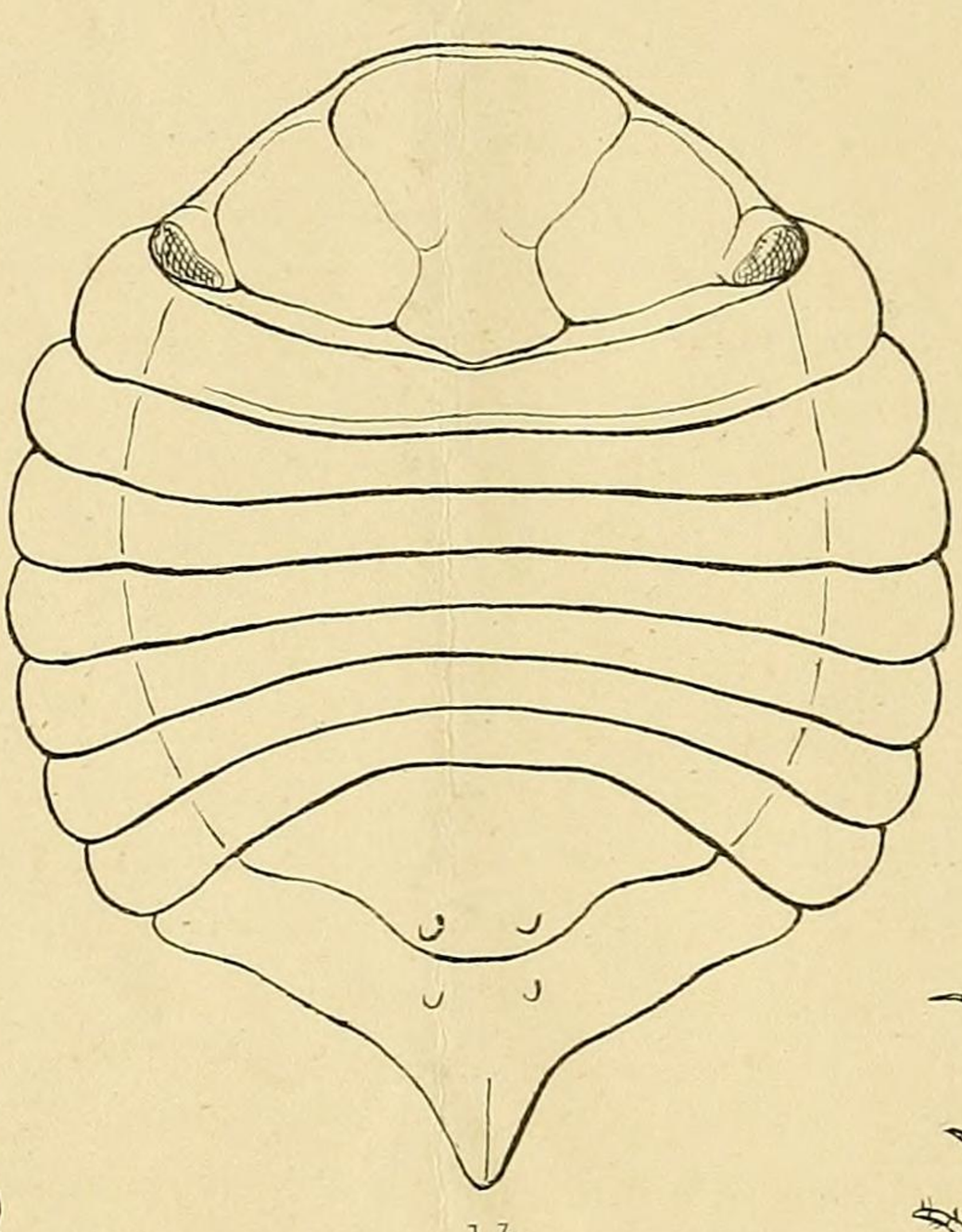

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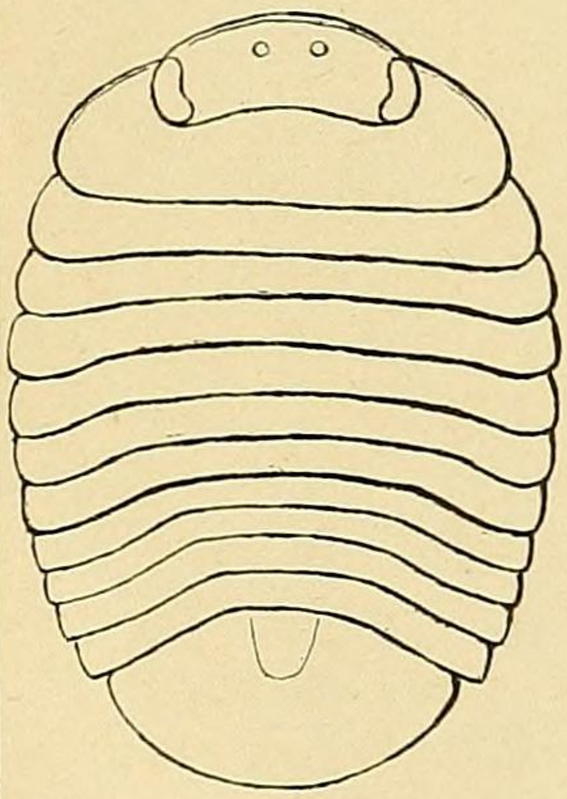

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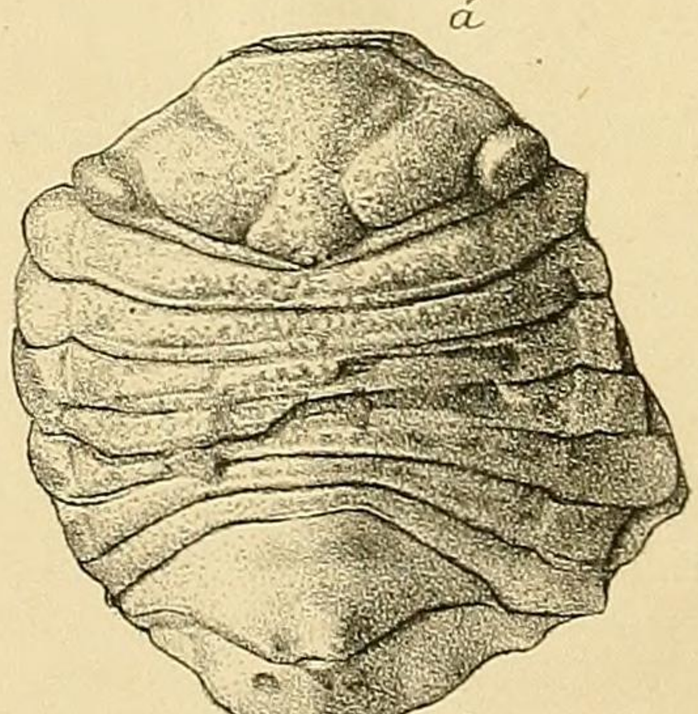

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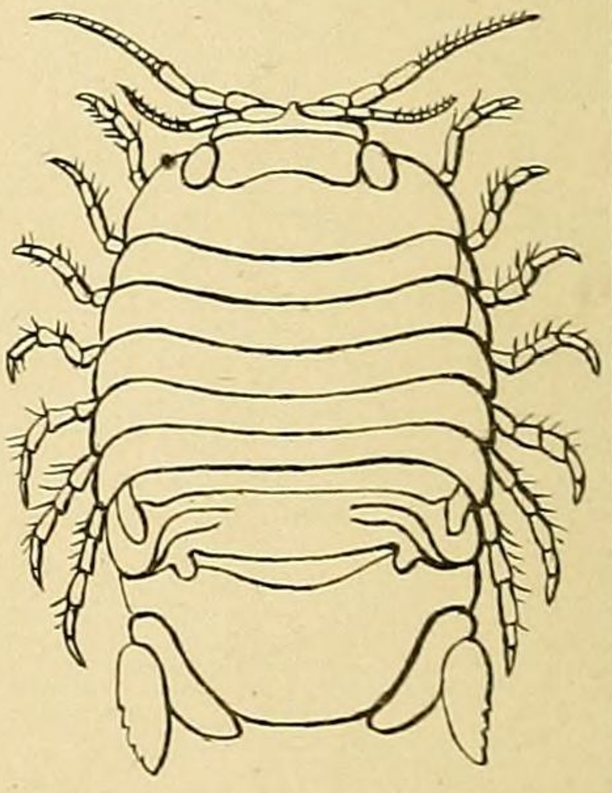

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# A new British Isopod

## Cyclosphæroma trilobatum, *H. Woodw.*

THE

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## ORIGINAL ARTICLES.

### I.—On a New British Isopod (*Cyclosphæroma trilobatum*) from the Great Oolite of Northampton.

By Henry Woodward, LL.D., F.R.S., F.G.S.

(PLATE XV.)

MR. THOMAS JESSON, B.A., F.G.S., of Great Houghton House, Northampton, was lately so fortunate as to discover in the Great Oolite of that county, a new and most interesting example of an Isopodous Crustacean, which, by his kindness, I am permitted to figure and record in the Geological Magazine.

The last-described British Isopod was obtained from the Upper Greensand of Cambridge, and made known by Mr. James Carter, F.G.S., in this Magazine.[1] In his paper Mr. Carter gives a careful résumé of our knowledge of the species of this order which have hitherto been found in a fossil state, both British and Foreign, and it will therefore be sufficient, for our present purpose, to refer the reader to that admirable summary.

The specimen, which forms the subject of this article, was found imbedded in compact white crystalline limestone; only the upper surface of the cephalon, the body-segments and the telson being exposed (see Plate XV. Fig. 1*a*). About one-half of the fossil, consisting of the cephalon and the anterior thoracic segments, has the outer crust or shell preserved; the posterior segments, the abdomen and telson are seen as a sharp cast of the animal in the fine calcareous matrix. The margins of the cephalon, the segments and telson have suffered considerably in the process of removal from the parent-rock in which they had been enclosed, thus leaving much to be desiderated before we can obtain a complete and satisfactory knowledge of the fossil.

The epistomial plate, together with traces of the antennules and antennæ, can be made out in front of the cephalon (Pl. XV. Fig. 1*c*); also the basal portion of the left uropodite on the side of the telson.

A careful comparison of Mr. Jesson's specimen with several recent and fossil forms, has satisfied me that it should be placed in the Isopoda, and in the Family Sphæromidæ, of which I here subjoin a brief diagnosis, summarized from Messrs. Spence Bate and J. O. Westwood's excellent work.[2]

[1] See Geol. Mag. 1889, pp. 193–196, Pl. VI. Figs. 1–7.

[2] A History of the British Sessile-eyed Crustacea, by C. Spence Bate and J. O. Westwood, 1868, in 2 vols.; vol. ii. p. 398, etc.

*Sphæromidæ.*—Body short, broad, and very convex; often contractile into a ball; foot-jaws elongated; in some species the terminal joint is not dilated at the inner apical angle, so as to become palpiform; the head is large and transverse, and in *Sphæroma* the first segment of the thorax is laterally anteriorly produced so as to reach the anterior margin of the cephalon which it embraces on either side (see figure of *Sphæroma serratum*, Fabr. sp., Plate XV. Fig. 3). The mandibles robust and angulated at the extremity, the tips formed into sevaral distinct teeth, below which is a strong molar tubercle. Externally, also, the mandibles are furnished with a palpiform three-jointed appendage. The segments of the thorax do not exhibit, when viewed dorsally, the epimera-like structure of the basal joints of the legs observable in the *Idoteidæ*. The basal segments of the tail (abdomen) are more or less rudimentary, and are in general soldered together, more or less completely, so as to form, apparently, only a single joint, which in many species is furnished with large tubercles or spines.

CYCLOSPHÆROMA, H. Woodw., gen. nov.

General outline nearly circular, almost as broad as it is long. Cephalon rounded and tumid in outline; eyes moderately large, cornea vitreous; thoracic segments seven in number, broader than head-shield or telson, first segment coalesced with the cephalon; segments of abdomen coalesced together, but telson apparently distinct. Appendages ? (imperfectly preserved).

CYCLOSPHÆROMA TRILOBATUM, H. Woodw., gen. et sp. nov. (Pl. XV. Figs. 1*a*, *b*, and *c*.)

*Description.*—Outline of cephalon elliptical, twice as broad as long; glabella tumid, divided by strongly-marked furrows into three well-defined regions, a central, and two lateral parts; the central portion of the glabella is broadest in front, much constricted near the centre, expanding again into a small pentagonal area behind, where it unites with the first thoracic somite.

The two lateral lobes are ovate-oblong in form, broader in front, and narrower behind, where they abut against the constricted centre of the median lobe. The eyes, which are reniform in outline, and measure 5 mm. in length by $2\frac{1}{2}$ mm. in breadth, occupy the outer posterior angles of the two lateral lobes; the cornea is smooth and glassy, but exhibits distinct facets within (when viewed under a good platyscopic lens). A narrow ridge separated by a double furrow marks the line of division between the cephalon and the first thoracic segment, which in the living *Sphæroma* usually encloses the posterior and lateral margins of the cephalon, with which it is more or less completely united.[1]

[1] In the majority of the Isopoda the "head" segments become fused with the first segment of the thorax, and form a cephalic shield which is freely movable upon the second thoracic segment. In *Serolis* the first and second thoracic segments are closely united, and completely fused dorsally, though the sterna of the two remain distinct; in some species an incomplete transverse suture upon the first epimera seems to mark the line of division between the two segments dorsally; in others the

Viewed from the front (see Pl. XV. Fig. 1*c*) the strongly-marked trilobation of the cephalon is still more clearly seen. The epistomial plate is observable attached to the frontal margin of the glabella; resembling somewhat a short heraldic "label," with two pendant square ends. Traces of the antennules and antennæ occupy the lateral frontal margin of the cephalon, which is deeply excavated on each side for the articulation of their broad basal joints.

The eyes stand out from the antero-lateral angles of the cephalon, the superciliary border being formed by the projecting margin of the lateral lobes, of the head and the inferior border by the encircling lateral margin of the first thoracic segment, which here unites with the front margin of the head-shield (cephalon).

*Thoracic segments.*—There are seven thoracic segments between the cephalon and the abdomen; each segment is very strongly corrugated, and is narrower in the centre along the median dorsal line, but more expanded towards its free margins or epimera. The first thoracic segment is, without doubt, united to the cephalon, and curves around the lateral margins of the head-shield; the second thoracic segment is also curved somewhat forward at its epimeral margins; the third and fourth are nearly straight; the fifth, sixth, and seventh segments curve rather backwards, being nearly twice as wide at the epimera as on the median dorsal line. The epimeral border of each segment is distinctly marked off and defined by a clear lateral line of division crossing all the segments from near the outer angle of the eye on each side to the anterior outer angle of the abdomen (see Pl. XV. Figs. 1*a*, 1*b*). The posterior margin of the cephalon and that of each thoracic segment, has a narrow raised border, separated by a furrow from the rest of the segment, forming the line of articulation between each segment and the one immediately succeeding it; this union is further strengthened by the enarthroidal articulation of each segment with its neighbouring one near its epimeral border.

Owing to the decorticated condition of the posterior portion of the fossil, any indication of the former divisions of the coalesced segments in the abdomen which may have existed in the crust are wanting; but we have evidence on the cast of two, or more, strong protuberances on this region of the body. The abdomen is two and a half times as broad as it is long, being extremely narrow laterally, somewhat rhomboidal in outline, and must have had spines along its posterior border. Behind the abdomen the body terminates in a "telson," or caudal shield, nearly three times as broad as it is long, but some of the margin of this shield has probably been lost. It had two powerful sub-median spines near the anterior border, and one in the centre near the posterior extremity, which is acutely pointed. The sides are strongly curved and hollowed out for the reception of the flat curved inner lobe of the lateral appendages

epimera of the two thoracic segments are completely united, and show no traces of their original distinctness; these epimera are always largely developed, and completely inclose the cephalic shield on both sides (Frank E. Beddard, Report on the Isopoda collected by H.M.S. "Challenger," during the years 1873–76. Part I. *Serolis*: Zoology, vol. xi. 1884, p. 8).

(uropodites), beneath which the outer lobe is generally concealed. Traces of these, and of the walking appendages of the thorax, can, unfortunately, only be made out in sections in the matrix. The surface of the head-shield and segments, as far as it has been preserved, is curiously carunculated, and the thoracic segments are also ornamented with lines of small tubercles varying in size; save the large spines and prominences which ornament the abdomen and telson, we are unable to speak on account of these portions having been decorticated; but we may fairly conclude that the surface was carunculated like the head-shield. There is a tendency towards a median line of small tubercles down the dorsum, commencing with a rather prominent one in the centre on the posterior border of the cephalon.

*Dimensions.*—Greatest breadth of cephalon, 25 millimètres; length 13 mm.; greatest breadth of thorax 33 mm.; length of seven thoracic segments on median line 13 mm.; length of abdomen and telson united 15 mm. Total length of fossil 41 mm.

*Formation.*—Great Oolite. *Locality.*—Northampton.

In the cabinet of Thomas Jesson, Esq., B.A., F.G.S.

*Observations.*—This is certainly one of the most curious examples of fossil Isopods I have yet seen. Its remarkably-shaped cephalon recalls to mind the genus *Lichas* amongst the Trilobites, but the general form is that of a true Isopod; nevertheless there are several points of great interest in the fossil before us. Besides the trilobation of the head-shield, one cannot fail to notice the prominent marginal eyes inclosed by the first thoracic somite, as is the case in the living genus *Sphæroma*. This segment, in *Sphæroma*; and the first and second thoracic segments united to the head in *Serolis* (see footnote p. 530), are no doubt homologous with the genal portion (or "free-cheek" of Salter) in the head-shield of the Trilobites, thus affording another link by which to connect the modern Isopoda with the ancient and extinct Trilobita.[1]

I know of only one living form among the *Sphæromidæ* having such strong ornamentation upon the segments, head-shield and telson as is seen in *Cyclosphæroma*; I allude to the curious little form obtained by Dr. Milligan, at Flinder's Island, Bass's Straits, and named by the late Adam White *Ceratocephalus Grayanus*, MS.[2] (see Pl. XV. Figs. 2*a*, *b*, *c*). It has three horn-like prominences on its head-shield, and the telson has the same prolonged pointed termination as in our fossil, with similar protuberances and rugosities on its abdominal shield.

From *Archæoniscus* (Pl. XV. Fig. 4) the only other British Isopod from the Oolitic Series, *Cyclosphæroma* entirely differs, that Purbeck genus being now referred to the *Ægidæ*[3] on account of its free abdominal segments.

[1] See remarks in Monograph on the British Carboniferous Trilobites, by H. Woodward, Pal. Soc. Mon. 1883-84, p. 76.

[2] See Article "Crustacea," Encyclopædia Britannica, 1877, ninth edition, vol. vi. p. 659, fig. 72, A–E, by H. Woodward.

[3] See my paper "On Eocene Crustacea from Gurnet Bay, Isle of Wight," Quart. Journ. Geol. Soc. 1879, vol. xxxv. pl. xv. pp. 342-350, on *Archæoniscus*, p. 349.

Taking a review of the fossil Isopoda, we may venture to arrange them provisionally as follows:—

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|---|---|
| I. Bopyridæ. | *Bopyrus*, sp. (parasitic under carapace of *Palæocorystes*), Upper Greensand, Cambridge. |
| II. Ægidæ. | *Palæga*, 4 species, 2 Cretaceous, 2 Tertiary.<br>*Ægites*, 1 species, Oolite, Solenhofen.<br>*Archæoniscus*, 2 species, Purbeck, Swanage, etc. |
| III. Arcturidæ. | *Præarcturus*, 1 species, Old Red, Hereford.<br>*Arthropleura*, 1 species, Coal Measures. |
| IV. Sphæromidæ. | *Sphæroma*, 4 species, Tertiary, Italy, Calabria, etc.<br>*Eosphæroma*, 2 species, Eocene, Isle of Wight.<br>*Eosphæroma* (=*Palæoniscus*), 2 species, Eocene and Miocene.<br>*Archæosphæroma*, 1 species, Miocene, Bohemia.<br>*Cyclosphæroma*, 1 species, Great Oolite, Northampton.<br>*Cymodocea*, 1 species, Tertiary. |
| V. Oniscidæ. | *Oniscus*, 1 species, Tertiary (in amber).<br>*Triconiscus*, 1 species, Tertiary (in amber).<br>*Porcellio*, 3 species, Tertiary (in amber).<br>*Armadillo*, 1 species, Miocene, Oeningen. |

## EXPLANATION OF PLATE XV.

Figs. 1–*a*, *b*, *c*. *Cyclosphæroma trilobatum*, H. Woodw., sp. nov., Great Oolite, Northampton.

Fig. 1*a*. Specimen natural size (*á* position of flagellum of antenna).

Fig. 1*b*. The same as fig. *a*, enlarged 1½ times.

Fig. 1*c*. The same, front view of cephalon, *a* antennule; *á*, part of the antenna; *e* epistomial plate.

Figs. 2*a*, *b*, *c*. *Ceratocephalus Grayanus* (A. White, MS.) living; Bass's Straits (Mus. Brit. collection), about 4 times natural size.

Fig. 2*a*. dorsal aspect.

Fig. 2*b*. ventral aspect.

Fig. 2*c*. frontal aspect of head.

Fig. 3. *Sphæroma serratum*, Fabr. sp. (length of living specimen about half an inch). English and French coasts, found under stones.

Fig. 4. *Archæoniscus Brodiei*, Milne-Edwards, Purbeck, Swanage, Dorset (magnified 3 times), now referred to the *Ægidæ*.

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## II.—Note on the Effect of Pressure upon Serpentine in the Pennine Alps.

By Prof. T. G. Bonney, D.Sc., LL.D., F.R.S., F.G.S.

In some parts of the Alps serpentine is by no means a rare rock; indeed it is commoner than some geologists (myself included) once supposed, because much that was formerly comprehended under the term 'serpentinous schist' now proves to be true serpentine modified by the effects of pressure.

An Alpine serpentine, when in its most normal condition, so far as I have seen—and my experience is a fairly wide one—varies usually in colour from a dark green to almost black, a red tint being rare. Sometimes it is veined with a lighter green, and the rock that has been affected by pressure is usually of a paler colour, ranging from a fairly rich sage-green to a light greyish-green, the change being no doubt, in part at least, the result of weathering. Small grains of magnetite or chromite may often be detected. Except for this, the structure—apart from the results of mechanical action—is usually compact, though varieties with glittering crystals of bronzite and allied minerals occur. In this case the rock presents a con-