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ON *URNATELLA INDICA* SESHAIYA,
A FRESHWATER ENTOPROCTAN FROM SOUTH INDIA.

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INTRODUCTION.

The Entoprocta (Calyssozoa or Kamptozoa, as they are now called) are almost entirely marine. Two genera, *Loxosomatoides* Annandale (1908) and *Chitaspis* Annandale (1916) occur in brackish water. The only representative in freshwater, described so far, is *Urnatella gracilis* Leidy (1845), which is known only from the Schuylkill River, Pennsylvania, North America.

In 1944, I reported in the *Current Science* (10) the occurrence of a freshwater Entoproctan in Annamalainagar, South India. But I was not able at that time to define its systematic position, although I pointed out its resemblance to *Urnatella gracilis*. Subsequent examination of a large number of specimens, entire as well as in sections, led me to the conclusion that the freshwater Entoproctan from South India is a new species of *Urnatella*, for which I proposed the name *Urnatella indica* in a paper (11) submitted to the Indian Science Congress in 1946.

Genus *Urnatella* Leidy.

The genus *Urnatella* was constituted by Leidy (7) who gave the generic diagnosis as follows :—"Coenecium consists of a series of segments up to eighteen in number and forming free, semi-erect, curved stems attached only by the base of the lowest segment. Segments except the last three are urniform, the ante-penultimate and penultimate oblong, with simple or compound branches of the same form; the last segment or active polyp is companulate and supplied with cylindrical ciliated arms, arranged in a circle round the mouth" Leidy (8) also found that several stems arise from a common disc of attachment to the substratum. The tentacles vary from twelve to sixteen in number, but are usually fourteen.

A general description of *Urnatella gracilis* was published by Leidy (9) in 1884. Later, Davenport (5) investigated the species in detail and published a complete account of its structure and asexual mode of reproduction. Annandale (2, 3) in his account of the fauna of the Chilka lake and of the Talé Sap on the Gulf of Siam defined the limits and characteristics of the family Urnatellidae and commented on the genus *Urnatella*. More recently Cori (4) in his exhaustive account of the Kamptozoa defined the genus and its taxonomic position in the phylum.

In the light of the descriptions given by the authors mentioned above, the distinctive features of *Urnatella* may be summarised as

follows :—*Urnatella* is intermediate between *Pedicellina* Sars 1835 and *Loxosoma* Keferstein 1863 in the mode of attachment to the substratum. One or more, single or branched stalks arise from a basal disc. The stalks are segmented and each segment has a thick cuticle, and presents a 'heavily chitinated' appearance. The segments of the stalk, when old, present a beaded appearance, with alternate whitish and dark brown rings, due to the variation in the thickness of the cuticle in the segmental and intersegmental zones. The old or basal segments are usually uniform in appearance. *Urnatella* is unique among the Entoprocta in the storage of 'food-material' in the segments of the stalk in the form of refractile bodies resembling yolk spherules, by virtue of which the segments of the stalk are capable of functioning as resting buds. Another feature which distinguishes *Urnatella* from other Entoproctan genera is the opening of the nephridium, rectum, and genital duct into a cloaca instead of opening directly into the vestibule.

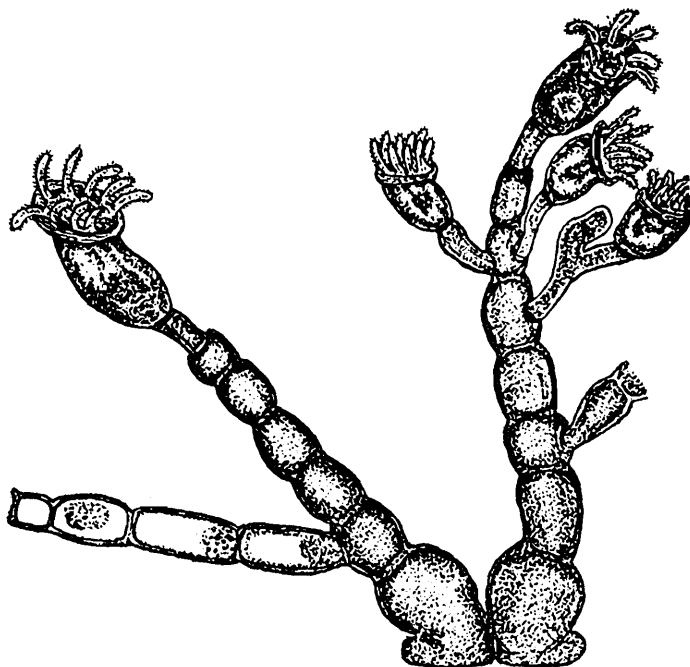
A reference to my earlier note (10) and to text-figs. 1 and 2a will show that the freshwater Entoproctan from South India has all the characteristics of *Urnatella* mentioned above. The beaded appearance of the segments of the stalk and the urniform shape of the lower segments, as well as the heavily thickened cuticle, can be made out in text fig. 1. The opening of the nephridium, rectum, and genital duct into the cloaca can be seen in fig. 2a, and the presence of refractile yolk-like spherules, in fig. 3a. A comparison of text-fig. 1. with the illustration of *Urnatella gracilis* given by Cori (4) will further corroborate the identification of the South Indian freshwater Entoproctan as an *Urnatella*.

The distinctive features of *Urnatella gracilis*, in comparison with the South Indian species may be stated as follows :—The stalks arise either singly from a basal plate, or in clusters of two or more from a common disc of attachment. The segments of the stem may be as many as eighteen in number. The tentacles of the polyp are usually fourteen, but may vary from twelve to sixteen in number. The colonies grow up to 5 mm., in height. As will be explained below, the South Indian species differs from the North American species in respect of all these features.

***Urnatella indica* Seshaiya.**

The specimens of this species were all collected from the living shells of Molluscs like *Paludomus*, *Potomida* (= *Parreysia*), and particularly *Lamellidens*. In the case of *Lamellidens*, encrusting the posterior region of the shell valves, and in the neighbourhood of the inhalent and exhalent siphons, there is a very interesting association of epizoic organisms including species of Algae, Ciliophora, Suctoriz, Rotifera, and Oligochaeta, besides dense colonies of *Urnatella indica*. From their position of vantage on the shells, in the neighbourhood of the siphons, the colonies of *Urnatella* continually divert into their vestibules, by ciliary action,

an abundance of food particles from the water currents in the siphons of the bivalve. *Urnatella indica*, like *Loxosoma*, is a commensal.

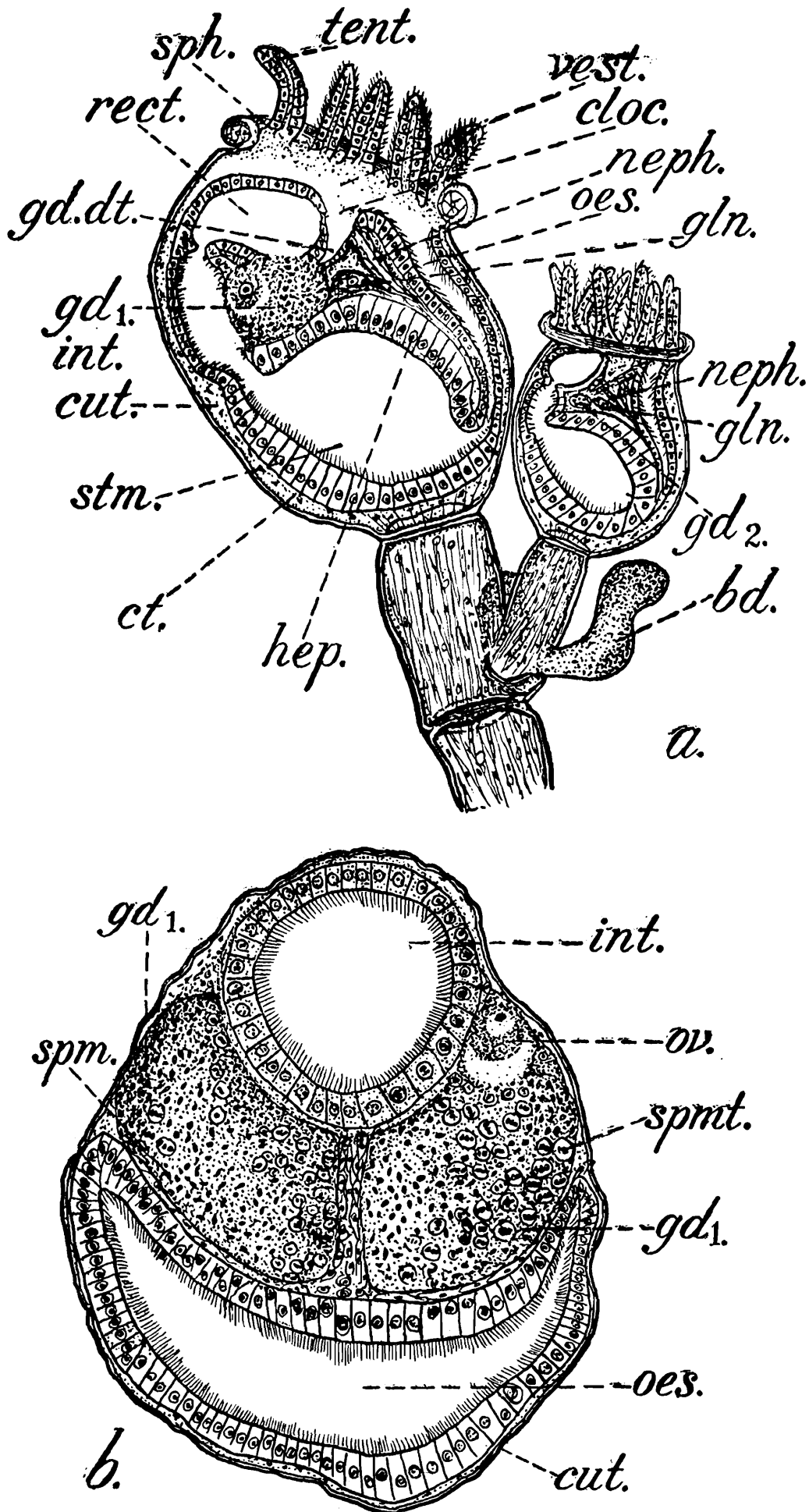


TEXT-FIG. 1.—Two colonies of *Urnatella indica* sketched from life. (Reproduced from *Current Science*.)

In the laboratory, I was able to grow the colonies on glass slides and in watch glasses placed in troughs containing pond water. For successful culturing, it was found necessary to renew the water in the troughs once or twice a day, not only to ensure a constant supply of food-particles but also to maintain the optimum pH of the water. The susceptibility of the colonies to the alterations in the pH of the surrounding water is very striking. If the colonies are placed in tap-water of the laboratory, having a pH value of 7.89, the polyps are shed within a few hours, although the food supply is kept adequate. If such headless stalks are transferred to pond water with a pH value of 8.3 new heads grow on the 'old shoulders' in two or three days.

The colonies of *Urnatella indica* are shorter than those of the North American species, being usually about 1 mm. and never more than 2 mm. in height. The exceptionally tall colonies of about 2 mm., which I came across, were very few, and all instances of luxuriant growth resulting from the regeneration of old 'headless' stalks.

The stalks arise either singly, or in groups of two or more. Instances of three or four stalks occurring together are quite common. In these cases, the basal disc is not a simple, uniform structure, but is always distinctly segmented and stolon-like, with as many segments as there are stalks, each segment giving rise to one stalk only. The segments of the stolon, which are usually two or three in number, are oblong in outline, and separated from each other by transverse dissepiments. The segments enclose yolk-like spherules and amoeboid cells, by virtue of which the basal plate, like the stalk, can function as a

TEXT-FIG. 2.—*Urnatella indica* Seshaiyah.

a.—Two polyps with buds seen in median optical section (slightly diagrammatic); b. Transverse section of a mature polyp through the region of the gonads.

bd. bud; cloc. cloaca; ct. connective tissue (parenchyma); cut. cuticle; gd. 1. ripe gonad; gd. 2. immature gonad; gd.dt. genital duct; gln. ganglion; hep. hepatic cells of stomach; int. intestine; neph. nephridium; oes. oesophagus; ov. ovary; rect. rectum; sph. sphincter; spm. sperms; spmt. developing sperms; stm. stomach; tent. tentacle; vest. vestibule.

resting bud, and sprouts into new stalks under favourable conditions. The distinctive features of the basal plate of *Urnatella indica* can be seen in text-figs, 3a and 3b.

In *Pedicellina* a creeping stolon is present, which continually produces new buds, and becomes segmented by the formation of dissepiments. In *Urnatella gracilis*, there is no such stolon, two or more stalks arising from a common base which is unsegmented, as described and illustrated in the accounts of Leidy (9), Davenport (5), and Cori (4).

In this connection it will be of interest to allude to the comments of Davenport (5) on the homology of the basal disc of *Urnatella gracilis*. The young stalks of the animal arise from the basal disc of the parent stalks, which, as Leidy (9) pointed out 'habitually become free for founding new stalks'. The young stalk, may be regarded on this account as having a stolon. The presence of this 'stolon' in the young stalk is regarded by Davenport (5) as an indication that *Urnatella* is derived from an ancestral condition possessing a stolon in the adult. According to Davenport (5) the 'stolon' of the young stalk of *Urnatella gracilis* is homologous with the stolon of the adult *Pedicellina*. In this connection he remarks ; " If, however, the stolon of the young *Urnatella* stalk is homologous with that of *Pedicellina*, we ought to find it sometimes at least giving rise to more individuals than two, and perhaps becoming segmented " He found both these conditions occasionally fulfilled. He came across three instances of the 'stolon' of young *Urnatella gracilis* giving rise to three stalks, and *only one* instance in which the young 'stolon' showed three segments with two dissepiments.

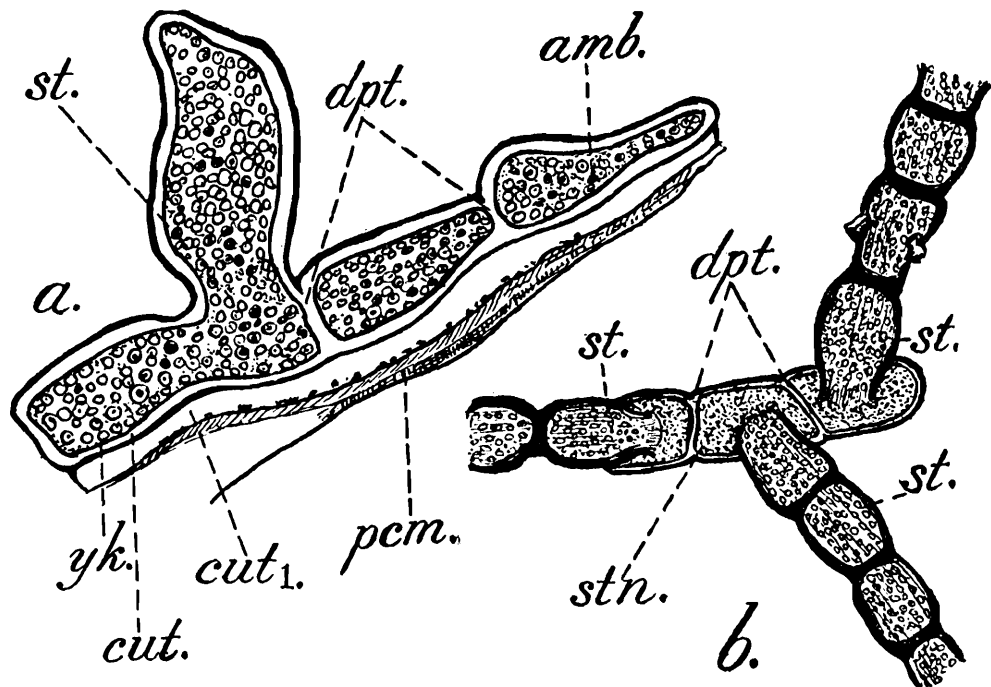
In the light of the above remarks, the presence of a distinctly segmented stolon in the adult *Urnatella indica* is interesting. The basal plate of this species is less specialised than that of the North American species, and intermediate between it and *Pedicellina*.

The stalks of *Urnatella indica* have the appearance characteristic of the genus. They do not have more than seven segments as a rule. Rarely, when old 'headless' segments regenerate and grow luxuriantly, the segments, including the old ones, may be eight or nine ; but this is found only in very exceptional cases. If we may judge from the illustrations of *Urnatella gracilis*, the segments of *Urnatella indica* are of stouter build.

The tentacles in the South Indian species vary in number from nine to eleven. The variation seems to be seasonal, for in the specimens which I examined during January, February and March, the tentacles were never more than nine, but in those examined later in the year, during August and September, they were very often ten or eleven. It is interesting to note that during the latter months the polyps showed also a considerable increase in the size of the gonads.

In text-figs 2a and 2b the well developed gonads are represented. None of the illustrations of *Urnatella gracilis*, given by Leidy (8), Davenport (5), or Cori (4) give any indication of the gonads attaining such large size as in *Urnatella indica*, where they occupy all the available space between the oesophagus and intestine. Davenport (5) found all

the mature specimens collected by him to be males, and failed to discover any trace of the ovary. He therefore concluded that the re-



TEXT-FIG. 3.—*Urnatella indica*.

a.—A sagittal section through the stolon of a specimen which was adherent to the periostracum of the shell of *Lamellidens*.

b.—A three-jointed stolon of *U. indica* with a stalk arising from each of the joints. (Sketched from a specimen mounted in Canada balsam. The stalks are represented as pressed down.)

amb. amoeboid cells; cut. cuticle; cut. 2 lower layer of the stolon which adheres to the substratum; dpt. dissepiment; pcm. periostracum of the shell of *Lamellidens* to which *Urnatella* was attached; st. stalk; stn. stolon; yk. yolk spherules".

production of *Urnatella gracilis* is entirely by budding and by regeneration of the stalks. Cori (4) is of the opinion that the freshwater habitat and intensive vegetative reproduction have resulted in the suppression of the ovary in the species. In *Urnatella indica*, however, a well-developed ovum is occasionally seen in the gonads besides developing sperms (text-fig. 2b). The South Indian species is therefore definitely hermaphrodite. But I have not been able so far to determine whether sexual reproduction occurs, though the large size of the gonads during certain months of the year and the occasional occurrence of a well-developed ovum would point to the probability of sexual reproduction.

In features other than those relating to the basal disc, height of the stalks, number of stalk-segments, and development of gonads, *Urnatella indica* resembles very closely *Urnatella gracilis*. In view of the detailed account of the North American species given by Davenport (5), I have refrained from describing the complete anatomy of *Urnatella indica*.

The two known species of *Urnatella* may be distinguished with the help of the following key :—

I. One or more stalks arising in the adult from an unsegmented basal plate ; in the adult ; segments up to eighteen in number ; colonies up to 5 mm. in height ; tentacles twelve to sixteen in number ; North American.... *Urnatella gracilis*.

II. Stalks, if more than one, arising from a segmented basal plate, resembling a short stolon, each segment giving rise to one stalk only ; stalk segments usually not more than seven, very rarely eight or nine, but never more than nine ; colonies not more than 2 mm. in height ; number of tentacles nine to eleven South Indian. *Urnatella indica*.

The type-specimens (No. Z.E.V. $\frac{7511-12}{7}$) of *Urnatella indica* mounted on slides have been deposited in the collections of the Zoological Survey of India.

My best thanks are due to Dr. Baini Prashad, and Dr. H. Srinivasa Rao for examining the specimens which I sent to them, and to Dr. B. N. Chopra for valuable suggestions in the preparation of the paper for the press. For the loan of references, I am indebted to the Zoological Survey of India. I am also thankful to Mr. P. N. Rajakrishna Menon, B.Sc., and Mr. L. K. Sowrirajulu of the Zoology Department of the Annamalai University for help in maintaining the cultures of *Urnatella indica* in the laboratory.

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LERNANTHROPUS SCIAENAE, SP. NOV., A COPEPOD PARASITIC ON THE GILLS OF THE FISH SCIAENA GLAUCA FROM MADRAS.

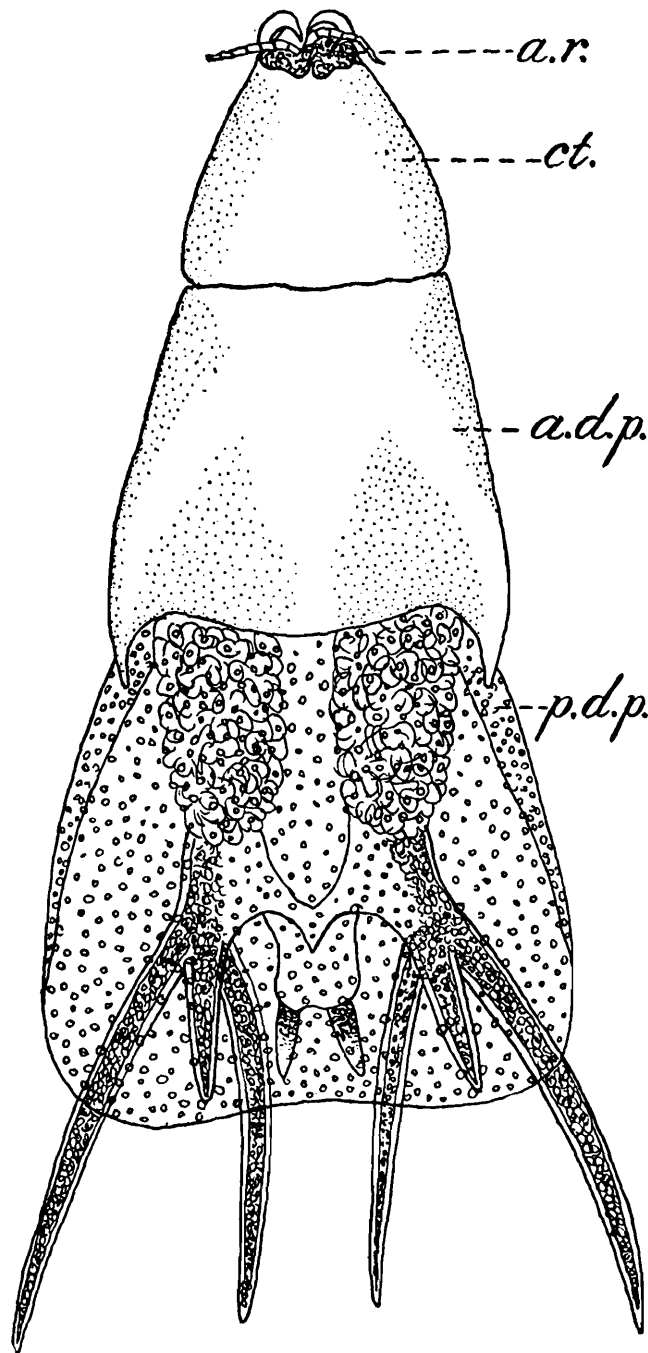
By C. P. Gnanamuthu, M.A., D.Sc., F.Z.S., Director, University Zoology Laboratory, Madras.

Introduction.—Of the few who have described Dichelesthid copepods parasitic on Indian fishes, Bassett Smith has recorded five species of the genus *Lernanthropus*; *L. giganteus* (Kroyer) on the gill of *Caranx* sp. from Indian Ocean, *L. trifolius* (Bassett Smith) on the gills of *Polynemus tetradactylus* from Bombay and *L. larvatus* (Heller) on the gills of the perch *Priacanthus ocellatus* from Indian ocean, *L. nudus* (Bassett Smith) on gills of *Mugil* sp. from Aden, and *L. atrox* (Heller) on gills of *Chrysophrys sarba* from the Persian Gulf. Kirtisinghe has recorded *L. cornutus* on gills of *Strongylura leiura* and *L. pristipomoidis* on the gills of *Pristipomides typus* from Ceylon. Thompson and Scott have mentioned two other genera in their account of Ceylon copepods. As American, British and European forms of Dichelesthidae have been exhaustively studied by Wilson, Scott and Brian respectively, a full description of the present form, a new species, was felt desirable.

Locality and Type specimen.—Three specimens of this Dichelesthid parasite were found (by Miss. A. G. Vijayalakshmi) attached to the gills of *Sciaena glauca* (a maigre of market value in Madras) when nearly a dozen of the fish caught in the shore nets were examined. The largest was 3.2 mm. long and of yellowish brown colour. As the other two were damaged, this has been deposited in the collections of the Zoological Survey of India, as the type specimen and is numbered C2551/1.

Description.—The cephalothoracic shield is about 0.5 mm. long and 0.3 mm. broad being sub-quadrangular in form (Text-fig. 1). Anteriorly it does not cover the antennal region. The front edge is marked by a median acuminate process with a convex projection on each side. The lateral edges of the carapace are bent down ventrally, the anterior and posterior corners of these lateral flaps being rounded. The rest of the body is attached to this cephalothorax by a constriction 0.3 mm. wide and is covered dorsally by a large dorsal plate, which is divided by a transverse groove into a front and hind portion. The front dorsal plate is 0.8 mm. broad behind but narrower in front where it is folded ventrally to form large rounded lobes on either side behind the neck like constriction that marks the posterior limit of the cephalothorax. Posteriorly where the dorsal plate broadens, these lateral folds cease. The posterior corners are produced on either side into lobes which taper to a point and extend behind over the front corners of the second dorsal plate covering the rest of the body (Text-fig. 1). Medially also the convex hind margin of the front plate extends over the anterior border of the hind plate. The hind plate is sub-quadrangular, like the cephalothoracic shield and is about 1.3 mm. long and 0.9 mm. broad behind

where it is broadest. The posterior corners are not only rounded but arch downwards slightly while the anterior corners are folded ventrally.



TEXT-FIG. 1.—*Lernanthropus sciaenae*, sp. nov., dorsal view : $\times 60$.

a.r. antennal region ; *a.d.p.* anterior dorsal plate ; *ct.* cephalothoracic shield ; *p.d.p.* posterior dorsal plate.

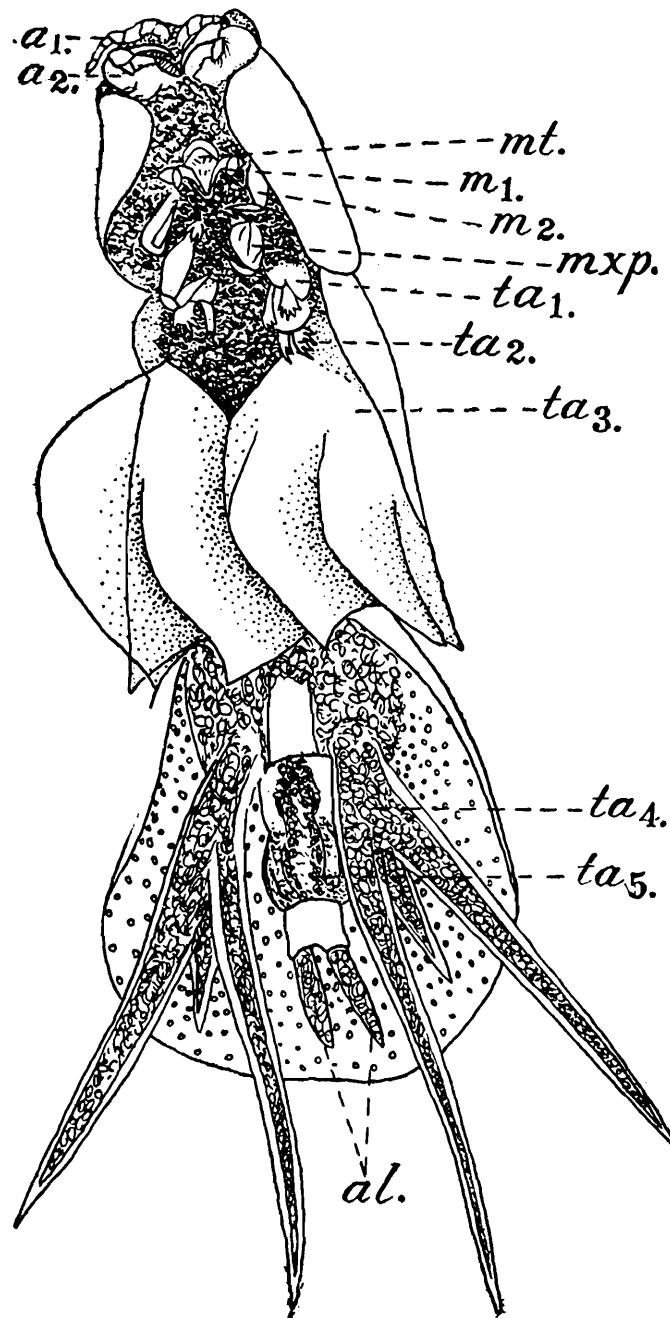
The hind margin is slightly concave medially. Four out of the six laminae of the fourth pair of legs project beyond the hind margin to a distance of about 0.9 mm. while the rest of their length, i.e. nearly 0.7 mm. can be seen through the transparent plate. The appendages are as in all Dichelesthids especially of the genus *Lernanthropus*. The first antenna is filiform and consists of seven short joints. The basal joints are setose while the distal ones bear spines. The appendage is concealed ventrally by the 2nd antenna and can be seen best from the dorsal side

as the cephalothoracic shield does not extend over the front part of head. 2nd antenna though seen dorsally for the same reason, can be better made out ventrally because of its uncinat character. It consists of a stout basal joint provided with a ridged plate at the base. The distal joint is a long stout claw close to the articulation of which the tip of the basal joint bears on its posterior inner aspect, a two jointed blunt projection.

The mandibles are found within the mouth tube. When viewed ventrally this tube appears triangular with its broad base lying on the anterior side and the apex pointing tailwards. This pointed end is formed by the tips of the two mandibles. Each mandible is styliform with a broadened flat tip, toothed on the inner or medial margin. Supporting the tips of the mandibles is a lower lip whose broad base lies above the endopod of the first maxilla. The first maxilla is well developed. The basal joint is stout and short. It bears a ventral scale-like appendage. The endopod consists of a long stout joint with a curved pointed tip which extends inward below the underlip and reaches very nearly the tips of the mandibles. At the base this joint bears an accessory plate having three processes. The exopod is directed outwards from the basal joint and consists of three joints of which the first is the largest, forming nearly three-fourths of the length of this ramus. It bears a short stout spine, the remaining two joints are short and form a spinous process. The 2nd maxilla is three jointed, uncinat. The basal joint is short and stout. It is not mentioned by Wilson and Scott in the species they have described. The second joint is large and swollen and has its distal margin on the outer side produced into a short spine. The third joint is long and slender. The extreme tip is formed by a small inwardly curved claw-like spine. No teeth were noticed on the inner aspect of the terminal joint such as are described by Wilson in the species he has studied.

The maxillipedes form a single pair as in the whole family. Each is four jointed. The short basal joint to whose inner aspect is applied a plate with three dentate lobes has not been mentioned by Wilson and Scott. The second joint is large and stout. The third joint is two-thirds as long but much thinner tapering to the outer end where it bears a small claw on the inner side of its distal margin. The fourth joint is a long stout spine. Thoracic legs are of four pairs. The first pair are biramous and two jointed. The basal joint is a flattened plate in a deep notch of which the two single jointed rami are inserted. The endopod is long and slender. It bears three terminal spines. The exopod is a shorter, broader, obovate plate with a dentate margin, there being five teeth. The second thoracic leg is of the same form, the rami being smaller. The third thoracic leg is modified into a broad foliaceous respiratory lamella. This lamella has a single broadly obtuse front end and two acute tips behind. Proceeding forwards from these two tips are two raised angular ridges with a deep groove between. This groove divides the lamella into two halves in such a way that a section across the lamella in the hind part would appear like "W" The groove between

the two halves (the exopod and the endopod) as well as the two ridges, so distinct behind, disappear about half-way up the lamella so that anteriorly the lamella is a smooth convex plate (Text-fig. 2). The two

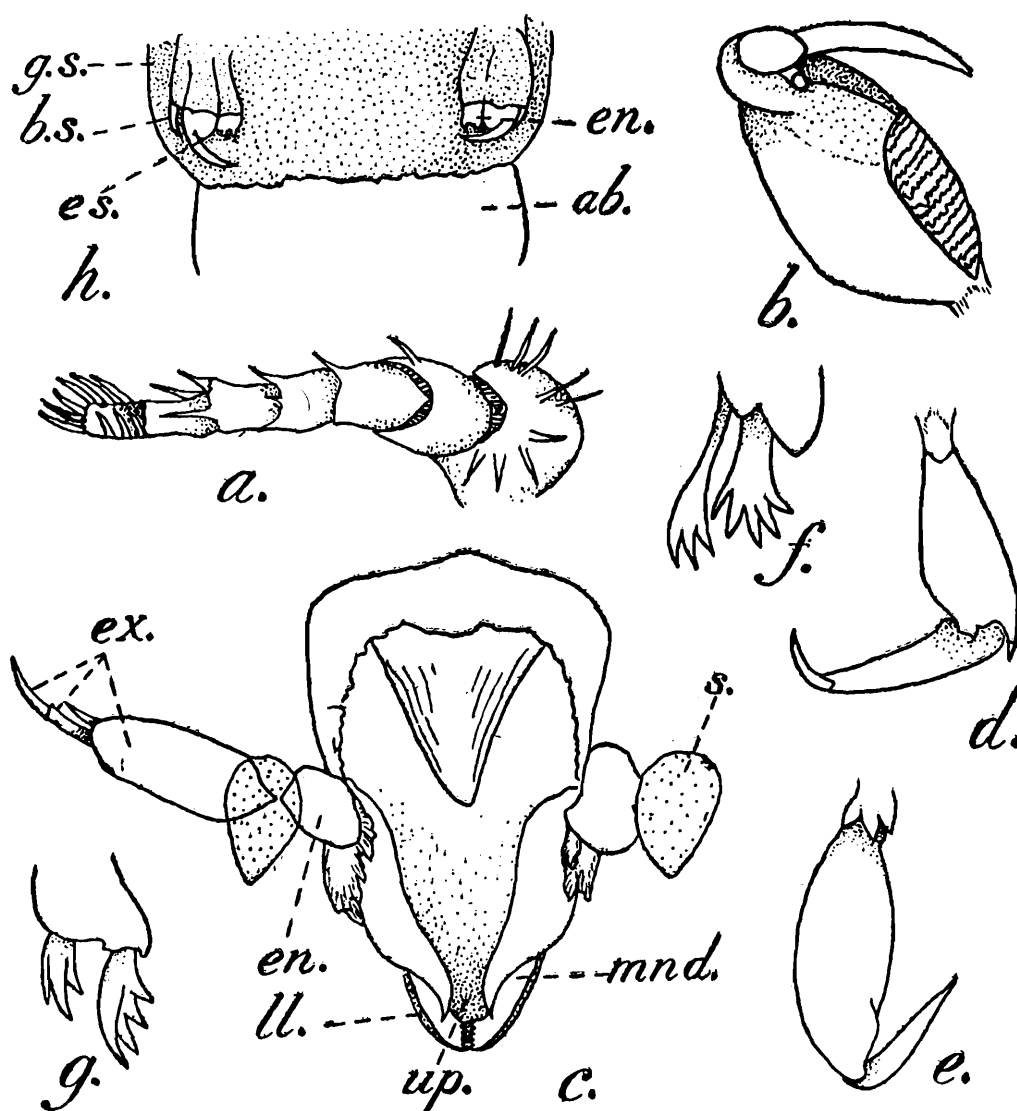


TEXT-FIG. 2.—*Lernanthropus sciaenae*, sp. nov., ventral view: $\times 60$.

al, anal laminae; *a1* & *a2*, 1st and 2nd antennae; *m1* & *m2*, 1st and 2nd maxillae; *mt*, mouth tube; *mxp*, maxillipede; *ta.*, 1-5. five thoracic appendages.

posterior tips extend behind ventrally under the region of the body which is covered dorsally by the second dorsal plate. Medially the lamellae of the opposite sides overlap each other to a slight extent. Laterally, the hind part of the lamella on each side is united with the posterior wings of the first dorsal plate. The lamellae being broad and held oblique to the body, make the posterior part of the body of the parasite project away from the surface of the host to which the anterior part of the body, the cephalon, is firmly attached by means of the 2nd

antennae, 2nd maxillae, the maxillipedes as well as the lateral folds of the cephalothoracic shield and the first dorsal plate. The first two pairs of thoracic legs serve to waft water between the body and the obliquely held lamellae. By the posterior part of the body being so held at an angle to the host, the long respiratory processes of the 4th thoracic legs get washed by the water currents of the gill chamber of the fish host. The fourth thoracic leg is attached by a stout cylindrical part which distally divides into three long stout processes tapering acuminate to a point. Of the three lamellae, two, which are 1.6 mm. long, extend far behind the dorsal plate. These are probably the exopod and the endopod. The third which is more dorsally attached to the basal part, is probably just a process of the basipod. No articulation or chitinous processes are seen and the outer thin covering is of a hyaline appearance. The presence of three such laminae in the form described in this paper recalls a similar condition described in *L. trifolius* by Bassett Smith, though the rest of the characters of the two



TEXT-FIG. 3.—*Lernanthropus sciaenae*, sp. nov.

a. I antenna; b. II antenna; c. mouth tube, mandible and I maxilla; d. II maxilla; e. maxillipede; f. I thoracic leg; g. II thoracic leg; h. V thoracic leg. ab. abdomen; bs. basal spine; en. endopod; es. exopod spine; ex. exopod of I maxilla; g.s. genital segment; ll. lower lip; mnd. mandible; s. scale; up. upper lip.

species are different as can be seen from the table given below. This third lamina extends back nearly to the hind margin of the dorsal plate which hides them dorsally.

Behind the fourth thoracic legs, the genital segment extends to about 0.3 mm. Close to its posterior border there occur ventrally vestiges of a fifth pair of legs. Starting from the posterior edge of the last thoracic segment this appears as a columnar ridge-like prominence on each side of the ventral surface of the genital segment. This ends in a swollen papillose basal part bearing a claw like spine. This basipod bears two one-jointed rami, the outer ending in a long stout claw and the inner bearing a bidentate plate. The abdomen is single segmented. It is broader than long, the length being just a fourth of that of the genital segment. The anal plates are lanceolate and are shorter than the third laminae of the fourth thoracic legs and extend very nearly as far as the posterior margin of the dorsal plate.

Remarks.—Of the seven species of *Lernanthropus* so far recorded from the Indo-tropical region, some have not been so fully described as to permit a close and detailed comparison. Nevertheless a few notes on the females of each are given below, in addition to a full comparison with *L. trifolius* which the present species resembles most.

L. giganteus (Kroyer) *Female*: 9 mm. long; was recorded from the Indian Ocean, found on the gills of *Caranx* sp. The dorsal plate consists of two parts, the anterior having conspicuous posterior processes and the posterior plate being as broad as the anterior but not covering nearly three-fourths of the fourth pair of legs.

L. larvatus (Heller) *Female*: 3 mm. long; was recorded from the Indian Ocean, found on the gills of *Priacanthus ocellatus*. The dorsal plate is of one piece, obovate shaped, much smaller than the cephalothoracic plate. The third pair of legs cover the genital segment, abdomen and nearly the whole of the fourth pair of legs.

L. atrox (Heller) *Female*: 4 mm. long, recorded from the Persian Gulf, found on the gills of *Chrysophrys sarba*. Cephalothoracic shield covers the antennal segments. It is oblong with convex side. 1st antenna is seven-articled and the genital segment long. The second dorsal plate is orbicular and covers greater length of the laminae of the fourth pair of legs.

L. nudus (Bassett Smith) *Female*: 8 mm. long, was recorded from Aden, found on the gills of *Mugil* sp. The cephalothoracic shield covers the antennal segments with posterior margin invaginate at the centre and the anterior as well as lateral margin convex. The anterior and posterior dorsal plates lobed; both together only as long as the cephalothoracic shield so that the genital segment, abdomen as well as nearly the whole length of the laminae are uncovered. The first antenna is six-jointed while the genital segment is long and constricted into two

L. cornutus (Kirtisinghe) *Female*: 5 mm. long; was recorded from Ceylon, found on the gills of *Strongylura leiura*. Cephalothoracic shield

has a median rostral projection over the antennal region and lateral horns as well as ventral flaps. The anterior dorsal plate has a hump on its front margin and convex lateral sides. Posterior plate is broader at the hind and far longer covering nearly the whole length of the laminae of the 4th leg. First antennae are six jointed and the genital segment short.

L. pristipomidis (Kirtisinghe) *Female* : 4 mm. long ; was recorded from Ceylon found on the gills of *Pristipomides typus*. The antennal region is covered by a special lobe of the cephalothoraci plate which is rhomboidal in shape and has ventral flaps. The dorsal plate is single and does not cover the laminae of the fourth pair of legs. First antennae six jointed ; the first joint is bent outwards on itself. Genital segment is long.

The characters in which the new species differs from *L. trifoliatus* are shown in the following table :—

<i>L. trifoliatus</i>	<i>L. sciaenae</i>
Carapace :	
Covers the antennal segments	Does not cover the antennal segments.
First dorsal plate :	
Shape differs	Sub-quadrangular with anterior corners folded and posterior corners extended to pointed processes.
Second thoracic plate :	
Much shorter ; having nearly the entire laminae exposed	Much longer ; covers nearly half their length ; anyway covering the third lamina completely.
Head : Oblong	Sub-quadrangular.
1st antennae : Six jointed	Seven jointed.
Length : 8 mm.	3.2 mm.
Genital segment : Short	Long ; bears vestiges of 5th thoracic logs

The first maxillae, mandibles and the mouth tube have not been described for *L. trifoliatus*, so cannot be compared, as also the details of the structure of the 2nd maxillae and the maxillipede. Sex : though the egg strings are not formed, the specimen is a female because the carapace has folded lateral margins, the free thorax is covered by dorsal plate which is so long and large as to hide the abdomen from a dorsal view and also because of the presence of well developed third and fourth thoracic legs. The other two specimens collected were also females.

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ON A COLLECTION OF MELANIIDS AND NERITIDS FROM THE ANDAMAN ISLANDS : (MOLLUSCA, GASTROPODA).

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INTRODUCTION.

In the course of his investigations on the shell fisheries of the Andamans during 1932-1935, Dr. H. S. Rao, Assistant Superintendent, Zoological Survey of India (at present Chief Research Officer, Central Marine Fisheries Research Station, Madras), collected some Melaniids and Neritids from various freshwater pools and streams in the North, South and Middle Andamans. The collection was handed over to me for study in 1940-41, but for various unavoidable reasons a report on this could not be published earlier.

The collection, though small, is fairly representative of the species usually found in the Andamans. A few previously known forms are, however, being recorded for the first time from this area, and a new species of *Melanoides* and a new variety of *Melanoides tigrinus* are also described.

I am thankful to Dr. H. S. Rao for giving me an opportunity to study the collection and to Dr. B. N. Chopra, Officiating Director, Zoological Survey of India, for his valuable suggestions and criticisms.

Family MELANIIDAE.

Sub-family MELANIINAE.

Genus *Melanoides* Olivier, 1807.

Subgenus *Stenomelania* P. Fischer, 1885.

Melanoides punctatus (Lamarck, 1822).

1822. *Melania punctata*, Lamarck, *Hist. Nat. Anim. Sans Verteb.* VI, p. 165.
1876. *Melania punctata*, Brot, in Martini and Chemnitz's *Syst. Conch.-Cab.*
1, Abth. 24, pp. 168, 169, pl. xx, fig. 4-4a.
1938. *Melania* (*Stenomelania*) *punctata* (in part), Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, pp. 93, 94, pl. v, fig. 9.

The figure given by Adam and Leloup in their paper cited above represents a true *punctata*, but the inclusion of other forms, such as *litigiosa*, *mindorensis*, *ornata* and *moluccensis*, in its synonymy is erroneous. Lea's *albescens* is, however, synonymous with *punctatus*.

There is a fairly large series of specimens of *M. punctatus* in the collection, varying greatly in shape, size and colouration of their shells. The young shells, which are quite subulate and have sharply acuminate spires (resembling more or less in shape those of Lea's *M. acus* figured

in Reeve's *Conch. Icon.*, pl. xiv, No. 92), are of pale yellowish colour and beautifully ornamented with a conspicuous spiral brown band round each whorl on its upper part. The uppermost whorls are found to be longitudinally ribbed. The transverse bands and the longitudinal ribs tend to disappear gradually with the maturity of the shells and in their place spiral lines develop on the surface which are not so regular. Besides these, regular transverse rows of prominent brown-dotted lines also appear on the surface. Most of the large shells are found to be covered completely or partially with white encrustations, which more or less conceal the original brown colour. The aperture in these shells is elongately-oval and the interior is bluish in colour.

Locality.—Rock-pools in the course of a stream on the East Coast of Interview Island, N. Andaman-many (26. xii. 33).

Distribution.—Nicobars, Dutch East Indies, Australia, Philippines (Guimaras, Negros, Siquijor, Cagayan, Misamis, Mindanao), Caroline Is. and New Caledonia. The species is recorded for the first time from Andamans.

Melanoides zelevori (Brot, 1872),

var. **solidiuscula** (Nevill, 1884).

1884. *Melania zelevori* var. *solidiuscula*, Nevill, *Hand List Moll. Ind. Mus.* II, p. 230.

1915. *Tiara (Radina) zelevori* var. *solidiuscula*, Preston, *Faun. Brit. Ind. Moll. Freshw. Gastr. & Pelec.*, p. 14.

One young specimen, having a slightly decollate shell of light brownish-olive colour, represents this interesting variety in the collection. Out of the eight whorls, the first two only appear to be strongly longitudinally ribbed, while the rest bear faint ribs only. The spiral striations on the surface are obsolete, excepting a few at the base of the last whorl only.

Locality.—A stream near bridge, Beadonabad, Port Blair, S. Andaman (25. xii. 35).

Distribution.—It is not known to occur anywhere beyond Andamans.

Subgenus **Melanoides** S.S.

Melanoides tuberculatus (Müller, 1774).

1774. *Nerita tuberculata*, Müller, *Verm. Terr. and Fluv. Hist.* II, p. 101.

1941. *Thiara (Melanoides) tuberculata*, Benthem Jutting, *Archives Néerland. de Zool.* V, pp. 267, 268, 327, 329.

1943. *Melanoides (Melanoides) tuberculatus*, Ray, *Journ. Roy. As. Soc. Bengal, Science*, IX, p. 71.

There is only one specimen in the collection which represents this extremely plastic and common species. The shell is young, pale yellowish-green, and is characteristically ornamented with regular spiral and longitudinal ridges intersecting each other and giving rise to small tubercles. The longitudinal reddish markings on the surface are also quite

conspicuous, though not very regular. Connolly¹ has given the full synonymy of this species.

Locality.—In stream connecting with the sluice near Chauldari, S. Andaman-1(5.xii. 34).

Distribution.—This is the most widely distributed species of the genus, having its range extending into Southern and Eastern shores of the Mediterranean Sea, Africa, Asia Minor, Palestine, Arabia, Syria, Persia, Aden, Mesopotamia, India, Ceylon, Burma, Annam, Siam, Indochina, Andamans, Nicobars, East Indies to Australia and China, Formosa, Hainan and Viti.

Melanoides nevillei (Brot, 1877)

var. **andamanica** (Nevill, 1884),

1884. *Melania* (*Striatella*) *nevillei* var. *andamanica*, Nevill, *Hand List. Moll. Ind. Mus.* II, p. 236.

1915. *Tiara* (*Striatella*) *nevillei* var. *andamanica*, Preston, *Faun. Brit. Ind. Moll. Freshw. Gastr. and Pelec.*, p. 18.

Nevill in describing this variety writes, "Possibly a distinct species, though at present, I believe, it is correctly classed as a local variety of *M. nevillei*." It is well-represented in the collection by quite a large number of individuals, of which only seven are large with partly broken and decollate shells which have already turned black, while the rest are quite young and have pale yellowish-olive shells. In both, the spiral striations appear to be broad and regular, while the longitudinal ribs are not at all so prominent.

Locality.—A pool in the course of a stream, S. of Golf Course, Port Blair, S. Andaman-7(14.iii.34); a stream with a muddy bottom, Beehive Hill, near Long Island, M. Andaman-5 (24.iii.34); stream, north of Shadipore, Port Blair, S. Andaman-many (11.xi.35).

Distribution.—Confined to Andamans only.

Melanoides nicobaricus (Reeve, 1859).

1859. *Melania nicobarica*, Reeve, *Conch. Icon.* XII, pl. x, fig. 54.

1872. *Melania* (*Melanoides*) *nicobarica*, Mörch, *Journ. de Conchyliol.* XX, p. 321.

1877. *Melania nicobarica*, Brot, in *Martini and Chemnitz's Syst. Conch.* Cab. 1, Abth. 24, pp. 235, 236, pl. xxv, fig. 11.

1915. *Tiara* (*Striatella*) *nicobarica*, Preston, *Faun. Brit. Ind. Moll. Freshw. Gastr. and Pelec.*, p. 19.

Hinds's *M. plutonis*² from the Fiji islands is considered by some authors as synonymous with *nicobaricus*. But after carefully examining the shells of both the species in the collections of the Zoological Survey of India I find that they are quite distinct.

Of the six specimens of *M. nicobaricus* in the collection, four have partly broken shells with acuminate spires, while the rest have perfect but decollate shells. The colouration of the shell is olivaceous green,

¹ Connolly, S. *Ann. S. Afric. Mus.* XXXIII, pp. 566, 567 (1930).

² Hinds, R.B. *Ann. and Mag. Nat. Hist.* (1) XIV, p. 8 (1844).

but appears in most cases to be concealed by a black or rust-stained layer. The spiral striations are present throughout the upper whorls, but faintly visible in the lower ones at the base.

Locality.—Edge of Dhanikhari stream near Manglutan, 'Maymyo turning of the Road, S. Andaman-2 (11. xii. 32) ; stream, north of Cocoanut plantation, Long Island, M. Andaman-4(27.iii.34).

Distribution.—Originally known from Nicobars and subsequently from the Andaman Islands.

Melanoides rivularis (Philippi, 1847).

1847. *Melania rivularis*, Philippi, *Abbild. und Beschreib. Conchyl.* II, p. 21, pl. iv, fig. 6.

1884. *Melania (Striatella) rivularis*, Nevill, *Hand List. Moll. Ind. Mus.* II, p. 247.

1915. *Tiara (Striatella) rivularis*, Preston, *Faun. Brit. Ind. Moll. Freshw. Gastr. and Pelec.*, p. 20.

Philippi's *M. rivularis* which Nevill considers as "perhaps scarcely separable from subspecies *fontinalis*" is undoubtedly a distinct species, though Brot erroneously combines it with *M. tuberculatus* as a variety.

I assign to this species a series of specimens of varying shape and size. The shells are mostly decollate, olive-green, but appear to be rusted in most cases. The spiral striations on the whorls are quite conspicuous and regular.

Locality.—Stream, S.W. of Golf Course, Aberdeen, Port Blair, S. Andaman—many (11.ii.34) ; weedy road-side pools between Port Bonington and Base Camp, N. Andaman-9 (24.ii.34).

Distribution.—First described from Java and later on from Andamans.

Melanoides fontinalis (Philippi, 1851).

1851. *Melania fontinalis*, Philippi, *Abbild. und Beschreib. Conchyl.* III, pp. 57, 58, pl. v, fig. 7.

1859. *Melania fontinalis*, Reeve, *Conch. Icon.* XII, pl. xvii, fig. 119.

1884. *Melania (Striatella) fontinalis*, Nevill, *Hand List. Moll. Ind. Mus.* II, p. 246.

That Philippi's *fontinalis* is distinct from his Javanese species *rivularis* is already stated above.

There is a series of young specimens only in the collection. The shell is slightly decollate, pale yellowish-olive and encircled with irregular spiral ribs which do not appear to be very prominent. In the smaller shells I find irregular longitudinal reddish-brown flames on the surface.

Locality.—In sandy pools at the edge of the stream from the Cholutunga Range, Jirkatang, Andaman-2 (5.xii.32) ; in a small muddy stream near Golpatrar, Beehive Hill, near Long Island, N. Andaman-28 (24.iii.34).

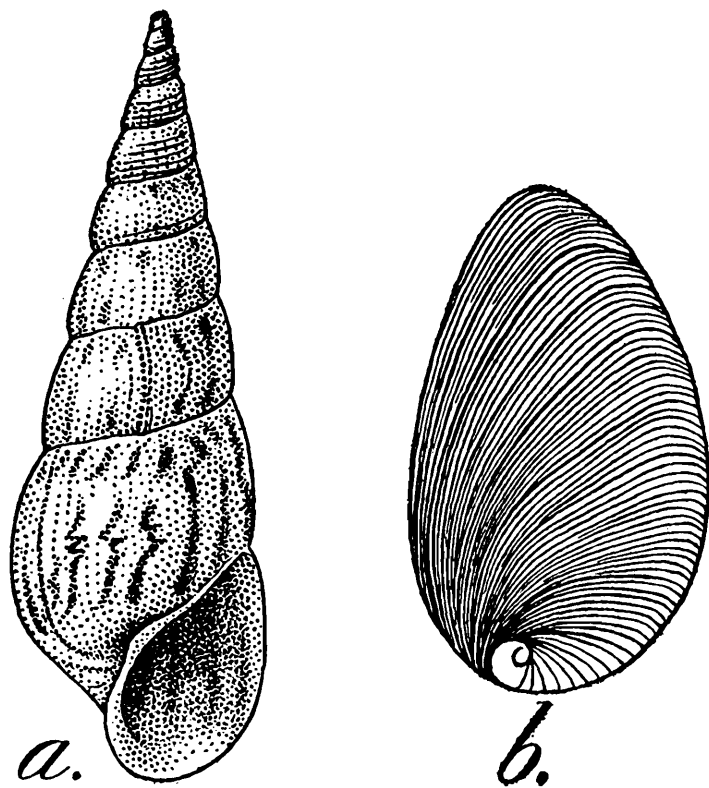
Distribution.—Originally known from "Pulo Pinang", but according to Nevill "Penang". Specimens are known in the collections of the Zoological Survey of India from Pazundaung (Rangoon) and Java. Andaman appears to be a new record.

Melanoides tigrinus (Hutton, 1849).var. **raoi**, nov.

There are altogether twenty-six specimens in the collection (including dry and spirit), of which sixteen have badly broken shells covered over with white encrustations on the surface, while the rest have perfect but slightly decollate shells with 10 whorls in each, excepting one which has 12. The similarity between these shells and the type-specimens of Hutton's *Melania tigrina* is so very close that they appear quite indistinguishable from a cursory view. But after critically comparing and examining the shells before me I find certain very interesting features on the basis of which the specimens are described as a distinct variety of *tigrina*. I propose for it the name *raoi* in honour of Dr. H. S. Rao, who collected the material.

The main points in which this new variety differs from the *forma typica* are :—The colouration of the shell is pale yellowish-olive ; the red flame-shaped longitudinal streaks on the surface appear to be slightly pale, narrow and less clumsy ; the margins of the whorls appear slightly flattened ; the longitudinal ribs and tubercles are entirely absent on the upper whorls, but, instead of these, incised spiral lines appear above the sutures.

The shape and structure of the operculum also agrees with that of the *forma typica* figured by Annandale¹, the only difference being that the actual spirals are slightly more rounded and situated nearer to the inner anterior margin.



TEXT FIG. 1. a. Shell of *Melanoides* (*Melanoides*) *tigrinus* (Hutton) var. *raoi*, nov. X 3; b. Operculum of the same. X 7.

1. Annandale, N. *Rec. Ind. Mus.* XVIII, p. 29, fig. 3d (1919).

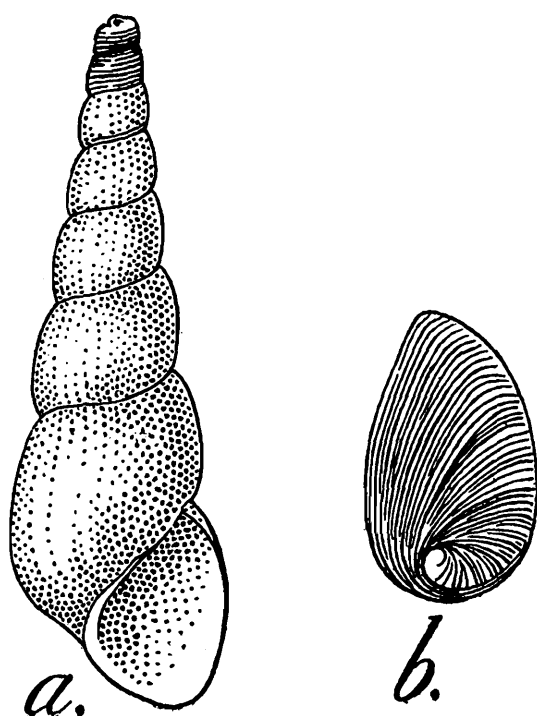
Locality.—Stream, S.W of Golf Course, Aberdeen, Port Blair, S. Andaman—1(11.ii.34); stream, north of Cocoanut Plantation, Long Island, M. Andaman—17 (27.iii.34); stream near bridge, Beadonabad, Port Blair, S. Andaman—2 (25.xii.34).

Type-specimens.—M15939-2. Zool. Surv. Ind. collected from a pool in the course of a stream, S. of Golf Course, Port Blair, S. Andaman—7(14.iii.34).

Melanoides prashadi, sp. nov.

There is a series of specimens, numbering twenty-four, in the collection which were collected along with the shells of *M. rivularis* in a stream, S.W of Golf Course, Aberdeen, Port Blair, S. Andaman, on 11.ii.34. On a critical examination they do not appear to match with any of the existing species of the genus and I, therefore, describe them as new.

Shell subulately-turreted, thick, dextral, smooth, pure olive-green, shining but slightly rusted here and there; spire acuminate with the apex slightly eroded; whorls 7 or 8 in decollate shells, probably ten in a complete shell, convex, regularly increasing in size, last whorl tumid, obliquely angular below, uppermost whorls regularly concentrically striated; the striations disappearing completely on the lower whorls; suture obliquely transverse, much exserted; regular longitudinal lines of growth also present throughout; aperture small, triangularly-ovate, columella white, thick, callously reflected, the outer lip slightly expanded, but produced below in the form of an obtuse angle before its union with the inner lip, the interior of the aperture whitish.



TEXT FIG. 2. *a.* Shell of *Melanoides (Melanoides) prashadi*, sp. nov. $\times 3$; *b.* Operculum of the same, $\times 7$.

There is only one operculum found in the collection, but it is difficult to say to which specimen it actually belongs. The shape and structure of the operculum is more or less like that of *M. tuberculatus*, the only difference being that the nucleus with its actual spirals appears to be situated slightly more below the inner anterior margin.

Type-specimens.—*M.* 15940/2. Zool. Surv. Ind.

Remarks.—The shell of *Melanoides prashadi* somewhat approaches that of the new variety *raoi* in having the uppermost whorls only adorned with spiral striae. In the shape of its aperture, the new species more or less resembles *M. torquata* v.d. Busch (1842) from Java, which Reeve (1859) and Preston (1915) include in the synonymy of *M. terebra* (Benson).

Subgenus **Tarebia** H. and A. Adams, 1859.

Melanoides semigranosus (v.d. Busch, 1842).

1842. *Melania semigranosa*, v.d. Busch, in *Philippi's Abbild. Beschreib. Conchyl.* 1, p. 2, pl. i, fig. 13a-b.

1860. *Melania semigranosa*, Reeve, *Conch. Icon.* XII, pl. xxiv, fig. 167a-b.

1914. *Melania* (*Tarebia*) *lineata* var. *semigranosa*, Leschke, *Jahrb. d. Hamb. Wissensch. Anstalt.* XXXI(2), p. 19.

1921. *Melania* (*Tarebia*) *semigranosa*, Prashad, *Rec. Ind. Mus.* XXII, p. 493.

1938. *Melania* (*Tarebia*) *granifera lineata*, Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, pp. 90, 91.

Prashad in supporting Dautzenberg's conclusion¹ that Busch's *semigranosa* should be treated as a distinct species rather than a variety of *lineata* remarks, "The specific characters as defined by Mousson are, as was also found by Dautzenberg, quite constant in a large series of specimens" This view appears to me (after carefully examining a fairly large series of specimens in the collection) more reasonable than the contrary view of Brot, Nevill, Preston, Rensch and Adam and Leloup. I believe that Dautzenberg's species *lineata*, figured in pl. ii, nos. 8, 8a-b, is not the true *lineata* of Gray (1828), but the young shells of *semigranosus*.

Locality.—In stagnant pools in the course of a stream near Rangat Camp, M. Andaman—many (25.iii.34); in weedy pools with a muddy bottom in the course of a stream near Rangat Camp, M. Andaman—Many (25.iii.34); Dhanikhari stream near Manglutan, Maymyyo turning of the Road, S. Andaman-1 (11.xii.34); a stream near junction of Maymyyo, Manglutan Road, S. Andaman—3; a stream close to Rangat Camp, M. Andaman—3 (19.i.35).

Distribution.—Originally described from Java, but subsequently from Banka, Bali, Sumatra, Borneo, Celebes, Cambodia, India and Burma.

¹. Dautzenberg, Ph. *Ann. Soc. Roy. Malacol. Belg.* XXXIV, p. 14, pl. ii, figs. 9, 9a-c (1899).

Subgenus **Plotia** Röding, 1798.

Melanoides scabra (Müller, 1774).

1774. *Buccinum scabrum*, Müller, *Verm. Terr. and Fluv. Hist.* II, p. 136.

1934. *Melania (Plotia) scabra*, Rensch, *Archiv f. Hydrobiol. Suppl.* XIII, p. 234.

1937. *Melania (Plotia) scabra*, Viader, *Maur. Inst. Bull.* 1(2), p. 37.

1941. *Thiara (Plotia) scabra*, Benthem Jutting, *Archives Neerland. de Zool.* V, pp. 280, 325, 328.

1943. *Melanoides (Plotia) scabra*, Ray, *Journ. Roy. As. Soc. Bengal. Science*, IX, p. 73.

The taxonomic position of *M. scabra* appears to be rather uncertain owing to lack of anatomical details. Lamarck's *spinulosa* is, no doubt, a synonym of *scabra*, but Lea's *acanthica*, which Adam and Leloup erroneously combine with it, is entirely distinct.

There are about forty shells of this variable and wide-spread species in the collection which agree with the description of the species. Most of them have turned black.

Locality.—On the underside of rotting leaves in weedy pools with muddy bottom in the course of a stream near Rangat Camp, M. Andaman (25.xii.34).

Distribution.—First recorded from Tranquebar, Madras. Rensch has enumerated the localities of its occurrence, but has omitted Ceylon and Burma. The species is evidently distributed from Mauritius to the Philippines.

Melanoides acanthicus (I. and H. Lea, 1850)

var. **roepstorffiana** (Nevill, 1884).

1884. *Melania acanthica* var. *roepstorffiana*, Nevill, *Hand List. Moll. Ind. Mus.* II, p. 281.

1915. *Tiara (Plotia) acanthica* var. *roepstorffiana*, Preston, *Faun. Brit. Ind. Moll. Freshw. Gastr. and Pelec.*, p. 37.

While indicating the relationship of this interesting variety Nevill remarks, "Very near to Brot's pl. 28, fig. 10A (Philippines)"

In the collection before me there is a large series of specimens which appear to be quite typical of this variety.

Locality.—Dhanikhari stream near Manglutan, Maymyyo turning of the Road, S. Andaman—5 (11.ii.34); a small muddy stream, Beehive Hill, near Long Island, M. Andaman—many (24.iii.34); in stream, north of Cocconut Plantation, Long Island, M. Andaman—many (27.iii.34).

Distribution.—Originally recorded from Andamans, but has since been known from the Philippines. I have also examined a few specimens of this variety received as presentations from Mr. R. V. Se haiya, Annamalai University, who collected them from Annamalainagar, Madras, S. India.

Family Neritidae.

Subfamily Neritinae.

Genus **Neritina** Lamarck, 1816.Subgenus **Neritina** S. S.Section **Neritina** S. S.**Neritina pulligera** (Linnaeus, 1767).

1767. *Nerita pulligera*, Linné, *Syst. Nat.* ed. XII, p. 1253, No. 726.
 1888. *Neritina (Clypeolum) pulligera* and var. *canalis*, Tryon, *Man. Conch* X, pp. 56, 57, pl. xviii, figs. 6-12; pl. xix, figs. 14-19, 22, 24.
 1908. *Neritina (Hemisphaericae) canalis* and *N.(H.) pulligera*, Horst and Schemman, *Cat. Moll. Mus. H. N. Pays-Bas*, p. 416.
 1923. *Neritina (Neritina) pulligera*, Baker, *Proc. Acad. Nat. Sci. Philadelphia*, LXXV, pp. 117, 137, 149, pl. xii, fig. 17 (radular teeth).
 1941. *Neritina (Neritina) pulligera*, Benthem Jutting, *Archives Neerland. de Zool.* V, pp. 270, 324, 328, 329.

I assign to this species sixteen specimens differing greatly amongst themselves in size. The shells are dark brown in colour and striated throughout. The apex is more or less eroded in all cases. The columellar area is wide, polished and greyish black, and the deep orange band running parallel to the outer lip as well as the orange colour inside the aperture are only faintly visible in some cases. Baker has studied the radular teeth of the species, indicating its affinity with *N. punctulata*.

Locality.—Near Bichgunj, Port Blair, S. Andaman-1; Dhanikhari stream near Manglutan, Maymyyo turning of the Road, S. Andaman-3 (11. xii. 34); Dhanikhari stream near junction of Maymyyo, Manglutan Road, S. Andaman-1 (21. ii. 35); a stream, north of Shadipore, Port Blair, S. Andaman-11 (11. xi. 35).

Distribution.—The range of this common Indo-Malayan form extends through East Indies to Australia and thence to the Philippines and Polynesia.

Subgenus **Vittina** Baker, 1923.Section **Vittoida** Baker, 1923.**Neritina variegata** Lesson, 1830.

1830. *Neritina variegata*, Lesson, in *Duperey's Voy. de la Cog.* Zool. II, p. 378.
 1923. *Neritina (Vittoida) variegata*, Baker, *Proc. Acad. Nat. Sci. Philadelphia*, LXXV, pp. 117, 137, 146, 147, pl. xi, fig. 14 (radular teeth).
 1937. *Vittina variegata*, Reich, *Arch. Naturgesch. N.F.* VI, p. 77.
 1938. *Neritina variegata*, Adam and Leloup, *Mem. Mus. Roy. Hist. Nat. Belg.* II, Fasc. 19, pp. 66, 67.

I have got the remnants of two shells (the last whorls only) in the collection, the upper portions being entirely lost possibly by erosion. The colouration of the shell is dark brown and there are rude striations

on the surface. The columellar callus is characteristically marked above with orange red. Baker and Adam and Leloup have described and figured the radular teeth of this species.

Locality.—A stream, north of Shadipore, Port Blair, S. Andaman—2(11. vi. 35).

Distribution.—The range of *N. variegata* extends from Andamans and Nicobars through East Indies to Polynesia.

Genus **Theodoxus** Montfort, 1810.

Subgenus **Clithon** Montfort, 1810.

Theodoxus bicolor (Recluz, 1842).

1842. *Nerita bicolor*, Recluz, *Proc. Zool. Soc. London*, p. 172.

1843. *Nerita subpunctata*, Recluz, *ibid*, p. 199.

1879. *Neritina subpunctata* and *N. bicolor*, von Martens, in Martini and Chemnitz's *Syst. Conch.*—*Cab. II, Abth. 10*, pp. 179-181, pl. xviii, figs. 18-24.

1888. *Neritina (Clithon) bicolor*, Tryon, *Man. Conch. X*, p. 69, pl. xxv, figs. 67-69, pl. xxvi, fig. 75.

1933. *Neritina bicolor*, Adam and Leloup, *Mém. Mus. Roy. Hist. Nat. Belg. II, Fasc. 19*, p. 63, pl. xiv, fig. 15.

The great variability of the shell characters of Recluz's *Nerita bicolor* often renders the identification of the species difficult and hence the confusion prevailing over its nomenclature. Adam and Leloup have rightly followed Tryon in combining Recluz's *subpunctata*, Musson's *punctifera* and Souleyet's *rugata* with *bicolor*, but they seem to have failed in ascertaining its true generic position.

There is only one young specimen in the collection which belongs to this species. It has a subglobose shell of pale greenish-yellow colour, with the apex slightly eroded. The surface is rudely flexuously striated throughout, but the striae are mostly covered with a black layer (more towards the apex which conceals the true colouration. The columellar area is bluish-white.

Locality.—A stream close to the Rangat Camp, M. Andaman-1 (19. i. 35).

Distribution.—Tryon summarizes the range of this greatly variable species as "East Indies to Philippines". Its occurrence in Andamans somewhat extends the distribution westwards.

**BOMOLOCHUS MULTISPINOSA, SP. NOV. : AN ERGASILID
COPEPOD OBSERVED IN COPULATION.**

By C. P. GNANAMUTHU, M.A., D.Sc., Director, University Zoology
Laboratory, Madras.

Eleven mature female Ergasilid parasites were collected from about eight young fishes (*Dussumiera acuta*) during February when several of these were examined for earlier stages of the Lernaepodid *Clavellisa dussumieria*. Each infested fish had two parasites inside its gill covers. It may be noted that though several fishes were examined, not one of the Ergasilid *Bomolochus acuta* collected three months earlier was found. Of the eleven female parasites found this time one had a male attached to the dorsal side of the posterior part of the body. As it has been stated by all authors, including Wilson and Bassett Smith, that the males of Ergasilidae are free-swimming throughout life and that the female copulates only during the free swimming stage, receiving enough spermatozoa to fertilise the eggs she will ever lay as a parasite, this find of a male attached to a female bearing eggs, inside the gill cover of the fish host is of interest. A photograph was taken and a camera lucida drawing was made to show the position and mode of attachment of male to female. As these eleven females and the male differ from all the Ergasilids described up-to-date and since so far the males of only three species of the genus *Bomolochus* have been described, a full description of the male and female of this new species is given in this paper.

Types.—The female holotype bearing the No. C $\frac{2757}{1}$ and the male allotype are deposited in the collections of the Zoological Survey of India. The paratypes are in the collection of the author.

Habitat.—Operculum of the Madras Rainbow Sardine, *Dussumieria acuta*.

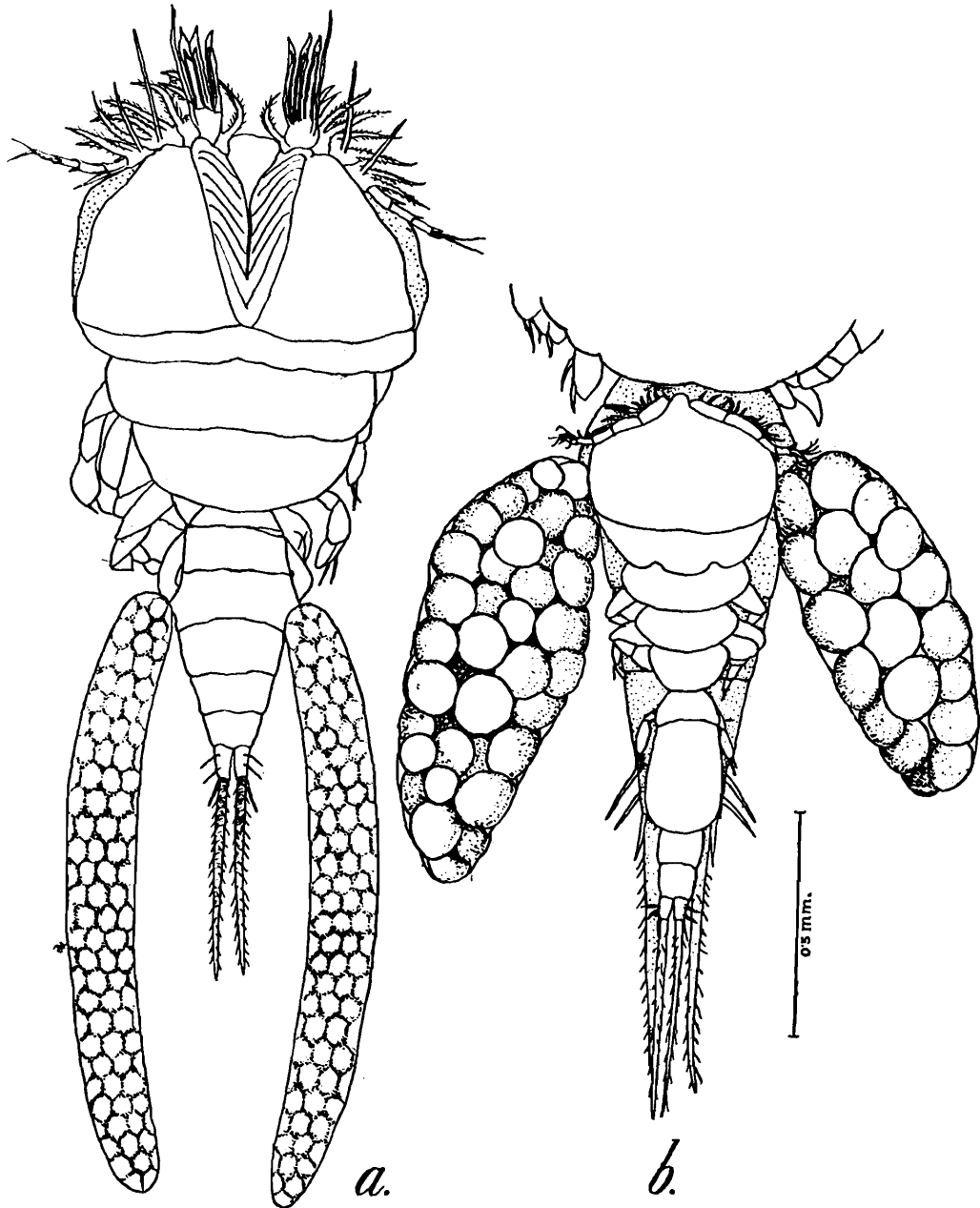
***Bomolochus multispinosa*, sp. nov.**

FEMALE.

Size.—The parasite measured 2.75 mm. long, from the tips of the antennal setae in front to the hind ends of the egg-sacs behind. The widest part of the body, the cephalothorax, measures 0.82 mm. with the free thoracic segments, the genital segments and the abdomen forming the tapering posterior part of the body.

The Carapace or cephalothoracic shield, which is convex above and concave below, has its edge extended ventrally in the antero-lateral regions into a thin flexible hyaline plate which helps in the adhesion to the host. The concavity of the ventral surface appears to be due, as in all species of *Bomolochus*, to a ventral reduplication of the undersurface carrying the maxillipedes to a position anterior to the maxillae and mandibles. The cephalothorax is semicircular in outline being widest

at its posterior margin where the first thoracic segment has fused with it. The frontal margin is re-entrant medially rendering the bases of the



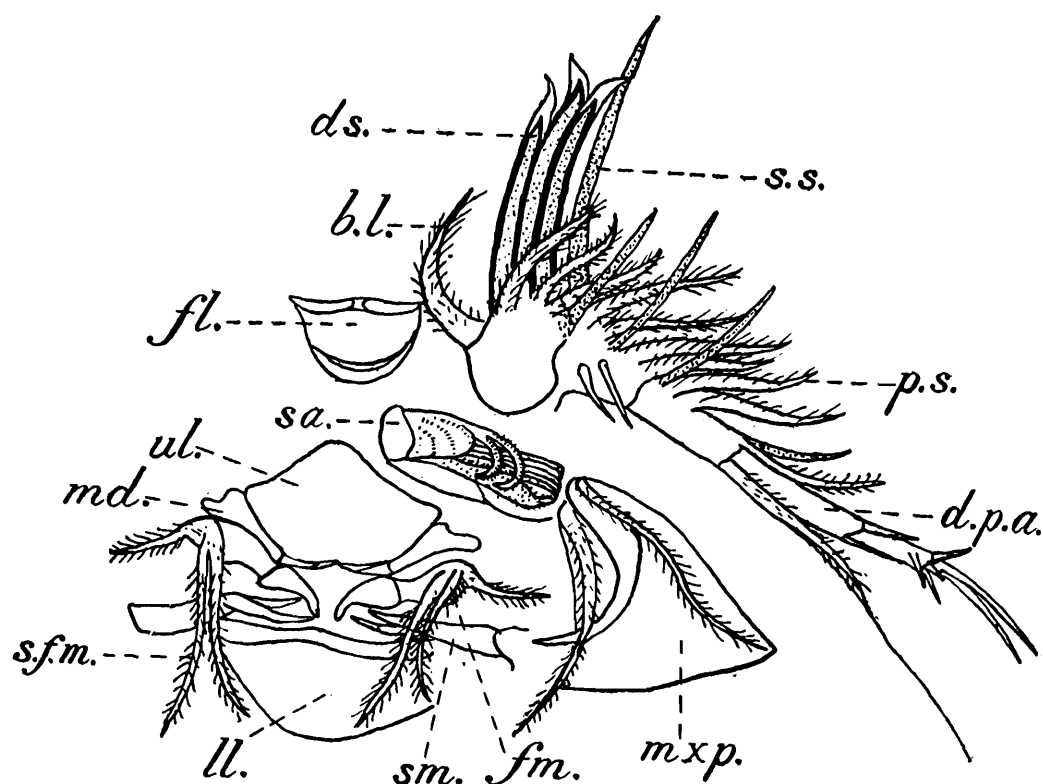
TEXT-FIG. 1. *Bomolochus multispinosus*, sp. nov.

a. Dorsal view, female: $\times 50$.

b. Dorsal view, male, attached to posterior part of the body of female.

antennae conspicuous. To the hind edge of the notch so formed an almost orbicular frontal plate is attached and folded down transversely. The lower free edge is entire. The carapace is marked dorsally by a median furrow running forwards from its hind edge and widening in such a way that the two edges of the furrow form two divergent ridges ending in raised swollen prominences on the frontal margin of the carapace. Medially the furrow opens out into the region of the median eye

and the rostral lobe. Through the thin carapace in this depressed area, the muscles moving the antennae can be seen.



TEXT-FIG. 2. Ventral view of cephalothoracic appendages of female *Bomolochus multi-spinosa*, sp. nov. : $\times 200$.

bl. basal lobe of first antenna ; *dpa.* distal part of first antenna ; *ds.* digitate spine of frontal cluster ; *fl.* frontal lobe ; *fm.* first maxilla ; *ll.* lower lip ; *md.* mandible ; *mxp.* maxillipede ; *ps.* plumose setae ; *sm.* second maxilla ; *sfm.* setae of first maxilla ; *ss.* sensory spine of frontal cluster ; *sa.* second antenna ; *ul.* upper lip.

Appendages : The most striking feature of the parasite is a cluster of long formidable spines on the *first antenna* which is seven-jointed with distinct constriction of the first or basal joint to bear these four long spines. The outermost spine in the cluster appears to be longest but is of the simple kind occurring elsewhere on the antennae while the others which arise close together appear to be more complex. They have a transparent vitreous outer sheath ending in an acuminate tip with a denser core terminated by a more obtuse tip, a little short of the outer point. If the simple straight spines of the antennae are tactile in function, it is probable that these peculiar spines help in attachment by being inserted into the soft skin lining the inner side of the operculum. There are ten other simple spines in addition to the long one in the cluster and twelve plumose setae, arranged along the remaining six joints of the first antenna. The basal joint bears four long stout curved plumose setae of which the innermost is conspicuous in the frontal region. The succeeding two segments are bent outward as in all species of the genus and make the antennae sweep out to the side in front of the edge of the cephalothorax. These two segments bear six plumose setae curving outwards and forwards and three of the simple setae thrust forwards.

The outer distal edge of the fourth segment bears two plumose setae, one dorsal and one ventral, extending horizontally over and under the next two segments. These two segments are more slender and bear two simple straight spines thrust forward and two other shorter spines thrust outward. The last or terminal segment bears two long spines and four short ones.

The second antenna is three-jointed. The first two joints extend inward while the third, which is rounded, bends the antenna back on itself to bear the fourth joint which points outward. The third joint is covered with minute prickly-like teeth and bears a long claw directed back. The last joint also is covered with such prickles densely arranged on ribbon-like extensions of chitin. Four stout needle-like spines with curved pointed tips are borne by the terminal joint. The labrum is rhomboidal in shape being wider than long and having an obtuse tip in front and behind. The labium is a broad semicircular flap. Both are smooth.

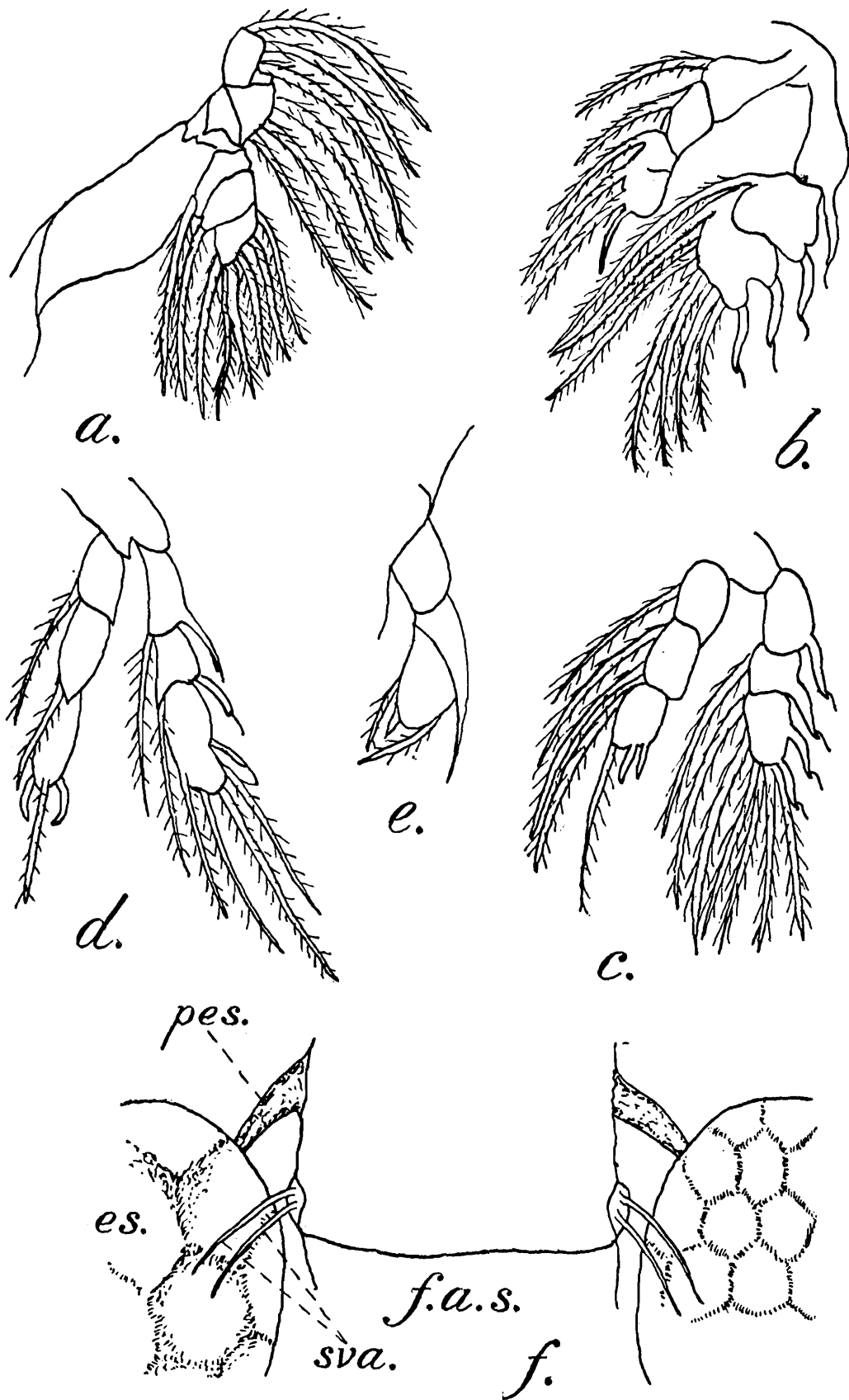
The mandible is four-jointed. The basal joint which forms the attachment is directed backwards and outwards while the second is directed inwards to bear the two single-jointed rami which are sharp-pointed and meet their fellow medially and are free from setae.

The first maxillae are three-jointed; a basal joint forming the attachment is followed by a short joint and a terminal joint which bears three plumose setae. A two-jointed palp extends close behind the mandible but its distal joint is destitute of setae and directed backwards.

The second maxilla is four-jointed; the basal joint providing the attachment is bent inward, the middle as well as the two terminal rami also are directed medialward. The rami are single-jointed, sharp-tipped and glabrous.

The maxillipedes are turned forward outside the other mouth-parts. They are three-articled, the basal joint being the longest and the middle joint roughly triangular in shape, bearing at its anterior apex the stout terminal claw. This claw is of a simple curved form and does not have any accessory teeth, but has, at its base, two plumose setae of which the inner is longer and stouter than the one on the outside.

Thoracic segments. A well marked groove indicates the union of the first segment of the thorax. This segment is as broad as the cephalothorax. The second segment is four-fifths as broad as the first. The third thoracic is four-fifths of the second in width but a third longer and has a more convex posterior margin. The fourth segment is less than half the width of the third and about a fourth in length. The fifth is as wide as the fourth segment but nearly thrice as long. The sixth or genital segment is as large as the fifth and bears the two long egg-sacs. The egg-sacs are 1.4 mm. long and 0.25 mm. at their widest. When packed to their fullest capacity they extend about 0.5 mm. behind the tip of the anal setae. They contain six to seven rows of eggs, each row having about 26 eggs. In several of the forms examined, the egg-sacs were partially or wholly empty, only a few had replete egg-sacs. In one



TEXT-FIG. 3. *Bomolochus multispinosa*, sp. nov.
a. first leg. b. second leg. c. third leg. d. fourth leg. e. fifth leg. f. vestigial sixth leg.
es. egg sac; f.a.s. first abdominal segment; gs. genital segment; pes. peduncle of egg-sac; sva. setae of vestigial appendage.

of the specimens, a large number of the eggs had just hatched, the nauplii emerging independently from the eggs. A microphotograph of this was taken as this differed from Wilson's observation that the "egg tube ruptures in one or two places only and all the nauplii issue through the same opening."

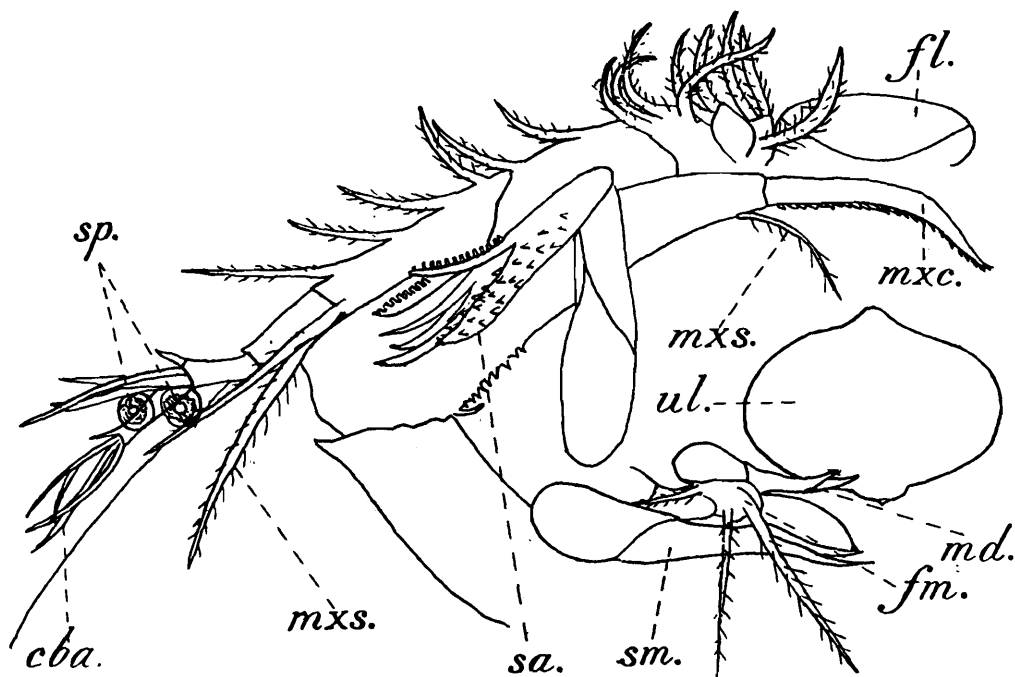
The abdomen consists of three segments of nearly equal length but of decreasing width so that the abdomen tapers posteriorly to half its anterior width. The two anal laminae are as long as the last abdominal segment. Each lamina bears a long stout plumose seta at its tip. This seta is longer than the abdomen and anal laminae put together. At the base of this seta, the posterior edge of the lamina bears a short slender spine. In addition to these, each lamina bears two shorter thinner spines on its outer aspect.

The thoracic appendages. The first swimming feet are biramous. The exopod is biarticulate, both joints bearing three long plumose setae each. The endopod is three-jointed, the first two joints bearing one plumose seta each and the distal joint bearing six. The basal joint is so attached to the median ventral surface that only the tips of the setae are seen dorsally, projecting beyond the carapace. The second, third and fourth swimming feet are biramous and similar. The basipod is single-jointed. The exopods are four-jointed but the last two joints being fused, only three joints are seen. The endopods are three-jointed. The two rami, especially the exopod, bear long plumose natatory setae as well as simple spines. The setae and the spines are distributed as follows:—II Endopod 1—0, 1—0, 3—1, Exopod 0—1, 1—1, 7—2, III Endopod 1—0, 2—0, 2—2, Exopod 0—1, 1—1, 6—2, IV Endopod 1—0, 1—0, 1—2, Exopod 1—1, 1—1, 5—1. The spines on the outer aspect of the exopod are noteworthy because of their taxonomic importance. Each spine is stout and short and acute tipped and bear subterminally a long bristle. The serrate teeth borne by spines of *B. denticulatus* and *B. acuta* are absent. The fifth swimming leg is different from the previous four in being short and uniramous as in all Ergasilids. It is three-jointed; the first joint is short and cylindrical. The next is short and has its distal edge produced into a long external spine, while the third or distal joint is large and stout and bears three long setae. Vestiges of the sixth pair of appendages can be made out on the sides of the genital segment just in front of the attachment of the egg-sacs. Each vestige consists of a swollen papilla bearing two long smooth setae.

MALE.

So far only three males have been recorded among the species of *Bomolochus*. Bassett Smith's description of the male of *B. megaceros* is incomplete and even Wilson's accounts of the males of *B. soleae* and *B. concinnus* leave much to be desired. Hence a full description of the male of *B. multispinosa* is given in this paper. Further, its being found attached to the body of a female already having eggs in its egg-sacs and parasitic within the gill chamber of the fish host, invests this male with special interest, for, its copulation with the female after she had become

parasitic, may turn out to be a usual feature in other species of the genus as well. The male is 1.36 mm. long. the anal laminae and their setae forming nearly a third of this length. The ventral side of the male is applied to the dorsal side of the female which is nearly 2.75 mm. As the anterior border of the body of the male is just over that of the genital segment of the female, the posterior tips of the anal setae of the male extend as far as those of the female. The two creatures were so firmly attached that considerable resistance was encountered when the male was forcibly dislodged by pushing it behind with the tip of a fine camel-hair brush. It is safe to assume that the hold of the male was as secure as that of the female on the fish host. Nevertheless, careful examination of the two *in copula* showed no hooking over of the appendages of the male, while a close scrutiny of the ventral surface of the male, after its separation, showed that the mode of adhesion must be as in the female, being specially facilitated by the much longer toothed claw of the maxi-

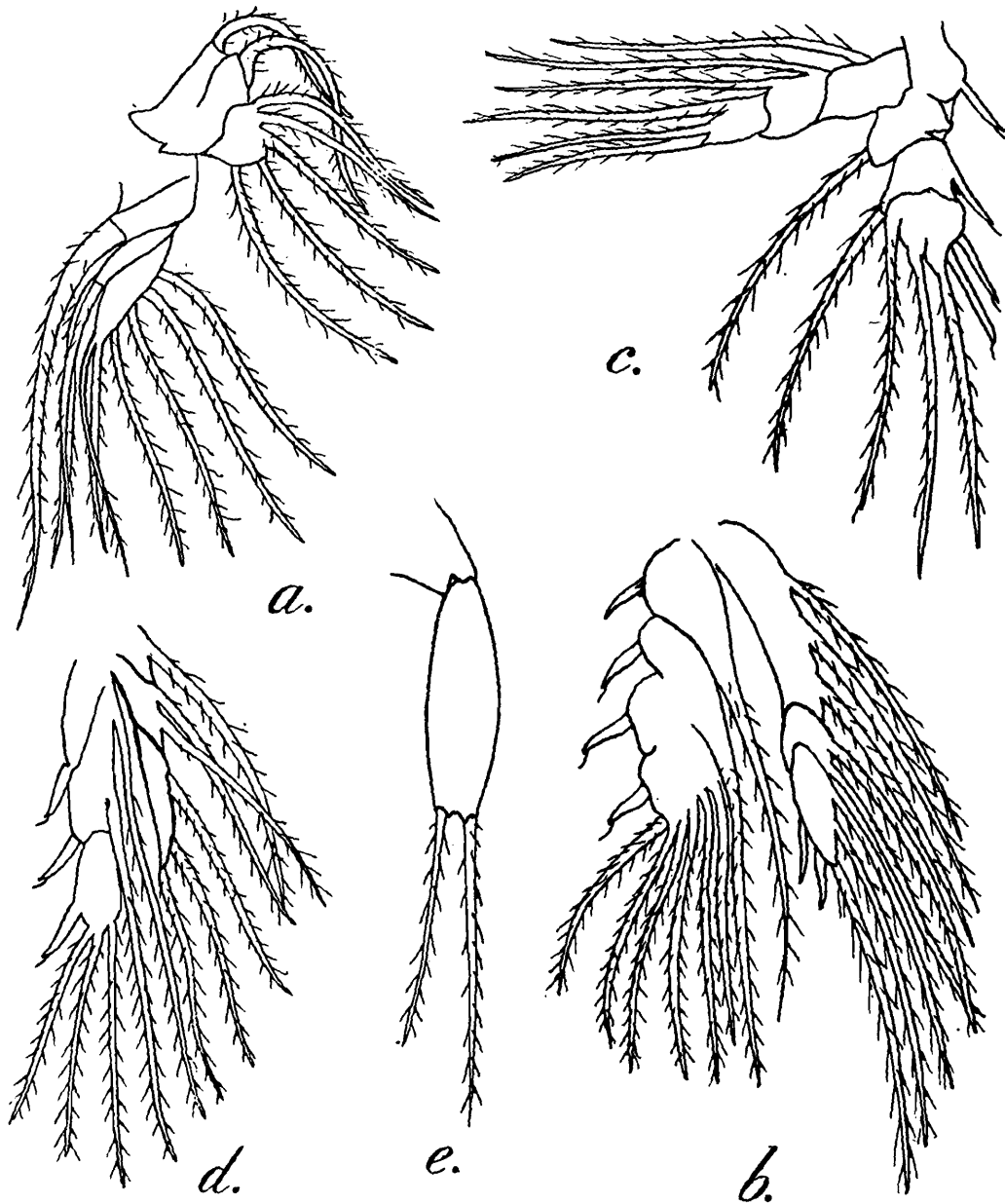


TEXT-FIG. 4. Ventral view of cephalothoracic appendages of male *Bomolochus multi-spinosa*; $\times$ ca. 470.

cba. clinging bristles of first antenna; *fl.* frontal lobe; *fm.* first maxilla; *mxc.* claw of maxillipede; *mxs.* seta of maxillipede; *md.* mandible; *sa.* second antenna; *sm.* second maxilla; *sp.* spermatophore; *ul.* upper lip.

llipede. The body is much more slender, being only 0.36 mm. broad at the cephalothorax, than in the female. As in *B. solea* described by Wilson, not only are the six segments of the thorax distinct but even the segment which had fused with the cephalon to form the cephalothorax appears indicated by a faint groove. The first thoracic segment behind the cephalothorax is well marked by a distinct groove in front and by a notched edge behind. The second, third and fourth segments decrease in width so that the fourth is only half as broad as the first. This fourth segment is however slightly longer and is marked by a more convex posterior margin. The fifth thoracic segment is of a different form, being narrow in front and wide behind and leads to the wider genital segment.

If the widening of the fifth segment is from 4 to 6 micrometer divisions the genital segment widens from 7 to 9 divisions. The abdomen is two-segmented, the missing third segment is probably indicated by a transverse groove on the first segment. Anteriorly the first segment is only three-fifths of the width of the genital segment. Posteriorly two segments taper behind to half the breadth of this front boundary. The two anal laminae taper still further and bear two long stout stiff plumose setae. In addition, each lamina bears, on its outer aspect, two slender short bristles, and one on its outer posterior edge.



TEXT-FIG. 5. *Bomolochus multispinosa*, sp. nov.

a. first leg of male. b. second leg of male. c. third leg of male. d. fourth leg of male.
e. fifth leg of male.

Appendages. The first antennae are seven-jointed as in the female and bear the same number of plumose setae but the cluster of four conspicuous spines on the lobe of the basal segment of the female is striking in its absence in the male. Interspersed among the dozen plumose

setae are about five flexible bristles representing the rigid straight simple spines of female. The distal three-segmented part of the antenna is more slender than in the female and bears a number of flexible bristles in the place of spines. There are three short spines, one at the dorsal distal edge of each segment and four long bristles at the tip of the last segment and four at the end of the penultimate segment. The weakly plumose character of the pointed setae, and the clinging character of the bristles of the distal part of the antennae are less suited for swimming than the corresponding structures in the female. The *second antenna* is four-jointed, the first two joints forming a proximal half and the rest forming the distal part. When the male was dislodged, the proximal half was found rotated forward and the distal portion opened outward as shown in figure. The tip of the distal joint bears four sharp curved needle-like setae held between two sheath-like chitinous strips beset with numerous short teeth. The *labrum*, *labium*, *mandibles* and the *maxillae* are of the same form as in the female. The *maxillipedes*, however, are the most conspicuous appendages of the male. Proportionate to the size of the body of the male, this appendage is several times larger than in the female. It is probable that it is the organ of adhesion *par excellence* in the male and can hold on the groove in front of the genital segment of the female. It is of three joints. The basal joint which is attached behind the other mouth-parts extends outward and forward so that the second joint which is longest reaches very nearly the front edge of the carapace and extends inwards close to the frontal lobe. The third joint consists of a stout pointed claw whose inner edge is beset with fine teeth. This claw is so long that it extends across the middle line to the opposite side. Thus the maxillipedes, which by the nature of the joints and their length can be swung forwards and outwards beyond the front edge of the body, are well suited for prehension because of their pointed toothed claws. When the prehensile nature of the maxillipedes is considered, along with the feeble natatory character of the setae and the clinging type of bristles of the first antennae, and the adhesive character of the second antennae one doubts their fitness for a free swimming mode of life which has been ascribed to the males by earlier authors.

The other appendages are of the same natatory character as in the female, but are of distinctly weaker build. The first thoracic leg has two, three-jointed rami. The exopod bears a plumose seta, one on each of the two joints and five on its distal joints. The endopod bears nine such plumose setae, six on the distal, two on the second and one on the proximal joint. Both the exopod and the endopods are flattened as in the female. The second thoracic is also flattened but less broad. The exopod is of four segments but owing to the fusion of the last two segments, it appears to be three-jointed. Each exopod joint bears on the outside a short pointed spine provided with a subterminal cirrus. On their inner aspect, the three joints bear seven plumose setae; the first and second bearing one each and the distal double joint bearing five. The endopod is narrower and longer. It is clearly three-jointed, the proximal joint bears four plumose setae, the middle joint bears two

plumose while the distal joint bears two plumose setae as well as two spines. The third thoracic leg is of the same biramous form. The exopod bears four short stout spines on the outer margin of its three joints and five plumose setae on the inside. Of these the distal joint bears three and the other two joints one setae each. The three-jointed endopod bears six plumose setae, one on the first, two on the second and three on the last. The fourth thoracic leg has an endopod, like the third, but its exopod bears only two of the external spines. The fifth leg is slender, uniramous, two jointed and bears two terminal setae; there being three joints and three terminal setae in the female is a feature of sexual difference. No trace of the vestigial sixth appendage, present in the female, was observed.

SYSTEMATICS.

This parasite belongs to the genus *Bomolochus* of the sub-family Bomolochinae. An application of the artificial key Wilson has framed for the species of the genus, brings out the importance of the maxillipedes in being turned forward outside the other mouth parts, their claws not having any teeth or branches, and the claws being of a simple curved form. Further, the frontal margin of the carapace being deeply notched, the basal joint of the first antenna being distinct and heavily armed with stout and digitate spines, the maxillipedes having two large plumose setae, the carapace being but little wider than the first free segment, lead us to two species *B. parvulus* and *B. teres*. But in the second free segment not being swollen and not overlapping the third, the present species differs from *B. parvulus* while in the abdominal joints being of equal size it differs from *B. teres*. The distinctive characters of the four species recorded from the Indo-tropical area, *B. megaceros*, *B. tricerus*, *B. denticulatus* and *B. hirsutus*, are such as do not cover the present species which is therefore described as new. The diagnostic features of this species are the presence of over ten simple spines, three stout conspicuous digitate spines, as well as over dozen sharp plumose setae on the first antenna, which is seven-jointed; the second antennae having four spines; the mandibles and second maxillae being biramous; the first maxilla having three plumose setae; the maxillipedes having a simple claw with two plumose setae; the fourth free thoracic segment forming a narrow waist; the genital segment being broad and long; the egg-sacs being long slender containing nearly 23 eggs in a row; the anal lamina having a single terminal seta; the abdomen having three equal joints in female, two in male; and the fifth leg being three-jointed in female, two-jointed in male.

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CRITICAL REMARKS ON THE SYSTEMATICS OF THE WHITE-BROWED SHORT-WING, *HETEROXENICUS CRURALIS CRURALIS*, (BLYTH) [AVES : TURDIDAE¹]

By M. L. ROONWAL, M. Sc., Ph. D. (Cantab.), F. N. I., and BHOLA NATH, M. Sc., Zoological Survey of India, Benares Cantt.

(Plates I and II)

INTRODUCTION.

Stuart Baker (1924) has partly confused the two allied species of Himalayan Short-wings, viz., the White-browed Short-wing, *Heteroxenicus cruralis* (Bly.) and the Nepal Short-wing, *H. nipalensis* (Horsf. & Moore). His key on p. 16 is wrong and does not agree with the subsequent descriptions. Thus, he says in the key that in *H. nipalensis* the chin and throat are indigo blue in males and dull white in females, whereas actually, as shown below, they are dull white in both the sexes. Again, he gives the chin and throat as white in *H. cruralis* males and ashy brown in females, whereas actually these regions are dark indigo-blue in males and ashy brown in females only. His description of the plumage of *H. cruralis* is very inadequate and, in some respects, incorrect.

In the present note the points mentioned above have been clarified from the specimens of *H. cruralis* and *H. nipalensis* present in the collection of the Zoological Survey of India. In addition, the question of the type-specimen(s) of *H. cruralis*, which Sharpe (1883) claimed to be in the British Museum, London, but which is actually in the Zoological Survey of India (Indian Museum), is clarified. The question of the correct type-locality, which has been wrongly given in many recent publications, is settled. Finally the plumages of adult males and females are described, and notes added on breeding, distribution, etc.

Our thanks are due to Mr. Bisamoy Biswas, Research Scholar (Birds), Zoological Survey of India, for some assistance with regard to the literature.

SYSTEMATICS.

Order PASSERIFORMES.

Family TURDIDAE.

Subfamily *Brachypteryginae*.

Genus **Heteroxenicus** Sharpe.

¹1868. *Drymochares*, Gould, *Proc. zool. Soc. London*, p. 218. Preoccupied.

1902. *Heteroxenicus*, Sharpe, *Bull. Brit. Orn. Cl.* XII, p. 55. New name for *Drymochares* Gould.

¹ Some authors place it in the family Timaliidae.

Heteroxenicus cruralis cruralis (Blyth).

(The White-browed Short-wing.)

1843. *Calliope(?) cruralis*, Blyth, *J. Asiat. Soc. Bengal* XII, p. 933. Type-locality: "Darjeeling", N. Bengal (formerly Sikkim). Type (♂) in Zoological Survey of India (Indian Museum), Calcutta.
1844. *Larvivora homochroa*, Hodgson, *Gray's Zool. Misc.*, p. 83. *Nomen nudum*. (Not seen.)
1844. *Ruficilla cruralis*, Gray, *Genera Birds* I, p. 180.
- 1846¹. *Brachypteryx cruralis*, Hodgson, *Catal. Birds Nepal, presented by B. H. Hodgson to Brit. Mus.*, pl. 73, no. 589. (Not seen.)
1847. *Brachypteryx cruralis* Blyth, *J. Asiat. Soc. Bengal* XVI, p. 136.
1849. *Brachypteryx cruralis*, Blyth, *Catal. Birds Mus. Asiat. Soc. [Bengal]*, p. 178, no. 1056 A (not B).
1850. *Larvivora cruralis*, Bonaparte, *Conspect. Genera Avium*, p. 301.
1854. *Brachypteryx cruralis*, Horsfield and Moore, *Catal. Birds Mus. E. India Coy. London* I, p. 397, no. 646.
1861. *Brachypteryx rufifrons*, Blyth (ex. Jerdon and Blyth MS.), *Proc. zool. Soc. London*, p. 201. Type-locality: Sikkim. ♀
1862. *Brachypteryx cruralis*, Jerdon, *Birds of India* I, p. 495.
1862. *Brachypteryx aurifrons*, Jerdon, (ex. Jerdon and Blyth MS.), *Birds of India* I, p. 495. *Nomen nudum*. ♀. (Probably a misprint for *rufifrons* Blyth 1861.)
1863. *Brachypteryx cruralis*, Hodgson, *Catal. Mamm., Birds, Reptiles & Fishes of Nepal & Tibet presented by B. H. Hodgson to Brit. Mus.* (2nd ed.), p. 40, no. 245.
1870. *Brachypteryx cruralis*, Godwin Austen, *J. Asiat. Soc. Bengal* XXXIX, p. 102.
1872. *Brachypteryx ?cruralis*, Blanford, *J. Asiat. Soc. Bengal* XLI, p. 160.
1875. *Brachypteryx cruralis*, Hume, *Nests & Eggs Indian Birds* I, p. 219.
1875. *Brachypteryx cruralis*, Ramsay, *Ibis* (3) V, p. 352.
1875. *Brachypteryx cruralis*, Blyth, "*Catal. Mamm. & Birds Burma*", *J. Asiat. Soc. Bengal* XLIV (2), Extra Number, p. 99.
1883. *Brachypteryx cruralis*, Oates, *Handb. Birds Brit. Burma* I, p. 19.
1883. *Brachypteryx cruralis*, Hodgs. [=Bly.], Sharpe, *Catal. Birds Brit. Mus.* VII (Turdidae), p. 26.
1888. *Brachypteryx cruralis*, Hume, *Str. Feath.* XI, p. 121.
1889. *Drymochares cruralis*, Oates, *Fauna Brit. India, Birds* I, p. 188.
1892. *Drymocharis cruralis*, Selater, *Ibis* (6) IV, p. 76.
1901. *Drymochares cruralis*, Finn, *List Birds Indian Mus.*, Part I, pp. ix, xiii and 69.
1904. *Drymocharis cruralis*, Osmaston, *J. Bombay nat. Hist. Soc.* XV (3), p. 511.
1921. *Brachypteryx cruralis cruralis*, Hartert, *Vögel paläarkt. Fauna* III, Heft 17, p. 2134.
1924. *Heteroxenicus cruralis*, Stuart Baker, *Fauna Brit. India, Birds* (2nd ed.) II, p. 17.
1926. *Brachypteryx cruralis cruralis*, Rothschild, *Novit. Zool.* XXXIII, p. 271.
1930. *Heteroxenicus cruralis*, Stuart Baker, *Fauna Brit. India, Birds* (2nd ed.) VII, p. 97.
1930. *Brachypteryx cruralis*, Delacour, *Ibis* (12) VI, p. 576.
1931. *Brachypteryx cruralis*, Delacour and Jabouille, *L'Oiseaux l'Indochine Française* III, p. 100.
1933. *Heteroxenicus cruralis*, Stuart Baker, *Nidific. Birds Indian Emp.* II, p. 7.
1933. *Heteroxenicus cruralis cruralis*, Greenway, *Bull. Mus. compar. Zool. Harvard* LXXIV, p. 139.
1935. *Brachypteryx cruralis cruralis*, Hartert and Steinbacher, *Vögel paläarkt. Fauna, Ergänzungsbd.*, Heft 4, p. 331.
1938. *Heteroxenicus cruralis cruralis*, Stanford and Ticehurst, *Ibis* (14) II, p. 221.

¹ This reference is presumably the same as the following one given by Sharpe (1883, p. 26):—" *Brachypteryx cruralis*, Hodgs. *Icon. ined. in Brit. Mus. App.* pl. 73 (no. 589)" [no date]. In the *Catal. Books Manuscripts, etc. in Brit. Mus. (Nat. Hist.)*, vol. II, E-K, p. 852 (1904), there is no reference with the above title, but the references of Hodgson (1846 and 1863) given in the present paper are mentioned.

1939. *Brachypteryx cruralis*, Ticehurst, *Ibis* (14) III, pp. 349, 350.

1939. *Heteroxenicus cruralis*, Roonwal, *Rec. Ind. Mus.* XLI, p. 287.

1940. *Brachypteryx cruralis*, Smythes, *Birds Burma*, p. 88.

1940. *Brachypteryx cruralis*, Delacour and Greenway, *L' Oiseau et Rev. Fr. d' Orn.*, 1940, p. 41.

Type-specimen.—Sharpe (1883, p. 26) had overlooked Blyth (1843) and assigned the authorship of *cruralis* to Hodgson (no date, but presumably 1846, *vide* foot-note on previous page). Accordingly, he had claimed specimens *a* and *b* of the *British Museum Catalogue* as the types of "*Brachypteryx cru. alis*" Hodgson (as well as of "*Larvivora homochroa*" Hodgson).

In his original description, Blyth (1843, pp. 933-934) gave the following characters of *cruralis*:— greeing with *Larvivora* (= *Calliope*) *cyana* Hodgson, being "only distinguishable from that bird, on its upper parts, by a very slight and inconspicuous character; whilst the lower, being concolorous with the former, but paling a little on the belly, affords a very striking contrast with those of *C[alliope] cyana*, wherein they are wholly bright ferruginous with the exception of the lower tail-coverts: the tarsi, also, of our present species are considerably longer as in my *Cinclidium frontale*, and of a dark colour: its wings are shorter and rounder than in other species of *Calliope*; and the tail rather shorter and weak. Colour a full deep cyaneous or dark greyish-blue, paling on the belly, and relieved by a white superciliary streak, confined to the bases of the feathers and yet showing conspicuously: bill black; and legs (in the dry specimen) brownish-dusky." The dimensions (in inches) are given as follows: Length $5\frac{1}{4}$; wing $2\frac{5}{8}$; tail $1\frac{3}{4}$; tarsus $1\frac{1}{4}$; bill (to forehead, through feathers) $\frac{5}{8}$. These dimensions work out at: W. 67; Tl. 44; Tr. 31.5; and B. 16 mm.

In his *Catalogue*, Blyth (1849, p. 178, no. 1056) lists two specimens of "*Bachypteryx cruralis*" (= *Calliope cruralis* Blyth) as follows:—

"HAB. Sikkim. A. Male. Purchased (1842). B. Female. Purchased (1849). Both from Darjiling."

Both these specimens are present in the Zoological Survey of India (Indian Museum) Collection, and are marked as "types" They bear the following labels:—

(i) "Type No. 1056. *Brachypteryx cruralis* Blyth.

a. ♂ Purchased 1842. Darjiling. A. S. B."¹

(ii) "Type No. 1056. *Brachypteryx cruralis* Blyth.

Darjiling. ♀ Purchased 1842. A. S. B."

The paper wrapper of each specimen bears the following identical inscription:—"Type No. 1056. *Brachypteryx [Drymochares] cruralis* Blyth. Type. Blyth. Sikkim. Purchased."

The question to decide is which of these two specimens (or both) should be regarded as the type(s).

Sclater (1892, p. 76), who gave a list of the type-specimens in the Indian Museum, Calcutta, mentioned *two* type-specimens, without giving any further particulars, except: "Sikkim. Purchased." Finn (1901), who gave a list of the bird-specimens in the Indian Museum, made conflicting

¹ "A.S.B." denotes "Asiatic Society of Bengal, Calcutta".

statements. On page xiii, he mentioned (following Selater) *two* type-specimens. On page 69, however, he listed four specimens (this number being confirmed in "Systematic index", page ix), including *one* type-specimen about which he wrote as follows: "1056, Sikkim. A. S. B. (TYPE OF SPECIES, Blyth,)." Since, out of the four specimens listed by Finn, three have Indian Museum Numbers only (18147, 18214, 10982), they are excluded from being Blyth's specimens; so that only *one* specimen (1056, A. S. B.) remains as the type, as against the two listed by him on an earlier page. But Finn did not state whether he meant specimen No. 1056*A* or 1056*B* of Blyth's *Catalogue*, nor did he give the sex, year etc., so that it is impossible to say which of the two specimens of Blyth he referred to.

Coming to the two original specimens of Blyth, one of them, No. 1056*A*, ♂, agrees with Blyth's (1843) original description as regards its dark greyish-blue colour (it is evident that Blyth was describing a male) and its size (see Table 1) which closely agrees with the dimensions given by Blyth. The particulars on the label of the specimen also agree with those given in Blyth's *Catalogue*.

On the other hand, the second specimen, No. 1056*B*, ♀, differs from Blyth's (1843) account in colour and size—it is a brown ♀, and is much smaller (W. 57, Tl. 39, Tr. 29, B. 15.5 mm.). In addition, the particulars given on the label differ from those given in Blyth's *Catalogue* firstly, in the absence of a complete number (only 1056 is given, instead of 1056*B*); and secondly, the year of collection is given as 1842 instead of 1849. The specimen, in fact, is not *H. cruralis* Bly. at all, but a female of *H. nipalensis* (Horsf. & Moore)!

Consequently, specimen No. 1056*A*, ♂, must be regarded as the *Holotype* of "*Calliope cruralis* Blyth" (Pl. I, Fig. 1.)

Type-locality.—Since, as already pointed out, Sharpe (1883) wrongly considered Hodgson as the author of *cruralis*, he regarded Nepal (whence Hodgson's specimens came) as the type-locality. This mistake has been repeated by several subsequent authors, even though the latter have recognised Blyth, and not Hodgson, as the author of *cruralis*. Thus, both Hartert (1921, p. 2134) and Rothschild (1926, p. 271) give Nepal as the type-locality of *cruralis* Blyth.

Blyth (1843, p. 935) clearly gave the type-locality as "Darjeeling" in N. Bengal (formerly in Sikkim), and the particulars on the label of the type-specimen bear this out.

Plumage, etc.—The following description is based on the specimens, including the holotype and a number of topotypes, present in the Zoological Survey of India.

Adult ♂ (Pl. I, Fig. 1; and Pl. II, Figs. 1 and 2).—Whole of upper surface deep indigo-blue. A partly concealed supercilium above the eye white due to the concealed feathers either partly (on outer and lower portions) or wholly white. Nares partly covered by black, rather stiff feathers. Ear-coverts indigo blue-black. A narrow greyish-white band on rump produced by the feathers having a subterminal band of that colour, the tips being darker. Wing-quills black on the outside,

with the exposed edges dusky-brown ; upper wing-coverts black. Lower surface like upper, but paling considerably on the abdomen and gradually merging at the sides into the deeper tint of the dorsum. Chin, throat and upper breast dark indigo-blue. Abdomen and the long feathers at its sides pale ashy-violet, with several of the feathers broadly but irregularly tipped whitish. Inner surface of wing-quills pale ashy-brown ; under wing-coverts ashy-brown ; axillaries indigo-blue. Tail, both above and below, deep indigo-blue like upper surface of body ; upper tail-coverts like tail ; under tail-coverts ashy-blue with white margins.

Adult ♀ (Pl. I, Fig. 2 ; and Pl. II, Figs. 3 and 4).—General colour above dark olivaceous-brown. A partly concealed supercilium above the eye golden-brown instead of white as in male¹. Lores, frontal edge of forehead, a narrow ring around the eye, and the feathers abutting on the gape and those below the front end of eye, russet-golden-brown ; this colour also present, although to a less pronounced degree, on the outer edges of the wing-quills on outside and on upper wing-coverts. Ear-coverts like back but with pale shafts. Nares partly covered by stiff feathers which are russet mixed with black. A narrow, greyish-white band on rump produced by the feathers having a subterminal band of that colour, the tips being pale brown. Outer surface of wing-quills like back but with more of brown and less of olive-green. Lower surface brownish. Chin, throat, chest and abdomen pale ashy-brown, the individual feathers with pale centres, giving the whole of the lower surface a patchy appearance. Long feathers at the sides of abdomen pale ashy-brown with a whitish subterminal band and pale-brown margin. Inner surface of wing-quills pale ashy-brown ; under wing-coverts and axillaries pale fulvous. Tail russet above, similar but more olivaceous below ; upper tail-coverts like upper surface of tail ; under tail-coverts fulvous.

Young ♂.—According to Sharpe (1883, p. 27), it is characterized as follows : “ Similar to adult female, but with a black lores and a concealed silky white spot over the eye ; underneath deeper olive.” (Also *vide* foot-note on this page). Delacour and Jabouille (1931, p. 100) stated that in Indo-China they obtained several males in juvenile plumage, and that these remain so throughout the year and breed in that plumage.

Soft parts.—Iris brown ; bill blackish ; legs olive-brown (Delacour and Jabouille, 1931). In dry specimens : Bill brownish black ; legs and feet dusky olivaceous-brown ; claws olivaceous-brown.

Measurements.—Measurements of eight Indian specimens (from Darjeeling, Manipur, etc.) are given in Tables 1 and 2. The length of the wing (W.), tail (Tl.) and tarsus (Tr.) were measured in the usual way (*vide* Roonwal², 1941, p. 289). The length of the upper bill

¹ No. 26942 (Nanglea Atrow, 14 Feb. 1936), has a white supercilium but is otherwise like the remaining females. It is labelled ♀ but might be a young ♂.

² Roonwal, M. L. 1941. *Revue Ind. Mus.* XI-III, pp. 281-360.

TABLE 1.

Heteroxenicus crurali cruralis (Blyth).

The sex is given within brackets when determined by plumage alone and not by examination of the gonads. (W., Tl., Tr., length of wing, tail and tarsus respectively; B., length of bill from base; b., width of bill across middle of nares.)

Registered Number.	Locality.	Date of collection.	Collector.	Sex.	Measurements (in mm.).					Percentage of tarsus-length to wing-length. $\left(\frac{\text{Tr.}}{\text{W.}} \times 100\right)$	Percentage of tail-length to wing-length. $\left(\frac{\text{Tl.}}{\text{W.}} \times 100\right)$
					W.	Tl.	Tr.	B.	b.		
1056A (A.S.B.) (Holotype) ..	Darjeeling (N. Bengal)	1842	Purchased ..	♂	64	46	32	15	3.8	50.0	71.9
10982 (Z.S.I.)		28th June 1875 ..	W. E. Brooks. (Exchange.)	♂	71	48	33	15	4.0	46.5	67.6
18214 (Z.S.I.)	Darjeeling ..	Before 1889 ..	G. Masson ..	(♂)	68	48	31	15	4.0	45.6	70.6
18147 (Z.S.I.)	Ditto ..	Ditto ..	Ditto. ..	(♂)	70	45	32	15	4.5	45.7	64.3
26940 (Z.S.I.)	Nanglea Atrow, 63 miles W. of Imphal on Silchar Road, Manipur.	13th Feb. 1936 ..	Z.S.I. Naga Hills & Manipur Survey.	♂	71	48	32	..	4.1	45.1	67.6
24201 (Z.S.I.)		Before 1902 ..	E. C. Stuart Baker. (Purchased).	(♀)	68	47	31	15	5.1	45.6	69.1
26941 (Z.S.I.)	Nanglea Atrow, Manipur.	14th Feb. 1936 ..	Z.S.I. Naga Hills & Manipur Survey.	♀	68	47	29	15	4.1	42.6	69.1
26942 (Z.S.I.)	Ditto ..	Ditto ..	Ditto ..	♀*	65	46	30	..	4.1	46.2	70.8

*Juvenile male?—See foot-note, on previous page

(B.) was measured from the tip to the base (through the feathers) where it meets the skull ; and the width (b.) across the middle of the nares.

TABLE 2.

Heteroxenicus cruralis cruralis (Blyth).
Summary of measurements (in mm.), etc. (From Table 1.)

Sex, etc.		W.	Tl.	Tr.	B.	b.	$\frac{\text{Tr.}}{\text{W.}} \times 100$	$\frac{\text{Tl.}}{\text{W.}} \times 100$
5 ♂♂	{ Range ..	64-71	45-48	31-33	15	3.8-4.5	45.1-50.0	64.3-71.9
	{ Average ..	(68.8)	(47)	(32)	(15)	(4.1)	(46.6)	(69.6)
3 ♀♀	{ Range ..	65-68	46-47	29-31	15	4.1-5.1	42.6-46.2	69.1-70.8
	{ Average ..	(67)	(46.7)	(30)	(15)	(4.4)	(44.8)	(69.7)

The males are slightly larger than the females as regards the wing-, tail- and tarsus-lengths. The bill is equally long in both sexes, but is appreciably wider in females than in males. The percentages of tail-length and tarsus-length to wing-length are given for comparison with allied species as these ratios are of systematic importance (*vide* Ticehurst, 1939 ; and Roonwal, 1939).

Comparisons.—The following key would separate *H. cruralis* from *H. nipalensis* :—

- Chin and throat white. Size smaller.
Wing¹ 57-64 ; tail 27-39 mm. *nipalensis*.
Chin and throat indigo-blue (adult ♂)
or pale ashy-brown (adult ♀ and juvenile² ♂).
Size larger. Wing 64-71 ; tail 45-48 mm. *cruralis*.

Distribution, etc.—The following is the known range of *H. c. cruralis* :—Himalayan region from Nepal eastward, across Sikkim, N. Bengal (Darjeeling, type-locality), Assam (including Manipur) and northern and central Burma to south Yunnan (*vide infra*) in China and in Tongking [Tonkin], “ Haut-Mékong ” and Luang Rabang in northern French Indo-China. Occurs between about 1,000 to 10,000 feet altitude above sea-level, probably even higher in the breeding season.

Some further remarks are necessary in amplification of the above statement. Stuart Baker (1924, p. 18) included some areas west of Nepal, *viz.*, the Simla Hills (Punjab) and Garhwal (United Provinces), but these inclusions seem to be without authority. In Burma *H. c. cruralis* has been recorded from north-western Burma (the Chin and

¹ Occasionally very large specimens are met with, like the female recorded by Roonwal (1939, p. 287) from Gish in the Bengal Duars which measured as follows : W. 70 Tl. 45 ; Tr. 26 ; C. (culmen) 16 mm.
² Males sometimes breed in juvenile plumage.

Kachin Hills ; and the Upper Chindwin District) and central Burma (Karenni Hills), but it does not extend, according to Smythes (1940, p. 88), to Arakan, the Shan States and further south to Tenasserim. Sharpe's (1883, p. 26) inclusion of "Tenasserim" within its range was evidently an error, but probably explicable on the basis that in those days "Tenasserim" implied not merely south Burma but also a considerable portion of central Burma.

Besides *H. c. cruralis*, two other subspecies have been described, both from southern China, as follows :—

H. c. formaster, Thayer and Bangs, *Mem. Mus. compar. Zool Harvard* XL, no. 4, p. 169 (1912), type-locality Washan Mt., 10,000 ft., W. Szechwan.

H. c. laurentei, La Touche, *Bull. Brit. orn. Cl.* XLII, p. 29 (1921), type-locality Mengtz, S. E. Yunnan, 4,000 ft. According to Greenway (1933, p. 139) and Delacour & Greenway (1940, p. 41) it is synonymous with *H. c. formaster* ; and further, the Yunnan birds which Rothschild (1926) called *H. c. cruralis* are probably *formaster*.

It is also probable that the Chinese Short-wing, *H. sinensis*¹ Rickett and La Touche, *Bull. Brit. orn. Cl.* VI, p. 50 (1897), type-locality Kuatun, N. Fohkien, China, is a race of *H. c. cruralis* very close to, if not identical with, *H. c. formaster*.

Breeding.—*H. c. cruralis* breeds all over its range from about 5,000 to 10,000 feet altitude above sea-level. The breeding season is from early May to the end of July. Hume (1875) gave the breeding season as April and May in Nepal and Darjeeling, but from the data provided by several later observers the breeding season all over the range is from early May to the end of July.

¹The specimens from Assam recorded by Stuart Baker, *Fauna Brit. India, Birds* 2nd ed., II, p. 20 (1924), as *H. sinensis* are really *H. cruralis*, as shown by Ticehurst, *Ibis* (14) IV, p. 724 (1940). Since these were the sole "Indian" specimens, *H. sinensis* does not belong to the Indian fauna at all.

EXPLANATION OF PLATE I.

Photographs of *Heteroxenicus cruralis cruralis* (Blyth). $\times 2/3$.

FIG. 1.—Male, No. 1056*A* (A. S. B.). Holotype.

FIG. 2.—Female, No. 24201 (Z. S. I.).



1.



2.

HETEROXENICUS CRURALIS CRURALIS (BLYTH)
Male (above), female (below)

EXPLANATION OF PLATE II.

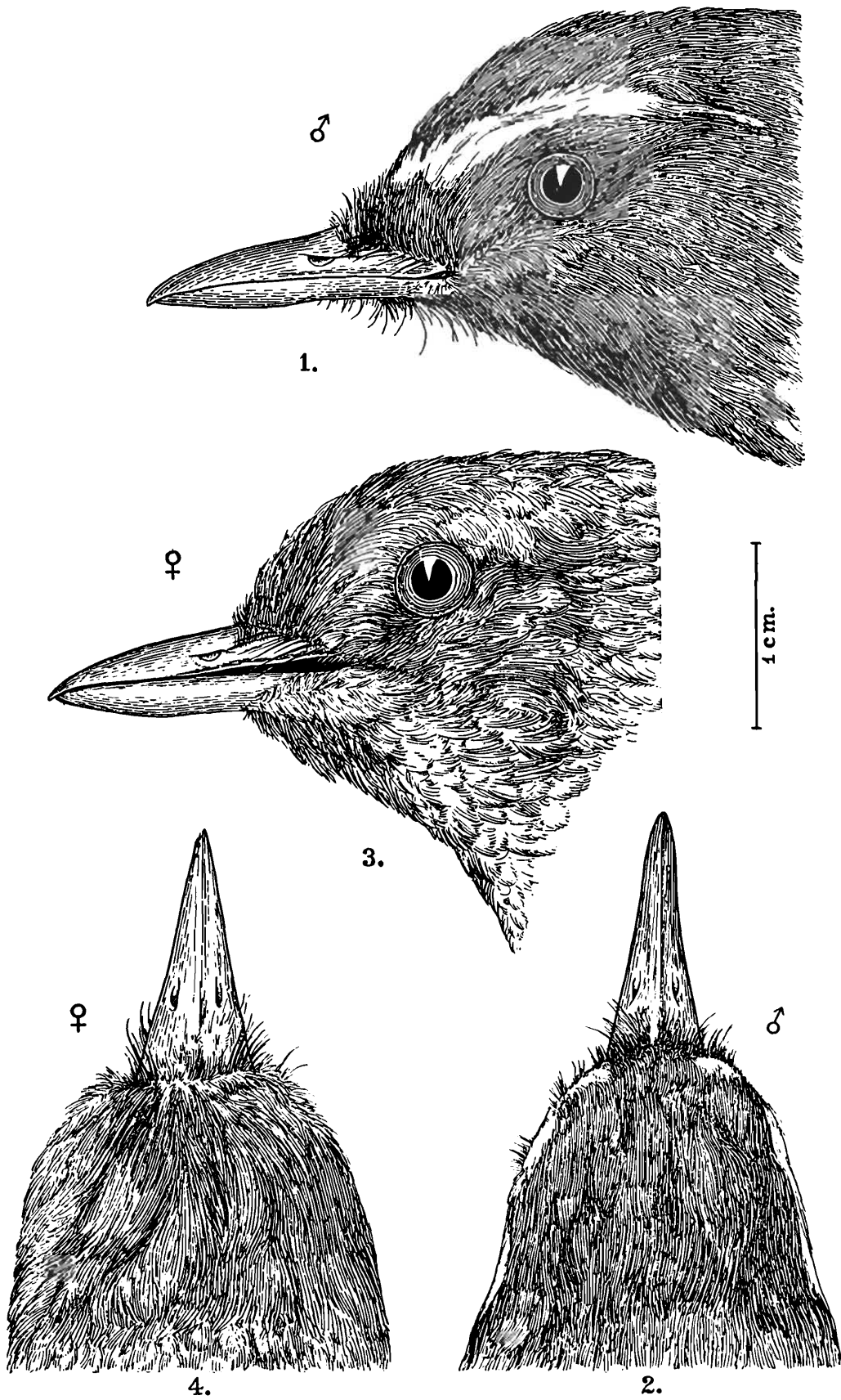
Heads of *Heteroxenicus cruralis cruralis* (Blyth). $\times$ about 2.

FIG. 1.—Male, No. 18147 (Z. S. I.). Side view.

FIG. 2.—Same, dorsal view.

FIG. 3.—Female, No. 24201 (Z. S. I.). Side view.

FIG. 4.—Same, dorsal view.



HETEROXENICUS CRURALIS CRURALIS (BLYTH)

PRELIMINARY DESCRIPTIONS OF TWO NEW SPECIES OF *PALAEMON* FROM BENGAL.

By KRISHNA KANT TIWARI, M.Sc., Research Scholar, Zoological Survey
of India, Banaras.

IN studying the collection of Palaemons from Bengal preserved in the Zoological Survey of India, with the ultimate object of revising the genus *Palaemon*, I have come across two species which are new to science. As a complete revision of this large genus is likely to take sometime, I have considered it desirable to publish brief descriptions, giving the major diagnostic characters of these two species. Fuller descriptions and illustrations will be published later.

***Palaemon villosimanus*, sp.nov.**

This species resembles *P. carcinus* (Fabr.) in the structure of rostrum and telson, and *P. weberi* deMan (from Celebes) and *P. idae* Heller, in the structure of second peraeopods. It can, however, be distinguished from these by a combination of the following characters :—

Rostrum is long and narrow, exceeding the antennal scale by one-fifth to one-third its length. The proximal part of the rostrum is conspicuously convex over the eyes and the distal half is strongly upturned. The rostral formula is $\frac{12-14}{7-10}$ (usually $\frac{13}{8-9}$). Of the teeth on the upper border, the first two, rarely three, are on the cephalothorax behind the orbital border. The first 8, 9 or 10 teeth are more closely situated than the rest, which are more widely spaced. The last tooth is usually sub-apical, and the penultimate tooth is very near the last. The lower teeth are almost equidistant. There are scattered small spinules, chiefly over the dorsal surface, on the carapace.

The first peraeopods exceed the antennal scale by the chela and a portion of the carpus. The second peraeopods are long and slender, much longer than the body in fully mature males. The entire cheliped is beset with spinules, which are much better developed on the under-surface. The merus and palm are sub-equal, the palm being usually slightly shorter. The carpus is long, slender, cylindrical and of uniform thickness. It is about one-third of the entire cheliped. The chela is usually slightly shorter than the carpus, but rarely may be equal to it, or even slightly longer (cf. *P. idae* and *P. weberi*). The fingers are short, being usually a little less than half the length of the palm. The mobile finger is densely pubescent and free from spinules whereas the fixed finger is sparsely pubescent on the upper and lower surfaces only, and also beset with spinules. Telson is as in other *Palaemons* but the apex is rather long and acute, and the inner sub-terminal spinules fail to reach the apex.

I have examined a large number of adult males of this species from Calcutta and Chittagong hill tracts, and two males from Rangoon.

Holotype.—*Male*: Reg. No. C $\frac{2841}{1}$, Zoological Survey of India.

Rostral formula $1\frac{3}{8}$, third tooth on the orbital border. Body 146.4 mm. Carapace 34.0 mm. Rostrum 38.0 mm.

		*I	M	C	P	F	Total
II Peraeopods	{ Right	21.1	25.6	33.5	23.0	11.3	114.5
	{ Left	25.1	28.5	42.3	26.0	13.8	135.7

Locality.—Calcutta, Pulta Waterworks, May 1941.

One of the bottles, containing three examples of the present species from Calcutta Bazar, is labelled as "*Palaemon villosimanus*, Blyth." As I have not been able to find a reference to this name in literature, I have retained it for this species.

***Palaemon kemp*, sp.nov.**

This species is based on the material collected by the late Drs. Annandale and Kemp from the Chittagong district and as a mark of respect to the memory of that great Carcinologist, I name it after Dr. Kemp. This species closely resembles *P. hendersoni* de Man, but can be distinguished from it by (i) the absence of fluting and pubescence on the fingers and (ii) the presence of a dense felt of hair on the inner border of the palm, the latter character being specific of this species only. This species can be easily recognised by the following characters:—

Rostrum is short, reaching up to the middle or the end of the third segment of the antennular peduncle. The upper edge of the rostrum is moderately convex with the apex sloping downwards. The rostral formula is $\frac{8}{2-3}$. The first two teeth of the upper edge are placed on the carapace behind the orbital border. The distance between successive teeth diminishes as they approach the tip. The carapace is rough. The first peraeopods exceed the antennal scale by almost the entire chela. The second peraeopods are stout, more than half as long as the body, coarsely granular, and very variable as regards the proportion of different segments. The carpus is shorter than the merus, palm and fingers, and its distal end is somewhat thickened. It is about one-third to two-fifths as long as the entire chela. The palm is slightly thicker than the distal end of the carpus; it is somewhat compressed and bears a dense felt of hair on its inner border. Fingers are equal, slightly shorter than palm; pubescence and grooving are absent. Telson and its spinules are as in *Palaemon hendersoni* de Man.

*The abbreviations I, M, C, P and F stand for ischium, merus, carpus, palm, and finger respectively.

Types.—Regd. No. C $\frac{2842}{1}$, Zoological Survey of India.

Male—Rostral formula $8\frac{2}{2}$. Body 48.0 mm. Carapace 13.0 mm., Rostrum 5.0 mm.

	I	M	C	P	F	Total
II. Peraeopod Left.	4.5	5.5	4.3	7.6	6.9	28.8

Female (egg-bearing) Rostral formula $8\frac{2}{3}$. Body 43.0 mm. Carapace 11.0 mm., Rostrum 6.0 mm.

	I	M	C	P	F	Total
II. Peraeopod left.	4.3	4.7	3.9	5.9	5.2	24.0

Locality.—In a small stream between Chittagong and Sultan Bagu Bastan, January 1913.

ON A NEW SPECIES OF *PALAEMON* FROM BANARAS, WITH A
NOTE ON *PALAEMON LANCHESTERI* DE MAN.

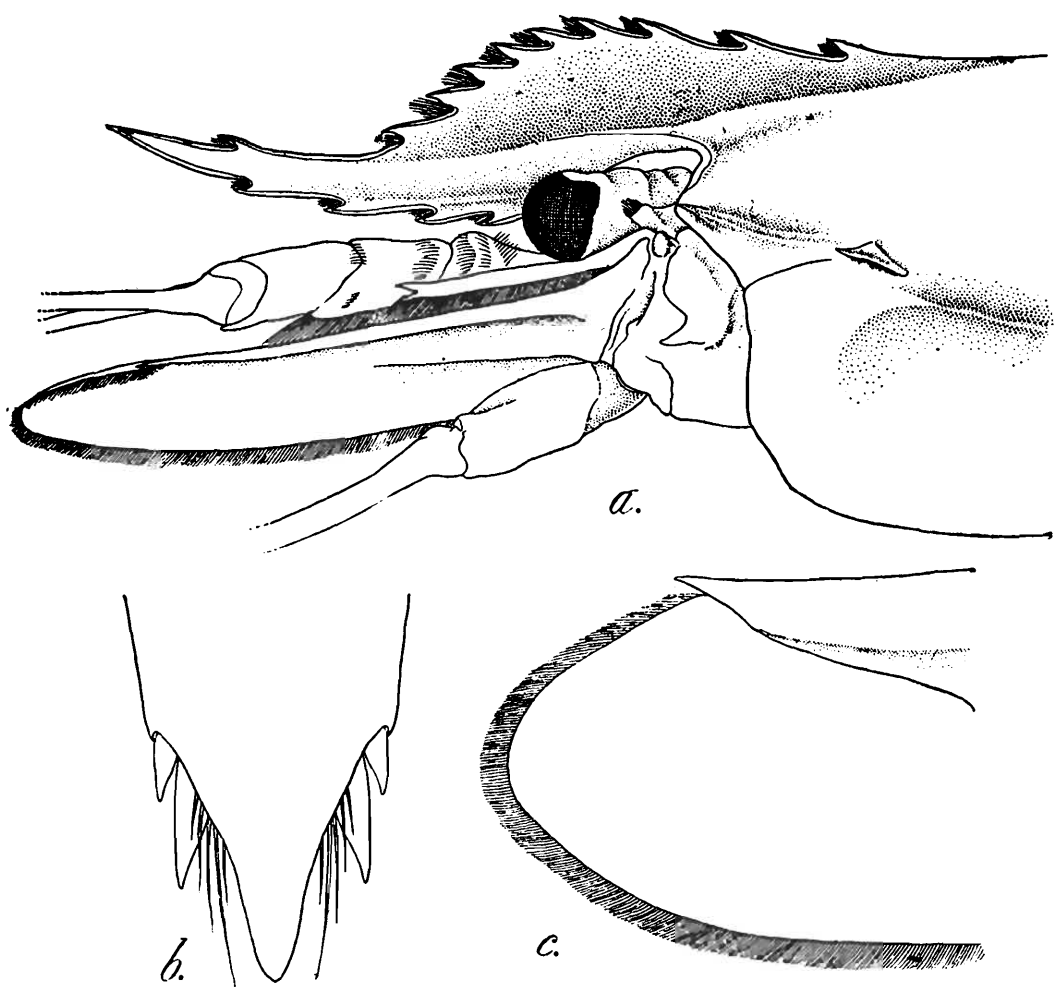
By KRISHNA KANT TIWARI, M.Sc., Research Scholar, Zoological Survey of
India, Banaras.

The material for this paper was obtained partly from the fish market in Banaras in the U. P., and partly from collections preserved in the Zoological Survey of India.

Of the two species dealt with in this note, one is new to science, while the other is recorded from India for the first time and is of considerable interest from the zoogeographical point of view. I am indebted to Dr. S. L. Hora and Dr. B. N. Chopra for constant help and guidance in the course of this work.

***Palaemon choprai*, sp. nov.**

The rostrum in this species is rather short (Text-fig. 1*a*), usually extending as far as the spine of the antennal scale. In some cases it



TEXT-FIG. 1.—*Palaemon choprai*, sp. nov.

a. Lateral view of the anterior region of the body of an adult male : $\times 2$; *b.* Dorsal view of the posterior end of the telson in the same animal : $\times 20$; *c.* Anterior end of the antennal scale : $\times 4\frac{2}{3}$.

just reaches the end of the antennular peduncle, and very rarely it may extend upto the end of the antennal scale. The proximal two-thirds of the dorsal edge of the rostrum forms an elevated, highly convex keel, very much like that in *Palaemon weberi* de Man* (from Celebes), the distal one-third being narrow, sharp, tapering towards the apex, and occasionally slightly upturned distally. A well-marked lateral ridge separates the dorsal, deep, convex keel from the narrow ventral edge.

The proximal keel on the dorsal border of the rostrum usually bears about 9 or 10 teeth, rarely 8 or 11, the narrow distal portion carrying one or two, rarely three teeth. In the 23 specimens examined the following is the arrangement of the dorsal teeth :—

2 specimens bear	8 proximal teeth ;
8 " "	9 " " ;
12 " "	10 " " ;
1 specimen bears	11 " " ;
and 12 specimens have	1 distal tooth ;
10 " "	2 " teeth ;
1 specimen has	3 " "

The usual number of dorsal teeth may thus be represented as 9 or 10+1 or 2, whereas the total range of variation is 8 to 11+1 to 3. The lower edge usually bears four or five, occasionally six teeth, which are carried on the distal two-thirds of the ventral edge, and are more or less equidistant. Of the proximal teeth on the dorsal edge, the two posterior most are more widely separated from each other and are borne on the carapace just behind the orbital border. The distal teeth are more widely spaced. When there is only one distal tooth it often stands mid-way between the anterior most proximal tooth and the apex, when more than one, the last tooth is usually sub-apical and smaller than the rest.

The carapace is rough and scabrous as in *Palaemon malcolmsoni* H.M.-Edw. The hepatic spine is shorter than the antennal spine. A deep, oblique, sub-hepatic sulcus is present below the hepatic spine (Text-fig. 1a). The branchial region is clearly defined by another deep groove which starts behind the sub-hepatic sulcus and arches upwards towards the posterior border. Another groove runs dorsally for a short distance on the posterior half of the carapace.

The cornea is broader than the eyestalks and the ocellus is well marked. The antennular peduncle is normal in form. The lateral process of its basal segment extends upto the middle of the second segment and bears a small tooth. In dorsal view the third segment appears to be slightly longer than the second. The outer antennular flagellum is fused with its fellow of the inner side for about one-sixth of its length. The antennal scale is parallel-sided with its outer margin straight and apex oval (Text-fig. 1c).

The mandibular palp is three-segmented.

The third maxillipeds reach almost upto the middle of the antennal scale.

* De Man, J. G., in *Max Webber's Zool. Ergeb. Nederland, Ost-Ind.* II, pp. 421-427, Taf. xxv, Fig. 33 (1892).

The first peraeopods exceed the antennal scale by the chela and about half the carpus. In an adult male, from the Ganga at Banaras, measuring 168.0 mm., the first peraeopod of the right side has the following measurements (in mm.) :—

Ischium	Merus	Carpus	Palm	Finger	Total
13.0	19.5	25.5	5.0	4.5	67.0

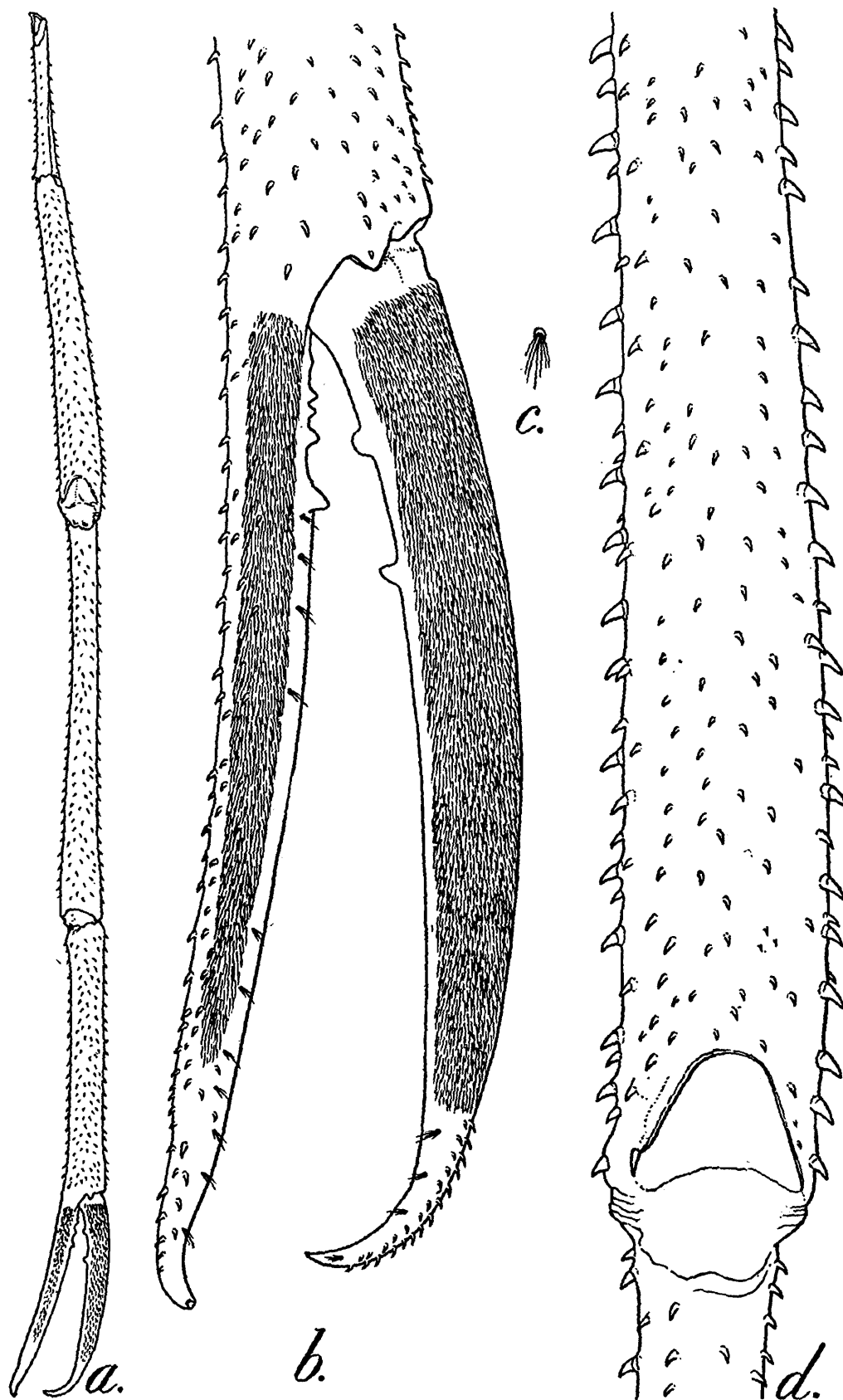
The merus is about three-fourths the length of the carpus ; the carpus is slightly less than three times the length of the chela and is about three-eighth of the entire peraeopod. The fingers are slightly shorter in length than the palm. The fingers, lower border of the palm, inner edge of the ischium, and the basis are setose, the rest of the ischium is scabrous.

The second peraeopods (Text-fig. 2a) are stout, subequal and always longer than the body in an adult male, being about one and a third to about one and two-thirds of the body-length. All the joints of the second peraeopods, with the exception of a major portion of the mobile finger, are beset with strong, broad-based forwardly-directed spinules. The spinules are larger on the undersurface (Text-fig. 2 d) of the merus and carpus. The remaining portions bear rather smaller spinules which continue, although scantily, on the immobile finger. Only the tip of the mobile finger is spinulose (Text-fig. 2b).

In the example from the Ganga, referred to above, the following are the dimensions of the second peraeopods :—

	Ischium	Merus	Carpus	Palm	Finger	Total
Right	35.8	56.0	72.1	51.9	32.8	248.6
Left	35.4	56.6	71.8	54.0	33.1	250.9

The ischium is, as usual, compressed and laterally grooved. The merus is cylindrical and of more or less uniform thickness, its distal end, however, being slightly swollen (Text-fig. 2a) and thicker than the carpus. One of the characteristic features of *Palaemon choprai* is that the merus is *usually longer than the palm*. In seven adult males from Banaras, the merus is longer than the palm, while in three it is slightly shorter. In many examples from Assam and Bihar in the Zoological Survey collection, this feature of merus is constant. In this respect *P. choprai* conspicuously differs from *P. malcolmsoni* in which *the merus is always shorter than the palm*. Taking the total length of the entire cheliped as 100, the length of the merus is usually between 20.8—23.0 (average 22.0). The carpus is slenderer than the merus, cylindrical and very slightly thickened distally (Text-fig. 2a). In the male, measurements of which are given above, the length of the carpus is about eleven times its distal thickness. The average length of the carpus is about 29 per cent. of the entire peraeopod, the range of variation being from 25.7 per cent. to 30.5 per cent. The carpus, therefore, appears to be more variable in length than the merus. The palm is cylindrical, uncompressed, usually shorter than the merus. Distally there is a longitudinal groove along each side of the palm. It measures from 20.4 per cent. to 24.2 per cent. of the entire cheliped. The fingers are about three-fifths the length of the palm (variation in percentage length being 11.9—14.7 per cent.). The tip of the mobile finger is acutely incurved (Text-fig. 2b) and is spinulose, while that of the fixed finger is less so.

TEXT-FIG. 2.—*Palaemon choprai*, sp. nov.

a. Entire left second peraeopod of an adult male: $\times 2$; b. Anterior half of the chela: $\times 3\frac{1}{2}$; c. A tuft of hair on the finger: $\times 3\frac{1}{2}$; d. Dorsal view of the anterior portion of the merus: $\times 3\frac{1}{2}$.

The inner edge of the mobile finger is concave and bears two conical teeth ; the distal tooth which is sharper, being situated at a distance of about one-third length of the finger, from the joint. The proximal tooth is situated midway between the distal tooth and the joint (Text-fig. 2b) and is blunt. The mobile finger is densely pubescent except towards the tip and along the inner edge, and in the area covered with hair it is free from spinules. The outer border of the fixed finger forms a slight curve with the border of the palm, the inner, cutting edge having the same curve. This finger is sparsely spinulose and is pubescent along its dorsal and ventral surfaces. The inner edge bears a big conical tooth which fits between the two teeth of the mobile finger. This tooth is followed by a crenated ridge bearing two or three tubercles. When the fingers close, their tips cross each other, and there is a more or less narrow gap between the apposed margins, the gap being slightly wider distally.

A table of measurements of the various joints in the second peraeopods of some adult examples from Banaras is given on pages 343, 344.

The last three pairs of peraeopods are comparatively slender. With the exception of their dactyli all are scabrous. All the three pairs exceed the antennal scale by their dactyli and half of the propodites. The fifth pair is the longest. The merus is about nine to 10 times as long as thick and is about two and a half times longer than the carpus in the third and fourth pairs and about twice as long as the carpus in the fifth. The dactyli are slightly curved, spineless and have their outer margins fringed with setae.

The sixth abdominal somite, measured dorsally, is one and a half times as long as the fifth, and about three-fourths of the length of the telson. The telson bears the usual two pairs of dorsal spinules and ends in a rather acute apex (Text-fig. 1b). The outer sub-terminal spinules are very small, the inner pair is about twice as long as the outer and fails to reach the apex of the telson.

Appendix masculina is fully developed in all the male examples.

Females.—As usual in a large number of Palaemons, *P. choprai* exhibits considerable sexual dimorphism. In females, the body is usually shorter, less stout, smooth, and the second peraeopods are about half the length of the body. The rostrum is proportionately longer and the dorsal keel is not so deep as in the males. In the second pair of legs, *the propodus is shorter than the carpus*, the palm is proportionately much shorter than the merus and the ischium is much longer.

The first and second peraeopods of an egg-bearing female, 130.5 mm. in body-length, have the following measurements (in mm.) :—

		Ischium	Merus	Carpus	Palm	Finger	Total
I Peraeopod	Right	8.1	10.9	14.1	3.2	2.8	39.1
	Left	8.0	10.6	14.0	3.2	2.6	38.4
II Peraeopod	Right	15.0	12.2	18.1	8.7	6.6	60.6
	Left	14.9	12.3	18.3	8.7	6.7	60.9

It will be seen from the above measurements that both the merus and the palm are considerably shorter than the ischium in the second peraeopods.

Young.—Although no young specimens were obtained from the Ganga at Banaras. the collections in the Zoological Survey of India contain many young examples, males and females, from Assam and Bihar. In younger examples, the rostrum is longer and usually exceeds the antennal scale. The convex keel over the dorsal edge of the proximal half of the rostrum is not as prominent as in adult males, and the narrow distal region is as long as the proximal keeled region. The carapace is smooth, although the characteristic sculpturing is visible. The tip of the telson is more acute than in adult examples, and the inner-sub-terminal spinules at its tip are proportionately longer and nearly reach the tip.

The second peraeopods are considerably shorter than the body, usually even less than half the entire body-length in very young examples. In examples measuring below 130 mm. in body-length, the second peraeopods are shorter than the body and have nearly the same proportions as in a female. In a specimen measuring 150.0 mm. in total body length the chelipeds are longer than the body, and have acquired the characters of adult males. It should thus be presumed that the sexual differentiation in the adult males begins somewhere beyond 130.0 mm. stage and by the time the animal attains 150.0 mm. the chelipeds show complete secondary sexual characters.

Even in very young examples, the males can be distinguished from the females by the characteristics of their chelae, which are longer than the carpus in the males but shorter in females. The fingers are proportionately longer, being about four-fifths of the length of the palm. In a very young male example from Bihar the fingers are longer than the palm. In this specimen which measures 71.0 mm. (from the tip of the rostrum to the apex of the telson), the rostrum exceeds the antennal scale by about one-fifth of its length and the proximal keeled region is as long as the narrow distal portion, the former bearing 10 and the latter two teeth, whereas the lower border carries five equidistant teeth. The second peraeopods exceed the antennal scale by the entire length of the chela and about one-third length of the carpus. The following are the measurements (in mm.) of the left leg of the second pair in this individual :—

Ischium	Merus	Carpus	Palm	Fingers	Total
7.0	7.0	8.0	4.0	6.5	32.5

It is thus seen that the finger is more than one and a half times longer than the palm, which is half as long as the carpus. In another male individual from Assam (?), with the rostral formula $\frac{(2)9+2}{4}$ and a body length of 91.0 mm. the second peraeopods show the following dimensions :—

	Ischium	Merus	Carpus	Palm	Finger	Total
Right	7.7	7.2	9.0	5.6	4.6	34.1
Left ..	10.1	9.2	11.1	6.1	6.9	43.4

In this case also the propodus is longer than the carpus and the finger slightly longer than the palm in the left leg.

A study of *P. choprai* at various stages of growth yields the following information which, on detailed investigations may appear to be applicable to a large number of other species of *Palaemon*.

In *P. choprai* (i) sexual dimorphism appears at quite an early stage, the chelae being shorter than the carpus in females and longer in males ; and (ii) in young males the fingers are proportionately long and in very young specimens are longer than the palm. An examination of the large collection in the Zoological Survey of India has shown that these characters are found in the young of many other species of *Palaemon* also.

Affinities : *Palaemon choprai* resembles *Palaemon weberi* de Man (*loc. cit*) in the shape of its rostrum and rostral formula but can be easily distinguished from it by its bigger size and much longer and stouter second cheliped. In the largest male of *P. weberi*, described by De Man, with a body length of 104 mm., the chela is a little smaller than the carpus, and the finger in the right foot less than half the length of the palm and in the left foot only about one-third of its length. In *P. choprai* the chela in the male is always longer than the carpus and the finger is always more than half the length of the palm.

Palaemon malcolmsoni H. M.-Edw. appears to be the nearest Indian ally of *P. choprai*. In the number of rostral teeth on the upper and lower edges, and the general build of the body both these species are more or less alike. *P. choprai* can, however, be distinguished from *P. malcolmsoni* by the keeled rostrum, and by the dimensions of the second peraeopods ; in *P. choprai* the palm is usually shorter than the merus, but in *P. malcolmsoni* it is always longer. The carpus is also proportionately longer in *P. choprai*.

Size.—The largest male example from the Ganga at Banaras measures 188.5 mm. (from the tip of the rostrum to the apex of the telson) and the smallest egg-bearing female is 130.5 mm. long. As the specimens were not examined fresh, coloration could not be noted.

Locality.—The types and paratypes of *Palaemon choprai* were purchased from the Banaras fish market. These prawns were caught by fishermen at Rajghat in the Ganga, near the Dufferin Bridge close to Banaras.

Besides Banaras, *P. choprai* is represented in the collection of Zoological Survey of India from the following localities :—

<i>Locality</i>	<i>Collected by</i>	<i>Date</i>
1. The River Ganga at Monghyr, Bihar.	Dr. H. A. Hafiz	March 1945.
2. Bankipore, Patna	?	June 1942.
3. Bijlee Bheel, Kamrup, District Assam.	L. W. Middleton Esq.	Jan.-Feb. 1911.
4. Saran District (?) Bihar	Mr. Mackenzie	Jan. 17, 1901.
5. Mangaldai and Tezpur, Darrang District, Assam.	Dr. B. Prashad and Dr. S. L. Hora.	Nov. 1939,

The Types.—*Male*:—*Rostrum* with proximal half strongly keeled, exceeds the antennular peduncle by 4.7 mm., fails to reach the apex of antennal scale, rostral formula $\frac{9^2+3}{6}$, first three teeth more widely separated, distal end somewhat upturned. *Second peraeopods* one and three quarters as long as the body, strong, robust, spinulated, exceeding the antennal scale by three-fourths the merus.

Measurements: Body 175.0 mm.; Carapace 48.5 mm.; Rostrum 29.8 mm.

Second peraeopods—

	Ischium	Merus	Carpus	Palm	Finger	Total length
Right	42.9 mm.	71.1 mm.	93.7 mm.	65.2 mm.	36.8 mm.	309.7 mm.
Left	42.1 mm.	70.5 mm.	90.2 mm.	62.7 mm.	38.4 mm.	303.9 mm.

Female.—*Rostrum* longer than in the male, reaching the apex of the antennal scale; proximal keel somewhat less prominent, rostral formula $\frac{10^2+2}{5}$, somewhat wider gap between the tenth and eleventh tooth, distal end slightly upturned; *second peraeopod* of right side (left broken) about half as long as the body, exceeds the antennal scale by half of the carpus, weak, feebly spinulated, non-pubescent.

Measurements: Body 116.5 mm.; Carapace 30.0 mm.; Rostrum 22.7 mm.

	Ischium	Merus	Carpus	Palm	Finger	Total length
Second peraeopod, right	14.0 m.m.	12.8 m.m.	18.4 m.m.	9.2 m.m.	7.2 m.m.	61.6 m.m.

Regd. No. C $\frac{2843}{1}$, Zoological Survey of India.

***Palaemon lanchesteri* de Man.**

1901. *Palaemon paucidens*, Lanchester, *Proc. Zool. Soc. London*, pp. 568-570, pl. xxxiii, fig. 4, (not *P. paucidens*, Hilgendorf, *Sitzber. Ges. naturf. Freunde, Berlin*, Jahrg 1893, p. 155).

1911. *Palaemon (Eupalaemon) lanchesteri*, de Man, (*nom. nov.* for *P. paucidens*. Lanchester, *nec.* Hilgendorf.) *Notes Leyden Mus.* XXXIII, p. 264. footnote.

1918. *Palaemon lanchesteri*, Kemp, *Mem. As. Soc. Bengal* VI, pp. 257-258.

This species, originally described from Singora, in Malaya, by Lanchester and later on from the Talé Sap, near Lampam, in Siam by Kemp, is recorded from India for the first time. I had the opportunity of examining these prawns from the Baroda State sent to the Survey for identification by Dr. Moses, and from Nagpur preserved in the collections of the Zoological Survey of India.

The Indian specimens agree in most characters with the description given by Lanchester and Kemp. Still, on comparison with Kemp's specimens from the Talé Sap, they show certain differences which may prove to be of more than local importance.

The following are the characters in which the Indian specimens differ from the Malayan examples :—

1. *Rostral formula*.—Lanchester gives the rostral formula of Singora examples as $\frac{5.8}{3.4}$ (usually $\frac{6}{3.4}$). The specimens from Baroda have the formula $\frac{6.9}{4.5}$ (commonly $\frac{7.8}{4.5}$) and the Nagpur specimens $\frac{6.9}{3.5}$ (usually $\frac{7.8}{4}$). Thus the rostral formula of the Indian specimens may be taken as $\frac{6.9}{3.5}$ (usually $\frac{7.8}{4.5}$) and the total range of variation in the rostral formula of *P. lanchesteri* may be represented as $\frac{5.9}{3.5}$.

2. *Carapace*.—In the Baroda examples the carapace is nearly equal to or slightly longer than the rostrum, but in the Nagpur examples it is distinctly longer.

3. *Second peraeopods*.—The Indian examples agree with Lanchester's description and measurements of the second peraeopods, but differ from the Talé Sap specimens. The following are the average percentage lengths of the various segments of the second peraeopod in examples from Malaya, Siam, and India :—

		Merus	Carpus	Palm	Finger
Singora	..	28.57	40.00	18.57	13.00
Talé Sap	..	29.20	44.00	15.20	11.50
Baroda	..	27.88	40.46	18.56	12.87
Nagpur	..	28.47	39.00	17.80	13.40

The above measurements show that in Kemp's examples from the Talé Sap, the carpus is proportionately longer, whereas the palm is shorter. Kemp had also noticed this difference. (Table 2 on page 345 gives measurements of the joints of second peraeopods in some specimens from Nagpur and Baroda).

4. *Eggs*.—Lanchester has not given the size of eggs in the Singora examples. According to Kemp the eggs in Talé Sap examples measure 1.05 mm. $\times$ 0.78 mm. The Indian specimens have bigger eggs varying from 1.20 mm.-1.64 mm. in longer diameter and 1.00 mm.-1.24 mm. in the shorter diameter.

5. *Size*.—The Indian specimens are slightly bigger in size than those from Malaya and Siam.

Affinities.—Lanchester doubted the validity of his species (*P. paucidens*) and he thought it might prove to be a young stage of *P. idae* Heller. It is now certain that *P. lanchesteri* is distinct from *P. idae*, from whom it differs in size, rostral formula and proportions of second peraeopods. Even in very young examples of *P. idae* the number of teeth on the upper

edge of rostrum is usually much more than in *P. lanchesteri*, and the chela is longer.

Palaemon dayanus Henderson has a rostral formula nearly like that of *P. lanchesteri* but in *P. dayanus* the chela of the second peraeopods is longer than the carpus and this species shows sexual dimorphism.

Palaemon talvarae Blanco¹ from the Philippines does not show sexual dimorphism, and the telson in this species resembles that of *P. lanchesteri*. It has, however, a different rostral formula and the fingers are as long as the palm.

Palaemon lamarrei H. M.-Edw. also appears to be a close ally of *P. lanchesteri*. Both these species are primitive in as much as they do not show any sexual dimorphism; in both of them the second peraeopods of male are slender, and the carpus is much longer than the chela.

P. lamarrei, however, differs from *P. lanchesteri* in having a longer rostrum with a larger number of ventral teeth. The carpus of the second peraeopods of *P. lamarrei* is proportionately longer and in this respect it resembles the examples of *P. lanchesteri* from the Talé Sap.

Distribution.—The record of this Malayan species from the Satpura Trend of Mountains (Nagpur and Baroda) is of special interest. In the case of hill-stream fishes, Hora² has adduced evidence to show that waves of migration of Malayan fauna passed over the Eastern Himalayas and Assam Hills to the Satpura Trend of Mountains and thence to the Western Ghats and the extreme south of India. The discontinuous distribution of *Palaemon lanchesteri* lends support to the hypothesis advanced by Hora.

¹ Blanco, G. J., *Philippine Jour. Sci.* LXIX, pp. 168-169, pl. ii, (1939).

² Hora, S. L., *Proc. Nat. Inst. Sci. India* X, pp. 423-439 (1944). (See list of references for earlier literature).

TABLE 1.—*Measurements of Palaemon choprai; sp. nov., from Banaras, U. P.*

No.	Sex	Rostral formula	Total length of the body	Length of carapace	Length of rostrum	Second Peraeopods					
						Total length	Ischium	Merus	Carpus	Palm	Finger
1	♂	$\frac{(2) 9+3}{6}$	188.5	47.0	31.0	{ R 307.2 L 301.1	40.3 39.7	70.8 70.0	93.8 90.1	65.5 62.9	36.8 38.4
2	♂	$\frac{(2) 9+2}{4}$	186.5	45.7	32.1	{ R 306.0 L 318.7	39.1 40.5	67.8 69.6	89.0 95.5	69.7 70.0	40.4 43.1
3	♂	$\frac{(2) 10+1}{5}$	178.0	45.0	28.8	{ L 260.4 R 284.5	36.3 40.0	58.4 63.8	75.9 86.4	53.8 59.3	35.4 35.0
4	♂	$\frac{(2) 10+2}{4}$	177.0	..	..	L 288.3	40.0	65.0	86.8	61.1	35.4
5	♂	$\frac{(2) 10+1+1}{5}$	176.2	44.4	30.0	{ R 200.4 L 202.8	32.0 33.0	42.5 42.2	51.5 53.8	45.0 44.0	29.4 29.8
6	♂	$\frac{8+1+1}{4+(2)}$	174.0	..	..	{ R 251.9 L 243.5	34.7 33.0	56.4 55.0	74.2 69.0	53.3 54.9	33.3 31.6
7	♂	$\frac{(2) 10+1}{5}$	173.1	43.5	28.5	{ R 247.7 L 252.5	37.3 36.7	55.7 56.8	71.4 71.0	51.7 53.8	31.6 33.2
8	♂	$\frac{(3) 11+1}{5}$	168.5	38.3	28.8	{ R 220.6 L 225.7	30.6 30.7	47.0 48.3	63.2 64.9	52.0 63.0	27.8 28.8
9	♂	$\frac{10+1}{4}$	166.0	..	..	{ R 216.2 L 227.0	30.0 32.0	47.8 49.9	62.4 65.6	49.4 51.1	26.6 28.4

N.B.—(i) All measurements are taken in millimeters.

(ii) The abbreviations R and L denote the peraeopod of right and left sides respectively.

TABLE 1.—Measurements of *Palaemon choprai*, sp. nov., from Banaras, U. P.—contd.

No.	Sex	Rostral formula	Total length of the body	Length of carapace	Length of rostrum	Second Peraeopods					
						Total length	Ischium	Merus	Carpus	Palm	Finger
10	♂	$\frac{(2) 10+1}{5}$	164.0	38.5	29.5	{ R 215.3	30.2	47.0	62.6	46.5	29.0
						{ L 215.5	31.0	46.7	62.5	46.6	28.7
11	♀ (egg-bearing)	$\frac{(2) 10+2}{6}$	130.5	28.2	26.8	{ R 60.6	15.0	12.2	18.1	8.7	6.6
						{ L 60.9	14.9	12.3	18.3	8.7	6.7
12	♂ "	$\frac{(2) 10+2}{5}$	129.5	28.8	24.6	{ R 62.7	14.8	13.0	18.6	9.1	7.2
						{ L 62.8	15.0	13.0	18.4	9.3	7.1

TABLE 2.—*Measurements of Palaemon lanchesteri, de Man.*

Locality	No.	Sex	Rostral formula	Total length of the body	Length of carapace	Length of rostrum	Second Peraeopods					
							Ischium	Merus	Carpus	Palm	Finger	Total length.
Nagpur, C. P.	1	♀ (egg-bearing)	$\frac{1}{7/4}$	52.8	12.8	7.7	R 4.6	4.9	6.5	3.3	2.5	21.8
							L 4.5	4.7	6.3	3.4	2.4	21.3
" "	2	♀ (")	$\frac{1}{7/4}$	51.6	11.3	9.2	R 5.2	4.8	6.4	3.1	2.2	21.7
							L 5.1	4.7	6.5	3.3	2.1	21.7
" "	3	♀ (")	$\frac{1}{7/4}$	50.4	10.5	9.0	R 4.8	4.9	6.8	2.9	2.3	21.7
							L 4.6	4.6	6.7	3.1	2.0	21.0
" "	4	♀ (")	$\frac{2}{9/5}$	46.8	10.7	8.0	L 4.4	4.4	6.0	3.0	2.0	19.8
Baroda	5	♀ (")	$\frac{1}{7/5}$	54.8	10.8	10.2	4.9	5.0	7.3	3.0	2.7	22.9
"	6	?	$\frac{1}{7/5}$	54.5	10.6	10.6	4.5	4.5	7.2	3.3	2.2	21.7
"	7	♀	$\frac{1}{7/4}$	51.2	10.5	9.5	4.3	4.6	6.1	2.9	1.8	19.7
"	8	♀	$\frac{1}{7/4}$	50.8	9.6	9.1	4.6	4.6	6.6	3.1	2.1	21.0
"	9	♂	$\frac{1}{7/4}$	38.5	7.9	8.3	3.7	3.5	4.8	2.2	1.6	15.6

NOTES ON A COLLECTION OF AQUATIC RHYNCHOTA FROM THE PATNA STATE, ORISSA, WITH DESCRIPTIONS OF TWO NEW SPECIES.

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INTRODUCTION.

The collection of Aquatic Rhynchota made from tanks, rivers and streams of the Patna State, Orissa, surveyed in March 1946, comprises twenty-eight species belonging to fourteen different genera of the following eight families :—

Family PLEIDAE.
Plea indistinguenda Matsumura.
Plea (*Paraplea*) *frontalis* (Fieber).

Family NOTONECTIDAE.
Anisops (*Anisops*) *sardea* (Herrich-Schäffer).
Anisops (*Anisops*) *breddini* Kirkaldy.
Anisops nasuta Fieber.
Anisops (*Anisops*) *nivea* (Fabricius).

Family CORIXIDAE.
Subfamily *Micronectinae*.
Micronecta (*Basileonecta*) *scutellaris* scutellaris (Stål).
Micronecta (*Basileonecta*) *quadristrigata* Breddin.
Micronecta (?*Dichaetonecta*) *haliploides* Horvath.
Subfamily *Corixinae*.
Corixa (*Tropocorixa*) *distorta* Distant.
Corixa (*Tropocorixa*) *promontoria* Distant.

Family NEPIDAE.
Cercotmetus fumosus Distant.
Laccotrephes griseus (Guér.).
Laccotrephes ruber (Linn.).
Ranatra filiformis (Fabricius).

Ranatra varipes Stål.
Ranatra elongata Fabricius.
Ranatra titilaensis, sp. nov.
Ranatra digitata, sp. nov.

Family HYDROMETRIDAE.
Hydrometra vittata Stål.

Family VELIIDAE.
Microvelia douglasi Scott.

Family GERRIDAE.
Subfamily *Gerrinae*.
Cylindrostethus productus (Spinola).

Subfamily *Halobatinae*.
Metrocoris stali (Dohrn).

Subfamily *Ptilomerinae*.
Ptilomera sp.

Family BELOSTOMATIDAE.
Sphaerodema molestum (Duf.).
Sphaerodema rusticum (Fabr.).
Sphaerodema annulatum (Fabr.).
Lethocerus indicus (Lep. & Serv.).

SYSTEMATIC ACCOUNT.

Plea indistinguenda Matsumura.

1905. *Plea indistinguenda*, Matsumura, *J. Sapporo Coll. Agric.* II, pp. 59, 60. taf. 1, fig. 7.

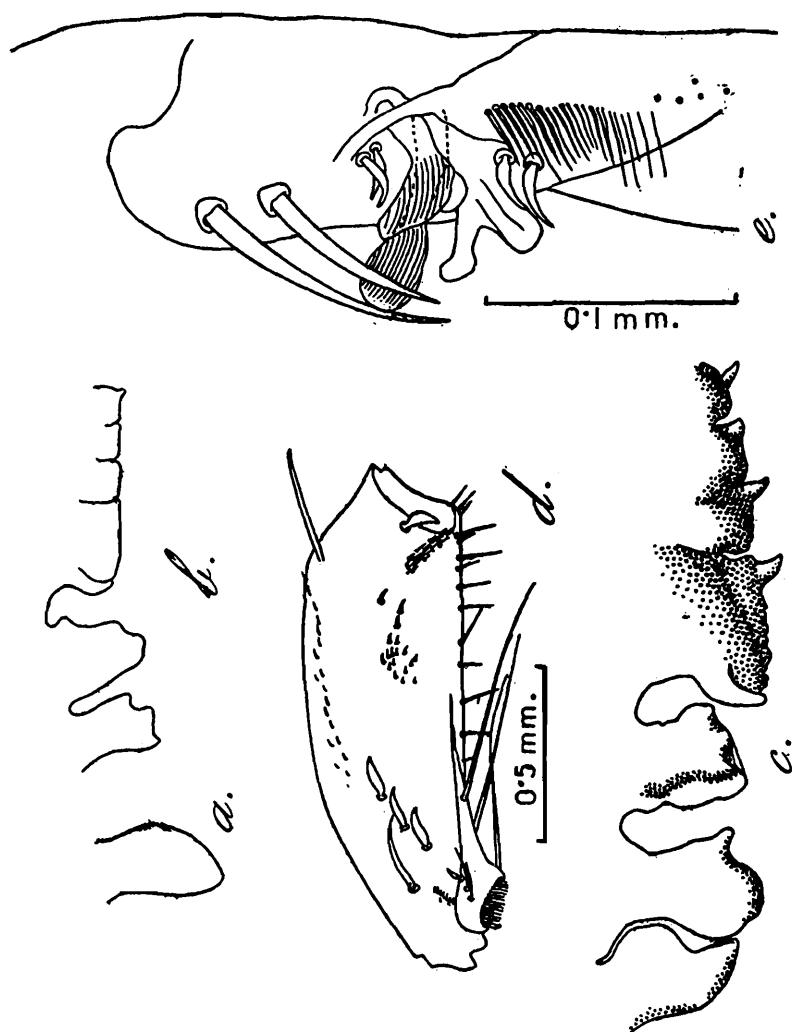
1906. *Plea pallescens*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 48.

1939. *Plea* (*Paraplea*) *pallescens*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, p. 434.

This species is characterised by the structure of the prosternal keel and the presence of a dark castaneous streak at the basal margin of the head. The shape of the thoracic and abdominal keel offers a stable character for distinguishing the different species of the genus *Plea*. Previous descriptions of the species are rather inadequate and a more detailed

description based on four female specimens collected from the Patna State, Orissa, is given below :—

Head with a small, light brownish longitudinal stripe (0.27 mm. in length); frons and vertex finely punctate and covered with very fine short hairs; interocular space about twice the width of an eye; terminal joint of rostrum black, subterminal joint yellowish brown; basal margin of head with a dark castaneous streak extending upto the inner margins of eyes, the streak appearing somewhat wider about the middle of its length due to the presence of an irregular patch of dark brown spots slightly above the longitudinal stripe. Pronotum wider than long, reticulately punctate, not punctured along the middle line and appearing slightly gibbous in this region, usually unspotted but sometimes with a few irregularly arranged brown spots near the anterior margin. Scutellum pale, almost as wide as or slightly wider than long, never reticulately punctate, provided with few punctures,



TEXT-FIG. 1.—*a.* *Plea indistinguenda* Mats. Prosternal keel; *b.* *P. indistinguenda* Mats. Mesosternal, metasternal and abdominal keel; *c.* *P. frontalis* Fieb. Thoracic and abdominal keel; *d.* *Anisops (Anisops) sardea* (Herr.—Schäff.) Male anterior tibia; *e.* *A. (A.) breddini* Kirk. Part of the anterior tibia of male showing the stridulatory area.

usually unspotted but occasionally with a few small brown spots. Elytra pale with a series of dark brown spots arranged longitudinally close to their outer margin, clavus and corium coarsely and reticulately punctate, punctures in the hinder angle of clavus with brown spots and the remaining area of clavus almost unspotted, anterior half of corium more or less unspotted except for a few spots near the margin of clavus suture, the posterior half brownish owing to the presence of a large number of big brown spots. Colour of underside light brownish. Prosternal keel (text-fig. 1a) flap-like and without a notch, its anterior margin hairy; the keel of the abdominal sternites without prominent posteriorly directed spine-like processes (shape of thoracic and abdominal keel as in text-figs. 1a, b). Legs pale, apices of tibiae and tarsi somewhat infusate, femora, tibiae and tarsi armed with short spines and spinous setae, the first tarsal joint of all the legs without spines, claws of the anterior and intermediate legs of equal length but those of the hind leg slightly longer.

An examination of ovipositors of three examples revealed that the number and arrangement of spines on them varies in different individuals; sixteen spines were observed on the ovipositor of one example and nineteen on each of the other two, the number of spines on the right and left ovipositors was, however, constant. The operculum ends in a single point with a bundle of bristles on either side.

Length of the specimens: 1.8 mm.

The specimens collected from the Patna State are slightly longer than *P. pallescens* Dist. which are described to be 1.5 mm. in length.

The species has been recorded from Takasago, Japan; Bengal; Bihar; United Provinces and Cochin State.

***Plea (Paraplea) frontalis* (Fieber).**

1906. *Plea frontalis*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 48.

1910. *Plea pelopea*, Distant, *Faun. Brit. Ind. Rhyn.* V. (Appendix), pp. 336, 337.

1934. *Plea (Paraplea) frontalis*, Lundblad, *Arch. Hydrobiol. Plankt.* XII, (Supplement), pp. 138-140, text-fig. 44.

1939. *Plea (Paraplea) frontalis*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, pp. 434, 435.

The specimens generally conform to previous descriptions except for certain details of characters omitted by previous authors.

Head with a small dark reddish-brown longitudinal stripe (length 0.23 mm., width 0.01 mm.) but the three short dashes on the front (*vide* Distant, 1906) are absent; both frons and vertex are finely but not reticulately punctate; the interocular space is almost twice the width of an eye. Pronotum is wider than long. Elytra with very fine hairs, coarsely and reticulately punctate. Structure of the Pro- and meso-sternal keel as described by Lundblad (1934) but the meta-sternal keel with a more or less irregular anterior margin and a shallow depression about the

middle in the ventral margin (Text-fig. 1c). The depression in the ventral margin of the metasternal keel is not indicated in Lundblad's (1934, p. 139, fig. 44H) figure.

Previous workers have mentioned nothing about the number of spines on the ovipositor of female specimens of this species, although Lundblad (1934, p. 134) has stated that the number of spines in *P. liturata* (Fieb.) is fairly constant and varies between 13-14. This statement led to the detailed examination of the ovipositors of three female examples, and permanent Balsam mounts were prepared with a view to finding out whether or not the number of spines was constant in this species as well, but it was found that the number and arrangement of spines on them varies not only in different individuals but also on the right and left ovipositor of the same individual. The number of spines was invariably greater on the left ovipositor as shown below :—

Right ovipositor.

17
14
17

Left ovipositor.

19
16
20

The male specimens are smaller in size than the females ; the length of the male and female specimens being 2.3 and 2.5 mm. respectively.

Nine specimens of the species were collected from the following localities :—One male from Deval bandh, three miles west of Patnagarh (17th March 1946) ; four males and four females from Gait Sarovar, Bolangir (11th March 1946).

The species has a wide range of distribution and has been recorded from Bengal, Bihar, United Provinces, Madras Presidency, Burma, Cochin China, Sumatra, Java, Formosa, Nicobar.

Anisops (Anisops) sardea (Herrich-Schäffer).

1906. *Anisops sardea*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 45, fig. 27.

1929. *Anisops (Anisops) sardea*, Hutchinson, *Ann. South Afric. Mus.* XXV, pp. 381-384.

1939. *Anisops (Anisops) sardea*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, pp. 432-433.

The number of flattened spine-like plates on the stridulatory comb and the arrangement of spines on the anterior tibia of male differ from the description given by Hutchinson (1929).

The stridulatory comb, situated on a ridge-like tubercle at the base of the anterior tibia, is composed of fifteen narrow plates broadest at the proximal end. On the inner surface of the tibia below and behind the stridulatory comb there is a pair of spinous hairs and a short stout spine (text-fig. 1d) ; a little away from these are situated nine very short spines arranged in an oblique longitudinal row, and a long slightly curved stout spine-like seta more towards the extensor margin. Hutchinson (1929, p. 382) described the tibia as " rather stout with about six short spines on its anterior margin, some of which are flattened and spatulate and one short spine nearer the stridulatory comb." In the specimen

collected from the Patna State and also in several examples of the species in the collection of the Zoological Survey of India three stout spatulate spines arranged in an oblique longitudinal row are present. The anterior leg figured by Hutchinson (1929, Plate XXXI, fig. 1) shows only two spatulate spines. He has omitted to mention about (i) a group of twelve to fifteen or more short but prominent spines beyond the middle of the tibia, (ii) a fairly stout sub-apical spine at the distal end, (iii) one stout spinous bristle at the extensor margin in the distal region. In addition, there are a number of other irregularly scattered spines or spinous bristles on the anterior tibia.

The male specimens are longer than the females : males 7.5 to 8.0 mm. ; females 7.0 mm.

According to Hutchinson the length of male and female specimens is 8.5-9.0 mm. and 8.0-8.5 mm. respectively ; while Distant (1906, p.45) has mentioned the size as 6-7.5 mm. Kirkaldy¹ gives the dimensions as : ♂ 9-10.5, ♀ 7.7-8.7 mm. but Distant states that he has seen no Oriental specimens approaching that size.

This species is represented in the collections from the Patna State, Orissa, by two male and two female specimens collected from Jhitri bandh, Salebhata (7th March 1946).

The species is very widely distributed and has been recorded from Cape, Natal, Transval, S.W. Africa, Mediterranean countries and Western Asia. It is represented in the collections of the Zoological Survey of India from Bengal, Bihar, Orissa, Madras Presidency, United Provinces, Punjab and Burma.

***Anisops (Anisops) breddini* Kirkaldy.**

1910. *Anisops* ? *breddini*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 333, fig. 194.

1939. *Anisops (Anisops) breddini*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XL1, p. 434.

This species is readily distinguished from other Indian species of the genus by the character of eyes which are contiguous along the intero-posterior margin. The structure of the stridulatory comb on the anterior tibia of male affords a stable character for recognising the various species of the genus. There is no description or figure of the stridulatory area in the literature consulted. The characters not recorded previously and a figure of stridulatory area are, therefore, appended now.

Colouration pale above with the elytra pale-greyish. Abdomen beneath of dark brown colour with the keel reddish-yellow (in fresh specimens) for the greater part of its length and brownish-black at the posterior or terminal end.

Tibia of anterior leg of male slightly more than one and a half times as long as tarsus, which is about two and a half times as long as the longer claw and beset with a large number of short and minute spines on the outer surface, and two long stout spines near the base on the inner side in addition to several spinous hairs. Structure of stridulatory comb very characteristic, being composed of a few flattened and spatulate spines, other spines near the stridulatory comb as in text-fig. 1e.

¹ Kirkaldy, G. W., *Wien. ent. Zeit.* XXIII, p. 116 (1904).

Tibia of intermediate leg about twice as long as the first (1+2) tarsal joint, which is about twice as long as the third. The longer claw almost as long as the third tarsal joint.

Tibia of posterior leg about one and a quarter times as long as the tarsus.

Length of male specimen : 6.45 mm.

Length of female specimens : 5.9-6.3 mm.

Distant records the length as 7 mm.

This species is represented in the Patna State collection by one male and three female specimens collected from Jhitri bandh, Salebhata (7th March 1946).

The species is represented in the collections of the Zoological Survey of India from Bengal, Bihar, Orissa, Madras, and Malay Peninsula.

Anisops nasuta Fieber.

1906. *Anisops fieberi*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 46.

1934. *Anisops nasuta*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 168-171, fig. 58.

Distant (1906, p. 46) in a brief description described it under the name *A. fieberi* Kirk. Lundblad's reference to the species includes a complete list of synonymy.

The male specimens of the species are provided with a cephalic-horn like that of *A.(A.) sardea* with which it is usually confused, but the cephalic projection differs from that of the latter species in being shorter, less angulated and more or less rounded at the end. It would not be out of place here to give a detailed account of the structure of cephalic horn which differs considerably in minute details in the two species. When the cephalic horn is viewed from the ventral side two longitudinal ridges are seen running throughout its length; they, however, do not run parallel to each other as in *A.(A.) sardea* but extend somewhat obliquely towards each other to meet in front and thus enclose a concave triangular area between them (text-fig. 2c). Lateral to the ridges are two furrows in which, near the apical end, are two depressions. The two carinae which extend latero-longitudinally from the eyes forwards in *A.(A.) sardea* are absent in this species. The arrangement of spines on the anterior tibia of the two species is also different. The stridulatory comb at the base of the anterior tibia is composed of seventeen flattened plate-like spines.

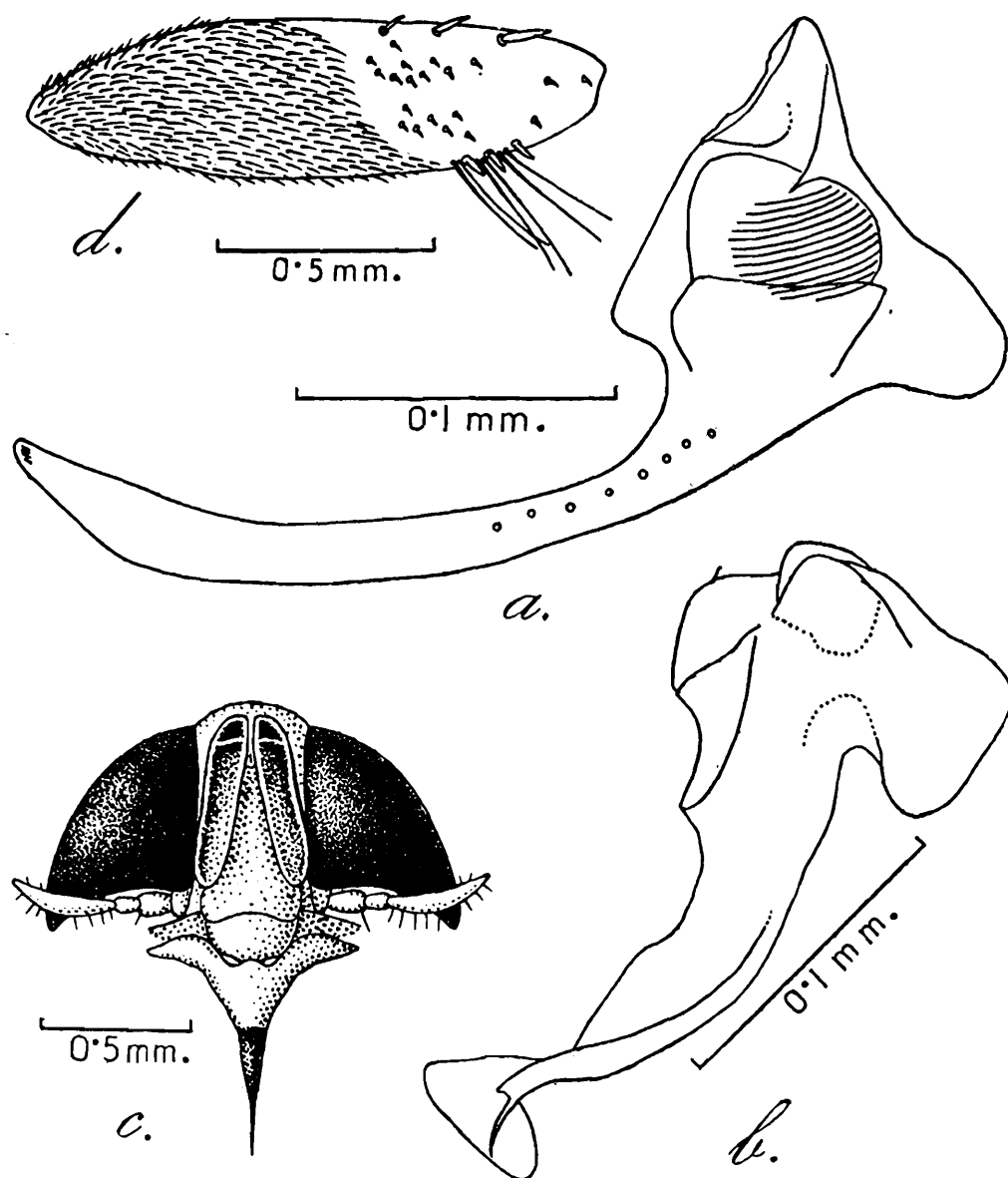
Intermediate tibia one and a three-fourth times as long as the first (1+2) tarsal joint, which is about twice as long as the terminal joint; the longer claw is almost as long as the third tarsal joint.

The tibia of posterior leg is a little longer than the tarsus.

The species is represented by a single male example collected from a tank at Titilagarh (20.3.46) and is recorded from this area for the first time. The specimen measures 6.2 mm. whereas Distant records the length of the male specimens as 5 mm.

The species is represented in the collections of the Zoological Survey of India from Nasratabad, Seistan; Siliguri, Bengal; Katmandu

and Nepal. It has also been recorded from Ceylon, China, Sumatra, Java, Formosa, Celebes, Newguinea, Australia and Samoa.



TEXT-FIG. 2.—*a.* *Micronecta* (*Basileonecta*) *quadristrigata* Breddin. Right paramere; *b.* *M. (B.) quadristrigata* Bredd. Left paramere; *c.* *Anisops nasuta* Fieb. Front view of head showing the structure of cephalic horn; *d.* *Corixa* (*Tropocorixa*) *distorta* Dist. Ventral view of posterior femur.

***Anisops* (*Anisops*) *nivea* (Fabricius).**

1906. *Anisops niveus*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 46.

1929. *Anisops* (*Anisops*) *nivea*, Hutchinson, *Ann. South. Afric. Mus.* XXV, p. 385.

1934. *Anisops nivea*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 163—166, fig. 56.

1939. *Anisops* (*Anisops*) *nivea*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, p. 433.

This common species is represented by one hundred and forty-seven adult examples collected from the following localities in the Patna State :—

Forty-three male and seventy-one female specimens from Jhitri

bandh, Salebhata (7.3.46); one male and twenty-nine female specimens from Tahsil bandh, Patnagarh (14.3.46); two female specimens from Bhoosagar and Mainey bandh, Patnagarh (14.3.46); one male specimen from a tank at Titilagarh (20.3.46).

The species has been recorded from India, Burma and Sumatra. It is represented in the collections of the Zoological Survey of India from Bengal, Bihar, Orissa and S. Shan States.

Family CORIXIDAE.

The Indian species of this family, according to Hutchinson¹, fall into two subfamilies, viz., Micronectinae and Corixinae. The subfamily Micronectinae includes the genera *Micronecta* Kirkaldy, *Micronectella* Lundblad, and *Synaptonecta* Lundblad. Of these, only two have so far been recorded from India and the genus *Micronectella* Lund., which is not known from India, has been considered by Hutchinson as a subgenus of *Micronecta*. The subfamily Corixinae includes the genera *Cymatia* Flor, *Agraptocorixa* Kirkaldy, and *Corixa* Müller, which have been recorded from this region.

In the collection under study from the Patna State the family is represented by three species of the genus *Micronecta* and two of *Corixa*.

Micronecta (Basileonecta) scutellaris ***scutellaris* Stal.**

1910. *Micronecta dione*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 348.

1910. *Micronecta proba*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 348.

1940. *Micronecta (Basileonecta) scutellaris scutellaris*, Hutchinson, *Trans. Conn. Acad. Arts. Sci.* XXXIII, pp. 365-371.

Of all the Indian species of *Micronecta* so far known, *M. scutellaris* is the largest in size. Its length has been recorded as varying from 3.6 to 4.0 mm. The length of the specimens now under study ranges from 3.45 to 4.0 mm.

Hutchinson (1940, p. 369) is of the opinion that *M. Proba* and *M. dione*, which have been referred to by Distant as distinct species, should be considered as a synonym of *M. scutellaris*. He writes, "continued study has failed to reveal any characters by which a satisfactory separation can be effected" Some structural details of the armature of male anterior leg which have not been mentioned by previous authors are: femora with a row of nine spines basally, two short stout spines a little above the row and rather centrally placed, one short stout subapical spine and two short slender spines along the anterior margin near the apical end.

This species is represented in the collection under study by seventy-eight specimens collected from the following localities:—One male from Farm Tank, Bolangir (10.3.46), eight males and seven females from Gait sarovar, Bolangir (11.3.46), twenty males and forty-two females from Mainey bandh and Bhoosagar, Patnagarh (14.3.46).

¹ Hutchinson, G.E., *Trans. Conn. Acad. Arts. Sci.* XXXIII, p. 346 (1940).

The species has been recorded from Burma, Ceylon, Palestine, South Arabia, Central Africa and is widely distributed in India.

***Micronecta* (*Basileonecta*) *quadristrigata* Breddin.**

1910. *Micronecta minthe*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 347.
 1934. *Micronecta quadristrigata*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 87-91, text-figs. 26, 27, pl. XIX, fig. 1.
 1939. *Micronecta quadristrigata*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, p. 435.
 1940. *Micronecta* (*Basileonecta*) *quadristrigata*, Hutchinson, *Trans. Conn. Acad. Arts and Sci.* XXXIII, pp. 376-377.

Hutchinson (1940, p. 376) records the size of male as varying from 2.67-2.89 mm., and of female from 3.03-3.28 mm. Lundblad's measurements of the species vary from 2.1 to 2.7 mm. The male and female specimens dealt with in this study range in length from 2.63 to 2.72 mm., and 2.72 to 2.90 mm. respectively.

The specimens under study conform to the descriptions given by Lundblad (1934) and Hutchinson (1940), except for certain differences in the structures of the male specimens as noted below.

The entire lateral margin of the free lobe of eighth abdominal tergite from the rounded proximal end is provided with conspicuous spine-like setae or bristles. In the illustrations of Lundblad and Hutchinson the hairs do not seem to extend upto the extreme proximal rounded end.

On the anterior femur are present three to four spines near the apex and one spine a little behind. The total number of spines in this region is, therefore, from four to five and not three as illustrated by Lundblad (1934, p. 88, fig. B). The entire outer surface from base upto the apex is covered with spine-like hairs.

The parameres are not exactly as figured by Hutchinson (1940, Plate VIII, figs. 105, 106). They are here figured as observed in the specimens under study (Text. fig. 2a, b).

This species is represented by twenty-three specimens collected from the following localities:—Six males and ten females from Gait sarovar, Bolangir (11.3.46); three males and four females from Mainey bandh and Bhoosagar, Patnagarh (14.3.46).

The species has been recorded from India, Ceylon, Java, Sumatra and Philippines.

***Micronecta* (*Dichaetonecta*) *haliploides* Horvath.**

1910. *Micronecta merope*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 351.
 1934. *Micronecta haliploides*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), p. 104.
 1939. *Micronecta haliploides*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, pp. 435, 436.
 1940. *Micronecta* (?*Dichaetonecta*) *haliploides*, Hutchinson, *Trans. Conn. Acad. Arts and Sci.* XXXIII, pp. 377, 378.

This species is readily recognised by the characteristic black irregular markings on the pale elytra and also by the structure of pronotum which is shorter and narrower than the head with the lateral margins obsolete.

One male example of the species was collected from Mainey bandh and Bhoosagar, Patnagarh (14.3.46). The length and breadth of the specimen are 2.72 mm. and 1.27 mm. respectively.

The species has been recorded from India, Burma, Ceylon, Sumatra, Java, Malay Peninsula and Siam.

Corixa (Tropocorixa) distorta Distant.

1910. *Corixa distorta*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 343.

1940. *Corixa (Tropocorixa) distorta*, Hutchinson, *Trans. Conn. Acad. Arts and Sci.* XXXIII, pp. 440-445.

Hutchinson (1940) is of the opinion that *C. affinis* Dist., *C. verecunda* Dist. and *Sigara fissa* Lundblad should be regarded as synonyms of *C. distorta* Dist. He examined the type of *C. verecunda* Dist. and paratypes of *C. affinis* Dist. and found that the structure of the left paramere of male type specimen of *C. verecunda* was identical with that of *C. distorta*.

Though the structure of the genitalia of male specimens is exactly as described by Hutchinson (1940, pp. 442, 443) the specimens under study differ in the pattern of pronotum, in the number and arrangement of spines on the oblique row of anterior femur, and in the distribution of spines on the ventral surface of posterior femur.

The pronotum is short and a little more than twice as broad as long. It is marked with six yellow bands, the anterior four yellow bands anastomose laterally while the two posterior ones remain completely separated from each other due to the intervening black space that extends upto the extreme lateral margins.

On the anterior femur, distal to the stridulatory area, an oblique patch of eight spines has been recorded by Hutchinson (1940) but the number of spines arranged in the oblique row in this region has been found variable in the two male specimens examined in the present study. In one example there are only five spines and in the other there is a patch of nine spines arranged in two oblique rows. A little to the middle of the extensor margin only one short spine is present, but Hutchinson has described two short spines near the middle of the extensor margin. There are thirty-six pegs in the peg row that runs almost parallel to the flexor margin of pala. Of these, six distal ones are more pointed and directed less transversely than the other oval or more or less elliptical ones. Of the six elongate pegs, three proximal ones, namely 31st, 32nd, 33rd, are of almost equal size and longer than all the others of the series. Hutchinson records a row of thirty-eight pegs and of these he describes five distal ones as being more elongate and pointed than others.

Intermediate femur is provided with a well developed fringe of short swimming hairs and the dimensions of joints of intermediate leg, except for slight differences, are similar to those given by Hutchinson.

The ventral pubescence of posterior femur having a sigmoid border extends well beyond the centre of the mid-line (text-fig. 2d). In the non-pubescent distal portion on the flexor side of the mid-line there is a group of five spines in one and seven spines in another specimen. Hutchinson, however, describes only five spines in this region. The number of spines lying between the mid-line and the extensor margin separated from the former group by a non-spinous region is variable

as ten have been observed in one example and thirteen in another. Hutchinson records a group of thirteen spines lying just within the extensor margin. Besides the spines described by Hutchinson, dorsal surface of the femur is provided with a pair of almost apical spines near the extensor margin.

Hutchinson records the length of the specimens as 5.05 mm; the length of the specimens now under study varies from 5.18 to 5.4 mm.

Three examples, two males and one female, were collected from Jhitri bandh, Salebhata (7.3.46).

The species has been recorded from India, China, Danish Is. and Amoy.

***Corixa* sp., prox. *distorta* Distant.**

A single male specimen of the genus *Corixa* Müller with sinistral asymmetry (*i.e.*, male genital capsule directed to left and strigil on the left side of the sixth abdominal tergite) was collected from Jhitri bandh, Salebhata (7.3.46). It has not been possible to place this specimen in the systematic scheme by the help of structural characters and keys given by Hutchinson¹ in any of the subgenera or species described by him.

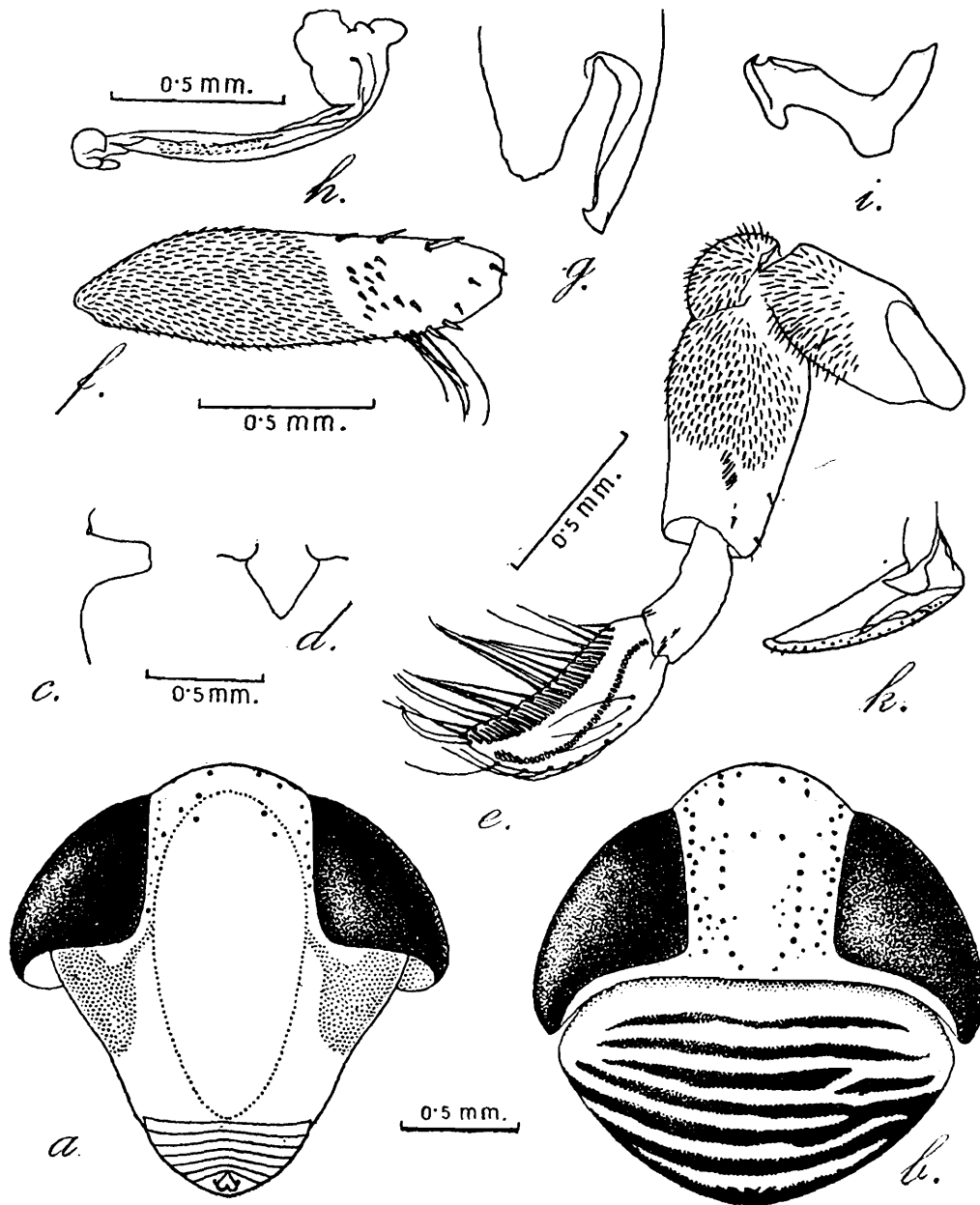
An examination of the genital capsule revealed that the characters of the right paramere of the specimen are reverse of the subgenus *Tropocorixa* Hutchinson otherwise the genitalia is like that of *C.(T.) distorta* Distant. Although the specimen differs in other structural details from *C.(T.) distorta* it is not considered desirable to propose a new subgeneric or specific name at this stage unless some more specimens of the kind become available either from the same or from any other locality. The characters observed in the specimen are however described below:—

Head (text-fig. 3a) brownish ochraceous about three times as wide as the least interocular space, vertex with a number of small dark-brown irregular spots, carina between two longitudinal rows of punctures obsolete, facial impression fairly prominent and somewhat deep with well developed margins extending high between the eyes, the latter reddish brown, moderately projecting between and behind the anterior pronotal angles; the head slightly produced in front and the area of the head immediately below the eyes brownish.

Pronotum (text-fig. 3b) pale ochraceous, disc marked with six yellow transverse bands more or less wider than the intermediate black spaces, second yellow band anastomosed with the third owing to the discontinuity of the intermediate black space towards the right, fourth band stops short on the right and not extending upto the extremity; elytra brownish-ochraceous with vermiculations, clavus brownish with broken yellow vermiculations wider than the intervening spaces, which fuse to form irregular longitudinal lines, corio-membranal suture pale yellow, right membrane brownish with vermiculate yellow markings throughout, the intero-apical part of the left membrane sub-hyaline; ectocorium yellow, brown markings of corium transgressing sub-apically, body beneath more or less pale ochraceous, legs pale stramineous.

¹ Hutchinson, G. E., *Trans. Connect. Acad. Arts and Sci.* XXXIII, pp. 401-404 and 414-416 (1940).

Lateral lobe of prothorax with the dorsal margin slightly concave, ventral margin almost straight and apex as in the text. fig. 3c.



TEXT-FIG. 3.—*Corixa*-sp., prox. *distorta* Dist.

a. Front view of head ; b. Dorsal view of head and pronotum ; c. Lateral lobe of prothorax ; d. Metasternal process ; e. Anterior leg ; f. Posterior femur ; g. Apex of genital capsule ; h. Inner penis sheath ; i. Left paramere ; k. Right paramere (g-k of same magnification).

Metasternal process short, almost equilateral with the apex somewhat bluntly angulated as in text-fig. 3d.

Anterior trochanter with a few spine-like hairs in the proximal region and with an almost uniform pubescence in the remaining portion ; anterior femur (text-fig. 3e) with a fairly well developed stridulatory area composed of a number of small stout spines, distal to this seven long spines set in an oblique longitudinal row extending from the well differentiated stridulatory area towards the extensor margin, two short spines (the proximal smaller than the distal) between the mid-line and extensor margin, two spines near the extensor margin (one subapical

and the other set more proximally), one subapical spine at the extensor margin; tibia in the distal region with a few spine-like hairs arranged in an oblique longitudinal row between mid-line and extensor margin, two subapical long spines and a few spinous hairs near the flexor margin; pala simple with a curved row of forty-one pegs of which the distal five pointed and slightly more elongate than the others, extensor margin with nine long hairs, lower or posterior flexor margin with seventeen and upper or anterior flexor margin with thirty-two long spinous hairs.

Intermediate femur with a fringe of long swimming hairs, length of joints of intermediate leg: femur 2.13 mm., tibia 1.0 mm., tarsus 0.63 mm., claw 0.9 mm.

Posterior femur (text-fig. 3f) with three spines on extensor margin, four spines (the proximal two smaller than the distal ones) and a number of long spinous hairs on the flexor margin; dorsal surface with two spines between mid-line and flexor margin, a pair of almost apical stout spines of moderate size near the extensor margin, an oblique row of spinous hairs across the femur in the proximal region (the hair between the mid-line and the extensor margin—especially near the latter—longer than those between the mid-line and flexor margin); ventral surface of the posterior femur with a proximal pubescent area having a sigmoid border and extending beyond the middle of its length, the glabrous area of femur—distal to the pubescent border—with a group of thirteen irregularly distributed spines, besides these one short spine between the mid-line and flexor margin near the distal most spine of the flexor row, one central subapical spine and one almost apical spine near the extensor margin; dimensions of the posterior leg; femur 1.81 mm., tibia 1.0 mm., proximal tarsus 1.27 mm., distal tarsus 0.54 mm.

Fifth abdominal tergite with a short central lobe and with its lateral margins as in text-fig. 4a.

Sixth abdominal segment (text-fig. 4b) with a moderately large almost subquadrate strigil on the left side of the sixth abdominal tergite; strigil composed of five combs and the apical comb appearing irregularly fragmented.

Seventh abdominal segment (text-fig. 4c) with a rather reduced median lobe and provided with a few long setae, the margin on the left side produced into a lobe-like structure that lies immediately behind the strigil.

Apex of ninth abdominal segment (*i.e.* genital capsule) simple (text-fig. 3g). Inner penis sheath with the whole apex broad, more or less plate-like and with a short process directed towards the right (text-fig. 3h), the base of the process with a deeply chitinised spot. Left paramere broad in the basal half and narrowed beyond the middle; its ventral and outer lateral margin near the apex recurved and the dorso-lateral margin with a fairly prominent semi-circular emargination (text-fig. 3i). Right paramere elongate, more or less triangular; its ventral margin with a long thin lobe separated from the main body by a narrow cleft (text-fig. 3k).

Length.—5.36 mm.

Specimen.—No. 5985/_{U7} to 5988/_{U7}, Zoological Survey of India.

Locality.—Patna State, Orissa (Salebhata, Jhitri bandh).

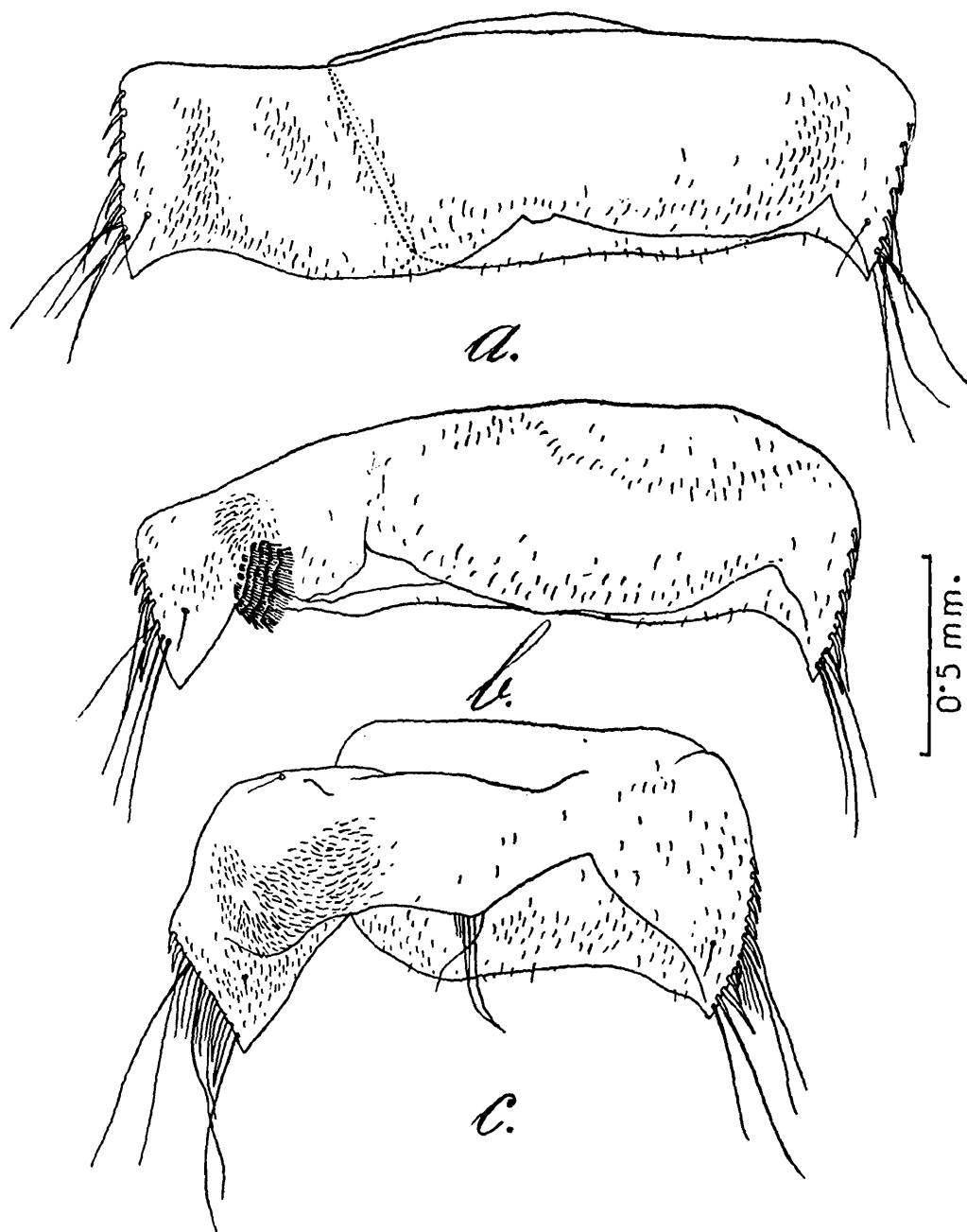
***Corixa (Tropocorixa) promontoria* Distant.**

1910. *Corixa promontoria*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 341.

1922. *Corixa ribeiroi*, Paiva and Dover, *Rec. Ind. Mus.* XXIV, p. 333.

1940. *Corixa (Tropocorixa) promontoria*, Hutchinson, *Trans. Conn. Acad. Arts and Sci.* XXXIII, pp. 437-440.

Except for certain differences in the number of paler pegs and arrangement of spines on the anterior and posterior femora of male, the specimens collected from Patna State conform to the account given by Hutchinson (1940).



TEXT-FIG. 4.—*Corixa* sp., prox. *distorta* Dist.

a. Fifth abdominal segment; b. Sixth abdominal segment; c. Seventh abdominal segment.

Hutchinson describes two pairs of small spines on the anterior femur just distal to the well developed stridulatory area but the specimen examined revealed the presence of seven spines in this region arranged in two oblique rows (2+5).

Hutchinson records the pala as having eight long hairs on the extensor margin and provided with thirty-four pegs, of which the last ten are more elongate than others ; but the pala of the specimen examined is provided with nine long hairs on the extensor margin and a curved peg row of only thirty pegs, of which the distal eight are slightly more elongate than the others.

The non-pubescent ventral surface of the posterior femur is provided with two stout spines arranged in a longitudinal row situated more or less centrally and two spines (one apical and one subapical) set near the extensor border. Hutchinson describes only one small spine situated centrally and two set apically and subapically near the extensor border. On the dorsal surface of posterior femur between the mid-line and flexor margin three spines have been recorded by Hutchinson but only two have been observed in this region in the specimen under study.

Two specimens, one male and one female, were collected from Jhitri bandh, Salebhata (7.3.46).

The species has been recorded from the United Provinces : Amman-garh, Nainital, Lucknow, Malwa Tal, Kumaon ; Mysore State : Gundlepet ; Bengal : Berhampore Court ; Bihar : Santal Parganas ; and Orissa : Cuttack.

***Cercotmetus fumosus* Distant.**

1906. *Cercotmetus fumosus*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 23.

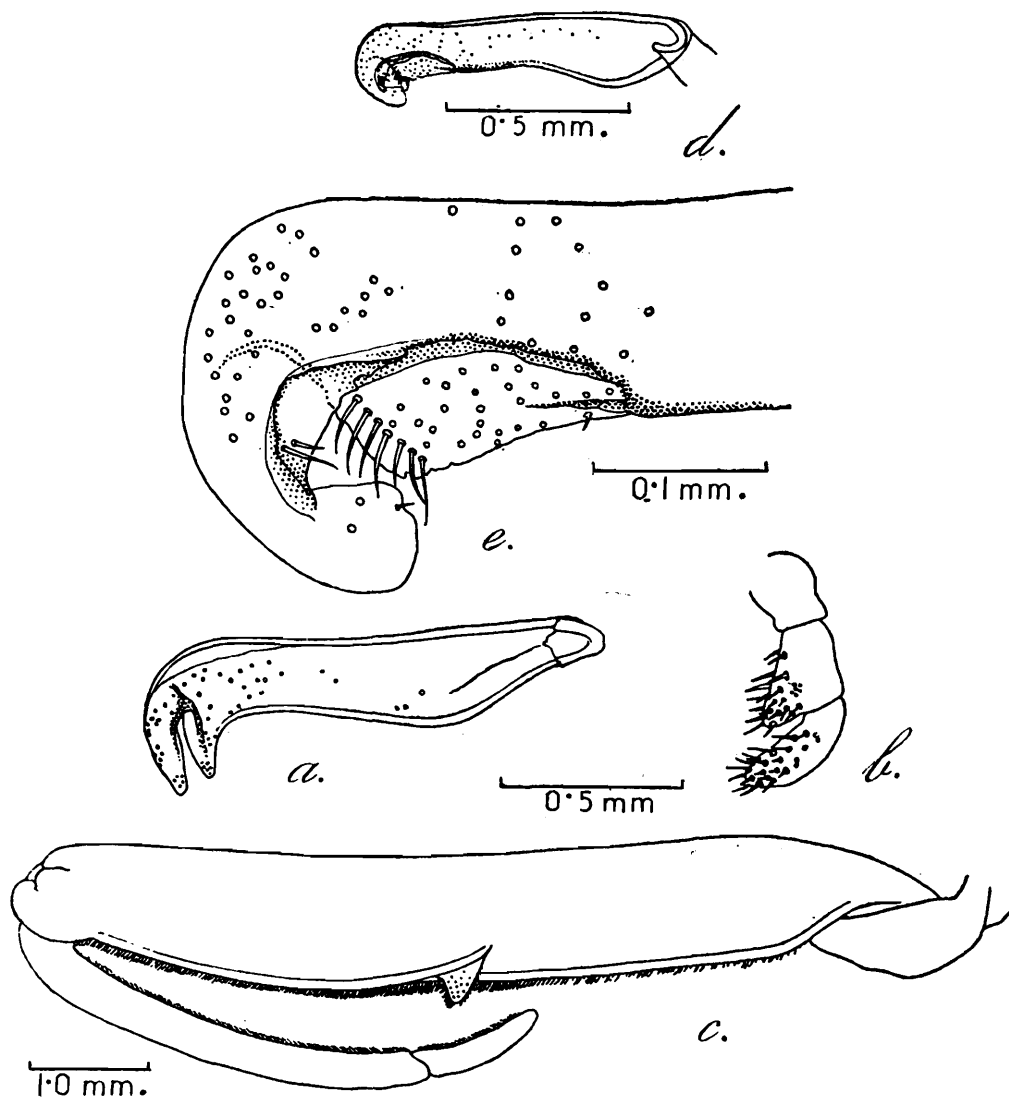
Two male specimens, one dark fuscous and the other light fuscous are referred to this species. Vertex of both the specimens is provided with a pointed tubercle as described by Distant, and pronotum is almost as long as the intermediate femur. Abdomen beneath is strongly keeled and metasternum is provided with a distinct keel along the middle line. In the dark fuscous example, the area of the meta-sternum bearing keel is of lighter colour and when viewed with the naked eye, the keel appears as a thin longitudinal pale yellowish streak ; the continuation of the pale streak forward and its presence approximately in the posterior two-thirds of the meso-sternum gives a false indication of the presence of a keel in this region as well, but a closer examination has revealed the total absence of carination in the meso-sternum. In the other example which is of lighter shade, there is no trace of a pale yellowish streak and the mesosternum like the darker example is devoid of a keel. Distant (1906, p. 23) writes, " abdomen beneath strongly keeled, the keel continued on sternum as far as anterior coxae " This statement clearly indicates that mesosternum also is keeled. Lundblad¹ (1934), in providing a key for a number of species of *Cercotmetus*, has placed *C. fumosus* along with those species in which the mesosternum is not keeled. This is, however, not in agreement with the statement made by Distant. It, was, therefore, considered necessary to reinvestigate the matter further and reach a conclusion on the exact condition of the mesosternum in various examples of the species. Since no authentically named specimens of *C. fumosus* were available in the named Collections of the Zoological Survey of India, the matter was referred to the British Museum

¹ Lundblad, O., *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 49, 50 (1934).

with a view to having an authentic report based on a careful examination of the named specimens present there. The report received from Dr. Hinton (Brit. Mus.) read "that the abdominal keel is continued across the metasternum to the anterior coxae in the manner described by Distant, the keel on the metasternum being quite distinct" Lundblad has taken the character of carination of mesosternum as of primary importance and arranged the various species into two groups namely (i) the species *C. pilipes*, *C. horni*, *C. asiaticus* and *C. asiaticus* var. *longicollis* in which the mesosternum is provided with a distinct keel; (ii) the species *C. brevipes*, *C. dissidens*, *C. robustus*, *C. fumosus*, *C. strangulatus* and *C. compositus* in which the mesosternum is without a keel.

The specific determination of the examples collected from Patna State is, therefore, based on the key as set forth by Lundblad (1934, pp. 49, 50).

The illustrations of the paramere, antenna, and anterior femur are not available in the literature consulted and hence they are presented in the text-fig. 5*a*, *b*, *c*.



TEXT-FIG. 5.—*a*. *Cercotmetus fumosus* Dist. Paramere; *b*. *C. fumosus* Dist. Antenna; *c*. *C. fumosus* Dist. Anterior leg; *d*. *Laccotrephes griseus* (Guer.) Paramere; *e*. *L. griseus* (Guer.) Apical part of paramere highly magnified.

Length of body and abdominal appendages respectively of the two examples are as follows :—

(i) 39.2 and 11.2 mm.

(ii) 38.6 and 9.6 mm.

The examples from the Patna State are shorter in length than those described from Ceylon by Distant for according to him the length, excluding abdominal appendages, is 47 mm.

The two male specimens were collected from Tel river, Belgaon (19.3.46).

C. fumosus is recorded for the first time from this region. It has been recorded by Distant from Ceylon.

***Laccotrephes griseus* (Guérin).**

1910. *Laccotrephes griseus*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 314.

1939. *Laccotrephes griseus*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLJ, p. 430.

The description of the species (*vide* Distant, 1910) is very meagre. The characters observed in the examples collected from the Patna State are as noted below :—

The specimens are fuscous in colour. Anterior femora and tibiae are marked with prominent fuscous shadings but the markings on the intermediate and posterior femora and tibiae are feeble and less pronounced. Prosternum is convex along the middle line and is provided with a tubercle in the anterior region. Abdominal appendages are distinctly shorter than the body, although Distant (1910, p. 314) is of the opinion that the abdominal appendices are a little longer than the body. Pronotum is wider than long and scutellum is almost as long as wide. Claval commissure is slightly shorter than the anterior femora. Intermediate femora are always longer than the intermediate tibiae but distinctly shorter than the femora of anterior legs. Posterior femora and tibiae are almost equal in length. The parameres (text-figs. 5*d*, *e*) of two male examples examined on permanent mounts were found to be identical.

The parameres of this species have not been figured or described by previous workers.

Length of male and female specimens has been found varying from 15.1 to 17 mm. and 16.9 to 19 mm. respectively.

Eighteen specimens of the species were collected from the following localities :—One male from Jhitri bandh, Salebhata (7.3.46); two males and two females from Ang river, Salebhata (8.3.46); one male from Ang river, Agalpur (9.3.46); one female from Gait sarovar, Bolangir (11.3.46); three males and four females from Tahsil bandh (14.3.46); one female from Deosar tank no. 2 (18.3.46).

The species is represented in the collection of the Zoological Survey of India from Bengal, Bihar, Orissa, United Provinces, Punjab, Bombay Presidency, Madras Presidency, Ceylon, Cochin State and Siam. It has also been recorded from Burma.

Laccotrephes ruber (Linn.).

1906. *Laccotrephes ruber*, Distant, *Faun. Brit. Ind. Rhyn.* III, pp. 18, 19.

1939. *Laccotrephes ruber*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, pp. 429, 430.

The anterior femora and tibiae of all the specimens are marked with prominent fuscous shadings but the markings on the posterior femora and tibiae are feeble and less conspicuous. Prosternum is convex along the middle line and provided with a tubercle in the anterior region and a slightly raised tubercle-like area medially near the posterior margin. Abdominal appendages of all but one specimens are distinctly longer than the body. [In one female example collected from Tahsil bandh, Patnagarh (14.3.46) abdominal appendages and body are of equal length.] Pronotum is wider than long and claval commissure is shorter than the length of the anterior femora. Posterior femora and tibiae are of almost equal length. Anterior femora are more or less equal to posterior femora but distinctly longer than the intermediate femora. Neither a description nor an illustration of the paramere of this species is recorded in the available literature consulted and the latter is now presented in text-fig. 6*d*, *e*.

Lengths of male and female specimens vary from 27.0 to 27.3 and 28.0 to 30.6 mm. respectively.

Nineteen specimens collected from the following localities are referred to this species:—two females from Purnibandh, Salebhata (7.3.46); two females from Ang river, Salebhata (8.3.46); one male and two females from Farm tank, Bolangir (10.3.46); two females from Tahsil bandh, Patnagarh (14.3.46); two males from Sukhtel river, down stream, Hari-shanker (16.3.46); two males and six females from Deosar Tank No. 2 (18.3.46).

The species has been recorded by Distant from India, Burma, Ceylon, China, Japan and Formosa. It is represented in the collections of the Zoological Survey of India from Bengal, Bihar, United Provinces, Madras Presidency, Bombay Presidency, Ceylon and Burma.

Ranatra filiformis Fabricius.

1906. *Ranatra filiformis*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 21.

1906. *Ranatra sordidula*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 22.

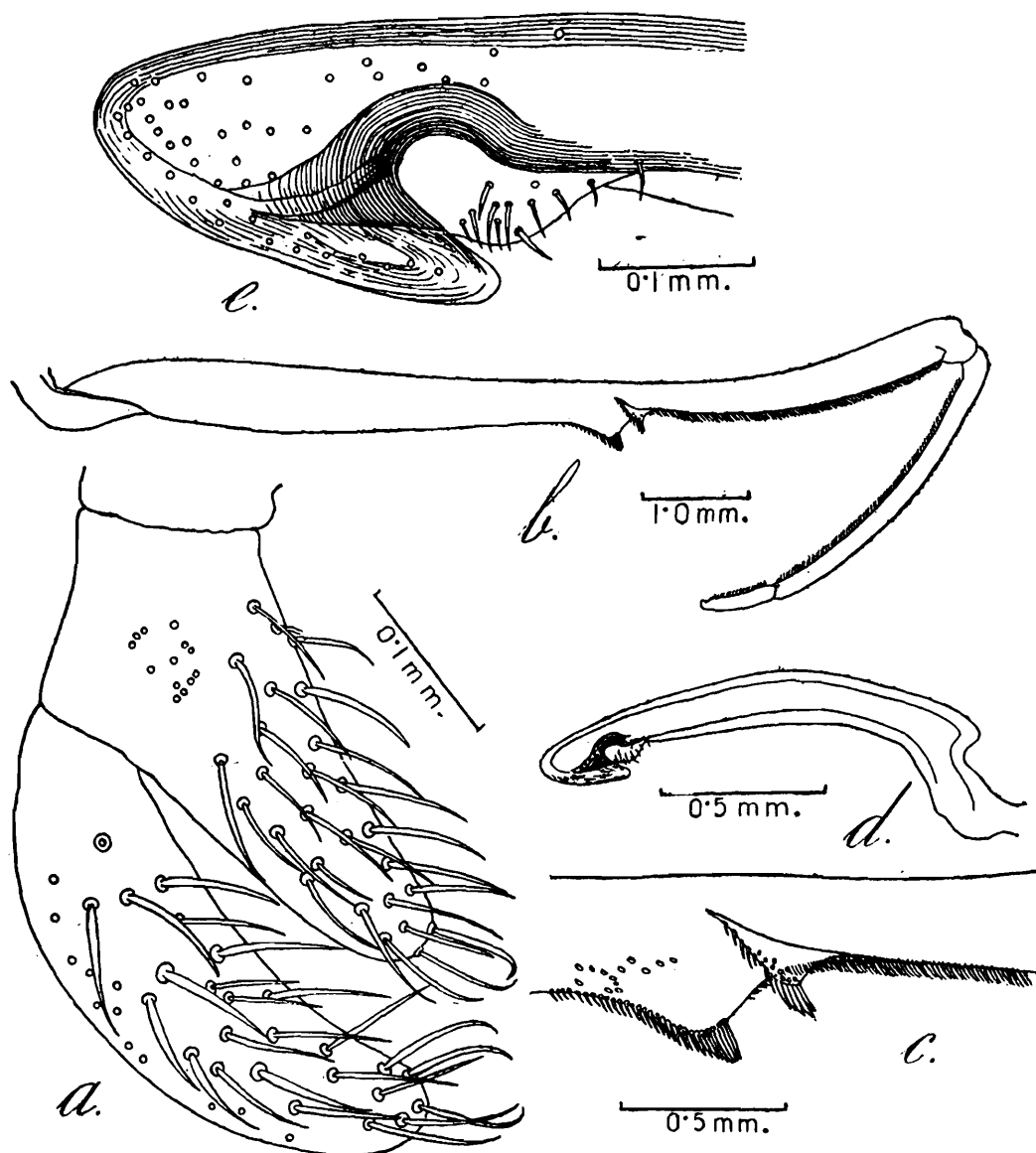
1934. *Ranatra filiformis*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 36-38, text-fig. 7.

1939. *Ranatra filiformis*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, p. 430.

The description of this species (Distant, 1906) is meagre as it is mostly based on colouration only. The characters observed in fifteen examples of the species collected from the Patna State are given below:—

Head is usually provided with a minute distinct tubercle or sometimes with a blunt slightly elevated area on the vertex between eyes. Distant (1906, p. 21) omitted to mention anything about the structural characters of antenna, anterior femoral dentation and the presence or absence of a tubercle on the vertex. Interocular space is slightly greater than the width of the eye. Second antennal joint is blunt and somewhat triangular, usually a little shorter than the third. It is pale in the basal region

but tinged with brown apically. Third antennal joint is slightly curved and tinged with brown distally. Outer surfaces of both the joints are covered with thorny bristles (text-fig. 6a). In some specimens the second



TEXT-FIG. 6.—a. *Ranatra filiformis* Fabr. Antenna; b. *R. filiformis* Fabr. Anterior leg; c. *R. filiformis* Fabr. Part of the anterior femur highly magnified in the teeth region; d. *Laccotrephes ruber* (Linn.) Paramere; e. *L. ruber* (Linn.) Apical part of paramere highly magnified.

and third antennal joints are of the same length. Anterior femora are bidentate; they are about as long as or slightly longer than the head and pronotum together; the shape, size and distance of the inner or dorsal tooth from the ventral one is as in the text-figs. 6b, c. Metasternal process is broadly triangular and slightly carinate posteriorly with its point rounded. Abdominal appendages are distinctly shorter than the body. The hemelytra extend upto the base of the last abdominal segment or slightly beyond it and posterior femora upto the anterior half of the last abdominal segment. In some specimens posterior femur extends only upto the base of the last abdominal segment. All the legs are marked with obscure fuscous annular shadings, and the intermediate and posterior tibiae and tarsi are infusate.

The parameres of male specimens are figured by Lundblad (1934, p. 36, fig. 7).

The length of the body and abdominal appendages vary from 21.1 to 25.4 mm. and 18.2 to 22.7 mm. respectively.

The actual measurements in mm. of the body, abdominal appendages, anterior femur, etc., are given below :—

Sex		Length of body	Length of abdominal appendages	Length of anterior femur	Length of head and pronotum together
♂	..	21.1	19.3	7.5	7.1
	..	22.9	19.5	8.0	7.9
	..	21.9	19.8	8.2	7.2
	..	23.0	18.9	8.2	7.5
	..	24.8	19.9	8.7	8.2
	..	25.4	22.7	9.1	8.2
	..				
	..				

Fifteen examples of the species were collected from the following localities :—Two male and two female specimens from Ang river, Salebhata (8.3.46) ; one male specimen from Farm Tank, Bolangir (10.3.46) ; two male and four female specimens from Deo sar Tank no. 2 (18.3.46) ; one female specimen from Tel river, Belgaon (19.3.46) ; one male and two female specimens from Titilagarh Tank (20.3.46).

The species is represented in the collections of the Zoological Survey of India from Assam, Bengal, Bihar, United Provinces, Chota Nagpur, Ceylon and Siam.

Ranatra varipes Stål.

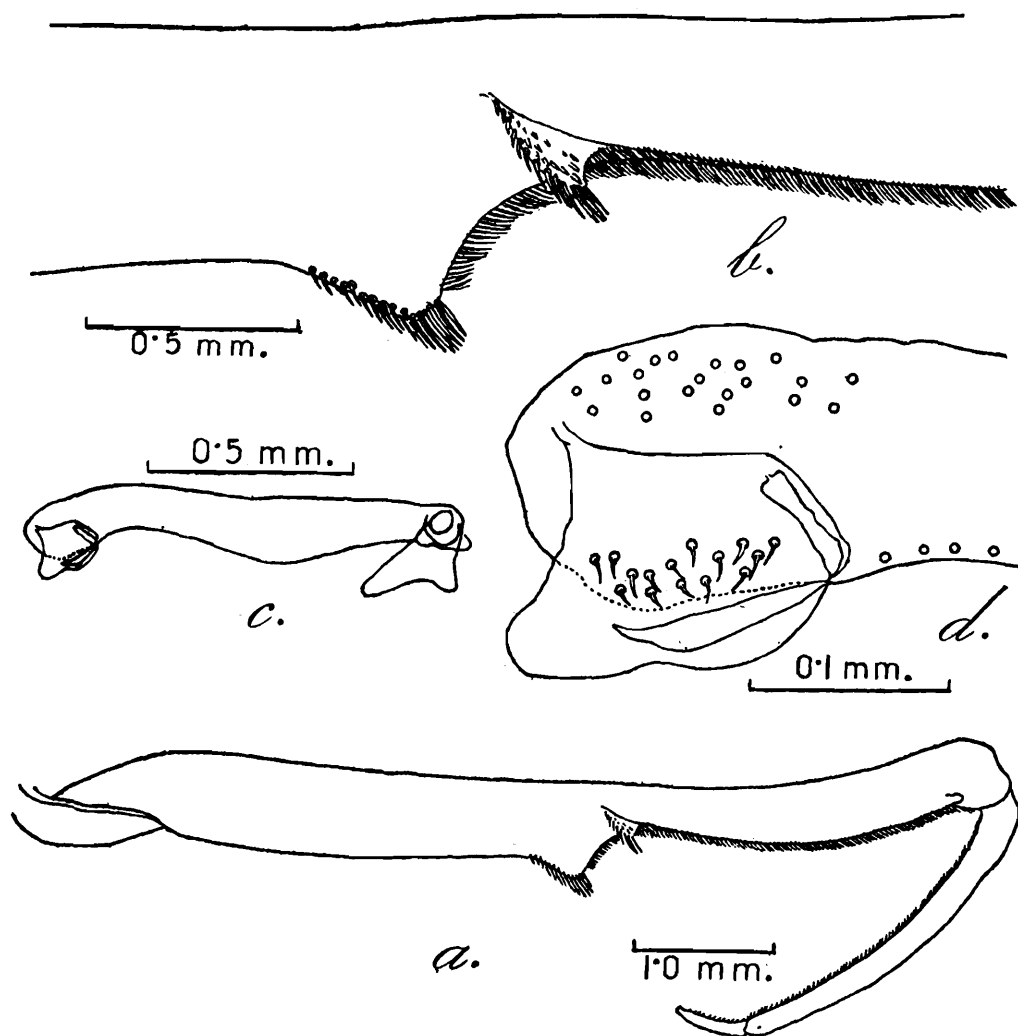
1910. *Ranatra varipes*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 316.

1934. *Ranatra varipes*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 34-36, text-fig. 6.

Montandon, quoted by Distant (1910), has described the species as “very near *R. longipes* Stål and from the same localities, hardly to be separated except by the posterior legs and the abdominal appendices which are shorter ; the length is proportionally less and the intraocular space a little less constricted. The pronotum is of the same form in the two species” This account is obviously quite insufficient. The species has been confused with *R. filiformis* and *R. longipes* by previous workers. Lundblad (1934), however, pointed out that the structure of the paramere is quite characteristic of the species and by the help of this character the male specimens can be easily distinguished from those of other species. The following account which is based on a study of the specimens collected from the Patna State and also on those present in the named collection of the Zoological Survey of India has been used to separate the specimens of both the sexes from closely allied species.

General colouration ochraceous, with abdomen above dark brownish-ochraceous and its lateral margins pale ochraceous ; the terminal segment of the abdomen above greyish ; all legs marked with annular fuscous shadings ; middle and posterior tibiae and tarsi infusate at their apices ;

head devoid of a tubercle on the vertex between eyes, eyes small and more or less rounded, interocular space slightly greater than the width of the eye; second antennal joint smaller than the third, both pale with slight tinge of brownish and covered with a few thorny bristles; metasternal process short and narrow, slightly carinate posteriorly with its point bluntly rounded; abdominal appendages distinctly shorter than the body; hemelytra reaching slightly beyond the base of the last abdominal segment; posterior femora extending upto the base of the last abdominal segment and in some cases even upto the anterior—third of the last segment; anterior femora bi-dentate and a little longer than the head and pronotum together, the dorsal or inner tooth of anterior femur short, triangular and at a distance from the ventral tooth (text-figs. 7a, b.).



TEXT-FIG. 7.—*Ranatra varipes* Stål.

a. Anterior leg; b. Part of the anterior femur highly magnified in the teeth region; c. Paramere; d. Apical part of the paramere highly magnified.

The paramere of male specimens is very characteristic and appears hatchet-shaped as in text-figs. 7c, d.

The length of body, abdominal appendages, etc. of two male examples is as follows :—

Sex	Body length	Length of abdominal appendages	Length of anterior femur	Length of head and pronotum together
♂	19.1 mm.	15.0 mm.	6.7 mm.	5.5 mm.
♂	18.5 mm.	14.1 mm.	6.1 mm.	5.4 mm.

The species is represented in the collection of the Zoological Survey of India from Bengal, United Provinces, Madras Presidency, Malay Peninsula, Southern Shan States and Siam.

Ranatra elongata Fabricius.

1906. *Ranatra elongata*, Distant, *Faun. Brit. Ind. Rhyn.* III, pp. 20, 21.

This species is readily distinguished by the structure of the anterior femur which is provided with one big triangular tooth beyond the middle of its length and a pair of short teeth a little before the apex at the proximal border of a shallow notch and by its characteristic metasternal process which is sub-triangular and centrally longitudinally foveately sulcate. The paramere of the male specimen examined is shaped as figured by Lundblad¹. Some structural details are added here.

Head devoid of a tubercle on the vertex between eyes. Interocular space almost equal to the width of the eye. Second joint of the antenna triangular while the third curved and stout; both the joints somewhat dark brownish and covered with thorny bristles. Hemelytra reaching upto the middle of the subterminal segment. Posterior femora extending either upto the middle or in some cases only upto the base of the last abdominal segment.

The abdominal appendages are invariably longer than the body as mentioned by Distant. Length of the body and respiratory tube (or abdominal appendages) of a few male and female specimens as below :—

Sex	Body length	Length of abdominal appendages
♂	39.9 mm.	48.8 mm..
	40.9 mm.	52.1 mm.
	.. 41.5 mm.	57.8 mm.
	.. 44.2 mm.	50.8 mm.
	.. 43.9 mm.	49.0 mm.
	.. 46.8 mm.	55.1 mm.

¹ Lundblad, O., *Arch. Hydrobiol. Plankt.* XII (Supplement), p. 41, fig. 9B (1934).

Fifty-six adult and two juvenile specimens of the species were collected from the following localities :—

Four female specimens from Jhitri bandh, Salebhata (7.3.46); twenty-three male and fifteen female specimens from Tank no. 2 and three male specimens from Tank no. 3, Bolangir (11.3.46); three male, seven female and two juvenile specimens from Tahsil bandh, Patnagarh (14.3.46); one male specimen from Titilagarh tank (20.3.46).

The species is represented in the collections of the Zoological Survey of India from Bengal, Bihar, Orissa, Chota Nagpur, United Provinces and Madras Presidency.

***Ranatra titilaensis*, sp. nov.**

Brownish-ochraceous; short, thin and slender; head and pronotum castaneous or ochraceous, posterior area of pronotum slightly darker in hue; abdomen beneath, legs and abdominal appendages pale ochraceous; abdomen above ochraceous; intermediate and posterior tibiae and tarsi infusate; head without a distinct pointed tubercle on the vertex between eyes; interocular space almost equal to the width of the eye; second joint of antenna pale in colour, somewhat tapering towards the end, equal or subequal to the third joint, the latter pale ochraceous, elongate, slightly curved and bluntly rounded at the end, both the joints covered with a few thorny bristles (text-fig. 8a); metasternal process broad, truncate and slightly carinate posteriorly; abdominal appendages considerably shorter than the body (approximately by about $\frac{1}{3}$ the total length of body); hemelytra reaching upto the base of the last abdominal segment; posterior femur reaching upto the base of the last abdominal segment; anterior femora slender and bi-dentate, the teeth lying beyond the middle of their length, inner or dorsal tooth short, narrow and convexly rounded, ventral tooth flattened and not much projected as in other species, the shape, proportionate size and distance between the teeth as in the text-figs. 8b, and c; length of head and pronotum together almost equal to the anterior femur; paramere of male hook-shaped, narrow at the proximal end and appearing somewhat bulged out ventrally about the middle of its length, at the extremity slightly flattened, bent inward and upward towards the dorsal side, and with a small tooth-like process (clearly visible under the high power of a microscope) projecting obliquely upward and forward as in the text-figs. 8d, e.

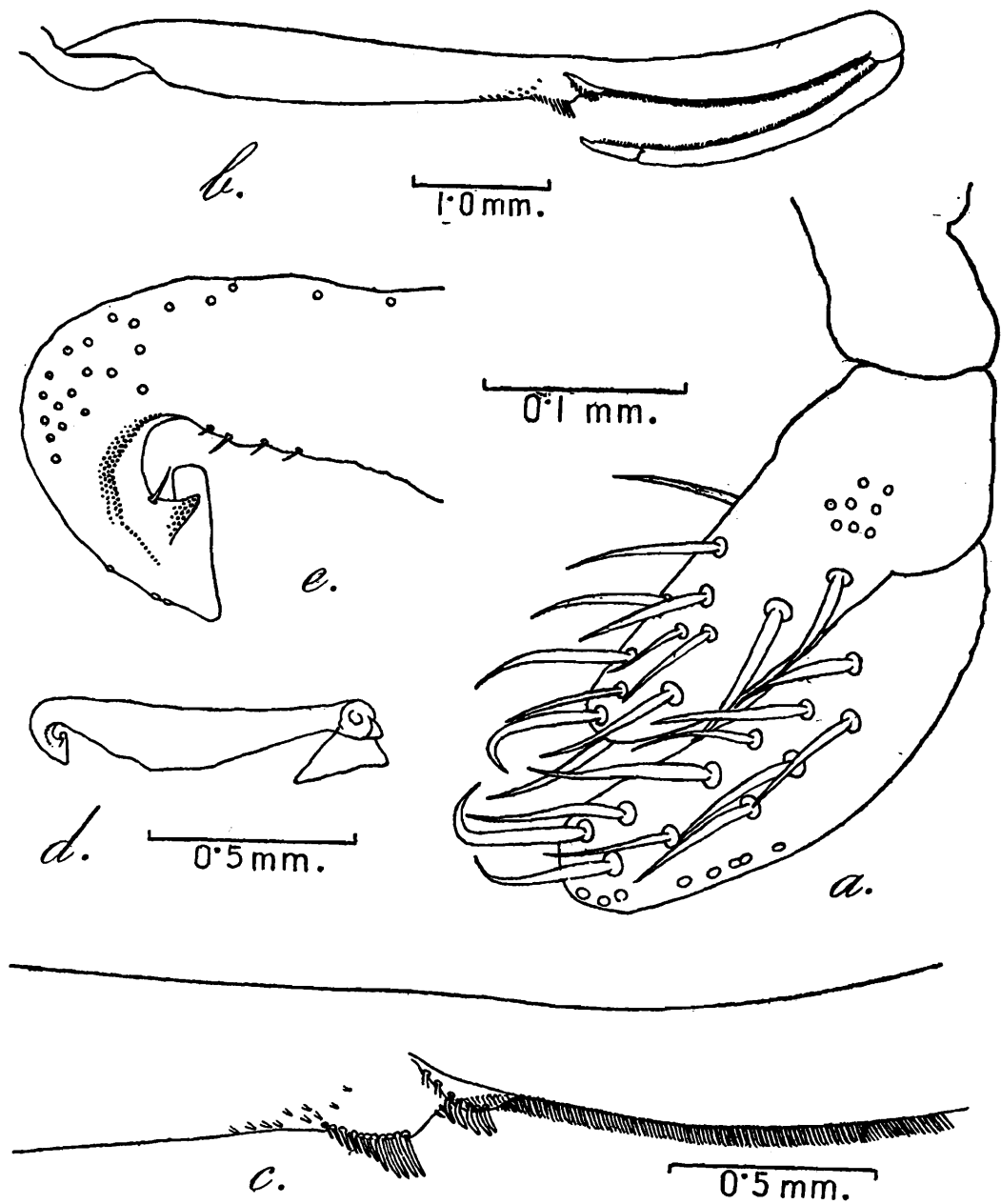
Both male and female specimens are readily recognised by the help of the structure of the anterior femur, while the male specimen alone is distinguished by the structure of the paramere.

Length of the body 17.5 mm.; length of abdominal appendages 13.1 mm.

Type-specimen.—No. $\frac{5990}{H_7}$, Zoological Survey of India.

Locality.—Titilagarh, Patna State, Orissa.

The measurements of the body, abdominal appendages, etc., of a few male and female examples are as follows :—



TEXT-FIG. 8.—*Ranatra titilaensis*, sp. nov.
a. Antenna ; b. Anterior leg ; c. Part of the anterior femur highly magnified in the teeth-region ; d. Paramere ; e. Apex of paramere highly magnified.

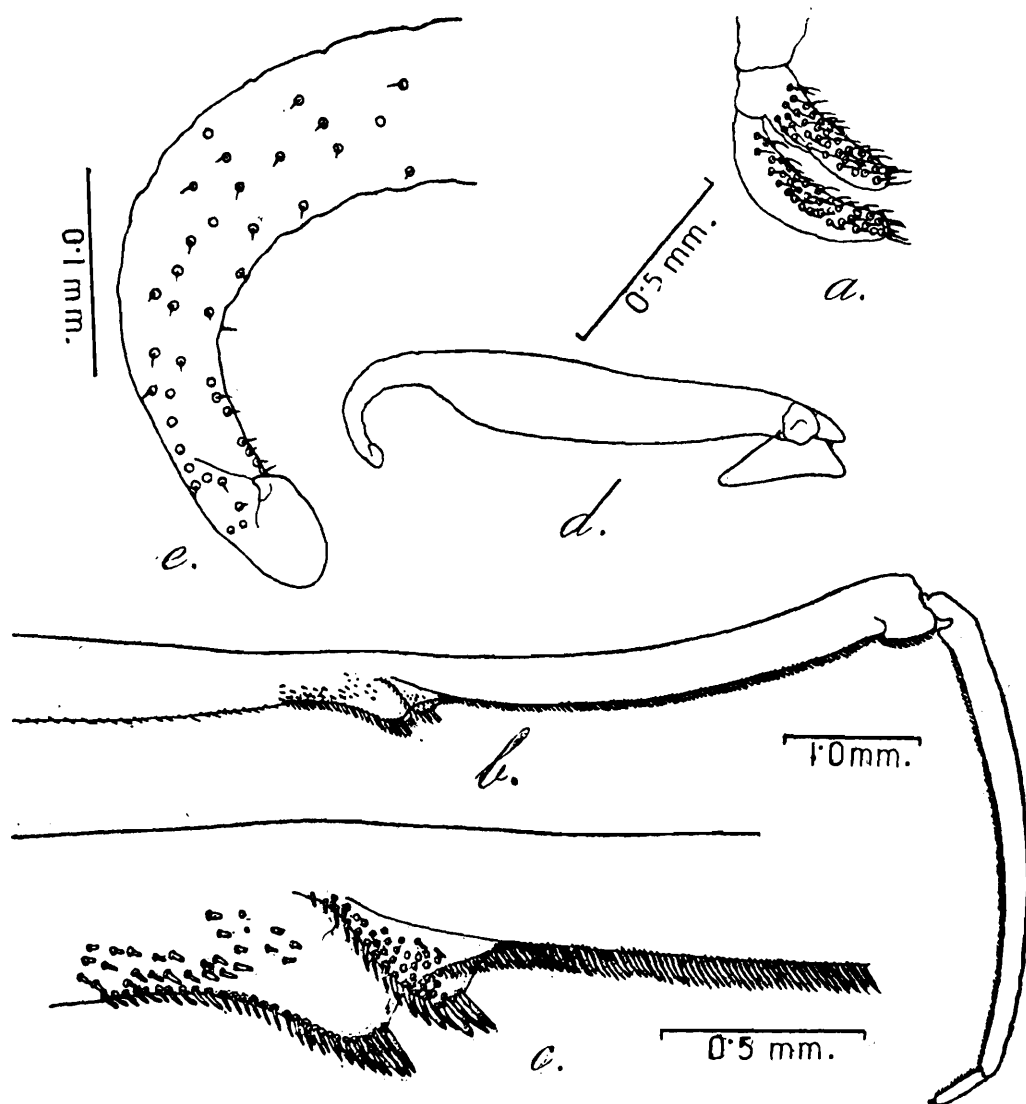
Sex	Body length	Length of the abdominal appendages	Length of anterior femur	Length of head and pronotum together
♂	17.5 mm.	13.1 mm.	5.7 mm.	5.4 mm.
♂	17.3 mm.	12.6 mm.	5.8 mm.	5.4 mm.
♀	18.4 mm.	12.5 mm.	6.1 mm.	5.6 mm.
♀	18.7 mm.	12.9 mm.	5.9 mm.	5.7 mm.
♀	19.3 mm.	13.3 mm.	5.9 mm.	5.8 mm.
♀	19.5 mm.	13.8 mm.	6.0 mm.	6.0 mm.

Thirteen specimens of the species were collected from the following localities in the Patna State, Orissa :—Two male and seven female speci-

mans from Deosar tank (18.3.46); two male and two female specimens from Titilagarh tank near the Inspection bungalow.

***Ranatra digitata*, sp. nov.**

Dark brownish-ochraceous; moderately stout; head and anterior area of pronotum pale castaneous; abdomen beneath, legs and abdominal appendages pale ochraceous, abdomen above dark fuscous with a fuscous longitudinal linear fascia extending upto the apex of the penultimate segment of the abdomen, lateral margins of the abdomen pale ochraceous, terminal abdominal segment grayish; femora of all legs with a narrow annular blackish tinge at the apices; middle and posterior tibiae and tarsi infusate; head without any tubercle or blunt elevation on the vertex between eyes; interocular space slightly narrower than the width of the eye; second joint of antenna elongate, digitate (or finger-like) and blackish for its whole length, third joint curved and longer than the second, its concave surface dark-brownish from base to apex, both the joints covered with thorny bristles (text-fig. 9a); metasternal



TEXT-FIG. 9.—*Ranatra digitata*, sp. nov.

a. Antenna; b. Anterior leg; c. Part of the anterior femur highly magnified in the teeth region; d. Paramere; e. Apex of paramere highly magnified.

process broadly convexly rounded with a slight median keel posteriorly ; abdominal appendages are a little shorter than the body ; hemelytra reaching a little beyond the base of the last abdominal segment ; anterior femora with two teeth beyond the middle of their length, inner or dorsal tooth broadly triangular and not very distant from the ventral one ; the shape, size and relative distance between the two teeth as in the text-figs. 9*b, c* ; length of head and pronotum together almost equal to the anterior femur ; paramere of male hook-shaped, broadest beyond the middle, narrower and somewhat semi-circularly curved in the distal region and with a short recurved apical blunt process directed upward and backward as in the text-figs. 9*d, e*.

Length of the body 27.5 mm. ; abdominal appendages 27.0 mm.

Type-specimen.—No. $\frac{5989}{H_7}$, Zoological Survey of India.

Locality.—Titilagarh, Patna State, Orissa.

Measurements of the body, abdominal appendages, etc., are given below :—

Sex	Body length ¹	Length of abdominal appendages	Length of anterior femur	Length of head and pronotum together
♂	27.3 mm.	26.4 mm.	9.3 mm.	9.3 mm.
	26.2 mm.	26.9 mm.	9.3 mm.	8.7 mm.
	27.8 mm.	27.0 mm.	9.3 mm.	9.1 mm.
	27.8 mm.	28.2 mm.	9.5 mm.	9.3 mm.
	28.1 mm.	25.4 mm.	9.2 mm.	9.4 mm.
	28.1 mm.	26.2 mm.	9.5 mm.	9.5 mm.

Six specimens of the species were collected from the following localities in the Patna State, Orissa :—One male specimen from Tahsil bandh and one female specimen from Bhoosagar and Mainey bandh, Patnagarh (14.3.46) ; one male specimen from Deosar tank (18.3.46) ; one male specimen from Tel river, Belgaon (19.3.46) ; one male and one female specimen from a tank at Titilagarh near Inspection bungalow (20.3.46).

Family HYDROMETRIDÆ

Distant^{1a} (1904) included under the family Hydrometridae four subfamilies, namely, Mesoveliinae, Hydrometrinae, Veliinae and Gerrinae. Bueno² (1925) did not include the above subfamilies under the family Hydrometridae but recognised them as distinct families. Lundblad³ (1934) also considered Mesoveliidae, Hydrometridae, Veliidae and Gerridae as distinct families and this system is followed in the present work.

Hydrometra vittata Stål.

1904. *Hydrometra vittata*, Distant, *Faun. Brit. Ind. Rhyn.* II, p. 170.

This species is represented in the collection under study by two examples and the hemelytra in both the specimens extend upto the middle

¹ Body length does not include the length of the rostrum or the abdominal appendages.

^{1a} Distant, W. L., *Faun. Brit. Ind. Rhyn.* II, p. 168 (1904).

² Bueno, J. R. de la Torre, *Spolia zeylanica* XIII, pp. 225-234 (1925).

³ Lundblad, O., *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 185-195 and 285-435 (1934).

of the fifth abdominal segment although Distant (1904) described them as reaching upto the base of the fifth abdominal segment. The colour of the underside is paler in thoracic region and dark brownish in the abdominal region.

Distant mentioned the length of the specimens of the species as 11 to 12 mm. The specimens collected from Patna State are slightly smaller in size, the actual measurements being 10.5 mm.

Two examples were collected from Deosar tank (18.3.46) in the Patna State, Orissa.

The species has been recorded by Distant from India, Ceylon, Burma Malay Peninsula, Philippines and Japan.

Family VELIIDAE

Microvelia douglasi Scott.

1874. *Microvelia douglasi*, Scott, *Ann. Mag. Nat. Hist.* (4) XIV, p. 448.

1934. *Microvelia douglasi*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 347-357.

This species is represented in the collection under study by five male and twelve female examples collected from Sukhtel river at Gandh Mardan Pervat, Harishanker (15.3.46).

M. repentina Dist., *M. singalensis* Kirk., *M. Kumaonensis* Dist. and *M. samoa* Esaki have all been referred to *M. douglasi* as synonyms by Lundblad (1934).

The species has been recorded from India, Ceylon, Samoa, Sumatra, Java and Japan.

Family GERRIDAE

Cylindrostethus productus (Spinola).

1904. *Cylindrostethus productus*, Distant, *Faun. Brit. Ind. Rhyn.* II, p. 184, fig. 132.

1910. *Janias elegantulus*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), pp. 148, 149, fig. 80.

1939. *Cylindrostethus productus*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, pp. 428, 429.

This species is represented in the collection under study by eleven male and seventeen female examples collected from Sukhtel river at Gandh Mardan Pervat, Harishanker (15.3.46).

Specimens of both the sexes collected from the above locality are macropterous.

Length of body of male and female specimens varies from 22.3 to 23.4 mm. and from 23.2 to 24.0 mm. respectively.

The species is represented in the collection of the Zoological Survey of India from Bihar, Travancore, Bombay Presidency and Ceylon.

Metrocoris stali (Dohrn).

1904. *Metrocoris stali*, Distant, *Faun. Brit. Ind. Rhyn.* II, p. 190.

1910. *Metrocoris stali*, Distant, *Faun. Brit. Ind. Rhyn.* V (Appendix), p. 158.

1926. *Metrocoris stali*, Esaki, *Ann. Hist.-nat. Mus. Nat. Hungar.* XXIII, pp. 123 124.

Two apterous examples, one male and one female, of this species were collected from Sukhtel river, Gandh Mardan Pervat, Harishanker (16.3.46).

Length of male and female specimen being 4.4 and 4.2 mm. respectively.

The species is represented in the collections of the Zoological Survey of India from Bengal, Bihar, United Provinces, Punjab and Bombay Presidency.

It has also been recorded by Distant from Madras, Sikkim, Nepal and Ceylon.

Ptilomera sp.

The subfamily Ptilomerinae is represented in the collection under study by two examples which are referred to the genus *Ptilomera*. When a large series of material becomes available it will be possible to refer these to a species of the genus.

Two specimens, one male and one female were collected from Sukhtel river, Gandh Mardan Pervat, Harishanker (15.3.46).

Family BELOSTOMATIDAE

Sphaerodema molestum (Duf.)

1906. *Sphaerodema molestum*, Distant, *Faun. Brit. Ind. Rhyn.* III, pp. 36, 37.

Distant's (1906) account of the species is insufficient and, therefore the following characters are added. Hemelytra are longer than broad and with a rounded or oval shining spot of very fine close-set short bristles beyond the middle of their length at the inner margin. A similar spot is described by Lundblad¹ in the closely allied species *S. rusticum* (Fabr.). Anterior tarsus one-jointed and anterior tarsal claws are moderately well developed. The ventro-lateral stripe of fine hair on the abdomen is broad.

Two female specimens, one from the tank Purni bandh and the other from Jhutel bandh, measuring 15.6 and 16.9 mm. in length were collected from Salebhata (7.3.46).

The species has been recorded by Lundblad from India, Malacca and Sumatra.

Sphaerodema rusticum (Fabricius).

1906. *Sphaerodema rusticum*, Distant, *Faun. Brit. Ind. Rhyn.* III, p. 36.

1934. *Sphaerodema rusticum*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 55-61.

The head is almost as long as greatest width between eyes. Hemelytra are longer than broad and with a rounded spot of very fine close-set

¹ Lundblad, O., *Arch. Hydrobiol. Plankt.* XII (Supplement), p. 56, fig. 16 (1934).

short hairs beyond the middle of their length near the inner margin. Anterior tarsus is one-jointed and the tarsal claws are very short. The ventro-lateral stripe of fine hair on the abdomen is narrower than *S. molestum* (Duf.).

Length 17.5 mm., greatest breadth 10.5 mm.

Hemelytra 13.5 mm. long.

The species is represented in the collection by one female specimen collected at Salebhata on 7.3.46 from the tank Jhutel bandh.

The species is widely distributed and has been recorded from India, Burma, Ceylon, Siam, Malay Peninsula, Sumatra, Java, Philippines, China, Japan, Formosa, Newguinea and Australia.

***Sphaerodema annulatum* (Fabricius).**

1906. *Sphaerodema annulatum*, Distant, *Faun. Brit. Ind. Rhyn.* III, pp. 35, 36.

1939. *Sphaerodema annulatum*, Hafiz and Ribeiro, *Rec. Ind. Mus.* XLI, p. 431.

Hemelytra are invariably longer than broad and without a rounded spot of fine close-set short hairs as in the other two species of the genus dealt with in this paper. Anterior tarsus is two-jointed and the tarsal claws are well developed.

The species is represented by nine specimens collected from the following localities :—Four male and three female specimens from Deval bandh tank, three miles west of Patnagarh (17.3.46) ; one female specimen from Deosar tank (18.3.46) ; one male specimen from a tank near the Inspection bungalow at Titilagarh (21.3.46).

The species has been recorded from India and Formosa and is represented in the collections of the Zoological Survey of India from Assam, Bengal, Bihar, Orissa and Chota Nagpur.

***Lethocerus indicus* (Lepeletier and Serville).**

1906. *Belostoma indicum*, Distant, *Faun. Brit. Ind. Rhyn.* III, pp. 38, 39, fig. 24.

1934. *Lethocerus indicus*, Lundblad, *Arch. Hydrobiol. Plankt.* XII (Supplement), pp. 52-55, text-fig. 15, pl. XVI, figs. 3-4.

This very common species is represented in the collection by two examples, one male and one female collected from a tank at Titilagarh (20.3.46).

The species has a wide range of distribution in the Oriental region and is known in India from Darjeeling district, Eastern Himalayas; Assam; Bengal; Bihar; Orissa; the United Provinces; Sind; the Bombay Presidency and the Madras Presidency. It has also been recorded from Ceylon, Burma, Siam, China, Formosa, Sumatra, Java and the Philippines.

A CHECK-LIST OF THE FISHES OF INDIA, BURMA AND CEYLON.

PART II. CLUPEIFORMES, BATHYCLUPEIFORMES, GALAXIIFORMES, SCOPELIFORMES AND ATELEOPIIFORMES.

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INTRODUCTION.

† The second part¹ of the "Check List" deals with Clupeiformes, Galaxiiformes, Scopeliformes, Bathyclupeiformes and Ateleopiformes of India, Burma and Ceylon and contains a list of 171 species of fish. Dr. Day recorded only 68 species of the first three orders and none of the last two.

The species marked with an asterisk (*) is doubtfully recorded from India.

SYSTEMATIC ACCOUNT.

Class TELEOSTOMI.

Subclass ACTINOPTERYGII.

Order CLUPEIFORMES (ISOSPONDYLII, MALACOPTERYGII)

Suborder CLUPEOIDEI.

Superfamily ELOPOIDAE.

Family ELOPIDAE.

Genus *Elops* Linnaeus.

1766. *Elops* Linnaeus, *Syst. Nat.* I, ed. 12, p. 518. (Type, *Elops saurus* L., monotypic).

Elops saurus L.

1766. *Elops saurus*, Linnaeus, *Syst. Nat.* I, ed. 12, p. 518 (type locality : Carolina).
1839. *Elops indicus* Swainson, *Hist. Nat. Animal.* II, p. 292 (on Jinagow Russell, *Fish Coromandel* II, p. 63, pl. clxxix, 1803, type locality : Vizagapatam).
1846. *Elops saurus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XIX, p. 365 (Massauah, Red Sea, Mauritius, Pondicherry, Coromandel).
1865. *Elops saurus*, Kner, *Reise Novara Fische*, p. 338 (Madras).
1878. *Elops saurus*, Day, *Fish. India*, p. 649, pl. clxvi, fig. 1 (tropical and subtropical seas).
1889. *Elops saurus*, Day, *Faun. Brit. Ind. Fish.* I, p. 401, fig. 125 (tropical and subtropical seas).
1909. *Elops machnata*, Regan, *Ann. Mag. Nat. Hist.* (8)III, p. 39 (Madras).
1913. *Elops machnata*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 4.
1915. *Elops indicus*, Chaudhuri, *Mem. Ind. Mus.* V, p. 413 (Chilka Lake).
1917. *Elops saurus*, Hornell, *Madras Fish. Bull.* XI, p. 93 (Tuticorin).
1929. *Elops saurus*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 354 (Travancore).
1933. *Elops indicus*, Deraniyagala, *Ceylon Journ. Sci.* (C)V, p. 82 (Ceylon).
1941. *Elops saurus*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 524.
1941. *Elops machnata*, Herre, *Mem. Ind. Mus.* XIII, p. 333 (Andamans).

¹For Part I of the "Check List" dealing with Elasmobranchii and Holocephali reference may be made to *Rec. Ind. Mus.* XLV, Part I, pp. 1-46 (1947).

Distribution.—Red Sea, Arabia, East Coast of Africa, Mauritius, Madagascar, India, Ceylon, Andamans, Malay Peninsula, Malay Archipelago, Philippines, China, Japan, Queensland, Hawaii.

Family MEGALOPIDAE.

Genus **Megalops** Lacépède.

1803. *Megalops* Lacépède, *Hist. Nat. Poiss.* V, p. 289. (Type, *Megalops filamentosus* Lac.=*Clupea cyprinoides* Broussonet, monotypic.)

Megalops cyprinoides (Brouss.).

1782. *Clupea cyprinoides*, Broussonet, *Ichth.*, pl. ix (type locality : Oceans between the Tropics).
 1822. *Cyprinodon cundinga*, Hamilton, *Fish. Ganges*, pp. 254, 283 (type locality : salt water estuaries of the Ganges).
 1846. *Megalops indicus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XIX, p. 388, pl. xlii (type locality : Fort Dauphin, Madagascar ; Mauritius ; Bouru ; Coromandel ; Pondicherry ; Malabar ; Alipey ; Cananor ; Palembang ; Java ; Tahiti ; Tana).
 1851. *Megalops kundinga*, Jerdon, *Mad. Journ. Lit. Sci.* XVII, p. 146.
 1865. *Elops apalike* (nec Lac.) Day, *Fish. Malabar*, p. 228 (Malabar).
 1868. *Megalops cyprinoides*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 471 (Zanzibar ; Shire River ; Madras ; Bengal ; Penang ; Java ; Sumatra ; Amboyna ; Formosa ; Aneitum ; Cape York ; Port Essington).
 1878. *Megalops cyprinoides*, Day, *Fish India*, p. 650, pl. clix, fig. 3 (East Coast of Africa, freshwater and estuaries of India, Ceylon, Malay Archipelago, China, Polynesia).
 1889. *Megalops cyprinoides*, Day, *Faun. Brit. Ind. Fish.* I, p. 402, fig. 125 (Indian and Pacific Oceans, waters and estuaries of India, Ceylon, etc., occasionally captured in rivers, but much more commonly found in tanks).
 1907. *Megalops cyprinoides*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
 1913. *Megalops cyprinoides*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 5, fig. 4.
 1915. *Megalops cyprinoides*, Chaudhuri, *Mem. Ind. Mus.* V, p. 417 (Chilka Lake).
 1916. *Megalops cyprinoides*, Raj, *Rec. Ind. Mus.* XII, p. 252 (Madras).
 1929. *Megalops cyprinoides*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1933. *Megalops cyprinoides*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 83 (Ceylon).
 1941. *Megalops cyprinoides*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 519
 1941. *Megalops cyprinoides*, Herre, *Mem. Ind. Mus.* XIII, p. 334 (Andamans)

Distribution.—East Africa, Zanzibar, Natal, Madagascar, India, Ceylon, Burma, Malay Peninsula, Malay Archipelago, Siam, China, Formosa, Japan, Australia, Melanesia, Micronesia, Polynesia.

Superfamily ALBULOIDAE.

Family ALBULIDAE.

Genus **Albula** Scopoli.

1777. *Albula* Scopoli, *Introd. Nat. Hist.* p. 454. (Type, *Esox vulpes* L.)

Albula vulpes (L.).

1758. *Esox vulpes*, Linnaeus, *Syst. Nat.* I, ed. 10, p. 313 (type locality : Bahama Islands).
 1868. *Albula conorhynchus*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 468 (Ceylon).
 1878. *Albula conorhynchus*, Day, *Fish. India*, p. 648 (Red Sea, Seas of Africa, India, Malay Archipelago and America, also the Pacific).
 1889. *Albula conorhynchus*, Day, *Faun. Brit. Ind. Fish.* I, p. 401 (coasts of India and all the tropical and subtropical seas).
 1913. *Albula vulpes*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 7, fig. 5.
 1916. *Albula vulpes*, Raj, *Rec. Ind. Mus.* XII, p. 253 (Madras).
 1933. *Albula vulpes*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 81 (Ceylon).
 1941. *Albula vulpes*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 529.

Distribution.—Red Sea, Zanzibar, Natal, Mauritius, India, Ceylon, Malay Peninsula, Malay Archipelago, Japan, Korea, Queensland, New South Wales, Melanesia, Micronesia, Polynesia, Hawaii.

Superfamily CLUPEOIDAE.

Family CLUPEIDAE.

Subfamily *Dussumieriini*.Genus **Dussumieria** Cuvier & Valenciennes.

1847. *Dussumieria* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 467. (Type, *Dussumieria acuta* C. V., monotypic).

Dussumieria acuta C. V.

1847. *Dussumieria acuta*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 467, pl. mcv (type locality : Bombay ; Coromandel).
 1851. *Dussumieria acuta*, Jerdon, *Madras Journ. Lit. Sci.* XVII, p. 145.
 1865. *Dussumieria acuta*, Day, *Fish. Malabar*, p. 226 (Malabar).
 1870. *Dussumieria acuta*, Day, *Proc. Zool. Soc. London*, p. 701 (Andamans).
 1878. *Dussumieria acuta*, Day, *Fish. India*, p. 647, pl. clxvi, fig. 4 (from Sind through the seas of India to the Malay Archipelago).
 1889. *Dussumieria acuta*, Day, *Faun. Brit. Ind. Fish.* I, p. 399, fig. 123 (from Sind through the seas of India to the Malay Archipelago).
 1912. *Dussumieria acuta*, Jenkins, *Rec. Ind. Mus.* VII, p. 60 (Chilka Lake).
 1917. *Dussumieria acuta*, Hornell, *Madras Fish. Bull.* XI, p. 93 (Tuticorin).
 1929. *Dussumieria acuta*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1929. *Dussumieria acuta*, Deraniyagala, *Spolia Zeylan.* XV, p. 33 (Ceylon).
 1933. *Dussumieria acuta*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
 1933. *Dussumieria acuta*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).
 1941. *Dussumieria acuta*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 570.
 1941. *Dussumieria acuta*, Herre, *Mem. Ind. Mus.* XIII, p. 334 (Andamans).

Distribution.—South Arabia, India, Ceylon, Malay Peninsula, Malay Archipelago, China, Philippines.

Dussumieria hasselti Blkr.

1851. *Dussumieria hasselti*, Bleeker, *Nat. Tijds. Ned. Ind.* I, p. 422 (type locality : Batavia, Cheribon, Samarang, Surabaya).
 1870. *Dussumieria elopsoides* (nec Bleeker), Day, *Proc. Zool. Soc. London*, p. 701.
 1878. *Dussumieria hasselti*, Day, *Fish. India*, p. 647, pl. clxvi, fig. 5 (from Canara and the Coromandel Coast of India to the Malay Archipelago and China).

1889. *Dussumieria hasseltii*, Day, *Faun. Brit. Ind. Fish.* I, p. 399 (from Canara and the Coromandel Coast of India to the Malay Archipelago and China).
 1913. *Dussumieria hasseltii*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 23.
 1917. *Dussumieria hasseltii*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1924. *Dussumieria hasseltii*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 39 (Calicut).
 1936. *Dussumieria hasseltii*, Hora & Mukerji, *Rec. Ind. Mus.* XXXVIII, p. 18 (Maungmagan, Burma).
 1941. *Dussumieria hasseltii*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 572.
 1941. *Dussumieria hasseltii*, Herre, *Mem. Ind. Mus.* XIII, p. 334 (Andamans).

Distribution.—India, Burma, Malay Peninsula, Malay Archipelago, Formosa, Queensland.

Genus **Ehirava** Deraniyagala.

1929. *Ehirava* Deraniyagala, *Spolia Zeylan.* XV, p. 34. (Type, *Ehirava fluviatilis* Deraniyagala, orthotypic.)

Ehirava fluviatilis Deraniyagala.

1929. *Ehirava fluviatilis*, Deraniyagala, *Spolia Zeylan.* XV, p. 34, pl. xiv (type locality: Piliandera, Kalutera S., Panadura, Digela, Kehelvatta, Kelaniya; according to Deraniyagala the type is in the British Museum).
 1933. *Ehirava fluviatilis*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).

Distribution.—Ceylon.

Genus **Stolephorus** Lacépède.

1803. *Stolephorus* Lacépède, *Hist. Nat. Poiss.* V, p. 381. (Type, *Atherina japonica* Houttuyn, designated by Jordan & Gilbert, *U. S. Nat. Mus. Bull.* XVI, p. 272, 1883.)
 1873. *Spratelloides* Bleeker, *Nat. Tijds. Ned. Ind.* II, p. 214. (Type, *Clupea argyrotaeniata* Blkr., orthotypic.)

Stolephorus malabaricus (Day).

1873. *Spratelloides malabaricus*, Day, *Proc. Zool. Soc. London*, p. 240 (type locality: Malabar).
 1878. *Spratelloides malabaricus*, Day, *Fish. India*, p. 648, pl. clxi, fig. 5 (Western Coast of India, in rivers and estuaries).
 1889. *Spratelloides malabaricus*, Day, *Faun. Brit. Ind. Fish.* I, p. 400, fig. 124.

Distribution.—India.

Subfamily *Clupeini*.

Genus **Harengula** Cuvier & Valenciennes.

1847. *Harengula* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 20. (Type, *Harengula tatulus* V.=*Clupea macrophthalma* Ranzani, designated by Gill, *Proc. Acad. Nat. Sci. Philad.*, p. 36, 1861.)

Harengula punctata (Rüpp.).

- 835-40. *Clupea punctata*, Rüppell, *Neue Wirbelth. Fische*, p. 78, pl. xxi, fig. 2 (type locality: Red Sea).

1847. *Sardinella lineolata*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 272 (type locality : Tranquemale, Ceylon).
 1868. *Clupea moluccensis*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 427 (Molucca Sea ; Ceylon).
 1878. *Clupea klunzei*, Day, *Fish. India*, p. 636, pl. clxiii, fig. 1 (Ceylon, Andamans and Nicobars to the Malay Archipelago ; the example figured was from the Andamans).
 1889. *Clupea kunzei*, Day, *Faun. Brit. Ind. Fish.* I, p. 372 (Ceylon, Andamans and Nicobars to the Malay Archipelago).
 1912. *Clupea kunzei*, Jenkins, *Rec. Ind. Mus.* VII, p. 59 (Puri, Orissa).
 1913. *Clupea (Harengula) moluccensis*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 81, fig. 28.
 1929. *Clupea (Harengula) moluccensis*, Deraniyagala, *Spolia Zeylan.* XV, p. 43 (Ceylon).
 1939. *Harengula punctata*, Herre, *Rec. Ind. Mus.* XLI, p. 329 (Andamans).
 1941. *Harengula ovalis*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 589.
 1941. *Harengula punctata*, Herre, *Mem. Ind. Mus.* XIII, p. 334.

Distribution.—Red Sea, Arabia, Zanzibar, Madagascar, Seychelles, India, Ceylon, Andamans, Nicobars, Singapore, Malay Archipelago, Japan, Queensland, Melanesia, Micronesia, Polynesia.

Harengula vittata (C. V.).

1847. *Clupeonia vittata*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 352 (type locality : Vanikora).
 1878. *Clupea melanura*, Day, *Fish. India*, p. 641 (seas of India and the Malay Archipelago).
 1889. *Clupea melanura*, Day, *Faun. Brit. Ind. Fish.* I, p. 378 (seas of India and the Malay Archipelago).
 1913. *Clupea (Harengula) melanura*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 72.
 1941. *Harengula vittata*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 596.

Distribution.—Reunion, Zanzibar, Madagascar, India, Malay Archipelago, Siam, Melanesia, Micronesia, Polynesia.

Genus *Sardinella* Cuvier & Valenciennes.

1847. *Sardinella* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 281. (Type, *Sardinella aurita* C.V., designated by Gill, *Proc. Acad. Nat. Sci. Philad.* p. 35, 1861).
 1849. *Amblygaster* Bleeker, *Journ. Ind. Archipel.* III, p. 73. (Type, *Amblygaster clupeoides* Blkr., monotypic.)

***Sardinella albella* (C. V.).**

1847. *Kowala albella*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 362, pl. dcii (type locality : Pondicherry).
 1868. *Clupea albella*, Günther, *Cat. Fish. Brit. Mus.* VIII, p. 424 (Pondicherry).
 1878. *Clupea brachysoma*, Day, *Fish. India*, p. 635, pl. clxiii, fig. 3 (East Coast of Africa, Seas of India to the Malay Archipelago).
 1889. *Clupea brachysoma*, Day, *Faun. Brit. Ind. Fish.* I, p. 371 (East Coast of Africa, Seas of India to the Malay Archipelago).
 1910. *Clupea brachysoma*, Jenkins, *Rec. Ind. Mus.* V, p. 131 (Karachi).
 1913. *Clupea (Harengula) brachysoma*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 70, fig. 25.
 1917. *Sardinella brachysoma*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 381 (Madras).
 1941. *Sardinella albella*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 605.

Distribution.—India, Malay Archipelago, Siam

***Sardinella clupeioides* (Blkr.).**

1849. *Amblygaster clupeioides*, Bleeker, *Journ. Ind. Archipel.* III, p. 73 (type locality : Macassar) (error).

1933. *Sardinella clupeioides*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 83 (Ceylon).

1941. *Sardinella clupeioides*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 619.

Distribution.—Ceylon, Malaya, Malay Archipelago, Philippines, Japan.

***Sardinella dayi* Reg.**

1917. *Sardinella dayi*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 381 (type locality : Karwar, India).

1924. *Sardinella dayi*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 36 (Calicut).

1941. *Sardinella dayi*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 604.

Distribution.—Mauritius, India, Philippines.

***Sardinella fimbriata* (C. V.).**

1847. *Spratella fimbriata*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 359, pl. dc (type locality : Malabar).

1865. *Spratella fimbriata*, Day, *Fish. Malabar*, p. 233 (Malabar).

1865. *Spratella fimbriata*, Kner, *Reise Novara Fische*, p. 329 (Madras).

1878. *Clupea fimbriata* (part), Day, *Fish. India*, p. 637, pl. clxi, fig. 3 (Red Sea, seas of India to the Malay Archipelago; the example figured, life-size, was from Vizagapatam).

1889. *Clupea fimbriata* (part), Day, *Faun. Brit. Ind. Fish.* I, p. 373 (Red Sea, seas of India to the Malay Archipelago).

1913. *Clupea (Harengula) fimbriata* (part), Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 75, nec fig. 26.

1916. *Clupea fimbriata*, Govindan, *Madras Fish. Bull.* IX, p. 114 (East Coast).

1917. *Sardinella fimbriata*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 382 (Akyab, Orissa, Malabar).

1929. *Clupea fimbriata*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).

1929. *Clupea (Harengus) fimbriata*, Deraniyagala, *Spolia Zeylan.* XV, p. 41, pl. xviii, fig. 3 (Ceylon).

1933. *Clupea fimbriata*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).

1941. *Sardinella fimbriata*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 609.

Distribution.—India, Ceylon, Burma, Singapore, Malay Archipelago, Siam, Indo-China, China.

***Sardinella gibbosa* (Blkr.).**

1849. *Clupea gibbosa*, Bleeker, *Journ. Ind. Archipel.* III, p. 72 (type locality : Macassar).

1878. *Clupea fimbriata* (part), Day, *Fish. India*, p. 637.

1889. *Clupea fimbriata* (part), Day, *Faun. Brit. Ind. Fish.* I, p. 373.

1913. *Clupea (Harengula) fimbriata* (part), Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 75, fig. 26.

1917. *Sardinella gibbosa* Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 383 (Ganjam, Madras).

1933. *Clupea (Harengula) gibbosa*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).

1941. *Sardinella jussieu*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 611.

Distribution.—East Africa, India, Ceylon, Malay Archipelago, Philippines, Australia, Micronesia, Polynesia.

Sardinella longiceps C. V

1847. *Sardinella longiceps*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 273 (type locality : Pondicherry).
 1847. *Sardinella neohowii*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 274 (type locality : Cananor ; Malabar).
 1847. *Alausa scombrina*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 442 (type locality : Cananor ; Malabar).
 1865. *Sardinella Neohowii*, Day, *Fish. Malabar*, p. 220 (Malabar).
 1868. *Clupea longiceps*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 428 (Pondicherry).
 1868. *Clupea scombrina*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 448 (Cochin).
 1878. *Clupea longiceps*, Day, *Fish. India*, p. 637, pl. clxi, fig. 2 (Sind down to the Western coast of India, more rarely on the Eastern, Ceylon, the Andamans to the Malay Archipelago).
 1889. *Clupea longiceps*, Day, *Faun. Brit. Ind. Fish.* I, p. 373 (Sind down to the Western coast of India, more rarely on the Eastern, Ceylon, the Andamans to the Malay Archipelago).
 1910. *Clupea longiceps*, Jenkins, *Rec. Ind. Mus.* V, p. 131 (Karachi).
 1913. *Clupea (Harengula) longiceps*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 82.
 1917. *Sardinella longiceps*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 379 (India).
 1917. *Clupea longiceps*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1924. *Sardinella longiceps*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 36 (Calicut).
 1924. *Sardinella longiceps*, Hornell & Nayadu, *Madras Fish. Bull.* XVIII, p. 129 (Madras).
 1929. *Clupea longiceps*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1929. *Clupea (Harengus) longiceps*, Deraniyagala, *Spolia Zeylan.* XV, p. 44, pl. xviii, fig. 11 (Ceylon).
 1933. *Sardinella longiceps*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 83 (Ceylon).
 1933. *Clupea longiceps*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).
 1941. *Sardinella longiceps*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 603.
 1941. *Sardinella longiceps*, Herre, *Mem. Ind. Mus.* XIII, p. 334 (Andamans).

Distribution.—Arabia, Seychelles, Ceylon, India, Andamans, Malay Archipelago, Philippines.

Sardinella melanura (C.).

1829. *Clupea melanura*, Cuvier, *Règne Animal* II, ed. 2, p. 318 (on Lacépède).
 1847. *Clupeonia commersoni*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 350 (type locality : Bombay).
 1870. *Clupea atricauda*, Day, *Proc. Zool. Soc. London*, p. 701 (Andamans).
 1878. *Clupea atricauda*, Day, *Fish. India*, p. 636, pl. clxiv, fig. 5 (Andamans to the Malay Archipelago ; the example figured was from Port Blair).
 1889. *Clupea atricauda*, Day, *Faun. Brit. Ind. Fish.* I, p. 372 (Andamans to the Malay Archipelago).
 1913. *Clupea (Harengula) atricauda*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 80.
 1917. *Sardinella melanura*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 384.
 1917. *Clupea atricauda*, Hornell, *Madras Fish. Bull.* XI, p. 91 (Tuticorin).
 1929. *Clupea atricauda*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1933. *Clupea (Harengula) melanura*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
 1941. *Sardinella melanura*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 614.
 1941. *Sardinella melanura*, Herre, *Mem. Ind. Mus.* XIII, p. 334 (Andamans).

Distribution.—East Coast of Africa, Madagascar, India, Ceylon, Andamans, Malay Archipelago, Hainan, China, Micronesia, Polynesia.

***Sardinella sindensis* (Day).**

1878. *Clupea Sindensis*, Day, *Fish. India*, p. 638, pl. clxiii, fig. 2 (type locality : Karachi; type is in the Zoological Survey of India; the example figured, life-size, was from Karachi).
 1889. *Clupea sindensis*, Day, *Faun. Brit. Ind. Fish.* I, p. 374 (seas of the Seychelles, Sind and Bombay).
 1910. *Clupea sindensis*, Jenkins, *Rec. Ind. Mus.* V, p. 131 (Karachi).
 1917. *Sardinella sindensis*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 383 (Sind, Bombay).
 1917. *Clupea sindensis*, Hornell, *Madras Fish. Bull.* XI, p. 91 (Tuticorin).
 1929. *Clupea sindensis*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1933. *Clupea sindensis*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).
 1941. *Sardinella sindensis*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 611.

Distribution.—Seychelles, India, Singapore, Amboina, Philippines, Formosa.

***Sardinella sirm* (Rüpp.).**

- 1835-40. *Clupea sirm*, Rüppell, *Neue Wirbelth. Fische*, p. 77, pl. xxi, fig. 1 (type locality : Red Sea, Massaua).
 1847. *Sardinella leiogaster*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 270 (type locality : Trincomalee, Ceylon).
 1878. *Clupea leiogaster*, Day, *Fish. India*, p. 636 (Ceylon to the Malay Archipelago).
 1889. *Clupea leiogaster*, Day, *Faun. Brit. Ind. Fish.* I, p. 372 (Ceylon to the Malay Archipelago).
 1913. *Clupea (Amblygaster) leiogaster*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 61.
 1917. *Clupea leiogaster*, Hornell, *Madras Fish. Bull.* XI, p. 91 (Tuticorin).
 1933. *Sardinella leiogaster*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 83 (Ceylon).
 1941. *Sardinella sirm*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 616.

Distribution.—Red Sea, Arabia, Zanzibar, India, Ceylon, Malay Archipelago, China, Micronesia, Polynesia.

Genus *Hilsa* Regan.

1916. *Paralosa* (nec Bleeker) Regan, *Ann. Durban Mus.* I, p. 167. (Type, *Paralosa durbanensis* Reg., monotypic) (inadmissible).
 1917. *Hilsa* Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 303. (Type, *Paralosa durbanensis* Reg.).

***Hilsa ilisha* (Ham.).**

1822. *Clupanodon ilisha*, Hamilton, *Fish. Ganges*, p. 243, pl. xix, fig. 75 (type locality : Ganges estuaries, Patna, Goyalpara, Calcutta, Dhaka=Dacca).
 1829. *Clupea palasah* Cuvier, *Règne Animal* II, ed. 2, p. 320 [on *Palasah* Russell, *Fish. Coromandel* II, p. 77, pl. cxviii, 1803 (type locality : Vizagapatam)].
 1847. *Alausa palasah* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 432 (Bombay).
 1865. *Alausa palasah*, Day, *Fish. Malabar*, p. 235 (Malabar).
 1865. *Alausa palasah*, Kner, *Reise Novara Fische*, p. 331 (Ceylon).
 1868. *Clupea palasah*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 445 (Ganges, Cochin).
 1873. *Clupea palasah*, Day, *Rep. Freshwater Fish. India & Burma*, p. 22 (Indus, Cauveri, Hoogli, Irrawadi).
 1878. *Clupea ilisha*, Day, *Fish. India*, p. 640, pl. clxxii, fig. 3 (Persian Gulf ascending the Tigris, the coasts of Sind, India and Burma, passing up the large rivers to breed, also the Malay Archipelago, Day collected them as high as Delhi and Hamilton recorded them from Agra and Cawnpore).
 1889. *Clupea ilisha*, Day, *Faun. Brit. Ind. Fish.* I, p. 376, fig. 115.
 1896. *Clupea (Alosa) ilisha*, Steindachner, *Ann. Hofmus Wien* XI, p. 228 (Rangoon).
 1907. *Clupea ilisha*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).

1910. *Clupea ilisha*, De, *Rep. Fish. East. Bengal & Assam*, p. 18 (Eastern Bengal and Assam).
 1911. *Clupea ilisha*, Maxwell, *Rep. Inland Fish. Thongwa, Mgangmya and Bassein Dts.*, p. 85 (Burma).
 1913. *Clupea ilisha*, Southwell, *Rec. Ind. Mus.* IX, pp. 88, 296 (Monghyr, Buxar, Calcutta, Diamond Harbour).
 1916. *Clupea ilisha*, Raj, *Rec. Ind. Mus.* XII, p. 252 (Tanjore).
 1916. *Clupea ilisha*, Govindan, *Madras Fish. Bull.* IX, p. 115 (East Coast).
 1917. *Hilsa ilisha*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 306 (Persian Gulf to Burma).
 1917. *Clupea ilisha*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1937. *Hilsa ilisha*, Shaw & Shebbeare, *Journ. Roy. As. Soc. Bengal Sci.* III, p. 13, fig. 4 (Sara Ghat).
 1938. *Hilsa ilisha*, Hora, *Rec. Ind. Mus.* XL, p. 147 (Pulta, Nawabgunge).
 1940. *Hilsa ilisha* Hora & Nair, *Rec. Ind. Mus.* XLII, p. 35 (East Bengal).
 1940. *Hilsa ilisha*, Prashad, Hora & Nair, *Rec. Ind. Mus.* XLII, p. 529 (Chandipore, Goalundo).
 1941. *Macrura ilisha*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 633.

Distribution.—Iraq, Persian Gulf, India, Ceylon, Burma, Philippines.

Hilsa kanagurta (Blkr.).

1852. *Alosa kanagurta*, Bleeker, *Verh. Bot. Gen. (Haring.)* XXIV, pp. 13, 34 (type locality : Batavia, Muntok, East Indies).
 1878. *Clupea kanagurta*, Day, *Fish. India*, p. 640, pl. clxii, fig. 4 (East Coast of Africa ; Sind, Coasts of India to the Malay Archipelago).
 1889. *Clupea kanagurta*, Day, *Faun. Brit. Ind. Fish.* I, p. 377 (East Coast of Africa ; Sind, Coasts of India to the Malay Archipelago).
 1913. *Clupea (Alosa) kanagurta*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 67.
 1917. *Hilsa kanagurta*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 304 (Zanzibar to Malay Archipelago).
 1924. *Hilsa blochii*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 3 (Bombay).
 1929. *Clupea kanagurta*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1929. *Clupea (Alosa) kanagurta*, Deraniyagala, *Spolia Zeylan.* XV, p. [39 (Ceylon).
 1941. *Macrura kelee*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 627.

Distribution.—Aden, Zanzibar, India, Ceylon, Malay, Siam, Malay Archipelago, Philippines.

Hilsa toli (C. V.).

1847. *Alosa toli*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 435 (type locality : Coromandel, Pondicherry).
 1878. *Clupea toli*, Day, *Fish. India*, p. 641, pl. clxii, fig. 2 (from Bombay through the seas of India to the Malay Archipelago and China ; the example figured, life-size, was from Bombay).
 1889. *Clupea toli*, Day, *Faun. Brit. Ind. Fish.* I, p. 377 (from Bombay through the seas of India to the Malay Archipelago and China).
 1910. *Clupea toli*, De, *Rep. Fish. East. Bengal & Assam*, p. 18 (Chittagong).
 1913. *Clupea (Alosa) toli*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 64.
 1917. *Hilsa toli*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 306 (India).
 1929. *Clupea toli*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1929. *Clupea (Alosa) toli*, Deraniyagala, *Spolia Zeylan.* XV, p. 39 (Ceylon).
 1941. *Macrura sinensis*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 631.

Distribution.—India, Ceylon, Malay Peninsula, Malay Archipelago, Siam, Formosa, China, Japan.

Genus **Gudusia** Fowler.

1911. *Gudusia* Fowler, *Proc. Acad. Nat. Sci. Philad.* LXIII, p. 207. (Type, *Clupanodon chapra* Ham., orthotypic).

Gudusia chapra (Ham.).

1822. *Clupanodon chapra*, Hamilton, *Fish. Ganges*, pp. 248, 383 (type locality : upper parts of the Ganges).
 1833-34. *Clupea Indica*, Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xci, figs. 1, 2 (type locality : India).
 1833-34. *Clupea Champil*, Gray, *Ill. Ind. Zool. Hardwicke*, II, pl. xcii, fig. 2 (Indian Ocean).
 1847. *Alausa microlepis*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 439 (type locality : Bengal).
 1853. *Alausa microlepis*, Bleeker, *Verh. Bat. Gen. (Bengal)* XXV, pp. (74), 146 (Calcutta).
 1868. *Clupea indica*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 444 (Ganges ; Assam ; Cachar).
 1868. *Clupea chapra*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 447 (Bengal).
 1869. *Clupea chapra*, Day, *Proc. Zool. Soc. London*, p. 385 (Orissa).
 1878. *Clupea chapra*, Day, *Fish. India*, p. 639, pl. cxc, fig. 1 (fresh waters of rivers and tanks of Sind and throughout India as far south as the Kistna River but absent from the Malabar coast and Madras).
 1889. *Clupea chapra*, Day, *Faun. Brit. Ind. Fish.* I, p. 375.
 1907. *Clupea chapra*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
 1910. *Clupea chapra*, Jenkins, *Rec. Ind. Mus.* V, p. 140 (Monghyr).
 1910. *Clupea chapra*, De, *Rep. Fish. East. Bengal & Assam*, p. 17 (Eastern Bengal, Sylhet).
 1912. *Clupea subia*, Chaudhuri, *Rec. Ind. Mus.* VII, p. 437 (type locality : River Gandak in Saran, Bihar ; type is in the Zoological Survey of India).
 1917. *Gudusia chapra*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 307 (Northern India, Sind to Assam).
 1933. *Clupea chapra*, Sorley, *Marine Fish. Bombay Presidency*, p. 170 (Bombay).
 1937. *Gadusia chapra*, Shaw & Shebbeare, *Journ. Roy. As. Soc. Bengal Sci.* III, p. 12 (Siliguri Bazaar).
 1941. *Gudusia chapra*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 634 (Ganges River, India).

Distribution.—India, Pinang, Philippines.

Gudusia variegata (Day).

1869. *Clupea variegata*, Day, *Proc. Zool. Soc. London*, p. 623 (type locality : Irrawaddi River and its branches ; type is in the Zoological Survey of India).
 1878. *Clupea variegata*, Day, *Fish. India*, pl. 639, p. clxi, fig. 4 (Irrawaddi and its branches).
 1889. *Clupea variegata*, Day, *Faun. Brit. Ind. Fish.* I, p. 375.
 1890. *Clupea variegata*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 350 (Irrawaddi).
 1907. *Clupea variegata*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
 1910. *Clupea variegata*, Jenkins, *Rec. Ind. Mus.* V, p. 138 (Mandalay).
 1917. *Gudusia variegata*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 308 (Burma).
 1924. *Gudusia variegata*, Myers, *Amer. Mus. Nov.* No. 150, p. 1 (Burma).
 1929. *Gudusia variegata*, Prashad & Mukerji, *Rec. Ind. Mus.* XXXI, p. 209 (Myitkyina).
 1941. *Gudusia variegata*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 635.

Distribution.—Burma, Philippines.

Genus **Kowala** Cuvier & Valenciennes.

1847. *Kowala* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 362. (Type, *Clupea kowal* Rüpp., tautotypic.)
 1850. *Clupeoides* Bleeker, *Nat. Tijds. Nat. Ind.* I, p. 274. (Type, *Clupeoides borneensis* Blkr., monotypic).

Kowala coval (C.).

1829. *Clupea coval*, Cuvier, *Règne Animal* II, ed. 2, p. 318 [on Kowal Russell, *Fish. Coromandel* II, p. 70, pl. clxxxvi, upper fig. 1803 (type locality : Vizagapatam)].
1847. *Kowala thoracata*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 363 (type locality : Pondicherry : according to Regan the type is in the Paris Museum).
1847. *Meletta lile*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 378 (type locality : Coromandel, Pondicherry ; according to Regan the type is in the Paris Museum).
1868. *Clupea lile*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 450.
1878. *Clupea lile*, Day, *Fish. India*, p. 638, pl. clxii, fig. 1 (seas of India and Burma to the Malay Archipelago ; the example figured, life-size, was from Bombay).
1889. *Clupea lile*, Day, *Faun. Brit. Ind. Fish.* I, p. 374.
1907. *Clupea lile*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
1910. *Clupea lile*, Jenkins, *Rec. Ind. Mus.* V, p. 131 (Karachi).
1913. *Clupeoides lile*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 57, fig. 22.
1913. *Clupea (Harengula) thoracata*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 78.
1922. *Kowala thoracata*, Regan, *Ann. Mag. Nat. Hist.* (9) X, p. 588 (Karachi to New Guinea).
1929. *Clupeoides lile*, Deraniyagala, *Spolia Zeylan.* XV, p. 36 (Ceylon).
1933. *Kowala thoracata*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
1940. *Clupeoides lile*, Herre, *Rec. Ind. Mus.* XLII, p. 9 (Mergui).
1941. *Kowala coval*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 638.

Distribution.—India, Ceylon, Burma, Malaya, Malay Archipelago, China.

Genus Corica Hamilton.

1822. *Corica* Hamilton, *Fish. Ganges*, pp. 253, 383. (Type, *Corica soborna* Ham., monotypic.)

Corica soborna Ham.

1822. *Corica soborna*, Hamilton, *Fish. Ganges*, pp. 253, 383 (type locality : Mahananda River).
- 1833-34. *Corica Guborni*, Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xci, figs. 7, 8 (India).
1878. *Corica soborna*, Day, *Fish. India*, p. 642, pl. clxii, fig. 5 (Orissa and Bengal ; the example figured, life-size, was from Orissa).
1889. *Corica soborna*, Day, *Faun. Brit. Ind. Fish.* I, p. 378 (Orissa and Bengal).
1910. *Corica soborna*, De, *Rep. Fish. East. Bengal & Assam*, p. 18 (Tippera, Assam, Eastern Bengal).
1929. *Corica soborna*, Hora, *Mem. Ind. Mus.* IX, p. 188.
1941. *Corica soborna*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 644.

Distribution.—India, Philippines.

Genus Ilisha Richardson.

1846. *Ilisha* (Gray) Richardson, *Ichth. China Japan*, p. 306. (Type, *Ilisha abnormis* Rich., monotypic.)

Ilisha brachysoma (Blkr.).

1852. *Pellona brachysoma*, Bleeker, *Verh. Bat. Gen.* XXIV, p. 22 (type locality : Batavia).
1878. *Pellona brachysoma*, Day, *Fish. India*, p. 645, pl. clxiv, fig. 2 (seas of India to the Malay Archipelago ; the example figured was from Cochin).
1889. *Pellona brachysoma*, Day, *Faun. Brit. Ind. Fish.* I, p. 382.
1913. *Pellona brachysoma*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 87.

1916. *Pellona brachysoma*, Govindan, *Madras Fish. Bull.* IX, p. 113 (East Coast).
 1923. *Ilisha brachysoma*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 3.
 1929. *Pellona brachysoma*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1933. *Clupea (Harengula) brachysoma*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
 1941. *Ilisha brachysoma*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 652.

Distribution.—India, Ceylon, Malaya, Malay Archipelago, Cochin-china.

***Ilisha elongata* (Benn.).**

1830. *Alosa elongata*, Bennett, *Mem. Life Raffles*, p. 691 (type locality : Sumatra).
 1833-34. *Clupea offinis*, Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xcvi (type locality : India).
 1878. *Pellona elongata*, Day, *Fish. India*, p. 643, pl. clxiv, fig. 3, pl. clxv, fig. 1 (seas of India to the Malay Archipelago China, and Japan; the example figured pl. clxiv, fig. 3, half natural size, was from Sind and the example figured pl. clxv, fig. 1, half natural size, was from Bombay).
 1889. *Pellona elongata*, Day, *Faun. Brit. Ind. Fish.* I, p. 380, fig. 117.
 1913. *Pellona elongata*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 90, fig. 30.
 1917. *Pellona elongata*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1923. *Ilisha elongata*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 7 (India).
 1928. *Ilisha elongata*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 103 (Bombay).
 1929. *Pellona elongata*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1933. *Ilisha elongata*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
 1941. *Ilisha elongata*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 661.

Distribution.—India, Ceylon, Malaya, Malay Archipelago, Siam, Cochinchina, Formosa, China, Japan.

***Ilisha filigera* (C. V.).**

1847. *Pellona filigera*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 322, (type locality : Coromandel ; Bombay).
 1878. *Pellona filigera*, Day, *Fish. India*, p. 643, pl. clxv, fig. 4 (Bombay).
 1889. *Pellona filigera*, Day, *Faun. Brit. Ind. Fish.* I, p. 380 (Bombay).
 1917. *Pellona filigera*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1923. *Ilisha filigera*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 10 (Coasts of India).
 1941. *Ilisha filigera*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 658.

Distribution.—India, Philippines.

***Ilisha indica* (Swms.).**

1839. *Platygaster indicus*, Swainson, *Nat. Hist. Animals* II, p. 294 [on *Ditchoe*. Russell, *Fish. Coromandel* II, p. 74, pl. cxiii, upper fig., 1803 (type locality : Vizagapatam)].
 1878. *Pellona indica*, Day, *Fish. India*, p. 644, pl. clxiv, fig. 4 (East Coast of Africa, seas of India to the Malay Archipelago).
 1889. *Pellona indica*, Day, *Faun. Brit. Ind. Fish.* I, p. 381 (East Coast of Africa, seas of India to the Malay Archipelago).
 1907. *Pellona indica*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
 1912. *Pellona indica*, Jenkins, *Rec. Ind. Mus.* VII, p. 57 (Akyab).
 1913. *Pellona ditchoa*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 88.
 1923. *Ilisha indica*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 4 (India).
 1941. *Ilisha indica*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 652.

Distribution.—East Africa, India, Burma, Malay Peninsula, Malay Archipelago, Siam, China.

***Ilisha kampeni* (Web. de Bfrt.).**

1913. *Pellona kampeni*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 87 (type locality: Java (Batavia ?); Borneo (Balikpapan ?)).
 1923. *Ilisha kampeni*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 5 (Madras).
 1941. *Ilisha kampeni*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 654.

Distribution.—India, Malay Archipelago.

***Ilisha leschenaulti* (C. V.).**

1847. *Pellona Leschenaulti*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 311 (type locality: Pondicherry).
 1868. *Pellona leschenaultii*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 459 (Pondicherry).
 1878. *Pellona leschenaultii*, Day, *Fish. India*, p. 646 (Pondicherry).
 1889. *Pellona leschenaultii*, Day, *Faun. Brit. Ind. Fish.* I, p. 383 (Pondicherry).
 1923. *Ilisha leschenaultii*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 6 (Pondicherry).
 1941. *Ilisha leschenaulti*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 651.

Distribution.—India.

***Ilisha melastoma* (C.).**

1829. *Clupea melastoma* Cuvier, *Règne Animal* II, éd. 2, p. 319 [*Jangarloo* Russell, *Fish. Coromandel* II, p. 73, pl. cxc, 1803 (type locality: Vizagapatam)].
 1839. *Platygaster megaloptera*, Swainson, *Nat. Hist. Animals* II, p. 294 (on *Jangarloo* Russell).
 1847. *Pellona dussumieri*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 316, pl. clxvi (type locality: Malabar; Coromandel; Bombay).
 1847. *Pellona micropus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 320 (type locality: Coromandel; Bengal).
 1868. *Pellona dussumieri*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 457.
 1878. *Pellona megaloptera*, Day, *Fish. India*, p. 645, pl. clxv, fig. 2 (seas of India to the Malay Archipelago).
 1889. *Pellona megaloptera*, Day, *Faun. Brit. Ind. Fish.* I, p. 382.
 1916. *Pellona megaloptera*, Govindan, *Madras Fish. Bull.* IX, p. 113 (East Coast).
 1923. *Ilisha megaloptera*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 10 (India).
 1941. *Ilisha melastoma*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 659.

Distribution.—India, Malay Peninsula, Malay Archipelago, Siam, Cochinchina.

***Ilisha motius* (Ham.).**

1822. *Clupanodon motius*, Hamilton, *Fish. Ganges*, pp. 251, 383 (type locality: the Brahmaputra River).
 1833-34. *Clupea Motius*, Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xci, figs. 3-4 (India).
 1847. *Pellona motius*, Cuvier & Valenciennes, *Hist. Nats. Pois.* XX, p. 323 (Ganges mouth).
 1878. *Pellona motius*, Day, *Fish. India*, p. 643, pl. clxv, fig. 3 (Assam, Bengal and Orissa, descending as low as coast; the example figured, life-size, was from Orissa).
 1889. *Pellona motius*, Day, *Faun. Brit. Ind. Fish.* I, p. 381.
 1923. *Ilisha motius*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 5 (Assam; Bengal).
 1941. *Ilisha motius*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 655.

Distribution.—India, Philippines.

***Ilisha novacula* (C. V.).**

1847. *Pellona novacula*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 319 (type locality: Rangoon).

1913. *Pellona novacula*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 92.

1923. *Ilisha novacula*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 8 (Burma).

1941. *Ilisha novacula*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 657.

Distribution.—Burma, Java, China, Philippines.

***Ilisha sladeni* (Day).**

1869. *Pellona sladeni*, Day, *Proc. Zool. Soc. London*, p. 623 (type locality : Irrawaddi at Mandalay, Burma ; type is in the Zoological Survey of India).

1878. *Pellona sladeni*, Day, *Fish. India*, p. 645, pl. clxiv, fig. 1 (Irrawaddi as high as Mandalay).

1889. *Pellona sladeni*, Day, *Faun. Brit. Ind. Fish.* I, p. 383.

1923. *Ilisha sladeni*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 6 (Irrawaddi and Sittang Rivers).

1941. *Ilisha sladeni*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 657.

Distribution.—Burma, Philippines.

Genus ***Pellona*** Cuvier & Valenciennes.

1847. *Pellona* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 300. (Type, *Pellona orbignyana* C. V., designated by Gill, *Proc. Acad. Nat. Sci. Philad.*, p. 38, 1861.)

1923. *Neosteus* Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 17. (Type, *Pellona ditchela* C. V., designated by Norman, *Zool. Rec. Pisces*, p. 25, 1923.)

***Pellona ditchela* C. V**

1847. *Pellona ditchela*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 314 [on *Ditchelee* Russell, *Fish. Coromandel* II, p. 72, pl. clxxxviii, 1803 (type locality : Vizagapatam)].

1878. *Pellona ditchela*, Day, *Fish. India*, p. 644, pl. clxv, fig. 5 (Coromandel Coast ; Madras).

1878. *Pellona Hoevenii*, Day, *Fish. India*, p. 644, pl. clxv, fig. 6 (Coromandel Coast to the Malay Archipelago).

1889. *Pellona ditchela*, Day, *Faun. Brit. Ind. Fish.* I, p. 381 (Coromandel Coast).

1889. *Pellona hoevenii*, Day, *Faun. Brit. Ind. Fish.* I, p. 382 (Coromandel Coast to the Malay Archipelago).

1923. *Neosteus ditchela*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 17 (East Africa to Indo-Australian Archipelago).

1933. *Neosteus ditchela*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 83 (Ceylon).

1940. *Ilisha ditchela*, Herre, *Rec. Ind. Mus.* XLII, p. 9 (Julia Island ; Mergui Market).

1941. *Pellona ditchela*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 648.

Distribution.—East Africa, Madagascar, India, Ceylon, Burma, Malaya, Malay Archipelago, Siam, Queensland.

Genus ***Opisthopterus*** Gill.

1861. *Opisthopterus* Gill, *Proc. Acad. Nat. Sci. Philad.*, p. 38. (Type, *Pristigaster tartoor* C. V., orthotypic.)

***Opisthopterus tardoore* (C).**

1829. *Pristigaster tardoore*, Cuvier, *Régne Animal* II, ed. 2, p. 321 [on *Tartoor* Russell, *Fish. Coromandel* II, p. 74, pl. cxciii, lower fig., 1803 (type locality : Vizagapatam)].

1847. *Pristigaster tartoor*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 328 (Coromandel, Malabar).

1865. *Pristigaster tartoor*, Day, *Fish. Malabar*, p. 232 (Malabar).

1878. *Opisthopterus tartoor*, Day, *Fish. India*, p. 646, pl. clxiii, fig. 5 (from Gwadar in Baluchistan and Sind through the seas of India to the Malay Archipelago).
 1889. *Opisthopterus tartoor*, Day, *Faun. Brit. Ind. Fish.* I, p. 384.
 1913. *Opisthopterus tartoor*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 95, fig. 31.
 1917. *Opisthopterus tartoor*, Hornell, *Madras Fish. Bull.* XI, p. 93 (Tuticorin).
 1923. *Opisthopterus indicus*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 12 (Coasts of India).
 1924. *Opisthopterus tartoor*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 38 (Calicut).
 1929. *Opisthopterus tartoor*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1929. *Opisthopterus macrognathus*, Deraniyagala, *Spolia Zeylan.* XV, p. 45 (Ceylon).
 1933. *Opisthopterus indicus*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 83 (Ceylon).
 1940. *Opisthopterus tardoore*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 663.
 1941. *Opisthopterus macrognathus*, Herre, *Rec. Ind. Mus.* XLII, p. 9 (Julia Island, Mergui Archipelago).

Distribution.—India, Ceylon, Burma, Malaya, Malay Archipelago, Siam, China.

Genus **Raconda** Gray.

1831. *Raconda* Gray, *Zool. Miscell.* I, p. 9. (Type, *Raconda russelliana* Gray monotypic.)
 1833-34. *Apterygia* Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xcii, fig. 1. (Type, *Apterygia ramcarata* Gray, monotypic.)

Raconda russelliana Gray.

1831. *Raconda russelliana*, Gray, *Zool. Miscell.* I, p. 9 (type locality: Saugor Rocks; according to Norman the type is in the British Museum).
 1833-34. *Apterygia Ramcarata*, Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xcii, fig. 1 (type locality: Saugor Rocks; according to Norman the type is in the British Museum).
 1868. *Pristigaster russellianus*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 462 (Bengal).
 1878. *Raconda russelliana*, Day, *Fish. India*, p. 646, pl. clxiii, fig. 4 (Bay of Bengal to the Malay Archipelago, the young are common in the Sunderbunds).
 1889. *Raconda russelliana*, Day, *Faun. Brit. Ind. Fish.* I, p. 384.
 1912. *Raconda russelliana*, Jenkins, *Rec. Ind. Mus.* VII, p. 58 (Akyab).
 1913. *Raconda russelliana*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 97, fig. 33.
 1923. *Racondo russelliana*, Norman, *Ann. Mag. Nat. Hist.* (9) XI, p. 16 (Bay of Bengal).
 1933. *Raconda russelliana*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).
 1941. *Raconda russelliana*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 665.

Distribution.—India, Burma, Malay Peninsula, Malay Archipelago, Philippines, Cochinchina.

Subfamily **DOROSOMATINI.**

Genus **Clupanodon** Lacépède.

1803. *Clupanodon* Lacépède, *Hist. Nat. Poiss.* V, p. 468. (Type, *Clupea thrissa* L., designated by Bleeker, *Atlas Ichth. Ind. Neerland* VI, p. 112, 1866-72.)
 1815. *Thrissa* Rafinesque, *Analyse de la nature*, p. 88. (Type, *Clupea thrissa* L.).

Clupanodon punctatus (Schl.).

1846. *Chatoessus punctatus*, Schlegel, in Siebold's *Faun. Japonica Poiss.* pts. 10-14, p. 240, pl. cix, fig. 1 (type locality : Bays on coast of S. W. Japan).

1865. *Chatoessus punctatus*, Kner, *Reise, Novara Fische*, p. 336 (Madras).

1941. *Clupanodon punctatus*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 559.

Distribution.—India, Philippines, China, Japan, Polynesia.

Clupanodon thrissa (L.).

1758. *Clupea thrissa*, Linnaeus, *Syst. Nat.* I, ed. 10, p. 318 (type locality : Indian Ocean).

1928. *Clupanodon thrissa*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 103 (Bombay).

1933. *Clupanodon thrissa*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).

1941. *Clupanodon thrissa*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 557.

Distribution.—India, Ceylon, Philippines, China, Formosa, Japan.

Genus **Gonialosa** Regan.

1917. *Gonialosa* Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 315. (Type, *Chatoessus modestatus*, Day, orthotypic.)

1931. *Indialosa* Herre & Myers, *Lingnan Sci. Journ.* No. 10, p. 238. (Type, *Clupanodon manmina* Ham., orthotypic.)

Gonialosa manmina (Ham.).

1822. *Clupanodon manmina*, Hamilton, *Fish. Ganges*, pp. 247, 383 (type locality : most of the freshwater branches of the Ganges).

1878. *Chatoessus manminna*, Day, *Fish. India*, p. 633, pl. clx, fig. 2 (fresh waters of Sind, and the districts watered by the Indus and its branches, also the affluents and main streams of the Ganges; Jumna, Brahmaputra and Mahanuddi. It is spread through the tanks and estuaries of India and Assam, except the Deccan, Southern and Western India and Ceylon).

1889. *Chatoessus manminna*, Day, *Faun. Brit. Ind. Fish.* I, p. 387.

1917. *Gonialosa manmina*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 315 (Northern India and Assam).

1937. *Gonialosa manminna*, Shaw & Shebbeare, *Journ. Roy. As. Soc. Bengal, Sci.* III, p. 14 (Northern Bengal).

1940. *Gonialosa manmina*, Herre, *Rec. Ind. Mus.* XLII, p. 1 (Andamans).

1941. *Gonialosa manminna*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 548.

1941. *Gonialosa manmina*, Herre, *Mem. Ind. Mus.* XIII, p. 335.

Distribution.—India, Philippines.

Gonialosa modestus (Day).

1869. *Chatoessus modestus*, Day, *Proc. Zool. Soc. London*, p. 622 (type locality : Bassein River as high as Een-gay-gyee Lake, Burma ; type is in the Zoological Survey of India).

1878. *Chatoessus modestus*, Day, *Fish. India*, p. 633, pl. clx, fig. 1 (along the Bassein River as high as the Een-gyee-Lake, also the Selwein at Moulmein).

1889. *Chatoessus modestus*, Day, *Faun. Brit. Ind. Fish.* I, p. 386.

1917. *Gonialosa modesta*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 315 (Burma).

1941. *Gonialosa modesta*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 548.

Distribution.—Burma, Philippines.

Genus **Nematalosa** Regan.

1917. *Nematalosa* Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 312. (Type, *Clupea nasus* Bl., orthotypic.)

Nematalosa nasus (Bl.).

- 1795 *Clupea nasus*, Bloch, *Naturg. ausland. Fische* IX, p. 110, pl. ccccxix, fig. 1 (type locality : Malabar).
 1801. *Clupea nasus*, Schneider, *Syst. Ichth. Bloch*, p. 426 (Malabar).
 1833-34. *Chatoessus altus*, Gray, *Ill. Ind. Zool. Hardwicke* II, pl. xci, fig. 2 (type locality : India).
 1848. *Chatoessus nasus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 104 (Pondicherry ; Bombay).
 1865. *Chatoessus altus*, Day, *Fish. Malabar*, p. 245 (Malabar).
 1868. *Chatoessus nasus*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 407.
 1878. *Chatoessus nasus*, Day, *Fish. India*, p. 634, pl. clx, fig. 4 (seas of India, to the Malay Archipelago and the Philippine Islands).
 1889. *Chatoessus nasus*, Day, *Faun. Brit. Ind. Fish.* I, p. 387.
 1910. *Chatoessus nasus*, Jenkins, *Rec. Ind. Mus.* V, pp. 131, 135 (Karachi : Chilka Lake).
 1912. *Chatoessus nasus*, Jenkins, *Rec. Ind. Mus.* VII, p. 60 (Puri).
 1915. *Dorosoma nasus*, Chaudhuri, *Mem. Ind. Mus.* V, p. 417 (Chilka Lake).
 1917. *Nematalosa nasus*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 313 (Sind ; Bombay ; Canara ; Madras ; Calicut ; Burma).
 1929. *Chatoessus nasus*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1929. *Dorosoma nasus*, Deraniyagala, *Spolia Zeylan.* XV, p. 45 (Ceylon).
 1941. *Nematalosa nasus*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 555.

Distribution.—Iraq, India, Ceylon, Burma, Philippines.

Genus Anodontostoma Bleeker.

1849. *Anodontostoma* Bleeker, *Verh. Bat. Gen. (Madura)* XXII, p. 15. (Type *Anodontostoma hasseltii* Blkr.)

Anodontostoma chacunda (Ham.).

1822. *Clupanodon chacunda*, Hamilton, *Fish. Ganges*, pp. 246, 383 (type locality : Gangetic estuaries).
 1865. *Chatoessus chacunda*, Day, *Fish. Malabar*, p. 242 (Malabar).
 1868. *Chatoessus chacunda*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 411 (Ganges).
 1870. *Chatoessus chacunda*, Day, *Proc. Zool. Soc. London*, p. 700 (Andamans).
 1876. *Chatoessus chacunda*, Martens, *Preuss. Exped. Ost. Asien* I, p. 404 (Malabar).
 1878. *Chatoessus chacunda*, Day, *Fish. India*, p. 632, pl. clx, fig. 3 (seas and estuaries of India, Burma to the Malay Archipelago).
 1889. *Chatoessus chacunda*, Day, *Faun. Brit. Ind. Fish.* I, p. 386.
 1910. *Chatoessus chacunda*, Jenkins, *Rec. Ind. Mus.* V, p. 131 (Karachi).
 1912. *Chatoessus chacunda*, Jenkins, *Rec. Ind. Mus.* VII, p. 58 (Akyab).
 1913. *Dorosoma chacunda*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 25, fig. 14.
 1915. *Dorosoma indicus*, Chaudhuri, *Mem. Ind. Mus.* V, p. 419 (Chilka Lake).
 1917. *Chatoessus chacunda*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1917. *Anodontostoma chacunda*, Regan, *Ann. Mag. Nat. Hist.* (8) XIX, p. 316 (India).
 1922. *Dorosoma indicus*, Hora, *Mem. Ind. Mus.* V, p. 764 (Chilka Lake).
 1929. *Chatoessus chacunda*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 355 (Travancore).
 1933. *Chatoessus chacunda*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).
 1940. *Anodontostoma chacunda*, Herre, *Rec. Ind. Mus.* XLII, p. 10 (Mergui market).
 1941. *Anodontostoma chacunda*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 549.
 1941. *Anodontostoma chacunda*, Herre, *Mem. Ind. Mus.* XIII, p. 335.

Distribution.—India, Andamans, Burma, Malay Peninsula, Malay Archipelago, Siam, Philippines, Melanesia.

FAMILY ENGRAULIDAE.

Genus **Setipinna** Swainson.

1839. *Setipinna* Swainson, *Nat. Hist. Animals* II, p. 292. [Type, *Setipinna megalura* Swns. = *Clupea phasa* (Ham.),]
 1868. *Telara* Günther, *Cat. Fish. Brit. Mus.* VII, p. 400. (Type, *Clupea telara* Ham., tautotypic.)
 1868. *Heterothrissa* Günther, *Cat. Fish. Brit. Mus.* VII, p. 401. (Type, *Ex-graulis breviceps* Cant., monotypic.)

Setipinna breviceps (Cant.).

1849. *Engraulis breviceps*, Cantor, *Journ. As. Soc. Bengal* XVIII, p. 1288 (type locality : Pinang).
 1878. *Engraulis breviceps*, Day, *Fish. India*, p. 628 (Bay of Bengal to the Malay Archipelago).
 1889. *Engraulis breviceps*, Day, *Faun. Brit. Ind. Fish.* I, p. 392.
 1907. *Engraulis breviceps*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).

Distribution.—India, Burma, Malay Peninsula, Malay Archipelago, Cochinchina, Philippines.

Setipinna phasa (Ham.).

1822. *Clupea phasa*, Hamilton, *Fish. Ganges*, pp. 240, 382 (type locality : brackish rivers of Bengal).
 1822. *Clupea telara*, Hamilton, *Fish. Ganges*, pp. 241, 382, pl. ii, fig. 72 (type locality : high up in the Ganges, and in most of its larger branches and tributary streams).
 1848. *Engraulis telara*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 56, pl. deviii (Ganges mouth ; Irrawaddi, Rangoon).
 1848. *Engraulis phasa*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 59 (Bengal).
 1853. *Engraulis telara*, Bleeker, *Verh. Bat. Gen. (Bengal)* XXV, pp. 74, 147 (Calcutta).
 1868. *Engraulis telara*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 401 (Bengal : Cachar : River Hooghly).
 1870. *Engraulis telara*, Day, *Proc. Zool. Soc. London* p. 700 (Andamans).
 1878. *Engraulis telara*, Day, *Fish. India*, p. 627, pl. clviii, fig. 2 (Orissa, Bengal, Cachar and Burma ; Day collected *E. telara* as high up as Mandalay ; the example figured, life-size, was from Calcutta).
 1889. *Engraulis telara*, Day, *Faun. Brit. Ind. Fish.* I, p. 392.
 1910. *Engraulis telara*, Jenkins, *Rec. Ind. Mus.* V, p. 140 (Monghyr).
 1910. *Engraulis telara*, De, *Rep. Fish. East. Bengal & Assam*, p. 19 (Eastern Bengal ; Malda).
 1911. *Telara telara*, Fowler, *Proc. Acad. Nat. Sci. Philad.* p. 220 (Ganges River).
 1926. *Setipinna telara*, Jordan & Seale, *Bull. Mus. Comp. Zool.* LXVII, p. 365 (Rangoon).
 1941. *Setipinna phasa*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 688 (Rangoon ; Ganges River).
 1941. *Setipinna telara*, Herre, *Mem. Ind. Mus.* XIII, p. 335.

Distribution.—India, Andamans, Burma, Philippines.

Setipinna taty (C.V.).

1848. *Engraulis taty*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 60 (type locality : Pondichery : Malacca).
 1865. *Engraulis taty*, Day, *Fish. Malabar*, p. 240 (Malabar).
 1878. *Engraulis taty*, Day, *Fish. India*, p. 628, pl. clviii, fig. 5 (seas and estuaries of India and the Malay Archipelago ; the example figured, life-size, was from Orissa).
 1889. *Engraulis taty*, Day, *Faun. Brit. Ind. Fish.* I, p. 393.
 1907. *Engraulis taty*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
 1917. *Engraulis taty*, Hornell, *Madras Fish. Bull.* XI, p. 91 (Tuticorin).

1926. *Setipinna taty*, Jordan & Seale, *Bull. Mus. Comp. Zool.* XLVII, p. 366 (Siam; Java; Colombo).
 1940. *Setipinna taty*, Herre, *Rec. Ind. Mus.* XLII, p. 10 (Mergui).
 1941. *Setipinna taty*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 689.

Distribution.—India, Ceylon, Burma, Malay Peninsula, Malay Archipelago, Siam, China.

Genus **Coilia** Gray.

1831. *Coilia* Gray, *Zool. Miscell.*, p. 9. (Type, *Coilia hamiltonii* Gray, monotypic.)

Coilia borneensis Blkr.

1851. *Coilia borneensis*, Bleeker, *Nat. Tijds. Nederland. Ind.* II, p. 58 (type locality: Bandjermassing).
 1878. *Coilia Borneensis*, Day, *Fish. India*, p. 632, pl. clix, fig. 1 (Madras, Burma where it is common in the Irrawaddy river, also the Malay Archipelago).
 1889. *Coilia borneensis*, Day, *Faun. Brit. Ind. Fish.* I, p. 398.
 1890. *Coilia borneensis*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 352 (Rangoon).
 1913. *Coilia borneensis*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 52.
 1941. *Coilia borneensis*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 717.

Distribution.—India, Burma, Malay Archipelago, Siam, Philippines.

Coilia cantoris Blkr.

1853. *Coilia cantoris*, Bleeker, *Verh. Bai. Gen. (Bengal)* XXV, pp. 74, 148 (type locality: River Hooghly at Calcutta).
 1868. *Coilia cantoris*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 402 (River Hooghly).
 1878. *Coilia cantoris*, Day, *Fish. India*, p. 631 (Hooghly River).
 1889. *Coilia cantoris*, Day, *Faun. Brit. Ind. Fish.* I, p. 396.
 1941. *Coilia cantoris*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 715.

Distribution.—India, Philippines.

Coilia dussumieri C.V

1848. *Coilia Dussumieri*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 81, pl. dcx (type locality: Bombay, Mahe, Pondichery).
 1865. *Coilia dussumieri*, Day, *Fish. Malabar*, p. 242 (Malabar).
 1878. *Coilia Dussumieri*, Day, *Fish. India*, p. 631, pl. clviii, fig. 8 (very numerous at Bombay, seas and estuaries of India to the Malay Archipelago; the example figured, life-size, was from Orissa).
 1889. *Coilia dussumieri*, Day, *Faun. Brit. Ind. Fish.* I, p. 397, fig. 122.
 1913. *Coilia dussumieri*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 50, fig. 20.
 1917. *Coilia dussumieri*, Kemp, *Rec. Ind. Mus.* XIII, p. 234 (Matlah River).
 1927. *Coilia dussumieri*, Fowler, *Journ. Bombay Nat. Hist.* XXXII, p. 254 (Bombay).
 1933. *Coilia dussumieri*, Sorley, *Marine Fish. Bombay Presidency*, p. 160 (Bombay).
 1941. *Coilia dussumieri*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 714 (Bombay).

Distribution.—India, Malaya, Malay Archipelago, Philippines, Siam.

Coilia quadragesimalis C.V.

1848. *Coilia quadragesimalis*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 83 (type locality: the Ganges).
 1868. *Coilia quadragesimalis*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 404.

1878. *Coilia quadragesimalis*, Day, *Fish. India*, p. 631 (Ganges River).
 1889. *Coilia quadragesimalis*, Day, *Faun. Brit. Ind. Fish.* I, p. 397.
 1926. *Coilia margaritifera*, Jordan & Seale, *Bull. Mus. Comp. Zool.* LXVII, p. 363 (type locality : Colombo, Ceylon).
 1941. *Coilia quadragesimalis*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 713.

Distribution.—India, Ceylon, Philippines.

***Coilia ramcarati* (Ham.).**

1822. *Mystus ramcarati*, Hamilton, *Fish. Ganges*, pp. 233, 382 (type locality : salt water estuaries of the Ganges ; according to Günther (*loc. cit.*) the type is in the British Museum).
 1868. *Coilia ramcarati*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 402 (Ganges ; Calcutta ; Borneo).
 1878. *Coilia ramcarati*, Day, *Fish. India*, p. 631, pl. clix, fig. 2 (rivers and estuaries of Bengal).
 1889. *Coilia ramcarati*, Day, *Faun. Brit. Ind. Fish.* I, p. 396.
 1907. *Coilia ramcarati*, Lloyd, *Rec. Ind. Mus.* I, p. 221 (Akyab).
 1941. *Coilia ramcarati*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 716.

Distribution.—India, Burma, Philippines.

***Coilia reynaldi* C.V.**

1848. *Coilia Reynaldi*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 81 (type locality : Irrawadi River, Rangoon).
 1878. *Coilia Reynaldi*, Day, *Fish. India*, p. 630 (the Hooghly at Calcutta).
 1889. *Coilia reynaldi*, Day, *Faun. Brit. Ind. Fish.* I, p. 396.
 1941. *Coilia reynaldi*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 718.

Distribution.—India, Burma, Malaya, Philippines.

Genus *Anchoviella* Fowler.

1911. *Anchoviella* Fowler, *Proc. Acad. Nat. Sci. Philad.*, p. 211. (Type, *Engraulis perfasciatus* Poey, orthotypic).

***Anchoviella commersonii* Lac.**

1803. *Stolephorus Commersonii*, Lacépède, *Hist. Nat. Poiss.* V, pp. 381, 382, pl. xii, fig. 1 (type locality : not mentioned).
 1868. *Engraulis commersonianus*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 388 (Bengal).
 1878. *Engraulis Commersonianus*, Day, *Fish. India*, p. 629, pl. clviii, fig. 1 (seas of India to the Malay Archipelago).
 1889. *Engraulis commersonianus*, Day, *Faun. Brit. Ind. Fish.* I, p. 394.
 1912. *Engraulis commersonianus*, Jenkins, *Rec. Ind. Mus.* VII, p. 60 (Puri).
 1913. *Stolephorus commersonii*, Weber & de Baeufort, *Fish. Indo-Austral. Archipel.* II, p. 45, fig. 19.
 1915. *Stolephorus commersonii*, Chaudhuri, *Mem. Ind. Mus.* V, p. 426 (Chilka Lake).
 1917. *Engraulis commersonianus*, Hornell, *Madras Fish. Bull.* XI, p. 93 (Tuticorin).
 1922. *Stolephorus commersonii*, Hora, *Mem. Ind. Mus.* V, p. 764 (Chilka Lake).
 1928. *Engraulis commersonii*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXII, p. 704 (Colombo).
 1929. *Engraulis commersonianus*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1941. *Anchoviella commersonii*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 703.

Distribution.—Zanzibar, Mauritius, India, Ceylon, Malaya, Malay Archipelago, Philippines, China, Polynesia.

Anchoviella heterolobus (Rüpp.).

1838. *Engraulis heterolobus*, Rüppell, *Neue Wirbelth., Fische*, p. 79, pl. xxi, fig. 4 (type locality : Red Sea).
 1939. *Stolephorus heterolobus*, Herre, *Rec. Ind. Mus.* XII, p. 330 (Andamans).
 1940. *Stolephorus heterolobus*, Herre, *Rec. Ind. Mus.* XLII, p. 1 (Ross. Island).
 1940. *Stolephorus heterolobus*, Herre, *Rec. Ind. Mus.* XLII, p. 10 (Mergui market).
 1941. *Anchoviella heteroloba*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 698.
 1941. *Stolephorus heterolobus*, Herre, *Mem. Ind. Mus.* XIII, p. 335.

Distribution.—Red Sea, India, Burma, Malay Archipelago, Philippines, Siam, Australia, Fiji.

Anchoviella indica (v. Hass.).

1823. *Engraulis indica*, van Hasselt, *Algem. Konst-Letterbode*, p. 329 (type locality : Java).
 1839. *Engraulis albus*, Swainson, *Nat. Hist. Animals* II, p. 293 (on Nattoo Russell, *Fish. Coromandel* II, p. 71, pl. clxxxvii, 1803, type locality : Vizagapatam).
 1865. *Engraulis Brownii*, Day, *Fish. Malabar*, p. 237 (Malabar).
 1878. *Engraulis Indicus*, Day, *Fish. India*, p. 629, pl. clviii, fig. 3 (seas of India to the Malay Archipelago).
 1889. *Engraulis indica*, Day, *Faun. Brit. Ind. Fish.* I, p. 394.
 1913. *Stolephorus indicus*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 46.
 1915. *Stolephorus indicus*, Chaudhuri, *Mem. Ind. Mus.* V, p. 425 (Chilka Lake).
 1916. *Engraulis Indicus*, Govindan, *Madras Fish. Bull.* IX, p. 117 (East Coast).
 1917. *Engraulis indicus*, Hornell, *Madras Fish. Bull.* XI, p. 93 (Tuticorin).
 1922. *Stolephorus indicus*, Hora, *Mem. Ind. Mus.* V, p. 764 (Chilka Lake).
 1929. *Engraulis indicus*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1941. *Anchoviella indicus*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 706.
 1941. *Stolephorus indicus*, Herre, *Mem. Ind. Mus.* XIII, p. 335.

Distribution.—Zanzibar, India, Andamans, Malay Peninsula, Malay Archipelago, Philippines, Siam, China, Melanesia, Polynesia.

Anchoviella tri (Blkr.).

1852. *Engraulis tri*, Bleeker, *Verh. Bat. Gen. (Haring.)* XXIV, p. 40 (type locality : Batavia).
 1878. *Engraulis tri*, Day, *Fish. India*, p. 630, pl. clviii, fig. 6.
 1889. *Engraulis tri*, Day, *Faun. Brit. Ind. Fish.* I, p. 395 (from Bombay through the seas and estuaries of India to the Malay Archipelago. This fish ascends the Hooghly as high as Calcutta).
 1926. *Stolephorus rex*, Jordan & Seale, *Bull. Mus. Comp. Zool.* LXVII, p. 380 (type locality : Canara, India).
 1927. *Engraulis tri*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXII, p. 254 (Bombay).
 1941. *Anchoviella tri*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 709.

Distribution.—India, Malay Peninsula, Malay Archipelago, Philippines

Genus **Thrissocles** Jordan & Evermann.

1817. *Thrissa* (nec Rafinesque, 1815) Cuvier, *Régne Animal* II, ed. 1, p. 176. (Type, *Clupea setirostris* Brouss., logotypic; inadmissible being preoccupied by *Thrissa* Rafinesque, a genus of Clupeidae.)
 1829. *Thryssa* Cuvier, *Régne Animal* II, ed. 2, p. 323. (Type, *Clupea setirostris* Brouss., inadmissible according to Art. 36, Rec. of the International Commission of the Zoological Nomenclature.)
 1838. *Thryssus* Swainson, *Nat. Hist. Animal* I, pp. 279, 280. (Type, *Clupea setirostris* Brouss., inadmissible according to Art. 36, Rec. of the International Commission of the Zoological Nomenclature.)
 1917. *Thrissocles* Jordan & Evermann, *Gen. Fish.* p. 98. (Type, *Clupea setirostris* Brouss., orthotypic.)

Thrissocles annandalei (Chaudhuri).

1915. *Engraulis annandalei*, Chaudhuri, *Mem. Ind. Mus.* V, p. 419, fig. 3 (type locality : dredged in shallow water of Nalbano Island, Chilka Lake ; type is in the Zooigical Survey of India).

Distribution.—India.

Thrissocles baelama (Forsk.).

1775. *Clupea baelama*, Forskal, *Descript. Animal*, p. 72 (type locality : Djedda, Red Sea).
 1866-72. *Engraulis baelama*, Bleeker, *Atlas Ichth. Ind. Neerland.* VI, p. 130 (Amboina : Ceylon).
 1870. *Engraulis baelama*, Day, *Proc. Zool. Soc. London*, p. 700 (Andamans).
 1878. *Engraulis baelama*, Day, *Fish. India*, p. 626, pl. clviii, fig. 7 (the example figured, life-size, was from Port Blair, Andaman Islands).
 1889. *Engraulis baelama* Day, *Faun. Brit. Ind. Fish.* I, p. 391 (from the Red Sea and Coast of Zanzibar, through the seas of India to the Andamans also recorded by Günther from Mysol and Manado).
 1913. *Engraulis baelama*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 33.
 1933. *Anchoviella baelama*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 81 (Ceylon).
 1940. *Thrissina baelama*, Herre, *Rec. Ind. Mus.* XLII, p. 1 (Andamans).
 1941. *Thrissocles baelama*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 683.
 1941. *Thrissina baelama*, Herre, *Mem. Ind. Mus.* XIII, p. 335.

Distribution.—Red Sea, Arabia, Madagascar, Mauritius, Seychelles, India, Ceylon, Andamans, Malaya, Malay Archipelago, Melanesia; Micronesia, Polynesia.

Thrissocles dussumieri (C.V.).

1848. *Engraulis Dussumieri*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 69 (type locality : not given).
 1865. *Engraulis auratus*, Day, *Proc. Zool. Soc. London*, p. 312 (type locality : Cochin, Malabar).
 1865. *Engraulis auratus*, Day, *Fish. Malabar*, p. 238, pl. xix, fig. 2 (Malabar).
 1878. *Engraulis Dussumieri*, Day, *Fish. India*, p. 627, pl. clviii, fig. 4 (the example figured, life-size, was from Madras).
 1889. *Engraulis dussumieri*, Day, *Faun. Brit. Ind. Fish.* I, p. 391 (seas of India to the Malay Archipelago).
 1913. *Engraulis dussumieri*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 41.
 1917. *Engraulis dussumieri*, Hornell, *Madras Fish. Bull.* XI, p. 91 (Tuticorin).
 1924. *Engraulis dussumieri*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 40 (Calicut).
 1927. *Engraulis dussumieri*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXII, p. 253 (Bombay).
 1929. *Engraulis dussumieri*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1939. *Engraulis dussumieri*, Hora & Mukerji, *Rec. Ind. Mus.* XXXVIII, p. 18 (Maungmagan, Burma).
 1941. *Thrissocles dussumieri*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 681 (Calicut ; Bombay).

Distribution.—India, Burma, Malaya, Siam, Malay Archipelago, China.

Thrissocles hamiltonii (Gray).

- 1833-34. *Thrissa Hamiltonii*, Gray, *Ill. Ind. Zool. Hardwicke* II, p. xcii, fig. 3 (type locality : India).
 1839. *Thryssus subspinosa*, Swainson, *Nat. Hist. Animal* II, p. 293 (on *Poorawah* Russell, *Fish. Coromandel* II, p. 72, pl. clxxxix, 1803, type locality : Vizagapatam).

1848. *Engraulis Hamiltonii*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 66 (Pondicherry).
 1865. *Engraulis Hamiltonii*, Day, *Fish. Malabar*, p. 239 (Malabar).
 1878. *Engraulis Hamiltonii*, Day, *Fish. India*, p. 625, pl. clvii, fig. 4 (Sind through the seas of India to the Malay Archipelago).
 1889. *Engraulis hamiltonii*, Day, *Faun. Brit. Ind. Fish.* I, p. 389.
 1890. *Engraulis hamiltonii*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 350 (Rangoon).
 1913. *Engraulis grayi*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 37.
 1926. *Scutengraulis hamiltonii*, Jordan & Seale, *Bull. Mus. Comp. Zool.* LXVII, p. 371 (Calcutta ; Penang ; Colombo).
 1928. *Engraulis hamiltonii*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 104 (Bombay).
 1933. *Anchoviella hamiltoni*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 81 (Ceylon).
 1941. *Thrissocles hamiltonii*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 673 (Bombay).

Distribution.—India, Ceylon, Burma, Malay Peninsula, Siam, Malay Archipelago, Philippines, China, Australia.

Thrissocles kammalensis (Blkr.).

1849. *Engraulis kammalensis*, Bleeker, *Verh. Bat. Gen. (Madura)* XXII, p. 18 (type locality : Madura Straits near Kammal and Surabaja).
 1869. *Engraulis rhinorhynchus*, Day, *Proc. Zool. Soc. London*, p. 384 (Chanderpore).
 1878. *Engraulis kammalensis*, Day, *Fish. India*, p. 626, pl. clvii, fig. 1 (the example figured, life-size, was from Orissa).
 1889. *Engraulis kammalensis*, Day, *Faun. Brit. Ind. Fish.* I, p. 390 (Ceylon, Bay of Bengal to the Malay Archipelago).
 1913. *Engraulis kammalensis*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 35.
 1941. *Thrissocles kammalensis*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 672.

Distribution.—India, Ceylon, Malaya, Malay Archipelago, Siam, Cochinchina, Philippines.

Thrissocles kempi (Chaudhuri).

1915. *Engraulis kempi*, Chaudhuri, *Mem. Ind. Mus.* V, p. 421, fig. 4 (type locality : off Barkul in the main area of the Chilka Lake ; the type is in the Zoological Survey of India).

Distribution.—India.

Thrissocles malabaricus (Bl.).

1795. *Clupea malabaricus*, Bloch, *Naturg. Ausland. Fische* IX, p. 115, pl. ccccxxxii (type locality : Tranquebar).
 1803. *Clupea malabarica*, Lacépède, *Hist. Nat. Poiss.* V, p. 425 (Malabar).
 1839. *Thryssa Cuvieri*, Swainson, *Nat. Hist. Animal* II, p. 293 (on *Poorua* Russell, *Fish. Coromandel* II, p. 75, pl. cxciv, 1803 (type locality : Vizagapatam).
 1848. *Engraulis malabaricus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 63, pl. dcix (Bombay).
 1865. *Engraulis Malabaricus*, Day, *Fish. Malabar*, p. 239 (Malabar).
 1868. *Engraulis malabaricus*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 395 (coast of Malabar).
 1878. *Engraulis Malabaricus*, Day, *Fish. India*, p. 625, pl. clvii, fig. 5 (coast of Sind and through the seas of India).
 1889. *Engraulis malabaricus*, Day, *Faun. Brit. Ind. Fish.* I, p. 389.
 1910. *Engraulis malabaricus*, Jenkins, *Rec. Ind. Mus.* V, p. 135 (Chilka Lake).

1913. *Engraulis malabaricus*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 36.
 1929. *Engraulis malabaricus*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1941. *Thrissocles malabarica*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 671.

Distribution.—India, Celebes, Philippines.

Thrissocles mystax (Schn.).

1801. *Clupea mystax*, Schneider, *Syst. Ichth. Bloch*, p. 426, pl. clxxxiii (type locality : Malabar).
 1846. *Thryssa mystax*, Richardson, *Ichth. China Japan*, p. 309 (seas of India and China).
 1848. *Engraulis mystax*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XX, p. 67 (India).
 1868. *Engraulis mystax*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 397 (Bombay ; Madras ; Java).
 1878. *Engraulis mystax*, Day, *Fish. India*, p. 625, pl. clvii, fig. 3 (seas and estuaries of India to the Malay Archipelago and China).
 1889. *Engraulis mystax*, Day, *Faun. Brit. Ind. Fish.* I, p. 390.
 1910. *Engraulis mystax*, Jenkins, *Rec. Ind. Mus.* V, p. 135 (Chilka Lake).
 1913. *Engraulis mystax*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 38.
 1917. *Engraulis mystax*, Hornell, *Madras Fish. Bull.* XI, p. 93 (Tuticorin).
 1929. *Engraulis mystax*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1933. *Anchoviella mystax*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
 1940. *Scutengraulis mystax*, Herre, *Rec. Ind. Mus.* XLII, p. 9 (Mergui market).
 1941. *Thrissocles mystax*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 675.

Distribution.—India, Burma, Ceylon, Malay Peninsula, Malay Archipelago, Siam, China, Queensland.

Thrissocles purava (Ham.).

1822. *Clupea purava*, Hamilton, *Fish. Ganges*, pp. 238, 382 (type locality : the estuaries of the Ganges).
 1839. *Thryssa megastoma*, Swainson, *Nat. Hist. Animal* II, p. 293 (on *Peddah Poorawah* Russell, *Fish. Coromandel* II, p. 73, pl. cxc, 1803, type locality : Vizagapatam).
 1848. *Engraulis purava*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 65 (Coromandel).
 1868. *Engraulis purava*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 397 (Kurrachee ; Cochin ; Calcutta).
 1878. *Engraulis purava*, Day, *Fish. India*, p. 628, pl. clvii, fig. 2 (seas and estuaries of Sind, both sides of India to the Malay Archipelago).
 1889. *Engraulis purava*, Day, *Faun. Brit. Ind. Fish.* I, p. 393.
 1913. *Engraulis purava*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 39.
 1915. *Engraulis purava*, Chaudhuri, *Mem. Ind. Mus.* V, p. 424 (Chilka Lake).
 1916. *Engraulis purava*, Raj. *Rec. Ind. Mus.* XII, p. 251 (Madras).
 1917. *Engraulis purava*, Hornell, *Madras Fish. Bull.* XI, p. 92 (Tuticorin).
 1922. *Engraulis purava*, Hora, *Mem. Ind. Mus.* V, p. 764 (Chilka Lake).
 1924. *Engraulis purava*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 40 (Calicut).
 1924. *Engraulis hornelli*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXX, p. 41 (type locality : Calicut ; according to Fowler the type is in the United States National Museum, Washington).
 1929. *Engraulis purava*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1941. *Thrissocles purava*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 677 (Calicut).

Distribution.—India, Burma, Malaya, Malay Archipelago.

Thrissocles rambhae (Chaudhuri).

1915. *Engraulis rambhae*, *Mem. Ind. Mus.* V, p. 423 (type locality: Rambha Bay, Chilka Lake; type is in the Zoological Survey of India).

Distribution.—India.

Thrissocles setirostris (Brouss.).

1782. *Clupea setirostris*, Broussonet, *Ichth.* I, pl. xi. (type locality: Tanna, New Hebrides).
 1848. *Engraulis setirostris*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 69 (India).
 1878. *Engraulis setirostris*, Day, *Fish. India*, p. 626 (from the Red Sea through the seas of India to the Malay Archipelago).
 1889. *Engraulis setirostris*, Day, *Faun. Brit. Ind. Fish.* I, p. 391.
 1913. *Engraulis setirostris*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 40.
 1917. *Engraulis setirostris*, Hornell, *Madras Fish. Bull.* XI, p. 91 (Tuticorin).
 1940. *Thrissocles setirostris*, Herre, *Rec. Ind. Mus.* XI,II, p. 10 (Mergui market).
 1941. *Thrissocles setirostris*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 679.

Distribution.—Red Sea, Arabia, East Africa, India, Burma, Malaya, Siam, Malay Archipelago, Philippines, Queensland, Polynesia.

Thrissocles valenciennesi (Blkr.).

1866. *Stolephorus (Thryssa) valenciennesi*, Bleeker, *Ned. Tijds. Dierk.* III, p. 306 (type locality: Java, Sumatra, Singapore, Borneo).
 1927. *Engraulis valenciennesi*, Fowler, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 254 (Bombay).
 1941. *Thrissocles valenciennesi*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 682 (Bombay).

Distribution.—India, Malaya, Malay Archipelago, Philippines.

Genus **Xenengraulis** Jordan & Seale.

1925. *Xenengraulis* Jordan & Seale, *Copeia*, No. 141, p. 29. (Type, *Xenengraulis spinidens* Jordan & Seale, orthotypic).

Xenengraulis spinidens J. & S.

1925. *Xenengraulis spinidens*, Jordan & Seale, *Copeia* No. 141, p. 29 (type locality: India, Siam, Calcutta, Rangoon).
 1941. *Xenengraulis spinidens*, Fowler, *Bull. U.S. Nat. Mus.* (100) XIII, p. 668.

Distribution.—India, Burma, Siam, Philippines.

Superfamily ALEPOCEPHALOIDAE.

Family ALEPOCEPHALIDAE.

Genus **Alepocephalus** Risso.

1820. *Alepocephalus* Risso, *Mem. de l'Acad. Sci. Torino* XXV, p. 270. (Type, *Alepocephalus rostratus* Risso.)

Alepocephalus bicolor Alc.

1891. *Alepocephalus bicolor*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 133 (type locality: Bay of Bengal, off Ganjam coast, 15° 56' 50" N., 81° 30' 30" E., 240-276 fms., type is in the Zoological Survey of India).
 1892. *Alepocephalus bicolor*, Alcock, *Ill. Zool. Investing. Fish.*, pl. iv, fig. 2.
 1899. *Alepocephalus bicolor*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 169 (Bay of Bengal, off Ganjam Coast, 240-276 fms., Arabian Sea, off Malabar Coast, 360 fms.).

1906. *Alepocephalus bicolor*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 19.
 1913. *Alepocephalus bicolor*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 99.
 1939. *Alepocephalus bicolor*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 15.

Distribution.—Gulf of Aden, Arabian Sea, Bay of Bengal, Indo-Australian Archipelago.

***Alepocephalus blanfordii* Alc.**

1892. *Alepocephalus blanfordii*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 357 (type locality : S. of Cape Comorin, 6° 58' N., 77° 26' 50" E., 902 fms., type is in the Zoological Survey of India).
 1894. *Alepocephalus blanfordii*, Alcock, *Ill. Zool. Investig. Fish.*, pl. ix, fig. 1.
 1899. *Alepocephalus blanfordii*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 171 (Arabian Sea, off Cape Comorin, 902 fms.).
 1913. *Alepocephalus blanfordii*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 100.

Distribution.—Arabian Sea, Flores Sea.

***Alepocephalus edentulus* Alc.**

1892. *Alepocephalus edentulus*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 358, pl. xviii, fig. 2 (type locality : Bay of Bengal, 12° 50' N., 81° 30' E., 475 fms., type is in the Zoological Survey of India).
 1899. *Alepocephalus edentulus*, Alcock, *Cat. Ind. Deep Sea Fish.* p. 172 (Bay of Bengal, off Madras Coast, 475 fms.).
 1900. *Alepocephalus edentulus*, Alcock, *Ill. Zool. Investig. Fish.*, xxxii, fig. 4.

Distribution.—Bay of Bengal.

***Alepocephalus longiceps* Lloyd.**

1909. *Alepocephalus longiceps*, Lloyd, *Ill. Zool. Investig. Fish.*, pl. xlv, fig. 2.
 1909. *Alepocephalus longiceps*, Lloyd, *Mem. Ind. Mus.* II, p. 147 (type locality : Andaman Sea, Bay of Bengal, 12° 49' 30" N., 96° 24' 30" E., type is in the Zoological Survey of India).

Distribution.—Bay of Bengal.

***Alepocephalus macrops* Lloyd.**

1909. *Alepocephalus macrops*, Lloyd, *Ill. Zool. Investig. Fish.*, pl. xlv, fig. 3.
 1909. *Alepocephalus macrops*, Lloyd, *Mem. Ind. Mus.* II, p. 148 (type locality : Bay of Bengal, off Arakan coast, 419 fms., type is in the Zoological Survey of India).

Distribution.—Bay of Bengal.

***Alepocephalus microlepis* Lloyd.**

1909. *Alepocephalus microlepis*, Lloyd, *Ill. Zool. Investig. Fish.*, pl. xlv, fig. 4.
 1909. *Alepocephalus microlepis*, Lloyd, *Mem. Ind. Mus.* II, p. 146 (type locality : Laccadive Sea, 12° 47' N., 73° 44' 45" E., 823-870 fms., S. of Cape Comorin, 603 fms., Gulf of Oman, 689-700 fms., type is in the Zoological Survey of India).

Distribution.—Arabian Sea.

Genus *Bathytroctes* Günther.

1878. *Bathytroctes* Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 249. (Type, *Bathytroctes microlepis* Gthr., orthotypic.)

Bathytroctes macrolepis Gthr.

1887. *Bathytroctes macrolepis*, Günther, "Challenger" Rep. Deep Sea Fish. XXII, p. 225, pl. lvii (type locality: North of Celebes, 2150 fms., type is in the British Museum).
 1899. *Bathytroctes macrolepis*, Alcock, Cat. Ind. Deep Sea Fish., p. 174 (Andaman Sea).
 1913. *Bathytroctes macrolepis*, Weber & de Beaufort, Fish. Indo-Austral. Archipel. II, p. 103.

Distribution.—Andaman Sea, N. of Celebes.

Bathytroctes microlepis Gthr.

1878. *Bathytroctes microlepis*, Günther, Ann. Mag. Nat. Hist. (5) II, p. 249 (type locality: south east of Cape St. Vincent, 1090 fms.).
 1889. *Bathytroctes microlepis*, Alcock, Ann. Mag. Nat. Hist. (6) IV, p. 452 (Andaman Sea, 8 miles south-east of Cinque Island, 500 fms.).
 1899. *Bathytroctes microlepis*, Alcock, Cat. Ind. Deep Sea Fish., p. 174 (Andaman Sea).
 1941. *Bathytroctes microlepis*, Herre, Mem. Ind. Mus. XIII, p. 335.

Distribution.—Andaman Sea, South East of St. Vincent, Atlantic Ocean.

Bathytroctes rostratus Gthr.

1878. *Bathytroctes rostratus*, Günther, Ann. Mag. Nat. Hist. (5) II, p. 250 (type locality: Pernambuco, 675 fms.).
 1906. *Bathytroctes rostratus*, Braner, "Valdivia" Tiefsee Fische XV, p. 17, pl. xiv, figs. 2, 3 (Bay of Bengal, 7° 1' 2" N., 85° 56' 5" E., 1500-2000 m.).

Distribution.—N. E. Coast of Africa, between Seychelles and Zanzibar, Bay of Bengal, Pernambuco.

Bathytroctes squamosus Alc.

1890. *Bathytroctes squamosus*, Alcock, Ann. Mag. Nat. Hist. (6) VI, p. 303 (type locality: Arabian Sea, 15° 2' N., 72° 34' E., 740 fms., type is in the Zoological Survey of India).
 1892. *Bathytroctes squamosus*, Alcock, Ill. Zool. Investig. Fish., pl. iv, fig. 1.
 1899. *Bathytroctes squamosus*, Alcock, Cat. Ind. Deep Sea Fish., p. 173 (Arabian Sea, off the Laccadives, 740 fms.).
 1913. *Bathytroctes squamosus*, Weber & de Beaufort, Fish. Indo-Austral. Archipel. II, p. 101.

Distribution.—Arabian Sea, Bali Sea.

Genus Narcetes Alcock.

1890. *Narcetes* Alcock, Ann. Mag. Nat. Hist. (6) VI, p. 305. (Type, *Narcetes erimelas* Alc., orthotypic.)

Narcetes affinis Lloyd.

1906. *Narcetes affinis*, Lloyd, Ann. Mag. Nat. Hist. (7) XVIII, p. 308 (type locality: Gulf of Oman, 24° 35' 10" N., 57° 46' 6" E., 1005 fms., type is in the Zoological Survey of India).
 1908. *Narcetes affinis*, Lloyd, Ill. Zool. Investig. Fish., pl. xlii, figs. 1, 1a.
 1909. *Narcetes affinis*, Lloyd, Mem. Ind. Mus. II, p. 149 (Gulf of Oman).

Distribution.—Gulf of Oman.

Narcetes erimelas Alc.

1890. *Narcetes erimelas*, Alcock, Ann. Mag. Nat. Hist. (6) VI, p. 305 (type locality: Arabian Sea, 15° 2' N., 72° 34' E., 740 fms., type is in the Zoological Survey of India).

1892. *Narcetes erimelas*, Alcock, *Ill. Zool. Investig. Fish.*, pl. iv, fig. 1.

1899. *Narcetes erimelas*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 175 (Arabian Sea, near Laccadive Is., 740 fms.).

Distribution.—Arabian Sea.

Genus **Platytrectes** Günther.

1878. *Platytrectes* Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 249 (Type, *Platytrectes apus* Gthr., orthotypic).

Platytrectes apus Gthr.

1878. *Platytrectes apus*, Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 249 (type locality : mid Atlantic, 1500 fms.).

1890. *Platytrectes apus*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 307 (Arabian Sea, 15°2' N., 72°34' E., 740 fms.).

1899. *Platytrectes apus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 177 (Arabian Sea, in the neighbourhood of the Laccadive banks, 740 fms.).

Distribution.—Atlantic Ocean, Arabian Sea.

Genus **Xenodermichthys** Günther.

1878. *Xenodermichthys* Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 250. (Type, *Xenodermichthys nodulosus* Gthr., orthotypic).

1923. *Rouleina* Jordan, *Stan. Univ. Pub.* III, No. 2, p. 122. (Type, *Aleposomus guentheri* Alc.).

Xenodermichthys guentheri Alc.

1892. *Xenodermichthys Guentheri*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 359, pl. xviii, fig. 3 (type locality : Bay of Bengal, 15°43' 30" N., 8°19'30" E. 678 fms., type is the Zoological Survey of India).

1899. *Xenodermichthys Güntheri*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 180 (Bay of Bengal, off Madras Coast, 678 fms., Arabian Sea, off Travancore Coast, 430 fms.).

1900. *Xenodermichthys Guentheri*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxxii, fig. 2.

Distribution.—Gulf of Aden, Arabian Sea, Bay of Bengal.

Xenodermichthys lividis (Br.).

1906. *Aleposomus lividis*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 21, pl. ii, fig. 1 (type locality : 3°22'1" S., 101°11'5" E., 903m., 0°57'5" S., i, 99°51'1"E., 768 m.).

Distribution.—West Coast of Sumatra.

Xenodermichthys nudus (Br.).

1906. *Aleposomus nudus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 22, pl. ii, fig. 2 (type locality : 0°39'2" S., 98°52'3" E., 750m.).

Distribution.—West Coast of Sumatra.

Xenodermichthys squamilaterus Alc.

1898. *Xenodermichthys squamilaterus*, Alcock, *Ann. Mag. Nat. Hist.* (7) II, p. 148 (type locality : off the Andamans, 370-419 fms., type is in the Zoological Survey of India).

1899. *Xenodermichthys squamilaterus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 181 (Andaman Sea, 370-419 fms.).

1941. *Xenodermichthys squamilaterus*, Herre, *Mem. Ind. Mus.* XIII, p. 336.

Distribution.—Andaman Sea.

Genus **Leptoderma** Vaillant.

1886. *Leptoderma* Vaillant, *Comptes Rendus. Ac. Sci. Paris* CIII, p. 1239. (Type, *Leptoderma macrops* Vaillant, orthotypic).

Leptoderma affinis Alc.

1892. *Leptoderma macrops* (nec Vaillant), Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 361 (type locality : off Kistna Delta, Bay of Bengal, 753 fms., type is in the Zoological Survey of India).
 1899. *Leptoderma affinis*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 182 (type locality : Bay of Bengal, off Kistna Coast, 753 fms.).
 1900. *Leptoderma affinis*, Alcock, *Ill. Zool. Investig. Fish.*, p. xxxii, fig. 3.

Distribution.—Bay of Bengal.

Genus **Tauredophidium** Alcock.

1890. *Tauredophidium* Alcock, *Ann. Mag. Nat. Hist.* (6) V, p. 212. (Type, *Tauredophidium hextii* Alc., orthotypic).

Tauredophidium hextii Alc.

1890. *Tauredophidium hextii*, Alcock, *Ann. Mag. Nat. Hist.* (6) V, p. 213, pl. viii, fig. 1 (type locality : Bay of Bengal, off Ganjam coast 1310 fms.).
 1898. *Tauredophidium hextii*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxi, fig. 3.
 1899. *Tauredophidium hextii*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 97 (type locality : Bay of Bengal, off Ganjam Coast, 1310 fms.).

Distribution.—Bay of Bengal.

Family DOLICHOPTERYGIDAE.

Genus **Aulastomatomorpha** Alcock.

1890. *Aulastomatomorpha*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 307. (Type, *Aulastomatomorpha phospherops* Alc., orthotypic.)

Aulastomatomorpha phospherops Alc.

1890. *Aulastomatomorpha phospherops*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 307 (Laccadive Sea, 11°12'47" N., 74°25'30" E., 1000 fms., type is in the Zoological Survey of India).
 1892. *Aulastomatomorpha phospherops*, Alcock, *Ill. Zool. Investig. Fish.*, pl. v, fig. 2.
 1899. *Aulastomatomorpha phospherops*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 178 (Arabian Sea, near the Laccadives, 1000 fms.).

Distribution.—Arabian Sea.

Suborder **CHIROCENTROIDEI**.Family **CHIROCENTRIDAE**.Genus **Chirocentrus** Cuvier.

1817. *Chirocentrus* Cuvier, *Régne Animal* II, ed. 1, p. 178 (Type, *Clupea dorab* Forsk., monotypic).

Chirocentrus dorab (Forsk.).

1775. *Clupea dorab*, Forskål, *Descript. Animal*, pp. xiii, 72 (type locality Djedda, Red Sea).
 1839. *Chirocentrus nudus* Swainson, *Nat. Hist. Animals, Fish.* II, p. 294 [on *Wahlb. Russell Fish. Coromandel* II, p. 78, pl. cxcix, 1803 (type locality : Vizagapatam)].

1846. *Chirocentrus dora*^h, Cuvier & Valenciennes, *Hist., Nat. Poiss.* XIX, p. 160, pl. dlxv (Coromandel, Malabar).
 1865. *Chirocentrus dora*^h, Day, *Fish. Malabar*, p. 233 (Malabar).
 1868. *Chirocentrus dora*^h, Günther, *Cat. Fish. Brit. Mus.* VII, p. 275 (Bengal).
 1878. *Chirocentrus dorab*, Day, *Fish. India*, p. 652, pl. clxvi, fig. 3 (Red Sea, through the seas of India to the Malay Archipelago and beyond).
 1889. *Chirocentrus dorab*, Day, *Faun. Brit. Ind. Fish.* I, p. 368, fig. 114.
 1907. *Chirocentrus dorab*, Lloyd, *Rec. Ind. Mus.* I, p. 222 (Akyab).
 1912. *Chirocentrus dorab*, Jenkins, *Rec. Ind. Mus.* VII, p. 57 (Akyab).
 1913. *Chirocentrus dorab*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 18, fig. 11.
 1933. *Chirocentrus dorab*, Deraniyagala, *Ceylon Journ. Sci.* (C)V, p. 82 (Ceylon).
 1936. *Chirocentrus dorab*, Hora & Mukerji, *Rec. Ind. Mus.* XXXVIII, p. 18 (Maungmagan).
 1940. *Chirocentrus dorab*, Herre, *Rec. Ind. Mus.* XLII, p. 9 (Mergui Archipelago).
 1941. *Chirocentrus dorab*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 724.

Distribution.—Red Sea, Zanzibar, Natal, Mauritius, India, Ceylon, Burma, Malay Peninsula, Siam, China, Formosa, Malay Archipelago, Melanesia, Australia.

Suborder CHANOIDEI.

Family CHANIDAE.

Genus **Chanos** Lacépède.

1803. *Chanos* Lacépède, *Hist. Nat. Poiss.* V, p. 395. (Type, *Chanos arabicus* Lac., monotypic).

Chanos chanos (Forsk.).

1775. *Mugil Chanos*, Forskål, *Descript. Animal*, pp. xiv, 74 (type locality : Djedda, Red Sea).
 1829. *Cyprinus pala*, Cuvier, *Règne Animal* II, ed. 2, p. 276 (on *Palah Bontah* Russell, *Fish. Coromandel* II, p. 84, pl. ccvii, 1803, type locality : Vizagapatam).
 1829. *Cyprinus tolo*, Cuvier, *Règne Animal* II, ed. 2, p. 276 (on *Tooleloo* Russell, *Fish. Coromandel* II, p. 85, pl. ccviii, 1803, type locality : Vizagapatam).
 1832. *Leuciscus Zeylonicus*, Bennett, *Proc. Zool. Soc. London*, p. 184 (Ceylon).
 1846. *Chanos chloropterus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XIX, p. 195 (type locality : India).
 1856. *Chanos pala*, Day, *Fish. Malabar*, p. 224 (Malabar).
 1868. *Chanos salmoneus*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 473 (Ceylon).
 1878. *Chanos salmoneus*, Day, *Fish. India*, p. 651, pl. clxvi, fig. 2 (Red Sea, seas of India to the Malay Archipelago and beyond).
 1889. *Chanos salmoneus*, Day, *Faun. Brit. Ind. Fish.* I, p. 403, fig. 127.
 1915. *Chanos chanos*, Chaudhuri, *Mem. Ind. Mus.* V, p. 417 (Chilka Lake).
 1922. *Chanos chanos*, Hora, *Mem. Ind. Mus.* V, p. 764 (Chilka Lake).
 1929. *Chanos salmoneus*, Pillay, *Journ. Bombay Nat. Hist. Soc.* XXXIII, p. 356 (Travancore).
 1933. *Chanos chanos*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 82 (Ceylon).
 1941. *Chanos chanos*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 537.

Distribution.—Red Sea, East Coast of Africa, India, Ceylon, Malay Peninsula, Malay Archipelago, Philippines, China, Japan, Australia, Melanesia, Polynesia.

Suborder SALMONOIDEI.

Family SALMONIDAE (SALMONIDAE+COREGONIDAE Jordan).

Genus **Salmo** Linnaeus.

1758. *Salmo* Linnaeus, *Syst. Nat.* I, ed. 10, p. 308. (Type, *Salmo salar* L.).

Salmo trutta fario L.

(Brown trout)

1758. *Salmo trutta*, Linnaeus, *Syst. Nat.* I, ed. 10, p. 308 (type locality : Europe).
 1932. *Salmo trutta*, Boulenger, *Camb. Nat. Hist.* VII, p. 567.
 1936. *Salmo fario*, Mukerji, *Journ. Roy. As. Soc. Bengal Sci.* II, p. 157 (Hazara).
 1938. *Salmo fario*, Bhatti, *Journ. Bombay Nat. Hist. Soc.* XL, p. 429 (Kulu Valley).
 1940. *Salmo trutta fario*, Malik, *Journ. Roy. As. Soc. Bengal Sci.* V, p. 4 (Kashmir).

Salmo trutta has been introduced into Kashmir, Punjab, Ceylon.

Distribution.—Eurasia, N. America (introduced), S. Africa (introduced), S. Australia (introduced), India (introduced).

Salmo gairdnerii gairdnerii Rich.

(Rainbow trout. Steel-head trout).

1836. *Salmo gairdnerii*, Richardson, *Faun. Bor. Amer.* III, p. 221 (type locality: Columbia river at Fort Vancouver).
 1921. *Salmo irideus*, Wilson, *Madras Fish. Bull.* XII, p. 151 (Nilgiris).
 1939. *Salmo (Oncorhynchus) irideus*, Malik, *Journ. Roy. As. Soc. Bengal Sci.* V, p. 4 (Kashmir).
 1943. *Salmo irideus*, Phayre, *U. Serv. Journ. India*, p. 329.

Salmo gairdnerii gairdnerii has been introduced into India and Ceylon. The history of the undertakings may be read in F. G. Mitchell's "How Trouts were introduced into Kashmir" *Journ. Bombay Nat. Hist. Soc.* XXVI, pp. 295-299, 1918 and Philip Fowke's "Trout Culture in Ceylon" *Ceylon Journ. Sci.* (C) VI, 1938.

Distribution.—British Columbia to California, England (introduced), S. Africa (introduced), Australia (introduced), India (introduced), Ceylon (introduced).

Salmo levenensis Walker.

(Loch Leven trout).

1808. *Salmo levenensis*, Walker, *Wern Mem.* I, p. 541 (type locality : loch Leven ; topotypes are in the British Museum).
 1877. *Salmo levenensis*, Day, *Fish. India*, p. 508, pl. cxviii, fig. 3 (Neilgherry hills introduced from Loch Leven).
 1889. *Salmo fario levenensis*, Day, *Faun. Brit. Ind. Fish.* I, p. 404 (introduced into the Nilgiri Hills).

Salmo levenensis was introduced into the Nilgiri Hills.

Distribution.—England, Scotland, S. Africa (introduced), Australia (introduced), India (introduced).

Family MICROSTOMIDAE.**Genus Nansenia Jordan & Evermann.**

1896. *Nansenia* Jordan & Evermann, *Bull. U. S. Nat. Mus.* XLVII, p. 280 (Type, *Microstomus graenlandicus* Reinhardt, orthotypic).

Nansenia graenlandicus (Reinhardt).

1839. *Microstomus graenlandicus*, Reinhardt, *Overs. danske Vidensk. Selsk. Forh.*, p. 8 (type locality : Greenland).
 1939. *Nansenia graenlandicus*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 16 (Maldiva area).

Distribution.—North Atlantic, Arabian Sea,

Suborder *STOMIATOIDEI*.

Superfamily GONOSTOMOIDAE (HETEROPHOTODERMI).

Family GONOSTOMIDAE (GONOSTOMIDAE + MAUROLICIDAE Jordan).

Genus **Gonostoma** Rafinesque.

1810. *Gonostoma* Rafinesque, *Ind. Ittiol. Sicil.*, p. 64. (Type, *Gonostoma denudatum* Rafinesque).

Gonostoma elongatum Gthr.

1878. *Gonostoma elongatum*, Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 187 (type locality : South of New Guinea, 800 fms.).
 1891. *Gonostoma elongatum*, Wood-Mason & Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 127 (Laccadive Sea, 738 fms.).
 1892. *Gonostoma elongatum*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 354 (off Minikoi Is., Arabian Sea, 1200 fms.).
 1896. *Gonostoma elongatum*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 331 (Laccadive Sea, 738-1200 fms.).
 1899. *Cyclothone elongata*, Alcock, *Cat. Ind. Deep Sea fish.*, p. 139.
 1913. *Gonostoma elongatum*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 122, fig. 45.
 1939. *Gonostoma elongatum*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 17.

Distribution.—East Coast of North and Central America, Gulf of Guinea, Arabian Sea, West of Sumatra, Flores Sea, Banda Sea, Arfura Sea.

Genus **Cyclothone** Goode & Bean.

1882. *Cyclothone* Goode & Bean, *Bull. Mus. Comp. Zool. Harvard* X, p. 221. (Type, *Cyclothone lusca* G. B., orthotypic).

Cyclothone acclinidens Garm.

1899. *Cyclothone acclinidens*, Garman, *Mem. Mus. Comp. Zool. Harvard* XXIV, p. 247, pl. J, fig. 4 (type locality : 36°47'10"N., 122°3'20"W., 122 fms.).
 1906. *Cyclothone acclinidens*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 85, pl. vi, fig. 1, text-fig. 34a-c.
 1939. *Cyclothone acclinidens*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 18 (Maldiva area).

Distribution.—Atlantic Ocean, Arabian Sea, Bay of Bengal, Seas of Malay Archipelago.

Cyclothone microdon (Gthr.).

1878. *Gonostoma microdon*, Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 187 (type locality : Atlantic and Pacific, 500-2900 fms.).
 1889. *Gonostoma microdon*, Alcock, *Ann. Mag. Nat. Hist.* (6) IV, p. 399 (Bay of Bengal, 30 miles west of Middle Andaman, 485 fms., Andaman Sea, 7 miles south-east by south of Ross I., 265 fms.).
 1906. *Cyclothone microdon*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 82, pl. vi, fig. 4, text-fig. 32.
 1913. *Cyclothone microdon*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 126, fig. 46.
 1941. *Cyclothone microdon*, Herre, *Mem. Ind. Mus.* XIII, p. 336.

Distribution.—Atlantic ocean, Bay of Bengal, Seas of Malay Archipelago, Arctic and Antarctic Oceans.

Cyclothone microdon pallida Br.

1902. *Cyclothone pallida*, Brauer, *Zool. Anz.* XXV, p. 281 (type locality : Atlantic ; Indian Ocean).
 1906. *Cyclothone microdon pallida* Brauer, "Valdivia" *Tiefsee Fische* XV, p. 84, pl. vi, fig. 2, text-fig. 33.
 1939. *Cyclothone pallida*, Norman, *Sci. Rep. John Murray Exped.*, p. 18 (Gulf of Oman, Maldive area).

Distribution.—Atlantic Ocean, Arabian Sea, Bay of Bengal.

Cyclothone obscura Br.

1902. *Cyclothone obscura*, Brauer, *Zool. Anz.* XXV, p. 280 (type locality Atlantic and Indian Oceans).
 1906. *Cyclothone obscura*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 88, pl. vi, fig. 3, text-fig. 35 (Bay of Bengal).

Distribution.—Atlantic and Indian Oceans.

Cyclothone signata Garman.

1899. *Cyclothone signata*, Garman, *Mem. Mus. Comp. Zool. Harvard* XXIV, p. 246, pl. J, fig. 3 (type locality : 61°21'N., 80°41'W.).
 1906. *Cyclothone signata*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 78, pl. vi, fig. 6, text-figs. 28, 29 (Bay of Bengal, 7°43'2" N., 85°94'9"E.).

Distribution.—Atlantic, Arabian Sea, Bay of Bengal.

Cyclothone signata alba Br.

1906. *Cyclothone signata alba* var., Brauer, "Valdivia" *Tiefsee Fische* XV, p. 80, fig. 30 (type locality : Atlantic Ocean, 24°43'4" N., 17°1'3" W.).

Distribution.—Atlantic, Gulf of Aden, Arabian Sea, Bay of Bengal.

Genus **Vinciguerria** Goode & Bean.

1895. *Vinciguerria*, Goode & Bean, *Ocean Ichth.*, p. 513. (Type, *Maurolicus attenuatus* Cocco.)

Vinciguerria lucetius (Garm.).

1899. *Maurolicus lucetius*, Garman, *Mem. Mus. Comp. Zool. Harvard* XXIV, p. 242, pl. J, fig. 2 (type locality : 21°36'30" N., 106°25'W., 238 fms.).
 1906. *Vinciguerria lucetia*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 97, fig. 40 (Bay of Bengal).

Distribution.—Atlantic, Arabian Sea, Bay of Bengal.

Vinciguerria nimbaricus (Jordan & Williams).

1896. *Zalarges nimbarius*, Jordan & Williams, *Proc. Calif. Acad. Sci.* (2) V, p. 793, pl. lxxvi (type locality : Pacific Ocean).
 1939. *Vinciguerria nimbaria*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 19 (Arabian Sea, 23°2'48"N., 64°31'54" E.).

Distribution.—Atlantic, Indo-Pacific.

Genus **Valenciennellus** Jordan & Evermann.

1896. *Valenciennellus* Jordan & Evermann, *Bull. U. S. Nat. Mus.* No. 47, pt. 1, p. 577. (Type, *Maurolicus tripunctulatus* Esmark, orthotypic).

Valenciennellus stellatus Garm.

1899. *Valenciennellus stellatus*, Garman, *Mem. Mus. Comp. Zool. Harvard* XXIV, p. 239, pl. liii, fig. 2 (type locality : 30°31'35"N., 14°5'30"W.).
 1906. ? *Valenciennellus stellatus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 100, p. 100, fig. 42 (Bay of Bengal).

Distribution.—Atlantic, Arabian Sea, Bay of Bengal.

Genus **Yarrella** Goode & Bean.

1895. *Yarrella* Goode & Bean, *Ocean Ichth.*, p. 103. (Type, *Yarrella blackfordi* G. B., orthotypic).

Yarrella corythaeolum (Alc.).

1898. *Diplophos corythaeolum*, Alcock, *Ann. Mag. Nat. Hist.* (7) II, p. 14 (type locality : Andaman Sea, 185-405 fms., type is in the Zoological Survey of India).
 1899. *Diplophos corythaeolum*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxv, fig. 3.
 1899. *Photichthys corythaeolus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 142 (Andaman Sea).
 1939. *Yarrella corythaeola*, Norman, *Sci. Rep. John Murray Exped.* VII, (Maldivé area).
 1941. *Photichthys corythaeolus*, Herre, *Mem. Ind. Mus.* XIII, p. 336.

Distribution.—Natal Coast, Zanzibar, Gulf of Aden, Maldives, Andaman Sea, Southern Australia.

Genus **Triplophos** Brauer.

1902. *Triplophos* Brauer, *Zool. Anz.* XXV, p. 282. (Type, *Triplophos elongatus* Br.).

Triplophos elongatus Br.

1902. *Triplophos elongatus*, Brauer, *Zool. Anz.* XXV, p. 282 (type locality : South of Ceylon, 4°56'N., 78°15'3" E., 2000 m.).
 1906. *Triplophos elongatum*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 99, pl. vii, fig. 4, text-fig. 41.

Distribution.—South of Ceylon.

Family STERNOPTYCHIDAE.

Genus **Sternoptyx** Hermann.

1781. *Sternoptyx* Hermann, *Der Naturforscher* XVI, p. 8. (Type, *Sternoptix diaphana* Hermann.)

Sternoptyx diaphana Herm.

1781. *Sternoptix diaphana*, Hermann, *Der Naturforscher*, XVI, p. 8, pl. i, figs. 1, 2 (type locality : Jamaica).
 1896. *Sternoptyx diaphana*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 331 (off Malabar Coast, 912-931 fms.).
 1906. *Sternoptyx diaphana*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 115 (Bay of Bengal).
 1913. *Sternoptyx diaphana*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 132 fig. 48.

Distribution.—Atlantic, Indo-Pacific.

Genus **Argyropelecus** Cocco.

1829. *Argyropelecus* Cocco, *Arch. della R. Acad. Peloritano*, p. 146. (Type: *Argyropelecus hemigymnus* Cocco).

Argyropelecus aculeatus C.V.

1849. *Argyropelecus aculeatus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXII, p. 406 (type locality: Azores).
 1906. *Argyropelecus aculeatus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 110, fig. 47 (Bay of Bengal).

Distribution.—Atlantic and Indian Oceans.

Argyropelecus affinis Garm.

1899. *Argyropelecus affinis*, Garman, *Mem. Mus. Comp. Zool. Harvard* XXIV, p. 237 (type locality: Atlantic, 15°24'40"N., 63°31'30"W.).
 1939. *Argyropelecus affinis*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 20 (Arabian Sea, 10°54'42"N., 61°20'54"E., Maldivé area).

Distribution.—Atlantic Ocean, Gulf of Aden, Arabian Sea, Maldivé area.

Argyropelecus hemigymnus Cocco.

1829. *Argyropelecus hemigymnus*, Cocco, *Giorn. Sci. Sic.* LXXVII, p. 146 (type locality: Mediterranean).
 1896. *Argyropelecus hemigymnus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 331 (Bay of Bengal, 1803 fms.).
 1899. *Argyropelecus hemigymnus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 135 (Bay of Bengal, 1803 fms.).

Distribution.—Atlantic, Mediterranean, Bay of Bengal.

Argyropelecus olfersii (C.).

1829. *Sternoptyx. Olfersii*, Cuvier, *Régne Animal* II, ed. 2, p. 316, pl. xiii, fig. 2 (type locality: Atlantic Ocean).
 1906. *Argyropelecus Olfersi*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 108, fig. 46 (South of Ceylon).

Distribution.—Atlantic, Indian and Pacific Ocean.

Argyropelecus sladeni Reg.

1908. *Argyropelecus sladeni*, Regan, *Trans. Linn. Soc.* (2) XII, p. 218 (type locality: Chagos Archipelago, 400-500 fms., type is in the British Museum).
 1939. *Argyropelecus sladeni*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 20 (Arabian Sea, 12°8'16"N., 63°4'36"E.).

Distribution.—North and South Atlantic, Indo-Pacific, Antarctic.

Genus **Polyipnus** Günther.

1887. *Polyipnus* Günther, "Challenger" *Rep. Deep Sea Fish.* XXII, p. 170 (Type, *Polyipnus spinosus* Gthr., orthotypic).

Polyipnus spinosus Gthr.

1887. *Polyipnus spinosus*, Günther, "Challenger" *Rep. Deep Sea Fish.* XXII, p. 170, pl. li, fig. B (type locality: Indian Ocean, 250 fms.).
 1889. *Polyipnus spinosus*, Alcock, *Ann. Mag. Nat. Hist.* (6) IV, p. 398 (Bay of Bengal, between North and South Sentinel Is., 220-240 fms.).
 1896. *Polyipnus spinosus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 331 (off coasts of Andaman Is., 188-240 fms.).

1899. *Polyipnus spinosus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 138.

1913. *Polyipnus spinosus*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 130, fig. 47.

1941. *Polyipnus spinosus*, Herre, *Mem. Ind. Mus.* XIII, p. 336.

Distribution.—Gulf of Guinea, Bay of Bengal, Seas of Malay Archipelago, Sandwich Islands.

Order STOMIATOIDEI.

Superfamily STOMIATOIDAE (LEPIDOPHOTODERMI).

Family STOMIATIDAE.

Genus *Stomias* Cuvier.

1817. *Stomias* Cuvier, *Règne Animal* II, ed. 1, p. 184. (Type, *Esor boa* Risso),

Stomias affinis Gthr.

1887. *Stomias affinis*, Günther, "Challenger" *Rep. Deep Sea Fish.* XXII p. 205, pl. liv, fig. A (type locality : South of Sombrero I., West Indies 450 fms., type is in the British Museum).

1891. *Stomias elongatus*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 129 (type locality : Arabian Sea, off the Laccadives, 738 fms., type is in the Zoological Survey of India).

1896. *Stomias elongatus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (Laccadive Sea, 738 fms.).

1899. *Stomias elongatus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 147.

1934. *Stomias affinis*, Edge, "Dana" *Rep.*, No. 5, p. 5, figs. 1, 2.

Distribution.—Atlantic, Indo-Pacific.

Stomias nebulosus Alc.

1889. *Stomias nebulosus*, Alcock, *Ann. Mag. Nat. Hist.* (6) IV, p. 451 (type locality : Gulf of Manaar, 6°29'N., 70°34'E., 597 fms., type is in the Zoological Survey of India).

1892. *Stomias nebulosus*, Alcock, *Ill Zool. Investig. Fish.*, pl. vii, fig. 1.

1896. *Stomias nebulosus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (Gulf of Manaar, 597 fms.).

1906. *Stomias nabulosus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 50, text-fig. 14.

1913. *Stomias nebulosus*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 112, fig. 40.

1934. *Stomias nebulosus*, Edge, "Dana" *Rep.*, No. 5, p. 39, figs. 11, 12.

Distribution.—East Coast of Africa, Gulf of Manaar, Malay Archipelago.

Stomias valdiviae Br.

1906. *Stomias Valdiviae*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 48, pl. iii, fig. 1, text-fig. 11-13 (type locality : west coast of Africa ; Gulf of Guinea ; west coast of Sumatra, 0°30'5"N., 98°14'2"E., 594 m.).

Distribution.—Gulf of Guinea, West Coast of Africa, West Coast of Sumatra.

Genus *Photostomias* Collett.

1889. *Photostomias* Collett, *Bull. Soc. Zool. France* XIV, p. 291. (Type, *Photostomias guzneri* Collett, orthotypic.)

1890. *Thaumastomias* Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 220. (Type, *Thaumastomias atrox* Alc., orthotypic.)

Photostomias atrox (Alc.).

1890. *Thaumastomias atrox*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 220, pl. viii, fig. 7 (type locality : Bay of Bengal, off Ganjam Coast, 1310 fms., type is in the Zoological Survey of India).
 1899. *Photostomias atrox*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 150 (Bay of Bengal, off Ganjam Coast, 1310 fms., off the Andamans, 606 fms.).
 1900. *Photostomias atrox*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxx, fig. 2.

Distribution.—Bay of Bengal.

Family CHAULIODONTIDAE.

Genus **Chauliodus** Bloch & Schneider.

1801. *Chauliodus* Bloch & Schneider, *Syst. Ichth.*, p. 430. (Type, *Chauliodus sloani* Bl. Schn.)

Chauliodus pammelas Alc.

1892. *Chauliodus pammelas*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 355 (type locality : Laccadive Sea, 1370 fms., type is in the Zoological Survey of India).
 1899. *Chauliodus pammelas*, Alcock, *Cat. Ind. Deep. Sea Fish.*, p. 145 (Arabian Sea, in the neighbourhood of Minnikoy, 1370 fms.).
 1900. *Chauliodus pammelas*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxx, fig. 4.
 1906. *Chauliodus pammelas*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 42.
 1913. *Chauliodus pammelas*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 110, fig. 38.
 1939. *Chauliodus pammelas*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 21 (Arabian Sea ; Maldive area).

Distribution.—Gulf of Aden, Gulf of Oman, Arabian Sea, Maldive area, Malay Archipelago.

Chauliodus sloani Bl. & Schn.

1801. *Chauliodus sloani*, Bloch & Schneider, *Syst. Ichth.*, p. 430 (type-locality : Atlantic Ocean).
 1889. *Chauliodus sloanii*, Alcock, *Ann. Mag. Nat. Hist.* (6) IV, p. 399 (Bay of Bengal, 1590 fms., Gulf of Mannar, 597 fms.).
 1892. *Chauliodus sloanii*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 355 (Laccadive Sea).
 1896. *Chauliodus sloanii*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 332 (Bay of Bengal, 1590 fms., Gulf of Manaar, 597 fms., Laccadive Sea).
 1899. *Chauliodus Sloanii*, Alcock, *Cat. Ind. Deep. Sea Fish.*, p. 144 (Gulf of Manaar, 597 fms., Bay of Bengal, 922 fms., 1590 fms., Laccadive Sea).
 1906. *Chauliodus Sloanei*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 40, text-figs. 7-9.
 1913. *Chauliodus sloani*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 110, fig. 38.
 1939. *Chauliodus sloanei*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 21 (Maldive area, 494 m.).
 1941. *Chauliodus sloani*, Herre, *Mem. Ind. Mus.* XIII, p. 336 (Andamans).

Distribution.—Atlantic, Mediterranean, Arabian Sea, Bay of Bengal, Malay Archipelago.

Superfamily ASTRONESTHOIDAE (GYMNOPHOTODERMI).

Family ASTRONESTHIDAE.

Genus **Astronesthes** Richardson.

1844. *Astronesthes* Richardson, *Ichth. Voy. "Sulphur"*, p. 97. (Type, *Astronesthes niger* Rich., orthotypic.)

Astronesthes cyaneus (Br.).

1902. *Bathylchnus cyaneus*, Brauer, *Zool. Anz. XXV*, p. 289 (type locality : south of Ceylon, 4°56'N., 78°15'3" E., 2000 m.).
 1906. *Bathylchnus cyaneus*, Brauer, "Valdivia" *Tiefsee Fische XV*, p. 35, pl. ii, fig. 5, text-fig. 6a-b.

Distribution.—Ceylon.

Astronesthes indicus Br.

1899. *Astronesthes* sp., Alcock, *Cat. Ind. Deep Sea Fish.*, p. 211 (of the Travancore Coast, 224-284 fms.).
 1900. *Astronesthes* sp., Alcock, *Ill. Zool. Investig. Fish.*, pl. xxxv, fig. 3.
 1902. *Astronesthes indicus*, Brauer, *Zool. Anz. XXV*, p. 287 (type locality ; east of Zanzibar, 3000 m.).
 1906. *Astronesthes indicus*, Brauer, "Valdivia" *Tiefsee Fische XV*, p. 33, pl. ii, fig. 3, text-fig. 5a-b.

Distribution.—Arabian Sea.

Astronesthes martensii Klunz.

1871. *Astronesthes martensii*, Klunzinger, *Verh. Zool.-bot. Ges. Wien. XXI*, p. 594 (type locality : Red Sea).
 1906. *Astronesthes Martensi*, Brauer, "Valdivia" *Tiefsee Fische XV*, p. 32, pl. ii, fig. 4 (south of Ceylon, 4°56'N., 78°15'3"E.).

Distribution.—Atlantic Ocean, Red Sea, Arabian Sea, Ceylon.

Family MELANOSTOMIATIDAE (incl. MALACOSTEIDAE).

Genus **Melanostomias** Brauer.

1902. *Melanostomias* Brauer, *Zool. Anz. XXV*, p. 284. (Type *Melanostomias melanops* Br. orthotypic).

Melanostomias melanops Br.

1902. *Melanostomias melanops*, Brauer, *Zool. Anz. XXV*, p. 284 (type locality : west coast of Sumatra, 5°23'2"N., 94°48'1"E., 1024 m.).
 1906. *Melanostomias melanops*, Brauer, "Valdivia" *Tiefsee Fische XV*, p. 53, pl. iii, figs. 4, 5, text-fig. 15 (west coast of Sumatra).
 1913. *Melanostomias melanops*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel. II*, p. 114, fig. 41.

Distribution.—West Coast of Sumatra.

Melanostomias valdiviae Br.

1902. *Melanostomias valdiviae*, Brauer, *Zool. Anz. XXV*, p. 285 (type locality : west coast of Sumatra, 0°15'2"N., 98°8'8" E., 614 m.).
 1906. *Melanostomias valdiviae*, Brauer, "Valdivia" *Tiefsee Fische XV*, p. 56, pl. iii, fig. 6, text-fig. 16 (west coast of Sumatra).
 1913. *Melanostomias valdiviae*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel. II*, p. 115.

Distribution.—West Coast of Sumatra.

Genus **Malacosteus** Ayres.

1849. *Malacosteus* Ayres, *Journ. Bost. Soc. Nat. Hist.* VI, p. 53. (Type, *Malacosteus niger* Ayres, orthotypic).

Malacosteus indicus Gthr.

1878. *Malacosteus indicus*, Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 181 (type locality : Pacific ocean, 500 fms.).
 1889. *Malacosteus indicus*, Alcock, *Ann. Mag. Nat. Hist.* (6) IV, p. 452 (Andaman Sea, off Cinque l., 650 fms.).
 1896. *Malacosteus indicus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 334 (Andaman Sea, 650 fms.).
 1899. *Malacosteus* sp., Alcock, *Cat. Ind. Deep Sea Fish.*, p. 149 (Andaman Sea, 650 fms.).
 1900. *Malacosteus* sp., Alcock, *Ill. Zool. Investig. Fish.*, pl. xxxiii, fig. 4.
 1906. *Malacosteus indicus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 65, pl. iv, fig. 1, text-figs. 23-25 (Bay of Bengal).
 1913. *Malacosteus indicus*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 118, fig. 43.

Distribution.—West coast of S. Africa, Arabian Sea, Bay of Bengal, Andaman Sea, Celebes Sea, South of Philippines.

Family IDIACANTHIDAE.

Genus **Stylophthalmus** Braur.

1902. *Stylophthalmus* Brauer. *Zool. Anz.* XXV, p. 298. (Type, *Stylophthalmus paradoxus* Br., orthotypic.)

Stylophthalmus paradoxus Br.

1902. *Stylophthalmus paradoxus*, Brauer, *Zool. Anz.* XXV, p. 298 (type-locality : south of Cape Town, 36°23'4"S., 17°38'1"E., 4170m., Indian Ocean; Antarctic Ocean).
 1906. *Stylophthalmus paradoxus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 67, pl. v, figs. 1-7 (between Maldiva Is. and Ceylon; Bay of Bengal).

Distribution.—Atlantic Ocean, Arabian Sea, Bay of Bengal, Antarctic Ocean.

Suborder NOTOPTEROIDEI.

Family NOTOPTERIDAE.

Genus **Notopterus** Lacépède.

1800. *Notopterus*, Lacépède, *Hist. Nat. Poiss.* II, p. 189. (Type, *Gymnotus notopterus* Pallas, virtually tautotypic.)
 1934. *Chitala* Fowler, *Proc. Acad. Nat. Sci. Philad.* LXXXV, p. 244, (Type *Mystus chitala* Ham., orthotypic).

Notopterus chitala (Ham.).

1822. *Mystus chitala*, Hamilton, *Fish. Gauges*, pp. 236, 382 (type locality ; larger freshwater rivers of Bengal and Behar).
 1834. *Notopterus maculatus*, Valenciennes, *Voy. Ind. Orient. Belanger*, *Zool.*, p. 396, pl. v, fig. 2 (type locality : India).
 1848. *Notopterus buchanani*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 148 (type locality : Calcutta).
 1868. *Notopterus chitala*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 479 (East India).

1878. *Notopterus chitala*, Day, *Fish. India*, p. 654, pl. clix, fig. 5 (fresh waters of Sind, Lower Bengal, Orissa, Assam, Burma and Siam to the Malay Archipelago).
 1889. *Notopterus chitala*, Day, *Faun. Brit. Ind. Fish.* I, p. 407.
 1913. *Notopterus chitala*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 10, fig. 6.
 1919. *Notopterus chitala*, Southwell & Prashad, *Rec. Ind. Mus.* XVI, p. 217 (Buxar).
 1937. *Notopterus chitala*, Shaw & Shebbeare, *Journ. Roy. As. Soc. Bengal Sci.* III, p. 15 (Northern Bengal).
 1941. *Notopterus chitala*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 544.

Distribution.—India, Burma, Siam, Malay Archipelago, Philippines.

***Notopterus notopterus* (Pallas).**

1769. *Gymnotus notopterus*, Pallas, *Spicil. Zool.* VII, pl. vi, fig. 2 (type locality Indian Ocean).
 1801. *Clupea synura*, Schneider, *Syst. Ichth. Bloch*, p. 426 (type locality : Malabar).
 1822. *Mystus kapirot*, Hamilton, *Fish. Ganges*, pp. 235, 382 (ponds and rivers of fresh water in Bengal).
 1834. *Notopterus kapirot*, Valenciennes, *Voy. Ind. Orient. Belanger, Zool.*, p. 39, pl. v, fig. 1 (tanks of Bengal).
 1838. *Mystus badgee*, Sykes, *Trans. Zool. Soc. London* II, p. 376, pl. lxvii, fig. 2; (type locality : Mota Mola River at Poona).
 1848. *Notopterus pallasii*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 130 (type locality : India).
 1848. *Notopterus hontianus*, Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXI, p. 147, (Irrawaddi, Java).
 1868. *Notopterus kapirot*, Günther, *Cat. Fish. Brit. Mus.* VII, p. 480 (Loodianah, Assam, Bengal, Madras, Dekkan).
 1878. *Notopterus kapirot*, Day, *Fish. India*, p. 653, pl. clix, fig. 4 (fresh and brackish waters of India to the Malay Archipelago).
 1889. *Notopterus kapirot*, Day, *Faun. Brit. Ind. Fish.* I, p. 406.
 1890. *Notopterus kapirot*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 355 (Rangoon, Mandalay).
 1907. *Notopterus kapirot*, Lloyd, *Rec. Ind. Mus.* I, p. 222 (Akyab).
 1910. *Notopterus kapirot*, Jenkins, *Rec. Ind. Mus.* V, p. 134 (Chilka Lake).
 1913. *Notopterus notopterus*, Weber & de Beaufort, *Fish. Indo-Austral Archipel.* II, p. 9.
 1916. *Notopterus notopterus*, Raj. *Rec. Ind. Mus.* XII, p. 253 (Madras).
 1918. *Notopterus notopterus*, Annandale, *Rec. Ind. Mus.* XIV, p. 53 (Inle Lake Burma).
 1929. *Notopterus notopterus*, Prashad & Mukerji, *Rec. Ind. Mus.* XXXI, p. 209 (Indawgyi Lake, Burma).
 1936. *Notopterus notopterus*, Hora & Mukerji, *Rec. Ind. Mus.* XXXVIII, p. 18 (Rangoon).
 1937. *Notopterus notopterus*, Shaw & Shebbeare, *Journ. Roy. As. Soc. Bengal Sci.* III, p. 16 (clear streams of the Terai and Duars).
 1938. *Notopterus notopterus*, Hora & Misra, *Journ. Bombay Nat. Hist. Soc.* XL, p. 21 (Deolali).
 1941. *Notopterus notopterus*, Fowler, *Bull. U. S. Nat. Mus.* (100) XIII, p. 546.
 1942. *Notopterus notopterus*, Hora & Misra, *Journ. Bombay Nat. Hist. Soc.* XLIII, p. 219 (Poona).

Distribution.—India, Burma, Malay Peninsula, Malay Archipelago, Siam, Philippines.

***Notopterus osmani* Rahimullah & Das.**

1936. *Notopterus osmani*, Rahimullah & Das, *Bull. Soc. Port. Sci. Nat.* XII, No. 18, p. 136, pl. xxiii (type locality : rivers of Hyderabad, Deccan).

Distribution.—Hyderabad, India.

Order BATHYCLUPEIFORMES.

Family BATHYCLUPEIDAE.

Genus **Bathyclupea** Alcock.

1891. *Bathyclupea* Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 130. (Type, *Bathyclupea hoskynii* Alc., orthotypic).

Bathyclupea hoskynii Alc.

1891. *Bathyclupea Hoskynii*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 131 (type locality : Andaman Sea, 188-220 fms., type is in the Zoological Survey of India).
 1899. *Bathyclupea Hoskynii*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 40 (Andaman Sea, 189 fms., 188-220 fms., 370-419 fms., off Madras, 149-250 fms.).
 1900. *Bathyclupea Hoskynii*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxviii, fig. 2.
 1941. *Bathyclupea hoskyni*, Herre, *Mem. Ind. Mus.* XIII, p. 334 (Andamans).
Distribution.—Andaman Sea.

Order GALAXIIFORMES.

Family GALAXIIDAE.

Genus **Galaxias** Cuvier.

1817. *Galaxias* Cuvier, *Règne Animal* II, ed. 1, p. 183. (Type, *Esox truttaceus* Cuvier).

Galaxias indicus Day.

1888. *Galaxias indicus*, Day, *Fish. India Suppl.*, p. 806 fig. (type locality littoral districts of Bengal and Madras).
 1889. *Galaxias indicus*, Day, *Faun. Brit. Ind. Fish.* I, p. 405, fig. 128.
Distribution.—India.

Order SCOPELIFORMES.

Family SYNODIDAE (SAURIDAE, SYNODONTIDAE).

Genus **Harpodon** Le Sueur.

1825. *Harpodon* Le Sueur, *Journ. Acad. Nat. Sci. Philad.* V p. 48. (Type, *Salmo microps* Le Sueur = *Osmerus nehereus* Ham., orthotypic).

Harpodon nehereus (Ham.).

1822. *Osmerus ? nehereus*, Hamilton, *Fish. Ganges*, pp. 209, 380 (type locality : mouths of the Ganges).
 1849. *Saurus ophiodon* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXII, p. 490 (Coromandel, Malabar).
 1865. *Harpodon nehereus*, Day, *Fish. Malabar*, p. 201 (Malabar).
 1877. *Harpodon neherus*, Day, *Fish. India*, p. 505, pl. cxviii, fig. 1 (from Zanzibar to China, Seas and estuaries of India most Common at Bombay but decreasing in number down the Malabar Coast. It is not very common at Madras and estuaries of Bengal and Burmah).
 1889. *Harpodon nehereus*, Day, *Faun. Brit. Ind. Fish.* I, p. 412.
 1907. *Harpodon nehereus*, Lloyd, *Rec. Ind. Mus.* I, p. 223 (Akyab).

1910. *Harpodon nehereus*, De, *Rep. Fish. Eastern Bengal & Assam*, p. 26 (Chittagong, Noakhali).
 1911. *Harpodon nehereus*, Gupta, *Coll. Papers Fish. Surv. Bengal*, pp. 2, 6 (Sandheads).
 1912. *Harpodon nehereus*, Jenkins, *Rec. Ind. Mus.* VII, p. 58 (Arakan Coast).
 1913. *Harpodon nehereus*, Weber & de Beaufort, *Fish. Indo-Austral Archipel.* II, p. 151, fig. 57.
 1915. *Harpodon nehereus*, Southwell, *Rec. Ind. Mus.* XI, p. 311 (Diamond Harbour).
 1916. *Harpodon nehereus*, Govindan, *Madras Fish. Bull.* IX, p. 115 (East Coast).
 1917. *Harpodon nehereus*, Kemp, *Rec. Ind. Mus.* XIII, p. 234 (Matlah river).
 1922. *Harpodon nehereus*, Moses, *Madras Fish. Bull.* XV, p. 161 (Madras).
 1923. *Harpodon nehereus*, Hefford, *Rep. "William Carrick"* p. 31 (Bombay).
 1932. *Harpodon nehereus* Setna, *Journ. Bombay Nat. Hist. Soc.* XXXV, p. 867 (Bombay).
 1933. *Harpodon nehereus*, Sorley, *Marine Fish. Bombay Presidency*, p. 161 (Bombay).
 1934. *Harpodon nehereus*, Hora, *Journ. Bombay Nat. Hist. Soc.* XXXVII, p. 640.
 1937. *Harpodon nehereus*, Awati & Pinto, *Journ. Univ. Bombay.* V, p. 74 (Bombay).

Distribution.—Zanzibar, India, Burma, Malaya, Malay Archipelago, China.

Harpodon squamosus Alc.

1891. *Harpodon squamosus*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 127. (type locality : Bay of Bengal, 240-276 fms., type is in the Zoological Survey of India).
 1899. *Harpodon squamosus*, Alcock, *Cat. Ind. Deep. Sea Fish.*, p. 154 (Bay of Bengal).
 1900. *Harpodon squamosus*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxx, fig. 1.
 1906. *Harpodon squamosus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 379 (Bay of Bengal).

Distribution.—Bay of Bengal.

Genus **Saurida** Cuvier & Valenciennes.

1949. *Saurida* Cuvier & Valenciennes, *Hist. Nat. Poiss.* XXII, p. 499. (Type, *Salmo tumbil* Bl., logotypic).

Saurida gracilis (Q. & G.).

1824. *Saurus gracilis*, Quoy & Gaimard, *Voy "Uranie" Zool.*, p. 224 (type locality : Hawaiian Is., Mauritius).
 1877. *Saurida nebulosa*, Day, *Fish. India*, p. 505 (from the Red Sea, Madagascar and the coasts of Zanzibar, to the Mauritius, through the seas of India to the Malay Archipelago and beyond).
 1889. *Saurida nebulosa*, Day, *Faun. Brit. Ind. Fish.* I, p. 411, fig. 131.
 1913. *Saurida gracilis*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 143, fig. 53.
 1935. *Saurida gracilis*, Norman, *Proc. Zool. Soc. London*, p. 127 (Andamans ; Maldives).
 1941. *Saurida gracilis*, Herre, *Mem. Ind. Mus.* XIII, p. 340 (Andamans).

Distribution.—Red Sea, East Coast of Africa, Madagascar, Mauritius, Maldives, India, Andamans, Malay Archipelago, Philippines, Polynesia, Micronesia, Hawaii.

Saurida longimanus Norman.

1939. *Saurida longimanus*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 23 (type locality : Gulf of Oman, 25°35'N., 56°42'18"E., 106m., holotype is in the British Museum).

Distribution.—Gulf of Oman.

Saurida tumbil (Bl.).

1795. *Salmo tumbil*, Bloch, *Ausland Fische* IX, p. 112, pl. occcxxx (type locality; not given).
 1870. *Saurida tumbil*, Day, *Proc. Zool. Soc. London*, p. 699 (Andamans).
 1877. *Saurida tumbil*, Day, *Fish. India*, p. 504, pl. cxvii, fig. 6 (from the Red Sea through the Seas of India to the Malay Archipelago, China and Japan).
 1889. *Saurida tumbil*, Day, *Faun. Brit. Ind. Fish.* I, p. 410, fig. 131.
 1913. *Saurida tumbil*, Weber & de Beaufort, *Fish. Indo—Austral. Archipel.* II, p. 142.
 1922. *Saurida tumbil*, Moses, *Madras Fish. Bull.* XV, p. 159 (Madras).
 1923. *Saurida tumbil*, Hefford, *Rep. "William Carrick"*, p. 31 (Bombay).
 1933. *Saurida tumbil*, Deraniyagala, *Ceylon Journ. Sci.* (C) V, p. 89 (Ceylon).
 1933. *Saurida tumbil*, Sorley, *Marine Fish. Bombay Presidency*, p. 161 (Bombay).
 1935. *Saurida tumbil*, Norman, *Proc. Zool. Soc. London*, p. 129 (Karachi, Madras).
 1941. *Saurida tumbil*, Herre, *Mem. Ind. Mus.* XIII, p. 341 (Andamans).

Distribution.—Red Sea, Madagascar, Zanzibar, India, Andamans, Ceylon, Malay Archipelago, Philippines, Formosa, China, Japan, Australia, Sandwich Islands.

Saurida undosquamis (Rich.).

1848. *Saurus undosquamis*, Richardson, *Zool. "Erabus" and "Terror" Fish.* p. 138, pl. li, figs. 1-6 (type locality: N. W. Australia; type is in the British Museum).
 1935. *Saurida undosquamis*, Norman, *Proc. Zool. Soc. London*, p. 131 (Maldives; River Hooghly).
 1939. *Saurida undosquamis*, Norman, *Sci. Rep. John Murray Exped.* VIII, p. 23 (Gulf of Oman).

Distribution.—Red Sea, Gulf of Aden, East Africa, Zanzibar, Gulf of Oman, Maldives, India, Singapore, Australia, Japan.

Genus Synodus Scopoli.

1763. *Synodus Gronovius*, *Zooph.* I, p. 112. (Type, *Esox synodus* L., genotypic; inadmissible, according to opinion 89 of the International Commission of Zoological Nomenclature).
 1777. *Synodus Scopoli*, *Introd. Nat. Hist.*, p. 447. (Type, *Esox synodus* L., genotypic).
 1817. *Saurus Cuvier*, *Régne Animal* II, ed. 1, p. 169. (Type, *Salmo saurus* L., tautotypic).

Synodus indicus (Day.).

1873. *Saurus indicus*, Day, *Journ. Linn. Soc. Zool.* XI, p. 526 (type locality: Madras; lectotype is in the Zoological Survey of India).
 1877. *Saurus Indicus*, Day, *Fish. India*, p. 503, pl. cxvii, fig. 4 (Madras).
 1889. *Saurus indicus*, Day, *Faun. Brit. Ind. Fish.* I, p. 409 (Madras).
 1935. *Synodus indicus*, Norman, *Proc. Zool. Soc. London*, p. 114 (Madras).

Distribution.—South East Africa, India.

Synodus variegatus (Lac.).

1803. *Salmo variegatus*, Lacépède, *Hist. Nat. Poiss.* V, p. 157 pl. iii, fig. 3 (type locality: not given).
 1913. *Saurus variegatus*, Weber & de Beaufort, *Fish. Indo—Austral. Archipel.* II, p. 147.
 1935. *Synodus variegatus*, Norman, *Proc. Zool. Soc. London*, p. 106 (Maldives; Andamans).

Distribution.—Natal Coast, Zanzibar, Madagascar, Mauritius, Arabia, Gulf of Aden, Maldives, Andamans, Malay Archipelago China, Japan, Bismarck Archipelago.

Genus **Trachinocephalus** Gill.

1861. *Trachinocephalus* Gill, *Proc. Acad. Nat. Sci. Philad. Suppl.*, p. 53. (Type, *Salmo myops* Bl. Schn. genotypic).
 1897. *Goodella* Ogilby, *Proc. Linn. Soc. N.S. Wales XXII*, p. 249. (Type, *Goodella hypozona* Ogilby, genotypic).

Trachinocephalus myops (Bl. & Schn.).

1801. *Salmo myops*, Bloch & Schneider, *Syst. Ichth.*, p. 421 (type locality: St. Helena).
 1877. *Saurus myops*, Day, *Fish. India*, p. 504, pl. cxvii, fig. 5 (Seas of India to the Malay Archipelago and the tropical portion of the Atlantic and Pacific oceans).
 1889. *Saurus myops*, Day, *Faun. Brit. Ind. Fish. I*, p. 409, fig. 130.
 1913. *Saurus myops*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel. II*, p. 145.
 1929. *Saurus myops*, Pillay, *Journ. Bombay Nat. Hist. Soc. XXXIII*, p. 360 (Travancore).
 1935. *Trachinocephalus myops*, Norman, *Proc. Zool. Soc. London*, p. 122 (Indian Seas).

Distribution.—Natal, India, Malay Archipelago, Philippines, Formosa, China, Japan, Oceania.

Family SCOPELARCHIDAE.

Genus **Scopelarchus** Alcock.

1896. *Scopelarchus* Alcock, *Journ. As. Soc. Bengal LXV*, p. 306. (Type, *Scopelarchus guentheri* Alc., orthotypic.)

Scopelarchus guentheri Alc.

1896. *Scopelarchus Guentheri*, Alcock, *Journ. As. Soc. Bengal LXV*, p. 307 (type locality : off the Indus Delta, 947 fms., type is in the Zoological Survey of India).
 1897. *Scopelarchus guentheri*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xvii, fig. 7.
 1899. *Scopelarchus Guentheri*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 153.

Distribution.—India.

Family EVERMANNELLIDAE.

Genus **Evermannella** Fowler.

1838. *Odontostomus* (nec Beck, 1837) Cocco, *N. Ann., Sci. Nat. Bologna II*, p. 192, as *Odontostomus* on p. 194. (Type, *O. hyalinus* Cocco, orthotypic.)
 1901. *Evermannella* Fowler, *Proc. Acad. Nat. Sci. Philad.*, p. 211. (Type, *Odontostomus hyalinus* Cocco, orthotypic.)

Evermannella atratus (Alc.).

1893. *Odontostomus atratus*, Alcock, *Journ. As. Soc. Bengal LXII*, p. 182, pl. ix, fig. 4 (type locality : Bay of Bengal, 573 fms., type is in the Zoological Survey of India).
 1896. *Odontostomus atratus*, Alcock, *Journ. As. Soc. Bengal LXV*, p. 333 (Bay of Bengal, 573 fms.).
 1899. *Odontostomus atratus* Alcock, *Cat. Ind. Deep Sea Fish.*, p. 167 (Bay of Bengal, 573 fms., Andaman Sea, 370-419 fms.).
 1900. *Odontostomus atratus*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xxxiii, fig. 3.
 1906. *Evermannella atratus*, Brauer, "Valdivia" *Tiefsee Fische XV*, p. 136, pl. x, figs. 3, 4.

Distribution.—Chagos Archipelago, Bay of Bengal.

Family SUDIDAE.

Genus **Chlorophthalmus** Bonaparte.

- 1832-41. *Chlorophthalmus* Bonaparte, *Icongr. Faun. Ital.* III, fasc. 28, p. 144.
(Type, *Chlorophthalmus agassizi* Bonaparte.)

Chlorophthalmus agassizi Bonap.

- 1832-41. *Chlorophthalmus agassizi*, Bonaparte, *Icongr. Faun. Ital.* III, fasc. 28, p. 144 (type locality : Mediterranean).
1894. *Chlorophthalmus corniger*, Alcock, *Journ. As. Soc. Bengal* LXIII, p. 133, pl. vi, fig. 5 (type locality : Bay of Bengal, 11½ miles S. 83°W. of Colombo Lt., 26½-250 fms. ; type is in the Zoological Survey of India).
1895. *Chlorophthalmus corniger*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xv, fig. 8.
1896. *Chlorophthalmus corniger*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (Bay of Bengal, 145-250 fms.).
1899. *Chlorophthalmus corniger*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 155 (Bay of Bengal, off Madras coast, 145-250 fms.).
1906. *Chlorophthalmus corniger*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 145.
1913. *Chlorophthalmus corniger*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 178 (west coast of Sumatra).
1928. *Chlorophthalmus agassizi*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 19.
1939. *Chlorophthalmus agassizi*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 24.

Distribution.—Mediterranean, N.E. Coast of Africa, Ceylon, Bay of Bengal, West Coast of Sumatra, Hawaiian Is.

Genus **Bathypterois** Günther.

1878. *Bathypterois* Günther, *Ann. Mag. Nat. Hist.* (5) II, p. 183. (Type, *Bathypterois longifilis* Gthr., orthotypic.)

Bathypterois atricolor Alc.

1896. *Bathypterois atricolor* Alcock, *Journ. As. Soc. Bengal* LXV, p. 306 (type locality : Laccadive Sea, 891 fms. ; type is in the Zoological Survey of India).
1897. *Bathypterois atricolor*, Alcock, *Ill. Zool. Investig. Fish.*, pl. xvii, fig. 6.
1898. *Bathypterois atricolor*, Alcock, *Ann. Mag. Nat. Hist.* (7) II, p. 146 (off Laccadives, 891 fms., off Maldives, 459 fms., off Cape Camorin, 824 fms.).
1899. *Bathypterois atricolor*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 159.

Distribution.—India.

Bathypterois guentheri Alc.

1889. *Bathypterois Guentheri*, Alcock, *Ann. Mag. Nat. Hist.* (6) IV, p. 450 (type locality : Andaman Sea, 7½ miles east of N. Cinque I., 490 fms. ; type is in the Zoological Survey of India).
1891. *Bathypterois Guentheri*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 129 (Bay of Bengal, 561 fms.).
1892. *Bathypterois Guentheri*, Alcock, *Ill. Zool. Investig. Fish.*, pl. vii, fig. 6.
1896. *Bathypterois guentheri*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 332 (off coast of Andaman Is., 490-561 fms.).
1899. *Bathypterois Guentheri*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 157 (Andaman Sea, 490 fms., Arabian Sea, off the Laccadives and Maldives, 636, 719 fms.).
1906. *Bathypterois Guentheri*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 380.
1928. *Bathypterois guentheri*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 25.

Distribution.—Arabian Sea, Bay of Bengal.

Bathypterois insularum Alc.

1892. *Bathypterois insularum*, Alcock, *Ann. Mag. Nat. Hist.* (6) X, p. 356 (type locality : Arabian Sea, 14°35'15"N., 70°2'37"E., 1140 fms. ; type is in the Zoological Survey of India).
 1896. *Bathypterois insularum*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 33 (Laccadive Sea, 1,140 fms.).
 1899. *Bathypterois insularum*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 158 (Arabian Sea, off the Laccadive Is., 1,140 fms.).
 1928. *Bathypterois insularum*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 27.

Distribution.—Coast of S. Africa, Laccadive Is.

Family OMOSUDIDAE.

Genus **Omosudis** Günther.

1887. *Omosudis* Günther, *Rep. Deep Sea Fish.* "Challenger" XXII, p. 201. (Type, *Omosudis lowi* Gthr., orthotypic.)

Omosudis elongatus Br.

1906. *Omosudis elongatus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 140, fig. 68 (type locality : Gulf of Guinea ; Bay of Bengal ; South of Ceylon).

Distribution.—Atlantic Ocean, South of Ceylon, Bay of Bengal.

Family SCOPELIDAE.

Genus **Myctophum** Rafinesque.

1810. *Myctophum* Rafinesque, *Indice d' Ittiologia Siciliana Messina*, p. 56. (Type, *Myctophum punctatum* Raf.)

Myctophum coccoi (Cocco).

1829. *Scopelus coccoi*, Cocco, *Giorn. Sci. per la Sicilia* VII, p. 143 (type locality : Mediterranean).
 1906. *M. (Myctophum) Coccoi*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 199, figs. 116-120 (Bay of Bengal).
 1913. *Myctophum coccoi*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 158.
 1928. *Myctophum coccoi*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 61.

Distribution.—Atlantic ocean, Mediterranean, Bay of Bengal, Indian and Pacific waters.

Myctophum fibulatum Gilbert & Cramer.

1897. *Myctophum fibulatum*, Gibbert & Cramer, *Proc. U.S. Nat. Mus.*, p. 411, pl. xxxviii, fig. 3 (type locality : 12°13'N., 157°43'37"E. ; type is in the United States National Museum).
 1939. *Myctophum fibulatum*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 28 (Arabian Sea, 23°2'48"N., 64°31'54"E.).

Distribution.—Atlantic Ocean, Arabian Sea, Pacific Ocean.

Myctophum indicus Day.

1878. *Scopelus Indicus*, Day, *Fish. India*, p. 507, pl. cxviii, fig. 2 (type locality : Vizagapatam ; it would belong to sub-genus *Myctophum*).
 1889. *Scopelus indicus*, Day, *Faun. Brit. Ind. Fish.* I p. 413, fig. 133.
 1899. *Myctophum indicus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 161.
 1928. *Myctophum indicus*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 53.

Distribution.—India.

Myctophum laternatum Garm.

1899. *Myctophum laternatum*, Garman, *Mem. Mus. Comp. Zool.* XXIV, p. 267, pl. lvi, fig. 1 (type locality : 10°14'N., 96°28'W., surface to 200 fms.).
 1906. *M. (Myctophum) laternatum*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 178, figs. 89-91 (Bay of Bengal).

1928. *Myctophum laternatum*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 67.

1939. *Myctophum laternatum*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 29 (Arabian Sea, 12°8'6"N., 63°4'36"E.).

Distribution.—Gulf of Panama, Gulf of Guinea, Gulf of Aden, N.E. Coast of Africa, Arabian Sea, between Chagos Archipelago and Ceylon, Bay of Bengal, West Coast of Central America.

Myctophum pterotus Alc.

1890. *Scopelus (Myctophum) pterotus*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 217 (type locality : Bay of Bengal, 18°30'N., 84°46'E., 98-102 fms.; type is in the Zoological Survey of India).

1894. *Scopelus pterotus*, Alcock, *Ill. Zool. Investig. Fish.*, pl. ix, fig. 3.

1896. *Scopelus (Myctophum) pterotus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (off Madras coast, 98-102 fms.).

1899. *Scopelus pterotus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 162 (Bay of Bengal, 98-102 fms., Andaman Sea, 370-419 fms.).

1906. *M. (Myctophum) pterotum*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 182, fig. 94 nec fig. 93.

1939. *Myctophum pterotum*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 28 (Arabian Sea, 23°2'48"N., 64°31'54"E.).

Distribution.—Atlantic (?), Arabian Sea, Bay of Bengal, Sandwich Is. Norman (*loc. cit.*) writes "This species has been so frequently confused with *M. fibulatum* Gilbert and Cramer that it is difficult to ascertain the range of its distribution.

Myctophum reinhardti (Lütken.).

1892. *Scopelus reinhardti*, Lütken, *Spolia Atlantica Scopelini*, p. 257, fig. 16 (type locality : Madeira, 34°22'N., 18°10'W.).

1939. *Myctophum reinhardti*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 29 (Arabian Sea, 12°8'6"N., 63°4'36"E.).

Distribution.—Madeira, Canaries I., Gulf of Guinea, S. W. Africa, N. E. Africa, Gulf of Aden, Arabian Sea.

Myctophum spinosum (Steind.).

1867. *Scopelus spinosus*, Steindachner, *Ichth. Notizen V. Sitzber. Akad. Wien* LV, p. 711, pl. iii, fig. 4.

1906. *M. (Myctophum) spinosum*, Brauer, "Valdivia" *Tiefsee Fische*, XV, p. 196, figs. 113, 114 (Bay of Bengal).

1913. *Myctophum spinosum*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 163.

1928. *Myctophum spinosum*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 63.

Distribution.—Atlantic Ocean, Indian Ocean, Bay of Bengal, Pacific Ocean.

Myctophum valdiviae Br.

1904. *Myctophum Valdiviae*, Brauer, *Zool. Anz.* XXVIII, p. 398, fig. 6 (type locality : Atlantic and Indian Oceans).

1906. *M. (Myctophum) Valdiviae*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 206, fig. 127 (Bay of Bengal, 7°43'2"N., 88°44'9"E.).

1928. *Myctophum valdiviae*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 57.

Distribution.—Atlantic Ocean, Indian Ocean, Bay of Bengal, Pacific Ocean.

Genus **Lampanyctus** Bonaparte.

1840. *Lampanyctus* Bonaparte, *Faun. Ital.* pt. 27, fasc. 138. (Type, *Nyctophus bonapartii* Cocco, orthotypic.)

Lampanyctus gemmifer G. B.

1895. *Lampanyctus gemmifer*, Goode & Bean, *Ocean, Ichth.* LXXXI, fig. 88 (type locality : Grand Banks, 39°39'45" N., 71°35'15" W.).

1906. *M. (Lampanyctus) gemmifer*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 246, fig. 163.

Distribution.—Atlantic Ocean, Arabian Sea, 947 fms. (Marine Survey).

Lampanyctus longipes Br.

1906. *M. (Lampanyctus) longipes*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 236, fig. 155 (type locality : Madeira, 31°59'3"N., 15°5'W., Gulf of Guinea ; Cocos I., Bay of Bengal ; Seychelles).

1928. *Lampanyctus longipes*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 82.

Distribution.—Madeira, Gulf of Guinea, Seychelles, Chagos Archipelago, Bay of Bengal, Cocos Is.

Lampanyctus macropterus Br.

1904. *M. (Lampanyctus) macropterus*, Brauer, *Zool. Anz.* XXVIII, p. 404, fig. 5 (type locality : Indian Ocean).

1906. *M. (Lampanyctus) macropterus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 249, figs. 166, 167 (South of Ceylon, 4°56'N., 78°15'3"E., Bay of Bengal).

1928. *Lampanyctus macropterus*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 88.

1939. *Lampanyctus macropterus*, Norman, *Sci. Rep. John. Murray Exped.* VII, p. 29 (Arabian Sea, 12°8'6"N., 63°4'36"E.).

Distribution.—N.E. Coast of Africa, Gulf of Aden, Arabian Sea, Chagos Archipelago, South of Ceylon, Bay of Bengal, Cocos Is.

Lampanyctus micropterus Br.

1906. *M. (Lampanyctus) micropterus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 239, fig. 157 (type locality : Gulf of Guinea, 0°26'3"N., 6°32'W.).

1928. *Lampanyctus micropterus*, Parr, *Bull. Bingham Ocean. Coll.* III, p. 85 (Atlantic and Indian Oceans.)

Distribution.—Gulf of Guinea, West Coast of Sumatra.

Lampanyctus pyrsobolus (Alc).

1890. *Scopelus pyrsobolus*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 218, pl. viii fig. 3 (type locality : Bay of Bengal, 15°38'N., 82°30'E., 690–920 fms. type is in the Zoological Survey of India).

1896. *Scopelus pyrsobolus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (off Madras coast, 690–920 fms).

1899. *Scopelus pyrsobolus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 163 (Bay of Bengal, 690–920 fms).

1900. *Scopelus pyrsobolus*, Alcock, *Ill. Ind. Zool. Investig. Fish.*, pl. xxx, fig. 3.

Distribution.—Bay of Bengal.

Genus Diaphus Eigenmann and Eigenmann.

1891. *Diaphus* Eigenmann and Eigenmann, *Proc. Calif. Acad. Sci.* (2) III, p. 3. (Type, *Diaphus theta* Eig. Eig., orthotypic).

Diaphus coeruleus (Klunz.).

1871. *Scopelus coeruleus*, Klunzinger, *Verh. zool. bot. Ges. Wien* XXI, p. 592 (type locality : Kossair, Red Sea ; type is in the Berlin Museum).

1891. *Scopelus engraulis*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 129 (Andaman Sea, 188–220 fms.).

1896. *Scopelus engraulis*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (Andaman Sea, 188-220 fms.).
 1899 *Scopelus engraulis*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 161.
 1913. *Myctophum caeruleus*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 163, fig. 65 b.
 1928. *Diaphus coeruleus*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 122.
 1941. *Diaphus coeruleus*, Herre, *Mem. Ind. Mus.* XIII, p. 341.

Distribution.—Red Sea, Andaman Sea, West Coast of Sumatra, Celebes Sea, Philippines.

Diaphus dumerili (Blkr.).

1836. *Scopelus Dumerili*, Bleeker, *Act. Soc. Sci. Ind. Neerl.* (Manado) I, p. 66 (type locality : Manado, Celebes).
 1899. *Scopelus Dumerili*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 162 (off the Malabar Coast, 172 fms.).
 1913. *Myctophum dumerili*, Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 166.

Distribution.—India, Celebes, Hawaii, Tropical Atlantic Ocean.

***Diaphus garmani** Gilb.

1906. *Diaphus garmani*, Gilbert, *Bull. Mus. Comp. Zool. Harvard* XLVI, No. 14, p. 258, pl. ii (type locality : Cuba).
 1939. *Diaphus garmani*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 30 (Arabian Sea, 23°3'48"N., 64°31'54"E.).

Distribution.—West Indies, Arabian Sea (?).

Norman (*loc. cit.*) writes " These small specimens are very doubtfully referred to this species "

***Diaphus lutkeni** (Br.).

1904. *M. (Myctophum) Lutkeni*, Brauer, *Zool. Anz.* XXVIII, p. 400 (type locality : Indian Ocean).
 1939. *Diaphus lutkeni*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 30 (Arabian Sea, 10°54'42"N. 61°20'54"E.).

Distribution.—N. E. Coast of Africa, Zanzibar, Chagos I., Arabian Sea.

***Diaphus rafinesquei** (Cocco).

1838. *Nyctophus Rafinesquei*, Cocco, *N. Ann. Sci. Nat. Bologna* II, p. 20, pl. iii, fig. 7 (type locality : Mediterranean).
 1906. *M. (Diaphus) Rafinesquei*, Brauer, " Valdivia " *Tiefsee Fische* XV, p. 223, figs. 144, 145.
 1939. *Diaphus rafinesquei*, Norman, *Sci. Rep. John. Murray Exped.* VII, p. 30 (Arabian Sea, 23°2'48"N., 64°31'54"E.).

Distribution.—Atlantic, Mediterranean, Gulf of Aden, Arabian Sea Pacific Ocean.

Diaphus splendidum (Br.).

1904. *Myctophum (Nyctophus) splendidum*, Brauer, *Zool. Anz.* XXVIII, p. 399, fig. 7 (type locality : Atlantic and Indian Oceans).
 1906. *M. (Diaphus) splendidum*, Brauer, " Valdivia " *Tiefsee Fische* XV, p. 218, figs. 138, 139 (Bay of Bengal).
 1939. *Diaphus splendidum*, Norman, *Sci. Rep. John. Murray Exped.* VII, p. 31 (Maldives).

Distribution.—Gulf of Guinea, N. Coast of Africa, Mauritius, Seychelles, Maldive area, Bay of Bengal, West Coast of Sumatra.

Genus Neoscopelus Johnson.

1863. *Neoscopelus* Johnson, *Proc. Zool. Soc. London*, p. 44. (Type, *Neoscopelus macrolepidotus* Johnson, orthotypic.)

Neoscopelus macrolepidotus Johnson.

1863. *Neoscopelus macrolepidotus*, Johnson, *Proc. Zool. Soc. London*. p. 44, pl. vii (type locality : Madeira ; type is in the British Museum).
 1891. *Neoscopelus macrolepidotus*, Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 129 (Andamans, 188-220 fms.).
 1896. *Neoscopelus macrolepidotus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 333 (Andaman Sea, 188-220 fms.).
 1899. *Neoscopelus macrolepidotus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 164 (Andaman Sea, 188-405 fms., Arabian Sea, off Travancore Coast, 360 fms.).
 1906. *Neoscopelus macrolepidotus*, Brauer, "Valdivia" *Tiefsee Fische* XV, p. 147 pl. xi, figs. 2, 3, test-figs. 72-76.
 1913. *Neoscopelus macrolepidotus* Weber & de Beaufort, *Fish. Indo-Austral. Archipel.* II, p. 174, fig. 67.
 1939. *Neoscopelus macrolepidotus*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 28 (Maldivé area).
 1941. *Neoscopelus macrolepidotus*, Herre, *Mem. Ind. Mus.* XIII, p. 341 (Andamans).

Distribution.—Madeira, West Indies, Coast of Morocco, Arabian Sea, Maldivé area, Andamans, West Coast of Sumatra, Malay Archipelago, New Zealand, Sandwich Is.

Genus **Scopelengys** Alcock.

1890. *Scopelengys* Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 302. (Type, *Scopelengys tristis* Alc., orthotypic).

Scopelengys tristis Alc.

1890. *Scopelengys tristis*, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 303 (type locality : Laccadive Sea, 11°12'47"N., 74°25'30"E., 1000 fms.; type is in the Zoological Survey of India.)
 1892. *Scopelengys tristis*, Alcock, *Ill. Zool. Investig. Fish.*, pl. vii, fig. 7.
 1899. *Scopelengys tristis*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 166 (Arabian Sea, off the Laccadive Is., 1,000 fms.).
 1928. *Scopelengys tristis*, Parr, *Bull. Bingham Ocean. Coll.* III, art. 3, p. 48.
 1939. *Scopelengys tristis*, Norman, *Sci. Rep. John Murray Exped.* VIII, p. 28 (Arabian Sea, 12°8'6"N., 63°4'36"E.).

Distribution.—Arabian Sea, Laccadive Is., West Coast of Central America.

Order ATELEOPIFORMES (CHONDROBRANCHII).

Family ALELEOPIDAE.

Genus **Podateles** Boulenger.

1846. *Ateleopus* Temminck & Schiegel (*nec Ateleopus* Duméril & Bibron, 1841) *Faun. Japon. Pisc.* IV, p. 255. (Type, *Ateleopus japonicus* Blkr., orthotypic : inadmissible.)
 1902. *Podateles* Boulenger, *Ann. Mag. Nat. Hist.* (7) X, p. 403. (Type, *Ateleopus japonicus* Blkr., orthotypic.)

Podateles indicus (Wood-Mason & Alcock).

1891. *Ateleopus indicus*, Wood-Mason & Alcock, *Ann. Mag. Nat. Hist.* (6) VIII, p. 123, fig. 3 (type locality : Andaman Sea, 10°31'40"N., 92°46'6"E., 188-220 fms. ; type is in the Zoological Survey of India).
 1892. *Ateleopus indicus*, Alcock, *Ill. Zool. Investig. Fish.*, pl. ii, fig. 2.
 1896. *Ateleopus indicus*, Alcock, *Journ. As. Soc. Bengal* LXV, p. 327.
 1899. *Ateleopus indicus*, Alcock, *Cat. Ind. Deep Sea Fish.*, p. 123 (Andaman Sea, 188-220 fms., Arabian Sea, off Travancore Coast, 224-284 fms.).
 1939. *Ateleopus indicus*, Norman, *Sci. Rep. John Murray Exped.* VII, p. 32 (Maldivé area).

Distribution.—Arabian Sea, Maldivé area, Andaman Sea, Philippines.