THE

# QUARTERLY JOURNAL

OF THE

# GEOLOGICAL SOCIETY OF LONDON.



EDITED BY

THE ASSISTANT-SECRETARY OF THE GEOLOGICAL SOCIETY.

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Quod si cui mortalium cordi et curæ sit non tantum inventis hærere, atque iis uti, sed ad ulteriora penetrare; atque non disputando adversarium, sed opere naturam vincere; denique non belle et probabiliter opinari, sed certo et ostensive scire; tales, tanquam veri scientiarum filii, nobis (si videbitur) se adjungant. —*Novum Organum, Præfatio.*

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VOLUME THE FIFTY-FOURTH.

1898.



LONDON:

LONGMANS, GREEN, AND CO.

PARIS: FRIED. KLINCKSIECK, 11 RUE DE LILLE; F. SAVY, 77 BOULEVARD ST. GERMAIN

LEIPZIG: T. O. WEIGEL.

SOLD ALSO AT THE APARTMENTS OF THE SOCIETY.

MDCCCXCVIII.

# 4. A Contribution *to the* Palæontology *of the* Decapod Crustacea *of* England.

By the late James Carter, F.R.C.S., F.G.S.
(Communicated by Prof. T. McKenny Hughes, M.A., F.R.S.
Read November 3rd, 1897 )

[Plates I & II.]

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## Introductory Note.

[The following memoir deals mainly with the Brachyura. It contains descriptions of several new forms, and gives much fresh information with regard to the morphology, affinities, and distribution of species previously described. The author bequeathed his collection of Crustacea, together with his scientific library, to the Woodwardian Museum, where both are now accessible to palæontologists. This work has been edited by Mr. Henry Woods, M.A., F.G.S., at the request of the author's daughter, Mrs. J. E. Foster.—T. McK. H.]

## I. Macrura.

### Family Astacomorpha.

### Genus Nephrops, Leach.

**Nephrops Reedi, sp. nov.** (Pl. I, fig. 1.)

*Description.*—Chelæ elongate; basal portion of propodite—'hand'—more than twice as long as wide; a double row of large bluntly-conical tubercles, the apices of which are directed forward, runs along both the outer and inner borders as far as the base of the fingers. On the dorsal surface a series of 10 to 12 tubercles, larger than those on the border, and placed upon a broad ridge, extends from the carpal end to the base of the fixed finger; the spaces between the median and the marginal rows are slightly concave and nearly smooth. The palmar surface also bears a median series of large tubercles of unequal size, which are arranged on the proximal two-thirds of the hand in two rows, which coalesce and terminate as a single row at the base of the fixed finger. Fingers imperfect, rather slender, half(?) as long as the hand when perfect. Length of hand from carpal to dactylopodal articulation $=2\frac{1}{2}$ inches.

*Affinities.*—This species differs from its existing representative, *N. norvegicus*, by its larger size, by the form and magnitude of the tubercles, and by the arrangement of the median rows on the dorsal and palmar surfaces; in the living form these are placed approximately opposite each other and about equidistant from the inner and outer borders; in the fossil the palmar is much nearer the inner, and the dorsal nearer the outer border of the hand.

*Remarks.*—The only portions of this species which have been hitherto determined are the chelæ of the first pair of limbs, but the characters which these members afford are so distinctive as to warrant a positive generic reference.

It is of phylogenetic interest to recognize in this Eocene form the vigorous prototype of one of the most graceful of existing British species, *N. norvegicus*, and it is of biological importance as affording partial evidence of the kind and degree of modification of character which has taken place.

I am indebted to the authorities of the York Museum for kind permission to describe this addition to the list of British fossil Crustacea, and I have great pleasure in dedicating this species to the late William Reed, F.G.S., to whose profuse liberality that museum owes one of the most valuable of the many provincial collections in this country.

*Distribution.*—Crag of Boyton—derived from the London Clay. Four specimens exist in the York Museum.

### Genus Gebia, Leach.

**Gebia clypeatus, sp. nov.** (Pl. I, fig. 2.)

*Description.*—Carapace rather compressed laterally; length—exclusive of rostrum—nearly twice the metabranchial height. Rostrum produced, broadly lanceolate, deeply grooved dorsally; the

distinct carinæ, which border the rostrum on each side, extend backward and outward, and bound a space which anteriorly and laterally encloses the mid-gastric lobes ; a central ridge runs along the dorsal groove of the rostrum and the mesogastric lobe, and bifurcates midway towards the cervical sulcus. Between the mid-gastric lobes and the antero-lateral margin occurs another indistinct ridge, which terminates as a slight blunt process on the frontal border. A narrow, sinuous, cervical sulcus crosses the dorsum about midway between the frontal and the posterior border, and extends obliquely forward to the antero-lateral border. On the scapular region a median ridge commences at the cervical sulcus, becomes gradually wider and more elevated, and ends as a distinct, blunt process near the posterior border of the carapace. Branchial lobes indistinctly defined; surface minutely punctate. A rather wide, shallow sulcus apparently indicates the separation of the metabranchial from the anterior branchial lobes. An elevated ridge subtends the posterior and lateral margin of the carapace.

Abdomen seven-jointed, as long as the carapace; segments of nearly equal length, slightly increasing in width from the first to the fifth ; mesotergal portion of each segment large, slightly punctated, and sparsely granulated near the epimera. Epimera broadly rounded, slightly granulated, marked off from the mesotergal portion by a ridge. Caudal appendages largely developed. Telson with distinct lateral ridges, and gradually widening towards the posterior border, which is slightly rounded. Endopodite and exopodite respectively equal to the telson in width ; strongly ridged centrally.

First pair of limbs monodactylous ; the meropodite has a row of acute tubercles on the outer border ; carpopodite subterete, nearly half as long as the propodite. Propodite rather more than half the length of the carapace; surface granulated. Fixed finger rudimentary. Dactylopodite slender, half as long as the propodite, its inner border trenchant.

Specimens vary in length from 13 to 20 mm.

*Remarks.*—The long slender abdomen, the largely-developed caudal appendages, and the conformation of the chelæ are so similar to those of *Gebia* that I provisionally refer this species to that genus.

Specimens of this species usually occur in the form of casts, the most characteristic feature of which is the sharply-defined shield-shaped dorsal lobe occupying the mid-gastric region ; this character has suggested the specific name. Examples in which portions of the test are preserved show that the surface of the cephalic region is granulated, and that the elevations which occur as sharp carinæ in the cast are indicated by corresponding, but broader, ridges bearing granules of a larger size than those on the rest of the carapace. Eleven specimens have been examined.

*Distribution.*—Great Oolite of Northampton ; in the Woodwardian Museum, the collection of Mr. T. J. George, of Northampton, and in my own cabinet.

## II. Brachyura.

## Family Dromiacea.

### Genus Gastrosacus, H. v. Meyer.

### Gastrosacus Wetzleri, H. v. Meyer, 1854. (Pl. I, fig. 3.)

1854. *Gastrosacus Wetzleri*, H. v. Meyer, 'Jurass. u. Trias. Crust.,' Palæontographica, vol. iv, p. 51 & pl. x, figs. 3 & 4.

1858. *Prosopon aculeatum*, Quenstedt, 'Der Jura,' p. 779 & pl. xcv, figs. 46 & 47.

1860. *Gastrosacus Wetzleri*, H. v. Meyer, 'Die Prosoponiden,' Palæontographica, vol. vii, p. 219 & pl. xxiii, fig. 34.

1867. *Prosopon aculeatum*, Quenstedt, 'Handb. d. Petrefaktenkunde,' p. 315 & pl. xxvi, fig. 14.

*Description.*—Length, from base to rostrum, one-sixth greater than the width. Surface minutely granulated. The rostrum occupies the median third of the orbito-frontal border; it is acutely pointed, and about one-fourth the length of the carapace; it bears a sharp granulated dorsal carina. Orbits rather small, with thin margins. Cephalic area somewhat smaller than the scapular. Surrounding the gastric lobes is an unusual annular sulcus, bearing granules which tend to assume a radiate or linear arrangement; an indistinct radiate depression divides this area into four portions:—the normal branchial lobes separated by slight sulci; the linear urogastric lobe; and the pentagonal cardiac lobe.

Length of carapace from base of rostrum = 11 mm.

*Affinities.*—The form of the carapace, the conformation of the rostrum, and the annular sulcus surrounding the median gastric lobes distinguish this species.

*Distribution.*—A single imperfect—but certainly recognizable—specimen in the Woodwardian Museum, from the Coral Rag of Upware, is the only evidence I have of the occurrence of this species in England. It is found abundantly in the Upper White Jura of Germany, where, as in England, it is associated with *Prosopon marginatum*. In the specimen figured by Meyer (pl. x, fig. 4), the rostrum is imperfect, and is wrongly represented as being short and trifid.

### Genus Dromilites, Milne-Edwards.

### Dromilites Bucklandi, Milne-Edwards.

1858. Bell, Monogr. pt. i, p. 31 & pl. vi, figs. 1–11.

*Supplementary.*[1]—Bell has described this well-marked species in detail. I have not been able completely to determine the characters of the orbito-frontal border. Bell states that the rostrum is pointed, but in the cast of the interior it is widely bifid.

To this species it is exceptionally difficult to assign definite characters which will apply to all stages of growth, so considerably do they vary according to age. Bell's description applies accurately to the earlier stages. *Dr. Bucklandi* may usually be recognized at

[1] The remarks made under this heading throughout are intended to supplement the descriptions given by Bell in his Monograph on the Malacostracous Crustacea (Palæont. Soc.).

first sight by the series of four bosses upon the mesogastric and metabranchial lobes, arranged in a semicircle in front of the cardiac lobe.

*Distribution.*—Examples from the Red Crag (derivative) of Sutton and Waldringfield are in the British Museum, the Museum of Practical Geology, the Woodwardian Museum, and the Ipswich Museum.

### Dromilites Lamarckii (Desmarest).

1858. Bell, Monogr. pt. i, p. 29 & pl. v, figs. 1–9.

*Supplementary.*—The interorbital portion of the frontal border is very prominent, triangular, and deeply grooved dorsally. Basal joint of inner antennæ robust. Epistome equilaterally triangular. Sternal plastron narrow, longitudinally hollowed. Episternum acutely pointed, half the length of the sternal plastron. Meropodite of the chelæ dentate on both borders.

In the preface to Part II of his 'Monograph,' Bell suggests that *Dromilites* may be the Tertiary representative of the Greensand genus *Homolopsis*. Certainly aged individuals of *Dr. Lamarckii* so closely resemble specimens of *Homolopsis Edwardsii* as to confirm this view. The variation of character according to age and stage of growth, to which Bell alludes in his description of *Dr. Bucklandi*, is equally remarkable as regards *Dr. Lamarckii*.

*Distribution.*—Specimens from the Red Crag of Sutton and Waldringfield are in the Woodwardian and the Ipswich Museums.

## Genus Diaulax, Bell.

*Supplementary.*—The two transverse sulci upon the dorsum of the carapace, which suggested to Prof. Bell the name of this genus, constitute a character which is not peculiar to it, but exists, more or less distinctly marked, as a normal feature in other genera. The anterior represents the cervical sulcus, and the posterior that which separates the meso- and metabranchial lobes. This latter sulcus is interrupted by the intervention of the cardiac lobe, as is accurately represented in Bell's figure (pl. i, fig. 14). Bell mentions that it is almost obsolete in many specimens of *D. Carteriana*.

### Diaulax Carteriana, Bell.

1863. Bell, Monogr. pt. ii, p. 6 & pl. i, figs. 14–16.

*Supplementary.*—Carapace approximately hexagonal in outline; nearly half as high as wide; considerably convex longitudinally in the young, less so in the adult stage. Orbito-frontal border as wide as the carapace is long. Rostrum slightly produced, pointed, broadly triangular, with a median longitudinal depression. Orbits obliquely oval, occupying the outer fourth of the orbito-frontal border; a shallow notch in both the upper and lower margins. Ophthalmic peduncle constricted and granulated. Antero-lateral margin trenchant, meeting the thickened oblique postero-lateral at a considerable angle. Posterior margin not so wide as the orbito-frontal. Epibranchial lobe tectiform, its outer portion forming the lateral angle.

Pterygostomate region large, granulated. Buccal orifice slightly narrowed posteriorly. Sternum nearly twice as long as wide. Episternum acutely pointed. Chelæ equal, about one-eighth shorter than the carapace. Dorsum of the hand considerably convex, covered by small tubercles of various sizes, by the removal of which the surface may be rendered pitted or reticulate; palm flattened; fingers short, a third of the length of the hand; fixed finger reflexed; carpopodite with a few coarse tubercles. Meropodite large, upper face convex; lower face flattened; posterior border with a few tubercles. Width of carapace = 15 to 24 mm.

*Remarks.*—Dr. Woodward regards the Gault form as a distinct species, and has named it *D. feliceps*. It is of smaller size than *D. Carteriana*, but I do not recognize any characters by which it can be distinguished.

*Distribution.*—Rare in the Gault of Folkestone. In the Cambridge Greensand it is less rare than was supposed by Bell. I have upwards of thirty specimens of the carapace in my collection, and others are in the British Museum, the Museum of Practical Geology, and the museums of York and Folkestone.

### Diaulax Oweni (Bell).

1850. *Platypodia Oweni*, Bell, in Dixon, 'Geol. Sussex,' p. 345 & pl. xxxviii,* fig. 9.

*Supplementary.*—Bell figured a carapace, from the Chalk, which he regarded as that of a species of *Platypodia*, but he did not describe it; and, so far as I can ascertain, no description of the form has yet been published. Specimens, evidently of the same species, are in the British and Woodwardian Museums, but, unfortunately, they are not sufficiently well preserved to admit of specific description. They are clearly referable to the genus *Diaulax*, and closely resemble and may even be identical with *D. Carteriana*, but the carapace is of considerably larger size than in the last-mentioned species.

*Distribution.*—Lower Chalk of Maidstone (Woodwardian Museum). Chalk of Dover (British Museum).

### Diaulax, sp.

A single specimen of a carapace of a small species of *Diaulax* is too imperfect for specific description. It is of interest as showing the existence of the genus in the Tertiary period. Size of carapace: width = 14 mm.; length = 10 mm.

*Distribution.*—Middle Headon of Whitecliff Bay (Woodwardian Museum).

## Genus Cyphonotus, Bell.

### Cyphonotus incertus, Bell.

1863. Bell, Monogr. pt. ii, p. 8 & pl. i, figs. 17–19.

*Supplementary.*—The epigastric and mesogastric are the only cephalic lobes which are separately definable. The scapular lobes are more readily distinguishable. The transverse sulcus between

the urogastric and cardiac lobes is usually sharply marked. The granulation of the surface of the carapace is remarkable; the summit of each granule is excavated and holds a minute central papilla. The pterygostome is regularly and minutely granulated. The epistome is slender, minutely granular, and has a median condyloid tubercle on the anterior border which meets the apex of the depressed rostrum.

*Remarks.*—The carapace is the only portion known to me. I have examined twelve or fourteen specimens, of which two are in the British Museum, and six in my own collection. A single carapace from the Chloritic Marl of Chard is in the Woodwardian Museum.

A Tertiary species, described by Bittner, as *Dromia Hilarionis*,[1] bears considerable resemblance to *Cyphonotus incertus*; both forms appear to be distinctly referable to the same genus.

## Genus Plagiophthalmus, Bell.

### Plagiophthalmus oviformis, Bell.

1863. Bell, Monogr. pt. ii, p. 9 & pl. ii, figs. 1–3.
1875. *Prosopon oviformis*, Tribolet, Bull. Soc. géol. France, ser. 3, vol. iii, p. 457.

*Supplementary.*—The details, both generic and specific, which Bell has given as to the characters and conformation of the orbits are probably inaccurate. I apprehend that this pretty little crustacean was far more comely of feature than Prof. Bell recognized. Careful examination of the specimens in the British Museum (Cunnington Collection), which the distinguished author figured and described, leads me to regard the small irregular depressions 'in the substance of the carapace,' observable in one only of the specimens, as really not the orbits but as accidental fractures. Large oval depressions occupying the outer thirds of the orbito-frontal border, as the artist has faintly but accurately represented in Bell's fig. 2 (pl. ii), are traceable in most of the specimens, and probably indicate the true orbits. If this determination should be confirmed by the discovery of better-preserved examples, the generic name, as indicating squint, or oblique vision, would be literally inapplicable.

Bell's figures (pl. ii) are enlarged to $1\frac{1}{2}$ natural size.

Tribolet refers this species to the genus *Prosopon*, but probably a reference to the subgenus *Pithonoton* would be more accurate.

*Distribution.*—Upper Greensand, Warminster.

## Genus Homolopsis, Bell.

### Homolopsis Edwardsii, Bell. (Pl. I, fig. 4.)

1863. Bell, Monogr. pt. ii, p. 23 & pl. v, figs. 1 & 2.

*Supplementary.*—Carapace slightly convex dorsally; quadrate in general outline and also in transverse section. The height of the carapace is equal to half its width. The granules upon the surface are irregular both in size and disposition. Rostrum broadly prominent. Orbito-frontal region half as wide as the carapace. Epi-

[1] Denkschr. k. Akad. Wissensch. Wien, vol. xlvi (1883) p. 306 & pl. i, fig. 5.

branchial process remarkably prominent; postero-lateral margin thick. Most of the areolar tubercles become more or less obliterated in aged individuals. The normal regions are distinctly defined in young specimens, but become gradually confluent as growth advances. Epistome equilaterally triangular, granulated, larger than the endostome. Female abdomen broadly lanceolate; all the segments distinct; surface minutely punctate; chelæ rather small; propodite as long as the orbito-frontal margin is wide; meropodite as long as the carapace, slightly granulated and sulcated longitudinally; carpodite cuboid; hand about twice as long as wide, oval in transverse section; fingers slender, as long as (or longer than) the hand. All the ambulatory limbs are well-developed; the meropodite is as long as the carapace, angular, granulated, and spinulose on both borders. Length of carapace = 8 to 25 mm.; average adult size = 20 mm.

*Remarks.*—Several obvious mistakes occur in Bell's description of this species. It is one of the most variable of brachyurous forms. Specimens differ considerably according to age, rendering specific description exceptionally difficult; the Gault examples at first sight appear to differ much in general aspect—particularly old individuals—from the Cambridge Greensand form; the difference, however, arises almost entirely from the degree to which the system of areolar tubercles on the cephalic area and the processes upon the lateral margin are developed. The carapace of a specimen in the British Museum, from the Gault, near Aylesford (no. 51210), is nearly even—the areolar tubercles and the prominences characteristic of the species being so indistinctly expressed as to suggest that it may be a distinct form. It would be of interest to examine other examples from this locality.

As usually found most specimens have a fracture on one or both sides, extending from the orbit towards the posterior border, probably the result of pressure upon the highly-vaulted carapace; not unfrequently the lateral portions are completely broken away, and the central portion only, showing the median lobes, is preserved. Bell has alluded to the close resemblance of this species to *Dromilites Lamarckii*, from the London Clay, which is very marked in old individuals.

*Distribution.*—Gault and Cambridge Greensand. Specimens are in the British Museum, Museum of Practical Geology, Woodwardian Museum, and my own collection.

HOMOLOPSIS DEPRESSA, sp. nov. (Pl. I, fig. 5.)

*Description.*—Carapace approximately hexagonal in outline, flattened dorsally. Rostral portion of the orbito-frontal border prominent. An undulating cervical sulcus crosses the carapace about midway between the anterior and posterior borders. Most of the normal cephalic regions are indistinctly defined; those of the scapular area are more distinctly marked. The dorsal surface is minutely granulated throughout, but the areolar tubercles are obsolete, except two of small size, with granulated summits on the metagastric lobes. The orbits are large, shallow depressions, with sharp irregular

margins, opening forward and outward, and occupying the outer thirds of the orbito-frontal border. Most of the other characters correspond with those of *H. Edwardsii*. Length of carapace = 10 to 16 mm.

*Affinities.*—This species is readily distinguished from *H. Edwardsii* by the smaller size and more compressed form of the carapace, the absence of areolar tubercles, the much smaller branchial lateral process, and by the situation and direction of the cervical sulcus.

*Distribution.*—Cambridge Greensand and Gault of Folkestone. I have three specimens in my collection from the Cambridge Greensand, and one from the Gault of Folkestone; the latter agrees precisely with a specimen in the British Museum labelled 'Sheppey' (Gardner Coll. No. 59811).

### Genus Goniochele, Bell.

#### Goniochele angulata, Bell. (Pl. I, fig. 6.)

1858. Bell, Monogr. pt. i, p. 26 & pl. iv, figs. 3–9.

*Supplementary.*—A nearly straight row of five areolar tubercles crosses the cephalic region opposite the second antero-lateral marginal process. In many specimens the longitudinal striation of the urogastric lobe is not observable. Penultimate segment of the female abdomen twice longer than any of the anterior segments, resembling in this character the abdomen of *Xanthopsis* and some other genera. Sternal plastron broadly ovate, two-fifths the width of the carapace. Episternum considerably longer than wide, much produced, pointed, minutely granulated.

*Distribution.*—Specimens from the London Clay are in the Woodwardian Museum, the Museum of Practical Geology, the Ipswich and Warwick Museums, etc. Specimens from the Red Crag (derivative) are in the Woodwardian and Ipswich Museums.

## Family Raninoidea.

### Genus Ranina, Lamarck.

The characters of the genus *Ranina*, established by Lamarck in 1801, are well marked and recognizable. The general form of the carapace is indicated by the figure here given (Pl. I, fig. 7). The orbito-frontal border is remarkably wide; the dorsal surface in most of the species is singularly sculptured by numerous transverse, minutely serrated markings, or is finely stippled. The sternum is peculiar in conformation; the episternum is widely trifid, and the posterior portion is narrow—almost linear.

The genus is represented by living species and by 18 or 20 extinct forms from the foreign Tertiary and Cretaceous beds, but I am not aware that the occurrence of any representative of it in the British rocks has been recorded hitherto. A valuable history of the genus and full notice of the fossil species is published by Reuss.[1]

[1] 'Zur Kenntniss foss. Krabben,' Denkschr. k. Akad. Wissensch. Wien, vol. xvii (1859) p. 19.

*Ranina*, as defined by Lamarck, has been divided by Brocchi into the subgenera *Ranina* proper, *Raninella*, and *Palæonotopus*.

RANINA (RANINELLA ?) ATAVA, sp. nov. (Pl. I, fig. 7.)

*Description.*—Carapace about a fourth longer than wide, moderately convex transversely; in outline elongate-ovoid. Width of orbito-frontal border equal to half that of the carapace. Buccal orifice large, two-fifths of the carapace in length. External maxillipeds correspondingly elongated, supported upon large basal segments. Anterior portion of sternum widely trifid, largely excavated laterally for the insertion of the chelæ; posterior portion rapidly reduced in width so as to become linear. Length of carapace = nearly 50 mm.; width = 38 mm.

*Distribution.*—The only specimens known to me are:—One in the Brighton Museum (G, 2329 Willett Coll.), from the Upper Greensand of Chute Farm, Wiltshire; and another in the British Museum (No. 59527, Cunnington Coll.), also from the Upper Greensand of Wiltshire.

## Family Oxystomata.

### Genus PALÆOCORYSTES, Bell.

PALÆOCORYSTES NORMANI, Bell.

1863. Bell, Monogr. pt. ii, p. 16 & pl. iii, figs. 10–12.

This form appears to have very slender claim to specific distinction; it occurs only in the Chalk, and can scarcely be regarded as other than a robust, vigorously-grown, variety of *P. Stokesi*. Nearly all the Crustacea which are common to the Chalk and Upper Greensand attain fuller development in the former than in the latter rock. The type is in the Woodwardian Museum (Leckenby Coll.); four other specimens from the Grey Chalk of Dover are in the British Museum.

PALÆOCORYSTES STOKESII (Mantell). (Pl. I, fig. 8.)

1863. Bell, Monogr. pt. ii, p. 15 & pl. iii, figs. 1–9.

*Supplementary.*—The small lateral teeth upon the rostrum, to which Bell refers, are seldom observable. The gastric lobes are indistinctly defined. The base of the mesogastric lobe in Gault examples bears a single areolar tubercle, but the Greensand form bears three or four. The posterior border is slightly narrower than the orbito-frontal. The orbits have a single fissure in the lower border and two in the upper. The sides of the buccal opening are curved. The episternum is unusually small, and pentagonal in shape. A solitary specimen, in the Woodwardian Museum, of a detached propodite which may almost certainly be referred to this species suggests the probability that in the fossil form—as in its living representative *Corystes Cassivelanus*—the first pair of limbs was much longer in the male than in the female. I have not, however, met with a male carapace having the chelæ intact.

In Gault specimens the marginal processes and the areolar tubercles are more or less pointed, but in Greensand examples they are obtuse. Specimens having the branchial region on one or both sides rendered tumid by parasitic infestation are of frequent occurrence.

*Additional Localities.*—Lower Chalk, Dover (British Museum, No. I, 2011). Gault of Puttenham (Woodwardian Museum). Upper Greensand of Lyme Regis.

## Genus Eucorystes, Bell.

### Eucorystes Broderipii (Mantell).

1863. *Palæocorystes Broderipii*, Bell, Monogr. pt. ii, p. 14 & pl. ii, figs. 8–13.

*Supplementary.* — The armature of the antero-lateral border varies considerably in degree of development, the processes being prolonged in some specimens into acute spines. The chelæ resemble those of *E. Carteri*, but are larger and the fingers are relatively longer. The hand is about as wide as long; the dorsum smooth; both borders have a few teeth; the outer border of the dactylopodite is flat and has marginal ridges, that on the palmar edge being toothed. Carpopodite tuberculate or spinulose. Bell has described the ambulatory legs as 'nearly cylindrical'; but specimens in my own and other collections show them to be of large size and much compressed, both borders being sharply spinulose.

Length of carapace = 19 to 38 mm.

*Remarks.*—The characters which Bell assigned to his genus *Eucorystes* apply so precisely to *E. Broderipii* that I do not hesitate, notwithstanding the remarks of that experienced author, to transfer this species from the genus *Palæocorystes* to *Eucorystes*. The specific alliance between *E. Carteri* and *E. Broderipii* is very close. The feature which especially distinguishes them is the series of singular ligulate markings which occur on the cephalic area of *E. Carteri*, but are entirely absent in *E. Broderipii*. The orbito-frontal border is relatively narrower, but in other characters the two species correspond so precisely as even to suggest the probability that they may be local varieties of the same form, characterized by the difference of surface-features.

*Distribution.*—*E. Broderipii* is peculiar to the Gault. Specimens are in the British Museum, the Museum of Practical Geology, the Woodwardian and York Museums, and my own collection.

### Eucorystes Carteri (M'Coy).

1863. Bell, Monogr. pt. ii, p. 17, pl. ii, figs. 14–17 & pl. xi, fig. 16.

*Supplementary.*—Rostrum bifid or rendered trifid by a prolongation of the slender process of the mesogastric lobe. Orbito-frontal border equal to two-thirds the length of the carapace. In many specimens the cervical sulcus is interrupted in the middle—the lateral portions terminating at minute puncta between the meso- and urogastric lobes. Mesogastric lobe divided posteriorly into two lobules. Buccal opening rather narrow in front; sides slightly

curved. External maxillipeds slender; exopodite and endopodite nearly equal in width; meros of the endopodite elongated, two-thirds as long as the ischios. Chelæ of moderate size; meros subterete, granulate, dentate on both borders; carpus cuboid; hand compressed, rather longer than wide, both borders somewhat trenchant and serrated by several teeth. The chelæ correspond closely with those of *E. Broderipii*. Abdomen seven-jointed; penultimate segment twice as long as the fifth. Telson rounded at its extremity, rather longer than wide. Length of carapace = 15 to 35 mm.; length of average adult = 25 mm.

*Remarks.*—I have examined upwards of 200 specimens of this species, all of which were obtained from the Cambridge Greensand. I am not aware that it has been found elsewhere.

M'Coy regarded the peculiar series of strap-shaped markings on the surface of the carapace as representing the normal dorsal lobes; but Bell does not assent to this opinion. I would suggest it as probable that they are modifications produced by the confluence or expansion of prominences which occur in the form of areolar tubercles in *Necrocarcinus*, *Campylostoma*, and other genera. This interpretation of their morphological significance is suggested by a specimen in my own collection figured by Bell (pl. xi, fig. 16) which has three elevated lobes on the scapular region, similar to those on the cephalic area: in this respect corresponding precisely with the position normally occupied by areolar tubercles in other genera.

*Distribution.*—Cambridge Greensand. Specimens are in the British Museum, the Museum of Practical Geology, the Woodwardian, York, Glasgow, Northampton, Nottingham, and other Museums.

## Genus Cyclocorystes, Bell.

### Cyclocorystes pulchellus, Bell.

1858. Bell, Monogr. pt. i, p. 24 & pl. iv, figs. 1 & 2.
1863–64. *Necrozius Bowerbankii*, Milne-Edwards, Ann. Sci. Nat. ser. 4, vol. xx (1863) pl. xii, fig. 2; ser. 5, vol. i (1864) p. 58.
1867. *Necrozius Bowerbankii*, Milne-Edwards, Geol. Mag. p. 531 & pl. xxi, figs. 2 & 3.

*Supplementary.*—Carapace rotundo-quadrate in outline, deflexed in front, rather wider than long. Orbito-frontal border equal to three-fifths of the width of the carapace, nearly straight. Granules on the dorsal surface uniform in size and regular in disposition; interspaces very minutely punctated (seen with a lens). Most of the normal cephalic and scapular lobes distinct, separated by unusually wide smooth sulci; central portion of each lobe granulated, basal portion smooth. Orbits rather small, with granulated edges; two distinct fissures in the upper and one in the lower border. Antero-lateral border with two or three slightly-produced processes, which have granulated summits and are surrounded at the base by a smooth space. Posterior border delicately and regularly granulated. Abdomen, in the male, seven-jointed, rapidly tapering to a small

triangular telson. Chelæ strong, very unequal in size; meropodite robust, expanding rapidly towards the distal end, which is nearly as wide as the joint is long, is circumscribed by a distinct sulcus, and has the upper border prolonged into a stout spine; hand as long as the carapace is wide, and a third longer than wide, oval in section; dorsum smooth. Fingers nearly as long as the hand, prehensile borders with several blunt teeth. Posterior pairs of limbs slender, and nearly equal in size. Bell and Milne-Edwards describe the orbits as being without marginal fissures; but a specimen in the Woodwardian and another in the British Museum (No. 59218) show distinctly the characters which I have described; probably these notches become obliterated by age.

*Remarks.*—In 1865 Milne-Edwards figured and described a species from the London Clay of Sheppey, which he named *Necrozius Bowerbankii*. In 1867 Dr. Woodward discovered a specimen in the British Museum (No. 59400), from the London Clay of Holloway, which he recognized as the form described by Milne-Edwards; and he afterwards published an excellent description and an enlarged figure of it in the 'Geological Magazine,' with remarks on its generic alliance. Subsequent examination of this and other specimens, however, has convinced me that the species described by Milne-Edwards is identical with that previously determined by Bell and named *Cyclocorystes pulchellus*.

*Distribution.*—The specimen figured by Bell is in the British Museum (No. 59101), as also four others from the London Clay of Sheppey; also a carapace from 'Copenhagen House' which is 29 mm. wide. A nearly perfect example from the London Clay of Clacton is in the Woodwardian Museum. Specimens from the Crag (derived from the London Clay) are in the Woodwardian and Ipswich Museums.

## Genus Necrocarcinus, Bell.

### Necrocarcinus Bechei (Deslongchamps). (Pl. I, fig. 9.)

1863. Bell, Monogr. pt. ii, p. 20 & pl. iv, figs. 4–8.

*Supplementary.*—The armature of the antero-lateral border of the carapace is irregularly expressed; small tubercles not unfrequently occur on the postero-lateral border. The dorsum bears 16 or 18 areolar tubercles, those on the lateral gastric and the hepatic lobes forming an undulating row (in *N. Woodwardii* these tubercles are arranged in a straight line). The normal interruption of the cervical sulcus, and the minute puncta between the meso- and urogastric lobes, indicating the attachment of gastric muscles, are well marked in this species. Orbits approximate, oval, widely open inwardly, directed obliquely upward; two notches in the upper and one in the lower margin. Endopodite of external maxillipeds slightly wider than the exopodite. The abdomen, which is seldom preserved, is seven-jointed; in the first 5 segments the mesonotum is raised into a sharp transverse rib; the penultimate segment is twice as long as that preceding it. The abdomen of the female is

half as wide again as that of the male. The chelæ are of moderate and equal size; meropodite compressed, dorsal surface convex and smooth; anterior border rounded, posterior thin; propodite about a fourth longer than wide, dorsum highly convex, with a median longitudinal row of three tubercles and others of smaller size near each of the borders; palmar surface flat; fingers shorter than the hand; outer border of dactylopodite flat, edged by a delicate, slightly dentate ridge on each side; the dentary border trenchant. Chelæ identical in form with those of *N. Woodwardii*, but scarcely one-third as large.

The claw which Bell has figured (pl. v, fig. 3) certainly cannot be referred to this species. Specimens having the branchial region rendered tumid by some Bopyriform parasite are of frequent occurrence.

*Distribution.*—Numerous examples from the Cambridge Greensand are in the Woodwardian, British, Jermyn Street, and York Museums, and in my own collection. It occurs sparingly in the Upper Greensand of Warminster, and specimens from the Gault of Puttenham are in the Woodwardian Museum.

NECROCARCINUS TRICARINATUS, Bell.

1863. Bell, Monogr. pt. ii, p. 21 & pl. iv, figs. 9–11.

*Supplementary.* — Carapace approximately hexagonal in outline, a fifth wider than long; surface minutely and uniformly granulated. Rostrum prominent, broadly triangular (with a small tooth at the base on each side?). Orbito-frontal border slightly exceeding half the greatest width of the carapace. The antero-lateral border bears four or five rather large marginal tubercles, the last of which forms the prominent lateral angle. Postero-lateral border nearly straight. Posterior margin not quite so wide as the orbito-frontal. The areolar tubercles are somewhat smaller than in any of the other species; about fourteen occur on the dorsal surface, and a series of five or seven crosses the cephalic area transversely; those upon the mesogastric and the cardiac lobes form a median series, and a lateral row of three occurs upon the branchials. The longitudinal carina, which gives the specific name, is indistinctly marked in many specimens. Orbits large, with two notches in the upper and a large one in the lower margin. First pair of limbs:—meropodite triangular in section, with acute spines on the posterior angle; carpopodite about as long as wide, tuberculated; hand two-thirds of the width of the carapace in length; a double row of spines runs along the border and terminates at the base of the fixed finger, and a single row occurs on the dorsal surface; fingers slender, half as long as the hand. Length of carapace = 15 to 25 mm.

*Distribution.*—Cambridge Greensand and Gault of Folkestone. About thirty specimens examined. Gault examples are in the British, Jermyn Street, and Woodwardian Museums.

### Necrocarcinus Woodwardii, Bell. (Pl. II, fig. 1.)

1863. Bell, Monogr. pt. ii, p. 20 & pl. iv, figs. 1–3.

*Supplementary.*—The small lateral teeth at the base of the rostrum, mentioned by Bell, are not usually observable. The antero-lateral border bears four or five small tubercles. The mesogastric lobe, in Gault specimens from Folkestone, bears a single areolar tubercle, whereas, in Cambridge specimens, three or five tubercles occur on this lobe.

I have not met with examples of this species in which the chelæ are retained *in situ*; but detached propodites of large size, which I do not hesitate to regard as those of large specimens of *N. Woodwardii*, are frequently found in the Cambridge Greensand. Except that they are twice or thrice larger, they precisely resemble the chelæ of *N. Bechei*; but I have no evidence that that species ever attains so large a size as its congener. The two forms, however, have in all other characters a close correspondence. In these large Cambridge specimens the hand is robust, slightly compressed, and rather longer than wide; the dorsal surface bears a median series of three equidistant tubercles, and a double row of smaller size on both borders, frequently with a few others between these lateral rows; the palmar surface is very slightly convex; the outer border of the dactylopodite is flattened, and is bounded by a slender, slightly denticulated ridge; the dentary border is trenchant.

The chela which Bell figured (pl. v, fig. 4) as that of *N. Woodwardii* certainly does not belong to that species, nor, I apprehend, do the other portions figured in the same plate (figs. 5, 6 & 7). The chela is probably that of a new species.

This species may be distinguished from *N. Bechei* by having a large number of areolar tubercles—of which three or five are placed upon the mesogastric lobe—and by having those on the cephalic region placed in an almost straight transverse row, whereas in *N. Bechei* they assume an undulating arrangement. Specimens from the Chalk generally attain a considerably larger size than those from the Gault or Greensand: a specimen in the Woodwardian Museum from the Chalk Marl of Cherry Hinton is more than 60 mm. wide. Width of Gault specimens = 8 to 24 mm. Width of Greensand specimens = 25 to 50 mm.

*Distribution.*—Tolerably abundant in the Gault of Folkestone and in the Cambridge Greensand. Examples occur in the British and Jermyn Street, Woodwardian, Folkestone, York, and other Museums.

## Genus Orithopsis, Carter.

### Orithopsis Bonneyi, Carter.

1868. *Necrocarcinus tricarinatus*, H. Woodward, Geol. Mag. p. 259 & pl. xiv, fig. 4.

1872. *Orithopsis Bonneyi*, J. Carter, Geol. Mag. p. 529 & pl. xiii, fig. 1.

*Description.*—Carapace rather wider than long, considerably arched transversely, less so longitudinally; dorsal surface minutely granulated, and still more minutely punctated. Orbito-frontal

region rather less than half the greatest width of the carapace. Rostrum widely bifid, with elongated lateral spines. Orbits opening forward; upper border with two distinct lobes, which are separated from each other by a deep sinus and from the external orbital lobe by a sharp fissure; external angle of orbit much produced, extending nearly as far forward as the rostral spines. The antero-lateral border, in addition to the external orbital spine, bears four other well-developed acute processes. Postero-lateral margin nearly straight, inclining inward and rendering the posterior about equal to the orbito-frontal border. A distinct sinuous cervical sulcus marks off the anterior third of the dorsal area from the scapular portion. Gastric regions obscurely indicated. Branchial regions sharply defined; the epibranchial terminates about midway between the margin and the median dorsal ridge, and is separated from the mesobranchial lobe by an undulating sulcus; a similar and nearly parallel groove—the inner half of which is obliquely crossed by a series of interdigitations—divides the meso- from the metabranchial lobes. A granulated longitudinal ridge, slightly inflected in the middle, carinates each metabranchial lobe, and a median carina extends the whole length of the carapace. Of the faintly-marked areolar tubercles, two occur on the protogastric and three or four on the median ridge. Length of carapace=31 mm.; width (not measuring marginal spines)=44 mm.

*Affinities.*—In general form this species closely resembles *Necrocarcinus tricarinatus*, but it differs from all the species of *Necrocarcinus* in the structure of the rostrum and in the conformation of the orbital regions, as also by the greater development of the spines [1] of these antero-lateral margins.

The characters of the carapace indicate an affinity, as Dr. Woodward has remarked, rather with the Portunidæ than with the Corystidæ. The orbito-frontal characters are very similar to those of *Orithyia*; but the armature of the antero-lateral margin, especially the well-developed metabranchial spine, approximates to that in *Matuta*. The zoological position of *Orithopsis* appears to lie between these genera.

*Distribution.*—Upper Greensand, Lyme Regis, and (?) Isle of Wight; Gault of Folkestone. I have seen fifteen specimens, which are preserved in the British Museum, the Museum of Practical Geology, the Woodwardian Museum, and my own collection.

## Genus Campylostoma, Bell.

### Campylostoma matutiforme, Bell.

1858. Bell, Monogr. pt. i, p. 23 & pl. iii, figs. 8–10.

*Supplementary.*—Granules occupy the sulci and obscure the outline of the normal lobes. Orbito-frontal margin nearly equal to half the width of the carapace. Orbits large, transversely oval, opening obliquely upward; the margin thin, divided into flattened

[1] These are more slender than represented by the figure in the Geol. Mag.

lobes by two notches in the upper and one in the lower portion. A specimen in my collection has an elongated ophthalmic peduncle divided by slender longitudinal ridges into three or four spaces, in one of which numerous minute corneal facets are distinctly visible. Pterygostomate regions steeply inclined and minutely granulated.

Bell's figure represents the marginal orbital lobes as pointed, but in a well-preserved specimen in my collection these processes exist as flattened, quadrate lobes, separated by distinct parallel-sided fissures.

*Distribution.*—London Clay. Specimens are in the Woodwardian and Malton Museums, and my own collection, etc. Derivative examples occasionally occur in the Crag.

## Genus Mithracia, Bell.

### Mithracia libinioides, Bell. (Pl. II, fig. 8.)

1858. Bell, Monogr. pt. i, p. 9 & pl. v, figs. 10–12.

*Supplementary.*—The inflated lobes which occupy the lateral portions of the scapular area represent the confluent meso- and metabranchials. Two slight eminences occur between the cardiac lobe and the posterior border of the carapace. The characters of the limbs have yet to be ascertained.

*Affinities.*—This species is readily distinguishable by the semi-globose form of the carapace, and by the sharp definition and inflation of the principal dorsal lobes. The surface-granules are unusually prominent.

*Mithracia* is probably represented in foreign Tertiaries by the genus *Micromaia*, Bittner. There is a general resemblance in the character of the carapace of these genera, but they differ in the conformation of the orbito-frontal region, the rostrum of *Micromaia* being prominent and widely bifid.

*Distribution.*—Of this rather rare species there are eight specimens in the British Museum and two in the Woodwardian Museum, all from the London Clay of Sheppey.

### Mithracia oblita, sp. nov. (Pl. II, fig. 4.)

*Description.*—Carapace broadly ovoid in outline, rather longer than wide, highly vaulted transversely, strongly deflexed in front. Rostrum small, entire. Orbito-frontal border equal to two-thirds the length of the carapace. Posterior border slightly wider than the orbito-frontal. A sharp cervical sulcus indents the antero-lateral border, crosses the carapace, and marks off the cephalic region, which occupies scarcely the anterior third of the dorsal area, and is rendered nodular by the prominent gastric lobes. The two nodules near the base of the rostrum represent the epigastric lobes; a small tubercle intervenes between the epigastric and the orbit; three nodules occur upon the mesogastric, and one on each metagastric; the hepatic lobe is very small; the urogastric is

unusually large; cardiac lobe pentagonal, and slightly elevated. A deep sulcus extends from the angles of the cardiac lobe and runs parallel with the cervical sulcus. Epibranchial lobe piriform; inner half of the mesobranchial bilobed; metabranchials large and confluent posteriorly. The whole of the dorsal surface of the carapace bears traces of depressed tubercles of moderate size. Orbits small, round, four diameters apart. Abdomen of the female seven-jointed (?); each segment trilobed, and the penultimate the largest; telson rather small. Limbs and other appendages undetermined. Length of carapace =16 mm. Width (metabranchial) =15 mm.

*Affinities.*—This species has a general resemblance to *M. libinioides* of the London Clay, of which it is probably an ancestral form. It is of smaller size, and may be further distinguished from that species by the more delicate granulation of the surface, and by the nodulated cephalic area; the hepatic and branchial lobes are less inflated, and the anterior branchial lobes relatively larger, consequently the space between the cervical and transverse branchial sulci is greater than in *M. libinioides*. The granulation of the dorsal surface being much less distinctly marked than in *M. libinioides* renders the carapace comparatively smooth.

*Distribution.*—Cambridge Greensand.

## Genus Mithracites, Gould.

### Mithracites vectensis, Gould.

1859. Gould, Quart. Journ. Geol. Soc. vol. xv, p. 237 & figs. 1–3.
1863. Bell, Monogr. pt. ii, p. 1 & pl. i, figs. 2 & 3.

*Supplementary.*—Orbits large, shallow, nearly round, twice their diameter apart, directed forward and slightly upward. The eyes are not lodged in the natural orbits, but rest in slight depressions behind them. Antero-lateral margin with three or four obtuse processes. Scapular area rather larger than the cephalic; the posterior border is slightly wider than the orbito-frontal. In the early stages of growth the whole of the dorsal surface of the carapace bears small granules, two or three diameters apart, which become obsolete with age, as also do the areolar tubercles. The disposition of the areolar tubercles is normal; the hepatic and protogastric, together with one on the prolonged tongue of the mesogastric, form a transverse row upon the cephalic area; the base of the mesogastric lobe has one or three tubercles which soon become obsolete; the anterior branchials bear one, and the metabranchials four; the summits of these tubercles, when well-preserved, are granular. The epigastric lobes are unusually large, and obliquely elongated.

The female abdomen is ovate, and the segments distinct; telson very small, triangular. Chelæ equal in size; meropodite with a stout spine at the distal end; length of propodite equal to half the width of the carapace; dorsum of hand finely granulated, strongly convex; palm flattened. Fingers rather shorter than the

hand; on the sides of the dactylopodite are setigerous puncta, and the outer border is flat; a single tooth occurs on the dentary border. Length of carapace =10 to 36 mm.; length of average adult =18 mm.

*Affinities.*—The more ovate form of the carapace, the larger and more prominent rostral portion, the difference in the number and arrangement of the areolar tubercles on both the cephalic and the scapular regions, distinguish this species from *Homolopsis Edwardsii*, some of the several forms of which it approximately resembles. The slight depression, which apparently performed the functions of a false orbit, is a character which occurs in *Homolopsis* and also in the recent form *Homola*. Bell's reference to an alliance of the genus with *Mithrax*, as Dr. Woodward has remarked, is not very evident; probably *Mithracites* may be more correctly placed between *Hyas* and *Micippe*.

*Distribution.*—Lower Greensand. There are twenty specimens in the Woodwardian Museum, one of which is 38 mm. in diameter; others occur in the British Museum and in the Museum of Practical Geology—all coming from Atherfield, Isle of Wight.

### Genus Trachynotus, Bell.

#### Trachynotus sulcatus, Bell.

1863. Bell, Monogr. pt. ii, p. 2 & pl. i, fig. 1.

*Supplementary.*—The only examples of this species known to me are those in the British Museum (Cunnington Coll.) described and figured at twice the natural size by Bell. The singular transverse sulcation of the scapular area is more strongly expressed in the figure than in the specimen, and the arrangement of the sulci is not quite accurately shown. The carapace bears a general resemblance to that of *Dromiopsis* from the Faxö Beds, and suggests a phylogenetic alliance with that genus.

*Distribution.*—Upper Greensand, Wiltshire.

## Family Cyclometopa.

### (i) Subfamily Portunidæ.

### Genus Neptunus, de Haan, emend. Milne-Edwards.

#### Neptunus vectensis, sp. nov. (Pl. II, fig. 2.)

*Description.*—Carapace about a fourth wider than long, slightly convex transversely. Interorbital portion of the frontal margin straight, slightly prominent, quadridentate (sex-dentate, including the internal orbital processes). Orbits large, transversely oval. Dorsal surface slightly and sparsely granulated; the normal cephalic and scapular lobes indistinctly defined. Sternal plastron broadly obovate, half as wide as the carapace, minutely punctated; episternum bearing the large external maxillipeds—three-fourths

the length of the sternal plastron, a fifth wider than long, slightly pointed and retroflexed. Male abdomen wide at the base, tapering rapidly to a small triangular telson; third, fourth, and fifth segments coalescent. Third joint of the endopodite of the external maxilliped thrice as long as wide; exopodite half the width of the endopodite. Limbs undetermined. Width of carapace = 2 inches.

*Remarks.*—The specimens which have afforded the foregoing scanty detail of character are of interest because they constitute, so far as I know, the only evidence obtained as to the occurrence of any representative of the genus *Neptunus* in British rocks. A considerable number of species—some twelve or fifteen—occur in foreign Tertiary beds and have been described by Milne-Edwards and by Stoliczka.

*Affinities.*—All the species are characterized by having a series of eight or ten pointed processes upon the antero-lateral margin, the last of which is prolonged into a long spine. The British examples, although not well-preserved, are clearly referable to the genus *Neptunus*. The characters of *N. vectensis*, so far as known, closely resemble those of *N. Larteti*, Milne-Edw.

*Distribution.*—Hamstead Beds (*Corbula*-bed), Hamstead, Isle of Wight. Two specimens are in the Woodwardian Museum.

## Genus Portunites, Bell.

### Portunites incerta, Bell.

1858. Bell, Monogr. pt. i, p. 21 & pl. iii, figs. 1–5.

*Supplementary.*—The dorsal surface of the carapace is smooth or minutely granulated. Areolar tubercles almost obsolete. I have not met with specimens showing the retroflexion of the last pair of legs or the form of their terminal joint. Average width of adult carapace = 20 to 40 mm.; average length = 16 to 26 mm.

In stating the dimensions Bell accidentally reversed the relative proportion of length to width.

*Affinities.*—The wide orbito-frontal border, the three equally prominent meso- and protogastric lobes, and the narrow, arcuate, transverse epibranchial lobe readily distinguish this species. It is well described by Milne-Edwards, who refers to the zoological alliance of the genus, and agrees with Bell in classifying it with the Portunidæ. Reuss described a species from the London Clay which he named *Leiochilus Morrisi*; subsequently he considered *Portunites incerta*, Bell, to be identical with this species, but his description and figure apply so much more closely to the form which he described in the same paper as *Pseuderiphia M'Coyi* (= *Xanthilites Bowerbankii*, Bell) than to *Portunites incerta* as to suggest the probability that *Leiochilus Morrisi* may be a variety of the former of these species.

*Distribution.*—London Clay. I have two specimens in my collection; another from the Red Crag (derivative) is in the Woodwardian Museum.

## Genus Rhachiosoma, Woodward.

### Rhachiosoma bispinosum, Woodward.

1871. Woodward, Quart. Journ. Geol. Soc. vol. xxvii, p. 91 & pl. iv, fig. 3.
1873. Woodward, *ibid.* vol. xxix, p. 26 & pl. i, figs. 1–6.

*Description.*—Carapace about one-fourth wider than long (excluding the lateral spines). Orbito-frontal border rather more than a third the width of the carapace; the interorbital portion quadridentate. Rostrum slightly bifid. Orbits nearly round, with two notches in the upper and one in the lower margin. Antero-lateral border with four pointed processes, the first three gradually increasing in size; the portion of the border between them flattened into a trenchant edge which is indented by a sharp cleft; the fourth, or epibranchial, process prolonged into a spine, the length of which, in some specimens, is equal to half the width of the carapace. Postero-lateral border thickened. Posterior border rather wider than the orbito-frontal; the postero-lateral angles slightly produced. Dorsal surface minutely granular in well-preserved specimens. An areolar tubercle occurs on each protogastric lobe, two (or three) on the mesogastric, one near the base of the long epibranchial spine, and an oblique longitudinal series of three on each metabranchial lobe. The cardiac lobe bears a single median tubercle. Two minute punctures marking the attachment of the posterior gastric muscles are noticeable behind the mesogastric lobe. The several normal dorsal regions are defined by shallow depressions.

Female abdomen seven-jointed. In the male the fifth and sixth segments are coalescent. Telson small. Sternum broadly ovate; endopodite of the external maxilliped twice as wide as exopodite, furrowed longitudinally.

Buccal opening large. Chelæ nearly equal in size; hand smooth, approximately twice as long as wide, ovate in section; palm less convex than the dorsum. Fingers slender, rather shorter than the hand; prehensile border serrated by eight to twelve teeth. All the posterior pairs of limbs are well-developed and nearly equal in size, the last pair being as large as, or rather larger than, the penultimate, as in most Portunidæ. Width of carapace (excluding the epibranchial spine)=from 25 to 50 mm.

*Distribution.*—I have examined upwards of twenty examples, all of which were obtained from the London Clay of Portsmouth. Specimens are in the British Museum, and a large series in the Woodwardian Museum; a single example, labelled '*Psammocarcinus*,' is in the Manchester Museum.

## (ii) Subfamily Cancridæ.

## Genus Actæopsis, Carter.

### Actæopsis Wiltshirei, sp. nov. (Pl. II, fig. 3.)

*Description.*—Carapace approximately hexagonal in outline, slightly and equally convex, both transversely and longitudinally;

wider than long—in the proportion of 28 to 23 mm. Orbito-frontal border half the width of the carapace. Antero-lateral border moderately arcuate, trenchant, bearing four (or five?) pointed processes; two or three similar processes occur upon the postero-lateral border. Posterior border as wide as the orbito-frontal. Rostrum large, longitudinally sulcated. Orbits of moderate size, with two slight notches in the upper edge. A wide, unusually shallow, undulating cervical sulcus marks off the cephalic region, the area of which is rather larger than that of the scapular. Most of the gastric lobes exist as nodular prominences, which are separated by wide and smooth interspaces. The summit of each of these lobes bears numerous minute, sharply-defined granules. A slightly-curved row of seven granulated tubercles crosses the carapace opposite the first marginal process. The mesogastric, as usual, sends forward, to the base of the rostrum, a slender prolongation which separates the protogastric lobes. The several branchial lobes are indistinctly defined. Upon the metacardiac lobe are two large granulated prominences; and two or three of a similar size occur on the metabranchial.

The abdomen and limbs are not preserved.

Width of carapace=28 mm.; length=23 mm.

*Affinities.*—This is quite unlike any British fossil species with which I am acquainted. It somewhat resembles an imperfect specimen of *Xanthilites verrucosus*, Schafh., from the Bavarian Nummulitic beds figured and described by Milne-Edwards, but is, I think, distinct from that form. The characters of the carapace decidedly support an alliance with the recent genus *Actæa*. I dedicate this species to Prof. Wiltshire.

*Distribution.*—Lower Greensand of Atherfield.

## Genus Etyus, Mantell.

### Etyus Martini, Mantell.

1863. Bell, Monogr. pt. ii, p. 5 & pl. i, figs. 7–9 (not fig. 11).

*Supplementary.*—Orbito-frontal border about a third of the width of the carapace. Rostrum slightly produced. Antero-lateral margin tumid, with three or four small tubercles supported on a slight ridge. Posterior border rather wider than the orbito-frontal. An areolar tubercle occurs on each of the metagastric, hepatic (close to the antero-lateral border), and mesobranchial lobes. The sulcus between the epi- and mesobranchial lobes scarcely reaches the postero-lateral margin; mesogastric lobe distinctly defined. Pterygostomate region tumid, surface minutely granulated; on the inner portion of the inferior branchiostegite is an unusual oblique sulcation. Sternum rather narrow; episternum granulated, sharply retroflexed. Epistome granulated; endostome narrowing posteriorly and deeply emarginate. Exopodite of external maxilliped about half as wide as the endopodite, which is furrowed longitudinally and has the inner distal angle produced. Abdomen seven-jointed, the penultimate twice as long as the segment preceding it; each

segment divided into a median and lateral portions by longitudinal grooves. Chelæ elongate; propodite about a third of the width of the carapace in length, oval in section. Fingers very slender, nearly as long as the hand; inner border with irregular acicular denticles. Width of carapace = 7 to 26 mm. Length of average adult = 20 mm.

*Remarks.*—In Cambridge Greensand specimens the tubercles on the dorsal surface of the carapace are much less acutely prominent than in those from the Gault—a condition which Bell attributes to attrition. The difference is certainly normal and not accidental; nor is it peculiar to this species; a similar modification of surface-character occurs in most of the forms which are common to the two deposits. The delicate chelæ are very seldom preserved *in situ* in Cambridge specimens, but they occasionally occur in those from the Gault. The detached hand (Bell, pl. i, fig. 11) which Bell supposed to be that of *Etyus Martini* belongs to *Diaulax Carteriana*. M'Coy's figure is inaccurate as regards the course of the scapular sulci, and also in representing the mesobranchial lobe as bearing two tubercles instead of one.

*Distribution.*—Abundant in the Cambridge Greensand. Specimens from the Gault of Puttenham are in the Woodwardian Museum.

## Genus Xanthosia, Bell.

### Xanthosia gibbosa, Bell.

1863. Bell, Monogr. pt. ii, p. 3 & pl. i, figs. 4–6.

*Supplementary.*—The resemblance of *X. gibbosa* with *X. granulosa*, to which Bell alludes in his description of the latter form, is so close that it may well be regarded as a variety of that species. Almost the only distinctive character refers to the processes of the antero-lateral margin, which in this species are more or less pointed, but in *X. granulosa* are quadrate. The marginal armature is, in all the Brachyura, an unstable character, by reason of the variation in form and in degree of development, according to the age of the individual. I have not been able to detect the punctation of the posterior portion of the carapace which Bell mentions as a character. Portions of the test preserved on the cephalic area of specimens which I have seen are distinctly, but minutely, granulated. The fissures in the borders of the orbit are very distinct.

I have met with no other specimens than those described by Bell, four in number, now in the British Museum (Cunnington Coll.). The carapace is the only portion that has been determined. The name *Xanthosia* has been applied by De Candolle to a genus of Umbelliferous plants.

### Xanthosia granulosa (M'Coy). (Pl. II, fig. 5.)

1854. *Reussia granulosa*, F. M'Coy, 'Contrib. Palæont.' p. 272.
1863. *Xanthosia granulosa*, Bell, Monogr. pt. ii, p. 4 & pl. i, fig. 13.
1865. *Reussia granosa*, Milne-Edwards, 'Monogr. Crust. Foss. Fam. Cancériens,' Ann. Sci. Nat. ser. 4, vol. xviii, p. 78 & pl. v, fig. 2.

*Description.*—Carapace a third wider than long, depressed.

Rostrum broadly triangular, slightly prominent. Orbito-frontal border equal to half the width of the carapace. Antero-lateral border compressed to a thin marginal edge, which is divided into three or four quadrate lobes by notches or clefts. Postero-lateral border thickened, inclining inward, and rendering the posterior border narrower than the orbito-frontal. Dorsal surface uniformly covered by small granules—about four in a square millimetre. Areolar tubercles not observable. Most of the normal regions of both the cephalic and scapular areas are separately indicated: lateral gastric lobes inflated; mesogastric lobe small; urogastric undefined; the pyriform epibranchials terminate in the lateral angles; in some specimens a linear, indistinctly defined, mesobranchial extends obliquely forward and inward; cardiac region large, inflated: the metabranchials occupy the postero-lateral two-fifths of the scapular area. A sharp impression occurs in the sinus between the anterior cardiac and the branchial lobes. Pterygostomate region granulated like the dorsal surface. Sternum moderately wide, lanceolate. Episternum sharply retroflexed, acutely pointed. Epistome granulated; cavities for insertion of external antennæ large. Endostome large, with a median, and oblique lateral, ridges. Orbits large, transversely oval, rather less than two diameters apart; two notches in both the upper and lower margins. Ophthalmic peduncles constricted, granulated. Buccal opening rather widened in front. Exopodite of external maxillipeds a third of the width of the endopodite, which latter is longitudinally furrowed and granulated.

Female abdomen seven-jointed; penultimate segment quadrate; telson triangular.

Width of carapace = 10 to 30 mm.; average adult width = 28 mm.; average length = 15 mm.

*Remarks.*—In his generic diagnosis Bell quotes emargination of the orbito-frontal border as a character; but the frontal border of the specimen which he has described and figured is imperfect, and is made to appear emarginate by the accidental fracture of the rostrum. Specimens in which this border is well preserved show a slightly prominent, but distinct, rostrum.

*Affinities.*—This species may be readily distinguished from its allies by the depressed form of the carapace, by the trenchant antero-lateral border, and by the uniformity in size and regularity of disposition of the surface-granules.

*Distribution.*—Cambridge Greensand. Upper Greensand, Warminster (*fide* Milne-Edwards). A single example from the Gault near Aylesford is in the British Museum (No. 44311). I have examined upwards of fifty specimens in the Woodwardian Museum, the British Museum, the Museum of Practical Geology, the York Museum, etc.

### Xanthosia similis (Bell). (Pl. II, fig. 9.)

1863. *Etyus similis*, Bell, Monogr. pt. ii, pp. 6, 39 & pl. i, fig. 12, pl. xi, fig. 15.
1865. Milne-Edwards, Ann. Sci. Nat. ser. 5, vol. iii, p. 347 & pl. vi, fig. 7.

*Description.*—The carapace is almost identical in character with

that of *X. granulosa*, except as regards the granulation of the cephalic portion of the dorsal surface; this area, instead of being uniformly and minutely granulated as in *X. granulosa*, bears larger and pointed tubercles, which vary considerably both as to size and arrangement—not being disposed in any constant order, but scattered irregularly over the gastric and hepatic lobes, differing in disposition in each individual. The cephalic lobes are more inflated and more prominent than in *X. granulosa*. The antero-lateral border is so compressed as to be rendered trenchant.

Length of carapace = 11 to 16 mm.; width = 18 to 28 mm.

*Affinities.*—*X. similis* is smaller in size than its congener—*X. granulosa*—and has a general aspect which suggests the probability that it may be an abnormal form of that species. It was first recognized by Bell, who referred it to the genus *Etyus*, but well-preserved specimens present characters so completely identical with those of *Xanthosia* that I do not hesitate to transfer it to that genus. The difference in form, the irregularity of the granulation of the carapace, and the compressed, trenchant, antero-lateral margin, at once distinguish it from *Etyus Martini*.

The posterior portion of the carapace figured by Bell (pl. xi, fig. 15) is broken away, so that it is made to appear disproportionately wide.

*Distribution.*—Cambridge Greensand. I have examined altogether about twenty specimens, which are preserved in the British and Woodwardian Museums, and in my own collection. This species is probably represented in the Gault of Sainte-Croix by *X. Fischeri*, Milne-Edwards.

## Genus Xanthopsis, M'Coy.

The diagnosis of *Xanthopsis* is given by Bell in detail amply sufficient for determination. It may be added that the sternal plastron is broadly ovate and a fourth longer than wide. Genital pores exist in the third segment of the female. The episternum is half the width of the sternum and twice as wide as long. As regards the abdomen, it is difficult to determine whether the middle segments in the male were free or coalescent during life; but transverse markings distinctly indicate the seven normal segments. The chelæ are unequal, and in some examples the difference in size is very considerable—one being only a third as large as its fellow. The fingers of the larger claw are robust, and have the dentary margin coarsely tuberculated; those of the small chela are slender and usually nearly edentulous. A similar difference occurs normally in many other genera, both recent and fossil.

*Xanthopsis* is abundantly represented in the Tertiary deposits by a variety of forms, of which 14, including 10 foreign, have been described as distinct species. Milne-Edwards has expressed an opinion that several of the foreign forms, to which specific names have been applied, can be considered as varieties only; Bell's careful investigations led him to a similar conclusion relative to

the several British forms, which he regarded as varieties of one species, of which *X. Leachi* is the type. I fully concur with these experienced carcinologists in this opinion. It may, however, be permissible and convenient provisionally to regard these varieties as specifically distinct, and to continue the names employed by Bell, with the object of determining by future observation any special value or interest, either biological, phylogenetic, or geological, which may attach to them.

XANTHOPSIS BISPINOSA, M'Coy.

1858. Bell, Monogr. pt. i, p. 15 & pl. i, figs. 5 & 6.

*Supplementary*.—I apprehend that the dentition of the inner border of the dactylopodite represented by Bell (fig. 5) is inaccurate.

XANTHOPSIS LEACHII (Desmarest).

1858. Bell, Monogr. pt. i, p. 14 & pl. i, figs. 1–4.

*Supplementary*.—The punctation of the dorsum of the carapace varies according to the stage of growth. In small specimens the puncta are so close as to produce a reticulated appearance; they become more widely separated as growth advances, and in large specimens they are more than a diameter apart. The large tubercle upon the dorsum of the hand, near the carpal articulation, and those upon the marginal crest are more or less obsolete in many specimens.

Bell figured a nodulated form which he considered to be that of a variety of *X. Leachi*. I have met with a number of similar examples, most of them from Alum Bay, Isle of Wight; but it is not peculiar to that locality, as specimens from the London Clay of Sydenham and Bognor are in the British Museum. This form nearly resembles a variety of *X. Dufourii*, Milne-Edw., but Milne-Edwards regards it as a nodulated variety of *X. hispidiformis*, Schloth., the occurrence of which at Sheppey is quoted by M'Coy. *X. hispidiformis* and its varieties are fully described and profusely figured by Reuss and by Milne-Edwards. I am, however, unable positively to determine the precise form to which Schlotheim originally applied this name.

*Distribution*.—London Clay.

## Genus PLAGIOLOPHUS, Bell.

PLAGIOLOPHUS WETHERELLII, Bell. (Pl. II, fig. 6.)

1858. Bell, Monogr. pt. i, p. 19 & pl. ii, figs. 7–13.

1859. *Glyphithyreus affinis*, Reuss, 'Zur Kenntniss foss. Krabben,' Denkschr. k. Akad. Wissensch. Wien, vol. xvii, p. 53 & pl. x, figs. 4 & 5.

1861–65. *Plagiolophus Wetherelli*, Milne-Edwards, 'Hist. des Crust. Podophth. Foss.' Ann. Sci. Nat. ser. 4, vol. xiv, p. 358, pl. xxxii, fig. 2 & pl. xxxiv, fig. 1. [?]

*Supplementary*.—Carapace approximately quadrate in outline, as long as wide in the early stage of growth, becoming a fourth or fifth wider as growth advances. Orbito-frontal border as wide as the carapace is long. Mesogastric lobe small, confluent posteriorly with a small angular urogastric lobe of unusual form—which is

separated from the cardiac by a V-shaped sulcus. Posterior margin of the carapace abruptly declivous. Buccal opening as wide as long. Sternal plastron large, broadly ovate. Male abdomen hastate, tapering rapidly to a small telson; sulci between the third, fourth, and fifth segments indistinct. Chelæ rather unequal in size; meropodite remarkably robust, as large as, or larger than, the propodite.

*Distribution.*—London Clay of Sheppey and Portsmouth. Red Crag (derivative) of Felixstowe.

## Genus Xanthilites, Bell.

### Xanthilites Bowerbankii, Bell.

1858. Bell, Monogr. pt. i, p. 17 & pl. ii, figs. 2–6.

1859. *Pseuderiphia M'Coyi*, Reuss, 'Zur Kenntniss foss. Krabben,' Denkschr. k. Akad. Wissensch. Wien, vol. xvii, p. 54 & pl. xviii, figs. 4–6.

1859 ? *Leiochilus Morrisi*, Reuss, *ibid.* p. 56 & pl. xviii, fig. 7; see *Portunites incerta.*

1863–64. *Xanthilites Bowerbankii*, Milne-Edwards, Ann. Sci. Nat. ser. 4, vol. xx (1863) pl. xi, figs. 1 & 2; ser. 5, vol. i (1864) p. 47.

*Supplementary.*—Antero-lateral margin of the carapace slightly arcuate. The postero-lateral margin—described by Bell as very short—is longer than the antero-lateral, nearly straight, inclining inward. Dorsal surface bears granules, ten to twelve in a square centimetre, irregularly disposed, most of them having an apical (setigerous?) pit. A triangular lobe occurs between the base of the mesogastric and the branchial lobes, representing an unusually distinct hypogastric. Sternal plastron broadly lanceolate, a fifth longer than wide; episternum trilobate, minutely granulated, half the width and a fourth the length of the sternal plastron.

*Remarks.*—Bell has given a diagram (fig. 6) of the abdomen, which he considered to be that of the female, but I venture to doubt that determination. In all Brachyura, both fossil and recent, so far as I can ascertain, the segments of the female abdomen, posterior to the third, are as wide as, or wider than, those preceding it, and thus are rendered adaptive for the normal function of supporting and protecting the ova. In some genera this lateral expansion is slight, but it is always recognizable. The hastate form appears to be peculiar to the male: as all the specimens of the abdomen of this species which I have examined are of this form, I regard them as belonging to that sex.

This species, together with *Plagiolophus Wetherellii* and *Portunites incerta*, was concurrently and independently described, but under different names, by Reuss and by Bell. The description is given by Reuss in a valuable communication made in 1857, but not published in full until 1859.[1] The volume of the Palæontographical Society containing Bell's monograph, dated 1857, was issued in 1858, and became available for reference at an earlier date than the German publication. Under these circumstances I have recognized Bell's claim to priority, and have continued the names which he employed. Reuss alludes to this coincidence of publication in a copious note appended to his paper.

[1] Denkschr. k. Akad. Wissensch. Wien, vol. xvii.

*Distribution.*—London Clay. Specimens are in the Woodwardian and Jermyn Street Museums. Examples (derivative) from the Red Crag are in the Woodwardian Museum, etc.

## Genus Podopilumnus, M'Coy.

### Podopilumnus Fittoni, M'Coy. (Pl. II, fig. 7.)

1849. M'Coy, Ann. & Mag. Nat. Hist. ser. 2, vol. iv, p. 166.
1854. M'Coy, 'Contrib. Palæont.' p. 121.
1854. Morris, 'Cat. Brit. Foss,' 2nd ed. p. 114.
1859. Reuss, 'Zur Kentniss foss. Krabben,' Denkschr. k. Akad. Wissensch. Wien, vol. xvii, pp. 8, 79.
1865. Milne-Edwards, Ann. Sci. Nat. ser. 5, vol. iii, p. 315 & pl. vi, fig. 6.

*Description.*—Carapace about a third wider than long; slightly convex transversely, cephalic portion strongly deflexed in front. Orbito-frontal border nearly straight; width rather less than half that of the carapace; interorbital portion occupied by a broad, flattened, quadridentate rostrum. Orbits transversely oval, margins irregular. Antero-lateral border moderately arcuate, slightly keeled, and bearing three small, distant, pointed processes. The postero-lateral margin is longer than the antero-lateral and undulates inward, making the width of the posterior margin about equal to that of the orbito-frontal. The normal dorsal regions are indistinctly defined. A shallow median sulcus extends from the rostrum. The whole surface of the carapace is nearly smooth, but under the lens small granulations of various sizes are visible, especially near the borders. The inferior branchiostegite is sparsely granular, and bears a sharp, curved, granulated ridge. Sternal plastron broadly ovate, half as wide as the carapace. Female abdomen broadly ovate, segments apparently distinct; the five anterior are of equal length and much wider than long. Chelæ robust; meropodite considerably shorter than the propodite; carpopodite large, rhomboid, granulated; hand rather longer than wide; the dorsal surface is singularly sculptured by minute *Cypris*-like markings, and bears several rows of small tubercles extending from the carpal articulation towards the fixed finger; anterior border tuberculated; fixed finger shorter than the hand, and calcareous, the inner border being coarsely dentated. The four posterior pairs of limbs are large and long: the meropodite of the fourth pair measuring half the width of the carapace.

Length of carapace = 36 mm.; width = 48 mm.

*Affinities.*—This genus is clearly referable to the Portunidæ. Milne-Edwards has fully discussed the alliance of this form, and regards its relationship with *Pilumnus* as remote.

*Distribution, etc.*—The only known specimen of this species is that in the Woodwardian Museum described by Sir Frederick M'Coy. It is labelled 'Greensand, Lyme Regis,' but there is doubt both as to the rock and the locality from which it came. Sir Richard Owen[1] regarded it as 'probably from some Tertiary deposit.' It is quoted and figured as a British fossil by Milne-Edwards, Bronn & Rœmer, and Pictet. The figures given by these

[1] 'Palæontology,' Edinburgh, 1860, p. 46.

authors respectively are copies of the woodcut accompanying M'Coy's description, which is stated by the author to be diagrammatic only, and not intended as an accurate representation of the specimen.

## Family Catometopa.

### Genus Goniocypoda, Woodward.

Goniocypoda sulcata, sp. nov. (Pl. II, fig. 10.)

*Description.*—Carapace quadrate in outline, a fourth wider than long; slightly convex transversely, more so longitudinally. Orbito-frontal border nearly straight; width in proportion to that of the carapace as 17 to 20; the median fifth occupied by the obtuse, square rostrum. Portions of the elongated ophthalmic peduncles are preserved. The antero-lateral borders bear the normal external orbital, hepatic, and branchial processes. The postero-lateral margin undulates inwardly and renders the posterior border considerably narrower than the orbito-frontal. Dorsal surface of carapace smooth; the median are separated from the lateral gastric lobes by an unusually wide, shallow sulcus, which extends on each side from the base of the rostrum to the cervical sulcus; hepatic lobes large, but most of the normal dorsal lobes are indistinctly defined. Cardiac region very wide, occupying fully the median third of the scapular area. Sternum large, broadly oval, five-sixths the width of the carapace; the segments are of nearly equal size. The abdomen in the male gently narrows towards the telson; the second, third, and fourth segments are coalescent. Chelæ of equal and moderate size; hand scarcely half the length of the carapace; surface smooth. Fingers shorter than the hand.

Length of carapace = 16 mm.; width = 20 mm.

*Affinities.*—I refer this form to the genus *Goniocypoda*, established by Dr. Woodward for the reception of a Tertiary species, *G. Edwardsi*, Woodw. The carapace differs from that of its Eocene ally in both form and size, being considerably larger, wider in proportion to the length, and less acutely quadrangular; also by the existence of processes on the antero-lateral margin. The specific name refers to the strongly-marked sulcus which surrounds the mid-gastric lobes.

*Distribution.*—Lower Greensand of Shanklin. The only specimen that I have seen is in the Museum of Practical Geology; it is a male, and the chelæ are of moderate size.

## EXPLANATION OF PLATES I & II.

The figures are of the natural size, unless otherwise stated.

### Plate I.

Fig. 1. *Nephrops Reedi*, sp. nov. Left chela. 1 *a*, palmar surface; 1 *b*, dorsal surface. Crag of Boyton, derived from the London Clay. York Museum.

2. *Gebia clypeatus*, sp. nov. 2 *a*, dorsal surface of cephalothorax, × 2;

2 *b*, lateral view of same; 2 *c*, lateral view of abdomen; 2 *d*, dorsal surface of body; 2 *e*, posterior view (telson, etc.), × 2. Great Oolite, Northampton; Woodwardian Museum.

Fig. 3. *Gastrosacus Wetzleri*, v. Meyer. Dorsal surface of cephalothorax. 3 *a*, ×1; 3 *b*, × 2. Coral Rag, Upware (southern pit). Presented to the Woodwardian Museum by Prof. W. J. Sollas, F.R.S.

4. *Homolopsis Edwardsii*, Bell. 4 *a*, carapace; 4 *b*, transverse section of carapace; 4 *c*, female abdomen. Cambridge Greensand.
5. *Homolopsis depressa*, sp. nov. 5 *a*, Gault, British Museum. 5 *b*, Cambridge Greensand, Author's collection. × 1½.
6. *Goniochele angulata*, Bell. Female abdomen. London Clay. Author's collection. Slightly reduced.
7. *Ranina* (*Raninella*?) *atava*, sp. nov. Upper Greensand, Chute Farm, Warminster. Willett Collection, Brighton Museum.
8. *Palæocorystes Stokesii* (Mantell). Sternum, maxillipeds, first pair of legs, and abdomen. Cambridge Greensand. Author's collection. Enlarged.
9. *Necrocarcinus Bechei*, Desi. Female abdomen. Cambridge Greensand. × 3.

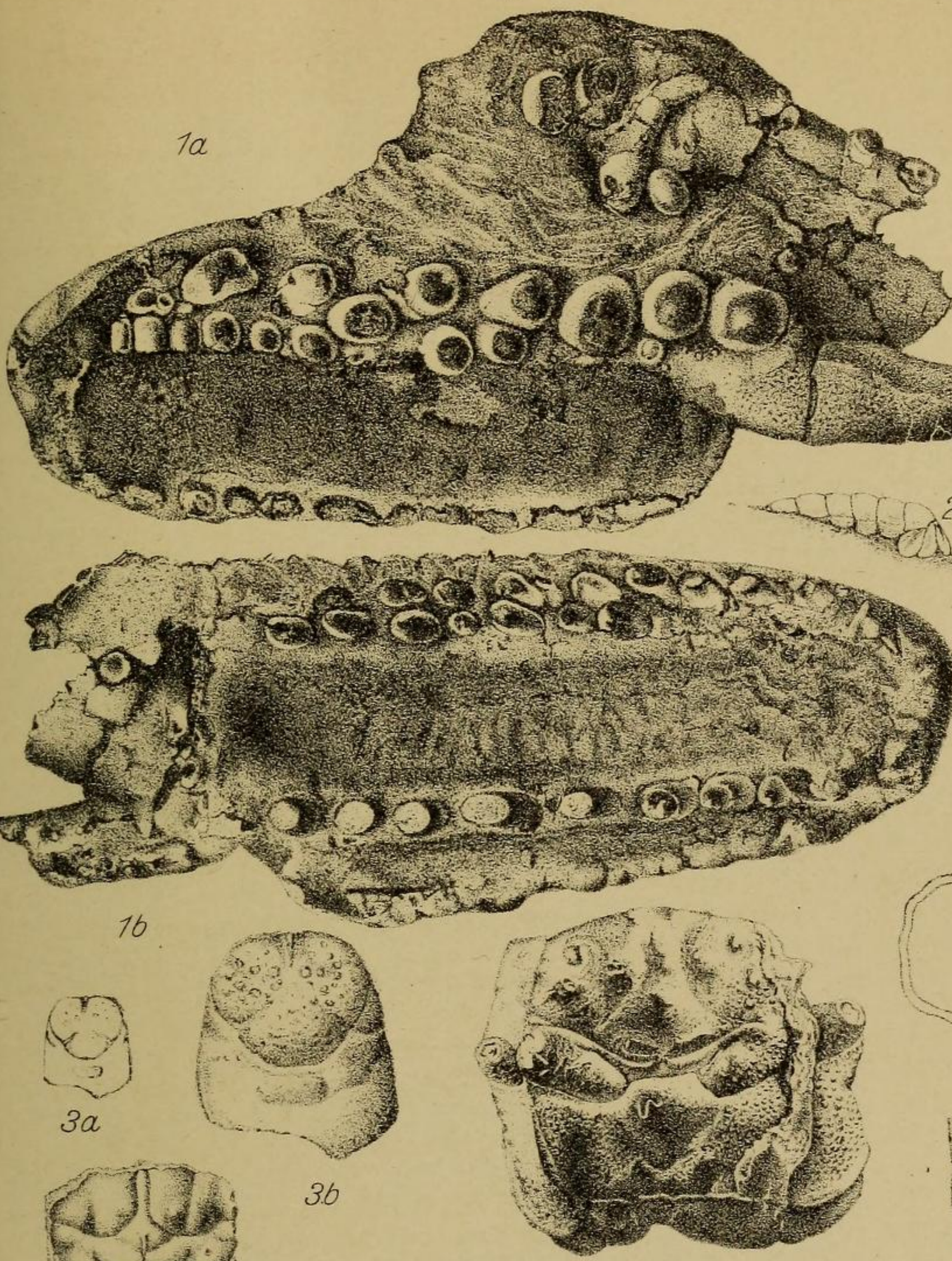
## Plate II.

Fig. 1. *Necrocarcinus Woodwardii*, Bell. 1 *a*, hand; 1 *b*, *c*, sections. Cambridge Greensand. Author's collection.

2. *Neptunus vectensis*, sp. nov. Ventral aspect, showing plastron, etc. Hamstead Beds (*Corbula*-bed), Hamstead. Woodwardian Museum.
3. *Actæopsis Wiltshirei*, sp. nov. Lower Greensand, Atherfield.
4. *Mithracia oblita*, sp. nov. Cambridge Greensand. × 2.
5. *Xanthosia granulosa* (M'Coy). 5 *a*, epistome and endostome, enlarged; 5 *b*, abdomen, enlarged. Cambridge Greensand.
6. *Plagiolophus Wetherellii*, Bell. Male abdomen. London Clay, Sheppey?
7. *Podopilumnus Fittoni*, M'Coy. 7 *a*, ventral view; 7 *b*, anterior view. Greensand, Lyme Regis. Woodwardian Museum.
8. *Mithracia libinioides*, Bell. London Clay, Sheppey. Woodwardian Museum. × 1¼.
9. *Xanthosia similis* (Bell). Cambridge Greensand. Author's collection. × 1½.
10. *Goniocypoda sulcata*, sp. nov. 10 *a*, dorsal; 10 *b*, ventral aspect. Lower Greensand, Shanklin. Museum of Practical Geology (No. 6375).

## Discussion.

Mr. Marr regretted the absence of Prof. Hughes, who, as a Delegate of the Society to the International Geological Congress, had been so occupied that he had only recently returned to Cambridge, and consequently, owing to stress of work, was unable to be present that evening. Prof. Hughes had requested him (the speaker) to express his regrets, and to record the Woodwardian Professor's appreciation of the value of the late Mr. Carter's work, which he was glad to do, as it enabled him to bear personal testimony to the way in which Mr. Carter had ever placed his stores of knowledge at the disposal of geologists, and to his deep regard for the welfare of this Society.



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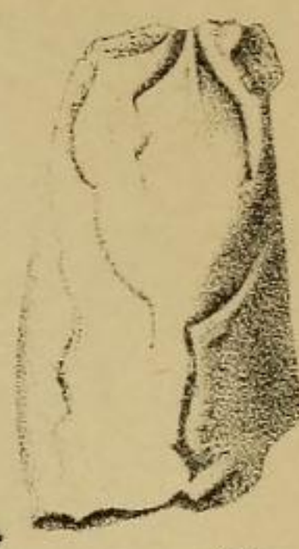

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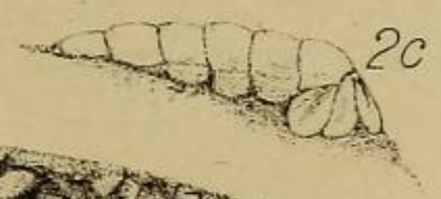

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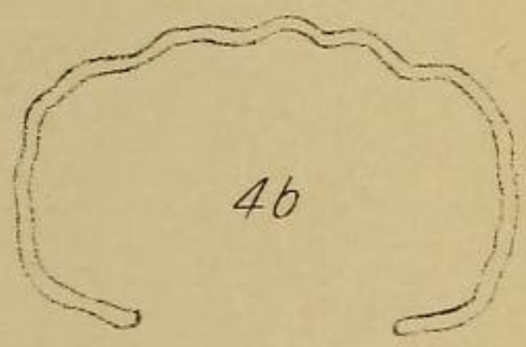

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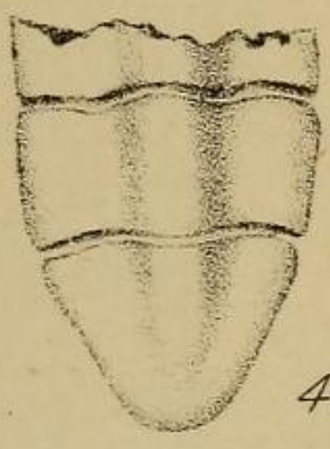
4a



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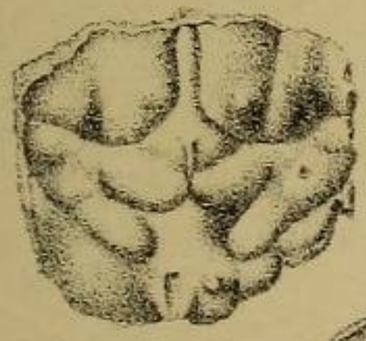

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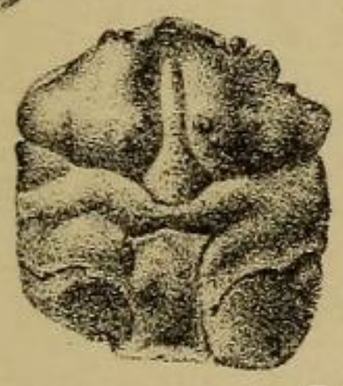

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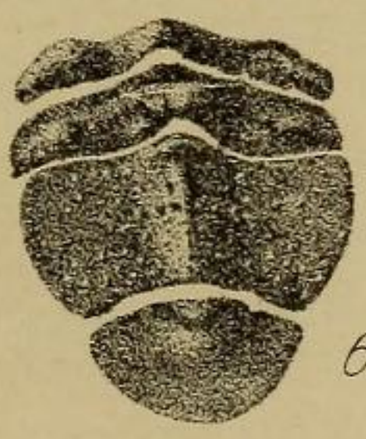

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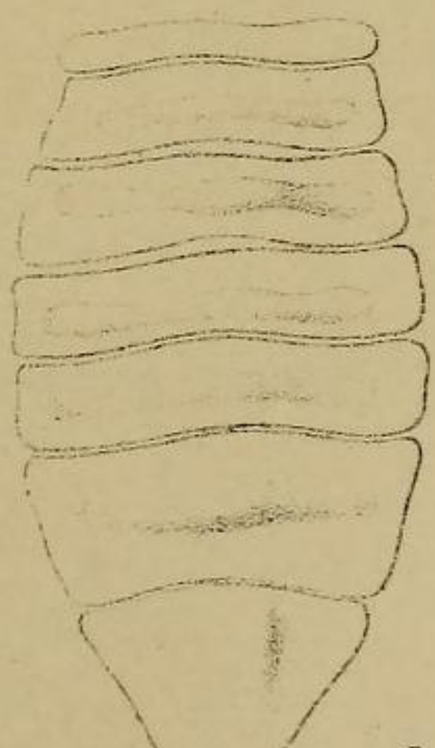

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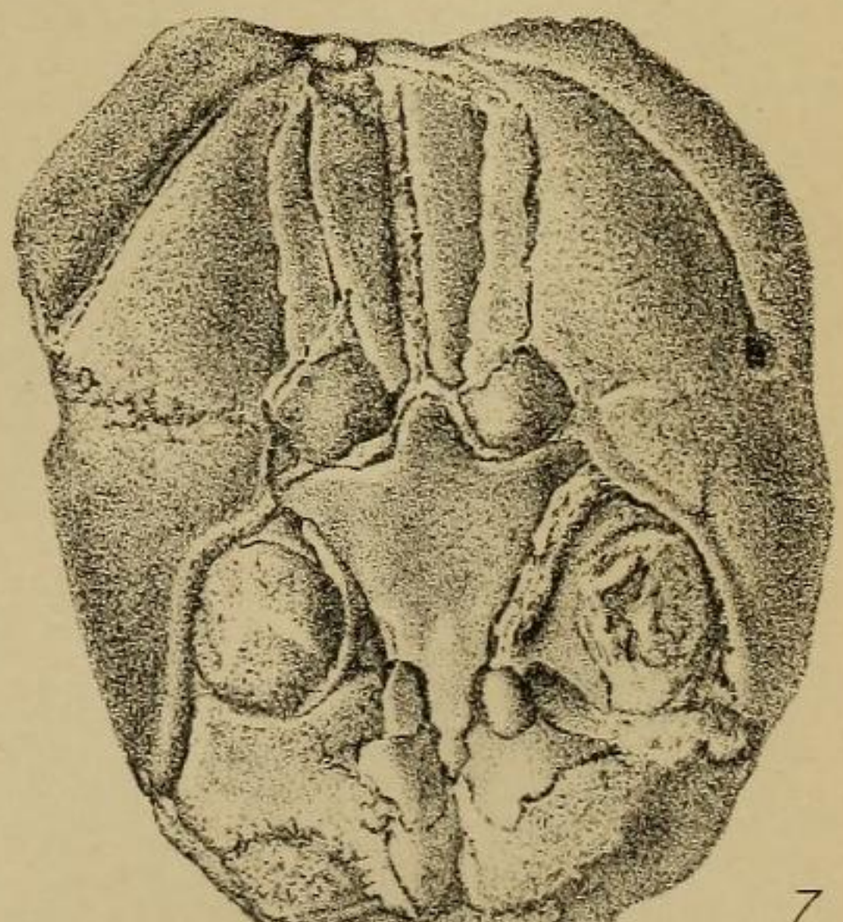

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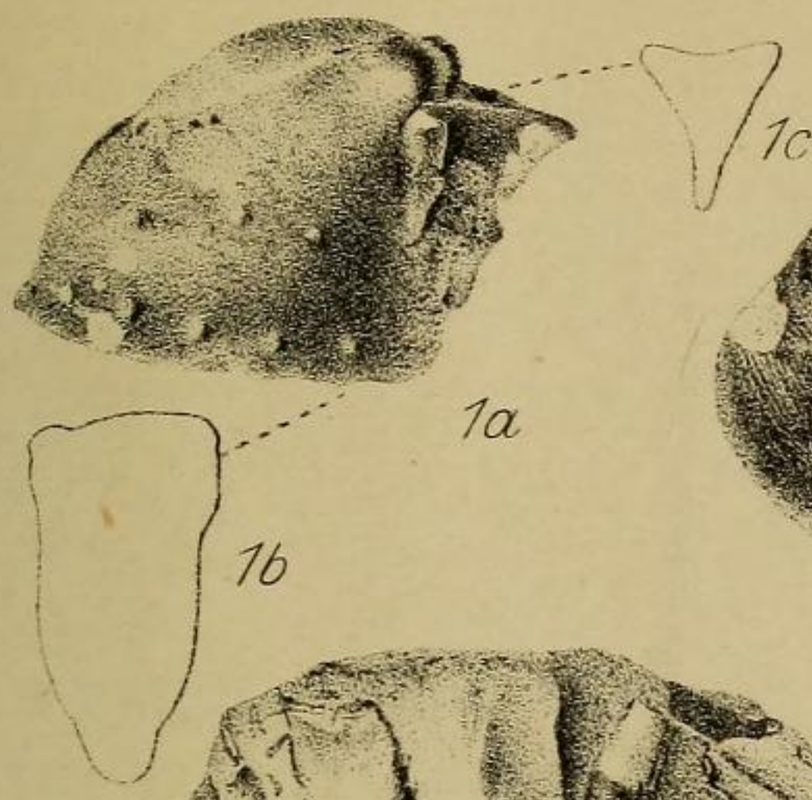
8

DECAPOD CRUSTACEA.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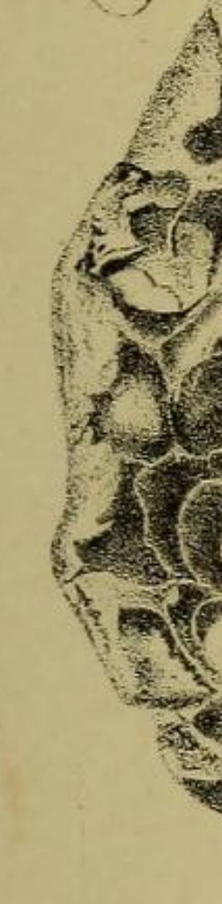
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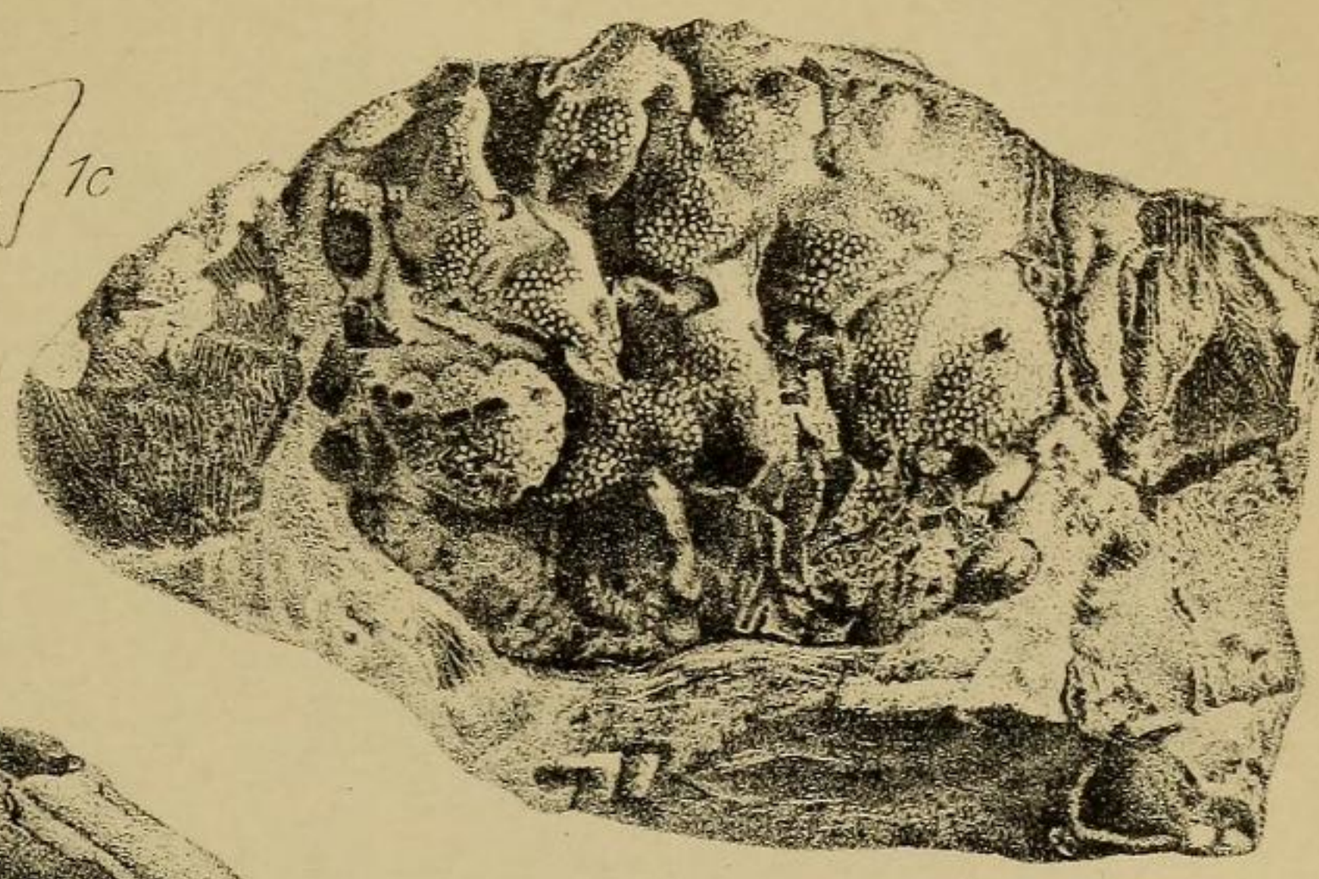
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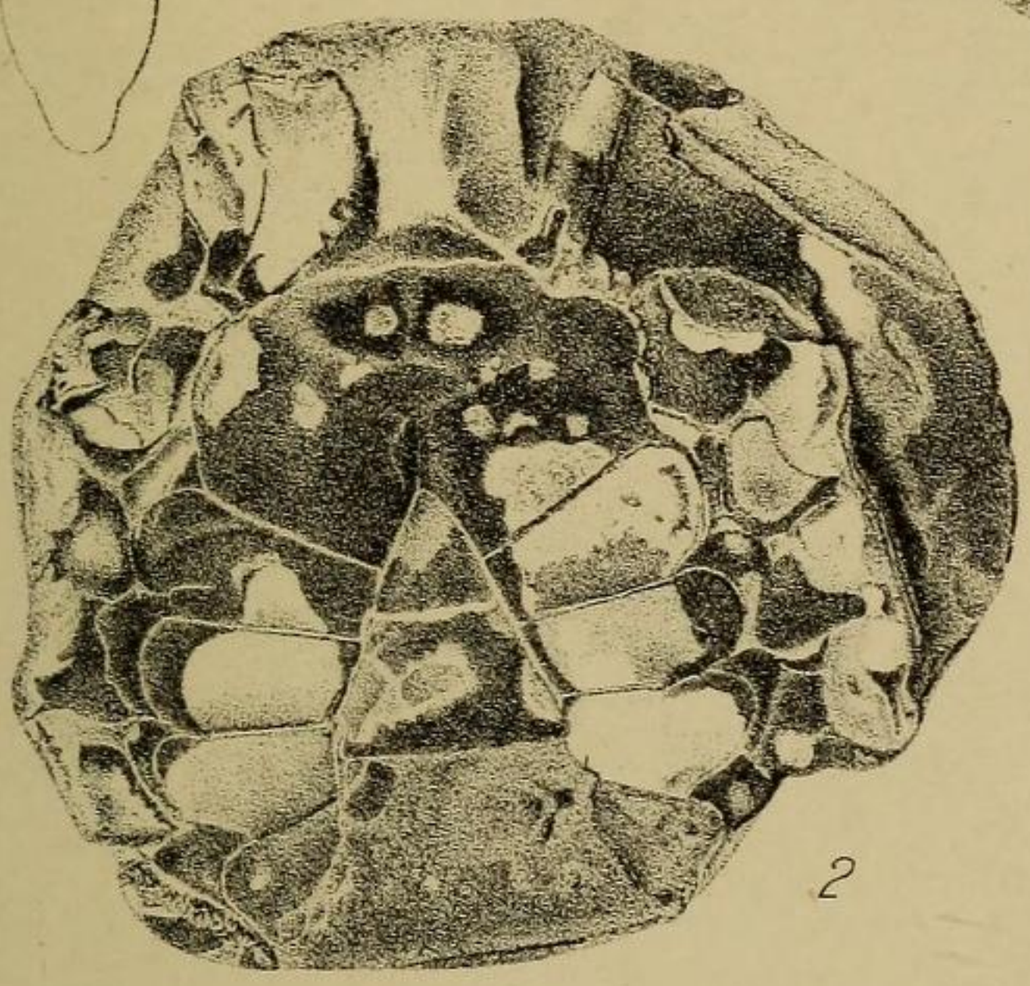
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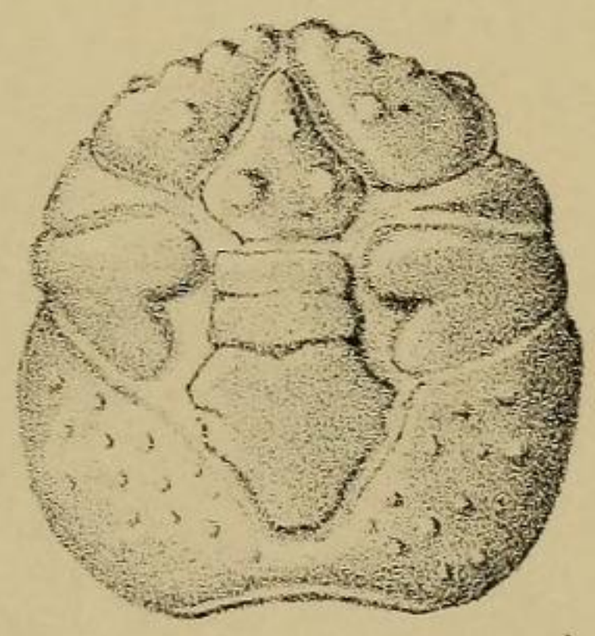
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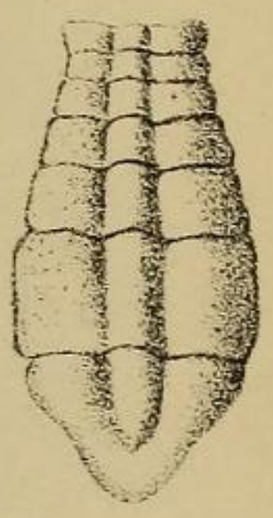
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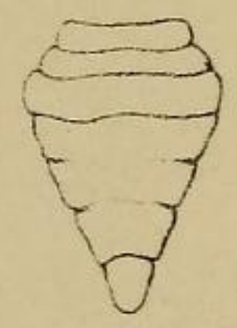
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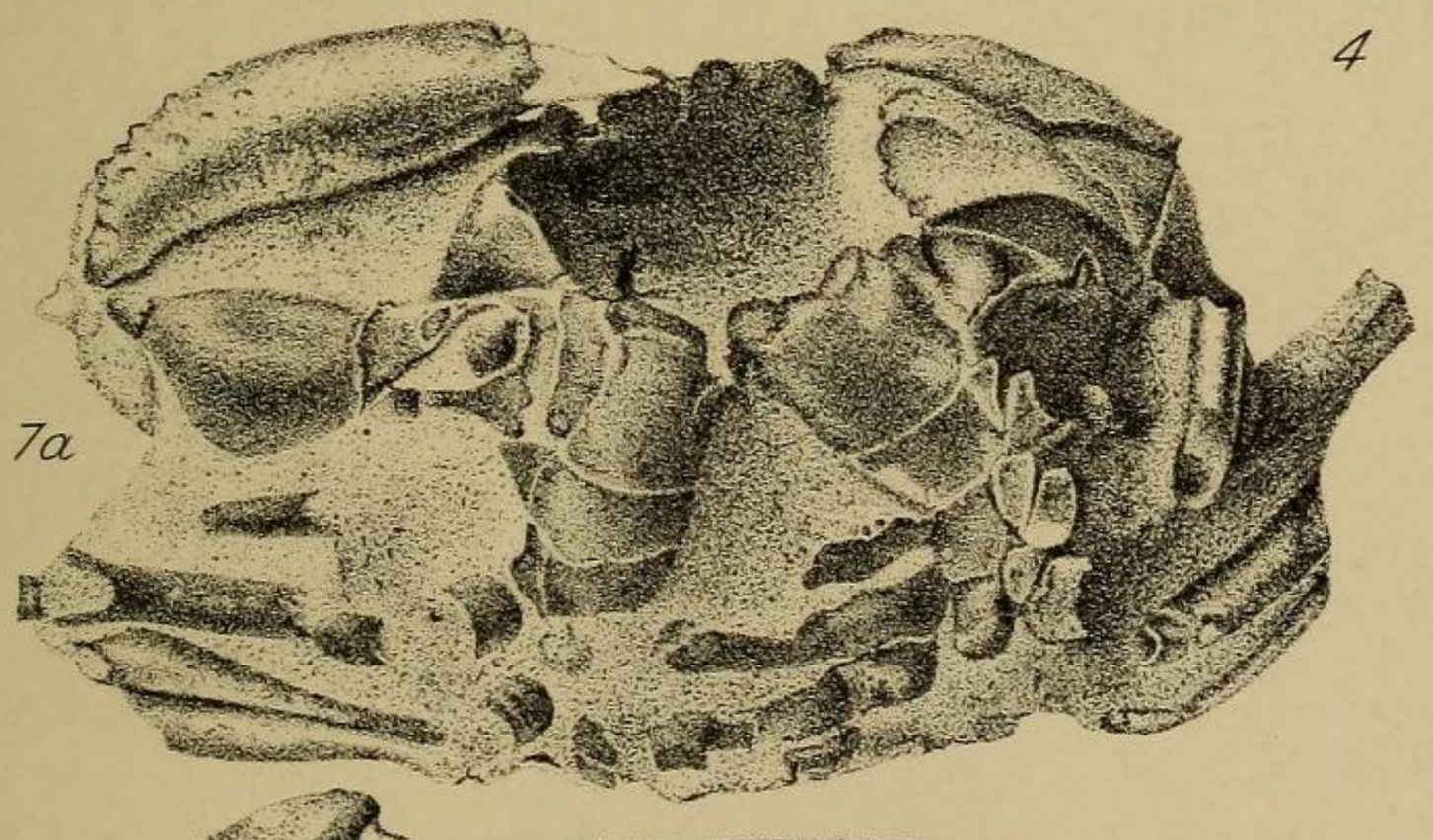
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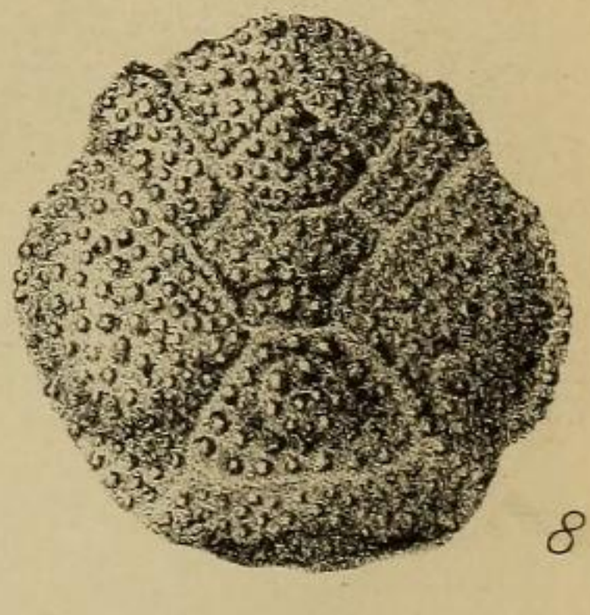
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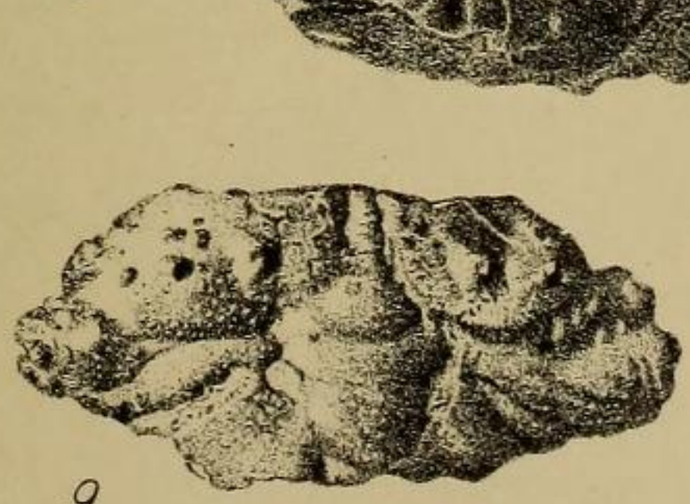
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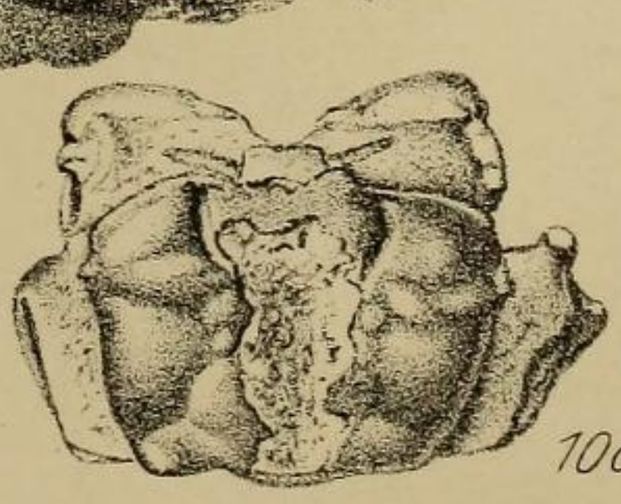
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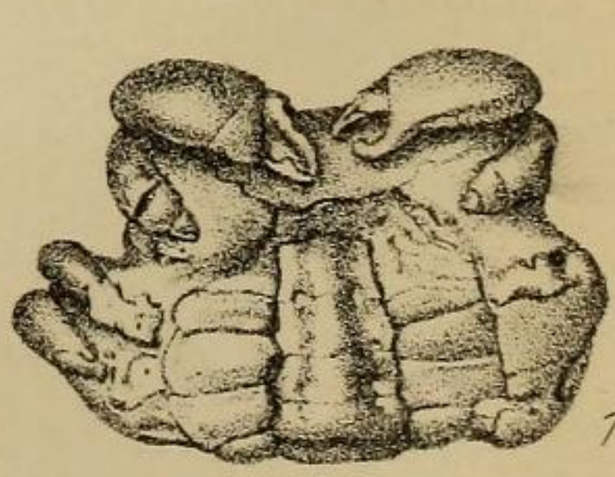
10b

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