

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.

*DROMIIDEA*.

*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, infraocular 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 pterygostomian 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*, *Pyrasmus*, 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 *Pyrasmus* 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*.

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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 chelipedes, &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. Eye-peduncles 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  $\frac{2}{3}$  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.

##### *Thalassina 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?

Samangkabaai, Tandjong (an adult male); Borneo, Bandjermassin (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 Chilian 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. æquinoctialis*, *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 Samangkabai, 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. Hügeli*, 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 examined, 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. 3 (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 ( $\frac{12}{9}$ ). In the larger examples the rostra are respectively  $\frac{15}{12}$ - and  $\frac{13}{10}$ -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 Alphonsianus*, Hoffmann, Rech. faune Madagascar, Cr. p. 35, pl. ix. figs. 63-65 (1874).

Samangkabai, 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.]

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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-