

BULLETIN  
OF THE  
MADRAS GOVERNMENT MUSEUM

EDITED BY THE SUPERINTENDENT

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SUPPLEMENT TO  
THE LITTORAL FAUNA OF KRUSADAI ISLAND  
IN THE GULF OF MANAAR

BY VARIOUS AUTHORS

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# ANNELIDA POLYCHAETA

## OF THE

# MADRAS GOVERNMENT MUSEUM

By PIERRE FAUVEL,

*Professeur de Zoologie à l'Université catholique d'Angers.*

The present report deals with a collection of Polychaeta, of which by far the greater part was collected in the littoral waters of Krusadai Island, Pamban, etc., Gulf of Manaar, by Mr. F. H. Gravely, Superintendent of the Madras Government Museum.

I am thankful to Mr. Gravely for having given me the opportunity of studying this very interesting material.

Mr. F. H. Gravely having previously published (1927) a "Report on the Littoral Fauna of Krusadai Island" it has been deemed useless to describe anew the species already mentioned in his report. Such species are marked with the page reference to reprints of this report<sup>1</sup> in the following list which includes all the species I have investigated. Species or varieties which were new are printed in block-type.

### APHRODITIDAE.

- (3) *Lepidonotus cristatus*, Grube.
- (3) *Lepidonotus carinulatus*, Grube.  
*Lepidonotus tenuisetosus*, Gravier.
- (4) *Harmothoë dictyophora*, Grube.
- (4) *Harmothoë amplexifera*, Grube (= *H. imbricata*, Gravely nec Linn).
- (4) *Iphione muricata*, Savigny.  
*Leanira japonica*, McIntosh.  
*Sthenelais Boa*, Johnston.

### CHRYSOPETALIDAE.

- (5) *Chrysopetalum Ehlersi*, Gravier.

### AMPHINOMIDAE.

- Amphinome rostrata*, Pallas.
- (5) *Eurythoë complanata*, Pallas.
- (6) *Chloeia flava*, Pallas.
- (6) *Euphrósyne myrtosa*, Savigny.

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<sup>1</sup> The addition of 54 to this will give the page reference in the full volume.

## PHYLLODOCIDAE.

*Eulalia viridis*, O. F. Müller.

- (7) *Eulalia (Eumida) sanguinea*, Oersted.  
 (6) *Pterocirrus ceylonicus*, Michaelsen.

## HESIONIDAE.

- (7) *Hesione pantherina*, Risso (= *H. ceylonica* Grube ?).  
 (7) *Leocrates Claparedii*, (Costa) (= *L. chinensis* Kinberg ?).

## SYLLIDAE.

- (8) *Syllis gracilis*, Grube.  
 (8) *Syllis variegata*, Grube.  
*Syllis prolifera*, Krohn.  
*Syllis Krohnii*, Ehlers.  
*Syllis exilis*, Gravier.  
*Syllis closterobranhia*, Schmarda.  
*Syllis (Ehlersia) cornuta*, Rathke.  
*Trypanosyllis zebra*, Grube.  
*Opisthosyllis brunnea*, Langerhans.  
 (8) **Odontosyllis Gravelyi**, Fauvel (= ? *Syllis sp.*, Gravely).  
*Pionosyllis spec.*

## NEREIDAE.

- Lycastis indica*, Southern.  
 (11) *Tylonereis Bogoyawlenskyi*, Fauvel.  
*Tylonereis Fauveli*, Southern.  
*Leonnates Jousseamei*, Gravier.  
**Leonnates decipiens**, Fauvel.  
*Nereis Coutierei*, Gravier.  
 (12) *Nereis Kauderni*, Fauvel (= *N. falcaria*, Gravely).  
 (13) *Nereis indica*, Kinberg (= *N. sp. near ezoensis*, Gravely).  
*Nereis cricognatha*, Ehlers.  
*Nereis abnormis*, Horst.  
 (14) *Perinereis nuntia*, Savigny, var. *vallata* Grube.  
*Perinereis cultrifera*, Grube.  
*Pseudonereis anomala*, Gravier.  
 (13) *Ceratonereis mirabilis*, Kinberg.  
*Platynereis Dumerilii*, Aud.-Edw., var. *insolita* Gravier.

## GLYCERIDAE.

*Glycera alba*, Rathke.

- (10) **Goniada (Goniadopsis) Agnesiae**, Fauvel.

## EUNICIDAE.

*Eunice afra*, Peters.

- (18) *Eunice tentaculata*, Quatrefages (= *Eunice sp.*, Gravely, reddish form with white markings).
- (17) *Eunice antennata*, Savigny.  
*Eunice tubifex*, Crossland.
- (17) *Eunice siciliensis*, Grube.
- (18) *Eunice gracilis*, Crossland (= *Eunice sp.*, Gravely, ? subgen, *Nicidion*).
- (18) *Marphysa sanguinea*, Montagu (= *M. furcellata*, Gravely).
- (18) *Marphysa McIntoshi*, Crossland.
- (18) *Marphysa mossambica*, Peters (incl. *M. gravelyi*, Gravely nec Southern).<sup>1</sup>
- (19) *Lyxidice collaris*, Grube.  
*Nematonereis unicornis*, Grube.  
*Onuphis holobranchiata*, Marenzeller.
- (20) *Onuphis dibranchicta*, Willey.  
*Onuphis spec.*
- (20) *Diopatra neapolitana*, Delle Chiaje.
- (20) *Aglaurides fulgida*, Savigny (= *Halla sp.*, Gravely).  
*Lumbriconereis sphaerocephala*, Schmarda.  
*Lumbriconereis heteropoda*, Marenzeller.  
*Arabella iricolor*, Montagu.  
*Staurocephalus australis*, Haswell.

## ARICIIDAE.

- (22) *Scoloplos (Aricia) Chevalieri*, Fauvel (= *Scoloplos sp.*, Gravely).
- (22) *Scoloplos marsupialis*, Southern.

## SPIONIDAE.

- (22) ***Scoelepis indica***, Fauvel.
- (23) *Polydora coeca*, Oersted.  
*Polydora antennata*, Claparède (?)
- (24) *Polydorella prolifera*, Augener (= post-larval Chaetopterid, Gravely).  
***Prionospio Krusadensis***, Fauvel.
- (22) ***Prionospio polybranchiata***, Fauvel (= *Spio sp.*, Gravely).

## CHAETOPTERIDAE.

- (23) *Phyllochætopterus socialis*, Claparède (= *Phyllochætopterus sp.*, Gravely).  
*Phyllochætopterus Elioti*, Crossland.
- (24) *Mesochætopterus minutus*, Potts (= *Spiochætopterus sp.*, Gravely).

<sup>1</sup> Prof. Fauvel has examined these specimens and considers my identification incorrect. I am also now convinced that I was mistaken in thinking that some of the segments of these specimens bore compound setæ—F.H.G.

## CIRRATULIDAE.

- (25) *Audouinia filigera*, Delle Chiaje (= *Audoninia sp.*, Gravely).  
*Cirratulus filiformis*, Keferstein (?).  
*Cirratulus chrysoderma*, Claparède.  
*Dodecaceria opulens*, Gravier.

## CHLORAEMIDAE.

- (27) *Stylarioides parmatus*, Grube.  
(26) *Stylarioides eruca* Claparède, var. **indica**, Fauvel.

## SCALIBREGMIDAE.

- (26) **Parasclerocheilus branchiatus**, Fauvel.

## OPHELIIDAE.

*Armandia leptocirris*, Grube.

## CAPITELLIDAE.

- Dasybranchus caducus*, Grube.  
(26) *Heteromastus similis*, Southern (= *Heteromastus sp.*, Gravely).  
*Heteromastides bifidus*, Augener.  
**Pulliella armata**, Fauvel.  
*Scyphoproctus Djiboutiensis*, Gravier.

## MALDANIDAE.

- Axiothella Obockensis*, Gravier.  
(26) *Axiothella australis* Augener (= *Axiothea sp.*, Gravely).

## SABELLARIIDAE.

- (29) *Sabellaria spinulosa* Leuckart, var. *Alcocki* Gravier.  
(29) **Sabellaria pectinata**, Fauvel.

## TEREBELLIDAE.

- (25) *Terebella Ehrenbergii*, Grube (= *Polymnia sp.*, Gravely).  
(25) *Loimia medusa*, Savigny.  
(25) *Loimia annulifilis*, Grube.  
*Polymnia nebulosa*, Montagu.  
*Nicolea gracilibranchis*, Grube.  
**Pista Herpini**, Fauvel.  
*Streblosoma persica*, Fauvel.  
*Polycirrus coccineus*, Grube.  
**Lysilla Pambanensis**, Fauvel.

## SABELLIDAE.

*Sabella porifera*, Grube.

- (27) *Potamilla ceylonica*, Augener.  
 (27) *Potamilla Ehlersi*, Gravier.  
 (27) *Hypsicomus phæotænia*, Schmarda.  
 (28) *Dasychone cingulata*, Grube.

## SERPULIDAE.

*Hydroides monoceros*, Gravier.

*Vermiliopsis glandigera*, Gravier.

*Vermiliopsis acanthophora*, Augener.

*Omphalopomopsis Langerhansi*, Marenzeller.

- (28) *Pomatostegus stellatus*, Abildgaard (= *P. actinoceros*, Gravelly).  
*Pomatostegus polytrema*, Philippi, var. **indica** Fauvel.  
 (28) *Spirobranchus giganteus*, Pallas (= *S. semperi*, Gravelly).  
*Pomatoceros coeruleus*, Schmarda.  
 (28) *Salmacina Dysteri*, Huxley (= *Filograna sp.*, Gravelly).  
 (28) *Spirorbis foraminosus*, Moore.

Out of these 119 species 11 are new to science:

*Odontosyllis Gravellyi*—*Goniada* (*Goniadopsis*) *Agnesiae*—*Leonnates decipiens*—*Scolecopsis indica*—*Prionospio polybranchiata*—*Pr. Krusadensis*—*Parasclerocheilus branchiatus*—*Pulliella armata*—*Sabellaria pectinata*—*Pista Herpini* and *Lysilla Pambanensis*.<sup>1</sup>

The genera *Parasclerocheilus*, *Pulliella* and the subgenus *Goniadopsis* are new as well as the two varieties: *Stylarioides eruca* var. *indica* and *Pomatostegus polytrema*, var. *indica*.

Amongst rare or little known species the following are noteworthy: *Tylonereis Bogoyawlenskyi* and *T. Fauveli*; *Nereis abnormis*, a very peculiar *Heteronereis* stage; *Nereis Kauderni*; *Eunice gracilis*, which has been previously described by Crossland as a *Nicidion* and which proved to be a genuine *Eunice*; the singular *Polydorella prolifera*, Augener, a scissiparous Spionid; the odd *Mesochætopterus minutus*, Potts; *Dodecaceria opulens*, Gravier; *Heteromastides bifidus* Augener; *Scyphoproctus Djiboutiensis*, Gravier, with its spiked anal funnel to which *Pulliella armata* provides a connecting link; *Axiiothella Obockensis*, Gravier; *Potamilla Ceylonica*, Augener, and *Spirorbis foraminosus*, Moore.

As a dichotomous key of the families of Polychæta Errantia is to be found in Gravelly's Report (1927), I give here only a translation of my analytic key of Sedentaria from "Faune de France, Polychètes Sédentaires" (1927).

- |  |    |
|--|----|
| 1. Body clearly divided into regions ... ..    | 8. |
| — Body not clearly divided into regions ... .. | 2. |

<sup>1</sup> Previously described in preliminary notes in: "Bulletin du Museum de Paris" No. 1-2, 1928; and "Bulletin de la Société Zoologique de France", 1929, No. 3.

2. Segments numerous. Without anal branchiae, without broad ventral shield ... .. 3.  
 — Body short, swollen; segments few; filiform anal branchiae. A large ventral shield bordered with stiff setae ... .. Sternaspidae.
3. Palps elongated, tentacle-like ... .. 4.  
 — Without tentacle-like palps ... .. 7.
4. Two large tentacular palps on the prostomium ... .. 5.  
 — One or more pairs of palps inserted on the anterior segments. Branchiae simple, filiform, inserted above the feet. Capillary setae and acicular setae. Prostomium conical, without processes ... .. Cirratulidae.
5. Two palps and two bundles of subulate branchiae retractile into a buccal funnel. The protracted setae of the first feet forming a cephalic cage. Body thickly covered with papillae ... .. Chloræmidae.  
 — Two long canaliculated palps, not retractile into the mouth. Without cephalic cage ... .. 6.
6. Palps without suckers. Parapodial lamellae erect, dorsal branchiae cirriform. Hooded hook setae ... .. Spionidae.  
 — Palps with sucker-like papillae. Without branchiae. Prostomium oval, broad and flattened (spoon-shaped). Magelonidae.  
 — Anterior dorsal and ventral cirri flask-shaped or frilled. Thread-like lateral branchiae. Numerous kinds of setae ... .. Disomidae.
7. One median tentacle. Dorsal cirri. Dorsal foliaceous branchiae. Capillary setae and hooded hook setae ... Paraonidae.  
 — Prostomium with, or without, two short tentacles; both parapodial rami more or less conspicuous. Capillary setae and forked setae. No hooks ... .. Scalibregmidae.  
 — Prostomium blunt, without appendages or with a crown of lacinated lobes. Without branchiae. Ventral tori with many rows of very small uncini. Sandy tube ... Oweniidae.  
 — Prostomium with a keel or a rimmed cephalic plate, without process. An anal plate or an anal funnel with cirri. Without branchiae. Dorsal setae capillary. Ventral tori with elongated sigmoid hooks ... Maldanidae.
8. A terminal branchial tuft with numerous filaments bearing secondary processes. Prostomium indistinct. Uncini dorsal in the thoracic region, ventral in

- the abdominal region. Tube membranaceous or calcareous ... .. 17.
- Without terminal branchial tuft ... .. 9.
9. Modified setae (paleae) forming an operculum closing the tube ... .. 16.
- Without opercular setae ... .. 10.
10. Prostomium conical or blunt, without process. Branchiae on many segments ... .. 13.
- Prostomium more or less distinct. One pair of tentacle-like palps or numerous tentacular filaments ... .. 11.
11. Prostomium with, or without two small tentacles. Two long canaliculate palps. 2-3 strikingly dissimilar regions, the anterior short with uniramous feet bearing peculiar setae in the fourth setigerous segment. Posterior notopodia erect. Uncini comb-like ... .. *Chætopteridae*.
- Without tentacles. A cephalic veil and numerous tentacular filaments. Ventral tori with pectinate uncini ... .. 12.
12. Tentacular cirri retractile into the mouth. Prostomium distinct. 3-4 pairs of subulate branchiae inserted on the first segments ... .. *Ampharetidae*.
- Tentacular cirri not retractile into the mouth. Prostomium indistinct. Branchiae arborescent, or rarely subulate, one to three pairs in number, inserted on the first segments; they are sometimes wanting ... .. *Terebellidae*.
13. With uncinigerous tori... .. 15.
- Without uncinigerous tori ... .. 14.
14. Serrated capillary setae and acicular hooks. Feet and branchiae conspicuous and erected on the back of abdominal region ... .. *Ariciidae*.
- Only capillary setae. Feet without lobes. Branchiae lateral and ligulate. Prostomium sharp, conical ... .. *Opheliidae*.
15. Prostomium blunt. Anterior region abranchiate; middle region with dorsal arborescent branchiae not retractile; often an achetous and abranchiate caudal region ... .. *Arenicolidae*.
- Prostomium conical. Anterior region abranchiate; posterior region with branchiae, simple, rudimental or wanting; or, sometimes multifid and then retractile into lateral pouches. In the abdominal region, dorsal and ventral tori with sigmoid hooded crochets ... .. *Capitellidae*



16. An operculum of one anterior row of large golden setae (paleae). Posterior region (scapha) very small and leaf-like, with hooks at the base. Two pairs of anterior foliated branchiae. Slightly conical tube of sand grains, free ... .. Amphictenidae.
- Two large opercular stalks bearing a crown of paleae. Branchiae dorsal and numerous. A narrow smooth achaetous and abranchiolate caudal region. Fixed tubes of sand grains often clustered in big reef-like masses. Sabellariidae.
17. Without operculum. No thoracic membrane. Tube membranaceous or mucous ... .. Sabellidae.
- Usually with an operculum. Thoracic membrane. Tube calcareous ... .. Serpulidae.

#### Family APHRODITIDAE.

#### Genus *Lepidonotus*, Leach.

#### *Lepidonotus tenuisetosus*, Gravier.

*Euphione tenuisetosa*, Gravier, 1901, p. 122, pl. viii, figs. 123-125.

*Euphione tenuisetosa*, Fauvel, 1911, p. 368.

*Lepidonotus tenuisetosus*, Fauvel, 1919, p. 330.

Madras Harbour, two small specimens.

I have already drawn attention elsewhere (1919, p. 331) to the fact that this species comes very near to *Lepidonotus squamatus* and *L. Bowerbankii*. It only differs by its slightly finer dorsal setae, the smaller tubercles on its scales and its eyes drawn closer. Such trifling characters are not of sufficient weight to justify classing it in a distinct genus.

*Habitat*.—Red Sea ; Persian Gulf ; Madagascar ; India.

#### Genus *Harmothoe*, Kinberg.

#### *Harmothoe ampullifera*, Grube.

*Polynoe ampullifera*, Grube, 1878, p. 35, pl. iii, fig. 5.

*Lepidonotus ampulliferus*, Gravier, 1901, p. 214, pl. vii, figs. 111-113, pl. viii, figs. 127-128.

*Harmothoe ampullifera*, Fauvel, 1911, p. 368.

*Harmothoe imbricata*, Gravelly (*non* L.), 1927, p. 4, pl. ix, fig. 4.

A large specimen from Krusadai, 37 mm. long and 10 mm. broad, feet included, with 37 setigerous segments and 15 pairs of elytra. The prostomium wants frontal peaks but the edges of its lobes are distinct, though faint. The lateral tentacles are inserted on each side of the median tentacle and somewhat under it. The elytra are fringed and have small papillae and large vesicles in concentric rows. These dark-grey vesicles show conspicuously on the clearer but uniformly coloured ground of the scale. Bristles and scales are rather like those of *H. imbricata*, but the elongated nephridial papillae and the ventral lamellae, well marked on the whole length of the body, clearly distinguish the Indian species from the European *Harmothoe*.

The presence of fifteen pairs of elytra and the ventral insertion of the lateral tentacles are characters of the genus *Harmothoë* and do not allow of including this species in the genus *Lepidonotus*.

The elytra and bristles of the Krusadai specimen do not differ from those of the Persian Gulf specimens I had formerly the opportunity of investigating.

*Habitat*.—Philippine Islands; Red Sea; Persian Gulf; India.

### Genus *Leanira*, Kinberg.

No dorsal cirrus on third setigerous segment. Ventral setae jointed, spinigerous.

#### *Leanira japonica*, McIntosh.

*Leanira japonica*, McIntosh, 1885, p. 154, pl. xxii, fig. 3, pl. xiv, A, figs. 1-2.

*Leanira Sibogae*, Horst, 1917, p. 115, pl. xxiv, figs. 1-3.

*Sthenolepis japonica*, Willey, 1905, p. 259, pl. ii, fig. 49.

*Sthenolepis japonica*, Izuka, 1912, p. 88, pl. x, figs. 3-7.

"D-net between Krusadai and Kutikal. September 25, 1922". An anterior part only.

The prostomium bears four black eyes and antennal ctenidia. The elytra are not fimbriated. The parapodia and the setae agree very well with Willey's figures. The dorsal setae are slightly spinulose. The upper edge of the notopodium carries a bundle of bipinnate setae. Every foot, from the fourth, bears a cirriform branchia. On the third setigerous segment is a small conical tubercle but no true cirrus.

McIntosh does not mention any cirrus on the third setigerous segment in his description, but his fig. 3, pl. XXII shows one. Is it an exaggerated tubercle or an error of the engraver? Izuka (1922, pl. X, fig. 3) figures on the third left foot a process similar to the branchiae of the following feet, but his description is mute on the point.

This species is very near *Leanira Yhleni*, Malmgren. It differs from it chiefly by its few ventral bipectinate setae. As regards *L. Sibogae*, I fail to find any noteworthy difference from *L. japonica*.

I agree with Horst who has shown the uselessness of the genus *Sthenolepis* based on a misinterpretation.

*Habitat*.—Malayan Sea; Japan; Gulf of Manaar.

### Genus *Sthenelais*, Kinberg.

Three tentacles. No dorsal cirrus on third setigerous segment. Ventral setae falcigerous.

#### *Sthenelais Boa*, Johnston.

*Sthenelais Boa*, Fauvel, 1923, p. 110, fig. 41, a-1 (synonymy).

Krusadai, sandy ground at the edge of the lagoon on the south side. 20th-21st May 1928.

This specimen shows one or two rusty spots on the elytra. Having compared it with specimens from the coasts of France, I was unable to find any noticeable difference. The shape of the elytra is the same and their papillae and fimbriae are alike. The ventral ramus of the parapodia is likewise provided with 2-3 simple bipectinate setae, compound setae with a short sickle-shaped appendix and a smooth shaft, others with a pluriarticulate appendix and, in the anterior feet, a few compound setae with a spinulose shaft.

Alike also, are the stylodes and the bracts, at least as far as one can ascertain, the specimen being slightly macerated.

*Habitat*.—Channel; Atlantic Ocean; Mediterranean; Indian Ocean.

#### Family AMPHINOMIDAE.

#### Genus *Amphinome*, Bruguières.

Caruncle small, heart-shaped. Ventral setae uncinatae. Arborescent branchiae in dense clusters.

#### *Amphinome rostrata* (Pallas).

*Aphrodite rostrata*, Pallas, 1778, p. 106, pl. viii, figs. 14-18.

*Amphinome rostrata*, McIntosh, 1885, p. 21, pl. i-A, fig. 16, pl. ii-A, figs. 8-12.

*Amphinome rostrata*, Potts, 1909, p. 363.

*Amphinome rostrata*, Fauvel, 1914, p. 87.

*Amphinome rostrata*, McIntosh, 1923, p. 90.

*Amphinome Pallasii*, Quatrefages, 1865, p. 394.

*Amphinome Pallasii*, Fauvel, 1914, p. 85 (Bibliography).

*Pleione tetrædra*, Milne-Edwards, 1849, pl. viii bis, figs. 1-1a.

*Amphinome vagans*, Savigny, Kinberg, 1885, p. 12; 1857-1910, p. 34, pl. xi, fig. 6.

Madras, 1913; one large specimen, with proboscis half torn out, and two smaller ones.

In a former paper (1914, p. 87), after having compared Atlantic specimens with a fine one from the Indian Ocean, I felt justified in drawing a clear distinction between the two forms.

The Atlantic specimens tallied quite well with Quatrefages' descriptions and they appeared well characterized by their smooth caruncle and their pale dorsal setae slightly denticulate at the apex. On the other hand, *A. rostrata*, from the Indian Ocean, seemed to have a longer, and sometimes plaited caruncle and dark-brown smooth dorsal setae.

But afterwards, McIntosh (1923) having had the opportunity of comparing specimens from the Indian Ocean and from the Atlantic, noted the variability of the coloration of the setae. The occasional folds of the caruncle are caused by contractions due to the fixation. The softening of the setae and the disappearance of the serrations at their end is a result of the action of formalin or of alcohol.

I unreservedly agree with these conclusions, for I have since, more than once, had the opportunity to ascertain the alteration of Amphinomids' setae in the preservatives and the complete disappearance of their peculiar features.

On the Madras specimens, I have found conspicuously serrated setae and short acicular setae with a distal knob, similar to those of *A. Pallasii*.

There are therefore no grounds for looking on the Atlantic and Indian Ocean's forms as two distinct species. They must be united under the oldest name *A. rostrata*.

*Habitat*.—Indian Ocean ; Atlantic ; Pacific.

### Genus *Euphrosyne*, Savigny.

#### *Euphrosyne myrtosa*, Savigny.

##### Fig. I.

*Euphrosyne myrtosa*, Savigny, 1820, p. 64, pl. ii, fig. 2.

*Euphrosyne myrtosa*, Gravier, 1901, p. 254, pl. x, figs. 147-149.

*Euphrosyne myrtosa*, Augener, 1916, p. 95.

*Euphrosyne myrtosa*, Fauvel, 1923, p. 139, fig. 49, k-n.

Krusadai, one specimen, "bright pink." Pamban, two specimens, "red in life," about 14 mm. long.

Gravely (1927, p. 6), somewhat dubiously, identified these specimens with *E. globosa*, Horst.

The gills appear to me to agree closely with those of *E. myrtosa* as it has been described and figured by Gravier from his specimens from Djibouti. These branched gills are tapered and not enlarged distally (fig. I, *a*). The ringent setae are present and very like those of *E. foliosa*, Aud.-Edw. (fig. I, *b*). The forked setae, of varied shapes, correspond to Gravier's figures (fig. I, *c, f*).

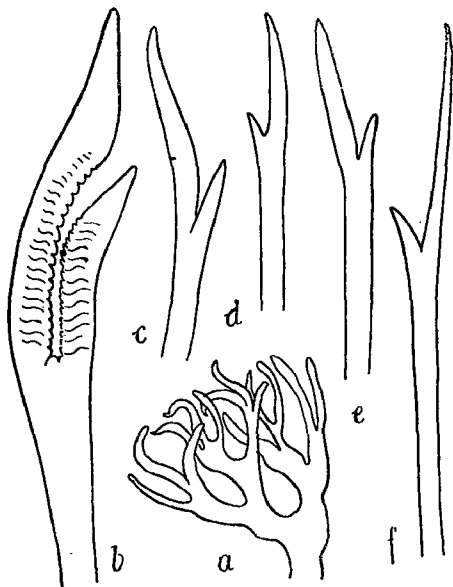


Fig. I.—*Euphrosyne myrtosa*. *a*, fragment of gill  $\times 60$ ; *b*, ringent bristle  $\times 350$ ; *c, d, e, f*, forked setae  $\times 150$ .

According to Augener, *E. myrtosa* Ehlers from the Pacific, is another species and he names it *E. samoana*. It is characterized by its longer setae, a smaller number of segments, 31 instead of 43, and its pelagic habits.

The worth of such characters is perhaps questionable for de Saint Joseph found, on the French coast, a *Euphrosyne* with long slender bristles which he named *E. intermedia*. Later, Fage and Legendre found it again, swimming on the surface, during the night at Concarneau and it turned out to be only an epitocous stage of *E. foliosa* (1927, p. 49.)

Augener thinks that Savigny's two species from the Red Sea: *E. laureata* and *E. myrtosa* ought almost to be united, the slight differences in the shape of the extremity of the gills, more or less lanceolate, being of little importance.

As regards *E. globosa*, Horst, I think it very little different—if at all—from *E. myrtosa*.

*Habitat*.—Red Sea; South Atlantic (Cameroun); Indian Ocean; Malayan Sea (?); Adriatic (?); Pacific (?)

#### Family PHYLLODOCIDAE.

##### Genus *Eulalia*, Oersted.

##### *Eulalia viridis*, O. F. Müller.

*Eulalia viridis*, Fauvel, 1923, p. 160 (synonymy).

Pamban, September 1925.

A small specimen, yellowish in alcohol, with three distinct tentacular segments, erect, elongated, lanceolate dorsal cirri, appears, very likely, to belong to this cosmopolitan species.

##### *Eulalia (Eumida) sanguinea*, Oersted.

*Eulalia (Eumida) sanguinea*, Fauvel, 1923, p. 116 (synonymy).

Pamban, September 1925

Two specimens. Body rather short and attenuated at both extremities. One dull violet and the other ochraceous when alive. The dorsal cirri are rather heart-shaped, the eyes large and the first tentacular segment hidden under the back part of the head. As the proboscis is not extruded, an accurate identification is not possible. Nevertheless, these specimens very likely belong to *E. sanguinea*.

*Habitat*.—Atlantic; Mediterranean; Persian Gulf; Indian Ocean; New Zealand.

#### Family HESIONIDAE.

##### Genus *Leocrates*, Kinberg.

##### *Leocrates Claparedii* (Costa).

*Tyr. hena Claparedii*, Claparede, 1868, p. 228, pl. xviii, fig. 3.

*Leocrates Claparedii*, Fauvel, 1918, p. 333; 1919, p. 371; 1923, p. 237, fig. 88, i-n.

*Leocrates Giardi*, Gravier, 1900, p. 180, pl. x, figs 17-19.

(?) *Leocrates chinensis*, Kinberg, 1865, p. 214; 1857-1910, p. 57, pl. xxiii, fig. 7.

(?) *Leocrates iris*, Grube, 1878, p. 105.

*Leocrates*, spec. Gravely, 1927, pl. ix, fig. 5.

Krusadai, September 26, 1922. Pamban, September 1922 and September 1925  
 "Pink in colour when alive."

The Pamban and Krusadai specimens do not show any noticeable differences from the *L. Claparedii* from the Mediterranean. In both forms the dorsal setae begin at the fifth setigerous segment. I have also found this species in collections from the Red Sea and Persian Gulf. It is very likely synonymous with *L. chinensis*, Kinberg, whose name has precedence. But Kinberg's description is so short and so incomplete that it may fit any *Leocrates* and for want of certainty it is better to keep to Costa's and Claparède's name.

*Habitat*.—Mediterranean; Red Sea; Persian Gulf; India; Philippines; China (?).

#### Family SYLLIDAE.

#### Genus *Syllis*, Savigny.

#### *Syllis prolifera*, Krohn.

*Syllis prolifera*, Krohn, Fauvel, 1923, p. 261, fig. 97, a-g (synonymy).

Shingle Island, September 1925.

A single specimen, about 30 mm. long. The anterior segments are nearly completely brown, with a large clear, round, square or irregular central spot. The occipital bump is obsolete. The dorsal cirri are long, with closely set articles and with brown marks. The anterior cirri do not show noticeable differences in shape.

The setae are bidentate with a slightly swollen shaft.

*Habitat*.—Atlantic; Mediterranean; Indian Ocean.

#### *Syllis Krohnii*, Ehlers.

*Syllis Krohnii*, Fauvel, 1923, p. 259, fig. 96, a-e (synonymy).

Shingle Island, September 1925. Two specimens.

In the anterior region, one shows on each segment two transverse brown streaks, and only one in the posterior region. The other has three streaks on the anterior segments, next two and then one only in the posterior segments. The articles of the dorsal cirri are numerous, short, very close together and spotted with brown. The anterior cirri are alternating, short and long, more or less swollen at the tip. The following ones are alternate and bent on the back.

The occipital bump, protruding over the back part of the prostomium, is well marked. The appendices of the setae are short and simple. On the first segments, the terminal pieces are longer with a more or less conspicuous accessory tooth.

*Habitat*.—Atlantic; Channel; Mediterranean; Indian Ocean.

### Syllis exilis, Gravier.

*Syllis exilis*, Gravier, 1900, p. 160, pl. x, fig. 9.

*Syllis exilis*, Augener, 1913, p. 192.

*Syllis exilis*, Fauvel, 1917, p. 195, fig. xi, pl. v, fig. 24 ; 1919, p. 354.

(?) *Syllis solita*, Grube, 1878, p. 120, pl. vii, fig. 7.

Krusadai, September 1925 ; Pamban, 1925 ; Rameswaram, April 20, 1924.

The wide-open proboscis crowned with papillae and armed with a big anterior tooth, gives to this thick and dorsally convex Syllid a deceiving appearance of being a Hesionid. The median tentacle is long and on the prostomium the four red eyes are disposed on a concave line. The palps are rather large and shorter than the slender lateral tentacles. The cephalic hood is well marked. The shaft of the lower setae of the anterior and posterior feet is noticeably swollen and the terminal piece is a large, bent, simple hook. The terminal pieces of the upper setae are more elongated and furnished with an accessory process.

A few transverse dull-violet streaks are still visible on the anterior segments of some specimens.

*Habitat*.—Red Sea ; Indian Ocean ; Madagascar ; Pacific ; Australia ; Gambier Islands ; (Philippine Islands?).

### Syllis closterobranchia, Schmarda.

*Syllis closterobranchia*, Ehlers, 1904, p. 19, pl. iii, figs. 1-4.

*Syllis closterobranchia*, Augener, 1913, p. 20, fig. 23 (synonymy).

*Syllis closterobranchia*, Fauvel, 1919, p. 354.

Krusadai, April 25, and May 8, 1924. F.H.G.

The only specimens I saw were on a slide mixed with *Syllis variegata*.

The dorsal cirri are short and fusiform. The compound setae of the median region are not bidentate.

*Habitat*.—Red Sea ; South Africa ; Australia ; New Zealand.

### Syllis (Ehlersia) cornuta, Rathke.

*Syllis cornuta*, Malmgren, 1867, p. 161, pl. vii, fig. 45.

*Syllis cornuta*, Fauvel, 1911, p. 371 ; 1914, p. 101 ; 1919, p. 355 ; 1923, p. 267, fig. 100, g-i.

*Ehlersia sexoculata*, Saint-Joseph, 1906, p. 181.

Krusadai, September 1925.

Only an anterior fragment of a small specimen represents this species easily known by the very long and slender terminal pieces of its anterior setae which are accompanied by others with a short bidentate, spinous appendix.

*Habitat*.—Atlantic ; Mediterranean ; Persian Gulf ; Indian Ocean.

### Genus Trypanosyllis, Claparède.

Body flat, ribbon-like. Proboscis crowned with a trepan-like circle of small teeth and a single dorsal tooth.

### Trypanosyllis zebra, Grube.

*Trypanosyllis zebra*, Fauvel, 1923, p. 269, fig. 101, a-e.

Krusadai, September 1925.

A specimen mounted in Canada balsam, has the falciform terminal pieces of its setae a little less markedly bifid than the typical form. Another specimen, with a stolon, has anterior and posterior end-pieces clearly bidentate.

*Habitat*.—Atlantic ; Mediterranean ; Indian Ocean.

### Genus *Opisthosyllis*, Langerhans.

Tentacles and cirri articulated. Tooth in the back part of the pharynx. A flap-like process, or hood, on the posterior part of the head.

### *Opisthosyllis brunnea*, Langerhans.

Fig. 2.

*Opisthosyllis brunnea*, Langerhans, 1879, p. 541, pl. xxxi, fig. F.

*Opisthosyllis brunnea*, Augener, 1916, p. 274, text fig. xxv.

Krusadai, September 1925.

A large specimen, about 40 mm. long and 1 mm. broad carries a 8-9 mm. long acephalous stolon with swimming bristles. The palps are elongated. The number of the articles in the dorsal cirri ranges from 30 to 50. The ventral cirri are finger-shaped. The parapodia want papillae. The pharynx, extending on about 11 segments, bears an anterior crown of papillae and, at its back part, a large conic tooth inserted on a kind of round bulb (fig. 2, a). The proventricule extends from the 17th to the 28th setigerous

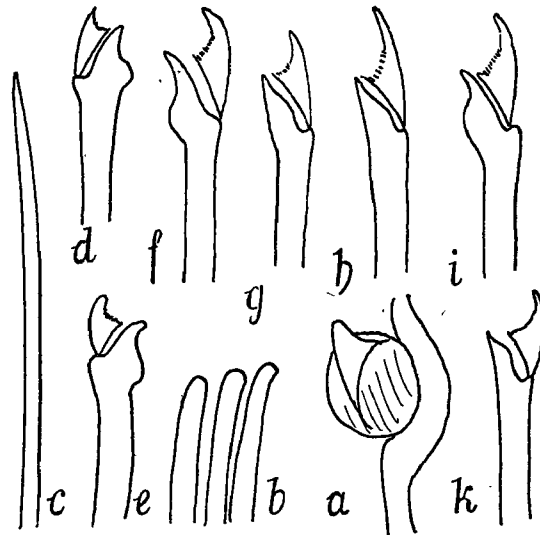


Fig. 2.—*Opisthosyllis brunnea*: a, tooth in the pharynx  $\times 60$ ; b, acicular setae of the stolon  $\times 225$ ; c, posterior simple seta  $\times 225$ ; d, e, f, posterior falcigerous setae  $\times 225$ ; g, h, anterior falcigerous setae  $\times 225$ ; i, k, middle falcigerous setae  $\times 225$ .



segment. The shaft of the setae is much swollen distally and bears a simple appendix gradually shortened in the segments farthest from the head (fig. 2, *d-k*). On the last segments a small simple seta (fig. 2, *c*) and 3-4 large aciculi (fig. 2, *b*) are to be found. The stolon is moreover furnished with long, slender, swimming setae.

*Habitat*.—Atlantic (Madeira and tropical coast of Africa); Indian Ocean.

### Genus *Pionosyllis*, Malmgren.

Palps fused at the base. Tentacles and cirri not distinctly articulated. Pharynx armed with a single tooth anteriorly. Anterior edge of the proboscis smooth.

### *Pionosyllis* spec.

Krusadai.

A single specimen, mounted in balsam, and more or less twisted. It has long inarticulated cirri and setae with a very long terminal piece very like those figured by Augener (1913, p. 222) for *Pionosyllis pulligera*. It also reminds one of *P. divaricata* Claparède, but, on account of the impossibility of ascertaining the characters of the proboscis and the difficulties of the investigation of the setae in balsam, the identification remain dubious.

### Genus *Odontosyllis*, Claparède.

Palps fused at the base. Tentacles and cirri not distinctly articulated. A flap-like process, or hood, on the posterior part of the head. A transverse row of teeth pointing backwards inserted on the anterior edge of the pharynx (fig. 3, *b*).

### *Odontosyllis* *Gravelyi*, Fauvel.

Figs. 3-4.

*Odontosyllis Gravelyi*, Fauvel, 1928, p. 91, fig. 1.

*Specific characters*.—Body long, thick, rounded dorsally, semi-circular in section, very brittle (fig. 3, *a*). 80-150 segments and more. Prostomium sub-rectangular. Four large brown-red eyes forming a trapezium, the anterior larger and wider apart (fig. 4, *a*). Three long, unequal tentacles, the median twice as long the laterals. Two large broad palps pointing forwards, parallel or converging, sometimes bent ventrally. 6-7 large pharyngeal teeth pointing backwards and two large lateral folds (fig. 3, *b*). Pharynx extending over 5-6 segments (from 4th, 5th to 10th included). Proventricle twice as long as pharynx (10-11 segments; from 11th to about 20th). Tentacular segment protracted in a rounded flap over the prostomium. Two pairs of long, unequal tentacular cirri, the dorsal ones twice as long as the ventral (fig. 4, *a*). Dorsal cirri filiform, unjointed; on the first setigerous segment they are much longer than on the next, rapidly decreasing in length, they then become nearly equal in size, or irregularly alternate, their length reaching about half the body breadth (fig. 4, *c*). Ventral cirri broad and short (fig. 4, *b, c*). Stout aciculi with a blunt end slightly dilated and bent. Compound setae of two kinds in every foot, the



Fig 3.--*Odontosyllis Gravelyi*: a, section of the anterior part  $\times 45$ ; b, armature of the proboscis  $\times 45$ .

upper ones with a long needle or awl-like terminal piece slightly flattened, very indistinctly bifid and bulbous at the tip; the lower ones, much more numerous, with an enlarged shaft and a short, stout strongly bidentate appendix (fig. 4, *d-e*). On the last segments, a small dorsal simple seta, slightly bent (fig. 4, *h*) and a ventral simple bifid seta (fig. 4, *i*). Mature specimens with long pelagic setae from about the 30th setigerous segment (fig. 4, *b*). Two long anal cirri. Phosphorescent, 15-30 mm. long and 1.5-2 mm. broad, bristles included.

Colour in alcohol: yellowish white with a longitudinal dark-brown, nearly black, dorsal streak running the whole length of the body. On a variable number of anterior segments, a brown dorsal spot at the base of the foot.

This splendid Syllid was collected by Mr. F. H. Gravelly "a little to the east of the anchorage at Krusadai Island on May 7, 1924, a few days after the new moon" and on the north side of Sandy Point; also in September 1925 and 1928 off the end of Sandy Point. The worms were swimming at the surface, brilliantly phosphorescent and very active. The swarming "lasted only for a very brief period" (1927, p. 8).

This species, though rather akin to *O. fulgurans*, Claparède, of the French coasts is readily distinguished by its upper setae with a long terminal piece and its short falciform appendices which are more distinctly bidentate. *Odontosyllis hyalina*, Grube (1878, p. 129, pl. VII, fig. 1) has a like appearance but it has only short falciform terminal pieces. *Odontosyllis fasciata*, Grube, apparently carries falciform appendices of two kinds

but they are simple and do not differ so much in length from each other (fig. 4, *k*, *l*). Moreover, its cirri are much shorter and it is streaked crosswise with reddish stripes.

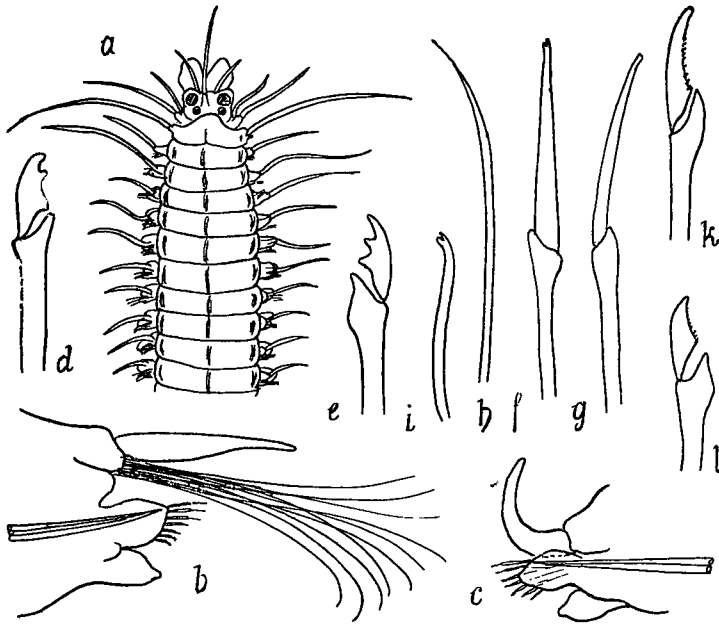


Fig. 4.—*Odontosyllis Gravelyi*: *a*, anterior part  $\times 12$ ; *b*, foot with swimming bristles  $\times 60$ ; *c*, anterior foot  $\times 60$ ; *d*, *e*, setae with short bidentate end-piece  $\times 400$ ; *f*, *g*, setae with long end-piece  $\times 400$ ; *h*, simple posterior seta  $\times 400$ ; *i*, simple bidentate posterior seta  $\times 400$  *Odontosyllis rubrofasciata*: *k*, *l*, two falcigerous setae from the same posterior foot  $\times 400$ .

The swarming of *Odontosyllis* has already been noted by Crossland (1905) in the Red Sea, and by Potts (1913)<sup>1</sup> and MacLean Fraser (1915) as regards *Odontosyllis phosphorea*, Moore.

The question of the relations between the swarming and the lunar phases wants further investigation.<sup>1</sup>

#### Family NEREIDÆ.

#### Genus *Lycastis*, Savigny.

Feet uniramous. Proboscis without paragnaths.

<sup>1</sup> Mr V. John, the Fisheries Department Research Assistant in charge of the Krusadai Island Biological Station, informs me that he has since observed that *O. Gravelyi* is most abundant on the fourth to ninth days after the new moon, especially on the sixth and seventh days when he has sometimes seen as many as fifty at a time. They are completely absent only on a few days at the period of full moon. He finds that they are commoner on the south side of Bushy Point than at Sandy Point.

*Lycastis indica*, Southern.

*Lycastis indica*, Southern, 1921, p. 578, fig. 2, pl. xix, fig. 2.

*Lycastis indica*, Horst, 1924, p. 4.

Adyar (Madras), January 20, 1916.

I have nothing to add to Southern's excellent description. Only, I find the eyes arranged in a widely opened trapezium rather than on a line and I did not notice the small pit on the middle part of the prostomium.

*Habitat*.—In the neighbourhood of Madras and Calcutta in brackish water of very variable salinity. Macassar, on shore (Horst).

Genus *Tylonereis*, Fauvel.

Feet biramous. Dorsal ligule foliaceous. All setae homogomph spinigerous. Proboscis with papillae, without paragnaths.

*Tylonereis Fauveli*, Southern.

*Tylonereis Fauveli*, Southern, 1921, p. 582, pl. xix, fig. 3, a-f.

Pamban Bridge, September 1925, F. H. Gravely.

A single specimen which allowed me to verify the leading specific characters clearly distinguishing this species from *T. Bogoyawlenskyi*, Fauvel.

The ventral setigerous lobe is not trilobed, whilst it is distinctly so even in the posterior feet of *T. Bogoyawlenskyi*. The dorsal setae of the posterior feet are much shorter than the ventral ones. The inferior setae in the upper ventral bundle have the terminal piece shorter and broader and differ less from the falcigerous appendices of other Nereids than in the other species where they are rather short spinigerous.

*Habitat*.—Chilka Lake and Pamban.

Genus *Leonnates*, Kinberg.

Proboscis with both soft and horny paragnaths.

*Leonnates Jousseaumei*, Gravier.

Fig. 5, a-e

*Leonnates Jousseaumei*, Gravier, 1901, p. 160, pl. xi, figs. 34-37.

*Leonnates Jousseaumei*, Fauvel, 1911, p. 180; 1919, p. 400.

*Leonnates Jousseaumei*, Horst, 1924, p. 150.

Pamban, September 18, 20, 1922.

A single small specimen, an atocous female with proboscis retracted.

*Habitat*.—Red Sea; Persian Gulf; Gulf of Manaar; Macassar Straits.

### Leonnates decipiens, Fauvel.

Fig. 5, f-m.

*Leonnates decipiens*, Fauvel, 1929, p. 180.

*Leonnates Jousseau mei* (non Gravier), Fauvel 1927, p. 427, fig. 106, f, g.

*Specific characters*.—Body stout, a little flattened. 89 to 90 setigerous segments. Prostomium broader than long. Four black eyes arranged in a widely opened trapezium or in a rectangle. Palps stout, diverging, as long as the tentacles. The longer tentacular cirri reach backwards to the fourth or fifth setigerous segment. Jaws dark brown, curved, nearly smooth on edge. Maxillary ring with small conical paragnaths, transparent, hardly visible. I = O; II = an oblique row; III = a small transverse group; IV = a crescentic group. Oral ring with soft conical papillae. V = O; VI = a single large papilla on each side; VII-VIII = a single row of 7-8 smaller papillae, sometimes more or less wanting. Parapodia: dorsal ramus with three ligules, the upper triangular, with well marked dark glands (fig. 5), the two lower subequal, conical, smaller. Dorsal cirrus inserted on the base of the superior ligule and a little longer. Ventral ramus with

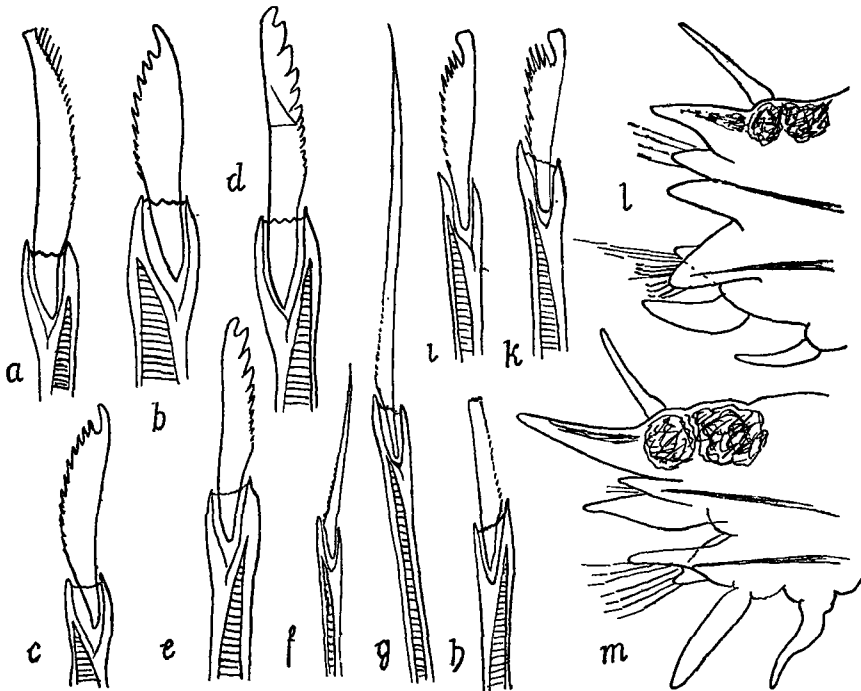


Fig. 5.—*Leonnates Jousseau mei*, typical specimen from the Persian Gulf: a, b, c, dorsal (tip broken), upper ventral and lower ventral falcigerous setae from the 24th setigerous segment  $\times 500$ ; d, falcigerous seta from the first setigerous segment  $\times 600$ ; e, falcigerous seta from the first segment of a Pamban specimen  $\times 600$ .

*Leonnates decipiens*: f, short lower spinigerous seta from an anterior foot  $\times 600$ ; g, lower spinigerous seta from the 69th segment  $\times 600$ ; h, heteromorph joint of a lower spinigerous seta from the 61st segment  $\times 600$ ; i, k, inferior and intermediate hemigomph falcigerous setae from mid-body  $\times 600$ ; l, foot from the middle of body  $\times 30$ ; m, posterior foot  $\times 30$ .

two unequal fillets and a slightly longer blunt ligule; ventral cirrus tapering, shorter. In the posterior region the dorsal ramus is much larger than the ventral (fig. 5, *m*). Dorsal setae all homogomph spinigerous. Ventral setae, in the anterior and posterior feet, homogomph and hemigomph spinigerous and shorter heterogomph spinigerous (fig. 5, *g, h, f*); on the feet of the middle region, from the 13th—15th setigerous segment, about, the ventral heterogomph spinigerous are superseded by falcigerous setae the terminal piece of which has a spinous convex edge and an enlarged and abruptly truncated tip (fig. 5, *i, k*). *Even in the posterior feet there are no dorsal falcigerous setae* and the ventral falcigerous setae are absent in the anterior and posterior feet. Two long anal cirri. 20–30 mm. long and 2 mm. broad.

Krusadai, September 16, 26, 1925. Pamban, September 1925. F. H. Gravely.

There are three specimens and a posterior fragment, all uncoloured in alcohol.

I had already seen this species amongst Polychaeta from the Suez Canal (1927, p. 426, fig. 106) and I had noted the singular appearance of the ventral falcigerous setae, but as most of the terminal pieces were gone or broken on the specimen I was led to view it only as an anomaly, inasmuch as broken terminal pieces of *L. Jousseaumei* often present a somewhat like condition (fig. 5, *a*). But, in the specimens from the Gulf of Manaar, such appendices are too many and too well preserved to allow of a doubt; their enlarged and abruptly truncated tip and the long sharp spines on their convex edge are truly characteristic and they clearly differ from the stout terminal pieces of *L. Jousseaumei* (fig. 5, *b, c, d, e*). Moreover, these setae are hemigomph or nearly heterogomph (fig. 5, *i, k*). The two species do not differ only in the shape of their setae. In *L. Jousseaumei* the falcigerous setae are already present on the first setigerous segment (fig. 5, *d, e*), next, in both ventral bundles of every foot and in the dorsal ramus of the posterior feet. In *L. decipiens* the falcigerous setae are wanting in all dorsal rami, even in the posterior ones, and, in the ventral ramus, they are only to be found in a number of feet ranging from the 13th or 15th. On the anterior and posterior feet, the ventral falcigerous setae are superseded by heterogomph spinigerous setae with an appendix a little shorter than the others (fig. 5, *f*) whereas in *L. Jousseaumei* only homogomph spinigerous and equally homogomph falcigerous are to be found.

The two species also show differences in the proboscis, especially as regards the oral ring, which in *L. Jousseaumei* bears fairly numerous papillae in groups VI and several rows in groups VII–VIII, whilst, in *L. decipiens*, a single papilla only is to be noticed on each group VI and the papillae of the groups VII–VIII are reduced to a single row of 7–8 which may be entirely wanting or reduced to 1 or 2 small papillae.

Both species may live together in the same locality since a typical *L. Jousseaumei*, bearing on the first setigerous segment setae identical to those of the specimens from the Persian Gulf (fig. 5, *e, d*), was also found at Pamban.

*Habitat*.—Suez Canal; Gulf of Manaar.

Genus *Nereis*, Cuvier.*Nereis Coutierei*, Gravier.

*Nereis Coutierei*, Gravier, 1901, p. 167, figs. 166-170, pl. xi, figs. 36-41.

*Nereis Coutierei*, Fauvel, 1911, p. 384, pl. xix, fig. 17; 1919, p. 397; 1927, p. 428.

Krusadai, September 26, 1922 and September 1925.

Shingle Island, September, 1925. F. H. Gravely.

Two small specimens from Krusadai are normal. Having dissected the proboscis of one I found it with the typical arrangement of the paragnaths. The parapodia of both specimens have the enlarged dorsal ligule and, in the posterior feet, the typical homogomph dorsal falcigerous setae.

The Shingle Island specimen, 30 mm. long and 1.5 mm. broad, is exactly similar to the former, as regards the feet and the setae, but its extruded proboscis shows a rare anomaly, it being utterly devoid of paragnaths.

*Habitat.*—Red Sea; Persian Gulf; Suez Canal; Gulf of Manaar.

*Nereis Kauderni*, Fauvel.

*Nereis Kauderni*, Fauvel, 1921, p. 8, pl. i, figs. 1-7.

*Nereis falcaria*, Gravely, 1927, p. 12, pl. x, fig. 20.

*Nereis Mortenseni*, Augener, 1923, p. 21, figs. 7-14.

(?) *Ceratonereis falcaria*, Willey, 1905, p. 272, pl. iv, fig. 89.

Krusadai and Shingle Islands, September 1925.—Rameswaram, April 1924, F. H. Gravely.

These small *Nereis* agree very well with my *N. Kauderni*, from Madagascar. \* The frontal edge of the prostomium is slightly notched between the tentacles. (Fauvel, 1921, pl. I, fig. 7 and Gravely, 1927, pl. X, fig. 20). The colour pattern on the anterior segments, the feet and the big posterior homogomph dorsal setae with their falcigerous toothed appendix are the same. In the posterior feet, the upper ligule of the dorsal ramus is reduced to a small spur at the base of the cirrus.

The paragnaths are arranged in the same manner: I=O; II=a more or less irregular\* row; III=a variable cluster; IV=a crescentic group; V=O; VI=on each side, a small cluster of very minute paragnaths; VII-VIII=a single row of 8-9 paragnaths.

Gravely identifies this *Nereis* with *Ceratonereis falcaria*, Willey, taking for granted that the paragnaths of the oral ring escaped Willey's notice, which looks rather doubtful.

The big homogomph falcate piece in the posterior feet agrees, indeed, well enough with Willey's figure (pl. IV, fig. 89), but it is only fair to note that like setae occur in several other species such as *N. zonata* var. *persica*, *N. Coutierei*, *N. funchalensis*, etc. Augener identifies *N. Kauderni* to *N. Jacksoni* Kinberg, as well as *N. Denhamensis*, *N. Heirissonensis* and *Ceratonereis falcaria* Benham.

Nevertheless the proboscis armature of *N. Denhamensis* noticeably differs from that of *N. Kauderni*. The big posterior homogomph falcigerous appendices differ as well as the posterior feet.

*N. Kauderni* is rather nearer to *N. Mortenseni* Augener (1923, p. 21, figs. 7-14) which has proboscis, feet and setae quite analogous. According to Augener, *N. Mortenseni* is principally characterized by its prostomium notched in the frontal border, this feature distinguishing it at once from *N. Jacksoni* and *N. Kauderni*. A glance at Gravely's figure 20, pl. X and at mine (1921, pl. I, fig. 7) satisfies one that this last species has a prostomium more or less notched. If *N. Kauderni* and *N. Mortenseni* are identical, the first name has the priority. If further observations prove the casual disappearance of the oral ring's paragnaths, Willey's denomination, *Nereis falcaria* would be the right one, but it would probably entail the suppression of the sub-genus *Ceratonereis*.

The Rameswaram specimen is a male *Heteronereis*, 8 mm. long and 1 mm. broad, with three distinct regions: an anterior atocous region, an epitocus middle one, and a posterior of 16 atocous segments forming a slender tail. The dorsal cirri of the middle region are warty.

The prostomium is slightly notched between the antennae.

This small *Heteronereis* well agrees with the one described by Augener (1924, p. 320, fig. 4) as *Nereis Mortenseni*, though I find the ventral cirrus process less branched than his fig. 4 shows. But Augener had also to deal with sub-epitocus specimens on which such processes were likely to be less branched. In the Rameswaram specimen, in the feet of the middle region, there are a few spinigerous setae and even a few ventral falcigerous besides the oar-shaped setae. On the posterior atocous segments, the big dorsal characteristic falcigerous end-pieces with two or three large blunt teeth are to be found.

This *Heteronereis* brings a new proof of the identity of *N. Mortenseni*, *N. Kauderni* and, perhaps, *Nereis falcaria*.

On so small a specimen I was unable to check the state of the paragnaths, the proboscis being retracted.

*Nereis Kauderni* and *N. abnormis* increase the number of species of which the *Heteronereis* stages show three distinct regions, such as: *Nereis icosiensis*, Gravier and Dantan, *Leptonereis glauca* ♂, *Perinereis Marionii*, *P. macropus* and *P. (Arete) tenuisetis*.

*Habitat*.—Indian Ocean (Madagascar, Gulf of Manaar); Pacific.

### *Nereis abnormis*, Horst.

*Nereis abnormis*. Horst, 1924, p. 163, pl. xxxii, fig. 6

*Nereis abnormis*, Augener, 1926, p. 448.

Krusadai, September 1925. F. H. Gravely.

Of this very curious species only a small male *Heteronereis*, about 6 mm. long and 1, 2 mm. broad, feet included, was available. The four large eyes, with a whitish lens, are arranged in a square. Tentacles and palps are bent to the ventral side. The anterior tentacular cirri, which are the longest, reach backwards to the third or fourth setigerous segment. The three anterior feet are little altered. On the 4th, 5th and 6th the dorsal cirrus is enlarged, bird-head-like, with a small filiform tip. The dorsal cirri of the seventh setigerous segment widely differ from the others and identify this *Heteronereis*



at the first glance. They mimic tentacular cirri but are still larger and as long as the 8 following segments. The other dorsal cirri are normal. The ventral cirri 1 to 7 are small and conical, but on the feet 5, 6, 7 and 8 a large prominent swollen lobe is conspicuous above the ventral cirrus. The epitocous parapodia begin with the 15th setigerous segment. Their dorsal cirri are warty. According to Horst, the mutation occurs on the 14th, 15th foot, in the male, in the 16th, in the female.

Augener, who found this species in material from Trincomali, noted three regions in its Heteronereis stage: an anterior of fourteen segments, an epitocous middle one of thirty-three, and a posterior, atocous, with eleven. Moreover, he mentioned two long filiform cirri, on the eighth segment of the posterior region. The second region of the above specimen being incomplete I am unable to confirm the fact. Besides the oar-shaped setae, the epitocous feet still preserve a few dorsal and ventral spinigers and ventral heterogomph falcigers,

*Habitat*.—Philippine Islands; Ceylon; Krusadai.

### *Nereis cricognatha*, Ehlers.

*Nereis cricognatha*, Ehlers, 1904, p. 29, pl. iv, figs. 1-3.

*Nereis cricognatha*, Augener, 1913, p. 163; 1924, p. 334; 1927, p. 133

*Nereis cricognatha*, Horst, 1924, p. 158.

*Nereis arenaceodentata*, Benham, 1916, p. 134, pl. xlvii, figs. 1-3.

Krusadai, March 25th or April 8th, 1924. F. H. Gravely.

A single specimen 15 mm. long and 3 mm. broad, slightly incomplete posteriorly. The retracted proboscis carries numerous paragnaths, the groups of which nearly fused together form a belt around the oral as well as the maxillary ring.

The ventral falcigerous end-pieces are all long and knife-like, homogomph or, at most, hemigomph. There are no dorsal falcigerous on the back feet.

This species looks very like *Nereis caudata*, Claparède, differing only by its less crowded groups V, VI, its shorter dorsal cirri and its longer and less markedly heterogomph falcigerous end-pieces.

*Habitat*.—New Zealand; Bass Straits; Philippine Islands; India.

### *Nereis indica*, Kinberg.

*Nereis indica*, Kinberg, 1865, p. 169.

*Nereis indica*, Willey, 1905, p. 270.

*Nereis* sp. nr. *ezoensis* Gravely, 1927, p. 13, pl. x, fig. 22.

The small Pamban specimen, which Gravely thought near *Nereis ezoensis*, Izuka, is a slightly sub-epitocous male the parapodia of which show rudimentary lamellae but not yet oar-shaped setae. The inferior ventral spinigerous setae are clearly heterogomph, the posterior feet are devoid of dorsal homogomph falcigers and their upper ligule is not strongly increased. The dorsal ramus of the anterior feet is trilobed.

The paragnaths are arranged as follows: I=1; II=2 curving rows; III=a lozenge-shaped cluster; IV=triangular clusters; V=0; VI=on each side, 4-5 conical, in oval group; VII-VIII=1 or 2 large rows and a row of much more numerous and minute denticles.

The proboscis recalls that of *N. pelagica*. I believe that this specimen may be identified with *Nereis indica*, as described anew by Willey.

*Habitat*.—Bangka Straits; Gulf of Manaar.

### Family EUNICIDAE.

#### Genus *Eunice*, Cuvier.

#### *Eunice afra*, Peters.

*Eunice afra*, Crossland, 1904, p. 289, pl. xx, figs. 1-5.

*Eunice afra*, Fauvel, 1919, p. 374 (synonymy).

Krusadai, April 25, 1924; September 1925.

A number of small specimens more or less incomplete, 2-3 mm. broad. A small one, whole, 40 mm. long. The gills usually begin at the 15th foot, sometimes at the 20th. They are simple or of two filaments in the smaller specimens and of three or four, at the maximum, in the others.

Crossland has already noted that in the smaller specimens the gills begin at the feet 15 to 20, 22, sometimes even at the 8th.

*Habitat*.—Red Sea; Indian Ocean; Philippine Islands; Gambier Islands.

#### *Eunice tentaculata*, Quatrefages.

*Eunice tentaculata*, Quatrefages, 1865, T. I, p. 317.

*Eunice tentaculata* Fauvel, 1917, p. 209, fig. xvii (synonymy).

*Eunice pycnobranchiata*, McIntosh, 1885, p. 294, pl. xxxiv, figs. 13-15.

*Eunice Elsyi*, Baird, 1870, p. 344.

Krusadai and Shingle Islands, September 1925.

Several specimens still show traces of a white collar on the fourth setigerous segment. All have the first gill on the third setigerous segment, sometimes simple, sometimes already of 2 or 3 filaments. In the larger specimens the gills attain to 8-9 filaments, from 6-7th to 25th 26th foot. They are wanting only in the 3-4 last segments. The tentacles are more or less distinctly annulated at the base and moniliform at the tip. The tentacular cirri and dorsal cirri are smooth or very faintly ringed. Aciculi and acicular setae are black.

According to the notes of colour, they were, in life, "dull red above, tentacles white, except at constrictions, dorsal tentacles white but not area between. White spot at

each side above gills, from 6th setigerous segment. Round white median spot about 30th." Others were: "dull red with banded tentacles and white dorsal tentacular cirri and white fourth setigerous segment. Parapodia white, bases of setal bundles dark."<sup>o</sup>

Such specimens resemble *Eunice torquata* with the first gill at the 3rd setigerous segment but they differ in having the gills continued to the posterior extremity and the dorsal cirri not moniliform.

I think they can be identified with *Eunice tentaculata* though the last has generally the first gill at 4th to 6th setigerous segment and dorsal cirri more distinctly annulated.

I have already propounded the hypothesis that *Eunice tentaculata* might be a relatively young form of the large *E. Aphroditois*. Augener (1927, pp. 160-166) was inclined to unite the two species.

*Habitat*.—Ceylon; Australia; New Zealand.

### *Eunice tubifex*, Crossland.

*Eunice tubifex*, Crossland, 1904, p. 303, figs. 52-55, pl. xxi, figs. 1-8.

*Eunice tubifex*, Willey, 1905, p. 282.

*Eunice tubifex*, Fauvel, 1914, p. 123, pl. vii, figs. 62, 64; 1917, p. 230.

Krusadai. A single specimen in its membranaceous forked tube overgrown with Algae and calcareous matter. The gills begin about 34th, 35th setigerous segment, simple at first, then of 3-4 long filaments.

This species is easily distinguished by its thick glandular pads very large for about fifty segments and then rounded and decreasing.

In the anterior part of the body the compound setae have a smooth, elongated, knife-like end-piece. In the middle and posterior regions the end-pieces are bidentate sickle-shaped hooks, as in other species of *Eunice*.

*Habitat*.—Atlantic (Gulf of Guinea); Indian Ocean; Philippine Islands; South Australia.

### *Eunice gracilis* (Crossland).

Fig. 6.

*Nicidion gracilis*, Crossland, 1904, p. 327, figs. 65-66, pl. xxii, figs. 10-11.

*Nicidion gracilis*, Augener, 1913, p. 284.

Krusadai, September 16, 1922. Shingle Island.

A small filiform rounded specimen answers very well to Crossland's figure.

The prostomium carries two reniform eyes. The tentacles are short, thick and smooth. The tentacular cirri are shorter than the buccal segment, the right one (strange

anomaly) is double. The acicular setae are bidentate and brown. The comb-setae and the bidentate sickle-shaped setae agree well with Crossland's figures (fig. 6, *d, e, f*).

The gills are absent from the greater part of the animal. The first, very small, appears at the 112th setigerous segment, and I note their presence on the 18–20 following segments. Unhappily the specimen is incomplete beyond. The gills are all simple (fig. 6, *c*).

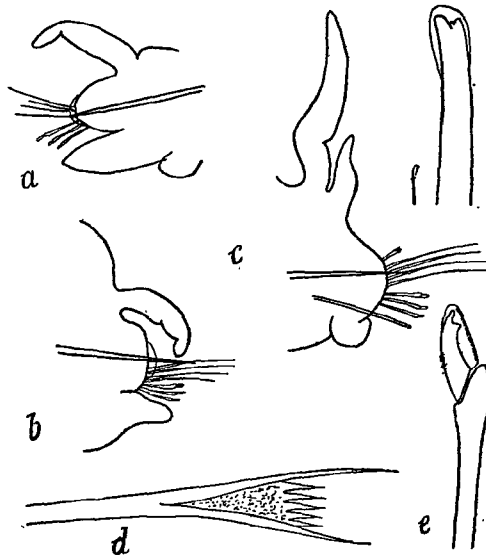


Fig. 6.—*Eunice gracilis*: *a*, fifth foot  $\times 80$ ; *b*, tenth foot  $\times 80$ ; *c*, 120th foot  $\times 80$ ; *d*, comb-seta  $\times 500$ ; *e*, falcigerous seta  $\times 400$ ; *f*, acicular seta  $\times 400$ .

As the genus *Nicidion* only differs from *Eunice* in the lack of gills and since *N. gracilis* has gills in the posterior region of its body the latter is a genuine *Eunice* and not a true *Nicidion*.

Of Crossland's three specimens two wanted the hind end and the third was undergoing regeneration of the posterior part. There is no wonder that the gills escaped Crossland's notice since they only exist at the posterior end, very far from the head.

Augener's Australian whole specimens, numbered only 98 segments and 19 mm. length. The others wanted the back part. In that case the lack of gills is explained, since they begin only after the 100th segment.

This species is closely allied to *Eunice Marenzelleri*, Gravier, which has only simple gills beginning far from the head.

*Eunice siciliensis*, Grube, has also simple gills far removed from the head but it is easily distinguished by the absence of comb-setae and acicular setae. *Nicidion edentulum* Ehlers, is very like it; the jaws, the lower gouge-like jaw-plates, are the same, it also

lacks comb-setae and acicular setae. The absence of gills alone differentiates it from *E. siciliensis*. Perhaps it is only a variety of the last?

*Habitat*.—Indian Ocean (Zanzibar); Gulf of Manaar; Pacific (Australia).

### Genus *Marphysa*, Quatrefages.

#### *Marphysa Macintoshi*, Crossland.

*Marphysa Macintoshi*, Crossland, 1903, p. 137, pl. xiv, figs. 3-6.

*Marphysa Macintoshi*, Fauvel, 1919, p. 382.

Krusadai. V. John. Krusadai, September 14, 1928. F. H. Gravely.

Three incomplete specimens.

The body is long, slender, nearly cylindrical. The broad, undivided prostomium is horse-shoe-shaped. The setae and branchiae are like those of *M. sanguinea*.

*Habitat*.—Red Sea; Indian Ocean (Zanzibar, India).

#### *Marphysa sanguinea*, Montagu.

*Marphysa sanguinea*, Fauvel, 1919, p. 381; 1923, p. 408, figs. a-h (synonymy).

*Marphysa furcellata*, Crossland, 1903, p. 141, pl. xv, figs. 13-14.

*Marphysa furcellata*, Gravely, 1927, p. 18.

Krusadai, September 1925. Kutikal backwater.

After investigating specimens from Djibouti, I satisfied myself (1919, p. 381), by comparing then with *Marphysa sanguinea* from the European coasts, that no differences of specific value could be found to separate the last from *M. furcellata*, Crossland, and Montagu's name has priority.

*Habitat*.—Atlantic; Mediterranean; Red Sea; Indian Ocean.

### Genus *Nematonereis*, Grube.

#### *Nematonereis unicornis*, Grube.

*Nematonereis unicornis*, Fauvel, 1923, p. 413 (synonymy).

Pamban, September 1925, a very small specimen. Krusadai (lagoon) May 1928, a whole specimen.

*Habitat*.—Atlantic; Channel; Mediterranean; Suez Canal; Indian Ocean.

Genus *Diopatra*, Aud.-Edw.*Diopatra neapolitana*, Delle Chiaje.

*Diopatra neapolitana*, Fauvel, 1923, p. 419, fig. 166, a-h (synonymy); 1921, p. 7.

*Diopatra neapolitana*, Crossland, 1903, p. 132, pl. xiv, fig. 1.

*Diopatra amboinensis*, Willey, 1905, p. 274, pl. iv, figs. 95-97.

Krusadai, May 20-21, 1928.

A few specimens, incomplete, 3 mm. broad and others much smaller.

The first gill, already large and of many spirally disposed filaments, appears at the fourth setigerous segment. The ventral cirri are conical on the 5 or 6 first feet, according to specimens. The aciculi and setae agree very well with those of *D. neapolitana* from Naples. But the comb-setae differ, having more numerous and finer teeth and, sometimes, one lateral filament thread-like and more or less twisted.

Augener sets a great weight on this character and uses it to distinguish species otherwise very close to each other. To my thinking, it is first necessary to prove the fixity of this character which, moreover, I deem of very slight specific worth.

The large *Diopatra* of Naples have, indeed, comb-setae with larger and fewer teeth (6-9), but it is necessary to investigate also small and young specimens from that locality, which I have not had the opportunity to do.

In *Diopatra* specimens from the coast of Africa (Angola) I found, on the same worm and sometimes on the same foot, long comb-setae with fine and numerous teeth, and others short, with a few large teeth. I have often noticed similar variations in *Marphysa sanguinea*.

Such a character does not then appear to have a great specific value.

In short, the Krusadai specimens agree with Willey's *Diopatra amboinensis*. But Milne-Edwards' old description is so vague and incomplete that it is better to drop the name. Southern's *D. variabilis* does not look noticeably different from *D. neapolitana* and from the Krusadai specimens, only the comb-setae have larger teeth.

*Habitat*.—Atlantic; Mediterranean; Red Sea; Indian Ocean.

Genus *Onuphis*, Aud.-Edw.*Onuphis spec.*

Krusadai, May 20-21, 1928.

A very doubtful anterior fragment of an *Onuphis* almost entirely discoloured. The tentacular cirri slightly outstrip the prostomium. The hooks of the three first setigerous segments are bidentate, the four first ventral cirri are conical, the median lobe of the feet

remains cirriform till the seventh foot, at the eighth it is already reduced. The gills begin at the fourth setigerous segment, simple at first, next bifid and of two filaments at most. This *Onuphis* only differs from *O. dibranchiata*, Willey by its three first gill-less setigerous segments. Perhaps it is but a variety or an individual anomaly of it (?).

### *Onuphis holobranchiata*, Marenzeller.

*Onuphis holobranchiata*, Marenzeller, 1879, p. 132, pl. iv, fig. 1.

*Onuphis holobranchiata* Willey, 1905, p. 278, pl. iv, fig. 101.

*Onuphis holobranchiata*, Augener, 1913, p. 283.

Krusadai. April 1924 and September 1925.

All specimens have long, simple gills beginning at the first setigerous segment. The eyes are more or less conspicuous according to their state of preservation. A few specimens show traces of pigment on the sides or transverse bands.

The jaws agree with Marenzeller's description, with the exception of the teeth, finer and more numerous. The ventral cirri are conical till the fourth setigerous segment and the first four carry setae with a bidentate or tridentate end-piece. From the fifth setigerous segment backwards the setae are simple and further back are mixed with comb-setae and bidentate acicular setae.

*Habitat*.—Japan; Gulf of Manaar.

### Genus *Lumbriconereis*, Blainville.

#### *Lumbriconereis sphaerocephala*, Schmarda.

*Lumbriconereis sphaerocephala*, Augener, 1913, p. 288; 1927, p. 188.

*Lumbriconereis mirabilis*, Kinberg, Augener, 1922, p. 30, fig. 8.

Krusadai. Shingle Island. Pamban, September 1925.

This species, with a globular prostomium, compound setae with short appendix and short and stout simple hooks is very closely allied to the European *L. coccinea*, Renieri. It also comes near to *L. obtusa*, Kinberg, recorded from Ceylon by Augener.

*Habitat*.—Indian Ocean; Pacific (Australia, New Zealand).

#### *Lumbriconereis heteropoda*, Marenzeller.

*Lumbriconereis heteropoda*, Marenzeller, 1879, p. 30, pl. vi, fig. 1.

*Lumbriconereis heteropoda*, Izuka, 1912, p. 141, pl. xiv, fig. 19.

*Lumbriconereis heteropoda*, Fauvel, 1919, p. 394.

*Lumbriconereis heteropoda*, Crossland, 1924, p. 4, figs. 1-7.

*Lumbriconereis erecta*, Moore, 1903, p. 454.

Krusadai Island. V. John.

Eight specimens, incomplete, 160 to 320 mm. long and 3-5 mm. broad. The prostomium is conical. The upper jaw-plates are glossy black. The feet are strikingly long the lip of the seta-sack in the posterior part of the body being erect or pointing backwards. Usually the forty anterior feet of this species carry only simple capillary setae. In the Krusadai specimens the hooks are already present at the tenth setigerous segment. As already noted by Crossland, the slender upper teeth are often worn or obsolete, giving the hooks a bidentate appearance. I noticed a similar variation in the hooks of *L. impatiens* (1919, p. 293, fig. vii), a very near allied species.

*Habitat*.—Red Sea; Persian Gulf; India; Japan; California.

### Genus *Arabella*, Grube.

#### *Arabella iricolor* (Montagu).

*Arabella iricolor*, Fauvel, 1914, p. 137; 1919, p. 389; 1923, p. 438, fig. 175, *a-h* (synonymy).

*Aracoda iricolor*, Augener, 1924, p. 430; 1927, p. 191.

*Aracoda multidentata*, Augener, 1913, p. 291.

Krusadai. Shingle Island. Pamban bridge.

This cosmopolitan species does not appear to reach, in the tropical seas, so large a size as on our European coasts.

The prostomium bears four small eyes. All the setae are capillary, with two wings, and more or less geniculate.

*Habitat*.—North and South Atlantic; Mediterranean; Indian Ocean; Pacific.

### Genus *Aglaurides*, Ehlers.

#### *Aglaurides fulgida* (Savigny).

*Aglaurides fulgida*, Ehlers, 1868, p. 408.

*Aglaurides fulgida*, Fauvel, 1917, p. 240, pl. vi, figs. 52-55 (synonymy).

*Oenone fulgida*, Augener, 1913, p. 290.

*Oenone fulgida*, Crossland, 1924, p. 85, figs. 106-111.

Pamban, September 1925.

One specimen is a posterior fragment with a long and slender regenerated anterior part, head included. I have stated elsewhere (1919, p. 254) the reasons for my rejecting the genus *Oenone* based on a highly erroneous diagnosis.

Crossland (1924, p. 84) suppressed the genus *Halla* as a synonym of *Oenone* (*Aglaurides*). *Halla parthenopeia*, D. Ch. has indeed many common features with *Aglaurides*. Nevertheless there are worse genera.



The prostomium bears eyes and three *very short* tentacles. The dorsal cirri are large and flattened. The setae are capillary. There are no hooks.

*Habitat*.—Atlantic ; Indian Ocean ; Pacific.

### Genus *Staurocephalus*, Grube.

#### *Staurocephalus australis*, Haswell.

*Staurocephalus australis*, Haswell, 1886, p. 747, pl. liii, figs. 1-5.

*Stauronereis australis*, Augener, 1913, p. 293.

*Stauroner is incerta*, Ehlers, 1904, I. p. 36.

*Cirrotyllis incerta*, Schmarda, 1861, p. 79.

Shingle Island, September 1925.

Two very small specimens 5 mm. long, 7 to 8 mm. broad, numbering about 40 segments.

The tentacles with 6-7 joints are not much longer than the palps. In one specimen one of the palps has a single terminal piece whilst the other appears to have four rings at least (perhaps a misleading effect of contraction?). There is no dorsal cirrus on the first setigerous segment. In the following segments, the cirrostyle of the dorsal cirrus is shorter than the cirrophore, but the whole is rather short.

On the first setigerous segment, the dorsal ramus carries only 1 or 2 capillary setae and a short bent seta, the setae of the ventral ramus are compound with a long sickle-shaped end-piece of a gradually decreasing size. The Y-shaped setae, with very unequal limbs, begin only at the second setigerous segment. Only 2-3 anal cirri are preserved. The two eyes are large.

To sum up, these specimens, by their size and other features, answer well to Augener's description. This species comes very close to *St. Rudolphi*, D. Ch.

I have already stated elsewhere why I keep to the name *Staurocephalus*, waiting till the fanatics of the law of priority are agreed on the older name to be maintained, which does not appear easy to do. *Staurocephalus* has at least the advantage of a long use and a wide notoriety!

*Habitat*.—Indian Ocean ; Pacific (Australia, New Zealand).

### Family GLYCERIDAE.

#### Genus *Goniada*, Aud.-Edw.

#### Sub-genus *Goniadopsis*, Fauvel.

V-shaped paragnaths absent on the sides of the proboscis. Body divided into three distinct regions : 1° an anterior, with uniramous parapodia, short cirri and stout falcigerous

setae; 2° an intermediate, with uniramous parapodia, long cirri and spinigerous setae; 5° a posterior, with biramous parapodia, dorsal acicular setae and long spinigerous ventral setae.

### *Goniada* (*Goniadopsis*) *Agnesiae*, Fauvel.

Fig. 7, *a-f*.

*Goniada* (*Goniadopsis*) *Agnesiae*, Fauvel, 1928, p. 92, fig. 2, *a-f*.

*Specific characters*.—Body divided into three regions: the anterior and middle ones slender, cylindrical, and the posterior one somewhat broader and more flattened, 150 setigerous segments and more. Prostomium an elongated tapering conical ringed process with four slender tentacles at the tip and two small black widely separated eyes at the base. Proboscis cylindrical, armed with two large pectinate jaws (fig. 7, *f*). Between the jaws, four bidentate paragnaths and, on the other side, a half circular row of about twelve smaller bidentate paragnaths apparently simple. There are no V-shaped denticles. Anterior region of 28 setigerous segments with uniramous parapodia including a broad, short, lanceolate dorsal cirrus, a setigerous process with three ligules, one posterior, broadly triangular and two anterior, finger-shaped, unequal (fig. 7, *a*), a thick short ventral cirrus, an aciculum and a bundle of stout compound setae with a short blunt, slightly bent end-piece (fig. 7, *d*). Middle region of 39 segments with uniramous parapodia including a finger shaped dorsal cirrus, two ligules, one short triangular, the other longer, finger-shaped, a ventral cirrus, twice or thrice as long, an aciculum and two bundles of compound setae thinner than the former, with a long, narrow, delicately spinulose end-piece (fig. 7, *b, e*). Posterior region with biramous parapodia (fig. 7, *c*) including, in the dorsal ramus, a short conical cirrus, a blunt setigerous process with an aciculum and two short acicular setae blunt at the tip (fig. 7, *c*): in the ventral ramus, a triangular posterior ligule, an anterior one longer and finger-shaped, a short, thick ventral cirrus, an aciculum and two bundles of compound spinigerous setae, with a long terminal piece, like those of the middle region. 105 mm. long and 1 mm. broad. Colour: bright red in front, pale ochraceous behind. In the posterior region only, a ventral spot in the middle of each segment.

Krusadai Island, in the sand, September 1925. F. H. Gravely. A single specimen incomplete behind.

The appearance is, on the whole very narrow, nearly filiform, the middle region being still more so and the posterior one a little more expanded.

The retracted proboscis had to be dissected and did not show any traces of lateral V-shaped denticles.

This interesting species claims a likeness to *Goniada emerita*, Aud.—Edw. from the French coasts, owing to its two stout blunt setae in the dorsal division of its posterior feet. It differs from it by its anterior region with compound setae carrying thick short, blunt end-pieces and by its middle region with setae differing from the former and with very long ventral cirri. Moreover, in that intervening region, the feet are only bilobed

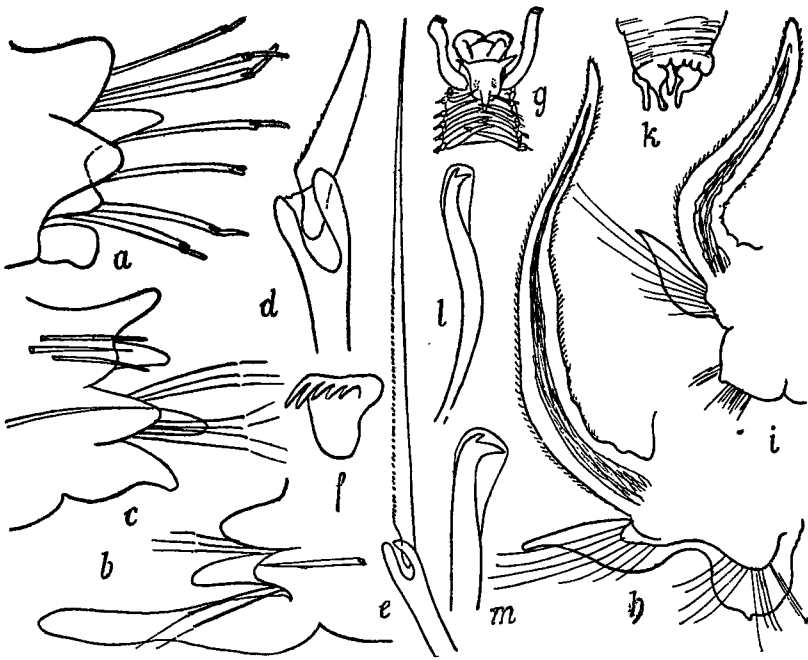


Fig. 7.- *Goniadopsis Agnesiae*: a, anterior foot  $\times 85$ ; b, foot from the intermediate region  $\times 85$ ; c, foot from the posterior region  $\times 85$ ; d, huge, short, falcigerous seta from the anterior region  $\times 350$ ; e, posterior compound seta with long terminal piece  $\times 350$ ; f, jaw  $\times 60$ . *Scolelepis indica*: g, head  $\times 8$ ; h, tenth foot  $\times 40$ ; i, 73rd foot  $\times 40$ ; k, pygidium  $\times 40$ ; l, ventral crochet from the last segments  $\times 400$ ; m, posterior ventral crochet  $\times 400$ .

instead of trilobed. In the posterior region the ventral ramus is similarly bilobed, instead of trilobed. Last, not least, the V-shaped lateral denticles are seemingly wanting on the proboscis.

Arwidsson (1898, p. 47, pl. iii, figs. 43-44) has described a *Goniada* (?) *longicirrata*, from the west coast of Africa, equally destitute of V-shaped denticles, provided with stout dorsal acicular setae, long ventral cirri, and uniramous feet of the anterior region not all alike. Unhappily, Arwidsson does not expatiate on their differences.

*G. longicirrata* differs from the Krusadai species in having long dorsal cirri, whilst in *G. Agnesiae* only the ventral cirri are elongated. The setae of the anterior and middle regions are very unlike and Arwidsson does not mention stout falcigerous setae. Moreover *G. longicirrata* wants dorsal paragnaths and its ventral rami are trilobed, whilst *G. Agnesiae* has both dorsal and ventral paragnaths and bilobed ventral rami, in the middle and posterior regions. Both species are remote from all the other *Goniada*, owing to their three distinct regions, their long cirri, and the want of V-shaped denticles.

The sub-genus *Goniadopsis*, in which they may be both included, is a connecting link between *Goniada* and *Eone* (*Glycinde*),

The want of V-shaped denticles is a feature it has in common with *Eone* (*Glycinde*) and *G. Agnesiae* is not very far remote from *Glycinde oligodon*, Southern, though clearly distinct. But the shape of the anterior feet and the dorsal setae better agree with *Goniada*.

#### Family ARICIIDAE.

Genus *Scoloplos*, Blainville.

*Scoloplos Chevalieri*, Fauvel.

*Scoloplos Chevalieri*, Eisig, 1914, p. 418.

*Aricia Chevalieri*, Fauvel, 1901, p. 83, figs. 22-28; 1919, p. 428.

*Aricia Chevalieri* Gravier, 1906, p. 167, pl. ii, figs. 193-195.

Krusadai and Shingle Islands, September 1925. Krusadai (lagoon), May 1928.

This species, first recorded from the West coast of Africa (Casamance), has since been collected in the Red Sea at Djibouti and Obock by Gravier.

According to Eisig's classification of the Ariciidae, it should be now placed in the genus *Scoloplos*, as defined by him.

*Habitat*.—Atlantic; Red Sea; Indian Ocean.

#### Family SPIONIDAE.

Genus *Scolecopsis*, Blainville.

*Scolecopsis indica*, Fauvel.

Fig. 7, *g-m*.

*Scolecopsis indica*, Fauvel, 1928, p. 93, fig. 2, *g-m*.

*Specific characters*.—Body long, slightly broader and flattened forwards, filiform behind. Prostomium shield-shaped with two frontal peaks, well marked and laterally inserted (fig. 7, *g*). The prostomium ends backwards in a pointed keel reaching to the second setigerous segment but not raised in an occipital tentacle. Two irregular clusters of very small and numerous eye-spots. Two long and stout palps spirally curling (fig. 7, *g*). Gills beginning at the first setigerous segment.<sup>1</sup> In the anterior region, the long, cirriform gills cross over on the back. Dorsal lamella erect, lanceolate, attached to the outer edge of the gill only at its base. Ventral lamella rounded or oval, slightly mucronate, not notched; posteriorly it is reduced to a decreasing crescent (fig. 7, *h-i*). Dorsal setae capillary, not winged, not dotted. Ventral setae alike but shorter and sometimes dotted, with a bundle of 5-6 shorter ones, larger, curved, with a tapering bent tip. Hooded ventral crochets bidentate, 2 to 4-6 in each ramus, from about the 70th setigerous segment (fig. 6, *l-m*). Dorsal crochets absent. In the last segments, gills short, no more marked lamellae, long and slender dorsal capillary setae; in the ventral ramus 1-2

<sup>1</sup> In the preliminary note, owing to a printer's mistake, the gills were described as beginning on the second setigerous segment instead of the first.

curved setae, 5-6 crochets and 1-2 long, slender setae. Pygidium bearing 4 short finger-shaped cirri. Anus terminal (fig. 6, k).

It is 60 mm. long and more, 1 to 1.5 mm. broad. Colour, when living, pink. In alcohol, sometimes more or less broad dorsal transverse bands of black pigment and, between the feet, two spots, the one between two succeeding gills, the other between the ventral rami. On the under-surface, on each side, a short and narrow inter-segmental streak of pigment. This pattern is often wanting.

Krusadai, in muddy sand, April 25 to May 8, 1924, September 1925 and 14-21 September 1928.

The protracted proboscis is globular, tulip-shaped, the edge divided into three large rounded lobes. This species, very nearly related to *Sc. fuliginosa* and *Sc. ciliata*, differs by its dorsal lamellae smaller in proportion to the gill, less attached, more pointed, by its longer and more slender gills and by its numerous and very small eye-spots.

#### Genus *Polydora*, Bosc.

Highly modified setae on the 5th setigerous segment.

#### *Polydora antennata*, Claparède (?).

*Polydora antennata*, Fauvel, 1927, p. 56, fig. 19, *t-m*.

Krusadai, May 20-21, 1928.

An anterior fragment of a rather large *Polydora* with a prostomium notched at the anterior border, 4 eyes, a small erect occipital tentacle, large gills beginning on the 7th setigerous segment and the peculiar 5th setigerous segment's setae arranged in a horse-shoe and of two kinds. All such features agree well with *P. antennata*, but as the posterior region is wanting and as I have not fully investigated the setae of the 5th setigerous segment, being afraid of spoiling the specimen, I cannot be quite sure of the identification.

*Habitat*.—Mediterranean; Atlantic; Indian Ocean (?).

#### Genus *Polydorella*, Augener.

Closely allied to *Polydora*. Setae nearly similar but modified setae on the 4th setigerous segment. Pygidium not cup-like. Scissiparous.

#### *Polydorella prolifera*, Augener.

Fig. 8, *a-g*.

*Polydorella prolifera*, Augener, 1914, p. 16, pl. i, fig. 3.

*Post-larval Chaetopterid*, Gravely, 1927, p. 24, pl. ix, figs. 12-14.

Gulf of Manaar.

"Found in abundance, each in a minute mud-covered tube adherent throughout its length to the surface of a sponge" (Gravely).

This small and very curious species is deeply pigmented. The rounded prostomium, more or less conspicuously bilobed, bears two eyes inserted forwards, at the base of the long, stout, cylindrical palps, more or less wrinkled but not spirally coiled.

The number of segments ranges from about 15 to 16, including 12-13 setigerous and 3-4 posterior achaetous. The conical, or cylindro-conical pygidium is faintly notched, without cup or funnel. The anus is terminal.

On the first setigerous segment I noticed a dorsal and a ventral bundle of slender capillary setae. According to Augener, there is only a dorsal bundle, "as far as he could ascertain."

Up to the 6th setigerous segment, there are only capillary setae, with the exception of the 4th bearing the modified setae, which lie in the 5th in *Polydora*. The following segments bear dorsal long and slender capillary setae. The ventral crochets appear on the 6th-7th setigerous segment, according to the size of the specimens. They show a double strongly marked curvature and have a hooked tip with a very long and slender tooth running nearly parallel to the vertex which is provided with a broad hood (fig. 8, *g*)

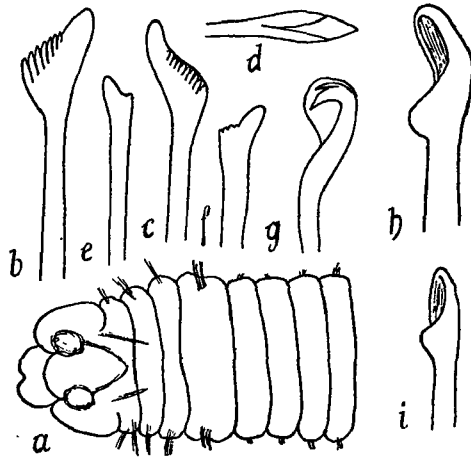


Fig. 8.—*Polydorella prolifera*: *a*, anterior region, dorsal side, tentacles cut out  $\times 45$ ; *b*, *c*, *d*, peculiar setae from the fourth setigerous segment, profile and front view  $\times 550$ ; *e*, *f*, spoon-shaped setae from 4th setigerous segment  $\times 550$ ; *g*, crochet from the 7th setigerous segment. *Dodecaceria opulens*: *h*, anterior spoon-shaped hook  $\times 550$ ; *i*, posterior spoon-shaped hook  $\times 550$ .

The fourth setigerous segment bears: 1° a row of 3 to 6 large asymmetric setae with a denticulate or wrinkled crest and a blunt hook (fig. 7, *b*, *c*, *d*); 2° an inferior row of 3 to 6 smaller setae slightly enlarged at the tip which is spoon-shaped with a more or less blunt lateral process (fig. 8, *e*-*f*); 3° a few ventral slender capillary setae.

I did not notice gills. According to Augener, they are only to be found, in a few specimens (presumably older), on the 6th segment. They are simple filaments the length of which is about one-third of the breadth of the body.

The very curious scissiparous proliferation has been described by Augener. Gravely (1927, pl. ix, figs. 12-14) has given excellent figures of it.

*Habitat*.—Australia; Gulf of Manaar.

## Prionospio, Malmgren.

Branchiae, often pinnate, on the anterior segments.

## Prionospio Krusadensis, Fauvel.

Fig. 9.

*Prionospio Krusadensis*, Fauvel, 1929, p. 182, fig. 2.

*Specific characters*.—Body slender, filiform, little enlarged anteriorly. Prostomium long conical, with a blunt ridge running to the 2nd setigerous segment. Two clusters of 4-5 small eye-spots. First setigerous segment with both rami obsolete and only dorsal setae (?). A low lateral fold which does not form a marked wing on the side of the prostomium. Branchiae three pairs, on the second, third and fourth setigerous segments, they are all pinnate, the third pair often smaller. On the anterior segments, the dorsal lamellae are large, oval or sub-triangular (fig. 9, *a*), the 5-6 first ones sub-equal, the 4th

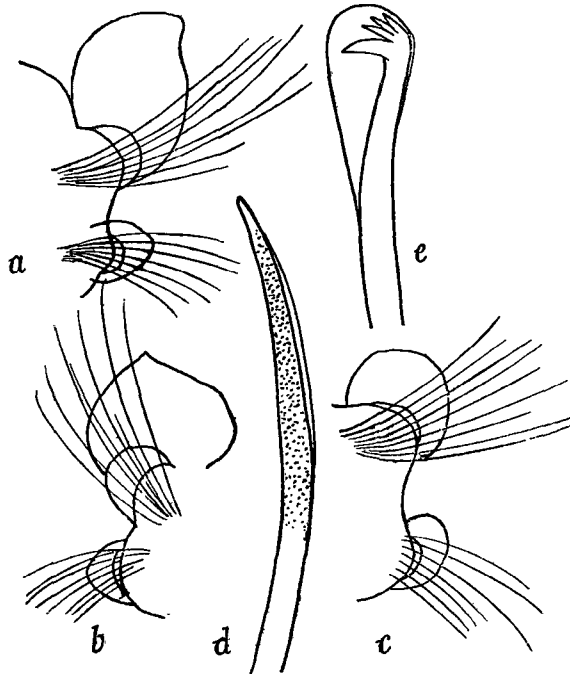


Fig. 9.—*Prionospio Krusadensis*: *a*, *b*, *c*, sixth, fifteenth and twentieth foot  $\times 120$ ; *d*, dotted seta from the 10th setigerous segment  $\times 400$ ; *e*, ventral crochet from the 18th setigerous segment.

often larger. The following lamellae are lower, more rounded or heart-shaped (fig. 9, *b*) gradually decreasing in size (fig. 9, *c*) but still conspicuous to the end of the body. Ventral lamellae smaller, at first oval, next rounded and then very small. No dorsal transverse ridges noteworthy. In the anterior region dorsal and ventral setae long and capillary. In 3-4 segments, from the 10th setigerous, on the ventral ramus, a large

golden seta curved and dotted (fig. 9, *d*). From the 17th-18th setigerous segment, ventral crochets with 3 teeth above the main fang (fig. 9, *e*). Dorsal crochets from the 40th-42nd setigerous segment. *There are no genital pouches*. A median anal cirrus and two very small others. About 20 mm. long 0, 7-0, 8 mm. broad. Yellowish in alcohol.

Krusadai, May 20-21, 1928. Several specimens, a few complete.

This species, with its three pairs of long branchiae, all pinnate, is close to *P. aucklandica*, Augener, but the last, like *P. pinnata*, is endowed with large wing-like processes sheltering the prostomium.

The wingless *Prionospio* previously known with branchiae on the second setigerous segment have either all the gills simple or both pinnate and simple gills. None of them agrees with the above species from Krusadai.

### *Prionospio polybranchiata*, Fauvel.

Fig. 10, *a-g*.

*Prionospio polybranchiata*, Fauvel, 1929, p. 184.

*Prionospio multibranchiata*, Fauvel (*non* Berkeley), 1928, p. 94, fig. 3, *a-g*.

*Specific characters*.—Anterior region flattened, enlarged, tapering forwards, posterior region cylindrical. Above 40 segments. Prostomium elongate, anterior border rounded, ending backwards in a blunt ridge on the edge of the third setigerous segment (fig. 10, *a*).

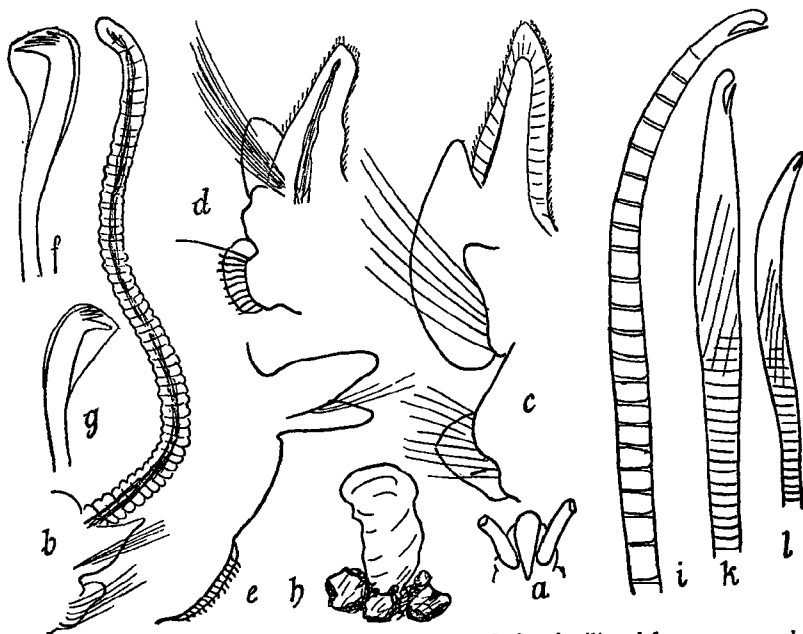


Fig. 10.—*Prionospio polybranchiata*: *a*, prostomium, enlarged; *b*, fourth gill and foot  $\times 30$ ; *c*, eleventh foot  $\times 60$ ; *d*, 29th foot  $\times 60$ ; *e*, 40th foot  $\times 60$ ; *f*, crochet  $\times 450$ ; *g*, posterior crochet  $\times 450$ . *Stylarioides eruca*, var. *indica*: *h*, foot papilla  $\times 140$ ; *i*, *k*, *l*, three kinds of ventral setae from the same foot  $\times 140$ .



No eyes apparent. Two very long twisted palps reaching backwards to the 26th—30th segment. On the first setigerous segment the dorsal ramus is reduced to a small conical (achæous?) nipple and a small ventral lamella and setae. Gills from the second setigerous segment, the five first pairs filiform, not pinnate, very long, reaching backwards to the 8th—10th setigerous segment, (fig. 10, *b*) the following ones foliaceous, subtriangular, elongate, bent on the back and partly attached to the dorsal lamella (fig. 10, *c*). Their size then decreases but they still exist on the 40th setigerous segment (fig. 10, *e*). Dorsal lamellae triangular, erect, rather large and free on the 5 first setigerous segments, after which their size decreases and they become more oval and more attached to the gill. Ventral lamellae at first oval or subtriangular, then obsolete (fig. 10, *c, e*). In the anterior region the dorsal ridges are reduced to a very slender transverse wrinkle on each segment. Anteriorly both dorsal and ventral setae are capillary. Ventral pluridentate hooded crochets (fig. 10, *f-g*) from the 22nd setigerous segment. At the 40th, they are still wanting in the dorsal ramus. No genital pouches. Pygidium unknown. The single specimen, from Watchman's Bay, Krusadai Island, is incomplete being broken at about the 40th segment. It is 11 mm. long and 2 mm. broad and discoloured in alcohol.

This species is distinguished from all others by the persistence of its branchiae, at least till the 40th segment, their striking dimorphism and their more or less marked binding to the dorsal lamella.

I had first named it *P. multibranchiata* (1928, p. 94) but the name having been used already by Berkeley, a few months before, for a quite different species from Vancouver (1927, p. 414), it has had to be altered to *P. polybranchiata*.

## Family CHAETOPTERIDAE.

### Genus Phyllochaetopterus, Grube.

#### *Phyllochaetopterus socialis*, Claparède.

*Phyllochaetopterus socialis*, Fauvel, 1914, p. 267, pl. xxv, figs. 16-21; 1927, p. 84, fig. 30, *a-r* (synonymy).

*Phyllochaetopterus pictus*, Crossland, 1903, p. 174, pl. xvi, figs. 5-9.

*Phyllochaetopterus spec.*, Gravely, 1927, p. 23, pl. ix, fig. 15.

Krusadai and Shingle Islands, September 1925 and May 1928.

The specimens I succeeded to extract from their tube agree well with Gravely's and Crossland's descriptions. A few of them still show boldly conspicuous red brown spots on the anterior part and tentacle-like palps. They have only a single stout seta on the fourth setigerous segment, and a single lanceolate seta in the posterior feet.

The number of segments in the anterior region ranges from 9 to 15, 13 being the more frequent. In the middle region they vary from 5 to 6. The appearance of the mouth is very variable according to its state of contraction, sometimes it is funnel-shaped with a thick edge, sometimes it is reduced to a mere simple or triangular slit between two thick lips.

In the main, these specimens do not show any noticeable difference with those from Naples and I trust I was previously justified in bringing together *Ph. pictus*, Crossland and *Ph. socialis*, Claparède as synonymous.

*Habitat*.—Atlantic; Mediterranean; Falkland Islands; Australia; Indian Ocean.

### Phyllochaetopterus Elioti, Crossland.

*Phyllochaetopterus Elioti*, Crossland, 1903, p. 172, pl. xvi, figs. 1-3, 8, pl. xvii, figs. 10-13.

Krusadai, May and September 1928. F. H. Gravely.

A number of tubes were mixed up with tubes of *Mesochaetopterus* and *Axiothella*.

This species is not far remote from *Ph. socialis*, though it has several features distinguishing it. The tube is larger, more opaque, more or less coated with sand-grains, indistinctly annulated—if at all—and straighter. The body is milk-white anteriorly and black posteriorly. The reddish spots are restricted to the long palps. On the fourth setigerous segment, there are 2-3 stout cylindrical setae which are not noticeably curved.

*Habitat*.—Indian Ocean (Zanzibar, India).

### Genus Mesochaetopterus, Potts.

#### Mesochaetopterus minutus, Potts.

*Mesochaetopterus minuta*, Potts, 1914, p. 963, figs. 4-5, pl. ii, fig. 4, pl. iii, figs. 7-8.

*Spiochaetopterus* sp., Gravely, 1927, p. 24.

Krusadai, September 1925, May 1928, September 12-21, 1928. "Edge of South Lagoon." F. H. Gravely.

A number of small horny tubes, from the cavity of a sponge, and others, intricately mixed with the tubes of *Phyllochaetopterus* and *Axiothella*, contain small *Chaetopteridae* which closely agree with Potts' description.

Their average size is about 20 mm. in length and hardly 1 mm. in breadth. They are provided with two tentacles half as long as the body. The prostomium is ovoid, blunt anteriorly and ends posteriorly between the two tentacles, the scar of which only is sketched in Potts' figure. A small, conspicuous, black eye-spot lies outwards and forwards of the tentacle base. The anterior border of the funnel-shaped peristomium stretches beyond the prostomium.

The anterior region includes about ten setigerous segments devoid of ventral rami, and bears triangular, blunt parapodia erect and slightly bent backwards. It is furrowed with a long groove in which the long tentacles may lie. The setae are more or less symmetrically oar-shaped. The setae of the fourth setigerous segment are stout, dark and truncated, as in other Chaetopterids.

The middle region, of two segments, is convex ventrally, and its raised glandular borders are striated. The dorsal side is deeply grooved.

The dorsal ramus of the first foot of this middle region is small, finger-shaped and erect, the ventral ramus is a short uncinigerous pinnule. The length of this segment

nearly equals half the length of the middle region. On the second segment, the dorsal rami are thick processes meeting each other in the middle of the back and bent forwards. The two ventral pinnules are very closely drawn together. The posterior third of this segment bears a kind of cup, bilobed, notched and thin-edged, which ends the long, elevated, ciliated groove which runs along the middle of the back on the whole granular part. Sometimes, however, this groove extends to the edge of the third region. The dorsal setae are capillary and enclosed in the rami.

The segments of the third region are much shorter, cylindrical with two short, thick, triangular dorsal rami bent over the back and two transverse close-set pinnules. Quite at the posterior end, the very small dorsal rami recall those of *Phyllochatopterus* with small enclosed capillary setae. The uncini are sub-triangular and finely serrated on edge.

This rare and curious species was first recorded from the Cape Verde Islands, Saint Vincent and Porto Praya, in the Atlantic, by Crossland. It was next recorded from Torres Straits by Potts, who gave an extensive description of it with which the Krusadai specimens very well agree.

The tubes collected in 1928 are very numerous and sand coated.

*Habitat*.—Atlantic; Indian Ocean; Torres Straits.

#### Family CHLORAEMIDAE.

#### Genus *Stylarioides*, Delle Chiaje.

#### *Stylarioides parmatum*, Grube.

*Stylarioides parmatum*, Grube, 1878, p. 199, pl. xi, fig. 1.

*Stylarioides parmatum*, Willey, 1905, p. 289, pl. viii, fig. 5.

Krusadai, September 1925.

The body, much swollen anteriorly, is abruptly tapered into a filiform tail and bears, on the forward part of the back, a kind of oval shield firmly coated with sand. The other parts of the body are naked. The setae of the cephalic cage are rather long and slender.

*Habitat*.—Philippine Islands; Ceylon; Madagascar; New Zealand.

#### *Stylarioides eruca*, Claparède.

#### Var. *indica*, Fauvel.

Fig. 10, h-l.

*Stylarioides eruca*, Clap., var. *indica*, Fauvel, 1928, p. 95, fig. 3, h-l.

Krusadai, September 1925.

*Specific characters*.—Body sub-tetragonous, deeply coated with sand, segments clearly marked. *Skin papillae* small, short, not arranged in regular longitudinal rows. 3-4 longer papillae behind each bundle of setae (fig. 9, h). Branchiae numerous, filiform, inserted on a short peduncle, easily deciduous. Cephalic cage formed by the setae of the three first setigerous segments, long, slender, not iridescent and pointing forwards. At the third

segment, the ventral setae are already shorter than the dorsal ones and bidentate. In the following segments, the ventral setae vary in length but they are all ringed, bent at the tip with a long slender sub-rostral spine (fig. 10, *i, k, l*). About 70 segments, 60 mm. long and 3-4 mm. broad.

This variety differs from the type in having: 1° adhesive papillae shorter, less numerous and less regularly arranged; 2° relatively longer and more slender upper ventral setae.

*Habitat*.—Indian Ocean.

#### Family CIRRATULIDAE.

#### Genus *Cirratulus*, Lamarck.

#### (?) *Cirratulus filiformis*, Keferstein.

*Cirratulus filiformis*, Keferstein, 1862, p. 122, pl. x, figs. 28-31.

Pamban, September 1925.

A long, filiform fragment of a Cirratulid, brown, without gills or appendages and with four bundles of long and slender capillary setae in each segment may perhaps belong to the above species?

*Habitat*.—Atlantic; Persian Gulf; India (?)

#### (?) *Cirratulus chrysoderma*, Claparède.

*Cirratulus chrysoderma*, Claparède, 1868, p. 262, pl. xxxiii, fig. 4.

Pamban.

A brown Cirratulid with branchiae and tentacular cirri on the 4th and 5th setigerous segments, long capillary setae and a prostomium without eye-spots agrees rather well with *C. chrysoderma*.

*Habitat*.—Mediterranean; India (?)

#### Genus *Audouinia*, Quatrefages.

#### *Audouinia filigera*, Delle Chiaje.

*Audouinia filigera*, Fauvel, 1911, p. 140; 1927, p. 92, fig. 32, *h. m.*

Krusadai, September 1925 and May 1928.

A specimen, from sponge cavity, was, in life, dark orange, a smaller one was yellow.

The branchiae begin at the first setigerous segment, the tentacular cirri are clustered on 4th and 5th. The ventral hooks are large, dark, few, 2-3 in each ramus, the dorsal hooks, about two, are long, slender and with them there are capillary setae in the hind part of the body. The branchiae are inserted higher above the dorsal ramus than the distance between the two rami.

*Habitat*.—Atlantic; Persian Gulf; Indian Ocean; Pacific.

Genus *Dodecaceria*, Oersted.  
*Dodecaceria opulens*, Gravier.

Fig. 8, *h, i*.

*Dodecaceria opulens*, Gravier, 1909, p. 643, pl. xvii, figs. 39-45.

*Dodecaceria Joubini*, Gravier, 1906, p. 156, pl. i, figs. 183-84.

Pamban, September 1925.

A single specimen coloured very dark brown and black. The prostomium is bluntly conical. Behind the two large palps it bears five pairs of large black branchiae and, on the left side, three other small, light yellow ones, inserted on the three following segments, that is 8 branchiae in all on the left. On the right side, it carries 6 large branchiae and, four segments farther back, a very small one. Originally, there were, very likely, 10 on that side.

The setae are capillary. The large hooks are spoon-shaped, with a kind of lateral spur, like those of the B form of *Dodecaceria concharum* (fig. 8, *h-i*). These spoon-shaped setae agree very well with those of *D. opulens*, Gravier, from the coast of Peru. The last, indeed, has a greater number of branchiae, 14 pairs, but unequal in size. *D. Joubini*, Gravier, from the Red Sea, has only 6 pairs of branchiae "the two last pairs, especially the last, are noticeably shorter and more slender than the others." The spoon-shaped setae are devoid of a marked lateral spur. Perhaps the worth of such characters is questionable for in *D. concharum*, Oersted, the number of branchiae ranges from 4 to 8 pairs and the spoon-shaped setae differ in the different forms. It is not unlikely that Gravier's two species will be found to be synonymous when they are better known.

*Habitat*.—Indian Ocean; Red Sea (?); Pacific.

Family SCALIBREGMIDAE.

Genus *Parasclerocheilus*, Fauvel.

Body fusiform, elongated. Prostomium T-shaped, with two long frontal peaks and eye-spots. Nuchal organs protractile. Peristomium achaetous. Proboscis unarmed. Anterior segments divided into superficial rings. A few anterior segments bearing branchiae. Dorsal and ventral rami reduced to stout rounded processes. Dorsal cirri absent. *A cirrus-like process above the ventral ramus, in the posterior region.* Lateral organs. Acicular setae in the dorsal ramus of the first setigerous segments. Forked setae in the following segments. Anal cirri finger-like.

*Note*.—This genus, allied to *Sclerocheilus*, materially differs from it by its branchiae and its cirrus-like processes inserted *above* the ventral ramus.

*Parasclerocheilus branchiatus*, Fauvel.

Fig. 11.

*Parasclerocheilus branchiatus*, Fauvel, 1928, p. 159, fig. 1, *a-k*.

Shingle Island. A single specimen.

*Specific characters*.—Body rather long, nearly uniform in breadth, slowly tapering backwards, rectangular in section with a more or less marked ventral groove. Prostomium

globular with two diverging thick tentacle-like processes. Four red pigmented plates, linear, arched, converging (eye-spots, see fig. II, *a*). Two protractile cushion-shaped

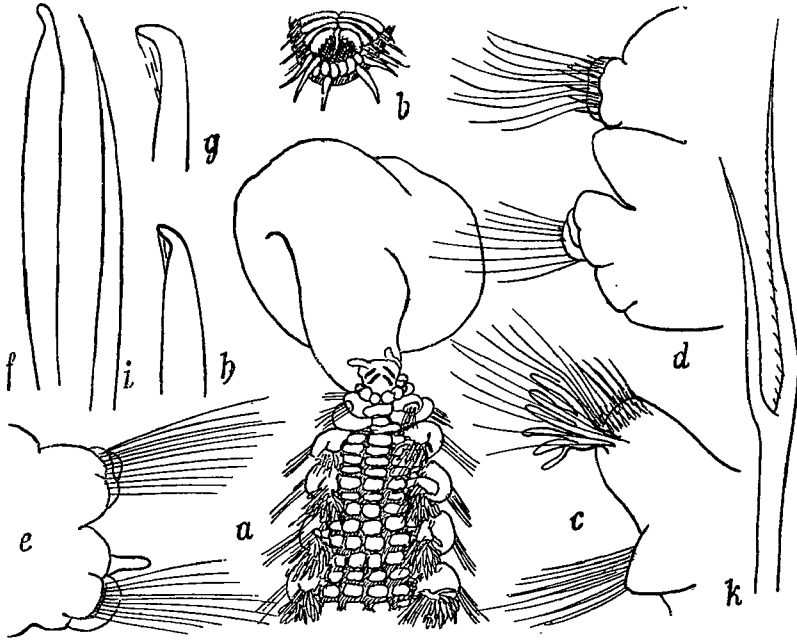


Fig. 11.—*Parasclerocheilus branchiatus*: *a*, anterior region, proboscis extruded, dorsal side  $\times 8$ ; *b*, pygidium  $\times 8$ ; *c*, second foot  $\times 30$ ; *d*, tenth foot  $\times 30$ ; *e*, 40th foot  $\times 30$ ; *f*, hook from the second setigerous segment,  $\times 300$ ; *g*, tip of a lower hook  $\times 400$ ; *h*, tip of an upper hook  $\times 400$ ; *i*, curved seta from the second setigerous segment  $\times 300$ ; *k*, forked seta  $\times 400$ .

nuchal organs. Peristomimum achaetous. Proboscis, huge, campanulate (fig. II, *a*). Segments divided into four rings, nearly smooth on the ventral side, rough and corrugated on the dorsal. In the first 4 setigerous segments, the dorsal ramus carries, in front of a bundle of long capillary setae, large curved acicular setae with a hook at the tip (fig. II, *f*, *g*, *h*). The other dorsal and ventral setae are some capillary, slender and smooth, the others shorter and slightly bent (fig. II, *i*). In the following segments, the dorsal and ventral rami are like each other, shaped as thick rounded processes without cirri (fig. II, *d*) and bearing each a bundle of capillary setae and shorter forked setae with limbs unequal and ciliated on the inner edge (fig. II, *k*). From the 29th setigerous segment to the last one, a short slender finger-like process is inserted *above* the ventral ramus. In the last segments, this process reaches one-fourth or one-third of the body's breadth. A lateral organ lies between the two rami. There are 6 pairs of branchiae (from the 2nd to the 7th setigerous segment), arborescent, densely ramified (as in *Scalibregma*). The first pair, the smaller, has 6-7 filaments (fig. II, *c*), the four last ones are sub-equal and much larger. They are inserted behind the dorsal setae. Pygidium short, with broad terminal vent and 6 anal cirri: 1 dorsal, 1 ventral and 2 on each side (fig. II, *b*). Proboscis included,

35 mm. long and 3 mm. broad. Discoloured in alcohol with the exception of the red carmine eye-spots.

Shingle Island, Gulf of Mannar.

A single specimen was found of this very interesting species which combines the characters of both *Sclerocheilus* and *Scalibregma*.

In common with *Sclerocheilus*, it has a T-shaped prostomium, with clusters of eye-spots, acicular setae in the first segments and the cirrus-like processes in the posterior feet. But whilst in *Sclerocheilus* these processes are cirri inserted *under* the ventral ramus, they are inserted *above* it in *Parasclerocheilus*. Then, very likely, these organs are not homologous in both genera. Like *Scalibregma*, it carries several pairs of bushy gills on the anterior segments. But *Scalibregma* wants acicular setae and its posterior feet are provided with large finger-shaped dorsal and ventral cirri.

*Habitat.*—Gulf of Manaar.

#### Family CAPITELLIDAE.

#### Genus *Dasybranchus*, Grube.

#### *Dasybranchus caducus*, Grube.

*Dasybranchus caducus*, Eisig, 1887, p. 823, pl. xvii-xxiii.

*Dasybranchus caducus*, Fauvel, 1927, p. 148, fig. 52, a-h.

Rameswaram, April 26, 1924; Krusadai, September 1925.

Of this species, so widely spread all the world over, in hot seas, only two small specimens were found. One has its gills conspicuously protruding.

There are 13 thoracic segments bearing only capillary setae. The branchiae are lateral, bushy and retractile.

*Habitat.*—Atlantic; Indian Ocean; Pacific.

#### Genus *Heteromastus*, Eisig.

#### *Heteromastus similis*, Southern.

*Heteromastus similis*, Southern, 1921, p. 640, pl. xxix, fig. 23.

*Heteromastus sp.*, Gravely, 1927, p. 26.

Watchman's Bay and Kutikal, September 1925.

Several specimens, bright red in life, were found in mud.

Southern gave a very extensive description of this species, first found in the Chilka Lake. The Madras Museum specimens agree closely with this description. This species is very nearly related to *H. filiformis* Claparède, if not identical. Only the first abdominal segments are shorter in *H. similis* and the lateral lobes wanting in the moniliform segments.

But on *H. filiformis* specimens from Saint-Jean-de-Luz I found lateral lobes obsolete and the difference in length of the first abdominal segments is far less than Eisig's figure shows.

*Habitat.*—Chilka Lake; Gulf of Manaar.

Genus *Heteromastides*, Augener.*Heteromastides bifidus*, Augener.

## Fig. 12.

*Heteromastides bifidus*, Augener, 1914, p. 64, fig. 8, pl. i, fig. 11.

Krusadai, May 20-21, 1928.

Seven small Capitellids, all but one without the hind part, having some 12, the others 13. thoracic segments with capillary setae on both rami. The prostomium is bluntly finger-shaped with two lateral clusters of numerous small eye-spots (fig. 12, *a*). The abdominal segments are more or less moniliform, about sixty in the single whole specimen. The last segment ends in a broad round plate, slightly slanting, somewhat Maldanid-like, and bearing two long finger-shaped diverging anal cirri (fig. 12, *b*). The last but one segment bears, on each side, a small globular swelling; the four or five penultimate segments are provided with a small triangular process (gill?) pointing backwards.

I know no other Capitellid, with the exception of *Heteromastides bifidus*, bearing a similar anal plate with two diverging cirri, which Augener compares, rightly enough to two snail's tentacles.

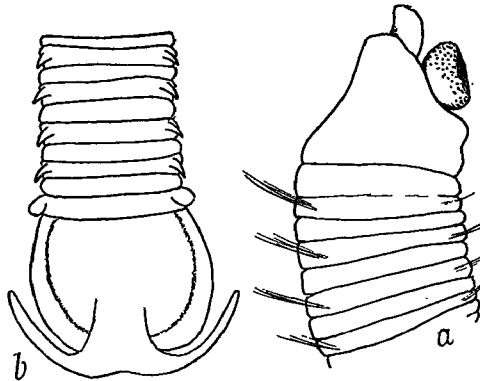


Fig. 12.—*Heteromastides bifidus*: *a*, anterior region, side view  $\times 40$ ; *b*, posterior region and pygidium  $\times 40$ .

Augener's specimen was only 7.5 mm. long, with 33 segments. The whole Krusadai specimen is 10 mm. long, 0.8 mm. broad, in the thorax, and has upwards of 70 segments. Both specimens have 12 thoracic setigerous segments. Augener supposes that the last thoracic segments carried long hooks, as does *Heteromastus*, but he could not ascertain, the setae being broken, as but too often happens.

In the whole specimen from Krusadai there is no appearance of thoracic hooks and, if the other anterior fragments really belong to the same species, there could not have been any, for they all bear capillary setae only in both rami, in the thoracic segments. But some have 12 setigerous thoracic segments and the others 13, though they do not otherwise differ. In *Leiochrides africanus*, Augener found sometimes 11, sometimes 12 setigerous thoracic segments, all of them only with capillary setae.



The anal plate is, as far as I can judge, sufficiently characteristic to identify the whole specimen.

*Habitat*.—Australia ; Gulf of Manaar.

### Genus *Scyphoproctus*, Gravier.

#### *Scyphoproctus Djiboutiensis*, Gravier

*Scyphoproctus Djiboutiensis*, Gravier, 1906, p. 181, pl. iii, figs. 200-204.

Krusadai, September 1925.

Two specimens only were collected, one is whole and the other lacks the anterior part. The posterior end of the body is enlarged into a cup-like plate, or broad sucker the walls of which are stiffened with bundles of acicular setae. This cup circles the anus and is provided with two finger-shaped cirri. This anal funnel is a striking character of the genus and of the hitherto only species.

*Habitat*.—Red Sea ; Gulf of Manaar.

### Genus *Pulliella*, Fauvel.

Body divided into three distinct regions: 1° thoracic, the 9 segments of which bear only capillary setae in both rami; 2° abdominal, with hooks in both rami and dorsal tori well apart; 3° posterior, with dorsal acicular setae and ventral hooks. The last segments partly fused together. Pygidium with two stout, conical, ventral cirri. Branchiae absent.

#### *Pulliella armata*, Fauvel.

Fig. 13.

*Pulliella armata*, Fauvel, 1929, p. 184, fig. 3.

Pulli Island, Gulf of Manaar.

*Specific characters*.—Body swelling at both ends. Three clearly distinct regions, (fig. 13, *a, b*). Prostomium blunt, two eyes. Peristomium achætous, biannulate. The nine following segments are short, close together, biannulate, smooth, without any pattern and each carry two dorsal and two ventral bundles of capillary setae inserted into hollows (retractile eminences?). In the next three segments, the dorsal and ventral hooks are arranged in transverse rows, faintly raised, but not forming true tori. The following abdominal segments bear two short prominent dorsal tori, well apart. The first ventral tori are longer and closer, next they become nearly as short as the dorsal tori. The posterior region (fig. 13, *b, c*) numbers 8 to 11 segments, larger than the preceding ones, short, conspicuous, separated from each other by a narrow and deep constriction (fig. 13, *b*). They carry, on the dorsal side, stout bodkin-like acicular setae (fig. 13, *d, h*) arrayed in two rather wide apart curved rows, and, on the ventral side, hooks like those of the abdomen (fig. 13, *e, f, g*). Pygidium on the ventral edge of the last setigerous segment with two stout conical, diverging cirri under the anus (fig. 13, *c*). On the 4th and 5th

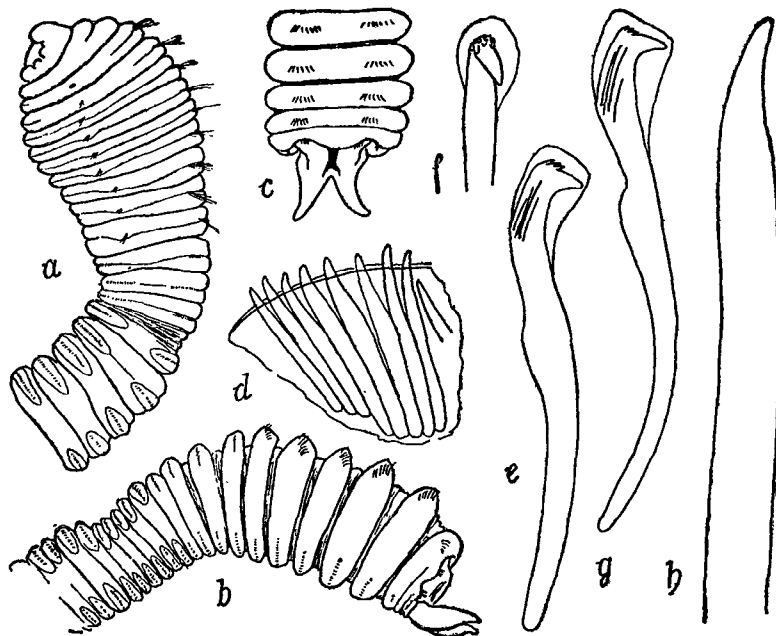


Fig. 13.—*Pulliella armata*: a, anterior region, side view  $\times 8$ ; b, posterior region, side view  $\times 8$ ; c, pygidium and last segments, from above  $\times 8$ ; d, a row of posterior dorsal acicular spines  $\times 60$ ; e, ventral posterior hook  $\times 350$ ; f, g, dorsal anterior hooks  $\times 350$ ; h, tip of a posterior acicular dorsal seta  $\times 350$ .

abdominal segment a dorsal swelling raised between the tori and somewhat behind. There are no branchiae.

Unfortunately, of this very strange Capitellid there are only an anterior part, 8 mm. long, 3 mm. broad in its swollen region, with 18 segments; 15 posterior segments, 8 mm. long and 2 mm. broad and another posterior fragment 15 mm. long, 1.5–2.5 mm. broad, numbering about fifty segments.

The prostomium, partly retracted into the mouth, seems rather blunt. It bears two black eyes half-hidden under the skin. The segment next to the mouth is achaetous and biannulated. The next nine segments are very short, close together and biannulated, but they look very smooth and are devoid of the tessellated appearance so frequent in other Capitellids. They bear, in ventral as well in dorsal rami, a bundle of long yellowish capillary setae inserted in a hollow of the skin. Perhaps owing to contraction, no lateral organs could be detected.

The next following segment (tenth setigerous) carries a few hooks arranged in two small dorsal and ventral curved rows. In the two next segments (11th and 12th setigerous) on the contrary, the hooks form long transverse rows but, in contradistinction to the abdominal segments, they are not inserted on raised tori. It is rather difficult to decide whether these three segments belong to the thorax, as do the segments with long hooks in *Heteromastus*, or are to be regarded as the three first modified abdominal segments. The

fact that the hooks of these three segments do not differ from those of the abdomen rather favours the last supposition.

As regards the other abdominal segments, as far as one may judge by the anterior and posterior fragments, they are all provided with two short, raised and well separated dorsal tori and two longer ventral tori nearing each other on the medio-ventral line except towards the posterior end where the four tori in each segment are about of the same length and equally removed. On the 13th and 14th setigerous segments, in the middle of the dorsal side and slightly behind the two dorsal tori, lies a very conspicuous hump, perhaps in connection with genital pores. I was unable to detect any traces of gills and lateral organs on the abdominal segments left in the specimens.

The posterior region numbers 8 to 11 segments progressively increasing in size, very unlike the abdominal segments and much larger (fig. 13, *b, c*). They are stout annular pads separated by deep and narrow constrictions. Instead of dorsal hooks, these segments bear, each, two transverse rows of erect strong acicular setae reminding one of the paleae of *Pectinaria* (fig. 13, *d, h*). These peculiar setae are not borne on raised tori. On the ventral side the hooks are like those of the preceding region but are no longer borne on raised tori. The three last segments of this posterior region are partly fused together, the penultimate and the last, very small, can only be identified in their dorsal part by their bodkin-shaped setae, two on each side in the last, 4 in the penultimate, and 5-6 in the preceding one (fig. 13, *b*). On the ventral side, these three segments are still distinct but the last two are deprived of ventral hooks. There is a tendency to the formation of an anal slanting plate with six groups of radiating setae.

The pygidium is an elongation of the ventral border of the last segment, ending in two stout conical, diverging cirri, under the anus (fig. 13, *c*).

There is nothing noteworthy in the capillary setae.

The hooks are long, sigmoid, with a marked enlargement, a hooded fang crested with 2-3 rows of denticles. They do not show very marked differences (fig. 13, *e, f, g*).

This very interesting species affords an illustration of the manner in which the anal cup of *Scyphoproctus* was evolved by a conrescence of the last segments expanding into a broad funnel and their dorsal spike-setae radiating whilst the ventral hooks disappeared. It is a connecting link between *Scyphoproctus* and the other Capitellids.

*Habitat*.—Gulf of Manaar.

### Family OPHELIIDAE.

#### Genus *Armandia*, Filippi.

#### *Armandia leptocirris*, Grube.

*Armandia leptocirris*, Willey, 1905, p. 289.

*Armandia leptocirris*, Fauvel, 1911, p. 414; 1919, p. 435.

*Ophelina leptocirris*, Grube, 1878, p. 194.

Krusadai, 14-21 September, 1928. "In surface layer of the sand, edge of beach, S. Lagoon."

A number of specimens, ranging from 12 to 22 mm. long and 2-3 mm. broad number 36, 37 and 38 setigerous segments.

• Willey found 37 setigerous segments in specimens from Ceylon; Grube 34 in those of the Philippines: I noted 33 in specimens from the Persian Gulf. An allowance must be made for a certain range of variations as well in the number of segments as in the number of lateral eye-spots and of the papillae of the anal funnel. The long anal median cirrus is often broken and its cirrophore is to be sought for in the anal funnel. It is not a distinctive feature of the species, as was previously thought, for I have noticed its presence in many other species. This species is very closely related to *Armandia polyophtalma*, Filippi.

*Habitat*.—Red Sea; Persian Gulf; Ceylon; Gulf of Manaar; Philippine Islands.

Family MALDANIDAE.

Genus *Axiothella*, Verrill.

A cephalic rimmed plate. Pygidium funnel-shaped, fringed with cirri. Without collar. Denticulated uncini from the first setigerous segment.

*Axiothella Obockensis*, Gravier.

Fig. 14, *a-e*.

*Axiothella Obockensis*, Gravier, 1906, p. 206, pl. iv, figs. 221-222.

Krusadai, September 1925-1928 and May 1928, in muddy sand; Watchman's Bay.

The specimen from Watchman's Bay has the head and first segment regenerated. It numbers 17 setigerous segments and two long pre-anal achaetous segments. The pygidium is funnel-shaped, with a basal ring and a score of cirri, short and long alternating. The long oval cephalic plate has a smooth rim, an elongated ridge and two parallel nuchal grooves.

The remaining Krusadai specimens are in better condition. They show a very slanting cephalic plate with the rim smooth or with one posterior and two very small lateral notches (fig. 14, *a, b*). The number of the setigerous segments reaches 18, followed by two pre-anal achaetous segments. The anus opens on the summit of a small cone sunk in the bottom of the anal funnel which is fringed with about fifteen long, slender, sub-equal cirri. Irregularly alternating with the long cirri, one or two very small ones are to be noted. The median ventral cirrus is the longest of all (fig. 14, *c*).

The dorsal capillary setae, with a narrow wing finely spinulose, are all nearly alike, a few being only slightly more slender, but not much longer than the others. The ventral hooks are much bent, with a strongly enlarged manubrium, a tuft of sub-rostral bristles, 3 large teeth and several small denticles over the main fang. Moreover, in the middle segments, there is a bundle of numerous and very slender capillary setae hardly emerging from the teguments. The first setigerous segment bears a row of ventral hooks (fig. 14, *d, e*). The relative length of the segments varies widely with the state of contraction of the body.

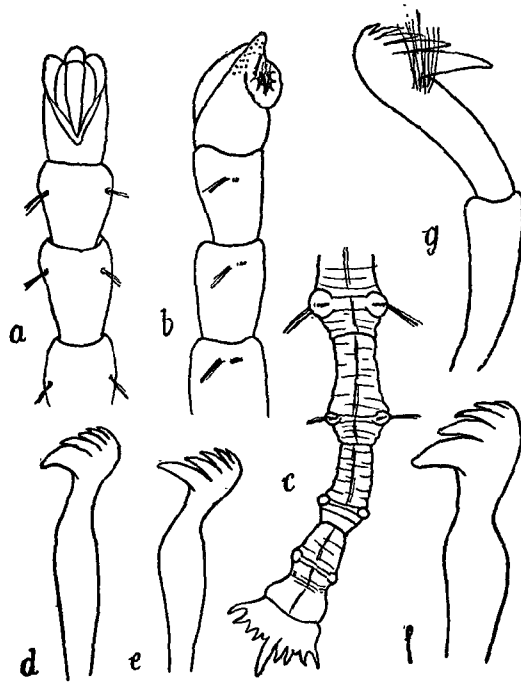


Fig. 14.—*Axiiothella Obockensis* : *a, b*, anterior region, dorsal and side view  $\times 9$  ; *c*, posterior region, ventral side  $\times 9$  ; *d, e*, hooks from the first setigerous segment  $\times 550$ . *Axiiothella australis* : *f*, hook from the first setigerous segment  $\times 550$  ; *g*, hook from the 10th setigerous segment  $\times 550$ .

This species differs from *A. australis*, Augener : 1° by its longer cephalic ridge and its smooth plate-rim ; 2° by its anal funnel with a long ventral cirrus ; 3° by the hooks of the first setigerous segment which are more numerous, smaller and clearer ; 4° by the absence of pinnate setae.

*Habitat*.—Red Sea ; Gulf of Manaar.

### *Axiiothella australis*, Augener.

Fig. 14, *f, g*.

*Axiiothella australis*, Augener, 1913, p. 65, pl. I, figs. 7-8.

*Axiiothea sp.*, Gravely, 1927, p. 26.

Krusadai, in a colony of *Polydora coeca* ; May 1928, a number of tubes. September 14-21, 1928, "In surface layer of sand, edge of beach, South Lagoon" a number of small specimens with *Mesochaetopterus*.

Many of these small specimens, 8-15 mm. long and 0.6-0.7 mm. broad died strongly shrunk in their tube. A few have a notched cephalic rim which, in others, has only three faint slits. There are 8-11 long cirri fringing the anal funnel with 1, 2 and even 3 much

shorter between them, as in *Clymene Oerstedii*, Clap. The ventral cirrus is not noticeably longer than the others. Conspicuous pigment spots lie on each side of the cephalic ridge and under the prostomium.

The dorsal setae are straight or slightly sigmoid. The manubrium of the ventral hooks is strongly curved (fig. 14, *g*). Slender bipinnate setae are present. This last feature is the best character distinguishing this species from *A. Obokensis* for the others are only of a very relative value.

*Habitat*.—Australia; Gulf of Manaar.

#### Family SABELLARIIDAE.

#### Genus Sabellaria Lamarck.

#### *Sabellaria spinulosa*, Lamarck.

#### Var. Alcocki, Gravier.

*Sabellaria Alcocki*, Gravier, 1909, p. 298, pl. viii, figs. 11–23.

*Sabellaria spinulosa*, var. *Alcocki*, Fauvel, 1914, p. 144; 1927, p. 211.

Rameswaram, April 26, 1924.

Only a single small specimen, incomplete and without its tube, was found, though this variety is of frequent occurrence and widely spread. It is characterized by the inner opercular paleae standing erect and spike-like.

*Habitat*.—Channel; Atlantic; Persian Gulf; Indian Ocean.

#### *Sabellaria pectinata*, Fauvel.

#### Fig. 15, *a-g*.

*Sabellaria pectinata*, Fauvel, 1928, p. 163, fig. 3, *a-g*.

Shingle Island, April, May 1924; Krusadai, September 1925, channel between Krusadai and Kutikal. F. H. Gravely.

*Specific characters*.—Body nearly square in section; 20–25 setigerous segments. Opercular pillars elongated, semi-cylindrical, fused dorsally throughout nearly their whole length, bearing each a crown of three concentric rows of golden paleae. Outer paleae having broad paddle-shaped tips with a central triangular spike bearing numerous lateral spines (fig. 15, *a*). The middle paleae cup-shaped with a short smooth tip (fig. 15, *d*). Inner paleae shaped like an elongated spoon with spinous edges (fig. 15, *b, c*). A few dorsal acicular bristles. A row of acute tapering papillae under the paleae. A median cirrus between the opercular lobes. Two short acute palps. On the ventral side of each pillar, 5–6 flattened lobes carry numerous filiform tentacles. Posterior lip of the mouth thick and lobed. On each side, a blunt lobe and a triangular ligule with a few capillary, bipectinate setae (1st foot) (fig. 15, *g*). On the second segment, a cirriform branchia, a transverse ridge, a triangular ventral cirrus and a bundle of bipectinate capillary setae. Three parathoracic segments bearing a falciform, crenate, erect branchia, a

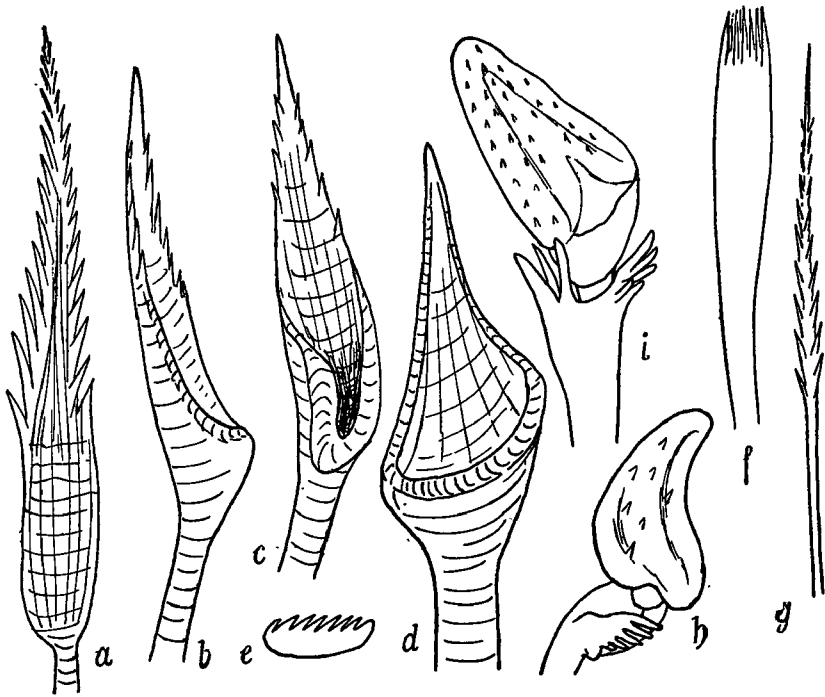


Fig. 15.—*Sabellaria pectinata*: *a*, outer palea  $\times 80$ ; *b*, *c*, inner palea  $\times 100$ ; *d*, intermediate palea  $\times 100$ ; *e*, uncinus  $\times 400$ ; *f*, paddle-shaped seta  $\times 200$ ; *g*, capillary bipectinate seta  $\times 200$ . *Pomatostegus polytrema* var. *indica*: *h*, *i*, two kinds of operculum, side and front view  $\times 35$ .

square paddle-shaped dorsal ramus with a transverse row of golden oar-shaped setae brush-like at the tip, and a few smaller and shorter setae (fig. 15, *f*). In the ventral ramus, a transverse pad and a small process bearing setae, like the dorsal, but smaller. No ventral cirrus. In the abdominal region, 15–20 segments, the first 12 bearing falciform branchiae gradually decreasing in size, the 3–5 last very small. Dorsal rami flattened, pinnule-like, the three first shaped as a very broad pad, the next square and the others narrow and elongated. They carry pectinate uncini with 5–7 teeth (fig. 15, *e*). Ventral rami with a transverse pad, a small pointed process bearing a bundle of long barbed capillary setae and a small ventral cirrus rapidly decreasing in size and wanting in the back part of the abdominal region. Caudal region smooth, tubular, devoid of appendages and generally folded into the ventral groove of the abdomen. Tube of somewhat minute transparent sandgrains held together by a white cement and encrusting corals. Length 10–12 mm. tail not included; 1–1.5 mm. broad. Pigment spots on the anterior part; buccal tentacles dotted with red-brown.

The above description readily shows that this new species only differs from *Sabellaria spinulosa* by its operculum. The outer paleae resemble those of some *Pallasia* and the inner have spinous edges, this last feature readily distinguishing this species from any other hitherto known.

## Family TERESELLIDAE.

Genus *Terebella*, L.*Terebella Ehrenbergi*, Grube.

*Terebella Ehrenbergi*, Grube, 1870, p. 511.

*Terebella Ehrenbergi*, Gravier, 1906, p. 213, pl. iv, figs. 224-225.

*Terebella Ehrenbergi*, Hesse, 1917, p. 188.

*Leprea Ehrenbergi*, Marenzeller, 1884, p. 201, pl. i, fig. 3.

Krusadai, April 26 and May 1924; September 1925 and 1928.

According to a note of colour, some specimens had pink tentacles. I found a few still showing, in alcohol, longitudinal streaks of pigment on the tentacles or annular bands, as in *Loimia annulifilis*.

The posterior bristles have a broadly winged tip minutely pectinate and spirally twisted. They agree well with Gravier's figures and the uncini resemble those of *T. punctata*, as figured by Hesse.

The nephridial papillæ are long on segments 3, 6, 7 and 8, short and little conspicuous on segments 9, 10, 11 and 12. By its setae and the number of nephridial papillae this species answers well to *T. Ehrenbergi* whilst the brown dots on the tentacles rather liken it to *T. punctata*. Both species, indeed, are very likely but two *ex colore* varieties of a single species. The fact that the nephridial papillae of segments 9 to 12 are small and often hardly visible would easily explain their apparent absence in *T. punctata*. The only weighty difference remaining would then be the absence in the last species of posterior setae with a winged and twisted tip.

*Leprea inversa*, Willey, is very likely a specimen of *T. Ehrenbergi* of which the gills have been brought back by contractions.

*Habitat*.—Red Sea; Japan; Gulf of Manaar.

Genus *Polymnia*, Malmgren.*Polymnia nebulosa*, Montagu.

*Polymnia nebulosa*, Fauvel, 1917, p. 267, fig. 28; 1927, p. 257 (synonymy).

*Polymnia triplicata*, Willey, 1905, p. 300, pl. vi, figs. 149-152.

*Polymnia trigonostoma*, Augener, 1914, p. 89.

Pamban, September 1925.

Having had the opportunity to handle a good number of specimens of *Polymnia triplicata* from the Red Sea, the Persian Gulf, Madagascar and Australia I compared them with the *P. nebulosa* so plentiful on the Channel coasts. I was unable to find any noteworthy or permanent difference between them. Accordingly, they must be united under the older name which is *P. nebulosa*, Montagu.

*Habitat*.—Channel; Atlantic; Mediterranean; Red Sea; Persian Gulf; Indian Ocean; Pacific.



Genus *Loimia*, Malmgren.*Loimia medusa* (Savigny).

*Loimia medusa*, Fauvel, 1914, p. 145, pl. vii, figs. 6-9 (synonymy).

*Loimia annulifilis*, Willey, 1905, p. 301, pl. iv, figs. 153-154.

*Loimia annulifilis*, Gravely, 1927, p. 25.

*Loimia annulifilis*, Grube, is apparently easily distinguished from *L. medusa*, 1° by its tentacular cirri ringed with purplish colour; 2° by the small sub-rostral tooth in the uncini. Really, such characters are far from deserving the weight set on them. In the same locality, *L. medusa* specimens are met, some with tentacular cirri ringed with red-brown and white, and others uniformly coloured. Likewise, specimens are also found with uncini showing a sharp sub-rostral tooth whilst in others this tooth is wanting or reduced to obsolete traces. The two varieties of uncini may even be found in a single specimen. Generally, but not always, the sub-rostral tooth appears to be more frequent and sharper in the young.

Wilson, who of late worked out the development of *L. medusa* at Plymouth (1928), does not set more weight on this variable feature.

Moreover, it is fair to note that in far remote localities such as the Red Sea, Ceylon, Philippine Islands, Casamance estuary and Morocco coasts, both forms are found near each other, with intervening specimens.

In view of these facts, I think it but right to consider both forms as only two varieties of the cosmopolite *Loimia medusa*.

Genus *Nicolea*, Malmgren.*Nicolea gracilibranchis*, Grube.

*Nicolea gracilibranchis*, Marenzeller, 1884, p. 207, pl. ii, fig. 2.

*Nicolea gracilibranchis*, Hessle, 1917, p. 173.

*Terebella gracilibranchis*, Grube, 1878, p. 230, pl. xii, fig. 6.

Tuticorin; Pamban, September 1915.

These small *Nicolea* have two pairs of branchiae, 17 setigerous segments with smooth capillary setae, and very projecting abdominal pinnules with uncini bidentate above the main fang. The eyes are hidden under the cephalic folds. The posterior lip is bilobed. The first segments do not show lateral lobes. There are 14-15 ventral shields. On the segment before the first setigerous lies a small papilla behind the second branchia. Nephridial papillae are conspicuous on the 3rd and 4th setigerous segments (6th and 7th segments).

According to Hessle, this species differs from *Nicolea venustula*, Montagu, by its larger size, 72 m.m. instead of 20 m.m., by its ventral shields, 17 instead of 14, by its uncini with 2-3 large teeth above the main fang and, lastly, by its nephridial papillae as long in the female as in the male.

Only the last character seems to be characteristic for, in *N. Venustula* from the Channel, the size varies from 3 to 6 cm.; the ventral shields from 13 to 17 and the upper teeth of the uncini from 2 to 4. But on the *mature* males there are two pairs of nephridial papillae much longer than in the females.

Nevertheless, both species are very close to each other.

*Habitat*.—Philippine Islands; Japan; Hawaii; Gulf of Manaar.

### Genus *Pista*, Malmgren.

Uncini of the first segments with a long chitinous process.

### *Pista Herpini*, Fauvel.

Fig. 16, *a-h*.

*Pista Herpini*, Fauvel, 1928, p. 160, fig 2, *a-h*.

Krusadai and Pamban, September 1925. Under stones.

*Specific characters*.—Body narrow, slender, elongate, slightly swollen anteriorly; seventeen thoracic setigerous segments. Prostomium large, without lateral folds. *Eye-spots wanting*. Buccal segment expanding into two large rounded lobes encompassing the prostomium and united, on the ventral side, by a fold ending in a lower notched lip (fig. 16, *a-b*). Second segment short, with a ventral transverse ridge but without marked lateral

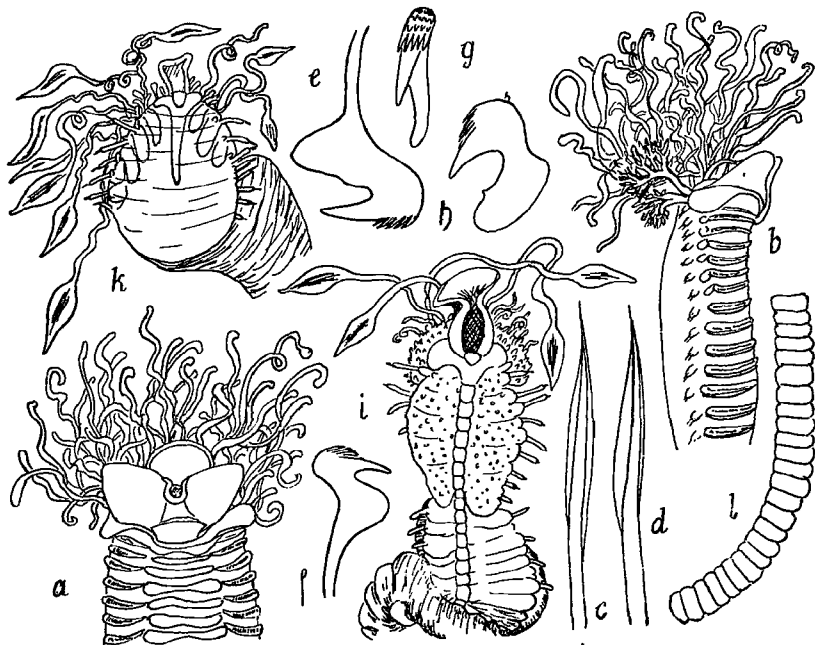


Fig. 16.—*Pista Herpini*: *a, b*, anterior region, ventral and side view  $\times 8$ ; *c, d*, capillary setae  $\times 200$ ; *e, f*, uncini from the first uncinigerous segment  $\times 400$ ; *g, h*, thoracic uncini, front and side view  $\times 400$ . *Lysilla Pambanensis*: *k*, anterior region, ventral side, much swollen, showing nephridia through the integument  $\times 8$ ; *i*, ventral side, contracted, most of the tentacular cirri fallen off  $\times 8$ ; *l*, posterior region  $\times 8$ .

lobes. At the third segment, two large, flattened, rounded lobes pointing forwards or bent backwards. There are no lobes on the 4th segment (1st setigerous). The 15-17 ventral shields are somewhat fused with the tori. Two pairs of branchiae may be either bushy or divided in a single plane; they are often borne on a long stalk; the first pair is the larger. Nephridial papillae unseen. Pygidium with terminal anus circled with short papillae. Dorsal setae capillary, broadly winged at the end with a short smooth tip (fig. 16, *c-d*). The uncini are in a single row on the six first uncinigerous segments, double alternating in the ten following (from the seventh to the sixteenth uncinigerous, or last thoracic, seventeenth setigerous), next again in a single row. Uncini avicular, with a broad base, a small ligament, a transverse row of 3-5 teeth and 2-3 rows of small denticles above the main fang (fig. 16, *g-h*). The uncini of the two first uncinigerous segments have a long narrow faintly chitinised process (fig. 16, *e-f*). Tendinous processes (*soies de soutien*) in the abdominal tori which are rectangular pinnules standing out boldly. Tube membranaceous, cylindrical, with a coating of sand, fragments of shells, and algae. 10-15 mm. long, 2 mm. broad. Tentacular cirri white.

This species shows a great likeness to *Pista maculata* (*Scione lobata*) but it differs from it: 1° by two pairs of branchiae, instead of one only; 2° seventeen thoracic setigerous segments, instead of sixteen; 3° by its uncini with a long process existing only in the two first uncinigerous segments, instead of three or four.

In three of the Krusadai specimens the branchiae are more developed, with a longer stalk, and sometimes one is larger than the three others. Such variations in the size of the branchiae occur in *Scione lobata* (*Pista maculata*). May be these variations are due to the regeneration of easily lost branchiae.

*Habitat*.—Gulf of Manaar.

### Genus *Streblosoma*, Sars.

Branchiae filiform. Uncini beginning at the 5th segment. Dorsal setae beginning at the 2nd segment.

### *Streblosoma persica*, Fauvel.

*Grymaea persica*, Fauvel, 1911, p. 419, pl. xx, figs. 35-43.

Krusadai and Pamban, September 1925, several specimens. Krusadai (lagoon), May 1928, a single specimen.

All these small specimens are like those from the Persian Gulf which I described years ago (1911).

This species differs from the European *Str.* (*Grymaea*) *Bairdi*, Malmgren, principally by the shape of its uncini. It is otherwise very near to it. The narrow ventral shields and the abdominal pinnules standing well out differentiate it from the *Str.* (*Grymaea*) *cespitosa*, Willey.

*Habitat*.—Persian Gulf; Gulf of Manaar.

Genus *Polycirrus*, Grube.

Branchiae absent. Uncini elongated toothed plates. Capillary setae smooth or serrated.

*Polycirrus coccineus*, Grube.

*Polycirrus coccineus*, Fauvel, 1919, p. 458, fig. xi.

*Anisocirrus decipiens*, Gravier, 1906, p. 225, pl. v, figs. 235-238.

Krusadai, September 1925.

Three whole specimens, with yellow tentacular cirri more or less enlarged, show a tongue-shaped process, as do most other *Polycirrus*. They have about 16-17 thoracic setigerous segments, bearing boldly serrated bristles, such as I already figured from Persian Gulf specimens. The uncini are also alike.

*Habitat*.—Red Sea ; Persian Gulf ; Gulf of Manaar.

Genus *Lysilla*, Malmgren.

No branchiae. Dorsal setae capillary, very small. No uncini.

*Lysilla Pambanensis*, Fauvel.

Fig. 16, *i-l*.

*Lysilla Pambanensis*, Fauvel, 1928, p. 162, fig. 2, *i-l*.

Pamban ; Rameswaram.

*Specific characters*.—Body often much swollen anteriorly, ventral side convex, dorsal concave (fig. 16, *i-k*), posterior region narrow, cylindrical (fig. 16, *l*). In the anterior region the skin is covered with small papillae, glandular, rounded, hemispherical or flattened and, often, little conspicuous. In the posterior region, the superficial rings are often very distinct, even nearly moniliform (fig. 16, *l*). There are 13-18 thoracic segments bearing dorsal setae. A wide frilled prostomial lobe, eyeless and bearing numerous tentacular cirri, some cylindrical, slender, spirally twisted, the others much stouter strongly enlarged at the tip and grooved. A prominent upper lip, hollowed, spoon-like. A small triangular fleshy knob under the lower lip. First segment as a large Y-shaped pad with bent edges (fig. 16, *i-k*). The ventral shields are short, narrow, square, sunk into a ventral groove (fig. 16, *i*). They are not to be seen when the thoracic region is much swollen (fig. 16, *k*). Small pointed nephridial papillae at the three first setigerous segments ; sometimes, on the next seven, a swelling with a small central spot (nephridiopore?) is visible on the base of the foot. It appears to have 8-9 pairs of nephridia, the 4-5 first pairs, often visible through the transparent teguments, being short and oval. The dorsal capillary setae, very slender and smooth, noticeably emerge from the long cylindrical foot, which is slightly enlarged at the tip. Tori and uncini are utterly wanting, as well in the abdomen as in the thorax. Anus terminal, without papillae.

Tube unknown. Length, up to 90 mm. and more, breadth 2 mm. Colour, in alcohol, yellowish white more or less closely dotted with rusty brown.

This species seems capable of reaching a rather large size for a posterior fragment with only the last thoracic segments and the abdominal region is 90 mm. long. It belonged to a female filled with large eggs.

The small whole specimens from Pamban have kept more or less of their tentacular cirri. The thoracic region of a few of them is swollen into a large ball showing no traces of segmentation and with papillae hardly to be detected whilst they show conspicuously in the other specimens. The appearance is thus very unlike according to the state of contraction. The number of setigerous thoracic segment varies much.

This species, though akin to *Lysilla Loveni*, Malmgren, differs from it by its much more numerous thoracic segments, 13-18 instead of 6, its more prominent setae, its tentacular cirri more enlarged at the tip, its less conspicuous glandular warts and, perhaps by its colour.

*Lysilla pacifica*, Hesse and *L. nivea*, Langerhans are readily distinguished by their spinous setae.

### Family SABELLIDAE.

#### Genus *Sabella*, Linné.

Two divisions of the branchiae equal, semi-circular, not spiral. In the thorax, dorsal winged setae, ventral uncini and pickaxe-shaped hooks. In the abdomen, dorsal avicular uncini and ventral winged setae.

#### *Sabella porifera*, Grube.

*Sabella porifera*, Grube, 1878, p. 252, pl. xiv, fig. 5.

*Sabella porifera*, Augener, 1914, p. 106.

*Eurato porifera*, Willey, 1905, p. 309, pl. vii, figs. 1 & 3.

*Sabella fusca*, Gravier, 1908, p. 71, pl. v, figs. 243-245.

Rameswaram, April 26, 1924.

The branchial fan of this large specimen is short, well furnished, uniformly yellow. Though the branchial lobes are not coiled spirally, each is a little more than semi-circular. At the base of the gills, four stout, brown, glandular lobes form pads of very characteristic kind. The body is large, short and stout and bears, between the two divisions of the feet, small eye-spots occasionally wanting. The thoracic tori are provided with pickaxe-shaped setae (*soies en pioche*) in addition to the usual avicular uncini. Consequently this species is a genuine *Sabella* and does not pertain to the genus *Eurato*, Saint-Joseph, which is destitute of pickaxe-shaped setae.

The Rameswaram specimen agrees well with Gravier's description of *Sabella fusca*, Grube. It differs only in having a collar notched on the sides and, perhaps, by its colour.

Johansson regards both species as synonymous.

*Habitat*.—Red Sea; Indian Ocean; Australia.

Genus *Potamilla*, Malmgren.

*Potamilla ceylonica*, Augener.

Fig. 17.

*Potamilla ceylonica*, Augener, 1926, p. 470.

Krusadai and Shingle Islands.

A number of small specimens were still encased in their sand-coated tubes.

The branchial fans carry each 7-10 gill filaments uncoloured, or ringed with light brown, and ending in a long slender, naked tip. *There are no traces of eye-spots on the branchial filaments.* The collar is generally much slanting, broadly open on the back and with two flattened, reflected, acute ventral flaps. The palps are broad and lacinate. The number of thoracic segments varies much between 15 and 23 (and even 45-46 according to Augener).

The dorsal thoracic setae are of two kinds: winged capillary and oboval oar-shaped paleae with a long slender tip (fig. 17, *c, d*). The avicular uncini, with a long base, or manubrium, are accompanied with pickaxe-shaped setae (*soies en pioche*) with a long beak (fig. 17, *a, e, f*).

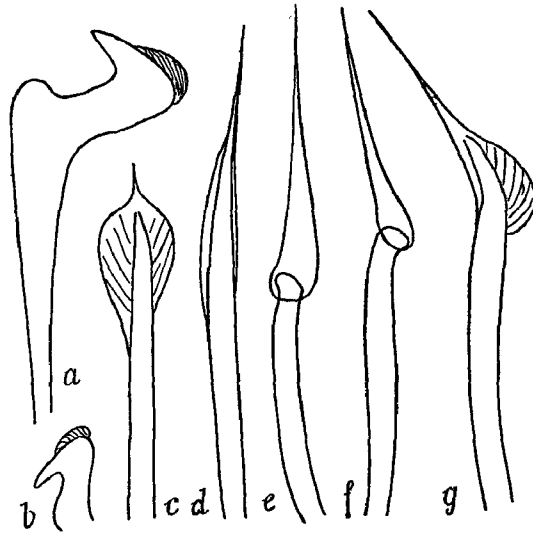


Fig. 17.—*Potamilla ceylonica*: *a*, thoracic avicular uncinus  $\times 400$ ; *b*, abdominal uncinus  $\times 400$ ; *c*, thoracic oar-shaped palea  $\times 400$ ; *d*, thoracic capillary seta  $\times 400$ ; *e, f*, pick axe-shaped setae  $\times 400$ ; *g*, abdominal spatulate seta  $\times 400$ .

In the abdomen, the dorsal uncini are avicular and the ventral setae are spatulate with unequal wings and a long slender tip (fig. 17, *b, g*).

This species comes near to *Potamilla Ehlersi* by its setae, but differs by the want of eyes. Eyes are equally wanting in *P. Torelli*, but the abdominal setae of this species are different.

*Habitat*.—Ceylon; Gulf of Manaar.

### Potamilla Ehlersi, Gravier.

*Potamilla Ehlersi*, Gravier, 1908, p. 87, pl. vi, figs. 60-64.

*Potamilla Ehlersi*, Fauvel, 1911, p. 423.

*Potamilla oligophthalmos*, Augener, 1914, p. 109.

Krusadai, September 1925, in coral rock, with *Polydora*.

The branchiae of the single small specimen bear one to three large dorsal eyes. There are nine thoracic setigerous segments. The collar and setae agree well with Gravier's description and figures. The abdominal setae have unequal wings and end in a very long and slender tip, rather like the setae of *P. streptochaeta*, Southern, but the thoracic paddle-shaped setae or paleae have a much shorter tip. Augener unites this species to *P. oligophthalmos*, Grube, but Johansson looks on this union as still dubious.

*Habitat*.—Red Sea; Persian Gulf; Gulf of Manaar; Australia (?).

### Genus Dasychone, Sars.

#### Dasychone cingulata, Grube.

*Dasychone cingulata*, Willey, 1905, p. 308, pl. vii, figs. 170-173.

*Dasychone cingulata*, Augener, 1914, p. 122 (synonymy).

*Branchiomma cingulata*, Johansson, 1927, p. 161.

Krusadai, April 8, 1924.

Of this species, so widely spread in all the tropical seas, only a single small, but typical, specimen was found.

Johansson, of late, for rather questionable reasons of priority, has utterly upset the nomenclature, applying the name of *Branchiomma* to *Dasychone* and creating the new name *Megalomma* for the species hitherto known by every one for more than sixty years under the name of *Branchiomma*. Such total overthrows are a downright nuisance, without any usefulness and only likely to breed no end of misleading confusions. It is a case, if ever there was one, calling for prescription and the keeping of the names sanctioned by a long and constant use.

*Habitat*.—Red Sea; Persian Gulf; Indian Ocean; Pacific.

## Family SERPULIDAE.

Genus *Hydroides*, Gunnerus.*Hydroides monoceros*, Gravier.

*Hydroides monoceros*, Gravier, 1908, p. 115, pl. viii, fig. 288.

*Hydroides monoceros*, Pixell, 1913, p. 76.

*Hydroides monoceros*, Fauvel, 1923, p. 48.

Rameswaram, April 26, 1924.

Only a small specimen in a bit of white, wrinkled, broken tube.

The lower funnel of the operculum is oval and slanting, the central crown of spines is very small and bears a very large spine with a lateral, triangular hook on each side and a strong curved terminal tip.

This species is closely allied to *H. minax*, Grube, from the Philippine Islands.

*Habitat*.—Red Sea; Zanzibar; Gulf of Manaar; Gambier Islands.

Genus *Vermiliopsis*, Saint-Joseph.*Vermiliopsis acanthophora*, Augener.

*Vermiliopsis acanthophora*, Augener, 1914, p. 155, pl. i, figs. 21-24.

*Vermiliopsis acanthophora*, Fauvel, 1923, p. 53.

Krusadai, September 1925.

A single small specimen with characteristic operculum. The flat, smooth, wingless pedicle bears a white hemisphere capped with a yellow cone, without chitinous partitions and ending in a hornlike hook. The thoracic segments bear *Apomatus setae*.

*Habitat*.—Australia; Gambier Islands; Gulf of Manaar.

*Vermiliopsis glandigera*, Gravier.

*Vermiliopsis glandigera*, Gravier, 1908, p. 121, pl. viii, figs. 290-291.

*Vermiliopsis glandigera*, Fauvel, 1919, p. 465.

*Vermiliopsis glandigera*, Augener, 1916; 1918, p. 652.

Rameswaram, April 26, 1924; Shingle Island, September 1925; Krusadai, September 1925.

A few specimens were still encased in their tube which is adorned with five longitudinal keels, more or less conspicuous, and showing faint traces of transverse ridges.

I found one operculum that agreed very well with Gravier's figure and, others with the upper cap conical or elongate divided by 3-4 partitions and, sometimes, slightly hollowed at the tip in a small cup.

*Habitat*.—Red Sea; Gulf of Manaar; West Coast of Africa; Madagascar.



Genus *Pomatostegus*, Schmarda.

Collar setae bayonet-shaped and covered with fine hair-like processes. Operculum with a slanting calcareous plate or several horny discs united by a central vertical column. Opercular pedicle with lateral wings. Abdominal setae trumpet-shaped.

*Pomatostegus stellatus*, Abildgaard.

*Pomatostegus stellatus*, Gravier, 1908, p. 135.

*Pomatostegus stellatus*, Augener, 1916-1918, p. 598.

*Pomatostegus actinoceros*, Willey, 1905, p. 314, pl. viii, fig. 34.

*Pomatostegus actinoceros*, Augener, 1914, p. 152 (synonymy).

Krusadai, April 1924.

A single truncated specimen, without its tube.

The operculum bears four denticulated discs, piled up very close and strung on a hollow pillar, slightly excentric, with two rows of star-like diverging spines and a circle of spines under each plate. The pedicle is flat with broad smooth wings.

The *P. actinoceros*, as far as I can judge, does not differ from *P. stellatus*, which name is the older.

*Habitat*.—Atlantic; Indian Ocean; Pacific.

*Pomatostegus polytrema*, Philippi.

Var. *indica*, Fauvel.

Fig. 15, *h, i*.

*Pomatostegus polytrema*, var. *indica*, Fauvel, 1928, p. 165, fig. 3, *h-i*.

Krusadai, September 1925. Four specimens.—Pamban, September 1925.

This new variety differs from the typical form only by its operculum. The setae and uncini are the same. The calcareous tube, whitish, with prominent, more or less serrated, keels shows the characteristic alveoles and perforations.

But whilst in the European form the operculum is a membranous vesicle shaped as an inverted cone capped with a calcareous plate which may be level, convex or bluntly conical, smooth or bearing 1, 2 or 3 more or less developed prongs very variable in shape, in the Indian variety the lower bladder is capped with a rigid cone, somewhat arched and bearing a number of small spines on its concave side (fig. 15, *h, i*).

A Pamban specimen carries an operculum provided with two blunt knobs, such as Rioja figured from a typical *P. polytrema* from the coast of Spain.

Accordingly the Indian form, with a conical spinous operculum, seems to be at most only a variety, for according to Rioja the operculum may have a single knob and ample variations have been observed.

*Habitat*.—Gulf of Manaar.—Typical form: Atlantic; Mediterranean; India.

Genus *Omphalopomopsis*, Saint-Joseph.

Operculum chitinous or horny, concave or funnel-shaped. Thoracic membrane very short. Setae of the first segment acicular or kneed (geniculate). Abdominal setae geniculate. Uncini with lower tooth gouge-like.

*Omphalopomopsis Langerhansi* (Marenzeller).

Fig. 18.

*Omphalopoma Langerhansi*, Marenzeller, 1884, p. 219, pl. iv, fig. 6.

Rameswaram, April 26, 1924.

The only specimen, nearly complete, is 35 mm. long and 5 mm. broad.

It has quite the general appearance of a *Spirobranchus*, some of which have a somewhat similar operculum, but the setae are very different.

The operculum ends in a yellow rounded plate slightly depressed, saucer-like, with a single stout spike arising nearly in the centre (fig. 18, *a*). The operculum is borne on a

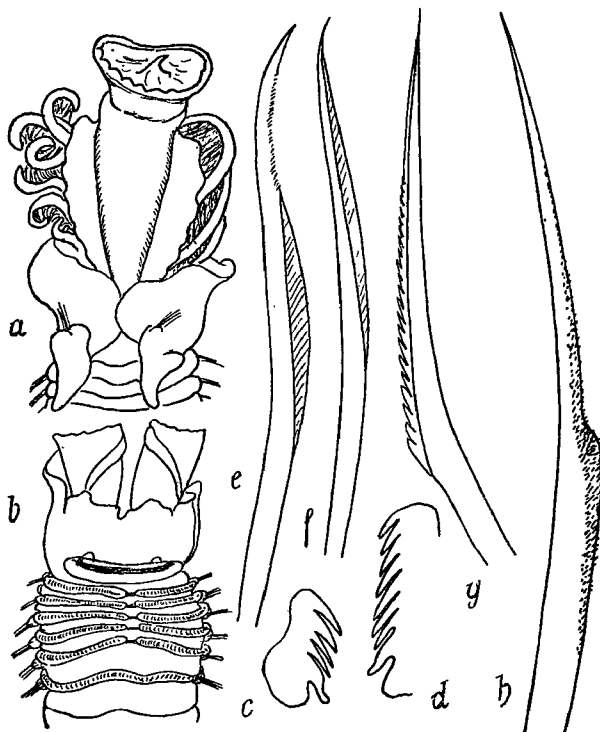


Fig. 18.—*Omphalopomopsis Langerhansi*: *a*, anterior part and operculum, dorsal side  $\times 4$ ; *b*, anterior region, ventral side  $\times 4$ ; *c*, abdominal uncinus  $\times 400$ ; *d*, thoracic uncinus  $\times 400$ ; *e*, *Apomatus* seta from the last thoracic segment  $\times 150$ ; *f*, thoracic capillary winged seta  $\times 150$ ; *g*, abdominal geniculate seta  $\times 400$ ; *h*, seta from the first setigerous segment  $\times 300$ .

huge, thick pedicle, nearly as broad as the terminal plate, bulging in the middle and with edges thinned into lateral smooth wings, without any processes. It is variegated with dark spots. Such an operculum recalls that of *Spirobranchus maldivensis*, Pixell (1913, p. 84, pl. ix, fig. 9).

The branchiae are tinged with violet-brown. They are short, thick, crowded into dense semi-circular clusters, rolled in but not spirally coiled.

The collar, widely opened dorsally, has an irregularly serrated edge but no distinct flaps. The thoracic membrane is very short, rudimentary, not overreaching the third setigerous segment. It is, indeed, but an extension of the collar (fig. 18, *a*). There are seven thoracic segments. The last six bear very long tori nearly meeting in the middle of the ventral side (fig. 18, *b*). The tori of the last are even coalescent, forming a kind of transverse ridge. The abdominal tori are long and also come very near each other in the middle of the ventral side.

The setae of the first setigerous segment are very minutely spinous (fig. 18, *h*). The other thoracic setae are winged and accompanied with *Apomatus* setae in the last thoracic segment (fig. 18, *e/f*). The uncini, like those of *Vermilia*, have a stout lower tooth which is not hollowed and gouge-like. The abdominal setae are somewhat geniculate and serrated (fig. 16, *g*).

According to Saint-Joseph, this species must be classed in the genus *Omphalopomopsis*.

*Habitat*.—Japan; Gulf of Manaar.

### Genus *Spirobranchus*, Blainville.

#### *Spirobranchus giganteus*, Pixell.

*Spirobranchus giganteus*, Gravier, 1908, p. 132, pl. viii, fig. 300.

*Spirobranchus giganteus*, Pixell, 1913, p. 80.

*Spirobranchus giganteus*, Fauvel, 1923, p. 52 (synonymy).

*Spirobranchus Semperi*, Augener, 1914, p. 148.

Rameswaram, April 26, 1924. Pamban, September 1925.

The Rameswaram specimen is complete. The operculum bears antler-like branched horns, the wings of the pedicle are fringed with two lateral, diverging, lacinated processes, such as are found in *Pomatocerospis Coutierei*, described by Gravier, which is synonymous with *Sp. giganteus*.

This Serpulist, wide-spread in all the tropical seas, is liable to very extensive variations in the shape of its operculum, which has been the cause of its being described under very many names.

*Habitat*.—Atlantic; Red Sea; Persian Gulf; Indian Ocean; Pacific.

### Genus *Pomatoceros*, Philippi.

Opercular pedicle with membranous wings. Collar and thoracic membrane highly developed. Setae of first setigerous segment slender, capillary. Abdominal setae trumpet-shaped. Lower tooth of uncini hollowed gouge-like.

### Pomatoceros coeruleus (Schmarda).

*Pomatoceros coeruleus*, Ehlers, 1907, p. 30.

●*Pomatoceros coeruleus*, Fauvel, 1919, p. 464.

*Pomatoceros strigiceps*, Ehlers, 1904, p. 67, pl. ix, figs. 11-19.

Ennur back-water, Chingleput District, May 26, 1922; Madras Harbour, March 3, 1924.

This *Pomatoceros*, very closely allied to the European *P. triquetèr*, L., replaces the latter in the Indian Ocean and Pacific. It shows the same variability in the shape of its operculum. The bright indigo-blue colour of its collar and thorax appears to be a more constant feature.

*Habitat*.—Indian Ocean; Pacific (Australia, New Zealand).

### Genus Salmacina, Claparède.

Operculum absent. Branchiae few, more or less enlarged at the tip. Calcareous tubes very small and slender, crowded in aggregate fenestrated masses. Hermaphrodite, scissiparous.

### Salmacina Dysteri (Huxley).

*Salmacina Dysteri*, Fauvel, 1927, p. 377, fig. 129, c-k.

*Salmacina australis*, Haswell, Augener, 1923, p. 106, fig. 39.

Rameswaram, April 26, 1924; Madras Harbour, March 1924; Krusadai, May 3, 1924; Gulf of Manaar, 1924.

Augener (1914, p. 160) had first considered *S. australis*, Haswell, as synonymous with *S. Dysteri* from the seas of Europe. But of late he has changed his mind and he now keeps Haswell's denomination for the Australian species, on the ground of slight differences in the shape of the wing of the setae of the first setigerous segment. But in *S. Dysteri* very extensive variations may be noticed in the wing of the setae of specimens living in the same colony and even between the setae of a single worm. The setae of a Madras specimen have a wing intermediate between the two setae which Augener figured for the two species.

McIntosh goes still farther, for he regards *Filograna implexa*, Berkeley, and *Salmacina Dysteri*, Huxley, as synonymous in spite of the fact that the first carries a kind of operculum which is wanting in the last. Though both species are often found crowded together in the same mass of tubes, I am afraid that McIntosh's view of the case cannot be supported, at least in the present state of our knowledge.

*Habitat*.—Atlantic; Indian Ocean; Pacific.

### Genus Spirorbis, Daudin.

Body asymmetrical. Thoracic setigerous segments less than five. Opercular pedicle without pinnules. Tube spirally coiled, dextral, or sinistral. Hermaphrodite.

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### Spirorbis foraminosus, Moore.

*Spirorbis foraminosus*, Augener, 1926, p. 472.

Krusadai, April 25 and May 8, 1924. On Algae.

This small dextral *Spirorbis* is very closely allied to *Sp. corrugatus*, Montagu. The tube is similarly keeled, wrinkled, more or less pitted with small alveoles in both species. There are only three thoracic setigerous segments. The collar setae are nearly smooth and deprived of a fin-like expansion and accompanied by a few capillary setae. The abdominal setae have a large falciform serrated blade, very transparent. The operculum is cylindrical transparent, dotted and crowned with a rim. As in *Sp. corrugatus*, it shows longitudinal grated plates which may part from each other along the generating lines of the cylinder.

*Habitat*.—Indian Ocean ; Pacific.

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## LIST OF REFERENCES.

- 1898 ARWIDSSON, I. Studien über die Familien *Glyceridae* und *Goniadidae* (*Bergens Museum Aarborg*, 1898, No. XI, pp. 1-69, pl. I-IV).
- 1913-14 AUGENER, H. Die Fauna Südwest Australiens. Polychaeta. I Errantia, II Sedentaria (IV and V. Iena).
- 1918 AUGENER, H. Polychaeta in: *Michaelsen. Beiträge zur Kenntniss der Meeres-Fauna West-Africas*. II, 2, pp. 67-625, pl. II-VII. (Hamburg.)
- 1922 AUGENER, H. Australische Polychaeten des Hamburger Zoologischen Museums (*Archiv für Naturgesch.* 88, 1922, Abt. A).
- 1922 AUGENER, H. Revision der Australischen Polychaeten-typen von Kinberg (*K. Svenska Vetensk. Akad. Ark. för Zool.* XIV, N<sup>o</sup>. 8).
- 1922 AUGENER, H. Results of Dr. E. Mjöberg's Swedish Scientific Expeditions to Australia 1910-1913, XXXII. Polychaeten (*K. Svenska Vet. Akad. Handlg.* LXIII, N<sup>o</sup>. 6).
- 1923 AUGENER, H. Polychaeten von den Auckland und Campbell Inseln (*Papers from Dr. Th. Mortensen's Pacific Expedition 1914-16 Polychaeten I. Saertryk af Vidensk. Medd. fra Dansk Naturh. Foren*, LXXV).
- 1924 AUGENER, H. Polychaeten von Neuseeland I. Errantia (*ibid.* I. XXV, pp. 241-441).
- 1925 AUGENER, H. Zoologische Ergebnisse der ersten Lehr-Expedition der Dr. P. Schottländer, schen Jubiläums-Stiftung. III. Polychaeta (*Mitth. aus dem Zoolog. Museum in Berlin*, XII, pp. 107-116).
- 1926 AUGENER, H. Ceylon-Polychaeten. Fauna et Anatomia Ceylonica, IV, No. 2 (*Jenaische Zeitschr. für Naturwiss.* LXII, N. F. LV Jena).
- 1926 AUGENER, H. Polychaeten von Neuseeland II, Sedentaria (*Papers from Dr. Th. Mortensen's Pacific Expedition 1914-1916, XXXIV—Saertryk af Vidensk. Medd. fra Dansk Naturh. Foren.* LXXXI, pp. 157-294).
- 1927 AUGENER, H. Polychaeten von Südost und Süd Australien (*ibid.* LXXXIII, pp. 71-275).
- 1927 AUGENER, H. Die Polychaeten der Sammlung Thilenius von Neuseeland und Samoa (*Mitth. aus dem Zoolog. Museum Berlin*, XIII, 2, pp. 339-363).
- 1870 BAIRD, W. Remarks on several genera of Annelids belonging to the group *Eunicea* (*J. Proc. Linn. Soc. London*, X, pp. 341-361).
- 1868 CLAPAREDE, E. Annélides Chétopodes du Golfe de Naples (*Mém. Soc. Phys. Genève* XIX-XX).
- 1903-04 CROSSLAND, C. On the Marine Fauna of Zanzibar and British East Africa from Collections made by Cyril Crossland in the years 1901 and 1902. Polychaeta (*Proceed., Zool. Soc. London* I, 1903, Vol. I; II, 1903, Vol. II; III, 1904, Vol. I).
- 1904 CROSSLAND, C. The Polychaeta of the Maldivé Archipelago from the Collections made by J. Stanley Gardiner in 1899 (*ibid.*, 1904, I, pp. 270-286).

- 1924 CROSSLAND, C. Polychaeta of tropical East Africa, the Red Sea and Cape Verde Islands collected by Cyril Crossland and of the Maldivé Archipelago collected by Profr. Stanley Gardiner, M.A., F.R.S. (*ibid.*, 1924, pp. 1-106).
- 1864-68 EHLERS, E. Die Borstenwürmer. Annelida Chaetopoda (Leipzig, I, 1864, II, 1868).
- 1904-07 EHLERS, E. Neuseeländische Anneliden (*Abh. d. König. Gesell. der Wiss. zu Göttingen Math. Phys. Kl. N.F. III*, 1904; V, 1907).
- 1887 EISIG, H. Die Capitelliden des Golfes von Neapel (*Fauna und Flora des Golfes von Neapel*, XVI).
- 1914 EISIG, H. Zur Systematik, Anatomie und Morphologie des Ariciiden nebst Beiträgen zur generallen Systematik (*Mitth. Zool. Stat. Neapel*, XXI, pp. 153-600).
- 1927 FAGE, L. et LEGENDRE. Pêches planctoniques à la lumière effectuées à Banyuls-sur-Mer et à Concarneau (*Arch. Zool. Expér. et Gen. LXVII*, fasc. 2, pp. 23-222).
- 1901 FAUVEL, P. Annélides Polychètes de la Casamance rapportées par M. Aug. Chevalier (*Bull. Soc. Linn. Normandie*, V, pp. 59-105. Caen).
- 1911 FAUVEL, P. Annélides Polychètes du Golfe Persique recueillies par M. N. Bogoyawlensky (*Arch. Zool. Expér. et Gen.* (5), VI, pp. 253-439).
- 1914 FAUVEL, P. Annélides Polychètes de San Thomé, Golfe de Guinée, recueillies par M. Ch. Gravier (*ibid.*, LIV, pp. 105-155, pl. VII-VIII).
- 1914 FAUVEL, P. Annélides Polychètes non pélagiques (*Rés. Scient. Campagnes du Prince de Monaco*, XLVI, 432 pp., 31 pl.).
- 1916 FAUVEL, P. Annélides Polychètes des Iles Falkland recueillies par Rupert Valentin Esqré (*Arch. Zool. Expér. et Gén. LV*, fasc. 10, pp. 418-482).
- 1917 FAUVEL, P. Annélides Polychètes de l'Australie Méridionale (*ibid.*, LVI, fasc. 3, pp. 159-277).
- 1919 FAUVEL, P. Annélides Polychètes de Madagascar, de Djibouti et du Golfe Persique (*ibid.*, LVIII, fasc. 8, pp. 315-473).
- 1921 FAUVEL, P. Annélides Polychètes de Madagascar du Museum R. d'Histoire Naturelle recueillies par M. le Dr. W. Kaudern en 1912 (*Arkiv. för Zoologi, Svenska Vetensk. Akad. XIII*, No. 24, pp. 1-32. Stockholm).
- 1923 FAUVEL, P. Sur quelques Polychètes de l'Angola Portugaise (*Göteborgs Kong. Vetensk. Handlg. F. F. XXVI*, 4).
- 1923 FAUVEL, P. Annélides Polychètes des Iles Gambier et de la Guyane Française (*Mem. Pont. Accad. Rom. Nuovi Lincei* (2), VI, pp. 1-59. Roma).
- 1923 FAUVEL, P. Polychètes Errantes (*Faune de France, V*. Paris, Lechevallier, 488 pp.).
- 1927 FAUVEL, P. Polychaeta (in Monod, *Contribution à la Faune du Cameroun. Faune des Colonies Françaises*. I, pp. 523-533. Paris).
- 1927 FAUVEL, P. Rapport sur les Polychètes Errantes (Cambridge Expedition to Suez Canal.) *Zool. Soc. London*, XXII, 4, N° 1, pp. 411-439).
- 1927 FAUVEL, P. Polychètes Sédentaires (*Faune de France, XVI*, Paris, Lechevallier, 494 pp.).

- 1928 FAUVEL, P. Annélides Polychètes nouvelles de l'Inde (*Bull. Mus. Nat. Hist. Nat. Paris*, I, N° I, II, N° 2, Vol. XXXIV).
- 1929 FAUVEL, P. Polychètes nouvelles du Golfe de Manaar (Inde) (*Bull. Soc. Zool. de France*, 1929, LIV, pp. 180).
- 1927 GRAVELY, F. H. Chaetopoda. The Littoral Fauna of Krusadai Island in the Gulf of Manaar (*Bull. Madras Govt. Museum N.S. Nat. Hist.* I, N° 1, pp. 1-32).
- 1900-08 GRAVIER, Ch. Contribution à l'Étude des Annélides Polychètes de la Mer Rouge (*Nouvelles Archives du Muséum de Paris*, 4e Sér. II, fasc. 2, 1900; III, fasc. 2, 1901; VIII, 1906; X, 1908).
- 1909 GRAVIER, Ch. Annélides Polychètes recueillies à Payta (Pérqu) par M. le Dr. Rivet (*Arch. Zool. Expér. et Gén.* (4), X, pp. 617-659).
- 1909 GRAVIER, Ch. Contribution à l'Étude de la Morphologie et de l'Évolution des Sabellariens (*Ann. Sc. Nat. Zool.* (9), IX, pp. 287-304. Paris).
- 1868 GRUBE, Ed. Beschreibungen einiger von Georg Ritter von Frauenfeld gesammelter Anneliden und Gephyreen des Rothes Meeres (*Verhdl. der Zool. Bot. Ges. Wien*; XVIII, pp. 629-650).
- 1869 GRUBE, Ed. Anneliden des Rothes Meeres (*Berlin Monatsb. d. Kgl. Akad. Wiss.*, 1869).
- 1874 GRUBE, Ed. Descriptiones Annulatorum novorum mare Ceylonicum habitantium (*Proced. Zool. Soc. London*. 1874).
- 1878 GRUBE, Ed. Annulata Semperiana. Beiträge zur Kenntniss der Anneliden-Fauna des Philippinen (*Mém. Acad. Sci. St. Petersbourg* (7) XXV, N° 8).
- 1886 HASWELL, A. W. Observations on some Australian Polychaeta (*Proc. Linn. Soc. N. S. Wales*, X, Pt. 4, pp. 733-756).
- 1917 HESSLE, Ch. Zur Kenntniss der Terebellomorphen Polychaeten (*Zool. Bidrag fra'n Uppsala*, V, pp. 39-255).
- 1912 } HORST, R. Polychaeta Errantia of the Siboga Expedition, I Amphinomidae; II  
1917 } Aphroditidae, III Nereidae (*Siboga-Expeditie* XXIV, a, 1912; XXIV, b, 1917; XXIV,  
1924 } c, 1924).
- 1912 IZUKA, A. The Errantiate Polychaeta of Japan (*J. Coll. Sci. Imper. Univ. Tokyo*, XXX (2), 262 pp.).
- 1927 JOHANSSON, K. Beiträge zur Kenntniss der Polychaeten-Familien *Hermellidae*, *Sabellidae* und *Serpulidae* (*Zool. Bidrag fra'n Uppsala*, XI, 183 pp.).
- 1857-1910 KINBERG, J. G. H. *Annulata* (Konglika Svenska Fregatten "Eugenies" (Resa omkring Jordan 1851-1853. Zoologi. III Annulater. *Upsal-Stockholm* 1857-1910).
- 1864-1866 KINBERG, J. G. H. *Annulata Nova*. (*Ofvcr. af Kong. Svenska Vet. Akad. Förhdg. Stockholm*, 1864, 1865, 1866).
- 1879-1884 LANGERHANS, P. Die Wurmfauna von Madeira (*Zeitsch. f. wiss. Zool.* XXXII, 1879; XXXIII, XXXIV, 1880; XL, 1884. Leipzig).
- 1885 MCINTOSH, W. C. *Annelida Polychaeta* (*Rep. Sci. Res. H. M. S. "Challenger"*, Zool. XII, London).



- 1923 MCINTOSH, W. C. On Amphinome rostrata Pallas in the Atlantic and Indian Oceans (*Gatty Marine Laboratory, Note XLV. Ann. Mag. Nat. Hist.* (9), XII, pp. 90-94).
- 1915 MCLEAN FRASER, C. The Swarming of *Odontosyllis* (*Trans. R. Soc. Canada*, (3) IX, pp. 43).
- 1865 MALMGREN, A. J. Nordiska Hafs Annulater (*Ofver af Kongl. Svenska Vet. Akad. Förhdg.* Stockholm).
- 1867 MALMGREN, A. J. Annulata Polychaeta Spetsbergiae, Groenlandiae, Islandiae et Scandinaviae hactenus cognita (*ibid.* 1867, pp. 127-235).
- 1879-1902 MARENZELLER, E. von. Sudjapanische Anneliden (*Denks. der Math. Natur V. Cl. der K. Akad. der Wiss. Wien*, XLI, 1879; XLIX, 1884; LXXII, 1902).
- 1849 MILNE-EDWARDS, H. Règne Animal Illustré. Annélides. Paris.
- 1778 PALLAS, P. S. Miscellanea Zoologica. La Haye.
- 1913 PIXELL, H. Polychaeta of the Indian Ocean, together with some species from the Cape Verde Islands. The Serpulidae with a classification of the genera *Hydroides* and *Eupomatus* (*Trans. Linn. Soc. London*, XVI (2), pp. 69-92).
- 1909-1910 POTTS, F. A. Polychaeta of the Indian Ocean I-II. Percy Sladen Trust Expedition (*Trans. Linn. Soc. London*, XII, XIII).
- 1913 POTTS, F. A. The Swarming of *Odontosyllis* (*Proceed. Cambridge Philos. Soc.* XVII, pp. 193-200).
- 1914 POTTS, F. A. Polychaeta from the North-East Pacific. The Chaetopteridae. (*Proceed. Zool. Soc. London* 1914, pp. 955-994).
- 1865 QUATREFAGES, de. Histoire Naturelle des Annelés marins et d'eau douce (3 vols. Paris. Roret).
- 1887-1895 SAINT-JOSEPH, baron de. Annélides Polychètes des Côtes de Dinard (*Ann. Sc. Nat. Zool.* (7), I, 1887; V, 1888; XVII, 1894; XX, 1895. Paris).
- 1898 SAINT-JOSEPH, baron de. Annélides Polychètes des Côtes de France (Manche et Océan) (*Ann. Sc. Nat. Zool.* (8), V, Paris).
- 1906 SAINT-JOSEPH, baron de. Annélides Polychètes des Côtes de France (Océan et côtes de Provence) (*Ann. Sc. Nat. Zool.* (9), III, Paris).
- 1820 SAVIGNY, J.C. Système des Annélides (*Description de l'Egypte Hist. Nat.* XXI. Paris).
- 1861 SCHMARDA, L. Neue Wirbellose Thiere II (Leipzig).
- 1921 SOUTHERN, R. Fauna of the Chilka Lake. Polychæta of the Chilka Lake and also Fresh and Brackish Waters in other parts of India (*Mem. Ind. Mus.* V, pp. 565-659).
- 1904 WILLEY, A. The littoral Polychæta from the Cape of Good Hope (*Trans. Linn. Soc. London* (2), IX, pp. 255-268).
- 1905 WILLEY, A. Polychæta (*Herdman's Rep. Ceylon Pearl Oyster Fisheries*, IV, pp. 241-324).
- 1928 WILSON, D. The Post-Parval development of *Loimia medusa* Sav. (*Jour. Mar. Biolog. Assoc. Plymouth*, XV, No. 1, N.S, pp. 129-146).

## PYCNOGONIDA OF KRUSADAI ISLAND (SUPPLEMENT).

By B. SUNDARA RAJ, *M.A., Ph.D.*

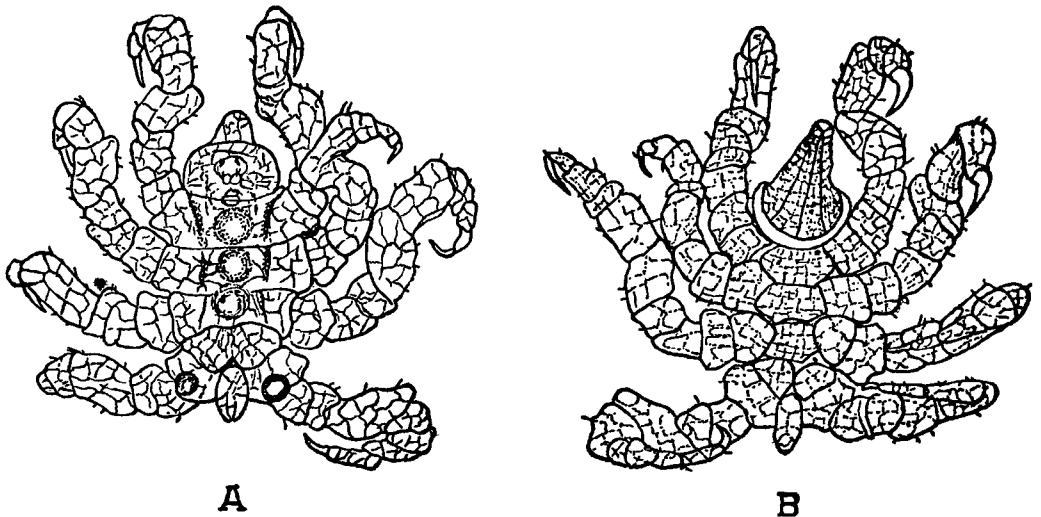
### Family PYCNOGONIDAE.

Body and legs short and thick set, appendages I and II absent <sup>1</sup> appendage III (oviger) present only in the male, usually 9 jointed<sup>2</sup>, 4 or 5 pairs of ambulatory legs, auxiliary claws rarely present<sup>3</sup>.

### Genus *Pycnogonum*, Brunnich 1764.

Only 4 pairs of ambulatory legs.

### *Pycnogonum indicum*, sp. nov.



Text Fig. I.—*Pycnogonum indicum* sp. n.  
A. Dorsal view. B. Ventral view.

One female specimen was collected by Dr. Gravely between tide marks on Shingle Island, Gulf of Mannar, in September 1925.

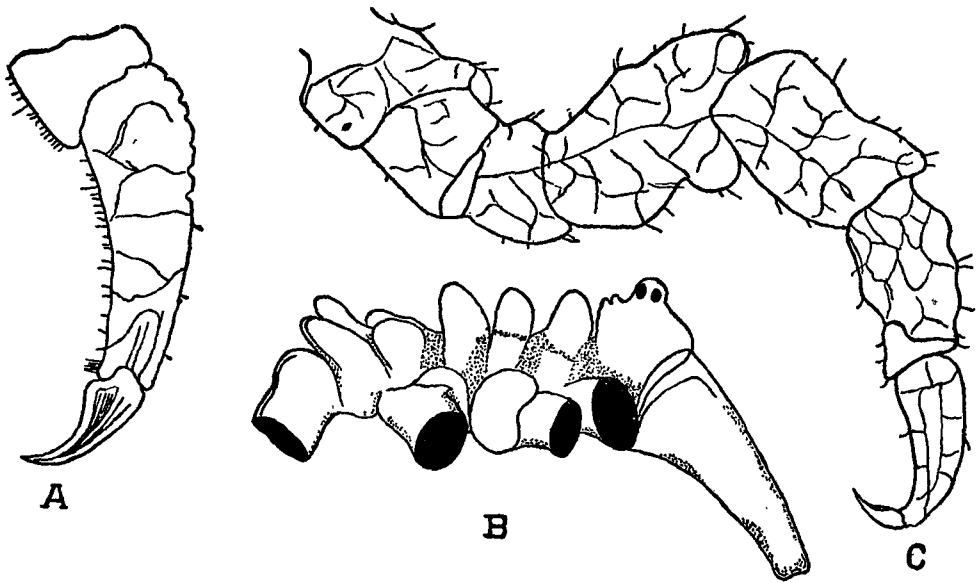
*Colour*.—Pale yellow in spirit.

<sup>1</sup> *P. claudum*, Loman 1908 has rudiments of cheliphores, but the species evidently is not a true *Pycnogonum*.  
<sup>2</sup> *P. gaini*, Bouvier has only 8 joints. *P. rhinoceros*, Loman apparently a young form, has but seven segments.  
<sup>3</sup> *P. pusillum*, Dohrn and *P. australe*, Grube have auxiliary claws.

*Trunk.*—Compact and distinctly segmented, its greatest width across the first pair of lateral processes about three-fourths of the length; cephalon very large and rounded, separated from the rest of the cephalic segment dorsally by a deep furrow; last segment of the trunk only the meeting place of the posterior lateral processes; lateral processes short and squarish, somewhat dilated distally, almost or quite in contact with each other and the cephalon anteriorly.

*Integument.*—Reticulate.

*Tubercles.*—The ocular tubercle rounded at the top with four dark eyes of even size. A ridge along the mid-dorsal line from the ocular tubercle to the deep groove separating the cephalon from the rest of the cephalic segment, with two small sharply pointed tubercles one immediately behind the other. Each segment of the trunk except the last raised dorsally in an obtusely rounded rod-shaped median tubercle. The first of these in the cephalic segment immediately posterior to the transverse groove separating the cephalon from the rest of the segment. Two similarly shaped but more oblique tubercles one on each of the first coxae of the last pair of legs.



Text Fig. II.—*Pycnogonum indicum* sp. n.

A. Terminal part of third leg. B. Lateral view of body (appendages omitted).

C. Third leg, left side, posterior view.

*Proboscis.*—Conical, much dilated at base, slightly constricted after the first third of its length and directed obliquely downwards.

*Abdomen.*—Slightly inflated, bluntly rounded posteriorly, distinctly longer than the first coxae of the last pair of legs by which it is flanked on either side,

*Legs*.—Thick short and somewhat nodular. The three coxae short and sub-equal. Femur longer than first tibia. Second tibia shorter than the first. Tarsus wedge shaped, propodus curved, longer than second tibia and about four times as long as the claw. All segments armed with short spines particularly the tarsus and propodus.

*Remarks*.—No species of *Pycnogonum* appear to have been described from Indian seas. Professor Bouvier's key<sup>1</sup> mentions only 16 species. He excludes *P. australe*, Grube 1869, as a larval form and fails to include *P. aurilineatum*, Flynn 1918<sup>2</sup>. Since then two new species, *P. platylophum*<sup>3</sup> and *P. rhinoceros*<sup>4</sup>, have been described by Loman. Of the 20 species, (including tentatively *P. australe*) so far described, only four have a reticulate skin while *P. aurilineatum* has a partially reticulate one. The new species *P. indicum* differs from the four previously described species with a reticulate skin in several important characters. It is distinguished from both *P. cataphractum*, Mobius, and *P. tumulosum*, Loman, chiefly by the absence of prominent and numerous tubercles on the legs, from *P. mucronatum* Loman, by its tapering proboscis, single median row of dorsal tubercles and rounded abdomen. From the brief account given by Bouvier of *P. madagascariensis*, the Indian species appears to resemble that species closely, but differs from it in having two tubercles on the first coxae of the last pair of legs and a much longer and posteriorly rounded abdomen and a pale yellow colour.

Measurements:—

	MM.
Length of trunk (from frontal margin of head to base of abdomen).	2.20
Length of abdomen ... ..	0.49
Greatest diameter of abdomen .. ..	0.27
Length of proboscis ... ..	1.62
Greatest diameter of proboscis ... ..	0.72
Width across first lateral processes ... ..	1.66
Length of cephalic segment ... ..	0.67
Third right leg:—	
1st coxa ... ..	0.31
2nd coxa ... ..	0.36
3rd coxa ... ..	0.36
Femur ... ..	0.99
First tibia ... ..	0.76
Second tibia ... ..	0.54
Tarsus ... ..	0.22
Propodus ... ..	1.12
Claw ... ..	0.22

<sup>1</sup> Ann. Sci. Nat. (Zool.) Paris., Ser., 10, Tome, 5, 1922, pp. 113-117.

<sup>2</sup> Pro. Roy. Soc. Tas. (1918), pp 91-95.

<sup>3</sup> Arkiv, Fer Zoologi Stockh Band 15 No 9, p. 10, fig E, 1922-23.

<sup>4</sup> Further, Zool. Results Swed Antarctic. Expd. Vol. 1, No. 2, 1923, pp. 7-9.

## LITERATURE.

- 1762 STROM. Physisk og oconomisk Baskrivelse over Forgderict Son and mor, beliggende I, Bergens Stift I, Norge Sorcø I, p. 209, pl. i. (*P. littorale*).
- 1869 GRUBE. Jahresber. Schles. Ges. vat. Cultur, p. 54 (*P. australe*).
- 1881 DOHRN. Fanna. W. Flora des Golfes Von Neapel. Mon., III (*P. nodulosum*, p. 203, Taf. XVI; *P. pusillum*, p. 207, Taf. XVI).
- 1891 SARS. Norwegian North Atlantic Expd. XX Pycnogonidea, p. 12 (*P. crassirostre*).
- 1892 ORTMANN. Zool. Tarb. Syst. 15, p. 167 (*P. littorale var. tenue*).
- „ IVES. Proc. Acad. Nat. Sci. Philadelphia, pp. 142-144 (*P. stearnsi*).
- 1898 HOEK. Tijds. Ned. Dierk. Ver. (2) Vol. V., p. 296 (*P. magellanicum*).
- 1902 MOBIUS. Die Pantopoden; Wiss. Ergebn. d. Deutschen Tiefsee. Exped. "Valdivia", III (6), pp. 194-195, pl. VII (*P. cataphractum* and *P. magnirostre*).
- 1904 LOMAN. Beit. Z. Fauna von. Sudafrika. Zool. Jahrb. Syst. 20, p. 378, Taf. 14 (*P. micropus*).
- 1908 LOMAN. Siboga. Expdn. Mon. XL (*P. tumulosum*, p. 35, Taf. XII; *P. mucronatum*, p. 35, Taf. XII; *P. occa*, p. 35, Taf. xii).
- 1910 BOUVIER, C. R. Acad. Sci. Paris, C.L.I., p. 30 (*P. gaini*).
- 1911 LOMAN. Japanische podosomata; Abh. Math. Phys. Kl.; K. Bayer. Akad. wiss. Munchen suppl. Bd. II. Abh. 4 (*P. ungelatum*).
- „ BOUVIER, C. R. Acad. Sci. Paris, 152, p. 494 (*P. madagascariensis*).
- 1918 FLYNN. Proc. Roy. Soc. Tasm., pp. 91-95 (*P. aurilineatum*).
- „ SCHIM KAWITSCH. Jour. Russe de Zoologie Tome III, pp. 239-248 (a monograph).
- 1922 LOMAN. Arkin. Fer. Zoologi, Band 15, No. 9, p. 10 (*P. platylophum*).
- „ BOUVIER. Ann. Sci. Nat. (Zool.) Paris, Series 10, Tome 5, pp. 113-117 (Key to the species).
- 1923 LOMAN. Further Zool. Results; Swed. Antarctic Exped. Vol. I. No. 2, pp. 7-9 (*P. rhinoceros*).

## THE ALPHEIDAE OF KRUSADAI ISLAND.

By F. H. GRAVELY, *D.Sc.*

When writing my general account of the Decapoda of Krusadai Island (1927) I had to confess my inability to identify the Alpheidae. Since then Dr. Pearson of the Columbo Museum has done this for me as regards four out of the five species collected. The fifth species he thinks may be new, but as time did not permit him to determine this with certainty it can only be referred to as *Alpheus* sp. at present. Of these species *Alpheus strenuus* is much the most abundant, and *Alpheus rapax*, represented in the collection by only two specimens, the rarest in the littoral area<sup>1</sup> where our collecting has been done. All fall into two genera which may be distinguished as follows:—

- |  |        |                     |
|--|--------|---------------------|
| Orbital spines in front of orbital arch always present, often equal to rostrum in length; peraeopods without epipodites; carpopodite of second pair subdivided into five parts, of which the first is at least equal in length to the sum of the three following; dactylopodite of last three pairs either bifid or trifid | ... .. | <i>Synalpheus</i> . |
| Orbital spines generally absent; peraeopods with epipodites; carpopodite of second pair subdivided into five parts of which the first is less than the sum of the three following; dactylopodite of last three pairs simple  | ... .. | <i>Alpheus</i> .    |

Two specimens of the Isopod parasite *Bopyrella thomsoni*, and one of *B. deformans* subsp. *indica* were found on these Alpheids (see Chopra, 1927, p. 119). The former were both on *Alpheus strenuus*, the latter was on *Synalpheus acanthitelsonis*.

Genus *Synalpheus*, Spence Bate.

*Synalpheus acanthitelsonis*, Coutière.

Pl. I, fig. 1, *a-b*.

*Synalpheus acanthitelsonis*, Coutière, 1906, pp. 875-6 pl. lxxii, fig. 13.

Krusadai Island (South Lagoon and its reef; Porites Bay); Pamban (in sponge) Rameswaram.

This small species is readily distinguishable from the others in the collection by the presence of a well-developed pair of orbital spines, one on each side of and nearly as long as the rostrum. The dorsal keel of the meropodite of both large and small chelae ends in a minute but distinct tooth or spine, so small that it is not always easy to see in a specimen with wet surface. The posterior border of the telson is often much more convex than it is shown in Coutière's figure.

The colour in life is somewhat variable. Usually it is of a smoky tint, but it may be purplish brown or there may be practically no colour at all.

<sup>1</sup> For definition of this area, see No. 1, p. 2 of this Krusadai Island volume.

Genus *Alpheus*, Fabricius.

The four species of this genus in the collection can readily be distinguished from *Synalpheus acanthitelsonis* by the absence or smaller size of the orbital spines and by the much larger size which specimens attain, and from each other by the form of the rostrum and chelae.

*Alpheus ventrosus*, Milne-Edwards.Pl. I, figs. 2 *a*-3 *b*.*Alpheus ventrosus*, Coutière, 1906, p. 882.*Alpheus ventrosus*, Pearson, 1911, pp. 176-8, pl. v, fig. 2.

Krusadai and Shingle Islands.

Three forms occur, all of which were identified by Dr. Pearson as belonging to this species. They are distinguished from the other four species by the presence of small orbital spines, one on each side of the much larger rostrum.

In the typical form the body is laterally compressed and the rostrum is somewhat flattened dorsally between the eyes, laterally compressed at apex. The hand is much flattened and has its margin entire. Even in spirit it often retains traces of the dark spots it bears in life when the general colour of the animal is orange-red with black back. This form is found among the branches of *Pocillopora damicornis*.

The two varieties have only been found on Krusadai Island, and in much small numbers. I have no record of the special associations of either of them, and only a brief note as to the colour of the second. In both the body lacks the lateral compression so characteristic of the typical form and the large chela is longer in proportion to its width. In the first variety the rostrum is convex above throughout, but not distinctly keeled, the basal part of the large chela is somewhat swollen, and in three out of the four specimens the posterior border of the penultimate segment of the exopodite of the uropods bears a very large stout conical spine, black in spirit. In the second variety, of which we have only two specimens, the rostrum and middle line of the front half of the carapace are sharply keeled, the hand is not swollen at the base, and the uropods have no strong black spine. Conspicuous longitudinal stripes were present in life.

*Alpheus* sp.Pl. I, fig. 4, *a*-*b*.

Krusadai Island.

The most distinctive character of this species is its dorsally flattened rostrum, which is T-shaped in section almost throughout. The vertical plate is united on either side below with a small laterally compressed orbital process, but there is no free orbital spine. Both hands are much elongated, more or less cylindrical. The larger of the two has a distinct marginal notch a little below the base of the movable finger. In life the body is longitudinally mottled with white and greenish brown, the arm banded and hands broadly marked with pale blue.

*Alpheus rapax*, Spence-Bate.Pl. I, fig. 5, *a-b*.*Alpheus rapax*, Pearson, 1911, pp. 181-2, pl. vi., fig. 4.

Krusadai Island.

The rostrum is very narrow, forming a low keel between the eyes. There is no trace of orbital spines. The hands are very large, parallel sided, with flattened margin, the larger one with a well-marked notch a little below the base of the broad flat movable finger. The fingers of the other hand are curved, slender and hairy along the whole length of their inner margins.

*Alpheus strenuus*, Dana.Pl. I, fig. 6, *a-b*.*Alpheus strenuus*, Coutière, 1906, pp. 913-4, pl. lxxxvii, fig. 53.*Alpheus strenuus*, Pearson, 1911, pp. 185-6, pl. vii, fig. 6.

Krusadai and Shingle Islands; Pamban; Rameswaram. The rostrum is somewhat broader and more rounded above than in the preceding species, which it resembles in having no trace of orbital spines. The hands and their fingers are more hairy and much stouter and less angular in section, and the larger of the two is notched below both fingers. The colour of the living animal is greenish brown, often either mottled or striped more or less distinctly with white. When stripes are present they are usually longitudinal, but may be transverse.

## LITERATURE.

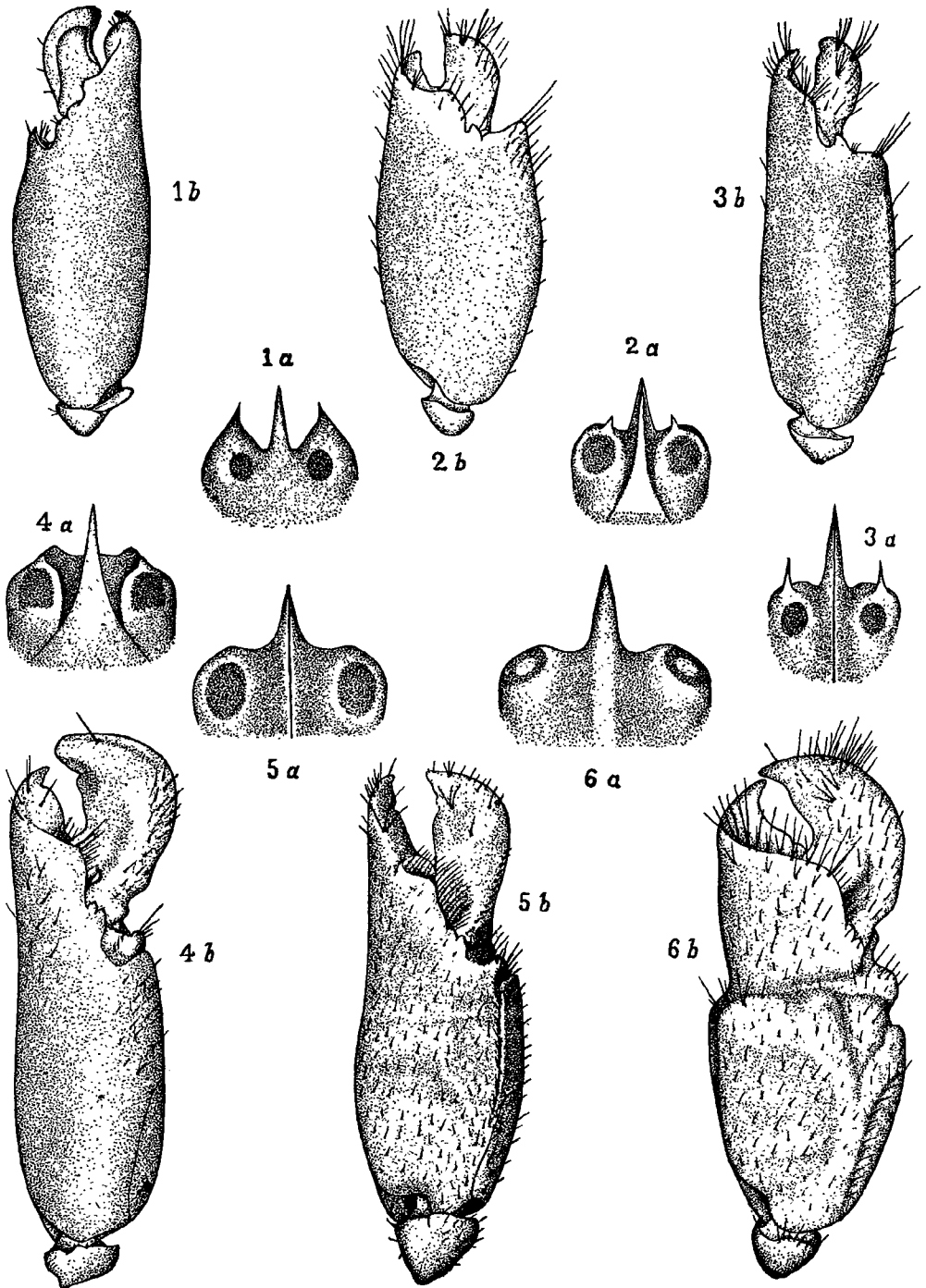
1899. COUTIÈRE, H. "Les Alpheidæ, Morphologie Externe et Interne, Formes Larvaires, Bionomie." *Ann. Sci. Nat. Zool.* (8) IX, 1899, pp. 1-559, pl. i-vi.
1905. PEARSON, J. "On the Macrura." Herdman's *Rep. Ceylon Pearl Oyster Fisheries* IV, (London, 1905) pp. 65-92, 2 pl. (*Alpheidæ*, pp. 82-88, pl. ii, figs. 9-10).
1906. COUTIÈRE, H. "Les Alpheidæ." Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes* II (Cambridge, 1906), pp. 852-921, pl. lxx-lxxxvii, figs. 127-139.
1911. PEARSON, J. "Ceylon Crustacea, Pt. I—Notes on the Alpheidæ." *Spolia Zeylanica* VII, pp. 169-186, pl. v-vii.
1927. CHOPRA, B. "Bopyrid Isopods of the Littoral Fauna of Krusadai Island." *Bull. Madras Govt. Mus.* (N.S.) Nat. Hist. I (1), pp. 119-122, 2 text figs.
- GRAVELY, F. H. "Decapoda (except Paguridea) and Stomatopoda of the Littoral Fauna of Krusadai Island." *Bull. Madras Govt. Mus.* (N.S.) Nat. Hist. I (1), pp. 135-155, pl. xix-xxvi (*Alpheidæ*, p. 136).



PLATE I.

- FIG. 1.—*Synalpheus acanthitelsonis*.  
,, 2.—*Alpheus ventrosus*, typical form.  
,, 3.— *Do.* var. 2.  
,, 4.—*Alpheus sp.*  
,, 5.—*Alpheus rapax*.  
,, 6.—*Alpheus strenuus*.

(a) Rostrum and ocular region of head  
(b) Large chela from above.



KRUSADAI ALPHEIDAE.

THREE SPECIES OF ALCYONARIA FROM THE  
GULF OF MANAAR

BY

SYDNEY J. HICKSON, F.R.S.

*(with three text figures)*

*(Published—April 1931)*

# Three Species of Alcyonaria from the Gulf of Manaar.

By SYDNEY J. HICKSON, F.R.S.

*With three text figures.*

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This small collection of Alcyonaria from the Gulf of Manaar raises some points of considerable interest. The specimens of the genus *Xenia* are much smaller than most of the species that have been described and show characters which would be quite consistent with the view that they are young stages in the growth of a larger species. A much larger number of specimens collected at different times of the year might throw light upon this point but at present our knowledge of the growth stages of all these Alcyonaria is so meagre that a provisional specific name must be given to these small specimens. The specimens of *Clavularia* in the collection show such a bewildering variation of spiculation that the value of the spicules as a specific character is very greatly reduced. In this case field observations on the relation of locality to spiculation can alone determine whether we have to deal here with one species with very variable spicules or several closely related species.

## Genus *Clavularia*.

The position of the genus *Clavularia* has been fully discussed in a recent paper (Hickson 1930) and its principal characters may be briefly summarised as follows:—

Stolonifera with (1) either reticulate or membranous thin stolons; (2) each polyp consisting of a thin-walled anthocodia capable of retraction into a thick-walled anthostele; (3) dorsal mesenteric filaments long and sterile; ventral, ventro-lateral and dorso-lateral filaments present, bearing the gonads if present; (4) spicules present or absent, when present very variable in size and shape but never fused to form rigid calcareous walls; (5) the surface ectoderm may form a cuticle but this cuticle never extends so far forward as to form a theca into which the polyp can be retracted.

Characters (2) and (3) distinguish the genus from *Xenia*, character (2) from *Stereosoma*, character (4) from *Sarcodictyon* and character (5) from *Cornularia*.

As Thomson and Henderson (1906, p. 399) have remarked "the problem of species in this genus is very difficult." There is great variation in most of the characters and "even in one colony there is sometimes considerable diversity." Spicules may be present or absent even in specimens, otherwise alike, from the same locality (*e.g.*, *C. australiensis*). The pinnules are usually in a single row on each side of the tentacles but in *C. flava* and *C. gracilis* there may be one or more rows of pinnules on each side. The number of pinnules in each row seems to be constant in full grown polyps but it is often difficult to determine whether a polyp is full grown or not.

Bearing this wide range of variability in mind, the problem which Dr. Gravelly asked me to solve when he sent me these specimens from the Gulf of Manaar to identify, has proved to be one of exceptional difficulty.

The only species of *Clavularia* hitherto described from the Gulf of Manaar is *C. margaritiferae*. (Th. and H. 1905, p. 273.) In the type of this species the body wall of the polyp has thickly crowded spicules of minute size, 0.06–0.07 mm. in length, and most of these spicules are substantial rods bearing blunt wart-like tubercles and there are numerous spicules in the tentacles. In another specimen from Zanzibar attributed to the same species the spicules of the body wall are described as "capstan-like" (double clubs or double wheels) 0.04–0.07 mm. in length and there are no spicules in the tentacles. If it can be admitted that specimens showing such a difference in spiculation belong to the same species I can see no reason why the specimens from the Gulf of Manaar sent to me by Dr. Gravely should not also be regarded as varieties of the *C. margaritiferae*.

If, on the other hand, great stress should be laid upon the spiculation in the determination of species then it must be decided that there are at least three species of *Clavularia* living under almost identical conditions in the Gulf of Manaar. My own opinion is that the spiculation of the Stolonifera is so variable that it cannot be relied upon as a character for specific determination; but the problem of species in this case is really insoluble until a search has been made in the Gulf for intermediate forms and more information is obtained about such characters as colour, growth and the time of spawning.

The specimens described below agree fairly well with the type of *C. margaritiferae* in the superficial character of the stolon and polyps. They differ from it but agree with the Zanzibar specimen of the species in the absence of spicules from the tentacles.

In the Shingle island specimens the spicules are rods with rough tubercles but no "capstans". In the Krusadai specimens there are no spicules in the polyps or stolon.

Dr. Gravely (1927) referred the specimens to the species *Clavularia crassa* of Marion and Kowalewsky. They have undoubtedly many points of resemblance with the description of the species from the coast of Algeria and it is quite possible that in the future Dr. Gravely's identification may prove to be correct; at present, however, there does not seem to be sufficient reason for merging *C. margaritiferae* with *C. crassa* and it is certainly more convenient to keep them distinct.

### *Clavularia margaritiferae*, Th. and H.

Text Fig. 1.

*Clavularia margaritiferae*, Thompson, J. A. and Henderson, W. D., 1905, p. 273, pl. iii, fig. 8.

*Clavularia crassa*, Gravely, 1927, pl. v, fig. 1.

This species appears to be very variable. In the small collection sent to me by Dr. Gravely there are two varieties which I shall name "*shinglei*" and "*krusadai*" respectively from the localities in which they were found. In calling them "varieties" however, I think it is possible that they may prove to be only growth stages or varieties due to purely local conditions.

Variety *shinglei*. There are two tubes of this variety. In one tube the colony is on a stone 38 × 18 mm. in area and was collected between April 25th and May 8th, 1924 and in the other a smaller colony on a stone 28 × 18 mm. in area collected in September 1925.

The colony on the larger stone collected in the spring has larger polyps than the colony collected in the autumn. This difference may be seasonal or it may have no significance. The evidence on this point derived from the examination of two small colonies is quite insufficient.

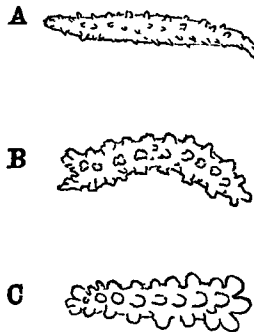
In the larger specimen collected in April the stolon consists of narrow strands 0.3-0.4 mm. in diameter and the polyps are situated singly on the strands at short but very variable distances apart.

The larger number of polyps consist of a thick-walled cylindrical anthostele, 5 mm. in length and a thin-walled anthocodia, 2 mm. or more in length. Gravely (1927 p. 1) says that the polyps "which are scarcely a centimetre high when expanded, faintly tinted with orange pink and to a large extent transparent, are somewhat inconspicuous." The tentacles, in a preparation, are 3 mm. in length and have twelve pinnules on each side. The pinnules are not quite contiguous at the base.

There are no spicules in the tentacles nor in the anthocodiae but the anthosteles are crowded with spicules.

These spicules are of very variable shape and arrangement. They seem to have grown in such a manner as to fill up all the available space in the mesogloea.

The ground form seems to be a rod, slightly swollen in the middle, or a narrow spindle with numerous small, blunt and quite irregularly scattered tubercles. The tubercles are considerably thicker in the lower than in the upper part of the anthostele. (Text fig. I.) The largest of these spicules are 0.3 × 0.06 mm. but the average size of the big spicules is about 0.25 × 0.5 mm.



Text Fig. I.

Spicules of *Clavularia margaritiferae* var. *shinglei*. A, a spicule of the upper part of anthostele; B, of the lower part of the anthostele; C, of the base of the anthostele. × 20 diams.

Some of them are bent or curved, some are branched at one end, there are many variations in the bluntness of one or both ends and there are a few spicules of very irregular shapes.

It is very difficult to separate large pieces of the stolon for the examination of the spicules, but in this region the outlines of the spicules seem to be even more irregular and the tubercles more elongated and elaborate. In some places they form a thick spicular network the ends of the tubercles being in contact. It may be that the tubercles of adjacent spicules are fused together as in *Sarcodictyon* but the evidence on that point is not conclusive.

In the smaller specimen collected in September the polyps are much smaller, the largest I could find being only 3 mm. in total length and of this less than one millimetre is anthostele and bears spicules. The anthocodiae and tentacles are evidently more contracted than in the larger specimen but there seem to be twelve short pinnules on each side of the tentacles.

The spicules present the same characters as those of the larger specimen.

Variety *krusadai*. These specimens are attached to larger stones, the largest having an area of about  $70 \times 30$  mm.

The greater part of the stolon is covered with sponge and other incrustations and is consequently difficult to trace, but where visible it has the characteristic features of a network of ribbons each about 0.2 mm. in width. The polyps are very small, the largest being less than 3 mm. in total height. Many of the polyps are contracted into wart-like verrucae, but the difference between the anthocodia and anthostele in the expanded polyps is not nearly so pronounced as in the variety *shinglei*.

The striking feature about the variety *krusadai* is that, neither in the polyps nor in the stolon, could I find any spicules. I have examined samples from several parts of the colony and all gave negative results. But I think it is quite possible that other specimens from *Krusadai* may possess spicules or even that I have overlooked parts of these colonies in which spicules may be present. The specimens are, however, of great interest because they lend support to the view that in this genus the absence of spicules, without other important characters to support it, should not be regarded as a sufficient reason for the constitution of a new species.

If it is correct to consider that they belong to the same species, three varieties of *C. margaritiferae* have been described from the Gulf of Manaar, one (*krusadai*) with no spicules, one by Thomson and Henderson from the Pearl banks, with spicules 0.06–0.07 mm. in length, and a third (*shinglei*) with spicules 0.25–0.3 mm. in length. It is possible that further investigations would reveal other varieties with intermediate characters of spiculation.

### *Xenia nana*, n. sp.

Text Fig. 2.

*Anthelia* sp?, Gravely, 1927, p. 25.

Locality. *Krusadai* island.

The specimens described by Gravely (1927, p. 2, Pl. V, fig. 2) as *Anthelia*? are undoubtedly of the same species as those described below. There are very good reasons

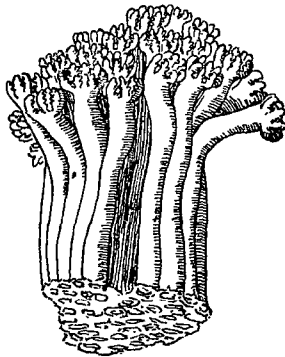
for bringing to an end the confusion in our literature which has arisen from the retention of the genus *Anthelia* (Hickson 1930) and these specimens must be included in the genus *Xenia* on the following grounds:—

The polyps are not retractile; the tentacles may be slightly bent over the oral disc but are not withdrawn, nor is the upper part of the body wall of the polyps retracted into a lower part. The spicules are minute flattened discs. Groups of polyps arising from the stolon are united to form syndetes (text fig. 2); and lastly, although Gravelly gives no statement on this point, the ventral and lateral mesenteric filaments are absent, only the two dorsal filaments persisting.

Two tubes were sent to me by Dr. Gravelly, one containing two specimens collected in April and May 1924 and the other one specimen collected in September 1925.

The specimens in the two tubes are not alike in appearance and if taken from different localities might have been mistaken for distinct species. They are, however, in my opinion only growth stages of the same species.

The specimens collected in April and May may, for the sake of convenience, be called specimen X and the specimen collected in September specimen Y; and it may be assumed that the former are younger stages than the latter.



Text Fig. 2.

A part of a colony of *Xenia nana*, n. sp. Specimen Y  $\times 5$  diam.

In X, there is a thin stolon spreading over stones about  $30 \times 30$  mm. in size. On this membrane are situated a number of small polyps singly or in clusters, but in both specimens considerable areas of the stolon are free from polyps. In most places the individual polyps of a cluster appear to arise independently from the basal membrane, but in some they are found to be united at the base to form short syndetes.

In these two specimens we find every intermediate condition between the *Clavularia* and the Alcyoniid form of colony. Apart from the consideration of other anatomical features, one of the specimens might have been regarded as a Stolonifer and the other as a *Xenia*.



Specimen Y collected in September is, however, unquestionably a *Xenia*. The basal membrane is almost entirely hidden by close set syndetes of larger polyps 6-8 mm. in height and in each of these syndetes there may be three or four times the number of polyps that are found in the syndetes of specimen X. (Text-fig. 2.)

Gravely (1927, p. 2) has already observed this difference between specimens of this species, and remarks: "In spite of this difference, which may well have been due to the different conditions under which they lived, the two colonies probably, I think, belong to the same species." He may be right in his opinion of the cause of the difference but I think it is more likely to be due to a difference in age. This matter can only be settled by much more extensive field observations.

Further details of the structure of specimen Y may now be given.

The larger polyps have a total length of 6-8 mm. In a polyp 6 mm. in length the lower part 4.5 mm. in length is fused with its neighbours to form a syndete, the remaining 1.5 mm. is free. The free part, which may be called the anthocodia, is not retractile. There may be some muscular contraction causing a shrinkage in length but it cannot be withdrawn into the syndete nor can the tentacles be withdrawn into the shelter of the upper part of the body of the polyps. The eight tentacles, probably somewhat shrunk in length, are about 0.6 mm. long. They have usually eight pinnules on each side, each about 0.15 mm. long and knobbed at the extremity, and there is a broad space free from pinnules between each row. This last character is of importance because very few species have been described which have only a single row of pinnules on each side.

The stomodaeum is 1.2 mm. in length. As in other species of the genus, therefore, it is "long" as compared with the size of the polyp. The two dorsal mesenteric filaments are present, the other six absent.

A number of ova 0.3 mm. in diameter were found in some of the polyps.

Very small spicules of various forms occur in the lower part of the syndetes and the basal membrane. They are mostly oval in shape, 0.05 x 0.025 mm. in size but there are some smaller hour-glass shaped, some twins and some quadruplets.

On first examination, I failed to find any spicules in the anthocodiae or tentacles but with a higher power I found minute calcareous bodies in some cases in the tentacles.

The absence of spicules in the tentacles seemed to be inconsistent with Gravely's statement (p. 2): "They were of a dark purplish brown colour, the back of each tentacle contrasting with the rest as a creamy white stripe on account of the densely packed minute spicules which there form a superficial protective layer."

An examination of the younger polyps in specimen X, however, showed a stripe of spicules in the tentacles corresponding to the description given by Gravely. These spicules were on an average about 0.02 mm. in length and did not differ materially from the spicules in other parts of the colony either in shape or size. I conclude that the stripe of spicules at the back of the tentacles is a character of the species but may be lost either in the large specimens, or in the preservation of the larger specimens.

Specimen X shows no differences from specimen Y except such as may be accounted for by a difference in age. The polyps are decidedly smaller and some of them are minute buds on the stolon. In the larger ones there is a long stomodaeum and the two dorsal mesenteric filaments only. Only five pinnules can be counted on each side of the tentacles. The spicules in the stolon and lower part of the syndetes are of the same size and shape as in specimen Y.

Thomson and Henderson (1905, p. 273) found two species of *Xenia* in the collection from the pearl banks in the Gulf of Manaar, *X. ternatana* and *X. umbellata*. *Xenia nana* differs in many respects from both these species; but as the specimens I have described are very much smaller than the specimens of *X. ternatana* and *X. umbellata* described by other authors, it is possible that the later stages of growth of our new species may approximate more closely to *X. ternatana* of Schenk (1896). At present we have no means of determining when the colonies of these Alcyonarians reach their full development in size. The presence of gonads is no test that they are full grown.

### *Cornularia cornucopiae*, Pallas.

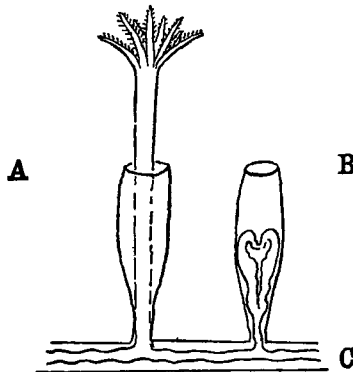
Text Fig. 3.

*Cornularia cornucopiae*, von Koch, 1891, p. 655.

Locality, Krusadai island, Gulf of Manaar 20-21. V. 1928.

This specimen is creeping over the very irregular surface of a piece of coral limestone about 75 mm. × 40 mm. in size.

There is no complete account of the type of this species which occurs in the Mediterranean, but the specimen agrees so closely with the description by von Koch that there seems to be no reason for regarding it as the type of a new species.



Text Fig. 3.

Diagram of two polyps of *Cornularia cornucopiae*. A, fully expanded. B, contracted. C, the single endoderm canal in the stolon. × 10 diam.

The polyps are situated irregularly on a network of delicate strands constituting the stolon. This stolon is in many places covered with thin layers of sponges and other organisms but no examples can be seen of the fusion of the strands to form membranes.

The whole of the stolon and the body wall of the polyps are protected by a perisarc. (Text fig. 3.)

In nearly all cases the anthocodiae of the polyps are tightly withdrawn into the shelter of the perisarc tubes and it is impossible to determine even approximately the total length of the polyps when fully expanded. A young polyp in my preparation which seems to be fully expanded is 4 mm. in length. The older polyps when extended may be three or four times that length.

For comparison with other specimens a more reliable measurement is that of the length of the perisarc tube protecting the polyps.

In the larger polyps this tube is 3-4 mm. in length. In the type specimen it is, according to von Koch's text figure, not more than 2 mm. In Light's *C. minuta* it is only 1-1.5 mm. in length.

These measurements are given because the specimens from Krusadai give the impression that the polyps are decidedly larger than those of the Mediterranean forms.

The form of the perisarc tube is that of an inverted cone. At the distal end it may be 0.75 mm. in diameter and at the proximal end where it is attached to the stolon only 0.2 mm. in diameter.

In this respect it closely resembles the cone of the Mediterranean form but differs very markedly from *C. minuta* in which it has a broad base and is said to be "beehive-like." (Light 1915.)

The tentacles of the polyps are provided with about ten close-set pinnules on each side; they are all somewhat contracted, the longest that was measured is 0.6 mm. in length.

The stomodaeum seems to be long, the only one measured being 0.7 mm. in length. Six ventral and lateral mesenteric filaments and two straight dorsal mesenteric filaments are present.

In one polyp a number of ova up to 0.05 mm. in diameter can be seen.

There are no spicules in any part of the colony.

In the parts of the stolon I have been able to study there is only one large endodermal canal traversing the strands and connecting the body cavities of the polyps. (Text fig. 3.) If time and material were available for such an investigation, the laborious work of cleaning from sponges and other growths a much larger number of strands might reveal two or more canals in some parts of the stolon; but in my opinion it would be more likely to show that this endodermal canal is undivided throughout the colony.

As Light (1915, p. 205) has pointed out there was only one well-known species of the genus *Cornularia* namely *C. cornucopiae* of the Mediterranean sea at the time when he described his new species *C. minuta* from the Philippine islands. Busk's *C. australis* may

be a good species but the other species attributed to the genus are not now regarded as species of *Cornularia*.

There can be no doubt that the specimens described above are quite distinct from *Cornularia minuta*. They differ from it in size, in the shape of the perisarcal tubes protecting the polyps and in the structure of the strands of the stolon, which enclose one endodermal canal instead of two or three. I do not consider that any difference in the character of the polyps of the two species can be determined. In *C. minuta* the number of pinnules on each side of the tentacles is eight on an average if we may judge from the drawing in Light's fig. 4, and "they are short, thick, cylindrical and crowded on the tentacles." In the Krusadai specimens they are usually 10 in number on each side and decidedly longer and more pointed than in *C. minuta*. In Cavolini's figure (1813, Plate IX, figs. 11, 12) of "*Tubularia*" *cornucopiae* the pinnules are also ten in number, still more pointed and separated at the base by short spaces. These differences may be due to the condition of contraction in which the specimens were fixed and are not reliable.

There are no characters I have discovered which would justify a separation of our specimens from the type species *C. cornucopiae*. They resemble the type in the long conical perisarcal tubes of the polyps into which the anthocodiae can be completely retracted. Cavolini remarked that the body can be so tightly withdrawn that it leaves the upper part of the tube empty. In a cone of one of our Krusadai specimens 3 mm. in length, in which the polyp is tightly withdrawn, it is empty for a distance of 0.9 mm. from the tip of the tentacles.

#### LITERATURE.

- 1813 CAVOLINI, P. Abh. Ü. Pflanzenthiere des Mittelmeers. (Nurnberg, 1813.) The original description of *Cornularia cornucopiae* was published in 1785 but reprinted in the reference given above.
- 1927 GRAVELY, F. H. The littoral fauna of Krusadai island. *Alcyonaria. Bull. Madras Govt. Mus. N.S., Vol. I, No. 1.*
- 1930 HICKSON, S. J. On the classification of the Alcyonaria. *Proc. Zool. Soc., London, 1930. Pt. I.*
- 1891 KOCH, VON. *Mitth. a.d. Zool. Stat. Neapel IX, p. 655.*
- 1915 LIGHT, S. F. Notes on Philippine Alcyonaria, Pt. V. *Philipp. Journ. Sci., X. No. 3, p. 203.*
- 1896 SCHENK, A. Clavulariiden, Xeniiiden u. Alcyoniiden von Ternate. *Abh. der Senckenberg. Gesellsch. XXIII Hft I, p. 41.*
- 1905 THOMSON, J. A. and HENDERSON, W. D. Report on the Alcyonaria. *Ceylon Pearl Fisheries. Supplementary Report XX, p. 269.*
- 1906 THOMSON, J. A. and HENDERSON, W. D. Marine Fauna of Zanzibar. *Alcyonaria. Proc. Zool. Soc., London, 1906, Vol. I, p. 393.*