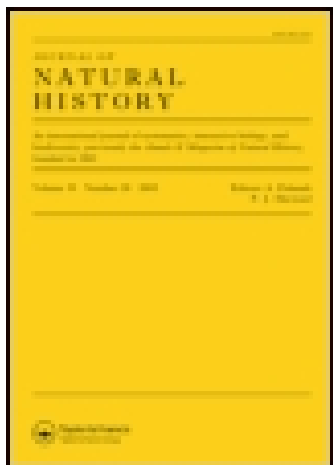


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XXXIV.—Natural history notes from H.M. Indian Marine Survey Steamer 'Investigator', Commander R. F. Hoskyn, R.N., commanding.—No. 18. On the bathybial fishes of the Arabian Sea, obtained during the season 1889-90

A. Alcock M.B.

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XXXIV.—*Natural History Notes from H.M. Indian Marine Survey Steamer 'Investigator,' Commander R. F. Hoskyn, R.N., commanding.*—No. 18. *On the Bathybial Fishes of the Arabian Sea, obtained during the season 1889-90.* By A. ALCOCK, M.B., Surgeon I. M. S., Surgeon-Naturalist to the Survey.

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- § 2. Notes on the Fishes, with Descriptions of new Species.

## § 1. *Sketch of the Hydrography and Zoology of the Dredging Stations.*

THE bathybial fishes which the 'Investigator' has to record from the Arabian Sea number nineteen specimens, of fifteen species, thirteen genera, and six families, all of which were obtained in two hauls of the trawl at the following stations:—

*Station 104.*—11 A.M. to 4 P.M., 3rd May, 1890.

Lat. 11° 12' 47" N., long. 74° 25' 30" E., off the Elicapeni Bank, in the Laccadive Sea. Depth 1000 fathoms. Temperature at the surface 83° Fahr., at the bottom 38°·6 Fahr. Bottom olive mud, with 2·15 per cent. of shells of Foraminifera, chiefly *Globigerina* and *Pulvinulina*.

Besides nine species of fishes, the trawl contained numerous specimens of Sponges (including *Hyalonema* and *Poliopogon?*), Alcyonids, Actinids, Turbinolid Corals (*Caryophyllia*), Echinoids (including *Phormosoma*), Asteroids, Holothuroids (including *Deima*), and Crustaceans (chiefly Penæids).

*Station 105.*—7 A.M. to 12 noon, 5th May, 1890.

Lat. 15° 02' N., long. 72° 34' E., about 75 miles west of the Goa coast, Laccadive Sea. Depth 740 fathoms. Temperature at the surface 83° Fahr., at the bottom 44° Fahr. Bottom coral-mud, with 12 per cent. of Foraminifera shells.

Besides six species of fishes, the haul brought to light a very large number of Crustaceans (Isopods, Penæids, Palæmonids, Crangonids, Homarids, Pagurids, Galatheids and Homolids); Actinids, Turbinolid Corals; Astropectinids, Ophiurids, Echinoids (including *Asthenosoma*), Holothuroids;

and Gastropod and Lamellibranch Mollusks; besides some curious green-coloured *Fucus*-like ova (?) adherent to the last.

By the Laccadive Sea is meant the basin which intervenes between the west coast of India and the parallel series of ridges whose peaks form the bases of the shoals and atolls of the Laccadive Archipelago.

It is a long narrow basin, open to the south and closing in gradually to the north, its boundary here being the Angrias Bank, in lat.  $16^{\circ} 30' N.$  It slopes steeply from east to west, its greatest depths, which are not much over 1100 fathoms, being close to the Laccadive Islands, which individually rise abruptly from the bottom. The nature of the bottom on the Indian side is, as would be expected, determined by detritus from the land; but on the Laccadive side the bottom consists almost entirely of coral-mud, with a variable proportion—from 2 to 12 per cent.—of Foraminifera shells.

## § 2. *Notes on the Fishes, with Descriptions of new Species.*

The bathybial fishes collected in the Laccadive Sea are remarkable for their large size.

At twenty stations in the Bay of Bengal and neighbouring waters the 'Investigator' has taken deep-sea fishes; and on contrasting them with these from the Laccadive Sea, the superior bulk of the latter is strikingly manifest. Among the *Macruri*, comparing mature females, the two specimens from the Laccadive Sea measure respectively 22 and  $19\frac{1}{4}$  inches, and weigh respectively 1.5 and .65 lb.; while the two largest specimens from the Bay of Bengal measure respectively  $14\frac{1}{4}$  and 11 inches, and weigh respectively .23 and .15 lb. The Ophidiids from the Laccadive Sea are also larger and heavier. Again, the longest deep-sea Physostome taken in the Bay of Bengal measures but 16 inches, against the 21 inches of the longest Physostome from the Laccadive Sea; while the average length of the Bay of Bengal specimens of this suborder is under 9 inches, against an average length of nearly 14 inches of the Laccadive Sea specimens.

The occurrence in the deep waters of the Arabian Sea of forms hitherto known from the depths on the one hand of the Mid-Atlantic, and on the other hand of the North Pacific, is a further illustration of the wideness of distribution of true bathybial fishes.

The following is the list of the fishes:—

## Family Ophidiidæ.

## MONOMITOPUS, gen. nov.

Agrees with *Sirembo*, Blkr., as diagnosed by Dr. Günther in the 'Catalogue of Fishes,' vol. iv. p. 373, except that the pseudobranchiæ are rudimentary.

1. *Monomitopus nigripinne*.

*Sirembo nigripinnis*, Alcock, Ann. & Mag. Nat. Hist., Nov. 1889, p. 384.

I described this species from a single, rather mutilated specimen from the Andaman Sea; but with a well-preserved and larger specimen from the Arabian Sea (Station 105) I find that the pseudobranchiæ, instead of being "thick and fleshy," as originally stated, really consist of two small pinnules only, on each side, parts of the opercular muscles having been mistaken for thickened pseudobranchiæ in the first specimen. The complete radial formula is

B. 8. D. 95-100. A. 85-88. C. 8. P. 28. V. 1.

## NEOBYTHITES, Goode &amp; Bean.

2. *Neobythites pterotus*.

*Neobythites pterotus*, Alcock, Ann. & Mag. Nat. Hist. Sept. 1890, p. 210.

A large female specimen,  $11\frac{1}{4}$  inches long, from Station 104, from which I am able to make the following corrections in the original description:—Eight branchiostegals; snout obtusely pointed; basal third of anal fin scaly.

## PARADICROLENE, Alcock.

3. *Paradicrolene Vaillanti*.

*Dicrolene introniger*, Vaillant, nec Goode and Bean; Vaillant, Exp. Sci. 'Travailleur' et 'Talisman,' Poiss. pp. 258-262, pl. xxiii. fig. 2.

From M. Vaillant's most excellent and exhaustive description I have no difficulty in identifying this Ophidiid. But though I can only dissent with diffidence from such an experienced ichthyologist, I cannot concur in his opinion that this fish is identical with *Dicrolene intronigra* of Messrs. Goode and Bean. Apart from numerous minor points of disagreement, the *Dicrolene* type is stated to have only seven branchiostegals.

Our single specimen is a female  $10\frac{1}{2}$  inches long, with the radial formula

B. 8. D. 106. A. 78. C. 6. P. dextra 18/6.  
P. sinistra 18/9. V. 2.

It was taken at Station 105, 740 fathoms.

#### DERMATORUS, gen. nov.

Allied to *Porogadus*, Goode & Bean, and to *Bathyonus*, Gthr.

Body compressed, with long tapering tail. Head with well-developed muciparous cavities and spiniferous bones. Snout depressed, with jaws conterminous in front. Eye of moderate size. Mouth very wide; villiform teeth in bands in the jaws and palatines, few and scattered on the vomer. No barbel. Gill-openings very wide; eight branchiostegals; four gills; well-developed gill-rakers. Pseudobranchiæ quite rudimentary. Scales small, deciduous. Lateral line indistinct. Ventral fins contiguous; each consists of a single simple filament. No pyloric cæca.

#### 4. *Dermatorus trichiurus*, sp. n.

Snout depressed, pointed. Head-bones and opercles with numerous acute spines. Body compressed, elongate, low—its height being from  $\frac{1}{11}$  to  $\frac{1}{12}$  of the total—ending in a long lash-like tail.

B. 8. D.  $160+x$ . A.  $140+x$ . C. ? P. 16 (?). V. 1.

Head symmetrically cuneiform, its muciferous cavities well developed, opening externally by large pores, and bounded by salient spinigerous crests; its length is between  $\frac{1}{6}$  and  $\frac{1}{7}$  of the total, its height a little more than the length of its postorbital portion, its breadth not quite half its length. A strong, acute, erect spine at each anterior orbital angle, and diverging backwards from it, on each side, two irregular rows of acute recumbent spines, the last spines of the rows situated respectively at the exterior occipital and the post-temporal angles; operculum with a strong sharp spine above; preoperculum with a double border, and each border with three rather distant spines radiating from its angle; an obliquely reclining humeral spine.

Snout not overhanging the mouth, depressed, rounded from side to side, its dorsal and ventral profiles meeting at a very acute angle; its length is  $\frac{2}{7}$  that of the head, equal to the

width of the interorbital space, and  $\frac{1}{2}$  greater than the major diameter of the eye.

Eye situated high up, the supraorbital border entering the dorsal profile.

The posterior nostril much larger than the anterior.

Mouth-cleft extremely wide, the maxilla, which is much expanded behind, measuring  $\frac{2}{3}$  of the head-length; jaws continuous, with sharp dentary edges and rudimentary labial folds. Villiform teeth in narrow bands in the jaws and palatines, scattered and obsolescent on the wide V-shaped head of the vomer. Tongue very small, papilliform.

Gill-openings very wide, the membranes entirely free; four gills with narrow laminae; gill-rakers well developed on all the arches, those on the outer side of the first arch, to the number of twenty, very long and bristle-like. The pseudo-branchiae are reduced to two small lamellae on each side.

Small deciduous scales on the body and at least the posterior half of the head; there are apparently twenty rows between the vent and the dorsal fin.

In the fresh state there is a thick subcutaneous layer of mucus, as in *Bathyonus*. Lateral line undistinguishable.

The dorsal fin begins immediately behind the vertical through the gill-opening, the anal immediately behind the vent, which is a head-length distant from the gill-opening. Pectorals narrow, pointed, as long as the rostrorbital portion of the head. The ventrals arise close together, just behind the pectoral symphysis; each consists of a simple filament as long as the postrostral portion of the head.

Stomach siphonal; intestine long (half the total), much coiled; no pyloric caeca. Air-bladder small.

Colours in the fresh state:—Transparent grey; oropharyngo-branchial membrane and parietal peritoneum intense black.

A single female specimen 7 inches long, with the end of the tail missing.

Station 104, 1000 fathoms.

### Family *Macruridae*.

#### *MACRURUS*, Bloch.

##### Subgenus *MACRURUS* (Bloch).

##### 5. *Macrurus Heattii*, sp. n.

B. 6. D.  $\frac{2}{11}$ /110 circ. A. circ. 110. P. 21-22. V. 7.

L. lat. circ. 130. L. tr.  $\frac{1}{29}$  circ.

The length of the head is half that of the entire trunk or  $\frac{1}{5}$

of the total, and just in excess of the greatest height of the body. The tail is rather abruptly constricted; its greatest height, behind the vent, is about  $\frac{3}{4}$  that of the trunk, and behind this it rapidly diminishes.

Snout faintly trihedral; its length is equal to the major diameter of the orbit and to the width of the flattened inter-orbital space at its middle, and all but  $\frac{1}{4}$  of the length of the head.

Nostrils very large, the anterior subtubular in appearance.

Mouth quite inferior; the maxilla almost reaches the vertical through the middle of the orbit. Teeth in broad villiform bands in both jaws, and in the lower an inner row of moderately and in the upper an outer row of considerably enlarged, conical, acute teeth.

Barbel about  $\frac{3}{4}$  as long as the eye.

Gill-membranes broadly united, thick, coriaceous; attachment of first branchial arch to opercle broad.

Body and head, except the glosso-hyal region, covered with rather deciduous spinigerous scales; those on the body uniformly large and deeply imbricating. There are five rows between the first dorsal fin and the lateral line. A scale from the dorsal half of the trunk is  $\frac{1}{4}$  of an inch high by  $\frac{1}{5}$  of an inch broad, with a shallow, triangular, non-imbricate area bearing about twenty-eight close, parallel, longitudinal series of small, equal, close-set, semierect spinelets.

First dorsal spine rudimentary; the second slightly prolonged, its front edge faintly crenulated in its basal, sharply serrated in its distal half. The interval between the first and second dorsal fins is equal to the length of the base of the first, or a little more than the length of the snout. The pectorals measure rather more than half the length of the head. Ventrals with the first ray slightly prolonged, reaching to the origin of the anal.

Stomach siphonal; intestine very long, much coiled. Fourteen or fifteen large long pyloric caeca. Liver large, both lobes almost equally developed. An air-bladder.

Colours in the fresh state:—Chocolate, with blackish fins; oro-pharyngo-branchial membrane and parietal peritoneum black.

One specimen—a female with gravid ovaries—measuring 22 inches in length and weighing (after preservation in spirit)  $1\frac{1}{2}$  pound.

Station 104, 1000 fathoms.



6. *Macrurus Wood-Masoni*, sp. n.

B. 6. D.  $\frac{2}{3}$ /100 circ. A. circ. 105. P. 21. V. 8.

L. lat. circ. 130. L. tr.  $\frac{4}{11}$  circ.

The length of the head is nearly  $\frac{2}{3}$  that of the entire trunk, or between  $4\frac{1}{2}$  and  $4\frac{2}{3}$  in the total. The greatest height of the body is not quite  $\frac{3}{4}$  the length of the head. The tail is long and tapering.

Snout trihedral, with strong median and lateral tubercles; its length slightly exceeds the major diameter of the orbit, which is almost  $\frac{1}{4}$  the head-length.

The width of the interorbital space in the middle is equal to the vertical diameter of the orbit.

Mouth completely inferior; the maxilla reaches a short distance behind the vertical from the anterior border of the orbit. Small conical acute teeth in broad bands in both jaws.

Barbel a small papilla, not equal in length to the vertical diameter of the posterior nostril.

Gill-membranes broadly united.

Body and head, except the glosso-hyal region, covered with rather deciduous spinigerous scales; those on the body of a uniform size and deeply imbricate. There are four and a half rows between the first dorsal fin and the lateral line. A scale from the dorsal half of the trunk is  $\frac{1}{4}$  of an inch high by  $\frac{1}{5}$  of an inch broad, and bears about twenty short, longitudinal, parallel series of small, equal, semierect spinelets.

First dorsal spine rudimentary; the second with numerous close-set recumbent barbs along its front edge. The interval between the first and second dorsal fins is double the length of the base of the first, or equal to the length of the post-orbital portion of the head. Ventrals with the outer ray slightly prolonged, reaching to the origin of the anal.

Stomach siphonal; the much-coiled intestine measures considerably more than the entire fish in length; eleven or twelve long large pyloric cæca. A large spongy air-bladder.

Colours in the fresh state:—Chocolate, with blackish fins; oro-pharyngo-branchial membrane and parietal peritoneum black.

One specimen—a female with gravid ovaries—measuring  $19\frac{1}{4}$  inches in length.

Station 104, 1000 fathoms.

## BATHYGADUS, Gthr.

7. *Bathygadus longifilis*, Goode & Bean.

*Bathygadus longifilis*, Goode & Bean, Proc. U. S. Nat. Mus. viii. p. 599;  
Günther, Zool. 'Challenger' Exp. xxii. p. 157.

*Hymenocephalus longifilis*, Vaillant, Exp. Sci. 'Travailleur' et 'Talisman,' Poiss. pp. 218-221, pl. xxiii. fig. 1.

A large female specimen,  $11\frac{3}{4}$  inches long, with gravid ovaries.

It has the radio-squamal formula

B. 7. D. 11 140 circ. P. 15. V. 8.

L. lat. circ. 150. L. tr. circ. 25 through vent.

The fourth branchial cleft exists, though it is not apparently functional. The stomach is siphonal; the intestine coiled, with about twenty-two large long pyloric cæca. The liver and spleen are very large, and the air-bladder is well-developed.

A smaller male (?) specimen, 8 inches long, with the same radio-squamal formula and with the barbel measuring more than  $\frac{2}{3}$  the length of the head.

Station 105, 740 fathoms.

## PHYSOSTOMI.

## Family Scopelidæ.

## SCOPELENGYS, gen. nov.

Apparently nearly allied to *Scopelus*, Gthr., and to *Nanobranchium*, Gthr.; but as the single specimen for which the generic distinction is claimed is entirely denuded of its integuments down to the muscles, its exact position among the Scopelidæ cannot be accurately defined at present.

Head and body compressed. Eye small. Mouth very wide; the maxilla dilated behind. Acute villiform teeth, in bands uncovered by the lips in the jaws, and in the palatines and vomer. Gill-openings very wide; gill-covers complete. Pseudobranchiæ rudimentary. Dorsal fin near the middle of the body, short; an adipose dorsal. Anal fin short. Caudal forked. Pectorals well developed. Ventrals with eight rays. [Scales, if present, very deciduous.] No air-bladder. Pyloric cæca present in moderate number.

8. *Scopelengys tristis*, sp. n.

B. 8. D. 12. A. 13. P. 15. V. 8.

Head and body rather elongate, compressed. Eye situated high up, very small; its major diameter is a little more than  $\frac{1}{3}$  the length of the snout, which is about  $\frac{1}{3}$  the length of the head, which is not quite  $\frac{1}{2}$  the total without the caudal. Mouth wide, its cleft very oblique, approaching the vertical, with the lower jaw projecting in repose; the maxilla, which is widely dilated behind, measures more than half the length of the head; the premaxilla is a stout bone, firmly attached to the maxilla, which it equals in length. Acute villiform teeth, in rather broad bands uncovered by the lips in the premaxillæ and mandible, in narrow bands in the palatines, and in a small patch on each side of the head of the vomer; no teeth on the tongue.

Gill-openings very wide; gill-covers complete; long close-set gill-rakers on the first arch. Pseudobranchiæ rudimentary, consisting of three or four small lamellæ on each side.

The dorsal fin begins above the origin of the ventrals; the whole fin is included in the anterior half of the body measured with the caudal. Adipose dorsal rather large, fimbriated. The anal fin begins a little more than a snout-length behind the posterior limit of the dorsal. Caudal forked. Pectorals entire, about as long as the maxilla, and reaching just beyond the origin of the ventrals; they arise close to the ventral profile.

Eight large pyloric cæca. No air-bladder.

Colours in the fresh state apparently uniform black throughout.

One specimen,  $6\frac{3}{4}$  inches in length.

Station 104, 1000 fathoms.

## Family Alepocephalidæ.

## BATHYTROCTES, Gthr.

9. *Bathytroctes squamosus*, sp. n.

Snout short. Eye very large. The entire head uniform intense black; apparently some scales on the opercles.

B. 7. D. 17 (18). A. 17 (18). C. circ. 35. P. 10.

V. 9. L. lat. circ. 50. L. tr.  $\frac{5}{9}$ .

Head with its ventral profile almost horizontal, its dorsal

profile forming a continuous curve synchronous with an arc of a circle of  $56^\circ$ ; its length is  $3\frac{5}{6}$  in the total measured without the caudal, and just over the greatest height of the body. Snout with the tip formed by a prominent knob at the symphysis of the lower jaw; its length, including the mandibular element, is less than its breadth and about  $\frac{2}{3}$  the major diameter of the eye. Nostrils large, situated high up, above the anterior angle of the orbit. Eye very large; its major diameter, which is obliquely ascendant from before backwards, is a little more than  $\frac{1}{3}$  the length of the head; interorbital space gently concave,  $\frac{1}{3}$  that diameter of the eye.

Mouth-cleft wide, approaching the transverse; premaxilla short and slender; the broad maxilla, composed of three longitudinal plates, of which the innermost (uppermost) is movable, reaches just behind the level of the mid-orbit, and includes the mandible in repose, except anteriorly, where the latter strongly projects. Small, even, acute, uniserial teeth, recurved in the premaxillæ, mandible, palatines, and vomer, procurent or procurved in the maxillæ. Tongue large. A row of pores along the limb of the mandible.

Gill-openings very wide, the membranes entirely separate; fourth gill-cleft occluded; gill-rakers long and close-set on the first three arches, longest on the first. Pseudobranchiæ large and coarse. Scales large, deciduous, except on the lateral line, where they are adherent and also perforated or bifid. There are pittings in the skin, which look like scale-folds, on the opercles.

The dorsal fin begins just behind the origin of the ventrals, which are situated in the vertical through the middle of the body measured without the caudal. The anal begins in the vertical through the third dorsal ray. Both these fins have fleshy succulent bases, and the rays increasing in length regularly and steeply to the fourth, and then decreasing as regularly but more gradually to the last. Caudal symmetrically forked. Pectorals long and narrow; their longest rays equal the length of the head behind the anterior nostril, and in repose almost touch the bases of the ventrals. Ventrals broad, reaching slightly beyond the vent.

Stomach large; intestine coiled in a spiral; five or six large pyloric cæca.

Colours in the fresh state:—Head uniform deep black, body pinkish brown, fins transparent grey; oro-pharyngo-branchial membrane and entire peritoneum black.

A heavy female specimen,  $10\frac{1}{4}$  inches long, with gravid ovaries, the mature ova measuring  $\frac{1}{8}$  of an inch in diameter.

Station 105, 740 fathoms.

The stomach contained a large Penæid.

This species differs from all described *Bathytroctes* and from all hitherto known Alepocephalidæ in possessing (apparently) scaly opercles; but, apart from the need of actual demonstration on this point, the affinities are so clearly indicated that one would hardly wish to separate the species from a family still so incompletely known on the ground of this one peculiarity.

#### NARCETES, gen. nov.

Closely allied to *Bathytroctes*, Gthr.

Head naked. Body rather elongate, compressed, covered with scales of moderate size. Eye rather small. Mouth wide; the maxilla extending beyond the vertical through the middle of the orbit. Fine teeth in premaxillæ, maxillæ, mandible, palatines, and vomer, those in the premaxillæ and mandible pluriserial; no teeth on the tongue.

Gill-openings wide; gill-covers complete; seven branchiostegals; four gills, with narrow laminae; gill-rakers long. Pseudobranchiæ present. No adipose dorsal fin. Caudal forked. Pyloric cæca in moderate number. Ovaries with an oviduct.

#### 10. *Narcetes erimelas*, sp. n.

B. 7. D. 15-16. A. 12. C. circ. 35. P. 10-11.

V. 9. L. lat. 68.

Head broad, pyramidal, its length  $3\frac{1}{2}$  to  $3\frac{1}{4}$  in the total without the caudal; body elongate, its greatest height, just behind the gill-opening, about  $5\frac{1}{3}$  in the same standard, and gradually diminishing to the caudal peduncle.

Head-bones sculptured, especially the operculum and preoperculum, both of which have their border augmented by a semimembranous corrugated fringe.

Snout nearly as broad as long, depressed, rounded from side to side, its dorsal and ventral profiles meeting at an acute angle; its length is a little over  $\frac{1}{3}$  that of the head, and more than half as long again as the eye. Nostrils very large.

Eye rather small, its major diameter  $5\frac{2}{3}$  in the head-length, and not quite equal to the width of the deeply concave inter-orbital space.

Mouth wide, oblique; the maxilla reaches conspicuously behind the vertical through the posterior border of the orbit. The premaxilla is a short strong bone; the maxilla is com-

posed of three longitudinal plates, of which the innermost (uppermost) is movable; the mandible is very strong and broad, and its under surface is excavated for a wide mucous channel which opens by six large circular pores on each side.

Teeth small, even, uniform, acute; those in the jaws standing, uncovered by the lips, outside the mouth; those in the premaxillæ and mandible recurved, quadriserial anteriorly, and laterally triserial in the former, biserial in the latter; those in the maxillæ uniserial, procurvent or procurved; those in the palatines uniserial, incurved; those in the vomer recurved, in a group of two or three on each side. Tongue large, toothless.

Gill-openings very wide; gill-membranes entirely separate; gill-covers large, complete; gill-rakers decreasing in size from the first arch to the fourth, those on the first arch being close-set, finely pointed, and as long as the eye; fourth gill-cleft rather wide; gill-laminæ very narrow, the individual lamellæ extremely delicate. Pseudobranchiæ large.

Head naked; body covered with deciduous scales of moderate size. The lateral line runs straight along the middle of the body.

The dorsal fin begins almost in the vertical through the origin of the ventrals, which are situated a snout-length behind the vertical through the middle of the body measured without the caudal. The anal fin begins two rows of scales behind the vertical through the hinder limit of the dorsal.

No adipose dorsal. Caudal symmetrically forked. Pectorals and ventrals well developed, broad, fragile.

Stomach very large, with thick walls thrown into deep longitudinal folds; the organ must be widely distensible in correlation with the wide mouth. Intestine coiled in a spiral; ten very large pyloric cæca in a bunch. No air-bladder. Ovaries with an oviduct.

Colours in the fresh state:—Head, iris, body, fins, oropharyngo-branchial membrane, and entire peritoneum deep black.

Two female specimens, measuring respectively  $13\frac{1}{2}$  and  $9\frac{1}{2}$  inches.

Station 105, 740 fathoms.

Both specimens when brought on board were in a cataleptoid state, the whole muscular system being quite rigid, and cutaneous excitation eliciting no responsive movement.

I have separated this fish from *Bathytroctes* chiefly on account of the pluriserial teeth in the premaxillæ and mandible.

## PLATYTROCTES, Gthr.

11. *Platytrectes apus*, Gthr.

*Platytrectes apus*, Günther, Ann. & Mag. Nat. Hist. 1878, vol. ii. p. 249; and Zool. Chall. Exp. xxii. p. 229, pl. lviii. fig. A.

One specimen, 6 inches long, answering in every respect to Dr. Günther's description, except that the eye is larger in this specimen, being  $\frac{2}{5}$  the length of the head and nearly twice as long as the snout.

Station 105, 740 fathoms.

## AULASTOMATOMORPHA, gen. nov.

Head naked. Body elongate, covered with minute hardly imbricate scales. Anterior bones of the head produced into a long tube terminating in a narrow mouth. Margin of the upper jaw formed equally by the premaxillæ and maxillæ. Uniserial teeth, in the jaws only. Eye large. Gill-cover apparently complete. Gill-opening wide below, contracted above, and not surpassing the level of the pectoral fin; four gills with narrow laminæ. Pseudobranchiæ almost rudimentary. Dorsal fin belonging to the caudal portion of the body; no adipose dorsal. Anal fin very long. Caudal forked. Pyloric cæca few, small. No air-bladder.

12. *Aulastomatomorpha phospherops*, sp. n.

B. 5? D. 21. A. 41. P. 7. V. 6.

Body elongate and compressed, surrounded from the mid-dorsal line behind the nape to the mid-ventral line behind the vent by a continuous thick succulent fold of the integuments, like, but not so wide as, that of *Platytrectes*; its greatest height, including this fold, is a little more than  $\frac{1}{6}$  of the total without the caudal.

Head low and rather depressed, its length  $3\frac{1}{8}$  in the total without the caudal; produced anteriorly into a long tubular snout, at the end of which is the small mouth; completely invested by a thick spongy or fungus-like poriferous skin, of a brilliant snow-white reflexion, and probably luminous in function. This covering is continuous round the branchiostegal rays and opercles with the equally thick velvety membrane which lines the external parietes of the gill-chambers, and it sends a fold backwards to the base of the pectoral on each side.

The snout is a little less than half the length of the head, or  $6\frac{2}{3}$  in the total without the caudal.

The eyes are very large and extremely prominent; the major diameter of the globus oculus is slightly over  $\frac{1}{4}$  the head-length, but owing to the encroachment up to the margin of the cornea of the broad posterior orbital fold, the diameter of the exposed "eye" is only a little more than  $\frac{1}{5}$  of the same standard; the true (bony) interorbital space is less than half the diameter of the eye in width.

Nostrils situated high up, above the anterior orbital angle. Mouth at the extreme end of the tubular snout, small, the jaws apparently with limited motion. The upper jaw, which projects slightly beyond the lower, is formed in its anterior half by the premaxilla, in its posterior half by the maxilla. Minute, acute, recurved teeth in a single row in the premaxillæ and mandible; no teeth in the maxillæ.

Gill-openings very wide below, contracted above, and not surpassing the level of the pectorals. Gill-covers apparently complete; their constituent bones, including the branchiostegal rays, though well calcified, are extremely thin and fragile, and are completely concealed within a continuous uniform investment of confluent external skin and internal mucous membrane. Four gills, with narrow laminae and coarse lamellæ; the fourth gill-cleft wide; gill-rakers well developed on all the arches, moderately long on the first, short on the fourth and fifth. Pseudobranchiæ rudimentary, consisting of four or five delicate short lamellæ on each side.

Body covered with minute, hardly imbricate, cycloid scales, about  $\frac{1}{40}$  by  $\frac{1}{30}$  of an inch, respectively in the shortest and longest diameters. The lateral line traverses the middle of the body uninterruptedly.

The dorsal fin begins slightly in advance of the posterior fourth of the body measured without the caudal; the length of its base is shorter than the snout; its rays, like those of the anal, increase gradually in length from before backwards, the longest being not quite equal to the major diameter of the bulbus oculus. The anal begins an eye-length behind the vertical through the middle of the body as above limited, and ends a short distance behind the vertical through the posterior limit of the dorsal; its longest rays slightly exceed the longest dorsal rays. Caudal symmetrically forked, its rudimentary rays very numerous, both dorsally and ventrally. Pectorals narrow, rather more than  $\frac{1}{3}$  of the head in length. Ventrals short, arising immediately behind the vertical through the middle of the body, as above limited, and reaching just behind the vent.



Stomach subsiphonal; intestine long, coiled in a spiral; four small pyloric cæca, arranged in a ring. No air-bladder. Reproductive glands very large, apparently discharging in the male (?) through a well-developed post-anal papilla.

Colours in the fresh state :—Head snow-white, iris black, body chocolate, fins blackish grey; oro-pharyngo-branchial membrane and entire peritoneum intense black.

One specimen, apparently a male near maturity, measuring 11 inches in length.

Station 104, 1000 fathoms.

This fish differs from all described Alepocephalids in having the pseudobranchiæ quite rudimentary and the anterior bones of the head produced into a snout like that of *Aulastoma*; but its affinities are quite clearly Alepocephalid.

### Family Halosauridæ.

#### HALOSAURUS, Johnson.

##### 13. *Halosaurus affinis*, Gthr.

*Halosaurus affinis*, Günther, Ann. & Mag. Nat. Hist. 1877, vol. xx. p. 444; and Zool. Chall. Exp. xxii. pp. 241, 242, pl. lix. fig. B.

Two specimens, measuring respectively  $18\frac{3}{4}$  and 19 inches in length, answer the diagnosis of this fish.

The radial formula is

B. 11. D. 11–12. A. circ. 200. P. 13. V.  $1/8$ .

There are nine large pyloric cæca, arranged in a row like the teeth of a comb along the first  $\frac{3}{4}$  inch of the intestine, and embracing the ascending limb of the stomach.

Station 104, 1000 fathoms.

##### 14. *Halosaurus Hoskynii*, sp. n.

Closely allied to the preceding.

B. 10. D. 11. A. circ. 175. P. 13. V.  $1/8$ .

Head naked, its length  $\frac{1}{8}$  of the total, and exceeding the distance between the gill-opening and the base of the ventral fin by about an eye-length.

Length of the snout  $2\frac{1}{5}$  in that of the head, the preoral portion being not quite a half of the whole.

The major diameter of the eye equals the width of the interorbital space, and is contained  $7\frac{1}{2}$  times in the head-length and just over 3 times in the length of the postorbital portion of the head.

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The maxilla does not quite reach the vertical through the anterior margin of the orbit.

The pterygoid band of teeth is very broad and not continuous with the palatine band.

Eight moderately long gill-rakers on the middle of the first arch, besides some small ones above and below.

Scales extremely deciduous, those on the lateral line larger and more adherent than the rest, measuring  $\frac{1}{4}$  of an inch in diameter; with a small central perforation; thirty between the gill-opening and the vent.

The dorsal fin begins rather more than an eye-length behind the level of the ventrals.

Seven large pyloric cæca in a longitudinal row embracing the ascending limb of the stomach.

Colours in the fresh state:—Body and fins uniformly dark sepia-brown.

Two female specimens, 20 and 21 inches long.

Station 104, 1000 fathoms.

I have thought it sufficient to indicate simply the diagnostic points of this species, which I have named after the accomplished hydrographer in charge of the Survey.

### Family Murænidæ.

#### Group *ANGUILLINA*.

#### PROMYLLANTOR, gen. nov.

Allied to *Congromuræna*.

Body stout, with the muscular and osseous systems well developed. Tail about as long as the trunk. Muciferous cavities of the head well developed. Eye rather small. Cleft of the mouth narrow, not extending behind the middle of the eye. Villiform teeth in broad bands in the jaws and in a broad confluent patch on the palate. Tongue free. Nostrils lateral. Gill-openings widely separate; four gills with wide clefts. No scales. Pectoral and vertical fins well developed, the latter confluent. The dorsal begins some distance behind the occiput.

#### 15. *Promyllantor purpureus*, sp. n.

The head is  $\frac{1}{6}$ , the tail a snout-length over half the total; the body is massive, its greatest height equals the length of the postorbital portion of the head.

Head with its muciferous cavities highly developed, low, broad, inflated, ending in a broad, pointed, swollen snout,

which is twice the length of the eye or  $\frac{1}{4}$  the total length of the head, and conspicuously prominent beyond the mouth. Eyes circular, set high up on the side of the head, deep beneath a small transparent area of skin, a diameter and a half apart.

Anterior nostril a short wide tube situated inferiorly at the tip of the snout. Posterior nostril a large circular foramen just above the anterior orbital angle.

Mouth subrostral; its angle reaching slightly behind the vertical through the anterior border of the orbit; the jaws completely hidden by the very thick inflated lips. Villiform teeth in broad bands in the jaws, and in a broad, confluent, triangular patch covering the palate. Tongue free.

Gill-openings small, widely separated foramina, hardly larger than the eye; four gills with narrow laminae and coarse lamellae and wide clefts; no gill-rakers.

Integument thick, coriaceous, scaleless, investing the vertical fins and completely concealing their rays. The lateral line traverses the middle of the body.

Vertical fins confluent; the dorsal begins a distance behind the occiput equal to the length of the postrostral portion of the head, or just behind the level of the tips of the pectorals when laid full back. The anal begins immediately behind the vent. Pectorals small, pointed, equal in length to the rostrorbital portion of the head.

Stomach with a *cul-de-sac* of moderate size; intestine wide, little convoluted; liver large, indistinctly lobated, embracing the oesophagus. Air-bladder very large, with very thick spongy walls and a small central cavity.

Colours in the fresh state:—Body and fins uniform purple-black.

One female specimen, 17 inches long, with mature ovaries. Station 104, 1000 fathoms.

I am greatly indebted to Professor Wood-Mason for counsel and advice.

XXXV.—On the Ophidian Genus *Pseudoxyrhopus*, *Gthr.*

By G. A. BOULENGER.

A CURIOUS snake from Madagascar was described by Jan in 1863 under the name of *Homalocephalus*, which name, being preoccupied in entomology, was changed by Günther to *Pseudoxyrhopus* in 1881. Jan placed his new genus among