

RS 1880

J. Mart
26191

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY,

INCLUDING

ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'ANNALS' COMBINED WITH LOUDON AND CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')

CONDUCTED BY

ALBERT C. L. G. GÜNTHER, M.A., M.D., Ph.D., F.R.S.,
WILLIAM S. DALLAS, F.L.S.,
WILLIAM CARRUTHERS, F.R.S., F.L.S., F.G.S.,

AND

WILLIAM FRANCIS, Ph.D., F.L.S.

~~~~~

**VOL. V.—FIFTH SERIES.**

~~~~~

LONDON:

PRINTED AND PUBLISHED BY TAYLOR AND FRANCIS.

SOLD BY LONGMANS, GREEN, READER, AND DYER; SIMPKIN, MARSHALL, AND CO.; KENT AND CO.; WHITTAKER AND CO.: BAILLIÈRE, PARIS:
MACLACHLAN AND STEWART, EDINBURGH:
HODGES, FOSTER, AND CO., DUBLIN: AND ASHER, BERLIN.

1880.

a yellow discal band with blackish external margin, very slender upon primaries, but widened into an elongated triangular patch upon the secondaries, bounded outwardly upon the primaries by three dark brown spots and towards apex of secondaries by a large dark brown patch; external border bronzy, fringe varied with white; primaries with a small red-brown reniform spot with pale border. Under surface sordid white; wings with blackish apical patches, fringe snow-white at apex. Expanse of wings 11 lines.

One example. Kurrachee, October.

There are also two specimens in Mr. Moore's collection. This genus much resembles in marking the Noctuid group *Microphysa*, but differs in its much longer and thicker palpi.

Asopiidæ.

30. *Hymenia fascialis*, Cramer.

Three specimens. Kurrachee, June and October.

Botydidæ.

31. *Botys iopasalis*, Walker.

Three specimens. Kurrachee, September and October.

32. *Godara comalis*, Guénée.

Two specimens. Kurrachee, October.

Tineidæ.

33. *Alavona barbarella*?, Walker.

Matheran, May 1879.

I cannot be perfectly certain of the identification of this species, owing to the rubbed condition of the type and the difficulty of tracing the markings in any but very good specimens of this genus.

XXIII.—*On a Collection of Crustacea from the Malaysian Region*.—Part I. *Crustacea Oxyryncha and Cyclometopa, except Telphusidea*. By EDWARD J. MIERS, F.L.S., F.Z.S.

[Plate XIII.]

THE present paper, which will be continued in succeeding numbers of the 'Annals,' will contain a complete enumeration, with notes and descriptions (where needed), of the Crus-

tacea recently selected from the collection of the late Dr. P. Bleeker, the eminent ichthyologist, for the British Museum. This collection is of much interest, not merely on account of the new and undescribed species included in it, which, as was to be expected in a collection from a region so thoroughly worked, are not very numerous, but also on account of the many species it contains which have been hitherto *desiderata* to the Museum collection. Amongst these are several of the *Maiioidea*, and fourteen out of sixteen species of *Isopoda* (*Cymothoidea*) parasitic on fishes, described by Dr. Bleeker in his two memoirs, entitled "Sur les Décapodes Oxyrhinques et les Isopodes Cymothoadiens de l'archipel Indien"*.

To avoid needless repetition I have seldom given references to the literature, except in those not unfrequent cases where I have been enabled to correct the synonyma or bring together species which appear to have been based on characters of insufficient value.

The exact localities were unfortunately not marked on all the bottles in Dr. Bleeker's collection; but those which were not more particularly labelled were marked as containing "Crustacea Indo-Archipelagica;" and therefore no doubt can be entertained of the Malaysian habitat of all the species.

OXYRHYNCHA *vel* MAIOIDEA.

Doclea brachyrhynchus.

Doclea brachyrhynchus, Bleeker, Act. Soc. Indo-Néerl. ii. p. 14 (1857).

Doclea sebæ, Bleeker, *l. c.* p. 13 (1857), junior.

An adult male, agreeing well with Bleeker's description, is in the collection, without special locality. A second male example agrees with the description of *Doclea sebæ*; and a comparison of the two specimens leaves little doubt in my mind that this latter species must be united with *D. brachyrhynchus* as having been established upon younger examples. The only character by which *D. sebæ* is distinguished, viz. the somewhat shorter, slenderer chelipedes, with fingers meeting along their inner margins, cannot be considered of specific value.

Doclea macracantha.

Doclea macracanthus, Bleeker, Act. Soc. Indo-néerl. ii. p. 10 (1857).

? *Doclea microchir*, Bleeker, *l. c.* p. 11 (1857), junior?

A small male example, without special indication of locality, agrees very well with Bleeker's description. As far as can be judged from the description, *D. microchir*, Bleeker, which

* Acta Soc. Sci. Indo-Néerlandicæ, Deel ii (1857).

is mainly distinguished by the relatively longer spines of the carapace and shorter legs of the second pair, is not specifically distinct. Amboina is mentioned by Bleeker as the habitat of the first, and W. Sumatra (Padang) as the habitat of the second species.

Micippa cristata (Linn.).

Java, a fine adult male.

Tiarinia cornigera?

? *Pisa cornigera*, Latr. *Encycl. Méth.* x. p. 141 (1826).

? *Pericera cornigera*, M.-Edwards, *Hist. Nat. Crust.* i. p. 335 (1834).

Tiarinia cornigera, Dana, *U.S. Expl. Exp. Cr.* i. p. 110, pl. iii. fig. 5 (1852).

Carapace broadly pyriform, narrowing rapidly from the middle of the branchial region (where it attains its greatest width) to the orbits, covered with more or less conical and acute irregularly-disposed unequal tubercles; three more prominent and rounded tubercles are placed in the middle of the cardiac region, and three in a transverse series on the posterior margin. The rostrum is imperfect; but from the single spine remaining it is probable that the rostral spines were parallel to their apices, straight and shorter than the width of the interorbital part of the carapace. There is a small supra-ocular spine; the anterior legs are robust; the arm irregularly tuberculated; wrist nearly smooth; palm smooth, enlarged, compressed, longer than broad; fingers arcuate and meeting only at the apices; on the inner margin of the upper finger near the base is a small tubercle; the first ambulatory legs are considerably elongated. Length to base of rostrum 1 inch $3\frac{1}{2}$ lines, breadth 1 inch $2\frac{1}{2}$ lines.

Java, Karangbollong (one adult male).

The descriptions of Latreille's and Milne-Edwards's *P. cornigera* are not sufficiently detailed for me to be certain that I am right in referring the example described above to it; it is, however, probably identical with the specimen described and figured by Dana as *T. cornigera* (*Cr. U.S. Expl. Exp.* xiii. p. 110, pl. iii. fig. 5, 1852), although the tubercles of the carapace are apparently more numerous.

CYCLOCELOMA, gen. nov.

Carapace suboblong, somewhat elongated, rounded behind and slightly constricted behind the orbits, which are tubular, projecting laterally, without spines, and with a small circular opening as in many Periceridae. Spines of rostrum very small. Basal joint of antennæ very greatly enlarged, as in *Othonia*,

the next joint enlarged but more elongated and less dilated than in that genus. Ischium-joint of outer maxillipedes small and narrow; merus-joint somewhat produced at its antero-external angle, as in *Othonia*. Anterior legs (in the male) small and slender; palm smooth and not dilated, twice as long as the fingers, which are excavated on their inner margins towards the apices, which, however, are acute. Ambulatory legs of moderate length. Postabdomen (of male) with all the segments distinct.

This interesting transitional form must be placed in the sub-family *Othoniinae* (as characterized in my recent revision of the *Maioidae*, a group hitherto restricted to the single West-Indian genus *Othonia*). From that genus it is distinguished by the more elongated carapace, which is not armed with lateral spines, the more distinct rostral spines, less dilated third antennal joints, and non-dilated anterior legs of the male. It is very distinctly related to *Criocarcinus* and *Pseudomicippe* in the family *Maiidae*; the inferior hiatus of the tubular orbits in *Criocarcinus*, however, is closed in *Othonia* and *Cyclocaeloma*.

Cyclocaeloma tuberculatum, sp. n.
(Pl. XIII. figs. 1, 2.)

Carapace armed with tubercles disposed as follows:—five tubercles, of which the median is the largest, on the front of the gastric region, and posterior to these four large rounded elevations in a median series, viz. one on the gastric, one on the cardiac, one on the intestinal region, and one on the posterior margin; there is a prominent rounded tubercle on each hepatic region, and about four on each branchial region, of which one is much larger than the rest. The spines of the rostrum are subacute and separated by a narrow median fissure. The slender palm or penultimate joint of the anterior legs about equals the arm in length, and is smooth, not compressed or dilated; the fingers are shorter than the palm. The small terminal claw of the ambulatory legs is but slightly incurved. Length $1\frac{3}{4}$ inch, breadth 1 inch.

Amboina (an adult male).

The single example has a short series of stiff curled hairs on the front of the gastric and cardiac regions and on the sides of the branchial regions. The first free antennal joint is narrowest at base and dilated toward the distal end, where it is about half as broad as long; thus it differs markedly from the slender form of certain species of *Macrocaeloma* in the *Periceridae*, to which this genus bears some external resemblance. In *Macrocaeloma*, moreover, the rostrum

is always much more considerably developed, and there is a distinct spine at the end of the basal antennal joint.

Lambrus contrarius (Herbst).

A male and female are retained for the Museum. No definite locality was preserved; but Bleeker states that this species is not uncommon at the Moluccas. A comparison of the Malaysian examples with specimens from the Mauritius convinces me of the correctness of Bleeker's determination.

Lambrus lamelliger.

Lambrus lamelliger, White, P. Z. S. p. 58 (1847).

Lambrus lamellifrons, Adams and White, Zool. Samarang, Crust. p. 26, pl. v. fig. 1 (1848).

Lambrus Rumphii, Bleeker, Act. Soc. Indo-Néerl. ii. p. 18 (1857), nec *C. longimanus*, Rumph.

An adult male without definite locality is in the collection, which I refer to this species. The gastric, cardiac, and branchial regions are very much elevated and indistinctly tuberculated; on the branchial regions one of the tubercles is much more prominent and obtuse. The rostrum is very prominent on its upper surface; and the interorbital space is deeply concave; the anterior legs are very robust, and the anterior and posterior margins of the arm and hand are armed with prominent, rounded, obtuse tubercles, of which there are only two or three on the posterior (or outer) margin of the hand. The ambulatory legs are smooth.

The specimen from the Philippine Islands designated *L. lamelliger* in the Museum collection is of small size, and the tubercles of the carapace and anterior legs are more acute and spine-like.

Bleeker's description of *L. Rumphii* also applies to this species; but the figure of Rumph (Amboin. Rariteit. p. 16, pl. viii. fig. 3), copied by Herbst (Nat. Krabben, i. p. 252, pl. xix. fig. 106), cited by Bleeker agrees far better with specimens from the Philippines in the Museum collection, named, perhaps wrongly, *Lambrus turriger*, Ad. & White. This latter species is distinguished from the foregoing by having a long prominent spine on each of the regions of the carapace, and the subcylindrical anterior legs covered with small nearly uniform tubercles.

Lambrus laciniatus?

? *Lambrus laciniatus*, De Haan, Faun. Japon. Crust. p. 91, pl. xxii. figs. 2, 3 (1839).

A male, without definite locality, is in the collection. It

differs from De Haan's figure in having the spines of the posterior (or outer) margin of the palm somewhat fewer in number and broader at base, where they are almost in contact with one another; but I do not regard it as belonging to a distinct species.

CYCLOMETOPA vel CANCROIDEA.

Atergatis floridus (Linn.).

Java, Karangbollong (male and female); Amboina (young female).

Atergatis integerrimus (Lamarck).

Java (an adult female). Another specimen without locality is in the collection.

Lophozozymus epheliticus (Linn.).

Java (an adult male).

Liomera Rodgersii. (Pl. XIII. fig. 3.)

Lachnopus Rodgersii, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 32 (1858); A. Milne-Edwards, Nouv. Arch. Mus. Hist. Nat. i. p. 233 (1865).

Carapace transverse, about once and a half as broad as long, smooth, glabrous, and shining, with the interregional sutures almost obsolete; the two posterior teeth of the antero-lateral margins are the only ones developed, and are very obscurely marked and obtuse. The front is somewhat produced, and is divided by a median and two lateral incisions into four lobes, of which the two median are broad and truncated, and the lateral (or inner orbital lobes) are small and dentiform. On the upper orbital margin are three small obtuse teeth (including that of the outer orbital angle); the tooth at the inner and lower orbital angle is rather prominent. The merus-joint of the outer maxillipedes is rather small and transverse; and this joint has a shallow pit on its outer surface. The anterior legs (in the male) are robust, smooth; arm or merus-joint with a series of spinules on its upper margin; carpus smooth, with an antero-internal tooth; penultimate joint or palm slightly rugose externally, and with two longitudinal and parallel grooves on its outer surface; fingers short, robust, toothed on their inner margins and with the apices not excavated. The ambulatory legs are somewhat compressed and clothed with long fulvous hairs; their merus-joints are spinulose on the upper margins. The postabdomen of the male is five-jointed, the third to fifth joints

being coalescent. Length $8\frac{1}{2}$ lines, breadth nearly 1 inch 1 line.

This species has been hitherto known only from the very short generic definition of Dr. Stimpson, which, however, embraces all the characteristic peculiarities of the species, and which agrees exactly with the example before me, except in one point. Stimpson says (*l. c.*), "Antennæ ut in *Carpilius*." In the specimen now before me the antennæ are of the same structure as in *Liomera*, the basal joint being very short and united at its summit to an inferior prolongation of the front, and not, as in *Carpilius*, joined to the front along its inner margin. I have little doubt that Stimpson erroneously wrote *Carpilius* for *Liomera*, as he does not say that *Lachnopodus* is distinguished from *Liomera* by any peculiarity in the structure of the antennæ.

I do not think that *Lachnopodus* is generically distinct, as Milne-Edwards has described a *Liomera* (*L. longimana*) with hairy ambulatory legs.

Actæa Rüppellii.

Ægle Rüppellii, Krauss, Südafrik. Crust. p. 28, pl. i. fig. 1 (1843).

? *Ægle rugata*, Adams and White, Zool. Samarang, Cr. p. 43, pl. viii. fig. 5 (1848).

Actæa Rüppellii, A. M.-Edwards, N. A. Mus. Hist. Nat. i. p. 270 (1865); Hilgendorf, Monatsb. Akad. Wissensch. Berlin, p. 787 (1878).

Actæa rugata, A. M.-Edwards, *l. c.* p. 269 (1869).

An adult male is in the collection, without definite locality, agreeing exactly with the figure of Krauss, and also with specimens in the Museum collection from the Mauritius. It is extremely probable that the *Ægle rugata* of White is, as noted by Hilgendorf, not specifically distinct, although the type specimen from the Philippines in the Museum collection has the lobules of the carapace covered with more numerous and smaller granules, and the chelipedes and legs are more densely hairy. But I see some reason to doubt the correctness of Hilgendorf's identification of Heller's *A. Kraussii* with the foregoing.

In specimens from Egypt in the Museum collection, which I refer to *A. Kraussii*, the carapace is wider in proportion to its length and less distinctly granulated. Both carapace and legs are much more densely pilose.

Menippe (Myomenippe) panope.

Cancer panope, Herbst, Nat. Krabben, iii. p. 40, pl. liv. fig. 5 (1801).

Cancer Hardwickii, Gray, Zool. Miscell. p. 40 (1831).

Menippe granulosa, Strahl, Arch. f. Nat. xxvii. p. 105 (1861); A. M.-Edwards, Ann. Soc. Entom. France, vii. p. 275 (1867)?

Menippe panope, v. Martens, Arch. f. Nat. xxxviii. p. 87 (1872).

Myomenippe duplicidens, Hilgendorf, Monatsb. Akad. Wissensch. Berlin, p. 796 (1878), footnote.

Java (an adult female of large size); Amboina (a male of smaller size).

The type of Gray's *C. Hardwickii* is from the Indian Ocean.

It is not without considerable hesitation that I have united the several species cited above under the heading of *C. panope*. The identification of Strahl's *Menippe granulosa* with Herbst's *C. panope* was made by Von Martens, after examination of the typical specimens; and the diagnosis of the latter author, as also the description by Hilgendorf of *M. duplicidens*, apply very well to the type of Gray's *C. Hardwickii* and the other specimens of this species in the Museum collection. The granulation of the sides of the carapace and bases of the fingers is somewhat less distinct in the specimens from Java and Amboina than in Gray's type; and it is possible that a larger series of specimens might establish a complete transition to the following species.

Menippe (Myomenippe) Legouillouii.

Menippe Legouillouii, A. M.-Edwards, Ann. Soc. Entom. France, vii. p. 274 (1867).

A male individual, without definite locality, is in the collection. It is distinguished mainly by the lesser prominence of the tubercles of the carapace and the absence of granulations on the upper surface of the wrist, palm, and base of mobile finger.

There is also a specimen from Swan River in the Museum collection.

Myomenippe Fornasinii, Hilgendorf (Monatsb. Ak. Wissensch. Berlin, p. 795, 1878), from Mozambique, is evidently very nearly allied to this species; but I should hesitate to unite the two without comparison of specimens.

Epixanthus dentatus.

Panopeus dentatus, White, Proc. Zool. Soc. p. 226 (1847); Adams and White, Zool. Samarang, Crust. p. 41, pl. xi. fig. 1 (1848).

Epixanthus dilatatus, Man, Notes from the Leyden Museum (no. xix.), p. 58 (1879).

Java (an adult male and female).

These specimens agree very well with Mr. Man's description of *E. dilatatus* (also founded on specimens from Java), and with the types of *Panopeus dentatus*, excepting only that they present no trace of the variegated coloration of the

carapace, which is excellently preserved in White's specimen. The figure given by White, although very characteristic, represents the chelipedes in such a position as to conceal the characteristic tuberculation of the mobile finger of the larger hand and the slenderness of the fingers of the smaller one, on which account, perhaps, Mr. Man did not suspect their identity with his species.

Carpilodes cinctimanus.

Carpilius cinctimanus, White, Append. Juke's Voy. Fly, Crust. p. 336, pl. ii. fig. 3 (1847); Adams and White, Zool. Samarang, Cr. p. 37, pl. vii. fig. 4 (1848).

Liomera cinctimana, A. M.-Edw. Nouv. Arch. Mus. Hist. Nat. i. p. 219 (1865), ix. p. 176, pl. v. fig. 4 (1873).
? *Liomera latu*, Dana, Cr. U.S. Expl. Exp. xiii. p. 161, pl. vii. fig. 6 (1852).

A young male is in the collection, without definite locality. As has been already noted by Prof. A. Milne-Edwards, in the young of this species the hand is without the black cincture, and the fingers are whitish.

Actæodes tomentosus (M.-Edwards).

A male example is in the collection, without definite locality.

Zozymus æneus (Linn.).

Java (a young male).

Chlorodius niger (Forskål).

New Guinea (one female).

Leptodius exaratus, var. *sanguineus* (M.-Edw.).

Java (an adult male).

The remarks made by me upon this species in Proc. Zool. Soc. 1877, p. 134, on specimens from Duke-of-York Island, apply equally well to the Javan example.

Pilumnus vespertilio.

Cancer vespertilio, Fabr. Ent. Syst. ii. p. 463 (1793), Suppl. p. 338 (1798).

Pilumnus vespertilio, Leach, Trans. Linn. Soc. xi. p. 321 (1815); M.-Edw. Hist. Nat. Crust. i. p. 418 (1834); Cr. in R. A. de Cuvier, Atlas, pl. xiv. fig. 3; Dana, U.S. Expl. Exp. xiii. Cr. i. p. 236 (1852); A. M.-Edw. N. Arch. Mus. Hist. Nat. ix. p. 242 (1873); Hilgendorf, Monatsb. Akad. Berlin, p. 793 (1878).

Pilumnus ursulus, Adams and White, Zool. Samarang, Cr. p. 45, pl. ix. fig. 6 (1848); Hess, Arch. f. Nat. p. 137, pl. vi. fig. 2 (1865).

Pilumnus mus, Dana, Pr. Ac. Nat. Sci. Phil. p. 82 (1852); U.S. Expl. Exp. xiii. Cr. i. p. 240 (1852).

Java (a female).

The hairs covering the body of this species vary from a deep brown to a fulvous or cinereous hue. The small tooth of the antero-lateral margins, situated anterior to and on a lower level than the first of the proper antero-lateral marginal teeth, and which is mentioned both by Milne-Edwards (in *P. vespertilio*) and Dana (in *P. mus*), is not invariably developed. This is a very common and generally distributed inhabitant of the Australian, Malaysian, and Pacific seas.

Kossmann (Zool. Ergebn. des rothen Meeres, Brachyura, p. 38, 1877) has recently subdivided the genus *Pilumnus* into three subgenera, based on characters derived from the presence or absence of fissures in the upper orbital margin. *P. vespertilio* belongs to the subgenus *Pilumnus* as restricted by him, as there are usually indications of two fissures in the upper orbital margin. I doubt, however, the constancy of these characters, or their validity as a means of separating the species, much as the genus *Pilumnus* requires subdivision into smaller groups.

Pilumnus Bleekeri, sp. n.

Carapace convex, with the antero-lateral margins shorter than the postero-lateral, and armed with five rather long spines (including the extraorbital spine); the spine next to this is placed on the subhepatic region. The body and legs are rather thinly clothed with long fulvous hairs; the front is divided by a rather wide and deep fissure into two truncated lobes. The orbits are armed with a series of prominent spinuliform teeth on their lower margins; but the upper margin is only minutely granulated, and is without fissures. The anterior legs are robust; the arm has three teeth on its upper margin; the wrist and palm are hairy; the palm is covered with rather irregularly-disposed granules on its outer surface, which toward the upper margin tend to become spinuliform; toward the lower margin the surface is smooth; but there is a line of granules on the lower margin of the hand. The fingers are short and thick, denticulated on their inner margins; the upper is granulated above at its base; the lower margin of the immobile finger forms a straight line with the inferior margin of the palm. Length 9 lines; breadth 11 lines.

New Guinea. Two males are in the collection. In the

larger, the fingers are of a chocolate-brown colour; in the smaller they are nearly colourless.

The truncated frontal lobes, with the armature of the carapace and chelipedes, apparently suffice to distinguish this species from its very numerous congeners. Many of the species of *Pilumnus*, however, are insufficiently known, and the genus is one which greatly needs a thorough revision. *P. Bleekeri* somewhat resembles *P. actumnoides*, A. Edw., which is represented as having the antero-lateral margins armed with more numerous teeth, and the hands more granulated on their external surface.

Pilumnopeus granulatus, sp. n.

(Pl. XIII. figs. 4, 5, 6.)

Carapace transverse, about once and a half as broad as long, and covered with small regularly disposed granules, which tend to become obsolete toward the posterior margin. Front rather prominent, divided by a small triangular median sinus into two lobes, the anterior margins of which are straight and rather oblique. Posterior to the frontal lobes, and occupying the interorbital space, are two small prominences. The antero-lateral margins are armed with five teeth (including the outer orbital tooth, which is very small); the orbital margins are without fissures, and the internal orbital hiatus is occupied by the outer antennæ, the basal joint of which is small and does not nearly reach the front. The anterior legs (in the female) are robust, the arm very short and smooth; the wrist regularly and evenly granulated on its outer surface, but without a spine at its antero-internal angle; palm covered on its outer surface with numerous granules; dactylus also granulated to within a short distance of its extremity; both this and the lower joint are strongly denticulated on their inner margins. Ambulatory legs slightly compressed and nearly smooth. Abdomen of female 7-jointed.

Indo-Malayan Region. One specimen of this very pretty little crab is in the collection; but the precise locality has not been preserved.

It must, I think, be included in *Pilumnopeus* of A. Milne-Edwards, a genus which, to judge from the descriptions, can scarcely be distinct from *Eurycarcinus* of the same author. From *Sphærozius*, Stimpson, this species is distinguished by its much broader carapace; from *Actumnus*, Dana, by the same character, and by the brevity of the basal antennal joint.

Eriphia lævimana.

Eriphia lævimana, Latr. (ined.), Guérin, Icon. Cr. pl. iii. fig. 1; M.-Edwards, Hist. Nat. Cr. i. p. 427 (1834); Dana, Cr. U.S. Explor. Exp. xiii. i. p. 240, pl. xiv. fig. 7 (1852); Hilgendorf, Cr. in V. der Decken's Reise in Ost-Afrika, iii. p. 75 (1869); Monatsb. Ak. Berlin, p. 797 (1878); A. M.-Edwards, Nouv. Arch. Mus. Hist. Nat. ix. p. 255 (1873).

Eriphia trapeziformis, Hess, Arch. f. Naturg. p. 135, pl. vi. fig. 4 (1865).

A male and female specimen of this species, presenting all the characteristics of the typical form, are in the collection.

I unite with *E. lævimana* the *Eriphia trapeziformis* of Hess, because there is nothing in the description and figure of the latter form to distinguish it specifically.

Eriphia lævimana, var. *Smithii*.

Eriphia Smithii, M'Leay, Annulosa, in Smith's Illustr. Zool. S. Africa, p. 60 (1838); Krauss, Südl. Afrik. Crust. p. 36, pl. ii. fig. 3 (1843).

Eriphia Fordii, M'Leay, l. c. p. 60 (1838).

Eriphia lævimana, var. *Smithii*, Hilgendorf, Monatsb. Akad. Berlin, p. 797 (1878).

New Guinea (an adult male).

The tuberculation of the chelipedes is subject to much variation according to Hilgendorf (*l. c.*), whom I follow in considering *E. Smithii* merely a variety of *lævimana*, the series in the Museum collection not being large enough to show whether the differences between the two forms are constant.

I may note, however, that in two specimens (young male and adult female) from Natal, which I regard as typical conditions of *E. Smithii*, the surface of the larger chela is strongly granulated between the tubercles, which are rounded and not crowded, and occupy only the upper part of the outer surface; and the tubercles of the smaller hand are crowded and acute, and cover the whole of the outer surface of the hand. In the specimens from New Guinea, also a male from Zanzibar, a female from Dukhun (Deccan?), India, and in a young female received from the Paris Museum under the name of *E. rugosa*, M.-Edwards*, the surface of the larger hand, between the tubercles (which are very faintly marked or obsolete), is smooth, and the tubercles of the smaller hand are less numerous and acute, and show a tendency to disposition in longitudinal series.

Of this form I have also seen a fine male from Pulo Sambu, Singapore, in a collection made by Surgeon-Major Samuel

* I do not know that this name has ever been published.

Archer, A.M.D., and which is in process of determination by Mr. A. O. Walker, F.L.S. Were it not for its occurrence also at Zanzibar, I should have had little doubt of the distinctness of this variety from the *Smithii* of Natal.

Trapezia cymodoce (Herbst).

A male example from Amboina belongs to this species as I have characterized it (Ann. & Mag. Nat. Hist. ser. 5, ii. p. 408, 1878).

Neptunus pelagicus (Linn.).

Celebes, Badjoa (an adult male); Borneo, Bandjermasin (a smaller female).

Neptunus trituberculatus, Miers.

An adult male is in the collection, without special indication of locality.

Neptunus sanguinolentus (Herbst).

W. Borneo (a female); Bali (another female).

Scylla serrata (Forskäl).

Bali (a male example); W. Borneo (a young male, showing the rudimental condition of the rostral teeth characteristic of the young of this species).

Podophthalmus vigil (Fabr.).

Aroe Islands (an adult male in fine condition).

Thalamita prymna (Herbst).

A male is in the collection, without special indication of locality.

Thalamita Stimpsoni, A. M.-Edwards.

New Guinea (an adult female). A smaller individual, apparently not specifically distinct, is in the collection, from Amboina, in which the fourth lateral tooth is very nearly as large as the rest. It is very probable that Kossmann is right in uniting many species of this genus that, when fewer materials were available for comparison, were considered distinct.

Goniosoma annulatum (Fabr.).

Two females are in the Museum, without definite locality. I am not sure that *G. sexdentatum* is specifically distinct from

this; at least I have seen specimens, apparently belonging to *G. annulatum*, in which the hand is slightly granulated above.

Goniosoma anisodon, De Haan.

A female specimen laden with ova is in the collection, also without definite locality.

[To be continued.]

XXIV.—On a supposed Pterobranchiate Polyzoon from Canada. By the Rev. THOMAS HINCKS, B.A., F.R.S.

SOME years since, I received from my father, the late Professor Hincks, of University College, Toronto, a short notice of a Polyzoon which he had obtained in the neighbourhood of that city, but was unable to identify with any described form. Some of its characters were so remarkable and, at that time, so entirely without parallel, that I could not venture (in the absence of specimens) to publish an account of it or to give any opinion upon it. He had no further opportunity of investigating its history; and, so far as I know, it has not been noticed since by any other observer.

Later discoveries, however, have supplied a clue to the interpretation of this aberrant type, in some particulars at least; and reading my father's brief and popular diagnosis by their light, we may find in it the indication of a form which, though unique in some respects, has now its allies and its definite place in our system.

Under these circumstances I think it may be interesting and useful to publish some account of it (however imperfect), accompanied by my father's rough sketch of the polypide: it may stimulate those who have the opportunity to search for it, and possibly lead to its rediscovery.

The description given of it, so far as it goes, may, I have no doubt, be relied upon. Professor Hincks was not, indeed, in any special way a student of the Polyzoa; but his knowledge of animal forms was extensive and accurate, and he was a practised and careful observer.

In a letter bearing date December 20, 1868, he writes:—
“I want your assistance in respect to a freshwater Polyzoon found in this neighbourhood, which I must attempt to describe to you. It was found attached to a sunken boat in the river Humber, which falls into Lake Ontario two or three miles west of Toronto.

smaller ; but the differences are scarcely sufficient to necessitate the bestowal of a separate specific name.

EXPLANATION OF PLATE XVI.

Fig. 1. *Paratymolus bituberculatus*, magnified about 4 diameters.

Fig. 2. First pair of legs of the same, magnified 7 diameters.

Fig. 3. *Paratymolus latipes*, magnified 4 diameters.

Fig. 4. Abdomen of the same.

Fig. 5. Under view of the anterior portion of the body of the same, magnified 8 diameters.

XXX.—On a Collection of Crustacea from the Malaysian Region.—Part II. Telfhusidea, *Catometopa*, and *Oxystomata*. By EDWARD J. MIERS, F.L.S., F.Z.S.

[Plate XIV.]

[Continued from p. 239.]

TELFHUSIDEA.

Telphusa Larnaudii, A. M.-Edwards.

Indo-Malayan seas. A male is in the collection without special indication of locality. Both this form and *T. denticulata* are so nearly allied to *T. fluviatilis* that I think it is probable that the examination of a sufficiently large series of specimens would show their identity:

Telphusa sumatrensis, sp. n.
(Pl. XIV. figs. 1, 2).

Carapace broader than long, rather convex in its anterior portion, and nearly smooth. Front more than one third the greatest width of the carapace, with the anterior margin straight ; its upper surface is punctulated, but not granulated or rugose. Some faintly indicated rugosities are visible on the carapace toward the epibranchial tooth, which is very small—scarcely distinguishable from the granulated line which defines the antero-lateral margins. The postfrontal crest is nearly obsolete, but, although scarcely distinguishable, is interrupted and divided into two median and two lateral portions, nearly as in *T. Larnaudii*. The chelipedes are smooth, not granulated or rugose, but slightly punctulated ; the carpus is armed with two spines on its inner margin, of which the anterior is the largest ; the fingers of the larger hand (in the male) are slightly arcuated, leaving an hiatus

when closed, and minutely toothed. Ambulatory legs and male postabdomen as in *T. Larnaudii*. Length of largest male 7 lines, breadth 9 lines.

W. Sumatra, Agam (two males and two females).

This species differs from *T. Larnaudii* in the not granulated or rugose carapace and chelipedes and the obsolescence of the postfrontal ridge and lateral epibranchial tooth. If it should prove to be merely a young state, it would throw doubt on the distinctness not only of *T. Larnaudii*, but of several other species of this very difficult genus. *T. philippina*, v. Martens, differs in possessing an epibranchial tooth and in the form of the postabdomen of the male; *T. picta* of the same author, in the form of the spines on the inner margin of the wrist and the denticulation of the fingers.

Telphusa sinuatifrons, M.-Edwards?

Carapace very much flattened, much wider at the branchial regions than in its posterior portion, transversely rugose near the antero-lateral margins; lateral epibranchial tooth distinct but not very prominent, the extraorbital angle or tooth not at all prominent and not projecting beyond the level of the front, which is not at all deflexed, about two fifths the greatest breadth of the carapace, with a very slight median and two lateral sinuses in its anterior margin. The postfrontal ridge is interrupted, the two median portions being more advanced than the lateral, which are continued in a nearly straight line to the epibranchial tooth. Length of carapace 1 inch 3 lines, breadth 1 inch 7 lines.

W. Borneo (an adult female).

The anterior legs are unfortunately wanting. Although this species resembles M.-Edwards's figure of *T. sinuatifrons* in the sinuated anterior margin of its front, a character peculiar to that species, the front appears to be relatively broader and the postfrontal line straighter; so that it may after all prove to be distinct.

Besides the foregoing there are two specimens (male and female) of a species belonging to that section of the genus which Stimpson designated *Geotelphusa*, which, on account of their mutilated condition, and the difficulty of determining the specific characters of the species of this section without large series for comparison, I will not designate by a distinct name. The carapace is considerably broader than long, and much inflated over the branchial regions; the postfrontal crest is indicated only by two well-marked prominences on either side of the middle line. The extraorbital angle is much depressed, so that there is no extraorbital tooth; the

epibranchial tooth is very small; and the antero-lateral margins of the carapace are defined by a distinct line. The front is less than one third the greatest width of the carapace; and its anterior margin is marked with a shallow median sinus. One (probably the larger) chelipede is absent in each specimen; the remaining one is slender; the carpus is armed with two strong spines, of which the anterior is the larger, on its inner margin; hand nearly smooth; fingers slender, straight, and minutely denticulated. Postabdomen of male somewhat constricted in the middle; the terminal joint longer than broad.

This species is apparently allied to *T. picta*, v. Martens, but differs in the spines of the wrist and probably in the form of the postabdomen of the male. No locality was preserved with the specimens.

Paratelphusa tridentata.

Paratelphusa tridentata, M.-Edwards, Ann. Sci. Nat. (sér. 3) Zool. xx. p. 213 (1853); Arch. Mus. Hist. Nat. vii. p. 171, pl. xiii. fig. 1 (1854); De Man, Notes from Leyden Museum, no. xix. p. 62 (1879).

Bali (an adult female); Java (a young male with *P. convexa*). An adult male and female are in the collection without definite locality.

This species, as Mr. de Man has pointed out, may always be distinguished by the form of the posterior epibranchial tooth and the absence of spines on the meropodal joints of the legs.

Paratelphusa convexa.

Paratelphusa convexa, De Haan (ined.), De Man, Notes from Leyden Museum, no. xix. p. 63 (1879).

Java (six specimens, including males, females, and young). In three of these specimens the body and legs are spotted or variegated with dark red. Nias (an adult female); Borneo (a young female).

In the young individuals the angular excavation of the inferior wall of the orbit is less marked than in the adult; and I think it possible that the examination of a sufficiently large series might show that *P. maculata* is not specifically distinct.

CATOMETOPA *vel* GRAPSOIDEA.

Macrophthalmus carinimanus, M.-Edw.

A male and female, of which the exact locality has not been preserved, are in the Museum collection, which agree

very well with Milne-Edwards's short diagnosis of this species. The eyes, in these specimens, do not reach quite to the antero-lateral angles of the carapace. The arm of the anterior legs has one or two spinules at the distal end of its inner margin; the wrist has a spinule on its inner surface; the hand is slender, granulated on its upper, and slightly on its outer surface; the lower finger is bent downward, so as to form a distinct angle with the inferior margin of the hand; the upper finger (when closed) meets the lower at its apex only; and the two enclose a large triangular space. The inner margin of the hand and arm is clothed with dense hair.

Specimens in the British-Museum collection from Singapore, the Mauritius, Penang, and Australia, which have been referred to *M. carinimanus*, belong to the following species.

Macrophthalmus convexus.

Macrophthalmus convexus, Stm. Proc. Ac. Nat. Sci. Phil. p. 97 (1858).

The specimen I refer to this species belongs to Milne-Edwards's second section, having the carapace less than twice as broad as long, and the inner surface of the hand unarmed. The carapace is coarsely granulated on the sides; and the branchial regions are sometimes armed with two small granulated prominences, with the antero-lateral angles spiniform and prominent; posterior to these, on the lateral margins, is a second tooth; the front is spatulate; the eye-peduncles do not quite reach to the end of the antero-lateral teeth; the anterior legs (in the male) have the inner margins of the arm and wrist granulated, the hand rounded and finely granulated on its upper margin, with a longitudinal granulated line (not a ridge) on its outer surface close to the lower margin; the lower (immobile) finger is deflexed, but does not form so decided an angle with the lower margin of the hand as in the preceding species; the distal end of the palm and the fingers are hairy on their inner surface; the fingers (when closed) include a much narrower space than in *M. carinimanus*; the ambulatory legs are smooth, not pectinated, scantily fringed with hair, and with a very small spine (which is sometimes obsolete) near the distal end of the upper margin of the merus. Length 7 lines, breadth at second marginal tooth 13 lines.

Indo-Malayan seas (a male).

This species is evidently allied to *M. simplicipes* and *M. affinis*, Guérin, from Bombay, which, however, are represented as having two teeth behind the antero-lateral or extra-

orbital tooth. *M. setosus*, M.-Edw., and *M. japonicus*, De Haan, have the antero-lateral angles much less prominent and acute. *M. inermis*, A. M.-Edwards, which may be identical with this species, is represented as having the upper margin of the hands sharp-edged, not rounded.

Ocypode ceratophthalma (Pallas).

Celebes, Macassar (an adult male); Batjan (an adult male).

Ocypode cordimana (Latr.).

Celebes, Macassar (a female).

GELASIMUS.

There can be little doubt that many of the numerous species of this large and difficult group have been founded on insufficient characters, and will be reduced to synonyma whenever the comparison of sufficiently large series of specimens of different ages and sexes shall have demonstrated the variability of the denticulation of the inner margins of the fingers of the larger chelipede and of other characters that have been employed in distinguishing the species.

* *Front narrow between the eyes.*

Gelasimus vocans (Linn.).

Three males are in the collection, without definite indication of locality. There is a strong triangular tooth near the distal end of the upper margin of the arm in this species; the hand is strongly granulated externally, and has two very strong granulated ridges on its inner surface; the fingers are robust and laterally compressed; there is always a strong triangular lobe or tooth near the distal extremity of the lower finger, and usually, but not invariably, a second between this and the base.

Gelasimus Marionis.

Gelasimus Marionis, Desm. Consid. Crust. p. 124, pl. xiii. fig. 1 (1825); M.-Edw. Ann. Sci. Nat. (sér. 3) Zool. xviii. p. 145, pl. iii. fig. 5 (1852); Hoffmann in Recherches faune Madagascar, Cr. p. 15, pl. iii. figs. 16-18 (1874); nec M.-Edw. Hist. Nat. Crust. ii. p. 53 (1837).

Gelasimus cultrimanus, White, P. Z. S. p. 84 (1847); Adams and White, Zool. Samarang, Cr. p. 49 (1848); M.-Edw. Ann. Sci. Nat. l. c. p. 145 (1852).

Batjan (two males).

The principal character that distinguishes this species from *G. vocans* is the absence of prominent lobes on the lower im-

mobile finger; and I regard it as very probable that it is merely a variety of that species. There is, as in *G. vocans*, a strong triangular tooth at the distal end of the upper margin of the arm; the palm is strongly granulated in the middle of its outer surface, and there is a well-marked concavity on the outer surface at base of the lower finger in both forms.

The relative length of the fingers as compared with that of the palm is clearly a character that varies with the age of the individual, the fingers being always shortest in the smallest examples. The upper finger is never longitudinally sulcated, either in *G. vocans* or *G. Marionis*.

Gelasimus arcuatus.

Gelasimus arcuatus, De Haan, Faun. Japon. Crust. pp. 53, 261, pl. vii. fig. 2 (1835).

Gelasimus tenuimanus, White, List Crust. Brit. Mus. p. 35 (1847), sine descr.

Borneo (an adult male).

In what I regard as the typical condition of this species, the fingers of the larger hand are greatly elongated and without prominent lobes on their inner margins. They are often nearly three times the length of the hand.

Gelasimus arcuatus, var. *forcipatus*.

Gelasimus forcipatus, Ad. & White, Zool. Samarang, Crust. p. 50 (1848); M.-Edw. Ann. Sci. Nat. (sér. 3) Zool. xviii. p. 147 (1852).

♀ *Gelasimus brevipes*, M.-Edw. l. c. p. 146, pl. iii. fig. 7 (1852).

♀ *Gelasimus rubripes*, M.-Edw. l. c. p. 148 (1852); Jacq. & Lucas, Voy. Pôle Sud, Zool. iii. Cr. p. 66, pl. vi. fig. 2 (1853).

Batjan (seven males, of different sizes).

In all the specimens I refer to this variety the fingers are shorter, not exceeding twice the length of the palm, and nearly always lobed or toothed on their inner margins. In the smaller examples the length of the fingers is relatively less; and in the smallest they are not half the length of the palm.

In the largest of the specimens from Batjan there is (besides the granulations with which the inner margins of the fingers are always armed) a single tooth on the lower finger; in three others, one on the upper and none on the lower; in two others, two on the upper and one on the lower; while in the smallest the teeth are obsolete. The width of the merus of the ambulatory legs also appears to vary somewhat in this species.

G. arcuatus may always be distinguished from *G. vocans* by the absence of the strong triangular tooth at the distal end of the arm, its place being taken by a series of granules; the

hand, moreover, is very coarsely granulated on the whole of its outer surface, and is of a reddish tinge in its lower half, which is not so markedly concave as in *G. vocans*; and the upper finger is sulcated on its outer surface.

** *Front broad between the eyes.*

Gelasimus annulipes, M.-Edw.

A male from Batjan and two specimens without definite locality are in the collection. Although the denticulations of the fingers vary considerably in this species, there is nearly always a strong triangular subterminal tooth on the lower immobile finger.

Three small examples of a *Gelasimus* allied to the above are in the collection (one from Batjan), which I will not venture to designate by a distinct specific name. The lateral margins of the carapace converge more rapidly to the posterior margin; and the antero-lateral angles are more produced and acute. The larger chelipede is nearly smooth externally, as in *G. annulipes*; but the upper finger is slenderer toward its distal end, and the lower finger (although denticulated on its inner margin) is without a subterminal tooth. In two of the specimens there is no granulated ridge on the inner surface of the hand near the base of the fingers; in the third specimen this ridge is present; the prominent granulated ridge on the inner surface of the palm, near its infero-proximal angle, is equally developed in all of the specimens. Whether this be the variety designated *albimana* by Kossmann, who founded his description on specimens from the Red Sea, could scarcely be decided without comparison of the types.

Grapsus pictus (Latr.).

Amboina (an adult female).

A very constant character distinguishing this species from *G. strigosus* is to be found in the form of the front, which is relatively narrow, with the anterior margin arcuated, in *G. pictus*, whereas in *G. strigosus* it is broader with the anterior margin straight.

Varuna litterata (Fabr.).

Bali (two males).

Pseudograpsus penicilliger (Latr.).

Batjan (two adult males in fine condition).

The genus *Heterograpsus* of Lucas is so very nearly allied

to *Pseudograpsus* in all structural characters, that I do not know whether it can be maintained as distinct. *Pseudograpsus penicilliger* is merely a more robust, thicker *Heterograpsus* with greatly developed chelipedes.

There are also three adult males of this species from the New Hebrides (Aneiteum) in the Museum collection.

I refer here with doubt a female in mutilated condition in the collection of Dr. Bleeker from Celebes (Macassar).

It resembles the male *P. penicilliger* in all particulars except that the carpus of the anterior leg is armed with a distinct lobe or tooth on its inner margin, and the outer surface of the penultimate joint, which is somewhat rugose, is marked with a longitudinal raised line, which is continued along the outer surface of the lower finger. Further material is needed to show whether these characters are sexual or indicative of a distinct species. As is usual in the females of some allied forms, the chelipedes are entirely devoid of hair. If distinct, this form may be designated *Pseudograpsus dentatus*.

Ptychognathus pilipes?

† *Gnathograpsus pilipes*, A. M.-Edw. Nouv. Arch. Mus. Hist. Nat. iv. p. 184, pl. xxvii. figs. 6-10 (1868).

I refer to this species with some hesitation a small female example from Batjan. It agrees very well with males and females in the Museum collection from the Philippines (Guimaras). The close affinity of *Gnathograpsus* to *Ptychognathus* was recognized by Prof. A. Milne-Edwards; and I can see no sufficient reason for regarding them as distinct genera. It is worthy of note that neither A. Milne-Edwards, Stimpson, nor Man have noted the common occurrence in the females of this genus of a small tuft or patch of hair near the distal end of the lower (immobile) finger of the chelipedes. This hairy patch exists in the females I refer to *P. pilipes*. It is possible that none of the authors above cited had females before them.

Metopograpsus messor (Forskål), var. *frontalis*, nov.

Celebes, Macassar. An adult male.

In its coloration this example appears to approach very near to what may be regarded as the typical form of the species, represented by specimens from the Red Sea in the Museum collection.

The front is relatively wider than in most of the specimens of this species in the Museum collection—about three and a

half times the length of the upper orbital margin; and its anterior margin is straight, not at all sinuated in the middle. I have observed, however, some variation in the width of the front in this species.

There is a second male, without definite locality, in the collection, that agrees in every particular with the Celebes example, except that on one side of the carapace there is a distinct tooth behind the extraorbital tooth, and on the other side an indication of a similar tooth, the margin of the carapace being slightly sinuated. This variety appears to mark a transition to *Metopograpsus quadridentatus*, Stimpson, and *M. oceanicus*.

From *M. latifrons*, White, this variety is distinguished by the much less coarsely denticulated front and less accentuated frontal lobes.

SESARMA.

- * *Lateral margins of the carapace without any tooth behind the extraorbital tooth.*

Sesarma affinis, De Haan.

Two specimens (males) are in the collection, without special indication of locality. They agree with De Haan's figure in having two minutely pectinated oblique ridges on the upper surface of the hand, a character which, curiously enough, is mentioned neither by De Haan nor by Mr. de Man in his remarks upon this species (Notes Leyden Museum, ii. (v.) p. 22, 1879). The tubercles of the upper mobile finger are somewhat more numerous than in De Haan's type.

Sesarma aspera of Heller, from Ceylon, Madras, and the Nicobars, is either identical with or very nearly allied to this species; the sides of the carapace, however, are represented as nearly parallel, not convergent distally.

Sesarma granosimana, sp. n.

(Pl. XIV. fig. 3.)

Carapace nearly quadrate, with the surface punctulated, but not granulated or rugose; antero-lateral margins without any tooth except the extraorbital tooth. The anterior margin of the carapace is divided into four nearly equal and not very prominent lobes; the front, although nearly vertically deflexed, does not form a marked angle with the anterior margin of the carapace; it is about two thirds the width of the carapace; and its anterior margin is nearly straight, but slightly reflexed on each side of the middle line. The anterior legs (in the male) are short; the arm has a very small tooth at

the distal end of its upper margin; the whole of the outer surface of the wrist is covered with short transverse ridges, which pass into the form of granules on the outer surface of the palm; on the inner surface of the wrist is a spiniform tooth; there are no pectinated crests on the upper surface of the palm; the mobile finger is granulated above at base, and both fingers are denticulated on their inner margins. The merus of the ambulatory legs is considerably dilated, and armed with a small spine near the distal end of its upper margin; the two following joints are marked with longitudinal raised lines; the dactyli are slender. The post-abdomen of the male is rather broad; its terminal joint considerably narrower than the penultimate joint. Length 7 lines, breadth 8 lines.

Indo-Malayan seas (no definite locality). A male and female are in the collection.

S. granosimana is nearly allied to *S. Dehaanii*, M.-Edw., but is distinguished by the existence of a tooth on the inner margin of the wrist, the more dilated merus of the ambulatory legs, &c. The legs, in the two specimens I have examined, are not clothed with long hairs as in *S. Dehaanii*.

S. trapezium, Dana, which is also apparently allied to this species, is described as having the carapace much narrowed behind, the abdomen of the male narrow, and as having a dense patch of hair near the base of the mobile finger*.

** *Carapace with a second (epibranchial) tooth behind the extraorbital tooth.*

Sesarma bidens (De Haan).

Indo-Malayan seas (one adult male without definite locality).

Sesarma taeniolata, White (ined.), Miers.

Borneo (an adult male). In this specimen and in the others in the Museum there exist but few traces of the tufts of hair with which, according to Mr. de Man (Notes Leyden Museum, ii. (v.) p. 26), the carapace is usually covered.

Sesarma Bocourti, A. M.-Edwards.

Borneo (two males and a female). The males agree very well with the diagnosis of A. M.-Edwards, and the longer

* I have not been able to compare *S. granosimana* with the description of *Sesarma chirogona*, Targioni-Tozzetti, "Crostatei Brachiuri ed Anomuri," in 'Zoologia della R. pirocorvetta Magenta,' Firenze, 1877, 8vo, as I have not yet had an opportunity of consulting this important work.

and more detailed description of Mr. de Man (*l. c.* p. 28). In the female (which has not as yet been observed) the hand is slender, not dilated and compressed as in the male, and its external surface, although flattened, is less coarsely granulated towards the fingers, which are nearly smooth.

Sesarma intermedia (De Haan).

Indo-Malayan seas (a male and female without definite locality).

Metagrapsus punctatus, A. M.-Edw.

Indo-Malayan seas (two males).

Leiolophus abbreviatus (Dana).

Indo-Malayan seas (one male).

Pinnotheres obesus, Dana? (Pl. XIV. fig. 4.)

? *Pinnothera obesa*, Dana, Cr. U.S. Expl. Exp. xiii. p. 380, pl. xxiv. fig. 3 (1852).

I thus designate three specimens of a *Pinnotheres* without locality in the collection. The carapace is subglobose, with the antero-lateral margins regularly rounded and entire, and is nearly naked; the front is very small, and projects slightly; its anterior margin is rounded or subtruncated. The merus of the outer maxillipedes is but little longer than broad, regularly rounded at its distal end (where it is most dilated); its outer margin also is arcuated, and its inner margin straight; its surface near the inner margin is somewhat thinly setose; the antepenultimate and penultimate joints are robust; the latter is fringed with hairs along its outer margin and at its distal end, which is obliquely subtruncated; the slender dactylus is articulated with the penultimate joint at a little before the middle of its inner margin, and does not project beyond its apex. The anterior legs are small and smooth, and present nothing remarkable; the ambulatory legs also are very slender and naked.

All the specimens are females.

This species, in the form of the broadly dilated merus of the outer maxillipedes, appears to differ from all the species figured by Milne-Edwards in his revision of the group in 1853, and others since described. A specimen from Borneo is in the Museum collection. A figure is given of the outer maxillipede, because it is not quite of the form figured by Dana; but I do not think the difference is sufficient to warrant the specific separation of the two forms.

OXYSTOMATA *vel* LEUCOSOIDEA.*Camara calappa* (Linn.).

New Guinea (an adult female); Aroe Islands (an adult female).

Calappa lophos (Fabr.).

Celebes, Macassar (a male).

No trace of the characteristic coloration exists in this specimen. The carapace is somewhat more tuberculated, and the denticulation of the antero-lateral margins near the extra-orbital tooth is less marked than in a specimen in the Museum collection from the Indian Ocean, which I refer to the typical *C. lophos*. It is possible that these characters indicate the existence of distinct varieties or species.

Matuta victrix, Fabr.

Celebes, Macassar (two males and a female); Bali (an adult female). A female from Batjan also perhaps belongs to this species, in which all trace of the spots or markings have disappeared.

Matuta circulifera, sp. n. (Pl. XIV. fig. 5.)

Carapace everywhere rather finely granulated; the granulations rather coarser on the more elevated parts; the tubercles all distinct, but not very prominent. The rostrum is small, obtuse, and subentire, with only a very obscure indication of a median notch. Lateral marginal spine long, acute, and straight. Hand of male nearly as in *M. lunaris* (*M. rubrolineata*, Miers) and *M. lineifera*. Lines of the carapace forming complete and distinct circles, arranged in three transverse series, *i. e.* a transverse series of three circles on the anterior portion, of four on the median portion, and of three on the posterior portion of the carapace.

Indo-Malayan seas. An adult male is in the collection of this interesting form, which belongs to section A of the genus, and is distinguished from both *M. lunaris* and *M. lineifera* by the strikingly symmetrical coloration and the form of the front.

The coloration has unfortunately much faded in the unique example (preserved in spirit), and, it is to be feared, will soon altogether disappear.

Matuta Banksii, Leach.

Celebes (a male); Amboina (a female); New Guinea (an adult male); Bali (a female).

In a fine adult male without locality the granulations of the carapace are somewhat less distinct.

Matuta obtusifrons, Miers.

Bali (a female).

This species is easily distinguished by the strongly-marked tubercles and obtuse front from *M. levidactyla**.

Leucosia pallida, var. *obscura*.

Leucosia obscura, Bell, Trans. Linn. Soc. xxi. p. 285, pl. xxx. fig. 3 (1855).

? *Leucosia moresbiensis*, Haswell, Proc. Linn. Soc. New S. Wales, iv. p. 49 (1879), var.

Indo-Malayan seas (two females without definite locality).

Mr. Haswell, in his excellent description of *L. moresbiensis*, acknowledges its affinity to *L. obscura*. This description, moreover, agrees better than that of Bell with the specimens designated *L. obscura* in the Museum collection. In these specimens there is a distinct row of granules on the inner margin of the hand, and the granulation of the posterior and postero-lateral margins of the carapace and the armature of the fingers are precisely those of *L. moresbiensis*. The only difference that I note is that in *L. obscura* (and *L. pallida*) there are four, not three, large tubercles on the lower margin of the thoracic sinus; but this alone would probably not suffice to distinguish *L. obscura* from *L. moresbiensis*. It is certain, therefore, either that Bell's description and figure are inaccurate, or were based on specimens belonging to a distinct species from the examples labelled *L. obscura* in the Museum collection.

Leucosia pallida, Bell, in all structural characteristics is identical with *L. obscura*; it differs only in the lighter coloration, which may possibly be due to the bleaching of the specimens. Among the specimens in the Museum collection are some on which the granulation of the inner margin of the hands is obsolete.

Myra carinata, Bell.

Celebes, Macassar (a male).

* I propose this name for the specimens that I, in my revision of the genus, referred to *M. lunaris* (Herbst). Hilgendorf, who had before him Herbst's typical example, has shown (Monatsb. Ak. Berlin, p. 810, 1878) that the species designated *M. rubrolineata* is really the *lunaris* of Herbst; consequently the specimens I referred to *lunaris* must receive a new appellation. It was impossible, in the case of such nearly allied species, to say, from the figure and description alone, what species Herbst had designated *lunaris*.

It appears to me not improbable that the comparative examination of a sufficient series of specimens would demonstrate that this species and *M. elegans* are founded on half-grown specimens.

Iphis septemspinosa (Fabricius).

Celebes, Macassar (a female).

Arcania novemspinosa (White), var. *aspera*, n.

A specimen (adult female) without definite locality differs from White's type of *novemspinosa* in the British Museum in the broader and much more closely granulated carapace, and the relatively shorter spines of the posterior and postero-lateral margins. White's specimen is a male. Although the characters distinguishing the genera *Iphis* and *Arcania* are scarcely of generic value, it may be convenient to retain the former name for the Fabrician *septemspinosa*, to which it has long been applied, and which differs somewhat more markedly from the species of *Arcania* than these do among themselves.

Dorippe sima, M.-Edw.

Borneo (an adult female).

[To be continued.]

XXXI.—*On Hypochlorin and the Conditions of its Production in the Plant.* By Prof. PRINGSHEIM*.

IN a previous communication † I called attention to the existence in green vegetable cells of a body to which I gave the name of "hypochlorin," on account of its close relationship to chlorophyll. I now give some more detailed statements as to its occurrence and microchemical characters, and append thereto some further remarks upon the constitution of the chlorophyll-bodies.

So far as they regard hypochlorin, these statements relate essentially to the behaviour of this body at high temperatures and to the conditions of its production in the seedling plant. With regard to the chlorophyll-bodies, they will at the same

* Translated by W. S. Dallas, F.L.S., from the 'Monatsbericht der Akademie der Wissenschaften zu Berlin,' November 1879, p. 800.

† Monatsb. Berl. Akad. July 1879; translated in this Journal for January 1880.

XXXV.—*On a Collection of Crustacea from the Malaysian Region*.—Part III. *Crustacea Anomura and Macrura (except Penæidea)*. By EDWARD J. MIERS, F.L.S., F.Z.S.

[Continued from p. 317.]

ANOMURA.

. DROMIDEA.

Dromia vulgaris, M.-Edw.

A fine adult male is in the collection (without definite locality) which does not seem to differ specifically from the Mediterranean *D. vulgaris*. The tubercle or accessory tooth at the base of the second antero-lateral marginal tooth, however, is more developed than is usually the case in *D. vulgaris*. A specimen undoubtedly belonging to *D. vulgaris* is in the Museum collection from Gen. Hardwicke, and therefore presumably from the Indian Ocean.

Dromia Rumphii, Fabr., junior?

I refer, with some hesitation, to this species a female *Dromia* which differs from adult examples of *D. Rumphii* in the proportionally narrower, more elongated carapace, the front and sides of which slope much more steeply (almost vertically) to the rostrum and antero-lateral margins. The carapace is much more convex anteriorly and is covered with a much shorter, more scanty pubescence. The median tooth of the rostrum is nearly obsolete; and the fifth pair of legs is relatively more elongated. The exact locality of this specimen has not been preserved. Length 1 inch 7 lines, breadth nearly 1 inch 9 lines.

I have observed very similar differences between adult *D. vulgaris* and a series of young *Dromiæ* from Sardinia in the Museum collection.

Dromia (Dromidia) orientalis, sp. n.
(Pl. XV. figs. 1, 2.)

Carapace convex, but little broader than long, and covered with a close velvety pubescence, which (probably through abrasion) is thin or absent on the gastric and cardiac regions; the sides slope very steeply, almost perpendicularly, to the antero-lateral margins. No sutures are visible on the upper surface. Front quinquedentate (the supraocular tooth included), the median tooth smallest, the others rather promi-

ment and tuberculiform; extraorbital tooth obsolete, infra-ocular similar to the supraocular tooth. Antero-lateral margins 6-toothed; the teeth rather small and tuberculiform; the two anterior somewhat approximated and placed at some distance behind the orbits; the two next teeth are similarly approximated, and placed near the fifth tooth. No spines on the subhepatic and pterygostomial regions; a low tubercle at the antero-lateral angles of the buccal cavity. The legs are closely pubescent; the anterior legs (in the female) rather robust, there are two tubercles on the outer surface of the carpus, and the calcareous dactyli are regularly and evenly toothed on their inner margins. The antepenultimate joints of the second and third legs are somewhat dilated distally; the fourth and fifth legs present nothing remarkable. The sternal sulci (in the female) are approximated, and terminate in a strong tubercle situated in the space between the first and second legs. The ridge on the endostome or palate is partially interrupted. Length 2 inches 4 lines, breadth 2 inches 6 lines.

Indo-Malayan Seas (a female without definite locality).

From the *Dromia Rumphii* of Fabricius, to which it has much external resemblance, this species is distinguished by the form of the sternal sulci in the female, and by the disposition of the teeth of the antero-lateral margins; the latter character also serves to distinguish it from all the species referred by Stimpson to the genus (or subgenus) *Dromidia*.

PAGURIDEA.

Birgus latro (Linn.).

Malaysia (an adult male of large size).

Cænobita clypeata (Fabr.).

Amboina (an adult male). The larger hand is nearly of the form figured by Dana as characteristic of the variety he designates *brevimana*, but is tuberculate externally, as in the form he considers to be the typical *clypeata*.

Cænobita compressa?

- Cænobita compressa*, Milne-Edwards, Hist. Nat. Crust. ii. p. 241 (1837);
 ? De Haan, Faun. Japon. Crust. p. 213 (1849).
Cænobita Olivieri, Owen, Zool. Voy. 'Blossom,' Crust. p. 84 (1839);
 ? Dana, U.S. Expl. Exp. xiii. Cr. i. p. 470 (1852).
Cænobita cavipes, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 245 (1858).
 ? *Cænobita violascens*, Heller, Reise der Novara, Cr. p. 82, pl. vii. fig. 1
 (1865).

Java (an adult male, in shell of *Pyrula*); Borneo, Bandjermasin (adult and two young, in shells of *Auricula* and *Purpura*); Batjan (adult and two smaller females, in shells of *Auricula*, *Pyrazus*, and *Murex*).

Whether these specimens belong to the *C. compressa* of Milne-Edwards is difficult to determine from his very short description; but they appear to be referable to that species as characterized by De Haan, to the *C. Olivieri* of Owen as described by Dana, and to *C. cavipes* of Stimpson, although each of the above-cited authors lays especial stress upon different characters. Stimpson says that *C. cavipes* differs from *C. compressa* in not having the branchial regions laterally inflated; but this is a relative distinction, and I have observed a more considerable inflation of the branchial regions in some specimens than in others. The principal characteristics of this species appear to consist in the compressed eyes, which are granulated above, in the larger hand being smooth on the lower part of its outer surface, granulated on the upper part, but without the series of oblique crests of *C. rugosa*, in the penultimate joint of the left third leg being convex on its outer surface at its upper and distal end, the terminal joint scarcely longer than the preceding, naked, and flattened on its outer surface, with corneous-tipped tubercles only on its upper and inner surface (both terminal and penultimate joint being granulated on their inferior margin); the tarsal joint of the third right leg is subcylindrical, and the coxæ of the fifth legs not greatly produced, in the male.

This would appear to be a very common and widely ranging species.

It is of interest to note that the *Auricula* and *Pyrazus* inhabited by this hermit-crab are brackish-water shells.

Cænobita perlata?, var. *affinis* (sp. n.?).

(Pl. XIV. fig. 8.)

A young male inhabiting the shell of a species of *Nerita* is in the collection from Batjan, which is nearly allied to *C. perlata* as described by De Haan, and to *C. purpurea*, Stimpson. The carapace is very roughly but uniformly granulated above in front of the cervical suture; the branchial regions, which have the anterior margin nearly straight, are punctulated. The larger chelipede is tuberculated on its outer surface; the tubercles white, with dark corneous tips; no trace of larger tubercles disposed in oblique series. The penultimate joint of the third left leg is granulated on its outer and more distinctly on its upper surface, and very distinctly granulated on its lower margin. The tarsal joint is somewhat

longer than the preceding, nearly smooth on its outer, and densely granulated and hairy on its upper and inner surfaces. The coxæ of the fifth legs in the male are greatly produced and subacute, and nearly of equal length; the left coxa has a slight rounded prominence on its outer margin. It differs principally in the form of the coxæ of the fifth legs of the male, and may prove to be a distinct species. Length of carapace nearly $\frac{3}{4}$ inch.

Diogenes miles (Fabr.).

A specimen is in the collection (without definite locality) which belongs, I believe, to this species. It very nearly resembles a specimen from the Philippine Islands, which was designated by White (but never described) as *Pagurus subpilosus*, but which cannot be regarded as specifically distinct. In these specimens the penultimate and antepenultimate joints of the legs and the outer surface of the larger hand are simply granulated (in the Philippine example the granules of the hand are less numerous and crowded). In what I regard as the adult *D. miles*, the granules of the hand and penultimate and antepenultimate joints of the legs are replaced by spinules. There are in the Museum two small specimens from Dukhun (*Col. Sykes*) which probably belong to *D. miles**.

* Of the genus *Diogenes* there are in the British Museum examples from Ceylon (*Holdsworth*) and Pondicherry of the species figured by Herbst as *Cancer miles*, but which is certainly not the *miles* of Fabricius, Milne-Edwards, and Dana, and which is at once distinguished by the form of the larger hand, which is granulated on its upper and lower margins and smooth on its outer surface, by the existence of a strong blunt lobe or tubercle on the inner margin of the wrist, and by the smooth non-granulated or spinulose tarsal joints of the second and third pairs of legs. This may be the *Diogenes custos* (*Pagurus custos*, Fabr.), or may require a new specific name. There is also a specimen from Shark's Bay, W. Australia, in which the short, acute, non-spinulose rostrum does not project beyond the level of the ophthalmic scales, which are subtriangulate and entire; the arm and wrist of the larger (left) chelipede are robust and coarsely granulated on their upper and external surface; the hand somewhat less coarsely granulated, except on its upper margin, very convex on its outer surface, particularly near its articulation with the wrist; lower (immobile) finger bent downward, and forming an obtuse angle with the lower margin of the palm. The dactyli of the second and third legs on the left-hand side are rather short, and scarcely exceed the penultimate joint in length; on the right-hand side they are relatively longer and curved. This species may be designated *D. granulatus*.

It is evidently nearly allied to *D. avarus* of Heller from the Nicobars, in which species, however, the left hand is externally costate, and this chelipede on the whole represented as much slenderer, and the dactyli of the second and third (left) limbs are relatively longer.

In a specimen from the "Eastern Seas" in the Museum collection,

Pagurus punctulatus, Olivier.

Celebes, Badjoa (a female). A larger male is in the collection, without locality, in which the coloration has disappeared.

Pagurus pedunculatus (Herbst).

Batjan (an adult male). A larger male, without special locality, is in the collection.

The specimens I refer here agree very well with examples named *P. pedunculatus* by White in the Museum collection. As, however, I have not had an opportunity of referring to Herbst's figure (the Museum copy of his work being imperfect), and as some recent remarks of Hilgendorf tend to throw doubt upon the correctness of White's identification, I will add that the specimens referred to *P. pedunculatus* in the Museum collection closely resemble in external appearance *P. deformis*, M.-Edwards, but may be distinguished by the hand of the larger chelipede being somewhat more closely granulated between the larger tubercles, which, as in *P. deformis*, are disposed in longitudinal series on the upper and outer surface of the palm; the mobile finger is granulated (but not carinated) on its upper and outer surface, the granules being disposed in longitudinal series; the penultimate joint of the third left leg is smooth, not carinated as in *P. deformis*; the terminal joint, however, is nearly of the same form as in that species. The dried specimens in the Museum collection from Port Jackson and Australia have the eye-peduncles marked with a very distinct white cincture, which is not visible in the Malaysian specimens, which have been long immersed in spirits. I will add that the external genital orifices of the female are very distinct in the males of *P. deformis* in the Museum collection (as noted by Hilgendorf), but not in the males of specimens of *P. pedunculatus*.

which I will designate *D. spinulimanus*, the rostrum is acute, but does not nearly reach to the apices of the ophthalmic scales, which are arcuate externally, but not denticulated; the merus and carpus of the larger (left) chelipede are granulated externally, the carpus armed on its upper margin with about a dozen spinules; palm armed on its outer surface and upper and lower margins with spinuliform granules; mobile finger with similar spinules on its upper margin, lower deflexed but less abruptly than in *D. granulatus*; smaller chelipede with the palm covered with long fulvous hairs, tarsal joints of the second and third legs on the right side (the left are wanting) long, hairy, and smooth.

This species may be compared to *D. penicillatus*, Stimpson, but differs in the non-denticulated ophthalmic scales, shorter rostrum, the armature of the chelipeda, &c.

Pagurus gemmatus, M.-Edwards.

Two specimens, males, in the collection, without special indication of locality, agree almost exactly with M.-Edwards's short description; the tubercles on the crest of the tarsus of the third left leg, however, are scarcely to be described as "tubercules arrondis," but in the larger specimen resemble small bluntish spines; the larger hand, which is very broad and short, is covered externally with unequal irregularly-disposed tubercles, and its inner surface with scattered tufts of hair; the tarsal joint of the third left leg is longer than the penultimate joint, which is not canaliculated, cristate, or flattened on its outer surface.

M.-Edwards's specimens were from the "Marquesas," by which, I presume, the Oriental group otherwise designated the Mendaña Islands is intended.

Aniculus typicus, Dana.

Malaysia (an adult male of large size, without locality).

Clibanarius vulgaris, Dana.

Borneo (an adult male, in shell of *Voluta*). A smaller male, without locality, is in the collection.

These specimens agree excellently with M.-Edwards's description, except that he says "tarse court," whereas in the Museum specimens the tarsus is longer than the preceding joint. It is to be noted that in Herbst's figure of his *Cancer clibanarius* there are no indications of the longitudinal markings of the legs described by Milne-Edwards.

Eupagurus japonicus? (Pl. XIV. figs. 6, 7.)

Pagurus hirtimanus, White, List Crust. Brit. Mus. p. 60 (1847), *sine descr.*

Eupagurus japonicus, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 250 (1858).

Carapace nearly naked, with the cervical suture strongly defined. Rostrum prominent, triangular and acute; frontal margin with a minute spinule on either side of the rostrum, and further from it than from the antero-lateral margins. Eyepeduncles slender, and shorter than the width of the frontal margin; ophthalmic scales narrow-linear, concave above, and rounded at the distal ends. Antennal scale very short. The larger (right) chelipede with the merus unarmed, smooth, and clothed with scanty hairs; carpus with short granulated lines on its outer surface, and armed above with four spinules on the upper and inner margin and two on the upper surface;

hand ovate, densely hairy on its outer surface, with the upper and lower margins, both of palm and fingers, granulated, and with a few prominent granules near the base of the palm; the inner margins of the fingers regularly toothed near the distal ends; upper finger with a large rounded tubercle near the base. Left chelipede with the carpus biserially spinulose above, and the hand and fingers hairy. Ambulatory legs smooth, the penultimate and antepenultimate joints unarmed and not externally compressed, and the tarsal joints shorter than the penultimate joint. The first postabdominal segment (in the male) with a small lobe or projection in its posterior margin on either side of the middle line, and with a slender filiform appendage on the left side only. Length of carapace about $\frac{3}{4}$ inch (8 lines).

A male is in the collection without definite locality. White's specimen was from the Philippines, and is also a male. There is also a small female example from the Fiji Islands (Ovalau) in the collection, in which the ambulatory legs are prettily mottled with red.

The specimens before me differ from the description of *E. japonicus* in the form of the ophthalmic scales; and there is no median series of spinules on the palm; but a line of granules with difficulty discernible amid the close pubescence exists in White's typical example. If they should be distinct, White's name of *hirtimanus* will have to be adopted for them; but a comparison of the description and figure now given with Stimpson's type is needed before the question can be certainly decided.

HIPPIDEA.

Remipes testudinarius, Latr.

Celebes, Macassar (three females, one of large size); Batjan (a male and female; one of the variety *denticulatifrons*); Bali (two males); New Guinea (two males of var. *denticulatifrons*).

RANINIDEA.

Ranina serrata, Lam.

Bali (a young male).

MACRURA.

THALASSINIDEA.

Thalassinia anomala.

Cancer anomalus, Herbst. Naturg. Krabben &c. iii. (Heft 4) p. 45. pl. lxii. (1803).

Thalassina scorpionides, Latr. Gen. Crust. & Ins. i. p. 51 (1807), nec Guérin et Milne-Edwards; Steenstrup & Lütken, Videnskabelige Meddelelser, p. 257 (1861).

Thalassina gracilis, Dana, U.S. Expl. Exp. xiii. Cr. i. p. 13, pl. xxxii. fig. 5 (1852), young?

Samangkabai, Tandjong (an adult male); Borneo, Bandermassin (an adult female).

In an old male from W. Borneo, which I am not inclined to regard as specifically distinct, the spines of the branchial and hepatic regions are much more prominent, and there are a few spines on the cardiac region. The hands are less unequal, and the larger hand is more distinctly granulated and proportionally longer; its length is more than once and a half its breadth.

Specimens presenting the characteristics of the adult are in the Museum collection from the Indian Ocean, Philippines, and Fijis. In what I consider to be the young of this species the branchial and hepatic regions and the sides of the hands are nearly smooth, and there is sometimes but a single spine on the upper margin of the arm. Specimens are in the Museum collection from Borneo, Penang, Singapore, the Indian Ocean, Philippines (designated by White *T. talpa*), and Fiji Islands.

The reference to Herbst's *C. anomalus*, given by White, I have not been able to verify, as the plate is wanting in the copy of his work in the British Museum.

In the synonymical references I have followed Steenstrup and Lütken, according to whom the *Thalassina scorpionides* of Latreille is not identical with the Chilean species referred to under the same name by Guérin and Milne-Edwards, and which Steenstrup and Lütken designate *T. chilensis*.

ASTACIDEA.

Scyllarus Haani.

Scyllarus Haani, v. Siebold in De Haan, Faun. Japon. Cr. p. 152, pl. xxxviii. fig. 1 (1849).

Aroe (Aru?) Islands (a fine adult male).

This form is distinguished from all the other *Scyllari* with which I am acquainted by the remarkable prominence of the tubercles or elevations on the gastric, cardiac, and intestinal regions, and second, third, and especially on the fourth post-abdominal segments; the Aroe-Island specimen agrees very closely with De Haan's figure in this and in all other respects. But slighter prominences occupying similar positions are observable in *S. aquinoctialis*, *S. squamosus*, and *S. Sieboldii*;

yet in the adult males in the Museum collection these are never so prominent as in *S. Haani*. *S. Haani* is also distinguished from the majority of specimens of *S. æquinoctialis* by the form of the antepenultimate joint of the antennæ, which is arcuate and dentated on its outer margin, and by the existence of strong spines on the inner margin of this and the penultimate joint; but there is a specimen from Madeira in the Museum collection which remarkably approaches *S. Haani* in these respects; and it is possible that the examination of a sufficiently large series would show that the four forms above cited are but varying conditions of one species ranging widely through both the Atlantic and Indo-Pacific regions. The bicarination of the antepenultimate joint of the second pair of legs in *S. Sieboldii* is not, I believe, a character of specific value.

From *S. latus* this species is distinguished not only by the prominent tubercles on the thorax and postabdomen, but by the different form of the terminal joint of the antennæ, the absence of distinct serrations on the outer margin of the antepenultimate joint, the more distinctly carinated legs, and the truncated form of the lateral prolongations of the second, third, and fourth postabdominal segments.

Parribacus antarcticus (Lund).

New Guinea (two young females).

Thenus orientalis, Rumph.

W. Borneo (a female).

Palinurus (Panulirus) fasciatus (Fabr.).

W. Borneo (a female and young male). A larger female is in the collection, without locality.

Palinurus (Panulirus) ornatus (Fabr.).

Indo-Malayan seas (a female, without locality).

A male and two very young individuals from Amboina perhaps belong to this species, although in them the original coloration has entirely disappeared; also a young individual, probably male, from New Guinea. In the younger individuals the external genital openings are not distinguishable; and I consider the New-Guinea specimen to be a male only on account of the uniramous appendages of the postabdominal segments. In young specimens, also, the rudimentary median spines of the rostral plate are absent. In an adult male of large size from the Pison Islands (Cape Melville) in the

Museum collection, the greenish or bluish rings on the ambulatory legs are much interrupted, so that the legs appear to be irregularly spotted or marbled rather than annulated.

Palinurus (Panulirus) penicillatus (Olivier).

Indo-Malayan seas (a female of small size, without locality).

Palinurus (Panulirus) versicolor (Latr.).

Aroe (Aru?) Islands (a young male, in which the coloration is excellently preserved). A young male from Samangkabaa, and two others without definite locality, in the collection, probably belong to this species. When the characteristic coloration has disappeared, it is extremely difficult to distinguish young examples of this species from *P. ornatus*. In the adult *P. ornatus* the spines of the carapace, especially on the branchial regions, appear to be more numerous than in *P. versicolor*.

*Palinurus** (*Panulirus*) *longipes*, A. M.-Edwards.

As the specimen before me differs in some particulars from M.-Edwards's description, I subjoin the following:—Carapace covered with spines interspersed with numerous smaller spinules or spinuliform tubercles; none but the smaller spinules on the sides of the branchial regions of the carapace. Upper surface of the antennal segment covered with spines disposed as follows:—two long spines placed somewhat in front of the middle of the segment; anterior to these, four small median spinules in a transverse series; and posterior to them, six disposed in a semicircle. There are usually indications of several yet smaller spinuliform tubercles on the posterior part of the segment; of those above mentioned, all are not always equally developed.

The dorsal surface of the postabdominal segments is marked with a transverse uninterrupted sulcus; their lateral prolongations terminate each in a long spine; the lateral spines of the

* The British Museum has recently obtained by purchase a specimen of *Palinurus* from Sydney Harbour, New S. Wales, that I refer to the rare *P. Hügelii*, Heller, which is covered by numerous examples of a species of pedunculated Cirripede which I refer to the species long ago figured by Quoy and Gaimard (Voy. Astrolabe, pl. xciii. fig. 5, 1834), and designated by Darwin (from the figure only) as *Alepas tubulosa*. So far as I am aware, this species has never been observed since the time of its discovery. As Darwin supposes, it may be distinguished from its congeners by the smooth, entire, carinated edge of the capitulum. The orifice, although tubular, is less protuberant than in the specimen figured by Quoy and Gaimard.

first postabdominal segment are straight; in the four following segments they are curved backwards, and are surmounted by a second smaller spine, situated at the postero-lateral angles of the segment; in the sixth segment there are no postero-lateral spines. The distal end of the merus of the ambulatory legs is armed with two spines. The colour (of specimens dried and in spirits) is bluish purple or reddish; the carapace, larger spines, antennæ, and segments of the postabdomen are covered with numerous pale yellow spots; and the legs are marked with longitudinal lines of the same colour, which are sometimes broken into irregular spots or blotches.

Indo-Malayan seas (an adult male without locality).

Of this beautifully marked species there are also in the Museum collection two adult males from Aneiteum (New Hebrides), and a smaller female from the Mauritius. A. M.-Edwards also records it from Zanzibar.

In the female the spines on the sternum, between the bases of the fifth ambulatory legs, which are prominent and well-developed in the males, are present, although of much smaller size. The carapace in all the specimens is more or less covered with short stiff hairs, arranged in short lines in front of the bases of the spines.

The pale yellow spots on the postabdominal segments are of unequal size; about four on each segment are larger; and of these the largest is situated on each side above the base of the lateral spines.

Enoplometopus pictus, A. Milne-Edwards.

Amboina (an adult male).

The example before me of this very rare and interesting species, which was previously unrepresented in the Museum collection, agrees in every particular with the description and excellent figure of M. A. Milne-Edwards ("Faune Carcinologique," in Maillard's 'Notes sur l'île de la Réunion,' Annexe F, p. 14, pl. xix. fig. 1), except only that the *chelæ* of the anterior legs are represented as somewhat broader in proportion to their length, with the tubercles of the upper surface more developed—characters on which it would certainly not be safe in any case to separate the two as distinct.

Perhaps the nearest ally of the genus *Enoplometopus* is to be found in *Eutrichocheles modestus*—a Malaysian form only known to me from Herbst's original figure and description (Naturg. Krabben u. Krebse, ii. p. 173, pl. xliii. fig. 2, 1794), and from the few remarks of Prof. Wood-Mason (Proc. Asiatic Soc. Bengal, p. 231, 1875), by whom the species has lately

been rediscovered, and the genus *Eutrichocheles* constituted for its reception. If, however, the figure be correct (and Mr. Wood-Mason says it is an accurate representation of the species), the first pair of legs has a much shorter hand, with proportionally longer and more strongly toothed fingers; the second pair of legs terminate in perfectly formed chelæ, whereas the third and following pairs are simple. In *Enoplometopus pictus* the penultimate joint of the four posterior pairs of legs terminates in a mobile spine, against which the spinuliferous dactylus is partially reflexible.

As the specimen of *Enoplometopus pictus* is unique, I have not been able to dissect the branchiæ, so as to make a complete examination of their arrangement. I may observe, however, that *Enoplometopus* is a Homarine form, belonging to the family Homaridæ as defined by Prof. Huxley in his recent classification of the *Astacina*, by their branchial characters (Proc. Zool. Soc. 1878, p. 781). As in the genera *Homarus* and *Nephrops*, the podobranchiæ are completely divided into a branchial and epipoditic portion; but the following remarkable peculiarity appears to exist in the structure of the podobranchia of the second maxillipede. In *Homarus* (as Prof. Huxley has pointed out) this gill is completely differentiated, in the usual way, into a branchia and epipodite; but in *Nephrops* the branchial plume is absent or rudimentary. In *Enoplometopus*, however, so far as can be judged from the examination of a single specimen and without actual dissection, the epipoditic portion is absent, the branchial plume being developed and of the normal structure; in other words, the modification of the typical branchia is the exact reverse of that observed by Prof. Huxley in *Nephrops*.

There is in the British Museum a specimen, unfortunately mutilated and in bad condition, of a species of *Enoplometopus* from St. Helena (*J. C. Melliss, Esq.*), which is distinguishable from the Indo-Pacific *E. pictus* by the slenderer chelipedes, which are smooth above, and by the existence of a distinct tooth on the lateral margin of the second to fifth postabdominal segments (see Pl. XV. fig. 7). This I will designate *E. dentatus*. The rostrum is broken off near the base; and the branchiæ are so rotten, from long immersion in weak spirit, that unfortunately nothing can be said of their structure with certainty; or it would have been interesting to know whether this Atlantic species assimilates in its branchial characters to its Indo-Pacific congener, or to the Mediterranean and North-European *Nephrops*, to which *Enoplometopus* bears so much external resemblance. It is of course possible, although it does not seem probable, that the epipodite, in the single speci-

men I have examinad, has been broken off, and that the genus, although presenting greater affinities in its external characters to *Nephrops*, is in reality more nearly allied to *Homarus*.

CARIDEA.

Atya moluccensis. (Pl. XV. figs. 3, 4.)

? *Atya moluccensis*, De Haan, Faun. Japon. Cr. p. 186 (1849).

Atya armata, A. M.-Edwards, Ann. Soc. Entom. France (ser. 4), iv. p. 149, pl. iii. fig. 5 (1864).

Java (an adult male); Batjan (an imperfect example); Bali (two females with ova); Celebes, Macassar (an adult female with ova).

In these specimens the rostrum is slender, acute, and narrowing to its distal end. In the adult male from Java (which agrees excellently with A. M.-Edwards's description and figure of *A. armata*) the third legs are considerably dilated, and the merus is armed below with a strong spine placed at some distance from the distal end of the joint. In adult males from the Samoa Islands of a closely allied species (probably *A. spinipes* of Newport), the rostrum is less acuminate, and appears in a lateral view more rounded toward the distal end, and the strong spine of the merus of the third legs is placed quite close to the distal end of the joint (see the figure, Pl. XV. figs. 5, 6). The types both of *A. spinipes* and of *A. pilipes*, Newport, are small and in bad condition; and it is probable that they are not specifically distinct. It is remarkable that the New-Caledonian *A. armata* should be identical with (or, at all events, much more nearly allied to) the Malaysian rather than the Samoan species. Two other forms described by A. M.-Edwards from New Caledonia, *A. robusta* and *A. margaritacea*, are distinguished by the form of the rostrum, which is armed at base with two ridges ending in short spines.

The true habitat of *A. pilipes* (as I have elsewhere noted) is Upolu, in the Samoa Islands, not New Zealand (Cat. New-Zeal. Crust. p. 79, 1876).

Palæmon carcinus, Fabr.

Java (an adult and full-grown male); Bali (an adult and a much smaller male).

In the smaller example the rostrum, although nearly of the same form, is less strongly sinuated, and the teeth are somewhat less numerous ($\frac{12}{5}$). In the larger examples the rostra are respectively $\frac{1}{2}$ - and $\frac{3}{8}$ -toothed. In these examples the terminal postabdominal segment is less narrowed and acute at

its distal end than is usual in *P. carcinus*, and seems to approach the form of this segment in *P. Rosenbergii*, a species recently described by Mr. de Man, and founded on a unique example. Possibly a larger series would show that the latter is not specifically distinct.

Palæmon ornatus.

Palæmon ornatus, Olivier, Encycl. Méth. Hist. Nat. viii. p. 660 (1811); Latr. Encycl. Méth. Atlas, pl. cccxviii. fig. 1: M.-Edw. Hist. Nat. Crust. ii. p. 396 (1837); v. Martens, Arch. f. Nat. xxxiv. (i.) p. 36 (1868); Miers, Phil. Trans. Roy. Soc. clxviii. p. 493 (1879).

Palæmon vagus, Heller, Sitzb. Ak. Wien, xlv. i. p. 417, pl. ii. figs. 42, 43 (1862).

P. equidens, Heller, t. c. p. 418, pl. ii. fig. 44 (1862).

Palæmon reunionensis, Hoffmann, Crust. in Recherches faune Madagascar, p. 33, pl. ix. figs. 66, 67 (1874).

Palæmon mayottensis, Hoffmann, t. c. p. 32, pl. ix. figs. 61, 62 (1874).

Palæmon longimanus, Hoffmann, t. c. p. 34, pl. ix. figs. 68, 69 (1874).

Celebes, Macassar (an adult male); Bali (an adult male).

The identity of *P. vagus*, Heller, and of *P. longimanus*, Hoffmann, with the very common and widely-spread *P. ornatus* is confirmed by Mr. de Man, by whom also *P. mayottensis*, Hoffm., is shown to be at most only a local variety of the same species. On the other hand, Mr. de Man (who had Hoffmann's types before him) regards *P. reunionensis* (which I have considered identical with *P. ornatus*) as synonymous with *P. equidens* of Heller, and the latter as distinct from *P. ornatus*. *P. equidens* was originally founded by Dana on an example in which the second legs were wanting and which is thus insufficiently known. But I can see no reason for regarding *P. reunionensis* or *P. equidens* as described by Heller, as distinct from *P. ornatus*, nor does Mr. de Man mention any character by which they may be separated with certainty. Both Heller's and Hoffmann's figures of the second legs show that they resemble those of *P. ornatus*, both in the proportions of the joints and characteristic tuberculation of the fingers.

Palæmon dispar.

Palæmon dispar, v. Martens, Arch. f. Nat. xxxiv. p. 41 (1868); Miers, Phil. Trans. Roy. Soc. clxviii. p. 493 (1879).

Palæmon Alphonsonianus, Hoffmann, Rech. faune Madagascar, Cr. p. 35, pl. ix. figs. 63-65 (1874).

Samangkabaai, Tandjong (an adult male).

In this example the rostrum (which is broken off at the tip) is $\frac{10}{4}$ -toothed. The smaller leg of the second pair is wanting; but I do not doubt its identity with v. Martens's species. The teeth on the inner margins of the fingers are largest at base, and become smaller or obsolete toward the

distal end of the fingers in the three specimens in the Museum collection, which are males. The upper finger (or dactylus) is, in all three, more curved and a little shorter than the lower. Besides the specimen from Samangkabaai, the examples in the Museum are from Rodriguez and the Samoa Islands.

Palæmon lepidactylus, Hilgendorf.

A small male in the collection, without definite locality, I refer, with some hesitation, to this species. The rostral formula ($\frac{11}{2}$) and the form and proportional length of the joints of the larger leg of the second pair agree exactly with the description and figure of Hilgendorf (Monatsber. Akad. Berlin, p. 838, pl. iv. figs. 14-16, 1878). The hairs on the inner margins of the fingers of the smaller hand, however, are few and scanty, like those of the larger hand. The granules with which the surface of the joints of both limbs are covered are small, and only on the inner margin of each limb are developed into small spines.

The specimen is of small size, and probably does not present the fully adult characteristics.

Besides the above, there are in the collection three examples of *Palæmon* from Java, which may belong to a new and distinct species. In all, however, one or other of the large limbs of the second pair are wanting; and none, probably, of the specimens present the characters of the fully adult. I will therefore leave them undescribed for the present. They differ from *P. grandimanus*, Randall, in the form of the larger chela (which is not so greatly dilated and compressed, with the fingers meeting along their inner edges when closed), from *P. javanicus*, Heller, in the much shorter carpus of the second legs (which is much shorter than the palm), and from *P. latimanus*, Von Martens, in the more numerous teeth of the rostrum.

[To be continued.]

XXXVI.—On a Collection of *Lepidoptera* from *Madagascar*, with Descriptions of new Genera and Species. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

[Continued from p. 344.]

Liparidæ.

XANTHODURA, gen. nov.

Form of the eastern genus *Dura*, but more nearly allied to *Orgyia*. The antennæ very small; body very short. Prima-

ries with the costal vein extending to second third of costa; discoidal cell extremely short, not extending to the middle of wing; subcostal four-branched, all the branches emitted at some distance beyond the cell, the last, moreover, from below the main vein; both radials emitted close together from the upper extremity of the cell; discocellular inarched, second and third branches emitted near together. Secondaries much elongated and sublobate in the middle of outer margin between second and third median branches; cell very short, as in primaries; costal and subcostal veins emitted from a curved basal pedicle; subcostal emitting its two branches from a short footstalk just beyond the cell, radial emitted from the superior extremity of the cell; discocellular slightly inarched, second and third median branches emitted close together from the inferior extremity of the cell. Type *X. trucidata*.

39. *Xanthodura trucidata*, sp. n.

Orange; primaries with the apical third, including the external border, chocolate-brown, its inner margin, terminating in a patch at external angle, dark blood-red: secondaries with a blood-red apical patch; fringe at apex dark brown; head and collar ferruginous, with white borders; antennæ black. Wings below orange; primaries with the apical third chocolate-brown; secondaries with a chocolate-brown apical patch: body below cream-coloured. Expanse of wings 1 inch.

LECHRIOLEPIS, gen. nov.

♀. Aspect of *Chærotriche*, but the antennæ serrate instead of pectinate, the anal tuft enormously developed, considerably more so even than in *Anaphe*; neuration entirely different. Primaries with the subcostal area partially bare in the middle, the scales upon it being placed edgeways and transversely; these scales are very thick, corneous, and curved, some of them being considerably more elongated than the others, and all of them being fringed or finely serrate at the distal extremity; costal vein nearly extending to apex; subcostal six-branched, the first four branches being emitted before the end of the cell, the second and third from a long footstalk, the fifth and sixth branches from a short footstalk at the superior angle of the cell, the sixth branch representing the upper radial; discocellular extremely fine, very oblique, and distinctly angulated; median vein four-branched, the fourth branch being in reality the lower radial, but emitted with the third median from a short footstalk. Secondaries rather small for the family, and

stolon (magnified 2 diameters). *a*, calyche, with portion of stolon cut off to show the vertically compressed form of the latter and cavity respectively; *b*, vertical section of stolon; *c*, compressed cavity; *d*, lateral view of tentaculated head when restored to position (ideal); *e*, end view of same sunk into the calyche: all relatively magnified on the scale of 1-144th to 1-1800th inch. *f*, form of young spicule; *g*, matured form (diagrams). *h*, fragment of the corallum, to show pore-openings between the calcareous tubipora-spicules, now otherwise consolidated; *i*, fragment of siliceous sponge-spicule imbedded in the same: scale 1-48th to 1-1800th inch. *k*, sponge-spicules imbedded in the corallum at the bottom of the calyche, as seen on looking down through the end of the latter (diagram).

Fig. 3. *Polytremat mesentericum*, n. sp., nat. size of specimen. *a*, portion of mesenteriform lamina, to show—*b*, pore-surface on the sides and, *c*, cortical and medullary cell-structure in the horizontal section: magnified 2 diameters. *d*, horizontal section of fragment, more magnified, to show—*e*, pore-tubules, *f*, cortical cells, and *g*, medullary cell-structure; *h*, fragment of surface, to show pore-openings (diagrams).

Fig. 4. *Holocladina pustulifera*, n. sp., suspended across a crevice in the Melobesian nodule, into which the ends of the branches are for the most part inserted, therefore represented as cut off (magnified about 16 diameters). *a*, average natural size. *b*, end view of large pustuliform eminence; *c*, the same, lateral view; *d*, the same, with summit extended into a spinous form: scale 1-24th to 1-1800th inch. *e*, end of branchlet, much magnified, to show the distribution and unequal size of the pustuliform eminences, also *f*, the structure and thickness of the test, *g*, the conical, and *h*, the amorphous terminations respectively (diagrams).

Fig. 5. *Cystodictyina compressa*, n. sp., in contact with the surface of the Melobesian nodule, represented as cut off at each end where the continuation of the circumference was not seen (magnified about 16 diameters). *a*, average natural size; *b*, fragment of surface, much magnified, to show the prismatic structure of the pore-tubulation; *c*, end of circumferential lobule, much magnified, to show thickness of test and punctate surface, also *d*, conical, and *e*, amorphous terminations respectively (diagrams).

PLATE XIX.

Fig. 6. *Ceratestina globularis*, n. sp. *a*, embryonic or primary cell; *b*, terminal cell or chamber; *c*, connecting stolon; *d*, crooked and knotted stolon tubulations put forth by the last chamber; *e*, microspinous processes on the surface of the chamber; *f*, groups of *Ceratestina* on the surface of old *Stylaster sanguineus* from the S. Pacific Ocean; *g*, aperture of terminal cell: scale 1-24th to 1-1800th inch.

Fig. 7. *Ceratestina tessellata*, n. sp. *a*, globuliferous or adenoid portion; *b*, stolon tubes: magnified about 16 diameters. *c*, commencement of the growth of a globuliferous portion on a stolon tube; *d*, globuliferous portion, much magnified, to show meridianate or crossing lines of fibre in the horny wall, producing the tessellated appearance; *e*, stolon portion; *f*, internal processes; *g*, end of stolon, more magnified, to show that it also

presents the tessellated appearance; *h*, tesseral division, much magnified, to show microspinous processes (diagrams).
 Fig. 8. *Hydradendrium spinosum*, n. gen. et sp., natural size of specimen. *a*, growth of dendriform spines (see *g*); *b*, portion of stem, much magnified, to show rows of spines, viewed laterally; *c*, horizontal section of stem and spines, to show that the stem is composed of concentric laminae developed on *d*, the axial canal, from which *pari passu* are developed the spines: scale 1-48th to 1-1800th inch. *e*, spine, much more magnified, to show that it also is composed of concentric laminae, but solid and imperforate towards the free end; *f*, end of branch, to show commencement of spinal development on the medullary sarcode: scale 1-24th to 1-1800th inch. *g*, dendriform growth of spines produced by the coenosarc (see *a*): scale 1-48th to 1-1800th inch.

[To be continued]

XLI.—On a Collection of Crustacea from the Malaysian Region.—Part IV. Penæidea, Stomatopoda, Isopoda, Suctorina, and Xiphosura. By EDWARD J. MIERS, F.L.S., F.Z.S.

[Plate XV.]

[Concluded from p. 384.]

PENÆIDEA.

Penæus avirostris, Dana.

W. Borneo.

I refer to this species two female specimens of *Penæus* in the collection. They agree with Dana's description in the form of the rostrum, fifth ambulatory legs, &c. In both the rostrum is prolonged backward into a somewhat indistinct median dorsal carina, which, however, is obsolete near the posterior margin. The rostrum, in the only perfect specimen, is 7-toothed above.

This species was not represented in the Museum collection when I wrote my analytical table of the species of *Penæus* (P. Z. S. 1878, p. 306); and the examination of the foregoing examples shows that it should be classed (in that synopsis) in the neighbourhood of *P. monoceros* and *P. Dobsoni*, on account of the distinct dorsal ridge of the carapace.

Penæus sculptilis, Heller.

W. Borneo (a female).

This specimen agrees very well with the description and figure of Heller, based on examples from Java. Like the

preceding it has been hitherto a desideratum to the Museum collection*.

There is also in the collection a small specimen of *Penæus* which, on account of the imperfection of the rostrum, I cannot at present determine with certainty.

Stenopus hispidus, Latr.

New Guinea (an adult female of large size).

• STOMATOPODA.

Lysiosquilla maculata (Fabr.).

Goram (a young male).

Squilla nepa, Latr.

West Borneo (an adult female).

Pseudosquilla ciliata (Fabr.).

New Guinea (an adult female).

* The following additional species have been lately received by the British Museum:—

Penæus Macleayi, Haswell.

A specimen has recently been purchased (together with one of *P. canaliculatus*) from Mr. A. P. Goodwin, who collected them at the mouth of the Richmond River, New South Wales. Mr. Haswell's types were from Port Jackson. This species, with several others still desiderata to the Museum, has been described by him since the publication of my paper. Its place in the classification is in the vicinity of *P. affinis* and *P. avirostris*.

Penæus Joyneri, sp. n. (Plate XV. figs. 8-10.)

Carapace more or less pilose above, with the antennal and gastro-hepatic sulci faintly indicated; no pterygostomial spine. Rostrum nearly straight, acute, slender, and not reaching to the end of the antennal scale, armed above with seven or eight teeth, of which the posterior three are situated on the carapace behind its anterior margin, the last being separated from the rest by a wider interval; the anterior third of the upper margin and the lower margin are without spines. A longitudinal median dorsal line on the surface of the carapace indicates the obsolete dorsal ridge; and a similar line exists on the first three post-abdominal segments. The first segment has a rounded tooth on each lateral margin. The fourth to sixth postabdominal segments are acutely carinated above. The terminal segment has a longitudinal median groove on its dorsal surface; its lateral margins are without spines; and its distal end is produced and acuminate. The eyes are large, the antennular flagella very short; the exognathi of the outer maxillipedes scarcely reach beyond the end of the penultimate joint. The second joint of the first and second legs (in the male) is armed with a spine

Gonodactylus scyllarus (Linn.).

Amboina (an adult male), Goram (an adult male), New Guinea (a male), Lette Island (a female?).

The specimens from New Guinea and Lette Island approach *G. Bleekeri*, A. Milne-Edwards, in having the median dorsal carina of the terminal postabdominal segment more elevated and acute; but the rostrum, although acute, is not more produced at its distal end than in the typical *G. scyllarus*.

Gonodactylus chiragra (Fabr.).

Java, Karangbollong (an adult female), New Guinea (an adult male), Amboina (a small male), Celebes, Macassar (an adult female).

The largest specimen (that from New Guinea) measures fully 4 inches from the tip of the rostrum to the terminal segment. The dilatation at the proximal end of the dactylus is of a pinkish tinge shading into blue; the distal end of the dactylus is always more or less inflexed.

Gonodactylus graphurus, White.

Amboina (an adult male). A male of small size is in the collection without special locality, in which, however, the genital appendages are perfectly developed.

on the under surface; the third legs, in place of this spine, are armed with a straight and slender styliform appendage, which reaches to the middle of the merus joint, and is furnished at its distal end with a spear-like head, which is acute in front, laterally dilated and produced posteriorly; the merus joint of the fourth legs is dilated, carinated, and armed with a strong tooth in the middle of its inferior margin. This joint in the fifth legs, which are slender and much elongated, is less dilated, but distinctly toothed (see the figures). In the female, the third legs are armed only with a small spine. Length of the single male about $4\frac{1}{2}$ inches.

Hab. Yokohama, Japan (*H. Batson Joyner, Esq.*).

Several specimens are in the collection.

I have much pleasure in associating this species with the name of its discoverer, who presented it, with several other interesting forms, to the British Museum. The peculiarity in the structure of the third to fifth ambulatory legs in the male, and particularly the remarkable appendages to the basis joints of the second legs (which, it may be presumed, serve as claspers during the act of coition), distinguish it from its congeners; but both sexes are further distinguishable by the form and dentition of the rostrum, and of the laterally unarmed terminal segment. It is allied to *P. avirostris*, Dana, and *P. Mastersii*, Haswell; but in the former species the rostrum is much more strongly carinated above, and in the latter the terminal segment is not acuminate; both, moreover, have a distinct dorsal carina on the carapace.

Gonodactylus trispinosus, White.

Amboina (an adult female).

This example agrees in all particulars with the two in the Museum collection from Sharks' Bay, W. Australia, which differ somewhat from the type (from Swan River) in the larger tubercles of the terminal segment, and the more numerous and regular denticulations of its posterior margin. The terminal segment is scantily clothed with short hairs.

ISOPODA.

The Isopoda in Dr. Bleeker's collection were nearly all contained in a single bottle, without any special indication of locality. Upon examination, however, this bottle was found to contain fourteen out of the sixteen species described by him in his memoir on the *Malaysian Cymothoidæ*, already referred to*.

Two or three other species, which are not included in that paper, were also found in the collection, and are described or referred to below.

In several of the species, and particularly in the large series of specimens of *Cymothoa Leschenaultii*, can be traced the gradual modification of the external sexual organs, accompanying the transformation of the young male individual into the fully-grown and perfectly-developed female, as detailed by Bullar† and Dr. P. Mayer‡, in their recent important researches demonstrating the existence of hermaphroditism and illustrating the various stages of development in the parasitic *Cymothoidæ*. Further details are given below, under the heads of the different species.

ONISCIDEA.

Ligia Gaudichaudii.

? *Ligia Gaudichaudii*, M.-Edw. Hist. Nat. Crust. iii. p. 157 (1840);
? Gay, Hist. Chile, iii. p. 265 (1840); ? Dana, Cr. U.S. Expl. xiv.
p. 741, pl. xlix. fig. 6 (1853).

A considerable number of specimens without definite locality are in the collection, which agree very well with the description and figure of Dana. Unfortunately in all of these the antennæ are imperfect and the uropoda are wanting. An

* "Sur les Isopodes Cymothoadiens de l'archipel Indien," in Acta Societatis Scient. Indo-Neerlandicæ, ii. (1857).

† Journ. Anat. Physiol. xi. p. 118 (1876).

‡ Mittheil. Zoolog. Stat. Neapel, i. (Heft 2) p. 165 (1870).

example belonging to the same species is in the British-Museum collection from Madgica Sima.

Whether this be the *L. Gaudichaudii* of Milne-Edwards must remain somewhat uncertain, on account of the brevity of his description; the habitat of his types was probably Chilian.

CYMOTHOIDEA.

Cymothoa Leschenaultii.

Cymothoa Leschenaultii, Leach, Dict. Sci. Nat. xii. p. 352 (1818).

Cymothoa Stromatei, Bleeker, Acta Soc. Sci. Indo-Noerland. ii. p. 35, pl. ii. fig. 13 (1857), ad. ♀.

Cymothoa Edwardsii, Bleeker, t. c. p. 34, pl. ii. fig. 12 (1857), jun. ♂.

This species would appear to be one of the commonest of the Malaysian Cymothoidea, if one may judge from the very large series in the collection. I have observed a considerable variation in the form of the antero-lateral lobes of the first segment of the body and of the basis joint of the last pair of legs, and can see no sufficient reason for regarding Bleeker's species as distinct from the *Cymothoa Leschenaultii* of Leach, of which, unfortunately, only a single specimen from Pondicherry is in the collection. Adult and full-sized examples of this species are nearly $1\frac{1}{2}$ inch in length; and amongst these are many in which the brood-pouch is fully developed; but there are not a few others, scarcely inferior in size, in which no trace of it exists. Two or three specimens are in the collection (length of the largest $1\frac{1}{2}$ inch), exhibiting that interesting transitional stage in the development of the animal, recently described by Prof. Schiödte (see Ann. & Mag. Nat. Hist. ser. 5, ii. p. 196), during which copulation takes place, and in which the ovigerous pouch is developed upon the three posterior segments of the body only. The largest of the specimens, in which the external genital organs of the male are developed upon the ventral surface of the seventh thoracic segment, measures a little over 1 inch in length; but the majority are much smaller, some not exceeding half an inch. These agree in all essential characters with *C. Edwardsii* as described by Bleeker, which, therefore, I doubt not, was founded on the younger male form of the species. The adult female form of the species is apparently not invariably to be distinguished by its greater size; for there is in the series one example which does not seem specifically distinct, although of somewhat abnormal growth, which bears ova in the perfectly formed brood-pouch, yet measures only $\frac{3}{4}$ inch in length.

Cymothoa irregularis, Bleeker.

Of this species (which, according to Dr. Bleeker, is common on fishes in the seas of Amboina) a good series is in the collection, including several specimens in which the brood-pouch is well developed (length of the largest 1 inch), and others in which it does not exist; but in these examples no external male organs are observable; the largest is about 8 lines. Even in the smallest the characteristic lunate form of the first thoracic segment is very apparent.

There is a specimen in the Museum collection, apparently referable to the *Cymothoa rhinoceros* of Bleeker, which certainly cannot remain in the genus *Cymothoa*; but, on account of its very mutilated condition, I cannot refer it with certainty to any described genus. It has neither male nor female external genital appendages. The head is transverse, eyes of moderate size; rostrum reflexed at tip, interantennal process small, and not dividing the upper antennæ at base, the first joints of the upper antennæ are not greatly dilated; the lower antennæ broken, but evidently reaching beyond the posterior margin of the first thoracic segment. The so-called epimeræ or coxal joints of the second to seventh legs are distinct. The basis joints of the legs are not dilated, and the terminal claw small but strongly curved; terminal segment triangular, and uropoda with the inner ramus the larger and somewhat obovate, outer slender, but not acute at apex.

Anilocra marginata.

Cymothoa marginata, Bleeker, Isopodes Cymothodiens, in Acta Soc. Scient. Indo-Neerland. ii. p. 36, pl. ii. fig. 14 (1857).

Two specimens are in the collection. According to Bleeker it is found on fish in the seas of Batavia. This species must, I think, be placed in the genus *Anilocra*, on account of the linear form of the basis joints of the ambulatory legs. The violet band on the posterior margin of the body-segments is in these specimens (that have long been immersed in spirits) of a brown hue. The larger example (length 11 lines) is a fully-developed female; the smaller (length about 7 lines), without brood-pouch, has yet some traces of the median prominences of the seventh thoracic segment, characteristic of the male.

Anilocra dimidiata, Bleeker.

A large number of specimens are in the collection, nearly all of which are fully-developed females. It lives, according to Dr. Bleeker, on different fishes in the seas of Batavia.

The length of a full-sized specimen is about $1\frac{1}{2}$ inch, of one of the smallest (with brood-pouch) about $\frac{3}{4}$ inch. There are one or two specimens in which neither brood-pouch nor external male organs exist (length of the largest $\frac{5}{8}$ inch).

Anilocra alloceræa.

♀ *Anilocra leptosoma*, Bleeker, t. c. p. 30, pl. i. fig. 6 (1857).

Anilocra alloceræa, Kölbel, Sitz. Ak. Wien, lxxviii. p. 407, pl. ii. fig. 1 (1879).

Four specimens, females, are in the collection. In one only of these are the antennæ and uropoda in a perfect condition. The first pair of antennæ agree exactly in the form of their fourth and fifth joints with Kölbel's excellent description and figure. In every other respect they so closely resemble the *Anilocra leptosoma* of Bleeker, that I at first assigned them without hesitation to that species; and I am even now inclined to regard it as probable that Bleeker's remarks and figure of the antennæ may be inaccurate, and the two forms really referable to one and the same species; and this I think the more likely, as the two species inhabit the same geographical region. Bleeker, it may be observed, notes that the uropoda in *A. leptosoma* do not reach beyond the extremity of the terminal postabdominal segment; in his figure, however, they are represented as distinctly longer than this segment, in this particular agreeing both with Kölbel's description of *A. alloceræa* and with the specimen before me*.

* I may take this opportunity of noting that the larger of the two original examples of *Ceratothoa trigonocephala* (*Cymothoa trigonocephala*, Leach, and the one which bears his MS. label and must be considered as the type) differs from *C. trigonocephala* as figured by Kölbel (pl. i. fig. 3), and resembles *C. oxyrhynchæna* of that author, in the form of the head (which has the lateral margins straight and the front acute) and in the form of the antero-lateral processes of the first segment of the body, which in a lateral view are rather broad, and in a dorsal view appear narrowed at their apices. It differs from *C. oxyrhynchæna*, however, in the form of the penultimate postabdominal segment, which has the posterior margin sinuated in the middle and on each side, and therein agrees with Kölbel's description of the specimens he refers to *trigonocephala*. Length $1\frac{1}{2}$ inch.

The smaller example (length $10\frac{1}{2}$ lines) agrees more nearly with Kölbel's figure of *C. trigonocephala* in having the lateral margins of the head slightly sinuated and the front less acute; the apices of the antero-lateral processes of the first segment of the body, however, are narrowed both in a lateral and dorsal view; the form of the penultimate postabdominal segment sinuated, as in the larger example. As the exact localities of these examples are not known, it is difficult to determine whether the two belong to distinct species, or whether the differences indicated by Kölbel are not perhaps rather to be regarded as of less than specific value. The basis joint of the seventh pair of legs is, in both specimens, much less dilated posteriorly than in *C. oxyrhynchæna*.

RENOCILA, gen. nov.

Allied to *Anilocra* in most of its characters; but the 8-jointed superior antennæ are greatly developed, reaching nearly to the posterior margin of the first thoracic segment, with all the joints (the terminal excepted) more or less dilated and compressed, so as entirely to conceal the very small inferior antennæ; the dilatation is greatest in the third joint (the second visible in a dorsal view), the following joints becoming successively smaller. The inferior antennæ are small and 7-jointed, reaching nearly to the end of the fifth joint of the upper antennæ. The eyes are small and indistinct, and placed near the postero-lateral angles of the head, which is truncated anteriorly; the front not produced inferiorly, so as to conceal the bases of the antennæ. The fifth to seventh thoracic segments are greatly prolonged backward at their postero-lateral angles, so as (in the sixth and seventh segments) entirely to conceal the "epimeræ" or coxal joints; the postero-lateral lobes of the seventh thoracic segment reach beyond the base of the terminal postabdominal segment. The coxal joints of all the legs are posteriorly acute; those of the second to fifth legs well developed and visible in a dorsal view. None of the legs have the basis joints dilated; and all terminate in very strong curved claws. The uropoda do not reach to the posterior margin of the transverse posteriorly-rounded terminal segment, and are furnished with slender rami, the outer of which is a little longer than the inner.

This genus, in all its characters, is most nearly allied to *Anilocra*, from which it is distinguished by its broad non-inflexed front, the greatly produced postero-lateral angles of the three posterior thoracic segments, and the greatly dilated superior antennæ.

Renocila ovata, sp. n. (Pl. XV. figs. 11-14.)

The body is moderately convex, ovate; the head, which is scarcely broader than long, has the posterior margin rounded, and the sides slightly convergent to the straight anterior margin, which is inflexed, but not produced so as to conceal the bases of the antennæ. The first thoracic segment is a little longer than the two following, and its postero-lateral angles are slightly prolonged backward and rounded; the two following segments are not so produced; in the fourth segment the postero-lateral lobes are very small, in the fifth to seventh segments they are (as stated above) greatly developed, not acute, but rounded at the distal ends, and with the

lateral margins slightly reflexed; the first five postabdominal segments are very short, and are not laterally produced; the terminal segment is almost semicircular in outline, smooth above, with a longitudinal median raised line on its upper surface. The second joint of the antennæ (in a dorsal view) is considerably enlarged and nearly quadrate; the following joints (except the last) of a similar form, but successively smaller, the terminal minute and slender. The penultimate and antepenultimate joints of the inferior antennæ are slenderer and more elongated than the preceding, the terminal is minute. • The coxal joints of the second to fifth legs become successively more acute; those of the sixth and seventh legs are acuminate and spiniform (in an inferior view). None of the basis joints of the thoracic legs are dilated or distinctly carinated; the rami of the uropoda are slender and rounded at the distal ends. Length of the larger example about 11 lines, breadth $5\frac{1}{2}$ lines.

Two specimens are in the collection, both presenting the characters of the female sex, the brood-pouches being developed. The length of the smaller is 8 lines.

The dilatation of the antennal joints is analogous to that characteristic of the genus *Ceratothoa*; but the antennæ are remote from one another at their base.

Lironeca emarginata, Bleeker.

This species is represented in the collection by a single specimen (a female) of large size (nearly 1 inch 4 lines).

The *Lironeca laticauda* described by me (P. Z. S. 1877, p. 677, pl. lxxix. fig. 5) from Manchuria is distinguished by the form of the front, which is not produced, by the much broader coxal joints of the thoracic legs (which are not fully exhibited in the dorsal view of the animal given in the figure cited above), and the more dilated basis joints of the three posterior pairs of thoracic limbs.

Lironeca Renardi, Bleeker.

Of this species (as of the preceding) there is in the collection only a single specimen (a female). The strongly-lunate form of the first segment of the body, with its projecting antero-lateral lobes, gives it a resemblance to *Cymothoa irregularis*. Length $\frac{2}{3}$ inch (8 lines). Both this and the preceding species are stated by Bleeker to have been taken from the skin of various fishes inhabiting the sea of Batavia. *L. Renardi* bears a considerable resemblance to the freshwater *L. daurica*, described by me (l. c. p. 676, pl. lxxix. fig. 4)

from the River Onon, in Dauria, South-eastern Siberia, but may be distinguished by the form of the coxæ, which in *L. Renardi* extend along the whole length of the lateral margins of the segments of the body to which they are respectively attached. Of *L. Renardi* there is in the Museum collection a female taken from a species of *Mugil* inhabiting the Indian seas (*Dr. F. Day, F.L.S.*).

L. daurica is very closely allied to *L. Jellinghausii* (*Ichthyoxenus Jellinghausii*, Herklots, Arch. Néerlandaises, v. p. 128, pl. v. fig. 10-18) from the fresh waters of Java, with which I should be inclined to unite it, were it not for the widely separated localities of the two species, as it apparently differs in nothing but the somewhat shorter uropoda of the penultimate segment.

I have no information as to whether *L. daurica* penetrates the body of its host behind the ventral fins, as does *L. Jellinghausii*. Except for its peculiar habitat, I can see nothing to distinguish *Ichthyoxenus* from *Lironeca*; but because Herklots had described the Javan species as a distinct genus I did not suspect its affinity with the Daurian form when I described the latter.

It does not appear that a generic character can be found in the position of the coxæ, *i. e.* their insertion in the angles between the thoracic segments, since Herklots notes a variation of this character in specimens he considers to be males of *L. Jellinghausii**.

Lironeca Boscii, Bleeker.

A considerable series is in the collection. The largest example (length about 10 lines) exhibits the characters of the male sex, and is the only one in which they are distinctly observable. The greater number are well-developed females, the largest being about 9 lines long ($\frac{3}{4}$ inch).

Lironeca ornata, Heller, from Sambelong, is a nearly allied form, but is distinguished by the triangular terminal segment, which is produced greatly beyond the extremity of the rami of the uropoda.

* Closely allied species are in the Museum collection from the Mauritius (*R. Templeton, Esq.*), designated, but not described, by White as *Cymothoa micronyx*, and from Australia (*Earl of Derby and J. B. Jukes, Esq.*), as *Cymothoa contracta*. *Lironeca contracta* is apparently distinguishable by the much broader, more dilated basis joints of the four posterior thoracic limbs and subacute rostrum, *Lironeca micronyx* by the transverse terminal segment and the less marked carina of the posterior thoracic limbs; the specimens of the latter species, however, are much shrivelled from having been preserved in a dry state. In all of the above the coxæ are inserted in the angles between the thoracic segments.

Lironeca lata, Dana, from the Sandwich Islands, seems to be in some degree intermediate between this species and *L. emarginata*, as in it the head is somewhat more deeply encased in the first segment of the body, but the terminal segment does not project beyond the extremity of the uropoda.

Lironeca pterygota, Kölbel.

This species is represented in the collection by a single specimen of very small size (length $4\frac{1}{2}$ lines) found among specimens of *Nerocila phaeopleura*. It agrees with Kölbel's description in all respects, except in the somewhat longer antennæ, the superior pair reaching to the posterior margin of the head, and the inferior pair to the middle of the lateral margins of the first thoracic segment. The very unequal development of the coxæ (those of the convex side of the body being much the larger) would seem to distinguish it from *L. Boscii*, to which, in its distorted form, it bears much external resemblance.

Nerocila trivittata, Bleeker.

This species, which, according to Dr. Bleeker, inhabits the seas of Amboina, is represented in the collection by a single specimen (a female, length nearly 9 lines). Dr. Bleeker's description was drawn up from a unique specimen; but the example before me is probably not the one figured by him, which is of larger size and may have been one obtained subsequently.

Nerocila phaeopleura, Bleeker.

A large series of specimens are in the collection, of which the greater number are females with well-developed brood-pouches. Length of a full-sized example 1 inch, of one of the smallest 7 lines. There are several specimens in which no brood-pouch exists; but in none of these have I observed external male organs. Length of one of the largest 9 lines.

Nerocila dolichostylis, Kölbel, is a nearly allied form, but distinguished by having the postero-lateral angles of all the segments produced into spines. In *N. phaeopleura* usually only the first and seventh segments are thus produced.

Nerocila laevinota, sp. n. (Pl. XV. figs. 15, 16.)

Body narrow-oval, about two and a half times as long as its greatest breadth, rather convex. Head with the frontal margin produced, rounded, and concealing the bases of the antennæ. Thoracic segments with their tergal portions smooth, and in no case produced at the postero-lateral angles;

the coxal joints of the second to fifth legs are posteriorly acute, but not produced beyond the postero-lateral angles of the segments; those of the sixth and seventh legs are more elongated, and form distinct spines. The lateral prolongations of the second (first exposed) and third postabdominal segments are elongated, laterally compressed, and acute; those of the fourth to sixth segments do not exceed half the length of the preceding; the terminal segment is large, flat, with the sides straight and parallel, with its distal end rounded, and with a longitudinal median raised line in the middle of its upper surface. The eyes are placed close to the postero-lateral angles of the head; the anterior antennæ are 8-jointed, reach a little beyond the posterior margin of the head, with the basal joint enlarged and subglobose; the posterior antennæ also are about 8-jointed. The dactyli of the four anterior thoracic legs are long and strongly curved; the rami of the uropoda unequal, the outer the longer and straight, the inner with a distinct tooth on its inner margin and with the distal extremity acute. Length about 1 inch.

West Borneo (an adult female).

The absence of tergal spines, the form of the coxæ and of the rami of the uropoda suffice to distinguish this species from its congeners. It is perhaps most nearly allied to *Nerocila aculeata*, an Indian species described by Milne-Edwards; but in this species the postero-lateral angles of the thoracic segments are produced into distinct spines.

A specimen from the Malabar coast in the British-Museum collection is allied to both *N. aculeata* and *N. levinota*, but apparently distinct from either. The length of the body barely exceeds twice its greatest breadth. The postero-lateral angles of the tergal portions of the fifth to seventh thoracic segments are produced into small distinct spines, as in *N. aculeata*; the form of the lateral prolongations of the segments of the postabdomen and of the uropoda, however, is nearly that of *N. levinota*. It is distinguished from both species by the great development of the coxal spines of the sixth and seventh legs, which are acuminate and nearly twice as long as the segments themselves (see Pl. XV. fig. 17). This I will designate *N. longispina*. It is possible that a large series would show intermediate gradations between the three forms; but, apart from such evidence, they must be regarded as distinct*.

* *Nerocila congener* is a name applied by White, without description, to a remarkable species of this genus in the Museum collection from the Philippine Islands. It is distinguished by the form of the head, which has the anterior margin broadly rounded and produced, so as almost

Nerocila (Emphyllia) sundaica?

♀ *Nerocila sundaica*, Bleeker, t. c. p. 26, pl. i. fig. 4 (1857).

Emphyllia ctenophora, Kölbel, Sitz. Ak. Wien, lxxviii. p. 414, pl. ii. fig. 4 (1879).

This fine species is represented in the collection by five specimens (four of which are well-developed females). Length of the largest about $1\frac{1}{4}$ inch; the smallest example (length 1 inch) has no brood-pouch. These agree with the description of Bleeker in all essential particulars, and also with that of Kölbel, whose excellent figure leaves me in little doubt of the identity of the specimens before me with his *Emphyllia ctenophora*. Bleeker's figure, however, differs in some important points; e. g. the basal joints of the antennæ are not represented as dilated, but of the form ordinarily characteristic of *Nerocila*, and the inner rami of the uropoda as somewhat sinuated and not shorter than the outer. In all other respects the figure seems to be a very fair representation of *Emphyllia ctenophora*. But in four out of five of the specimens of *N. sundaica* in the collection, the superior antennæ have their basal joints less dilated than in Kölbel's figure, and not in contact, but separated by an interval of varying width; moreover I have shown, in the case of *Anilocra leptosoma*, that the accuracy of the minuter details of Bleeker's plates is not always to be relied upon. Thus, also the outer rami of the uropoda of *Nerocila sundaica* are described by Bleeker as much longer than the inner (in this agreeing with specimens before me), although, as stated above, both rami are represented as subequal in the figure.

On account of the variation in the dilatation of the basal antennal joints, it seems to me doubtful whether the genus *Emphyllia* can be permanently maintained; but until a complete transition has been observed from it to *Nerocila*, it may be useful to retain it at least as a subgenus.

Corallana macronema.

♂ *Ega macronema*, Bleeker, t. c. p. 23, pl. i. fig. 1 (1857).

Two specimens (males) are in the collection. Length of the largest 9 lines. These specimens must, I think, certainly be referred to *Corallana*, and the species placed near *C. basalis*

completely to conceal both pairs of antennæ. The postero-lateral angles of the first segment of the body are produced into a small acute tooth, and those of the seventh segment into a broader less acute lobe. The coxæ of all the thoracic limbs are rather broad, posteriorly acute, but do not project greatly beyond the postero-lateral angles of their several segments. The uropoda are wanting. Length 1 inch 2 lines.

and *C. collaris*, in the classification recently proposed by Schiödte and Meinert (Nat. Tidsskr. p. 287, 1879), on account of the distinct but narrow linear interantennular process (*lamina frontalis*). The maxillipedes are slender, the basal portion not exceeding the terminal palpus in width, and the six anterior legs armed with a very small terminal claw.

SUCTORIA *vel* RHIZOCEPHALA.

Sacculina rotundata, sp. n. (Pl. XV. figs. 18, 19.)

The animal in outline is transversely oval, somewhat compressed, without any trace of the depression at the proximal end of the sac which characterizes several of the oriental species recently described by Kossmann (Arbeit. zool.-zootom. Inst. Würzburg, i. pp. 121-136, 1872-74).

The integument (unless microscopically examined) appears smooth, but is transversely wrinkled, on account, perhaps, of the long immersion of the specimen in spirits. On that surface of the sac which is applied to the sternum of the crab on which the *Sacculina* is parasitic are two wide and shallow concavities, separated by an obtusely rounded longitudinal median ridge which fits into the sternal suture (as in *S. corculum*). The opposite face of the sac (*i. e.* that applied to the abdomen of the crab) is regularly convex. The funnel-shaped oral aperture is moderately produced, and very similar to that of *S. corculum* as figured by Kossmann (*t. c.* pl. v. fig. 1 a); the distal aperture of the sac (*Mantelöffnung*) is placed on the sternal surface, and does not project at all from the plane of the body. Length 5 lines, breadth 7 lines.

A single specimen is in the collection, parasitic on a male example of *Eriphia levimana*, without definite locality.

I cannot identify it with any of the numerously described species; but as I have not had the opportunity of comparing it with any of Kossmann's types, it is with much hesitation that I regard it as distinct.

In most particulars this species is very nearly allied to *S. corculum*, Kossmann (*t. c.* p. 122, pl. v. fig. 1), parasitic on *Atergatis floridus* from the Philippines. It differs chiefly in the transverse oval, not cordiform shape of the sac. The integument is armed with numerous minute spicules, which are most abundant and conspicuous near the distal opening, but quite imperceptible except under the microscope. They seem to be rooted in the cellular tissue, beneath the outer cuticle, and furthermore differ from the spinules of *S. corculum*, and more nearly resemble the infracuticular spicules of *S. crucifera*, Kossmann, in being very slender, not broader at

base; their apices are somewhat blunt. Such, at least, is the form of spicules taken from the vicinity of the distal opening of the sac (Pl. XV. fig. 19).

XIPHOSURA.

Limulus moluccanus, Latr.

An adult male.

Limulus rotundicauda, Latr.

An adult female.

There is in the collection a specimen of small size (length of carapace about $1\frac{1}{4}$ inch) which probably belongs to this species. As in all young specimens I have seen, the spines of the dorsal surface of the cephalothoracic shield are considerably developed. None of the above has any special indication of locality.

EXPLANATION OF THE PLATES.

PLATE XIII.

- Fig. 1. *Cyclocecoma tuberculatum*, gen. et sp. nov. (nat. size).
 Fig. 2. Inferior view of buccal, antennal, and orbital region of the same ($\times 2$ diam.).
 Fig. 3. Inferior view of part of the antennal and orbital region of *Liomeria Rodgersii*, Stimpson ($\times 4$ diam.).
 Fig. 4. *Pilumnopus granulatus*, sp. n. ($\times 1\frac{1}{2}$ diam.).
 Fig. 5. Inferior view of buccal, antennal, and orbital region ($\times 2$ diam.).
 Fig. 6. Outer view of chela of the unique example (a female) ($\times 1\frac{1}{2}$ diam.).

PLATE XIV.

- Fig. 1. *Telphusa sumatrensis*, sp. n., ♂ ($\times 1\frac{1}{2}$ diam.).
 Fig. 2. Outer view of larger hand of the same ($\times 1\frac{1}{2}$ diam.).
 Fig. 3. Outer view of hand of *Sesarma granosimana*, sp. n., ♂ ($\times 1\frac{1}{2}$ diam.).
 Fig. 4. Third maxillipede of *Pinnotheres obesus*, Dana? (considerably magnified).
 Fig. 5. *Matuta circuliifera*, sp. n., ♂ (nat. size).
 Fig. 6. *Eupagurus japonicus*, Stimpson ♀ (nat. size).
 Fig. 7. Rostrum and ophthalmic scales of the same ($\times 2$ diam.).
 Fig. 8. Coxæ of the fifth ambulatory legs of male *Cænobita perlata*, var. *affinis*, n. ($\times 2$ diam.).

PLATE XV.

- Fig. 1. Antero-lateral margins of *Dromia (Dromidia) orientalis*, sp. n., showing the form and disposition of the teeth (nat. size).
 Fig. 2. Sternal sulci of the same (nat. size).
 Fig. 3. Rostrum of *Atya moluccensis*, sp. n. (nat. size). 3 a, teeth of the inferior margin of the same (magnified).
 Fig. 4. Third cephalothoracic leg of the same (nat. size).

- Fig. 5. Rostrum of *Atya spinipes*, Newport P, from the Samoa Islands (nat. size). *6 a*, teeth of the inferior margin of the same (magnified).
- Fig. 6. Third cephalothoracic leg of the same, showing the specific distinction between this species and *Atya moluccensis* (nat. size).
- Fig. 7. Lateral view of the second postabdominal segment of *Enoplometopus dentatus*, sp. n. (nat. size).
- Fig. 8. Basal portion of one of the third cephalothoracic legs of *Penæus Joyneri*, sp. n., showing the remarkable appendage of the second or basis joint ($\times 2$ diam.).
- Fig. 9. Basal portion of fourth cephalothoracic leg of the same, showing the dilatation and inferior tooth of the merus joint ($\times 2$ diam.).
- Fig. 10. Basal portion of the fifth cephalothoracic leg, showing the form of the merus joint ($\times 2$ diam.).
- Fig. 11. *Renocila orata*, gen. et sp. nov. ($\times 1\frac{1}{2}$ diam.).
- Fig. 12. Head and antennæ of the same, dorsal view ($\times 2$ diam.).
- Fig. 13. Inferior view of head, showing the form of the front and inferior antennæ ($\times 2$ diam.).
- Fig. 14. Inferior view of postero-lateral lobe of the sixth thoracic segment, showing the position of the small coxa ($\times 3$ diam.).
- Fig. 15. *Nevocila lævinota*, sp. n. ($\times 1\frac{1}{2}$ diam.).
- Fig. 16. Lateral view of coxa of sixth thoracic leg ($\times 2$ diam.).
- Fig. 17. Lateral view of coxa of the same limb in *N. longispina*, sp. n. ($\times 2$ diam.).
- Fig. 18. *Sacculina rotundata*, sp. n. ($\times 2$ diam.).
- Fig. 19. Spicules from the epidermis of the same, as seen under a $\frac{1}{4}$ -inch objective.

XLII.—Description of a new Bat from Java, of the Genus *Kerivoula*. By OLDFIELD THOMAS, F.Z.S., Assistant in the Zoological Department, British Museum.

THE specimen upon which this description is based was obtained by Mr. H. O. Forbes at Kosala, near Bantam, Java, 2100 feet above the sea, on the 24th of September, 1879, and is now in the British Museum.

Kerivoula javana, sp. n.

Fur greyish black, each hair being nearly black for its proximal third, then white for the middle third, the end being black, with sometimes a shining white tip. Ears rather short; laid forward they reach to about halfway between the eyes and the tip of the nose. Shape of ears and tragus exactly as in *K. Jagori**, the former having the second small concavity in the middle of the outer edge, and the latter the deep horizontal

* Peters, MB. Ak. Berl. 1866, p. 399; Dobson, Cat. Chir. B. M. p. 338.

notch above the external basal lobule described in that species, as shown in the woodcut. Distribution of fur as in *K. papuensis**, there being short shining yellowish hairs thickly set along the forearm, on the thumb quite to the claw, all along the second finger, on both phalanges of the third, and on the distal phalanges of the fourth and fifth fingers. There are also a few hairs on the proximal end of the fifth metacarpal. The tail and the hind limbs quite to the bases of the claws are covered with similar hairs; the edge of the interfemoral, however, is without a fringe. The teeth are quite similar to those of *K. papuensis*.



K. javana is thus intermediate between *K. Jagori*, a Philippine species, and *K. papuensis* from New Guinea, differing from the latter in the shape of the ears and tragus, and by the absence of an interfemoral fringe, and from the former by the presence of fur upon the limbs, that species having these quite naked†. It differs from both, however, in the tricolor character of the fur, as they are of a nearly uniformly dark reddish-brown colour, though the tips of the hairs are lighter.

Measurements of the type, an adult female in spirit:—Length, head and body 1''·93, tail 1''·72, head 0''·78, ear 0''·6, tragus 0''·37, forearm 1''·53, thumb 0''·27, third finger 3''·0, fifth finger 2''·2, tibia 0''·72, foot 0''·35.

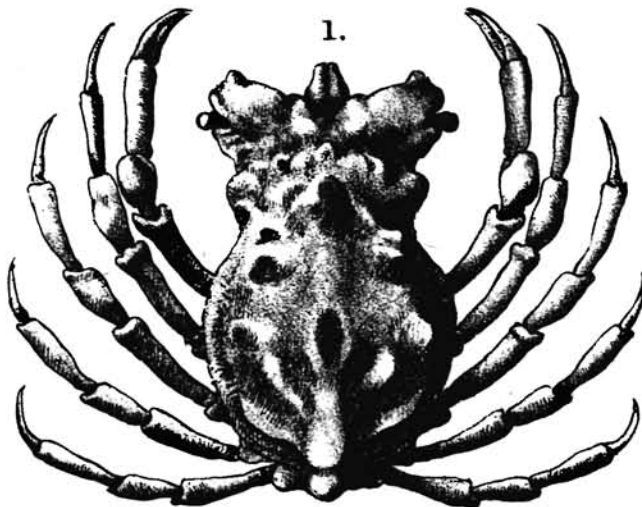
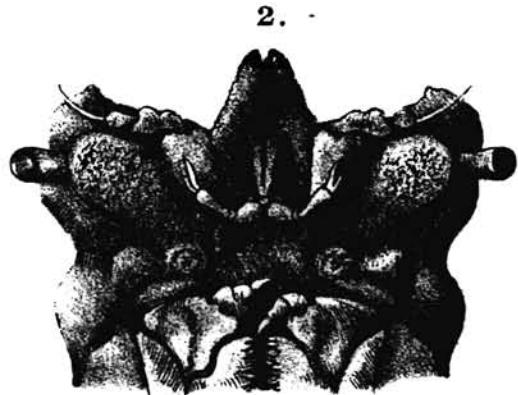
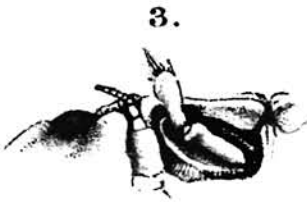
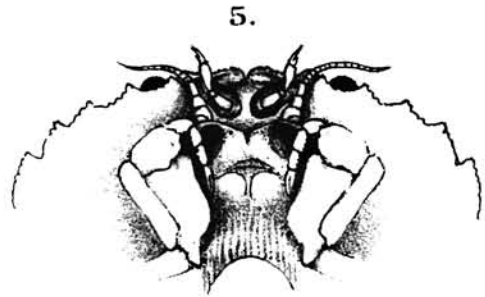
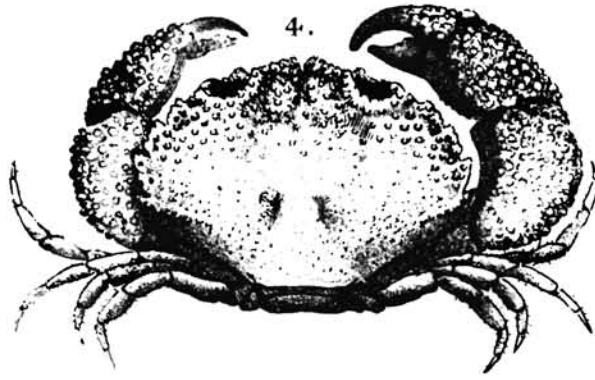
XLIII.—Notes on the *Gasteropoda* contained in the Gilbertson Collection, British Museum, and figured in Phillips's 'Geology of Yorkshire.' By R. ETHERIDGE, Jun., F.R.Ph.S.Ed.

In the 'Geological Magazine' for April 1879 (no. 178) I gave a few brief notes on the Bivalves contained in Gilbertson's collection of Carboniferous-Limestone fossils in the British Museum, and the majority of which were made the subject of illustration in the second volume of Phillips's work, 'Illustrations of the Geology of Yorkshire,' part 2, "The Mountain-Limestone District."

I now purpose following up this subject by an examination of the *Gasteropoda*, and in the present communication shall

* Dobson, *tom. cit.* p. 330.

† Cf. Dobson, *tom. cit.* p. 332.



1.



4.



7.



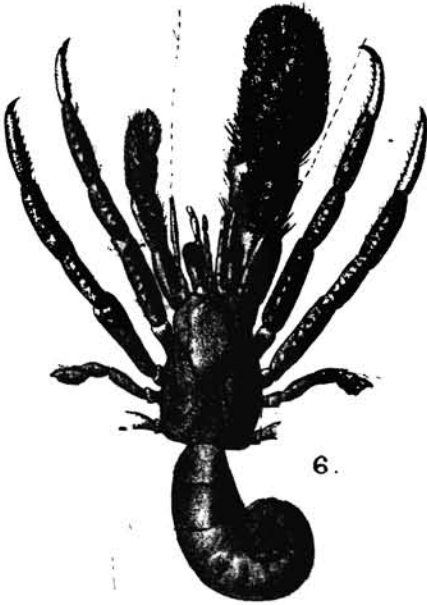
8.



3.



6.



2.



5.

