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*Natural History Notes from H. M. Indian Marine Survey Steamer 'Investigator,' Commander O. F. Oldham, R. N., commanding. Series II, No. 14. An Account of a Recent Collection of Deep Sea Crustacea from the Bay of Bengal and Laccadive Sea.—By A. ALCOCK, M.B., C.M.Z.S., Superintendent of the Indian Museum, and A. R. ANDERSON, B.A., M.B., Surgeon-Naturalist to the Survey.*

With plate IX.

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The collection described in the present paper numbers 96 species, exclusive of *Paguridea*, dredged in the Laccadive Sea and Bay of Bengal, in two seasons, 1891-92 and 1893-94, at depths ranging from 91 to 1,370 fathoms.\*

Of these 96 species, 31 appear to be undescribed, while 15 are new to the Indian fauna.

Among what we regard as new forms, the most interesting are—(1) *Engystenopus*, a deep-sea Stenopid, differing from *Stenopus* chiefly in the simple unsegmented carpopodites and propodites, and the simple claw-like dactyli, of the 4th and 5th pairs of trunk-legs; (2) *Bathyanthyristes*, a Galatheid, which differs from *Munidopsis* only in having the 2nd, 3rd, and 4th pairs of trunk-legs sub-cheliform; and (3) *Archaeoplas*, a Gonoplacid (?) crab of a remarkably antique facies, which appears to be closely connected also with *Oymopolia*.

Among the species new to the Indian Fauna, the following, which

\* A few species dredged in previous years have been included in special instances.

belong also to genera not before recorded from Indian waters, are worthy of mention:—*Petalophthalmus*, *Benthesicymus*, *Eiconaxius*, *Calocaris*, *Uroptychus*, and *Ethusia*. *Calocaris* is represented in our collection by the cosmopolitan *Calocaris macandreae*, Bell. We have figured our three new generic types (Plate IX.) on account of their greater importance; but figures are being prepared of all our new species, and we hope that they will be published in next year's issue (Part III.) of *Illustrations of the Zoology of the Investigator*. Figures of the new species of *Glyphocrangon* and of *Pentacheles*, among which those referred to in the present paper (with one exception) will be found, are published in "Illustrations of the Zoology of the R. I. M. S. *Investigator*, Part II," now in course of issue.

*List of the "Investigator" Dredging Stations referred to in the present paper.*

Station Number.	Position.	Depth in fathoms.	Nature of Bottom.	Bottom Temperature, Fahr.
116	Andaman Sea, Lat. 11° 25' 5" N., Long. 92° 47' 6" E. ...	405	Green mud.	47°
121	Laccadive Sea, Lat. 14° 35' 15" N., Long. 72° 2' 37" E. ...	1,140	Coral mud.	37·5°
122	Laccadive Sea, Lat. 12° 5' 35" N., Long. 71° 35' 50" E. ...	865-880	Globigerina ooze.	42°
124	Laccadive Sea, Lat. 10° 47' 45" N., Long. 72° 40' 20" E. ...	705	Large debris of Reef Coral.	P
125	Laccadive Sea, Lat. 10° 7' 50" N., Long. 74° 42' 30" E. ...	1,250	Blue mud.	36°
126	Laccadive Sea, Lat. 8° 49' 0" N., Long. 73° 18' 45" E. ...	1,370	Coral mud.	36°
127	Laccadive Sea, off the Island of Minnikoy ...	1,200	Globigerina and Coral ooze.	P
128	Off Ceylon, Lat. 6° 58' N., Long. 77° 28' 50" E. ...	902	Green mud.	P
129	Bay of Bengal, off Godávari Delta...	270	Mud.	51°
130	Bay of Bengal, off Godávari Delta...	258-281	Mud.	51°
131	Bay of Bengal, Lat. 16° 01' N., Long. 81° 25' E. ...	410	Mud.	45·5°
132	Bay of Bengal, Lat. 12° 50' N., Long. 81° 30' E. ...	475	Mud.	45·5°
135	Laccadive Sea, Lat. 15° 29' N., Long. 72° 41' E. ...	559	Foraminifera in Green mud.	47°
144	Laccadive Sea, Lat. 15° 03' 03" N., Long. 72° 49' 10" E. ...	172	Sand.	P
145	Laccadive Sea, Lat. 15° 03' 03" N., Long. 72° 38' 10" E. ...	698	Green mud.	P
150	Off the Northern Maldivo Atoll, Lat. 7° 03' 43" N., Long. 75° 04' E.	719	Fine Coral Sand.	P
151	Off Colombo ...	142-400	Mud.	P
159	Bay of Bengal, Lat. 14° 05' 55" N., Long. 80° 30' 20" E. ...	112	Mud.	P

Station Number.	Position.	Depth in fathoms.	Nature of Bottom.	Bottom Temperature, Fahr.
162	Bay of Bengal, Lat. 13° 51' 12" N., Long. 80° 28' 12" E. ...	145-250	Mud.	?
163	Bay of Bengal, Lat. 13° 45' 38" N., Long. 80° 29' 37" E. ...	210	Mud.	?
164	Bay of Bengal, Lat. 13° 41' 27" N., Long. 80° 32' E. ...	195-310	Mud.	51.2°
166	Bay of Bengal, Lat. 13° 34' 55" N., Long. 80° 32' 12" E. ...	183	Mud.	54.8°
169	Bay, of Bengal, Lat. 13° 05' 27" N., Long. 80° 38' 44", E. ...	91	Sand, Shells, and Mud.	?
170	Bay of Bengal, Lat. 13° 01' 06" N., Long. 80° 36' 56" E. ...	107	Sand Cinders and Mud.	?
173	Bay of Bengal, Off Trincomalee ...	200-350	Green Mud.	53°-49.8°
173	Bay of Bengal, Off Trincomalee ...	609	Brown mud.	44°
176	Laccadive Sea, Lat. 11° 47' 06" N., Long. 73° 57' 30" E. ..	1070	Green Mud.	37.5°
177	Laccadive Sea, Lat. 13° 47' 49" N., Long. 73° 07' E. ...	636	Green Mud.	44.2°

## MALACOSTRACA.

## Order SCHIZOPODA.

## Family Lophogastridae.

## GNATHOPHAUSIA, Suhm.

1. *Gnathophausia zoea*, Suhm, G. O. Sars.

G. O. Sars, 'Challenger' Schizopoda, p. 44, pl. vi, figs. 6-10; and A. Milne-Edwards, Rec. Fig. Crust. pl. 7.

This species, which is new to the record of the Indian fauna, has been dredged in the Laccadive Sea at Station 128; 902 fms., and Station 150; 719 fms.

It appears probable, from a comparison of the type of *Gnathophausia Sarsii*, Wood-Mason, which was founded on an injured specimen, with these perfectly preserved specimens, that the latter species should be included here.

## THYSANOPODA, Edw., G. O. Sars.

2. *Thysanopoda obtusifrons*, G. O. Sars.

G. O. Sars, 'Challenger' Schizopoda, p. 102, pl. xviii, figs. 1-14.

A large female was dredged in the Laccadive Sea, Station 125; 1,250 fms.

The colour in life was smoky pink.

This species is new to the Indian fauna.

Family *Mysidæ*.

## PETALOPHTHALMUS, Willemoes-Suhm.

3. *Petalophthalmus armiger*, Willemoes-Suhm.

Willemoes-Suhm, Trans. Linn. Soc. (2) i. 40, pl. viii; and G. O. Sars, 'Challenger' Schizopoda, p. 174, pl. xxxii, figs. 1-9.

A male, 32 mm. long, from the Laccadive Sea (Station 128), 902 fms., agrees exactly with the figures and descriptions of this remarkable species from the tropical Atlantic.

## Order DECAPODA.

## Sub-order MACRURA.

Tribe *PENÆIDEA*.Family *Penæidæ*.Sub-family *Parapenæina*.

## PARAPENÆUS, S. I. Smith.

S. I. Smith, Rep. U. S. Fish. Comm. for 1885, (1886), p. [81].

4. *Parapenæus fissurus*, (Sp. Bte.)

*Penæus fissurus*, Sp. Bte., 'Challenger' Macrura, p. 263, pl. xxxvi, fig. 1.

This species occurred (♂ and ♀) at Station 166, in the Bay of Bengal, 133 fathoms.

The branchial formula is:—

Somite.	Podobr.	Arthrobr.	Pleurobr.	Total.
viii.	1	2	0	3
ix.	0	2	1	3
x.	0 (Ep.)	2	1	3 + Ep.
xi.	0 (Ep.)	2	1	3 + Ep.
xii.	0	2	1	3
xiii.	0	1	1	2
xiv.	0	0	0	0
	—	—	—	—
	1	11	5	17 + 2 Ep.

## METAPENÆUS, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., October, 1891, p. 271.

5. *Metapenæus coniger*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., October, 1891, p. 272.

This species occurred in almost every haul in the Bay of Bengal, between 100 and 250 fms.



6. *Metapensæus rectacutus*, (Sp. Bte.)

*Pensæus rectacutus*, Sp. Bte., 'Challenger' Maorura, p. 266, pl. xxxvi, fig. 2, ♀ only.

This species is as common as the preceding, in the Bay of Bengal, between 100 and 250 fms. Our female specimens we have little hesitation in identifying with Spence Bate's descriptions and figures, which represent the female only, the male, apparently, not having been dredged by the 'Challenger;' but the males with which our females are constantly associated appear to agree in every detail, except in the form of the antennular flagella, with Spence Bate's figures and description of *Pensæus serratus*. In all our males the outer anteanteral flagellum is much longer than the inner, and is as much longer than the carapace as this is longer than the inner flagellum. The inner flagellum, again, has its base curved to form a rigid semi-circular hoop, the convexity of which is vertically downwards, and the distal end of which, at the junction with the straight portion of the flagellum, is thickened and strongly re-curved.

As Spence Bate does not mention the male of *Pensæus rectacutus*, and as he records that the females, for which he establishes the species, were also found associated, as in our case, with *Pensæus serratus*, from which he separated them only on account of certain differences in the "thelycum," it is not unreasonable to suspect, in the light of our further extended observations, that *Pensæus (Metapensæus) serratus* and *rectacutus* may be male and female of a single species.

Sub-family *Solenocerina*.

## SOLENOCHERA, Lucas.

7. *Solenocera hextii*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 188, and Oct. 1891, p. 275.

This species is characteristic of the Bay of Bengal, at and near 100 fms.

*Solenocera agassizii*, Faxon, Bull. Mus. Comp. Zool. Vol. XXIV., No. 7, 1893, p. 211, would appear to be extremely near to, if not identical with, this species.

In the largest specimens of *S. hextii* the sub-equal antennular flagella are from half to three-fifths the length of the carapace, measured in the mid-dorsal line without the rostrum, and there are 7 or 8 teeth on the rostrum and carina. This species is being figured for next year's issue of the 'Illustrations' of the 'Investigator.'

## HALIPORUS, Spence Bate.

8. *Haliporus aequalis*, Sp. Bate.

Spence Bate, 'Challenger' Macrura, p. 285, pl. xli, fig. 1.

Specimens were again obtained in the Bay of Bengal, at Station 164; 195–210 fms.

9. *Haliporus villosus*, n. sp.

Agrees in almost every particular with *Haliporus curvirostris*, Sp. Bte. ('Challenger' Macrura, p. 288, pl. xlii., fig. 1), but has not only the carapace but also the abdominal terga and pleuræ densely covered with fine flexible spinules and setæ. The entire integument is membranous or coriaceous. The rostrum is also longer, and although strongly arched, has the tip porrect: in its entire extent—posterior carina included—there are only 6–8 spines.

The branchial formula is:—

Somite.	Podobr.	Arthrobr.	Pleurobr.	Total.
viii.	1	2	0	3
ix.	0 (Ep.)	2	1	3 + Ep.
x.	0 (Ep.)	2	1	3 + Ep.
xi.	0 (Ep.)	2	1	3 + Ep.
xii.	0 (Ep.)	2	1	3 + Ep.
xiii.	0 (Ep.)	2	1	3 + Ep.
xiv.	0 (Ep.)	0	1	1 + Ep.
	—	—	—	—
	1	12	6	19 + 6 Ep.

From the Laccadive Sea, Stations 121 and 127; 1,140 fms. and 1,200 fms., respectively.

10. *Haliporus microps*, (S. I. Smith).

*Hymenopenæus microps*, S. I. Smith, Rep. U. S. Fish. Comm., 1884, p. 413, pl. x., fig. 1, and 1886, p. [84], pl. xvi, fig. 8; and Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 188, and Oct. 1891, p. 277.

From the Laccadive Sea, Stations 122 and 176; 880 fms. and 1,070 fms., respectively.

Sub-family *Aristæina*.

## ARISTÆUS, Duvernoy, Wood-Mason.

11. *Aristæus semidentatus*, (Sp. Bate).

*Hemipenæus semidentatus*, Sp. Bate, 'Challenger' Macrura, p. 305, pl. xlix., fig. 1.

*Aristæus semidentatus*, Wood-Mason, Ann. Mag. Nat. Hist., Oct. 1891, p. 280.

This species is common in the Bay of Bengal, between 150 and 300 fms.

12. *Aristeus crassipes*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Oct. 1891, pp. 281, 282, fig. 7.

As in *Aristeus virilis* (Sp. Bte.), and *Aristeus semidentatus* (Sp. Bte.), so also in this species, the rostrum in the female is, in proportion, much longer than it is in the male, except in young specimens. Another remarkable sexual difference, besides the much greater size of the female, and one that is found in all three species, is to be seen in the condition of the external maxillipeds. These appendages in the male are remarkably robust, the three terminal segments especially being greatly thickened and broadened: the antero-external angle of the propodite is prolonged to form a coarse spine which is surmounted by a brush of hairs, while the dactylopodite is truncated or actually inflated at tip and doubly curved, (forming a singular crook in *Aristeus crassipes*). In the female the maxillipeds are of the ordinary slender form, except that their styliform dactylopodite has its base expanded and notched, suggesting the idea that it forms with the crooked dactylus of the male a prehensile apparatus. In all of the three species mentioned, namely *Aristeus virilis*, *A. semidentatus*, and *A. crassipes*, the endopodite of the second pleopods is trifold or tripartite, consisting, from before backwards, of—(1) a broad scoop-like plate; (2) a tooth-like blade that closes upon the scoop; and (3) a multiarticulate flagellum.

## ARISTEOPSIS, Wood-Mason.

13. *Aristeopsis edwardsiana* (Johnson).

Wood-Mason, Ann. Mag. Nat. Hist., Oct. 1891, pp. 283-284, fig. 8, (see synonymy), and Ill. Zool. H. M. I. M. S. Investigator, Crustacea, pl. i.

This species occurred in the Bay of Bengal, Station 132; 475 fms., and in the Laccadive Sea, Station 124; 705 fms.

## HEMIPENAEUS, Spence Bate.

14. *Hemipenaeus carpenteri*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 189, and Oct. 1891, p. 286.

A young male from the Laccadive Sea, Station 127; 1,200 fms.

Sub-family *Benthescymina*.

## BENTHESCYMUS, Spence Bate.

15. *Benthescymus carminatus*, S. I. Smith.

S. I. Smith, Rep. U. S. Fish. Comm. for 1882 (1884), p. 308.

A single specimen, apparently identical with the above species, was dredged in the Laccadive Sea at Station 128; 902 fms. It is new to the Indian fauna.

Family *Sergestidae*.

## SERGESTES, Edw.

16. *Sergestes bisulcatus*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Nov. 1891, p. 353.

Bay of Bengal, Station 132; 475 fms.

17. *Sergestes robustus*, Smith.

S. I. Smith, Rep. U. S. Fish. Comm., 1882, (1884), p. 416, pl. viii, figs. 3-6, and 1885, (1886), p. [93], pl. xx, fig. 6; and Ball. Mus. Comp. Zool., x, p. 97 pl. xvi, figs. 5-8.

Colour in life, crimson.

Laccadive Sea and Bay of Bengal Stations 128, 172, and 177; 902 fms., 200-350 fms., and 636 fms., respectively.

New to the Indian fauna.

18. *Sergestes hamifer*, n. sp.

In many respects showing a resemblance to *S. diapontius*, Sp. Bte.. 'Challenger' Macrura, p. 399, pl. lxxii, fig. 3, and to *S. penerinkii*, id. *ibid.*, p. 418, pl. lxxvi, fig. 3.

The extreme length of the membranous carapace is about equal to the combined length of the first five abdominal somites. The rostrum is about half the length of the eye-stalks, and ends in a sharp point. The eye-stalks are about two-thirds the length of the first joint of the antennular peduncles, and the eyes are not expanded.

The antennular peduncles, which are over two-thirds the length of the carapace, have the two basal joints stout, and the third joint, which is the longest, slender and tapering: the outer flagellum is longer than the animal, the inner is not as long as the eye-stalk. The acute point of the antennary scale reaches nearly to the end of the antennular peduncle. The 2nd maxillipeds are stout but short, being not longer than the combined ischium and merus of the next pair: the three terminal joints are permanently flexed in relation to the merus.

The external maxillipeds far exceed all the other appendages in length and stoutness, and exceed the total length of the animal: their ischium and merus are singularly coarse, and are horizontally compressed: their carpus and two succeeding joints, on the other hand, are slender, and form a delicate flagellum, which is permanently flexed in relation to the truncated merus: their propus is four jointed, and is armed on its flexor surface, as is the distal end of the carpus, with long recurved acicular spines similar in size and form to the dactylus.

The thoracic legs are all short and slender: the 2nd and 3rd pairs, which are the longest, are only about half the length of the external maxillipeds, and are distinctly chelate: the 4th pair have the three terminal joints remarkably compressed and lamellar: the 5th pair are about half the length of the carapace.

The abdominal terga are all faintly grooved along the middle line. The setose telson is hardly two-thirds the length of the acute internal uropod: the external uropod is quite unarmed.

From the Laccadive Sea, Station 126; 1,370 fathoms.

Tribe *STENOPIDEA*.

Family *Stenopidæ*.

*ENGYSTENOPUS*, n. gen.

As *Stenopus*, but with simple claw-like dactyli to the fourth and fifth pairs of trunk legs, which also have all their joints simple and unsegmented; and with the third pair of trunk legs remarkably slender as far as the propodus. The external maxillipeds are of the ordinary pediform shape.

19. *Engystenopus palmipes*, n. sp., Plate IX., fig. 1.

Entire surface, except for a few definitely situated spines, chiefly on certain of the appendages, perfectly smooth and polished.

The carapace, measured in the middle line without the rostrum, is about half the length of the abdomen: its frontal border on either side of the rostrum is, like the posterior border, strongly emarginate, and is armed at each antero-lateral angle with a pair of small spinelets: its regions, with the exception of the gastric, are ill-defined. The rostrum, which reaches to about the middle of the second joint of the antennular peduncle, has a slight double curve: its concave upper border bears numerous very close sharp equal serrations, and its convex lower border has a single spine large enough to make the rostrum, when viewed from the side, appear bifid: on the front part of the well-defined gastric region, on either side of the base of the rostrum, is a procumbent acicular spine. Of the abdominal terga the third is of predominant size. The angular abdominal pleuræ have the edge distantly and unevenly spinulate. The telson is similar in shape and sub-equal in size to the lobes of the swimmeret. The eye-stalks are very short—about half the length of the free portion of the rostrum: the cornæ are small, opaque, and deficient in pigment.

The antennular peduncles are between one-third and one-half the length of the carapace: the sub-equal antennular flagella are more

than half as long again as the entire animal. The basal joint of the antennæ is spiny at the antero-external angle, as is also the outer border of the antennal scale, this last being more than half the length of the carapace and being fringed with setæ of great length along its inner border. The mandibular palps are not apparent in the undissected specimen. The external maxillipeds are pediform, and are hairy along the inner edge: their segments are all simple and undivided, and their tips reach to the end of the antennal scale.

The trunk legs are bilaterally symmetrical: the first three pairs are chelate and have the carpus long, the first two pairs being very slender, and the third pair also being slender as far as the chelæ, which are enormously expanded. Those of the first pair are not much longer than the external maxillipeds, those of the second pair exceed by about one-third of their length those of the first, while those of the third pair are longer by the extent of the dactylus than the entire animal. In this pair the basis ischium and carpus are long and slender, and the two last-named joints have both the inner and the outer border distantly and sharply spinate, the carpus becoming suddenly inflated at its distal end for the support of the huge chelæ: these chelæ are symmetrical, but are not quite similar in every detail, the fingers of the one being more closely apposable than those of the other. To describe these chelæ more in detail—they form a good deal more than one-third of the entire extent of the third pair of legs, and their greatest breadth, across the palm, is rather more than the greatest breadth of the abdomen: the palms are compressed, with the edges almost carinate and distally finely spinate: the fingers, which are considerably longer than the palm and are also thin and compressed, have their outside edges serrated in the proximal half, and the apposed edges smooth, except for one or two coarse teeth, or tubercles, at the base: in one pair a large tubercle on the propus fits in between two large tubercles on the opposite finger, while in the other pair—the pair in which the fingers can be completely apposed—there is but one small tubercle on each finger. The fourth and fifth pairs of trunk legs are slender, are about equal in length to the third pair *minus* the chelæ, and end each in a simple claw-like dactylus: in both pairs all the joints consist of single non-segmented pieces.

The abdominal appendages exhibit nothing unusual. The caudal swimmeret is somewhat of the Astacidean type, the blades being sub-equal, and being very similar in size and shape to the telson: the outer edge of the exopodite is strongly and sharply serrated.

A single female, about 31 millim. long from tip of rostrum to tip of telson, from the Bay of Bengal, off Trincomallee, Station 172; 200-350 fms.

The colours in life were: body salmon-red, flecked slightly with white; third pair of trunk legs with white nodes and salmon-pink internodes.

Tribe *CARIDEA*.

Family *Glyphocrangonidae*.

*GLYPHOCRANGON*, A. Milne-Edwards.

20. *Glyphocrangon investigatoris*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 191; and Illustrations Zool. B. I. M. S. 'Investigator,' pl. vi, fig. 3.

This species is of frequent occurrence in the Bay of Bengal, being taken this year at Stations 130, 131, and 162; 281 fms., 410 fms. and 145-250 fms., respectively.

21. *Glyphocrangon investigatoris*, var. *andamanensis*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Nov. 1891, p. 336; and Ill. Zool. B. I. M. S. 'Investigator,' pl. vi., fig. 2.

Dredged this year in the Gulf of Manaar, Station 151; 142-400 fms.

22. *Glyphocrangon priononota*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 192; and Ill. Zool. B. I. M. S. 'Investigator,' pl. vi., fig. 1.

Taken in the Laccadive Sea, Station 122; 865-880 fms.

23. *Glyphocrangon hastacauda*, Sp. Bte.

Spence Bate, 'Challenger' Macrura, p. 519, pl. xciii., fig. 5.

From the Bay of Bengal, Station 173; 609 fms.

Colour in life, pale salmon-red.

New to the Indian fauna.

24. *Glyphocrangon cerea*, n. sp.

Belonging to the late Professor Wood-Mason's 3rd section of the genus, where it is very close to *Glyphocrangon caeca*, but departing even more widely than that species from the typical form, especially in regard to the eyes, which are quite degenerate.

The entire surface of the trunk and tail is smooth. The characteristic carapacial crests are reduced to rows of insignificant tubercles, with the exception of the lateral crests which, though faint, are entire. The compressed spine at the antero-external angles of the carapace, or, to adopt Professor Wood-Mason's terminology, the spine

of the anterior moiety of the fourth or lateral crest on each side, is of huge size, and is remarkably oblique: from its base a small spine at the front limit of the branchiostegal region projects obliquely downwards and inwards. The external orbital or antennal spine is remarkably small and inconspicuous. The rostrum projects considerably beyond the end of the antennular peduncle: it has the usual two pairs of marginal spines which, however, are very small, the posterior pair especially being little more than tuberoles.

The abdominal terga have the sculpturing almost obsolete: the first has its front edge rugose; the second and third are quite smooth; the fourth in its posterior half, and the fifth and sixth throughout, are faintly carinated, the two latter also having some almost obliterated sculpturing. The abdominal pleuræ have the free edge bluntly spinate, and the surface hardly perceptibly rugose.

The eye-stalks are short, even for the genus, and the corneæ, which are quite devoid of pigment, are but one-fifth the length of the free portion of the rostrum in diameter.

The antennal scales stand out remarkably free from the carapace throughout, and are sub-circular in form.

The other appendages present nothing remarkable, except those that form the swimmeret—these being very slender, and being much shorter than the telson.

Laccadive Sea, Station 150; 719 fms.

### Family Crangonidae.

#### CRANGON, Fabr.

##### 25. *Crangon bengalensis*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Nov. 1891, p. 360.

Bay of Bengal, Stations 162 and 170; 145 to 250 fms., and 107 fms. respectively.

#### PRIONOCRANGON, Wood-Mason.

##### 26. *Prionocrangon ommatosteres*, Wood-Mason

Wood-Mason, Ann. Mag. Nat. Hist., Nov. 1891, p. 362.

An ovigerous female, about 30 mm. long, from the Bay of Bengal, Station 172; 200 to 350 fms., differs from the single known male taken in the Andaman Sea (Station 116, 405 fms.) in the following particulars:—the serrated gastric crest is six-toothed; the carapace is less than one-third the total length; the abdomen is vastly broader. The eggs are remarkably large.



In the original description, the 3rd and 4th pairs of legs are by mistake, for the 4th and 5th, stated to be more robust than the second: the 3rd pair of legs are, as stated at the outset, of the usual Crangonine form, and are remarkably filiform.

This curious blind Crangonid will be figured in the issue of the "Illustrations of the Zoology of the R. I. M. S. 'Investigator,'" now in preparation.

### Family Psalidopodidæ.

PSALIDOPUS, Wood-Mason.

#### 27. *Psalidopus spiniventris*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., April 1892, p. 274, pl. xiv., figs. 3-5a, 8; pl. xv., figs. 1-10.

A fine male of this remarkable species was taken at Station 177 in the Laccadive Sea, 636 fms.

### Family Alpheidæ.

ALPHEUS, Fabr.

#### 28. *Alpheus macroskeles*, n. sp.

Distinguished from all other species by the form of the great chelipeds, which are of singular tenuity, equally in all their segments, the larger cheliped having a long sub-cylindrical tapering hand, and exceedingly short fingers.

The integument, though firmly chitinized, is very thin. The eyes are markedly deficient in pigment. The thickened outer flagellum of the antennules has the usual abruptly filiform ending, up to and around which it is thickly fringed with setæ of remarkable length and silkiness.

The chelipeds are remarkable for their great length—in the largest specimen they are considerably longer than the body—for their comparative tenuity, for their straightness, and for their smoothness—their setæ being so few and so fine as to be invisible to the naked eye. The hands only are asymmetrical: in the larger hand, which may be right or left, the fingers are only a third the length of the sub-cylindrical tapering palm, and half the length of the meropodite, and the palm is from one-third to more than one-half the length of the animal: in the smaller hand the fingers are equal in length to the palm, which is not one-sixth the length of the animal, and are two-thirds the length of the meropodite. In the larger hand also the fingers are compressed, the dactylus is carinated, and carries a small tooth that fits into a

foramen in the apposed finger: in the smaller hand the fingers are slender, sub-cylindrical, and elegantly curved. The second pair of pereopods are also remarkable for their length and slenderness: they are of the typical form, having a long 5-articulate carpus.

Colours in spirit, ivory white: in life, transparent blood red.

From the Bay of Bengal, Station 129 (off Godávari) 270 fms., and Station 162 (off Pulicat), 145–250 fms. This remarkable species also appears in the collections of previous years from the "Swatch" 193 fms., and from the Andaman Sea, 193 fms.

### Family Pandalidae.

#### PANDALUS, Leach.

##### 29. *Pandalus martius*, A. Milne-Edwards.

A. Milne-Edwards Rec. Fig. Crust., and Wood-Mason and Alcock, Ann. Mag. Nat. Hist., May 1892, p. 369.

Several specimens that we identify with this species, from Station 151, off Colombo, 142 to 400 fms.

##### 30. *Pandalus*, sp.

With the above was dredged a single mutilated specimen which so far as identification is possible, is somewhat like *Pandalus stylopus*, A. M.-E., Rec. Fig. Crust.

#### HETEROCARPUS, A. Milne-Edwards.

##### 31. *Heterocarpus alphonssi*, Sp. Bte.

Spence Bate, 'Challenger' Macrura, p. 632, pl. cxii., fig. 1; and Wood-Mason Ann. Mag. Nat. Hist., Feb., 1891, p. 198, and May 1892, p. 367.

Laccadive Sea, Station 177; 636 fms.

##### 32. *Heterocarpus gibbosus*, Sp. Bte.

Spence Bate, 'Challenger' Macrura, p. 634, pl. cxii., fig. 2, and Wood-Mason and Alcock, Ann. Mag. Nat. Hist., May 1892, pp. 368 and 369, fig. 6.

Bay of Bengal, Station 162; 145 to 250 fms.

##### 33. *Heterocarpus tricarinatus*, n. sp.

Near *H. gibbosus*, from which it is readily distinguished by its smaller size, and by the indistinctness of the lower lateral carina, which fades completely before reaching the posterior half of the carapace.

The median dorsal carina is only less prominent than that of *H. gibbosus*: it bears behind the limit of the orbit five or six teeth, while on the up-curved rostrum—which is more than five-sixths the length of the carapace measured in the mid-dorsal line—are six or seven dorsal teeth, and seven (male) to ten (female) ventral teeth.

The upper lateral carina is prominent, and is curved just as in *H. gibbosus*, and is not confluent with the strong antennal spine. The lower lateral carina, which is continuous with the very prominent branchiostegal spine, ends in the anterior half of the carapace.

The abdominal terga, as in *H. gibbosus*, *H. alexandri*, *H. lewis*, and *H. levigatus*, are all non-carinate and non-spinate: the depressed telson, which is equal in length to the uropods, has four pairs of marginal, and several larger terminal, spines.

The appendages quite resemble those of *H. gibbosus*, except that the sub-equal antennulary flagella are more than three-fourths the length of the body, rostrum included.

The branchial formula is identical with that of *H. gibbosus* and *H. alphonssi*, and is as follows:—

Somites and their appendages.	Podo-branchiæ.	Arthrobranchiæ.	Pleuro-branchiæ.	Total.
viii.	1	r	0	1+r
ix.	0 (Ep.)	1	1	2+Ep.
x.	0 (Ep.)	1	1	2+Ep.
xi.	0 (Ep.)	1	1	2+Ep.
xii.	0 (Ep.)	1	1	2+Ep.
xiii.	0 (Ep.)	1	1	2+Ep.
xiv.	0	0	1	1
	<hr/>	<hr/>	<hr/>	<hr/>
	1+5 Ep.	5	6	12+5 Ep. +r

A male and two ovigerous females from the Laccadive Sea, Station 122; 880 fms.

Colour in life, pink.

#### PLESIONIKA, Spence Bate.

##### 34. ? *Plesionika bifurca*, n. sp.

Carapace smooth, dorsally carinated in rather more than its outer half, the carina having four teeth behind the limit of the orbit, while the up-curved rostrum, which is about two-thirds the length of the carapace measured in the mid-dorsal line, has three or four dorsal and

five ventral teeth: all these teeth are large and distant. There is a strong antennal spine, but the branchiostegal spine is almost obsolete.

The pleon is little compressed, and the abdominal terga are smooth and are not produced posteriorly, except the sixth, which forms a short blunt tooth on either side of the telson. The depressed telson, which is almost as long as the uropods, has four pairs of lateral, and several terminal spinelets, the outermost of the terminal spinelets on each side being of remarkable length and strength.

The eyes are large and reniform. The other appendages resemble those of *Heterocarpus gibbosus*. The branchial formula is identical with that of the three species of *Heterocarpus* in our collection, the pleuro-branch of the IX<sup>th</sup> somite, which according to Spence Bate ('Challenger' *Macrura*, p. 653) distinguishes *Plesionika* from *Heterocarpus*, being certainly present in all the species identified by the late Professor Wood-Mason and ourselves as *Heterocarpus*. Two ovigerous females, from the Laccadive Sea, Station 177; 636 fms.

Colour in life, red.

### Family *Acanthephyridæ*.

#### ACANTHEPHYRA, A. Milne-Edwards.

##### 35. *Acanthephyra armata*, A. M.-E, var. *imbriata*, W.-M.

Wood-Mason, *Ann. Mag. Nat. Hist.*, May, 1892, p. 359, fig. 2; and *Ill. Zool. 'Investigator,' Crustacea*, pl. iii., fig. 1.

Two magnificent males, both over 7 inches long, from the Bay of Bengal, Station 132; 475 fms., and a smaller one, 5 inches long, from Station 135, off the Malabar Coast, 559 fms.

In all our specimens there are only four dorsal spines at the base of the rostrum, and the single ventral spine arises midway between the base and the apex of the rostrum; and the legs are most remarkably setose.

##### 36. *Acanthephyra sanguinea*, Wood-Mason.

Wood-Mason, *Ann. Mag. Nat. Hist.*, May 1892, p. 359, fig. 1.

Laccadive Sea, Stations 122 and 128; 880 and 902 fms., respectively.

##### 37. *Acanthephyra brachytelsonis*, Sp. Bte.

Spence Bate, 'Challenger' *Macrura*, p. 753, pl. cxxvi., fig. 7; Wood-Mason, *Ann. Mag. Nat. Hist.*, May 1892, pp. 362, 363, fig. 4, and *Ill. Zool. 'Investigator,' Crustacea*, pl. iii., fig. 2.

This species is common in the Laccadive Sea, from 753 to 902 fms.

## HOPLOPHORUS, Edw.

38. *Hoplophorus gracilirostris*, A. M. Edw.

A Milne-Edwards, Ann. Sci. Nat. Zool., 1881, (6) xi. 4. p. 6, and Rec. Fig. Crust., and Wood-Mason, Ann. Mag. Nat. Hist., May 1892, p. 365 (see synonym.)

This species is fairly common in the Bay of Bengal, from 145 to 609 fms. As previously mentioned, it would appear to live at no great distance below the surface.

Family **Palaemonidae.**

## PALAEMONELLA, Dana.

39. *Palaemonella laccadivensis*, n. sp.

Distinguished by the remarkable shortness of the carpus of the second pair of chelipeds, which is shorter even than in Spence Bate's doubtful genus *Brachycarpus*.

The up-curved rostrum, which projects just beyond the tip of the antennular peduncles, and nearly reaches the tip of the antennal scale, has ten dorsal teeth—two or three of which are on the gastric region—and two ventral teeth near the middle of its free portion. The antennal spine, though very distinct, is not nearly so large as the hepatic.

At the tip of the telson are six spines, three on either side of the middle line, the middle one of each triad being much the longest.

The spine on the basal joint of the peduncles of the triflagellate antennules is very distinct, as is also that on the basal joint of the antennary peduncles, and that at the tip of the antennal scale.

The pediform external maxillipeds are exceedingly slender. The first pair of legs are the shortest and most slender of the five, and end in slender chelæ: the second pair are the longest and stoutest, but are quite slender as far as the carpus, the hands alone being moderately inflated, with cylindrical palms. These hands are not symmetrical, that on one side having its palm twice as stout and one-third again as long as its fellow, or as long as the carapace, or one-third the total length of the body: the carpus is extremely short, on neither side being as much as one-fourth as long as the palm of the larger hand.

An egg-laden female, 23 millim. long, was dredged in the Laccadive Sea, Station 124; 705 fms.

Colour in life, pink.

Family **Pasiphaeidae.**

## PASIPHEA, Savigny, Edw.

40. *Pasiphaa sicula*, (Risso).

For synonymy, etc., see Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1893, p. 161.

Bay of Bengal, Station 172; 200 to 350 fms.

41. *Pasiphæa unispinosa*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1893, p. 163, and Ill. Zool. 'Investigator,' Crustacea, pl. iii., fig. 7.

Bay of Bengal, Station 172; 200 to 350 fms.

## PARAPASIPHÆA, S. I. Smith.

42. *Parapasiphæa (Eupasiphæa) latirostris*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 196, and Feb. 1893, p. 163, fig. 2.

A second example of this fine species was dredged in the Laccadive Sea, Station 145; 696 fms.

43. *Parapasiphæa (Eupasiphæa) gilesii*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1893, p. 163; and Ill. Zool. 'Investigator,' Crustacea, pl. iii., fig. 8.

Bay of Bengal, Station 145; 696 fms.

## PSATHYROCARIS, Wood-Mason.

44. *Psathyrocaris fragilis*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1893, p. 171; pl. X., XI.

Laccadive Sea, Station 144; 172 fms., and Bay of Bengal, Station 173; 609 fms.

45. *Psathyrocaris platyophthalmus*, n. sp.

Differs from *Psathyrocaris fragilis* only in the following particulars, so far as can be judged from a single specimen destitute of the second and fourth pairs of legs:—

(1) The eye-stalks, instead of being moderately depressed and not much broader than deep, are extremely depressed, being twice as broad as deep; (2) the cornea, instead of being indistinctly reniform and broadly visible from above, are markedly reniform and only visible from above as a thin crescent; (3) the exopodites of the pleopods, instead of being about twenty times as long as the endopodites, are not ten times as long.

Colours in life, crimson lake.

The single specimen measures 93 mm. from tip of rostrum to tip of telson, and carries six eggs (also crimson lake in the fresh state) any one of which has a major diameter, even after contraction in spirit, of 6mm.

Laccadive Sea, Station 124; 705 fms.

46. *Psathyrocaris plumosa*, n. sp.

Differs from *Psathyrocaris fragilis* only in the following particulars:—

(1) The entire integument is covered with a fine very short down, instead of being quite smooth; and the appendages in general, instead of being sparsely and very finely setaceous, are thickly and coarsely setaceous; (2) the rostrum is longer, projecting beyond the eyes, instead of being shorter than the eye-stalks, but is otherwise dorsally serrated and ventrally ciliated, as in the other species; (3) the eyes are less pigmented; (4) the antennular peduncles, instead of being almost devoid of setæ, are thickly setose—the “stylocerite” especially; (5) the antennary scale is larger, and its inner edge is coarsely, instead of finely, setose; (6) the external maxillipeds, instead of being finely and sparsely setose, are thickly fringed with very coarse setæ; and their dactylopodite, instead of being narrowly lanceolate and nearly bare, has the form of a broadly lanceolate brush; (7) the large chela of the second pair of legs, instead of being plainly shorter than the palm, is as long as the palm; and instead of having setiform teeth that are hardly visible to the naked eye, has plainly visible acicular teeth—those of the larger series being particularly strong; (8) the exopodites of the abdominal appendages, instead of having setæ of microscopic tenuity, have the setæ very coarse.

Laccadive Sea, Station 128; 902 fms.

47. *Psathyrocaris infirma*, Wood-Mason MS. (name only.)

The integument is quite smooth, and the appendages have fine silky setæ, as in *P. fragilis* and *P. platyophthalmus*; and, as in *P. platyophthalmus*, the endopodites of the abdominal appendages are large relatively to the exopodites: but the present species is distinguished from all its congeners by the form of the rostrum and of the carpopodites of the first two pairs of trunk legs.

The rostrum, instead of being flush with the carapace, is strongly humped or arched: it is finely serrated dorsally, and setose ventrally, as in all the other species, and does not equal the eyes in length. The pediform external maxillipeds have narrowly lanceolate and finely setose dactyli, as in *P. fragilis* and *P. platyophthalmus*.

The two first pairs of trunk-legs in general form resemble those of the other species, but in both pairs the carpopodite is ovoid and receives the meral articulation at its middle, like the handle of a crutch: on the dorsal aspect of the merus, just behind this articulation, is either an eminence or a large spine. The larger cheliped of the second

pair of legs also differs from that of other species with which comparison is possible in the following points:—(1) it is relatively shorter, being only about half the length of the animal, instead of being nearly or quite as long as the animal; (2) its meropodite has its lower edge closely and regularly spinate, instead of being quite smooth; (3) its chela, instead of being at least three-quarters the length of the palm, is only half the length of the palm; and (4) its setiform teeth, instead of being in two regular series of different sizes, are all of one size.

As already stated, the endopodites of the abdominal appendages (1st to 5th) are large, being from one-fourth to one sixth the length of the exopodites.

Colour in life, crimson.

Andaman Sea, Station 116; 405 fms.

*Key to the species of PRATHYROCARIS.*

- I. \* Rostrum straight: carpopodites of both pairs of chelipeds of the ordinary form, and articulating with the meropodites in the ordinary manner:—
  1. \*\* Eye-stalks moderately depressed: eyes indistinctly reniform: exopodites of abdominal appendages about twenty times as long as the endopodites:—
    - a. † Integument perfectly smooth: appendages with sparse silky setæ ... *P. fragilis*.
    - b. † Integument closely and finely pubescent: appendages thickly and coarsely setaceous ... ... *P. plumosa*.
  2. \*\* Eye-stalks laminar: eyes markedly reniform: exopodites of abdominal appendages not ten times as long as the endopodites ... ... *P. platyophthalmus*.
- II. \* Rostrum dorsally arched: carpopodites of both pairs of chelipeds ovoid and forming a movable crutch-handle articulation with the meropodites ... *P. infirma*.

Family **Nematocarcinidæ**.

NEMATOCARCINUS, A. Milne-Edwards.

48. *Nematocarcinus gracilis*, Sp. Bte.

Spence Bate, 'Challenger' *Macrura*, p. 815, pl. cxxxii., fig. 8.

A common species in the Laccadive Sea between 600 and 700 fms.  
Colour in life, red.



49. *Nematocarcinus productus*, Sp. Bte.

Spence Bate, 'Challenger' Macrura, p. 810, pl. cxxxii., fig. 6.

Laccadive Sea, Station 125; 1,250 fms. New to the Indian fauna.  
Colour in life, deep crimson.50. *Nematocarcinus tenuipes*, Sp. Bte.Spence Bate, 'Challenger' Macrura, p. 813, pl. cxxxii., fig. 6; and Wood-Mason,  
Ann. Mag. Nat. Hist., Feb. 1891, p. 197.

Colour in life, bright orange.

Laccadive Sea, Station 127, 1,200 fms.

Tribe *ASTAIDEA*.Family *Homaridae*.*PHOBERUS*, A. Milne-Edwards.51. *Phoberus caecus*, A. Milne-Edwards, var. *sublevis*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb. 1891, p. 197.

A fine female from Station 177, Laccadive Sea, 636 fms.

The Indian Museum now possesses both male and female of this rare and beautiful form, the male having been taken in 1890, in the Laccadive Sea, at 740 fms., close to the spot where the female was dredged this year.

*NEPHROPSIS*, Wood-Mason.52. *Nephropsis stewartii*, Wood-Mason.

Wood-Mason, J. A. S. B., 1878, Vol. xlii., Pt. II., p. 89, pl. iv; and Ann. Mag. Nat. Hist., (4) xii, 1878, p. 69; and A. Milne-Edwards, Ann. Sci. Nat. Zool., (5) xix., pl. xx., figs. 1-3.

A fine female, from the Bay of Bengal, Station 129; 270 fms.

53. *Nephropsis carpenteri*, Wood-Mason.

Wood-Mason, Proceedings A. S. B., 1885, p. 70.

This species differs from *N. stewartii*, specimens of the same size and sex being compared, in the following particulars:—1. The carapace is longer and very much broader, its breadth being about  $\frac{1}{4}$  its length, instead of less than  $\frac{1}{2}$  its length as in *N. stewartii*. This is due to the greater inflation of the branchial regions and the much less vertical disposition of the branchiostegite, and may perhaps be merely a *post mortem* difference due to the less rigid nature of the exoskeleton.

2. The cervical suture is narrow, deep, almost discontinuous across the mid-dorsal region, and V-shaped; instead of being, as in

*N. stewartii*, broad, perfectly continuous across the mid-dorsal region, and very broadly U-shaped.

3. The rostrum is much shorter and straighter: instead of being  $\frac{1}{2}$  the total extent of the carapace and doubly curved as in *N. stewartii*, it is not much more than  $\frac{1}{4}$  the total length of the carapace, and is almost straight, besides being truncated at tip: the lateral spines of the rostrum, again, instead of being in the posterior half, are in the anterior half.

4. The abdominal terga, instead of being quite flush as in *N. stewartii*, are, from the third to the sixth inclusive, marked with a low fore-and-aft carina.

5. The antennular peduncles, instead of being between  $\frac{1}{3}$  and  $\frac{1}{2}$  the length of the rostrum as in *N. stewartii*, are almost equal in length to the rostrum; and the antennular flagella, instead of being little more than half the length of the carapace, are equal to the length of the carapace behind the lateral spines of the rostrum.

6. The colour in life, as recorded by Dr. Giles, is ivory-white with orange-red markings.\* Bay of Bengal, Station 162; 145 to 250 fms.

#### 54. *Nephropsis atlantica*, Norman.

Norman, P. R. S., Edimb., 1881—82, Vol. xi, p. 684; and Wood-Mason and Alcock, Ann. Mag. Nat. Hist., Feb. 1891, p. 198, fig. 4.

The lateral armature of the rostrum is extremely variable, especially in the female, in which sex the rostrum is, occasionally, entirely unarmed.

The armature of the abdominal pleuræ also varies, the second pleura, in the female, being sometimes devoid of a spine on the front edge.

Laccadive Sea, Station 145; 696 fms., and Station 177; 636 fms.

### Tribe THALASSINIDEA.

#### Family Axilidæ.

#### EICONAXIUS, Spence Bate.

#### 55. *Eiconaxius kermadeci*, Sp. Bte., var. *laccadivensis*.

*Eiconaxius kermadeci*, Sp. Bte., 'Challenger' Macrura, p. 48, pl. v., fig. 8.

A male and a female (the latter carrying large eggs), from the Laccadive Sea, Station 124, 705 fms., differ from Spence Bate's figures

\* The colouration, like that of *Nephrops andamanicus*, and of more than one species of *Manidopsis*, varies somewhat, the specimens taken this year having been coloured pink, with white antennules and antennoæ, and with two white tubercles on back.

and description only in having the meropodite of the large chelipeds unarmed, instead of armed distally with a large spine.

Length, 20 millim.

Colour in life, milk white.

### Family Callinassidae.

#### CALOCARIS, Bell.

##### 56. *Calocaris macandrewi*, Bell.

Bell, British Stalk-eyed Crustacea, p. 233, fig.; S. I. Smith, Trans. Connect. Acad. Sci., Vol. V., p. 55 (see distribution); Kirk, Tr. N. Z. Inst., xi., 1878, p. 401; Lovett, Zoologist, (3) ix., 1885, p. 16; Ortmann, Zool. Jahrb., vi., 1892, p. 50 (see distribution).

A small (33 millim.) but nearly perfect specimen of this widely ranging species was dredged in the Laccadive Sea, Station 177, 636 fms., bottom temperature 44.2° Fahr.

In recording this new addition to the Indian fauna we may be permitted to again notice its remarkably wide area of distribution. First dredged in Loch Fyne and neighbouring waters up to 180 fms., afterwards in Scandinavian waters up to 217 fms. (*vide* Ortmann, *l. c.*), and then in the Gulf of St. Lawrence at 190 fms., it was in 1878 reported (Kirk, *l. c.*) from the Antipodes, two dead specimens having been found on the coast of New Zealand.

#### CALLIANASSA, Leach, A. Milne-Edwards.

##### 57. *Callianassa cœuigena*, n. sp.

Belongs to M. Milne-Edwards' first section of the genus (A. Milne-Edwards, Nouv. Archiv. du Mus., VI., 1870, p. 75), in which it stands alone in having no trace of cornæ, although the eyestalks are well developed and of the usual form. It is otherwise close to *C. gigas*, Dana.

The carapace, which is less than one-third the total length of the body, is of the typical form, and ends in an acute triangular rostrum that reaches to the end of the eyestalks—these being about  $\frac{1}{3}$  the total length of the carapace. The middle of the three segments into which the carapace is longitudinally divided is gently carinated, the carina culminating, near the posterior border, in a large strong upstanding tooth. Of the abdominal terga no two are at all alike either in size or shape. The first, which is the narrowest and by far the shortest and has all its angles cockled upwards, is not two-fifths the length of the second which is considerably the longest: the second, which is half the length of the carapace (rostrum included), has its postero-lateral angles

spinate: the third to the sixth inclusive all have on either side, near the antero-lateral angle, a sharp recurrent declivous spine (rudimentary pleura P): the third fourth and fifth are broad, the sixth is long and narrow: the telson is as long as the sixth tergum, and is larger than either of the uropods.

The eyestalks are of the usual petaloid shape, and, as already mentioned, are devoid of any trace of a cornea.

The external maxillipeds are broadly pediform—the ischium being produced at its postero-internal angle to form an operculum: the dactylus forms a large, almost circular, plate, thickly beset with hairs. Of the first pair of trunk-legs the right is many times larger than the left, and has the following peculiarities of structure:—the ischium is spinate along its lower edge: the merus has a single small uncinat spine, placed infero-externally, at its proximal end: the carpus is considerably less than half the length of the palm of the hand, and has two small spines at its lower angle: the hand is longer and broader than the carapace, the palm is carinated along both the upper and the lower edge, the lower edge being also finely serrated: the dactylus, which is longer than the 'pollex,' is equal in length to the palm; is broadly phalanged, both outside and inside, above; and has, on its cutting surface, at the proximal end, two short rows of coarse crenulations, the outer of which is continued into a sharp edged ridge: the 'pollex' has at its base, close to the dactylar articulation, a strong sharp tooth.

The smaller cheliped of the first pair resembles its fellow as to the ischium and merus; but the carpus is more than  $\frac{1}{2}$  the length, and the fingers nearly twice the length, of the palm: the fingers, besides being relatively much longer, are also much straighter, and, except for a single tooth at the base of the pollex, are unarmed.

The second to fourth pairs of trunk-legs much resemble those of *C. gigas*: the fifth pair ends in a brush, which owing to the minuteness of the dactylus is only minutely and obscurely sub-chelate.

The first pair of abdominal legs (in the female) are short filiform and forked, the outer fork being filiform, the inner being very short, truncate, and ending in a tuft of hairs. The second to fifth pairs inclusive are very broadly lamellar, the exopodites and endopodites being nearly equal in size: in every case the inner edge of the endopodite carries, near the middle, a small styliform appendage.

Colours in life, ivory white with some scattered yellow-ochre flecks.

A single female, 65 millim. long from tip of rostrum to end of telson, was dredged in the Bay of Bengal, at Station 172; 200 to 350 fms.

Tribe *ERYONTIDEA.*Family *Eryontidae.**PENTACHELES*, Spence Bate.58. *Pentacheles phosphorus*, Alcock.

Alcock, Ann. Mag. Nat. Hist., March, 1894, p. 241; and Ill. Zool. 'Investigator', Crustacea, pt. II., pl. viii., fig. 2.

Bay of Bengal, Station 172; 200 to 350 fms., and Laccadive Sea, Station 145; 696 fms., and Station 177; 686 fms.

The male is much smaller than the female.

59. *Pentacheles heattii*, Alcock.

Alcock, Ann. Mag. Nat. Hist., March, 1894, p. 237.

Laccadive Sea, Station 150; 719 fms.

Tribe *SOYLLARIDEA.*Family *Soyllaridae.**ARCTUS*, Dana.60. *Arctus orientalis*, Sp. Bte.

Spence Bate, 'Challenger' Monura, p. 68, Pl. ix., fig. 4.

Bay of Bengal, Station 169; 91 fms.

New to the Indian fauna.

61. *Arctus rubens*, n. sp.

Close to *A. vittensis*, Dana.

Carapace slightly longer than broad: its surface, as in *A. tuberculatus*, Sp. Bte., is ornamented with squamiform granules which are especially numerous on the prominent median carina, and are especially large and numerous on the branchial regions laterally. The lateral dorsal carinae are very prominent anteriorly, where they overhang the orbit as large spines: the antero-lateral spines of the carapace are also very prominent.

The posterior border of the carapace, like that of each of the first three abdominal terga, is deeply excised in the middle line.

The sternum is traversed, fore and aft, by a row of sharp tubercles—one on each somite—which together form a regularly interrupted carina.

The second to fifth abdominal terga are sharply carinated, the carina in the case of the second and third bifurcating behind, and in the

case of the fourth and fifth being produced over the succeeding tergum to form a blunt spine. The sides and lateral margins of the terga, like the posterior borders of the pleuræ, are irregularly lobulate or crenulate. The second joint of the antennæ is deeply sculptured above, being traversed obliquely by *two* equally strong and salient ribs: its free margins are sharply serrate. The fourth joint of the antennæ has its antero-lateral margin 7-digitate.

The external maxillipeds, and the trunk-legs, are much stouter than in any other Indian species.

A single female from the Gulf of Manar, Station 151; 142 to 400 fms.

Colour in life, light rose madder above, white below.

### Family **Palinuridæ**.

#### PANULIBUS, Gray.

#### 62. *Panulirus angulatus*, Sp. Bte.

Spence Bate, 'Challenger' *Macrura*, p. 81, pl. xi, figs. 2, 3, 4.

Numerous fine specimens from the Gulf of Manar, Station 150; 142 to 400 fms.

New to the Indian fauna.

#### Tribe **ANOMALA**.

#### Families **Paguridæ** and **Parapaguridæ**.

Our collections in these families are the largest ever made by the 'Investigator' in a single season, and we have been fortunate enough to secure the co-operation of Professor J. R. Henderson in working them out. Professor Henderson's Report will be published separately.

### Family **Galatheidæ**.

#### MUNIDA, Leach.

#### 63. *Munida squamosa*, Hndrsn., var. *prolixa*, Alcock.

Alcock, *Ann. Mag. Nat. Hist.*, April, 1894, p. 322.

A number of fine specimens, of both sexes, from the Gulf of Manar, Station 151; 142 to 400 fms.

#### MUNIDOPSIS, Whiteaves.

#### 64. *Munidopsis stylirostris*, Wood-Mason.

Wood-Mason, *Ann. Mag. Nat. Hist.*, Feb., 1891, p. 201; and Alcock, *op. cit.* April, 1894, p. 328.

Laccadive Sea, Station 177; 636 fms.

65. *Munidopsis dasypus*, Alcock.

Alcock, Ann. Mag. Nat. Hist., April, 1894, p. 329.

Laccadive Sea, Station 177; 636 fms.

66. *Munidopsis scobina*, Alcock.

Alcock, Ann. Mag. Nat. Hist., April, 1894, p. 330.

Bay of Bengal, Station 162; 145 to 250 fms.

Colours in life, white with orange-red markings.

67. *Munidopsis poseidonia*, n. sp.

The dorsal integument of body and appendages finely scabrous beneath the usual pubescence.

The rostrum, which is about one-third the length of the carapace proper, is convexly laminar, carinated, and trifid at tip.

The carapace is elliptical, convex, and traversed fore-and-aft by a median multispinate ridge,—many of the spines being bifid and trifid: the frontal margin is convex and bears two spines, one above the base of either antenna, while just below the frontal margin, between the antenna and the eye, is a spine nearly as long as the eye: the lateral margins in front of the cervical groove are sharply quadridentate—the anterior of the four spines having a second spine to its inner side, while behind the cervical groove they are multispinate: the posterior margin, like the front edge of the second and third abdominal terga, is multispinate: in addition to the spines already noticed there is a pair of large spines on the gastric region, and there are some small spinules on the after margin of the cervical groove.

The eye-stalks are not prolonged beyond the cornea, and are movable. The meropodite of the external maxillipeds has, on its inner edge near the proximal end, two large uniforn spines, and, at the distal end of its outer edge, another large spine. The chelipeds slightly exceed the fully extended body in length, and are slender: the ischiopodite has two distal spinelets, one above, the other below: the meropodite has three series of thornlike spines along its upper and inner surface: the carpopodite has a distal ring of spines, and a row of spinules along its inner edge: the hand is smooth, the fingers being about three-fourths the length of the palm. The second to the fourth thoracic legs have the meropodite and carpopodite spiny along the front edge, and the dactyli, which are about half the length of the propodites, of the usual form.

Length of fully extended body 53·5 millim., of chelipeds 58 millim. Bay of Bengal, Station 163; 210 fms.

This species is nearest related to *Munidopsis scobina*.

68. *Munidopsis trifida*, Hndrsn.

Henderson, 'Challenger' Anomura, p. 156, pl. xvi., fig. 2.

We identify with this species a single female specimen from the Laccadive Sea, Station 177; 636 fms.

New to the Indian fauna.

[69. *Munidopsis trisana*, n. sp.

Closely resembles *M. trifida*, Henderson, from which it differs in the following particulars:—The middle tooth of the trifid rostrum is relatively longer: there is a large spine on the cardiac region: the front edges of the second to fourth abdominal terga are armed in the middle line, the second with a large hook-shaped spine, the third and fourth with a pair of spines: the chelipeds are much less spiny, the hand being quite smooth, and the carpus having only a pair of distal spines: the carpopodites of the second to fourth legs have only a single spine, terminal in position, on the front border.

Length of fully extended body 23 millim; of chelipeds 19·5 millim. Andaman Sea, 240 to 375 fms.

This small species was dredged several years ago, but was never described or named. We introduce it here as we wish to complete our account with a 'key' to the Indian species of the genus.]

70. *Munidopsis regia*, n. sp.

The entire dorsal surface both of body and of appendages is covered with a remarkably thick velvety down.

The rostrum, which is half the length of the carapace proper, is moderately broad, convex, carinated, and armed in its anterior half with a single pair of strong divergent spines.

The carapace is strongly semi-elliptical, and strongly convex, and is traversed fore and aft in the middle line by a raised row of coarse spines—of which three are in the gastric region, one in the procardium and one in the postcardium—in addition to a pair of large spines, disposed transversely, in the front part of the gastric region: the frontal margin is convex, and is armed with two spines, one above the antenna on each side, while below the frontal margin a large spine is interposed



between the eye and the antenna: the lateral margins are deeply trilobed in front of the cervical groove, each lobe culminating in a spine, while behind the cervical groove is a row of three smaller and successively decreasing spines: the posterior border is broadly raised and multispinate.

Of the abdominal terga the second has, in the middle line, on the front edge, one strong tooth, while the third and fourth have in the same situation a pair.

The eye-stalks are freely movable, and are not prolonged beyond their cornea. The thoracic appendages have many long setæ in addition to the general investment of down. The external maxillipeds have the meropodite armed, on the inner border, near the proximal end, with two very large unciform spines, and, on the outer border, distally, with a strong spine. The chelipeds are considerably longer than the fully-extended body, but are stout: the ischiopodite has two distal spines, one above, the other below: the meropodite has three series of strong spines along its inner and upper surface: the carpopodite has a distal ring of teeth, and a few sharp tubercles on its upper and outer surface: the hand is unarmed, the fingers being about two-thirds the length of the palm. The second to fourth thoracic legs have the meropodite and carpopodite spiny: in all the dactylus is remarkably long (about two-thirds the length of the propodite) and remarkably hairy on both edges, the posterior edge also being multispinate. The telson, which, as is usual in this genus, appears quite plainly to consist of a somite and incompletely fused appendages, has its postero-lateral angles remarkably thickened and recurved, and its lateral borders thickly clothed with setæ of a peculiarly firm consistence and of a dark colour.

Colour in life, chalky pink.

Gulf of Manár, Station 151; 142 to 400 fms.

This is a large species, the measurements of the single specimen being as follows:—

Length of fully extended body from tip of rostrum to end of telson 111 millim. Length, from tip of chelipeds to end of telson 205 millim.

#### 71. *Munidepsis trachypus*, n. sp.

Near *M. scabra*, Faxon.

Carapace and appendages everywhere closely, sharply, and evenly spinate.

The rostrum, which is about one-third the length of the carapace, is broadly lamellar and trilid, is finely serrated at the sides, and is

traversed by a finely serrated carina that extends uninterruptedly to the cervical groove.

The carapace is markedly convex and semi-elliptical: the frontal margin is strongly convex and is armed with two spines, one above the base of the antenna on each side: the lateral margins are multiserrate: the posterior margin is raised, and, like the rest of the carapace, is sharply and evenly granular: all the regions of the carapace are well delimited.

The abdominal terga are smooth, the telson alone, like the outer halves of the caudal swimmerets, being finely granular.

The eyes are movable, and the eye-stalks are not prolonged beyond their cornea: there is a considerable interval between them and the antenna, but no spine.

The antennal peduncles are remarkably slender, and are not longer than the eyes (which are not half the length of the rostrum): the flagella appear to have been not longer than the carapace. The external maxillipeds are small and slender: the meropodite has two large unci-form spines (the proximal one slightly bicuspid) on the inner edge near the base, and a large terminal spine on the outer edge.

The chelipeds are remarkably long and slender, being, even in the female, nearly twice the length of the fully extended body: they are closely thorny, on every surface, up to the base of the fingers: the palm is more than three times the length of the fingers. The longest of the second to fourth thoracic legs is not much more than half the length of the chelipeds: all are densely spiny up to the remarkably short dactyli, which are hardly one-fourth the length of the propodites: a spine at the distal end of the meropodite is pre-eminent in all.

Length of fully extended body 54 millim., of chelipeds 100 millim. Colours in life, pale salmon.

Laccadive Sea, Station 177; 636 fms.

[72. *Munidopsis centrina*, n. sp.

Belongs to the group *Munidopsis abbreviata*, A. M.-E., *M. brevimana*, Hndrsn., *M. ciliata*, W.-M., and *M. vicina*, Faxon.

The carapace and appendages are remarkably acutely spinose, besides bearing many long coarse stiff setæ.

The carapace is strongly semi-elliptical, and is about three times the length of the depressed, acute, simple, carinated, rostrum. The strongly convex frontal margin bears four spines, a large one above the antenna on each side, and a smaller one between and behind this and the

antero-lateral spine: the lateral margins are broken by 5 large spines, 3 of which are in the hepatic, and 2 in the branchial region: the posterior margin is raised but smooth: on the gastric region are two transverse rows of spines, four in each row, those of the middle pair of the front row being about two-thirds the length of the rostrum.

The abdominal terga are unarmed, but deeply cross-grooved.

The eye-stalks are short and immobile: their lower, their outer, and their inner border are all prolonged as spines beyond the cornea, the inner spine being more than half the length of the rostrum. The spines of the antennulary and antennary peduncles are of remarkable size. The meropodite of the external maxillipeds is faintly three-toothed along the inner edge. The chelipeds are rather shorter than the ambulatory legs: they are acutely spiny up to the hand, which has only the inner edge of the inflated palm slightly spinate: the fingers are very short and very broad. The 2nd to 4th legs are acutely spinate in every joint except the dactylus, which however has the usual dentations on its posterior margin.

Length of fully extended body 39 millim., of chelipeds 26.5 millim. Bay of Bengal, 1520 fathoms.

This species was obtained several years ago, but has never been described or named: we introduce it here to complete our survey of the genus in Indian waters.]

[73. *Munidopsis pilosa*, Hndrsn.

Henderson, 'Challenger' Anomura, p. 187; pl. xvii., fig. 5.

This species was dredged in the Andaman Sea, 480 fms., some years ago, and is now recorded as new to the Indian fauna.]

[74. *Munidopsis aristina*, n. sp.

Belongs to the *Munidopsis abbreviata* and *brevimana* group, but is distinguished from all its congeners by its enormous up-curved spiny *Heterocarpus*-like rostrum.

Carapace semi-elliptical. The rostrum, which is acutely styliform and strongly up-curved, is equal in length to the carapace, its tip reaching almost to the end of the fully extended chelipeds: its sides are acutely but unsymmetrically spinate.

The convex frontal margin is unarmed, except for the antero-lateral spine: the lateral margins besides this spine are armed with a second spine in the hepatic region, and a third in the branchial: the posterior margin is strongly spinate: on the gastric region are two pairs of

spines—a large pair in front, and a small inconspicuous pair behind: on the cardiac region also is a pair of small spines.

The abdominal terga are unarmed.

The eye-stalks, which are slightly mobile, are prolonged internally beyond the cornea to form a spine. The meropodite of the external maxillipeds has its inner edge faintly serrated. The chelipeds are rather shorter than the ambulatory legs, and have short broad hands. The 2nd–4th legs have dactyli of the usual form.

Length of fully extended body 27.5 millim., of chelipeds 15 millim. Bay of Bengal, 1,520 fms.]

75. *Munidopsis unguifera*, n. sp.

Distinguished from all its Indian congeners by the form of the dactyli of the 2nd–4th legs, which are long and talon-like, having the posterior edge sharp and entire.

The carapace is quadrangular, its surface is coarsely granular, and it is traversed fore and aft by a median carina which is surmounted by a few coarse spines: the frontal margin is hardly convex and is quite unarmed, although below it, and between the eye and the antenna, is a spine: the parallel lateral margins are acutely bilobed in front of the cervical groove, while behind it they are denticulated: the posterior margin is multi-spinate: there is a pair of coarse spines on the gastric region.

The rostrum, which is about one-third the length of the carapace proper, is depressed, acute, carinated, and simple.

The abdominal terga are unarmed.

The eye-stalks are movable: the inner margin forms a small papilla upon the summit of the cornea. The meropodite of the external maxillipeds has three small teeth on its inner edge. The chelipeds in both sexes are equal to the fully extended body, and are longer and stouter than the other legs: they are unarmed, except for a pair of small spines at the distal end of the meropodite: the fingers are not much shorter than the palm, and have the cutting edges dentate only near the distal end. The 2nd–4th legs have the posterior border of the meropodite serrated: in all the dactyli are remarkable for their great length—two-thirds that of the propodites, or more—for their long acute points, and for the sharp blade-like posterior edges.

This is a small species, ovigerous females measuring not more than 25 millim.

Colour, salmon-red to chestnut-brown.

Bay of Bengal, Station 162: 145 to 250 fms.

Key to the Indian Species of the genus *MUNIDOPSIS*.

A. Dactylopodites of the second, third, and fourth pairs of thoracic legs remarkably long, two-thirds the length of the propodites, or more—with the posterior edge sharp and entire ..... *M. unguifera*.

I. Chelipeds in both sexes always much longer than the other legs, with long slender hands; eye-stalks freely movable, and without any spiniform prolongation beyond the cornea; meropodite of the external maxilliped with two large unciniform spines on the inner edge.

[Species found between 200 and 750 fms.]

B. Dactylopodites of the 2nd, 3rd and 4th pairs of thoracic legs not remarkably long, not nearly two-thirds the length of their propodites, and having their posterior edge strongly serrated and multi-spinate.

II. Chelipeds shorter than the other legs, with short squat hands; eye-stalks fixed, or hardly mobile, and forming spiniform prolongations beyond the cornea; meropodite of the external maxilliped with only faint serrations along the inner edge.

[Species, with the single exception of *M. pilosa*, found between 1,200 and 1,800 fms.]

i. Rostrum trifid, carinated; carapace more or less elliptical, convex.

ii. Rostrum simple and styliform; carapace usually quadrangular and flat.

i. Rostrum styliform, as long as the carapace, and spiny; posterior border of the carapace armed with several large spines ..... *M. arctica*.

1. Posterior border of carapace not armed with large spines; carapace not, or incompletely, carinated.

2. Posterior border of carapace armed with large spines; carapace traversed from end to end by a median longitudinal spiny carina.

1. Carapace rather broader behind than in front, laterally multispinate, traversed from end to end by a median longitudinal spiny carina ..... *M. scobina*.

2. Carapace quadrangular, non-carinate, non-spinate, quite flat; lateral margins with only one or two spines.

a. Chelipeds even in the female nearly twice the length of the fully extended body; dactylopodites of the 1st—4th thoracic legs hardly one-fourth the length of their propodites.....*M. trachypus*.

b. Chelipeds about equal to the body in length; dactylopodites of the 1st—4th thoracic legs about half the length of their propodites.

1b. 2nd—4th abdominal terga armed in front with one or two spines.....*M. triana*.  
2b. Abdominal terga unarmed.....*M. trifida*.

a. Postero-external angles of telson greatly thickened and recurved, forming on each side a stout hook.....*M. regia*.

b. Telson of typical form; carapace very distinctly carinated.....*M. poseidonica*.

a. A single (antero-lateral) spine on the side of the carapace; posterior border of carapace unarmed.....*M. styliretris*.

b. Two or three spines near the antero-external angles of the carapace; posterior border of carapace armed with strong teeth.....*M. dasyops*.

1. Surface of carapace non-spiniferous; lateral margins of carapace with only one or two spines .....*M. pilosa*.

2. Gastric region at the least spiniferous; lateral margins of carapace multispinate.

a. Eye-stalks with only the inner border prolonged beyond the cornea to form a spine; fingers of chelipeds longer than the palm.....*M. subequanota*.

b. Eye-stalks with inner, outer, and lower borders all three forming spines; fingers of chelipeds shorter than the palm.

1b. Only a pair of gastric spines; four spines on lateral border of carapace; propodite of thoracic legs non-spiniferous; only the internal ocular spine conspicuous, *M. ciliata*.

2b. Two transverse rows of gastric spines; six or seven spines on lateral border of carapace; propodites of thoracic legs acutely spiniferous; cornea hidden by three large ocular spines.  
*M. centriscia*.

## GALACANTHA, A. Milne-Edwards.

76. *Galacantha areolata*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., Feb., 1891, p. 200.

The free end of the horizontal portion of the rostrum is not always minutely bifid, being sometimes minutely multidentate.

Laccadive Sea, Station 176; 1,070 fms.

The Indian Museum now possesses perfect specimens of both sexes.

77. *Galacantha investigatoris*, n. sp.

Closely allied to *G. bella*, Henderson, from which it differs in the following particulars:—

The carapace and appendages are very much more closely scabrous, being everywhere covered with small sharp granulations in close contact, and the spines at the antero-lateral angles are much longer and more acute: the horizontal portion of the rostrum is so strongly bifid, that, when viewed from above, the rostrum appears trifid: all the abdominal terga and pleuræ, with the sole exception of the concealed first tergum, are closely and sharply granular: the fingers, though longer than the palm, are relatively shorter than in the Challenger species, and have the cutting edges quite straight: the dactyli of the 2nd—4th thoracic legs have the posterior edge 15 to 17-dentate.

Colours in life, body and corneæ milky orange: in spirit, white with an uniform dull blue-black suffusion.

Length of fully extended body 56 millim; of chelipeds, 36 millim.

Laccadive Sea, Station 127; 1,200 fms.

78. *UROPTYCHUS* (A. Milne-Edw.), Henderson.*Uroptychus nitidus*, A. Milne-Edwards.

A. Milne-Edwards, Bull. Mus. Comp. Zool., Vol. viii., 1880, p. 62; and Henderson, 'Challenger' Anomura, p. 174, pl. xxi., fig. 6.

Laccadive Sea, Station 177; 636 fms.

Colours in life, uniform bright pink.

New to the Indian fauna.

## [BATHYANKYRISTES, n. g.

As *Munidopsis*, but with the trunk-legs, from the 2nd to the 4th, increasingly subcheliform in order of succession, the 4th pair being almost perfect subchelæ; and with the true third joint (the apparent second) of the antennal peduncle furnished at the antero-external angle with an unusually large spine.

79. *Bathyankestrytes spinosus*, n. sp. Pl. IX. fig. 2.

Carapace broad, depressed, rather broader behind than in front, but not at all elliptical in shape: its surface pilose, and transversely rugose, especially on the branchial regions, but not spinate. The rostrum, which is more than half the length of the carapace, is stoutly styliform, upturned, and very acute. The frontal margin of the carapace is slightly excavated above the eye (somewhat as in *Aeglea*), and almost transverse; it is unarmed, but a little ventrad of it, between the eye and the antenna, is a stout spine: the lateral margins of the carapace are deeply bilobed in front of the cervical groove, each lobe ending in an acute spine, and a third smaller spine occurs immediately behind the cervical groove: the posterior border is broadly moulded, and unarmed. The abdominal terga are perfectly smooth beneath a close fine pubescence, and ungrooved.

The eyes are unpigmented: the eyestalks are not prolonged beyond the cornea. The antennules are exactly as in *Munidopsis*, the basal joint being inflated and strongly spinate. All the joints of the antennal peduncle are strongly spinate, the spine at the antero-external angle of the true third joint being of significantly large size. The mouth-parts resemble closely those of *Munidopsis*, the expodite of the 1st or anterior maxillipeds being without a flagellum. The external maxillipeds also are much as in *Munidopsis*: the antero-external angles both of ischiopodite and of meropodite are strongly spiniform, as is also the antero-inferior angle of the ischiopodite: near the middle of the inner border of the meropodite is a single strong spine. The trunk-legs are stout and densely hairy. The chelipeds are longer than the other legs, but shorter than the fully extended body: the ischiopodite has the inner border serrulate up to a distal terminal spine, and has also a distal tooth superiorly: the meropodite is strongly and acutely spiny along its upper and inner, and the carpopodite along its inner side, both of these joints having a distal ring of spines: the hand, which is a little longer than the fingers, has a few spinules along the inner border: the fingers are finely and evenly toothed, and excavated ventrally, just as in *Munidopsis*. The 2nd—4th legs have the meropodite and carpopodite strongly spiniferous anteriorly: in all, but especially in the fourth, the propodite is enlarged at its distal end and there has its posterior border produced to form a compressed dentigerous tubercle, against which the basal portion of the dactylus can be flexed to form a sub-chela: in the second pair of legs the tubercle carries two or three teeth, in the third pair five or six, and in the fourth pair, which are almost typical sub-chelae, six or

seven: the dactyli are stout, and are minutely serrated only in that part of their posterior border which is opposed to the tubercle on the propodite. The fifth pair of trunk-legs is of the ordinary Galatheid form.

In the female the 2nd—5th pairs of (uniramous) abdominal appendages are present, increasing in size from before backwards. The telson and caudal swimmerets resemble those of *Munidopsis*, etc.

Length of fully-extended body 70 millim., of chelipeds 59 millim.  
Andaman Sea, off Ross Island, 265 fms.]

80. *Bathyanhyristes levis*, n. sp.

Closely resembles the preceding species, from which it differs only in the following particulars:—The rostrum is broader and more depressed, and is only half the length of the carapace: the cornua is relatively much larger—no part of the eye-stalk being visible from above: the chelipeds are much less spiny: the 2nd—4th pairs of trunk-legs have the meropodite and carpopodite quite unarmed, except for a distal spine above and below: the abdominal terga are in closer contact.

In the male the 1st and 2nd pairs of abdominal appendages resemble those of *Munidopsis*, and the 3rd—5th pairs, as in *Munidopsis*, are minute rudiments.

Length 29 millim: of chelipeds 27 millim.  
Laccadive Sea, Station 177; 636 fms.

Sub-Order BRACHYURA.

Tribe ANOMOLA.

Family Raninidæ.

LYREIDUS, de Haan.

81. *Lyreidus gracilis*, Wood-Mason.

Wood-Mason, J. A. S. B., Vol. LVI., pt. ii, 1887, p. 376.

Gulf of Manár, Station 151, 142–400 fms.

Family Dromidæ.

DROMIDIA, Stimpson.

82. *Dromidia Kendallii*, n. sp.

Carapace globular, covered, like the appendages, with a dense fine short yellowish fur.

The rostrum is deeply bifid, and is without any trace of a median tooth: the margins of the two teeth are strongly deflexed, and pass backwards to traverse obliquely the roof of the orbits as a prominent ridge, the point where they meet the upper margin of the orbit being



marked by a distinct notch: the orbit is thus imperfectly sub-divided into two chambers, an inner lodging the root of the eye-stalks, and an outer into which the eye can be reflexed, much recalling the mode of formation of the orbit in *Homola*. The inferior orbital tooth is small and inconspicuous.

The convex antero-lateral margin of the carapace bears a few small distant granules, arranged in two sets separated by a slight indentation which probably corresponds to the anterior division of the cervical groove, but only the last granule of the front set is at all conspicuous: the equally convex postero-lateral margin is, like the branchiostegal region, very finely granular. The cervical groove, though not deep, is conspicuous: it traverses the lateral wall of the carapace to end at the antennal fossa, enclosing between itself and the antero-lateral border of the carapace two oval bosses: the pterygostemian region internal to the groove is the most coarsely granular portion of the carapace.

The sternal sulci unite opposite the base of the chelipeds.

The convexity of the cornea is markedly deficient in pigment. The antennal flagellum is unusually long. The efferent branchial opening is remarkably patulous. The trunk-legs, in form and proportion, much resemble those of *D. rumphii*. In the chelipeds the meropodite has the edges finely and sharply granular, the granules encroaching slightly on the neighbouring surfaces; the carpus has the upper and outer surfaces finely granular, the granules being disposed in longitudinal lines; the hand is finely and distantly granular; and the fingers are very indistinctly dentate except at the tips.

Length of carapace 18 millim., breadth 19 millim.

Bay of Bengal, Station 159; 112 fms.

#### Family **Homolidae**.

##### *HOMOLA*, Leach.

#### 83. *Homola megalops*, Alcock.

Alcock, Ann. Mag. Nat. Hist., May, 1894, p. 408.

Gulf of Manár, Station 151; 142-400 fms.; and Bay of Bengal, Station 162; 145-250 fms.

#### Tribe **OXYSTOMATA**.

#### Family **Dorippidae**.

##### *ETHUSA*, Roux.

#### 84. *Ethusa indica*, Alcock.

Alcock, Ann. Mag. Nat. Hist., May, 1894, p. 405.

This species, first dredged in the Bay of Bengal, at 240 fms., now appears in the Laccadive Sea, Station 145; 600 fms., and in the Gulf of Manár, Station 151; 142-400 fms.

## ETHUSINA, Smith.

85. *Ethusina gracilipes*, Miers.

Miers, 'Challenger' Brachyura, p. 832, pl. xviii., fig. 3.

This species, dredged by the 'Challenger' in the Arafura Sea and neighbouring basins of the Eastern Archipelago at 700–1,425 fms., is now found in the Laccadive Sea, Station 127; 1,200 fms.

Its colour in life was milk-white, with the tips of the legs faint pink.

## Family Leucosidae.

## RANDALLIA, Stimpson.

86. *Randallia coronata*, n. sp.

Carapace globular, finely and closely granular beneath a dense pubescence. Besides granules there are numerous conical tubercles of nearly uniform, rather large, size,—one bordering upon the hepatic and pterygostomian regions, five on the branchial region, two rather larger than the others on the posterior border, one near the after limit of the gastric region, and two close together in the centre of the extremely well-defined cardiac region: a majority of these tubercles is disposed with such regularity and symmetry as to form a crown round the gastric region.

For the rest, the species very closely resembles Stimpson's type (Boston Journal of Natural History, Vol. VI., 1850–1857, p. 471, pl. xx., fig. 3), except that the front is much less produced, and that the chelipeds are much more finely granular.

Length of carapace 16 millim., breadth 17 millim.; length of cheliped 23 millim.

Bay of Bengal, Station 159; 112 fms.

## PARILIA, Wood-Mason.

87. *Parilia Alcocki*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., March, 1891, p. 264; and Ill. Zool., 'Investigator,' pl. v., figs. 3, 3a.

This species was taken at almost every haul in the Bay between 91 and 250 fms.

The figure (fig. 3) in the 'Illustrations,' gives a very inadequate idea of this fine species.

## Family Calappidae.

## CALAPPA, Fabr.

88. *Culappa exanthematos*, n. sp.

Carapace oval, remarkably inflated, especially in the branchial regions which are marked off from the gastro-cardiac regions by a par-

ticularly deep furrow: its length is about two-thirds its greatest breadth immediately in front of the lateral shields: its surface in the posterior half, except for a few marginal granules, is smooth, but in the anterior half is covered with numerous large smooth isolated mammillary tubercles, which by their colouration (red base and shining yellow apex) exactly resemble ripe small-pox pustules. In the posterior half of the carapace the place of these well-defined "pustules" is taken by equally well-defined round or oval slightly-raised red patches, which exactly resemble the "papules" of the earlier stage of small-pox.

The front is rather broad for *Galappa*, and is excavated, as usual, so as to appear bilobed. The arch of the antero-lateral margin is anteriorly faintly and irregularly orenulate, but posteriorly is bluntly dentate. The clypeiform expansions of the postero-lateral margins are little developed—hardly breaking the general curve—and are armed each with seven or eight teeth, all of which have a bluntly serrated edge. The posterior margin proper—that part, namely, which is co-extensive with the first abdominal segment—is finely beaded.

The abdomen resembles that of other species of the genus, being narrow in both sexes, and the 3rd—5th segments in the male being fused, though distinctly recognizable.

The eyes and orbits, the antennules, and the antennæ, conform to type; but the external maxillipeds are even less operculiform than usual in the male sex. The chelipeds have the usual form: the transverse crest of the merus, which meets the lateral shield of the carapace at an angle very much wider than a right angle, is well marked, and is quadricuspid: the carpus and the palm, on their outer aspect, are marked with "pustules" similar to those on the anterior part of the carapace: the whole antero-inferior surface of the hand is closely covered with bead-like granules: the crest of the palm is sexcuspid: the fingers have the usual dissimilarity, those of the right side being coarser, and less mobile; those of the left side being slenderer, more finely and evenly toothed, and more mobile.

The second pair of abdominal appendages, in the male, are long and vermiform, and are enclosed each in a tube formed by the inrolling of the parts of the first pair.

Two males—the largest measuring 116 millim. across the carapace proper, and 126 millim. across the arch formed by the adducted chelipeds—from Stations 159 and 170; 112 and 107 fms. respectively: and three small females from Station 169; 91 fms.

This species is remarkable among its congeners, not only from the unusual depth of its habitat, but also for its great size and remarkable colouration.

## MURSA, Desm.

89. *Mursia bicristimana*, n. sp.

This species bears a general resemblance to *Mursia armata*, de Haan, but differs in the following particulars:—

The carapace is relatively wider, the lateral spines shorter and slenderer: the granular prominences on the upper surface form seven distinct rows, the most external row losing itself on the antero-superior surface of the lateral spine, the other rows occupying the same position as in *M. armata*. The rostrum ends in three teeth, the middle one of which is sharp and prominent, the lateral ones being more obtuse than in *M. armata*. The antero-lateral margins are armed with eleven denticles, the last of which is very small. The postero-lateral margins are slightly cristiform and microscopically granular. The posterior margin is faintly trilobed, the median lobe being hardly distinct, and the lateral lobes being mere papillæ, and not spines as in *M. armata*. The hands, in addition to the high dentate crest of the upper margin, are longitudinally traversed at the lower limit of their outer surface by a sharp crest, the edge of which is unevenly trilobed, the proximal lobe being short acute and spiniform, the middle lobe being broad and obtuse, and the distal lobe being narrow and obtuse: the lower edge of the hand is finely, closely, and sharply serrate: the meropodite of the chelipeds bears two spines at its distal end, the outer of which is about three times the length of the inner.

Colour in life, salmon pink.

Length of carapace 21 millim., breadth, from tip to tip of lateral spines, 41 millim.

Gulf of Manâr, Station 151; 142–400 fms.

Tribe CATOMETOPA.

Family Gonoplacidæ.

The crab that we have now to describe is the most singular and interesting form in the whole collection.

At first sight, from its general shape, from its elongate third pair of trunk-legs and its almost rudimentary notopodal fifth pair, from its extremely incomplete orbits, from the absence of antennular fossæ, and from the curiously small and slender external maxillipeds, Homolid affinities are suggested; but that our species has nothing to do with the *Homolidae* is shown: (1) by the position of the openings of the oviducts, which is typically canceroid; (2) by the form and position of the openings of the efferent ducts of the male, which are typically Catometopan; and (3) by the number and disposition of the branchiæ, of which there are only six on each side.

In the number and arrangement of the branchia, as well as in the position and degenerate form of the fifth pair of legs, it might be supposed, from a verbal acquaintance with the animal, that it had affinities with the *Dorippidae* (*Dorippe* and *Ethusa* more especially). That this is not the case is shown (1) by the position, above indicated, of the genital openings of the male; (2) by the great broad buccal orifice, which is only very partially covered by the maxillipeds; (3) by the form of the carapace, which is broad, and completely covers the thorax; (4) by the form of the antennules, which are not obliquely or almost vertically folded in distinct fossæ as they are in *Ethusa* and *Dorippe*; and (5) by the form of the sternal plastron, which in our new form is a broad pentagonal plate as in many Ocyrodoids.

Although not nearly related, then, to the typical Dorippid, it certainly has considerable affinities with one of the forms generally ranked with *Dorippe*, namely, with *Cymopolia*.

It resembles *Cymopolia* (1) somewhat in general form, and (2) in the fact that the maxillipeds are small and do not nearly cover the orifice of the large squarish buccal cavity; but it differs from *Cymopolia* (1) in the incompleteness of the orbits and antennular fossæ, and (2) in having the front narrow and deflexed.

Its resemblance to *Cymopolia*, however, is chiefly of interest as indicating the proper position of *Cymopolia* itself; for this new *Cymopolia*-like form of ours, for which we propose the name of *Archaeoplax*, is quite clearly related to the "*Gonoplaciens*" among the Catometopa, in which section its nearer affinities are, perhaps, with the *Macrophthalmines*, as we hope the following description will show.

#### ARCHAEOPLAX, n. gen.

Carapace transverse, greatly depressed, with the front very narrow, and declivous, yet forming a distinct rostrum (*i.e.*, its front border is not fused with the epistome, but is free). Abdomen in both sexes narrow, not nearly co-extensive in breadth with the sternum between the penultimate pair of trunk-legs. Orbits and antennular fossæ very imperfect (hardly more perfect than in *Homola*). Eye-stalks long, slender, tapering: eyes small. Antennules well developed, transversely folded on the inflated basal joint, which is free and exposed from its origin. Antennal peduncles arising below the orbit, and external to, and in the same plane with, the antennules: the flagella long. Buccal opening much wider in front than behind, not nearly covered by the short slender external maxillipeds: efferent branchial channels produced and patulous: epistome linear: the carpopodite of the external maxillipeds articulates with the apex of the narrow meropodite.

Chelipeds unequal in the male, sub-equal in the female: second, third, and fourth pairs of trunk-legs long and slender (the third pair the longest), with long sabre-shaped dactyli. *Fifth pair of trunk-legs reduced to feather-like rudiments, arising close together, high up, almost on the back.* Genital ducts of the male opening at a distinct tubercle on the base of the fifth pair of legs, the tubercle being embedded in a notch in the posterior border of the sternum.

90. *Archaeoplax notopus*, n. sp., Pl. IX., figs. 3, 3a, 3b.

Carapace extremely flat and depressed, transversely oval, with the anterior and antero-lateral margins broadly excised; its surface punctate beneath a shaggy reddish fur.

The front proper is extremely narrow—about one-fourteenth the greatest breadth of the carapace—and is deflexed with the tip free and horizontal, the tip also being slightly expanded and bilobed just as in *Macrophthalmus*.

The anterior border of the carapace, which is half the greatest width of the carapace, is concave on either side of the front, each concavity being interrupted near the middle by a small projection: the antero-lateral borders are very short, are broadly excised or concave, and are rather acutely produced at their junction with the anterior margin: the postero-lateral borders, which constitute four-fifths or more of the lateral extent of the carapace, are convex, and form a small lateral spine at their much-advanced junction with the antero-lateral borders: the posterior border is raised and gently convex. The inflated branchial regions are fairly well delimited from the gastro-cardiac regions.

Two remarkable almost straight sutures, unlike anything known to us, cross the carapace from side to side: the anterior at the level of the junction of the antero-lateral with the postero-lateral borders, the posterior at the middle of the cardiac region. These sutures are remarkably distinct, equally from the exterior and from the interior of the carapace: their exact relations will be described presently.

The branchiostegal and pterygostomial regions form nearly a right angle with the dorsal surface of the carapace, and the pterygostomial region has a wide oblique fold or groove leading to the afferent branchial orifice. The sternum is widely pentagonal.

The orbits are remarkably incomplete, their inferior border being formed only by a large acute lamelliform spine and by the basal joint of the antennule.

The eye-stalks are long (their length being contained 6 or 7 times in the greatest breadth of the carapace), slender, tapering, and slightly bent: the eyes are small and hemispherical.

The antennules have the basal joint hugely inflated, globular, quite free and exposed from its origin, and freely mobile: the second and third joints, which are long and slender, fold transversely on the base of the first.

The antennæ arise just below the infra-orbital spine, and outside and in the same line with, the antennules: their flagellum is half the length of the carapace.

The buccal cavity is considerably wider in front than behind: the external maxillipeds are so small and slender as to leave completely exposed the mandibles, the wide endostome, and a part of the wide and produced efferent branchial channels.

The epistome is linear. The fourth joint of the external maxillipeds arises from the apex of the small oval third joint.

All the trunk legs are thickly fringed with a shaggy reddish hair.

The chelipeds are subequal in the female, but are unsymmetrical in the male: their length, half of which is formed by the hand, slightly exceeds the breadth of the carapace: both hands in the female, and the smaller hand in the male, are elongate compressed and sharp-edged; and have the fingers curved compressed acute, slightly excavated on the inside, and indistinctly dentate along the opposed edges: the larger hand of the male has the palm inflated.

Of the 2nd-4th trunk legs the 3rd pair is the longest, measuring rather more than twice the greatest breadth of the carapace: all are slender compressed and quite smooth, and all end in long sharp sabre-shaped dactyli.

The 5th pair of trunk legs is quite unique in form and disposition: they arise quite close to the middle line of the body and high up, almost on the back; they are short, being considerably less than the breadth of the carapace in length, and are very slender and flexible; and they are so thickly fringed with shaggy hairs as to appear like feathers.

The abdomen in the male consists of 5 separate pieces—the 3rd-5th segments being coalescent: its breadth opposite the penultimate pair of trunk-legs is about one-third that of the sternum at the same point. In the female the abdomen consists of 7 separate segments, and its breadth opposite the penultimate pair of trunk-legs is half that of the sternum at the same level. The genital openings in the female have the usual position on the sternum: in the male they are placed at the summit of a prominent tubercle situated at the antero-internal angle of the basal joint of the 5th pair of legs, the tubercle being embedded in a notch in the posterior border of the sternum.

The figure represents a life-size male, so that we do not give a

table of measurements. Colours, chestnut-brown, carapace lighter: eggs scarlet.

Bay of Bengal, at almost all stations off the Coromandel Coast, from 14° southwards, between 190 and 250 fms.

*The sutures on the carapace of Archæopliax notopus—*

The anterior of the two sutures above-mentioned crosses the carapace from side to side at the level of the junction of the antero-lateral and postero-lateral borders. In front of it the carapace is declivous. Upon the sides of the carapace this suture is continued downwards and forwards to meet the epimeral suture—here somewhat creased and indefinite—in which it is lost.

The posterior of the two sutures crosses the carapace from side to side, parallel with the first, passing through the middle of the cardiac region. It is lost in a dimple high up on the branchiostegal region.

What these sutures mean we hardly venture to surmise. They are far too conspicuous—being as plainly visible on the interior of the carapace as they are on the exterior—to be mere adventitious markings. If, as is possible, they indicate lines of fusion of segments, then they do not support the classical explanation of the formation of the entire Brachyuran carapace out of the antennary and mandibular segments, since the epimeral suture is also present, as well as a double posterior border.

**Family Ocypodidae.**

**PROPHETICUS, Wood-Mason.**

91. *Psopheticus stridulans*, Wood-Mason.

Wood-Mason, Illustrations of the Zoology of H. M. I. M. S. 'Investigator,' Crustacea, part i. pl. v. fig. 1., and Alcock, Annals and Magazine of Natural History Ser. 6, Vol. xiii, May, 1894, p. 402.

Gulf of Manár, Station 151; 142–400 fms.

**Tribe CYCLOMETOPA.**

**Family Cancridae.**

**NECTOPANOPE, Wood-Mason.**

92. *Nectopanops longipes*, Wood-Mason.

Wood-Mason, Ann. Mag. Nat. Hist., March, 1892, p. 262.

Laccadive Sea, Station 177; 636 fms.

**XANTHODES, Dana.**

93. *Xanthodes microps*, n. sp.

Very closely allied to *Xanthodes pachyductylus*, A. Milne-Edwards (Nouv. Archiv. du Mus., 1873, p. 201, pl. vi., fig. 4), from which it ap-



pears to differ only (1) in having the branchial regions more inflated, leading to a pushing forward of the hepatic regions and a shortening and straightening out of the antero-lateral border of the carapace; (2) in the very much smaller eyes; and (3) in the greater inequality of the chela in the male.

Colours in life, chestnut-brown with black fingers; cornea hardly darker than the rest of body.

Length of carapace, 11–12 millim. Breadth of carapace, 17 millim. Length of large cheliped, 26 millim.

Bay of Bengal, Station 159; 112 fms.: Station 170; 107 fms.: and Station 172; 200–350 fms.

### Family Fortunidae.

GONIOSOMA, A. Milne Edwards.

#### 94. *Goniosoma hoplites*, W.-M. MS. (name only).

Belongs to Milne-Edwards' second section of the genus (*Archiv. du Mus.*, tom. X., p. 385), in which it comes nearest to *G. affine*, Dana (*U. S. Expl. Expd.*, Crustacea, Vol. I., p. 286, pl. xvii., fig. 12; and De Man, *J. L. S. Zool.* Vol. XXII., 1888, p. 80, pl. v, fig. 2).

Differs from *G. affine*, as identified by De Man, in the following particulars: (1) The carapace is much wider, being in both sexes nearly twice as broad (measured from tip to tip of last antero-lateral spine) as long; (2) owing to the remarkable inflation of the branchial regions the transverse granular line that proceeds from the last antero-lateral spine is strongly convex anteriorly, rather than transverse, and is not continued across the gastric region; (3) the frontal teeth are broad and very blunt, and fall into three groups, a middle group of four separated by widish notches from a pair on either side; (4) the first five teeth of the antero-lateral margin are sharply multi-serrate; but the sixth tooth is a true spine, and in the male is three times as prominent laterally as any of the others; (5) the inner lobe of the lower margin of the orbit is broader and even more prominent; (6) the upper and outer surfaces of the hand have only four spines—two along the inner margin, and two along the outer.

The largest male measures as follows:—

Length of carapace 23 millim., breadth 43 millim. Length of cheliped 51 millim.

Colours in life, light salmon-pink, clouded on carapace.

At most stations along the Madras Coast at and near 100 fms.

## Tribe OXYRHYNCHA.

## Family Inachidae.

## ANAMATHIA, S. I. Smith.

95. *Anamathia beauchampi*, n. sp.

Very closely resembles *A. tanneri*, S. I. Smith [P. U. S. N. M. Vol. vi. 1883, p. 4; and 'Albatross' Crustacea in Rep. Comm. Fish for 1885 (1886), pl. i., fig 4] from the description and figure of which it differs only in the following points:—(1) The carapace and appendages are thickly covered with stout clavate hairs, beneath which on the carapace is a dense felty pubescence; (2) the rostral horns (in the female) are not quite so long, being less than half the length of the rest of the carapace; (3) the great epibranchial spines are more erect; (4) the præ-ocular spines are smaller, being much smaller than the post-orbital processes; (5) the eyes are smaller, and the cornea is almost devoid of pigment.

An egg-laden female from Bay of Bengal, Station 163; 210 fms.

Extreme length of carapace 21 millim., extreme breadth 14 millim.

## Order ISOPODA.

## Family Bathynomidae.

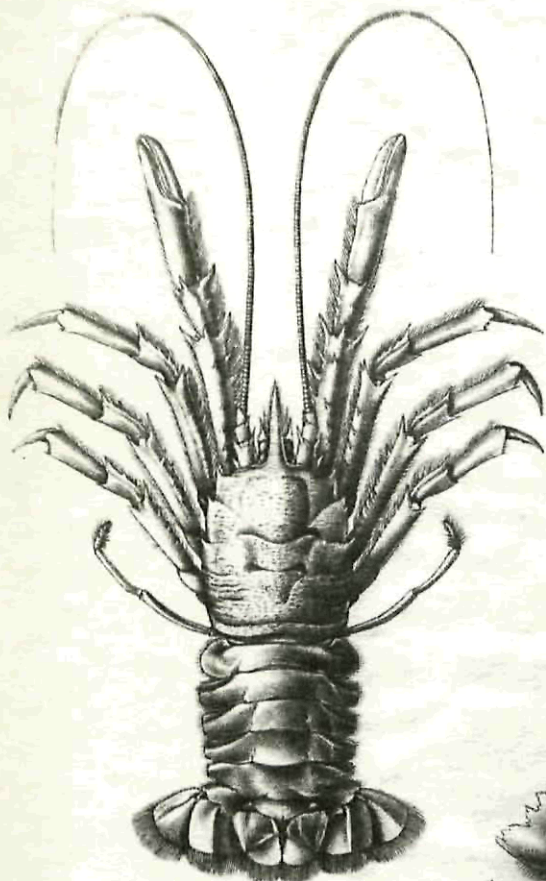
## BATHYNOMUS, A. Milne-Edwards.

96. *Bathynomus giganteus*, A. Milne-Edwards.

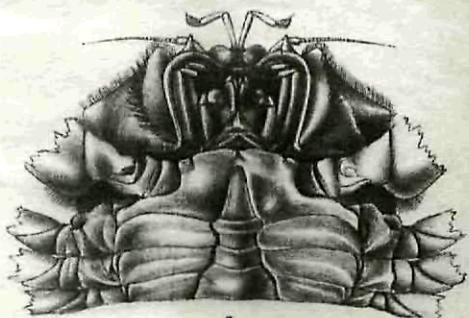
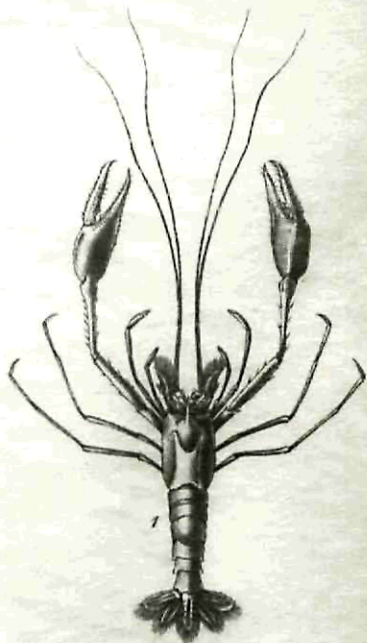
A. Milne-Edwards, Comptes Rendus, 1879, tom. lxxviii., pp. 31-33; A. Agassiz "Three Cruises of the Blake," Vol. II., p. 49, fig. 252; and Wood-Mason and Alcock, Ann. Mag. Nat Hist., March 1891, p. 270.

Laccadive Sea, Station 145; 696 fms.

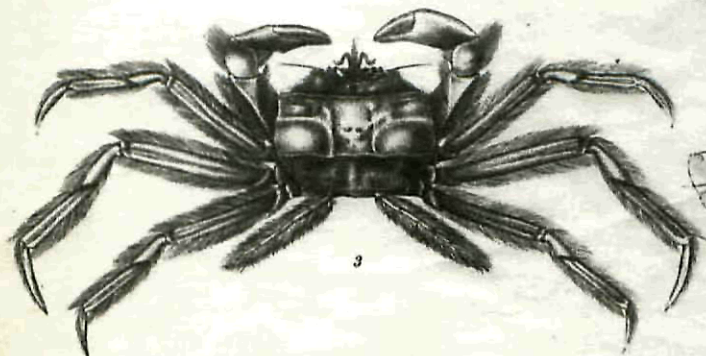
It is interesting to note that this species was deliberately dredged for as near as possible to the spot where it was first taken by the Investigator' in 1890, and with a successful result.



2



3a



3



3b

A. C. Chowdhary & S. C. Mondul del.

S. C. Mondul lith.

ENCYSTENOPUS. BATHYANKYRISTES. ARCHÆOPLAX.