

## PLATE IV.

- Fig. 4. *Dero Perrieri*, as a transparent object, showing arrangement of blood-vessels &c. After Perrier.
5. The same, in optical longitudinal section: *a*, integumental layer; *b*, ciliated layer; *c*, blood-vessels. From life.
6. The same. Dorsal view of branchial area. From life.
7. The same. Lateral view of branchial area. From life.  $\times 30$ .
8. *Dero latissima*. Dorsal aspect of branchial area. From life.  $\times 80$ .
9. *Dero Mülleri*. A similar view. From life.  $\times 125$ .
10. Setae of ditto: *a*, ventral seta of second to fifth segments; *b*, hooked dorsal seta of the same segments.

## PLATE V.

- Fig. 11. *Dero limosa*. Dorsal view of expanded area. From life.  $\times 50$ .
12. The same. Lateral view of expanded area. From life.  $\times 50$ .
13. The same. Dorsal view in outline. After Leidy.
14. The same. Ventral view of contracted area. Photographed from life.
15. The same. Ventro-lateral view. Photographed from life.
16. Setae of *D. limosa*: *a*, ventral seta of second to fifth segments; *b*, ventral seta of sixth and following segments; *c*, hooked dorsal setae.
17. *Dero furcata*. Dorsal view of branchial area. From life.  $\times 80$ .
18. The same. Lateral view. From life.  $\times 60$ .

Notes on a Collection of Crustacea from Singapore.

By ALFRED O. WALKER, F.L.S.

[Read 17th March, 1887.]

(PLATES VI.-IX.)

TOWARDS the end of the year 1879 my friend Mr. F. Archer, of Liverpool, requested me to undertake the naming of a collection of Crustacea which his brother, Surgeon-Major Archer, was then sending over from Singapore. Pressure of other work and want of acquaintance with exotic Crustacea, not to mention the fact of my residing at a distance from London (where alone the necessary works of reference can be procured), caused me to hesitate long before I undertook it; and it was not until it became clear that nobody else in England would undertake the work (such is the scarcity of carcinologists) that I finally decided to do so. I may also add that had it not been for the kind assistance rendered by Mr. E. J. Miers, which gave me the start without which the task would have been almost impossible, I should have given it up at the outset.

Surgeon-Major Archer has furnished me with the following memorandum on the collection, which extended over the years 1879 to 1883 :—

“The species collected were for the most part obtained whilst dredging or searching the reefs in the neighbourhood for Molusca. The Singapore Strait presents every variety of bottom within a few miles of the town—mud, gravel, sand, rock, and broken ground, may all be met with, each description furnishing its peculiar species. Most of the smaller forms were obtained by means of the dredge at depths seldom exceeding 15 to 20 fathoms. Some of them I extracted from living sponge and interstices of masses of coral. The new harbour, a narrow strait between the islands of Blahan Moti and Ayan Brani on the one side and Singapore Island itself on the other, was the most favourite dredging-ground, as it was conveniently situated and the bottom abounded in animal life. At low water I frequently waded about the reefs and shores of the numerous islands, and obtained many specimens under loose stones and lumps of coral, dead or living.

“The spring tides rise a full ten feet, and between the islands the currents are very strong, at times rendering it difficult for a steam-launch to make way against them. I am not aware what direction ocean currents, if any, take in the Strait.

“A long sandy shore extends to N. of Singapore, from Tanjong Rhoo to Tanjong Katong and other villages; and at spring tides the water recedes a considerable distance, leaving bare extensive banks of sand and mud, where I got a good many forms (amongst them two species with curved hooks on their hindmost claws, by means of which they hold on to a mangrove-leaf or a dead valve of a shell which conceals the animal from view; these leaves and dead valves may be seen apparently walking along on the shore). [These are probably *Dorippe sima* and *D. astuta*, also *Conchæcetes conchifera*.—A. O. W.]

“From the nets of the fishermen on this shore I also got a good many specimens, as likewise from the heaps of small fish, weed, &c., brought by the Chinamen into the market to be sold as food or manure.”

The collection is placed in the Public Museum, Liverpool, and duplicates of some of the new species in the Natural History Museum, South Kensington.

*Crustacea collected at Singapore by Surgeon-Major S. Archer.*

PODOPHTHALMIA.

BRACHYURA.

OXYRHYNCHA.

MAIIDÆ.

- Maia Miersii*, n. sp. (Plate VI. figs. 1-3.)  
*Oncinopus neptunus*, Adams & White.  
*Doclea muricata*, Herbst.  
 — *ovis*, Herbst.  
 — *tetraptera*, n. sp. (Plate VI. figs. 4-8.)  
*Egeria longipes*, Herbst.  
*Hyastenus oryx*, A. M.-Edwards.  
 — *planasius*, Adams & White.  
 — *diacanthus*, De Haan.  
*Schizophrys aspera*, M.-Edwards. (See note, p. 113.)  
*Micippa mascarenica*, Kossman.  
 — *curtispinga*, Haswell, Proc. Linn. Soc. N. S. W. vol. iv.  
 p. 446, pl. xxv. fig. 1.

PARTHENOPIDÆ.

- Gonatonotus pentagonus*, Adams & White.  
*Ceratocarcinus dilatatus*, A. M.-Edwards.  
*Lambrus laciniatus*, De Haan.  
 — *longispinus*, Miers, Ann. & Mag. Nat. Hist. ser. 5, vol. iv.  
 p. 18).  
 — *longimanus*, Leach.  
 — *prensor*, Herbst.  
*Cryptopodia fornicata*, Fabr.

CYCLOMETOPA.

CANCRIDÆ.

- Atergatis integerrimus*, Lamarck.  
 — *floridus*, Rumph.  
*Actæa spongiosa*, Dana.  
 — *areolata*, Dana, var.  
 — *Rüppellii*, Krauss; see Miers, in Ann. & Mag. Nat. Hist.  
 ser. 5, vol. v. p. 232.  
*Xantho scaberrimus*, n. sp. (Plate VII. figs. 1-4.)  
*Lophozozymus epheliticus*, Linn.

## ERIPHIIDÆ.

*Pilumnus vespertilio*, Fabr.

— *De Haanii*, Miers (Proc. Zool. Soc. 1879, p. 32).

— *labyrinthicus*, Miers (Zool. 'Alert' Collections, p. 224, pl. 22 c).

*Actumnus setifer*, De Haan.

*Eriphia larimana*, Latr., var. *Smithii*, M'Leay; see Miers, in Ann. & Mag. Nat. Hist. ser. 5, vol. v. p. 237.

*Trapezia cymodoce*, Herbst.

*Polycremnus ochtodes*, Herbst.

## CARCINOPLACIDÆ.

*Heteroplax dentatus*, Stimpson.

## RHIZOPIDÆ.

*Typhlocarcinus villosus*, Stimpson. (Plate IX. figs. 6-8.)

*Ceratoplax ciliatus*, Stimpson; 'Challenger' Report, vol. xvii. p. 234, pl. xix. fig. 3.

*Galene bispinosus*, Herbst.

## PORTUNIDÆ.

*Neptunus pelagicus*, Linn.

*Goniosoma natator*, Herbst.

— *crucifera*, Fabr.

— *inæquale*, n. sp. (Plate VIII. fig. 4.)

*Achelous Whitei*, A. M.-Edwards.

*Thalamita sima*, M.-Edwards.

*Caphyra Archeri*, n. sp. (Plate IX. figs. 4, 5.)

## C A T O M E T O P A.

## MACROPHTHALMIDÆ.

*Gelasinus vocans*, Linn.

*Podophthalmus vigil*, Fabr.

*Ocypoda ceratophthalma*, Pallas.

## GRAPSIDÆ.

*Grapsus strigosus*, Latreille.

*Pachygrapsus transversus*, Gibbes. (See note, p. 113.) Kingsley, Proc. Acad. Nat. Sci. Philadelphia, 1880.

*Sesarma Bocourti*, A. M.-Edwards. (Plate IX. fig. 9.)

## PINNOTHERIDÆ.

*Pinnotheres obesus*, Dana.

*Dotilla myctiroides*, M.-Edwards (Mélanges Carcinologiques).

## OXYSTOMATA.

## LEUCOSIIDÆ.

*Leucosia craniolaris*, Linn.

— *Whitei*, Bell.

— *marmorea*, Bell.

— *hematosticta*, Adams & White.

*Myra affinis*, Bell.

— *carinata*, Bell; see Miers, Trans. Linn. Soc. Zool. ser. 2, vol. i. p. 239.

— *australis*, Haswell, Proc. Linn. Soc. N. S. W. vol. iv. p. 50, pl. v. fig. 3.

*Philyra pisum*, De Haan.

*Nursia plicata*, Herbst.

*Oreophorus reticulatus*, Adams & White.

*Tlos muriger*, Adams & White.

*Arcania 11-spinosa*, Adams & White (= *A. pulcherrima*, Haswell, l. c. p. 58, pl. vi. fig. 4).

*Onychomorpha lamelligera*, Stimpson. (Plate VIII. fig. 3.)

## MATUTIDÆ.

*Matuta vitrix*, Fabr.

— *lunaris*, Herbst.

— *Banksii*, Leach.

## CALAPPIDÆ.

*Calappa lophos* (Herbst), var.  $\gamma$ , De Haan.

## DORIPPIDÆ.

*Dorippe sima*, M.-Edwards.

— *astuta*, Fabr., young.

## ANOMURA.

## DROMIIDÆ.

*Dromia vulgaris*, M.-Edwards; see Miers, Ann. & Mag. Nat. Hist. ser. 5, vol. v. p. 370.

— *Rumphii*? Fabr., young.

*Conchæetes conchifera*, Haswell.

## PORCELLANIDÆ.

*Petrolisthes dentata*, M.-Edwards; see De Man, Crust. of Mergui Archipelago.

— *corallicola*, Haswell, var. (Plate VIII. fig. 5.) See note, p. 118.

*Polyonyx obesulus*, White; see Zool. 'Alert' Collection, p. 372.

— *cometes*, n. sp. (Plate IX. figs. 1-3.)

*Porcellanella picta*, Stimpson. (Plate VIII. figs. 1, 2.)

## PAGURIDÆ.

*Diogenes miles*, Fabr.

*Clibanarius vulgaris*, Herbst.

*Cænobita perlata*, M.-Edwards.

*Diogenes avarus*, Heller. (Plate VIII. figs. 6, 7.) See note, p. 118.

## GALATHEIDÆ.

*Galathea elegans*, Adams & White.

## MACRUBA.

## GEBIIDÆ.

*Gebiopsis Darwinii*, Miers; see Zool. 'Alert' Collection.

## THALASSINIDÆ.

*Thalassina anomala*, Herbst.

## SCYLLARIDÆ.

*Thenus orientalis*, Herbst.

## PALINURIDÆ.

*Palinurus ornatus*, Fabr.

## ALPHEIDÆ.

*Alpheus comatularum*, Haswell.

— *minus*, var. *neptunus*, Dana.

— *Edwardsii*, Audouin.

## PALEMONIDÆ.

*Palæmon carcinus*, Fabr.

## PENÆIDÆ.

*Penæus monodon* (Fabr.), var. *carinatus*, Dana.

— *velutinus*, Dana.

— *affinis*, M.-Edwards.

*Acetes indicus*, M.-Edwards.

## STOMATOPODA.

*Squilla nepa*, Fabr.*Gonodactylus chiragra*, Fabr.

## NOTES ON CERTAIN SPECIES.

1. *SCHIZOPHYBS ASPERA*.—One specimen is the var. *spinifrons* of A. M.-Edwards.

2. *PACHYGRAPSUS TRANSVERSUS*, Gibbes, appears to be merely a variety of *Metopograpsus messor*.

3. *PORCELLANA* (? *PETROLISTHES*) *CORALLICOLA*, Hasw., var.—The single small specimen differs so much from the typical form in the sculpturing of the wrist and hand of the larger chelipede, that it is a question whether it ought to be referred to this species. The wrist has two rounded longitudinal ridges or carinæ. The upper surface of the hand is divided longitudinally into two unequal parts by a similar ridge, the space on each side of which is covered with tubercles. The fingers have a similar ridge on the outer surface. In the specimen in the British Museum from Queensland the central line of tubercles on the hand shows a tendency to fuse into a carina.

4. *DIOGENES AVARUS*, Heller, var.—I have some hesitation in referring the single specimen in the collection to this species, with which, however, it agrees except in having the margin of the carapace armed with three small teeth immediately beneath the upper external angle. The hand of the large chelipede is obsolete costate externally, but is more robust than in Heller's figure, resembling rather in this respect *D. granulatus*, Miers (Ann. & Mag. Nat. Hist. ser. 5, vol. v. p. 373, note). (Plate VIII. figs. 6; 7.)

In addition to the Podophthalmia there were a few Isopoda not yet examined, and a new Amphipod, *Byblis kallarthrus*, Stebbing, described by the Rev. T. R. R. Stebbing, in Proc. Zool. Soc. Jan. 19, 1886.

## DESCRIPTION OF NEW SPECIES.

*MAYA MIERSII*, n. sp. (Plate VI. figs. 1-3.)

Carapax ovalis, granulatus. Margo supraorbitalis spinis 2 longis; margo anterolateralis spinis 5, 2 primis minoribus. (Coll. Brit. Mus.)

Carapace ovoid, rather convex, with scattered hairs, and coarsely granulated. A long spine on the posterior gastric and another on the cardiac region in the central longitudinal line, with a shorter spine at each side of its termination on the posterior border. A long spine on the branchial region. Rostrum with two divergent spines about two sevenths of the length of the carapace and fringed with long hairs; beneath this the edge of the carapace is produced into a tooth bent downwards at a right angle. The basal joint of the outer antennæ is furnished with two spines, the shorter pointing downwards and the longer outwards. The lower orbital margin has a group of four tubercles about the centre. The upper orbital margin has a concave process or hood covering the inner orbital angle, and produced outwards into a long spine; there is a similar and parallel spine at the outer angle, and a small spine between the two. These are followed by five marginal spines, increasing in size to the last, which is equal in length to, and some distance in front of, the spine on the branchial region. The underside is coarsely granulated. The chelipedes in the male are shorter than the second pair of legs, and are slender, rounded, and very smooth. The hand to the base of the fingers is as long as the wrist, and about the same thickness. The fingers slender and without teeth, meeting at a short distance from the point. The remaining legs are moderately long (the second pair reaches slightly beyond the rostrum) and covered with long hairs. Length of carapace, exclusive of rostrum,  $1\frac{4}{5}$  in. (= 3.3 centim.). Width behind posterior marginal spines,  $1\frac{4}{5}$  in.

*DOCLEA TETRAPTERA*, n. sp. (Plate VI. figs. 4-8.)

*Carapax pyriformis tomentosus*; spina media posterior magna duplex. Pedes ambulantes alis fimbriatis instructi. (Coll. Brit. Mus.)

Carapace pyriform, having eight spines on the median line, of which the first (a little behind the eye), third, and seventh are very small. The last spine on the posterior margin is very large and double, the smaller branch pointing upwards and the larger backwards. Four spines on the lateral margin, the foremost being close to the outer angle of the buccal orifice, and smaller than the three following. A large spine on the metabranchial, and a smaller on the epibranchial, region. Rostrum horizontal, about one fifth of length of remainder of carapace, with short divergent spines at the tip. The whole of the carapace covered with a dense pubescence, the hairs of which are slightly thickened



towards the tip and mucronate (Plate VI. fig. 8). The hand is somewhat compressed, naked, carinate beneath, and finely granulate; the fingers are curved inwards and channelled. Wrist almost orbicular, and, as well as the arm, covered with a fine pubescence and fringed at the edge. The arm has a fringe or "wing" of club-shaped hairs on the upper, and two on the lower, side (Plate VI. fig. 8\*). The ambulatory legs have four similar wings on all the joints, which are pubescent, except the extremities of the tarsi, which are deeply channelled. Length of carapace to end of rostrum,  $1\frac{1}{8}$  in. (=4.2 centim.). Greatest width,  $1\frac{3}{8}$  in. (=3.5 centim.).

*XANTHO SCABERIMUS*, n. sp. (Plate VII. figs. 1-4.)

Carapax omnino verrucosus. Chelipedes verrucis magnis, pedes cæteri spinis instructi. (Coll. Brit. Mus.)

Carapace broader than long, moderately convex; regions and subregions strongly defined and covered with large granules, rounded in the central part and becoming more pointed towards the sides. Front 2-lobed. Antero-lateral margin with three prominent teeth, the hindmost being at the beginning of the branchial region, and the foremost (the smallest of the three) about halfway between that and the orbital margin; the central tooth about equidistant from the other two. Postero-lateral margin straight, not concave. Underside also densely granulate. The chelipedes covered with large granules, those on the hand being largest, especially on the outer side, on the lower half of which they are arranged in parallel rows, two of which terminate in carinæ on the fixed finger. The movable finger has a carina on the upper surface, with six granules gradually diminishing from a large one at the base, and two carinæ on the outer side. The walking-legs have a row of spines on the upper edge of the tarsal and carpal joints, with one or two more or less parallel rows below, and the lower edge slightly serrate at the distal extremity. The third and fourth pairs have a deep notch at the distal end of the merus. The fifth pair has a row of large irregular spines along the upper edge of the merus, with two ill-defined rows on the outer side and a row of smaller spines on the lower edge. Colour ashy, shading into dull yellow on the fingers. Length  $1\frac{3}{8}$  in. (=4.75 centim.). Breadth  $2\frac{1}{8}$  in. (=6.2 centim.).

*GONIOSOMA INEQUALE*, n. sp. (Plate VIII. fig. 4.)

Frons sexdentata. Margo antero-lateralis 7-dentatus, dentibus 2 et 5 minoribus.

Carapace rather convex, very finely granulate, with transverse interrupted beaded lines, one of which crosses the gastric region and has a group of larger granules in front of it and on each side. Front prominent, with six teeth, including orbital angle, the central pair the longest. Upper orbital margin with two small fissures and finely toothed. Antero-lateral margin with seven teeth, the first (the external orbital angle) being the largest, and the second and fifth the smallest; the third has a small accessory tooth at the base of its hinder margin. Chelipedes have the arm finely granulate and furnished with five prominent spines on the anterior border, of which the first is the smallest and the fifth situated some distance from the fourth; on the hind margin one spine at the distal extremity and another a little behind it. Wrist with two spines. Hand with three spines—one springing from the point touched by the overlapping part of the wrist, the other two near to and at equal distances from the base of the movable finger, where there are three tubercles. Fingers long, slender, and strongly carinated. Second pair of legs as long as the first. Merus of last pair of legs having a spine at the distal extremity of the hind margin. Length of carapace  $\frac{7}{8}$  in. (=1.3 centim.). Width of carapace  $\frac{9}{16}$  in. (=1.9 centim.).

*CAPHYRA ARCHERI*, n. sp. (Plate IX. figs. 4, 5.)

Carapax orbicularis albo-nitens. Frons prominens bilobata, dente magno utrinque instructa.

Carapace almost circular, finely granulate. Front of two semi-circular lobes, with a prominent tooth, formed by the anterior orbital angle, behind them; the lobes, teeth, and antero-lateral margin of the carapace finely denticulate. Chelipede (the right wanting in the single specimen) large; the hand about three fourths the diameter of the carapace, widening slightly towards the base of the fingers, and granulate, more coarsely on the under-side. Remaining legs short and robust, the last joint short and curved. Length (including front)  $2\frac{1}{4}$  lines (=4.75 millim.). Width 2 lines (=4 millim.).

*POLYONYX COMETES*, n. sp. (Plate IX. figs. 1-3.)

Carapax transverse ovatus. Chelipedes magni supra crinibus longis instructi; subtus albi, nitentes. (Coll. Brit. Mus.)

Carapace transversely ovate, very slightly convex, smooth, and shining; regions strongly defined, especially behind; edge fringed with long hairs. Front slightly prominent in the middle. Chelipedes very large, equal, densely covered on the upperside with long hairs, smooth and shining white on the underside; wrist shorter than the hand and hollowed out on the inner side. Next three pairs of legs short and weak, covered with long hair on the upperside; dactylus very small and curved; merus strong, as long as the two following joints. Last pair of legs long, slender, and almost naked; the last joint polished and horn-coloured, with a brush of hairs at the extremity. Length  $\frac{4}{12}$  in. (= 8 millim.). Width  $\frac{5}{12}$  in. (= 10 millim.).

## DESCRIPTION OF THE PLATES.

## PLATE VI.

- Fig. 1. *Maia Miersi*, ♂.  
 2. Ditto, underside of orbital region.  
 3. Ditto, abdomen.  
 4. *Doclea tetraptera*, ♂.  
 5. Ditto, underside of orbital region.  
 6. Ditto, left chelipede.  
 7. Ditto, abdomen.  
 8. 8\*. Ditto, hairs (magnified).

## PLATE VII.

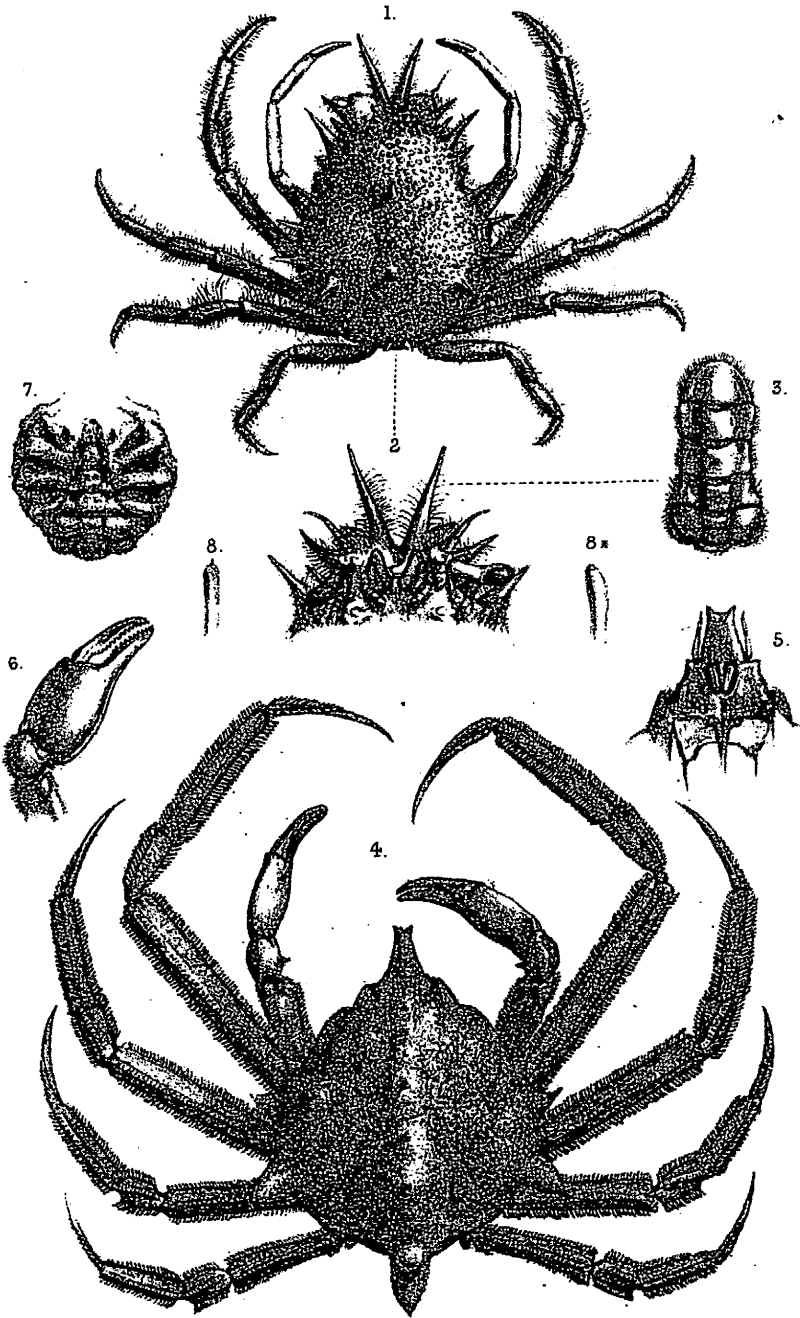
*Xantho scaberrimus*, ♂.

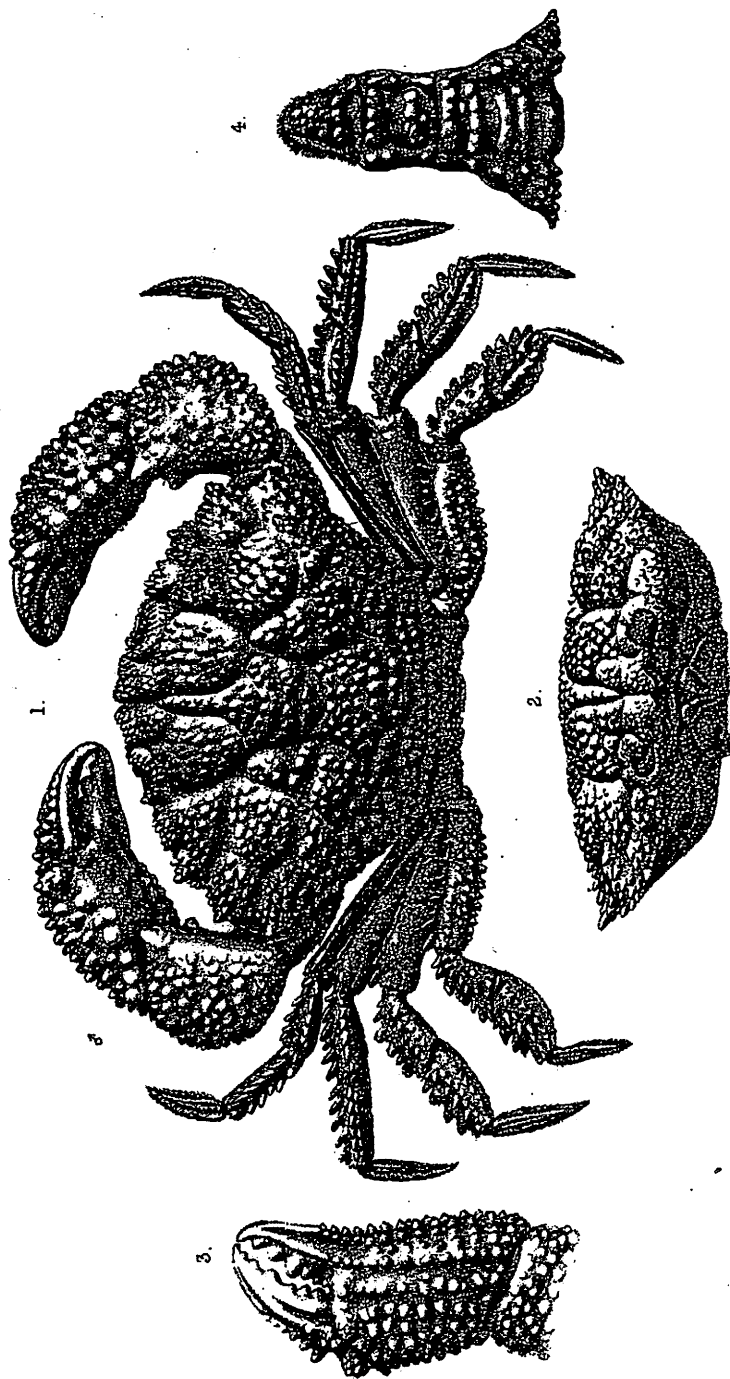
## PLATE VIII.

- Fig. 1. *Porcellanella picta*.  
 2. Ditto, left chelipede.  
 3. *Onychomorpha lamelligera*.  
 4. *Goniosoma inaequale*.  
 5. *Petrolisthes corallicola*, var., chelipede.  
 6. *Diogenes avarus*, cephalothorax.  
 7. Ditto, chelipede.

## PLATE IX.

- Fig. 1. *Polyonyx cometes*.  
 2. Front view of ditto.  
 3. Right chelipede of ditto.  
 4. *Caphyra Archeri*.  
 5. Chelipede of ditto.  
 6. *Typhlocarcinus villosus*.  
 7. Left chelipede of ditto.  
 8. Abdomen of ditto, ♂.  
 9. *Sesarma Bocourti*, chelipede of ♀.

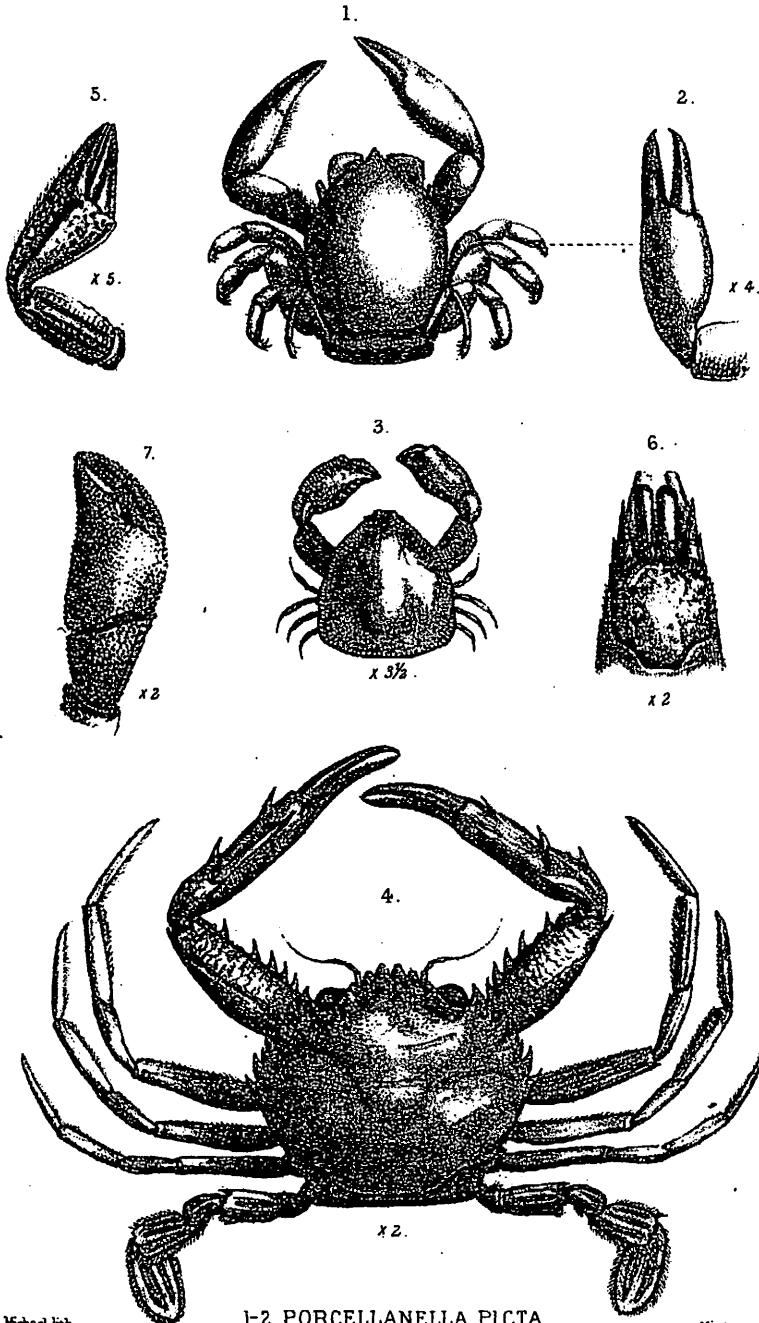




Crawther lith.

XANTHO SCABERRIMUS, *♂*.

Ministerra. imp.



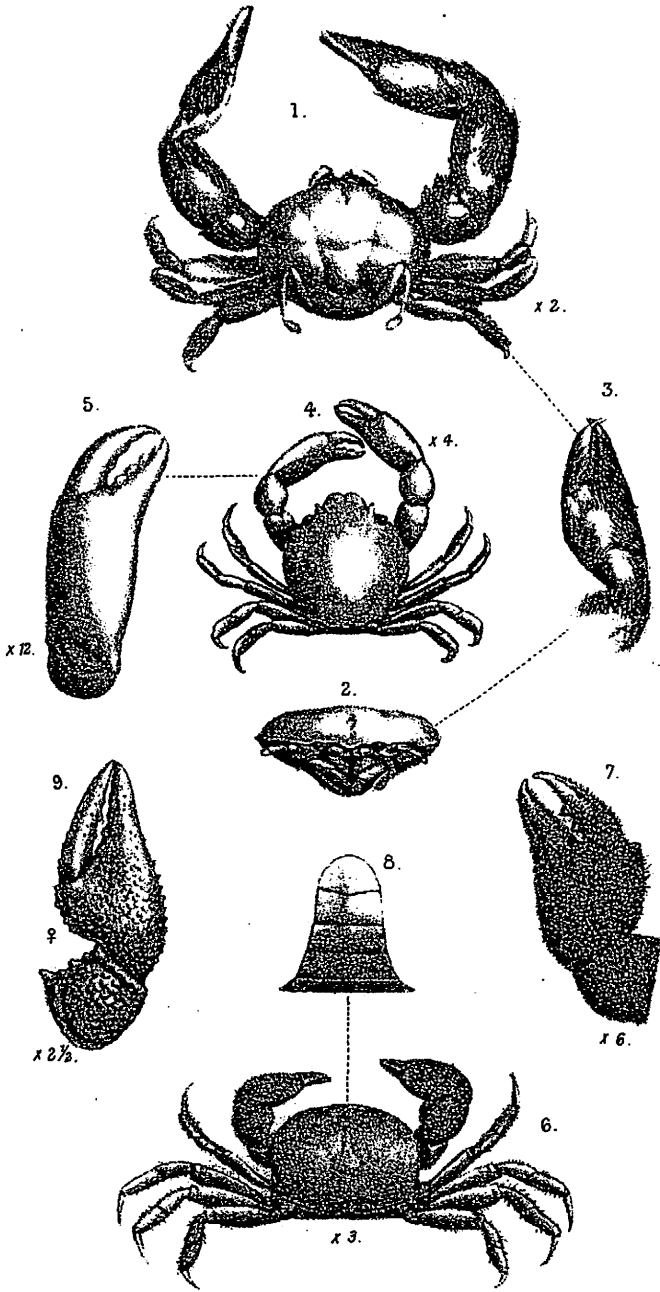
Michael ink.

1-2, PORCELLANELLA PICTA.

Mintern imp.

3, ONYCHOMORPHA LAMELLIGERA 4, GONIOSOMA INÆQUALE.

5, PETROLISTHES CORALLICOLA VAR 6-7, DIOGENES AVARUS



1-3, POLYONYX COMETES. 4-5, CAPHYRA ARCHERI. Crowther lith. 6-8, TYPHLOCARCINUS VILLOSUS. 9, SESARMA BOCOURTI, ♀. Mintern imp.