

trunk; with smooth hyaline spicules bearing peculiar digitiform terminal processes and showing very characteristic annulations, especially near the ends.

*Locality.* Cheval Paar, S.E. of Ceylon, 6 fathoms.

## EXPLANATION OF PLATE XVII.

*Fig. 1.* *Fusticularia Herdmani*, whole colony, natural size.

*Fig. 2.* Portion enlarged, showing the different stages of retraction of the autozooids.

*Fig. 3.* Transverse section of the stock, showing three central canals.

*Fig. 4.* Spicules of the cortical layer or cuticle.

*Fig. 5.* Spicules of the body-parenchyma.

*Fig. 6.* Spicules of the trunk.

LXXVIII.—*Natural History Notes from the R.I.M.S. Ship 'Investigator,' Capt. T. H. Heming, R.N., commanding.*—Series III., No. 9. *On a new Species of the Dorippoid Genus Cymonomus from the Andaman Sea, considered with reference to the Distribution of the Dorippidæ; with some Remarks on the allied Genus Cymonomops.* By A. ALCOCK, M.B., LL.D., F.R.S., Superintendent of the Indian Museum and Professor of Zoology in the Medical College of Bengal.

[Plate XVIII.]

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1. *Cymonomus* and the *Dorippidæ*.
2. *Cymonomus* characterized, and *C. andamanicus* distinguished and differentiated.
3. Geographical Distribution of *Cymonomus* and other Dorippoid Genera.
4. Remarks on the Genus *Cymonomops*.
5. List of the *Dorippidæ*.

1. *CYMONOMUS* AND THE *DORIPPIDÆ*.

The small blind deep-sea crabs of the genus *Cymonomus* have, in the 'Quarterly Journal of Microscopical Science' for December 1903, formed the subject of a paper, by Professor Ray Lankester, of much interest both biological and taxonomic; so that the discovery of a representative of the genus in the Andaman Sea may, perhaps, be thought worthy of independent notice, especially as it invites zoogeographical inquiries that seem to deserve consideration.

*Cymonomus* belongs to the Oxystome family Dorippidæ—a primitive family, in the typical members of which, as in



the still more primitive *Dromiacea*, the separation of the orbital and antennular fossæ is very incomplete, and the antenna is large and the elements of its peduncle are unusually distinct; and in which also, as in many of the *Dromides*, the last two pairs of thoracic appendages are subcheliform and reduced in size, have a strong dorsal elevation, and are often used for holding some kind of protective covering—such as a valve of a Lamellibranch shell, a worm-tube, a water-logged piece of drift vegetation, or sometimes an inert commensal—over the back, the habit indicating a passive disposition and a secluded life.

The family Dorippidæ at present embraces 10 genera and perhaps 50 recent species, many of which, in conformity with a well-established “law” applicable to primitive forms, have been driven into the depths of the sea.

[I must here remark that I do not include the genus *Palicus*, Philippi (= *Cymopolia*, Roux), with the Dorippidæ, although it was so placed by H. Milne-Edwards and is so retained by Bouvier. *Palicus* seems to me to be an aberrant Grapsoid. It may be added that this exclusion in no way affects the question here considered, since in the matter of geographical distribution *Palicus* presents no points of disagreement.]

## 2. *CYMONOMUS* CHARACTERIZED, AND *C. ANDAMANICUS* DISTINGUISHED AND DIFFERENTIATED.

### *CYMONOMUS*, A. Milne-Edwards.

*Cymonomus*, A. Milne-Edwards, Bull. Mus. Comp. Zool. Harvard, viii. 1, 1880, p. 26; Milne-Edwards & Bouvier, Crust. Décap. ‘Hiron-delle’ (Monaco, 1894), p. 57, and Mem. Mus. Comp. Zool. Harvard, xxvii. 1, 1902, pp. 72, 80; Bouvier, Bull. Soc. Philom. Paris, (8) ix. 1898, p. 59; Young, Stalk-eyed Crust. W. Indies, &c. 1900, pp. 321, 323; Lankester, Quart. Journ. Micr. Sci., Dec. 1903, p. 435.

Carapace square or squarish, not concealing the anterior segments of the abdomen; with the regions faintly defined, except the cardiac and postgastric, which are very distinct.

The front forms a rostrum, and the orbito-antennal border is prominent beyond the antero-lateral angles of the carapace; apart from this there are no indications of orbits or antennular fossæ.

The eye-stalks are either fixed or have their mobility diminished, and the eyes are unpigmented and vestigial.

The antennules are large and unconcealed. The antennal peduncle is not hidden and its renal tubercle is particularly prominent.

The buccal cavern is large and square; its roof is high



and is not well differentiated from the receding epistome, so that in an end-on view it is widely open, although ventrally it is closed by the external maxillipeds. The efferent branchial channels are separated, so that the endopodite of the first maxillipeds (which is so much produced in typical Oxystomes, where the channels lie side by side in the middle line of the palate) is of no great length, being much shorter than the exopodite.

In the first maxillipeds the epipodite is well developed, in the second it is almost vestigial, and in the third (external maxillipeds) it is small.

The external maxillipeds, though the ischium and merus are rather narrow, almost cover the buccal cavern ventrally, extending beyond the base of the antennal peduncles. The merus is produced far beyond the carpal articulation, so that it is not much shorter than the ischium. The flagellum is large, coarse, and completely exposed. No afferent branchial fissure is apparent between the carapace and the base of the chelipeds, this area being completely closed by the coxa of the external maxillipeds.

The chelipeds are equal, much shorter, and in the male considerably stouter, than the true crawling-legs.

The first and second pair of true legs are very long, especially as to the dactylus, and are somewhat compressed; the third and fourth pair are short, and in claw-like dactyli, and have the dorsal elevation usual for the family.

The abdomen is large, its breadth, even in the male, corresponding with that of the thoracic sternum; all its segments are distinct, and the three anterior ones are visible in a dorsal view. In the male there are two pairs of large abdominal appendages modified for sexual purposes; in the female, according to Bouvier, there are only three pairs of abdominal appendages.

The oviducts, according to Bouvier, open on the coxæ of the second pair of true legs.

The branchial formula given by Bouvier for the European and West Indian species, to which also the Indian species conforms, is as follows:—

Somites and their appendages.	Podo- branchiæ.	Arthro- branchiæ.	Pleuro- branchiæ.	Total.
VII. (1st maxillipeds).	epip. (large).	..	..	epip.
VIII. (2nd „ ).	vestigial epip.	..	..	vest. epip.
IX. (3rd „ ).	epip. (small).	2	..	2+epip.
X. (chelipeds) . . . .	..	2	..	2
XI. (1st true legs) ..	..	..	1	1
	<hr/>	<hr/>	<hr/>	<hr/>
	3 epip.	4	1	5+3 epip.



*Cymonomus andamanicus*, sp. n. (Plate XVIII.)

The entire surface of the body and of all the exposed parts of its appendages, except the terminal joint of the antennular peduncles, is finely frosted.

Carapace slightly, though manifestly, broader behind than in front, without any marginal spinules; the lateral borders are ill-defined posteriorly, and the posterior border is concave in the middle line; the usual regions and furrows are rather faintly indicated.

Rostrum triangular, acute, reaching to the middle of the eye-stalks: the frontal border on either side of it is advanced beyond the antero-lateral angles of the carapace, but the subantennal tooth, which is so conspicuous in *C. quadratus*, is small and quite invisible in a dorsal view, though plain enough in a side view.

The eye-stalks, which are rigidly fixed, divergent, and slightly curved, are devoid of hairs and enlarged spinules and do not reach the tip of the antepenultimate joint of the antennal peduncle; the eye is a small, smooth, unpigmented, subterminal patch.

The antennules are stout, and their peduncle is more than three-fourths the length of the carapace.

The antennæ are shorter and slenderer than the antennules; their peduncle does not reach the terminal third of the second joint of that of the antennules, and none of its joints are spinose; their lash is rather more than half the length of the carapace.

The gap between the epistome and the anterior end of the external maxillipeds is singularly wide and almost sub-tubular; on either side of the epistome is a spinule which may, perhaps, serve to separate the inhalant from the exhalant currents. The epipodite of the first maxillipeds is broadly foliaceous.

The chelipeds of the male are equal, about half again as long as the carapace, and not very massive; a spinule at the inner angle of the wrist and a few on the upper border and outer surface of the hand are enlarged; the hand is longer than the ischium and merus combined, the fingers are slightly longer than the palm and their cutting-edge is entire.

The first pair of true legs are about 3 times, the second pair about  $3\frac{3}{4}$  times the length of the carapace; their dactyli are subfalcate, that of the first pair contributing decidedly less, and that of the third pair a little more, than one third the total length of the appendage. The third pair of legs



are about once and a half, the fourth pair about once and a quarter, the length of the carapace, the dactylus in both having the form of a small claw.

The length of the carapace is 8.5 millim., the breadth posteriorly 8 millim., and the breadth across the antero-lateral angles 7 millim.

A single specimen was taken just inside the Andaman basin, at 'Investigator' Station 322: lat.  $11^{\circ} 26' 30''$ , long.  $92^{\circ} 53' 45''$ , depth 378 fathoms; bottom green mud with Foraminifera. Unfortunately the bottom-temperature was not recorded, but from previous observations we can infer that it was between  $47^{\circ}$  and  $48^{\circ}$  Fahr.

The chief differences between *C. andamanicus* on the one hand and the Atlantic species *C. granulatus* and *C. quadratus* on the other are as follows:—

The carapace is less square, its lateral borders being distinctly, if slightly, convergent anteriorly; its cervical and branchial grooves are somewhat fainter dorsally; and there are no spines at its antero-lateral angles. The rostrum also is broader and much less prominent.

The eye-stalks are quite immovable, and, though microscopically granulose, are not at all spinous.

The cutting-edges of the fingers of the chelipeds are not serrated, but, to the naked eye, are quite entire.

From *C. granulatus* the present species is further distinguished by the much smaller subantennal tooth at the outer angle of the buccal cavern; and from *C. quadratus* by the fact that the outer border of the antepenultimate joint of the antennal peduncle is not sharply serrated.

### 3. GEOGRAPHICAL DISTRIBUTION OF *CYMONOMUS* AND OTHER DORIPPOID GENERA.

The singular sort of residual distribution of *Cymonomus* requires to be explained, but as it fairly well exemplifies that of the family, it may be considered with that of all the other genera of the group, in the way that the subject has already been presented by Professor Bouvier, in his paper on the classification, origin, and distribution of the family, published in the 'Bulletin de la Société Philomathique de Paris' for 1896-1897, pp. 67-69.

1. DORIPPE, Fabr.—This genus, which is composed of 12 or 13 recent species, belongs to the fauna of the shallow water, not having hitherto been found outside the 60-fathom line. Its headquarters appear to be in South-eastern and



Eastern Asia, from the Bay of Bengal to Japan and Australia. On the other hand, two species occur in the Mediterranean, and one off the West Coast of Africa (Cape Verde to the Congo). One of the commonest Indo-Pacific species (*D. dorsipes*, L.) is also met with off the east coast of Africa.

2. *ETHUSA*, ROUX.—This genus consists of 14 species, and though found in the Mediterranean and in some parts of the Western Hemisphere, in quite shallow water (13-26 fathoms), commonly lives far down the submarine slopes between 200 and 1200 fathoms. The species are found off the west coast of Tropical America, from the Gulf of California to the Cocos Islands (Panama); in the region of the Gulf of Mexico, from Florida to the Antilles, and also further north off the south coast of New England; in the Eastern Atlantic in the neighbourhood of the Azores and Canaries; in the Mediterranean Sea and its Atlantic gate; and in Oriental Seas, from the Arabian Sea to Fiji.

3. *ETHUSINA*, S. I. SMITH.—Seven (or six) species are included in this genus and, among crabs, they are the deepest dwellers of any known, going down to abysses of nearly 2200 fathoms, although one—*E. Smithiana*, Faxon—has been taken in 134 fathoms. They have been dredged off the tropical Pacific coast of America, between the Galapagos and Cocos and the mainland; off the east coast of the Northern United States of America, as far as  $38^{\circ} 53' N.$ ; in the neighbourhood of the Azores, of the western coast of Morocco, and of the Cape Verde Islands; in the Arabian and Andaman Seas, and in the depths of the land-bound basins of the East Indian Archipelago; and off Japan, in  $34^{\circ} 37' N.$  According to Faxon, two of the Eastern Pacific species are identical with two from the western confines of the same ocean.

4. *TYMOLUS*, STIMPSON, is represented by a single species found in shallow water off Japan, about lat.  $42^{\circ} N.$  The genus is imperfectly known, but it appears to connect *Dorippe* and *Ethusa* with *Cyclodorippe* and *Cymonomops*.

5. *CYCLODORIPPE*, A. MILNE-EDWARDS.—This genus for the present embraces five sublittoral species, of which three occur in the West Indian region, from Florida to Trinidad, in 50 to 357 fathoms, while the other two are found in Japan between 35 and 200 fathoms. According to Bouvier, two of



the species referred by their authors to this genus—namely, *C. dromioides*, Ortmann, from Japan, and *C. granulata*, Rathbun, from off the island of Trinidad—may possibly belong to the next.

6. *CLYTHROCERUS*, Bouvier, at present stands for two species from the West Indies and adjoining coast of North America as far as 32° N., and inhabiting the sublittoral zone at a depth of 50 to 262 fathoms.

7. *CYMONOMUS*, A. Milne-Edwards.—Perhaps six species may be assigned to this genus, their bathymetrical range being from 101 to 1380 fathoms. Their area of distribution includes the Caribbean Sea, the eastern part of the North Atlantic from Iceland to the Arguin Bank off the Sahara (about 21° N.), the western part of the Mediterranean Sea, the east coast of Equatorial Africa, and the Andaman Sea.

8. *CYMOPOLUS*, A. Milne-Edwards, includes two species, one from 75 fathoms off the coast of Florida, the other from the West Indies (Montserrat), 148 fathoms.

9. *CORYCODUS*, A. Milne-Edwards, receives a single species from the West-Indian region and dredged in 175–250 fathoms.

10. *CYMONOMOPS*, Alcock, rests upon a single species found in the land-locked basin of the Andaman Sea at 265 and 405 fathoms.

The foregoing summary of the facts of distribution seems to me to support the opinion of Bouvier that the family Dorippidæ “appears to have had its centre of origin and dispersal in the Caribbean region.” It further seems to suggest an answer to the question whether the dispersion has been westwards by way of the Pacific or eastwards by way of the Atlantic. Of any emigration westwards through the Pacific we find very little evidence, while in the other direction the grouping of the family, on the one hand, in what may roughly be called the Panama and West-Indian region, and, on the other hand, in the seas of the Oriental region (India to Japan and Australia), with a halfway-house in the eastern part of the North Atlantic and the Western Mediterranean, seems capable of only one interpretation—namely, an open-sea connexion in the direction indicated by



the halfway-house at a time when the primitive crabs, which are now represented by a furtive remnant, were a more flourishing stock.

I may mention that this interpretation is confirmed by the distribution (tabulated in my 'Catalogue of Brachyura Primigenia in the Indian Museum') of three other families of primitive crabs, namely the Homolodromidæ, the Homolidæ, and the Latreillidæ; and though I must add that it finds no particular corroboration in the distribution of the Dynomenidæ and Dromidæ (which are also primitive groups related to the Homolidæ), I may suggest, as a necessary explanation, that the Dynomenidæ and Dromidæ are very largely shallow-water and littoral forms, whose distribution may have since been influenced by causes which would not affect species that had become adapted to deep-sea conditions.

I may also refer for corroborative evidence in this connexion to my paper in the 'Annals' for October 1904 on the distribution of the Amphibians of the family Cæciliidæ, in which also the suggestive geographical relations of the Indian sublittoral Paguridæ are tabulated.

#### 4. REMARKS ON THE GENUS *CYMONOMOPS*.

In the 'Bulletin de la Société Philomathique de Paris,' 8 sér. tom. ix. (1896-1897), and again in the Report on the Dromiacea and Oxystomes dredged by the 'Blake,' published in 1902, Professor Bouvier, who could not have seen my paper on Indian Oxystomata, published in the 'Journal of the Asiatic Society of Bengal' for 1896, complains that the affinities of *Cymonomops* have not been made clear; so I take this opportunity of re-characterizing this genus and of adding the necessary information regarding the structure of its mouth-parts, the distribution of its gills, and the position of the openings of the oviducts.

#### CYMONOMOPS, Alcock.

*Cymonomops*, Alcock, Ann. & Mag. Nat. Hist., May 1894, p. 406, and Journ. Asiatic Soc. Bengal, vol. lxxv. pt. 2, no. 2, 1896, p. 286; Bouvier, *loc. cit.*

Carapace almost semicircular in outline, not concealing the anterior abdominal terga, its grooves and regions fairly well defined.

The front consists of a narrow rostrum, not much breaking the general contour of the carapace and ending in two teeth,



between and beyond which can be seen, in a dorsal view, the roof of the much-produced efferent branchial canal. On either side of the rostrum are two teeth which form the dorso-lateral walls of the common orbito-antennular fossæ.

The eye-stalks are slender and freely movable; the eyes are almost without pigment.

The antennules, which are larger than the antennæ, are not entirely concealed in flexion.

The buccal cavern is of great length, its median efferent branchial canal, which is remarkably well defined, being prolonged anteriorly over the epistome and beyond the rostrum; it is closed ventrally and anteriorly, except as regards the tip of the branchial canal, by the long narrow external maxillipeds.

In the external maxillipeds the merus is about three fourths the length of the ischium, the flagellum (which is completely exposed) articulates near the middle of the merus and well inside its edge, the exopodite (which is broad and non-flagellate) is hardly longer than the ischium, and the epipodite is absent or minutely vestigial.

In the first maxillipeds the endopodite is nearly twice as long as the exopodite and is produced as far as the end of the efferent branchial canal, to which it forms a floor, as in typical Oxystomes; and the epipodite is large and foliaceous.

In the second maxillipeds the exopodite has the form of a lash and is much longer than the endopodite, and the epipodite also is of great length.

No afferent branchial fissure is visible between the carapace and the base of the chelipeds.

The chelipeds are equal and are much shorter, and in both sexes much stouter, than the legs.

The first and second pairs of true legs are stoutish and are of very great length, especially as regards the merus. The third and fourth pairs of legs are short, almost filamentous, and have the usual dorsal elevation.

The abdomen in the male is small, is not so broad as the corresponding part of the thoracic sternum, and carries two pairs of large appendages modified for sexual purposes; in the female it is large and broad and carries four pairs of appendages; in both sexes only six segments are distinguishable.

The oviducts open on the coxæ of the second pair of true legs.

The branchial formula is as follows:—



Somites and their appendages.	Podo- branchiæ.	Arthro- branchiæ.	Pleuro- branchiæ.	Total.
VII. (1st maxillipeds).	epip. (large)	..	..	epip.
VIII. (2nd „ ).	epip. (large)	..	..	epip.
IX. (3rd „ ).	..	2	..	2
X. (chelipeds) . . . .	..	2	..	2
XI. (1st true legs) ..	..	..	1	1
XII. (2nd „ „ ) ..	..	..	1	1
	2 epip.	4	2	6+2 epip.

In addition there are two microscopic filaments, probably the vestiges of a podobranch and arthrobranch, on somite VIII.

The genus is represented by a single species (which has been described in the 'Annals' and 'Journal' above cited, and figured on plate xiv. of the "Illustrations of the Zoology of the 'Investigator'") from the Andaman Sea, 265-405 fathoms.

#### 5. LIST OF THE DORIPPIDÆ.

I. DORIPPE, Fabricius, Entomol. Syst. Suppl. p. 361 (1798);  
M.-Edw. Hist. Nat. Crust. ii. 154.

1. *affinis*, Desmarest, Consid. Gén. Crust. p. 135 (1825) (? = *lanata*, Linn.).—Mediterranean.
2. *armata*, White, Miers, Ann. & Mag. Nat. Hist. (5) viii. 1881, p. 269, pl. xv. fig. 4.—Cape Verde to Congo.
3. *astuta*, Fabricius, *op. cit.* p. 361, *vide* Alcock, J. A. S. B. lxxv. pt. 2, 1896, p. 280.—Oriental and Australian.
4. *australiensis*, Miers, Zool. H.M.S. 'Alert,' pp. 185, 258, pl. xxvi. fig. D.—Australian.
5. *callida*, Fabricius, *op. cit.* p. 362; M.-Edw. Hist. Nat. Crust. ii. 157.—Mediterranean.
6. *dorsipes* (Linn.), Miers (Alcock, J. A. S. B. lxxv. pt. 2, 1896, p. 277; = *frascone*, Herbst, = *quadridens*, Fabr., = *quadridentata*, Edw., = *atropos*, Lam., = *nodulosa*, Lam.).—E. Africa to Japan and Australia.
7. *facchino* (Herbst), De Haan (Alcock, *t. c.* p. 278; = *sima*, M.-Edw.).—India to China.
8. *granulata*, De Haan, Faun. Japon., Crust. p. 122, pl. xxi. fig. 2 (1850).—China and Japan.
9. *histris*, Nobili, Boll. Mus. Zool. Torino, Dec. 1903, p. 24, and plate.—Singapore.
10. *japonica*, v. Siebold, De Haan, *l. c.* pl. xxxi. fig. 1.—Japan.
11. *lanata* (Linn.), Milne-Edwards, Hist. Nat. Crust. ii. 155.—Mediterranean and Atlantic Gate.
12. *polita*, Alcock & Anderson, J. A. S. B. lxxiii. pt. 2, 1894, p. 208, and Ill. Zool. 'Investigator,' Crust. pl. xxiv. fig. 4.—India.
13. *sexdentata*, Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 163.—Japan.



II. ETHUSA, Roux, Crust. Médit. 1828, pl. xviii. ; M.-Edw. Hist. Nat. Crust. ii. 161.

1. *americana*, A. Milne-Edwards, Bull. Mus. C. Z. Harvard, viii. 1880, no. 1, p. 30 ; Milne-Edwards & Bouvier, Mem. Mus. C. Z. Harvard, xxvii. no. 1, 1902, p. 67, pl. xiii. figs. 1-4.—California, Florida.
2. *andamanica*, Alcock, Ann. & Mag. Nat. Hist. (6) xiii. 1894, p. 405, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 8.—Andaman Sea.
3. *ciliatifrons*, Faxon, 1893, *vide* Mem. Mus. C. Z. Harvard, xviii. 1895, p. 34, pl. v. fig. 3.—Gulf of Panama.
4. *hirsuta*, McArdle, Ann. & Mag. Nat. Hist. (7) vi. 1900, p. 474, and Ill. Zool. 'Investigator,' Crust. pl. lxxii. fig. 1.—Arabian Sea.
5. *indica*, Alcock, Ann. & Mag. *l. c.*, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 2.—Indian Seas.
6. *lata*, Rathbun, 1893, *vide* Faxon, *t. c.* p. 35, pl. vi. fig. 1 (= *pubescens*, Fax.).—Gulf of California ; Cocos Island (Panama).
7. *mascarone* (Herbst), M.-Edw. Hist. Nat. Crust. ii. 162.—Mediterranean ; Canary Islands.
8. *microphthalma*, S. I. Smith, Proc. U.S. Nat. Mus. iii. 1881, p. 418.—New England ; Azores.
9. *orientalis*, Miers, 'Challenger' Brachyura, 1886, p. 330, pl. xxviii. fig. 1.—Fiji.
10. *pygmæa*, Alcock, Ann. & Mag. *t. c.* p. 406, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 5.—Andaman Sea.
11. *rosacea*, M.-Edw. & Bouv. 1897, *vide* A. Milne-Edwards & Bouvier, Crust. Décap., Exp. Sci. 'Travailleur' et 'Talisman,' pt. i. 1900, p. 26, pl. iii. fig. 5, pl. x. figs. 5-8.—Canary Islands and N.W. Africa.
12. *rugulosa*, M.-Edw. & Bouv. 1897, *vide* A. Milne-Edwards & Bouvier, *op. cit.* p. 24, pl. x. figs. 1-4.—W. Africa.
13. *tenuipes*, Rathbun, Proc. Biol. Soc. Washington, xi. 1897, pp. 109, 110.—Florida.
14. *truncata*, M.-Edw. & Bouv. 1899, *vide* A. Milne-Edwards & Bouvier, Mem. Mus. C. Z. Harvard, xxvii. no. 1, 1902, p. 69, pl. xiii. figs. 5-8.—West Indian region.

III. ETHUSINA, S. I. Smith, Ann. Rep. Comm. Fish. for 1882, Decapod Crust. of the 'Albatross,' Washington, 1884, p. 349.

1. *abyssicola*, S. I. Smith, *l. c.* pl. ii. fig. 1.—E. coast of U.S.A. ; Azores, Cape Verde.
2. *challengeri*, Miers, 'Challenger' Brachyura, 1886, p. 331, pl. xxviii. fig. 2.—Japan ; Galapagos.
3. *desciscens*, Alcock, J. A. S. B. lxxv. pt. 2, 1896, p. 286, and Ill. Zool. 'Investigator,' Crust. pl. lxxii. fig. 2.—Indian Seas.
4. *gracilipes*, Miers, *op. cit.* p. 332, pl. xxviii. fig. 3.—Oriental ; W. coast Tropical America.
5. *investigatoris*, Alcock, *tom. cit.* p. 285, and Ill. Zool. 'Investigator,' Crust. pl. lxxii. fig. 3.—Arabian Sea.
6. *Smithiana*, Faxon, 1893, *vide* Mem. Mus. C. Z. Harvard, xviii. 1895, p. 37, pl. vi. figs. 2, 2 a.—Cocos Island (W. coast Tropical America).
7. *talismani*, M.-Edw. & Bouv. 1897, *vide* A. Milne-Edwards & Bouvier, Crust. Décap. 'Travailleur' et 'Talisman,' pt. i. 1900, p. 30, pl. iii. fig. 6, pl. x. figs. 9, 10.—Azores ; W. coast Morocco.



IV. TYMOLUS, Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 1859, p. 163.

1. *japonicus*, Stimpson, *l. c.*—N. Japan.

V. CYMOPOLUS, A. Milne-Edwards, Bull. Mus. C. Z. Harvard, viii. 1880, p. 27.

1. *asper*, A. Milne-Edwards, 1880, *vide* A. Milne-Edwards & Bouvier, Mem. Mus. Comp. Zool. xxvii. no. 1, 1902, p. 74, pl. xiv. figs. 1-6, pl. xv. fig. 7.—Antilles.

2. *Agassizii*, M.-Edw. & Bouv. 1899, *vide* A. Milne-Edwards & Bouvier, *tom. cit.* p. 78, pl. xiv. figs. 7-9, pl. xv. figs. 1-6.—Florida.

VI. CYMONOMUS, A. Milne-Edwards, Bull. Mus. C. Z. Harvard, viii. 1880, p. 26.

1. *granulatus* (Norman), *vide* A. Milne-Edwards & Bouvier, Crust. Décap. Exp. Sci. 'Travailleur' et 'Talisman,' pt. i. 1900, p. 34, pl. xi. figs. 5-9.—Ireland to Sahara; W. Mediterranean.

2. *Normani*, Lankester, Q. J. M. S. vol. xlvii., Dec. 1903, p. 456, pl. xxxiii. fig. 1, pl. xxxiv. figs. 8, 10.—Eastern N. Atlantic.

3. *quadratus*, A. M.-Edw. 1880, *vide* A. Milne-Edwards & Bouvier, Mem. Mus. C. Z. Harvard, xxvii. no. 1, 1902, p. 81, pl. xvi.—West Indian region.

4. 'Valdivia' sp., Lankester, *t. c.* p. 458.—E. coast Africa.

5. 'Ingolf' sp., Lankester, *t. c.* p. 459.—S.W. coast of Iceland.

6. *andamanicus*, Alcock, *ante*, p. 468.—Andaman Sea.

VII. CORYCODUS, A. Milne-Edwards, 1880, *vide* A. Milne-Edwards & Bouvier, Mem. Mus. C. Z. Harvard, xxvii. no. 1, 1902, p. 86.

1. *bullatus*, A. M.-Edw. 1880, A. M.-Edw. & Bouv. *ibid.* pl. x. ii.—W. Indian region.

VIII. CYCLODORIPPE, A. M.-Edw. 1880, *vide* A. Milne-Edwards & Bouvier, Mem. Mus. C. Z. Harvard, xxvii. no. 1, 1902, p. 94.

1. *Agassizii*, A. M.-Edw. 1880; M.-Edw. & Bouv. *ibid.* pl. xix. figs. 1-7, pl. xx. figs. 1-3.—Havana.

2. *antennaria*, A. M.-Edw. 1880; M.-Edw. & Bouv. *t. c.* p. 99, pl. xix. fig. 8, pl. xx. figs. 4-12.—Antilles.

3. *dromioides*, Ortmann, Zool. Jahrb., Syst. &c. Abth. vi. 1892, p. 559, pl. xxvi. fig. 5 (? *Clythrocerus dromioides* ex Bouvier).—Japan.

4. *granulata*, Rathbun, Bull. Nat. Hist. Iowa, 1898, p. 293, pl. ix. fig. 1 (? *Clythrocerus granulatus* ex Bouvier).—Trinidad.

5. *uncifera*, Ortmann, *t. c.* p. 560, pl. xxvi. fig. 6.—Japan.

IX. CLYTHROCERUS, A. M.-Edw. & Bouv. 1899, *vide* A. Milne-Edwards & Bouvier, Mem. Mus. C. Z. Harvard, xxvii. no. 1, 1902, p. 90.

1. *nitidus*, A. M.-Edw. & Bouv. 1899; *ibid.* *ibid.* pl. xviii.—S.E. coast U.S.A.; Antilles.

2. *perpusillus*, Mary Rathbun, Bull. U.S. Fish. Comm. ii. 1900, p. 90.—Porto Rico.



X. CYMONOMOPS, Alcock, 1894, *vide* J. A. S. B. lxxv. pt. 2, 1896, p. 286.

1. *glaucomma*, Alcock, 1894, *ibid.*, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 9.—Andaman Sea.

EXPLANATION OF PLATE XVIII.

*Fig. 1.* *Cymonomus andamanicus*, male; enlarged three times.

*Fig. 1 a.* The same; ventral view of anterior part of cephalothorax and carapace, showing the buccal cavern almost completely closed by the external maxillipeds and the absence of any afferent branchial opening between the carapace and the base of the chelipeds; enlarged four times.

*Fig. 1 b.* The same; end-on view of the animal, showing the great breathing-opening between the front of the carapace and the anterior border of the external maxillipeds; enlarged four times.

In concluding this paper I have to express my thanks to Professor E. L. Bouvier for his kindness in sending me specimens of *Cymonomus granulatus* (Norman) for comparison with the new Andaman species.

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LXXIX. — *Observations on Coleoptera of the Family Buprestidæ, with Descriptions of new Species.* By CHAS. O. WATERHOUSE, F.E.S.

[Continued from vol. xiv. p. 348.]

*Agæocera Fenyési*, Kerr.

The type of this species is a rather small example of *A. gentilis*, Horn. The specimen labelled *A. gentilis* in Capt. Kerremans' collection is *A. gigas*.

*Hypoprasis magnifica*, Phil.

Capt. Kerremans gives this as a synonym of *H. harpago*, Fairm. (Wytsman's 'Genera,' p. 67). I have not been able to see the description of this species, but the specimens received by the Museum with this name differ from *H. harpago*, Fairm., in having the sides of the thorax coppery, and the posterior angles more rugosely punctured. The elytra are less acuminate. I think it is a distinct species.

*Halecia soror*, sp. n.

Fusco-æneous, shining. Head concave in front, and deeply longitudinally canaliculate; the clypeus coppery.



