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OCEANIC FISHES AND FLATFISHES
COLLECTED IN 1925-1927

By

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9-18

OCEANIC FISHES AND FLATFISHES COLLECTED IN 1925-1927

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(Plate II, text-figs. 1-47).

PART I. OCEANIC FISHES

INTRODUCTION

THE present report is based on the collections of oceanic fishes made by the R.R.S. 'Discovery' and, to a much less extent, by the R.R.S. 'William Scoresby' from 1925 to 1927, chiefly in the South Atlantic and Antarctic Oceans, at depths ranging from the surface down to 3500 metres. No larval or postlarval specimens are included, as this material will be the subject of a separate investigation. The report is entirely systematic in nature, as it is the author's intention to defer any theoretical considerations until a later date, when it is confidently expected that further material will be available. The collections already studied, however, have proved of great interest, and since the work of the Danish vessel, the 'Dana', and of several American investigators has been confined chiefly to the northern parts of the ocean, the material brought back by the 'Discovery' should add considerably to our knowledge of the fish fauna of the Atlantic.

As will be seen from the list which follows, the number of species obtained is about 160, represented in all by more than 2000 specimens: of these 18 prove to be new to science, 3 representing new genera. The identification of the members of the family Gonostomatidae has proved a matter of some difficulty, and a revision of these fishes has been included in this report, based not only on the Discovery material but on all the specimens in the British Museum, including those obtained by the 'Challenger'. Revisions of the fishes of the Berycoid genus *Melamphaës*, and of the family Chiasmodontidae, also based on the Discovery collections, have already been published in the *Annals and Magazine of Natural History* for last year.

When a considerable amount of material of some well-known species has been obtained from a number of different stations in the South Atlantic, no attempt has been made to give a complete list of these records of locality, etc., in the usual manner, but a general summary of the localities is given. All the text-figures accompanying this report are the work of Lieut.-Col. W. P. C. Tenison, D.S.O.

The author takes this opportunity of offering his thanks to the members of the Discovery Committee for placing this valuable material at his disposal and for entrusting him with the preparation of this report. Thanks are also due and are heartily

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tendered to Dr S. L. Hora of the Indian Museum, Professor L. Roule of the Paris Museum, Mr A. E. Parr of the Bingham Oceanographic Collection, and Mr A. V. Tåning of the Carlsberg Laboratory, Copenhagen, for the loan of type specimens, or for information concerning certain fishes under their charge.

LIST OF STATIONS

When a large number of specimens of a well-known species has been obtained from various stations no attempt has been made to give the data in full, and a mere summary is given in the report. A list of these particular stations, with the necessary data, and names of the species obtained, follows.

St. 3. 3. xii. 25. $29^{\circ} 31' 06''$ S, $13^{\circ} 56' 45''$ W. 2 m. tow-net, horizontal, 500-700 m.: 6 *Argyropelecus hemigymnus*, 10-32 mm.

St. 9. 11. ii. 26. $46^{\circ} 11' 30''$ S, $22^{\circ} 27' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 3500 (-0) m.: 5 *Cyclothone microdon*, 43-56 mm.

St. 65. 22. v. 26. $48^{\circ} 18' 00''$ S, $53^{\circ} 09' 00''$ W. 2 m. tow-net, horizontal, 120 (-0) m.: 2 *Lampanyctus* sp., 48-65 mm.

St. 66. 23. v. 26. $48^{\circ} 09' 00''$ S, $52^{\circ} 50' 00''$ W. 1 m. tow-net, horizontal, 90 (-0) m.: 1 *Lampanyctus guentheri*, 28 mm.; 1 *L. alatus*, 39 mm.

St. 69. 25. v. 26. $45^{\circ} 06' 00''$ S, $49^{\circ} 00' 00''$ W. 70 cm. tow-net, horizontal, 90 (-0) m.: 1 *Lampanyctus guentheri*, 41 mm.

St. 71. 30. v. 26. $43^{\circ} 20' 00''$ S, $46^{\circ} 02' 00''$ W. 70 cm. tow-net, vertical, 500-750 m.: 1 *Cyclothone microdon*, 27 mm.

St. 72. 1. vi. 26. $41^{\circ} 43' 20''$ S, $42^{\circ} 20' 40''$ W. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 5 *Cyclothone microdon*, 45-65 mm.

St. 76. 5. vi. 26. $39^{\circ} 50' 30''$ S, $36^{\circ} 23' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1500 (-0) m.: 28 *Cyclothone microdon*, 30-56 mm.; 1 *Lampanyctus alatus*, 43 mm.; 1 *L. guentheri*, 36 mm.

St. 78. 12. vi. 26. $35^{\circ} 18' 00''$ S, $19^{\circ} 01' 10''$ W. Young-fish trawl, 1000 (-0) m.: 72 *Cyclothone microdon*, 15-55 mm.; 1 *Sternoptyx diaphana*, 10 mm.; 1 *Lampanyctus* sp., 25 mm.

St. 79. 13. vi. 26. $34^{\circ} 48' 00''$ S, $16^{\circ} 36' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 5 *Cyclothone microdon*, 28-52 mm.

St. 80. 17. vi. 26. $32^{\circ} 46' 00''$ S, $10^{\circ} 00' 00''$ W. 2 m. tow-net, horizontal, 30 (-0) m.: 2 *Lampanyctus townsendi*, 40-67 mm.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 70 *Cyclothone microdon*, 15-40 mm.; 6 *Argyropelecus hemigymnus*, 18-34 mm.; 12 *Sternoptyx diaphana*, 17-25 mm.; 8 *Lampanyctus* sp., 15-32 mm.

St. 83. 21. vi. 26. $32^{\circ} 30' 50''$ S, $1^{\circ} 23' 30''$ W. 2 m. tow-net, horizontal, 650 (-0) m.: 9 *Argyropelecus hemigymnus*, 9-26 mm.; 4 *Lampanyctus* sp., 35-62 mm.

St. 85. 23. vi. 26. $33^{\circ} 07' 40''$ S, $4^{\circ} 30' 20''$ E. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 67 *Cyclothone microdon*, 20-60 mm.; 2 *Argyropelecus hemigymnus*, 23-29 mm.; 1 *Sternoptyx diaphana*, 12 mm.; 1 *Lampanyctus townsendi*, 22 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 14 *Cyclothone microdon*, 24-45 mm.; 4 *Argyropelecus hemigymnus*, 9-21 mm.; 3 *Sternoptyx diaphana*, 14-22 mm.; 1 *Myctophum laternatum*, 23 mm.; 1 *Lampanyctus* sp., 88 mm.

St. 87. 25. vi. 26. $33^{\circ} 53' 45''$ S, $9^{\circ} 26' 30''$ E. Young-fish trawl, 1000 (-) m.: 19 *Cyclothone microdon*, 17-50 mm.; 18 *Argyropelecus hemigymnus*, 8-24 mm.; 5 *Sternoptyx diaphana*, 12-16 mm.

St. 89. 28. vi. 26. $34^{\circ} 05' 15''$ S, $16^{\circ} 00' 45''$ E. Young-fish trawl, 1000 (-) m.: 25 *Cyclothone microdon*, 12-50 mm.; 4 *Argyropelecus hemigymnus*, 15-27 mm.; 3 *Myctophum laternatum*, 11-24 mm.

St. 100. 4. x. 26. $33^{\circ} 20' 00''$ to $33^{\circ} 46' 00''$ S, $15^{\circ} 18' 00''$ to $15^{\circ} 08' 00''$ E. Young-fish trawl, 2000-2500 m.: 23 *Cyclothone microdon*, 30-60 mm.; 4 *Argyropelecus hemigymnus*, 14-32 mm.; 4 *Myctophum laternatum*, 19-27 mm. Young-fish trawl, 625-675 m.: 1 *Argyropelecus hemigymnus*, 32 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 7 *Sternoptyx diaphana*, 13-25 mm.; 6 *Lampanyctus alatus*, 40-92 mm. 1310-1410 m.: 1 *Lampanyctus* sp., 100 mm.

St. 104. 31. x. 26. $41^{\circ} 33' 30''$ S, $17^{\circ} 58' 00''$ W. 70 cm. tow-net, vertical, 110 m.: 1 *Lampanyctus townsendi*, 50 mm.

St. 151. 16. i. 27. $53^{\circ} 25' 00''$ S, $35^{\circ} 15' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1025-1275 m.: 22 *Cyclothone microdon*, 34-68 mm.; 1 *Lampanyctus* sp., 76 mm.

St. 169. 22. ii. 27. $60^{\circ} 48' 50''$ S, $51^{\circ} 00' 20''$ W. Young-fish trawl, 1000-1100 m.: 3 *Cyclothone microdon*, 55-60 mm.

St. 239. 2. vi. 27. $46^{\circ} 56' 00''$ S, $46^{\circ} 03' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1050-1350 (-) m.: 89 *Cyclothone microdon*, 28-60 mm.; 7 *Lampanyctus alatus*, 80-102 mm.

St. 240. 2. vi. 27. $46^{\circ} 36' 30''$ S, $45^{\circ} 07' 00''$ W. 70 cm. tow-net, horizontal, 40 (-) m.: 1 *Lampanyctus guentheri*, 38 mm. 1 m. tow-net, horizontal, 70 (-) m.: 1 *L. guentheri*, 43 mm. 35 m.: 1 *L. guentheri*, 43 mm.

St. 241. 5. vi. 27. $40^{\circ} 34' 30''$ S, $36^{\circ} 35' 30''$ W. 1 m. tow-net, horizontal, 152 m.: 3 *Lampanyctus guentheri*, 41-50 mm. 70 cm. tow-net, horizontal, 49 (-) m.: 2 *L. guentheri*, 30-46 mm.

St. 242. 7. vi. 27. $39^{\circ} 16' 30''$ S, $30^{\circ} 26' 00''$ W. 70 cm. tow-net, horizontal, 124 m.: 1 *Lampanyctus guentheri*, 45 mm. 62 m.: 2 *L. guentheri*, 32-44 mm.

St. 245. 10. vi. 27. $38^{\circ} 20' 00''$ S, $22^{\circ} 18' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1800-2000 m.: 9 *Cyclothone microdon*, 26-54 mm.

St. 256. 23. vi. 27. $35^{\circ} 14' 00''$ S, $6^{\circ} 49' 00''$ E. Young-fish trawl, 850-1100 (-) m.: 70 *Cyclothone microdon*, 14-54 mm.; 2 *Sternoptyx diaphana*, 30-60 mm.

St. 257. 24. vi. 27. $35^{\circ} 01' 00''$ S, $10^{\circ} 18' 00''$ E. Young-fish trawl, 250 (-) m.: 1 *Argyropelecus hemigymnus*, 32 mm.; 3 *Lampanyctus alatus*, 69-73 mm.

St. 258. 25. vi. 27. $35^{\circ} 03' 30''$ S, $13^{\circ} 55' 00''$ E. Young-fish trawl, 320-450 m.: 1 *Argyropelecus hemigymnus*, 30 mm.

St. 267. 23. vii. 27. $24^{\circ} 31' 00''$ S, $12^{\circ} 15' 30''$ E. Young-fish trawl, 450-550 (-) m.: 1 *Argyropelecus hemigymnus*, 22 mm.

St. 268. 25. vii. 27. $18^{\circ} 37' 00''$ S, $10^{\circ} 46' 00''$ E. Young-fish trawl, 100-150 (-) m.: 1 *Lampanyctus guentheri*, 43 mm.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 600-700 (-) m.: 4 *Sternoptyx diaphana*, 15-43 mm.; 14 *Stomias colubrinus*, 90-265 mm.; 9 *Lampanyctus* sp., 70-103 mm.

St. 270. 27. vii. 27. $13^{\circ} 58' 30''$ S, $11^{\circ} 43' 30''$ E. Young-fish trawl, 200 (-) m.: 2 *Stomias colubrinus*, 63-118 mm. 70 cm. tow-net, oblique, 126 (-) m.: 1 *S. colubrinus*, 68 mm. 1 m. tow-net, oblique, 125 (-) m.: 1 *S. colubrinus*, 55 mm.; 1 *Lampanyctus townsendi*, 60 mm.

- St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. 1 m. tow-net, oblique, 110 (-o) m.: 3 *Stomias colubrinus*, 130-150 mm.
- St. 281. 12. viii. 27. $00^{\circ} 46' 00''$ S, $5^{\circ} 49' 15''$ E. Young-fish trawl, 850-950 (-o) m.: 12 *Sternoptyx diaphana*, 6-25 mm.; 1 *Lampanyctus guentheri*, 81 mm.
- St. 282. 12. viii. 27. $1^{\circ} 11' 00''$ S, $5^{\circ} 38' 00''$ E. Young-fish trawl, 300 (-o) m.: 1 *Stomias colubrinus*, 90 mm.
- St. 284. 15. viii. 27. $2^{\circ} 13' 00''$ S, $1^{\circ} 52' 00''$ E. 1 m. tow-net, oblique, 71 (-o) m.: 3 *Lampanyctus guentheri*, 40-69 mm.; 4 *L. alatus*, 19-42 mm.
- St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-o) m.: 2 *Sternoptyx diaphana*, 21-22 mm.; 2 *Myctophum laternatum*, 14-20 mm.; 1 *Lampanyctus townsendi*, 66 mm.; 10 *L. alatus*, 18-48 mm.
- St. 286. 17. viii. 27. $3^{\circ} 06' 30''$ S, $3^{\circ} 53' 00''$ W. Young-fish trawl, 125 (-o) m.: 1 *Lampanyctus townsendi*, 48 mm.; 4 *L. guentheri*, 23-62 mm. 70 cm. tow-net, oblique, 102 (-o) m.: 4 *L. guentheri*, 42-61 mm. 1 m. tow-net, oblique, 102 (-o) m.: 4 *L. alatus*, 26-55 mm.
- St. 287. 19. viii. 27. $2^{\circ} 49' 30''$ S, $9^{\circ} 25' 30''$ W. Young-fish trawl, 800-1000 (-o) m.: 11 *Sternoptyx diaphana*, 6-23 mm.; 1 *Lampanyctus townsendi*, 32 mm. $4\frac{1}{2}$ m. net, horizontal, 800-1000 (-o) m.: 1 *Myctophum laternatum*, 19 mm.
- St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-o) m.: 1 *Sternoptyx diaphana*, 8 mm.; 4 *Lampanyctus guentheri*, 34-54 mm.; 5 *L. alatus*, 20-37 mm. 1 m. tow-net, oblique, 73 (-o) m.: 1 *Myctophum laternatum*, 16 mm.; 1 *Lampanyctus townsendi*, 55 mm.; 1 *L. guentheri*, 52 mm. 70 cm. tow-net, oblique, 100 (-o) m.: 1 *L. guentheri*, 46 mm.; 2 *L. alatus*, 21-41 mm.
- St. 289. 23. viii. 27. $3^{\circ} 04' 45''$ N, $16^{\circ} 52' 00''$ W. Young-fish trawl, 125-225 (-o) m.: 1 *Myctophum laternatum*, 21 mm.; 3 *Lampanyctus alatus*, 23-45 mm. 1 m. tow-net, oblique, 132 (-o) m.: 2 *L. guentheri*, 21-32 mm.
- St. 293. 24. viii. 27. $4^{\circ} 18' 15''$ N, $16^{\circ} 51' 00''$ W. 1 m. tow-net, oblique, 100-120 (-o) m.: 2 *Lampanyctus guentheri*, 32-60 mm.
- St. 294. 25. viii. 27. $4^{\circ} 33' 15''$ N, $16^{\circ} 52' 45''$ W. Young-fish trawl, 100-150 (-o) m.: 2 *Lampanyctus townsendi*, 20-27 mm.; 1 *L. alatus*, 43 mm.
- St. 295. 25. viii. 27. $5^{\circ} 30' 30''$ N, $17^{\circ} 45' 00''$ W. Young-fish trawl, 2500-2700 (-o) m.: 2 *Sternoptyx diaphana*, 16-21 mm.
- St. 296. 26. viii. 27. $8^{\circ} 12' 00''$ N, $18^{\circ} 49' 00''$ W. 1 m. tow-net, oblique, 120 (-o) m.: 1 *Stomias colubrinus*, 112 mm.; 1 *Lampanyctus guentheri*, 23 mm.; 3 *L. alatus*, 23-45 mm. 70 cm. tow-net, oblique, 120 (-o) m.: 2 *Myctophum laternatum*, 20-21 mm.; 1 *Lampanyctus townsendi*, 20 mm.; 3 *L. alatus*, 21-39 mm.
- St. 297. 28. viii. 27. $12^{\circ} 08' 00''$ N, $20^{\circ} 53' 30''$ W. 70 cm. tow-net, oblique, 163 (-o) m.: 1 *Stomias colubrinus*, 110 mm.; 1 *Lampanyctus alatus*, 40 mm. 1 m. tow-net, oblique, 163 m.: 1 *L. townsendi*, 17 mm.; 3 *L. alatus*, 30-34 mm. Young-fish trawl, 200-300 (-o) m.: 1 *L. guentheri*, 37 mm.
16. x. 25. $29^{\circ} 27' N$, $15^{\circ} 07' W$. 2 m. tow-net, horizontal, 900 (-o) m.: 5 *Sternoptyx diaphana*, 9-17 mm.
28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (-o) m.: 4 *Sternoptyx diaphana*, 15-39 mm.; 8 *Stomias colubrinus*, 60-170 mm.; 1 *Lampanyctus alatus*, 42 mm.; 3 *Lampanyctus* sp., 58-115 mm.
11. xi. 25. $6^{\circ} 55' N$, $15^{\circ} 54' W$. 2 m. tow-net, horizontal, 800 (-o) m.: 12 *Sternoptyx diaphana*, 15-24 mm.

SYSTEMATIC ACCOUNT

Order ISOSPONDYLI

Family ALEPOCEPHALIDAE

The fifteen genera of this family may be conveniently grouped as follows:

- I. Origin of pelvic fins at or about the middle of the length (without caudal); eyes normal; pectoral fins comparatively short.
- A. Snout short or of moderate length.
1. Body with scales.
- a. Pelvic fins present.
- * Maxillaries toothless. *Alepocephalus* (incl. *Conocara*), *Asquamiceps*, *Ericara*,
Leptoichthys, *Xenognathus*
- ** Maxillaries with teeth. *Bajacalifornia*, *Bathytroctes* (incl. *Talismania*),
Narcetes
Platytroctes
- b. Pelvic fins absent. *Platytroctes*
2. Scales absent, sometimes replaced by small nodules.
- a. Maxillary not extending beyond eye; no fold in front of dorsal fin.
- * Dorsal and anal fins sub-equal, well separated from caudal, which is well developed; eyes of moderate size. *Xenodermichthys*, *Rouleina*
- ** Dorsal fin much shorter than anal, which is more than half the length of fish; caudal peduncle and caudal fin very small; eyes very large. *Leptoderma*
- b. Maxillary extending well beyond eye; a high median fold in front of the dorsal fin. *Anomalopteryx*
- B. Snout long, tube-like, with a small mouth at its extremity; scales minute, scarcely imbricated. *Aulastatomorpha*
- II. Origin of pelvic fins well behind the middle of the length; eyes telescopic; pectoral fins very long. *Dolichopteryx*

Aleposomus, Gill, is a synonym of *Xenodermichthys*; *Mitchillina*, Jordan and Evermann, and *Benthosphyraena*, Cockerell, appear to be identical with *Alepocephalus*.

***Asquamiceps velaris*, Zugmayer.**

Zugmayer, 1911, *Bull. Inst. Océan. Monaco*, 193, p. 2; 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 10, pl. i, fig. 4.

St. 101. 14-15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 2580 m.: 1 specimen, 90 mm.¹

Depth of body 5 in the length, length of head 2½. Diameter of eye a little less than length of snout, which is 4½ in that of head; interorbital width 8½. Maxillary nearly reaching middle of eye; no teeth in upper jaw; lower jaw with microscopical teeth. Gill-membranes united as far back as a point well behind the eye; apparently 5 branchiostegal rays; membranous expansion of operculum partly covering the pectoral fin. Scales cycloid, irregularly arranged and partially embedded in the skin; about 65 scales

¹ All the specimens included in this report are measured to the base of the caudal fin.

in a longitudinal series. Dorsal 15; anal 15; both fins originating at about the same level. Pectoral with 13 or 14 rays, broad-based, rounded, shorter than eye. Uniformly blackish; fins pale.

Described from a single specimen, 90 mm. in length.

Hab. North and South Atlantic.

This genus seems to be well distinguished from *Alepocephalus* by the form of the gill-membranes, the smaller number of branchiostegal rays, the nature of the dentition, and the broad-based, rounded pectoral fin.

Bathytroctes (Bathytroctes) rostratus, Günther, 1878. [Pl. II, fig. 3.]

Bathytroctes rostratus, Holt and Byrne, 1908, *Fisheries, Ireland, Sci. Invest.* 1906, v, p. 45, pl. iv, figs. 3-5.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 2 specimens, 30-47 mm.

St. 101. 14-15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 350-450 (-0) m.: 2 specimens, 30-40 mm.

I have identified these young examples with *Bathytroctes rostratus*, Günther, after some hesitation, as it is difficult to compare them accurately with the type, which is considerably larger. They agree very

closely, however, with the small specimens described by Holt and Byrne under this name. All exhibit the pigmented "supraclavicular process", and there is no sign of this diminishing in size in the largest of the specimens collected by the 'Discovery'. I count 19 to 20 rays in the dorsal fin, and 14 to 16 in the anal. No mention is made by Holt and Byrne of the small oval luminous organs, which in the preserved specimens appear as white spots. They are regularly arranged, and seem to disappear altogether in the adult fish. A coloured sketch of the ventral surface of one of the specimens from St. 86, made by Mr E. R. Gunther (Pl. II, fig. 3), shows the luminous organs red in colour in the fresh fish, although some of those which had been damaged appeared white. Their arrangement

has been well described by Brauer ('*Valdivia*' *Tiefsee-Fische*, p. 17, pl. xiv, figs. 2-3), and is shown in the accompanying figures. Between the pelvic fins is a deeply pigmented globular body, with a luminous spot on its anterior and posterior surfaces.

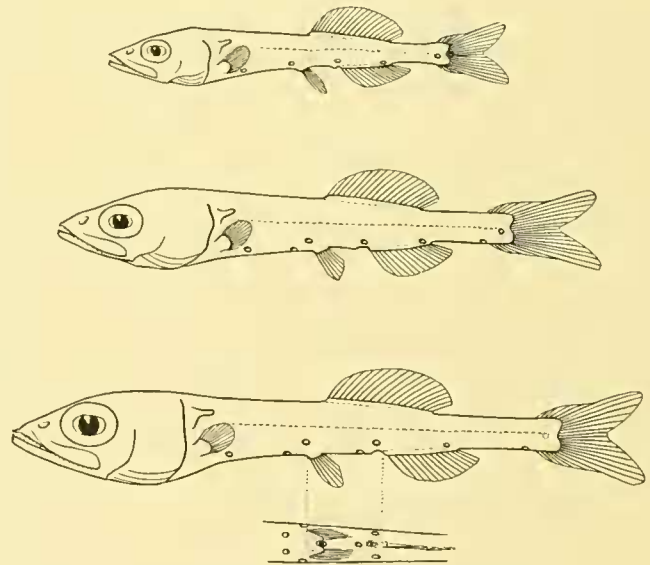


Fig. 1. Outline drawings of three young specimens of *Bathytroctes (Bathytroctes) rostratus*, respectively 30, 40 and 47 mm. in length. ($\times 1\frac{1}{2}$.) A portion of the ventral surface of the largest specimen is included to illustrate the arrangement of some of the principal luminous organs.

Bathytroctes (Bathytroctes) sp.

St. 85. 23. vi. 26. $33^{\circ} 07' 40''$ S, $4^{\circ} 30' 20''$ E. $4\frac{1}{2}$ m. net, 2000 (-0) m.: 1 specimen, 56 mm.

This young specimen agrees very closely with those described above, but the anal fin originates below the anterior part of the dorsal. The "supraclavicular process" is present, but the luminous organs are much less developed.

Bathytroctes (Talismania) homopterus, Vaillant.

Bathytroctes homopterus, Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman'*, Poissons, p. 153, pl. xii, fig. 1.

Bathytroctes (Talismania) homopterus, Goode and Bean, 1895, *Ocean. Ichth.* p. 43.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 600-700 (-0) m.: 2 specimens, 83-100 mm.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 1 specimen, 47 mm.

Depth of body $4\frac{1}{4}$ in the length, length of head a little more than 3. Snout a little shorter than eye, diameter of which is about $3\frac{1}{8}$ in length of head and equal to interorbital width. Upper part of operculum with a series of diverging ridges ending in feeble

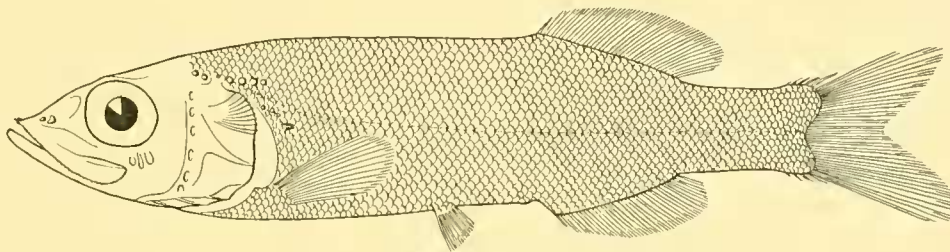


Fig. 2. *Bathytroctes (Talismania) homopterus*. ($\times 1$.)

pointed projections. A pointed membranous process above the clavicle. Praemaxillary somewhat protruding, bearing two or three forwardly directed teeth anteriorly, of which the inner are longest, followed by a series of smaller conical teeth; the anterior teeth are more prominent in the young; maxillary toothed, extending to below middle of eye or a little beyond. About 20 gill-rakers on lower part of anterior arch. 67-75 scales in a longitudinal series. Dorsal 18-20; origin a little nearer posterior edge of operculum than base of caudal. Anal 16-18; origin slightly behind that of dorsal. Caudal peduncle $1\frac{3}{4}$ times as long as deep.

Described from three specimens, 47 to 100 mm. in length.

Hab. North Atlantic.

Professor L. Roule has kindly compared one of these specimens with the type of the species preserved in the Paris Museum, and writes as follows: "Quant à la spécification, elle penche plutôt, à mon avis, après examen, du côté *B. homoptera* Vaillant. Pourtant, l'exemplaire étant unique, et de petite taille, il m'est malaisé d'opiner avec sûreté". It is of interest to note that the "supraclavicular process" is still present in the largest example.

In his monograph of the marine fishes of South Africa (1925, *Ann. S. Afric. Mus.* XXI, p. 122), Barnard mentions a specimen of *Bathytroctes* in the British Museum collection from Cape Point, registered as *B. homopterus*, Vaillant, and presumably collected by the S.S. 'Pieter Faure'. I have examined this fish, which is not a *Bathytroctes* but an *Alepocephalus*. It appears to belong to a species new to science, and may, therefore, be described here.

***Alepocephalus barnardi*, n.sp.**

Bathytroctes rostratus (non Günther), Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 122.

Depth of body 6 in the length, length of head 3. Snout about as long as eye, diameter of which is $3\frac{1}{2}$ in length of head; interorbital width $5\frac{2}{3}$. Maxillary extending nearly to below middle of eye; lower jaw included. About 16 gill-rakers on lower part of anterior arch. 50 (?) scales in a longitudinal series. Dorsal 18. Anal 18; origin below fifth dorsal ray, more than twice as distant from end of snout as from base of caudal. Caudal peduncle nearly 3 times as long as deep.

Described from a single specimen, 200 mm. in length.

Hab. Off Cape Point, South Africa; 700 fms.

This species appears to be close to *A. blanfordi*, Alcock, the type of which has been lent to me for examination by the Indian Museum. It differs in having a more slender body, rather longer snout, wider interorbital region, and more slender caudal peduncle. It may be distinguished from *A. productus*, Goode and Bean, by the narrower body, longer snout and larger orbit, and longer caudal peduncle; and from *A. umbriceps*, Jordan and Thompson, by the longer snout and larger eye.

***Xenodermichthys socialis*, Vaillant.**

Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman', Poissons*, p. 162, pl. xiii, fig. 1; Collett, 1896, *Rés. Camp. Sci. Monaco*, x, p. 138; Koehler, 1896, *Ann. Univ. Lyon*, III, p. 520, pl. xxvii, fig. 11; Holt and Byrne, 1908, *Fisheries, Ireland, Sci. Invest.* 1906, v, p. 48, pl. v, fig. 2; Roule, 1915, *Bull. Mus. Paris*, No. 2, p. 42; 1919, *Rés. Camp. Sci. Monaco*, LII, p. 10, pl. i, fig. 5; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 123.

Aleposomus socialis, Goode and Bean, 1895, *Ocean. Ichth.* p. 48, fig. 58.

Aleposomus cyanens, Zugmayer, 1914, *Bull. Inst. Océan. Monaco*, 288, p. 1.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. Young-fish trawl, 150 (-0) m.: 1 specimen, 100 mm.

X. copei, Gill, from the Western Atlantic, is perhaps identical with this species, but appears to have a somewhat larger head and a larger eye. *X. nodulosus*, Günther, from Japan, is easily distinguished by the longer and slenderer body, shorter head, smaller eye, and by the gill-opening only extending to a little above the base of the pectoral.

Rouleina (*Aleposomus*, Roule nec Gill) is close to *Xenodermichthys*, but differs in the large mouth with stronger teeth, which are developed on the maxillary as well as on the

praemaxillary and mandible, and in the smaller number of dorsal and anal rays—14 to 21 instead of 27 to 30. There are five species, viz: *R. guentheri* (Alcock, 1892), *R. squamilaterus* (Alcock, 1898), *R. lividus* (Brauer, 1906), *R. nudus* (Brauer, 1906), and *R. watasii* (Tanaka, 1909).

Dolichopteryx longipes (Vaillant).

Aulostoma (?) *longipes*, Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman', Poissons*, p. 340, pl. xxvii, fig. 4.

Dolichopteryx anascopa, Brauer, 1902, *Sitz. Ges. Beford. Ges. Naturwiss. Marburg*, 1901, No. 8, p. 127; 1906, 'Valdivia' *Tiefsee-Fische*, p. 24, fig. 4.

St. 101. 14-15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 350-400 (-0) m.: 1 specimen, 120 mm.

St. 295. 25. viii. 27. 5° 30' 30" N, 17° 45' 00" W. Young-fish trawl, 2500-2700 m.: 1 specimen, 100 mm.

Hab. North and South Atlantic.

Vaillant's specimen, taken off the coast of Morocco at a depth of 1163 m., was poorly preserved and only 45 mm. in total length. It agrees very closely with that described by Brauer, but there are said to be only 5 dorsal, 9 anal, and 6 pelvic rays, and the

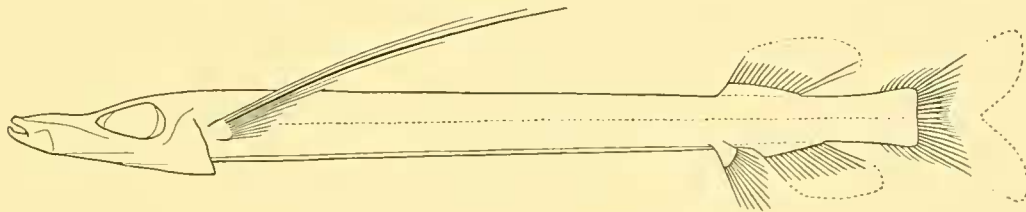


Fig. 3. *Dolichopteryx longipes*. (× 1.)

pectoral fin is shown in the figure as being comparatively short; further, the eye is not depicted as telescopic. Brauer's example, also somewhat damaged, was nearly 35 mm. in length, and was taken in the Indian Ocean (west of the Cocos Islands) at a depth of 2400 m. The two specimens obtained by the 'Discovery' are almost certainly the adults of the same species, but are both very poorly preserved. They differ from the smaller specimens in having a more slender body, smaller head, and the pelvic fins inserted much further back. If, as I believe, all the specimens represent a single species, there is a marked migration of the pelvic fins during growth. In Brauer's example (35 mm.) their origin is about $1\frac{3}{4}$ times as distant from end of snout as from base of caudal; in Vaillant's specimen (45 mm.) it is about twice as far; in the smaller of the 'Discovery' examples (100 mm.) it is $2\frac{2}{5}$, and in the larger (120 mm.) $3\frac{1}{2}$. A brief description of these two specimens follows.

Depth of body about 12 in the length, length of head about $4\frac{1}{2}$. Minute teeth are present, at least in the upper jaw. Pseudobranchiae developed. Dorsal 15 (?); last ray above middle of anal. Anal 12. Pectoral 14; elongate, the third ray broader than the

remainder. Pelvic 12; origin $2\frac{2}{5}$ to $3\frac{1}{2}$ times as distant from end of snout as from base of caudal. Pectoral and pelvic fins with a muscular basal lobe.

In one of the above-mentioned specimens I have been able to see enough of the skull to convince me that Brauer was correct in placing this genus in the family Alepocephalidae. The structure of the jaws—the maxillary, two supplemental bones, etc.—appears to be similar to that found in *Aulastomatomorpha*, Alcock, as described by Henning (1906, *Ann. Mag. Nat. Hist.*, (7), XVIII, p. 307, fig.).

Family ARGENTINIDAE

Revision of the Genus *Bathylagus*

I have been able to dissect a poorly preserved example of this genus, but as it has been in formalin the skeletal characters are difficult to make out. I cannot be certain whether there is a mesocoracoid, but the parapophyses seem to be ventral rather than lateral. Regan (1913, *Trans. R. Soc. Edinburgh*, XLIX (ii), pp. 231, 289) has placed this genus in the family Argentinidae as defined by him, and I am convinced that it belongs here rather than to the Microstomidae, with which it is generally associated.

Bathymacrops, Gilchrist, 1922, is easily distinguished by the position of the dorsal fin, which is in advance of the pelvics, and by the small anal fin. *Microstoma oblitum*, Facciola, 1887, from the Mediterranean, may prove to belong to this family. The anal fin has seven to nine rays, and the origin of the pelvics is immediately behind the dorsal. The body is rather compressed, but in other characters, and especially in the dentition, it bears a close resemblance to *Microstoma*.

Synopsis of the Species of Bathylagus

- I. Origin of dorsal nearer to base of caudal than to end of snout.
 - A. Dorsal with 12 rays; anal with 13 rays; occipital region normal. 1. *argyrogaster*, n.sp.
 - B. Dorsal with 8 rays; anal with at least 24 rays; occipital region swollen, with a median keel. 2. *milleri*, Jordan and Evermann, 1898
- II. Origin of dorsal nearer to end of snout than to base of caudal.
 - A. Anal with 13 rays; depth of body $4\frac{1}{4}$ in length. 3. *atlanticus*, Günther, 1878
 - B. Anal with 16 to 25 rays; depth of body 5 to $7\frac{1}{3}$ in length.
 1. Diameter of eye $2\frac{3}{5}$ in head, which is $5\frac{1}{4}$ to $5\frac{1}{3}$ in length of fish. 4. *microcephalus*, n.sp.
 2. Diameter of eye 2 to $2\frac{1}{2}$ (rarely $2\frac{3}{5}$) in head, which is 4 to $4\frac{2}{3}$ in length of fish.
 - a. Origin of anal $2\frac{2}{3}$ to $3\frac{1}{5}$ times as distant from end of snout as from base of caudal; base of fin $4\frac{1}{2}$ to nearly 6 in length of fish.
 - * Depth of body 6 to $7\frac{1}{3}$ in length; anal with 18 to 21 rays.
 - † Depth of body 6 to $6\frac{1}{4}$ in length, length of head $4\frac{1}{3}$ to $4\frac{2}{3}$; interocular width $2\frac{3}{4}$ to 3 in head; origin of dorsal nearer to adipose fin than to end of snout. 5. *glacialis*, Regan, 1913
 - †† Depth of body 7 to $7\frac{1}{3}$ in length, length of head $4\frac{1}{4}$ to $4\frac{2}{3}$; interocular width 4 or more in head; origin of dorsal equidistant from end of snout and adipose fin. 6. *gracilis*, Lönnberg, 1905

** Depth of body 5 to $5\frac{3}{5}$ in length; anal usually with 19 to 25 rays.

† Head $4\frac{1}{3}$ to $4\frac{3}{5}$ in length of fish; eye $2\frac{1}{5}$ to $2\frac{1}{2}$ in head, equal to or less than post-orbital part of head; anal with 22 to 25 rays, length of base $4\frac{1}{2}$ to $5\frac{1}{5}$ in that of fish.

7. *antarcticus*, Günther, 1878

†† Head $4\frac{1}{5}$ to $4\frac{1}{3}$ in length of fish; eye a little more than 2 in head, greater than postorbital part of head; anal with about 19 rays, length of base $5\frac{3}{5}$ to $5\frac{2}{5}$ in that of fish.

8. *benedicti*, Goode and Bean, 1895

††† Head 4 to $4\frac{1}{2}$ in length of head; eye $2\frac{1}{4}$ to $2\frac{1}{2}$ in head; anal with (16) 19 rays.

9. *pacificus*, Gilbert, 1890

b. Origin of anal $3\frac{1}{3}$ to $3\frac{3}{5}$ times as distant from end of snout as from base of caudal; base of fin $6\frac{1}{4}$ to $6\frac{3}{5}$ in length of fish.

10. *curyops*, Goode and Bean, 1895

Bathylagus argyrogaster, n.sp.

St. 268. 25. vii. 27. $18^{\circ} 37' 00''$ S, $10^{\circ} 46' 00''$ E. 1 m. tow-net, oblique, 73 (-0) m.: 1 specimen, 62 mm. Young-fish trawl, 100-150 (-0) m.: 3 specimens, 40-81 mm.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 600-700 (-0) m.: 2 specimens, 68-99 mm.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. Young-fish trawl, 150 (-0) m.: 1 specimen, 34 mm.

St. 284. 15. viii. 27. $2^{\circ} 13' 00''$ S, $1^{\circ} 52' 00''$ E. 1 m. tow-net, oblique, 71 (-0) m.: 1 specimen, 75 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 5 specimens, 23-115 mm.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 1 specimen, 30 mm.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 1 specimen, 46 mm.

Depth of body $4\frac{2}{3}$ to $5\frac{1}{2}$ in the length, length of head $3\frac{4}{5}$ to $4\frac{1}{5}$. Diameter of eye $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head, interocular width about 3, interorbital width about 5. Dorsal

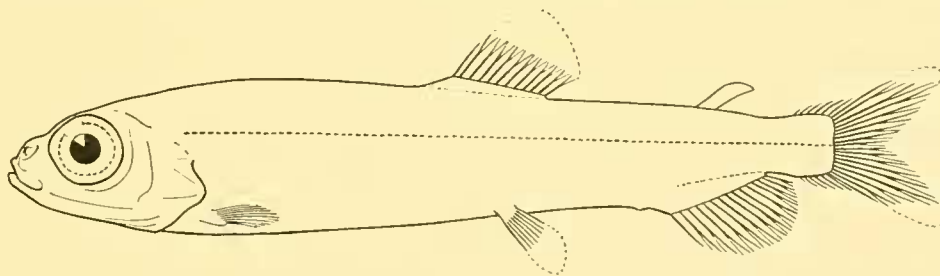


Fig. 4. *Bathylagus argyrogaster*. Holotype. ($\times 1$.)

12; origin equidistant from base of caudal and anterior part or middle of eye. Anal 14-15 (? 16); origin about equidistant from base of caudal and insertion of pelvic or nearer the latter, $3\frac{1}{4}$ to 4 times as distant from end of snout as from base of caudal; length of base 7 to nearly 8 times in that of fish. Pelvics 8-rayed, inserted below middle of dorsal. About 39 scales in a longitudinal series. Brownish above, silvery below; operculum silvery black.

Described from several specimens, up to 115 mm. in length. The largest example from St. 285 is selected as the holotype.

Hab. North and South Atlantic.

This species differs from all the others in its lighter coloration, and was actually taken in shallower water than any of the remaining specimens of *Bathylagus* collected by the 'Discovery'. It may be distinguished from all except *B. milleri* by the more posterior insertion of the dorsal fin.

Bathylagus milleri, Jordan and Evermann.

Jordan and Evermann, 1898, *Bull. U.S. Nat. Mus.* XLVII (3), p. 2825.

Hab. Cortez Banks, off San Diego, California; 776 fathoms.

Known only from the much mutilated type, 155 mm. in length.

Bathylagus atlanticus, Günther.

Günther, 1878, *Ann. Mag. Nat. Hist.* (5), 11, p. 248; 1887, *Deep-sea Fish.* 'Challenger', p. 219.
? *Bathylagus atlanticus*, Holt and Byrne, 1906, *Fisheries, Ireland, Sci. Invest.* 1905, 11, p. 6, pl. i, figs. 3-4.

Depth of body $4\frac{1}{4}$ in the length, length of head a little more than 4. Diameter of eye $2\frac{1}{8}$ in length of head, interocular width $3\frac{1}{5}$, interorbital width $5\frac{1}{3}$. Dorsal 9; origin nearer to end of snout than base of caudal. Anal 13; origin nearer to base of caudal than insertion of pelvic, $3\frac{3}{5}$ times as distant from end of snout as from base of caudal; length of base $7\frac{2}{3}$ in that of fish. Pelvics 8-rayed, inserted below last ray of dorsal. About 36 scales in a longitudinal series.

Described from a single specimen, 160 mm. in length, type of the species.

Hab. Atlantic.

The specimens described by Holt and Byrne, the largest of which is 54 mm. in length, were taken off the coast of County Mayo, Western Ireland. I have been unable to re-examine these examples, but, through the courtesy of Mr G. P. Farran of the Department of Fisheries, Dublin, I have had the opportunity of studying several more small specimens taken off south-west Ireland subsequent to the publication of Holt and Byrne's paper. Nearly all these are too young to be identified with any degree of certainty, but one, which is 50 mm. in length, may be the young of this species or of *B. benedicti*. A brief description of this fish follows:

Depth of body $5\frac{1}{2}$ in the length, length of head nearly 4. Diameter of eye about twice in length of head, interocular width 3. Dorsal 10. Anal 16 (or 17); origin about equidistant from base of caudal and insertion of pelvic, $3\frac{1}{5}$ times as distant from end of snout as from base of caudal; length of base 6 in that of fish.

One specimen, 50 mm., $50^{\circ} 57' N$, $11^{\circ} 38' W$. Mesoplankton trawl at about 700 fathoms.

Bathylagus microcephalus, n.sp.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13' S$, $16^{\circ} 04'$ to $15^{\circ} 49' E$. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 1 specimen, 129 mm. $4\frac{1}{2}$ m. net, horizontal, 350-400 m.: 1 specimen, 172 mm. Holotype.

St. 239. 2. vi. 27. $46^{\circ} 56' 00'' S$, $46^{\circ} 03' 00'' W$. $4\frac{1}{2}$ m. net, horizontal, 1050-1350 m.: 4 specimens, 38-84 mm.?

Depth of body 6 to $6\frac{1}{5}$ in the length, length of head $5\frac{1}{4}$ to $5\frac{1}{3}$. Diameter of eye $2\frac{3}{5}$ in length of head, interocular width nearly 3, interorbital width $5\frac{1}{4}$. Dorsal 10-11; origin much nearer to end of snout than base of caudal, equidistant from former and adipose fin. Anal 20-22; origin about equidistant from base of caudal and insertion of pelvic, $2\frac{5}{6}$ to $3\frac{1}{5}$ times as distant from end of snout as from base of caudal; length of base 5 to $5\frac{2}{3}$ in that of fish. Pelvics 10-rayed, inserted below middle or posterior part of dorsal. About 42 scales in a longitudinal series.

Described from two specimens, 129 and 172 mm. in length, of which the larger is selected as the holotype.

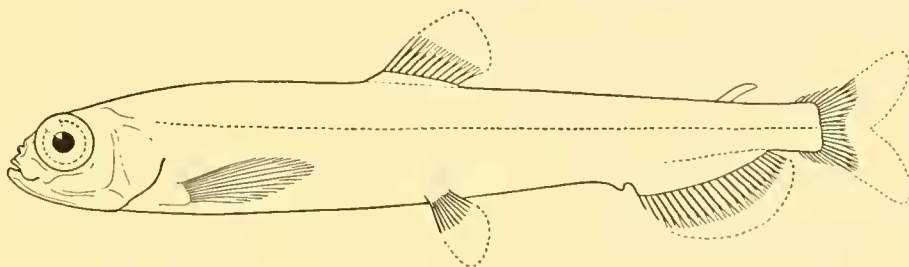


Fig. 5. *Bathylagus microcephalus*. Holotype. ($\times \frac{5}{8}$.)

Hab. South Atlantic.

This species is close to *B. antarcticus*, differing chiefly in the somewhat slenderer body, shorter head, smaller eye and rather longer snout, and the more anterior position of the dorsal fin.

Bathylagus glacialis, Regan.

Bathylagus antarcticus (part), Brauer, 1906, 'Valdivia' Tiefsee-Fische, p. 13, fig. 2.

Bathylagus glacialis (part), Regan, 1913, *Trans. R. Soc. Edinb.* XLIX (ii), p. 231, pl. ix, fig. 2.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 3 specimens, 24-34 mm.

St. 104. 31. x. 26. $41^{\circ} 33' 30''$ S, $17^{\circ} 58' 00''$ W. 1 m. tow-net, horizontal, 112 m.: 1 specimen, 45 mm.

St. 239. 2. vi. 27. $46^{\circ} 56' 00''$ S, $46^{\circ} 03' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1050-1350 (-0) m.: 2 specimens, 102-118 mm.

Depth of body 6 to $6\frac{1}{4}$ in the length, length of head $4\frac{1}{8}$ to $4\frac{1}{3}$. Diameter of eye $2\frac{1}{6}$ to $2\frac{1}{4}$ in length of head, interocular width $2\frac{3}{4}$ to 3, interorbital width about 6. Dorsal 10; origin nearer to end of snout than base of caudal, but nearer to adipose fin than end of snout. Anal 18-21; origin equidistant from base of caudal and insertion of pelvic or a little nearer the latter, $2\frac{3}{4}$ to $3\frac{1}{5}$ times as distant from end of snout as from base of caudal; length of base nearly 6 times in that of fish. Pelvics 8- or 9-rayed, inserted below middle of dorsal. 36 to 40 scales in a longitudinal series.

Described from four specimens, 80 to 135 mm. in length, including the types of the species.¹

¹ Of the five type-specimens of *B. glacialis* two are preserved in the British Museum collection, of which one proves to belong to *B. euryops*. The remainder are in the Royal Scottish Museum at Edinburgh: through the kindness of Dr J. Ritchie I have been able to examine these examples, and find them all identical with the type of *glacialis* in this museum.

Hab. North and South Atlantic; Antarctic.

In addition to the material collected by the 'Discovery' and that in the British Museum, I have examined another specimen, 135 mm. in length, from off Tearaght Rock, Co. Kerry, S.W. Ireland, at a depth of 720 to 695 fathoms, kindly lent to me by the National Museum of Ireland, Dublin.

Apart from its more slender form, somewhat larger head and shorter anal fin, this species is very close to *B. antarcticus*.

Bathylagus gracilis, Lönnberg.

Lönnberg, 1905, *Wiss. Ergebn. Schwed. Südpolar-Exped.* v (6), p. 68.

St. 72. 1. vi. 26. $41^{\circ} 43' 20''$ S, $42^{\circ} 20' 40''$ W. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 1 specimen, 65 mm.?

St. 76. 5. vi. 26. $39^{\circ} 50' 30''$ S, $36^{\circ} 23' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1500 (-0) m.: 2 specimens, 50-76 mm.

St. 151. 16. i. 27. $53^{\circ} 25' 00''$ S, $35^{\circ} 15' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1025-1275 m.: 5 specimens, 30-85 mm.

St. WS 303. 6. x. 28. $54^{\circ} 51' 24''$ S, $31^{\circ} 20' 12''$ W. 70 cm. tow-net, vertical, 1000-750 m.: 1 specimen, 50 mm.¹

St. WS 307. 7. x. 28. $54^{\circ} 19' 30''$ S, $30^{\circ} 31' 30''$ W. 70 cm. tow-net, vertical, 1000-780 m.: 1 specimen, 60 mm.¹

Closely related to *B. glacialis*, but depth of body 7 to $7\frac{1}{3}$ in the length, length of head $4\frac{1}{4}$ to $4\frac{3}{5}$. Diameter of eye about twice in length of head, interocular width about 4, interorbital width $6\frac{1}{2}$ to $7\frac{1}{2}$. Interorbital space deeply concave. Dorsal 10; origin equidistant from end of snout and adipose fin. Anal 19-20; origin $2\frac{2}{3}$ to 3 times as distant from end of snout as from base of caudal; length of base about 5 times in that of fish. 40 to 44 scales in a longitudinal series.

Described from four specimens, 50 to 85 mm. in length.

Hab. South Atlantic; Antarctic.

Bathylagus antarcticus, Günther.

Günther, 1878, *Ann. Mag. Nat. Hist.* (5), 11, p. 248; 1887, *Deep-Sea Fish.* 'Challenger', p. 220; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 129.

? *Bathylagus antarcticus* (part), Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 12.

St. 71. 30. v. 26. $43^{\circ} 20' 00''$ S, $46^{\circ} 02' 00''$ W. Young-fish trawl, 2000 (-0) m.: 1 specimen, 142 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 1 specimen, 200 mm. $4\frac{1}{2}$ m. net, horizontal, 350-400 m.: 3 specimens, 35-65 mm.

St. 151. 16. i. 27. $53^{\circ} 25' 00''$ S, $35^{\circ} 15' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1025-1275 m.: 2 specimens, 105-128 mm.

¹ A note on the label states that the specimens obtained by the 'William Scoresby' were alive and healthy when brought to the surface in the net, and that one of them lived for just under 12 hours after capture.

Depth of body $5\frac{1}{4}$ to $5\frac{3}{5}$ in the length, length of head $4\frac{1}{3}$ to $4\frac{3}{5}$. Diameter of eye $2\frac{1}{5}$ to $2\frac{1}{2}$ in length of head, equal to or less than postorbital part of head; interocular width 3 to $3\frac{1}{2}$, interorbital width $6\frac{2}{3}$ to 7. Dorsal 9-11; origin nearer to end of snout than base of caudal. Anal (21) 22-25; origin nearer insertion of pelvic than base of caudal, $2\frac{2}{3}$ to $3\frac{1}{6}$ times as distant from end of snout as from base of caudal; length of base $4\frac{1}{2}$ to $5\frac{1}{5}$ in that of fish. Pelvics 9- or 10-rayed, inserted below middle or posterior part of dorsal. 39-44 scales in a longitudinal series.

Described from eight specimens, 35 to 200 mm. in length, including the type of the species (105 mm.).

Bathylagus benedicti, Goode and Bean.

Goode and Bean, 1895, *Ocean. Ichth.* p. 55, fig. 64; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 529.

? *Bathylagus elongatus*, Roule, 1916, *Bull. Inst. Océan. Monaco*, 320, p. 8; 1919, *Rés. Camp. Sci. Monaco*, LII, p. 22, pl. i, fig. 2.

St. 72. 1. vi. 26. $41^{\circ} 43' 20''$ S, $42^{\circ} 20' 40''$ W. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 3 specimens, 120-135 mm.

St. 151. 16. i. 27. $53^{\circ} 25' 00''$ S, $35^{\circ} 15' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1025-1275 m.: 1 specimen, 115 mm.

Very close to the preceding species. Depth 5 to $5\frac{3}{5}$ in the length, length of head $4\frac{1}{5}$ to $4\frac{1}{3}$. Diameter of eye a little more than 2 in head, greater than postorbital part of head; interocular width $2\frac{2}{3}$ to nearly 3, interorbital width $5\frac{2}{3}$ to 6. Dorsal 9 or 10. Anal about 19; origin 3 to $3\frac{1}{5}$ times as distant from end of snout as from base of caudal; length of base $5\frac{3}{5}$ to $5\frac{2}{3}$ in that of fish.

Described from four specimens, 115 to 135 mm. in length.

Hab. North and South Atlantic.

Bathylagus pacificus, Gilbert.

Gilbert, 1890, *Proc. U.S. Nat. Mus.* XIII, p. 55; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 530; Gilbert, 1915, *Proc. U.S. Nat. Mus.* XLVIII, p. 312.

Bathylagus borealis, Gilbert, 1896, *Rep. U.S. Fish. Comm.* (1893), p. 402; Jordan and Evermann, 1898, *Bull. U.S. Nat. Mus.* XLVII (3), p. 2824.

Hab. Pacific coast of North America from the Bering Sea to southern California.

Bathylagus euryops, Goode and Bean.

Goode and Bean, 1895, *Ocean. Ichth.* p. 55, fig. 63; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 529.

Bathylagus euryops latifrons, Lönnberg, 1905, *Wiss. Ergebn. Schwed. Südpolar-Exped.* v (6), p. 67.

? *Bathylagus atlanticus*, Holt and Byrne, 1906, *Fisheries, Ireland, Sci. Invest.* 1905, II, p. 6, pl. i, figs. 3-4.

? *Bathylagus euryops*, Holt and Byrne, 1913, *ibid.* 1912, I, p. 24, fig. 10.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 1 specimen, 185 mm. $4\frac{1}{2}$ m. net, horizontal, 1410-1310 m.: 1 specimen, 152 mm.

St. 169. 22. ii. 27. $60^{\circ} 48' 50''$ S, $51^{\circ} 00' 20''$ W. Young-fish trawl, 1000–1100 m.: 1 specimen, 69 mm.?

St. 245. 10. vi. 27. $38^{\circ} 20' 00''$ S, $22^{\circ} 18' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1800–2000 m.: 1 specimen, 127 mm.

Depth of body $5\frac{1}{3}$ to $6\frac{1}{2}$ in the length, length of head $4\frac{1}{4}$ to $4\frac{2}{3}$. Diameter of eye $2\frac{1}{3}$ to $2\frac{3}{5}$ in length of head, interocular width $3\frac{1}{5}$ to $3\frac{1}{3}$, interorbital width about 6. Dorsal 9–10; origin a little nearer to end of snout than base of caudal. Anal 16–18; origin nearer base of caudal than insertion of pelvic, $3\frac{1}{3}$ to $3\frac{2}{3}$ times as distant from end of snout as from base of caudal; length of base $6\frac{1}{4}$ to $6\frac{2}{3}$ in that of fish. Pelvics 8- or 9-rayed, inserted below middle or posterior part of dorsal. 37 to 41 scales in a longitudinal series.

Described from five specimens, 69 to 185 mm. in length. In addition to the Discovery material I have examined one other specimen, 152 mm. in length, from $51^{\circ} 35' N$, $11^{\circ} 55' W$, at a depth of 720 fathoms, lent to me by the National Museum of Ireland.

Hab. North and South Atlantic.

Family GONOSTOMATIDAE MONOGRAPH OF THE FAMILY

The Gonostomatidae represent the most primitive family of the sub-order Stomiatoidea, which is distinguished from the Clupeoidea by the presence of photophores. According to Regan,¹ *Photichthys*, the most primitive genus, is very similar to *Elops* in skeletal characters. The family may be defined as follows:—

Elongate fishes, with or without scales; mouth moderate or rather large; suspensorium generally directed more or less obliquely backwards. No special postocular luminous organ, and no barbel. Gill-arches with gill-rakers. Dorsal fin in advance of or above anterior part of anal, generally followed by an adipose fin; pectorals low, pelvics nearly in the middle of the length. Skull elongate, with the parasphenoid nearly straight; parietals well developed, meeting or approaching each other above supraoccipital; epiotics separated by supraoccipital; basisphenoid and alisphenoids present; no orbitosphenoid. Praemaxillary without anterior expansion; maxillary with two supplemental bones. Post-temporal forked; mesocoracoid present.

Fourteen genera, all of which are oceanic in habitat.

Synopsis of the Genera

- I. Serial photophores on body arranged in continuous longitudinal rows; pseudobranchiae absent or very feebly developed. (Gonostomatinae)
 - A. A single series of photophores on each side of abdomen; origin of dorsal fin nearly opposite to that of anal.
 1. Origin of dorsal fin a little behind that of anal; no adipose fin; dorsal with 20 rays, anal with 29 rays. 1. *Bonapartia*
 2. Origin of dorsal fin a little in front of that of anal; adipose fin present; dorsal with 16 rays, anal with 23–26 rays. 2. *Margrethia*

¹ 1923, *Ann. Mag. Nat. Hist.* (9), xi, p. 613.

B. Two series of photophores on each side of abdomen.

1. Interorbital region rather wide; eyes normal; mouth large; teeth well developed; origin of dorsal behind pelvics.

a. No additional serial photophores on sides of body.

* Origin of dorsal fin opposite to or behind that of anal.

† Praemaxillary and maxillary with a continuous series of long acute teeth, set at fairly regular intervals, with much smaller teeth in the interspaces between them; second suborbital more or less enlarged; eye of moderate size; anal with 22 to 31 rays.

3. *Gonostoma*

†† Praemaxillary with few teeth; maxillary with a series of small teeth, increasing in size from before backwards, some of them at more or less irregular intervals a little enlarged; second suborbital not enlarged; eye small; anal with 16 to 20 rays.

4. *Cyclothone*

* Origin of dorsal fin in advance of that of anal.

† Origin of dorsal fin a little in advance of that of anal, which commences below its middle or posterior part.

‡ Anal with 23 to 32 rays.

5. *Yarella*

‡‡ Anal with 14 to 15 rays.

6. *Vinciguerria*

†† Origin of dorsal fin well in advance of that of anal, which commences at some distance behind it.

7. *Photichthys*

b. An additional series of photophores along the lateral line, and sometimes one or more rows of luminous spots between these and the two abdominal series; no adipose fin.

* Body moderately elongate; dorsal with 10 to 16 rays, origin nearer to base of caudal than end of snout; anal with 26 to 39 rays.

8. *Manducus*

** Body very elongate; dorsal with 9 to 11 rays, origin a little nearer to end of snout than base of caudal; anal with 55 to 63 rays.

9. *Diplophos*

*** Body moderately elongate; dorsal with 10 rays, origin more than twice as near to end of snout as to base of caudal; anal with 56 to 71 rays.

10. *Triplophos*

2. Interorbital region very narrow; eyes telescopic; mouth small, the lower jaw included; teeth minute; origin of dorsal in front of pelvics, which are nearer to base of caudal than end of snout.

11. *Ichthyococcus*

II. Photophores large and conspicuous; serial photophores on body more or less distinctly divided into groups; pseudobranchiae present. (Maurolicinae)

A. Origin of dorsal fin in advance of that of anal.

1. Series of photophores between pelvic and origin of anal separated from that above anterior part of anal fin; origin of dorsal nearer to base of caudal than end of snout; 25 to 27 gill-rakers on lower part of anterior arch.

12. *Maurolicus*

2. Series of photophores between pelvic and origin of anal continuous with that above anterior part of anal fin; origin of dorsal nearer to end of snout than base of caudal; about 16 gill-rakers on lower part of anterior arch.

13. *Argyripnus*

B. Origin of dorsal fin opposite to that of anal; photophores above and behind the anal arranged in four or five small groups, each group on a black background. 14. *Valenciennellus*

Genus *Bonapartia*, Goode and Bean

Goode and Bean, 1895, *Ocean. Ichth.* p. 102.¹

Zaphotias (Goode and Bean), Jordan and Evermann, 1898, *Bull. U.S. Nat. Mus.* XLVII (3), p. 2826.

Cleft of mouth wide. Both jaws with strong acute teeth set at more or less regular intervals, and with much smaller teeth in the interspaces; a single series of minute teeth on each palatine, somewhat enlarged anteriorly; a patch of similar teeth on the pterygoid. Gill-openings very wide; gill-rakers long, comparatively few in number. Scales large, cycloid. A single series of photophores on either side of the abdomen. Dorsal 19; no adipose fin. Anal 29-30; origin a little in advance of that of dorsal; anterior rays greatly prolonged. Pectoral and pelvic small.

A single species.

Bonapartia pedaliota, Goode and Bean.

Goode and Bean, 1895, *Ocean. Ichth.* p. 102, fig. 120; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 580; Jespersen and Täning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 221, pl. xvii, figs. 7-8.

Zaphotias pedaliotus, Jordan and Evermann, 1898, *ibid.* XLVII (3), p. 2826.

St. 282. 12. viii. 27. 1° 11' 00" S, 5° 38' 00" E. Young-fish trawl, 300 (-0) m.: 1 specimen, 47 mm.

Depth of body $4\frac{1}{2}$ in the length, length of head $3\frac{2}{5}$. Snout about as long as eye, diameter of which is nearly 4 in length of head and a little greater than interorbital width. About 12 gill-rakers on lower part of anterior arch. About 40 scales in a longi-

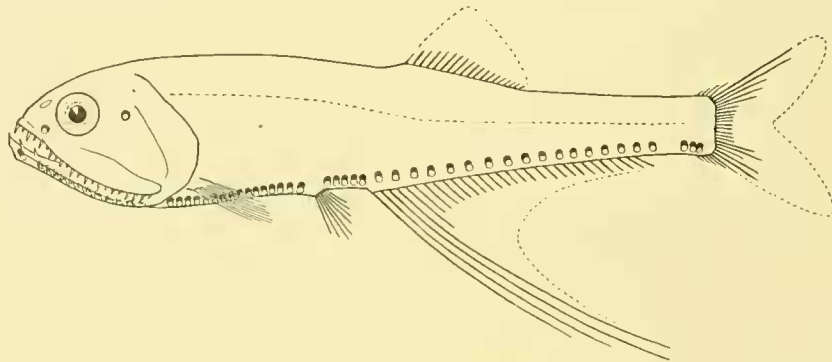


Fig. 6. *Bonapartia pedaliota*. ($\times 2$.)

tudinal series. Dorsal 19; origin equidistant from posterior margin of eye and base of caudal. Anal 29-30; origin equidistant from end of snout and base of caudal; the anterior rays greatly prolonged, the third and fourth about $\frac{1}{2}$ length of fish, reaching caudal when laid back; base of fin more than twice as long as that of dorsal. Pectoral

¹ Goode and Bean's *Oceanic Ichthyology* was first published as a *Special Bulletin of the United States National Museum*, bearing the date 1895 on the title-page. It was subsequently published as *Memoir XXII of the Museum of Comparative Zoology* (1896), and as a *Smithsonian Contribution to Knowledge*, xxx (1896). Büttikofer's note of the name *Bonapartia* (Aves) occurs in *Notes Leyden Museum*, xviii, June, 1896, p. 58.

with 16 rays. Pelvic 8(?); origin equidistant from end of snout and last anal rays. A pair of photophores at the symphysis of the mandibles and about 12 between the branchiostegal rays; a single photophore in front of the lower corner of the orbit and another in front of the upper part of the operculum; a single series on the abdomen, consisting of 16 from gill-opening to pelvic, 5 from pelvic to origin of anal, 17 from origin of anal to just behind the last ray, and a group of 3 placed close together on lower edge of caudal peduncle.

Described from a single specimen, 47 mm. in length.

Hab. Atlantic.

As has already been pointed out by Jespersen and Tåning, these specimens from the eastern Atlantic differ somewhat from those described by Goode and Bean from off the coast of Florida. According to their original account the jaws are "armed with a single series of not very numerous, acicular teeth, uniform in size..." Further, the pelvic and anal fins are further forward in examples from the eastern Atlantic, the anterior anal rays are more produced, and there are differences in the number and arrangement of the photophores. There are, however, certain discrepancies between the description and the figure in Goode and Bean's work, and I follow Jespersen and Tåning in identifying my specimens as *B. pedaliota*.

Genus *Margrethia*, Jespersen and Tåning

Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 222.

Closely allied to *Bonapartia*, differing in the rather more anterior insertion of the dorsal fin, and in the presence of an adipose fin.

A single species.

Margrethia obtusirostra, Jespersen and Tåning.

Jespersen and Tåning, 1919, *l.c.* p. 222, pl. xvii, figs. 11-12.

5 + 7 + 3 gill-rakers on the first arch. Dorsal 16; origin nearer to posterior margin of eye than base of caudal, a little in advance of that of anal. Anal 23-26; anterior rays somewhat longer than those that follow. Pectoral with about 14 rays. Pelvic 8. Photophores on head similar to *Bonapartia*; the single series on the abdomen consisting of 14-15 from gill-opening to pelvic, 4 from pelvic to origin of anal, 13 above the anal fin, and a group of 4 placed close together on the lower edge of the caudal peduncle.

The original description was based on several postlarval and adolescent specimens, $6\frac{3}{4}$ to 19 mm. in length, all taken at a depth of about 150 mm.

Hab. Eastern Atlantic.

Genus *Gonostoma*, Rafinesque

Rafinesque, 1810, *Ind. itt. Sicil.* p. 64.

Sigmops, Gill, 1884, *Proc. U.S. Nat. Mus.* vi (1883), p. 256.

Neostoma, Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman', Poissons*, p. 96.

Cyclothone (part), Goode and Bean, 1895, *Ocean. Ichth.* p. 99.

Cleft of mouth wide; both jaws with strong acute teeth set at more or less regular intervals, and with much smaller teeth in the interspaces; a series of minute teeth on

each palatine, with two or three larger ones anteriorly; vomerine teeth present or absent; a patch of minute teeth on each pterygoid. Eye of moderate size. Second suborbital more or less enlarged. No pseudobranchiae; gill-openings very wide; gill-rakers long, comparatively few in number. Scales present or absent. Serial photophores in two rows on each side of the abdomen, or with the upper row irregularly arranged on the side of the body. Dorsal 11-17. Anal 22-31; origin opposite to or in advance of that of dorsal.

Four species.

Synopsis of the Species

- I. Second suborbital greatly enlarged, covering the entire cheek; vomer without teeth; body completely covered with scales. 1. *denudatum*
- II. Second suborbital moderately enlarged, not nearly covering cheek; vomer with a pair of conical teeth; scales, if present, only developed on anterior and posterior parts of body, and in association with photophores.
 - A. Origin of anal very little in advance of dorsal; adipose fin present; dorsal with 13 to 16 rays.
 1. Eye $6\frac{1}{4}$ to $7\frac{1}{4}$ in head; anal with 29 to 31 rays; photophores conspicuous, arranged in two longitudinal series placed close together near the abdomen. 2. *elongatum*
 2. Eye $7\frac{1}{2}$ to 9 in head; anal with 22 to 24 rays; photophores very indistinct, the upper series irregular and situated on side of body. 3. *bathyphilum*
 - B. Origin of anal well in advance of that of dorsal; dorsal with 11 rays. 4. *gracile*

Gonostoma brevidens (Kner) Steindachner, and *G. raoulensis*, Waite, both belong to the genus *Vinciguerria*.

Gonostoma denudatum, Rafinesque.

Gonostoma denudatum (-a), Rafinesque, 1810, *Ind. itt. Sicil.* p. 65; Bonaparte, 1841, *Icon. Faun. Ital.* (27), Indice (4) and (138), fig.; Cuvier and Valenciennes, 1849, *Hist. Nat. Poiss.* xxii, p. 376; Johnson, 1862, *Ann. Mag. Nat. Hist.* (3) x, p. 279; Günther, 1864, *Cat. Fish.* v, p. 391; 1887, *Deep-sea Fish, 'Challenger'*, p. 172; Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman'*, *Poissous*, p. 102; Moreau, 1891, *Hist. Nat. Poiss. France, Suppl.* p. 79; Goode and Bean, 1895, *Ocean. Ichth.* p. 98, fig. 116; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 579; Brauer, 1906, *'Valdivia' Tiefsee-Fische*, p. 73, fig. 26; Sanzo, 1912, *Mem. R. Com. Talass. Ital.* ix, p. 1, figs.; Jespersen and Tåning, 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, p. 4, figs.

Gasteropelecus acanturus, Cocco, 1829, *Giorn. Sci. Lett. Sicilia*, xxvi, p. 145.

Gonostomus acanthurus, Cocco, 1838, *N. Ann. Sci. Nat.* 11, p. 163.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 5 specimens, 28-45 mm.

St. 293. 24. viii. 27. $4^{\circ} 18' 15''$ N, $16^{\circ} 51' 00''$ W. Young-fish trawl, 100-120 (-0) m.: 3 specimens, 35-40 mm.

St. 295. 25. viii. 27. $5^{\circ} 30' 30''$ N, $17^{\circ} 45' 00''$ W. Young-fish trawl, 2500-2700 m.: 1 specimen, 30 mm.

St. 296. 26. viii. 27. $8^{\circ} 12' 00''$ N, $18^{\circ} 49' 00''$ W. Young-fish trawl, 450-500 (-0) m.: 1 specimen, 50 mm.

Depth $5\frac{1}{3}$ to 6 in the length, length of head about 4. Snout about as long as eye, diameter of which is $4\frac{1}{2}$ (young) to $5\frac{3}{4}$ in length of head and about equal to interorbital

width. Second suborbital greatly enlarged, covering entire cheek. Vomer toothless. The whole body covered with thin cycloid scales; about 36 in a longitudinal series. 10 or 11 gill-rakers on lower part of anterior arch. Dorsal 14-16 (17); origin about equidistant from root of pectoral and base of caudal. Adipose fin rather small. Anal 29-31; origin opposite to that of dorsal. Pectoral with 11 or 12 rays. Pelvic 8; origin equidistant from tip of lower jaw and base of caudal or a little nearer the former. A pair of photophores at the symphysis of the mandibles, and a series of nine between the branchiostegal rays; a single photophore in front of the lower corner of the orbit; a narrow vertical streak in front of the operculum, with one luminous spot above and two below; three larger luminous patches at base of caudal fin, one above and two below; lower series of photophores on body consisting of 5 in front of the pectoral fin, 10 or 11 from pectoral to pelvic, 5 from pelvic to origin of anal, and 17-19 from anal to base of caudal; in the upper series there are 13-15 (1 + 9 + 3 + 0-2).

Described from 18 specimens, 28 to 140 mm. in length.

Hab. Mediterranean and Eastern Atlantic.¹

Two distinct sub-species of *Gonostoma denudatum* may be recognised, and the main differences between them have already been pointed out by Jespersen and Tåning.² The true *denudatum* occurs in the Mediterranean and in the neighbouring parts of the Atlantic; the specimen from Madeira described by Johnson belongs to this sub-species. The other, which may be called *atlanticum* (n.subsp.), occurs only in the Eastern Atlantic, and may be recognised chiefly by the greater number of gill-rakers and by the arrangement of the photophores above the origin of the anal fin. The dorsal fin seems to be inserted a little further forward in this form, but my material is not sufficient to be certain of this. The two sub-species may be recognised as follows:—

I. Usually 5 + 10 gill-rakers on the first arch; first two photophores above the anal fin placed much higher than the two which follow, which are themselves situated lower than the remainder.

denudatum

II. Usually 6 + 11 gill-rakers on the first arch; all the anterior photophores above the anal fin forming an unbroken series at about the same level.

atlanticum

Gonostoma elongatum, Günther.

Gonostoma elongatum, Günther, 1878, *Ann. Mag. Nat. Hist.* (5) 11, p. 187; 1887, *Deep-Sea Fish. 'Challenger'*, p. 173, pl. xlv, fig. B; Alcock, 1891, *Ann. Mag. Nat. Hist.* (6) viii, p. 127; 1892, *ibid.* (6) x, p. 354; Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 75, pl. iv, fig. 4; Weber, 1913, '*Siboga*' *Fische*, p. 17; Weber and Beaufort, 1913, *Fish. Indo-Austral. Arch.* 11, p. 122, fig. 45. *Sigmops stigmaticus*, Gill, 1884, *Proc. U.S. Nat. Mus.* vi (1883), p. 256.

Neostoma elongatum, Collett, 1896, *Bull. Soc. zool. France*, xxi, p. 96.

Cyclothone elongata, Goode and Bean, 1895, *Ocean. Ichth.* p. 101, fig. 119; Alcock, 1899, *Cat. Indian Deep-Sea Fish.* p. 139.

Cyclothone (Sigmops) elongata, Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* xlvii (1), p. 583.

¹ According to Goode and Bean this species was taken in the Western Atlantic off the New England coast in 1881, and from off the Californian coast by the 'Albatross'. These specimens have not yet been described.

² I am greatly indebted to Mr A. V. Tåning for notes on these sub-species.

Cyclothone rhodadenia, Gilbert, 1905, *Bull. U.S. Fish. Comm.* XXIII (1903), p. 602, pl. lxxi, fig. 1.

Gonostoma polyphos, Zugmayer, 1911, *Bull. Inst. Océan. Monaco*, 193, p. 4; 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 47, pl. ii, fig. 2; Roule, 1919, *ibid.* LII, p. 27.

?? *Gonostoma rhodadenia*, Weber, 1913, 'Siboga' *Fische*, p. 18; Weber and Beaufort, 1913, *Fish. Indo-Austral. Arch.* 11, p. 121.

St. 85. 23. vi. 26. $33^{\circ} 07' 40''$ S, $4^{\circ} 30' 20''$ E. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 1 specimen, 200 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 1 specimen, 195 mm.

St. 256. 23. vi. 27. $35^{\circ} 14' 00''$ S, $6^{\circ} 49' 00''$ E. Young-fish trawl, 850-1100 (-0) m.: 1 specimen, 200 m.

St. 280. 10. viii. 27. $00^{\circ} 36' 00''$ S, $8^{\circ} 28' 00''$ E. Young-fish trawl, 100-200 (-0) m.: 1 specimen, 135 mm.

St. 281. 12. viii. 27. $00^{\circ} 46' 00''$ S, $5^{\circ} 49' 15''$ E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 42 mm.

St. 282. 12. viii. 27. $1^{\circ} 11' 00''$ S, $5^{\circ} 38' 00''$ E. Young-fish trawl, 300 (-0) m.: 1 specimen, 160 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 7 specimens, 140-180 mm.

St. 286. 17. viii. 27. $3^{\circ} 06' 30''$ S, $3^{\circ} 53' 00''$ W. Young-fish trawl, 125 (-0) m.: 1 specimen, 55 mm.

Depth of body $6\frac{3}{4}$ to $7\frac{1}{4}$ in the length, length of head $4\frac{3}{5}$ to $4\frac{4}{5}$. Snout as long as or a little longer than eye, diameter of which is $6\frac{1}{4}$ to $7\frac{1}{4}$ in length of head and $1\frac{1}{5}$ to $1\frac{1}{3}$ in the interorbital width. Suborbital moderately enlarged, not covering the entire cheek. Vomer with a pair of conical teeth. Scales mostly wanting, but sometimes traces of scales associated with photophores immediately behind the head and in the tail region. About 12 gill-rakers on the lower part of the anterior arch. Dorsal 13-15; origin somewhat nearer to root of pectoral than base of caudal. Adipose fin well developed. Anal 29-31; origin very little in advance of that of dorsal. Pectoral with 11-13 rays. Pelvic 8; origin much nearer to tip of lower jaw than base of caudal. Photophores conspicuous; a pair at the symphysis of the mandibles and a series of 8 or 9 between the branchiostegal rays; a luminous patch below the eye and immediately above the jaw, connected with a photophore in front of the lower corner of the orbit; a small indistinct spot behind the end of the maxillary, and another on the upper part of the praeoperculum, the latter connected with a vertical luminous streak; one supracaudal and two infracaudal patches as in the preceding species; lower series of photophores on body consisting of 4 in front of the pectoral fin, 11 from pectoral to pelvic, 4 from pelvic to origin of anal, and 19-22 from anal to base of caudal; in the upper series there are 14 or 15 (8-9+3-4+2-3). Uniformly blackish.

Described from 16 specimens, 55 to 200 mm. in length, including the types of the species.

Hab. North and South Atlantic; Indian Ocean; Hawaiian Islands.

Gonostoma bathyphilum (Vaillant).

Neostoma bathyphilum, Vaillant, 1884, *La Nature*, xxii, p. 184, fig.; 1888, *Expéd. Sci. 'Travailleur' et 'Talisman'*, Poissons, p. 96, pl. viii, fig. 1.

Cyclothone bathyphila, Goode and Bean, 1895, *Ocean. Ichth.* p. 100, fig. 118.

? *Gonostoma brevidens*, Goode and Bean, *t.c.* p. 98, fig. 117.

Cyclothone grandis, Collett, 1896, *Bull. Soc. zool. France*, xxi, p. 99.

Gonostoma bathyphilum, Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 73; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 49, pl. ii, fig. 1; Holt and Byrne, 1913, *Fisheries, Ireland, Sci. Invest.* 1912, 1, p. 11, figs. 3-4; Roule, 1919, *Rés. Camp. Sci. Monaco*, lii, p. 27.

Gonostoma grandis, Barnard, 1925, *Ann. S. Afric. Mus.* xxi, p. 143.

St. 81. 18. vi. 26. 32° 45' 00" S, 8° 47' 00" W. 4½ m. net, horizontal, 650 (-0) m.: 2 specimens, 29-35 mm.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 3 specimens, 30-70 mm.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 850-950 m.: 1 specimen, 60 mm. 4½ m. net, horizontal, 1310-1410 m.: 3 specimens, 80-130 mm.

Depth of body 6½ to 6⅔ in the length, length of head 4 to 4½. Snout longer than eye, diameter of which is 7½ to 9 in length of head and nearly twice in the interorbital width. Suborbital moderately enlarged, not covering entire cheek. A pair of conical teeth on the vomer. Scales absent. About 15 gill-rakers on lower part of anterior arch. Dorsal 12-14; origin about equidistant from occipital region and base of caudal. Adipose fin well developed. Anal 22-24; origin very little in advance of that of dorsal. Pectoral with 7-10 rays. Pelvic 7 or 8; origin much nearer to tip of lower jaw than base of caudal. Photophores small and indistinct; a series between the branchiostegal rays; a narrow luminous streak below the eye, and another on the praeoperculum; one supracaudal and two infracaudal luminous patches; lower series of photophores on body consisting of 2 or 3 in front of the pectoral fin, 8 or 9 from pectoral to pelvic, 3 from pelvic to origin of anal, and 19-20 from anal to base of caudal; the upper series, consisting of 14 photophores irregularly arranged on the side of the body, ends opposite to the origin of the dorsal fin. Uniformly blackish.

Described from 13 specimens, 29 to 130 mm. in length.

Hab. North and South Atlantic.

Gonostoma brevidens (Kner and Steindachner), Goode and Bean, from the Western Atlantic, may be this species, but there are several discrepancies between their description and figure. The number of anal rays, for example, is given as 17-19, but about 26 are shown in the figure. I am indebted to the Director of the Museum of Comparative Zoology, Cambridge, Mass., for some young examples collected by the 'Blake' and identified as this species, but these prove to be *Cyclothone microdon*.

Gonostoma gracile, Günther.

Gonostoma gracile, Günther, 1878, *Ann. Mag. Nat. Hist.* (5), 11, p. 187; 1887, *Deep-Sea Fish. 'Challenger'*, p. 174, pl. xlv, fig. C.

Neostoma gracile, Collett, 1896, *Bull. Soc. zool. France*, XXI, p. 96; Jordan, Tanaka and Snyder, 1913, *J. Coll. Sci. Tokyo*, XXXIII (1), p. 50.

Depth of body 8 to 9 in the length, length of head about 5. Snout about as long as eye, diameter of which is 6 to $6\frac{1}{2}$ in length of head and about equal to interorbital width. Suborbital moderately enlarged, not covering entire cheek. A pair of conical teeth on the vomer. Scales apparently absent. About 13 gill-rakers on lower part of anterior arch. Dorsal 11; origin about equidistant from gill-opening and base of caudal. No adipose fin. Anal 26-27; origin well in advance of that of dorsal. Pectoral with 11 rays. Pelvic 7; origin much nearer to tip of lower jaw than base of caudal. Photophores rather small and indistinct; a series between the branchiostegal rays; a luminous patch below the eye, in front of which is a small photophore; another, but smaller patch on the praeoperculum; one supracaudal (?) and two infracaudal luminous patches; some scattered photophores on sides of body in addition to the two rows on the abdomen; lower series of photophores consisting of 10 from pectoral to pelvic, 3 or 4 from pelvic to origin of anal, and 16 (?) from anal to base of caudal; there appear to be 7 in the upper series; an oblique row of 5 photophores is present on the isthmus, running upwards to the base of the pectoral fin. Uniformly blackish.

Described from two specimens, 58 to 110 mm. in length; types of the species.

Hab. South of Japan.

Genus *Cyclothone*, Goode and Bean

Goode and Bean, 1883, *Bull. Mus. Comp. Zool.* x, p. 221; Collett, 1896, *Bull. Soc. zool. France*, XXI, p. 96.

Close to *Gonostoma*, but with a small eye; second suborbital not enlarged; prae-maxillary with few teeth; maxillary with a series of small teeth, increasing in size from before backwards, some of them at more or less irregular intervals somewhat enlarged. Dorsal 13 to 15. Adipose fin present or absent. Anal 16 to 20; origin about opposite to that of dorsal.

About six species.

I have not attempted a revision of the species of this genus, as my material is quite inadequate. Further, a good revision has been published by Brauer in 1906 ('*Valdivia*' *Tiefsee-Fische*, p. 77), and, apart from an important paper by Jespersen and Tåning (1926, *Rep. Danish Ocean. Exped.* 1908-1910, II, A, 12, p. 7), based on extensive material from the Mediterranean and the adjacent parts of the Atlantic, little has been added to our knowledge of the group since that date.¹

Cyclothone signata, Garman.

Garman, 1899, *Mem. Mus. Comp. Zool.* XXIV, p. 246, pl. J, fig. 3.

Hab. Gulf of Panama; Atlantic (?).

¹ Pappenheim (1914, *Deutsche Südpolar-Exped.* xv, Zool. VII) has listed a number of specimens of *Cyclothone* from the North and South Atlantic, but gives no descriptions. See also Roule (1919, *Rés. Camp. Sci. Monaco*, LII, p. 27).

Cyclothone signata alba, Brauer.

Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 80, fig. 30.

Hab. Atlantic and Indian Oceans.

Cyclothone braueri, Jespersen and Tåning.

Cyclothone signata (*non* Garman), Brauer, *t.c.* p. 78, pl. vi, fig. 6, text-figs. 28, 29.

Cyclothone braueri, Jespersen and Tåning, 1926, *Rep. Danish Ocean. Exped.* 1908-10, 11, A, 12, p. 7, figs.

St. 89. 28. vi. 26. 34° 05' 15" S, 16° 00' 45" E. Young-fish trawl, 1000 (-0) m.: 43 specimens, 15-42 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800-1000 (-0) m.: 60 specimens, 23-58 mm.

16. x. 25. 29° 26' N, 15° 07' W. 2 m. tow-net, horizontal, 900 (-0) m.: 28 specimens, 13-37 mm.

Hab. Mediterranean; North and South Atlantic; Caribbean Sea.

Cyclothone livida, Brauer.

Brauer, 1902, *Zool. Anz.* xxv, p. 279; 1906, 'Valdivia' *Tiefsee-Fische*, p. 80, pl. vi, fig. 5, text-fig. 31.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850-950 (-0) m.: 40 specimens, 20-42 mm.

St. 298. 29. viii. 27. 13° 01' 45" N, 21° 34' 45" W. Young-fish trawl, 900-1200 (-0) m.: 7 specimens, 23-35 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 31 specimens, 25-50 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 12 specimens, 21-53 mm.

Hab. North and South Atlantic.

Cyclothone microdon (Günther).¹

Günther, 1878, *Ann. Mag. Nat. Hist.* (5), 11, p. 187; 1887, *Deep-Sea Fish.* 'Challenger', p. 175; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 82, pl. vi, fig. 4, text-fig. 32; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 43; Regan, 1916, *Larval Fish.* 'Terra Nova', p. 137, pl. v, fig. 5.

Neostoma quadrioculatum, Vaillant, 1888, *Expéd. Sci.* 'Travailleur' et 'Talisman', *Poissons*, p. 99, pl. viii, fig. 2.

The 'Discovery' obtained more than 500 specimens of this species from the following stations in the North and South Atlantic, at depths ranging from 0-2500 m., measuring from 12 to 70 mm. in length: St. 9, 71, 72, 76, 78, 79, 81, 85, 86, 87, 89, 100, 151, 169, 239, 245, 256.²

Hab. Arctic Ocean; North and South Atlantic; Antarctic Ocean; Indian Ocean; Pacific.

¹ For full synonymy see Brauer (1906).

² A list of these stations is given at the beginning of this report.

Cyclothone microdon pallida, Brauer.

Brauer, 1902, *Zool. Anz.* xxv, p. 281; 1906, 'Valdivia' *Tiefsee-Fische*, p. 84, pl. vi, fig. 2, text-fig. 33; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 44, pl. II, fig. 3.

Hab. Atlantic and Indian Oceans.

Cyclothone microdon pygmaea, Jespersen and Tåning.

Jespersen and Tåning, 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, p. 7, figs.

Hab. Mediterranean and neighbouring parts of the Atlantic.

Cyclothone acclinidens, Garman.

Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 247, pl. J, fig. 4; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 85, pl. vi, fig. 1, text-fig. 34.

Hab. Atlantic and Indian Oceans; Pacific.

Cyclothone atraria, Gilbert.

Gilbert, 1905, *Bull. U.S. Fish. Comm.* xxiii (1903), p. 605, pl. lxxii, fig. 2.

Hab. Hawaiian Islands.

Cyclothone canina, Gilbert.

Gilbert, 1905, *t.c.* p. 604, pl. lxxi, fig. 2.

Hab. Hawaiian Islands.

Cyclothone obscura, Brauer.

Brauer, 1902, *Zool. Anz.* xxv, p. 280; 1906, 'Valdivia' *Tiefsee-Fische*, p. 88, pl. vi, fig. 3, text-fig. 35.

St. 295. 25. viii. 27. 5° 30' 30" N, 17° 45' 00" W. Young-fish trawl, 2500-2700 (-0) m.: 5 specimens, 25-60 mm. (?).

Hab. Atlantic and Indian Oceans.

Genus **Yarrella**, Goode and Bean

Goode and Bean, 1895, *Ocean. Ichth.* p. 103.

Polymetme, McCulloch, 1926, *Biol. Res. 'Eudeavour'*, v, p. 166.

Close to *Gonostoma*, but whole of body covered with deciduous scales. Photophores conspicuous. Dorsal 10-12. Anal 23-32; origin below middle or posterior part of dorsal.

Two species.

Yarrella blackfordi, Goode and Bean.

Goode and Bean, 1895, *Ocean. Ichth.* p. 103, fig. 121; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 584, fig. 249; Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 223, pl. xvii, fig. 13.

St. 273. 31. vii. 27. $9^{\circ} 38' 00''$ S, $12^{\circ} 42' 30''$ E. 1 m. tow-net, oblique, 118 (–) m.: 8 specimens, 33–45 mm.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. 1 m. tow-net, oblique, 110 (–) m.: 2 specimens, 40–50 mm.

Depth of body $6\frac{1}{2}$ to 7 in the length, length of head $4\frac{1}{2}$ to $4\frac{3}{4}$. Snout somewhat longer than eye, diameter of which is $4\frac{1}{4}$ to $5\frac{1}{4}$ in length of head and about equal to interorbital width. About 12 gill-rakers on lower part of anterior arch. Dorsal 10–12; origin about equidistant from base of caudal and anterior margin of eye. Anal 23–30; origin below middle of dorsal. Pectoral with 8 rays. Pelvic 7; origin equidistant from tip of lower jaw and posterior part of anal. Lower series of photophores consisting of 9 in front of pectoral, 12 or 13 from pectoral to pelvic, 7 or 8 from pelvic to origin of anal, and 20 or 21 from anal to base of caudal; there are 19 or 20 photophores in the upper series.

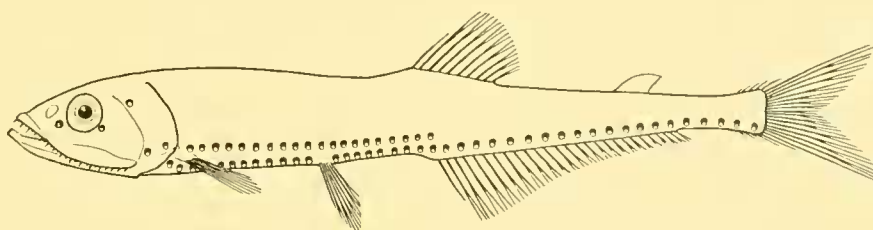


Fig. 7. *Yarrella blackfordi*. ($\times 2\frac{1}{2}$.)

Described from 16 specimens, 28 to 50 mm. in length.

Hab. Atlantic.

The above specimens differ in several respects from the description of Goode and Bean, but in view of their small size I have followed Jespersen and Tåning in identifying them with that species.

Yarrella corythaeola (Alcock).

Diplophos corythaeolum, Alcock, 1898, *Ann. Mag. Nat. Hist.* (7), 11, p. 147; 1899, *Illust. Zool. 'Investigator'*, *Fishes*, pl. xxv, fig. 3.

Photichthys corythaeolus, Alcock, 1899, *Cat. Indian Deep-Sea Fish.* p. 142.

Yarrella africana, Gilchrist and Von Bonde, 1924, *Rep. Fish. Mar. Biol. Surv. S. Afr.* 111 (1922), *Spec. Rep.* VII, p. 8, pl. i, fig. 2; Barnard, 1925, *Ann. S. Afr. Mus.* XXI, p. 148.

Polymetme illustris, McCulloch, 1926, *Biol. Res. 'Endeavour'*, v, p. 167, pl. xlv, fig. 1.

Depth of body 5 to 6 in the length, length of head 4 to $4\frac{3}{5}$. Snout as long as or a little shorter than eye, diameter of which is 4 to $4\frac{1}{4}$ in length of head and a little greater than interorbital width. About 12 gill-rakers on lower part of anterior arch. Dorsal 11–12; origin about equidistant from end of snout and base of caudal. Anal 24–32; origin below last rays of dorsal. Pectoral with 10 or 11 rays. Pelvic 7; origin equidistant from tip of lower jaw and last rays of anal. Lower series of photophores consisting of 9 in front of pectoral, 11 from pectoral to pelvic, 8 from pelvic to origin of anal, and 22–24 from anal to base of caudal; there are 18–19 photophores in the upper series.

Described from 2 specimens, 103 and 130 mm. in length; one is the type of *Diplophos corythaeolum*, and the other a paratype of *Polymetme illustris* received in exchange from the Australian Museum.

Hab. Coast of Natal; Andaman Sea; Southern Australia.

I have no hesitation in uniting these three species. The number and arrangement of the photophores is exactly the same in all of them, and the only difference is in the number of anal rays—about 24 in *corythaeola*, 27–32 in *illustris*, and 25 in *africana*.

Genus *Vinciguerria*, Goode and Bean

Poweria, Bonaparte, 1840, *Icon. F. Ital.* 111 (under *Ichthyococcus poweriae*), sign. 1838** [2].

Vinciguerria (Jordan and Evermann), Goode and Bean, 1895, *Ocean. Ichth.* p. 513; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 577.

Zalarges (Jordan and Williams) Jordan and Starks, 1895, *Proc. Calif. Acad. Sci.* (2), v, p. 793.

Close to *Gonostoma* and *Yarrella*. Both jaws with a single series of teeth of varying sizes; teeth present on vomer, palatines and pterygoids. Scales developed. Photophores conspicuous. Dorsal 13–14. Anal 14–15; origin below middle or posterior part of dorsal.

Five or six species.

I have not sufficient material to undertake a revision of this genus, but give a list of the species, with a fairly complete synonymy in each case. The species are so close to one another that in many cases it is impossible to be certain as to which one any particular author was considering unless a reliable figure is provided. For this reason, the synonymies given below cannot be regarded as more than tentative. Jespersen and Tåning have given a full account of the two Mediterranean species (*V. poweriae* and *V. attenuata*) and have pointed out the characters which distinguish these from *V. sanzoi* and *V. lucetia*. The four species may be recognised as follows:—

- I. No photophores at the symphysis of the mandibles.
 - A. Length of row of photophores from origin of anal to base of caudal shorter than head; 12 (occasionally 11) gill-rakers on lower part of anterior arch. 1. *poweriae*
 - B. Length of row of photophores from origin of anal to base of caudal longer than head; usually 14 gill-rakers on lower part of anterior arch. 2. *attenuatus*
- II. A pair of photophores at the symphysis of the mandibles.
 - A. 24–25 (13 + 11–12) photophores in the upper series; 13–14 gill-rakers on lower part of anterior arch; dorsal with 14–15 rays; anal with 13–15 rays. 3. *sanzoi*
 - B. 21–22 (11–12 + 10–11) photophores in the upper series; 19–20 gill-rakers on lower part of anterior arch; dorsal with 13–14 rays; anal with 14–16 rays. 4. *lucetia*¹

Vinciguerria poweriae (Cocco).

Gonostomus poweriae, Cocco, 1838, *N. Ann. Sci. Nat.* 11, p. 167.

Ichthyococcus poweriae, Bonaparte, 1841, *Icon. F. Ital.* (27), Indice [4] and (138**), fig.

Scopelus poweriae, Cuvier and Valenciennes, 1849, *Hist. Nat. Poiss.* XXII, p. 441.

¹ *Gonostoma brevidens* (Kner) Steindachner (1870, *SitzBer. K. Akad. Wiss. Wien*, LXI (1), p. 443) seems to be a species of *Vinciguerria*, but I am unable to identify this.

Maurolicus poweriae, Günther, 1864, *Cat. Fish.* v, p. 390; Facciola, 1883, *Nat. Sicil.* II, p. 207; Carus, 1889-93, *Prodr. F. Medit.* II, p. 569.; Lütken, 1892, *Vid. Selsk. Skr.* (6), VII, p. 272.

Vinciguerria lucetia, Murray and Hjort, 1912, *Depths of the Ocean*, p. 604, fig. 457, p. 678, fig. 495.

Vinciguerria poweriae, Sanzo, 1913, *Mem. R. Com. Talass. Ital.* xxxv, p. 3, figs.; Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 218, pl. xvii, figs. 1-4; 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, p. 22, figs.

Hab. Mediterranean; Atlantic.

Vinciguerria attenuata (Cocco).¹

Maurolicus attenuatus, Cocco, 1838, *N. Ann. Sci. Nat.* II, p. 193; Bonaparte, 1841, *Icon. F. Ital.* (27), Indice [4] and (138), fig.; Günther, 1864, *Cat. Fish.* v, p. 390; Facciola, 1883, *Nat. Sicil.* II, p. 208; Carus, 1889-93, *Prodr. F. Medit.* II, p. 569; Lütken, 1892, *Vid. Selsk. Skr.* (6), VII, p. 272.

Scopelus tenorei, Cuvier and Valenciennes, 1849, *Hist. Nat. Poiss.* xxii, p. 441.

Vinciguerria attenuata, Goode and Bean, 1895, *Ocean. Ichth.* p. 513; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 577; Sanzo, 1913, *Mem. R. Com. Talass. Ital.* xxxv, p. 3, figs.; Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 218, pl. xvii, figs. 3 and 6; 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, p. 22, figs.

Vinciguerria lucetia (part), Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 97.

Vinciguerria lucetia, Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 56, pl. ii, fig. 4.

St. 78. 12. vi. 26. 35° 18' 00" S, 19° 01' 10" W. Young-fish trawl, 1000 (-0) m.: 2 specimens, 20-24 mm.

St. 85. 23. vi. 26. 33° 07' 40" S, 4° 30' 20" E. 4½ m. net, horizontal, 2000 (-0) m.: 4 specimens, 20-35 mm.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 7 specimens, 22-35 mm.

St. 89. 28. vi. 26. 34° 05' 15" S, 16° 00' 45" E. Young-fish trawl, 1000 (-0) m.: 3 specimens, 17-22 mm.

St. 252. 20. vi. 27. 35° 26' 00" S, 1° 43' 30" E. 1 m. tow-net, horizontal, 135 m.: 3 specimens, 18-26 mm.

St. 254. 21. vi. 27. 35° 04' 00" S, 6° 49' 00" E. Young-fish trawl, 200 (-0) m.: 8 specimens, 16-45 mm.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-0) m.: 21 specimens, 18-26 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800-1000 (-0) m.: 1 specimen, 20 mm.

Hab. Mediterranean; Atlantic.

¹ Leidenfrost (1917, *Allatt. Kozlem. Budapest*, xvi, p. 13, figs. 1-3) describes several postlarval and juvenile specimens of a species said to be *Vinciguerria attenuata*. His first figure represents a true *Vinciguerria*, probably *V. poweriae*, the second is a young stage of *Ichthyococcus*, and fig. 3 is probably a larval *Chauliodus*.

Vinciguerria sanzoi, Jespersen and Tåning.

Vinciguerria lucetia (part), Brauer, 1906, 'Valdivia' Tiefsee-Fische, p. 97.

Vinciguerria sanzoi, Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 218, pl. xvii, figs. 2 and 5; 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, pp. 22, etc., figs.

St. 295. 25. viii. 27. 5° 30' 30" N, 17° 45' 00" W. Young-fish trawl, 2500-2700 (-0) m.: 1 specimen, 47 mm.

St. 297. 28. viii. 27. 12° 08' 00" N, 20° 53' 30" W. Young-fish trawl, 200-300 (-0) m.: 2 specimens, 20-27 mm.

Hab. Atlantic.

Vinciguerria lucetia (Garman).

Maurolicus lucetius, Garman, 1899, *Mem. Mus. Comp. Zool.* XXIV, p. 242, pl. J, fig. 2.

? *Vinciguerria lucetia* (part), Brauer, 1906, 'Valdivia' Tiefsee-Fische, p. 97.

Vinciguerria lucetia, Gilbert, 1908, *Mem. Mus. Comp. Zool.* XXVI, p. 237; Weber, 1913, 'Siboga' Fische, p. 21; Weber and Beaufort, 1913, *Fish. Indo-Austral. Arch.* II, p. 119, fig. 44; Regan, 1916, *Larval Fish. 'Terra Nova'*, p. 137, pl. v, figs. 6-7.

Hab. South Atlantic; Indo-Pacific.

Vinciguerria raoulensis (Waite).

Gonostoma raoulensis, Waite, 1910, *Trans. N. Zealand Inst.* XLII, p. 373, pl. xxxv, fig. 1.

Vinciguerria raoulensis, McCulloch, 1923, *Rec. Austral. Mus.* XIV, p. 115.

Hab. Kermadec Islands.

Perhaps identical with *V. lucetia*.

Vinciguerria nimbarius (Jordan and Starks).

Zalarges nimbarius (Jordan and Williams), Jordan and Starks, 1895, *Proc. Calif. Acad. Sci.* (2), v, p. 793, pl. lxxvi.

Vinciguerria nimbarius, Gilbert, 1908, *Mem. Mus. Comp. Zool.* XXVI, p. 237.

Hab. Pacific.

Apparently very close to *V. poweriae*.

Genus **Photichthys**, Hutton

Phosichthys, Hutton, 1872, *Cat. Fish. N. Zealand*, p. 55.

Photichthys, Hutton, 1873, *Trans. N. Zealand Inst.* v, p. 269.

Cleft of mouth wide; maxillary with a single series of small, subequal teeth; premaxillary with two strong canines in addition to the small teeth; mandible with strong acute teeth and with smaller teeth in the interspaces; a pair of teeth on the vomer; each palatine with a single series of curved teeth, the anterior of which are enlarged; pterygoids toothless. Suborbital not enlarged. Scales present. Photophores conspicuous. Dorsal 12-13; origin behind pelvics but well in advance of anal. Adipose fin developed. Anal 23-26; origin well behind last dorsal ray.

A single species.

Photichthys argenteus, Hutton. [Pl. II, figs. 1 and 2.]

Phosichthys argenteus, Hutton, 1872, *Cat. Fish. N. Zealand*, p. 56.

Photichthys argenteus, Hutton, 1873, *Trans. N. Zealand Inst.* v, p. 269, pl. xv; Günther, 1887, *Deep-Sea Fish. 'Challenger'*, p. 178, pl. xlv, fig. A; Goode and Bean, 1895, *Ocean. Ichth.* p. 104, fig. 122; Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 92, fig. 37; Gilchrist, 1922, *Rep. Fish. Mar. Biol. Surv. S. Afr.* 11, *Spec. Rep.* 111, p. 55; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 150.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 3 specimens, 68-75 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 40 mm.

St. 87. 25. vi. 26. $33^{\circ} 53' 45''$ S, $9^{\circ} 26' 30''$ E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 27 mm.

St. 89. 28. vi. 26. $34^{\circ} 05' 15''$ S, $16^{\circ} 00' 45''$ E. Young-fish trawl, 1000 (-0) m.: 2 specimens, 18-31 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 350-400 (-0) m.: 12 specimens, 28-165 mm.

St. 258. 25. vi. 27. $35^{\circ} 03' 30''$ S, $13^{\circ} 55' 00''$ E. Young-fish trawl, 320-450 m.: 9 specimens, 24-32 mm.

Depth of body $6\frac{1}{4}$ to $6\frac{1}{2}$ in the length, length of head $4\frac{1}{2}$ to $4\frac{4}{5}$. Snout equal to or shorter than eye, diameter of which is 4 to $4\frac{4}{5}$ in length of head and about equal to interorbital width. About 11 gill-rakers on lower part of anterior arch. Dorsal 12-13; origin a little behind root of pelvic, equidistant from end of snout and base of caudal or a little nearer the former. Anal 23-26. Pectoral with 9 rays. Pelvic 7; origin equidistant from base of pectoral and vent. Lower series of photophores consisting of 10 in front of pectoral, 14 or 15 from pectoral to pelvic, 15 or 16 from pelvic to origin of anal, and 16 or 17 from anal to base of caudal; there are 33-34 (14 + 19 - 20) photophores in the upper series.

Described from 11 specimens, 27-240 mm. in length, including the type of the species.

Hab. Atlantic; New Zealand.

Genus **Manducus**, Goode and Bean

Goode and Bean, 1895, *Ocean. Ichth.* p. 514.

Lychnopoles, Garman, 1899, *Mem. Mus. Comp. Zool.* XXIV, p. 244.

Eye of moderate size; second suborbital not greatly enlarged. Cleft of mouth wide, the praemaxillary forming quite half the margin of the upper jaw; praemaxillary and mandible with one or two irregular series of unequal teeth, maxillary with a single series; each palatine with a single row of teeth, the anterior of which are enlarged; two groups of small teeth on the vomer; a patch of minute teeth on each pterygoid. No pseudobranchiae; gill-openings very wide; gill-rakers rather long, comparatively few in number. Scales present. Two series of conspicuous photophores along each side of the abdomen, another row along the region of the lateral line, and some additional series of smaller and less distinct spots on the sides. Dorsal 10-16; origin nearer to base of

caudal than end of snout. No adipose fin. Anal 26–39; origin below or a little behind dorsal.

Two species.

Synopsis of the Species

- I. Praemaxillary armed with strong canines; dorsal fin wholly in advance of anal. 1. *maderensis*
 II. Praemaxillary without marked canines; dorsal fin mainly above anal. 2. *argenteolus*

Manducus maderensis (Johnson).

Gouostoma maderense, Johnson, 1890, *Proc. Zool. Soc.* p. 458.

Manducus maderensis, Goode and Bean, 1895, *Ocean. Ichth.* p. 515.

Diplophos minutus, Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 224, pl. xvii, fig. 15.

Diplophos moorei, Welsh, 1923, *Proc. U.S. Nat. Mus.* LXII (3), p. 1, fig. 1.

Depth of body nearly 7 in the length, length of head 5. Snout a little longer than eye, diameter of which is 5 in length of head and a little less than interorbital width. Each praemaxillary with 5 canine teeth and with much smaller teeth between them. Nine gill-

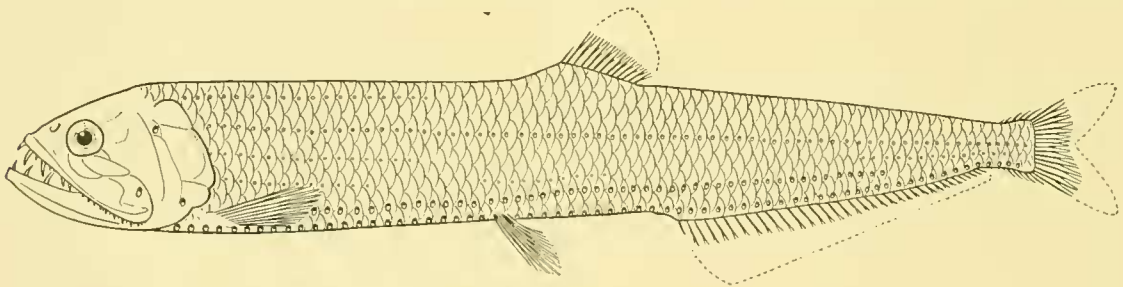


Fig. 8. *Manducus maderensis*. Holotype. ($\times 1$.)

rakers on lower part of anterior arch. Dorsal 12; origin equidistant from eye and base of caudal. Anal 36 (?); origin a little behind last dorsal ray. Pectoral with 9 or 10 rays. Pelvic 8; origin about equidistant from tip of lower jaw and last anal ray. Lower series of photophores consisting of 11 in front of pectoral, 19 from pectoral to pelvic, 13 (1 + 12) from pelvic to origin of anal, and 28 from anal to base of caudal; there are 46 (18 + 15 + 13) in the upper abdominal series and about 65 in the lateral line.

Described from a single specimen, 135 mm. in length; type of the species.

Hab. North Atlantic.

Manducus argenteolus (Garman).

Lychnopolis argenteolus, Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 244, pl. liii, fig. 4.

Depth of body 7 in the length, length of head a little more than 5. Snout longer than eye, diameter of which is 5 in length of head and a little less than interorbital width. Each praemaxillary with two series of teeth, alternating, none of them distinctly enlarged. Fourteen gill-rakers on lower part of anterior arch. Dorsal 14–16; origin equidistant

from eye and base of caudal. Anal 26–29; origin below sixth ray of dorsal. Pectoral with 9 rays. Pelvic 7; origin equidistant from tip of lower jaw and posterior part of anal. Lower series of photophores consisting of 9 in front of pectoral, 15 from pectoral to pelvic, 9 from pelvic to vent, and 22 from vent to base of caudal; there are 43 (11 + 10 + 22) photophores in the upper abdominal series.

Hab. Gulf of Panama.

Garman does not give the length of the type specimen.

Genus *Diplophos*, Günther

Günther, 1873, *J. Mus. Godeffroy*, 11, p. 101; 1889, *Pelagic Fish. 'Challenger'*, p. 32.

Related to *Manducus*. Form very elongate. Praemaxillary, maxillary and mandible each with a single series of small unequal teeth; 2 or 3 teeth on the vomer and a single series on each palatine. Two series of conspicuous photophores on each side of the abdomen, and another series along the lateral line. Dorsal 9–11; origin a little nearer to end of snout than base of caudal. Anal 55–63; origin below dorsal.

One or two species.

Diplophos taenia, Günther.

Günther, 1873, *J. Mus. Godeffroy*, 11, p. 102, fig.; 1889, *Pelagic Fish. 'Challenger'*, p. 32, pl. iv, fig. C; Lütken, 1892, *Vid. Selsk. Skr.* (6), VII, p. 278, pl. 11, figs. 1–3; Goode and Bean, 1895, *Ocean. Ichth.* p. 104; Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 89, fig. 36; Jespersen and Täning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 224, pl. xvii, fig. 14; Gilchrist, 1922, *Fish. Mar. Biol. Surv. S. Afr.* 11, *Spec. Rep.* 111, p. 55; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 149.

? *Diplophos pacificus*, Günther, 1889, *Pelagic Fish. 'Challenger'*, p. 33, pl. iv, fig. B; Goode and Bean, 1895, *Ocean. Ichth.* pl. xxxiv, fig. 126.

St. 297. 28. viii. 27. 12° 08' 00" N, 20° 53' 30" W. Young-fish trawl, 200–300 (–0) m.: 1 specimen, 32 mm.

Depth of body 10 to 16 in the length, length of head 6 to 7. Snout longer than eye, diameter of which is 5 to 6 in length of head and about equal to interorbital width. Dorsal 9–11. Anal 55–63. Pectoral with 8 or 9 rays. Pelvic 8; origin about equidistant from tip of lower jaw and middle of anal. Lower series of photophores consisting of 104–112, upper series of 69–73; there are about 94 photophores in the lateral line.

Described from 5 specimens, 32–44 mm. in length, including the type of the species.

Hab. Atlantic; coast of Natal; Indian Ocean; (?) Pacific.

The counts of dorsal and anal rays, and of the serial photophores, given above are only approximate, as all my material is of small size.

In view of the variation recorded for *D. taenia* by Brauer and others it is very doubtful whether *D. pacificus* can be retained as a distinct species. The type is in poor condition and has been mounted in glycerine as a microscopic preparation.

Genus *Triplophos*, Brauer

Brauer, 1902, *Zool. Anz.* xxv, p. 282; 1906, 'Valdivia' *Tiefsee-Fische*, p. 98.

Close to *Diplophos*, but with a short, blunt snout, and the body moderately elongate. Two series of conspicuous photophores on each side of the abdomen, and two or more additional rows on the sides of the body. Dorsal 10; origin more than twice as near to end of snout as to base of caudal. Anal 57-61; origin immediately behind dorsal.

A single species.

Triplophos hemingi (McArdle).

Photichthys hemingi, McArdle, 1901, *Ann. Mag. Nat. Hist.* (7), viii, p. 521; 1905, *Illust. Zool. 'Investigator'*, *Fishes*, pl. xxxvi, fig. 2.

Triplophos elongatum, Brauer, 1902, *Zool. Anz.* xxv, p. 282; 1906, 'Valdivia' *Tiefsee-Fische*, p. 99, pl. vii, fig. 4, text-fig. 41.

Depth of body nearly 8 in the length, length of head 7. Snout shorter than eye, diameter of which is 6 in length of head and about equal to interorbital width. Teeth arranged in two irregular series in the upper jaw and in a single series in the lower; strong, pointed, with smaller ones in the interspaces; a few small teeth at the anterior end of each palatine and one or two minute teeth on the vomer; surfaces of the mesopterygoids minutely denticulated. Dorsal 10. Anal (57) 61. Pectoral with 10 or 11 rays. Pelvic 6; origin nearer to commencement of anal than base of pectoral. Lower series of photophores consisting of 16 or 17 in front of pectoral, 13 from pectoral to pelvic, 5 from pelvic to origin of anal, and 35-36 (41) from anal to base of caudal; there are about 55 in the upper abdominal series and 43 in the lateral line.

Described from a single specimen, 205 mm. in length; one of the types of the species.

Hab. Indian Ocean.

Apart from a supposed difference in the dentition and some minor differences in the numbers of serial photophores, I am unable to separate the above specimen from Brauer's *T. elongatum*. The palatine and vomerine teeth are very small in this species and were probably overlooked by Brauer.

Genus *Ichthyococcus*, Bonaparte

Bonaparte, 1841, *Icon. F. Ital.* (27), Indice [4] and (138**) [2].

Coccia, Günther, 1864, *Cat. Fish.* v, p. 387.

Apparently related to *Vinciguerria*. Body more or less ovate, compressed. Eyes telescopic; interorbital region very narrow. Mouth small, the lower jaw included and almost completely hidden by the upper jaw; teeth in the jaws minute; vomer and palatines toothless. No pseudobranchiae; gill-openings very wide; gill-rakers rather short, comparatively few in number. Scales present; cycloid. Dorsal 11-12; origin in front of pelvic, the root of which is much nearer to base of caudal than tip of lower jaw. A long, low, adipose fin. Anal 15-17; origin well behind dorsal. Photophores conspicuous, arranged in two series on each side of the abdomen.

A single species.

This aberrant genus appears to be most nearly related to *Vinciguerria*, and the manner in which the photophores develop seems to be the same. Jespersen and Tåning, who have described the marked metamorphosis undergone by *Ichthyococcus*, state that in *Vinciguerria attenuata* (but not in any other species of that genus) the eye is somewhat telescopic in the adolescent stages, but that this character is scarcely apparent in the adult. In the telescopic eyes, narrow interorbital region, etc., *Ichthyococcus* approaches the Sternoptychiidae, but is essentially Gonostomatid in general structure.

Ichthyococcus ovatus (Cocco).

Gonostomus ovatus, Cocco, 1838, *N. Ann. Sci. Nat.* 11, p. 169, pl. i, fig. 3.

Ichthyococcus ovatus, Bonaparte, 1841, *Icon. F. Ital.* (27), Indice [4] and (138**) [2]; Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman', Poissons*, p. 104, pl. xiv, fig. 2; Moreau, 1891, *Hist. Nat. Poiss. France, Suppl.* p. 111; Goode and Bean, 1895, *Ocean. Ichth.* p. 95, fig. 113; Brauer, 1906, *'Valdivia' Tiefsee-Fische*, p. 94, figs. 38-39; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 57; Sanzo, 1913, *Mem. R. Com. Talass. Ital.* xxvii, fig.; Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* lxx, p. 218; 1926, *Rep. Danish Ocean. Exped.* 1908-10, 11, A, 12, p. 38, figs.

Scopelus ovatus, Cuvier and Valenciennes, 1849, *Hist. Nat. Poiss.* xxii, p. 453.

Coccia ovata, Günther, 1864, *Cat. Fish.* v, p. 388; Carus, 1889-93, *Prodr. F. Medit.* 11, p. 568.

Depth of body $2\frac{1}{3}$ to $2\frac{3}{4}$ in the length, length of head nearly 3. Snout shorter than eye, diameter of which is $2\frac{2}{3}$ to 3 in length of head. About 15 gill-rakers on lower part of anterior arch. 36-39 scales in a longitudinal series. Dorsal 11-12; origin about equidistant from end of snout and base of caudal. Anal 15-17. Pectoral with 8 rays. Pelvic with 7 rays. Lower series of photophores consisting of 25 (7 + 1 + 17) in front of pelvic, 10 or 11 from pelvic to origin of anal, and 13 or 14 from anal to base of caudal; there are 23-26 photophores in the upper series.

Described from 16 specimens, 25 to 44 mm. in length.

Hab. Mediterranean; Eastern Atlantic; Indian Ocean.

Genus *Maurolicus*, Cocco

Cocco, 1838, *N. Ann. Sci. Nat.* 11, p. 192.

Triarcus, Waite, 1910, *Trans. N. Zealand Inst.* xlii (1909), p. 387.

Two species.

Cleft of mouth wide, rather oblique, the lower jaw a little projecting; both jaws with a single series of minute teeth; a single transverse row of similar teeth on the head of the vomer. Pseudobranchiae well developed; gill-openings very wide; gill-rakers long, slender, fairly numerous. Scales present. Photophores large and conspicuous; lower series on body more or less broken up into groups; the series between pelvic and origin of anal separated from that above anterior part of anal. Dorsal 9-12; origin nearer to base of caudal than end of snout. A long, low, adipose fin. Anal 23-27; origin just behind last dorsal ray.

Two species.

Maurolicus muelleri (Gmelin).

Salmo muelleri, Gmelin, 1789, in *Linnaeus, Syst. Nat.* ed. 13, 1, p. 1378.

Argentina pennantii, Walbaum, 1792, *Artedi Ichth.* ed. 2, III, p. 47.

Scopelus humboldtii (non Risso), Yarrell, 1836, *British Fishes*, ed. 1, II, p. 94; 1841, ed. 2, II, p. 161; De Kay, 1842, *Fauna New York, Fish.* p. 246, pl. xxxviii, fig. 121.

Scopelus borealis, Nilsson, 1832, *Prodr. Ichth. Skand.* p. 20; Cuvier and Valenciennes, 1849, *Hist. Nat. Poiss.* xxii, p. 438.

Maurolicus amethysto-punctatus, Cocco, 1838, *N. Ann. Sci. Nat.* II, p. 193; Bonaparte, 1841, *Icon. F. Ital.* (27), Indice [4] and (138), fig.; Günther, 1864, *Cat. Fish.* v, p. 390; 1876, *Ann. Mag. Nat. Hist.* (4), xvii, p. 399; 1877, *Trans. N. Zealand. Inst.* ix, p. 472; Moreau, 1881, *Hist. Nat. Poiss. France*, III, p. 509.

Scopelus pennantii, Cuvier and Valenciennes, 1849, *Hist. Nat. Poiss.* xxii, p. 436; Yarrell, 1859, *British Fishes*, ed. 3, I, p. 330, figs.

Scopelus maurolici, Cuvier and Valenciennes, *t.c.* p. 439.

Maurolicus muelleri, Kroyer, 1846-53, *Danmarks Fiske*, III, p. 113, fig.; Smitt, 1895, *Scandinavian Fish.* II, p. 931, pl. xlv, fig. 3; Collett, 1903, *Vid. Selsk. For.* No. 9, p. 111.

Maurolicus borealis, Günther, 1864, *Cat. Fish.* v, p. 389; Jordan and Gilbert, 1882, *Bull. U.S. Nat. Mus.* xvi, p. 284; Goode and Bean, 1895, *Ocean. Ichth.* p. 96, fig. 111; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 58.-

Maurolicus pennanti, Day, 1880-84, *Fish. Britain*, II, p. 49, pl. cix, fig. 2; Lilljeborg, 1889, *Sveriges Fiskar*, III (6), p. 10; Lütken, 1892, *Vid. Selsk. Skr.* (6), VII, p. 267; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 577; Holt and Byrne, 1913, *Fisheries, Ireland, Sci. Invest.* 1912, I, p. 16, pl. ii, figs. 1-3; Jespersen and Tåning, 1919, *Vid. Medd. Dansk nat. For.* LXX, p. 220; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 151; Jespersen and Tåning, 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, p. 40, figs.

Maurolicus australis, Hector, 1875, *Trans. N. Zealand Inst.* VII, p. 250, pl. xi.

Maurolicus parvipinnis, Vaillant, 1888, *Miss. Sci. Cap Horn*, 1882-3, VI, *Zool. Poiss.* p. 17, pl. ii, fig. 3.

Gonostoma australis, Hutton, 1876, *Trans. N. Zealand Inst.* VIII, p. 215.

? *Maurolicus borealis*, Holt and Byrne, 1907, *Trans. Linn. Soc. Zool.* x, p. 194, fig. 1.

Triarcus australis, Waite, 1910, *Trans. N. Zealand Inst.* XLII, p. 387, pl. xxxviii.

? *Cyclothone* sp., Fage, 1910, *Ann. Inst. Océan. Monaco*, I (7), p. 7, figs. 3-5.

Maurolicus japonicus, Ischikawa, 1915, *J. Coll. Agric. Tokyo*, VI, p. 183, pls. xii, xiii.

Maurolicus pennanti australis, McCulloch, 1923, *Rec. Austral. Mus.* XIV, p. 114, pl. xiv, fig. 1.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-0) m.: 1 specimen, 11 mm.

St. WS 91. 8. iv. 27. 52° 53' 45" S, 64° 37' 30" W. Commercial otter trawl, 191-205 m.: fine dark sand and shells. 1 specimen, 30 mm.

St. H (Cape trawler). 8. vi. 27. 34° 04' 00" S, 17° 36' 00" W. Commercial otter trawl, 292-402 m.: 9 specimens, 35-50 mm. Taken from the stomach of *Zeus capensis*.

St. M (Cape trawler). 9. vii. 27. 33° 42' 00" S, 17° 29' 00" E. Commercial otter trawl, 310-402 m.: 4 specimens, 38-50 mm. Taken from the stomach of *Merluccius*.

Depth of body $3\frac{3}{4}$ to $4\frac{1}{4}$ in the length, length of head 3 to $3\frac{1}{3}$. Snout shorter than eye, diameter of which is $2\frac{2}{5}$ to nearly 3 in length of head and about twice the interorbital width. 25-27 gill-rakers on lower part of the anterior arch. Dorsal 9-12; origin about

equidistant from base of caudal and middle of eye. Anal 23-27; origin just behind last dorsal ray. Pectoral with 17 or 18 rays. Pelvic 7; origin much nearer to base of caudal than tip of lower jaw. Lower series of photophores consisting of 6 on the isthmus, 12 from isthmus to pelvic, 6 (2 + 4) from pelvic to origin of anal, and 1 + 15-18 + 8-9 from anal to base of caudal; there are 9 photophores in the upper row, which ends above the root of the pelvic fin.

Described from many specimens, 20 to 52 mm. in length.

Hab. Atlantic; Mediterranean; Red Sea; Indian Ocean; New Zealand; Japan.

I have carefully tabulated and compared a number of examples from the Mediterranean, Atlantic and New Zealand, but am unable to detect any differences of sufficient importance to warrant the recognition of more than one species. Jespersen and Tåning have noted certain differences in postlarvae from the Mediterranean and Atlantic respectively, but are unable to separate the adults.

Maurolicus oculatus, Garman.

Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 241, pl. liii, fig. 3.

Perhaps not distinct from the preceding species, but the dorsal fin is said to have only 6 rays, and the number and arrangement of some of the photophores seems to be somewhat different.

Hab. Coast of California.

The length of the type is not stated.

Genus *Argyripnus*, Gilbert and Cramer

Gilbert and Cramer, 1896, *Proc. U.S. Nat. Mus.* xix, p. 414.

Closely related to *Maurolicus*. Praemaxillary, maxillary and mandible with a single series of sharp, needle-like teeth; one or two small teeth on each side of the vomer and some very small ones on each palatine. Less than 20 gill-rakers on lower part of anterior arch. Series of photophores between pelvic fin and origin of anal continuous with that above the anterior part of the anal. Origin of dorsal nearer to end of snout than base of caudal.

One or two species.

Argyripnus iridescens, McCulloch.

McCulloch, 1926, *Biol. Res. 'Endeavour'*, v, p. 169, pl. xlv, fig. 2.

Depth of body nearly $3\frac{1}{2}$ in the length, length of head $3\frac{1}{4}$ to $3\frac{1}{2}$. Snout shorter than eye, diameter of which is about $3\frac{1}{2}$ in length of head and much greater than interorbital width. About 16 gill-rakers on lower part of anterior arch. Dorsal 12 (12-14). Anal 24-25; origin below last rays of dorsal. Pectoral with 16 rays. Pelvic 7; origin nearer to tip of lower jaw than base of caudal. Lower series of photophores consisting of 6 on the isthmus, 10 from isthmus to pelvic, 20-21 from pelvic to above anterior part of anal, 5 above middle of anal, and 13 from above last anal rays to base of caudal; there are 7 photophores in the upper series.

Described from two specimens, 98 and 100 mm. in length; paratypes of the species received in exchange from the Australian Museum.

Hab. Great Australian Bight.

Argyripnus ehippiatus, Gilbert and Cramer.

Gilbert and Cramer, 1896, *Proc. U.S. Nat. Mus.* xix, p. 414, pl. xxxix, fig. 2.

Probably not distinct from the above, but the dorsal is said to have only 10 rays and the anal 22. There are 19 photophores in the series from the pelvic to above anterior part of anal, and 15 from last anal rays to base of caudal.

Hab. Hawaiian Islands.

Known from a single example in bad condition, about 90 mm. in length.

Genus *Valenciennellus*, Goode and Bean

Valenciennellus (Jordan and Evermann), Goode and Bean, 1895, *Ocean. Ichth.* p. 513; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 577.

Close to *Maurolicus*. Dorsal 7-8; origin opposite to that of the anal. Anal 23-25. The photophores above and behind the anal fin are arranged in four or five groups, each of which is on a black background.

A single species.

Valenciennellus tripunctulatus (Esmark).

Maurolicus tripunctulatus, Esmark, 1871, *Vid. Selsk. Forh. Christiania* (1870), p. 489; Lütken, 1892, *Vid. Selsk. Skr.* (6), VII, p. 269, pl. i, fig. 6.

Valenciennellus tripunctulatus, Goode and Bean, 1895, *Ocean. Ichth.* p. 513; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 577; Weber, 1913, 'Siboga' *Fische*, p. 20; Weber and Beaufort, 1913, *Fish. Indo-Austral. Arch.* II, p. 136, fig. 50; Pappenheim, 1914, *Deutsche Süd-polar-Exped.* xv, *Zool.* VII, p. 182; Pietschmann, 1914, *SitzBer. K. Akad. Wiss. Wien*, CXXIII (1), p. 427, pl. ii, figs. 4-5.

? *Valenciennellus stellatus*, Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 239, pl. liii, fig. 2; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 100, fig. 42.

? *Cyclothone* sp. Fage, 1910, *Ann. Inst. Océan. Monaco*, 1 (7), p. 7, figs. 3-5.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 1 specimen, 24 mm.

St. 276. 5. viii. 27. 5° 54' 00" S, 11° 19' 00" E. Young-fish trawl, 150 (-0) m.: 3 specimens, 14-19 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 25 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800-1000 (-0) m.: 1 specimen, 24 mm.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-0) m.: 6 specimens, 20-23 mm.

Depth of body about 3⅔ in the length, length of head 3¼. Snout shorter than eye, diameter of which is about 2½ in length of head. Dorsal 7-8; origin about equidistant from end of snout and base of caudal. Anal 23-25. Pectoral with 12 rays. Pelvic with 8(?) rays.

Described from 10 specimens, the largest 25 mm. in length.

Hab. Between Greenland and Iceland; Atlantic; Madagascar; Indian Ocean; Timor Sea; coast of California.

Family STERNOPTYCHIIDAE

Genus *Argyropelecus*, Cocco, 1829

Synopsis of the Species of Argyropelecus

- I. Photophores forming a nearly continuous series.
 - A. Depth of body (without dorsal ridge) $2\frac{1}{4}$ to $2\frac{1}{3}$ in the length; praedorsal ridge rather low, length of exposed portion of last spine more than twice in the base of the dorsal fin.
 1. *affinis*, Garman, 1899
 - B. Depth of body (without dorsal ridge) $1\frac{4}{5}$ to nearly 2 in the length; praedorsal ridge higher, length of exposed portion of last spine $1\frac{2}{3}$ to $1\frac{1}{3}$ in the base of the dorsal fin.
 2. *gigas*, n.sp.
- II. Postabdominal photophores in three groups (prae-anal, supra-anal, and caudal).
 - A. A single serrated abdominal spine; supra-anal photophores separated from prae-anals by a distance of more than half the length of the supra-anal series, and from the caudal by a distance which is greater than the length of the supra-anal series.
 3. *hemigymmus*, Cocco, 1829
 - B. A pair of smooth abdominal spines; supra-anal photophores separated from the prae-anals by a very short interspace, and from the caudals by a distance which is less than the length of the supra-anal series.
 1. Posterior abdominal spine longer than the anterior and directed backwards; adults with the dorsal and abdominal ridges serrated, and with a double series of spines on the lower edge of the caudal peduncle.
 4. *aculeatus*, Cuv. and Val., 1850
 2. Abdominal spines subequal or anterior the longer; dorsal and abdominal ridges not serrated; no spines on the caudal peduncle.
 - a. Lower praeopercular spine curved, the upper very small or absent; depth of body about $1\frac{1}{2}$ in the length.
 5. *olfersii* (Cuvier, 1829)
 - b. Lower praeopercular spine straight, the upper of moderate size or rather small, directed backwards; depth of body $1\frac{2}{3}$ or more in the length.
 6. *sladeni*, Regan, 1908

Argyropelecus elongatus, Esmark [1871, *Forh. Vid. Selsk. Christiania* (1870), p. 489], is too briefly described to be identified with certainty, but may be synonymous with *A. affinis*. *A. bocagei*, Osorio [1909, *Mem. Mus. Bocage*, 1, p. 27, pl. ii, fig. 3], is also unrecognisable.

Argyropelecus affinis, Garman.

Argyropelecus hemigymmus (non Cocco), Goode and Bean, 1895, *Ocean. Ichth.* pl. xxxix, fig. 147. *Argyropelecus affinis*, Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 237; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 103, pl. vii, figs. 1-2; Regan, 1908, *Trans. Linn. Soc. Zool.* xii, p. 218; Jespersen and Tåning, 1915, *Rep. Danish Ocean. Exped.* 1908-10, 11, A, 2, p. 6; Barnard, 1925, *Ann. S. Afric. Mus.* xxi, p. 152, pl. viii, fig. 1.

St. 296. 26. viii. 27. 8° 12' 00" N, 18° 49' 00" W. Young-fish trawl, 450-500 (-0) m.: 2 specimens, 43-55 mm.

Hab. Atlantic; Caribbean Sea; Indian Ocean.

Argyropelecus gigas, n.sp.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m. : 1 specimen, 44 mm.

St. 287. 19. viii. 27. $2^{\circ} 49' 30''$ S, $9^{\circ} 25' 30''$ W. Young-fish trawl, 800-1000 (-0) m. : 1 specimen, 87 mm. Holotype.

11. ii. 25. $6^{\circ} 55' N$, $15^{\circ} 54' W$. 2 m. tow-net, horizontal, 800 (-0) m. : 1 specimen, 82 mm.

Related to *A. affinis*. Depth of body $1\frac{4}{5}$ to nearly twice in the length, length of head $3\frac{1}{2}$ to $3\frac{3}{4}$. Praeoperculum with a strong, straight or slightly curved, downwardly directed spine at the angle, above which is a much smaller spine directed outwards. No very

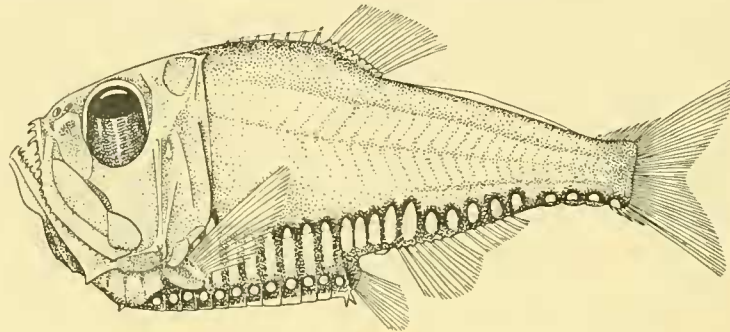


Fig. 9. *Argyropelecus affinis*. ($\times 1\frac{1}{2}$.)

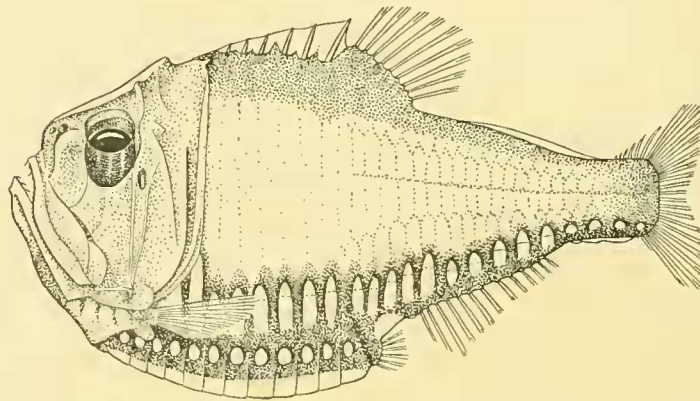


Fig. 10. *Argyropelecus gigas*. Holotype. ($\times 1$.)

long teeth in the lower jaw; palatines toothless or with a few feeble teeth anteriorly. Eleven gill-rakers on lower part of anterior arch. Praedorsal ridge rather high, length of exposed portion of last spine $1\frac{2}{5}$ to $1\frac{2}{3}$ in base of dorsal fin. Arrangement of photophores similar to that of *A. affinis*. Dorsal 9. Anal 13.

Described from 3 specimens, 44 to 87 mm. in length, of which the largest is selected as the holotype.

Hab. Atlantic.

In addition to the characters mentioned in the synopsis above, this species may be readily distinguished from *A. affinis* by the form of the spine at the angle of the praeperculum.

Argyropelecus hemigymnus, Cocco.¹ [Pl. II, fig. 4.]

Cocco, 1829, *Giorn. Sc. Sicil.*, fasc. 77, p. 146; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 106, fig. 45; Regan, 1908, *Trans. Linn. Soc. Zool.* XII, p. 219; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 51; Holt and Byrne, 1913, *Fisheries, Ireland, Sci. Invest.* 1912, 1, p. 21, figs. 7 b and 8; Pappenheim, 1914, *Deutsche Südpolar-Exped.* xv, *Zool.* VII, p. 182; Jespersen, 1915, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 2, p. 7; Roule, 1919, *Rés. Camp. Sci. Monaco*, LII, p. 25; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 153; Jespersen and Tåning, 1926, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 12, p. 48.

Sternoptyx mediterranea, Cocco, 1838, *Oss. pesci Messina (Il Faro, IV)*, p. 7.

? *Argyropelecus d'urvillei*, Cuvier and Valenciennes, 1850, *Hist. Nat. Poiss.* XXII, p. 405.

? *Argyropelecus intermedius*, Clarke, 1878, *Trans. Proc. N. Zealand Inst.* x, p. 244, pl. vi.

? *Argyropelecus heathi*, Gilbert, 1905, *Bull. U.S. Fish. Comm.* XXIII (1903), p. 601, pl. lxxii, fig. 1.

The 'Discovery' obtained 57 examples of this species from the following stations in the South Atlantic, at depths ranging from 0-2500 m., measuring from 9 to 34 mm. in length: St. 3, 81, 83, 85, 86, 87, 89, 100, 257, 258, 267.

Hab. Mediterranean; Atlantic; Indian Ocean; Hawaiian Islands (?); New Zealand (?).

Argyropelecus aculeatus, Cuvier and Valenciennes.

Cuvier and Valenciennes, 1850, *Hist. Nat. Poiss.* XXII, p. 406; Günther, 1864, *Cat. Fish.* v, p. 386; Sauvage, 1891, *Hist. Madagascar*, xvi, *Poissons*, p. 483, pl. xlvi, fig. 5; Lütken, 1892, *Vid. Selsk. Skr.* (6), VII, p. 282; Goode and Bean, 1895, *Ocean. Ichth.* p. 127; Collett, 1903, *Christiania Vid. Selsk. For.* No. 9, p. 108; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 110, fig. 47; Murray and Hjort, 1912, *Depths of the Ocean*, p. 612; Jespersen, 1915, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 2, p. 27.

Sternoptyx acanthurus, Cuvier and Valenciennes, 1850, *Hist. Nat. Poiss.* XXII, p. 408.

Sternoptychides amabilis, Ogilby, 1888, *Proc. Linn. Soc. N.S. Wales* (2), III, p. 1313.

? *Argyropelecus caninus*, Garman, 1899, *Mem. Mus. Comp. Zool.* XXIV, p. 235.

Argyropelecus amabilis, McCulloch, 1923, *Rec. Austral. Mus.* XIV, p. 118, pl. xiv, fig. 3.

St. 89. 28. vi. 26. 34° 05' 15" S, 16° 00' 45" E. Young-fish trawl, 1000 (-0) m.: 5 specimens, 9-55 mm.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-0) m.: 2 specimens, 15-25 mm.

St. 259. 26. vi. 27. 34° 59' 00" S, 16° 39' 00" E. Young-fish trawl, 370-450 (-0) m.: 2 specimens, 14-19 mm.

Hab. Atlantic; Indian Ocean.

The adults of this species may be readily distinguished from those of *A. olfersii* by the serration of the dorsal and abdominal ridges, and by the double series of spines on the lower surface of the caudal peduncle. Neither of these characters is apparent in young or half-grown examples, which may be recognised, however, by the shape of the body and the form of the abdominal spine.

¹ For full synonymy of this species see Brauer (1906)

Argyropelecus olfersii (Cuvier).¹

Sternoptyx olfersii, Cuvier, 1829, *R. Anim.* ed. 2, II, p. 316.

Argyropelecus olfersii, Cuvier and Valenciennes, 1850, *Hist. Nat. Poiss.* XXII, p. 408; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 108, fig. 46; Regan, 1908, *Trans. Linn. Soc. Zool.* XII, p. 219; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 52; Holt and Byrne, 1913, *Fisheries, Ireland, Sci. Invest.* 1912, I, p. 20, fig. 7 a; Weber and Beaufort, 1913, *Fish. Indo-Austral. Arch.* II, p. 134, fig. 49; Jespersen, 1915, *Rep. Danish Ocean. Exped. 1908-10*, II, A, 2, p. 23; Roule, 1919, *Rés. Camp. Sci. Monaco*, LII, p. 25; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 153.

Pleurothyris olfersi, Lowe, 1843, *Hist. Fish. Madeira*, p. 64.

? *Argyropelecus lychmus*, Garman, 1899, *Mem. Mus. Comp. Zool.* XXIV, p. 234, pl. J, fig. 1.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 22 mm. ?

Hab. Atlantic; Indian Ocean; Pacific coast of Central America (?).

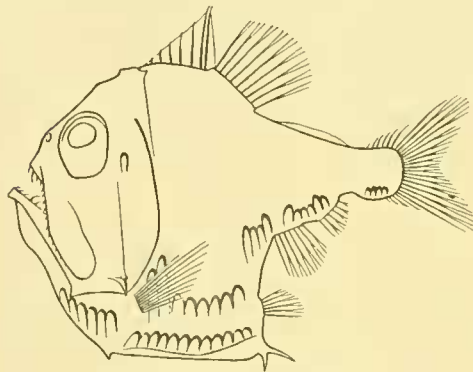


Fig. 11. *Argyropelecus aculeatus*.
Young example. ($\times 2\frac{1}{2}$.)

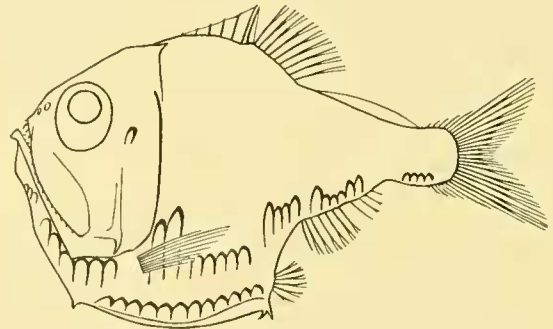


Fig. 12. *Argyropelecus olfersii*.
Young example. ($\times 2$.)

Argyropelecus sladeni, Regan.

Regan, 1908, *Trans. Linn. Soc. Zool.* XII, p. 218.

St. 170. 23. ii. 27. Off Cape Bowles, Clarence Island, 61° 25' 30" S, 53° 46' 00" W. Young-fish trawl, 200 (-0) m.: 1 specimen, 26 mm.

St. 269. 26. vii. 27. 15° 55' 00" S, 10° 35' 00" E. 4½ m. net, horizontal, 600-700 (-0) m.: 3 specimens, 23-28 mm.

St. 276. 5. viii. 27. 5° 54' 00" S, 11° 19' 00" E. Young-fish trawl, 150 (-0) m.: 1 specimen, 25 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125-175 (-0) m.: 32 specimens, 8-27 mm.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-0) m.: 7 specimens, 14-25 mm.

St. 297. 28. viii. 27. 12° 08' 00" N, 20° 53' 30" W. Young-fish trawl, 200-300 (-0) m.: 1 specimen, 15 mm.

The young and half-grown specimens of this species are often difficult to distinguish from those of *A. olfersii*. If specimens of equal size are compared, however, it will be

¹ For full synonymy of this species see Brauer (1906). Some of the references may refer to *A. sladeni*.

observed that the body is deeper in *A. olfersii* and the angle of the body behind the abdominal spines more marked. The lower praeopercular spine is more or less straight in *A. sladeni*, the small upper spine being well developed and directed outwards and backwards; in *A. olfersii* the lower spine is always more or less curved, and the upper spine is very small in young examples and minute or absent altogether in the adults.

Hab. North and South Atlantic; Antarctic; Indian Ocean.



Fig. 13. *Argyropelecus sladeni*. Young and adult examples. ($\times 2\frac{1}{2}$.)

***Sternoptyx diaphana*, Hermann, 1781.**

Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 115, figs. 56-63.

? *Sternoptyx obscura*, Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 232, pl. liii, fig. 1.

The 'Discovery' obtained 84 specimens of this species from the following stations in the North and South Atlantic, at depths ranging from 0-2700 m., measuring from 6 to 60 mm. in length: St. 78, 81, 85, 86, 87, 101, 256, 269, 281, 285, 287, 288, 295.

Hab. Atlantic; Indo-Pacific.

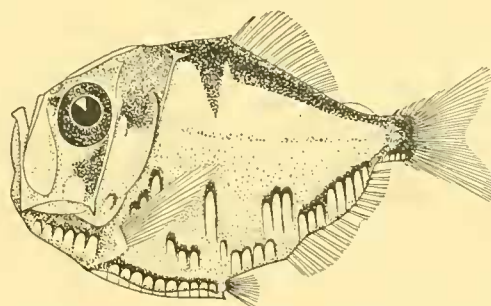


Fig. 14. *Polyipnus laternatus*. ($\times 1\frac{1}{2}$.)

***Polyipnus laternatus*, Garman.**

Garman, 1899, *Mem. Mus. Comp. Zool.* xxiv, p. 238.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. Young-fish trawl, 150 (-0) m.: 3 specimens, 12-14 mm.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 11 specimens, 18-34 mm.

Hab. Atlantic; West Indies.

Distinguished from *P. spinosus*, Günther, 1887, by the form of the post-temporal spines, the presence of palatine teeth, and the arrangement of the postabdominal photophores.

Family ASTRONESTHIDAE

A monograph of this family has been quite recently published by Regan and Trewavas (1929, *Ocean. Rep. Danish 'Dana'-Exped.* (1920-2), v, pp. 12-30, pls. i-vi, text-figs.), based largely on the material obtained by the 'Dana' in the Atlantic, Caribbean Sea, and Gulf of Panama.

Astronesthes filifer, Regan and Trewavas.

Regan and Trewavas, 1929, *t.c.* p. 14, pl. i, fig. 1

St. 294. 25. viii. 27. $4^{\circ} 33' 15''$ N, $16^{\circ} 52' 45''$ W. 1 m. tow-net, oblique, 84 (-0) m.: 1 specimen, 28 mm. 70 cm. tow-net, oblique, 84 (-0) m.: 1 specimen, 29 mm. Young-fish trawl, 100-150 (-0) m.: 2 specimens, 28-31 mm.

Hab. North Atlantic; Caribbean Sea.

Astronesthes cyaneus (Brauer, 1902).

Regan and Trewavas, *t.c.* p. 21, fig. 14.

11. xi. 25. $6^{\circ} 55'$ N, $15^{\circ} 54'$ W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 42 mm.

Hab. Atlantic; Caribbean Sea; Indian Ocean.

Astronesthes indicus, Brauer, 1902.

Regan and Trewavas, *t.c.* p. 23, pl. ii, fig. 3.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 1 specimen, 85 mm.

Hab. Atlantic; Caribbean Sea; Indian Ocean.

Borostomias antarcticus (Lönnerberg).

Astronesthes antarcticus, Lönnerberg, 1905, *Zool. Anz.* xxviii, p. 762.

Astronectes antarcticus, Lönnerberg, 1905, *Wiss. Ergebn. Schwed. Südpolar-Exped.* v (6), p. 65.

Borostomias antarcticus, Regan and Trewavas, *t.c.* p. 25.

St. 114. 12. xi. 26. $52^{\circ} 55' 00''$ S, $9^{\circ} 50' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 650-700 m.: 1 specimen, 180 mm.

Depth of body $6\frac{1}{4}$ in the length, length of head $5\frac{1}{5}$. Snout a little longer than eye, diameter of which is $5\frac{2}{3}$ in length of head. Postocular luminous organ much smaller than eye, apparently single, and with a slight anterior prolongation below the eye. Barbel $1\frac{1}{2}$ times as long as head; unpigmented stem¹ followed by a swollen black part, which is followed by a hyaline area with a small luminous body on either side and a short filamentous process; barbel ending in a globular white bulb. Maxillary with 6 or 7 teeth. Dorsal 12; origin just behind pelvics. Anal 15. Pelvics 7-rayed, about equidistant from end of snout and base of caudal. Photophores—in ventral series I-P 10; P-V 25; V-A 22 or 23; A-C 12; in lateral series O-V 23; V-A 22.

¹ The skin may have been stripped off.

Described from a single specimen, 180 mm. in length.

Hab. South Atlantic.

In the form of the teeth on the maxillary this species is a typical *Borostomias*, but in the anterior prolongation of the postocular luminous organ and in the structure of the barbel it is very similar to some of the species placed in the genus *Diplolychnus* by Regan and Trewavas. The single specimen is unfortunately poorly preserved, and it is impossible to be certain as to the form of the postocular luminous organ.

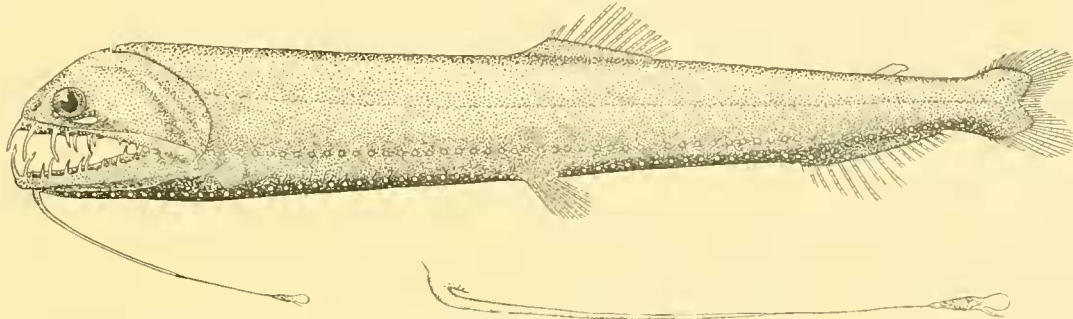


Fig. 15. *Borostomias antarcticus*. ($\times \frac{3}{4}$.) [Barbel $\times 1\frac{1}{2}$.]

Neonesthes microcephalus, n.sp.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 600–700 (–0) m.: 2 specimens, 145–148 mm.

Depth of body nearly 7 in the length, length of head $6\frac{1}{3}$. Snout short; diameter of eye 4 in length of head. Postocular luminous body 3 to 4 in length of head, with a narrow subocular prolongation more or less covered by a pigment layer. Barbel $1\frac{1}{10}$ to

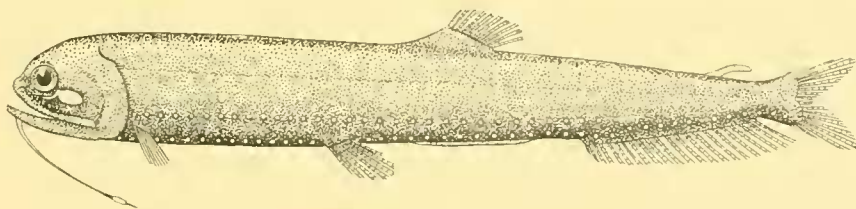


Fig. 16. *Neonesthes microcephalus*. Holotype. ($\times \frac{3}{4}$.)

$2\frac{1}{3}$ times as long as head; in the specimen with the shorter barbel the hyaline stem ends in a swollen white bulb which is prolonged distally into a fine filament, and there is a collar of pigmented tissue round the base of the bulb; in the other specimen the hyaline stem ends in a slightly swollen white tip, which is somewhat damaged but appears to be without pigmented collar or filament. Dorsal 10, short, above interspace between pelvics and anal. Anal 22 or 23. Pectorals 8. Pelvics 7-rayed, considerably nearer to snout than to caudal. Traces of a ventral adipose fin. Photophores—in ventral series I–P 9–10; P–V 16–17; V–A 18–19; A–C 12 (?); in lateral series O–V 14 (?); V–A 18 (?).

Described from two specimens, 145 and 148 mm. in length, of which the smaller is selected as the holotype.

Hab. South Atlantic.

Close to *N. macrolychnus*, Regan and Trewavas, from the North Atlantic, differing in the smaller head and mouth, structure of the barbel, and in the smaller number of anal rays. The length and form of the barbel appears to be very different in the two specimens described above, but I am unable to detect any other differences.

Neonesthes macrolychnus, Regan and Trewavas.

Regan and Trewavas, 1929, *t.c.* p. 30, pl. vi, fig. 2.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 1 specimen, 65 mm.

Hab. North and South Atlantic.

Family CHAULIODONTIDAE

Chauliodus sloanei, Schneider, 1801.

Regan and Trewavas, 1929, *Ocean. Rep. Danish 'Dana'-Exped.* (1920-2), v, p. 32, fig. 24.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 3 specimens, 33-190 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 3 specimens, 195-230 mm. $4\frac{1}{2}$ m. net, horizontal, 350-400 (-0) m.: 1 specimen, 190 mm.

St. 282. 12. viii. 27. $1^{\circ} 11' 00''$ S, $5^{\circ} 38' 00''$ E. Young-fish trawl, 300 (-0) m.: 3 specimens, 30-70 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 60 mm.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 1 specimen, 235 mm.

28. x. 25. $13^{\circ} 25'$ N, $18^{\circ} 22'$ W. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 7 specimens, 95-180 mm.

11. xi. 25. $6^{\circ} 55'$ N, $15^{\circ} 54'$ W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 175 mm.

Hab. Mediterranean; Atlantic; Caribbean Sea; Japan; Australia (?).

Chauliodus danae, Regan and Trewavas.

Regan and Trewavas, 1929, *t.c.* p. 34, pl. vii.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 5 specimens, 45-100 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 145 mm.

St. 87. 25. vi. 26. $33^{\circ} 53' 45''$ S, $9^{\circ} 26' 30''$ E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 55 mm.

Hab. Atlantic; Caribbean Sea; Indian Ocean; New Guinea.

Family STOMIATIDAE

A monograph of this family has been recently published by Regan and Trewavas (1930, *Ocean. Rep. Danish 'Dana'-Exped.* (1920-2), vi, pp. 53-133, pls. i-xi, text-figs.), based largely on material obtained by the 'Dana' in the Atlantic, Caribbean Sea, and Gulf of Panama. Through the kindness of the authors I have been able to refer to their manuscript during the preparation of this report.

Genus *Odontostomias*, gen. nov.

Elongate; head short. Cleft of mouth straight; jaws rather strong. Teeth tapering to sharp ends; first tooth in upper jaw rather small, fixed; second long, depressible, followed by 2 or 3 outer small fixed teeth and 1 inner stronger depressible tooth; lower jaw with a pair of small depressible teeth at the symphysis, a strong fixed fang on either side, followed by an inner depressible tooth and 3 or 4 outer fixed teeth; maxillary teeth all small, more or less erect; two groups, each of 1 to 4 teeth, on the vomer; 2 to 5 teeth on each palatine; a single pair of teeth on basibranchials or none. Teeth on gill-arches in pairs. Postocular luminous organ well developed (δ ?) or absent (φ ?). Dorsal 20–23. Anal 23–26; origin nearly below that of dorsal. Pectoral 7–9, without isolated ray. Pelvics 7-rayed, well behind middle of length.

Two species. Genotype: *Odontostomias micropogon*, n.sp.

Examination of the skulls of the fishes of this genus shows that it belongs to the group containing *Opostomias*, *Flagellostomias*, *Thysanactis* and *Leptostomias*, distinguished by the absence of post-temporals and the presence of parietals. In the form of the ethmoid region this genus seems to be nearest to *Opostomias*, but differs in having no isolated pectoral ray, and in the fangs of the lower jaw not perforating the praemaxillaries when the mouth is closed. The structure of the anterior part of the praemaxillaries bears some resemblance to that found in *Thysanactis*, but the median process is much less developed and the lateral projections are narrower.

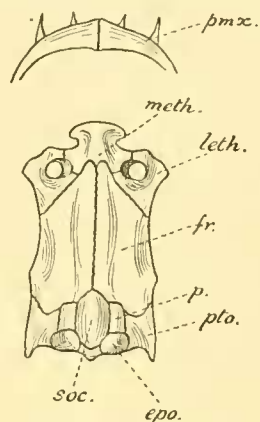


Fig. 17. Upper view of skull of *Odontostomias micropogon*. ($\times 2$.) *epo.* epiotic; *fr.* frontal; *leth.* lateral ethmoid; *meth.* mesethmoid; *p.* parietal; *pmx.* praemaxillary; *pto.* pterotic; *soc.* supra-occipital.

Odontostomias micropogon, n.sp.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 600–700 (–0) m.: 2 specimens, 180–186 mm.

St. 270. 27. vii. 27. $13^{\circ} 58' 30''$ S, $11^{\circ} 43' 30''$ E. Young-fish trawl, 200 (–0) m.: 8 specimens, 40–52 mm.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. 1 m. tow-net, oblique, 110 (–0) m.: 3 specimens, 38–45 mm. Young-fish trawl, 150 (–0) m.: 10 specimens, 39–290 mm. (The largest specimen is selected as the holotype.)

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (–0) m.: 1 specimen, 90 mm.

Depth of body $8\frac{1}{2}$ (young) to $12\frac{1}{2}$ in the length, length of head 7 to $8\frac{2}{3}$. Diameter of eye $4\frac{1}{4}$ to 6 in length of head, a little greater than postocular luminous organ.¹ Barbel $\frac{1}{4}$ to $\frac{2}{3}$ length of head; stem black, terminating in a simple white portion, scarcely

¹ The postocular luminous organ is well developed in some examples, and is altogether wanting in others. I have been able to determine the sex of two individuals, and find that the one with an organ is a male and the one without a female.

broader than the stem in adults, but forming a more or less definite bulb in the young. Five fixed teeth in lower jaw. A pair of teeth on basibranchials. Dorsal 20-23. Anal 23-26. Pectoral 7-9. Pelvic 7. Photophores—in ventral series I-P 10-11; P-V 34-36; V-A 13-15; A-C 12-13; in lateral series O-V 32-35; V-A 12-14.

Described from 24 specimens, 38 to 290 mm. in length.

Hab. North and South Atlantic.

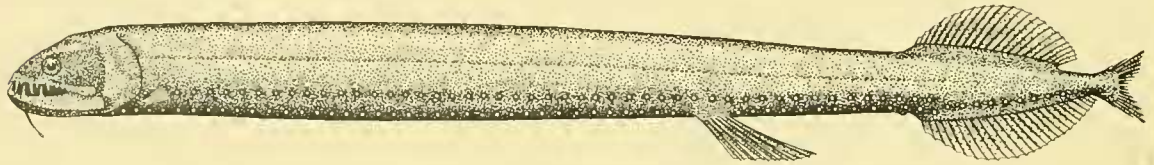


Fig. 18. *Odontostomias micropogon*. Holotype. ($\times \frac{1}{2}$.)

Odontostomias masticopogon, n.sp.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 1 specimen, 290 mm.

Depth of body nearly 10 in the length, length of head $7\frac{3}{4}$. Diameter of eye about 6 in length of head. No postocular luminous organ. Barbel $1\frac{1}{3}$ times length of fish; bulb (and possibly part of stem) apparently broken off. Four fixed teeth in lower jaw. No teeth on basibranchials. Dorsal 23. Anal 26 (or 27). Pectoral 9. Pelvic 7. Photophores—in ventral series I-P 10; P-V 36; V-A 14; A-C ?; in lateral series O-V 35; V-A 15.

Described from a single specimen, 290 mm. in length; holotype of the species.

Hab. North Atlantic.

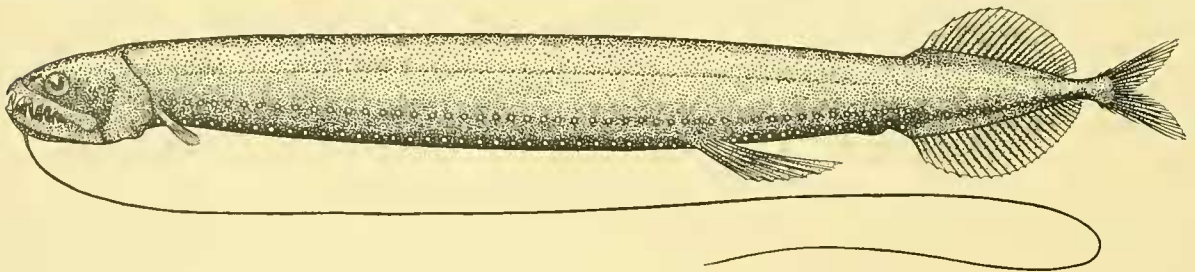


Fig. 19. *Odontostomias masticopogon*. Holotype. ($\times \frac{1}{2}$.)

Flagellostomias boureei (Zugmayer, 1913).

Regan and Trewavas, *t.c.* p. 57, pl. ii, fig. 2, text-fig. 33.

St. 81. 18. vi. 26. $32^{\circ} 45' 00'' S$, $8^{\circ} 47' 00'' W$. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 1 specimen, 60 mm.

St. 276. 5. viii. 27. $5^{\circ} 54' 00'' S$, $11^{\circ} 19' 00'' E$. Young-fish trawl, 150 (-0) m.: 1 specimen, 85 mm.

11. xi. 25. $6^{\circ} 55' N$, $15^{\circ} 54' W$. 2 m. tow-net, horizontal, 800 (-0) m.: 2 specimens, 70-80 mm.

Hab. Atlantic; West Indies.

Leptostomias macropogon, n.sp.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. 1 m. tow-net, horizontal, 55 m.: 1 specimen, 65 mm.

Depth of body about 16 in the length, length of head 10. Diameter of eye $4\frac{1}{2}$ in length of head. Maxillary with oblique teeth, the first 2 or 3 larger and nearly erect. Barbel nearly $\frac{3}{4}$ length of fish; proximal part of stem black, distal part with white spots and patches, which become larger nearer the bulb and finally unite to cover the black part completely; no filaments or appendages, except just proximal to bulb; bulb about $\frac{3}{5}$ length of head, slightly curved, narrow at tip; a series of 4 very small filaments on distal part of stem and proximal half of convex side of bulb; two pairs of similar filaments on distal part of bulb, and between these another filament, to which is attached a minute bulb at the end of a very fine stem. Dorsal 20. Anal 25. Pectoral 10. Pelvic 7. Photophores—in ventral series I-P 10; P-V 47; V-A 22; A-C 11; in lateral series O-V 45; V-A 22.

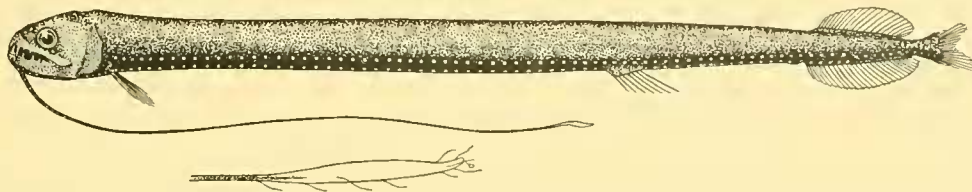


Fig. 20. *Leptostomias macropogon*. Holotype. ($\times \frac{3}{4}$.) [Barbel $\times 3$.]

Described from a single specimen, 165 mm. in length; holotype of the species.

Hab. South Atlantic.

This species may eventually prove to be identical with *L. gracilis*, Regan and Trewavas, described from four specimens, 70 to 75 mm. in length, but appears to differ in the length of the barbel and the structure of the bulb. In a related species, *L. ramosus*, the length of the barbel is less than $\frac{1}{3}$ that of the fish in an example 56 mm. in length, and nearly $\frac{1}{2}$ in one of 180 mm. In *L. leptobolus* it is $\frac{3}{5}$ in a specimen of 65 mm. and nearly $\frac{3}{4}$ in one of 95 mm. In *Flagellostomias boureei* the length of the barbel varies from $\frac{1}{3}$ to $\frac{2}{3}$ that of the fish in specimens measuring from 39 to 322 mm. in length. Assuming that the barbel grows at much the same rate in all these species, one would expect it to be about $\frac{1}{2}$ the length of the fish in a specimen of *L. gracilis* of 165 mm., whereas in that described above it is nearly $\frac{3}{4}$. *L. macropogon* may be distinguished from *L. haplocaulus* by the form of the bulb and the greater number of P-V photophores, and from *L. longibarba* by the structure of the bulb.

Bathophilus irregularis, n.sp.

St. 81. 18. vi. 26. 32° 45' 00" S, 8° 47' 00" W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 1 specimen, 40 mm.

Depth of body about $6\frac{1}{3}$ in the length, length of head a little more than 4. Postocular organ large; a small white spot below its anterior part. Dorsal 12 (or 13). Anal 16. Pectoral 3 + 7. Pelvics 21-rayed; inserted at middle of side, a little nearer to base of

caudal than end of snout. Photophores in ventral series consisting of 5 in front of the pectoral fin, 4 very small ones close together immediately behind the pectoral, 2 close together a little before pelvic and 1 or 2 very small ones just behind that fin, 4 close together above vent, and 5 behind anal. In the lateral series O-V 10 + 3, forming an ascending row, the last three being on the back; V-A 11, forming a curved row running from level of pelvic fin upwards nearly to back and then down again to the same level.

Described from a single specimen, 40 mm. in length; holotype of the species.

Hab. South Atlantic.

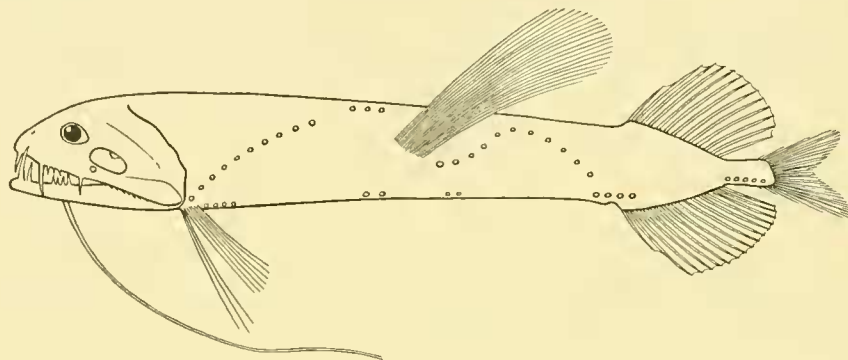


Fig. 21. *Bathophilus irregularis*. Holotype. ($\times 2\frac{1}{2}$.)

This species seems to be most nearly related to *B. longipes* and *B. schizochirus*, Regan and Trewavas; it is readily distinguished from the former by the number of pelvic rays, and from the latter by the number of pectoral rays and larger postocular luminous organ, and from all other species of the genus by the peculiar arrangement of the lateral photophores.

***Bathophilus longipinnis* (Pappenheim, 1914).**

Regan and Trewavas, *t.c.* p. 68, pl. v, fig. 1.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 1 specimen, 102 mm.

Hab. Atlantic; Caribbean Sea.

***Bathophilus pawneeii*, Parr, 1927.**

Regan and Trewavas, *t.c.* p. 69, fig. 47.

St. 280. 10. viii. 27. $00^{\circ} 36' 00''$ S, $8^{\circ} 28' 00''$ E. Young-fish trawl, 200-100 (-0) m.: 5 specimens, 55-62 mm.

St. 286. 17. viii. 27. $3^{\circ} 06' 30''$ S, $3^{\circ} 53' 00''$ W. Young-fish trawl, 125 (-0) m.: 1 specimen, 47 mm.

Hab. Atlantic; Caribbean Sea.

***Eustomias (Haploclonus) regani*, n.sp.**

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. 1 m. tow-net, oblique, 73-0 m.: 1 specimen, 58 mm.

Depth of body $11\frac{1}{2}$ in the length, length of head about 8. Diameter of eye $5\frac{1}{2}$ in length of head, interorbital width about 5. Barbel $\frac{1}{4}$ length of fish; bulb small, oval, with

terminal filaments arranged as shown in the accompanying figure; long filament with a luminous swelling at the tip. Dorsal 22 (?). Anal 38. Pectoral 3. Pelvic 7. Photophores—in ventral series I-P 7; P-V 26; V-A 12; A-C 19; in lateral series O-V 26; V-A 12.

Described from a single specimen, 58 mm. in length; holotype of the species.

Hab. Atlantic.

Apparently related to *E. enbarbatus*, Welsh, differing chiefly in the form of the barbel. Named for Dr C. Tate Regan, F.R.S., in recognition of his work on the 'Dana' Stomiatooids.

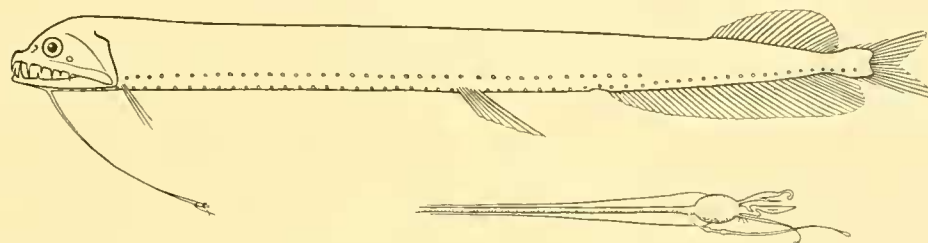


Fig. 22. *Eustomias (Haploclonus) regani*. Holotype. ($\times 2$.) [Barbel $\times 6$.]

Eustomias (Eustomias) obscurus, Vaillant, 1888.

Regan and Trewavas, *t.c.* p. 81, pl. vii, fig. 4, text-figs. 58-60.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 1 specimen, 156 mm.

Hab. Atlantic.

According to the label the basal half of the proximal swelling of the barbel was coloured pink in life, the apical half and the distal swelling being cream coloured.

Eustomias (Nominostomias) trewavasae, n.sp.

St. 79. 13. vi. 26. $34^{\circ} 48' 00''$ S, $16^{\circ} 36' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 60 mm.

Depth of body 12 in the length, length of head (with snout produced) about 8. Diameter of eye about 5 in length of head. Barbel more than $\frac{1}{3}$ length of fish; 3 bulbs, the middle one close to and somewhat larger than the distal one, which bears a knob-like process at its extremity but no filaments; a small luminous swelling on the stem at some distance from the proximal bulb; a bunch of about 6 filaments, deeply pigmented at the base comes off from the stem just distal to the first bulb. Dorsal 23 (?). Anal 35 (?). Pectoral 3. Pelvic 7. Photophores—in ventral series I-P 7; P-V 32; V-A 16; A-C 15; in lateral series O-V 32; V-A 16.

Described from a single specimen, 60 mm. in length; holotype of the species.

Hab. South Atlantic.

This species appears to be rather close to *E. variabilis*, Regan and Trewavas, and *E. trituberosus*, Regan and Trewavas, differing from both chiefly in the form of the barbel. Named for Miss Ethelwynn Trewavas, in recognition of her work on the 'Dana' Stomiatooids.

A coloured sketch of the barbel of this species was made by Mr E. R. Gunther on board the 'Discovery'. The proximal swelling and the small swelling just behind it were pale yellow, the large bulb in the distal portion turquoise, and the distal bulb cream-coloured with a bright yellow tip. The central axis was said to be pigmented with black along its centre, and all the bulbs and swellings were enclosed in a wide transparent coating of pale blue.

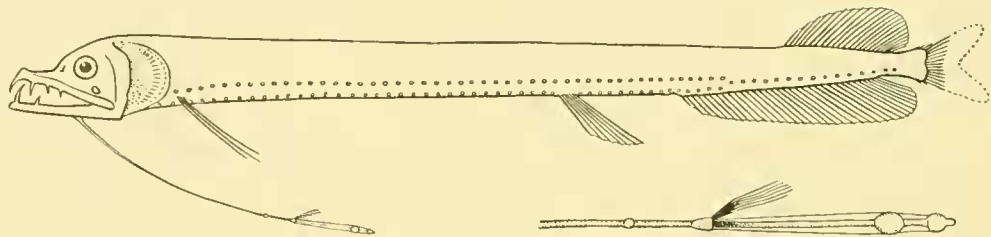


Fig. 23. *Eustomias (Nominostomias) trewavasae*. Holotype. ($\times 2$.) [Barbel $\times 6$.]

Haplostomias tentaculatus, Regan and Trewavas.

Regan and Trewavas, 1930, *t.c.* p. 109, pl. xi, fig. 1, text-figs.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850–950 m.: 1 specimen, 204 mm.

Depth of body equal to length of head, which is 8 in length of fish. Diameter of eye $5\frac{3}{4}$ in length of head, about as long as postocular luminous organ. Barbel twice as long as head, with black stem and white ovate bulb; axis of stem prolonged along edge of bulb, distally becoming free and forming a tentacle-like appendage. Dorsal 16. Anal 19. Pectoral 5. Pelvic 7. Photophores—in ventral series I-P 8 + 2; P-V 27; V-A 15; A-C 9 or 10: in lateral series O-V 25; V-A 14.

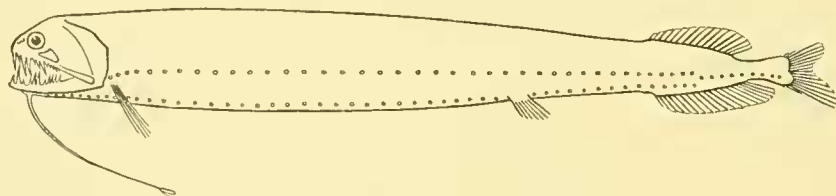


Fig. 24. *Haplostomias tentaculatus*. ($\times \frac{1}{2}$.)

Described from a single specimen, 204 mm. in length.

The largest specimen studied by Regan and Trewavas was 100 mm. in length, and the accompanying figure illustrates the difference in the form of the body in the two fishes.

Echiostoma tanneri (Gill, 1883).

Regan and Trewavas, *t.c.* p. 117, fig. 113.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850–950 m.: 2 specimens, 170–200 mm.

Hab. Atlantic; Gulf of Mexico; Caribbean Sea.

Idiacanthus niger, Regan, 1914.

Regan and Trewavas, *l.c.* p. 128, fig. 124.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 105 mm.

St. 107. 4. xi. 26. 45° 03' 00" S, 17° 03' 00" E. 4½ m. net, horizontal, 850-950 m.: 2 specimens, 425-440 mm.

St. 244. 9. vi. 27. 38° 26' 30" S, 24° 48' 30" W. 70 cm. tow-net, horizontal, 93 m.: 1 specimen, 98 mm.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-0) m.: 1 specimen, 145 mm.

Hab. South Atlantic; New Zealand; Chile.

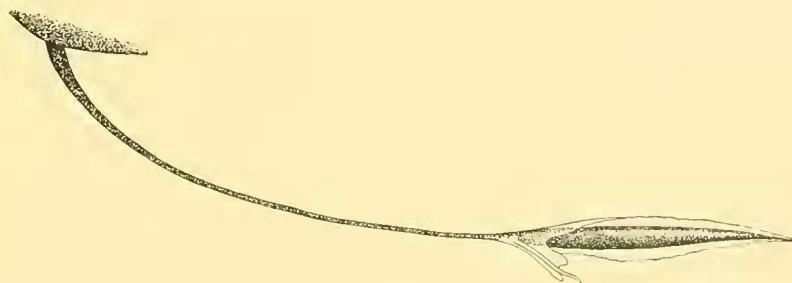


Fig. 25. Barbel of *Idiacanthus niger*. ($\times 1\frac{1}{2}$.)

Macrostomias longibarbus, Brauer.

Brauer, 1902, *Zool. Anz.* xxv, p. 283; 'Valdivia' *Tiefsee-Fische*, p. 52, pl. iii, fig. 2.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 95 mm.

Hab. Atlantic and Indian Oceans.

Stomias ferox, Reinhardt, 1842.

Ege, 1918, *Rep. Danish Ocean. Exped.* (1908-10), 11, A, 4, p. 3.

10. x 25. 41° 37' 15" N, 12° 30' 20" W. 2 m. tow-net, horizontal, 900 (-0) m.: 1 specimen, 88 mm.

Hab. North Atlantic.

Stomias affinis, Günther.

Günther, 1887, *Deep-Sea Fish. 'Challenger'*, p. 205, pl. liv, fig. A; Goode and Bean, 1895, *Ocean. Ichth.* p. 108, fig. 129; Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* XLVII (1), p. 588; Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 51.

Stomias elongatus, Wood-Mason and Alcock, 1891, *Ann. Mag. Nat. Hist.* (6), viii, p. 129; Alcock, 1899, *Cat. Indian Deep-Sea Fish.* p. 147.

Stomias valdiviae, Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 48, pl. iii, fig. 1, text-figs. 11-13.

St. 276. 5. viii. 27. 5° 54' 00" S, 11° 19' 00" E. Young-fish trawl, 150 (-0) m.: 2 specimens, 32-110 mm.

St. 280. 10. viii. 27. $00^{\circ} 36' 00''$ S, $8^{\circ} 28' 00''$ E. Young-fish trawl, 100–200 (–0) m.: 1 specimen, 158 mm.

St. 282. 12. viii. 27. $1^{\circ} 11' 00''$ S, $5^{\circ} 38' 00''$ E. Young-fish trawl, 300 (–0) m.: 1 specimen, 55 mm.

Hab. Atlantic; West Indies; Indian Ocean.

I have examined the type of *Stomias affinis* (120 mm.), and also the type of *S. elongatus* (105 mm.), lent for examination by the Indian Museum.

Stomias atlanticus, Pappenheim.

Pappenheim, 1914, *Deutsche Südpolar-Exped.* xv, *Zool.* vii, p. 169.

St. 109. 5. xi. 26. $46^{\circ} 25' 00''$ S, $15^{\circ} 13' 00''$ E. 1 m. tow-net, horizontal, 192 m.: 1 specimen, 240 mm.

Depth of body 16 in the length, length of head $10\frac{1}{2}$. Snout shorter than eye, diameter of which is $4\frac{1}{4}$ in length of head and about equal to interorbital width. Praemaxillary with 5 teeth, of which the second is enlarged and fang-like; a few minute teeth on the

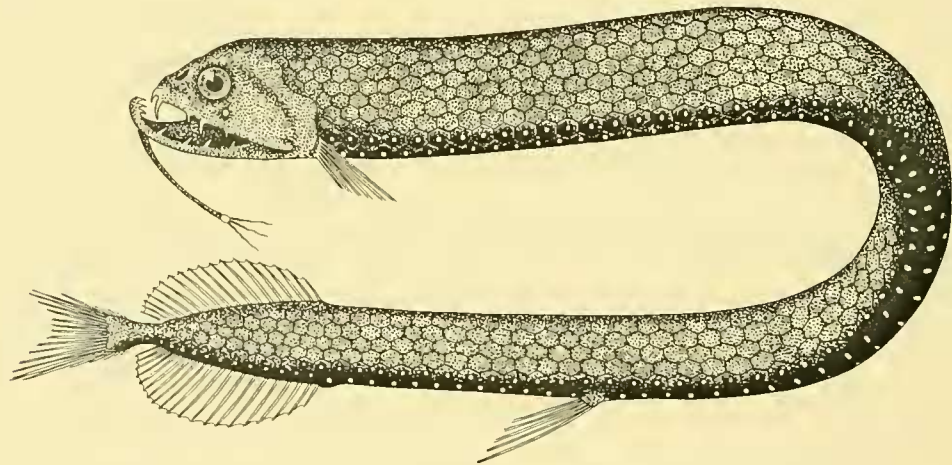


Fig. 26. *Stomias atlanticus*. ($\times 1$.)

maxillary; mandible with 7 or 8 teeth; a single pair of vomerine teeth and 1 or 2 on each palatine. Barbel $\frac{3}{4}$ length of head, trifid at its extremity. Dorsal 18. Anal 20. Photophores—in ventral series I–P 11; P–V 46; V–A 12; A–C 15 (?); in lateral series 58.

Described from a single specimen, 240 mm. in length.

Hab. South Atlantic.

Stomias colubrinus, Garman, 1899.

Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 47, fig. 10.

The 'Discovery' obtained 34 specimens of this species from the following stations in the North and South Atlantic, at depths ranging from 0–950 m., measuring from 55 to 265 mm. in length: St. 170, 269, 270, 276, 281, 282, 296, 297.

Hab. Atlantic; Pacific coast of Central America.

Family MALACOSTEIDAE

This family has also been recently monographed by Regan and Trewavas (1930, *Ocean Rep. Danish 'Dana'-Exped.* (1920-22), VI, pp. 133-143, pls. xiii, xiv, text-figs.).

Photostomias guernei, Collett, 1889.

Regan and Trewavas, *t.c.* p. 134, figs.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-0) m.: 1 specimen, 32 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 1 specimen, 140 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 92 mm.

Hab. Atlantic; Caribbean Sea.

In the male specimen the eye measures $3\frac{2}{3}$ in the length of the head, and the post-ocular organ is very large, $2\frac{2}{3}$ in length of lower jaw. In these characters it approaches *P. atrox*, Alcock, but the shape of the luminous organ appears to be different. In the female the eye is about equal to the postocular luminous organ, and 5 in length of head.

Aristostomias xenostoma, Regan and Trewavas.

Regan and Trewavas, 1930, *t.c.* p. 139, pl. xiii, fig. 3, text-figs. 133-134.

St. 286. 17. viii. 27. 3° 06' 30" S, 3° 53' 00" W. Young-fish trawl, 102-0 m.: 1 specimen, 55 mm.

Hab. Atlantic; Caribbean Sea.

Malacosteus niger, Ayres, 1857.

Regan and Trewavas, *t.c.* p. 142, fig. 138.

St. 85. 23. vi. 26. 33° 07' 40" S, 4° 30' 20" E. 4½ m. net, horizontal, 2000 (-0) m.: 1 specimen, 150 mm.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 1 specimen, 120 mm.

St. 100. 2. x. 26. 33° 20' 00" to 33° 46' 00" S, 15° 18' 00" to 15° 08' 00" E. Young-fish trawl, 625-675 m.: 2 specimens, 75-95 mm.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 850-950 m.: 1 specimen, 140 mm.

St. 298. 29. viii. 27. 13° 01' 45" N, 21° 34' 45" W. Young-fish trawl, 900-1200 (-0) m.: 1 specimen, 30 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 10 specimens, 80-155 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 75 mm.

Hab. Atlantic; Indian Ocean.

Order INIOMI

Family SUDIDAE

Sudis bronsoni, Parr.

Parr, 1928, *Bull. Bingham Ocean. Coll.* III (3), p. 36, fig. 3.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 1 specimen, 26 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 55 mm.

Hab. Atlantic; West Indies.

The larger of these specimens agrees very closely with the description of *S. bronsoni*, but the diameter of the eye is markedly smaller, being contained about $2\frac{4}{5}$ in the length of the snout and about 6 times in that of the head, as compared with $2\frac{1}{4}$ and $4\frac{1}{3}$ times respectively in the type of the species. Mr Parr has been kind enough to compare the larger of the 'Discovery' specimens with the type, and writes that in general appearance, body form, pigmentation, position of fins, etc., they are perfectly alike, and that, apart from the size of the eye, he is unable to detect any other differences. I have, therefore, identified these examples with his species until sufficient material is available to make possible a study of the individual variations in these fishes.

Sudis kroyeri (Lütken, 1892).

Parr, *t.c.* p. 39.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 2 specimens, 70-95 mm.

St. 100. 2. x. 26. $33^{\circ} 20' 00''$ to $33^{\circ} 46' 00''$ S, $15^{\circ} 18' 00''$ to $15^{\circ} 08' 00''$ E. Young-fish trawl, 625-675 m.: 1 specimen, 100 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 45 mm.

Hab. Atlantic.

Family MYCTOPHIDAE¹*Scopelopsis multipunctatus*, Brauer.

Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 146, fig. 71.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 1 specimen, 36 mm.

Hab. Off South Africa.

Genera *Myctophum*, *Lampanyctus*, *Diaphus*, *Lampadena*²

The species included in the above-mentioned genera are very numerous, but, since some of them have been briefly and often quite inadequately described, a certain

¹ I am much indebted to Mr A. Fraser-Brunner for assistance in determining many of the specimens of *Myctophum*, *Lampanyctus*, *Diaphus* and *Lampadena*. His preliminary sorting of the material has greatly facilitated my work on these genera.

² As suggested by Taning, further investigation will probably lead to the recognition of more than four well-defined genera in this group.

number of nominal species are probably included among them. Brauer [1906, '*Valdivia*' *Tiefsee-fische*, pp. 150-251], who included all the species in a single genus, *Myctophum*, was the first to reduce the chaos to some sort of order, and in quite recent years other investigators have added still further to our knowledge of the group. In 1928 Parr [*Bull. Bingham Ocean. Coll.* III (3), pp. 49-156] published a complete synopsis of the four genera, based on the collections made in the Western Atlantic and West Indies by the 'Pawnee', and described a number of new species. His keys to the species have proved useful in determining many of the 'Discovery' specimens, and as a groundwork, but, as many of the types of the species preserved in various museums and institutions were inaccessible to him, these keys are necessarily somewhat tentative. In the same year Tåning [*Vid. Medd. Dansk nat. For.* 86, pp. 49-69] published a preliminary synopsis of the species of the North Atlantic, and he is at present engaged in studying the large amount of material obtained in this and other regions by the 'Dana'. This synopsis has proved of great value and interest, since, in addition to the 'Dana' material from the Atlantic, Tåning has examined some specimens from the Gulf of Panama and from the Malay Archipelago, and has also studied most of the type specimens of these genera preserved in various European and other museums. In a recent paper [1929, *Ann. Mag. Nat. Hist.* (10), IV, pp. 510-15] I have published brief notes and descriptions of certain specimens in the British Museum collection, as a supplement to the works of Parr and Tåning. In the present report I give for each species a reference to the pages and figures in the papers of Brauer, Parr and Tåning.

Genus *Myctophum*, Rafinesque, 1810

The group of species distinguished by having no Pol photophores, and the AO forming a single continuous series, may be arranged as follows:—

- I. Lens of the eye excentric, dorsal.
 - A. The two first SAO and the two Prc separated from one another by wide interspaces.
 1. *parallellum*, Lönnberg, 1905
 - B. The first two SAO and the two Prc normally spaced.
 2. *arcticum* (Lütken, 1892)
- II. Lens of eye normal, central.
 - A. Depth of body less than 3 in the length, length of head $2\frac{1}{2}$ to 3; eye $1\frac{7}{8}$ to $2\frac{1}{4}$ in head. AO 10-12.
 3. *rissoi* (Cocco, 1829)
 - B. Depth of body more than 3 in the length, length of head 3 to 4; eye $2\frac{1}{5}$ to 3 in head.
 1. No SAO photophores; AO 14-15, first two elevated.
 4. *anderssoni*, Lönnberg, 1905
 2. 3 SAO photophores; AO 15-18, none elevated.
 - a. Origin of anal just behind last dorsal ray; dorsal commencing a little behind root of pelvic; 2 PVO, close together and side by side.
 5. *tenisoni*, n.sp.
 - b. Origin of anal below dorsal, which commences well behind root of pelvic; 2 PVO placed one above the other.
 - * Eye $2\frac{1}{3}$ to nearly 3 in the head; posterior margin of maxillary truncate; origin of anal below middle of dorsal.
 6. *antarcticum* (Günther, 1878)
 - ** Eye $2\frac{1}{4}$ to $2\frac{1}{2}$ in head; posterior margin of maxillary rounded; origin of anal below posterior part of dorsal.
 7. *subasperum* (Günther, 1864)

Myctophum parallelum, Lönnberg.

Lönnberg, 1905, *Zool. Anz.* xxviii, p. 764; 1905, *Wiss. Ergeb. Schwed. Südpolar-Exped.* v (6), p. 62; Parr, 1928, *Bull. Bingham Ocean. Coll.* iii (3), p. 57.

Myctophum (Myctophum) parallelum, Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 174, fig. 86.

St. 78. 12. vi. 26. 35° 18' 00" S, 19° 01' 10" W. Young-fish trawl, 1000 (-0) m.: 1 specimen, 17 mm.

St. 85. 23. vi. 26. 33° 07' 40" S, 4° 30' 20" E. 4½ m. net, horizontal, 2000 (-0) m.: 1 specimen, 20 mm.

St. 100. 4. x. 26. 33° 20' 00" to 33° 46' 00" S, 15° 18' 00" to 15° 08' 00" E. Young-fish trawl, 2500 (-0) m.: 2 specimens, 30-31 mm.

St. 100. 4. x. 26. 33° 20' 00" to 33° 46' 00" S, 15° 18' 00" to 15° 08' 00" E. Young-fish trawl, 2500-2000 m.; 2 specimens, 27-29 mm.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 350-400 (-0) m.: 2 specimens, 29-30 mm.

Depth of body about 3½ in the length, length of head 3½ to 3¼. Diameter of eye 2⅓ to 2½ in length of head. Dorsal 12. Anal 22. Pectoral 15. Pelvic 8. PLO photophore on lower part of pectoral base. 2 PVO, situated close together and side by side, below base of pectoral fin. 5 PO, all level. VLO nearer pelvic fin than lateral line. 4 VO, the second scarcely elevated. 3 SAO, interspace between first and second greater than that between second and third, forming a very obtuse angle. AO 15, forming an almost straight line, 4 behind last anal ray. Prc fairly well separated.

Described from several specimens, 17 to 31 mm. in length.

Hab. Off South-west Africa; South Atlantic.

Myctophum risoi (Cocco, 1829).

Brauer, *t.c.* p. 170, fig. 83; Tåning, 1928, *Vid. Medd. Dansk nat. For.* 86, p. 52; Parr, *t.c.* p. 58.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 15 mm.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 350-400 (-0) m.: 3 specimens, 63-72 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125-175 (-0) m.: 3 specimens, 21-23 mm.

Hab. Mediterranean; Atlantic; Indian Ocean.

Myctophum anderssoni, Lönnberg.

Scopelus antarcticus (non Günther), Boulenger, 1902, *Rep. Coll. Nat. Hist.* 'Southern Cross', v, *Pisces*, p. 174.

Myctophum anderssoni, Lönnberg, 1905, *Zool. Anz.* xxviii, p. 763; 1905, *Wiss. Ergeb. Schwed. Südpolar-Exped.* v (6), p. 61; Parr, 1928, *t.c.* p. 58.

Myctophum (Myctophum) anderssoni, Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 172, fig. 84.

St. 64. 22. v. 26. 48° 34' 00" S, 53° 34' 30" W. 1 m. tow-net, horizontal, 90 (-0) m.: 2 specimens, 18-21 mm.

Depth of body 4¼ to 4⅓ in the length, length of head 3½. Diameter of eye about 3 in length of head. Dorsal 12. Anal 18-19. Pectoral 14. Pelvic 8. PLO photophore on

lower part of pectoral base, forming a straight line with the two PVO, which lie close together and side by side. 5 PO (6 on one side in the 'Southern Cross' specimen), all level. VLO much nearer pelvic fin than lateral line. 4 VO, all level. No SAO. AO 14-15, the first 2 elevated, the remainder forming a more or less straight line, 4 behind the last anal ray. Prc close together, second scarcely elevated.

Described from three specimens, 18 to 55 mm. in length.

Hab. South Atlantic; Antarctic (Victoria Land).

The types of this species, 22 and 60 mm. in length, were in poor condition, and the SAO photophores were described as missing, but their absence in all the specimens described above suggests that this is the normal condition. It is possible, however, that the so-called anterior AO, which are elevated above the level of the remainder, should be regarded as belonging to the SAO series.

Myctophum tenisoni, n.sp.

St. 36. 18. iii. 26. 38 miles N 39° E of Jason Light, South Georgia. 1 m. tow-net, horizontal, 90 (-0) m.: 1 specimen, 65 mm.

St. 44. 3. iv. 26. 32 miles N 51° E of Jason Light, South Georgia. 1 m. tow-net, horizontal, 170 (-0) m.: 2 specimens, 64-69 mm.

St. 65. 22. v. 26. 48° 18' 00" S, 53° 09' 00" W. 2 m. tow-net, horizontal, 120 (-0) m.: 1 specimen, 32 mm.

St. 72. 1. vi. 26. 41° 43' 20" S, 42° 20' 40" W. 4½ m. net, horizontal, 2000 (-0) m.: 3 specimens, 36-46 mm.

St. 107. 4. xi. 26. 45° 03' 00" S, 17° 03' 00" E. 4½ m. net, horizontal, 850-950 m.: 1 specimen, 50 mm.

St. 109. 5. xi. 26. 46° 25' 00" S, 15° 13' 00" E. 1 m. tow-net, horizontal, 96 m.: 3 specimens, 42-47 mm. (Largest selected as the holotype.)

St. 114. 12. xi. 26. 52° 25' 00" S, 9° 50' 00" E. 4½ m. net, horizontal, 650-700 (-0) m.: 2 specimens, 43-60 mm.

St. 217. 18. iv. 27. Drake Strait, 58° 27' 30" S, 67° 55' 00" W. 1 m. tow-net, horizontal, 77 m.: 2 specimens, 35-36 mm.

St. 239. 2. vi. 27. 46° 56' 00" S, 46° 03' 00" W. 4½ m. net, horizontal, 1050-1350 (-0) m.: 2 specimens, 25-27 mm.

Depth of body $3\frac{7}{8}$ to $4\frac{1}{4}$ in the length, length of head 3 to $3\frac{2}{5}$. Snout much shorter than eye, diameter of which is $2\frac{2}{5}$ to 3 in length of head and much greater than the inter-orbital width. Angle of preoperculum nearly vertical. Maxillary expanded behind, extending to a little beyond posterior margin of eye; lower jaw a little projecting. Dorsal 11-13; origin slightly behind root of pelvic; longest rays about $\frac{2}{3}$ head. Anal 22-24; origin just behind last dorsal ray. Pectoral 14-15; $\frac{3}{4}$ to $\frac{4}{5}$ length of head. Pelvic 8. About 42 scales in the lateral line. A very small antorbital luminous organ above the nostril and a somewhat larger one below the anterior part of the eye; 2 on the preoperculum, the upper larger and level with the upper edge of the maxillary; 3 below the lower jaw, the middle one the largest. PLO on lower part of pectoral base. 2 PVO, close together and side by side. 5 PO, all level. VLO much nearer pelvic fin than lateral line. 4 VO, the second scarcely elevated. 3 SAO, all close together and nearly

forming a straight line; the interspace between first and second greater than that between second and third. AO 17-18, none elevated, 3 or 4 behind last anal ray. No Pol. 2 Prc, close together, second scarcely elevated. 6 or 7 luminous scales on upper edge of caudal peduncle (♂) or 4 or 5 on lower edge (♀). Uniformly silvery.

Described from nine specimens, 35 to 69 mm. in length.

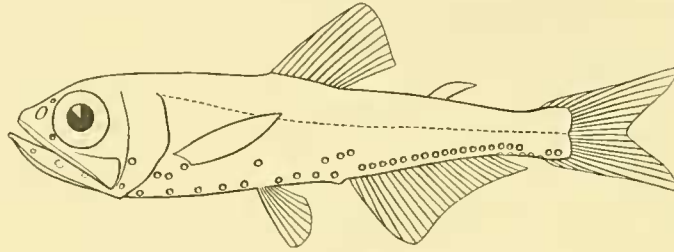


Fig. 27. *Myctophum tenisoni*. Holotype. ($\times 1\frac{1}{2}$.)

Hab. Southern Atlantic (south of 46°); Antarctic.

Named for Lieut.-Col. W. P. C. Tenison, D.S.O., who is responsible for the illustrations in the text of this report.

Myctophum antarcticum (Günther)

Scopelus antarcticus, Günther, 1878, *Ann. Mag. Nat. Hist.* (5), 11, p. 184; 1887, *Deep-Sea Fish. 'Challenger'*, p. 196, pl. li, fig. D.

Myctophum antarcticum, Lönnberg, 1905, *Wiss. Ergebn. Schwed. Südpolar-Exped.* v (6), p. 60; Roule, 1913, *Denx. Expéd. Antarct. Franç.* (1908-10), *Fish.* p. 20; Regan, 1913, *Trans. R. Soc. Edinburgh*, XLIX, p. 234; 1916, *Larval Fishes 'Terra Nova'*, p. 127, pl. i, figs. 1-3; Parr, 1928, *t.c.* p. 58.

Myctophum (Myctophum) antarcticum, Brauer, 1906, *t.c.* p. 168, fig. 82; Pappenheim, 1914, *Deutsche Südpolar-Exped.* xv, *Zool.* VII (2), p. 192; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 240.

St. 114. 12. xi. 26. $52^{\circ} 25' 00''$ S, $9^{\circ} 50' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 650-700 (-0) m.: 19 specimens, 14-80 mm.

St. 116. 14. xi. 26. $54^{\circ} 30' 00''$ S, $5^{\circ} 34' 00''$ E. 70 cm. tow-net, horizontal, 139 m.: 1 specimen, 70 mm.

St. 121. 25. xi. 26. $50^{\circ} 59' 00''$ S, $11^{\circ} 44' 00''$ W. 1 m. tow-net, horizontal, 58 m.: 1 specimen, 50 mm.

St. 197. 3. iv. 27. Bransfield Strait, South Shetlands, $62^{\circ} 27' 00''$ S, $58^{\circ} 11' 30''$ W. 1 m. tow-net, horizontal, 134 m.: 1 specimen, 78 mm.

St. 202. 5. iv. 27. Bransfield Strait, South Shetlands, $62^{\circ} 48' 00''$ S, $60^{\circ} 05' 00''$ W. 1 m. tow-net, horizontal, 188 (-0) m.: 1 specimen, 95 mm.

St. 267. 23. vii. 27. $24^{\circ} 31' 00''$ S, $12^{\circ} 15' 30''$ E. 1 m. tow-net, oblique, 117 (-0) m.: 1 specimen, 21 mm.

St. WS 30. 19. xii. 26. $53^{\circ} 34' 15''$ S, $38^{\circ} 36' 15''$ W. 1 m. tow-net, horizontal, 134 (-67) m.: 1 specimen, 65 mm.

Depth of body $3\frac{1}{2}$ to $4\frac{1}{4}$ in the length, length of head $3\frac{1}{3}$ to nearly 4. Diameter of eye $2\frac{1}{3}$ to nearly 3 in length of head (in specimens over 60 mm.). Posterior margin of

maxillary truncate, a little behind posterior edge of eye. Dorsal 13-14; origin well behind root of pelvic. Anal 19-21; origin nearly below middle of dorsal. Pectoral 13-15. Pelvic 8. About 40 scales in the lateral line. PLO photophore on lower part of pectoral base. 2 PVO, close together and one above the other, forming a right-angle with PLO. 5 PO, the last very little elevated. VLO nearer pelvic fin than lateral line. 4 VO, all level. 3 SAO, forming an obtuse angle, interspace between first and second a little greater than that between second and third. AO 17-18, almost in a straight line, 4 behind last anal ray. No Pol. 2 Prc, rather close together, the second a little elevated. 6 or 7 luminous scales on upper edge of caudal peduncle, or 5 on the lower edge.

Described from several specimens, 35 to 95 mm. in length, including the types of the species.

Hab. Circumpolar in southern seas.

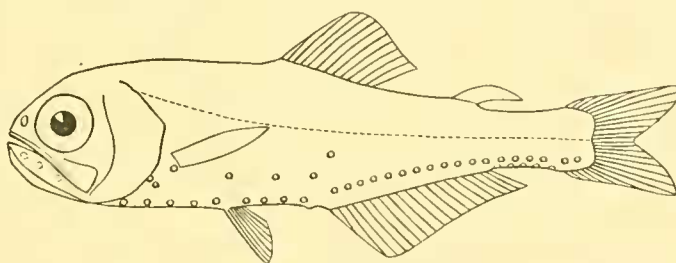


Fig. 28. *Myctophum antarcticum*. ($\times 1$.)

Myctophum subasperum (Günther).

Scopelus subasper, Günther, 1864, *Cat. Fish.* v, p. 411; Lütken, 1892, *Vid. Selsk. Skr.* (6), vii, p. 240, fig. 1.

Myctophum megalops, Peters, 1865, *Monatsber. Akad. Berlin* (1864), p. 393.

? *Scopelus colletti*, Lütken, 1892, *t.c.* p. 249, fig. 7.

? *Benthosema colletti*, Goode and Bean, 1895, *Ocean. Ichth.* p. 78.

Dasyscopelus subasper, Goode and Bean, 1895, *t.c.* p. 92.

Myctophum (Myctophum) subasperum, Brauer, 1906, 'Valdivia' *Tiefsee-Fische*, p. 175, fig. 87.

Myctophum antarcticum, Gilbert, 1911, *Bull. Amer. Mus. Nat. Hist.* xxx, p. 13; Regan, 1914, *Fishes 'Terra Nova'*, p. 1; Waite, 1916, *Fish. Austral. Antarct. Exped.* p. 59, pl. iv, fig. 2, text-fig. 13.

Myctophum subasperum, Parr, 1928, *Bull. Bingham Ocean. Coll.* iii (3), p. 58.

St. 78. 12. vi. 26. $35^{\circ} 18' 00''$ S, $19^{\circ} 01' 10''$ W. Young-fish trawl, 1000 (-0) m.: 19 specimens, 17-23 mm. ?

St. 104. 31. x. 26. $41^{\circ} 33' 30''$ S, $17^{\circ} 58' 00''$ W. 1 m. tow-net, horizontal, 0-5 m.: 1 specimen, 32 mm.

Close to *M. antarcticum*. Depth of body $3\frac{3}{4}$ to $4\frac{1}{4}$ in the length, length of head $3\frac{1}{2}$ to nearly 4. Diameter of eye $2\frac{1}{5}$ to $2\frac{1}{2}$ in length of head. Posterior margin of maxillary rounded, the maxillary scarcely extending beyond hinder edge of eye. Dorsal 13-14. Anal 21-22; origin below posterior part of dorsal. Pectoral 16 (?). Pelvic 8. 38 to 40 scales in the lateral line; those on the upper part of the body in adults with deeply crenulated edges, giving them a ctenoid appearance. PVO more widely separated and

SAO forming a much less obtuse angle than in *M. antarcticum*. AO 15-16, forming a continuous series in which three more or less distinct groups may be recognised; first two nearer anal base than the remainder, 9 or 10 arranged in a slight ~-shaped curve, and 4 behind the anal fin parallel with those of the opposite side. One to three luminous scales on upper or lower edge of the caudal peduncle.

Described from five specimens, 32 to 95 mm. in length, including the type of the species.

Hab. South Atlantic; Antarctic; Tasmania; South Pacific.

This species seems to have been confused with the preceding by some authors, and some of the references given under *M. antarcticum* may refer to *M. subasperum*.

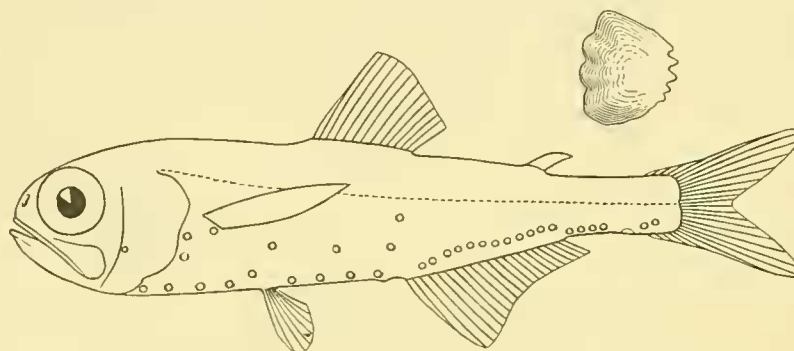


Fig. 29. *Myctophum subasperum*. ($\times 1$.) [Scale $\times 3$.]

Myctophum interruptum, Tåning.

Tåning, 1928, *t.c.* p. 56; Parr, *t.c.* p. 59.

St. 87. 25. vi. 26. $33^{\circ} 53' 45''$ S, $9^{\circ} 26' 30''$ E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 35 mm.

St. 257. 24. vi. 27. $35^{\circ} 01' 00''$ S, $10^{\circ} 18' 00''$ E. Young-fish trawl, 250 (-0) m.: 1 specimen, 28 mm.

The larger of the two specimens was coloured a brilliant silver on the sides in life, on which silver photophores were just discernible: the dorsal surface was a brilliant iridescent deep metallic blue.

Myctophum glaciale (Reinhardt, 1837).

Brauer, *t.c.* p. 80, fig. 92; Tåning, *t.c.* p. 56; Parr, *t.c.* p. 60

28. x. 25. $13^{\circ} 25'$ N, $18^{\circ} 22'$ W. $4\frac{1}{2}$ m. net. horizontal, 900 (-0) m.: 14 specimens, 45-50 mm.

Hab. North Atlantic and Arctic waters.

Myctophum laternatum, Garman, 1899.

Brauer, *t.c.* p. 178, figs. 90-91; Tåning, *t.c.* p. 56 (var. *atlanticum*); Parr, *t.c.* pp. 61, 67.

The 'Discovery' obtained 15 specimens of this species from the following stations in the Atlantic, at depths ranging from 0-2500 m., measuring 11 to 27 mm. in length: St. 86, 89, 100, 285, 287, 288, 289, 296.

Hab. Atlantic; Indian and Pacific Oceans

Myctophum fibulatum, Gilbert and Cramer, 1897.

Parr, *t.c.* pp. 61, 67.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-0) m.: 1 specimen, 30 mm.

Hab. West Indies; South Atlantic; Hawaiian Islands.

Myctophum coccoi (Cocco, 1829).

Brauer, *t.c.* p. 199, figs. 116-120; Tåning, *t.c.* p. 55; Parr, *t.c.* p. 61.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 18 mm.

St. 247. 13. vi. 27. 37° 20' 00" S, 12° 47' 30" W. Young-fish trawl 100-115 (-0) m.: 1 specimen, 33 mm.

Hab. Mediterranean; Atlantic; Indian Ocean; Pacific.

Myctophum asperum, Richardson, 1845.

Brauer, *t.c.* p. 197, fig. 115; Tåning, *t.c.* p. 54; Parr, *t.c.* p. 63.

16. vii. 26. 3° 45' N, 12° 48' W. Washed on board: 1 specimen, 60 mm.

Hab. Atlantic; Pacific; Australian seas.

I have compared the type of this species with one of the types of *Dasyscopelus naufragus*, Waite, and find them identical.

Myctophum humboldti (Risso, 1810).

Brauer, *t.c.* p. 192, figs. 108-111; Tåning, *t.c.* p. 54; Parr, *t.c.* p. 64.

St. 7. 3. ii. 26. Washed on board: 1 specimen, 69 mm.

St. 71. 30. v. 26. 43° 20' 00" S, 46° 02' 00" W. Young-fish trawl, 2000 (-0) m.: 3 specimens, 38-46 mm.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (-0) m.: 6 specimens, 16-23 mm.

St. 100. 2. x. 26. 33° 20' 00" to 33° 46' 00" S, 15° 18' 00" to 15° 08' 00" E. Young-fish trawl, 625-675 m.: 1 specimen, 40 mm.

Hab. Mediterranean; Atlantic; Pacific (?).

Myctophum affine (Lütken, 1892).

Brauer, *t.c.* p. 190, figs. 105-107; Tåning, *t.c.* p. 53; Parr, *t.c.* pp. 65, 69.

St. 240. 2. vi. 27. 46° 36' 30" S, 45° 07' 00" W. 1 m. tow-net, horizontal, 0-5 m.: 1 specimen, 17 mm.

St. 297. 28. viii. 27. 12° 08' 00" N, 20° 53' 30" W. Young-fish trawl, 200-300 (-0) m.: 7 specimens, 12-30 mm.

Hab. Atlantic; Indian Ocean; Pacific.

Myctophum phengodes (Lütken, 1892).

Brauer, *t.c.* p. 177, fig. 88; Parr, *t.c.* p. 66.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 24 mm.

Hab. Atlantic; Indian Ocean; Australian seas.

Myctophum macrochir (Günther, 1864).

Tåning, *t.c.* p. 57; Parr, *t.c.* pp. 67, 74.

St. 71. 30. v. 26. 43° 20' 00" S, 46° 02' 00" W. Young-fish trawl, 2000 (-0) m.: 6 specimens, 28-32 mm.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 20 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800-1000 (-0) m.: 1 specimen, 11 mm.

St. 289. 24. viii. 27. 3° 04' 45" N, 16° 52' 00" W. 70 cm. tow-net, oblique, 132-0 m.: 1 specimen, 16 mm.

St. 297. 28. viii. 27. 12° 08' 00" N, 20° 53' 30" W. Young-fish trawl, 200-300 (-0) m.: 1 specimen, 12 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 37 mm.

Hab. Atlantic; West Indies.

Genus *Lampanyctus*, Bonaparte, 1840*Lampanyctus nicholsi*, Gilbert.

Gilbert, 1911, *Bull. Amer. Mus. Nat. Hist.* xxx, p. 17, fig. 1; Parr, *t.c.* p. 78.

St. 60. 21. v. 26. 50° 45' 00" S, 56° 33' 00" W. 1 m. tow-net, horizontal, 75 (-0) m.: 1 specimen, 40 mm.

St. 62. 22. v. 26. 49° 22' 00" S, 54° 48' 00" W. 1 m. tow-net, horizontal, 90 (-0) m.: 1 specimen, 43 mm.

St. 106. 3. xi. 26. 44° 42' 30" S, 17° 47' 00" E. 1 m. tow-net, horizontal, 124 m.: 1 specimen, 75 mm.

St. 217. 18. iv. 27. Drake Strait, 58° 27' 30" S, 67° 55' 00" W. 1 m. tow-net, horizontal, 77 m.: 1 specimen, 71 mm.

St. WS 236. 6. vii. 28. 46° 55' 00" S, 60° 40' 00" W. Net with mesh of 7 mm. attached to back of trawl, 272-300 m.: dark green sand and mud. 25 specimens, 50-77 mm.

Depth of body $5\frac{1}{4}$ to nearly 6 in the length, length of head $3\frac{1}{3}$ to $3\frac{2}{3}$. Snout much shorter than eye, diameter of which is $3\frac{3}{4}$ to 4 in length of head and about equal to interorbital width. Dorsal 18-20; origin a little in advance of root of pelvic; longest rays $\frac{2}{5}$ to $\frac{3}{5}$ length of head. Anal 20-22; origin below posterior part of dorsal. Pectoral 13. Pelvic 8. 43-45 scales in the lateral line. PLO photophore a little nearer to lateral line than pectoral fin. 2 PVO, situated close together, level with base of pectoral fin. 5 PO, the last a little elevated. VLO about equidistant from lateral line and pelvic fin or a little nearer the latter. 5 VO, all level. 3 SAO, almost forming a straight line, the lowest continuous with the VO series; interspace between first and second not much

less than that between second and third, which is close to lateral line. AO in two groups, well separated from one another; anterior 9-11, the first elevated and level with the middle SAO, the last sometimes a little elevated; posterior 7, generally well separated from Prc series, although in one or two specimens the two are continuous. 2 (occasionally 3) Pol, the upper just below the lateral line. 6-9 Prc. No luminous scales on caudal peduncle.

Described from numerous specimens, 43-77 mm. in length.

Hab. South Atlantic; Falkland Islands; Drake Strait.

Lampanyctus braueri (Lönnerberg).

Myctophum (Lampanyctus) braueri, Lönnerberg, 1905, *Zool. Anz.* xxviii, p. 764; 1905, *Wiss. Ergebn. Schwed. Südpolar-Exped.* v (6), p. 64, fig. 1; Brauer, 1906, *t.c.* p. 230, fig. 150.

Lampanyctus braueri, Regan, 1913, *Trans. R. Soc. Edinburgh*, xlix, p. 234; Waite, 1916, *Fish. Austral. Antarct. Exped.* p. 61, fig. 14; Parr, 1928, *t.c.* p. 78.

St. 62. 22. v. 26. 49° 22' 00" S, 54° 48' 00" W. 1 m. tow-net, horizontal, 90 (-0) m.: 1 specimen, 31 mm.

St. 66. 23. v. 26. 48° 09' 00" S, 52° 50' 00" W. 1 m. tow-net, horizontal, 45 m.: 1 specimen, 45 mm. 1 m. tow-net, horizontal, 90 (-0) m.: 3 specimens, 34-45 mm.

St. 151. 16. i. 27. 53° 25' 00" S, 35° 15' 00" W. 4½ m. net, horizontal, 1025-1275 m.: 2 specimens, 85-133 mm.

St. 239. 2. vi. 27. 46° 56' 00" S, 46° 03' 00" W. 4½ m. net, horizontal, 1050-1350 m.: 2 specimens, 31-34 mm.

St. 256. 23. vi. 27. 35° 14' 00" S, 6° 49' 00" E. Young-fish trawl, 850-1100 m.: 3 specimens, 20-32 mm.

Depth of body $5\frac{2}{5}$ to $5\frac{3}{5}$ in the length, length of head $3\frac{1}{4}$ to $3\frac{1}{2}$. Snout shorter than eye, diameter of which is $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head and less than interorbital width. Dorsal 15; origin above or a little behind root of pelvic. Anal 18. Pectoral 13. Pelvic 8. 42-45 scales in the lateral line. PLO photophore rather nearer to lateral line than pectoral fin. 2 PVO, close together, level with pectoral base. 5 PO, fourth nearer to middle of thorax than the remainder, which are more or less level. VLO about equidistant from lateral line and pelvic fin. 5 VO, second, third and fourth a little elevated. 3 SAO, forming a straight line, the lowest level with middle VO. Anterior AO 9 or 10, the first elevated; well separated from posterior AO which number 8-10. 4 or 5 Prc, separated from or continuous with the posterior AO, the last separated by a wide interspace from the remainder. 2 Pol. No luminous scales on the caudal peduncle.

Described from 10 specimens, 20 to 133 mm. in length.

Hab. South Atlantic; Antarctic; Macquarie Island.

Lampanyctus townsendi (Eigenmann and Eigenmann).

Myctophum townsendi, Eigenmann and Eigenmann, 1889, *West. Amer. Sci.* vi, No. 48, p. 125.

Scopelus (Nyctophus) warmingii, Lütken, 1892, *Vid. Selsk. Skr.* (6), vii, p. 259, fig. 19.

Lampanyctus warmingii, Goodé and Bean, 1895, *Ocean. Ichth.* p. 80; Tåning, 1928, *t.c.* p. 65; Parr, 1928, *t.c.* p. 91, fig. 11.

Lampanyctus townsendi, Jordan and Evermann, 1896, *Bull. U.S. Nat. Mus.* xlvii (1), p. 558; Gilbert, 1908, *Mem. Mus. Comp. Zool.* xxvi, p. 230, pl. iv; 1913, *Mem. Carnegie Mus.* vi, p. 98; McCulloch, 1923, *Rec. Austral. Mus.* xiv, p. 115, pl. xiv, fig. 2; Parr, 1928, *t.c.* p. 79.

Myctophum (Lampanyctus) townsendi, Brauer, 1906, *t.c.* p. 167.

Myctophum (Lampanyctus) warmingi, Brauer, 1906, *t.c.* p. 229, fig. 149; Pappenheim, 1914, *Deutsche Südpolar-Exped.* xv, *Zool.* vii (2), p. 195; Barnard, 1925, *Ann. S. Afric. Mus.* xxi, p. 237.

The 'Discovery' obtained 14 specimens of this species from the following stations in the North and South Atlantic, at depths ranging from 0–2000 m., measuring 17 to 67 mm. in length: St. 80, 85, 104, 257, 270, 285, 286, 287, 288, 294, 296, 297.

Depth of body $4\frac{1}{4}$ to $4\frac{3}{4}$ in the length, length of head 3 to $3\frac{1}{4}$. Snout much shorter than eye, diameter of which is 3 to $3\frac{1}{2}$ in length of head and equal to or greater than interorbital width. Dorsal 13–15; origin above or a little in front of or behind root of pelvic. Anal 13–15; origin below last rays of dorsal. Pectoral 13–15; about as long as head, extending to origin of anal or beyond. Pelvic 8. 36–38 scales in the lateral line. PLO photophore much nearer to lateral line than pectoral fin. 2 PVO, well separated from each other, one opposite the pectoral base, the other vertically below it. 5 PO, the last a little elevated. VLO equidistant from lateral line and pelvic fin or rather nearer the latter. 5 VO, the second, third and fifth a little elevated. 3 SAO, very slightly angulate, interspace between first and second less than that between second and third; third SAO touching the lateral line. AO 5–6 + 4–6; last of anterior series sometimes a little elevated; posterior series all behind the anal fin. 2 Pol, the upper in contact with the lateral line. 4 Prc, the interspace between the third and fourth much greater than that between the remainder. A luminous scale above the pectoral fin and a group of 2–7 in the neighbourhood of the lower PVO; a plate sometimes present above axil of pelvic; a series of 2 to 4 plates between root of pelvic and vent, and often one on each side of the vent; 3 to 5 plates at base of anal, not extending to hinder end of fin; a series of plates on upper and lower edges of caudal peduncle, those below extending forward nearly as far as the anal fin; 3 to 5 small plates on middle part of base of dorsal fin, and sometimes another series in front of this fin; no plates in front of the adipose fin.

Described from 10 specimens, 27–67 mm. in length, including two of the types of the species from the Cortes Banks, California.

Hab. North and South Atlantic; Indian Ocean; Pacific.

Lampanyctus hectoris (Günther).

Scopelus hectoris, Günther, 1876, *Ann. Mag. Nat. Hist.* (4), xvii, p. 399.

Scopelus argenteus, Gilchrist, 1904, *Mar. Invest. S. Afric.* iii, p. 15, pl. xxxvi.

Myctophum (Lampanyctus) argenteus, Barnard, 1925, *Ann. S. Afric. Mus.* xxi, p. 238.

Lampanyctus argenteus, Parr, 1928, *t.c.* p. 83.

St. 99 D. 27. ix. 26. $33^{\circ} 20' 00''$ to $33^{\circ} 11' 00''$ S, $17^{\circ} 17' 00''$ to $17^{\circ} 26' 00''$ E. 70 cm. tow-net, horizontal, 200 m.: 1 specimen, 57 mm.

Depth of body $4\frac{1}{2}$ to 5 in the length, length of head $3\frac{1}{4}$ to $3\frac{1}{2}$. Snout much shorter than eye, diameter of which is $3\frac{1}{4}$ to $3\frac{4}{5}$ in length of head and equal to or less than interorbital width. Dorsal 13–14; origin above or a little behind root of pelvic. Anal 15–16; origin below last dorsal ray or a little farther back. Pectoral 13–14. Pelvic 8. 37 to 39

scales in the lateral line. PLO photophore much nearer to pectoral fin than lateral line. 2 PVO, close together and more or less level with lower part of pectoral base. 5 PO, first, second and fourth forming a straight line near middle of thorax, third and fifth elevated, level with root of pelvic. VLO nearer pelvic fin than lateral line. 5 VO, forming a curved line, the third most elevated. 3 SAO, forming a straight oblique line, the lowest near to the last VO. AO 8 + 6, the two series well separated. 1 Pol, about equidistant from lateral line and ventral series of photophores. 5 Prec, well separated from posterior AO, the last about equidistant from lateral line and lower edge of caudal peduncle. No luminous scales.

Described from 7 specimens, 40 to 57 mm. in length, including the type of the species and co-types of *L. argenteus*.

Hab. Off South Africa; New Zealand.

Lampanyctus elongatus (Costa, 1844).

Brauer, *t.c.* p. 232, figs. 152–153; Taning, *t.c.* p. 64; Parr, *t.c.* p. 80.

St. 168. 21. ii. 27. 60° 58' 00" S, 48° 05' 00" W. Young-fish trawl, 100–150 (–0) m.: 1 specimen, 52 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800–1000 (–0) m.: 1 specimen, 30 mm.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (–0) m.: 1 specimen, 53 mm.

St. 293. 24. viii. 27. 4° 18' 15" N, 16° 51' 00" W. Young-fish trawl, 100–120 (–0) m.: 1 specimen, 50 mm.

Hab. Mediterranean; North and South Atlantic; Antarctic; Pacific.

Lampanyctus photothorax, Parr.

Parr, 1928, *t.c.* pp. 81, 95, fig. 13.

St. 256. 23. vi. 27. 35° 14' 00" S, 6° 49' 00" E. Young-fish trawl, 850–1100 (–0) m.: 1 specimen, 25 mm.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850–950 (–0) m.: 1 specimen, 42 mm.

Hab. North and South Atlantic; West Indies.

Lampanyctus guentheri, Goode and Bean, 1895.

Taning, *t.c.* p. 65; Parr, *t.c.* p. 82.

The 'Discovery' obtained 39 specimens of this species from the following stations in the North and South Atlantic, at depths ranging from 0–1500 m., measuring 21 to 70 mm. in length: St. 66, 69, 76, 240, 241, 242, 268, 281, 284, 286, 288, 289, 293, 296, 297.

Hab. North and South Atlantic; Australian seas (?).

Lampanyctus pusillus (Johnson, 1890).

Tåning, *t.c.* p. 66; Parr, *t.c.* pp. 89, 112.

St. 85. 23. vi. 26. $33^{\circ} 07' 40''$ S, $4^{\circ} 30' 20''$ E. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 1 specimen, 28 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 3 specimens, 30-34 mm.

St. 89. 28. vi. 26. $34^{\circ} 05' 15''$ S, $16^{\circ} 00' 45''$ E. Young-fish trawl, 1000 (-0) m.: 1 specimen, 25 mm.

St. 100. 4. x. 26. $33^{\circ} 20' 00''$ to $33^{\circ} 46' 00''$ S, $15^{\circ} 18' 00''$ to $15^{\circ} 08' 00''$ E. Young-fish trawl, 2000-2500 (-0) m.: 2 specimens, 33-35 mm.

St. 257. 24. vi. 27. $35^{\circ} 01' 00''$ S, $10^{\circ} 18' 00''$ E. Young-fish trawl, 250 (-0) m.: 1 specimen, 31 mm.

Hab. North and South Atlantic.

Lampanyctus alatus, Goode and Bean, 1895.

Lampanyctus pseudoalatus, Tåning, 1928, *t.c.* p. 66; Parr, 1928, *t.c.* p. 90.

Lampanyctus alatus, Parr, 1929, *Proc. U.S. Nat. Mus.* LXXVI (10), p. 25, fig. 12.

The 'Discovery' obtained 65 specimens of this species from the following stations in the North and South Atlantic, at depths ranging from 0-1500 m., measuring 18 to 102 mm. in length: St. 66, 76, 101, 239, 257, 281, 284, 285, 286, 289, 294, 296, 297.

Hab. North and South Atlantic; (?) Indian Ocean.

Lampanyctus festivus, Tåning.

Tåning, 1928, *t.c.* p. 67; Parr, *t.c.* p. 84.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 2 specimens, 84-90 mm.

St. 257. 24. vi. 27. $35^{\circ} 01' 00''$ S, $10^{\circ} 18' 00''$ E. Young-fish trawl, 250 (-0) m.: 1 specimen, 31 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 60 mm.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 1 specimen, 52 mm.

Hab. North and South Atlantic.

Lampanyctus intricarius, Tåning.

Tåning, 1928, *t.c.* p. 67; Parr, *t.c.* p. 90.

St. 76. 5. vi. 26. $39^{\circ} 50' 30''$ S, $36^{\circ} 23' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1500 (-0) m.: 2 specimens, 60-100 mm.

St. 87. 25. vi. 26. $33^{\circ} 53' 45''$ S, $9^{\circ} 26' 30''$ E. Young-fish trawl, 1000 (-0) m.: 3 specimens, 40-55 mm.

St. 100. 2. x. 26. $33^{\circ} 20' 00''$ to $33^{\circ} 46' 00''$ S, $15^{\circ} 18' 00''$ to $15^{\circ} 08' 00''$ E. Young-fish trawl, 625-675 m.: 4 specimens, 62-68 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 3 specimens, 68-115 mm.

St. 107. 4. xi. 26. $45^{\circ} 03' 00''$ S, $17^{\circ} 03' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 10 specimens, 70-115 mm.

St. 250. 17. vi. 27. $36^{\circ} 09' 00''$ S, $5^{\circ} 33' 00''$ W. Young-fish trawl, 300 (-0) m.: 1 specimen, 46 mm.

Hab. North and South Atlantic.

Lampanyctus ater, Tåning.

Tåning, 1928, *t.c.* p. 68; Parr, *t.c.* p. 88.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 4 specimens, 55-61 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 350-400 (-0) m.: 1 specimen, 142 mm.

St. 239. 2. vi. 27. $46^{\circ} 56' 00''$ S, $46^{\circ} 03' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1050-1350 (-0) m.: 1 specimen, 140 mm.

St. 259. 26. vi. 27. $34^{\circ} 59' 00''$ S, $16^{\circ} 39' 00''$ E. Young-fish trawl, 370-450 (-0) m.: 1 specimen, 30 mm. ?

Hab. North and South Atlantic.

Lampanyctus micropterus (Brauer, 1904).

Brauer, 1906, *t.c.* p. 239, fig. 157; Parr, *t.c.* p. 85.

St. 287. 19. viii. 27. $2^{\circ} 49' 30''$ S, $9^{\circ} 25' 30''$ W. 1 m. tow-net, oblique, 124 (-0) m.: 1 specimen, 58 mm.

Hab. Atlantic and Indian Oceans.

Lampanyctus niger (Günther, 1887).

Brauer, *t.c.* p. 242, fig. 159; Parr, *t.c.* p. 87.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 12 specimens, 30-70 mm.

St. 241. 5. vi. 27. $40^{\circ} 34' 30''$ S, $36^{\circ} 35' 30''$ W. 1 m. tow-net, horizontal, 152 m.: 1 specimen, 75 mm.

St. 252. 20. vi. 27. $35^{\circ} 26' 00''$ S, $1^{\circ} 43' 30''$ E. 1 m. tow-net, horizontal, 135 mm.: 1 specimen, 40 mm.

Hab. South Atlantic; Indian Ocean; Pacific.

Lampanyctus, sp.

The 'Discovery' also obtained 32 examples of *Lampanyctus*, which are all in bad condition, and cannot be specifically identified with any certainty. These specimens are from the following stations in the North and South Atlantic, at depths ranging from 0-1410 m., and measure 15 to 130 mm. in length: St. 65, 78, 81, 83, 86, 101, 151, 269. Two are from the stomach of a Blue whale taken near the South Shetlands.

Genus **Diaphus**, Eigenmann and Eigenmann, 1891**Diaphus dumerili** (Bleeker, 1856).

Tåning, *t.c.* p. 58; Parr, *t.c.* p. 126.

St. 280. 10. viii. 27. $00^{\circ} 36' 00''$ S, $8^{\circ} 28' 00''$ E. Young-fish trawl, 100-200 (-0) m.: 1 specimen, 47 mm.

Hab. Tropical Atlantic; Indo-Pacific.

Diaphus dofleini (Zugmayer, 1911).

Tåning, *t.c.* p. 58; Parr, *t.c.* p. 124.

St. 85. 23. vi. 26. 33° 07' 40" S, 4° 30' 20" E. 4½ m. net, horizontal, 2000 (-0) m.: 1 specimen, 34 mm.

St. 250. 17. vi. 27. 36° 09' 00" S, 5° 33' 00" W. Young-fish trawl, 300 (-0) m.: 2 specimens, 34-42 mm.

St. 251. 18. vi. 27. 35° 54' 30" S, 3° 01' 30" W. 1 m. tow-net, horizontal, 79 m.: 1 specimen, 30 mm. 1 m. tow-net, horizontal, 159 m.: 1 specimen, 48 mm.

St. 254. 21. vi. 27. 35° 04' 00" S, 2° 59' 30" E. Young-fish trawl, 200 (-0) m.: 2 specimens, 33-34 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125-175 (-0) m.: 4 specimens, 34-40 mm.

St. 286. 17. viii. 27. 3° 06' 30" S, 3° 53' 00" W. Young-fish trawl, 125 (-0) m.: 1 specimen, 47 mm.

St. 294. 25. viii. 27. 4° 33' 15" N, 16° 52' 45" W. Young-fish trawl, 100-150 (-0) m.: 1 specimen, 43 mm.

Hab. Mediterranean; Atlantic.

Perhaps identical with *D. gemellari* (Cocco).

Diaphus fulgens, Brauer, 1904.

Brauer, 1906, *t.c.* p. 224, fig. 146; Parr, *t.c.* p. 117.

St. 3. 3. xii. 25. 29° 31' 06" S, 13° 56' 45" W. 2 m. tow-net, horizontal, 500-700 m.: 1 specimen, 39 mm.

Hab. Atlantic and Indian Oceans.

Diaphus taaningi, n.sp.

St. 280. 10. viii. 27. 00° 36' 00" S, 8° 28' 00" E. Young-fish trawl, 100-200 (-0) m.: 1 specimen, 36 mm.

Depth of body nearly 4 in the length, length of head about 3½. Snout much shorter than eye, diameter of which is nearly 3 in length of head and about equal to interorbital width. Maxillary not expanded posteriorly, extending to well beyond eye. Operculum with a short rounded membranous process above the pectoral fin. 13 gill-rakers on lower part of anterior arch. Dorsal 14; origin a very little behind root of pelvic. Anal 13; origin behind last dorsal ray. Pectoral with 11 or 12 rays, a little more than ½ length of head. Pelvic 8. 35 scales in a longitudinal series. Upper antorbital (dorsonasal) luminous organ small, rounded, entirely above nostril and well separated from that of opposite side. No lower antorbital. A single suborbital (ventronasal) organ, rather broad and of moderate length, extending to a little beyond anterior margin of pupil, connected with the upper antorbital merely by a black pigmented band along the anterior margin of the eye. No supraorbital organ. A large luminous scale at PLO, which is nearer to pectoral fin than lateral line. 2 PVO, the upper on lower part of pectoral base, the lower a little in advance. 5 PO, the fourth elevated, opposite the space between the third and fifth, about level with upper PVO. VLO slightly nearer pelvic fin than lateral line. 5 VO, second and third progressively elevated, forming a straight line with

the first; fourth and fifth level. 3 SAO, forming an almost vertical straight line, the lowest close behind and a little above level of last VO; interspace between first and second less than that between second and third; third SAO well below lateral line. AO 5 + 5; first photophore of anterior series elevated, above level of second SAO; those of posterior series all level. Pol well below lateral line, about level with third SAO. 4 Prc, more or less equally spaced and forming an even curve, the last distinctly below lateral line. No luminous plates on upper or lower edges of caudal peduncle. Uniform brownish black.

Described from a single specimen, 36 mm. in length; holotype of the species.

Hab. Middle Atlantic.

This species appears to be very close to *D. fulgens*, Brauer, differing chiefly in the form of the suborbital organs and the lower position of the PLO, VLO, SAO₃, Pol and Prc₄ photophores. Mr Tåning has studied two of Brauer's types of *D. fulgens*, respectively 10 and 22 mm. in length, but the larger example of 39 mm. is not in the collection of the Zoological Museum at Berlin. He has kindly examined the specimen described above, and informs me that in his opinion this should probably be regarded as a species new to science, but adds that the species of this particular group of *Diaphus* are very difficult to identify. He tells me that both the small types of *D. fulgens* have a small posterior suborbital organ, which is not shown in Brauer's figure of the species.

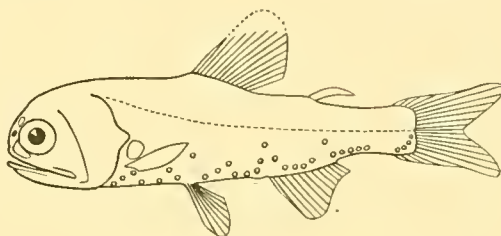


Fig. 30. *Diaphus taaningi*. Holotype. ($\times 1\frac{1}{2}$.)

Diaphus luetkeni (Brauer, 1904).

Brauer, 1906, *t.c.* p. 221, figs. 141-142; Tåning, *t.c.* p. 59; Parr, *t.c.* p. 118.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (-o) m.: 1 specimen, 45 mm.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-o) m.: 2 specimens, 31-35 mm.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850-950 (-o) m.: 1 specimen, 42 mm.

St. 284. 15. viii. 27. 2° 13' 00" S, 1° 52' 00" E. 1 m. tow-net, oblique, 71 (-o) m.: 1 specimen, 38 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125-175 (-o) m.: 2 specimens, 40-45 mm.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-o) m.: 3 specimens, 33-45 mm.

St. 289. 23-24. viii. 27. 3° 04' 45" N, 16° 52' 00" W. Young-fish trawl, 125-225 (-o) m.: 4 specimens, 34-43 mm. 70 cm. tow-net, oblique, 132 (-o) m.: 1 specimen, 18 mm.

Hab. Atlantic and Indian Oceans.

Diaphus brachycephalus, Tåning.

Tåning, 1928, *t.c.* p. 59; Parr, *t.c.* p. 119.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-0) m.: 2 specimens, 22-25 mm.

St. 293. 24. viii. 27. 4° 18' 15" N, 16° 51' 00" W. Young-fish trawl, 100-120 (-0) m.: 1 specimen, 26 mm.

Depth of body $3\frac{1}{2}$ in the length, length of head about 3. Diameter of eye a little less than 3 in length of head. Dorsal 13; origin opposite root of pelvic. Anal 14; origin a little behind last dorsal ray. Pectoral 12 (?). Pelvic 9. 32 scales in the lateral line. Photophores all large. Upper antorbital organ small, rounded, entirely above nostril and well separated from that of opposite side. First suborbital long and narrow, extending from nostril to behind lens of eye; second small, oval in shape, situated close behind the first. No supraorbital organ. PLO without luminous scale, much nearer pectoral fin than lateral line. 2 PVO, the lower below pectoral base. 5 PO, the interspace between first and second greater than that between any of the remainder; fourth elevated, opposite space between third and fifth. VLO much nearer pelvic fin than lateral line. 5 VO, third elevated, second, fourth and fifth level. 3 SAO, third about equidistant from lateral line and ventral series of photophores. AO 4-5 + 4; fifth anteroanal a little elevated. Pol well below lateral line. 4 Prc, forming a slight curve.

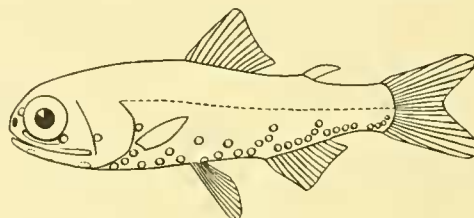


Fig. 31. *Diaphus brachycephalus*. ($\times 2$.)

Described from two specimens, 22-25 mm. in length.

Hab. Atlantic.

Diaphus rafinesquei (Cocco, 1838).

Brauer, *t.c.* p. 223, figs. 144-145; Tåning, *t.c.* p. 60; Parr, *t.c.* pp. 119, 131, figs.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. $4\frac{1}{2}$ m. net, horizontal, 350-400 (-0) m.: 7 specimens, 25-70 mm.

St. 241. 5. vi. 27. 40° 34' 30" S, 36° 35' 30" W. 70 cm. tow-net, horizontal, 49 (-0) m.: 1 specimen, 20 mm.

St. 257. 24. vi. 27. 35° 01' 00" S, 10° 18' 00" E. Young-fish trawl, 250 (-0) m.: 3 specimens, 16-18 mm.

St. 266. 21. vii. 27. 29° 34' 00" S, 14° 24' 00" E. Young-fish trawl, 200 (-0) m.: 5 specimens, 20-32 mm.

St. 267. 23. vii. 27. 24° 31' 00" S, 12° 15' 30" E. Young-fish trawl, 450-550 (-0) m.: 6 specimens, 20-31 mm. 1 m. tow-net, oblique, 117 (-0) m.: 5 specimens, 18-36 mm.

St. 268. 25. vii. 27. 18° 37' 00" S, 10° 46' 00" E. Young-fish trawl, 100-150 (-0) m.: 2 specimens, 31-32 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 3 specimens, 31-48 mm.

Hab. Mediterranean; Atlantic; Marquesas Islands; Japan.

I have examined more than fifty examples of this species from the Mediterranean and Atlantic and find that, as suggested by Parr, it is impossible to recognise Tåning's two species, *D. rafinesquei* and *D. holti*, in the Atlantic, although the Mediterranean material seems to fall readily into two forms. *D. mollis*, Tåning, may also prove to be identical with this species.

Diaphus lucidus (Goode and Bean, 1895).

Brauer, *t.c.* p. 164; Tåning, *t.c.* p. 62; Parr, *t.c.* pp. 121, 141, fig. 31.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 2 specimens, 75-85 mm.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. Young-fish trawl, 250 (-0) m.: 1 specimen, 60 mm.

Hab. Atlantic.

Diaphus splendidus (Brauer, 1904).

Brauer, 1906, *t.c.* p. 218, figs. 138-139; Tåning, *t.c.* p. 60; Parr, *t.c.* p. 123.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 3 specimens, 26-30 mm.

The 'Discovery' also obtained the following specimens of *Diaphus*, which are either very young or poorly preserved, and cannot be identified with certainty:—

Diaphus sp.

St. 240. 2. vi. 27. $46^{\circ} 36' 30''$ S, $45^{\circ} 07' 00''$ W. 1 m. tow-net, horizontal, 0-5 m.: 1 specimen, 12 mm.

St. 247. 13. vi. 27. $37^{\circ} 20' 00''$ S, $12^{\circ} 47' 30''$ W. Young-fish trawl, 100-115 (-0) m.: 1 specimen, 33 mm.

St. 280. 10. viii. 27. $00^{\circ} 36' 00''$ S, $8^{\circ} 28' 00''$ E. Young-fish trawl, 100-200 (-0) m.: 7 specimens, 12-15 mm.

Genus *Lampadena*, Goode and Bean, 1895

Lampadena braueri, Zugmayer, 1914.

Tåning, *t.c.* p. 63; Parr, *t.c.* p. 149.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. Young-fish trawl, horizontal, 600-700 (-0) m.: 2 specimens, 88-94 mm.

Depth of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the length, length of head $3\frac{1}{4}$ to $3\frac{3}{5}$. Snout about $\frac{1}{4}$ diameter of eye, which is twice or a little more than twice in length of maxillary, $\frac{7}{8}$ of the interorbital width, and about 3 in length of head. Dorsal 14-15; origin above root of pelvic, about equidistant from tip of snout and front of supracaudal plate. Anal 14-15; origin distinctly behind last dorsal ray. Pectoral 17. Pelvic 9. 40-42 scales in a longitudinal series (from upper angle of gill-opening to base of caudal). Photophores rather indistinct. PLO very close to lateral line. 2 PVO, the lower below the pectoral base.

5 PO, all level. VLO a little nearer lateral line than pelvic fin. 6 (?) VO, all level, the last in front of the origin of the anal. Only 2 SAO, the first nearer to the anal fin than to lateral line, a little posterior to the second, which is just below the lateral line. AO 6-7 + 2-3, all level; posteroanal series well behind the anal base and just in front of the infra-caudal plate. 1 Pol, near the lateral line. 2-3 + 1 (?) Prc. Supracaudal plate emarginate posteriorly, shorter than infra-caudal plate, which is a little more than $\frac{1}{2}$ length of head.

Described from two specimens, 88 to 94 mm. in length.

Hab. Eastern Atlantic.

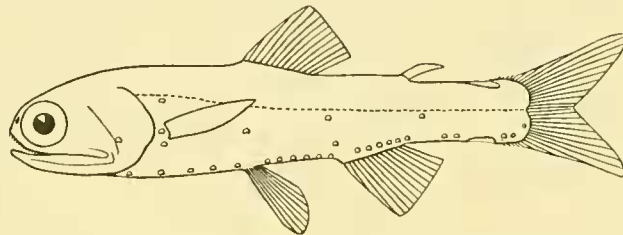


Fig. 32. *Lampadena braueri*. ($\times \frac{3}{4}$.)

Lampadena minima, Tåning.

Tåning, 1928, *t.c.* p. 63; Parr, *t.c.* p. 154, fig. 37.

The following young specimens from the South Atlantic appear to belong to this species:—

St. 85. 23. vi. 26. $33^{\circ} 07' 40''$ S, $4^{\circ} 30' 20''$ E. $4\frac{1}{2}$ m. net, horizontal, 2000 (-o) m.: 1 specimen, 20 mm.

St. 89. 28. vi. 26. $34^{\circ} 05' 15''$ S, $16^{\circ} 00' 45''$ E. Young-fish trawl, 1000 (-o) m.: 1 specimen, 19 mm.

Hab. Atlantic.

Lampadena nitida, Tåning.

Tåning, 1928, *t.c.* p. 62; Parr, *t.c.* p. 155.

St. 286. 17. viii. 27. $3^{\circ} 06' 30''$ S, $3^{\circ} 53' 00''$ W. Young-fish trawl, 102 (-o) m.: 1 specimen, 115 mm.

Depth of body $5\frac{1}{2}$ in the length, length of head $3\frac{1}{3}$. Snout about $\frac{1}{2}$ diameter of eye, which is $3\frac{1}{3}$ in length of maxillary, $\frac{2}{3}$ of the interorbital width, and $4\frac{3}{4}$ in length of head.

Dorsal 15; origin in advance of root of pelvic, about equidistant from tip of snout and front of supracaudal plate. Anal 14; origin behind last ray of dorsal. Pectoral 16; about $\frac{2}{3}$ length of head. Pelvic 8. 37 scales in a longitudinal series (from upper angle of gill-opening to base of caudal).

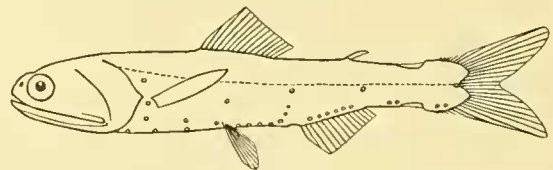


Fig. 33. *Lampadena nitida*. ($\times \frac{1}{2}$.)

PLO rather close to lateral line. 2 PVO, the lower below pectoral base. 5 PO, the fourth vertically above the third. VLO about equidistant from lateral line and pelvic fin. 5 VO, nearly level. 3 SAO, interspace between second and third much greater than that between first and second. Upper SAO and Pol very close

to lateral line. AO 5 + 2, all level; first posteroanal just in front of infra-caudal plate, second above its anterior part. 2 + 1 Prc, the first two above procurrent spines of caudal fin, the third on lateral line at base of fin.

Described from a single specimen, 115 mm. in length.

Hab. Atlantic.

As far as one can judge from this single example, and from the descriptions of Parr and Tãning, the Atlantic form seems to be sufficiently distinct from that of the Indo-Pacific as described by Brauer, Garman, and Weber and Beaufort, to be recognised as a distinct species. It differs chiefly in the somewhat slenderer body, larger head, and in having 2 + 1 instead of 3 + 1 Prc photophores.

Order LYOMERI

Family EURYPHARYNGIDAE

Eurypharynx pelecanoioides, Vaillant, 1888.

Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 88, pl. iv, fig. 3; Roule, 1919, *ibid.* LII, p. 93.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 295 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800-1000 (-0) m.: 1 specimen, 170 mm.

Hab. Atlantic.

Order APODES

Family NEMICHTHYIDAE

A preliminary synopsis of the Eels of this family has been published by Roule and Bertin (*Bul. Mus. Paris*, 1924, p. 61).

Nemichthys scolopaceus, Richardson, 1848.

Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 126, pl. ix, fig. 1.

St. 85. 23. vi. 26. 33° 07' 40" S, 4° 30' 20" E. 4½ m. net, horizontal, 2000 (-0) m.: 1 specimen, 580 mm.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 1 specimen, 750 mm.

St. 245. 10. vi. 27. 38° 20' 00" S, 22° 18' 00" W. 4½ m. net, horizontal, 1800-2000 m.: 1 specimen, 375 mm.¹

St. 247. 13. vi. 27. 37° 20' 00" S, 12° 47' 30" W. Young-fish trawl, 100-115 (-0) m.: 1 specimen, 620 mm.

St. 268. 25. vii. 27. 18° 37' 00" S, 10° 46' 00" E. Young-fish trawl, 100-150 m.: 7 specimens, 430-500 mm.

St. 269. 26. vii. 27. 15° 55' 00" S, 10° 35' 00" E. 4½ m. net, horizontal, 600-700 (-0) m.: 6 specimens, 400-485 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 4 specimens, 470-720 mm.¹

Hab. Mediterranean; Atlantic, Indian and Pacific Oceans.

¹ Tail incomplete.

Nematoprora polygonifera, Gilbert.

Gilbert, 1905, *Bull. U.S. Fish. Comm.* XXIII (1903), p. 587, fig. 234.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 12 specimens, 220-300 mm.

28. x. 25. $13^{\circ} 25'$ N, $18^{\circ} 22'$ W. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 1 specimen, 260 mm.

Hab. Atlantic; Hawaiian Islands.

Avocettina infans (Günther, 1878).

Brauer, 1906, *t.c.* p. 129, pl. viii, figs. 5-6.

St. 72. 1. vi. 26. $41^{\circ} 43' 20''$ S, $42^{\circ} 20' 40''$ W. $4\frac{1}{2}$ m. net, horizontal, 2000 (-0) m.: 2 specimens, 450-470 mm.

St. 76. 5. vi. 26. $39^{\circ} 50' 30''$ S, $36^{\circ} 23' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1500 (-0) m.: 1 specimen, 360 mm.¹

St. 79. 13. vi. 26. $34^{\circ} 48' 00''$ S, $16^{\circ} 36' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 200 mm.¹

Hab. Atlantic, Indian and Pacific Oceans.

Serrivomer beanii, Gill and Ryder, 1883.

Goode and Bean, 1895, *Ocean. Ichth.* p. 155, fig. 175.

St. 79. 13. vi. 26. $34^{\circ} 48' 00''$ S, $16^{\circ} 36' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 295 mm.

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 5 specimens, 140-490 mm.

Hab. Atlantic, Indian and Pacific Oceans.

Family CONGRIDAE

Genus *Grammatocephalus*, gen. nov.

Body of moderate length, the tail a little shorter than the trunk, naked; dorsal and anal fins well developed, confluent with the caudal; pectorals present. Head with some large mucous pores, regularly arranged, and with a number of fine, close-set, and more or less parallel ridges, arranged in regular longitudinal, transverse and oblique series, more developed on the upper surface; snout broad and flat; nostrils lateral, neither with a tube. Mouth of moderate width, the angle below the posterior border of the eye; lower jaw included, much narrower than the upper. Teeth villiform, conical, forming rather broad bands in both jaws; similar teeth on the vomer, apparently arranged in a horseshoe-shaped patch. Tongue free. Gill-openings widely separated, forming narrow slits of moderate size. Pores of lateral line distinct.

Genotype. *Grammatocephalus kempi*, n.sp.

¹ Tail incomplete.

Grammatocephalus kempii, n.sp.

St. 101. 15. X. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850–950 m.: 1 specimen, 160 mm. Holotype.

Depth of body about 20 in the length, length of head (measured from tip of snout to anterior edge of gill-opening) $3\frac{1}{4}$ in the distance from posterior edge of gill-opening to vent; head as broad as deep, its depth less than its length; snout broadly rounded anteriorly, with a shallow median emargination, about as broad as long, its length $4\frac{1}{2}$ in that of head and a little greater than the diameter of the eye. Anterior nostril equidistant from end of snout and posterior nostril, which is in front of upper part of eye. Origin of dorsal well behind gill-opening, about equidistant from tip of snout and vent. Pectoral more than twice as long as diameter of eye. More or less uniformly brownish above, lighter beneath.

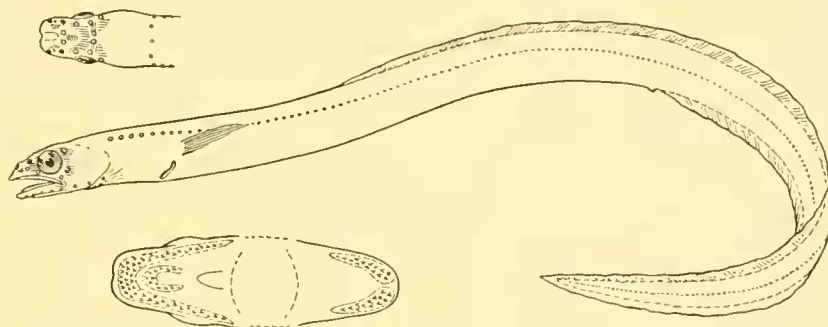


Fig. 34. *Grammatocephalus kempii*. Holotype. ($\times 1$.) [View of open mouth $\times 2$.]

Described from a single specimen, 160 mm. in length; holotype of the species.¹

Hab. Off South Africa.

Grammatocephalus seems to be most closely related to *Promyllantor*, Alcock, and *Pseudoplichthys*, Roule, but is readily distinguished by the position of the vent, the dentition, and the presence of ridges on the head.

Order SYNENTOGNATHI

Family EXOCOETIDAE

Halocypselus evolans (Linnaeus, 1758).

13. i. 28. $01^{\circ} 00'$ S, $31^{\circ} 20'$ W. Washed on board: 1 specimen, 55 mm.

Order ANACANTHINI

Family GADIDAE

Bregmaceros maclellandi, Thompson.

Thompson, 1840, *Mag. Nat. Hist.* N.S. iv, p. 184, fig.; Günther, 1864, *Cat. Fish.* iv, p. 368; Day, 1865, *Fish. Malabar*, p. 171; 1877, *Fish. India*, p. 418; Alcock, 1883, *J. Asiat. Soc. Bengal*,

¹ Named in honour of Dr Stanley Kemp, Director of Research, Discovery Expedition.

LXII (2), p. 181; Günther, 1888, *Pelagic Fish. 'Challenger'*, p. 25, pl. iii, figs. A-B; Goode and Bean, 1895, *Ocean. Ichth.* pp. 388, 531; Jordan and Evermann, 1898, *Bull. U.S. Nat. Mus.* XLVII (3), p. 2527; Alcock, 1899, *Cat. Indian Deep-Sea Fish*, p. 75; Weber, 1913, *Fische 'Siboga'-Exped.* p. 174; Gilchrist and Thompson, 1914, *Ann. S. Afric. Mus.* XIII, p. 87; 1917, *Ann. Durban Mus.* I, p. 320; Barnard, 1925, *Ann. S. Afric. Mus.* XXI, p. 325; Weber and Beaufort, 1929, *Fish. Indo-Austral. Arch.* v, p. 6, fig. 2.

Calloptilum mirum, Richardson, 1845, *Zool. Voyage 'Sulphur'*, p. 95, pl. xlvi, figs. 4-7.

Asthenurus atripinnis, Tickell, 1864, *J. Asiat. Soc. Bengal*, xxxiv (2), p. 32, fig.

Bregmaceros atripinnis, Day, 1869, *Proc. Zool. Soc.* p. 522; 1877, *Fish. India*, p. 418, pl. xci, fig. 1.

Bregmaceros atlanticus, Goode and Bean, 1886, *Bull. Mus. Comp. Zool.* XII, p. 165; 1895, *Ocean. Ichth.* p. 388, fig. 331; Borodin, 1928, *Bull. Vanderbilt Ocean. Mus.* 1 (1), p. 13.

Bregmaceros bathymaster, Jordan and Bollman, 1890, *Proc. U.S. Nat. Mus.* XII, p. 173.

St. 277. 7. viii. 27. 1° 44' 00" S, 8° 38' 00" E. Young-fish trawl, 63 (-0) m.: 2 specimens, 43-45 mm.

St. 281. 12. viii. 27. 00° 46' 00" S, 5° 49' 15" E. Young-fish trawl, 850 m.: 1 specimen, 35 mm.

St. 284. 15. viii. 27. 2° 13' 00" S, 1° 52' 00" E. 1 m. tow-net, oblique, 71-0 m.: 1 specimen, 27 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 2 specimens, 39-42 mm.

Hab. Atlantic, Indian and Pacific Oceans.

I have examined a fairly representative series of specimens of this species from several localities, and am unable to detect any marked differences between those from the Atlantic and Indo-Pacific respectively. There seems to be little doubt that *B. atlanticus* is, at the most, a race of *B. maclellandi*.

Melanonus gracilis, Günther.

Günther, 1878, *Ann. Mag. Nat. Hist.* (5), II, p. 19; 1887, *Deep-Sea Fish. 'Challenger'*, p. 84, pl. xiv, fig. B; Goode and Bean, 1895, *Ocean. Ichth.* p. 380, fig.; Brauer, 1906, *'Valdivia' Tiefsee-Fische*, p. 277, pl. xii, fig. 5.

St. 72. 1. vi. 26. 41° 43' 20" S, 42° 20' 40" W. 4½ m. net, horizontal, 2000 (-0) m.: 1 specimen, 140 mm.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 3 specimens, 50-70 mm.

St. 100. 4. x. 26. 33° 20' 00" to 33° 46' 00" S, 15° 18' 00" to 15° 08' 00" E. Young-fish trawl, 2500 (-0) m.: 1 specimen, 67 mm.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 850-950 m.: 2 specimens, 67-72 mm.

St. 239. 2. vi. 27. 46° 56' 00" S, 46° 03' 00" W. 4½ m. net, horizontal, 1050-1350 (-0) m.: 3 specimens, 100-160 mm.

St. 276. 5. viii. 27. 5° 54' 00" S, 11° 19' 00" E. Young-fish trawl, 150 (-0) m.: 3 specimens, 15-47 mm.

Depth of body 6¼ to 6½ in the length, length of head 5⅓ to 5½. Snout 3½ to 3¾ in length of head, diameter of eye 4 to 4½, interorbital width 2⅓. Maxillary extending to below posterior border of eye or not quite as far; both jaws with narrow bands of minute villiform teeth; similar teeth generally present on vomer, palatines and pterygoids.

About 70 scales in a longitudinal series. Dorsal 5-8 + 59-67 +. Anal 52-54 +. Third dorsal + caudal + second anal about 50. Pectoral 12-14. Pelvic 7.

Described from 5 specimens, 67 to 142 mm. in length, including the type of the species.

Hab. South Atlantic; Antarctic.

Melanonus zugmayeri, n.sp.

Melanonus gracilis (non Günther), Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 120, pl. vi, fig. 1.

St. 270. 27. vii. 27. 13° 58' 30" S, 11° 43' 30" E. Young-fish trawl, 200 (-0) m.: 1 specimen, 110 mm. Holotype.

St. 288. 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-0) m.: 6 specimens, 23-58 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: one specimen, 50 mm.

Depth of body $4\frac{2}{3}$ to $5\frac{1}{3}$ in the length, length of head a little more than 4. Snout $3\frac{1}{2}$ in length of head, diameter of eye $4\frac{3}{4}$ to 5, interorbital width $2\frac{1}{3}$. Maxillary extending nearly to below posterior edge of eye; teeth all stronger than in *M. gracilis*; a pair in

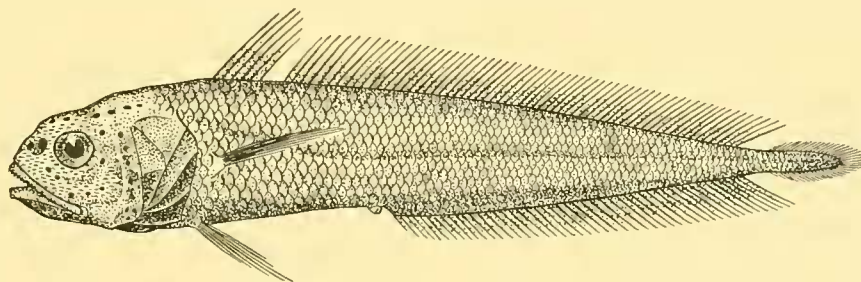


Fig. 35. *Melanonus zugmayeri*. Holotype. ($\times 1$.)

front of upper jaw and some of those at sides of lower jaw somewhat enlarged; a single series of teeth on each side of the head of the vomer, and a similar row on each palatine. About 80 scales in a longitudinal series. Dorsal 6 + 64 +. Anal 50 + (?). Third dorsal + caudal + second anal about 50. Pectoral 13, about $\frac{2}{3}$ length of head. Pelvic 7.

Described from three specimens, 58 to 110 mm. in length. The largest is selected as the holotype.

Hab. North and South Atlantic.

Family MACRURIDAE

Cynomacrurus piriei, Dollo.

Dollo, 1909, *Proc. R. Soc. Edinburgh*, xxix, p. 316; Regan, 1913, *Trans. R. Soc. Edinburgh*, XLIX, p. 236, pl. iii, fig. 1.

St. 9. 11. ii. 26. 46° 11' 30" S, 22° 27' 30" W. 2 m. tow-net, horizontal, 1250 (-0) m.: 1 specimen, 135 mm.

St. 71. 30. v. 26. 43° 20' 00" S, 46° 02' 00" W. Young-fish trawl, 2000 (-0) m.: 1 specimen, 80 mm.¹

¹ Tail incomplete.

St. 76. 5. vi. 26. $39^{\circ} 50' 30''$ S, $36^{\circ} 23' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1500 (-0) m.: 1 specimen, 240 mm.

St. 151. 16. i. 27. $53^{\circ} 25' 00''$ S, $35^{\circ} 15' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1025-1275 m.: 2 specimens, 100-220 mm.¹

Hab. South Atlantic (south of 39°); Antarctic.

The characteristic strong antero-lateral canines of this species are not developed in specimens under 135 mm. in length.

Order ALLOTRIOGNATHI

Family STYLOPHORIDAE

Stylophorus chordatus, Shaw.

Shaw, 1791, *Trans. Linn. Soc.* 1, p. 90, pl. vi; Starks, 1908, *Bull. Mus. Comp. Zool.* LII, p. 17, pls.; Regan, 1924, *Proc. Royal Soc. B*, 96, p. 193, figs.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. Young-fish trawl, 150 (-0) m.: 1 specimen, 38 mm.

St. 296. 26. viii. 27. $8^{\circ} 12' 00''$ N, $18^{\circ} 49' 00''$ W. Young-fish trawl, 450-500 (-0) m.: 1 specimen, 185 mm.

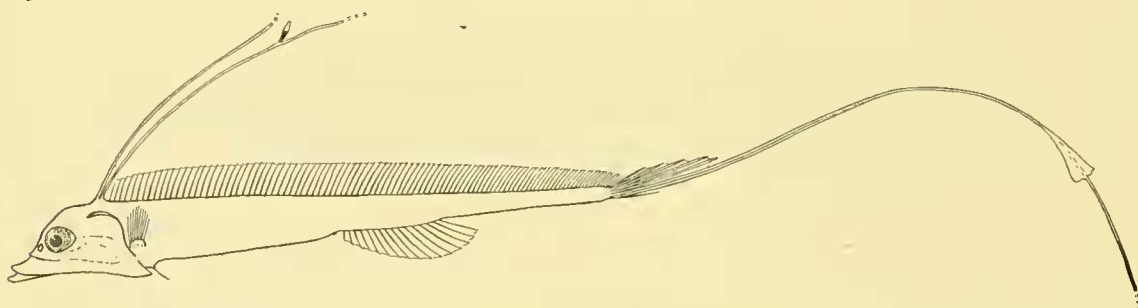


Fig. 36. Young specimen of *Stylophorus chordatus*. ($\times 2\frac{1}{2}$.)

Hab. Atlantic; West Indies; south of Galapagos Islands.

In his diagnosis of this species Regan states that there are no pelvic fins, but an examination of the small specimen obtained by the 'Discovery' shows that these are present, and that each has the form of a single ray lying below the hinder part of the base of the pectoral fin. This is very fragile and is wanting on one side of the fish, and there is little doubt that these structures have been broken off in all the specimens previously studied.

Order BERYCOMORPHI

Family DIRETMIDAE

Diretmus argenteus, Johnson.

Johnson, 1863, *Proc. Zool. Soc.* p. 403, pl. xxxvi, fig. 2; Günther, 1887, *Deep-Sea Fish.* 'Challenger', p. 45; Goode and Bean, 1895, *Ocean. Ichth.* p. 211, fig. 234; McCulloch, 1909, *Rec. Austral. Mus.* VII, p. 320; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 107, pl. v, fig. 7; Roule, 1919, *ibid.* LII, p. 52.

¹ Tail incomplete.

Discus aureus, Campbell, 1879, *Trans. N. Zealand Inst.* xi, p. 298, fig.

Diretmus aureus, Günther, 1887, *t.c.* p. 45.

Gyrinomena nummularis, Vaillant, 1888, *Expéd. Sci. 'Travailleur' et 'Talisman', Poissons*, pp. 18, 355 (*n.n.*).

St. 81. 18. vi. 26. $32^{\circ} 45' 00''$ S, $8^{\circ} 47' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 650 (-0) m.: 1 specimen, 55 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 350-400 (-0) m.: 1 specimen, 60 mm.

Hab. North Atlantic; coast of New South Wales; New Zealand.

Zugmayer regards the fish described by Campbell from New Zealand as belonging to a distinct genus, but both Günther and McCulloch are of the opinion that it is specifically identical with *Diretmus argenteus*. *Discus* is said to differ from *Diretmus* in having no enlarged pelvic spine, and in the presence of denticulated scales on the abdomen. In both the examples obtained by the 'Discovery' (55 and 60 mm.) the pelvic spine is less developed than in the type of the species (90 mm.) preserved in the British Museum collection, and the ventral margin of the body is denticulated.

Family CARISTIIDAE

Caristius macropus (Bellotti).

Pteraclis macropus, Bellotti, 1903, *Atti Soc. Ital. Sci. Nat.* XLII, p. 137, pl. vi.

Caristius macropus, Jordan and Thompson, 1914, *Mem. Carnegie Mus.* VI, p. 243, pl. xxviii, fig. 7.

Elephenor macropus, Jordan, 1919, *Ann. Carnegie Mus.* XII, p. 330, pl. liv.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 60 mm.

Depth of body $1\frac{3}{4}$ in the length, length of head $2\frac{3}{4}$. Body much compressed. Anterior profile of head nearly vertical. Diameter of eye about $\frac{1}{3}$ length of head, a little greater than its distance from the maxillary. A number of radiating ridges on upper part of operculum ending in feeble spinous points; angle of praeoperculum and margin of suboperculum crenulated. Check and opercular bones scaly. Maxillary not expanded posteriorly, partially concealed by the praeorbital, extending to below anterior part of eye. A single series of small slender teeth in each jaw, and traces of similar teeth on vomer and palatines. Gill-rakers rather slender, of moderate length; 15 on lower part of anterior arch. Scales small, cycloid; irregularly arranged; some of those below the pectoral fin somewhat enlarged. No distinct lateral line. Dorsal 35. Anal 17. Bases of both dorsal and anal covered by a scaly sheath. Pectoral with 17 (?) rays. Pelvic I 5; origin just in front of base of pectoral, separated from origin of anal by a space which is nearly $\frac{3}{4}$ length of head; rays very long, reaching base of caudal when laid back. Caudal with 19 principal rays, of which 17 are branched; the spinous procurrent rays feeble. Uniformly greyish brown.

Described from a single specimen, 60 mm. in length.

Hab. Atlantic; Japan.

It is only after some hesitation that I have identified the specimen described above with Bellotti's species, as both his figure and that of Jordan and Thompson show a very narrow space between the eye and the maxillary, although in the description given by the American authors the cheek is said to be "deep and triangular, about four-fifths of the diameter of the eye in depth". Further, the mouth seems to be somewhat larger in the examples from Japan, and the diameter of the eye is said to be 2.33 to 2.5 in the length of the head. *Caristius japonicus*, Gill and Smith, of which *Platyberyx opalescens*, Zugmayer, may be a synonym [cf. Regan, 1912, *Ann. Mag. Nat. Hist.* (8), x, p. 637], is closely related to *C. macropus*, differing chiefly in the narrower cheek, larger eye, pluriserial teeth, and in the more anterior insertion of the pelvic fins. There seems to be little justification for placing *C. macropus* in a distinct genus, as has been done by Jordan. There is no doubt that the species described by Bellotti and Gill and Smith are congeneric, and, although the osteology of these fishes has not yet been studied, I feel certain that Regan was right in placing them with the Berycoids.

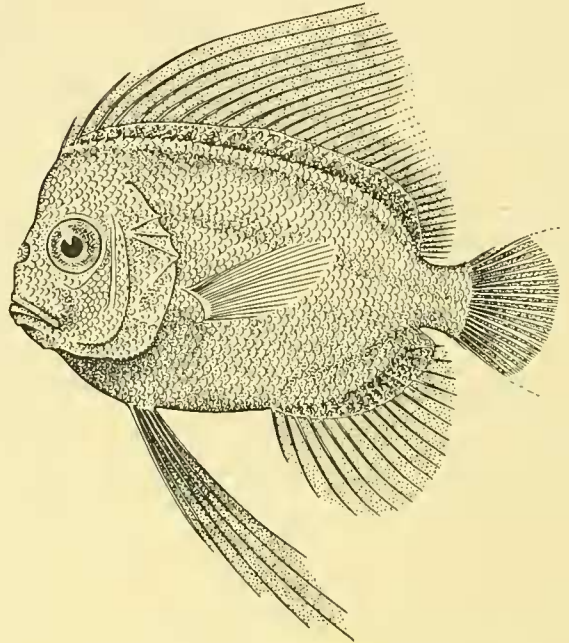


Fig. 37. *Caristius macropus*. ($\times 1$.)

Family MELAMPHAIDAE

Genus Melamphaes

I have recently published a revision of this genus, based on the material obtained by the 'Discovery', the specimens in the British Museum collection, including those obtained by the 'Challenger', and a series of authenticated examples of certain species kindly lent to me by the Smithsonian Institution of Washington (1929, *Ann. Mag. Nat. Hist.* Ser. 10, IV, p. 153). A few additional specimens have since come to light, and are duly listed below, together with the remainder of the 'Discovery' material.

Melamphaes typhlops (Lowe, 1843).

Norman, *t.c.* p. 156.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 26 mm. (?).

Hab. Eastern North Atlantic.

Melamphaes microps (Günther, 1878).

Norman, *t.c.* p. 157.

The following examples, all of small size, seem to belong to this species, which may prove to be identical with *M. typhlops*:—

St. 81. 18. vi. 26. 32° 45' 00" S, 8° 47' 00" W. 4½ m. net, horizontal, 650 (–0) m.: 1 specimen, 28 mm.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125–175 (–0) m.: 2 specimens, 20–43 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. 70 cm. tow-net, oblique, 124 (–0) m.: 1 specimen, 25 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (–0) m.: 4 specimens, 18–31 mm.

Hab. North and South Atlantic; Indian Ocean.

Melamphaes nordenskjoeldii, Lönnberg, 1905.

Norman, *t.c.* p. 159.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (–0) m.: 1 specimen, 72 mm.

St. 87. 25. vi. 26. 33° 53' 45" S, 9° 26' 30" E. Young-fish trawl, 1000 (–0) m.: 6 specimens, 14–80 mm.

St. 256. 23. vi. 27. 35° 14' 00" S, 6° 49' 00" E. Young-fish trawl, 850–1100 (–0) m.: 12 specimens, 15–28 mm.

Hab. South Atlantic.

Melamphaes robustus, Günther, 1887.

Norman, *t.c.* p. 160.

St. 101. 15. x. 26. 33° 50' to 34° 13' S, 16° 04' to 15° 49' E. 4½ m. net, horizontal, 2580 m.: 1 specimen, 65 mm. Do. 1310–1410 m.: 2 specimens, 50–55 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800–1000 (–0) m.: 2 specimens, 20–35 mm.

Hab. North and South Atlantic; Banda Sea (?).

Melamphaes megalops, Lütken, 1877.

Norman, *t.c.* p. 161.

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (–0) m.: 1 specimen, 50 mm.

St. 267. 23. vii. 27. 24° 31' 00" S, 12° 15' 30" E. Young-fish trawl, 450–550 m.: 2 specimens, 43–62 mm.

St. 287. 19. viii. 27. 2° 49' 30" S, 9° 25' 30" W. Young-fish trawl, 800–1000 (–0) m.: 1 specimen, 60 mm.

St. 296. 26. viii. 27. 8° 12' 00" N, 18° 49' 00" W. Young-fish trawl, 450–500 (–0) m.: 1 specimen, 30 mm.

St. 298. 29. viii. 27. 13° 01' 45" N, 21° 34' 45" W. Young-fish trawl, 900–1200 (–0) m.: 2 specimens, 27–32.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (–0) m.: 2 specimens, 65–70 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (–0) m.: 1 specimen, 35 mm.

Hab. North and South Atlantic; Indian Ocean.

Melamphaes cristiceps, Gilbert, 1890.

Norman, *t.c.* p. 162.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13' S$, $16^{\circ} 04'$ to $15^{\circ} 49' E$. $4\frac{1}{2}$ m. net, horizontal, 1310–1410 m.: 3 specimens, 78–105 mm.

St. 245. 10. vi. 27. $38^{\circ} 20' 00'' S$, $22^{\circ} 18' 00'' W$. $4\frac{1}{2}$ m. net, horizontal, 1800–2000 m.: 1 specimen, 180 mm.

Hab. Atlantic; Pacific coast of North America.

Melamphaes atlanticus, Norman.

Norman, 1929, *t.c.* p. 165.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13' S$, $16^{\circ} 04'$ to $15^{\circ} 49' E$. $4\frac{1}{2}$ m. net, horizontal, 850–950 m.: 2 specimens, 105–110 mm. (The smaller is the holotype.)

St. 151. 16. i. 27. $53^{\circ} 25' 00'' S$, $35^{\circ} 15' 00'' W$. $4\frac{1}{2}$ m. net, horizontal, 1025–1275 m.: 2 specimens, 75–78 mm.

St. 239. 2. vi. 27. $46^{\circ} 56' 00'' S$, $46^{\circ} 03' 00'' W$. $4\frac{1}{2}$ m. net, horizontal, 1050–1350(–0) m.: 1 specimen, 125 mm.

Hab. South Atlantic; off South Africa.

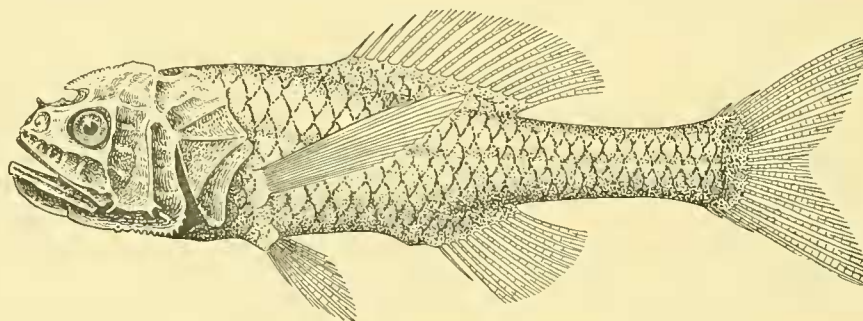


Fig. 38. *Melamphaes atlanticus*. Holotype. ($\times 1$.)

Melamphaes beanii, Günther, 1887.

Norman, *t.c.* p. 166.

St. 78. 12. vi. 26. $35^{\circ} 18' 00'' S$, $19^{\circ} 01' 10'' W$. Young-fish trawl, 1000 (–0) m.: 1 specimen, 105 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00'' S$, $6^{\circ} 31' 00'' E$. $4\frac{1}{2}$ m. net, horizontal, 1000 (–0) m.: 2 specimens, 45–70 mm.

St. 87. 25. vi. 26. $33^{\circ} 53' 45'' S$, $9^{\circ} 26' 30'' E$. Young-fish trawl, 1000 (–0) m.: 2 specimens, 128–130 mm.

St. 100. 3–4. x. 26. $33^{\circ} 20' 00''$ to $33^{\circ} 46' 00'' S$, $15^{\circ} 18' 00''$ to $15^{\circ} 08' 00'' E$. Young-fish trawl, 900–1000 m.: 1 specimen, 125 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13' S$, $16^{\circ} 04'$ to $15^{\circ} 49' E$. $4\frac{1}{2}$ m. net, horizontal, 850–950 m.: 2 specimens, 75–120 mm.

St. 267. 23. vii. 27. $24^{\circ} 31' 00'' S$, $12^{\circ} 15' 30'' E$. Young-fish trawl, 450–550 (–0) m.: 2 specimens, 53–115 mm.

St. 269. 26. vii. 27. $15^{\circ} 55' 00'' S$, $10^{\circ} 35' 00'' E$. $4\frac{1}{2}$ m. net, horizontal, 600–700 m.: 8 specimens, 60–75 mm.

Hab. North and South Atlantic.

Melamphaes mizolepis (Günther, 1878).

Norman, *t.c.* p. 168.

St. 276. 5. viii. 27. $5^{\circ} 54' 00''$ S, $11^{\circ} 19' 00''$ E. Young-fish trawl, 150 (-0) m.: 2 specimens, 28-30 mm.

St. 281. 12. viii. 27. $00^{\circ} 46' 00''$ S, $5^{\circ} 49' 15''$ E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 20 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 12 specimens, 35-60 mm.

St. 288. 21. viii. 27. $00^{\circ} 56' 00''$ S, $14^{\circ} 08' 30''$ W. 70 cm. tow-net, oblique, 100 (-0) m.: 1 specimen, 12 mm. Young-fish trawl, 250 (-0) m.: 27 specimens, 20-75 mm.

St. 296. 26. viii. 27. $8^{\circ} 12' 00''$ N, $18^{\circ} 49' 00''$ W. Young-fish trawl, 450-500 (-0) m.: 2 specimens, 28-30 mm.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (-0) m.: 12 specimens, 25-85 mm.

Hab. North and South Atlantic; Indian Ocean and Archipelago; Pacific coast of North America.

Melamphaes sp.

The following specimens are small and poorly preserved, and cannot be identified:—

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 3 specimens, 15-22 mm.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 4 specimens, 28-38 mm.

St. 245. 10. vi. 27. $38^{\circ} 20' 00''$ S, $22^{\circ} 18' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1800-2000 m.: 1 specimen, 50 mm.

St. 298. 29. viii. 27. $13^{\circ} 01' 45''$ N, $21^{\circ} 34' 45''$ W. Young-fish trawl, 900-1200 (-0) m.: 1 specimen, 24 mm.

11. xi. 25. $6^{\circ} 55' N$, $15^{\circ} 54' W$. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 60 mm.

Caulolepis longidens, Gill, 1884.

Brauer, 1906, '*Valdivia*' *Tiefsee-Fische*, p. 286, pl. xii, fig. 4; Zugmayer, 1911, *Rés. Camp. Sci. Monaco*, xxxv, p. 102, pl. v, fig. 3.

St. 239. 2. vi. 27. $46^{\circ} 56' 00''$ S, $46^{\circ} 03' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1050-1350 (-0) m.: 3 specimens, 115-150 mm.

Depth of body a little more than twice in the length, length of head $2\frac{1}{5}$ to $3\frac{1}{5}$. Diameter of eye 4 to $4\frac{3}{4}$ in length of head, interorbital width $2\frac{1}{2}$ to $2\frac{2}{3}$. Dorsal III 16-17. Anal II 7-8. Pectoral 15. Pelvic I 6.

Hab. Atlantic; coast of California; Hawaiian Islands.

C. subulidens, Garman, from the Pacific coast of Panama, appears to differ chiefly in the form of the body, more anterior insertion of the pelvics, with a greater distance between them and the anal, and in having the praemaxillary produced posteriorly into a long slender process which extends beyond the broadly rounded hinder end of the maxillary.

Order PERCOMORPHI

Family CHILODIPTERIDAE

Genus *Rhctogramma*, gen. nov.

Body somewhat elevated, covered with firm ctenoid scales of moderate size; head scaled. Mouth oblique; jaws equal anteriorly; maxillary exposed, its hinder end rather broad. A single series of minute villiform teeth in each jaw; no canines; vomer and palatines apparently toothless. Posterior margin of praeoperculum feebly serrated, with one or two stronger spines at the angle; operculum with a group of spines at its upper angle and one or two acute spines near its junction with the suboperculum, which is armed with a similar but shorter spine. Gill-rakers numerous, long, slender, close-set. Pseudobranchiae present. First dorsal with 8 spines, well separated from second dorsal, which has 9 rays. Anal with 3 spines and 7 rays; originating below anterior part of dorsal. Dorsal and anal scaleless, with some fine flexible rods resembling rudimentary rays between the principal rays.¹ Caudal forked. Vent immediately in front of anal fin. Lateral line interrupted; the pores simple.

Genotype. *Rhctogramma sherborni*, n.sp.

This genus appears to be related to *Parasphyraenops*, Bean, and *Parahymnodus*, Barnard. It differs from the former in the form of the maxillary and operculum, and in the separate dorsal fins, and from the latter chiefly in the form of the maxillary and operculum, scaly head, dentition, and interrupted lateral line.

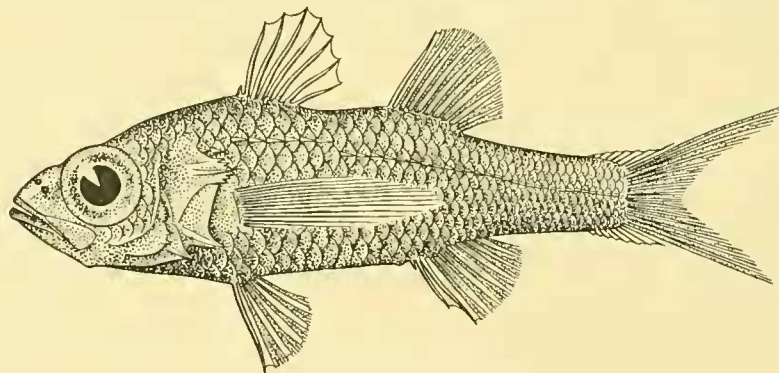


Fig. 39. *Rhctogramma sherborni*. Holotype. ($\times 1$.)

Rhctogramma sherborni, n.sp.

St. 101. 15. x. 26. $33^{\circ} 50'$ to $34^{\circ} 13'$ S, $16^{\circ} 04'$ to $15^{\circ} 49'$ E. $4\frac{1}{2}$ m. net, horizontal, 850-950 m.: 1 specimen, 80 mm. Holotype.

Depth of body $3\frac{1}{4}$ in the length, length of head $2\frac{2}{3}$. Snout much shorter than eye, diameter of which is greater than interorbital width and $2\frac{1}{2}$ in length of head. Maxillary

¹ These structures, which have the appearance of slender rays, extend nearly to the margin in the anterior part of the fin but become much shorter posteriorly.

extending to below anterior half of eye. 22 gill-rakers on lower part of anterior arch. 36 scales in a longitudinal series; 4 between origin of first dorsal and lateral line; 2 + 6 + 27 scales in the lateral line, which is interrupted near its origin and again just behind first dorsal fin. Dorsal VIII + I 9; origin of first dorsal $1\frac{1}{2}$ times as distant from base of caudal as from end of snout; first spine very short; fourth longest, more than $\frac{1}{2}$ length of head. Anal III 7. Pectoral with 14 or 15 rays, about as long as head. Pelvic I 5, below base of pectoral. Dark brownish; head lighter, with silvery reflections.

Described from a single specimen, 80 mm. in length; holotype of the species.

Hab. Off South Africa.

Named in honour of Mr C. D. Sherborn, to whose extensive and unrivalled knowledge of matters of nomenclature the author is greatly indebted, as a slight appreciation of his magnificent work, the *Index Animalium*.

Family CHIASMONTIDAE

I have given an account of the osteology of this interesting family in a recent paper, together with a systematic revision of the genera, which includes the material obtained by the 'Discovery' (1929, *Ann. Mag. Nat. Hist. Ser. 10*, III, p. 529).

Chiasmodon niger, Johnson, 1863.

Norman, *t.c.* p. 538, fig. 8 a.

St. 239. 2. vi. 27. $46^{\circ} 56' 00''$ S, $46^{\circ} 03' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1050-1350 (-0) m.: 1 specimen, 60 mm.

St. 285. 16. viii. 27. $2^{\circ} 43' 30''$ S, $00^{\circ} 56' 30''$ W. $4\frac{1}{2}$ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 42 mm.

11. xi. 25. $6^{\circ} 55' N$, $15^{\circ} 54' W$. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 58 mm.

Hab. Atlantic; Caribbean Sea; Indian Ocean.

Chiasmodon bolangeri, Osorio.¹

Osorio, 1909, *Mem. Mus. Bocage*, 1, p. 22, pl. ii, fig. 1.

Chiasmodon microcephalus, Norman, *t.c.* p. 539, fig. 8 b.

St. 76. 5. vi. 26. $39^{\circ} 50' 30''$ S, $36^{\circ} 23' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1500 (-0) m.: 2 specimens, 85-115 mm.

St. 86. 24. vi. 26. $33^{\circ} 25' 00''$ S, $6^{\circ} 31' 00''$ E. $4\frac{1}{2}$ m. net, horizontal, 1000 (-0) m.: 1 specimen, 48 mm.

Hab. Atlantic.

Dysalotus alcocki, MacGilchrist 1905.

Norman, *t.c.* p. 541, fig. 9.

St. 245. 10. vi. 27. $38^{\circ} 20' 00''$ S, $28^{\circ} 18' 00''$ W. $4\frac{1}{2}$ m. net, horizontal, 1800-2000 m.: 1 specimen, 145 mm.

Hab. South Atlantic; Bay of Bengal.

¹ The paper by Osorio, entitled *Contribuição para o conhecimento da Fauna Bathypelagica vizinha das Costas de Portugal*, was never included in the *Zoological Record*, and as unknown to me until quite recently.

Dysalotus macrodon, Norman.

Norman, *t.c.* p. 542, fig. 10.

St. 100. 4. x. 26. 33° 20' 00" to 33° 46' 00" S, 15° 18' 00" to 15° 08' 00" E. Young-fish trawl, 2500-2000 m.: 1 specimen, 145 mm. (Holotype.)

Hab. South Atlantic.

Pseudoscopelus scriptus, Lütken, 1892.

Norman, *t.c.* p. 543, fig. 11.

St. 288. . 21. viii. 27. 00° 56' 00" S, 14° 08' 30" W. Young-fish trawl, 250 (-0) m.: 1 specimen, 100 mm.

Hab. Atlantic; Sagami Sea.

Family STROMATEIDAE

Nomeus gronovii (Gmelin, 1788).

Regan, 1902, *Ann. Mag. Nat. Hist.* (7), x, p. 122.

2. xi. 25. 7° 17' N, 16° 19' W. Hand net, surface: 8 specimens, 16-40 mm.

Hab. Atlantic and Indo-Pacific.

Cubiceps gracilis (Lowe, 1843).

Regan, *t.c.* p. 123.

Cubiceps lowei, Osorio, 1909, *Mem. Mus. Bocage*, 1, p. 14.¹

St. 86. 24. vi. 26. 33° 25' 00" S, 6° 31' 00" E. 4½ m. net, horizontal, 1000 (-0) m.: 1 specimen, 92 mm.

Hab. Mediterranean; coast of Portugal; Madeira; Cape of Good Hope; South Atlantic.

Comparison of a number of examples from South Africa with Lowe's types shows that *C. capensis* (Smith, 1845) is synonymous with *C. gracilis*.

Psenes cyanophrys, Cuv. and Val., 1833.

Regan, *t.c.* p. 125.

St. 291. 24. viii. 27. 3° 46' 00" N, 16° 49' 00" W. Young-fish trawl, 100 (-0) m.: 1 specimen 30 mm.

Hab. Atlantic and Indo-Pacific.

Psenes pellucidus, Lütken.

Lütken, 1880, *Spoilia Atlantica*, p. 516, fig. 601; Regan, *t.c.* p. 125.

St. 285. 16. viii. 27. 2° 43' 30" S, 00° 56' 30" W. 4½ m. net, horizontal, 125-175 (-0) m.: 1 specimen, 36 mm.

Depth of body twice in the length, length of head 3¼. Snout shorter than eye, diameter of which is nearly 3 times in length of head and about equal to interorbital width.

¹ See footnote under *Chiasmodon bolangeri* on p. 349.

Maxillary extending to below anterior part of eye. Dorsal X or XI, I 32. Anal III 32. Posterior rays of dorsal and anal fins longest, about $\frac{4}{5}$ length of head. Pectoral nearly as long as head. Pelvic a little longer than head. Pale yellowish and semi-transparent; sides of body and bases of vertical fins with large brown spots; distal parts of vertical fins dusky; pectorals pale, pelvics dusky.

Described from a single specimen, 36 mm. in length.

Hab. Atlantic.

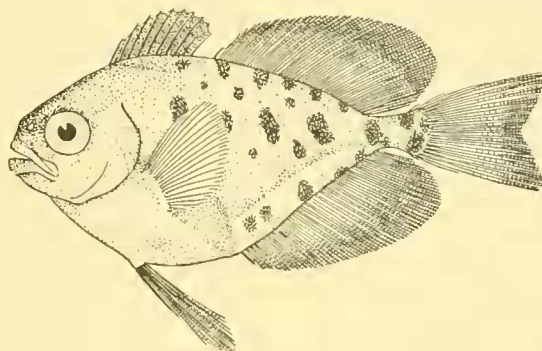


Fig. 40. *Psenes pellucidus*. ($\times 1\frac{1}{2}$.)

Family GEMPYLIDAE

Nealotus tripes, Johnson.

Johnson, 1865, *Proc. Zool. Soc.* p. 434; Günther, 1887, *Deep-Sea Fish. 'Challenger'*, p. 35; Goode and Bean, 1895, *Ocean. Ichth.* p. 199.

St. 281. 12. viii. 27. $00^{\circ} 46' 00''$ S, $5^{\circ} 49' 15''$ E. Young-fish trawl, 850-950 (-0) m.: 1 specimen, 53 mm.

St. 291. 24. viii. 27. $3^{\circ} 46' 00''$ N, $16^{\circ} 49' 00''$ W. Young-fish trawl, 100 (-0) m.: 1 specimen, 88 mm.

Depth of body 8 to $8\frac{2}{3}$ in the length, length of head nearly 4. Snout longer than eye, diameter of which is greater than interorbital width and $4\frac{1}{4}$ to $4\frac{1}{2}$ in length of head. Maxillary extending to below anterior part of eye; lower jaw strongly projecting. A single series of small teeth of varying sizes in both jaws; three pairs of strong canines

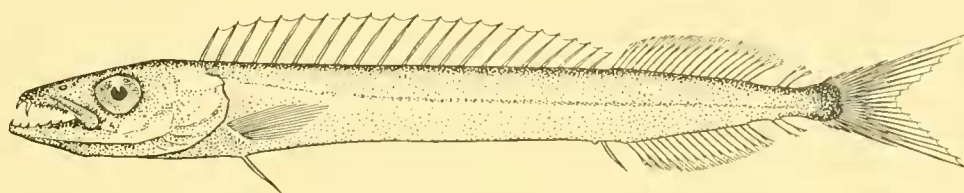


Fig. 41. *Nealotus tripes*. ($\times 1\frac{1}{4}$.)

anteriorly in upper jaw and a single pair of much smaller ones at symphysis of lower jaw. Dorsal XX-XXI, 17-19 + 2. Anal 15-16 + 2. Pectoral about $\frac{1}{2}$ length of head. Pelvic represented by a single spine, equal in length to diameter of eye, and rather longer than the dagger-shaped spine behind the vent.

Described from two specimens, 53 and 88 mm. in length.

Hab. Atlantic.

Order SCLEROPAREI

Family LIPARIDAE

Paraliparis gracilis, n.sp.

St. 146. 8. i. 27. $53^{\circ} 48' 00''$ S, $35^{\circ} 37' 30''$ W. Large dredge, heavy pattern, 4 ft. in length (1.2 m.), 728 m.: rock. 1 specimen, 70 mm. Holotype.

Depth of body equal to length of head and $5\frac{1}{3}$ in length of fish. Snout rather obtuse, scarcely projecting beyond mouth, shorter than eye, diameter of which is about $\frac{1}{3}$ of head. Maxillary extending to below posterior part of eye; teeth villiform, in broad bands. Lower end of gill-opening opposite upper pectoral rays. Dorsal with about 59 rays; origin above extremity of operculum; first four rays very short and partially hidden beneath the skin. Anal with about 56 rays; origin below about tenth ray of dorsal. Pectoral with $10 + 1 + 1 + 1 + 3$ rays; longest rays of upper portion about equal to those of lower and as long as head; upper and lower portions separated by three single rays set wide apart.

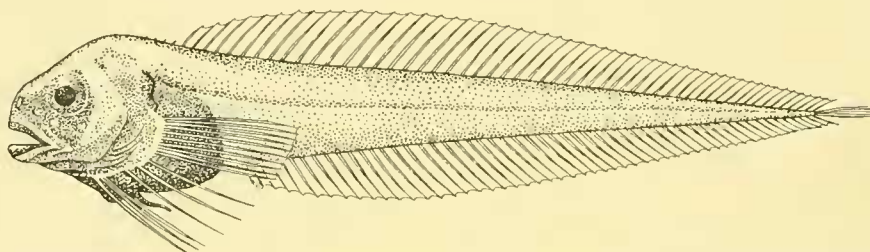


Fig. 42. *Paraliparis gracilis*. Holotype. ($\times 1\frac{1}{2}$.)

Described from a single specimen, 70 mm. in length; holotype of the species.

Hab. North of South Georgia.

Very close to *P. terrae-novae*, Regan, which was described from a single young specimen, 35 mm. in length, from McMurdo Sound. It appears to differ in the greater number of anal rays and in the form of the pectoral fin. The three Antarctic species may be distinguished as follows.

- | | |
|--|--------------------------------------|
| I. Upper portion of pectoral with 19 rays. | 1. <i>antarcticus</i> , Regan, 1914 |
| II. Upper portion of pectoral with about 10 rays. | |
| A. Anal with 43 rays; pectoral fin without elongate lower rays. | 2. <i>terrae-novae</i> , Regan, 1916 |
| B. Anal with about 56 rays; pectoral with 3 elongate lower rays. | 3. <i>gracilis</i> , n.sp. |

Order PEDICULATI

Family LINOPHRYNIDAE

Haplophryne mollis (Brauer, 1902).

Regan, 1926, *Ocean. Rep. Danish 'Dana'-Exped.* (1920-2), 11, p. 25, pl. iii, fig. 3.

St. 287. 19. viii. 27. $2^{\circ} 49' 30''$ S, $9^{\circ} 25' 30''$ W. Young-fish trawl, 800-1000 (-0) m.: 1 specimen, 40 mm.

Hab. Atlantic; Indian Ocean; New Zealand.

Family ONEIRODIDAE

Dolopichthys heteracanthus, Regan, 1925.

Regan, 1926, *t.c.* p. 28, pl. v, fig. 1.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 2 specimens, 28-50 mm.

Hab. North Atlantic; Gulf of Panama.

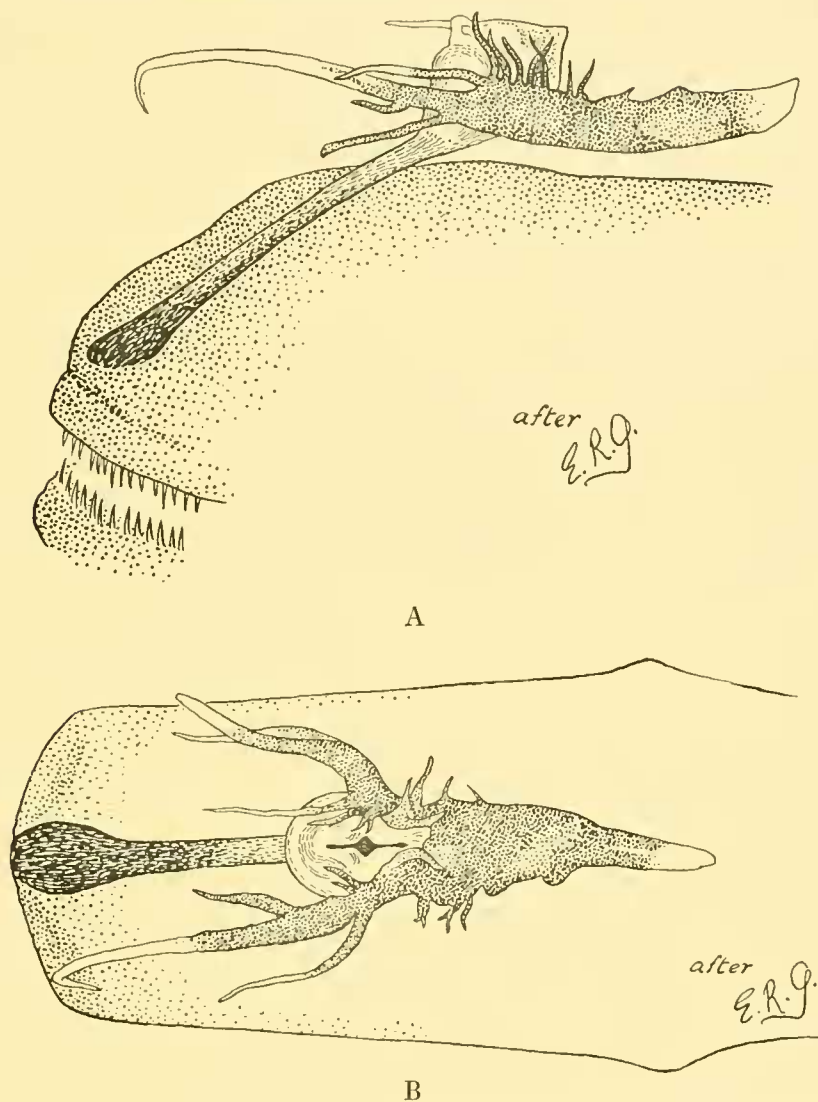


Fig. 43. Distal end of the illicium of *Dolopichthys allector*. A. Lateral view. B. Dorsal view. ($\times 8$.) From sketches made by Mr E. R. Gunther.

Dolopichthys allector, Garman, 1899.

Regan, *t.c.* p. 28.

St. 297. 28. viii. 27. 12° 08' 00" N, 20° 53' 30" W. Young-fish trawl, 250-300 (-0) m.: 1 specimen, 36 mm.

Hab. North Atlantic; Gulf of Panama.

The structure of the bulb of the illicium of this specimen seems to be a little different to that of *D. allector*, but in the absence of more data as to the variability of these structures, and as I have been unable to detect any other differences, I have hesitated to describe a new species on the basis of a single small specimen. According to a note made by Mr E. R. Gunther on the fresh specimen, the bulb is silvery in colour with a tinge of blue, slightly speckled with light brown. This is surmounted by a silvery organ, perhaps connected with the production of light, which in turn bears a transparent membranous process pigmented at its base. The Y-shaped appendage attached to and almost embracing the bulb and silvery organ is reddish brown in colour, and is fringed by membranous processes of varying length, the distal ends of which are devoid of colour and nearly transparent.

***Dolopichthys longicornis*, Parr.**

Parr, 1927, *Bull. Bingham Ocean. Coll.* 111 (1), p. 18, fig. 6.

St. 287. 19. viii. 27. $2^{\circ} 49' 30''$ S, $9^{\circ} 25' 30''$ W. Young-fish trawl, 800–1000 (–0) m.: 1 specimen, 35 mm.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (–0) m.: 1 specimen, 30 mm.

Hab. Atlantic; West Indies.

***Lophodolus acanthognathus*, Regan, 1925.**

Regan, 1926, *t.c.* p. 30, pl. vi, fig. 1.

St. 287. 19. viii. 27. $2^{\circ} 49' 30''$ S, $9^{\circ} 25' 30''$ W. Young-fish trawl, 800–1000 (–0) m.: 1 specimen, 23 mm.

Hab. Atlantic.

Family MELANOCETIDAE

***Melanocetus johnsoni*, Günther, 1864.**

Regan, *t.c.* p. 33.

St. 269. 26 vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. Young-fish trawl, 600–700 (–0) m.: 8 specimens, 25–73 mm.

St. 270. 27. vii. 27. $13^{\circ} 58' 30''$ S, $11^{\circ} 43' 30''$ E. Young-fish trawl, 200 (–0) m.: 1 specimen, 35 mm.

28. x. 25. $13^{\circ} 25' N$, $18^{\circ} 22' W$. $4\frac{1}{2}$ m. net, horizontal, 900 (–0) m.: 2 specimens, 26–30 mm.

Hab. Atlantic; Indian Ocean (?).

Family CERATIIDAE

***Cryptosparas couesii*, Gill, 1883.**

Regan, *t.c.* p. 35, pl. ix, fig. 2.

St. 87. 25. vi. 26. $33^{\circ} 53' 45''$ S, $9^{\circ} 26' 30''$ E. Young-fish trawl, 1000 (–0) m.: 1 specimen, 65 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 1 specimen 15 mm.

11. xi. 25. 6° 55' N, 15° 54' W. 2 m. tow-net, horizontal, 800 (-0) m.: 1 specimen, 17 mm.

Hab. Atlantic; Gulf of Aden; Gulf of Panama.

The specimen from St. 87 was examined alive on board the 'Discovery'. It was observed continually to beat the water with the pectoral fins, suggesting that this action was in some way connected with respiration. When the water was churned, as by pouring in more salt water, or when the illicium was stroked, the luminous distal end emitted a greenish blue light for half a minute or so. This phenomenon was noted three times. Definite projections of the skin in the form of very fine black papillae were noted in six places on each side of the body: three on each side of the lower jaw; one on each side of the head between the nostril and the base of the illicium; and a pair on each side of the back at the middle of the body. The position of these papillae is indicated in the accompanying figure.

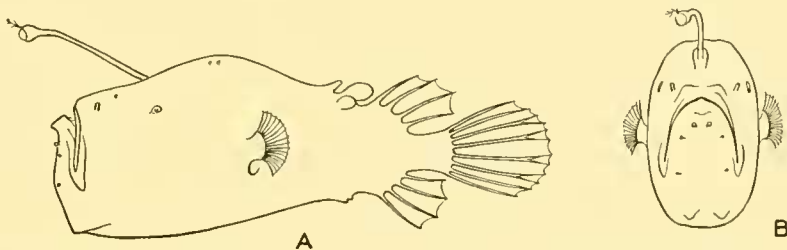


Fig. 44. Outline drawings of *Cryptosparas couesii*, showing the position of the papillae in the skin. A. Lateral view. B. Front view. ($\times 1$.)

Mancalias uranoscopus (Günther, 1878).

Regan, *t.c.* p. 37, text-fig. 21.

St. 293. 24. viii. 27. 4° 18' 15" N, 16° 51' 00" W. Young-fish trawl, 100-120 (-0) m.: 2 specimens, 28-30 mm.

28. x. 25. 13° 25' N, 18° 22' W. 4½ m. net, horizontal, 900 (-0) m.: 1 specimen, 70 mm.

Hab. Atlantic; Hawaiian Islands.

Mancalias tentaculatus, n.sp.

St. 114. 12. xi. 26. 52° 25' 00" S, 9° 50' 00" E. 4½ m. net, horizontal, 650-700 m.: 1 specimen, 110 mm. (Holotype.)

Closely related to *M. uranoscopus*. Basal bone of illicium a little more than $\frac{1}{4}$ length of fish (without caudal), and little longer than the illicium itself; bulb pigmented proximally, pale yellowish white distally; at the tip of the bulb is a very small brown ring, close to which are two small and almost transparent tentacles. In front of the pair of stalked caruncles is a stout ray, which is nearly as long as the distance from the caruncles to the upper ray of caudal fin, and about $3\frac{1}{2}$ in length of fish.

Described from a single specimen, 110 mm. in length; holotype of the species.

Hab. South Atlantic.

In 1908 Tanaka described a somewhat similar fish, 440 mm. in total length, from

Japan, under the name of *Paraceratias mitsukurii*, and Regan has shown that apart from the presence of the tentacle-like ray in front of the caruncles this is exactly similar to *Cryptosparas coesii*. Another fish from Japan described by Günther as *Ceratias carunculatus*, which was 35 mm. in length, has this ray represented by a slight prominence, under which is a gland with a pore, but likewise resembles *Cryptosparas coesii* in other characters. It is of some interest to find a species with this ray on the back occurring in both genera.

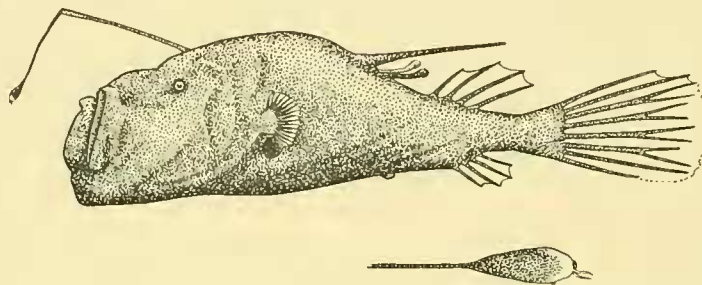


Fig. 45. *Mancalias tentaculatus*. Holotype. ($\times \frac{3}{4}$.) [Distal portion of illicium $\times 3$.]

Family HIMANTOLOPHIDAE

Genus *Paroneiroides*, Alcock, 1890

Regan, who had not seen Alcock's specimen, united this genus with *Diceratias*, but it may be distinguished by the smooth skin, feeble teeth, and more backward position of the illicium, which arises between the sphenotics.

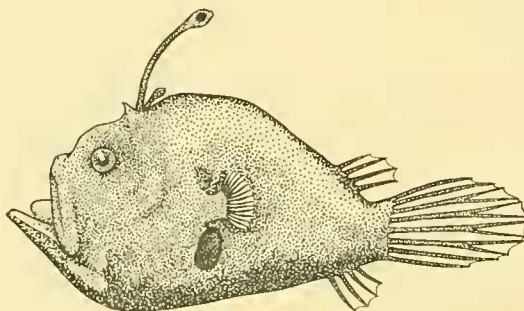


Fig. 46. *Paroneiroides glomerosus*. ($\times 2\frac{1}{2}$.)

Paroneiroides glomerosus, Alcock.

Alcock, 1890, *Ann. Mag. Nat. Hist.* (6), vi, p. 206, pl. ix, fig. 6.

Oneiroides glomerosus, Alcock, 1899, *Cat. Indian Deep-Sea Fish.* p. 57; 1900, *Illust. Zool. 'Investigator'*, *Fishes*, pl. xxviii, fig. 4.

Diceratias glomerulosus, Regan, 1926, *t.c.* p. 42.

St. 269. 26. vii. 27. $15^{\circ} 55' 00''$ S, $10^{\circ} 35' 00''$ E. Young-fish trawl, 600–700 (–0) m.: 1 specimen, 26 mm.

Illicium about $\frac{1}{3}$ length of fish, more than four times as long as the ray behind it; terminal bulb without filaments. Dorsal 6. Anal 4. Caudal 8 (?).

Described from two specimens, 26 to 28 mm. in length, including the type of the species lent to me by the Indian Museum¹.

Hab. South Atlantic; Indian Ocean (Bay of Bengal).

Family ACERATIIDAE

Lipactis tumidus, Regan, 1925.

Regan, 1926, *t.c.* p. 43, pl. xii, fig. 2.

St. 298. 29. viii. 27. 13° 01' 45" N, 21° 34' 45" W. Young-fish trawl, 900-1200 (-0) m.: 1 specimen, 13 mm.

Hab. North Atlantic.

Rhynchoceratias brevirostris, Regan, 1925.

Regan, 1926, *t.c.* p. 43, pl. xiii, fig. 1, text-fig. 25 a.

St. 298. 29. viii. 27. 13° 01' 45" N, 21° 34' 45" W. Young-fish trawl, 900-1200 (-0) m.: 1 specimen, 40 mm.

¹ This specimen is poorly preserved, and the ray behind the illicium has been torn away from the skin, thus appearing somewhat longer at first sight.

PART II. FLATFISHES

INTRODUCTION

THE collection of Flatfishes made by the R.R.S. 'Discovery' and R.R.S. 'William Scoresby' includes examples of nine species, and, although of small size, is of considerable interest. It includes a single specimen of a genus and species apparently new to science. With the sole exception of one specimen of *Heteromycteris capensis*, the collection was made either in the Magellan-Falkland Islands region or off the coast of West Africa.

My thanks are due to the members of the Discovery Committee for permission to examine this material, and are gratefully tendered. The figure of *Achiropsetta tricholepis* has been drawn by Lieut.-Col. W. P. C. Tenison, D.S.O.

SYSTEMATIC ACCOUNT

Order HETEROSOMATA

Family BOTHIDAE

Genus *Thysanopsetta*, Günther

Günther, 1880, *Shore Fishes 'Challenger'*, p. 22.

Thysanopsetta naresi, Günther.

Günther, 1880, *t.c.* p. 22, pl. xi, fig. A.

St. 51. 4. v. 26. Off Eddystone Rock, East Falkland Islands. From 7 miles N 50° E to 7.6 miles N 63° E of Eddystone Rock. Large otter trawl, 105-115 m.: fine sand. 2 specimens, 100-127 mm.

St. WS 77. 12. iii. 27. 51° 01' 00" S, 66° 31' 30" W. Commercial otter trawl, 110-113 m.: coarse dark sand. 4 specimens, 38-115 mm.

St. WS 90. 7. iv. 27. 13 miles N 83° E of Cape Virgins Light, Argentine Republic. Commercial otter trawl, 82-81 m.: fine dark sand. 5 specimens, 63-132 mm.

St. WS 91. 8. iv. 27. 52° 53' 45" S, 64° 37' 30" W. Commercial otter trawl, 191-205 m.: fine dark sand and shells. 1 specimen, 44 mm.

St. WS 92. 8. iv. 27. 51° 58' 30" S, 65° 01' 00" W. Commercial otter trawl, 145-143 m.: fine dark sand and stones. 2 specimens, 41-61 mm.

St. WS 96. 17. iv. 27. 48° 00' 45" S, 64° 58' 00" W. Commercial otter trawl, 96 m.: fine dark sand. 35 specimens, 34-80 mm. [Taken from stomach of *Merluccius*.]

St. WS 97. 18. iv. 27. 49° 00' 30" S, 61° 58' 00" W. Commercial otter trawl, 146-145 m.: sand, gravel and stones. 1 specimen, 83 mm.

St. WS 216. 1. vi. 28. 47° 37' 00" S, 60° 50' 00" W. Net attached to back of trawl, 219-133 m.: fine sand. 1 specimen, 142 mm.

St. WS 219. 3. vi. 28. 47° 06' 00" S, 62° 12' 00" W. Tow-net attached to back of trawl, 116–114 m.: dark sand. 2 specimens, 70–75 mm.

St. WS 222. 8. vi. 28. 47° 23' 00" S, 65° 00' 00" W. Tow-net attached to back of trawl, 100–106 m.: coarse brown sand and shells. 5 specimens, 37–45 mm.

Depth of body $2\frac{1}{3}$ to $2\frac{1}{2}$ in the length, length of head 4 to 5. Upper profile of head generally a little notched in front of eyes. Snout shorter than eye, diameter of which is 3 to $3\frac{1}{2}$ in length of head and more than twice the width of the flat, scaly interorbital space; upper eye a little in advance of lower and close to edge of head. Jaws and dentition about equally developed on both sides; the maxillary extending to below middle of eye or not quite as far, length a little more than 2 in that of head; lower jaw scarcely projecting, its length $1\frac{2}{3}$ to nearly 2 in head; rather broad bands of small conical teeth in both jaws. Margin of gill-cover fringed; gill-rakers long, slender, 20 to 23 on lower part of anterior arch. Scales small, ctenoid on both sides of body; 67 to 72 in lateral line. Dorsal 84–90; origin above nostrils of blind side and just in front of upper eye; all the rays simple, not scaled. Anal 61–66; first interhaemal spine not projecting. Pectoral of ocular side with 9 or 10 simple rays, length about $\frac{1}{2}$ that of head; that of blind side shorter. Pelvics with 6 rays; short-based, subequal and nearly symmetrical. Caudal with 15 simple rays, rounded; caudal peduncle short. Brownish or greyish, mottled and spotted with darker, and with small dark dots forming irregular lines running along the body between the series of scales; all the rays of the fins finely dotted with brown or black.

Described from several specimens, up to 175 mm. in total length, including the holotype of the species.

Hab. Magellan-Falkland Islands region.

Genus *Eucitharus*, Gill

Citharus (*non* Reinhardt, 1838), Bleeker, 1862, *Versl. Akad. Amsterdam*, XIII, p. 424.
Eucitharus, Gill, 1889, *Proc. U.S. Nat. Mus.* XI, p. 600.

Eucitharus linguatula (Linnaeus).

Pleuronectes linguatula, Linnaeus, 1758, *Syst. Nat.* ed. 10, p. 270.
Citharus linguatula, Günther, 1862, *Cat. Fish*, IV, p. 418.
Eucitharus linguatula, Carus, 1889–93, *Prodr. Faun. Medit.* II, p. 588.

St. 272. 30. vii. 27. Off Elephant Bay, Angola; from 13° 11' S, 12° 44' 45" E to 13° 09' 45" S, 12° 46' E. Large otter trawl, 73–97 m.: green sand and mud. 3 specimens, 200–212 mm.

St. 274. 4. viii. 27. Off St Paul de Loanda, Angola; from 8° 40' 15" S, 13° 13' 45" E to 8° 38' 15" S, 13° 13' 00" E. Large otter trawl, 64–65 m.: grey mud. 4 specimens, 28–80 mm.

St. 279. 10. viii. 27. Off Cape Lopez, French Congo; from 8.5 miles N 71° E to 15 miles N 24° E of Cape Lopez Light. Large otter trawl, 58–67 m.: mud and fine sand. 2 specimens, 140–170 mm.

Depth of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the length, length of head 3 to $3\frac{1}{4}$. Upper profile of head distinctly concave. Snout a little longer than eye, diameter of which is 5 to $5\frac{3}{8}$ in length

of head; eyes separated by a low bony ridge, the upper a little in advance of lower and very close to edge of head. Posterior nostril a large opening, that of blind side covered by a membranous valve which extends downwards towards the mouth. Maxillary extending to below posterior edge of eye or not quite as far, length about $\frac{1}{2}$ head; lower jaw strongly projecting, its length $1\frac{2}{3}$ to $1\frac{3}{4}$ in that of head; a shallow emargination at its anterior end receives a corresponding prominence on the upper jaw; praemaxillary with an outer series of rather strong teeth, inside which are one or two large canines; maxillary with a single series of smaller teeth; mandibular teeth uniserial, somewhat enlarged anteriorly; two or three strong teeth on the vomer. Gill-rakers of moderate length and rather slender, 11 or 12 on lower part of anterior arch. Scales rather large, thin, deciduous, more or less ctenoid on both sides of body; 35 to 39 scales in the lateral line. Lateral line well developed on both sides of body, with a strong curve above the pectoral fin; continued to posterior edge of caudal fin; the tubules simple. Dorsal 64-72; origin immediately behind lower part of posterior nostril on blind side of head and just in front of eye; nearly all the rays branched, not scaled. Anal 44-48; tip of first interhaemal spine not projecting. Pectoral fin of ocular side with 10 rays (7 branched), length a little more than $\frac{1}{2}$ that of head; that of blind side shorter. Pelvics with 6 rays; short-based, subequal, that of ocular side situated on median line of body. Caudal with $2\frac{1}{15}/2$ rays; double-truncate; caudal peduncle $1\frac{2}{3}$ times as deep as long. Greyish or yellowish brown; a black spot at base of last rays of dorsal fin and a similar spot above posterior end of anal; a row of round black spots on dorsal and anal fins.

Described from several specimens, 28 to 170 mm. in total length.

Hab. Mediterranean; West Africa.

This species, which does not appear to have been adequately described before, has not been previously recorded from the coast of West Africa.

Genus *Arnoglossus*, Bleeker

Bleeker, 1862, *Versl. Akad. Amsterdam*, XIII, p. 427.

Arnoglossus imperialis (Rafinesque).

Bothus imperialis, Rafinesque, 1810, *Car. n.gen.*, p. 23.

Arnoglossus imperialis, Kyle, 1913, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 1, p. 79, fig. 10.

St. 272. 30. vii. 27. Off Elephant Bay, Angola; from $13^{\circ} 11' S$, $12^{\circ} 44' 45'' E$ to $13^{\circ} 09' 45'' S$, $12^{\circ} 46'' E$. Large otter trawl, 73-97 m.: green sand and mud. 1 specimen, 80 mm.

St. 274. 4. viii. 27. Off St Paul de Loanda, Angola; from $8^{\circ} 40' 15'' S$, $13^{\circ} 13' 45'' E$ to $8^{\circ} 38' 15'' S$, $13^{\circ} 13' 00'' E$. Large otter trawl, 64-65 m.: grey mud. 1 specimen, 75 m.

St. 279. 10. viii. 27. Off Cape Lopez, French Congo; from 8.5 miles N $71^{\circ} E$ to 15 miles N $24^{\circ} E$ of Cape Lopez Light. Large otter trawl, 58-67 m.: mud and fine sand. 1 specimen, 90 mm.

All these specimens are rather small and in poor condition, but appear to belong to this species. The most southerly point from which it has been previously recorded is south of the Azores ('Hirondelle').

Genus *Lepidopsetta*, Günther

Günther, 1880, *Shore Fishes 'Challenger'*, p. 18.

Lepidopsetta maculata, Günther.

Günther, 1880, *t.c.* p. 18, pl. xxx, fig. C.

St. WS 218. 2. vi. 28. 45° 45' 00" S, 59° 35' 00" W. Commercial otter trawl, 311–247 m.: dark sand. 1 specimen, 238 mm.

Depth of body $2\frac{1}{8}$ to $2\frac{1}{5}$ in the length, length of head about $3\frac{1}{5}$. Upper profile of head a little notched in front of eyes. Snout shorter than eye, diameter of which is 3 to $3\frac{1}{4}$ in length of head; eyes separated by a very narrow scaly space, the lower in advance of upper, which is close to edge of head; upper parts of both eyes densely scaled. Jaws about equally developed on both sides; the maxillary extending to below anterior part of eye, length $\frac{1}{3}$ or more than $\frac{1}{3}$ that of head; lower jaw not projecting, its length about 2 in head; teeth more developed on blind side; small, conical, uniserial in both jaws; no teeth on the vomer. Gill-rakers rather short and stout, about 12 on lower part of anterior arch. Scales ctenoid on both sides of body, 114 to 120 in lateral line. Lateral line well developed on both sides of body, nearly straight. Dorsal 118–119; origin behind posterior nostril of blind side and just in front of eye; highest rays about $\frac{1}{3}$ length of head. Anal 97–98; tip of first interhaemal spine not projecting. No pectorals. Pelvic fin of ocular side with 7 rays, elongate, situated on median line of body; that of blind side with 5 rays, short-based, lateral in position, its first ray opposite to fourth of right pelvic; both pelvic fins free from anal. Caudal with $2/15/2$ rays, rounded; caudal peduncle very short. Brownish; head, body and fins covered with irregular rounded darker spots and blotches.

Described from two specimens, 134 and 238 mm. in total length, the smaller being the holotype of the species.

Hab. Near Prince Edward's Island; South Atlantic, north of the Falkland Islands.

Genus *Achiropsetta*, gen. nov.

Body rather elongate; the middle portion fairly thick and muscular, continued above and below as a thin, semi-transparent region containing the supports of the fins. Eyes on the left side, separated by a flat scaly space. Mouth rather small; jaws and dentition about equally developed on both sides; teeth very small, pointed, not enlarged anteriorly; apparently uniserial in both jaws; palate toothless. Gill-rakers short and stout. Dorsal fin commencing above posterior nostril of blind side and in advance of upper eye; all the rays simple and scaled on both sides; dorsal and anal ending very close to base of caudal. No pectorals. Pelvic fin of ocular side elongate, median anteriorly, twisted on to left side of body posteriorly; that of blind side with shorter base, lateral. Scales very small, ctenoid, the long spinules directed vertically, giving the skin a pilose appearance; upper surfaces of both eyes densely scaled. Lateral line well developed on both sides of body, nearly straight.

Genotype: *Achiropsetta tricholepis*, n.sp.

Apparently related to *Lepidopsetta*, differing chiefly in the form of the body and the structure of the scales.

***Achiropsetta tricholepis*, n.sp.**

St. WS 89. 7. iv. 27. 9 miles N 21° E of Arenas Point Light, Tierra del Fuego; from 53° 01' 00" S, 68° 07' 00" W to 52° 59' 30" S, 68° 06' 00" W. Commercial otter trawl, 23-21 m.: mud, gravel and stones. 1 specimen, 100 mm. Holotype.

Depth of body $2\frac{1}{3}$ in the length, length of head $4\frac{1}{2}$. Upper profile of head evenly convex. Snout shorter than eye, diameter of which is about $3\frac{1}{2}$ in length of head and 3 times the interorbital width; lower eye in advance of upper, which is rather close to edge of head. Maxillary extending to below anterior part of eye, length a little more

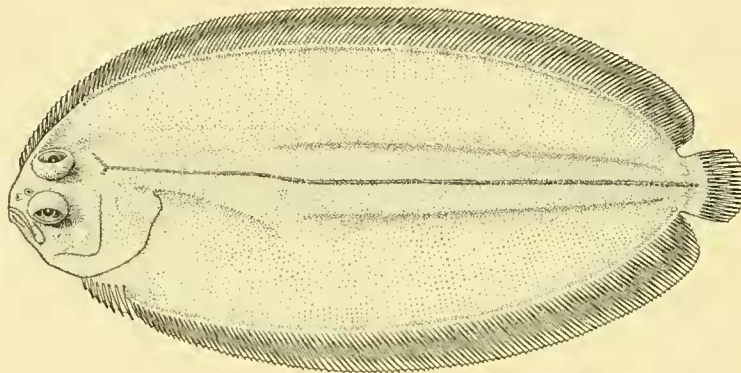


Fig. 47. *Achiropsetta tricholepis*. Holotype. (Nat. size.)

than $\frac{1}{3}$ that of head; lower jaw scarcely projecting, its length nearly $\frac{1}{2}$ head. Upper angle of gill-opening below commencement of lateral line, level with centre of interorbital space; 9 or 10 gill-rakers on lower part of anterior arch. Dorsal about 130; highest rays less than $\frac{1}{2}$ length of head. Anal 114. Pelvic fin of ocular side with 7 rays, that of blind side with 6. Caudal with 18 rays, rounded. Uniformly yellowish brown.

Described from a single specimen, 100 mm. in total length; holotype of the species.

Hab. Off Tierra del Fuego.

Genus *Bothus*, Rafinesque

Rafinesque, 1810, Car. n.gen., p. 23.

***Bothus podas* (Delaroche).**

Pleuronectes podas, Delaroche, 1809, *Ann. Mus. H.N.* (Paris), XIII (77), p. 354.

Bothus podas, Kyle, 1913, *Rep. Danish Ocean. Exped.* 1908-10, II, A, 1, p. 100, fig. 17.

St. 271. 29. vii. 27. Elephant Bay, Angola. Seine net, 5-0 m.: 3 specimens, 55-73 mm.

St. 299. 4. ix. 27. Tarrafal, S. Antonio, Cape Verde Islands. Medium rectangular net, 7-11 m.: 1 specimen, 38 mm.

Hab. Mediterranean; Eastern Atlantic, southwards to Angola.

Family SOLEIDAE

Genus *Solea*, Quensel

Quensel, 1806, *Vet. Akad. Handl.* xxvii, p. 229.

Solea (*Dicologlossa*) *chirophthalmus*, Regan.

Solea chirophthalmus, Regan, 1915, *Ann. Mag. Nat. Hist.* (8) xv, p. 129.

Dicologlossa chirophthalmus, Chabanaud, 1927, *Bull. Inst. Océan. Monaco*, 488, p. 28.

St. 274. 4. viii. 27. Off St Paul de Loanda, Angola; from 8° 40' 15" S, 13° 13' 45" E to 8° 38' 15" S, 13° 13' 00" E. Large otter trawl, 64–65 m.: grey mud. 2 specimens, 145–210 mm.

Hab. West Africa.

Known previously only from the types (170–200 mm.) from Lagos.

Genus *Heteromycteris*, Kaup

Kaup, 1858, *Arch. Naturg.* xxiv, 1, p. 103.

Heteromycteris capensis, Kaup.

Kaup, 1858, *t.c.* p. 103; Chabanaud, 1927, *Ann. Mag. Nat. Hist.* (9) xx, p. 525.

St. 91. 8. ix. 26. 0.5 mile off Roman Rock, False Bay, South Africa. Large rectangular net, 35 m.: sand. 1 specimen, 104 mm.

Hab. South Africa.

Family CYNOGLOSSIDAE

Genus *Symphurus*, Rafinesque

Rafinesque, 1810, *Indice Itt. Sicil.* pp. 13, 52.

Symphurus nigrescens, Rafinesque.

Rafinesque, *t.c.* pp. 13, 52.

Plagusia lactea, Bonaparte, 1833, *Icon. Faun. Ital.* (5).

Symphurus lactea, Kyle, 1913, *Rep. Danish Ocean. Exped.* 1908–10, 11, A, 1, p. 130, fig. 23.

St. 274. 4. viii. 27. Off St Paul de Loanda, Angola; from 8° 40' 15" S, 13° 13' 45" E to 8° 38' 15" S, 13° 13' 00" E. Large otter trawl, 64–65 m.: grey mud. 6 specimens, 23–77 mm.

St. 279. 10. viii. 27. Off Cape Lopez, French Congo; from 8.5 miles N 71° E to 15 miles N 24° E of Cape Lopez Light. Large otter trawl, 58–67 m.: mud and fine sand. 7 specimens, 62–90 mm.

Hab. Mediterranean; West Africa.

These small specimens appear to be identical with the species originally described from the Mediterranean, but I have no material from the latter locality for comparison. It has been recorded from the Bay of Biscay and from near the Azores.

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PLATE II

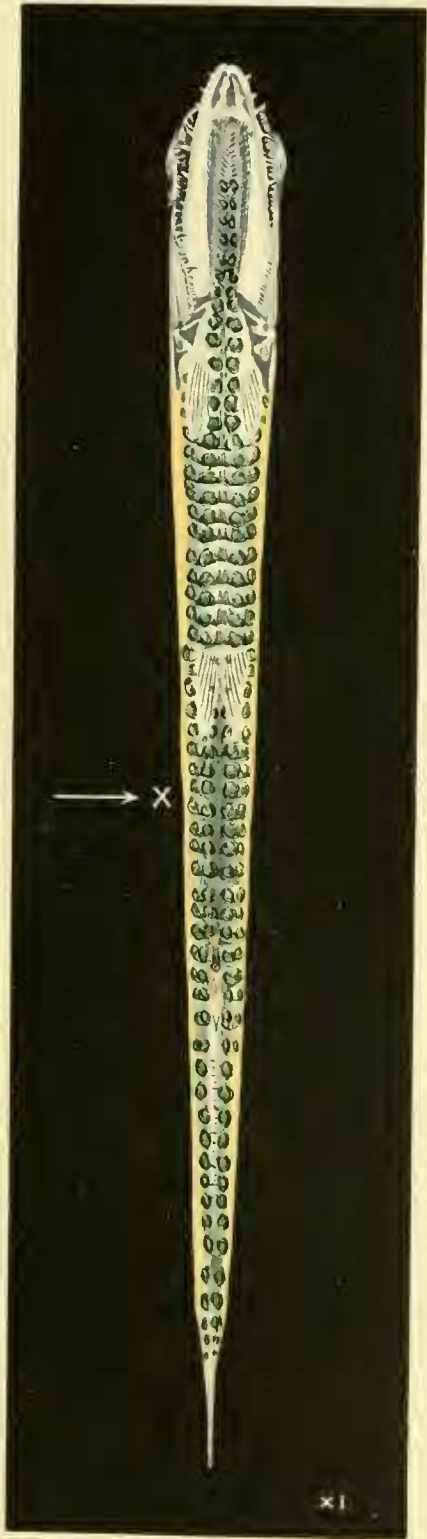
Range of colour in photophores of oceanic fishes.
From sketches made during life by Mr E. R. Gunther.

Fig. 1. *Photichthys argenteus*. Ventral view showing distribution and green colour of photophores.

Fig. 2. *P. argenteus*. Lateral view of two lateral and two ventral photophores on right side of body (opposite $\rightarrow \times$ in Fig. 1). Lateral photophores with long concave reflectors, ventral photophores with shorter concave reflectors.

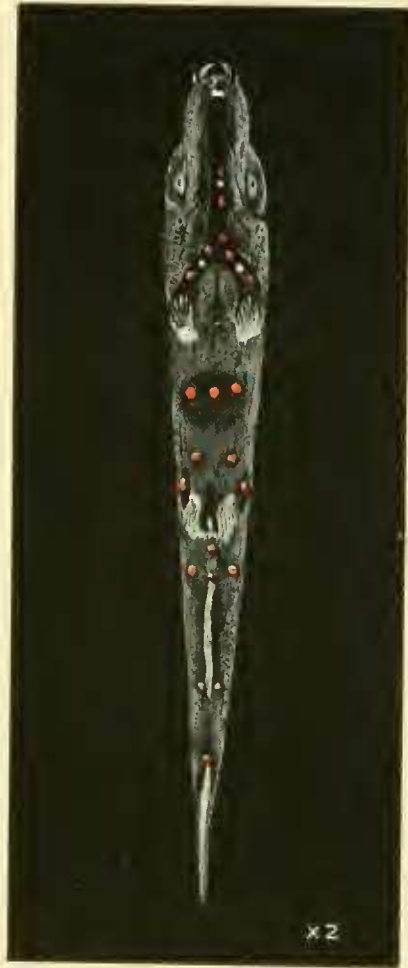
Fig. 3. *Bathytroctes rostratus*. Ventral view showing distribution and red colour of photophores (damaged photophores appear white). The body colour is black.

Fig. 4. *Argyropelecus hemigymnus*. Ventral view to show distribution of photophores. The violet coloration is attributed to a diffraction effect.

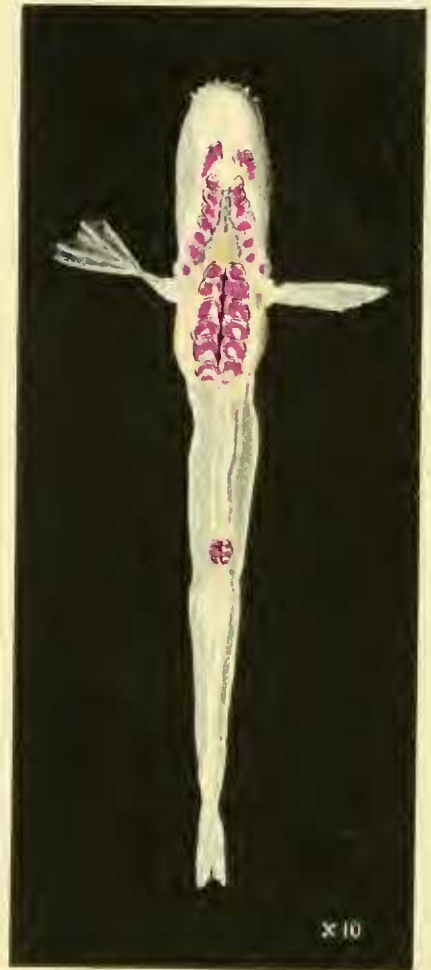


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