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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 Maldive 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.

THYSANPODA, 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 antennulary flagella, with Spence Bate's figures and description of *Pensæus serratus*. In all our males the outer anteanal 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 antennulary 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.

HEMIPENEUS, Spence Bate.

14. *Hemipeneus 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. 2-5a, 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
	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 IXth 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. 358, 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 antennæ, 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 cœvigena*, 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 cornes, 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