

bus, thorace medio plaga magna nigra nitida: capite (cum oculis) quam thorax utroque sexu vix latiore, inter antennis depresso; thorace antice paullo angustiore, disco quinquetuberculato; elytris elongato-oblongis, convexis, ante apicem paullo subito declivibus, apice subtruncato-truncatis, dorso punctulatis, carina laterali recta acuta, longe ante apicem terminata, carinula accessoria carinæ parallela, minus elevata sed longius prolongata; antennis nigris, scapo subtus et apud apicem rufo, articulo quarto albo; pedibus nigris, femoribus vel totis vel subtus tantum flavis.

Long. $7\frac{1}{2}$ lin. ♂ ♀.

Ecuador (*Buckley*).

Amphionycha rubra.

Oblongo-cylindrica, postice angustata, rufa, antennis nigris: capite (♂) magno, exserto, infra retracto, inter antennis depresso, vertice valde convexo, fronte elongata, planata, oculis parvis; thorace breviter cylindrico; elytris apice late truncatis, angulo exteriore paullulum producto, medio dorso planato, apice declivi, carina laterali subrecta, abbreviata, carina accessoria flexuosa, longiore.

Long. 6 lin. ♀.

Novo Friburgo, Rio Janeiro, Brazil.

Amphionycha urocosmia.

Gracilis, flavo-testacea, subnuda, metathorace (medio), abdomine elytrisque dimidio apicali nigris, his plaga magna subapicali canotomentosa; antennis (♀) corpore longioribus, cinereo-nigris, articulo quarto flavo; capite exserto, inter antennis planato, fronte convexa, lateribus paullo rotundatis; thorace cylindrico, basi constricto; elytris apice subsinuatim truncatis, angulis productis, dorso sublineatim punctulatis, epipleuris nitidis, carinis duabus æqualiter acutis.

Long. $4\frac{1}{2}$ lin. ♀.

New Granada.

[To be continued.]

XXI.—*On a Collection of Crustacea made by Baron Hermann-Maltzam at Goree Island, Senegambia.* By EDWARD J. MIERS, F.L.S., F.Z.S.

[Plates XIII., XIV., XV., & XVI.]

THE collection that forms the subject of the present Report, which will be continued in the two succeeding numbers of the 'Annals,' is of very considerable interest, as having been made in a locality hitherto scarcely visited by the carcino-

logical collector, and also on account of the number of new and remarkable forms it contains.

All the species collected, except *Pencæus brasiliensis*, were dredged in Goree Bay, at a depth of about 9–15 fathoms (18–28 metres), on a bottom partly shelly and partly muddy, and were brought to the British Museum by Baron Hermann-Maltzam. Dr. Günther, Keeper of the Zoological Department, recognizing the scientific value of this collection, intrusted it to me for description; and a complete set of the species obtained has been retained for the British Museum.

Although (so far as I am aware) the only species heretofore described from Goree is the *Pilumnus africanus* of M. Alph. Milne-Edwards, a considerable number of species have been recorded from other localities on the West-African coast, and from the Cape-Verd and Canary Islands and Madeira, by Leach, Webb and Berthelot, Dana, Stimpson, Milne-Edwards, and other naturalists, reference to whose works will be found in the following pages; and a very close affinity will be shown to exist between the crustacean fauna of West Africa and that of the Mediterranean region, through the island groups above mentioned. In the determination of this affinity I have been much aided by the collections made at Madeira by the Rev. R. B. Watson and at the Canaries by the late R. MacAndrew, Esq., and by them presented to the British Museum.

A very distinct but less marked relationship is also traceable between the West-African Crustacea and those inhabiting the western shores of the Atlantic (particularly the West Indies); and some few of the species collected have even an Oriental distribution. One only has as yet been recorded from the Cape of Good Hope (*Pilumnus verrucosipes*, Stimpson).

At the end of the paper will be given a systematic list of the genera and species, with the geographical distribution as far as known at present.

I have added descriptions in footnotes of a few species from neighbouring localities in the British-Museum collection.

Baron Hermann-Maltzam is himself engaged in working out the interesting series of Mollusca collected; but the few shells inhabited by Paguridæ and referred to below have been determined for me by my colleague Mr. E. A. Smith,

DECAPODA.

BRACHYURA.

Stenorhynchus rostratus (Linn.).

Several small specimens, both males and females, are in the collection; the length of the cephalothorax of the largest to tip of rostrum is only about 7 lines (15 millim.).

In all of these specimens the rostrum is very short, the epistome and basal antennal joint are without spines, and the anterior legs nearly smooth; the long vertical spines on the gastric and cardiac regions of the carapace are in most of these specimens more developed than in the numerous European specimens of *S. rostratus* in the collection of the British Museum.

An adult male in the collection—length of carapace about $8\frac{1}{2}$ lines (18 millim.)—differs from the foregoing and from typical specimens of *S. rostratus* in having the anterior legs or chelipedes armed with numerous spinules on the upper and lower edges of the arms, wrists, and hands, which joints are ordinarily in *S. rostratus* smooth or simply granulated; the fingers, which are dilated and laterally compressed, are smooth, and when closed have between them, near the base, a wide hiatus. A specimen collected by W. S. Kent, Esq., during the 'Norma' Expedition, in Vigo Bay (which, however, has the rostrum broken), and one from Belfast Bay, dredged in 20 fathoms (*W. Thompson, Esq.*), present similar characters.

This variety differs from *S. ægyptius*, *S. Czernjawsckii*, and *S. longirostris* in the very short rostrum and by the absence of the minute spines at the base of and upon the basal antennal joint, and may be designated var. *spinulosus*.

Herbstia violacea.

Micropisa violacea, A. M.-Edwards, *Nouv. Archiv. Mus. Hist. Nat.* iv. p. 50, pl. xvi. figs. 3-6 (1868).

To this species I refer a series of small specimens (both males and females). Length of the largest about 9 lines (19 millim.), breadth about 7 lines (nearly 15 millim.).

The spines of the carapace show great variation in the degree of their development. In all the specimens I have examined the chelipedes have the inner margins of the fingers smooth, not denticulated. Specimens are in the British Museum (preserved dry) from the West-African coast,

Pisa carinimana.

Pisa carinimana, Miers, Ann. & Mag. Nat. Hist. (ser. 5) iv. p. 11, pl. iv. fig. 6 (1879).

Several specimens are in the collection, of both sexes and different sizes; none are as large as the type from the Canaries (*R. MacAndrew, Esq.*), which (rostrum included) measures 7 lines in length (15 millim.); the largest specimen in the Senegambian collection has a total length (rostrum included) of only 6 lines (13 millim.), breadth little over 4 lines (9 millim.).

Some of the specimens preserved in spirit are of a beautiful rose-colour with yellowish patches, others yellowish brown; but there are apparently no other differences observable between the two varieties. Only in adult males are the specific characters drawn from the anterior legs or chelipedes to be made out. In the females not only are these characters undistinguishable, but also the tubercles on the gastric and branchial regions are commonly obsolete; the transverse tubercles of the gastric region (which are very obscure in the type) are not to be made out in the series now before me, and ought to be erased from the specific description.

Lambrus (Parthenopoides) massena, Roux.

A good series of specimens of both sexes is in the collection, which I refer here. Colour in spirit varies from yellowish brown to reddish.

This species varies very considerably in the form of the rostrum and the amount of tuberculation of the carapace; and it is possible that some of these differences may be of specific importance.

In what I shall regard as the typical, because the commonest, condition of the species, with which I believe *L. rugosus*, Stimpson, from the Cape-Verds, to be probably identical, the front is very prominent, triangulate, and acute or subacute; the gastric, cardiac, and branchial regions very convex and tuberculated; one tubercle on the summit of each of these regions is more prominent than the rest; the inter-regional depressions in the carapace and the sides towards the lateral margins of the branchial regions are nearly smooth. The chelipedes have the merus or arm rather slender and elongated, strongly tuberculated above, palm with but few granules or tubercles on its flattened upper surface (exclusive of the marginal teeth).

Length and breadth of a specimen from Goree a little over

7 lines (15 millim.); length of the larger (right) chelipede when fully extended 1 inch $2\frac{1}{2}$ lines (31 millim.).

There are in the Museum collection examples from the Mediterranean and Sicily.

In two specimens, length and breadth of largest about $7\frac{1}{2}$ lines (16 millim.), which otherwise do not differ much from the foregoing, the prominent tubercles of the gastric, cardiac, and branchial regions are developed into blunt spines, a similar spine exists near the distal end of the upper surface of the arm, and the upper surface of the palms is strongly granulated and tuberculated; they may be designated var. *spinifer*.

In another set of specimens from Goree Island, which appear entitled to rank as a distinct variety, the front is much less prominent, more deflexed and rounded at its distal end, the regions of the carapace less convex and less prominently granulated, with the interspaces and the sides towards the lateral margins also more or less granulated; arm generally shorter. They may be designated var. *atlanticus*.

The five specimens I have seen are females. Colour in spirit more or less reddish; length of the largest a little over 7 lines (15 millim.); breadth 8 lines (over 17 millim.). Length of larger chelipede when extended about 1 inch 1 line (nearly 28 millim.).

Another adult female differs from any of the preceding in having the carapace almost altogether destitute of tubercles or spines; some very small and obscure granulations exist on the branchial and cardiac regions and on the interspaces between them and on the posterior margin; the upper surface of the hands is nearly smooth. In the less acute rostrum and in general form this specimen nearly resembles the preceding variety, of which it is probably an extreme condition. The colour is a nearly uniform deep red. Length of carapace about $6\frac{1}{2}$ lines (14 millim.); breadth about 7 lines (15 millim.). Length of larger chelipede when fully extended about 1 inch ($25\frac{1}{2}$ millim.).

L. pulchellus, A. M.-Edwards*, from the Cape-Verd Islands, has the front in the figure represented as truncated, concave on each side in front of the orbits, and may be distinct from any of the foregoing.

Lambrus (Parthenopoides) bicarinatus, sp. n.

In this, which I must regard as a distinct species, because I have observed no examples connecting it with any of the

* Nouv. Arch. Mus. Hist. Nat. iv. p. 53, pl. xvi. figs. 7-9 (1868).

varieties above enumerated of *L. massena*, the carapace is more depressed than in that species, and the front elongated triangulate acute or subacute, and scarcely at all deflexed. There are a few small granules on the summit of the gastric, cardiac, and branchial regions, and in the interspaces between the two last mentioned, and on the posterior margin; but the anterior part of the carapace, rostrum, and the sides of the branchial regions are smooth; the branchial regions are obliquely carinated, the carina reaching to and most distinctly defined near the postero-lateral margins. The chelipedes have the arms distinctly tuberculated; palms smooth on the upper surface. Colour (in spirit) yellowish brown or pinkish. Length and breadth of the largest example about 6 lines ($12\frac{1}{2}$ millim.).

Four specimens (males and females) are in the collection from Goree. There is also in the British Museum a male from the Canaries.

This well-marked form may be distinguished from *P. expansus*, Miers, by not having the carapace nearly so much produced over the bases of the ambulatory legs, the acute rostrum, and other points.

It bears some resemblance to the variety figured by Costa* of the form he designates *Parthenope contracta*; the carapace, however, is broader, not indented on the sides of the hepatic regions, and there is no prominent spine on the cardiac region. The typical *P. contracta* is regarded by Heller and others as synonymous with *P. massena*.

Heterocrypta Maltzami, sp. n.
(Pl. XIII. fig. 1.)

In this species, of which I have seen a large number of specimens of both sexes from Goree, the carapace is pentagonal rather than triangulate, the lateral margins at first widely divergent, and afterwards nearly parallel; the gastric, cardiac, and branchial regions convex; the gastric region is posteriorly steeply inclined; anteriorly it slopes gently downward to the front, which is very prominent, nearly horizontal, smooth, and flat above, with the sides slightly arcuated and the apex subacute; the sides of the anterior face of the gastric prominence are sharply defined and usually somewhat granulated; the cardiac prominence has the form of a large, very distinctly defined granulated tubercle; on the branchial regions is a sharply defined oblique granulated ridge that extends from the postero-lateral angles of the carapace nearly

* Crustacea in Fauna del Regno Napoli, pl. vi. fig. 3 (1838).

to the base of the gastric prominence; the intervening parts of the carapace are nearly smooth; the antero-lateral, lateral, and posterior margins of the carapace are thin, sharp-edged, and somewhat obscurely crenulated. As in *Heterocrypta granulata*, there is a distinct more or less granulated ridge on the pterygostomian regions; the postabdomen in both sexes has six joints distinct. The short thick eyes fit closely into the orbits, which have a scarcely distinguishable closed fissure in their upper margins; the longitudinally-folded antennules are widely separated from the antennæ, whose basal joint occupies the inner orbital hiatus and whose short flagellum is scarcely visible from above in a dorsal view; the ischium joint of the outer maxillipedes is broad, nearly oblong, excavated at its distal end to receive the merus, which is nearly quadrate, not notched at its antero-internal angle, where it is articulated with the next joint; the exognath is narrow, and about reaches to the distal end of the merus. Chelipedes slender and somewhat elongated; merus or arm trigonous, with the three faces smooth, the margins with little-prominent crenulations or teeth, which are themselves minutely denticulated; wrist with three crenulated and minutely denticulated ridges; palm longer than the arm, trigonous, its upper surface smooth, the margins dentated, the teeth themselves granulated or denticulated and very small, except on the inner margin, where they average about ten in number; fingers small, acute at apices, and distinctly toothed on their inner margins. Ambulatory legs slender, smooth, with the joints compressed and usually unarmed; the merus joints of the first ambulatory legs, however, are sometimes minutely denticulated.

Colour (in spirit) yellowish white, pinkish, or slaty. Length of the largest male 5 lines (nearly 11 millim.); breadth nearly 6 lines (12 millim.); length of chelipede when extended as far as its conformation will allow $10\frac{1}{2}$ lines (22 millim.).

The description is taken from an adult male. Most of the females bear ova.

It is at once distinguished from its congeners, *Heterocrypta granulata*, Stimpson, and *H. macrobrachia*, Stimpson*, from the American seas, by the different form of the carapace, which in outline more nearly resembles that of certain species of *Cryptopodia* (e. g. *C. concava*).

It is certainly one of the most interesting species in the collection; and I have much pleasure in dedicating it to Baron Hermann-Maltzam, its discoverer.

* Ann. Lyc. Nat. Hist. New York, x. p. 105 (1871).

Lophozozymus (*Lophoxanthus*) *sexdentatus*, sp. n.
(Pl. XIII. fig. 2.)

In this pretty little species the carapace is less than one and a half times as broad as long; its dorsal surface is less convex than usual, and rather strongly lobulated on the postfrontal, gastric, and hepatic regions, and on the sides of the carapace behind the antero-lateral marginal teeth; the cervical suture and the depressions between the lobules are very distinct; the surface of the carapace (viewed under a lens) appears punctulated; the frontal margin projects somewhat more than is usual in the genus, and is straight and entire. The first (or outer orbital) tooth and the second tooth of the antero-lateral margins are not developed, the three posterior antero-lateral marginal teeth are prominent, triangulate, and acute, the front part of the antero-lateral margins and the subhepatic and pterygostomian regions, and the narrow epistome are more or less pitted and eroded. The segments of the post-abdomen are all separate and distinct in both sexes. The basal antennal joint reaches to the infero-lateral angles of the front. The outer maxillipedes are punctulated on their outer surface, the transverse merus joint being marked with two somewhat larger and deeper depressions. The chelipedes in the male are short, robust, and (in the specimens I have examined) of unequal size; arm or merus joint very short; carpus somewhat pitted above and on its outer surface, and with a spine on its inner surface; palm slightly convex on its upper and inner surface, and more or less pitted above and on its outer surface; fingers short, compressed, and nearly meeting along their inner edges when closed; the dactylus or mobile finger carinated above.

Ambulatory legs of moderate length, compressed, and carinated above; dactyli not carinated and closely pubescent. Coloration yellowish or slaty; chelipedes and ambulatory legs sometimes reddish, fingers brownish. Length of the largest example rather over $5\frac{1}{2}$ lines (11 millim.); breadth about $7\frac{1}{2}$ lines (16 millim.); the largest male is a trifle smaller.

All the specimens are males, except the largest, which differs in coloration, having the carapace marked with reddish blotches on a paler ground. In this example one chelipede only remains; in this the palm is more strongly pitted on its outer surface, and the fingers are pinkish.

M. Alph. Milne-Edwards has recently* established the genus *Lophoxanthus* for two species which apparently scarcely differ from *Lophozozymus*, except in the more depressed cara-

* Crust. in Mission Scientifique du Mexique, p. 256 (1873-80).

pace and the obsolescence of the first and second antero-lateral marginal teeth. To this genus (or subgenus, as I prefer to regard it) *L. sexdentatus* is to be referred. It differs from both the West-American species, *L. lamellipes*, Stim., and *L. bellus*, Stim., in the much more prominent front and teeth of the antero-lateral margins.

Prof. A. Milne-Edwards* has united with the *Lophozozymus* (*Xantho*) *radiatus* of M.-Edwards both the *Xantho lamelligera* and *Atergatis lateralis* of White. Yet more recently Dr. F. Hilgendorf† has referred all these species to the *Cancer dodone* of Herbst. It appears to me very doubtful, however, whether these identifications can be sustained. In White's specimens of *A. lateralis* in the British-Museum collection the chelipedes have the hands pitted and the wrist with a short keel or lobe (not two tubercles) on its inner surface, as in *L. dodone*, but there are no hairs on the antero-lateral marginal teeth, as described by Hilgendorf in that species. In *Lophozozymus lamelliger*, White, the carapace, as well as the chelipedes, is very distinctly granulated and pitted, the frontal lobes are sinuated, and the lobes of the antero-lateral margins granulated and very obscurely defined. The carpus of the chelipedes is rather bluntly cristate on its inner margin.

Xanthodes melanodactylus.

Xanthodes melanodactylus, A. M.-Edwards, Nouv. Arch. Mus. Hist. Nat. iv. p. 60, pl. xvii. figs. 1-3 (1868).

A large series is in the collection, all the specimens being of small size, the largest scarcely more than 3 lines (6·5 millim.) in length and 5 lines (11 millim.) in breadth; the anterior legs are unequally developed, ordinarily the right, but more rarely the left, being the larger; in the smaller chelipede the palm is slenderer and the fingers bent downwards, so that the lower margin of the smaller finger is not in a straight line with the inferior margin of the palm. The colour (of specimens preserved in spirit) is variable: sometimes the minute red punctulations on the carapace mentioned by M. A. Milne-Edwards are discernible, but in other examples they are quite obliterated; ordinarily the chelipedes are reddish and the fingers black or dark-coloured, with paler tips; but in others these limbs are pale-coloured, and in some the fingers are purplish. These variations seem to afford evidence that the coloration is of little value in this genus as a specific distinction.

* Nouv. Arch. Mus. Hist. Nat. ix. p. 206 (1873).

† Monatsb. der Akad. Wiss. Berlin, p. 789 (1878).

There is in the British-Museum collection a small specimen of this species from the Island of Ascension (*R. Trimen, Esq.*) in which carapace and legs are alike of a pale rose colour, and the fingers brownish, also specimens from Madeira (*Rev. R. Boog Watson*) in which the coloration is obliterated.

It may be of interest to add that there is in the series obtained by Baron Maltzam a female bearing ova whose length does not reach 2 lines (4 millim.).

X. rufopunctatus, A. M.-Edwards*, from Cape St. Vincent and Maio, is very briefly described, and I should be inclined to doubt its distinctness from *X. melanodactylus*; but not having examined the type, I do not venture to quote it as synonymous with the latter species.

X. eriphioides, A. M.-Edwards†, also obtained from Cape St. Vincent, is at once distinguished by the strong spiniform tubercles of the carapace, chelipedes, and legs. This species is still a desideratum in the collection of the British Museum.

Xantho pilipes ?

? *Xantho pilipes*, A. M.-Edwards, Ann. Soc. Entom. France, vii. p. 268 (1867).

There are in the collection numerous specimens of a species of *Xantho*, which I refer here with some hesitation, as Milne-Edwards's diagnosis is in few words. According to the distinguished French naturalist *X. pilipes* is nearly allied to *X. rivulosus*, but is distinguished by its narrower and less convex carapace, the much deeper depressions separating the branchial from the hepatic regions, the well-defined triangular anterolateral marginal teeth, which are four in number, the slight prominence of the external orbital angle, and in the inferior and lateral regions of the carapace being covered with hairs. Breadth of carapace 40 millim., length 34 millim. In all these particulars the specimens before me agree with *X. pilipes*.

The front in these specimens, as in most species of the genus, is divided by a median notch into two broad and truncated lobes. On the postfrontal region and on the front of the gastric region are slightly marked transverse elevations. The male postabdomen is five-jointed; the third to fifth segments coalescent; the anterior legs (in the adult male) are very robust; merus or arm short, smooth; carpus or wrist with a small tooth on its inner margin; palm short, robust, smooth on its outer and inner surfaces, in all except the largest examples obscurely ridged on its upper margin;

* Rev. et Mag. Zool. (ser. 2), xxi. p. 409 (1869).

† Arch. Mus. H. N. iv. p. 58, pl. xvi. figs. 10-14 (1868).

fingers black or pale brown, with lighter tips. Ambulatory legs short, compressed, the hairs most dense on the merus joints. In spirit-specimens the chelipedes are often orange or reddish, and the carapace with more or less trace of reddish coloration upon a paler ground. None of the specimens before me are so large as Milne-Edwards's type, the largest not 7 lines (14 millim.) in length, and a little under 10 lines (20 millim.) in breadth.

X. pilipes has been hitherto a desideratum in the collection of the British Museum.

X. parvulus (Fabr.), Milne-Edwards* (a species found in the West Indies and on the coast of Brazil, and which, according to Dana, occurs at the Cape-Verds), has an extremely strong tooth at the base of the mobile finger, which does not exist in the specimens I refer to *X. pilipes*.

In *X. minor*, Dana†, from Madeira and the Cape-Verds, the upper margin of the hand is deeply sulcated; and in specimens I refer with some hesitation to this species in the Museum collection from Madeira (*Rev. R. B. Watson*), the chelipedes are much slenderer, hand and carpus more rugose and tuberculated.

Leptodius punctatus, sp. n. (Pl. XIII. fig. 3.)

Carapace moderately convex, about one and a half times as broad as long, the convexities on the anterior part of its upper surface prominent and separated by strongly-marked and rather wide depressions; these elevations are pitted with scattered punctuations; but the intervening depressions and the flat posterior and postero-lateral regions of the carapace are smooth. Front bisinuated and with a median incision, thus divided into four rounded and not prominent lobes, the frontal margin and the upper orbital margins somewhat thickened. Antero-lateral margins of the carapace with the four posterior teeth distinct and somewhat tuberculiform; the tooth at the exterior orbital angle obsolete. Postabdomen of the male narrow, composed of only five distinct segments; terminal segment triangulate. Outer maxillipedes having the merus joint transverse and marked with a circular pit on its outer surface. Anterior legs or chelipedes (in the two specimens examined) robust; merus or arm short; carpus or wrist pitted on its upper and outer surfaces, smooth on its inner surface, with a blunt tooth at its antero-internal angle; palm pitted above and on the upper part of its outer surface, smooth

* *Hist. Nat. Crust.* i. p. 395 (1834).

† *Cr. U.S. Expl. Exp.* xiii. p. 169, pl. viii. fig. 7 (1852).

below and on its inner surface; fingers rather obscurely toothed on their inner margins, of a deep black colour, the coloration not extending along the inner and outer surfaces of the palm; the mobile finger is longitudinally channelled above, but without spinules or tubercles near its base. Ambulatory legs short, compressed, with only a few hairs on the upper margins of the merus joints; terminal joints clothed with a short dense pubescence. Colour in the typical example coppery red, paler below. Length of carapace about 7 lines (15 millim.), greatest breadth nearly 11 lines (23 millim.).

The single specimen in the collection is an adult male. In the pitted carapace and chelipedes, and in the strongly defined inequalities of the carapace, this species more nearly resembles *Xanthodius* than *Leptodius*; but it presents no traces of the palatal ridges which are characteristic of the former genus and, indeed, constitute its sole claim to generic distinctness. As these ridges in *Xanthodius* are sometimes imperfectly defined, it may be necessary to unite the two genera, as has been done by Prof. A. Milne-Edwards. As compared with the West-Indian *Xanthodius americanus*, Saussure, *Leptodius punctatus* has the carapace somewhat less convex toward the frontal and antero-lateral margins, the lobulations of the carapace less prominent and separated by wider depressions. In both specimens of *Leptodius punctatus* examined the right chelipede is but little larger than the left.

The differences, however, between the West-Indian and African forms are so slight that, but for the single character of the absence of the palatal ridges, I should have considered *L. punctatus* a mere variety of *X. americanus*. *L. punctatus* further resembles *Xanthodius*, and differs from most species of *Leptodius*, in that the black coloration of the fingers does not extend along the inner or outer surface of the hands. There is in the British-Museum collection a male, preserved dry, from the west coast of Africa, in which the frontal lobes are obsolete*.

* *Leptodius Macandreeæ*, sp. n. (Pl. XIII. fig. 4.)

There is in the collection of the British Museum a single specimen of a species of *Leptodius* from the Canaries, which is very distinct from the preceding and from all others that I have examined. It may be briefly diagnosed as follows:—Carapace flat above, with scarcely any traces of surface prominences or depressions; slight sulci, however, are observable, which originate at the bases of the third and fourth antero-lateral marginal teeth. Frontal margin divided by a median notch into two broad truncated lobes, from which the little prominent internal orbital angles are separated by a notch; the teeth at the exterior orbital angles and the first pair of antero-lateral-marginal teeth are obsolete, the three posterior teeth of the antero-lateral margins distinct. Chelipedes robust; carpus

Pilumnus verrucosipes. (Pl. XIII. fig. 5.)

Pilumnus verrucosipes, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 38 (1858).

Four specimens in the collection agree in all particulars with Simpson's diagnosis, to which the following may be added:—The front is rather prominent, its median notch very small; the first or exterior orbital tooth is small; the verrucosities of the chelipedes and ambulatory legs are prominent and tuberculiform; the outer surface of the larger chelipede (which may be either the right or the left) is nearly naked, and the granulations with which it is covered become obsolete toward the inferior margin. The oblique ridges on the inner surface of the palate do not quite reach to the anterior margin of the buccal area. Orbital margin with a wide inner hiatus and a very narrow fissure near the outer orbital tooth, near to which, on the upper orbital margin, is sometimes a second very small tooth. Colour yellowish or olive-brown. Length of the largest example 3 lines (nearly 6 millim.), breadth a little over 4 lines (9 millim.).

This species was hitherto unrepresented in the British-Museum collection; and its acquisition is of interest, since the type was obtained by the United-States expedition at Simon's Bay, Cape of Good Hope.

A *Pilumnus* (*P. africanus*) has been described by Prof. A. Milne-Edwards* from Goree and Angola, which is in all respects very distinct from *P. verrucosipes*, and is allied in many of its characters to *P. hirtellus*. To it I refer specimens without locality in the Museum collection.

with two obscure teeth on its inner surface; palm obscurely ridged and sulcated along the upper margin; fingers somewhat compressed, distinctly toothed near the base, and ridged above; pale coloured, the lower fingers only being excavated at tips; those of the larger chelipede widely gaping; ambulatory legs compressed.

The specimen, which is preserved dry, has faint reddish markings on a pale ground. Length of carapace little more than 6 lines (11 millim.), breadth about 8 lines (17 millim.). The smooth carapace, together with the obsolescence of the exterior orbital and first antero-lateral-marginal teeth, seems to distinguish this species, which was presented to the British Museum by the late R. MacAndrew, Esq.

It bears a curious resemblance to *Lophozozymus 6-dentatus*, from which not only the excavated finger-tips but the much broader, smoother carapace, with less prominent front and smaller antero-lateral teeth, at once distinguish it. It is very nearly allied to *Leptodius dispar*, Stimpson, a Cuban species, in all particulars except that in *L. dispar* no trace exists of the third antero-lateral tooth, and the chelipedes are described as "naked, smooth, and polished; fingers a little more than one half as long as the palm, scarcely gaping, and but little excavated at the tips."

* Ann. Soc. Entom. France (ser. 4), vii. p. 280 (1867).

Neptunus (Amphitrite) inæqualis, sp. n.
(Pl. XIII. fig. 6.)

Carapace rather convex, closely pubescent and granulated; the granules disposed in series upon the more elevated parts of the gastric, cardiac, and branchial regions; on the gastric region the granulated prominences are disposed in a cruciform figure, behind which are two closely approximated tubercles in the median line; two similar submedian prominences exist on the cardiac region, and three oblique granulated elevations on each branchial region; from the long lateral epibranchial spines a line of granulations extends on each side to the hepatic region, where it is bifurcated. Front with six lobes, of which the two median are small, the next on each side prominent and triangulate, and the outer (or inner orbital lobe) broadly rounded. The antero-lateral marginal teeth are spiniform and acute; the ninth (or lateral epibranchial) tooth very long, in the largest individual about one third as long as the greatest width of the carapace. No spines at the postero-lateral angles of the carapace. Postabdomen (in the male) subtriangulate, not T-shaped, as in *Callinectes*. Anterior legs slender and somewhat elongated; arm or merus with four or five spines on its anterior margin, and one at the distal extremity of its posterior margin; wrist or carpus with a strong spine on its inner and outer surfaces; palm slender and elongated, with two spines on its upper margin (one just above the articulation of the dactylus, and the other a short distance behind it), and with a third spine just above the articulation with the wrist. Ambulatory legs slender; fifth pair having the merus joint unarmed, and the terminal joint ovate, ciliated, and rounded at the distal end. Colour (of spirit-specimens) light yellowish, inclining to pink; fingers variegated with reddish or purplish. Length of largest individual (a female with ova) about 7 lines (15 millim.), breadth to base of lateral epibranchial spines $11\frac{1}{2}$ lines (24 millim.). Length of chelipede, when extended, 1 inch $6\frac{1}{2}$ lines (39 millim.).

The description is taken from the largest example; three other smaller specimens are in the collection, two of which are males. In the smaller specimens the elevations of the carapace are less distinctly marked, the two anterior gastric prominences being indeed obsolete: the teeth of the antero-lateral margins are less spiniform; but the full number are developed even in the smallest example, which measures scarcely 3 lines (6 millim.) in length.

In many particulars this species is nearly allied to the West-Indian *Neptunus Gibbesii*, Stimpson, but may be dis-

tinguished by the greater prominence of the submedian frontal teeth, more convex and tuberculated carapace, with longer lateral epibranchial spines, &c. From *Neptunus marginatus*, A. M.-Edwards, which inhabits the Gaboon coast, it is at once distinguished by the tuberculated carapace and the existence of an additional spine on the upper margin of the palm; and from *N. vocans*, A. M.-Edwards, from the Cape-Verd Islands, by the form of the frontal teeth and the absence of a spine at the postero-lateral angles of the carapace.

N. anceps, Saussure*, of which there is a specimen from Martinique in the Museum, has the carapace much less tuberculated and differently shaped antero-lateral marginal teeth, &c.

Thalamita integra, var. *africana*, n.

This designation is proposed for several *Thalamitæ* in the collection, which scarcely differ from typical specimens of *Thalamita integra*, except in having the lateral lobes of the front shorter than the median lobes. As is usual in *T. integra*, the fourth lateral marginal spine is rudimentary, the basal antennal joint is armed with a smooth and entire crest, and the penultimate joint of the fifth leg bears traces of very minute denticulations. The carapace is somewhat pubescent; the armature of the chelipedes closely resembles that of the typical *T. integra*. The fact of *Thalamita integra* being an Oriental species and not occurring (as far as is known) on the west African coasts, renders it possible that the specimens from Goree Island may belong to a distinct species; but a larger series is required to determine the point with certainty.

There are in the British Museum two small specimens from the Canaries (*R. MacAndrew, Esq.*) which belong to the new variety.

Goniosoma Millerii.

Goniosoma Millerii, A. M.-Edwards, Nouv. Arch. Mus. Hist. Nat. iv. p. 54, pl. xviii. figs. 1-3 (1869).

Here are referred two small examples, males; the larger measures little more than 5 lines (11 millim.) in length, and about 7 lines (15 millim.) in breadth. The small denticles between the larger antero-lateral teeth are perfectly distinguishable, although very small; the frontal teeth, although broad and obtuse, are scarcely as much truncated as in the figure above cited. In the smaller example, length only $3\frac{1}{2}$ lines (little over 7 millim.), the denticles of the antero-

* Mém. Soc. Phys. et Hist. Nat. Genève, xiv, p. 434, pl. ii. fig. 11 (1858).

lateral margins are on one side obsolete and on the other discernible only by a lens of considerable power; the frontal teeth are less regular, and separated by somewhat shallower incisions; so that, had the larger specimen not been available for comparison, the identity of the smaller with Milne-Edwards's species might well have been questioned.

This is a very interesting acquisition, the species having been hitherto a desideratum in the Museum collection.

Its near affinity with the Oriental *G. erythroductylum*, noted by Milne-Edwards, is unquestionable; but in adult individuals of that species there are only two rudimentary denticles in the interspaces between the three anterior teeth of the antero-lateral margins; moreover, in the specimens I have seen of *G. erythroductylum*, the carapace is smooth and naked, whereas in *G. Millerii* it is clothed by a short pubescence.

Since the above was written a larger female has been received from Baron Hermann-Maltzam, from Goree Bay. Length nearly 10 lines (21 millim.), breadth about 1 inch 2 lines (30 millim.).

Portunus corrugatus (Pennant).

Here are referred several specimens in the collection; they are of the typical form, with distinctly defined frontal lobes. The wide Oriental range of this common European species I have already noted*; and the fact of its occurrence in the Atlantic region, as far southward on the west coast of Africa as Senegambia, is not without interest.

Portunus pusillus, Leach.

Three examples, a male and two females, are in the collection, which agree in all particulars with Mediterranean specimens.

There are in the British Museum examples from the Canaries (*R. MacAndrew, Esq.*).

Portunus pusillus has much affinity with *Portumnus africanus* (A. M.-Edw.) and *P. nasutus* (Latreille), and it is indeed difficult to cite any certain differences by which these species may be distinguished from *Portunus*.

P. pusillus has evidently a wide geographical range, being found on the British coasts as far north as the Shetlands, from which locality there are specimens in the British-Museum collection.

It is one of the British species recently mentioned by Mr.

* "On a Collection of Crustacea from the Korean and Japanese Seas," Proc. Zool. Soc. 1879, p. 33.

Kirk as occurring in the New-Zealand seas; but I am inclined to think the New-Zealand species distinct, since Mr. Kirk mentions the existence of a "prominent spine" on the anterior margin of the hand in his specimens: this I have never observed in the true *P. pusillus*, which has the distal end of the anterior margin acute or armed with a very small spinule.

Atelecyclus rotundatus, Olivi.

Several specimens of this common Mediterranean species are in the collection. Length of the largest 11 lines (23 millim.), breadth a little over 1 inch 1 line (28 millim.); the others are all much smaller.

[To be continued.]

XXII.—*Remarks upon Mr. Wood-Mason's Paper "On the Discrimination of the Sexes in the Genus Paludina."* By
EDGAR A. SMITH.

MR. WOOD-MASON'S object is to show that the sexes of *Paludina* are distinguishable by differences both in the shells and animals. This fact, I need scarcely remind the readers of this journal, has been known for nearly two hundred years. Lister, in 1695*, gave a very fair anatomical description of the animal, demonstrating (p. 46) the bisexuality of the genus and the characters of both male and female.

He says, in reference to the distinguishing external features, "si tamen nota aliqua *externa*, qua mas a foemina primo intuitu discerni possit, desideretur, scire licet mares fere *minores* esse, deinde, in maribus *dextrum cornu* (tab. 2. fig. 1, *f*) *sinistro* duplo *latius* esse, *apiceq.* obtuso *desinere*." On turning to the above-quoted figure we find it thus described:—"Dextrum maris *cornu obtusum*, in quo *penis exitus* est."

The latter discovery has since received confirmation from Cuvier †, Moquin-Tandon ‡, and others.

Supposing a marked difference in the size of the adult shells generally prevails in the sexes of *Paludina*, I fail to perceive how a conchologist, judging from the shells alone, can know which, in any series he may have before him, have contained males and which females. In any large number of a species

* 'Exercitatio anatomica altera, in qua maxime agitur de Buccinis fluviatilibus et marinis' (12mo, London, 1695).

† Ann. du Mus. 1808, p. 170; also Mémoires pour serv. à l'Hist. des Mollusques, 1817.

‡ Mollusques terr. et fluv. de France, 1855, vol. ii. pp. 530-537.

(No. 32, p. 365), which, presenting a membranous form when stretched across the irregularities of the detritus of the seabottom in which it may be growing, can be satisfactorily examined with the microscope, when it is found to be composed of an extremely thin transparent layer or epidermis on each side, enclosing one of polygonal cells of different sizes, indistinctly defined, but filled with granules, and apparently each containing a nucleus. In this membrane may be observed minute foreign bodies, such as fragments of sponge-spicules &c.; but their presence is only a part of what is taking place generally with the detritus under the spreading growth and agglomerating influence of this ruby-coloured organism, whose "granules" appear to bear the colouring-material. This is all that I could make out of *Halisarca rubitingens* in the dry state; and therefore, like Schmidt, I have stated that further observations in the wet state or while living are necessary for its elucidation.

XXVI.—*On a Collection of Crustacea made by Baron Hermann-Maltzam at Goree Island, Senegambia.* By EDWARD J. MIERS, F.L.S., F.Z.S.

[Continued from p. 220.]

Pilumnoplax sulcatifrons, var. *atlantica*, n.

Pilumnoplax sulcatifrons, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 93 (1858).

I thus designate, with much hesitation, a small female crustacean which agrees in nearly all its characters with specimens from the "Eastern seas" in the Museum collection that are referred to Stimpson's species, of which, however, I have seen no typical specimens. The Oriental examples have lost their ambulatory legs, but agree in the form of the carapace and the antero-lateral marginal teeth, the notched and sulcated frontal margin, and the structure of the antennæ with the West-African specimen. This latter has somewhat slenderer chelipedes—a character that cannot be depended upon, in the absence of males from the same locality for comparison. Length $3\frac{1}{2}$ lines (nearly 8 millim.), breadth about $4\frac{1}{2}$ lines (10 millim.).

I may add, as further points of distinction, that there are a few granules near the base of the second antero-lateral tooth, and the sulcus reaching from the fourth tooth to the cardiac region is obsolete in the West-African specimen.

Typhlocarcinus integrifrons, sp. n.
(Pl. XIV. fig. 1.)

The carapace is transverse, granulated, convex longitudinally, with a short scanty pubescence on its upper surface, and clothed with longer hairs on the lateral margins and on the margins of the legs; the cervical and branchio-cardiac sutures are very distinct. Front somewhat deflexed, with its anterior margin entire, straight, and clothed with long hairs, and rounded off on the sides towards the inner orbital angles. Antero-lateral margins arcuated, when viewed under a high magnifying-power appearing granulated, with obscure indications of division into two or three granulated lobes. Epistome very short. Postabdomen (of male) not as wide in its widest part as the sternum, with all the segments distinct, terminal segment subtriangulate. The ocular peduncles lie closely within the orbits, which are widest internally, with granulated margins; a wide hiatus exists between the inner suborbital angle and the front, which is filled by the broad quadrate basal (or second) joint of the antennæ, which reaches to the front; the exposed joints of the antennal peduncle are slender and clothed with long hairs; the flagellum rather long and multiarticulate, the joints clothed with very short setæ; the outer maxillipedes are smooth externally, with scarcely any intervening hiatus when closed; ischium rather broad, merus about as broad as long, not notched at its antero-internal angle, where it is articulated with the next joint. Chelipedes (in the male) rather robust, pubescent; arm short, carpus without a tooth on its inner surface; palm short and broad, and rather convex, broader transversely than the carpus; fingers slightly arcuated, minutely toothed on their inner margins, which are hairy at base, and having a rather wide interspace between them when closed. Ambulatory legs compressed, with hairy margins and rather long and slender terminal joints. The male verges lie in channels of the sternum, but are visible from above. Colour light fulvous-brown. Length of the largest example (a male) somewhat over 3 lines (7 millim.), breadth 4 lines (nearly 9 millim.).

A second specimen (female) is of rather smaller size, with slender chelipedes, the fingers of which meet when closed.

It is with some hesitation that I assign this species to the genus *Typhlocarcinus* of Stimpson's family Rhizopidæ, as but few of the types to which it is apparently most nearly allied are represented in the Museum collection. The different genera of this family described by Stimpson are apparently separated by characters of small importance. The

species now described is apparently most nearly allied to *Ceratoplax* in the characters of the orbits, antennæ, and ambulatory legs, but differs in the form of the carapace, the small epistome, and the form of the merus of the maxillipedes. From *Typhlocarcinus nudus* and *T. villosus* it is distinguished by the form of the front, &c.

THAUMASTOPLAX, gen. nov.

I propose this generic name for a species in the collection that is closely allied in all its characters, and particularly in wanting the fifth pair of thoracic legs, to the genera *Hexapus*, De Haan, and *Amorphopus*, Bell, but is distinguished from the former by the much greater development of the second ambulatory legs and the structure of the outer maxillipedes, whose merus joint is elongated and narrowed at its summit, where it is articulated with the next joint; and from the latter by the well-formed orbits and the entire absence of rudimentary fifth legs.

Thaumastoplax anomalipes, g. et sp. n.
(Pl. XIV. fig. 2.)

The carapace is transverse, about one and a half times as broad as long, longitudinally rather convex, polished, naked, and rather coarsely punctulated above; the regions not defined; the sides sharp-edged; the antero-lateral margins arcuated, the margins of the branchial regions straight and parallel. The front is nearly a quarter the breadth of the carapace, and has its anterior margin nearly straight. The orbits are very small, without marginal fissures, with a wide hiatus at the infero-internal angle, which is filled by the basal part of the antennæ. The buccal cavity is without distinct longitudinal ridges on the palate; epistome obsolete; abdomen in the male narrow, five-jointed, the third and fourth joints coalescent, and also the fifth and sixth, although in one specimen traces of the suture dividing the two last-mentioned joints are discernible under the microscope; the sternal surface (in the specimens examined) is nearly naked. The eyes are closely encased in the orbits, which have a distinct inferior margin; the large antennules are transversely folded; antennæ with the basal portion very small and occupying the infero-internal orbital hiatus; antennal flagellum rather long and about ten-jointed. The outer maxillipedes are slender and clothed with long dense hairs on their inner margins; ischium and merus each longer than broad, narrowing at each end, and with the inner margin arcuated; the penultimate joint

dilated distally. Chelipedes (in the specimens examined) subequal, of moderate length; arm very short, little exceeding its vertical depth in length; carpus small; hands compressed, with short hairs and with subseriately-arranged tubercles on their outer surface; fingers thin, sharp-edged, denticulated, and nearly meeting along their inner margins; second legs small, third and fourth legs thick, with the third to fifth joints very robust, and the claws small; fifth legs entirely wanting. Colour (in spirit) light yellowish brown; legs more or less densely clothed with a short pubescence. Length of the largest example (a male) nearly 4 lines (8 millim.), breadth a little over 6 lines (13 millim.).

Two smaller examples are in the collection—one a male, the other apparently an immature female.

This form is apparently so nearly allied to *Amorphopus* of Bell* that I am not sure whether it ought to be generically separated from it. In *Amorphopus*, however, the carapace is described as cylindrical, the inferior orbital margin is wholly wanting; the chelipedes are unequal, the fingers in the larger hand meeting only at the tips, and the fifth legs are represented by a minute tubercle inserted in a little notch at the base of the first joint of the fourth pair. Of this I find no trace in *T. anomalipes*.

The locality of Bell's type, *Amorphopus cylindraceus*, is not stated.

Hexapus sexpes (Fabr.), as described and illustrated by De Haan, in v. Siebold†, resembles this species in general shape and in having only three pairs of ambulatory legs, without a rudiment of a fourth; the species, however, is of minute size, the carapace somewhat broader behind, the outer maxillipedes with the ischium or second joint broad and transverse, merus quadrate (as shown in the figure), truncated at its distal end, with the next joint articulated with it at its antero-internal angle; the second legs are shorter, whereas in *T. anomalipes* they are longer and more robust than the rest.

Gelasimus tangieri (yg.).

Gelasimus tangieri, Eydoux, Magas. de Zoologie, vii. pl. xvii. (1835); M.-Edw. Ann. Sci. Nat. (ser. 3) Zool. xviii. p. 151, pl. iv. fig. 21 (1852); Heller, Crust. des südl. Europa's, p. 101 (1863); Kingsley, Proc. Acad. Nat. Sci. Philad. p. 153 (1880).

* Journ. Linn. Soc., Zool. iii. p. 27 (1859).

† Fauna Japonica, Crust. pp. 35, 63, pl. xi. fig. 5, and pl. D. fig. (1849).

Gelasimus perlatus, Herklots, Addit. Faun. Carcin. Afric. Occid. p. 6, pl. i. fig. 3 (1851); M.-Edwards, Ann. Sci. Nat. t. c. p. 151 (1852); Hilgendorf, Monatsber. der Akad. Wissensch. Berlin, p. 806 (1878); Kingsley, t. c. p. 153 (1880).

Here are referred three very small specimens in the collection, which I was at first disposed to regard as a distinct species; the largest only measures about 3 lines (7 millim.) in length and 4 lines ($8\frac{1}{2}$ millim.) in breadth. Not only do they differ from all the specimens of *G. tangieri* I have seen in their much smaller size, but also in the small number of the granules of the carapace, of which there are scarcely any on the median portions, and in the relatively much shorter fingers of the larger chelipede, which are no longer than the palm. The hand, when the fingers are closed, is nearly ovate; and there are scarcely any granules on its inner surface. An approach to these specimens is exhibited, however, in an example from Sierra Leone of rather small size; length of carapace $5\frac{1}{2}$ lines (12 millim.).

This species occurs at various localities on the northern and western coasts of Africa, as noted by Mr. Kingsley in his monographic list of the species of the genus above cited; and I may add, as a fact of much interest, that there are specimens from the West Indies (*Frazer*) in the British-Museum collection which are not to be distinguished specifically from the African examples.

Philyra cristata, sp. n. (Pl. XV. fig. 1.)

In this species the body is depressed, suborbiculate; carapace minutely punctulated above, produced at the margins into a thin continuous crest that surrounds the body; the regions are not distinguishable; the intestinal region, behind the posterior marginal crest, is also strongly cristate. The front has its anterior margin straight, and does not project anteriorly so much as the front of the buccal cavity. Orbits small; the fissures of the upper margin are very indistinct, and have a wide hiatus at their exterior and interior angles, and no lower margin other than that formed by the projecting rim of the buccal cavity. Postabdomen with all the joints except the first and last coalescent, of the male nearly half as broad as the sternum, concave on the sides in the middle, with a small tubercle on the penultimate joint, terminal joint much smaller than the preceding. Eyes small, black. Antennules lodged in horizontal fossettes. Antennæ scarcely distinguishable. Inferior surface of the body smooth and minutely punctulated. Outer maxillipedes with the triangular merus as long as the ischium; exognath very broad, with its

exterior margin arcuated, broader at its distal end than the endognath. Anterior legs or chelipedes rather slender; merus trigonous with the margins granulated; carpus very small; palm slightly compressed, with the upper and lower margins carinated but not granulated; fingers slightly incurved at their acute apices, and slightly hairy on their inner margins. Ambulatory legs slender and short, with the joints (except the dactylus) slightly compressed and carinated but not granulated; dactylus slender. Colour (in spirit) light yellowish or greyish, sometimes with faint dusky lines on the carapace. Length of the largest specimen nearly 3 lines (6 millim.), breadth very little more; length of chelipede, when extended, about 4 lines ($8\frac{1}{2}$ millim.).

I refer this species to the genus *Philyra*; but it may not improbably be found to constitute the type of a distinct genus intermediate between *Philyra* and *Onychomorpha*. It differs from all other species of the genus except *P. marginata*, A. M.-Edwards*, from Upolu, in the marginal crest or rim of the carapace, and in the form of the male postabdomen. From *Onychomorpha lamelligera*, Stimpson†, it differs not only in the form of the carapace, but also in the transverse antennular fossettes, form of the postabdomen in the male, and longer fingers of the chelipedes. *O. lamelligera* was obtained at Hong-Kong.

Philyra marginata is very briefly described, but is apparently distinguishable by the finely granulated upper and lower margins of the chelipedes.

Philyra lævidorsalis, sp. n. (Pl. XV. fig. 2.)

Carapace moderately convex, smooth and shining, its upper surface minutely punctulated, slightly concave behind the front, but without any marked depressions or sutures, and destitute of granulations and tubercles; the lateral margins, however, are defined by a granulated line, which extends from the front to within a short distance of the posterior margin, which is straight and marked with a granulated ridge. The frontal margin projects less than the anterior margin of the buccal cavity, and has a very obscure median prominence. The inferior surface of the body is naked, shining, but minutely punctulated. The postabdomen of both sexes has all the joints except the first and last coalescent, without tubercles; the terminal joint in the male is very small, much narrower than the preceding, whose posterior limit is indicated by cre-

* Journ. Mus. Godeffroy, iv. p. 85 (1873).

† Proc. Ac. Nat. Sci. Phil., p. 162 (1858).

nations in the lateral margins. The eyes are contained in small circular orbits, whose upper margins are marked by a fissure. Antennules transverse; the minute antennæ are also placed almost transversely, and occupy the narrow inner orbital hiatus. Maxillipedes with large ischium and elongate triangulate merus joint; exognath stout, with its exterior margin curved, and apex (which does not reach quite to the distal end of the merus) rounded. Chelipedes robust, of moderate length; merus or arm with numerous small granules at its proximal end on its upper and under surfaces, the margins also granulated; carpus smooth, convex; palm little longer than broad, convex on its inner and outer surfaces, its upper margin acute, its inferior margin rounded; fingers but little shorter than the palm, curved at the apices and denticulated on the inner margins. Ambulatory legs slender, short; dactyli longer than the penultimate joint. Colour (in spirit) more or less slaty or pinkish. Length of the largest example (a male) little over 7 lines (15 millim.), breadth about $6\frac{1}{2}$ lines (nearly 14 millim.); length of chelipede (when extended) nearly 1 inch (25 millim.). In the smallest example (a female) the length of the carapace is about 4 lines (9 millim.).

Five males and females are retained from Baron Hermann-Maltzam's collection.

From the preceding species *P. lævidorsalis* is distinguished by the absence of the lateral marginal crest, not to speak of other characters. It is distinguished from most of the other species of *Philyra* by its smooth and somewhat polished carapace and shorter robust chelipedes—from the Australian *P. orbicularis*, Bell, by the lateral marginal line of granules not being continued over the posterior margin, by the absence of a tubercle on the male postabdomen, smaller granules of the arms, and other characters.

Ilia spinosa, sp. n. (Pl. XV. fig. 3.)

This very interesting species has the subglobose body covered with small granules, which, however, are less numerous and crowded than in *I. nucleus*. There is a short spine on the pterygostomian region, and two long somewhat curved spines on the postero-lateral margins of the carapace, in place of the short postero-lateral spines of *I. nucleus*; also two shorter somewhat triangulate and compressed spines on the posterior margin, occupying the position of the rounded prominences of *I. nucleus*. In the form of the rostrum, postabdomen, and the thoracic limbs this species very nearly re-

sembles *I. nucleus*. Colour (in spirit) light purplish or yellowish; the smallest example has reddish markings. Length and breadth of the largest example (a female) about $8\frac{1}{2}$ lines (18 millim.); length of chelipede, when extended, 1 inch 7 lines (40 millim.).

Five specimens have been retained for the British Museum from Goree Bay. The largest male, which is but little smaller than the female above mentioned, has the carapace rather more strongly and closely granulated than the other specimens. In the adult females the postabdomen completely conceals the sternal surface; in a smaller example which appears to be of this sex, length and breadth nearly 5 lines (10 millim.), the postabdomen occupies little more than one third the breadth of the sternum.

The length of the posterior and postero-lateral spines of the carapace is so much greater than in *I. nucleus* that I cannot regard the distinction as of less than specific value when taken in connexion with the other characters I have mentioned. In the young examples, however, the spines are less developed. There is in the collection of the British Museum a young specimen from the Canaries (*R. MacAndrew, Esq.*) which I refer to this species.

EBALIA.

The specimens of this genus, and of the allied *Phlyxia* (which, I am inclined to think, cannot be retained as generically distinct), present such great individual variations of sex and age that their determination is extremely difficult, and is moreover complicated by the insufficiency of the figures and descriptions of several of the species. It is therefore not without much hesitation that I have described the following as new; and it is possible that a comparative examination of the types would have enabled me to identify one or more of them with previously described forms, or that a larger series would have shown that the distinctions are not in all cases of specific value.

Ebalia tuberculata, sp. n. (Pl. XIV. fig. 3.)

In this handsome species the carapace is subrhomboidal, rather convex, and covered with numerous small but prominent granulations, which are numerous and crowded on the prominent parts of the carapace, but absent upon some of the depressions—as, for instance, on the deep concavities behind the antero-lateral margins. The front is obtusely truncated or obscurely emarginated; a longitudinal narrow ridge passes

from it to the gastric region; the carapace is crossed in its widest part by a transverse series of six granulated elevations or tubercles, of which the two median are situated on the gastric region; posterior to these is another granulated prominence. The cardiac region is obtusely rounded and very convex; there are usually two slight prominences on the antero-lateral margins of the carapace, one on the postero-lateral margins, and two rounded lobes, which are sometimes confluent, on the posterior margin. The fissures of the upper orbital margin are indistinct or sometimes quite obliterated. The male postabdomen has its third to sixth joints coalescent. The antennular fossæ communicate with the orbits by the cavity at the inner suborbital angle, which is also partly occupied by the basal antennal joints. The outer maxillipedes, legs, and the inferior surface of the carapace are granulated; the exognath of the maxillipedes is robust, with a nearly straight outer margin, and does not reach to the extremity of the triangulate merus joint of the endognath. The chelipedes (in the adult male) are closely granulated, the granules often acute; the arm or merus is slender and, like the carpus, destitute of prominent spines or tubercles; the palm has two slight prominences on its upper margin, and is rather convex on its inner surface; fingers compressed, acute at apex. Ambulatory legs short, slender, the joints (except the last) somewhat compressed, margins with acute granulations; terminal joints slender, pubescent. Colour (in spirit) yellowish or grey, often tinged with pink, sometimes with irregularly-disposed punctulations of a more intense purplish pink. Length of largest male a little over 5 lines (11 millim.), breadth about 6 lines (nearly 13 millim.); length of chelipede a little over 7 lines (15 millim.).

A good series of both sexes is in the Museum collection. The tuberculations of the carapace are more distinct in some specimens (from which the description is taken) than in others, where they are rather to be described as rounded prominences. In the females they are sometimes nearly obsolete. The margins of the postabdomen are usually marked with red spots. I very much doubt the generic distinctness of *Phlyxia* from *Ebalia*: the presence or absence of supraocular fissures is not a character of much importance; and the antennular fossettes certainly communicate with the orbits in some species of *Ebalia* (e. g. in adult *E. tuberosa*).

There is a specimen from the Canaries, and another from Madeira, in the collection of the British Museum which have the carapace everywhere evenly and distinctly granulated, and scarcely any trace of the transverse series of prominences.

These may be designated *E. fragifera*; they may be no more than a marked variety of the preceding.

In *Ebalia maderensis*, Stimpson, from Funchal Bay*, no mention is made of the tubercles on the gastric region, and that on the cardiac region is described as "acutely prominent." Specimens are in the British-Museum collection from Madeira (*Rev. R. B. Watson*) which I refer to this species, which is perhaps identical with *E. tumefacta*.

Ebalia insignis, Lucas†, appears to be allied to *E. tuberculata*; but the tubercles of the carapace are differently disposed.

E. granulosa, M.-Edwards‡, has the posterior margin of the arm or merus joint cristate.

E. aspera, Costa§, somewhat resembles *E. fragifera* in the even granulation of the carapace, which, however, is very much more convex in *E. aspera* than in *E. fragifera*.

Ebalia affinis, sp. n. (Pl. XIV. fig. 4.)

The carapace is depressed, finely and closely granulated on the posterior half, but nearly smooth in its anterior half, with three small tubercles disposed in a triangle on the gastric region, a rounded prominence on the cardiac region, one on the hepatic and pterygostomial regions, a small tubercle, which is sometimes obsolete, on each branchial region, and two prominent rounded lobes on the posterior margin. Front slightly concave. Fissures of the upper orbital margin nearly obsolete. Inferior surface of the carapace, maxillipedes, and the merus joints of the chelipedes strongly granulated. Male postabdomen narrow, with the third to sixth joints coalescent. The exognath of the maxillipedes is broad and reaches to the distal end of the merus joint. Anterior legs or chelipedes slender and elongated, with the arms everywhere closely granulated, but not cristate or tuberculate; wrist and palm more finely granulated; palm somewhat convex on its inner surface and slightly cristate above; fingers straight, acute at their apices, and somewhat hairy on the inner margins at base. Ambulatory legs slender, with the joints not dilated and compressed, very finely granulated; tarsi pubescent. Colour (in spirit) yellowish or slate, tinged with pink. Length and breadth of an adult male about $4\frac{1}{2}$ lines (10 millim.);

* Proc. Ac. Nat. Sci. Phil. p. 160 (1858).

† Crust. in Explor. Sci. Algérie, p. 24, pl. ii. fig. 8 (1849).

‡ Hist. Nat. Crust. ii. p. 130 (1837).

§ Crust. in Fauna del Regno Napoli (Addizioni), p. 6, pl. v. fig. 5 (1838).

length of chelipede, when extended, about 7 lines (nearly 15 millim.).

In the females the lobes of the posterior margin of the carapace are not distinct one from another, so that the posterior margin appears nearly straight.

This species is evidently very nearly allied to *E. Cranchii*, but is more coarsely granulated, the two anterior of the tubercles of the gastric region are much less distinct, the palm of the chelipedes in the male slenderer and more elongated. Moreover, in *E. Cranchii* the exognath of the maxillipedes does not nearly reach to the distal end of the merus joint.

Dorippe armata. (Pl. XV. fig. 4.)

Dorippe armata, White, List Cr. Brit. Mus. p. 54 (1847), descript. nullâ.

Several small examples are in the collection (males and females); length of the largest nearly 6 lines (12 millim.), breadth about $7\frac{1}{2}$ lines (16 millim.).

The description that follows, as also the figure, is taken from White's typical example, which is a male of much larger size, length of carapace about 10 lines (21 millim.), greatest breadth about 1 inch 1 line (28 millim.), and was obtained during the Congo expedition (*J. Cranch*). It is without precise indication of locality.

Carapace moderately convex, with the cervical and branchio-cardiac sutures strongly defined. The branchial and cardiac regions are convex above and distinctly granulated. The front between the orbits is concave; the inner orbital angle is prominent, but scarcely spiniform; there is a spine at the outer orbital angle, and a very strong spine on the sides of the branchial regions at the widest part of the carapace. The inferior surface of the body is more or less hairy; postabdomen 7-jointed in both sexes; the third joint in the male with a transverse prominence; terminal joint small, received into an excavation in the anterior margin of the penultimate joint, its distal half triangulate. Chelipedes (in the male) unequal; the larger (which is the right in the specimen described) has the arm granulated on its outer surface, without spines or tubercles; wrist granulated in its outer and proximal portion, without spines; hand about as long as vertically deep; palm posteriorly rounded, smooth on its outer and inner surfaces; fingers nearly straight, with acute apices, and only very obscurely denticulated on their inner margins. Smaller chelipede slender, with the fingers relatively longer and more distinctly denticulated. Second and third legs more than twice

as long as the carapace; fourth to sixth joints not much dilated, nor armed with spines, but longitudinally granulated above; terminal joint not quite as long as the preceding, compressed, and somewhat twisted. Fourth and fifth legs slender, short, and subdorsally elevated as in other species of the genus. Colour pale yellowish or greyish. The body and legs are more or less pubescent.

From the Mediterranean *D. lanata*, to which this species seems to be most nearly allied, *D. armata* differs not only in the much stronger lateral branchial spines, but in the non-tuberculated carapace, the non-spinulose merus joints of the second and third legs, &c. In the small West-African examples the chelipedes are feeble, subequal, and the outer orbital and lateral branchial spines much smaller.

Ethusa mascarone (Roux).

Several specimens (among them males and females) are in the collection from Goree Bay, which cannot be regarded as specifically distinct from Mediterranean examples, although the larger chelipede in the male has the palm deeper and externally somewhat more convex than the male from the Mediterranean in the Museum collection. Colour (in spirits) pale yellowish or purplish; chelipedes (of male) pale, with purplish tips. Besides the Mediterranean examples there are specimens in the British Museum from the Canaries.

Prof. A. Milne-Edwards has recently described a species, *Ethusa americana*, from West Florida*, which is only distinguished from *E. mascarone* by the more acute and divergent rostral spines, more deeply notched orbital margin, and more prominent postorbital spine. In these particulars I can see no difference between the Mediterranean and African specimens of *E. mascarone*.

The *Ethusa microphthalma* is another American species of this genus, quite recently described by Prof. S. I. Smith, from the coast of New England†. It is apparently well distinguished by the diagnostic characters mentioned by its author, *i. e.* the very small eyes and form of the carapace.

ANOMURA.

Dromia fulvo-hispida, sp. n. (Pl. XVI. fig. 1.)

In this species the carapace is a little broader than long, moderately convex, and covered with a short close fulvous

* Bull. Mus. Comp. Zool. viii. p. 30 (1880).

† Proc. U.S. Nat. Mus. iii. p. 418 (1881).

pubescence, which is absent (perhaps from abrasion) on the median and most elevated portion of the body. The anterolateral margins are entire and apparently somewhat flattened on the hepatic regions. The front is triangulate and deflexed, with a small tuberculiform tooth above the inner orbital hiatus. Epistome triangulate. The buccal cavity has apparently no longitudinal palatal ridges, and has three fissures in its anterior margin. The male postabdomen is narrow-triangulate, with all the joints apparently distinct, and is covered, as is all the inferior surface of the body, with a dense fulvous hairy coat. Eyes well nigh concealed in the deep orbital cavities, which are very incomplete below. Basal joint of the antennules much enlarged. Basal antennal joint occupying the large hiatus beneath the ocular peduncles. Outer maxillipedes with the merus joint as long as the ischium, and truncated at its distal end, articulated at its antero-internal angle with the next joint; exognath narrow. Anterior legs or chelipedes of moderate length, densely hairy, but apparently without spines or tubercles; fingers naked, excavated, and strongly dentated at their apices. Ambulatory legs of the first two pairs somewhat flattened above, clothed with longish fulvous hairs; terminal joints slender. In the fourth and fifth pairs of legs the spiniform terminal joint is reflexible against a spiniform process of the penultimate joint. Colour of the single specimen (a male in spirit) light yellowish or fulvous brown; tips of fingers white. Length nearly 4 lines (8 millim.), breadth 5 lines (nearly 11 millim.). The specimen has been somewhat crushed and its natural outline thereby altered.

Dromia spinirostris, sp. n. (Pl. XVI. fig. 2.)

In this species the carapace is rather convex, a little broader than long, and clothed with a short close pubescence, which is absent in certain places; the surface is rather uneven, there being an obscure rounded prominence on each branchial region near the branchio-cardiacal suture, which, however, is very faintly defined; nor are the other sutures of the carapace indicated. The rostrum is composed of two rather prominent conical and slightly divergent spines; there is a short spine at the inner angle of the orbit, and another on its lower margin; four small dentiform spines on the lateral margins of the carapace, one on the subhepatic region, and one at the antero-lateral angles of the buccal cavity. The inferior surface of the body is clothed with a dense pubescence; the buccal cavity has no longitudinal ridges on the palate; the

sternal *sulci* in the female are not approximated, and terminate in a tubercle between the bases of the second pair of legs. The postabdomen in both sexes is seven-jointed; the terminal segment in the male is small, rounded at its distal end, and armed with a short rounded lobe or spine at its proximal and lateral angles. As is usual in the group, no *septa* separate the antennules from the antennæ and the antennæ from the eyes. The first antennal joint is short, the second robust. The outer maxillipedes have the merus as large as the ischium, with the next joint inserted at its antero-internal angle; exognath stout, and reaching nearly to the extremity of the merus. The chelipedes (in the two specimens examined) are subequal, moderately robust, and densely pubescent, except at the finger-tips; arm trigonous, carpus with two small tubercles on its upper and outer surface near the articulation with the merus; palm nearly twice as long as broad, in the male clothed with longer hair on the inner and under surface; fingers somewhat obliquely deflexed, dentated, and closely meeting along their inner edges, excavated, naked, and white at the apices. Second and third legs robust, not tuberculated, fourth and fifth legs subdorsally elevated; penultimate joint in both terminating in a spiniform process, against which the terminal claw closes; fifth legs much more slender and feeble than the fourth. Colour (in spirit) brownish. Length of the largest (a male) to tip of spines of rostrum about 1 inch 5 lines (nearly 36 millim.), breadth 1 inch 6 lines (38 millim.). The smaller example is a female with ova.

The form of the spines of the rostrum, together with the small dentiform teeth of the antero-lateral margins, appear to distinguish this species from its congeners.

Diogenes varians.

- Pagurus varians*, Costa, Fauna di Napoli, Cr. p. 9, pl. ii. fig. 2 (1838).
 ?*Pagurus arenarius*, Lucas, Anim. Artic. in Expl. Sci. Algérie, Crust. p. 33, pl. iii. fig. 7 (1849).
 ?*Diogenes arenarius*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 233 (1858).
Diogenes varians, Czerniavsky, Materialia ad zoograph. ponticam comparatam, p. 127 (1868); Heller, Crust. südl. Europa, p. 170, pl. v. figs. 13, 14 (1863).

Here are referred with some doubt a series of specimens inhabiting sponge-incrusted shells of the genera *Oliva*, *Turritella*, and *Clavatula*. As M. Costa's description and figure leave several points undetermined, the following description is given of the specimens from Goree Island. I may add that *D. varians* may itself be identical with the *Pagurus pugilator* of

Roux*, a species very insufficiently characterized; but, to judge from the figure, the smaller chelipede differs from that of *D. arenarius*. Heller, however (*t. c.*), unites it with that species.

The carapace is smooth and naked, the cervical suture very distinct, the branchial regions but little dilated; the front between the eyes has a very slight rounded median prominence, but a strong lobe or tooth on the outer side of the eye-peduncles; the rostriform spine attached to the ophthalmic segment does not reach to the apices of the ophthalmic scales. The terminal postabdominal segment is somewhat transverse, and has its margins armed with numerous small spinules. The eye-peduncles are rather slender, and do not quite equal in length the width of the frontal margin; their basal scales are spinulose on their outer and distal margins, the distal spinules being the longest; the antennules have the terminal peduncular joint slender and longer than the preceding, the flagella very short; the second joint of the peduncle of the antennæ is armed with a spinulose tooth, which does not reach to the apex of the eye-peduncle; the terminal joint of the peduncle is slender and longer than the preceding; the joints of the rather short flagella are clothed on the underside with very long setæ. The chelipedes are very unequal, the right small and feeble, the left very considerably developed; in the right the arm, wrist, and hand are of about equal thickness, the wrist and hand armed with a series of small spinules on their upper margins, and more or less hairy; fingers acute at the apices, and distinctly toothed on the inner margins; in the left chelipede the arm is very short and thick, with a few spiniform granules at the distal end of its upper and lower margins; wrist granulated, with a large concavity extending somewhat obliquely across the upper surface, its margins towards the inner side with stronger, almost spinuliform granules; palm scarcely longer than broad, nearly flat, and very closely and evenly granulated on its outer surface, punctulated on the inner surface, its lower margin acute and strongly granulated; fingers rather shorter than the palm, acute at their apices, lower finger rather strongly toothed on the inner margin, upper robust, arcuate, with strong, almost spinuliform tubercles on its upper margin. Second and third legs moderately robust, somewhat hairy, with the dactyli faintly longitudinally channelled on their outer surface, curved, and longer than the penultimate joints; the fourth legs are thicker than the fifth, with very small dactyli that scarcely

* Crust. de la Méditerranée, pl. xiv. fig. 3 (1830).

project beyond the scabrous pad at the distal end of the penultimate joint. The fifth legs are more distinctly chelate, the dactylus closely applied to the projecting lobe at the distal end of the penultimate joint. The uropoda are nearly symmetrical, the left little larger than the right. Colour (in spirit) yellowish; eye-peduncles orange, the chelipedes pinkish; there are faint indications of longitudinal orange or brownish bands on the joints of the legs. Length of carapace about 4 lines (9 millim.); of the second leg on the left side about 9 lines (19 millim.); the larger chelipede is incapable of full extension, therefore its dimensions are not given.

In what I regard as the typical state of this species, because most nearly resembling Costa's figure, the palm of the left chelipede is more elongated, with the lower margin nearly straight, outer surface of lower finger concave at base; in another variety, which I will designate var. *ovata*, the palm is more ovate, lower margin convexly arcuated, the fingers somewhat shorter, the lower nearly flat on its outer surface. In both the concavity of the wrist is very distinct.

In a single specimen of small size the granules on the outer surface of the wrist and palm are smaller and less crowded, wrist without any concavity on its upper surface, hand more elongated and less flattened on its outer surface, dactylus as long as the palm and less strongly spinulose. This variety (or species) may be designated provisionally var. *gracilimana*.

M. Brito de Capello has recently described* two species (*Pagurus Bocagei* and *P. algarbiensis*) from the Portuguese coast which appear to belong to this genus, and must be designated *Diogenes Bocagei* and *D. algarbiensis*. They are distinguished by having the sides of the carapace armed with a spinose crest, and by the anterior legs being "covered with spines," &c.

Pagurus striatus (Latr.).

Several small specimens inhabiting shells of *Conus prometheus*, var. *siamensis*, Hwass., and *Mesalia brevisalis*, Lamk., are referred to this species; their coloration, however, differs somewhat from that of *P. striatus* as described by Milne-Edwards and Roux, and as exhibited in dried specimens from the Mediterranean in the British-Museum collection. The coloration of the legs in the specimen preserved in spirits from Goree is a deep purplish red, variegated with pale blue and lighter red markings, and with numerous small whitish spots

* Jornal de Sciencias etc. de Lisboa, 1874, p. 123.

on the under and inner sides of the joints; the eye-peduncles are bluish, banded with red. Length of cephalothorax in the largest example (a male) about $7\frac{1}{2}$ lines (16 millim.), of the larger (left) chelipede, when extended as far as its conformation will allow, rather more than 1 inch (26 millim.). There are in the British Museum specimens of this species from Madeira (purchased) in which the coloration has to a considerable extent disappeared; also others apparently referable to the Mediterranean *P. calidus*, Roux. Of this latter species there are also specimens from Lanzarote Island (*Rev. R. T. Lowe*)*.

* There is in the collection of the Museum a remarkable Hermit-crab from St. Helena, which does not appear to have been described; it may be appropriately designated

Pagurus imperator, sp. n.

The carapace is indurated in its cervical portion, and considerably dilated on the sides of the branchial regions, with the cervical, post-frontal, and other sutures strongly defined; the lateral margins are hairy; the frontal margin is nearly straight, without any median rostriform prominence, but with an obtuse lobe or tooth on either side of the eye-peduncles. Four transverse calcareous plates protect the dorsal surface of the postabdomen; the penultimate and terminal segments are calcified, the penultimate segment with a T-shaped impression, the terminal segment furcate, with the lobes unequally developed and rounded at their distal ends, and with three or four denticles on their inner margins. Eye-peduncles robust and shorter than the front, with two or three tufts of hairs on their upper surface near the corneæ, and with their basal scales narrowing distally, and hairy and denticulated on their outer margins. Antennules short. Antennæ shorter than the body, with the terminal joint of the peduncle much longer than the preceding; the basal acicle short, spiniform, and not reaching far beyond the end of the penultimate peduncular joint; flagellum red, the joints clothed with very short setæ. Outer maxillipedes robust, short. Chelipedes robust, unequal; in both the merus is trigonous, with its inferior margin and the outer and distal margins armed with short spines; wrist and palm externally convex, wrist shorter than the palm; both wrist, palm, and fingers are armed on the outer surface with numerous conical acute spiniform tubercles, the surface between the tubercles in the larger (left) hand being closely pubescent, and in the smaller (right) chelipede clothed only with longer scattered hairs; the fingers are robust, dentated on their inner margins, and with black, corneous, excavated tips. The second and third legs are very robust, the last three joints armed above with strong spiniform tubercles and clothed with scattered hairs; tarsi externally longitudinally sulcated, except in the second leg on the left side, which has the last two joints dilated and nearly of the same form as in *P. pavimentatus*, Hilgendorf, *i. e.* with a strong longitudinal tuberculated ridge on their outer surface, above which the outer surface of each joint is deeply longitudinally concave; margins densely hairy, the concavity deepest in the terminal joint; the fourth pair of legs are imperfectly and the fifth perfectly chelate; the four postabdominal appendages (developed on the left side only, and articulated with the calcareous dorsal plates) are simple; the uropoda are asymmetrical, the left being larger

Pagurus granulimanus, sp. n.
(Pl. XVI. fig. 3.)

This designation is proposed for a species of *Pagurus* of which there are several specimens inhabiting shells of *Cassidulus morio*, Lamk., *Purpura hæmastoma*, Lam., and *Natica cruentata*, Lam., in the collection.

Carapace one and a half times as long as broad, with the cardiaco-branchial as well as the cervical sutures distinctly defined, punctulated in front of the cervical suture, with a few granulations near the antero-lateral angles; hepatic and branchial regions clothed with tufts of yellowish hairs; no distinct median rostriform projection; terminal postabdominal segment somewhat quadrate, with the angles rounded. Eye-peduncles slender and nearly or quite equalling in length the width of the frontal margin; ophthalmic scales narrow, nearly approximated in the median line, and with the apices denticulated. Antennules reaching little beyond the eye-peduncles; terminal joint of the peduncle slender and longer than the preceding; flagella very short. Antennæ shorter than the body, with thin basal acicles, rather narrow, acute at apices, reaching about halfway to the end of the eye-peduncles, and very hairy; the joints of the peduncle are very short, the penultimate joint has a short spine on the under surface near its distal end; flagella nearly naked. The last three joints of the outer maxillipedes have their under margins near the

than the right. Length of the largest specimen about $5\frac{1}{4}$ inches (133 millim.), of the larger (left) chelipede about $3\frac{1}{2}$ inches (88 millim.).

The ground-colour of the specimen described (which was presented by H. E. Dresser, Esq., and at the time of its acquisition by the Trustees had been preserved for some time in spirit) is orange-yellow, the front of the carapace and eye-peduncles variegated with purple; the prevailing colour of the limbs is a deep blood-red. In a second smaller example from the same locality (*J. C. Melliss, Esq.*) the coloration is not so distinct. Both examples are males.

There are several species allied to *P. imperator* in the structure of the left leg of the third pair. In *P. setifer*, M.-Edwards, from Australia (of which there are specimens in the Museum collection), and in *P. sculptipes*, Stimpson, from Japan, the eye-peduncles are much longer and slenderer; in *P. pavementatus*, Hilgendorf, the hand of the left chelipede is much shorter in proportion to its length; *P. hungarus*, Herbst, is very imperfectly known; but Hilgendorf, in his remarks upon the specimens in the Berlin Museum, does not mention any differences from *P. pavementatus* in the form of the left chelipede. In *P. sinistripes*, Stimpson, from Panama, the outer surface of the left chelipede is described as granulate-squamose, and the last two joints of the left leg of the third pair are apparently but little excavated. A much larger series than the Museum at present possesses is needed to show whether these are truly distinct or may not be, some or all, varieties of one widely-distributed form.

distal ends fringed with long hairs; the penultimate and antepenultimate joints are somewhat dilated near the distal ends of their inferior margins; the terminal joints are slender.

The chelipedes are very unequal, the right being small and the left considerably enlarged; in the right the wrist is about as long as the palm, and both are externally granulated and hairy, the hairs being more dense on the hands; fingers a little longer than the palms, scarcely denticulated on their inner margins, and subexcavated towards the tips, which are corneous and black. The left chelipede has the arm very short, thick, trigonous, with a strong blunt tubercle on its under surface; wrist and hand naked, the wrist shorter than the palm, and externally closely granulated; palm shorter than its vertical depth, somewhat compressed, with the outer surface covered with large flattened granules. A longitudinal series of more prominent granules exists near the upper margin, and a longitudinal series of larger, transversely set, flattened tubercles parallel to the lower margin, which is sharp-edged and crenulated; fingers very short, granulated externally, acute at the apices; the mobile finger with the outer surface deeply concave. Second and third legs robust; the right legs of each pair have the joints nearly smooth; dactyli a little longer than the penultimate joints, with black corneous tips: the third leg on the left side has the upper and outer margins of the last two joints carinated, and the outer surface concave, the concavity being deepest on the last joint. In the fourth legs (which are shorter and more robust than the fifth) the small dactylus impinges against the produced scabrous portion of the preceding joint; the slender fifth legs are not chelate; the male postabdomen is armed with four filamentous appendages on the left side, besides the uropods, which are very unequally developed, the left being much the larger. Colour (in spirit) yellowish, inclining to orange on the front of the carapace, eye-peduncles, and legs; left chelipede of a slaty or purplish tinge. Length of the carapace of the largest specimen (a male) about 10 lines (21 millim.). The legs are not capable of complete extension.

The form and sculpture of the left chelipede apparently distinguishes this species from all its congeners.

Isocheles? gracilis, sp. n. (Pl. XVI. fig. 4.)

In this species the carapace is membranaceous, widest posteriorly (at the back of the branchial regions), with the sides nearly straight and convergent thence to the front, which is sinuated, but without any rostriform projection; so that the

ophthalmic segment is just visible between the bases of the eye-peduncles. The postabdomen is clothed with scattered hairs, and has the dorsal surface of the antepenultimate and penultimate segments protected by imperfectly calcified plates; the terminal segment is somewhat transverse, and with a shallow emargination at its distal end. Eye-peduncles slender and longer than the width of the front; their basal scales small, with acute apices. Antennules small. Antennæ about as long as the animal, with a very small basal acicle; penultimate joint of the peduncle shorter than the terminal joint; joints of the flagellum with very short setæ. Outer maxillipedes very hairy. Right chelipede very little larger than the left; both are rather thinly clothed with longish hairs; with the merus unarmed; carpus with four or five short spines on their inner and upper margins; hands rather narrow-ovate (the left narrower than the right), with short spinules along the upper margins; fingers in the right about as long as, and in the left a little longer than, the palm, with acute apices, and rather strongly dentated along their inner edges. Second and third legs slender and hairy, with the penultimate longer than the antepenultimate joint, and the dactyli long, curved, and slightly twisted. Fourth and fifth legs slender, feeble, and hairy; in the fourth leg the small curved dactylus closes against the produced infero-distal scabrous lobe of the preceding joint; the fifth legs terminate in a very small but perfect chela; the left uropoda are much larger than the right, and hairy. Colour (in spirit) yellowish white; legs pinkish. Length of cephalothorax 5 lines (nearly 11 millim.), of right chelipede, when extended as far as its conformation will allow, $9\frac{1}{2}$ lines (20 millim.).

The single specimen examined is a male.

In most of its characters (*e. g.* the form of the carapace, hairy postabdomen, elongated eye-peduncles, which are approximated at base, short antennal flagella, and subequal horizontal chelæ, whose fingers are acute at the tips) this species belongs to *Isocheles*; but the antennal flagella are clothed with very short setæ, and the dactyli of the ambulatory legs are very slightly contorted.

Spiropagurus elegans, sp. n. (Pl. XVI. fig. 5.)

This is a very interesting addition to a genus whose only representatives hitherto known are from the Japanese seas and the West Indies (Barbadoes).

In general appearance it very much resembles the well-known *Eupagurus Prideauxii*, having similarly-formed but

more nearly equal chelipedes, and long twisted and longitudinally canaliculated joints to the second and third ambulatory legs.

The cephalothorax and legs are slightly pubescent. The carapace is rather broad in proportion to its length, and is of a thin and almost membranaceous texture. There is no distinct median rostriform projection, the carapace between the eyes being rather broadly rounded, and leaving the ophthalmic segment at this part partially visible. The cervical suture is very distinct. The terminal postabdominal segment is divided by a narrow almost closed longitudinal median fissure; and the lobes are armed on their distal and outer margin with ten to eleven small spinules. The eye-peduncles are short and thick, the corneæ somewhat dilated; and the eyes do not reach beyond the apices of the acicles of the antennæ; the scales at base of the ophthalmic peduncles are broad, entire, subtruncated at the distal ends. The antennules are short, with two flagella; the last joint of the slender peduncle nearly as long as the eye-stalks, the upper flagellum fringed on its under surface with long hairs. Antennæ about as long as the animal, the last joint of the peduncle little longer than the preceding; the slender acicle scarcely reaching beyond the end of the penultimate joint; the outer maxillipedes reach (when thrown forward) considerably beyond the antennules; the joints are hairy on their under surface at their distal ends. The chelipedes are of about equal length; the right, however, is more robust than the left; merus short, with two small denticles near the distal end on its under surface; carpus about as long as the palm, with about half a dozen small spinules of unequal length near the distal end of its inner and upper margin; hand ovate, palm about as long as fingers, smooth on its outer surface, its upper margin without spinules, its lower subacute; fingers meeting along their inner edges when closed, acute at apices, and very indistinctly denticulated on their inner margins. The left chelipede is very similar to the right, but the joints are slenderer. Second and third legs robust, with the fourth to sixth joints thick, nearly smooth; fourth joint with transverse short impressed lines, fringed with short setæ on its outer surface; on the fifth joints these lines are longitudinal, and on the sixth oblique; dactyli slender, much longer than the penultimate joints, fringed above with long hairs, and deeply longitudinally channelled on their outer surfaces. The fourth legs are wanting in the single specimen examined; the fifth are slender, feeble, and are apparently not chelate, the last joint being densely hairy on its under surface and at its distal end; the spirally-coiled genital ap-

pendage of the left fifth leg is articulated with the posterior surface of the basal joint and is membranaceous, with the outer margin indurated and diminishing in thickness to the extremity, which is slightly hairy. The uropoda are unequally developed, the rami of the right being smaller than those of the left. Colour (in spirit) whitish. Length of the cephalothorax of the male a little over 6 lines (13 millim.), of right chelipede about 9 lines (19 millim.). The full extension of this limb, however, is not possible.

The single example (male) is in imperfect condition, not only the fourth pair of legs but also the second leg on the right side being deficient.

In *S. spiriger* (De Haan), from Japan, the ciliated striations of the limbs exist, it would appear, on the chelipedes as well as the following limbs. In *S. dispar*, Stimpson, from Barbadoes, the fingers of the right chelipede are short, not more than half the length of the palm, and are coarsely toothed within.

In *S. iris*, A. M.-Edwards*, also from the Barbadoes, there is a distinct rounded rostriform lobe, and the chelipedes are covered with small spines.

Eupagurus excavatus.

Cancer excavatus, Herbst, Nat. Krabben u. Krebse, ii. (Abth. 2) p. 31, pl. xxiii. fig. 8 (1796).

Pagurus angulatus, Risso, Crust. de Nice, p. 58, pl. i. fig. 8 (1816); Hist. Nat. Eur. Mérid. v. p. 39 (1826); Desmarest, Consid. sur les Crust. p. 178 (1825); Roux, Crust. de la Méditerranée, pl. xli. (1830); M.-Edw. Hist. Nat. Crust. ii. p. 217 (1837); Lucas, Cr. in Anim. Artic. de l'Algérie, p. 28 (1849); Heller, Cr. südl. Europa's, p. 166 (1863).

Pagurus meticulousus, Roux, Cr. de la Médit. pl. xlii. (1830), var.

Pagurus excavatus, White, List Cr. Brit. Mus. p. 59 (1847).

Eupagurus angulatus, Stimpson, Proc. Ac. Nat. Sci. Philad. p. 237 (1858).

Several small specimens, representing both sexes, are in the collection, which I refer here with little hesitation. They scarcely differ from the much larger specimens in the collection of the British Museum, except in the lesser granulation of the chelipedes, which yet are of the form so characteristic of *E. excavatus*. The spinules arming the upper margin of the penultimate and antepenultimate joints of the right leg of the second pair exist, but are with difficulty discernible among the hairs with which this limb is clothed. Colour (in spirit) light yellowish; limbs pinker. The length of the carapace of the largest specimen from Goree barely

* Bull. Mus. Comp. Zool. viii. p. 44 (1880).

exceeds 8 lines (17 millim.). One specimen inhabited a shell of a species of *Clavatula*.

I cannot regard the distinctions mentioned by Heller as characteristic of *E. meticulousus* as of specific importance.

The smallest specimen in the collection referred to this species—length of carapace not 3 lines (6 millim.)—has the outer surface of the palm in the larger chelipede much more evenly granulated and the median longitudinal ridge obsolete, and bears a great resemblance to *E. Forbesii*, Heller, of which there is an authentically named specimen from Falmouth (*W. P. Cocks, Esq.*) in the Museum collection, which may be nothing but the young state of this species. I hesitate, however, to unite the two without further comparison of a larger series of specimens. A much larger example from Sicily, in the Museum collection, designated *E. Forbesii*, has the outer surface of the larger chela armed with numerous spines, and without depressions or longitudinal ridges, and is probably referable to *E. Lucasi*, Heller (= *E. spinimanus*, Lucas).

Besides the Paguridæ enumerated above, there is in the collection a very small hermit-crab, apparently of the genus *Cibanarius*, inhabiting a shell of *Nassa miga*, Adanson, which it would be unadvisable to designate by a distinct specific name.

[To be continued.]

XXVII.—Dr. H. ADLER'S * *Researches on the Alternating Generation of the Gall-flies of the Oak.*

“ A SATISFACTORY explanation of the mode of reproduction of the Cynipidæ will only be obtained when their development is traced step by step, through all its stages, from the fertilized and unfertilized egg. Let us hope that amongst our entomologists an Œdipus will be found able to solve this enigma.”

It was thus that Prof. von Siebold expressed himself in the last chapter of his work upon parthenogenesis, published ten years ago. The Œdipus has appeared, and has furnished us with one of the most curious chapters in the history of insects.

It has been known for a long time that in many species

* Translated by W. Francis, jun., from the ‘Bibliothèque Universelle de Genève’ for June 15, 1881.

is perhaps worth noticing. He represents four spots on the margin of the *left* elytron, and three on the margin of the right *; and I notice that this is just the reverse in the type specimen, which has four spots on the margin of the *right* elytron and three on the left; but if Prof. Westwood represented the spots when drawing on the stone as he saw them in the insect, they would be reversed when the plate was printed. The additional spot on the right side is extremely small, which accounts for Burmeister and Westwood having omitted to mention it in their descriptions.

XXXVII.—*On a Collection of Crustacea made by Baron Hermann Maltzan† at Goree Island, Senegambia.* By EDWARD J. MIERS, F.L.S., F.Z.S.

[Plates XIII., XIV., XV., & XVI.]

[Continued from p. 281.]

MACRURA.

Scyllarus (Arctus) arctus, var. *paradoxus*, n.

Two small examples are in the collection (length of the largest a little over 1 inch 1 line, 28 millim.), which differ from the typical form of the species in the somewhat broader carapace, the three cardiac prominences of which are more elevated, and in the form of the teeth of the median longitudinal dorsal carina in front of the cervical suture; the most anterior of these teeth is obsolete, the second very minute and situated just in front of, and beneath, the last tooth of the series, which is very prominent; whereas in the typical *S. arctus* these teeth are all well defined and nearly equidistant from one another. In both, the carapace is covered with depressed squamiform tubercles, and the postabdomen marked with impressed lines forming leaf-like patterns.

Whether these characters are of permanent value a larger series of better-grown specimens is needed to determine. There is, however, in the Museum collection a series of small specimens from Madeira (*the Rev. R. B. Watson*), the largest of

* In the Museum copy of the 'Arcana' the colourist has not placed the white on the spots where they are indicated by small circles.

† By an unfortunate oversight on my part, which I regret extremely, Baron Maltzan's name has been misspelled in the earlier parts of this paper. Instead of "Maltzam" read "Maltzan," and instead of "*Heterocrypta Maltzami*" read "*Heterocrypta Maltzani*."

which does not reach the size of the Gorean specimens, which present all the characters of the typical form of *S. arctus**.

In two small specimens from Mr. Watson's Madeiran collection, and in the one from the same locality referred to by me in my recent report on the Crustacea collected by Dr. Coppinger, of H.M.S. 'Alert,' under the name of *S. arctus* †, the carapace is much depressed and nearly smooth, but little broader than long, with scarcely any trace of squamiform tubercles and the median dorsal teeth very low; the lateral carinæ distinct, and reaching nearly to the posterior margin; the lateral lobes of the second to fifth postabdominal segments are angulated, but the angles not produced into spines; there is a strong spine on the sternum, at base of each of the fifth pair of legs. I have little doubt that these belong to the species recently described by Prof. S. I. Smith under the name of *S. depressus*, the types of which were dredged in 86 fathoms off the New-England coast ‡.

Possibly, as Prof. Smith remarks, both the depressed form of the carapace and the prominence of the sternal spines may be due to immaturity.

S. Gundlachi, von Martens, from Cuba §, appears to bear a considerable resemblance to *S. arctus*, var. *paradoxus*, if the figure may be trusted; but the spines of the carapace are differently arranged. Prof. S. I. Smith (*t. c.* p. 431), I may add, apparently regards this species as synonymous with his *S. americanus*, which has the median crest of the carapace "high, covered with low squamiform tubercles, tridentate, the anterior tooth small, and situated halfway between the front and second tooth," &c.

Crangon (Cheraphilus) cataphractus, Olivi.

There is in the collection a single small specimen (a female with ova), length rather over 11 lines (24 millim.), which I refer, with scarcely any doubt, to this species. The position of the spines of the carapace and the sculpture of the post-abdominal segments are similar to those obtaining in the Mediterranean examples in the collection of the British Museum; but the spines are much smaller.

Alpheus paracrinitus, sp. n. (Pl. XVI. fig. 6.)

Rostrum triangulate, acute, arising from the frontal margin

* M. Brullé, in Webb and Berthelot's 'Iles Canaries,' Crust. p. 18 (1836-44), mentions the occurrence of *S. arctus* at the Canaries.

† Proc. Zool. Soc. 1881, p. 63.

‡ Proc. U.S. Nat. Museum, iii. p. 429 (1881).

§ Arch. f. Naturg. p. 123, pl. v. fig. 13 (1872).

of the carapace (which is slightly concave on each side of its base), but not prolonged backward as a dorsal carina. Orbital arches entire, arcuated, without spinules. Anterior margin of the carapace sinuated on the sides, without spines. Postabdominal segments smooth, entire, with the lateral margins broadly rounded; terminal segment not three times as long as broad at the base, with its distal end subtruncated. Eyes completely concealed beneath the carapace. Antennules with three joints of the peduncle exposed, of which the middle one is slightly the longest, with a small spine-like scale at base, reaching nearly to the end of the basal joint. Basal scale of antennæ about reaching to the end of the antennal peduncle, with the outer margin nearly straight and ending in a small spine, and the inner margin convergent towards it and clothed with long hairs. Anterior legs or chelipedes having the merus and carpus slender; merus with a small tooth or spine at the distal end of its under margin; palm of larger chelipede rather more than twice as long as broad, smooth, without notches or ridges, largest at its rounded basal end, with an impressed curved line on its upper and proximal end; fingers nearly half as long as the palm; the upper with its superior margin arcuated. Smaller chelipede with the carpus rather longer, and chela very slender, fingers hairy. Second legs with first joint of the carpus longer than the second, the last three joints of nearly equal length, the last a little the longest, the joint preceding these somewhat longer. Ambulatory legs somewhat hairy. Distal ends of the rami of the uropoda clothed with long hairs. Colour light yellowish (in spirit). Fingers of larger chelipede pinkish. Length 7 lines (nearly 15 millim.).

Two females with ova are in the collection.

Several species of this very difficult genus have been recorded from the Cape-Verd Islands; it may therefore be useful to note that *Alpheus paracrinitus* may be distinguished from *Alpheus pugilator* and *A. rugimanus*, A. M.-Edwards*, *Alpheus streptochirus*, Stimpson†, and *Alpheus Edwardsii* (Audouin) ‡, by the absence of spinules from the orbital arches (not to mention other characters), and from *Alpheus Bouvieri*, A. M.-Edwards (*t. c.* p. 231), by the form and insculptation of the larger chela.

From the well-known Mediterranean *A. ruber* it may be distinguished by the form of the rostrum and of the larger chela.

* Bull. Soc. Philomath. de Paris, ser. 7, ii. pp. 229, 230 (1878).

† Proc. Ac. Nat. Sci. Philad. p. 30 (1860).

‡ Explic. des planches in Savigny's Cr. de l'Égypte, pl. x. fig. 1.

It is also evidently very nearly allied to *A. crinitus*, Dana*, from the far distant Balabac Straits; but the front between the eyes in *A. paracrinitus* can scarcely be described as carinated, and the first carpal joint of the second pair of legs is decidedly longer than the second joint.

Sicyonia sculpta, M.-Edwards.

Seven specimens, which apparently do not differ specifically from this species, are in the collection; the length of the largest is nearly 1 inch 3 lines (32 millim.).

If, as appears to be the case, Olivi's name of *carinata* is the earliest applicable to this species†, it will be necessary to apply a new designation to the *Sicyonia carinata* of M.-Edwards and Olivier, which might be named *S. Edwardsii*. For the present, however, I prefer to adopt the generally-received terminology.

Mr. C. Spence Bate‡, in his recent memoir on the Penæidea, has recorded the occurrence of this species at St. Vincent, in the Cape-Verd Islands ('*Challenger*' collection).

Penæus brasiliensis (Latr.).

Three females are in the collection; length of the largest about 4 inches 2 lines (106 millim.). They were obtained in the marshes at Rufisque.

I have already noted the occurrence of this species at Whydah, on the West-African coast§. On the American coasts its range extends from New York to Brazil (*vide* Kingsley, *Bullet. Essex Instit.* x. p. 69, 1878).

Penæus velutinus, Dana.

Thus must be provisionally designated several small specimens in the collection from Goree (length of the largest to base of rostrum, which is broken, about $1\frac{1}{4}$ inch, 32 millim.), and also specimens in the Museum collection which I formerly very doubtfully designated *P. affinis*, M.-Edwards, having only M.-Edwards's short diagnosis for a basis of identification. Mr. Spence Bate, however, has recently examined the type of *P. affinis*; and I am satisfied from his figure (*t. c.* p. 179, pl. xii. fig. 6) that *P. velutinus* is in reality distinct from M.-Edwards's species. Mr. Bate, however, agrees with me in

* U.S. Explor. Exp. xiii. Cr. i. p. 548, pl. xxxiv. fig. 8 (1852).

† *Vide* 'Zoologia Adriatica,' p. 51, pl. iii. fig. 2 (1792).

‡ *Ann. & Mag. Nat. Hist.* (ser. 5) viii. p. 172 (Sept. 1881).

§ *Proc. Zool. Soc.* 1878, p. 299.

regarding *P. affinis* (*barbatus*) of De Haan as identical with *P. velutinus*.

The range of this species having now been ascertained to extend to the West-African coast, it is more than ever probable that *P. pubescens*, Stimpson, from St. Thomas (West Indies), which is scarcely to be distinguished by the author's description, will have to be united with *P. velutinus*. Stimpson mentions, however, but a single pair of lateral caudal spines.

Mr. Spence Bate has described several species from New Guinea, the Philippines, and Japan, which (in the short diagnoses published) are separated from one another and from *P. velutinus* by characters largely drawn from the rostrum and postabdomen. I may add, therefore, the following particulars respecting the Gorean examples and others in the Museum collection:—Rostrum nearly straight, sharp, slightly ascending from the base, and armed with from seven to ten spines on its upper margin, besides the gastric spine (the number of spines fewest in the smallest specimens). Second to sixth segments of the postabdomen carinated, the carina terminating on the last segment in a small tooth or spine; terminal segment longitudinally sulcated above and terminating in a strong spine and with four pairs of lateral spines, of which the proximal pair are small and remote from the rest. These are wanting in some specimens, and may have been disarticulated and lost. A similar arrangement of the spines is evident in two specimens from the Gulf of Suez in the Museum collection; in a specimen from the Japanese seas the proximal pair of spines are wanting, and in one from the Australian seas the distal pair. In another specimen from Shark Bay, West Australia, the spines correspond in number and development with the Gorean specimens. In all of the above there is but little variation in the form of the rostrum and number of its teeth and of the postabdominal carina; and in all the body is more or less densely clothed with a short scabrous pubescence. In but few of the specimens I have seen are the external genital appendages fully developed.

STOMATOPODA.

Lysiosquilla (*Coronis*) *acanthocarpus*, var. *septemspinosa*.
(Pl. XVI. fig. 7.)

I thus designate a small female example in the collection that agrees with examples of *C. acanthocarpus*, from Port Essington, North Australia, and from Penang, in the form of

the carapace and postabdomen, the number of the spines on the terminal segment, the existence of a spine on the carpus of the large raptorial limbs, in the form of the spines of the basal prolongation of the uropoda, &c.

It scarcely differs, indeed, except in the somewhat less-elongated, slightly transverse rostral plate (which, as in the typical examples of *C. acanthocarpus*, has its anterior margin armed with a short spine, and its antero-lateral angles not prolonged into spines), its less prominent eyes, and in having the dactylus of the raptorial limbs armed with seven, not six, spines on their inner margins; the penultimate spine is also relatively not so short as in the two specimens of *C. acanthocarpus* above referred to; the small spinules on the latero-posterior margin of the terminal segment are somewhat more elongated. The example from Goree Island measures barely 1 inch 4 lines (34 millim.), whereas the smallest (the type) specimen of *C. acanthocarpus* measures about 2 inches 6 lines (64 millim.); and in the absence of a larger series for comparison I do not venture to regard the distinctions above mentioned as of specific value; yet, in consideration of the widely-separated localities, it appears desirable to apply a distinct designation to the West-African variety. As in the typical form, the lamellate appendage of the antepenultimate joint is less dilated in the last pair of thoracic limbs than in the preceding*.

Lysiosquilla armata, Smith †, from the coast of New England, is a very distinct species from the foregoing, differing (it would appear) in the form of the rostrum and terminal segment, as well as in having ten spines on the prehensile edge of the dactylus of the "raptorial limbs" (second maxillipedes).

ISOPODA.

Cirolana Swainsonii.

Nelocira Swainsonii, Leach, Dict. Sci. Nat. xii. p. 347 (1818); Desmarest, Consid. Crust. p. 302, pl. xlvi. fig. 2 (1825); M.-Edwards, Cr. in Cuvier, Règne Anim., Atlas, pl. lxxvii. fig. 4.

Eurydice Swainsonii, M.-Edwards, Hist. Nat. Crust. iii. p. 238 (1840); White, List Crust. Brit. Mus. p. 106 (1847).

? *Cirolana hirtipes*, Heller, Verh. zool.-bot. Gesellsch. Wien, xvi. p. 742 (1866); Stalio, Atti Istit. Veneto (ser. 5), iii. p. 1375 (1876-77).

There are in the collection six small specimens that I refer

* Vide Ann. & Mag. Nat. Hist. (ser. 5), v. p. 125 (1880).

† Proc. U.S. Nat. Mus. iii. p. 446 (1881).

to this species with little hesitation after comparison with Leach's types in the British Museum, which are from the Mediterranean, and are dried and in fairly good condition. The length of the largest of the West-African examples is not quite 4 lines (8 millim.), whereas that of the largest of the Mediterranean types is about 6 lines (over 12 millim.). It may be useful to subjoin a detailed description of this species, the original diagnoses being very short and insufficient.

Body oblong-oval, convex, and nearly smooth. Head transverse, closely encased in the first segment of the body, smooth above, its anterior margin with only a very small subacute median rostriform lobe that projects somewhat between the bases of the antennules. First thoracic segment more than twice as long as the following, with its antero-lateral angles little prominent; the following segments of the thorax are short, with their posterior margins straight and their postero-lateral angles nearly right angles. The postabdomen has not more than four or five of its segments visible in a dorsal view; of these the first four are very short, the second and third having their sides prolonged, acute, and visible in a lateral view; the penultimate has its posterior margin perfectly straight to within a short distance of the lateral angles; the terminal segment is nearly equilaterally triangulate, flat above, with the apex subacute and fringed with hairs. The eyes, which are placed close to the postero-lateral angles of the head and occupy about half of the lateral margins, are oblong in a lateral view and more or less distinctly faceted. The antennules reach about to the posterior margin of the head; the two visible joints of the peduncle are moderately enlarged and of nearly equal length; flagellum of eight or nine joints. Antennæ barely half as long as the animal, with the last two joints of the peduncle subequal and longer than the preceding; flagellum with numerous joints (twenty to forty). Epimera of second and third segments oblong and transverse; those of the four following segments with the postero-lateral angles slightly prolonged and acute, and with an oblique line on their outer surface. Legs moderately robust, the fourth to sixth joints margined with short stiff setæ; dactylus slightly curved. Uropoda little longer than the terminal segment, the rami arising from a broad and transverse base, margined with hairs, the outer the narrower, both somewhat ovate, outer with the apex subacute. Colour more or less of a yellowish brown, with darker punctulations.

Cirolana Swainsonii is regarded (but doubtfully) by Heller (*t. c.*) as synonymous with *C. hirtipes* of Milne-Edwards, a

species from the Cape of Good Hope. Stalio, while retaining Dr. Heller's designation of *C. hirtipes* for the Adriatic specimens, is yet of opinion that *Eurydice Swainsonii* may be their proper designation, and *C. hirtipes* be a distinct yet allied species. That *C. hirtipes* is distinct is, I think, certain, since in Milne-Edwards's figure the body is represented as longer and narrower, the terminal segment less acute, and the uropoda subequal and of a more acute and narrow lanceolate shape; moreover, in specimens referred, I think rightly, to *C. hirtipes* in the British-Museum collection, the interantennal process of the epistome is narrower and the median frontal lobe more distinct and prominent.

In all its characters *C. Swainsonii* much more nearly approaches *C. Cranchii* of Leach; and the two species may even be identical; but more specimens of *C. Cranchii* are needed for comparison, and for the present it may suffice to point out the affinity and possible identity of the two species. Neither the degree of granulation of the eyes nor the number of exposed postabdominal segments are characters of importance, since I have seen specimens of *C. Cranchii* having the eyes nearly smooth and but five postabdominal segments exposed; there are, however, slight differences in the form of the uropoda and terminal segment.

AMPHIPODA.

Ampelisca tenuicornis, Lilljeborg.

Here are referred with little hesitation two Amphipods in somewhat imperfect condition in the collection which agree in all essential characters with A. Boeck's diagnosis of the species*, who, moreover, quotes as synonymous with the Arctic form the *Araneops diadema* of Costa from the Gulf of Naples †. I have thought it well, however, to subjoin the following detailed description of the Gorean specimens:—

The body is compressed and dorsally arcuated, without spines or tubercles; the head projects somewhat beyond the anteriorly-prorected coxa of the first thoracic segment, is nearly twice as long as its greatest vertical depth, and its antero-lateral margins are slightly sinuated. Segments of the postabdomen smooth; the first has its postero-lateral angles rather broadly rounded; in the third postabdominal segment this angle is nearly a right angle; the fourth seg-

* De Skandinaviske og Arktiske Amphipoder, ii. p. 519, pl. xxxi. fig. 1 (1876).

† Mem. R. Accad. Sci. Napoli, p. 178, pl. i. fig. 1 (1856).

ment is dorsally somewhat carinated; the terminal segment is narrow-ovate and divided through rather more than half its length by a narrow fissure. The eye-specks are very small, pale-coloured, and scarcely distinguishable. Antennules scarcely half as long as the antennæ; with two joints of the peduncle visible, the first being thicker and rather shorter than the second; flagellum with from eighteen to twenty joints; the antennæ have the first peduncular joint very short, the next two slender, elongated, and subequal; the flagellum is longer than the peduncle, but broken in the two specimens I have examined; the coxæ of the first four legs are narrow; and the posterior margins of the five succeeding joints in these legs are clothed with long hairs. In the first pair of legs, which are rather shorter than the next pair, the wrist and palm are a little longer than broad and somewhat dilated inferiorly, so that these joints are broadest in the middle of their length; dactylus scarcely more than half as long as the palm and closing against its inferior margin. Second legs with the wrist slender, more than three times as long as broad; palm slender and a little shorter than the wrist (which it resembles in shape), not dilated below; dactylus rather shorter than the palm. The third and fourth legs have the penultimate and antepenultimate joints somewhat dilated, the dilatation greatest in the fourth legs; dactylus very slender and longer than the two preceding joints taken together. In the three posterior pairs of legs the coxæ are very short and the basa or second joints very considerably dilated; in the fifth and sixth pairs these joints are dilated anteriorly as well as posteriorly; in the last pair the anterior margin is straight and the large posterior dilatation is broadly rounded; in the fifth and sixth legs the fifth joints are slightly produced at their posterior and distal angles; and the dactyli in all three are very short. The three posterior pairs of postabdominal appendages are biramose, the rami lanceolate; those of the last pair slightly sinuated. Colour pale yellowish in spirit. Length a little more than 5 lines (11 millim.).

CIRRIPIEDIA.

Balanus spongicola, Brown.

To this species, as characterized by Mr. Darwin*, are referred numerous small specimens incrusting certain of the shells tenanted by hermit crabs in the collection; two or

* Monograph of the Cirripedia, Balanidæ, p. 225, pl. iv. fig. 1 (1854).

three specimens were also observed attached to the dorsal surface of the carapace of *Lambrus massena*, var. *atlanticus*, and *Ebalia tuberculata*. The valves of the operculum in these specimens are of a pinkish or purplish hue in spirit, and longitudinally ribbed or folded, the ribs often nearly as prominent as in *B. trigonus*; the adductor ridge of the scutum is generally very distinct, the tergum has a short and broadly truncated spur.

Intermingled with the above I have found in one or two instances young specimens apparently referable to *Balanus amphitrite*, which is mentioned by Mr. Darwin (*t. c.* p. 241) as occurring on the west coast of Africa and being, in fact, common in nearly all the warmer temperate and tropical seas; whereas *B. spongicola* has, according to Mr. Darwin, a more restricted range, occurring on the southern and western coasts of Britain, at Madeira, and in the West Indies.

Geographical Distribution of the Species.

In order to facilitate reference to the species enumerated in the foregoing paper, the following systematic list is given, with the geographical range of each, so far as known to me at present. Our knowledge of the distribution of the higher Crustacea is as yet very imperfect, although the attention of carcinologists has been of late years increasingly directed to its study. The following list, however, will suffice to show the marked affinities of the crustacean fauna of Goree (so far as it is represented in the collection now described) with that of the Mediterranean and Eastern American coasts, which I have already referred to above. Of 55 species or well-marked varieties contained in this list, 3 are not included in the Gorean collection, and may be dismissed from present consideration. Of the remaining 52, 17 have been recorded from the temperate European seas; and of these several are now indicated from one or more of the intervening island-groups, *i. e.* the Cape-Verd, Canary, and Madeiran Islands; the European affinity is further exhibited by several of the new species having near allies in Mediterranean forms. Only five species in the following list have been recorded from the West Indies or localities on the east coast of North America; but several others find near allies among their American congeners, *e. g.* *Heterocrypta Maltzani*, *Lophozozymus sexdentatus*, *Leptodius punctatus*, *Neptunus inæqualis*, *Ethusa mascarone*, Roux, *Spiropagurus elegans*, *Scyllarus arctus*, var. *paradoxus*, n., and *Pencæus velutinus*, Dana.

Portunus corrugatus, Pennant, *Pencæus velutinus*, Dana, and *Balanus amphitrite* have an Oriental range; and the typical

forms of *Thalamita integra*, *Pilumnoplax sulcatifrons*, and *Lysiosquilla acanthocarpus* (new varieties of which are in the Gorean collection) are also from Oriental localities. Other species there are, as (*e.g.*) *Goniosoma Milleri*, A. M.-Edw., *Spiropagurus elegans*, and *Alpheus paracrinitus*, which are very closely allied to Oriental congeners.

Several of the new species or varieties described from Goree are also known to occur at the Cape-Verd, Madeira, or Canary Islands; and no doubt all may be expected to have a more or less extended range †.

Systematic List of the Species.

(The species distinguished by an asterisk are those not represented in the collection from Goree.)

DECAPODA.

BRACHYURA.

- Stenorhynchus rostratus* (Linn.). European seas.
S. rostratus, var. *spinulosus*, n. Vigo Bay?, Ireland?
Herbstia (*Micropisa*) *violacea*, A. M.-Edw. Cape St. Vincent
 (Cape-Verd Isl.), Angola.
Pisa carinimana, Miers. Canaries.
Lambrus (*Parthenopoides*) *massena*, Roux. Mediterranean,
 Cape-Verds?
L. (P.) massena, var. *goreensis* ‡, n.
L. (P.) massena, var. *atlanticus*, n.
L. (P.) bicarinatus, sp. n. Canaries.
Heterocrypta Maltzani, sp. n.
Lophozozymus (*Lophoxanthus*) *sexdentatus*, sp. n.
Xanthodes melanodactylus, A. M.-Edw. Madeira, Cape St.
 Vincent (C.-Verd Isl.), Ascension Island.
Xantho pilipes, A. M.-Edw.? Senegal.
Leptodius punctatus, sp. n.
 **L. Macandreae*, sp. n. Canaries.
Pilumnus verrucosipes, Stimpson. Cape of Good Hope, Si-
 mon's Bay.
Neptunus (*Amphitrite*) *inæqualis*, sp. n.
Thalamita integra, var. *africana*, n. Canaries.

† In connexion with the subject of geographical distribution, I may be allowed to call attention to the remarks of Prof. S. I. Smith on the geographical distribution of the Crustacea recently dredged by the United-States Fish Commission on the New-England coast (*vide* Ann. & Mag. Nat. Hist. ser. 5, 1881, vii. p. 146).

‡ This designation must be given to the variety above named *spinifer*, since Mr. Haswell has quite recently applied the latter name to an Australian species.

- Goniosoma Millerii*, A. M.-Edw. Cape St. Vincent (Cape-Verd Isl.).
- Portunus corrugatus* (Pennant). European temperate seas, Red Sea, Japan.
- P. pusillus*, Leach. European temperate seas, New Zealand?
- Atelecyclus rotundatus*, Olivi. Mediterranean, west coast of France.
- Pilumnoplax sulcatifrons*, Stm., var. *atlantica*, n. (The typical form was obtained at Hong Kong.)
- Typhlocarcinus integrifrons*, sp. n.
- Thaumastoplax anomalipes*, gen. and sp. nov.
- Gelasimus tangieri*, Eydoux. North and west coasts of Africa, coast of Portugal, West Indies.
- Philyra cristata*, sp. n.
- P. lævidorsalis*, sp. n.
- Ilia spinosa*, sp. n. Canaries.
- Ebalia tuberculata*, sp. n.
- **E. fragifera*, sp. n. Madeira, Canaries.
- E. affinis*, sp. n.
- Dorippe armata*, White (ined.), Miers.
- Ethusa mascarone*, Roux. Mediterranean, Canaries.

ANOMURA.

- Dromia fulvo-hispida*, sp. n.
- D. spinirostris*, sp. n.
- Diogenes varians* (Costa). Coasts of Portugal, Mediterranean, Black Sea.
- D. varians*, var. *ovata*, n.
- D. varians*, var. *gracilimana*, n.
- Pagurus striatus*, Latr. Mediterranean, Madeira, coasts of Portugal.
- **P. imperator*, sp. n. St. Helena.
- P. granulimanus*, sp. n.
- Isocheles? gracilis*, sp. n.
- Spiropagurus elegans*, sp. n.
- Eupagurus excavatus* (Herbst). Mediterranean.

MACRURA.

- Scyllarus (Arctus) arctus*, var. *paradoxus*, n.
- Crangon (Cheraphilus) cataphractus* (Olivi). Mediterranean.
- Alpheus paracrinitus*, sp. n.
- Sicyonia sculpta*, M.-Edw. Mediterranean, St. Vincent.
- Penæus brasiliensis* (Latr.). West Africa, Whydah, American coasts from New York to Brazil.
- P. velutinus*, Dana. Oriental region, from Japan to Gulf of

Suez; West Australia (Sharks Bay), West Indies, St. Thomas? (as *P. pubescens*?).

STOMATOPODA.

Lysiosquilla (*Coronis*) *acanthocarpus*, var. *septemspinosa*, n.
(The typical form was from Port Essington, North Australia.)

ISOPODA.

Cirolana Swainsonii (Leach). Mediterranean.

AMPHIPODA.

Ampelisca tenuicornis, Lilljeb. North-European and Mediterranean seas.

CIRRIPEDIA.

Balanus amphitrite, Darwin. Warmer temperate and tropical seas of the globe.

B. spongicola, Brown. South and west coasts of Britain, Madeira, West Indies.

EXPLANATION OF THE PLATES.

PLATE XIII.

Fig. 1. *Heterocrypta Maltzani*, sp. n., $\times 3$ diam.

Fig. 1 a. Inferior view of the front of the cephalothorax, showing the position and structure of the antennæ and outer maxillipedes, $\times 3$ diam.

Fig. 2. *Lophozozymus* (*Lophoxanthus*) *sexdentatus*, sp. n., $\times 3$ diam.

Fig. 2 a. Outer view of chela of the same, $\times 3$ diam.

Fig. 3. Outer view of chela of *Leptodius punctatus*, sp. n., $\times 1\frac{1}{2}$ diam.

Fig. 4. Outer view of chela of *Leptodius Macandreae*, sp. n., $\times 2$ diam.

Fig. 5. Similar view of a chela of *Pilumnus verrucosipes*, Stm., $\times 3$ diam.

Fig. 6. *Neptunus* (*Amphitrite*) *inæqualis*, sp. n., $\times 1\frac{1}{2}$ diam.

PLATE XIV.

Fig. 1. *Typhlocarcinus integrifrons*, sp. n., \times about 3 diam.

Fig. 1 a. Frontal and orbital region of the same, further magnified.

Fig. 2. *Thaumastoplax anomalipes*, gen. and sp. n., $\times 2$ diam.

Fig. 2 a. Frontal and orbital region of the same, further magnified.

Fig. 2 b. Outer maxillipede of the same, considerably magnified.

Fig. 2 c. Outer view of chela of the same, $\times 2$ diam.

Fig. 3. *Ebalia tuberculata*, sp. n., $\times 3$ diam.

Fig. 3 a. Outer maxillipede of the same, showing the form of the exognath, further magnified.

Fig. 4. Outer maxillipede of *Ebalia affinis*, sp. n., considerably magnified.

PLATE XV.

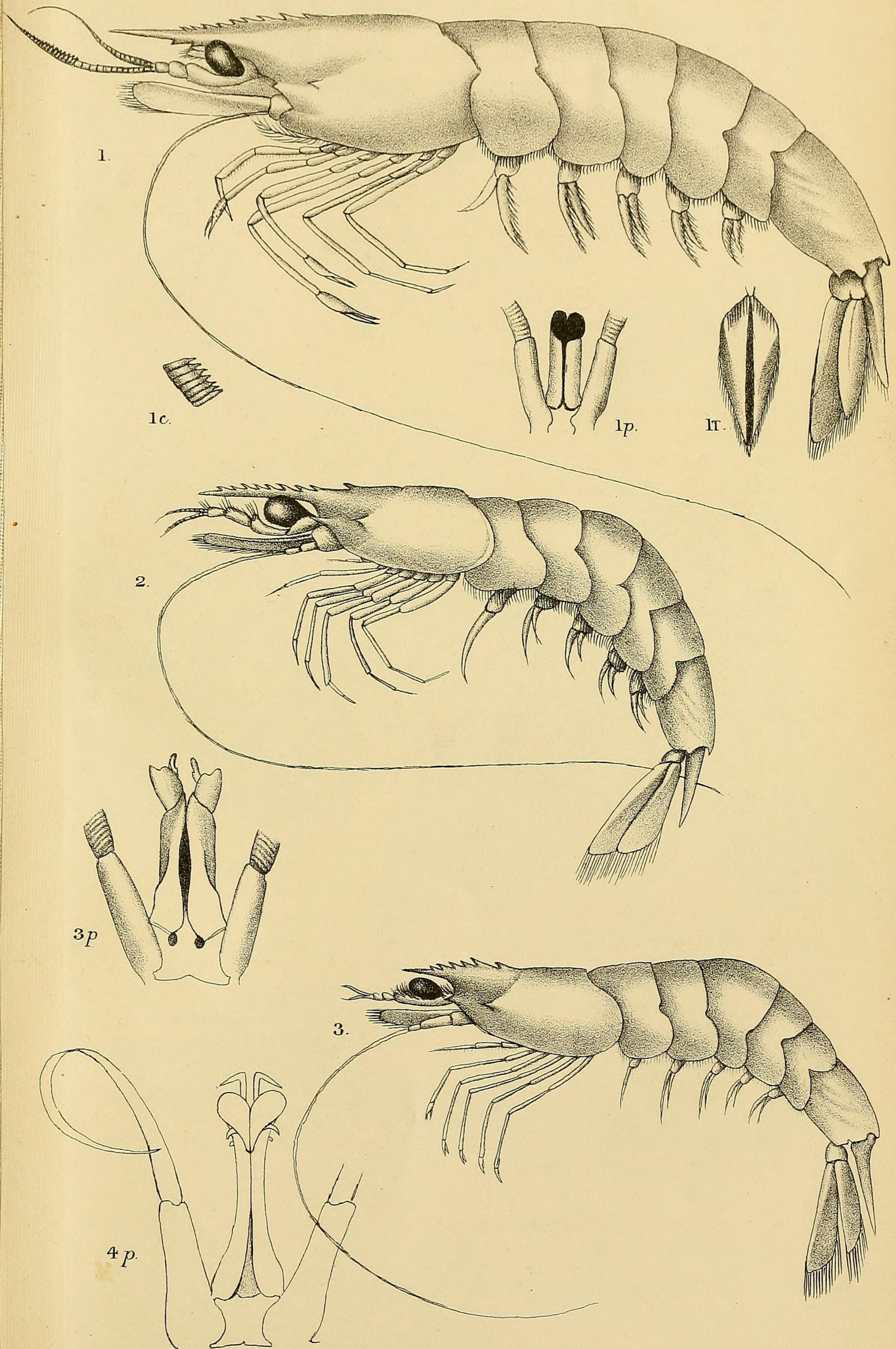
- Fig. 1. *Philyra cristata*, sp. n., $\times 4$ diam.
 Fig. 1 a. Outer maxillipede of the same, considerably magnified.
 Fig. 1 b. Postabdomen of a male, considerably magnified.
 Fig. 2. Chela of *Philyra lævidorsalis*, sp. n., magnified.
 Fig. 3. *Ilia spinosa*, sp. n., $\times 2$ diam.
 Fig. 4. *Dorippe armata*, White (ined.), nat. size.
 Fig. 4 a. Outer view of larger chela of the same, nat. size. (The figures are taken from White's typical specimen in the Museum collection.)

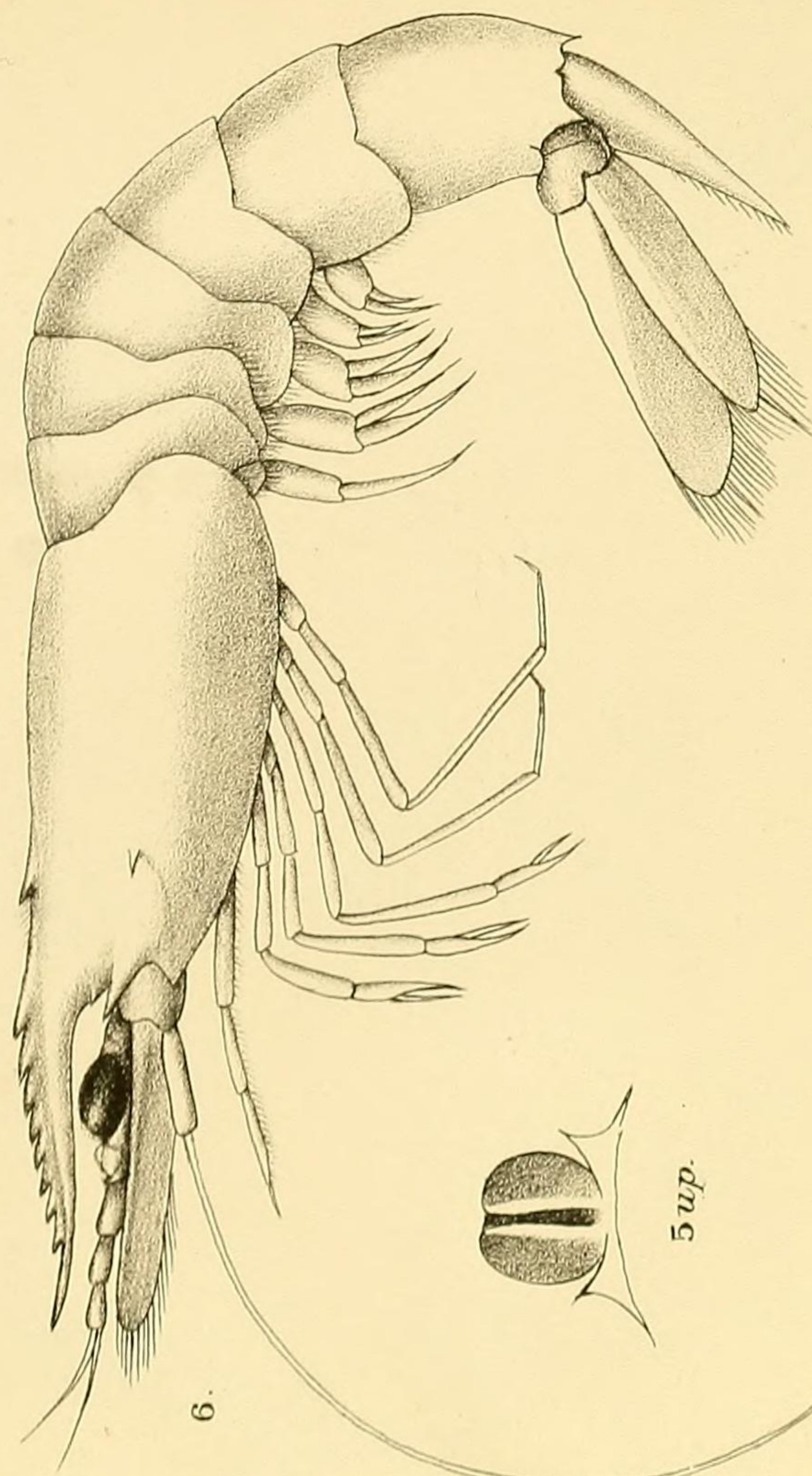
PLATE XVI.

- Fig. 1. Outer view of chela of *Dromia fulvo-hispida*, sp. n., \times about 4 diam.
 Fig. 2. Dorsal view of frontal region of *Dromia spinirostris*, showing the form of the rostral spines, $\times 1\frac{1}{2}$ diam.
 Fig. 3. *Pagurus granulimanus*, sp. n., nat. size.
 Fig. 3 a. Outer view of larger (left) chela of the same, nat. size.
 Fig. 4. Outer view of third (right) leg of *Isocheles? gracilis*, sp. n., $\times 1\frac{1}{2}$ diam., showing the form of the long and slender dactylus.
 Fig. 5. *Spiropagurus elegans*, sp. n., $\times 1\frac{1}{2}$ diam.
 Fig. 5 a. The spirally-coiled genital appendage of the left leg of the fifth pair, $\times 3$ diam.
 Fig. 6. Rostrum and orbital region of *Alpheus paracrinitus*, sp. n., $\times 8$ diam.
 Fig. 7. Large raptorial limb (second maxillipede) of *Lysiosquilla acanthocarpus*, var. *septemspinosa*, sp. n., $\times 2$ diam.

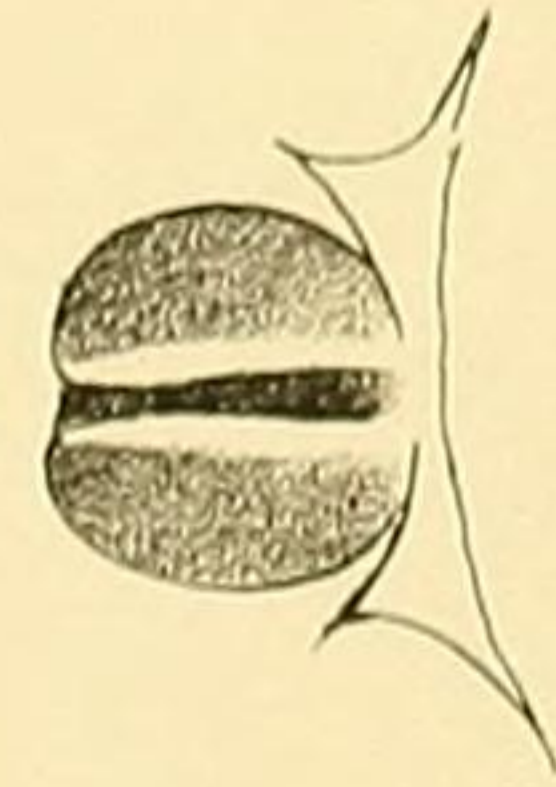
XXXVIII.—*Description of the Animal of Durgella Christianæ, a Species of Land-Shell from the Andaman Islands.* By Lieut.-Colonel H. H. GODWIN-AUSTEN, F.R.S., F.Z.S., &c.

MY friend Mr. Geoffrey Nevill, a short time since, was good enough to send me some specimens of Andaman and Nicobar land-shells in spirit, and among them a specimen named *Helicarion Christianæ*, Theobald. This I took an early opportunity of examining; and it proved a most interesting species. The form of the shell-lobes at once recalled the genus *Durgella*, W. Blf., described in full in *Journal Linn. Soc.* vol. xv. 1881, p. 291; and after dissecting out the generative organs and odontophore, there was no doubt of its relationship to *D. levicula*, Bs., of Tenasserim, and *D. assamica* of the Brahmaputra valley, Assam, thus extending in an interesting way the range of this very well-marked genus. I give below a full description of the animal of this the largest species of it; and I only wish that I could give

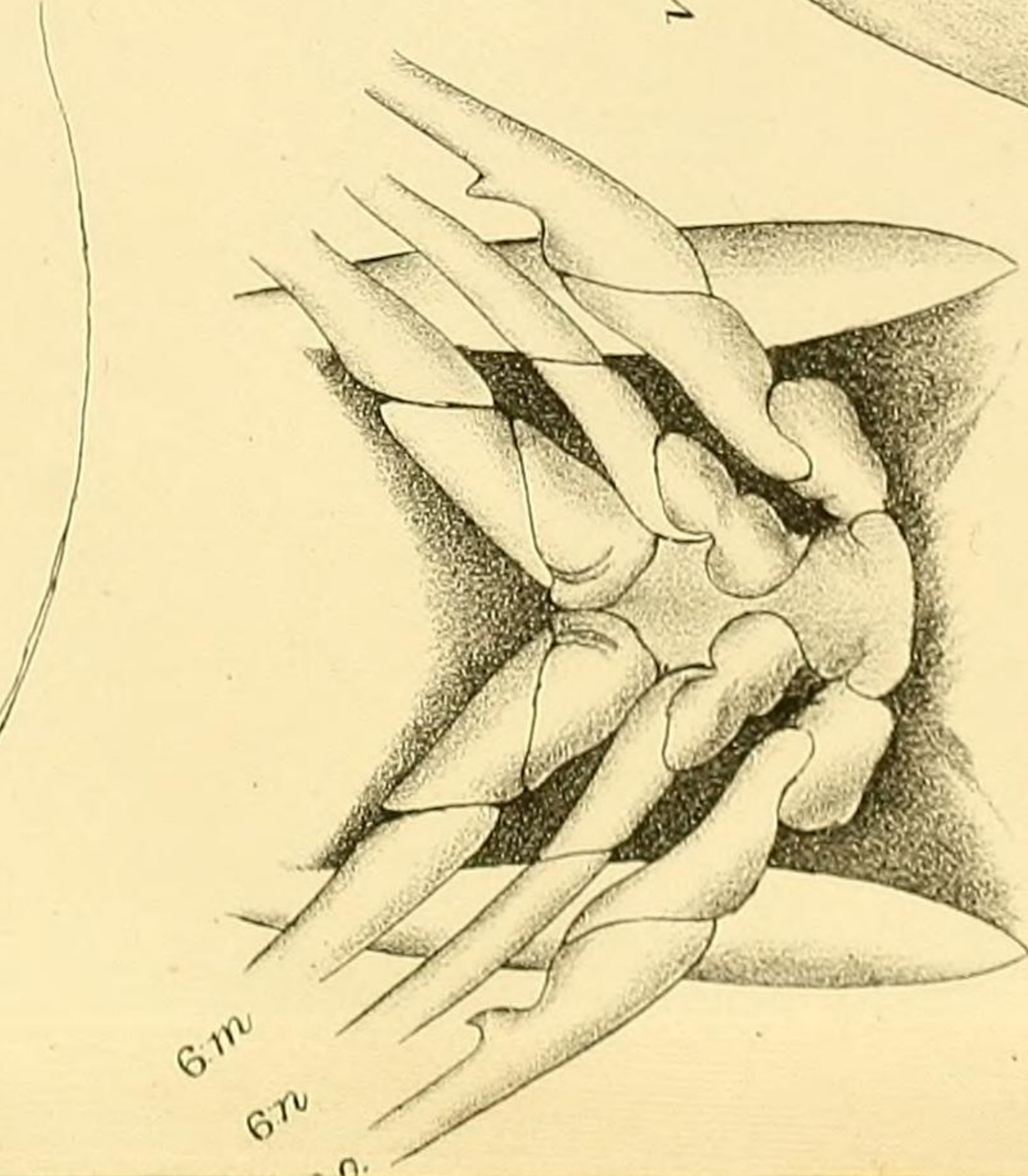




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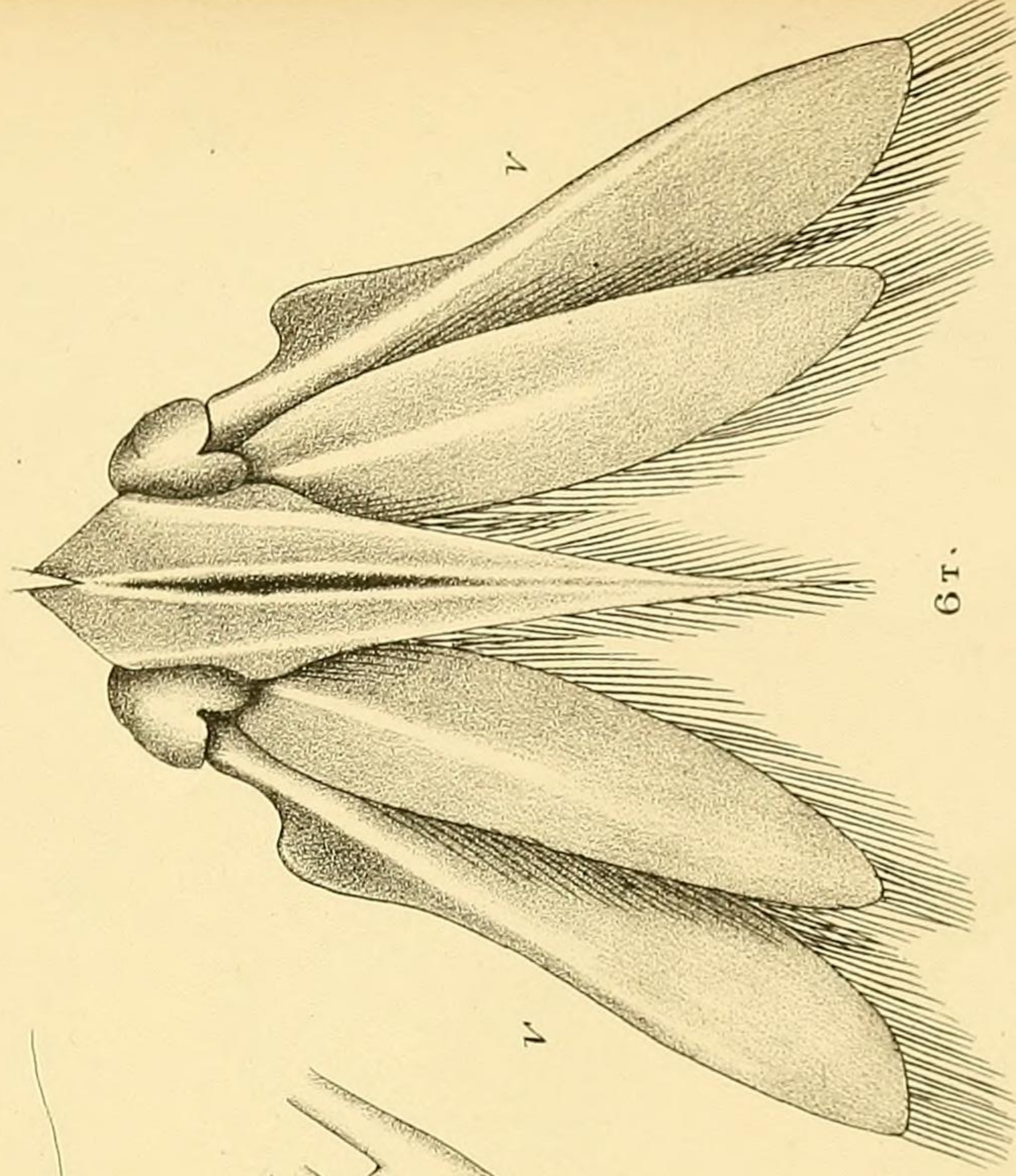


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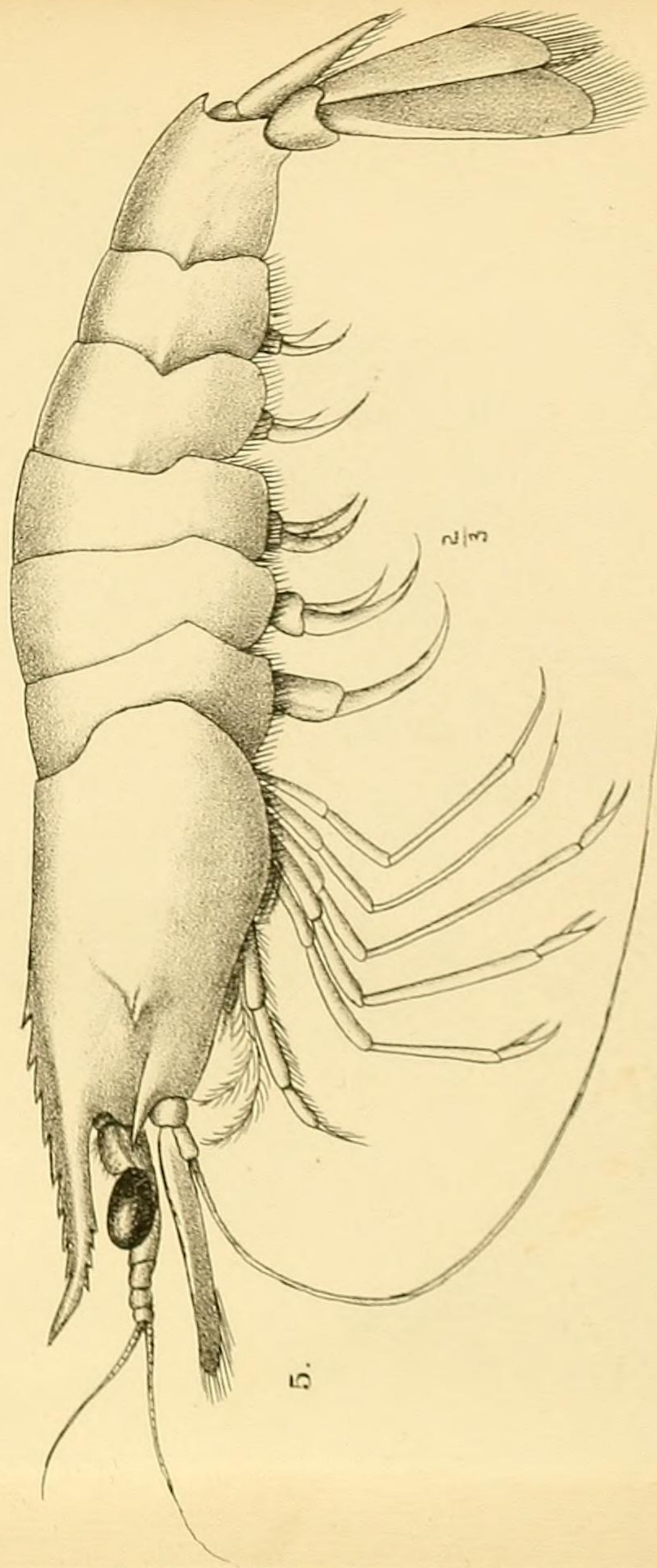


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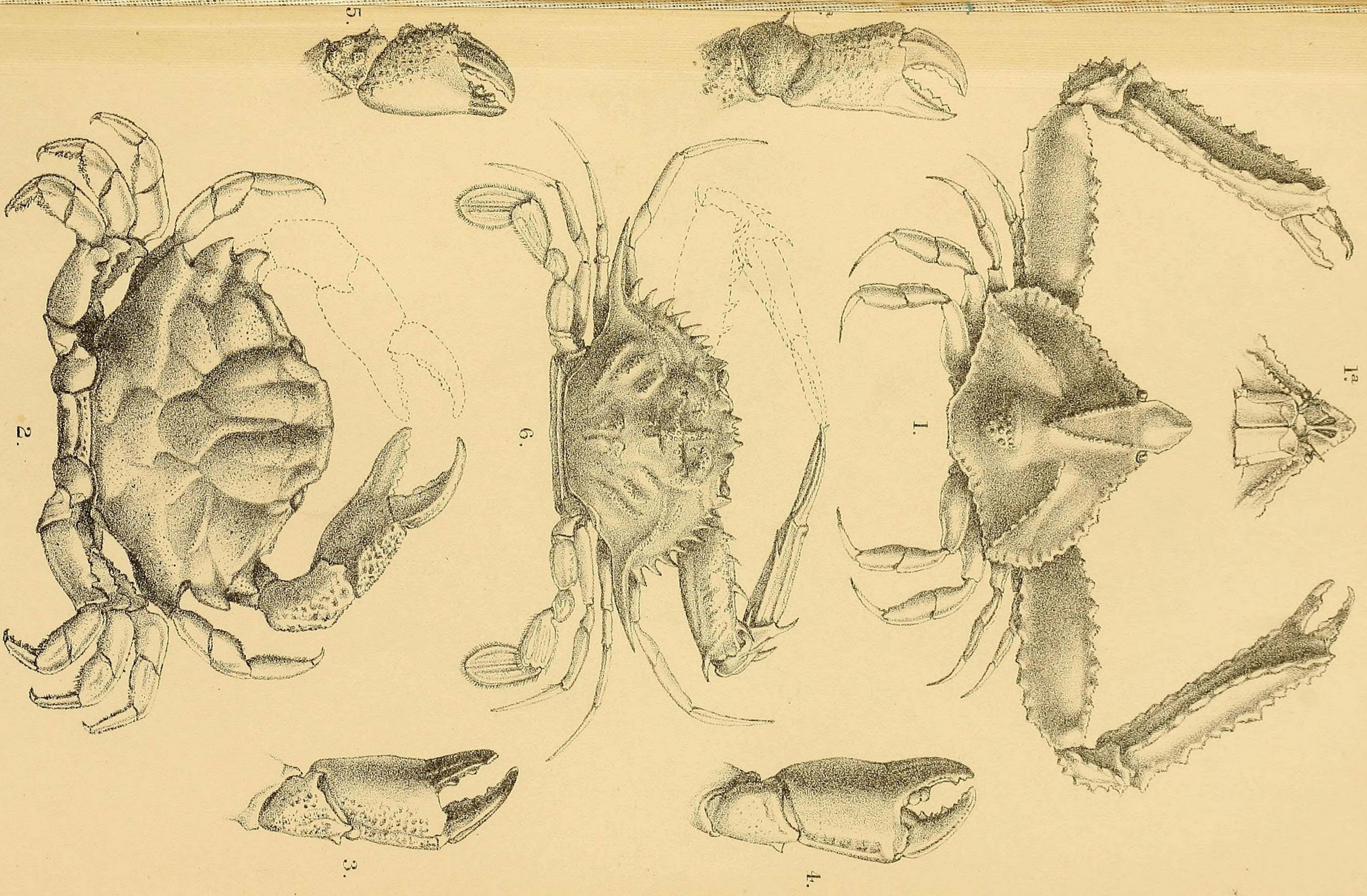


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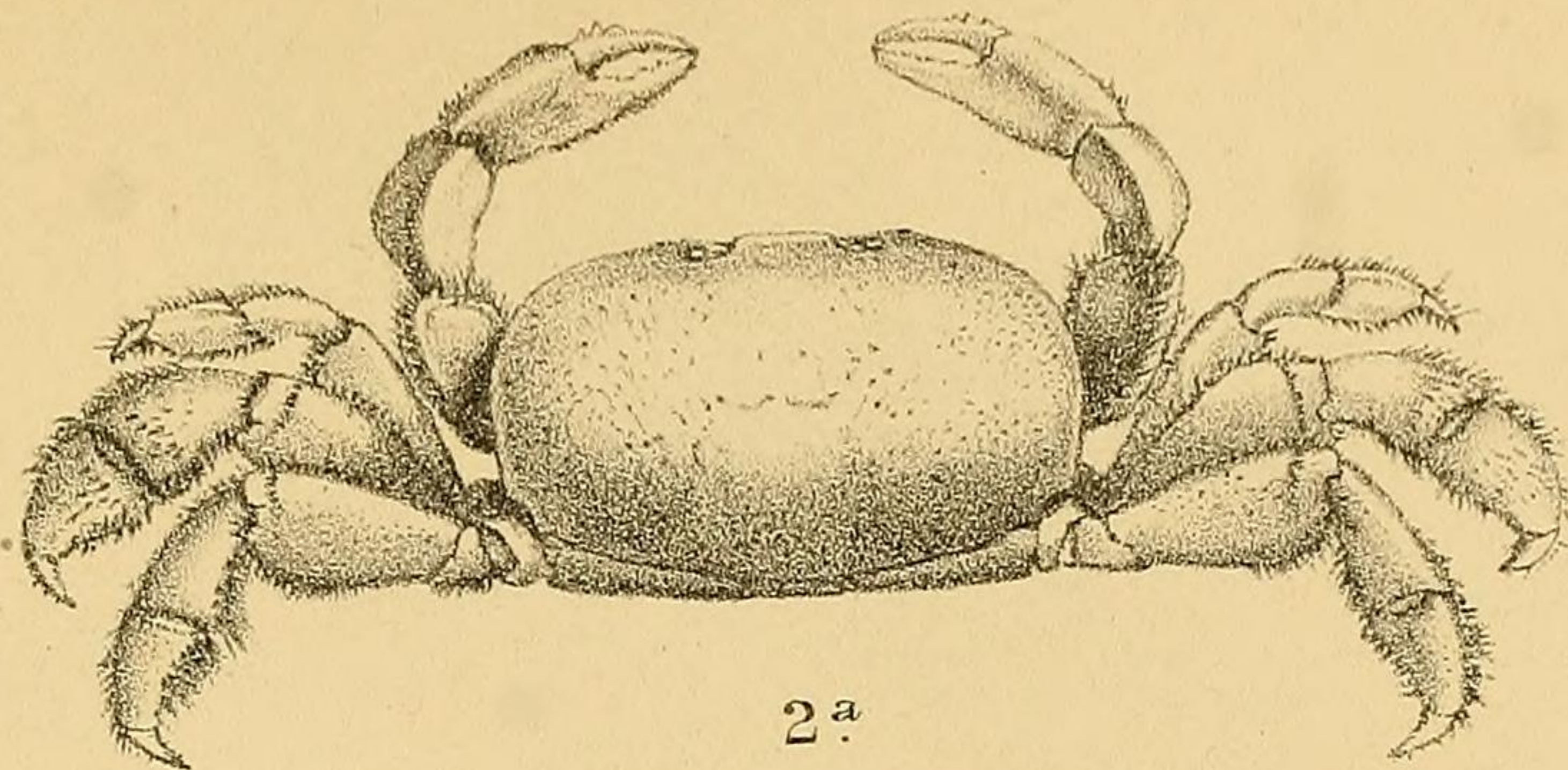


Edwin Wilson, del et lith.

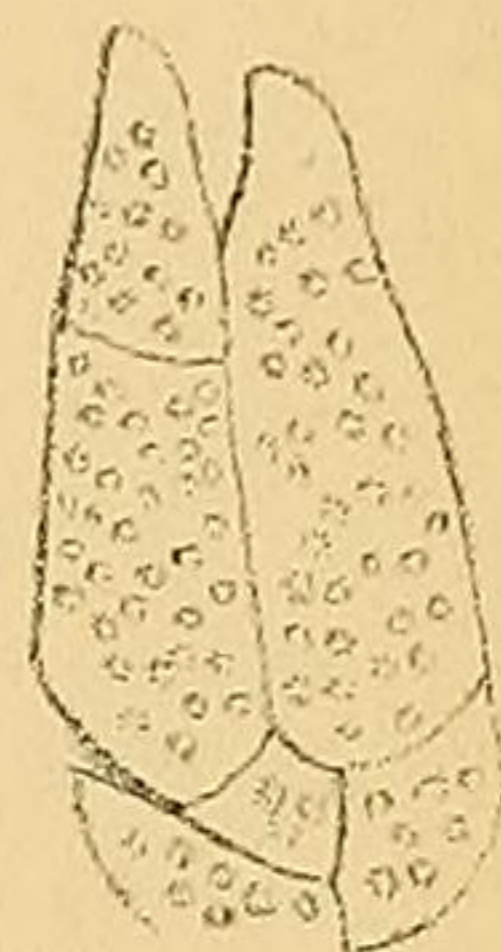
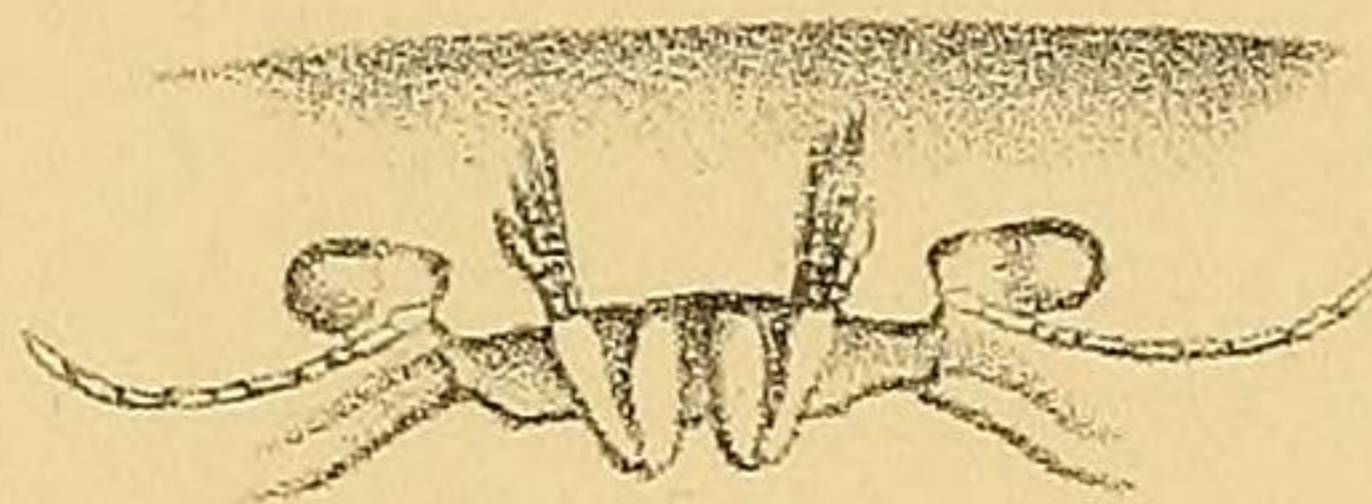
NEW CRUSTACEA FROM GORREE.

Mintern Bros imp.

2.

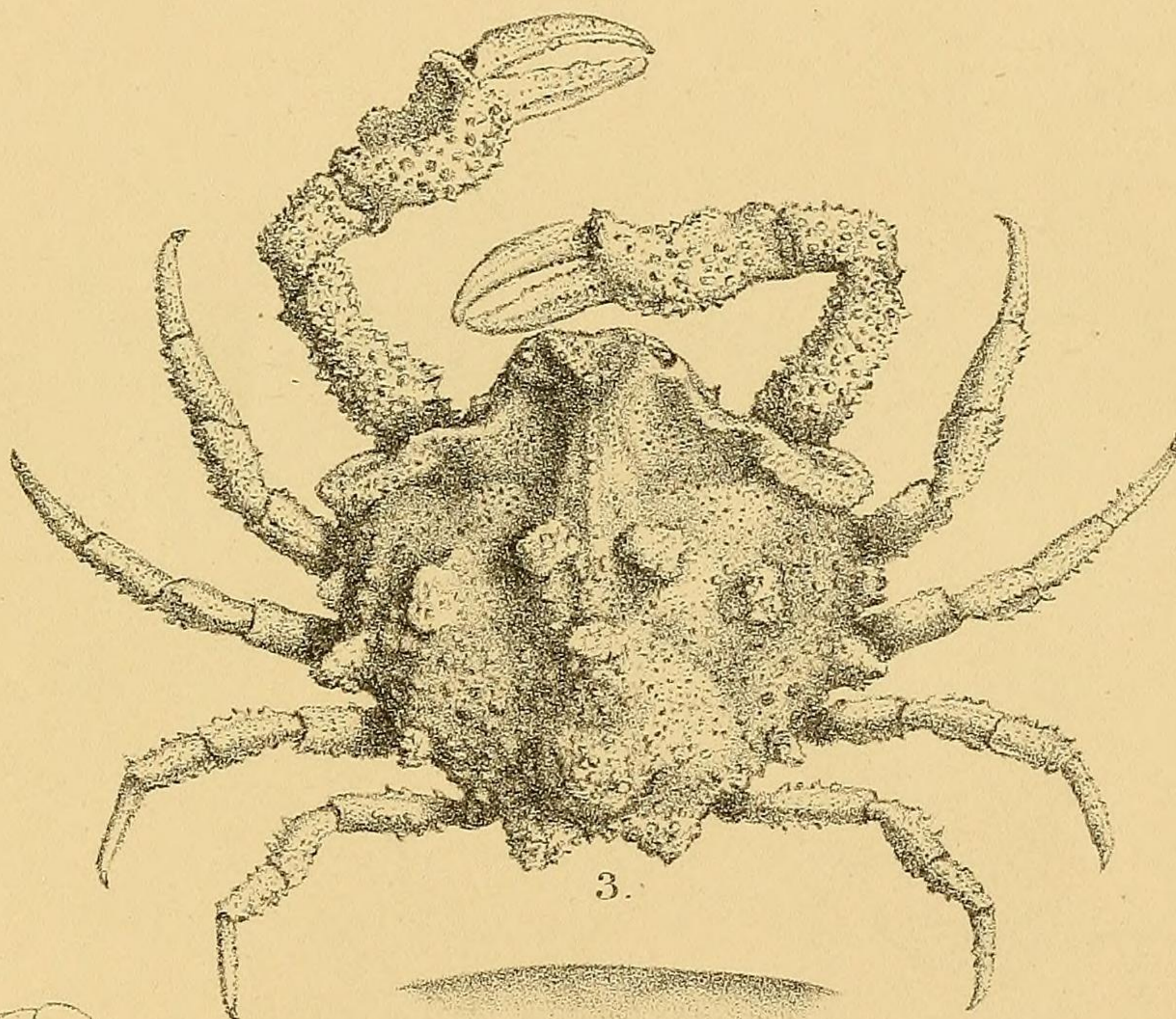


2^a



4.

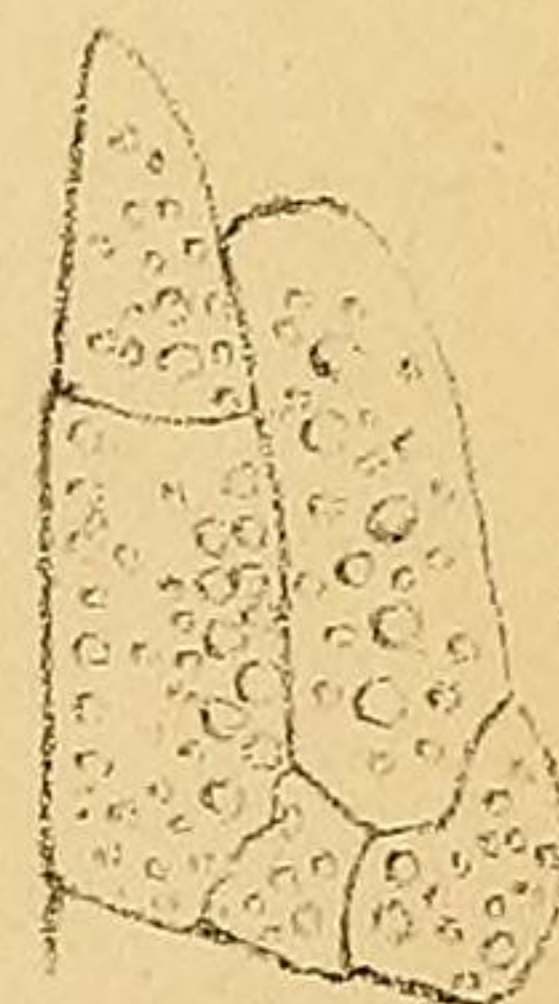
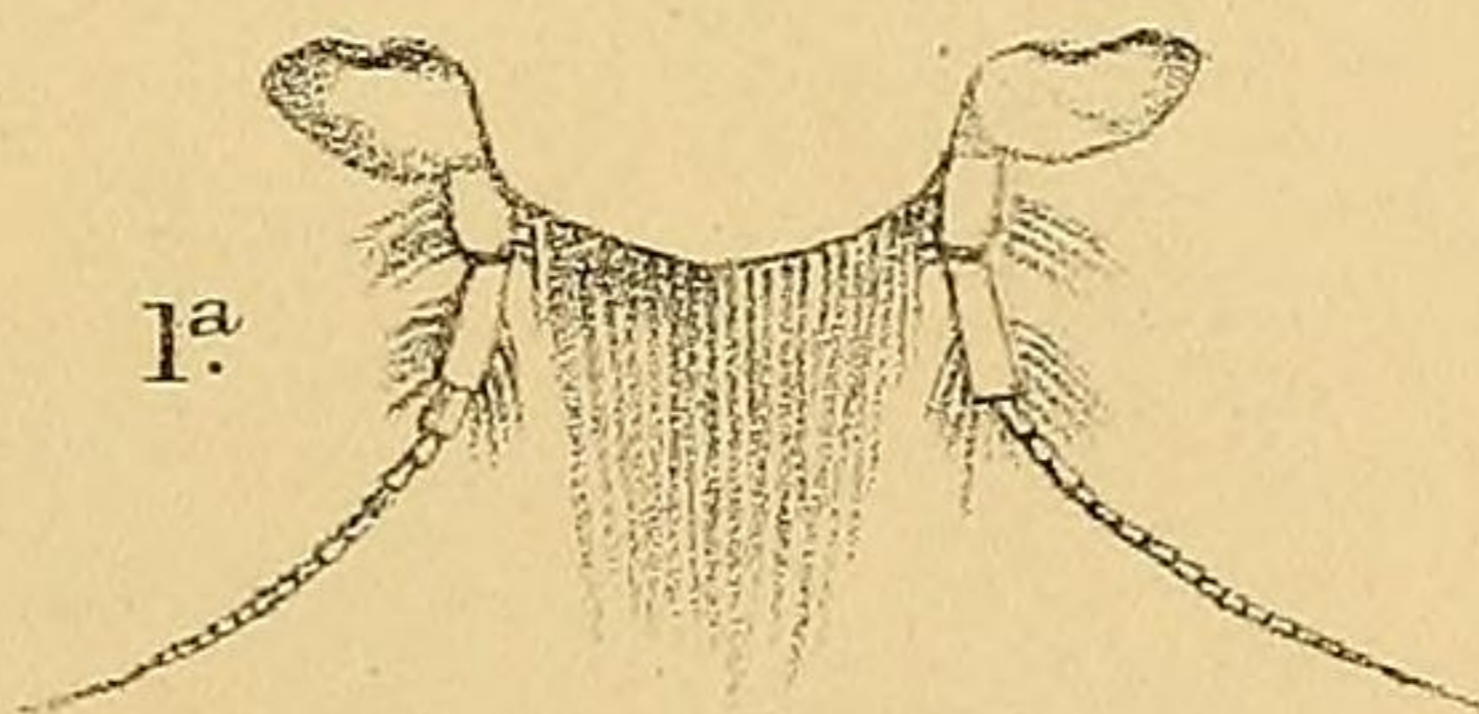
2^c



3.

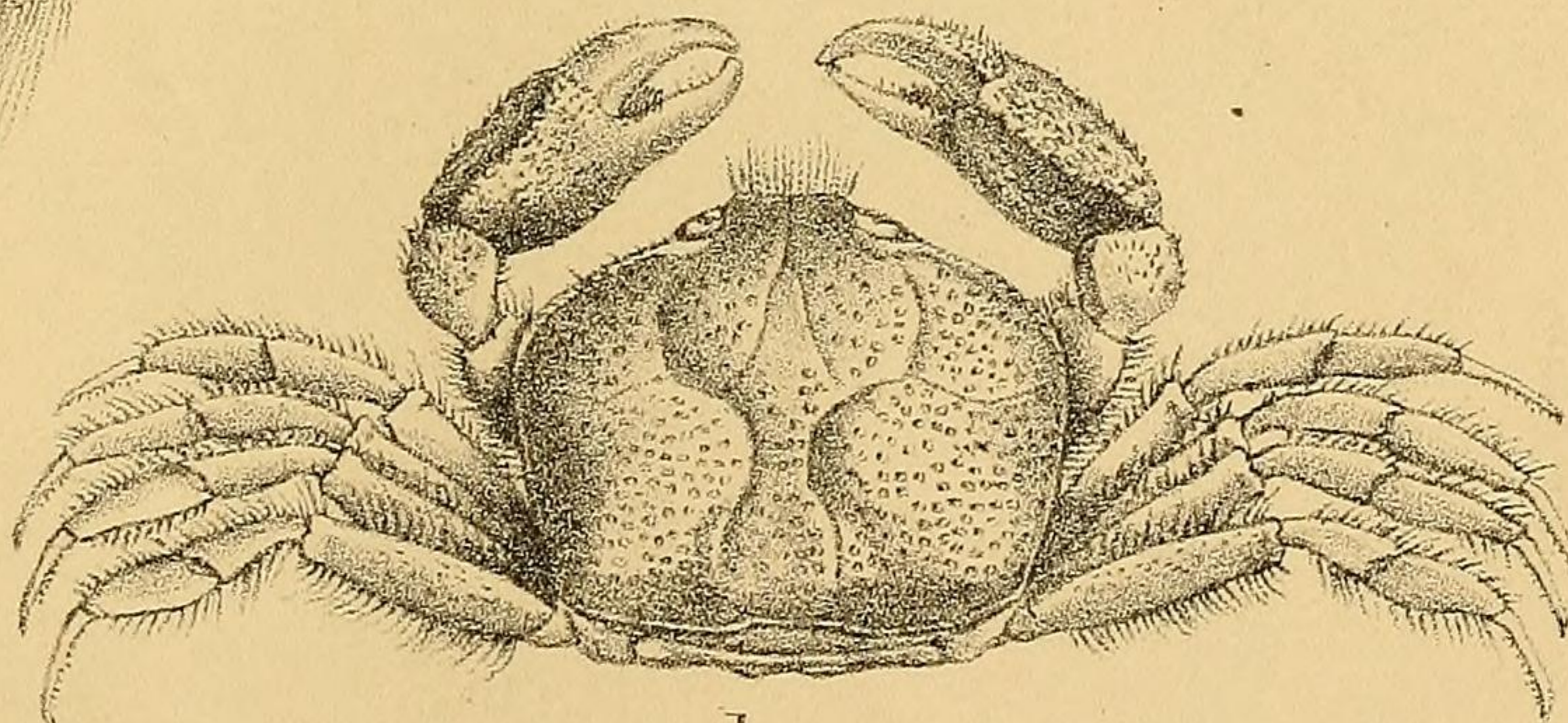
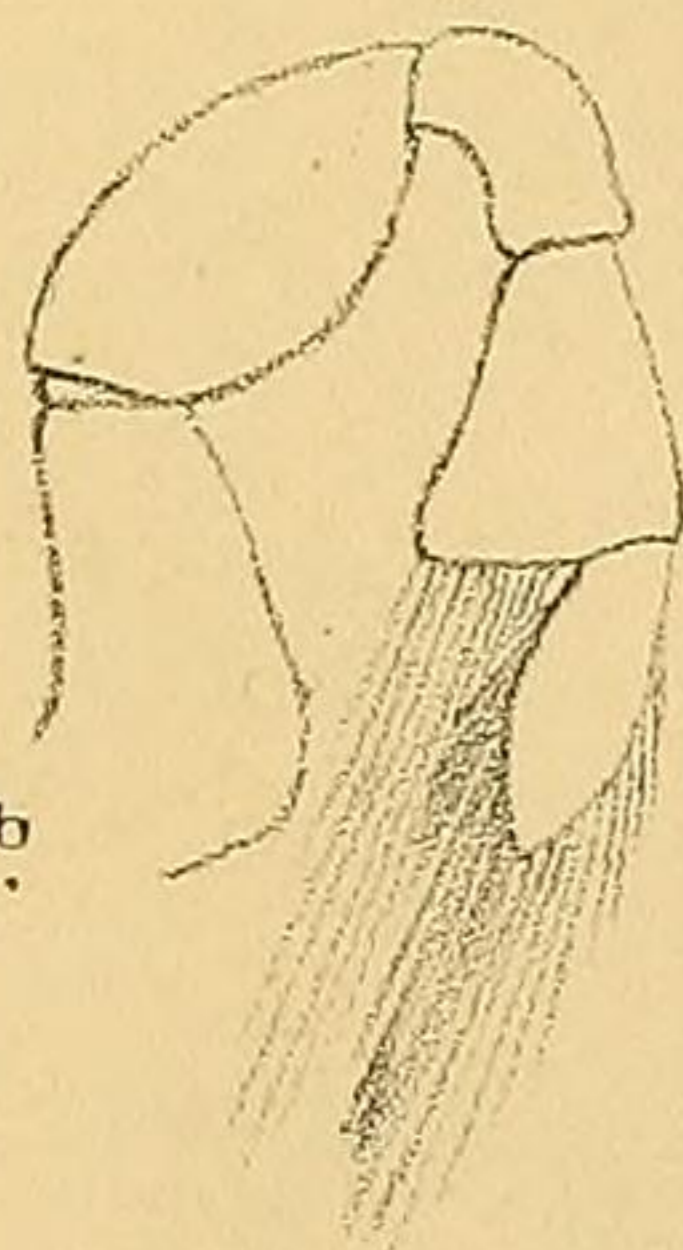


1^a



3^a

2^b



1.

