

Sub Order STOMIATOIDEA

Dentigerous maxillary under the mouth gape and firmly joined to premaxillary. Ribs attached to short parapophyses which inserted in pits in vertebral center. Caudal skeleton as in clupeoides, with upturned vertebrae.

Oceanic fishes, some living in great depths. Differs from the clupeoides in the presence of photophores definitely arranged in 2 series on each side of the body below.

ANALYSIS OF FAMILIES

- 1
a. Premaxillary without front expansion; 2 supplemental maxillaries; no barbel; dorsal before or above front part of anal.
- 1
b. Body elongate Gonostomatidae.
- 2
b. Body deep, strongly compressed Sternoptychidae.
- a. Premaxillary with strong front expansion extending upward over ethmoid; maxillary slender, without supplemental bone.
- 1
c. Dorsal before anal; adipose fin present; pectoral well developed.
- 1
d. Dorsal above or behind ventral Astronesthidae.
- 2
d. Dorsal well before ventral Chauliodontidae.
- a. c. Dorsal and anal wholly or in great part opposed; no adipose fin; pectoral usually small or absent.
- 1
e. Mouth wide; hyoid barbel present. Stomiatidae.
- 2
e. Mouth very wide; no barbel Malacosteidae.

Family GONOSTOMATIDAE

Body elongate. Head conic, elongate, compressed. Mouth moderate to rather large. Mandibular suspensorium usually directed more or less obliquely back. Maxillary with 2 supplemental bones. Teeth moderate, some enlarged or canine like. No barbel. Opercle complete. Gill openings wide. Gill arches with long gill rakers. Body usually covered with large thin caducous scales. No modified postorbital luminous organ. Photophores present. Dorsal and anal well developed, median or posterior, dorsal usually over or before front of anal. Adipose fin usually present. Caudal forked. Pectoral low. Ventral nearly median.

Bathypelagic.

ANALYSIS OF GENERA

- a.¹ GONOSTOMATINAE. Serial photophores arranged in continuous longitudinal rows; pseudobranchiae absent or very feebly developed.
- b.¹ One series of photophores each side of body; dorsal origin nearly opposite anal origin.
- c.¹ Dorsal rays 20, origin little behind anal origin; A. 29; no adipose fin Bonapartia.
- c.² Dorsal rays 16, origin little before anal origin; A. 23 to 26; adipose fin present Margrethia.
- b.² Two series of photophores each side of body.
- d.¹ Interorbital rather wide; eyes normal; mouth large; teeth well developed; dorsal origin behind ventral.
- e.¹ No additional series of photophores on sides of body.
- f.¹ Dorsal origin opposite or behind anal origin.
- g.¹ Premaxillary and maxillary with continuous series of long acute

included; teeth minute; dorsal origin before ventral which nearer
caudal base than snout tip ichthyococcus.

²
a. MAUROLICINAE. Photophores large and conspicuous; serial photophores on
body more or less distinctly divided into groups; pseudobranchiae present.

¹
1. ¹ Dorsal origin before anal origin.

¹
m. Serial photophores between ventral and anal continuous with
those above front part of anal; dorsal origin nearer snout
tip than caudal base; 16 lower gill rakers.

argyripnus.

²
m. Serial photophores between ventral and anal separated from
those above front part of anal fin; dorsal origin nearer
caudal base than snout tip; 27 lower gill rakers

maurolicus.

²
1. Dorsal origin opposite anal origin; photophores above and
behind anal arranged in 4 or 5 small groups, each group on
black background Valenciennellus.

Genus BONAPARTIA Goode and Bean

Bonapartia GOODE and BEAN, Oceanic Ichth., 1895, p.102. Type Bonapartia pedali-
liota GOODE and BEAN, monotypic. (Versus Bonapartia BUTTIKOFER June 1896
in birds.)

Zaphotias (GOODE and BEAN) JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47,
pt.3, 1898, p.2826. Type Bonapartia pedaliota GOODE and BEAN, orthotypic.

lead → Body oblong, compressed, tapering to rather long tail. Head moderate. ←
Snout short. Eye moderate. Mouth cleft wide. Both jaws with strong acute
teeth, regularly set, much smaller teeth in interspaces. Single series of

teeth, set at regular intervals, much smaller teeth in interspaces; second suborbital more or less enlarged; eye moderate; A. 22 to 31.

¹
h. Eye very large, $2 \frac{7}{8}$ in head Pseudomaurolicus.

²
h. Eye smaller, $4 \frac{1}{2}$ to 9 in head Gonostoma.

g. Premaxillary with few teeth; maxillary with series of small teeth, increasing backward, some more or less regular, little enlarged; second suborbital not enlarged; eye small; A. 16 to 20

Cyclothone.

²
f. Dorsal origin before anal origin.

¹
i. Dorsal origin little before anal origin which begins below middle of its hind part.

¹
j. A. 23 to 32 Yarella.

²
j. A. 14 to 15 Vinciguerria.

i. Dorsal origin well before anal origin, which begins some space behind

Phosichthys.

¹
e. An additional series of photophores along lateral line and sometimes 1 or more rows of luminous spots between these and 2 abdominal series; no adipose fin.

¹
k. Body moderately long; D. 10 to 16 or little nearer caudal base than snout tip; A. 26 to 39 Manducus.

²
k. Body very long; D. 9 to 11 or little nearer snout tip than caudal base; A. 55 to 63 Diplophos.

³
k. Body moderately long; D. 10, origin more than twice near snout tip than caudal base; A. 56 to 71 Triplophos.

²
d. Interorbital very narrow; eyes telescopic; mouth small, lower jaw

minute teeth on each palatine, somewhat enlarged anteriorly. Patch of similar teeth on pterygoid. Gill openings very wide. Gill rakers long, few. Scales large, cycloid. Single or ventral series of photophores each side of abdomen. Dorsal rays 19 or 20, origin postmedian. Anal rays 29 to 31, origin little before dorsal origin, anterior rays greatly prolonged. Paired fins small.

Bonapartia pedaliota Goode and Bean

Bonapartia pedaliota GOODE and BEAN, Oceanic Ichth., 1895, p. 102, pl.32, fig. 120. N. $25^{\circ} 20' 30''$ W. $79^{\circ} 58'$, 217 fathoms, Gulf Stream. - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt.1, 1896, p.580 (compiled). - # JESPERSEN and TAANING, Vidensk. Medd. Dansk. Nat. Foren. København, vol. 70, 1919, p.221, pl.17, figs. 7 - 8. - NORMAN; Discovery Rep., vol.2, 1930, p. 280, fig.6 (outline) (S. $1^{\circ} 11'$ E. $5^{\circ} 38'$, 300 meters).

Zaphotias pedaliotus JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.3, 1898, p.2826 (reference).

Zaphotias nudum BORODIN, Proc. New England Zool. Club, vol.11, Jan. 10, 1930, p.88. N. 33° W. 64° , 1200 meters.

Depth $3 \frac{2}{3}$ to $4 \frac{1}{4}$; head $3 \frac{1}{2}$ to $3 \frac{3}{4}$, width 3 to $3 \frac{1}{3}$. Snout 4 to 6 in head; eye $4 \frac{1}{4}$ to $4 \frac{2}{5}$, slightly greater than snout or interorbital; maxillary extends $1 \frac{2}{3}$ to $1 \frac{3}{4}$ eye diameters behind eye, length $1 \frac{1}{8}$ to $1 \frac{1}{5}$ in head; interorbital $3 \frac{2}{3}$ to $4 \frac{2}{5}$, low, little convex. Gill rakers 6 or 7 + 11, slender, lanceolate, subequal with eye; gill filaments $\frac{1}{2}$ of eye.

Scales (pockets) 46 in median lateral series to caudal base; 7 transversely at dorsal origin. Scales very caducous, all fallen.

Small preorbital photophore at lower front eye edge; 1 at upper angle of

preopercle; 1 on opercle below, behind hind maxillary end; photophore forward on mandible each side of symphysis; 11 or 12 branchiostegals; 4 before pectoral origin and 12 between pectoral and ventral origins; 5 between ventral and anal; 15 or 16 above anal; 2 to 4 on caudal, opposite, upper at bases of uppermost longest rays, lower on lower rudimentary caudal rays.

D. 19 or 20, longest front ray $1 \frac{2}{3}$ to $1 \frac{3}{4}$ in head; A. 30 or 31, longest front ray $2 \frac{1}{2}$ to $3 \frac{2}{5}$ in combined head and body to caudal base; caudal $1 \frac{1}{10}$ to $1 \frac{1}{8}$ in head, well forked; least depth of caudal peduncle $2 \frac{3}{4}$ to 3; pectoral 3; ventral $2 \frac{7}{8}$ to 3.

Pale brown, nearly uniform where skin worn away. Head silvery white, at least on opercles. Iris silvery white. Photophores of ventral series all in strip of black pigment. Fins uniform pale brown.

Gulf Stream, Gulf of Guinea.

44337 U.S.N.M. N. $25^{\circ} 20' 30''$ W. $79^{\circ} 58'$. In 217 fathoms.

Albatross Station 2642. Length 66 mm. Type. Goode and Bean state "The types of this species are two specimens, about one and two inches long respectively", but the other specimens found in the bottle with the type is an immature macrurid !

89911 U.S.N.M. N. 33° W. 64° Iselin Cruise No. 322. Museum of Comparative Zoology. Length 48 to 62 mm. 3 examples. Paratypes of Zaphotias nudum.

Genus MARGRETHIA Jespersen and Taaning

Margrethia JESPERSEN and TAANING, Vidensk. Medd. Dansk Nat. Foren. Kobenhavn, vol.70, 1919, p.222. Type Margrethia obtusirostra JESPERSEN and Taaning, monotypic.

Body elongate, rather deep. Head large. Snout obtuse. Eye large, far forward. Mouth large. Teeth very small. Interorbital moderately high. Photophores in nearly continuous ventral series. Dorsal origin very slightly postmedian. Anal origin but slightly behind dorsal origin, front rays not greatly elongated. Adipose fin present. Caudal forked. Paired fins small.

Margrethia obtusirostra Jespersen and Taaning

Margrethia obtusirostra JESPERSEN and TAANING, Vidensk. Medd. Dansk Nat. Foren.

Köbenhavn, vol.70, 1919, p.222, pl.17, figs 11 and 12. Station 1072, 300 meters; Station 1060, 300 meters; Atlantic Ocean. - NORMAN, Discovery Rep., vol.2, 1930, p.281 (compiled).

Depth $3 \frac{2}{5}$; head 3. Snout 6 in head; eye 3, greater than snout; maxillary extends $\frac{3}{5}$ an eye diameter behind eye, length $1 \frac{1}{4}$ in head. Gill rakers 5 + 10.

Three opercular photophores, uppermost level with lower eye edge, lowest opposite hind maxillary end, third spot posterior or in line with lowest and pectoral fin origin. Ventral series 12 branchiostegals, 14 or 15 from gill opening to ventral, 4 from ventral to vent, 13 above anal base and 4 on lower surface of caudal peduncle.

D. 16, fourth ray $1 \frac{9}{10}$ in total head length; A. 23 to 26, second ray $1 \frac{2}{3}$; caudal 1; least depth of caudal peduncle $2 \frac{2}{3}$; pectoral $2 \frac{1}{2}$; ventral 3.

Length 19 mm. without caudal. (Jespersen and Taaning.)

Atlantic.

Genus GONOSTOMA Rafinesque

Gonostoma Rafinesque, Indice Itt. Sicil., 1810, p.64. Type Gonostoma denudata

Rafinesque, monotypic.

Gonostomus COCCO, Nuov. Ann. Sci. Nat. Bologna, vol.2, 1838, p.163. Type Gonostoma denudata RAFINESQUE, virtually. Gnostomas COCCO variant spelling for Gonostoma RAFINESQUE.

Sigmops GILL, GILL, Proc. U.S.Nat. Mus., vol.6, 1883 (1884), p.256. Type Sigmops stigmaticus GILL, monotypic.

Neostoma FILHOL, La Nature, 1884, p.184. Type Neostoma bathyphilum Filhol, monotypic.

Body oblong, compressed. Head conic, much compressed, bones thin. Eye moderate. Mouth very wide. Premaxillary short, not extending far below level of eye. Maxillary much longer, forms nearly entire jaw edge. Jaws with single band of strong minute teeth, unequal, minute ones alternating with long pointed teeth. Band of minute teeth on each palatine and pterygoids, former with few conic ones in front. Second suborbital more or less enlarged. Gill opening very wide, outer branchial arch extends forward behind symphysis of lower jaw, with very few gill rakers. No pseudobranchiae. Branchiostegals 13 or 14. No air vessel. Scales subequal, present or absent. Photophores on lower parts of body, tail and branchiostegal membranes. Dorsal rays 11 to 17, postmedian, opposite or behind anal. Adipose fin small. Anal rays 22 to 31. Caudal forked. Paired fins well developed.

ANALYSIS OF SPECIES

- 1
a. SIGMOPS. Second suborbital enlarged; scales, if present, only on front and hind parts of body and in association of photophores.
- 1
b. Anal origin very little before dorsal origin; adipose fin present; D. 13

- ¹
c. Eye $6 \frac{1}{4}$ to $7 \frac{1}{4}$; A. 29 to 31; photophores conspicuous, in 2 longitudinal series close together near abdomen elongatum.
- ²
c. Eye $7 \frac{1}{2}$ to 9; A. 22 to 24; photophores very indistinct, upper series irregular and on side of body bathophilum.
- ²
b. Anal origin well before dorsal origin; D. 11 gracile.
- ^b
a. GONOSTOMA. Second suborbital greatly enlarged, covers entire cheek; vomer toothless; body completely scaled denudatum.

Gonostoma elongatum ["]Günther

Gonostoma elongatum ["]GÜNTHER, Ann. Mag. Nat. Hist., London, ser.5, vol.2, 1878, p. 187. South of New Guinea, 800 fathoms; Rep. Voy. Challenger, vol.22, 1887, p.173, pl.45, fig.B (type; off Banda, 360 fathoms). - WOOD, MASON and ALCOCK, Ann. Mag. Nat. Hist., London, ser.6, vol.8, 1891, p.127 (Investigator Station 107, 738 fathoms). - ALCOCK, Ann. Mag. Nat. Hist., London, ser. 6, vol.10, 1892, p.354 (Investigator Station 127, 1200 fathoms); Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.331 (reference). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee - Fische, 1906, p.75, pl.4, text fig.27 (N. $1^{\circ} 51'$ E. $0^{\circ} 31' 2''$, 2000 meters, Gulf of Guinea; N. $0^{\circ} 15' 2''$ E. $98^{\circ} 8' 8''$, 614 meters, west coast of Sumatra; N. $0^{\circ} 16' 5''$ E. $98^{\circ} 7' 5''$, 677 meters). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.17 (S. $8^{\circ} 0' 5''$ E. $118^{\circ} 34'$, 7, 2477 meters, Banda Sea). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.122, fig 45 (compiled). - NORMAN, Discovery Rep., vol.2, 1930, p.283 (S. $33^{\circ} 7' 40''$ E. $4^{\circ} 30' 20''$, 2000 meters; S. $33^{\circ} 50'$ to $34^{\circ} 13'$ E. $16^{\circ} 4'$ to $15^{\circ} 49'$, 850 to 950 meters; S. $35^{\circ} 14'$ E. $6^{\circ} 49'$, 850 to

to 950 meters; S. $1^{\circ} 11'$ E. $5^{\circ} 38'$, 300 meters; S. $2^{\circ} 43' 30''$
W. $56^{\circ} 30'$, 125 to 175 meters; S. $3^{\circ} 6' 30''$ W. $3^{\circ} 53'$, 125 meters).

Gonostoma elongata FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (compiled).

Cyclothone elongata GOODE and BEAN, Oceanic Ichth., 1895, p.101, pl.32, fig.
119 (type of Signops stigmaticus; N. 13° to 41° W. 66° to 81° , 435
to 2369 fathoms). - JORDAN and EVERMANN, Bull. U.S. Nat. Museum, No.47,
pt.1, 1896, p.583 (compiled). - ALCOCK, Cat. Deep Sea Fish. Indian Mus.,
1899, p.139 (Arabian Sea near Laccadive Islands, 738 to 1200 fathoms).

Neostoma elongata COLLETT, Bull. Soc. Zool. France, vol.21, 1896, p.96.

Signops stigmaticus GILL, Proc. U.S. Nat. Mus., vol.6, 1883 (1884), p.256.

N. $38^{\circ} 19' 26''$ W. $68^{\circ} 20' 20''$, 2361 fathoms.

Cyclothone rhodadenia GILBERT, Bull. U.S. Fish Comm., vol.23, pt.2, 1903 (1905),
p.602, pl.71, fig.1. Albatross Station 4108, 411 to 442 fathoms, Kaiwi
Channel; Albatross Station 4019, 409 to 550 fathoms, vicinity Kauai.

Gonostoma rhodadenia MURRAY and HJORT, Depths of the Ocean, 1912, p.612

(Gran Canaria to Fayal, Azores, 1235 to 3886 meters; N. $57^{\circ} 41'$ W. 11°
 $48'$, 1853 meters). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.18

(S. $2^{\circ} 37'$ E. $130^{\circ} 33'$, 41914 meters, Ceram Sea). - WEBER and
BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.121 (compiled).

- FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (compiled).

Gonostoma polyphos ZUGMAYER, Bull. Inst. Océanogr. Monaco, No. 193, January 20,

1911, p.4, N. $36^{\circ} 7'$ W. $10^{\circ} 18'$, 4740 meters; N. $36^{\circ} 6'$ W. 9° , 3660
meters, off Portugal. - ROULE, Res. Camp. Sci. Monaco, vol.52, 1919, p.27.

Depth $6 \frac{1}{5}$ to 7; head $4 \frac{1}{2}$ to $4 \frac{2}{3}$, width $2 \frac{4}{5}$ to $3 \frac{1}{5}$. Snout 5 to

5 1/2 in head from snout tip; eye 8 to 8 3/4, 1 1/8 to 1 4/5 in snout, 1 1/4 to 1 4/5 in interorbital; maxillary extends 2 4/5 to 4 3/4 eye diameters behind eye, expansion 1 to 1 1/2 in eye, length 1 1/5 to 1 1/4 in head from snout tip; interorbital 5 1/3 to 5 3/4, slightly convex. Gill rakers 8 + 11, slender, lanceolate, 1 1/5 times eye; gill filaments slightly less than gill rakers.

Scales all fallen.

Slender ovoid luminous organ below eye close above upper maxillary edge, less than eye; upper lateral series of photophores 8 or 9 between pectorals and ventrals, 4 between ventrals and anal, 1 opposite front of anal; between pectoral from above its base series of 12 rather large white luminous bodies of which but 4 behind ventral; lower or ventral series of photophores 4 before pectoral origin, then 11 to ventral origin, 5 between ventral and anal and 21 more to caudal base; 2 white luminous bodies at lower rudimentary caudal rays and 1 at upper.

D. III, 9, I to III, 11, I, first branched ray 1 2/5 (?) to 2 in total head length; adipose fin 4 1/2 to 7 4/5; A. III, 26, I to III, 29, I, first branched ray 1 1/2 to 2 1/5; caudal 1 1/3 to 1 3/5, well forked; least depth of caudal peduncle 4 1/8 to 6 1/2; pectoral 1 4/5 to 2 1/8; ventral 2 to 2 1/8.

Dark brown, usually with more or less dusky, nearly blackish on under surfaces. Iris neutral dusky. Fins pale brownish or whitish. When fresh body violaceous black.

Atlantic, Indian, Pacific Oceans.

5727.D. 5497. Bantigui Island, N. 64° W., 10 miles (N. 9° 7' 15" E. 124° 59' 30"), between Leyte and Mindanao. In 960 fathoms. August 3, 1909. Length 96 mm.

4317. D. 5671. Chenoki Point, S. 31° E., 42.5 miles (S. 1° 5'

E. 118 ' 56 '), Macassar Strait. In 960 fathoms. December 30, 1909.

Length 175 mm.

5788. D. 5231. Limasaua Island (S.), S. 68 ° E., 21.70 miles (N. 10 ° 1 ' 15 " E. 124 ° 43 ' 15 "), between Bohol and Leyte. May 7, 1908. Length 120 mm.

D. 5233. Limasaua Island (S.), S. 70 ° E., 19.50 miles (N. 10 ° 00 ' 32 " E. 124 ° 45 ' 6 "). May 7, 1908. Length 42 to 128 mm. 15 examples.

D. 5121. Malabrigo Light, N. 14 ° W., 9 miles (N. 13 ° 27 ' E. 121 ° 17 ' 45 "), east coast of Mindoro. In 108 fathoms. February 2, 1908.

Length 82 mm.

3872. D. 5618. March Island, S. 69 ° E., 7.8 miles (N. 0 ° 37 ' E. 127 ° 15 '), Molucca Passage. In 517 fathoms. November 27, 1909. Length 123 mm.

D. 5125. Nogas Island (W.), S. 11 ° E., 24 miles (N. 10 ° 48 ' E. 121 ° 48 ' 30 "), Sulu Sea, vicinity southern Panay. In 411 fathoms. February 3, 1908. Length 48 mm.

1474. D. 5488. San Ricardo Point (Panaon Island), S. 59 ° E., 9 miles (N. 10 ° E. 125 ° 6 ' 45 "), between Leyte and Mindanao. In 772 fathoms. July 31, 1909. Length 206 mm.

D. 5120. Sombrero Island, S. 79 ° 30 ' E., 19.2 miles (N. 13 ° 45 ' 30 " E. 120 ° 30 ' 15 "), Balayan Bay and Verde Island Passage. In 393 fathoms. January 21, 1908. Length 57 to 81 mm. 6 examples.

29069 U.S.N.M. N. 38 ° 29 ' W. 73 ° 21 ' . In 435 fathoms. October 10, 1881. Fish Hawk Station 1048. Length 170 mm.

33291 U.S.N.M. N. 38 ° 19 ' 26 " W. 68 ° 20 ' 20 " . In 2369 fathoms. July 28, 1883. Albatross Station 2039. Type of Signops stigmaticus. Length 90 mm.

35446 U.S.N.M. N. $39^{\circ} 44' 30''$ W. $70^{\circ} 10' 30''$. In 1222 fathoms.
Albatross Station 2193. Length 180 mm.

35465 U.S.N.M. N. $39^{\circ} 35'$ W. $69^{\circ} 44'$. In 1230 fathoms. Albatross
 Station 2196. Length 160 mm.

38174 U.S.N.M. N. $36^{\circ} 34'$ W. $73^{\circ} 48'$. October 24, 1886. In 1374
 fathoms. Albatross Station 2725. Length 157 mm.

39242 U.S.N.M. N. $36^{\circ} 52'$ W. $74^{\circ} 23'$. September 16, 1887. In
 958 fathoms. Albatross Station 2738. Length 182 mm.

44599 U.S.N.M. N. $36^{\circ} 52'$ W. $74^{\circ} 25'$. April 4, 1884. Albatross
 Station 2149. Length 156 mm.

44600 U.S.N.M. N. $40^{\circ} 3' 30''$ W. $67^{\circ} 27' 15''$. In 1149 fathoms.
 July 15, 1885. Albatross Station 2535. Length 160 mm.

44601 U.S.N.M. N. $38^{\circ} 24'$ W. $71^{\circ} 52'$. In 1569 fathoms. September
 19, 1886. Albatross Station. Length 183 mm.

51584 U.S.N.M. South coast of Molaki. Albatross Station 4108. In
 411 to 422 fathoms. April 1, 1902. Length 200 mm.

53060 U.S.N.M. N. $29^{\circ} 3' 15''$ W. $88^{\circ} 16'$. In 324 fathoms.
Albatross Station 2376. Length 78 mm.

83874 U.S.N.M. $35^{\circ} 54' 30''$ N. $131^{\circ} 45' 00''$ W. Oct. 15, 1891.
Albatross Station 2718. Length 30 to 178 mm. 15 examples. In poor pre-
 servation.

83875 U.S.N.M. N. $36^{\circ} 48' 15''$ W. $121^{\circ} 47' 34''$ W. Oct. 11, 1891.
 Length 75 to 160 mm. 2 examples.

85467 U.S.N.M. Gulf of Mexico, March 3, 1885. Albatross Station 2385.
 Length 165 mm.

89910 U.S.N.M. N. 33° W. 64° C.O.D. Iseln. 1929.

Station 322. Museum Comp. Zool. Length 250 mm.

91407 U.S.N.M. Albatross Station 20039. December 13, 1919. Length 195 mm.

Gonostoma bathyphilum (Vaillant)

Gonostoma bathyphilum VAILLANT, La Nature, 1884, p. 184, fig. Talisman dredgings in Eastern Atlantic.

Neostoma bathyphilum VAILLANT, Expéd. Sci. Travailleur et Talisman, Poiss., 1888, p.96, pl.8, fig. 1 - 1 a (Gulf of Gascony, 1420 meters).

Cyclothone bathyphila GOODE and BEAN, Oceanic Ichth., 1895, p.100, pl.31, fig. 118 (N. $38^{\circ} 47' 20''$ W. $72^{\circ} 37'$, 1091 fathoms; N. $17^{\circ} 36' 10''$ W. $76^{\circ} 46' 5''$, 966 fathoms; N. $46^{\circ} 1'$ W. $67^{\circ} 29' 15''$, 1234 fathoms; N. $39^{\circ} 35'$ W. $69^{\circ} 44'$, 1230 fathoms) . - JORDAN and EVERMANN, Bull. U.S.N. Mus., No.47, pt.1, 1896, p.582 (compiled).

Gonostoma bathyphilum BRAUER, Deutsch. Tiefsee Fische, 1906, p.73 (reference). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol. 35, 1911, p.49, pl.2, fig.1 (N. 32° to 44° W. 4° to 17° , 1968 to 5100 meters). - HOLT and BYRNE, Dep. Agricult. Tech. Instruct. Ireland Sci. Invest., No.1, 1913, p.11, figs. 3 and 4 (Irish Atlantic Slope, 602 to 750 fathoms). - ROULE, Rés. Camp. Sci. Monaco, vol.52, 1919, p.27 (off Cape Finisterre, 3500 meters; between Portugal and Azores, 2100 meters; off Azores, 2600 meters).

(?) Gonostoma brevidens (KNER) STEINDACHNER, Sitzs. Ber. Akad. Wiss. Wien, Math. - naturw. Klasse, vol.61, 1870, p.443. Atlantic Ocean. - GOODE and BEAN, Oceanic Ichth., 1895, p.98, pl.31, fig.117 (off Havana, 243 fathoms; off Bequia, 458 fathom). - ~~JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47,~~

off Granada, 161 to 461 fathoms; Old Bahama Channel, 500 fathoms; off Bequia, 458 fathom). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt. 1, 1896, p. 579 (copied).

Cyclothone grandis COLLETT, Bull. Soc. Zool. France, vol. 21, 1896, p. 99.

West of São Miguel, Azores, 4020 meters.

Gonostoma grande MURRAY and Hjort, Depths of the Ocean, 1912, p. 612 (Grand Canay to Fayal, Azores to Newfoundland, thence to Glasgow, thence to Bergen, 1000 to 3239 meters).

Gonostoma grandis BARNARD, Ann. South African Mus., vol. 21, June 1925, p. 143 (off Cape Point, 660 to 800 fathoms).

Depth 6 to $6 \frac{2}{3}$; head 4 to $4 \frac{1}{3}$, width $2 \frac{1}{2}$ to $3 \frac{1}{8}$. Snout $4 \frac{1}{5}$ to 5 in head from snout tip; eye 9 to $9 \frac{2}{5}$, 2 to $2 \frac{1}{3}$ in snout, 2 to $2 \frac{1}{5}$ in interorbital; maxillary extends 5 eye diameters behind eye, length $1 \frac{1}{8}$ to $1 \frac{1}{16}$ in head; interorbital $4 \frac{2}{5}$ to $4 \frac{1}{2}$, low, with median concave depression. Gill rakers 11 - 16, slender, lanceolate, $1 \frac{1}{2}$ times eye.

Scales (pockets) 35 in median lateral series to caudal base; 8 transversely. Scales all very caducous, most all fallen.

Small indistinct luminous body as narrow short whitish bar inclined and below eye; photophores indistinct, small, upper lateral series 15 or 16 from above pectoral till below front dorsal rays, 8 between pectoral and ventral, 3 between ventral and anal, then 20 to caudal base.

D. III, 10, I, first branched ray 2 to $2 \frac{2}{5}$ (?) in total head length; adipose fin $4 \frac{1}{2}$ to $4 \frac{2}{3}$; A. III, 20, I, first branched ray 3; caudal $1 \frac{9}{10}$, forked, least depth of caudal peduncle 5 to 6; pectoral $2 \frac{1}{3}$ to $2 \frac{3}{4}$ (?); ventral $2 \frac{2}{5}$ to $2 \frac{4}{5}$.

Brownish, skin largely dusky or dark brown, nearly blackish in best preserved material. Fins brown to dark brown.

Atlantic Ocean. The photophores are very indistinct and apparently not existant on most my specimens. Their location is usually made out with difficulty.

33368 U.S.N.M. N. $41^{\circ} 09' 40''$ W. $66^{\circ} 02' 20''$ Albatross

Station 2077. Length 160 mm.

35514 U.S.N.M. N. $39^{\circ} 35' 0''$ W. $69^{\circ} 44' 0''$. Albatross

Station 2196. Length 160 mm.

44325 U.S.N.M. N. $40^{\circ} 01' 00''$. W. $67^{\circ} 29' 15''$. Albatross

Station 2534. Length 150 mm.

44597 U.S.N.M. N. $17^{\circ} 36' 10''$. W. $76^{\circ} 46' 05''$. Albatross

Station 2140. Length 154 mm.

44598 U.S.N.M. N. $38^{\circ} 47' 20''$. W. $72^{\circ} 37' 00''$. Albatross

Station 2103. Length 140 mm.

83859 U.S.N.M. (no data) Albatross Station 2683. Length 123 mm.

83866 U.S.N.M. (no data) Albatross Station 2721. Length 153 mm.

84540 U.S.N.M. N. $38^{\circ} 29' 00''$. W. $71^{\circ} 13' 00''$. Albatross

Station 2717. Length 168 mm.

85465 U.S.N.M. (no data) Off Florida. Albatross Station 2638.

Length 60 mm. As Cyclothone microdon.

85466 U.S.N.M. Long Island, Albatross Station 2682. Length 128

to 165 mm.

Gonostoma gracile Gonostoma gracile Gunther

Gonostoma gracile ⁿ GUNTHER, Ann. Mag. Nat. Hist., ser.5, vol.2, 1878, p.187.

Sea of Japan, in 345 to 2425 fathoms; Rep. Voy. Challenger, vol.22, 1887, p.174, pl.45, fig.c (types). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.73 (reference). - NORMAN, Discovery Rep., vol.2, 1930, p.285 (types).

Cyclothone gracile GOODE and BEAN, Oceanic Ichth., 1895, p.101 (copied).

Neostoma gracile COLLETT, Bull. Soc. Zool. France, vol.21, 1896, p.96.

Depth $7 \frac{3}{4}$ to $8 \frac{1}{3}$; head $4 \frac{3}{5}$ to 5, width ~~3 to~~ 3 to $3 \frac{1}{5}$. Snout $4 \frac{3}{5}$ to 5 in head from snout tip; eye $4 \frac{1}{2}$ to 5, subequal with snout, slightly greater than interorbital in young to $1 \frac{1}{8}$ in interorbital in age; maxillary extends $2 \frac{3}{4}$ to $3 \frac{1}{3}$ in eye diameters behind eye, length $1 \frac{1}{8}$ to $1 \frac{1}{5}$ in head from snout tip; interorbital $4 \frac{1}{2}$ to $5 \frac{2}{3}$, low, depressed concavely medianly. Gill rakers 7 or 8 + 12, slender, lanceolate, long as eye; gill filaments $\frac{3}{5}$ gill rakers.

Luminous organ below eye center but slightly longer than pupil diameter, narrowly ovoid, directly above upper maxillary edge; upper lateral series of photophores 8 between pectorals and ventrals of which fifth and eighth well elevated equally high above general course of series, 3 between ventral and anal; lower or ventral series 5 before pectoral base then 10 to ventral, 5 between ventral and anal and then 15 to 22 to caudal base. Below each photophore of upper lateral series larger whitish luminous body as 7 or 8 between pectoral and ventral with 3 more behind ventral. Usually 2 luminous whitish bodies at lower rudimentary caudal rays.

D. III, 10, first branched ray $1 \frac{2}{5}$ to $1 \frac{1}{2}$ in total head length; no adipose fin; A. III, 26 to III, 28, first branched ray 2 to $2 \frac{3}{5}$; caudal $1 \frac{2}{5}$ to $1 \frac{3}{5}$, well forked, lobes slender, pointed and lower longer; least

depth of caudal peduncle subequal with eye; pectoral $1 \frac{4}{5}$ to 2 in total head length; ventral $2 \frac{2}{5}$ to $2 \frac{1}{2}$.

Generally blackish brown. Iris dark neutral gray. Fins whitish.

" Western Pacific. Known by its long slender tail and absence of adipose fin. Gunther had but two specimens, which are redescribed by Norman. Gunther's figure shows a long slender supracaudal luminous organ, not seen in any of my specimens. In Gunther's figure the caudal is shown as only shallowly emarginate whereas in all my specimens it is distinctively forked and the rudimentary rays are far more in evidence, at 10 may be seen in most of the specimens. Gunther's figure shows only the fourth or fifth photophore of the upper lateral series elevated whereas in all my examples the first one over the ventral base is equally high.

D. 5320. Ibugos Island (S. end) N. 81° W., 1.25 miles (N. 20° $19' 15''$ E. 121° $51' 20''$), China Sea, vicinity Formosa. In 46 fathoms. November 9, 1908. Length 64 to 125 mm. 19 examples.

51453 U.S.N.M. Siruga Bay, Japan. Albatross Station 3712. May 10, 1900. Length 50 mm.

Gonostoma denudatum Rafinesque

Gonostoma denudata RAFINESQUE, Indice Itt. Sicil., 1810, p.64. Sicily. -

BONAPARTE, Iconogr. Fauna Italica, Pesci, pt.1, 1841, fasc.27, no pagination, pl., fig.1 (Italy). - VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.376 (Messina). - Canestrini, Fauna Italica, Pesci, 1874, p.121 (Sicily). - MOREAU, Manuel Ich. France, 1892, p.541 (Mediterranean; Nice). Gonostoma denudatum JOHNSON, Ann. Mag. Nat. Hist., London, ser.3, vol.10, 1862, p.279 (Madeira). - GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.391 (Madeira, Sicily, Messina); Rep. Voy. Challenger, vol.22, 1887, p.172

(Mediterranean). - VAILLANT, Expéd. Sci. Travailleur et Talisman, Poiss., 1888, p.102 (Coasts of Morocco, 1180 meters; Cape Verde Islands, 460 to 580 meters). - CARUS, Prodr. Fauna Medit., vol.2, 1893, p.569 (compiled). - GOODE and BEAN, Oceanic Ichth., 1895, p.98, pl.31, fig.116 (copied) (off New England; Albatross Station 2665, 263 fathoms). - JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p.579 (compiled). - GRIFFINI, Ittiol. Italiana, 1903, p.258, fig.139 (Sicily; Messina). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.73, fig.26 (outline) (Messina). - MURRAY and HJORT, Depths of the Ocean 1912, p.612, fig.456 (outline) (N. 37 ° W. 29 °, 948 to 1235 fathoms, Gran Canaria to Fayal; N. 36 ° 52 ' W. 39 ° 55 ', Azores to Newfoundland). - SANZO, Mem. R. Com. Talass. Ital., No.9, 1912, p.1, figs. - JESPERSEN and TAANING, Rep. Danish Oceanogr. Exped. Medit., No.9, A.12, 1926, p.4, figs. 1 - 3 (Mediterranean; Messina; Bay of Cadiz). - NORMAN, Discovery Rep., vol.2, 1930, p.282 (S. 00 ° 56 ' W. 14 ° 8 ' 30 ", 250 meters; N. 4 ° 18 ' 15 " W. 16 ° 51 ', 2500 to 2700 meters; N. 8 ° 12 ' W. 18 ° 49 ', 450 to 500 meters).

Gasteropelecus acanturus Cocco, Giorn. Sci. Lett. Sicilia, vol.26, No.77, 1829, p.145. Messina.

Gasteropelecus acanthurus COCCO, Isis. vol.24, 1831, p.1342 (Messina).

Gonostomus acanthurus COCCO, Nuov. Ann. Sci. Nat. Bologna, vol.2, 1838, p.163.

Gonostoma denudatum subsp. atlanticum NORMAN, Discovery Rep., vol.2, 1930, p. 283. Eastern Atlantic.

Depth $5 \frac{3}{5}$ to $5 \frac{4}{5}$; head $3 \frac{3}{4}$ to 4, width $3 \frac{3}{5}$ to $3 \frac{2}{3}$. Snout 5 to

5 1/5 in head from snout tip; eye 5 2/5 to 6, 1 1/8 to 1 1/2 in snout, 1 1/5 in interorbital; maxillary extends 2 3/4 to 3 eye diameters behind eye, length 1 1/5 to 1 1/4 in head from snout tip; interorbital 5 1/2 to 6, convex. Gill rakers 5 + 10, slender, lanceolate, equal eye; gill filaments 1 1/2 in eye.

Scales 30 in median lateral series; 6 transversely, 18 predorsal. Scales cycloid, large, partly adherent; striae as 1 perfect and 1 to 4 imperfect, radiating and basal; circuli very fine.

Single small preorbital photophore close to lower front eye edge; upper above pectoral base to ventral, then 5 back until above front of lateral series 10 from above front of anal fin; lower or ventral series 4 before pectoral origin, then 12 to ventral, 4 to anal and 19 to caudal base. Two whitish luminous bodies at lower rudimentary caudal rays.

D. III, 10, I or III, 11, I, first branched ray 1 2/5 to 1 4/5 in total head length; A. III, 25, I, first branched ray 1 4/5 to 2; caudal 1 1/5, damaged; least depth of caudal peduncle 4 to 4 1/4; pectoral 1 1/2 to 1 2/3; ventral 2 to 2 1/5.

Pale brown generally. Scales silvery white, with iridescent shades. Iris silvery gray or whitish. Fins pale.

Atlantic Ocean.

28419 U.S.N.M. Messina. Italian Commission. Length 125 mm.

40059 U.S.N.M. Messina. Royal Zool. Mus. Florence. Length 75 to 130 mm. 3 examples.

44582 U.S.N.M. N 29 ° 47 ' . W. 80 ° 05 ' 45. Albatross Station
2665. Length 57 mm.

Genus CYCLOTHONE Goode and Bean

Cyclothone GOODE and BEAN, Bull. Mus. Comp. Zool., vol.10, 1883, p.221.

Type Cyclothone lusca GOODE and BEAN, monotypic.

Neostoma FILHOL, La Nature, 1884, p.184. Type Neostoma bathyphilum FILHOL, monotypic.

Body elongate, somewhat compressed. Head conic, compressed. Eye very small, much smaller than snout. Mouth cleft very wide, lower jaw projecting. Premaxillary small and long slender sickle-shaped maxillary more or less dilated posteriorly. Teeth numerous, needle like, larger posteriorly, sometimes few short fangs anteriorly in mandible. Teeth present on palatines and pterygoids, present or absent on vomer. Second suborbital not enlarged. Gill opening very large. Gill membranes free from isthmus. Gill rakers numerous, long, bristle like. No pseudobranchiae. Branchiostegals 12 to 14, short. Scales absent or large, very thin and deciduous, often only as faint markings on skin. Two opercular photophores. An incomplete lateral series of small photophores and ventral series complete. Dorsal rays 13 to 15, postmedian. Adipose fin present or absent. Anal rays 16 to 20, postmedian, opposite dorsal. Caudal forked. Pectoral in lower half of body height. Ventrals slightly premedian.

ANALYSIS OF SPECIES

- 1
a. Ground color pale or whitish; gill rakers less than 20 (13 to 19);
 lateral photophores 6 or 7.
- 1
b. Gill rakers 3 + 11 or 12 signata.
- 2
b. Gill rakers 3 or 4 + 13 to 16 braueri.
- 2
a. Ground color dark brown or dusky; gill rakers 20 to 23.
- 1
c. Photophores present.

- 1
d. Posterior upper teeth little inclined, with larger ones interspersed;
 lateral photophores 7 + 0 livida.
- 2
d. Posterior upper teeth well inclined with larger ones interspersed;
 lateral photophores 7 + 0, 7 + 1, 7 + 2, 7 + 3.
- 1
e. No canines in front of jaws.
- 1
f. Uniform brownish black.
- 1
g. Size larger; oceanic. microdon.
- 2
g. Size small; Mediterranean pygmaea.
- 2
f. Whitish or unpigmented median area before dorsal and anal
pallida.
- 2
e. Three pairs of lower front canines canina.
- 3
d. Posterior upper teeth well inclined, uniformly large.
- 1
h. Lateral photophores 7 + 2 acclinidens.
- 2
h. Lateral photophores 6 + 2 atraria.
- 2
c. No photophores; blackish obscura.

Cyclothone signata Garman

Cyclothone signata GARMAN, Mem. Mus. Comp. Zool., vol.26, 1899, p.246, pl.J,
 fig.3. N. 6° 21' W. 80° 41', 1763 fathoms, Gulf of Panama. - NORMAN,
 Discovery Rep., vol.2, 1930, p.286 (reference).

Depth 5 3/4; head 4. Snout 6 in head from snout tip; eye 14 1/2, 2 4/5
 in snout; maxillary extends 10 eye diameters behind eye, length 1 1/8 in
 head from snout tip; maxillary teeth shorter, more numerous and more erect
 than in Cyclothone acclinidens, interorbital low.

Ventral series of photophores 1 before pectoral origin, 13 between pectoral
 and ventral, 4 between ventral and anal, 16 between anal origin and caudal

bas^e.

D. 12, origin midway between middle of postocular and caudal base; A. 21; pectoral 2; ventral $1 \frac{2}{3}$.

White. Eyes and photophores black with silver facings. Belly blackish. Transverse streak across bases of caudal rays. (Garman.)

Cyclothone alba (Brauer)

Cyclothone signata alba BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-fische, 1906, p.80, text fig.30. West Africa from Canaries to Cape Colony; between New Amsterdam and Sumatra; Bay of Bengal; between Ceylon and Chagos; between Chagos and Zanzibar; north east coast of Africa and Gulf of Aden; 520 meters. - HJORT, Depths of the Ocean, 1912, p. 612 (Gibraltar to Gran Canaria, thence to Fayal, Azores to Newfoundland, thence to Glasgow, thence to Bergen, 1013 to 1770 meters). - PAPPENHEIM, Deutsch. Sudpolar Exped., vol.15, pt.2, 1914, p.177 (N. $5^{\circ} 27'$ W. $21^{\circ} 41'$, 800 meters). - NORMAN, Discovery Rep., vol.2, 1930, p. 287 (reference)

Cyclothone signata (not GARMAN) BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-fische, 1906, p.78 (between New Amsterdam and Sumatra; between Ceylon and Chagos Archipelago; thence to Zanzibar; south of Sokotra; 800 to 2500 meters. - WEBER, Siboga Exped., vol.57, Fische, 1913, p.19 (Bali Sea, Macassar Strait, Manipa Strait, Banda and Tawi Tawi Seas, 421 to 2081 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.125 (above material).

Depth $6 \frac{1}{5}$; head $4 \frac{2}{5}$. Snout 5 in head from snout tip; eye $10 \frac{1}{2}$, 2 in snout; maxillary extends $5 \frac{2}{3}$ eye diameters behind eye, length $1 \frac{1}{5}$ in head from snout tip; teeth erect, with little larger ones interspersed at

intervals.

Two opercular photophores, upper level with lower eye edge, lower level with pectoral fin origin. Lateral series 6 between gill opening and ventral. Ventral series 3 before pectoral, 10 between pectoral and ventral, 4 between ventral and anal, 12 between anal origin and caudal.

D. II, 12, origin midway between gill opening and caudal base, first branched ray $1 \frac{1}{4}$ in total head; A. II, 17, first branched ray $1 \frac{2}{3}$; caudal $1 \frac{1}{8}$; least depth of caudal peduncle $3 \frac{1}{3}$; pectoral $1 \frac{1}{3}$; ventral 2. (Brauer.)

Atlantic and Indian Oceans.

Cyclothone braueri Jespersen and Taaning

Cyclothone braueri JESPERSEN and TAANING, Rep. Danish Oceanogr. Exped. Medit., No.9, vol.2, A. 12, 1926, pp.7, 52, figs.4 to 8. Off Spain, Portugal and Mediterranean. - NORMAN, Discovery Rep., vol.2, 1930, p.287 (S. $34^{\circ} 5' 15''$ E. $16^{\circ} 00' 45''$, 1000 meters; N. $29^{\circ} 26'$ W. $15^{\circ} 7'$, 900 meters).

Cyclothone signata (not GARMAN) BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol. 15, Tiefsee-fische, 1906, p.78, pl.6, fig.6, text figs.28 and 29 (Eastern Atlantic from Canaries to Cape Colony, 600 to 3000 meters; between Chile and Cape Horn). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.45 (N. 35° to 46° W. 2° to 19° , 850 to 5700 meters). - MURRAY and HJORT, Depths of the Ocean 1912, p.612 (Plymouth to Gibraltar, thence to Gran Canaria, thence to Cape Bojor, Azores to Newfoundland, thence to Glasgow, thence to Bergen, 456 to 4700 meters). - PAPPENHEIM, Deutsch. Sudpolar, vol.59, 1919, p.28 (south east of

Exped., vol.15, pt.2, 1914, p.177 (N $0^{\circ} 46'$ W. $18^{\circ} 59'$, 3000 meters; N. $5^{\circ} 27'$ W. $21^{\circ} 41'$, 1500 meters; N. $17^{\circ} 28'$ W. $29^{\circ} 42'$, 3000 meters; S. $14^{\circ} 3'$ W. $19^{\circ} 10'$, 1900 meters; S. $26^{\circ} 59'$ W. $17^{\circ} 6'$, 1390 meters; S. $35^{\circ} 10'$ E. $2^{\circ} 33'$, 3000 meters; S. $8^{\circ} 43'$ W. $11^{\circ} 55'$, 3000 meters). - ROULE, Res. Camp. Sci. Monaco, vol.52, 1919, p.28 (south east of Pico, Azores, 1748 meters.

Depth $5 \frac{2}{5}$; head $4 \frac{1}{8}$. Snout 5 in head from snout tip; eye $10 \frac{1}{4}$, $2 \frac{1}{4}$ in snout; maxillary reaches 7 eye diameters behind eye, length $1 \frac{1}{4}$ in head from snout tip; teeth enlarged posteriorly, subequal, but little inclined.

Two opercular photophores, upper in slightly inclined line from lower eye edge and pectoral origin, lower level with lower pectoral fin edge basally. Lateral series 7 between gill opening and ventral. Ventral series 3 before pectoral, 10 between pectoral and ventral, 4 between ventral and anal, 13 between anal origin and caudal base.

D. II,12, origin midway between middle of postocular region and caudal base, first branched ray $1 \frac{1}{3}$ in total head; A. II, 17, first branched ray $1 \frac{2}{5}$; caudal $1 \frac{1}{5}$; least depth of caudal peduncle $3 \frac{1}{2}$; pectoral $1 \frac{3}{4}$; ventral $2 \frac{1}{4}$.

Whitish, more or less speckled with black, arranged as Y on top of head. Small black spots on cheek and upper surfaces. Lateral row of spots becoming median on tail, row of opposite dorsal and anal bases and 2 vertical bars at caudal base. Length 28 mm. (Brauer.)

Atlantic, Mediterranean and Caribbean Seas.

Cyclothone livida Brauer

Cyclothone livida BRAUER, Zool. Anzeiger, vol.25, 1902, p.279. Atlantic Ocean; Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-fische, 1906, p.80, pl.6, fig.5, text fig.31 (between Canary Islands and Great Fish Bay between N. 25 ° and S. 17 °, Gulf of Guinea; 1200 to 3000 meters). - HJORT, Depths of the Ocean, 1912, p.612 (N. 28 ° 52 ' W. 14 ° 16 ', 2170 meters; N. 27 ° 27 ' W. 14 ° 52 ', 2603 meters). - PAPPENHEIM, Deutsch. Sudpolär Exped., vol.15, pt.2, 1914, p.177 (S. 35 ° 10 ' E. 2 ° 33 ', 3000 meters; S. 28 ° 54 ' W. 8 ° 5 ', 3000 meters; N. 5 ° 27 ' W. 21 ° 41 ', 500 meters; N. 17 ° 28 ' W. 29 ° 42 ', 3000 meters). - NORMAN, Discovery Rep., vol.2, 1930, p. 287 (S. 00 ° 46 ' E. 5 ° 49 ' 15 ", 850 to 950 meters; N. 13 ° 1 ' 45 " W. 21 ° 34 ' 45 ", 900 to 1200 meters; N. 13 ° 25 ' W. 18 ° 22 ', 900 meters; N. 6 ° 55 ' W. 15 ° 54 ', 800 meters).

Depth 6; head 4. Snout 5 in head from snout tip; eye 16, 3 in snout; maxillary reaches 9 eye diameters behind eye, length 1 1/5 in head from snout tip; teeth enlarged posteriorly in upper jaw, scarcely inclined, with some little enlarged interspersed at intervals.

Two opercular photophores, upper level with middle of eye, lower level with bases of infero-median pectoral rays. Lateral series 7 between gill opening and ventral, 1 over ventral base. Ventral series 3 before pectoral, 10 between pectoral and ventral, 5 between ventral and anal, 14 between anal origin and caudal, luminous whitish area along rudimentary caudal rays.

D. II,12, origin midway between last third of postocular and caudal base,

first branched ray $1 \frac{7}{8}$ in total head length; A. II,15, first branched ray $1 \frac{4}{5}$; caudal $1 \frac{1}{4}$; least depth of caudal peduncle $3 \frac{4}{5}$, long, slender; pectoral $1 \frac{3}{4}$; ventral $2 \frac{2}{3}$.

Blue black. Length 39 mm. (Brauer.)

North and South Atlantic.

Cyclothone microdon (Gunther)

Gonostoma microdon GÜNTHER, Ann. Mag. Nat. Hist., ser.5, vol.2, 1878, p.187.

Atlantic and Pacific Oceans, in 500 to 2900 fathoms; Rep. Voy. Challenger, vol.22, 1887, p.175 (types; South Pacific; Kermadec Islands; Mid-Pacific; off New South Wales; Antarctic Ocean; north of New Guinea; Amboina; western Pacific; south of Japan; south of Yeddo; in 450 to 2900 fathoms) . - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.331 (off Andamans, in 265 to 485 fathoms); Ann. Mag. Nat. Hist., ser.6, vol.4, 1898, p.399 (Bay of Bengal and Andaman Sea, in 265 to 485 fathoms). - WAITE, Records Canterbury Mus., vol.1, No.1, Ap.25, 1907, p.10 (reference).

Gonostoma (Cyclothone) microdon Lütken, Kon. Danske Vidensk. Sels. Skrift.

Köbenhavn, vol.7, ser.6, 1892, p.280 (Baffins Bay).

Cyclothone microdon LÜTKEN, Kon. Danske Vidensk. Sels. Skrift. Köbenhavn, vol.7, ser.6, 1892, pl.2, figs.4 - 5. - GILBERT, Rep. U.S. Fish Comm., pt.19, 1893 (1895), p.402 (southwest of Pribilof Islands, 1033 and 1625 fathoms). - GOODE and BEAN, Oceanic Ichth., 1895, p.99, pl.30, fig.114. (Atlantic materials). - COLLETT, Bull. Soc. Zool. France, vol.21, 1896, p.130 (). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus. No.47, pt.1, 1896, p.582 (copied). - ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p.141

(Bay of Bengal off Andaman Islands, in 485 fathoms; Andaman Sea, in 265 fathoms). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-fische, 1906, p.82, text fig.32, pl.6, fig.4 (between Canaries, West Africa and Cape Colony, between New Amsterdam and Sumatra, between Maldives and Chagos Islands; 900 to 1500 meters). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.43 (N. 28° to 44° W. 0° to 40° , 1000 to 5000 meters). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612 (Plymouth to Gibraltar, thence to Gran Canaria, thence to Bojador, Gran Canaria to Fayal, Azores to Newfoundland, thence to Glasgow, thence to Bergen, 856 to 2753 meters). - WAITE, Records Canterbury Mus., vol.1, No.4, Dec.28, 1912, p.317 (reference). - HOLT and BYRNE, Dep. Agric. Techn. Instruct. Ireland, Sci. Invest., No.2, 1913, p.12, fig.5 (Irish Atlantic Slope, 300 to 1150 fathoms). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.18 (Celebes Sea, Molucca Passage, Halmahera Sea, Manipa Strait, Banda, Timor, Flores Sea, 421 to 2291 meters). - WEBER and BEAUFORT, Fishes Indo - Austral. Archipelago, vol.2, 1913, p.126, fig.46 (above localities). - PAPPENHEIM, Deutsch. Südpolar Exped., vol.15, pt.2, 1914, p.178 (S. $26^{\circ} 59'$ W. $17^{\circ} 6'$, 1340 meters; S. $35^{\circ} 10'$ E. $2^{\circ} 33'$, 3000 meters; S. $24^{\circ} 55'$ W. $1^{\circ} 18'$, 1500 meters; S. $7^{\circ} 53'$ W. $14^{\circ} 27'$, 3000 meters; N. $17^{\circ} 28'$ W. $29^{\circ} 42'$, 3000 meters). - REGAN, Brit. Antarctic Terra Nova Exped., Zool., vol.1, No.4, 1916, p.137, pl.5, fig.5 (6 miles off Rio Janeiro, 2 meters; S. $35^{\circ} 29'$ W. $50^{\circ} 26'$, 2 meters). - ROULE, Rés. Camp. Sci. Monaco, vol.52, 1919, p.27 (off Azores, 2600 to 3250 meters; Gulf of Gascony, 1700 meters; Cape Fisinterre, 3500 meters; between Portugal and Azores, 2100 meters). - VAILLANT,

Rés. Camp. Sci. Monaco, vol.52, 1919, p.130 (N. 37° to 43° W. 6° to 15° , 468 to 2170 fathoms). - NORMAN, Discovery Rep., vol.2, 1930, p.287 (S. 32° to 60° W. 1° to 53° or E. 4° to 16° , 500 to 3500 meters).

Cyclothone lusea GOODE and BEAN, Bull. Mus. Comp. Zool., vol.10, 1882, p.221.

N. 31° to 34° W. 74° to 76° , 457 to 1632 fathoms.

Neostoma quadrioculatum VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss.,

1888, p.99, pl.8, figs. 2 a - c. Gulf of Gascony, coasts of Portugal, Morocco, Canaries, Banc d'Arguin, Cape Verde, Azores, North Atlantic, 950 to 4415 meters.

Depth 7 to $7 \frac{7}{8}$; head $3 \frac{7}{8}$ to $4 \frac{2}{3}$, width 3 to $3 \frac{1}{8}$. Snout $4 \frac{3}{7}$ to 7 in head from snout tip; eye $7 \frac{1}{4}$ to 10, $1 \frac{1}{4}$ to $2 \frac{1}{4}$ in snout, 2 in interorbital; maxillary extends 4 to 6 eye diameters behind eye, length $1 \frac{1}{10}$ to $1 \frac{1}{5}$ in head from snout tip; interorbital 6 to 7, level. Gill rakers 8 or 9 + 15, slender, about equal snout combined with half of eye; gill filaments equal eye.

Scales absent.

Small photophore below lower front of eye; upper lateral series with 7 between pectoral and ventral and 1 behind ventral base; lower or ventral series 13 before ventrals, 5 between ventral and anal and 14 or 15 to caudal base.

D. II, 12, fin height $1 \frac{1}{3}$ to $1 \frac{3}{5}$ in total head length; A. II, 17 or 18, fin height $1 \frac{2}{5}$ to $1 \frac{3}{5}$; caudal $1 \frac{1}{5}$ to $1 \frac{1}{4}$, emarginate; least depth of caudal peduncle $3 \frac{3}{4}$ to $4 \frac{1}{8}$; pectoral $1 \frac{3}{5}$ to $1 \frac{3}{4}$; ventral $1 \frac{3}{5}$ to 2.

Rather dark or umber brown generally. Abdomen neutral black. At dorsal

base on back 11 short vertical blackish bars and 12 to 14 at anal base on under surface of tail. Fins pale to whitish.

Atlantic, Indian, Pacific, Arctic and Antarctic Oceans.

D. 4671 Palominos Light House, S. 89° E., 71 miles (S. $12^{\circ} 7'$ W. $78^{\circ} 28'$), Peru, in 1490 fathoms. Albatross Eastern Pacific Expedition. November 20, 1904. Length 30 to 53 mm. 14 examples.

D. 4673. Palominos Light House, N. 57° E., 40 miles (S. $12^{\circ} 30'$ W. $77^{\circ} 49' 30''$). In 458 fathoms. Albatross Eastern Pacific Expedition. November 21, 1904. Length 20 to 32 mm. 4 examples.

D. 4675. Palominos Light House, N. 60° E. 89 miles (S. $12^{\circ} 54'$ W. $78^{\circ} 33'$). In 3120 fathoms. Albatross Eastern Pacific Expedition. November 22, 1904. Length 33 to 40 mm. 3 examples.

30286 U.S.N.M. Off Martha's Vineyard. U.S.F.C. Travel wings. Loc. 1029. Length 33 to 39 mm. 2 examples. As Chauliodus sloanii.

39222 U.S.N.M. N. $38^{\circ} 31' 00''$. W. $72^{\circ} 53' 00''$ Albatross Station 2743. Length 42 to 57 mm. 7 examples.

D. 5320. China Sea, vicinity of Formosa, N. $20^{\circ} 58'$ E. $120^{\circ} 3'$. In 1804 fathoms. November 6, 1908. Length 28 to 56 mm. 3 examples.

D. 5437. Hermana Mayor Light, N. 69° E., 4.9 miles (N. $15^{\circ} 45'$ E. $119^{\circ} 42' 45''$), west of Luzon. May 8, 1909. Length 13 to 55 mm. 83 examples.

D. 5227. Point Origen. S. 44° E., 18.30 miles (N. $12^{\circ} 53' 45''$ E. $121^{\circ} 52' 30''$), east of Mindoro. In 322 fathoms. May 5, 1908. Length 12 to 37 mm. 33 examples.

D. 4657. S. $7^{\circ} 12' 30''$ W. $84^{\circ} 9'$. November 13, 1904. Albatross Eastern Pacific Expedition. In 300 fathoms. Length 31 to 54 mm. 6 examples.

39254. U.S.N.M. N. $39^{\circ} 27' 00''$. W. $71^{\circ} 15' 00''$. Albatross
Station 2747. Length 35 to 61 mm. 6 examples.

44338. U.S.N.M. N. $28^{\circ} 43'$. W. $87^{\circ} 14' 30''$. Albatross
Station 2393. Length 51 to 56 mm. 3 examples

44339. U.S.N.M. N. $40^{\circ} 03'$. W. $07^{\circ} 27' 15''$. Albatross
Station 2535. Length 42 to 59 mm. 11 examples.

48613. U.S.N.M. N. $56^{\circ} 12' 00''$. 1, 625 fathoms. Albatross
Station 3308. Length 56 mm. 4 examples (with 51453 U.S.N.M.). Suruga
Bay, Japan. Albatross Station. Length 22 to 30 mm.

83855. U.S.N.M. Albatross Station 2653. Length 53 to 58 mm. 3
examples.

The following all as Cyclothone bathyphila:

38188. U.S.N.M. N. $37^{\circ} 27'$. W. $73^{\circ} 02' 00''$. Albatross Station
2732. Length 48 to 64 mm. 7 examples.

53053. U.S.N.M. N. $39^{\circ} 35' 00''$. W. $71^{\circ} 02' 30''$. 1, 137 fathoms.
Albatross Station 2685. Length 52 mm.

8 examples (with 83859 U.S.N.M.). Albatross Station 2683. Length
37 to 57 mm.

45 examples (with 83866 U.S.N.M.). Albatross Station 2721. Length
45 mm.

85460 U.S.N.M. Gulf of Mexico. Albatross Station 2394. Length 35
mm.

85461 U.S.N.M. N. $37^{\circ} 26'$. W. $73^{\circ} 43'$. Albatross Station 2733.
Length 51 to 57 mm. 2 examples.

85462 U.S.N.M. N. $32^{\circ} 32' 30''$. W. $77^{\circ} 15' 00''$. Albatross
Station 2675. Length 23 to 57 mm. 7 examples.

- 85463 U.S.N.M. N. $38^{\circ} 24'$ W. $71^{\circ} 13'$. Albatross Station
2717. Length 50 to 66 mm. 11 examples.
- 85464 U.S.N.M. M. $40^{\circ} 01'$ W. $67^{\circ} 29' 15''$. Albatross Station
2534. Length 50 to 61 mm. 2 examples.
- 85459 U.S.N.M. Off Bahamas. Albatross Station 2056. Length 30
to 65 mm. 5 examples.
- 85469 U.S.N.M. Lesser Antilles. Albatross Station 2751. Length
47 to 50 mm. 2 examples.

The following as Cylcothone lusca:

- 28885 U.S.N.M. N. $39^{\circ} 40'$ W. $71^{\circ} 30'$. Length 46 mm.
- 29833 U.S.N.M. N. $39^{\circ} 52' 30''$ W. $70^{\circ} 17' 30''$. In 724 fath-
oms. August 23, 1881. U.S.F. Comm. 953. Length 32 to 55 mm. 9 examples.
- 32666 U.S.N.M. N. $37^{\circ} 16' 30''$ W. $74^{\circ} 26' 36''$. March 23,
1883. Albatross Station haul 3. Length 37 to 50 mm. 4 examples.
- 33292 U.S.N.M. N. $38^{\circ} 19' 26''$ W. $68^{\circ} 20' 20''$. In 2369
fathoms. Albatross Station 2039. Length 20 (?) to 48 mm. 4 examples.
Very poorly preserved.
- 33474 U.S.N.M. N. $40^{\circ} 26' 40''$ W. $67^{\circ} 5' 15''$. In 959 fathoms.
Albatross Station 2083. September 5, 1883. Length 48 to 63 mm. 6 ex-
amples.
- 33504 U.S.N.M. N. $39^{\circ} 44' 30''$ W. $71^{\circ} 4'$. In 1022 fathoms.
September 21, 1883. Albatross Station 2094. Length 54 to 61 mm.
3 examples.
- 33508 U.S.N.M. N. $39^{\circ} 42' 50''$ W. $71^{\circ} 1' 20''$. Albatross
Station 2093. Length 44 mm.
- 33549 U.S.N.M. N. $37^{\circ} 12' 20''$ W. $69^{\circ} 39'$. In 2949 fathoms.
October 2, 1883. Albatross Station 2099. Length 27 to 58 mm. 19 examples.

35452. U.S.N.M. N. $39^{\circ} 54' 30''$. W. $70^{\circ} 71' 08''$. In 1800 fathoms. Albatross Station 2190. Length 35 to 47 mm. 4 examples.

35608 U.S.N.M. N. $39^{\circ} 34' 45''$. W. $29^{\circ} 71' 21' 30''$. Albatross Station 2209. Length 39 to 54 mm. 2 examples.

35619 U.S.N.M. N. $39^{\circ} 34' 15''$. W. $71^{\circ} 45' 15''$. Albatross Station 2203. Length 21 to 55 mm. 11 examples. Very poorly preserved.

43423 U.S.N.M. N. $00^{\circ} 30'$. W. $88^{\circ} 37' 30''$. Albatross Station 2806. Length 40 to 44 mm. 3 examples.

43628 U.S.N.M. N. 42° . W. 50° . Albatross Station 2428. Length 50 to 60 mm. 5 examples. N. $42^{\circ} 48'$. W. $50^{\circ} 55' 30''$.

42068 U.S.N.M. Mus. Hist. Nat. Paris 83 + 60. Length 28 mm. As Neostoma quadrioculata.

Cyclothone pygmaea Jespersen and Taaning

Cyclothone microdon var. pygmaea JESPERSEN and TAANING, Rep. Danish Oceanogr. Exped. Medit., No.9, vol.2, A. 12, 1926, pp.7, 54, figs.5 to 7, 9. Off Spain and Portugal and in Mediterranean.

Cyclothone microdon pygmaea NORMAN, Discovery Rep., vol.2, 1930, p.288 (reference).

Cyclothone microdon (not GÜNTHER) BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol. 15, Tiefsee-Fische, 1906, p.82 (part). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.43 (part).

Depth $6 \frac{1}{5}$; head 4, Snout 6 in head from snout tip; eye 14, 2 in snout; maxillary extends about 7 eye diameters behind eye, length $1 \frac{1}{5}$ in head from snout tip; upper teeth but slightly enlarged posteriorly, little inclined, some rather well or more enlarged at intervals.

Two opercular photophores, upper level with lower eyeedge, lower opposite pectoral base. Lateral photophores 7 between gill opening and ventral and 1 or 2 more over latter fin; ventral series 8 to 10 on branchiostegals, 3 before pectoral, 10 between pectoral and ventral, 4 or 5 between ventral and anal. 14 or 15 between anal and caudal.

D. 13 or 14, fin origin nearly midway between middle of postocular and caudal base; A. 18 or 19; pectoral rays 9 or 10; ventral rays 6. Length less than 27 mm. without caudal. (Jespersen and Taaning.)

Mediterranean and neighboring Atlantic. A dwarfed form of Cyclothone microdon.

Cyclothone pallida Brauer

Cyclothone pallida BRAUER, Zool. Anzeiger, vol.25, 1902, p.281. Atlantic and Indian Oceans. - PAPPENHEIM, Deutsch. Sudpolar Exped., vol.15, pt.2, 1914, p.179 (S. 14° 3' W. 19° 10', 1900 meters; S. 16° 54' W. 19° 47', 1000 meters; S. 19° 1' W. 20°, 800 meters; S. 26° 59' W. 17° 6', 1340 meters; S. 32° 8' W. 8° 28', 1000 meters; S. 35° 10' E. 2° 33', 3000 meters; S. 24° 55' W. 1° 18', 1500 meters; S. 8° 43' W. 11° 55', 3000 meters; S. 7° 53' W. 14° 27', 3000 meters; N. 0° 46' W. 18° 59', 3000 meters; N. 5° 27' W. 21° 41', 1500 meters; N. 17° 28' W. 29° 42', 3000 meters; N. 28° 42' W. 34° 33', 3000 meters).

Cyclothone microdon pallida BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-fische, 1906, p.84, pl.6, fig.2, text fig.33 (dentition) (Cape Verde Islands, Gulf of Guinea, off Southwest Africa, Bengal Bay, between Chagos and Seychelles, off northeast Africa, north of New Amsterdam,

northwest of Chagos; 250 to 1000 meters). - HJORT, Depths of the Ocean, 1912, p.612 (Gibraltar to Gran canaria, thence to Cape Bojador, Gran Canaria to Fayal, Azores to Newfoundland, thence to Glasgow, thence to Bergen, 547 to 2753 meters). - NORMAN, Discovery, Rep., vol.2, 1930, p.288 (reference).

Cyclothone microdon var. pallida ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.44, pl.2, fig.3 (N. $26^{\circ} 37'$ W. $36^{\circ} 35'$, 4800 meters).

Depth $6 \frac{1}{2}$; head 4. Snout $5 \frac{1}{8}$ in head from snout tip; eye 12, $2 \frac{2}{3}$ in snout; maxillary extends 7 eye diameters beyond eye, length $1 \frac{1}{5}$ in head from snout tip; upper teeth enlarged posteriorly, well inclined and with larger teeth at intervals; interorbital low.

Scales 27 in lateral series medially.

Two opercular photophores, upper level with middle of eye, lower little above level of pectoral origin. Lateral photophores 7 between gill opening and ventral and 1 over ventral; ventral series 3 before pectoral, 10 between pectoral and ventral, 5 between ventral and anal, 15 between anal origin and caudal.

D. II, 12, fin origin midway between middle of postocular and caudal base, first branched ray $1 \frac{5}{6}$ in total head length; A. II, 16, first branched ray $1 \frac{7}{8}$; caudal $1 \frac{2}{5}$; least depth of caudal peduncle $4 \frac{1}{4}$; pectoral $1 \frac{9}{10}$; ventral $2 \frac{1}{3}$.

Dark brown. ^Pale or whitish area, unpigmented, before dorsal and anal. Length (not given). (Brauer.)

Atlantic and Indian Oceans.

(1903 (1905), p. 604, pl. 71, fig. 2)

Cyclothone canina Gilbert

Cyclothone canina GILBERT, Bull. U.S. Fish Comm., vol.23, pt.2, Off Kauai, in 480 to 570 fathoms; Kauai, in 368 to 1021 fathoms; Kauai Channel, in 449 to 460 fathoms; between Oahu and Kauai, in 743 to 1218 fathoms; Bird Island, in 636 to 850 fathoms; Niihau Island, in 417 to 426 fathoms. - FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (Hawaiian materials). - NORMAN, Discovery Rep., vol.2, 1930, p.288 (reference).

Depth $6 \frac{1}{3}$ to 7; head 4 to $4 \frac{1}{2}$, width $2 \frac{2}{3}$ to 3. Snout 5 to $5 \frac{2}{5}$ in head from snout tip; eye 9 to 10, $1 \frac{3}{4}$ to 2 in snout, 2 to $2 \frac{1}{2}$ in interorbital; maxillary extends 6 to $7 \frac{3}{4}$ eye diameters behind eye, length $1 \frac{1}{10}$ to $1 \frac{1}{8}$ in head from snout tip; interorbital $5 \frac{3}{4}$, nearly level. Gill rakers 9 + 16, finely lanceolate, 3 times eye; gill filaments long as eye.

Preocular photophore low, with short vertical black bar posteriorly; 2 preoperculars, 1 below lower preopercular angle and other of level of middle of sides; branchiostegals 10 or 11; upper lateral series of 7 to 10, sometimes discontinued before ventral, sometimes reach of opposite vent, all small like lower series and without special glands of convoluted tubes; lower or ventral series 13 between isthmus and ventrals; 5 between ventrals and anal; 15 or 16 from front of anal to caudal base.

D. III, 10 or 11, first branched ray $1 \frac{1}{4}$ to $1 \frac{1}{2}$ (?) in total head length; A. III, 15, I or III, 16, I, first branched ray $1 \frac{2}{5}$ (?) to $1 \frac{7}{8}$; caudal 2 (?), forked; least depth of caudal peduncle 5; pectoral $1 \frac{3}{4}$ to 2; ventral $2 \frac{1}{2}$ to $2 \frac{3}{4}$.

Dark brown above and on sides. Black on abdomen and sides of head. Iris slate gray. Basal portion of each dorsal and anal ray black, also series of short dusky to blackish bars from base of each fin ray. Fins whitish.

Hawaiian Islands.

- 51538, U.S.N.M. Hawaii. Albatross Station. Length 25 to 60 mm.
10 examples.
- 51539, U.S.N.M. Near Kauai Id. Albatross Station 4005. Length 21 to
60 mm. 5 examples.
- 51540, U.S.N.M. Between Oahu and Kauai Ids. 368 to 1, 021 fathoms.
Length 27 to 57 mm. 2 examples.
- 51541, U.S.N.M. Near Kauai Id. 804 to 724 fathoms. Albatross
Station 4026. Length 28 to 43 mm. 2 examples.
- 51542, U.S.N.M. Near Kauai Id. 462 to 417 fathoms. Albatross
Station 4018. Length 36 to 45 mm. 2 examples.
- 51543, U.S.N.M. Near Niihau Id. 636 to 414 fathoms. Albatross
Station 4180. Length 40 (?) mm.
51544. U.S.N.M. Near Kauai Id. 577 to 480 fathoms. Albatross
Station 3981. Length 58 mm.
51545. U.S.N.M. Near Kauai. Albatross Station 4005. June 17,
1904. Length 68 mm. Type.

Cyclothone acclinidens GARMAN

Cyclothone acclinidens GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.247,
pl.J., fig.4. S. Lat. 0° to N. Lat. 36°, W. Long. 78° to 138°, in
1122 fathoms and surface to 2413 fathoms. - BRAUER, Deutsch. Tiefsee Exped.
Waldivia, vol.15, Tiefsee-Fische, 1906, p.85, text figs.34 a - c, pl. 6,
fig.1 (between Canaries and Cape Colony, Antarctic Sea, between New Amster-
dam and Sumatra, between Ceylon and Chagos Archipelago, between Chagos
Archipelago and Zanzibar, north east coast of Africa, Gulf of Aden, to

520 meters). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.19 (Molucca Passage, Halmahera Sea, Manipa Strait, Banda and Timor Seas, in 1000 to 2050 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.127 (above materials). - TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist. New York, vol.52, art.1, May 16, 1925, p.11 (southwest of Santa Barbara Islands, California, to off Pt. San Bartholome, Lower California, 28° to 33° Lat., 451 to 1076 fathoms). - NORMAN, Discovery Rep., vol.2, 1930, p.288 (reference). - PARR, Bull. Bingham Oceanogr. Collection, vol.2, art.4, Oct.1931, p.11 (N. $22^{\circ} 50' 20''$ W. $109^{\circ} 48' 45''$, 525 fathoms).

Depth 7 to $7 \frac{1}{4}$; head $3 \frac{7}{8}$ to 4, width $2 \frac{7}{8}$ to $3 \frac{1}{8}$. Snout $5 \frac{3}{4}$ to $6 \frac{1}{3}$ in head from snout tip; eye 9 to 10, $1 \frac{1}{2}$ to 2 in snout, 2 to $2 \frac{1}{2}$ in interorbital; maxillary $1 \frac{1}{8}$ in head from snout tip; interorbital $4 \frac{1}{2}$ to 6, slightly convex. Gill rakers 7 + 13 or 14, slender, equal snout; gill filaments $\frac{3}{4}$ gill rakers.

Scales (pockets) 27 in median lateral series to caudal base; 5 transverse-ly. Scales all fallen.

Small ant/orbital photophore; 1 at first third in postorbital space; 10 branchiostegals; ventral or lower series with 14 before ventrals, 4 between ventral and anal, 15 to caudal.

D. 12, damaged, origin opposite anal origin; A. 18 (?), damaged; caudal forked; least depth of caudal peduncle $4 \frac{1}{3}$ in total head; pectoral $2 \frac{1}{2}$; ventral $2 \frac{1}{8}$.

Pale brown, scale pockets deeper brown. Belly and under surface of abdomen dusky or blackish brown. Iris gray. Fins pale brown.

Atlantic, Indian and Pacific Oceans.

D. 5320. N. $20^{\circ} 58'$ E. $120^{\circ} 3'$, China Sea vicinity of Formosa.

In 1804 fathoms. November 6, 1908. Length 53 mm.

57889 U.S.N.M. 50 miles south east of Guaymas. 1890 - 91. Albatross Station. Mus. Comp. Zool. Length 38 to 44 mm. 3 examples.

87562 U.S.N.M. 1911. Albatross Station. Townsend Expéd. Length 47 mm.

Cyclothone atraria Gilbert

Cyclothone atraria Gilbert: Bull. U.S. Fish Comm., vol. 23, pt. 2, 1903 (1905),

p. 605, pl. 72, fig. 2. Off Kauai, in 508 to 703 fathoms. - FOWLER, Mem.

Bishop Mus., vol. 10, 1928, p. 34 (type). - NORMAN, Discovery Rep., vol. 2, 1930, p. 288 (reference).

Depth $6 \frac{2}{3}$; head 4, width 3. Snout $7 \frac{1}{4}$ in head from snout tip; eye 11, $1 \frac{1}{2}$ in snout, 2 in interorbital; maxillary reaches 7 eye diameters behind eye, length $1 \frac{2}{5}$ in head from snout tip; interorbital $5 \frac{1}{5}$, level. Gill rakers $7 + 13$, finely lanceolate, equal $1 \frac{2}{3}$ times eye diameter; gill filaments equal eye.

Scales 28 in median lateral series; 5 transversely, 15 or 16 predorsal. Scales all very caducous, all fallen and pockets damaged.

One preocular photophore; 2 preoperculars; 6 branchiostegals; upper lateral series 8; lower lateral series 13 between isthmus and ventrals, 3 anterior crowded; 5 between ventral and anal or last nearly opposite first anal ray; 15 from front of anal to caudal base.

D. III, 10, fin height $2 \frac{1}{2}$ in total head length; A. III, 15, first

branched ray 2; caudal $1 \frac{7}{8}$ (?), damaged, forked; least depth of caudal peduncle $4 \frac{3}{4}$; pectoral $2 \frac{1}{4}$; ventral $2 \frac{1}{2}$.

Uniform black on head and body, fins apparently similar. Where skin torn away pale brownish.

Hawaiian Islands.

52055 U.S.N.M. Albatross Station 4187. Length 55 mm., caudal broken.

Type.

Cyclothone obscura Brauer

Cyclothone obscura BRAUER, Zool. Anzeiger, vol.25, 1902, p.280. Atlantic and Indian Oceans; Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefseefische, 1906, p.88, text fig.35 (teeth), pl.6, fig.3 (West Africa between Cape Verde and Cape Colony; between Cocos Island and Sumatra; Bay of Bengal; between Ceylon and Chagos Archipelago; between Chagos Archipelago and Seychelles; south of Sokotra). - NORMAN, Discovery Rep., vol.2, 1930, p. 2,288 (N. $5^{\circ} 30'$ W. $17^{\circ} 45'$, 2500 to 2700 meters).

Depth 7; head 4. Snout $6 \frac{1}{5}$ in head from snout tip; eye $14 \frac{1}{2}$, $2 \frac{1}{4}$ in snout; maxillary extends $9 \frac{1}{2}$ eye diameters behind eye, length $1 \frac{2}{7}$ in head from snout tip; teeth above enlarged posteriorly, oblique, with large ones at intervals; interorbital low.

Scales 30 in median lateral series, 8 rows transversely between dorsal and anal.

No photophores.

D. III, 11, first branched ray $1 \frac{3}{5}$ in total head length, fin origin midway between last half of postocular region and caudal base; A. II, 18, first branched ray $1 \frac{3}{4}$ in total head length; caudal $1 \frac{1}{6}$; least depth of caudal peduncle $3 \frac{2}{3}$; Pectoral $1 \frac{4}{5}$; ventral $2 \frac{1}{5}$. Brownish black

or black. Length 55 mm. (Brauer.)

North and South Atlantic.

Genus YARRELLA Goode and Bean

Yarrella GOODE and BEAN, Oceanic Ichth., 1895, p.103. Type Yarrella blackfordi

GOODE and BEAN, monotypic. Polymetme MC CULLOCH, Biolog. Results Endeavour, vol.5, pt.4, June 8, 1926, p.166. Type Polymetme illustris MC CULLOCH, orthotypic.

Body elongate, compressed. Head pointed, compressed. Snout rather long. Eye moderate, little advanced. Mouth cleft wide, lower jaw protruding. Pre-maxillary and dentary teeth biserial, maxillary uniserial, interspersed with larger or stronger ones. Head of vomer with short fang either side. Row of short weak teeth on palatines. Gill opening very wide, gill membranes free from isthmus. Gill rakers rather short. No pseudobranchiae.

Branchiostegals 14. No air bladder. Whole body covered with large, thin deciduous scales. Photophore prominent. Dorsal little postmedian, begins before anal. Anal long basally. Adipose fin present. Caudal forked. Pectoral low. Ventral premedian.

Yarrella blackfordi Goode and Bean

Yarrella blackfordi GOODE and BEAN, Oceanic Ichth., 1895, p.103, pl.32, fig.

121. N. 29° 03' 15" W. 88° 16', 324 fathoms. - JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No.47, pt.1, 1896, p.584 (copied); pt.4, 1900, pl.93, fig.249 (copied). - JESPERSEN and TAANING, Vidensk. Medd. Dansk naturh. Foren. Köbenhavn, vol.70, 1919, p.223, pl.17, fig.13. - NORMAN, Discovery Rep., vol.27, 1930, p.288, fig.7 (S. 9° 38' E. 12° 42' 30",

118 meters; S. $5^{\circ} 54'$ E. $11^{\circ} 19'$, 110 meters).

Diplophos corythaeolum ALCOCK, Ann. Mag. Nat. Hist., London, ser.7, vol.2, 1898, p.147. Andaman Sea, 185 to 405 fathoms; Illustrat. Zool. Investigator, Fishes, pt.6, 1899, pl.25, fig.3.

Photichthys corythaeolus ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p.142 (types).

Yarella corythaeola NORMAN, Discovery Rep., vol.2, 1930, p.289 (type; paratype of Polymetme illustris).

Yarella africana GILCHRIST and VON BONDE, Fisher. Marine Biol. Survey South Africa, Rep. No.3, 1922 (1924), No.7, p.8, off South Africa, 201 to 240 fathoms. - BARNARD, Ann. South African Mus., vol.21, June 1925, p.148 (Natal coast, 201 to 240 fathoms).

Yarella africana GILCHRIST and VON BONDE, Fisher. Marine Biol. Survey South Africa, Rep. No.3, 1922 (1924), No.7, pl.1, fig.2.

Polymetme illustris MC CULLOCH, Biolog. Results Endeavour, vol.5, pt.4, June 8, 1926, p.167, pl.45, fig.1. Great Australian Bight south from Eucla, 350 to 450 fathoms; Great Australian Bight, E. $127^{\circ} 40'$, south west of 200 fathoms; Gabo Island, Victoria, 200 fathoms. Eucla,

Depth $6 \frac{1}{8}$ to $7 \frac{2}{5}$; head $4 \frac{1}{3}$, width $3 \frac{1}{10}$ to $3 \frac{2}{5}$. Snout $3 \frac{2}{5}$ to $3 \frac{3}{4}$ in head from snout tip; eye $4 \frac{1}{8}$ to $7 \frac{1}{5}$, $1 \frac{1}{5}$ to 2 in snout, 1 to $1 \frac{3}{4}$ in interorbital; maxillary extends $2 \frac{1}{5}$ to $2 \frac{2}{5}$ eye diameters behind eye, expansion equals interorbital, length $1 \frac{1}{3}$ to $1 \frac{2}{5}$ in head from snout tip; interorbital 4 to $4 \frac{3}{4}$, low, slightly depressed medianly. Gill rakers 6 + 13, slender, lanceolate, equal eye; gill filaments $1 \frac{1}{2}$ in eye.

Scales very caducous, all fallen.

Rather large photophore below front eye edge; upper lateral row of photophores 13 or 14 between pectoral and ventral, 10 between ventral and anal; lower or ventral series 25 from mandible symphysis and ventrals of which 11 on isthmus and before pectoral, 12 from ventral to vent, 24 to 26 from vent caudal.

D. III, 12, I, third branched ray $2 \frac{1}{3}$ in total head; A. III, 24 or III, 27, first branched ray $2 \frac{3}{4}$; least depth of caudal peduncle $3 \frac{1}{2}$; caudal $1 \frac{7}{8}$, emarginate; pectoral $3 \frac{2}{5}$; ventral $5 \frac{1}{2}$ (?).

Brownish generally or where skin removed. General color originally evidently purplish brown.

Atlantic, Indian and Pacific Oceans. I am inclined to identify Diplophos corythaeolum Alcock with this species as the details given by Norman do not seem to hold. Obviously my Pacific materials correspond more nearly with his Atlantic specimens 28 to 50 mm. representing Yarrella blackfordi. His 2 Indo. Pacific specimens are given as 103 to 130 mm. with 22 to 24 photophores between anal origin and caudal base, while for Y. blackfordi they are given as 20 or 21.

D. 5387. Bagatao Island Light (outer), S. 80° E. 27 miles (N. $12^{\circ} 54' 40''$ E. $123^{\circ} 20' 30''$), between Burias and Luzon. In 209 fathoms. March 11, 1909. Length 41 to 47 mm. 3 examples.

D. 5563. Dammi Island (N.) N. 79° W., 6.1 miles (N. $5^{\circ} 48' 12''$ E. $120^{\circ} 30' 48''$), between Jolo and Tawi Tawi. In 224 fathoms. September 21, 1909. Length 38 to 48 mm. 4 examples.

D. 5564. Dammi Island (N.), S. 85° W., 6.1 miles (N. $5^{\circ} 50'$ E. $120^{\circ} 31'$). In 236 fathoms. September 21, 1909. Length 40 mm.

D. 5267. Matocot Point, S. 39° E., 5.50 miles (N. $13^{\circ} 42' 20''$ E. $120^{\circ} 58' 25''$), Verde Island Passage and Batangas Bay. In 170 fathoms. June 8, 1908. Length 41 mm.

D. 5270. Escarceo Light, S. 9° E., 4.25 miles (N. $13^{\circ} 35' 45''$ E. $120^{\circ} 58' 30''$). In 235 fathoms. June 8, 1908. Length 16 to 36 mm. 33 examples.

D. 5548. Jolo Light (Jolo), N. 77° E., 14.9 miles (N. $6^{\circ} 00' 20''$ E. $120^{\circ} 45' 35''$), Jolo. In 232 fathoms. September 17, 1909. Length 51 mm.

D. 5458. Legaspi Light, S. 84° W., 14 miles (N. $13^{\circ} 10' 54''$ E. $123^{\circ} 59' 38''$), east coast Luzon. In 200 fathoms. June 8, 1909. Length 19 to 27 mm. 6 examples.

D. 5288. Matocot Point, Luzon, S. 20° E., 5.70 miles (N. $13^{\circ} 43' 30''$ E. 121°) China Sea, vicinity southern Luzon. In 140 fathoms. July 22, 1908. Length 16 to 50 mm. 18 examples.

D. 5231. Limasaua Island (S.), S. 68° E., 21.70 miles (N. $10^{\circ} 1' 15''$ E. $124^{\circ} 43' 15''$), between Bohol and Leyte. May 7, 1908. Length 16 to 34 mm. 3 examples. Anal photophores 15 to 19.

D. 5211. Panalangan Point, Talajit Island, N. 33° E., 5.25 miles (N. $11^{\circ} 51' 35''$ E. $124^{\circ} 14'$), east of Masbate Island. In 155 fathoms. April 17, 1908. Length 15 to 44 mm. 33 examples.

D. 5190. Pescador Island, S. 9° E., 10.70 miles (N. $10^{\circ} 8' 15''$ E. $123^{\circ} 16' 45''$), Tanon Strait east coast of Negros. In 295 fathoms. April 1, 1908. Length 16 to 50 mm. 81 examples.

D. 5457. Legaspi Light, S. 60° W., 5 miles (N. $13^{\circ} 12'$ E. 123°

49' 40"), east coast Luzon. In 146 fathoms. June 8, 1909. Length 37 mm.

P. 16071 (55 mm.)

44242 U.S.N.M. N. 29° 3' 15" W. 88° 16'. In 324 fathoms. Albatross Station 2376. Type 222 mm. and 2 paratypes 181 to 228 mm.

44588 U.S.N.M. N. 11° 43' W. 69° 9' 30". February 18, 1884. In 208 fathoms. Albatross Station 2125. Length 66 mm.

47618 U.S.N.M. Off Granada. In 161 fathoms. Blake Station XLIV. Length 34 mm. (See Science May 22 - 23, 1885). As Gonostoma brevidens.

Genus VINCIGUERRIA Goode and Bean

Vinciguerria (JORDAN and EVERMANN) GOODE and BEAN, Oceanic Ichth., 1895, p. 513. Type Maurolicus attenuatus COCCO, monotypic.

(?) Poweria BONAPARTE, Iconogr. Fauna Italica, vol.3, Pesci pt.1, fasc.27, 1840. Type Maurolicus attenuatus COCCO, monotypic virtually, (under Ichthyococcus poweriae).

Zalarges (JORDAN and WILLIAMS) JORDAN and STARKS, Proc. Cal. Acad. Sci., ser.2, vol.5, 1895, p.793. Type Zalarges nimbarius (JORDAN and WILLIAMS) JORDAN and STARKS, monotypic.

Body elongate. Head conic, depressed. Snout pointed. Eye large. Mouth cleft wide, bordered by premaxillary and maxillary. latter ventrally curved and reaches little behind eye. Lower jaw enclosed within maxillaries, symphyseal and posterior inferior angle prominent, protruding. Single row of small, unequal teeth in jaws, slightly increasing in size backwards. Vomer and pterygoids with teeth. Row of 4 or 5 teeth on palatines. Gill membranes

not joined, free from isthmus. Gill rakers well developed. Scales thin, cycloid. Besides those on head 2 rows of conspicuous photophores, ventral extending from isthmus to caudal and subventral from opercle till over vent. Dorsal rather short, nearly median. Anal origin below middle or hind part of dorsal. Short adipose fin, behind anal. Caudal forked. Paired fins low, ventral behind dorsal.

ANALYSIS OF SPECIES

- 1
a. ZALARGES. Pair of photophores at mandibular symphysis; D. 14 or 15;
 A. 13 to 15.
- 1
b. Lateral photophores 13 + 11 or 12 (= 24 or 25).
- 1
c. Lower gill rakers 13 or 14. sanzoi
- 2
c. Lower gill rakers 17 nimbarius.
- 1
b. Lateral photophores 11 or 12 - 10 or 11 (= 21 or 22).
- 1
d. D. 10; A. 10 raoulensis.
- 2
d. D. 13 or 14; A. 14 to 16 lucetia.
- 2
a. VINCIGUERRIA. No mandibular symphyseal photophores.
- 1
e. Length of row of photophores from anal origin to caudal base shorter than head; 12 (11) lower gill rakers poweriae.
- 2
e. Length of row of photophores from anal origin to caudal base less than head; 14 lower gill rakers attenuatus.

Vinciguerria sanzoi Jespersen and Taaning

Vinciguerria sanzoi JESPERSEN and TAANING, Vidensk. Medd. Dansk naturh. Foren.

København, vol.70, 1919, p.218, pl.17. Atlantic Ocean; Rep. Danish

Oceanogr. Exped. ^Medit., No.9, vol.2, A. 12, 1926, p.22, figs. 14 - 17

(Atlantic). - NORMAN, Discovery Rep., vol.2, 1930, p.292 (N. $5^{\circ} 30'$ 30" W. $17^{\circ} 45'$, 2500 to 2700 meters; N. $12^{\circ} 8'$ W. $20^{\circ} 53' 30''$, 200 to 300 meters).

Vinciguerria lucetia (not GARMAN) BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.5, Tiefsee-fische, 1906, p.97 (part).

Depth $5 \frac{1}{10}$; head $3 \frac{2}{5}$. Snout 4 in head from snout tip; eye $2 \frac{7}{8}$, slightly exceeds snout; maxillary extends $\frac{1}{5}$ eye diameter behind eye, length $1 \frac{1}{2}$ in head from snout tip; teeth rather large, slender, smaller ones intermixed; interorbital very low. Gill rakers 5 or 6 + 13 or 14.

Antorbital photophore before lower front eye edge; postocular close to lower hind eye edge; 3 operculars, upper level with eye center, 2 lower close with posterior slightly elevated, or anterior nearly to quite level with pectoral fin origin; 1 each side of mandible tip. Lateral photophores 13 between pectoral and ventral, 11 or 12 between ventral and anal. Ventral series 7 on isthmus and 16 more to ventral (of which 3 exposed before pectoral), 9 to 11 between ventral and anal, 12 to 14 between anal origin and caudal.

D. 14 or 15, fin height $2 \frac{1}{5}$ in total head length; adipose fin $1 \frac{1}{2}$ in eye; A. 13 to 15, fin height $3 \frac{2}{5}$ in total head; caudal $1 \frac{4}{5}$; least depth of caudal peduncle $3 \frac{3}{4}$; pectoral $1 \frac{3}{4}$; ventral $2 \frac{1}{2}$.

Length 26.7 mm. without caudal. (Jespersen and Tanning.)

Atlantic.

Vinciguerria nimbarius (Jordan and Starks)

Zalarges nimbarius (JORDAN and WILLIAMS) JORDAN and STARKS, Proc. California Acad. Sci., ser.2, vol.5, 1895, p.793. Northeast of Hawaii. - GILBERT,

Mem. Mus. Comp. Zool., vol.26, 1908, p.237 (note).

Vinciguerria nimbarius NORMAN, Discovery Rep., vol.2, 1930, p.292 (compiled).

Vinciguerria attenuata (not COCCO) FOWLER, Mem. Bishop Mus., vol.10, 1928, p. 34 (part).

Depth $5 \frac{3}{4}$; head $4 \frac{1}{4}$. Snout 4 in head from snout tip; eye $3 \frac{1}{8}$, greater than snout; maxillary extends $\frac{1}{2}$ eye diameter behind eye, expansion $2 \frac{1}{5}$ in eye, length $1 \frac{1}{2}$ in head from snout tip; teeth uniserial, slender, sharp, some slender canines; row of small teeth on palatine, none on vomer or tongue; interorbital low. Gill rakers $5 + 17$, $\frac{1}{2}$ of eye.

Antorbital photophore low, before eye; 1 postorbital close to lower hind eye edge; 2 opercular, follow end of maxillary; 1 at each side of mandibular tip. Lateral series 13 between pectoral and ventral, 11 between ventral and anal. Ventral series 10 on isthmus, 13 between pectoral and ventral, 10 between ventral and anal, 15 from anal origin to caudal of which 8 above anal base.

D. II, 12, I (9 description), first branched ray 2 in total head length; no adipose fin; A. I, 12 (15 description), first branched ray 2 to $2 \frac{1}{3}$; caudal $1 \frac{1}{10}$; least depth of caudal peduncle $3 \frac{3}{4}$; pectoral $1 \frac{2}{3}$; ventral $2 \frac{1}{4}$.

Back brown, sides burnished with silvery. Silvery oblique Y shaped area on cheeks. Fins with dark dots, form obscure bars across caudal. Dark specks on back of caudal peduncle and across base. Length 59 mm. (Jordan and Starks.)

Pacific.

Vinciguerria raoulensis (Waite)

Gonostoma raoulensis WAITE, Trans New Zealand Inst., vol.42, 1909 (1910),

p.373, pl.35, fig.1. Kermadec Islands.

Vinciguerria raoulensis MC CULLOCH, Records Austral. Mus., vol.14, 1923, p.115 (type). - NORMAN, Discovery Rep., vol.2, 1930, p.292 (compiled).

Depth 5; head 4. Snout $3 \frac{3}{4}$ in head; eye 3, greater than snout; maxillary extends half an eye diameter beyond eye, length $1 \frac{2}{5}$ in head; teeth unequal, canine like in jaws; palatines toothed, none on vomer; interorbital low, 5 in head. Gill rakers 5 + 13, long, slender. Scales 38 in median lateral series, 9 transversely.

Antorbital photophore little below middle of front eye edge; at side of mandible medially; ^{1 above} maxillary end close below hind lower eye edge; upper opercular level with upper pupil edge, 2 lower level, behind end of maxillary. Upper or lateral photophores 12 between pectoral and ventral, 11 between ventral and anal. Ventral series 8 on isthmus, 16 to ventral, 10 to anal, 14 from anal to caudal, less regular behind anal.

D. 10, fin height $2 \frac{1}{10}$ in head, origin postmedian, adipose fin $1 \frac{1}{3}$ in eye; A. 10, fin height $2 \frac{1}{2}$ in head, origin below last dorsal rays; caudal $1 \frac{2}{5}$ in head; least depth of caudal peduncle $3 \frac{1}{4}$; pectoral $1 \frac{3}{4}$; ventral $2 \frac{1}{4}$.

Sides silvery, upper edge dark brown far as hinder insertion of dorsal. Dots behind adipose fin, also at bases of caudal peduncle. Upper part of head spotted. Fins colorless. Length 41 mm. (Waite.)

Kermadec Island.

Vinciguerria lucetia (Garman)

Maurolicus lucetius GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.242, pl.J,

fig.2. N. 0° to 21° W. 82° to 106° , 100 to 1832 fathoms, off west coast of Central America and Mexico.

Vinciguerria lucetia BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.5, Tiefseefische, 1906, p.97 (374), fig.40 (Gulf of Guinea; between New Amsterdam and Sumatra; Bay of Bengal; between Ceylon and Chagos; between Chagos and Zanzibar; 800 to 2500 meters). - GILBERT, Mem. Mus. Comp. Zool., vol. 26, No.6, 1908, p.237 (near Marquesas Islands). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.56 (not figure) (N. 28° to 43° W. 7° to 16° , 520 to 4800 meters). - HJORT, Depths of the Ocean, 1912, 612, fig.457 (Gibraltar to Gran Canaria, thence to Cape Bojador, Gran Canaria to Fayal, Azores to Newfoundland, thence to Glasgow, 141 to 3886 meters). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.21 (Molucca Passage, 1500 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.119, fig.44 (Molucca material). - PAPPENHEIM, Deutsch. Sudpolar. Exped., vol.15, pt.2, 1914, p.181 (S. $0^{\circ} 6'$ to $35^{\circ} 10'$ W. $18^{\circ} 18'$ to E. $2^{\circ} 33'$, 300 to 1330 meters; N. 0° to 28° W. 16° to 34° , 10 to 3000 meters). - REGAN, Brit. Antarctic Terra Nova Exped., Zool., vol.1, No.4, 1916, p.137, pl.5, figs. 6 - 7 (S. 21° W. $37^{\circ} 50'$; S. 18° W. $31^{\circ} 45'$; N. $27^{\circ} 22'$ W. $33^{\circ} 40'$). - NORMAN, Discovery Rep., vol.2, 1930, p.292 (compiled). - PARR, Bull. Bingham Oceanogr. Collection, vol.2, art.4, Oct.1931, p.11 (N. 11° to 24° W. 89° to 108° , 100 to 625 fathoms).

Vinciguerria attenuata (not COCCO) FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (Cape Martin, Nukuhiva, Marquesas Islands).

Depth $4 \frac{1}{3}$ to 5; head $3 \frac{1}{4}$ to $3 \frac{2}{5}$, width $2 \frac{3}{5}$ to $2 \frac{3}{4}$. Snout $3 \frac{1}{2}$ to 4 in head from snout tip; eye 3 to $3 \frac{1}{3}$, equals or greater than snout,

greater than interorbital; maxillary extends $1/5$ to $2/5$ eye diameter behind eye, length $1\ 1/3$ to $1\ 1/2$ in head from snout tip; interorbital 4 to $4\ 1/5$, nearly level. Gill rakers 5 + 12 (?), finely lanceolate, little over half of eye; gill filaments subequal with gill rakers.

One preocular photophores, little below middle of front eye edge; 1 on cheek below hind eye edge, though but little below lower eye edge; 2 operculars at same level, slightly above origin of pectoral fin; upper lateral series 11 between pectoral and ventral, 11 between ventral and front of anal; lower or ventral series with 9 branchiostegals, 7 on isthmus, 3 before pectoral fin origin, 11 between pectoral and ventral, 10 between ventral and anal, 12 or 13 from anal origin to caudal base.

D. 14, first branched ray $1\ 2/3$ to 2 in total head length; adipose fin $4\ 1/2$; A. 14, first branched ray 2 to $2\ 1/8$; caudal $1\ 1/4$ to $1\ 1/2$, forked; least depth of caudal peduncle $3\ 7/8$ to 4; pectoral $1\ 1/5$ to $1\ 2/5$; ventral $1\ 4/5$ to $1\ 2/5$; ventral $1\ 4/5$ to 2.

Brown generally. Iris neutral gray. Photophores all set in blackish pigment. Iris silvery white, also reflections on sides of head. Fins pale brownish to whitish.

Atlantic, Pacific, Indian Oceans. The rows of photophores or spots on the front of the back and the 2 series along the middle of the tail are not evident in my examples.

D. 5507. Camp Overton Light, Iligan Bay, (Mindanao), S. 1° E., 68.6 miles (N. $81^{\circ} 21' 12''$ E. $124^{\circ} 12' 6''$), northern Mindanao and vicinity. In 425 fathoms. August 5, 1909. Length 27 mm.

D. 5319. China Sea vicinity of Formosa (N. $21^{\circ} 31'$ E. $117^{\circ} 53'$) November 5, 1908. Length 16 mm.

D. 5320. China Sea vicinity of Formosa (N. $20^{\circ} 58'$ E. $120^{\circ} 3'$).
In 1804 fathoms. November 6, 1908. Length 13 to 17 mm. 2 examples.

D. 5451. East Point (Batan Island), S. 38° E., 8.2 miles (N. $13^{\circ} 22' 22''$ E. $124^{\circ} 00' 48''$), east coast of Luzon. In 380 fathoms.
June 5, 1909. Length 16 mm.

D. 5233. Limasaua Island (S.), S. 70° E., 19 miles (N. $10^{\circ} 00' 22''$ E. $124^{\circ} 45' 06''$), between Bohol and Leyte. May 7, 1908. Length 30 mm.

D. 5422. Lusaran Point Light, S. 80° E., 9.7 miles (N. $10^{\circ} 31' 18''$ E. $122^{\circ} 18' 45''$), between Panay and Guimaras. March 30, 1909. Length 15 to 25 mm. 15 examples.

D. 5500. Macabalan Point Light (Mindanao), S. 20° E., 7.9 miles (N. $80^{\circ} 37' 45''$ E. $124^{\circ} 36' 45''$), northern Mindanao and vicinity. In 267 fathoms. August 4, 1909. Length 15 to 18 mm. 4 examples.

D. 5288. Matocot Point, Luzon, S. 20° E., 5.70 miles (N. $13^{\circ} 43' 30''$ E. 121°), China Sea vicinity southern Luzon. In 140 fathoms. July 22, 1908. Length 22 mm.

D. 5125. Nogas Island (W.), S. 11° E., 24 miles (N. $10^{\circ} 48' 121^{\circ} 48' 30''$), Sulu Sea, vicinity southern Panay. In 411 fathoms. February 3, 1908. Length 15 to 25 mm. 5 examples.

D. 5227. Point Origon, S. 44° E., 18.30 miles (N. $12^{\circ} 53' 45''$ E. $121^{\circ} 52' 30''$), east of Mindoro. In 322 fathoms. May 5, 1908. Length 20 to 25 mm. 2 examples.

D. 5287. Sombrero Island, N. 68° E., 11.25 miles (N. $13^{\circ} 37' 40''$ E. $120^{\circ} 39'$), China Sea, vicinity southern Luzon. In 379 fathoms. July 20, 1908. Length 27 to 29 mm. 2 examples.

76415 U.S.N.M. Cape Martin, Nuhiva Id. Albatross Station 3798.

Length 19 to 28 mm. 3 examples.

Vinciguerria poweriae (Cocco)

Gonostomus poweriae COCCO, Nuovi. Ann. Sci. Nat. Bologna, vol.2, 1838, p.167,
pl.5, fig.2. Messina.

Ichthyococcus poweriae BONAPARTE, Fauna Italica, vol.2, pt.1, Pesci, fasc.27,
1840, no pagination, pl. fig.2, (Italy).

Scopelus poweriae VALENCIENNES, Hist Nat. Poiss., vol.22, 1849, p.441 (Mediterranean).

Maurolicus poweriae GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.390
(Sicily). - FACCIOLA, Nat. Sicil., vol.2, 1883, p.207. - CARUS, Prodr.
Fauna Medit., vol.2, 1892, p.569 (compiled). - LÜTKEN, Kon. Dansk. Vid.
Selsk. Skr. København, ser.6, vol.7, 1892, p.272 (Mediterranean).

Vinciguerria poweriae SANZO, Mem. R. Com. Talass. Ital. vol.35, 1913, p.3,
figures (postlarval stages). - JESPERSEN and TAANING, Vidensk. Medd.
Dansk naturh. Foren. Kobenhavn, vol.70, 1919, p.218, pl.17, figs. 1 - 4;
Rep. Danish Oceanogr. Exped. Medit., No.9, vol.2, A. 12, 1926, pp.22,
56, figs. 13 - 17, 19 (off Spain and in Mediterranean). - NORMAN, Discovery Rep., vol.2, 1930, p.290 (compiled).

Vinciguerria lucetia (not GARMAN) HJORT, Depths of the Ocean, 1912, p.604,
fig.457, p.678, fig.495.

Depth $3 \frac{1}{4}$ to $3 \frac{2}{5}$; head $2 \frac{4}{5}$ to 3, width $2 \frac{2}{5}$ to $2 \frac{1}{2}$. Snout $3 \frac{1}{2}$
to $3 \frac{4}{5}$ in head from snout tip; eye 3, greater than snout or interorbital;
maxillary extends $\frac{1}{2}$ eye diameter behind eye, expansion $1 \frac{3}{4}$ to 2 in eye,
length $1 \frac{2}{5}$ in head from snout tip; interorbital 5 to 6, convex. Gill

rakers 6 + 12, finely lanceolate, $1/3$ of eye; gill filaments $1/2$ eye.

Scales 30 in median lateral series to caudal base, narrowly imbricated; 7 transversely. Scales very caducous, most all fallen.

Preorbital photophore opposite and rather close before middle of front eye edge; 1 on cheek below hind eye edge; 2 operculars, level, slightly above pectoral fin origin; upper lateral series 13 between pectoral and ventral, 11 between ventral and anal; lower or ventral series with 8 veiled branchiostegals, 9 on isthmus to pectoral, 15 between pectoral and ventral, 7 between ventral and anal, then 16 to caudal base which space less than head length.

D. III, 10 (?), first branched ray $1 \frac{3}{4}$ in head; adipose fin damaged; A. III, 10 (?), first branched ray $2 \frac{3}{4}$; caudal $1 \frac{3}{4}$, forked; least depth of caudal peduncle $4 \frac{1}{2}$; pectoral $1 \frac{3}{5}$ to 2; ventral $1 \frac{7}{8}$ to 2.

Back pale brown, sides and lower surfaces bright silvery white, also iris. Fins pale brownish.

Atlantic Ocean.

40079 U.S.N.M. Messina. Royal Zool. Mus. Florence. Length 36 or 37 mm. 2 examples.

Vinciguerria attenuata (Cocco)

Scopelus or Maurolicus attenuatus COCCO, Nuovi Ann. Sci. Nat. Bologna, vol.2, 1838, p.193, pl.8, fig.3. Messina.

Maurolicus attenuatus BONAPARTE, Fauna Italica, vol.3, pt.1, Pesci, fasc. 27, 1840, no pagination, pl., fig.8 (Italy); Cat. Metod. Pesci Europ., 1846, p.36 (Mediterranean). - GÜNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.390 (no locality). - FACCIOLA, Nat. Sicil., vol.2, 1883, p.208. -

CARUS, Prodr. Fauna Medit., vol.2, 1892, p.569 (compiled). - LÜTKEN, Kon. Dansk. Vid. Sels. Skr. København, ser.6, vol.7, 1892, p.272 (Atlantic and Mediterranean). - FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1911 (1912), p.570 (Italy).

Vinciguerria attenuata GOODE and BEAN, Oceanic Ichth., 1895, p.513 (compiled).

JORDAN and EVERMANN, Bull. U.S.N.M., No.47, pt.1, 1896, p.577 (compiled).

SANZO, Mem. R. Comm. Talass. Ital., vol.35, Ital., vol.35, 1913, p.3, figs.

(postlarval). - JESPERSEN and TAANING, Vidensk. Medd. Dansk naturh. Foren.

København, vol.70, 1919, p.218, pl.17, figs. 3 and 6; Rep. Danish Oceanogr.

Exped. Medit., No.9, vol.2, A.12, 1926, pp.22, 55, figs. 13 to 18 (off

Spain and in Mediterranean). - NORMAN, Discovery Rep., vol.2, 1930, p.291

(S. 33° to 49° W. 9° to 19° or E. 1° to 16° , 135 to 2000 meters).

Scopelus tenorei (BONAPARTE) VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849,

p.441 (based on COCCO).

Vinciguerra lucetia (not GARMAN) BRAUER, Deutsch. Tiefsee Exped. Valdivia,

vol.15, Tiefsee - fische, 1906, p.97 (part). - ZUGMAYER, Rés. Camp. Sci.

Monaco, vol.35, 1911, p.56, pl.2, fig.4.

Depth $4 \frac{1}{5}$ (?); head 3, width 3. Snout $3 \frac{1}{6}$ in head from snout tip; eye $2 \frac{4}{5}$, greater than snout or interorbital; maxillary reaches $\frac{4}{5}$ in eye, expansion $1 \frac{4}{5}$ in eye, length $1 \frac{3}{4}$ in head from snout tip; interorbital $5 \frac{1}{4}$, narrow, level. Gill rakers 5 - 14, $\frac{1}{2}$ of eye, slightly less than gill filaments.

Two orbital photophores, smaller preorbital level and little before front edge of orbit, lower larger and close to lower hind edge of orbit; 3 operculars, upper smaller and level with or but slightly higher than preorbital;

lower pair nearly on line with pectoral fin origin and close set with posterior slightly higher; branchiostegals 8; lateral series 12 to 14 between pectoral and ventral and 8 to between ventral and anal; lower or ventral series 7 on isthmus, then 16 to ventral, 7 to 9 from ventral to anal, 12 to 14 above anal to caudal base.

D. II, 11, fin height 2 (?) in total head length; adipose fin 6; A. II, 11 or II, 12, first branched ray $3 \frac{1}{4}$ (?); caudal $1 \frac{2}{5}$ (?) forked; least depth of caudal peduncle $3 \frac{4}{5}$; pectoral $2 \frac{1}{2}$; ventral 4.

Brownish. Photophores and sides of head silvery white. Iris pale slaty.
pale
Fins brownish.

4 examples. A.N.S.P. Italy. Bonaparte Collection 457. Dr. T. B. Wilson. Largest 43 mm.

Genus PHOSICHTHYS Hector

Phosichthys HECTOR, Colonial Mus. Geol. Surv. Dep. (Cat. Fishes New Zealand),

1872, p.55. Type Phosichthys argenteus HECTOR, monotypic.

Photichthys GÜNTHER, Rep. Voy. Challenger, vol.22, 1887, p.177. Type Photichthys argenteus Hector. Emendation.

Body elongate, slender. Head moderate. Eye moderate, well advanced. Mouth cleft wide. Maxillary with single series of small, subequal teeth. Premaxillary with 2 strong canines, besides small teeth. Mandible with strong acute teeth and smaller teeth in interspaces. Pair of teeth on vomer. Each palatine with single series of curved teeth, anterior enlarged. Pterygoids toothless. Suborbital not enlarged. Gill rakers moderate. Branchiostegals 21. Stomach coecal. Pyloric appendages short, few. Scales rather small. Photophores conspicuous, 2 rows along each side ventrally.

Dorsal nearly median, origin behind ventral origin. Adipose fin small.
 Anal far postmedian, well behind dorsal. Paired fins moderate.

ANALYSIS OF SPECIES

- 1
a. Depth $4 \frac{9}{10}$; head $3 \frac{1}{3}$; eye $3 \frac{1}{3}$; lower gill rakers 13
nonsuchae.
- 2
a. Depth $6 \frac{1}{4}$ to $6 \frac{2}{3}$; head $4 \frac{1}{2}$ to $4 \frac{4}{5}$; eye 4 to 5; lower gill
 rakers 11
argenteus.

Phosichthys nonsuchae Beebe

Photichthys nonsuchae BEEBE, Zoologica New York Zoological Society, vol.13,
 No.4, March 1932, p.61, fig.11. Seven miles south-southwest of Nonsuch
 Bermuda, 600 fathoms.

Phosichthys argenteus Hutton

Phosichthys argenteus HUTTON, Colonial Mus. Geol. Surv. Dep. (Cat. Fishes New Zealand), 1872, p.56. Cook Straits. - WAITE, Records Canterbury Mus., vol.1, No.1, Ap.25, 1907, p.10 (reference).

Photichthys argenteus HUTTON, Trans. New Zealand Inst., vol.5, 1873, p.269, pl.15. - GÜNTHER, Rep. Voy. Challenger, vol.22, 1887, p.178, pl.45, fig. A (New Zealand). - GOODE and BEAN, Oceanic Ichth., 1895, p.104, pl.32, fig.122 (copied). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.92, text fig.37 (S. $37^{\circ} 31' 2''$ E. $17^{\circ} 1' 6''$, 2000 meters, south of Cape Colony). - GILCHRIST, Fisher. Marine Biol. Survey South Africa, Rep. No.2, 1921, No.3, (1922), p.55. (off Cape Town, 290 to 537 fathoms). - BARNARD, Ann. South African Mus., vol.21, June 1925, p.150 (off Cape Point, 290 to 1000 fathoms). - NORMAN, Discovery Rep., vol.2, 1930, p.293 (S. 32° to 35° W. 8° to 16° , 320 to 1000 meters).

Depth $6 \frac{1}{4}$ to $6 \frac{2}{3}$; head $4 \frac{1}{2}$ to $4 \frac{4}{5}$. Snout 5 in head from snout tip; eye 4 to 5, subequal with snout or interorbital; maxillary extends $1 \frac{3}{4}$ eye diameters behind eye, expansion $1 \frac{2}{3}$ in eye, length $1 \frac{1}{3}$ in head from snout tip; interorbital low. Gill rakers + 11 below.

Scales 50 in lateral line to caudal base and 2 more on latter, 3 above.

Preorbital luminous organ $1 \frac{3}{4}$ in eye, close before lower front eye edge. Opercular photophore opposite hind end of maxillary, well above level of pectoral fin origin. Lateral photophores 14 between pectoral and ventral, 19 or 20 between ventral and anal (last 3 above anal); ventral series 10 between isthmus and pectoral, 14 or 15 between pectoral and ventral, 15 or

16 between ventral and anal, 16 or 17 from anal to caudal (11 over anal base).

D. 12 or 13, second ray 2 in total head length; A. 23 to 26, third ray $2 \frac{2}{5}$; caudal $1 \frac{1}{2}$; least depth of caudal peduncle $3 \frac{3}{4}$; pectoral 2, rays 9; ventral rays $1 \frac{2}{3}$ in total head, rays 7; adipose fin 2 in eye.

Length 305 mm. (Günther, Norman.) Atlantic, New Zealand Seas.

Genus MANDUCUS Goode and Bean

Manducus GOODE and BEAN, Oceanic Ichth., 1895, p.514. Type Gonostoma modernse JOHNSON, monotypic.

Lychnopoles GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.244. Type Lychnopoles argenteolus GARMAN, monotypic.

Paraphotichthys WHITLEY, Australian Zoologist, vol.6, Feb.13, 1931, p.334.

Type Gonostoma modernse JOHNSON, virtually. Paraphotichthys WHITLEY proposed to replace Manducus GOODE and BEAN, thought preoccupied by Manduca HUEBNER 1806 in lepidoptera.

Body oblong, compressed. Head long, conic, much compressed, with thin bones. Eye moderate. Mouth very wide, mandible largely included. Upper teeth uniserial in front, sharp, conic, with small ones between, followed either side by few very long teeth with others smaller behind. Lower teeth uniserial, small ones between and double row of 8 smaller similar ones in front. Vomer with few teeth. Row of minute sharp teeth on palatines and ~~and~~ pterygoids, also small similar patch on upper side of tongue. Opercles thin. Second suborbital not greatly enlarged. Gill openings very wide. Gill rakers rather long, few. No pseudobranchiae. Body with scales, except on top of head and ridge on back, which rugosely warted. Photophores in 2 rows each side of belly close to ventral line, also row along lateral line.

and smaller spots in series on sides. Dorsal rays 10 to 16, origin median on back, over space between ventral and anal. Anal 26 to 39, lower than dorsal, base longer, origin below or little behind dorsal. Paired fins well developed, latter narrow and shorter than pectoral.

ANALYSIS OF SPECIES

- 1
a. Premaxillary with strong canines; dorsal wholly before anal
maderensis.
- 2
a. Premaxillary without marked canines; dorsal largely above anal
argenteolus.

Manducus maderensis (Johnson)

Gonostoma maderense JOHNSON, Proc. Zool. Soc. London, 1890, p.459. Funchal, Madeira.

Manducus maderensis GOODE and BEAN, Oceanic Ichth., 1895, p.515 (copied). - NORMAN, Discovery Rep., vol.2, 1930, p.294, fig.8 (type).

Diplophos minutus JERPERSEN and TAANING, Vidensk. Medd. Dansk naturh. Foren. K benhavn, vol.70, 1919, p.224, pl.17, fig.15.

Diplophos moorei Welsh, Proc. U.S.Nat. Mus., vol.62, art.3, 1923, p.1, fig.1. Northeast Providence Channel, surface; Five miles west from Gun Key, Straits of Florida, 75 meters.

Depth $7 \frac{2}{3}$ to $7 \frac{3}{4}$; head $4 \frac{3}{4}$ to $5 \frac{1}{2}$, width $2 \frac{2}{5}$ to $2 \frac{3}{5}$. Snout 3 to 4 in head from snout tip; eye $5 \frac{1}{5}$ to $5 \frac{3}{4}$, $1 \frac{1}{4}$ to $1 \frac{1}{2}$ in snout, $1 \frac{1}{5}$ to $1 \frac{1}{2}$ in interorbital; maxillary extends $1 \frac{1}{2}$ to 2 eye diameters behind eye, expansion $1 \frac{1}{3}$ to 2 in eye, length $1 \frac{2}{5}$ in head from snout tip; interorbital $4 \frac{1}{3}$ to $5 \frac{4}{5}$, convex. Gill rakers 6 + 10, slender, lanceolate, $\frac{1}{2}$ of eye; gill filaments $\frac{2}{3}$ of eye.

Scales 65 in median lateral series from upper edge of gill opening to caudal base; 8 transversely from dorsal origin to lateral series of photophores. Scales cycloid, without striae; 6 basal circuli, apically scale entire.

Small suborbital photophore; 2 small black photophores on cheek, one above maxillary end and other midway between first and eye center; 3 operculars, of which 2 on front border of opercle with upper level with eye center and lower behind mouth angle, third on subopercle slightly above level of pectoral fin origin; small mandibular photophore slightly before suborbital, terminal end of mandible glandular, apparently luminous; 3 close set series of lateral photophores ventrally, upper on lateral line of 66 small round spots and last in series on caudal base; median row slightly above level of pectoral fin, of 48 photophores as 2 before pectoral, 18 between pectoral and ventral, 13 between ventral and anal and along anal base till above twenty-third ray; lower row as 11 branchiostegals, 13 from isthmus to pectoral, 17 from pectoral to ventral, 12 from ventral to anal, 29 from anal to caudal and without break in series on caudal peduncle.

D. 12, fin height $1 \frac{3}{4}$ (?) in total head; A. 38, fin height anteriorly $2 \frac{1}{5}$; caudal damaged, apparently forked; least depth of caudal peduncle 4 to 5; pectoral 2 (?) to $2 \frac{1}{8}$; ventral $2 \frac{2}{5}$.

Blackish brown, scales edged darker or blackish. Cheeks and maxillary pale, dotted with brown. Mandible tip gray. Fins whitish.

Atlantic Ocean.

84292 U.S.N.M. Providence Channel. Grampus (Bache) Station.

March 3, 1914. Length 32 to 41 mm. Two examples.

84293 U.S.N.M. Gulf Stream 5 miles from Gun Cay. In 75 meters.

Station 10202. Length 37 mm. Type of Diplophos moorei.

Manducus argenteolus (Garman)

Lychnopoles argenteolus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.244, pl.53, figs.4 - a. N. $7^{\circ} 32' 36''$ W. $79^{\circ} 16'$, 286 fathoms; N. $7^{\circ} 33' 12''$ W. $79^{\circ} 17' 15''$, 242 fathoms; N. $7^{\circ} 16' 45''$ W. $79^{\circ} 56' 30''$, 210 fathoms; Gulf of Panama.

Manducus argenteolus NORMAN, Discovery Rep., vol.2, 1930, p.294 (copied).

Depth $6 \frac{1}{2}$ to $6 \frac{3}{4}$; head 4 to $4 \frac{1}{2}$, width $3 \frac{1}{8}$ to $3 \frac{1}{3}$. Snout $3 \frac{1}{2}$ in head from snout tip; eye 5 to $5 \frac{1}{4}$, $1 \frac{1}{3}$ to $1 \frac{2}{5}$ in snout, $1 \frac{1}{5}$ to $1 \frac{1}{4}$ in interorbital; maxillary extends eye diameter behind eye, length $1 \frac{1}{3}$ in head from snout tip; interorbital 4 to $4 \frac{3}{4}$, low, nearly level. Gill rakers 7 - 17, slender, lanceolate, equal eye; gill filaments $1 \frac{2}{5}$ in eye.

Preorbital photophore little inferior at front eye edge and with rather large black blotch below; photophore level with eye center at upper angle of preopercle, also 1 on lower front part of subopercle above level of pectoral fin origin and another at same level as first on preopercle behind end of maxillary; upper lateral series 11 between pectoral and ventral, 11 between ventral and anal; lower or ventral series as photophore each side of mandibular symphysis, 10 branchiostegals, 11 on isthmus before pectoral, 12 between pectoral and ventral, 10 between ventral and anal, then 20 to caudal base.

D. III, 10, I or III, 11, I, first branched ray $1 \frac{3}{4}$ in total head; A. III, 19, I (?) to III, 22 (damaged); caudal (damaged), widely forked(?); least depth of caudal peduncle $3 \frac{2}{5}$ to $3 \frac{3}{4}$; pectoral $3 \frac{2}{5}$ (?) to 4 (?); ventral $2 \frac{3}{4}$ (?) to 3 (?)

Uniform brownish. Fins all paler or lighter brownish. Iris silvery gray, photophores on under surface of body in bands of black pigment.

Gulf of Panama.

57897. U.S.N.M. N. $7^{\circ} 23 \frac{1}{2}$ " W. $79^{\circ} 17' 16$ ", Gulf of Panama.

In 242 fathoms. March 8, 1891. Albatross Station 3386. Length 113 to 120 mm. 2 examples.

Genus DIPLOPHOS Günther

Diplophos GÜNTHER, Journ. Mus. Godeffroy, vol.2, 1873, p.101. Type Diplophos taenia GÜNTHER, monotypic.

Body very elongate, band shaped. Head compressed. Snout pointed. Mouth large, lower jaw projecting. Premaxillary, maxillary and mandible each with single series of small unequal teeth. Vomer with 2 or 3 teeth. Single series of teeth on each palatine. Two series of conspicuous photophores each side of abdomen and another along lateral line. Dorsal rays 9 to 11, slightly premedian. Anal rays 55 to 63, origin below dorsal. Paired fins well developed.

ANALYSIS OF SPECIES

- 1
a. Ventral photophores 16 between isthmus and pectoral, 25 between pectoral and ventral, 13 between ventral and anal, 41 between anal and caudal proximus.
- 2
a. Ventral photophores 17 to 21 between isthmus and pectoral, 26 to 28 between pectoral and ventral, 16 or 17 between ventral and anal, 43 to 47 between anal and caudal taenia.

Diplophos proximus Parr

Diplophos proximus PARR, Bull. Bingham Oceanogr. Collection, vol.2, art.4,
Oct.1931, p.14, fig.4 (outline). N. $24^{\circ} 7'$ W. $108^{\circ} 40'$, 286 fathoms.

Depth 9; head $5 \frac{9}{10}$. Snout $3 \frac{2}{3}$ in head from snout tip; eye 5, $1 \frac{1}{2}$
in snout; maxillary extends $\frac{2}{3}$ eye diameter behind eye, length $1 \frac{1}{2}$ in
head from snout tip; interorbital low. Gill rakers + 9 below, fairly long.

Scales 85 in median lateral series, 10 transversely. Rounded luminous
organ below and close before eye. Group of 3 photophores, linear, on cheek
under hind end of maxillary; 1 at lower end and near top of opercle, 1 in
corner between preopercle, subopercle and interopercle. Upper lateral series
of photophores 2 before pectoral base, 25 from pectoral to ventral, 14 from
ventral to anal, 36 or 37 from anal origin to end of series of 24 anterior
well developed and conspicuous; 80 small photophores following lateral line;
ventral series 16 from isthmus to pectoral, 25 from pectoral to ventral,
13 from ventral to anal, 41 from anal to caudal.

D. 10, I, fin height $2 \frac{3}{4}$ in total head length; A. 58, fin height $3 \frac{2}{5}$;
pectoral $1 \frac{1}{3}$; ventral $1 \frac{9}{10}$.

Length 82 mm. without caudal. (Parr.)

Gulf of California.

Diplophos taenia Günther

Diplophos taenia GÜNTHER, Journ. Mus. Godeffroy, vol.2, 1873, p.102. S. 30
W. 24° ; N. 22° W. 30° ; mid Atlantic; Rep. Voy. Challenger, vol.31,
1889, p.32, pl.4, fig. C (types). - LUTKEN, Kon. Dansk. Vidensk. Sels.
Skr. Köbenhavn, ser.6, vol.7, 1892, p.278, pl.2, figs. 1 - 3 (N. 10° W.

1890; S. 10

250; S. 10° W. 12°). - GOODE and BEAN, *Oceanic Ichth.*, 1895, p.104 (copied). - BRAUER, *Deutsch. Tiefsee Exped. Valdivia*, vol.15, *Tiefsee-Fische*, 1906, p.89, text fig. 36 (N. $5^{\circ} 5' 3''$ W. $13^{\circ} 27' 5''$, 3070 meters, off West Africa; S. $4^{\circ} 45'$ E. $48^{\circ} 58' 6''$, 2000 meters between Seychells and Zanzibar). - JESPERSEN and TAANING, *Vidensk. Medd. Dansk naturh. Foren. København*, vol.70, 1919, p.224, pl.17, fig.14 (Atlantic, S. of 40° N. Lat. and W. of 40° W. Long.). - GILCHRIST, *Fisher. Marine Biol. Survey South Africa*, Rep. No.2, 1921, No.3 (1922), p.55 (off Natal, 250 fathoms). - BARNARD, *Ann. South African Mus.*, vol.21, June 1925, p.149 (Natal specimen). - NORMAN, *Discovery Rep.*, vol.2, 1930, p.295 (type). - PARR, *Bull. Bingham Oceanogr. Collection*, vol.2, art.4, Oct.1931, p.41 (diagnosis in key).

Diplophos pacificus GÜNTHER, *Rep. Voy. Challenger*, vol.31, pt.2, 1889, p.33, pl.4, fig.B. N. L. $5^{\circ} 54'$, W. Long. $147^{\circ} 2'$, in mid-Pacific. - GOODE and BEAN, *Oceanic Ichth.*, 1895, p.104 (reference). - FOWLER, *Mem. Bishop Mus.*, vol.10, 1928, p.35 (compiled). - PARR, *Bull. Bingham Oceanogr. Collection*, vol.2, art.4, Oct. 1931, p.14 (diagnosis in key).

Depth $9 \frac{1}{4}$; head 6, width $3 \frac{1}{2}$. Snout $3 \frac{4}{5}$ in head from snout tip; eye $4 \frac{1}{4}$, $1 \frac{1}{3}$ in snout, slightly greater than interorbital; maxillary extends $\frac{1}{2}$ eye diameter behind eye, expansion $\frac{7}{8}$ of eye, length $1 \frac{2}{5}$ in head from snout tip; interorbital 6, low, very slightly convex. Gill rakers 4 + 11, slender, lanceolate, $1 \frac{1}{6}$ in eye; gill filaments subequal with gill rakers.

Scales (pockets) 72 in median lateral series to caudal base, 12 transversely, 28 predorsal. Scales cycloid; without radiating striae; circuli fine, basal, none apical.

Preorbital photophore opposite lower front eye edge; 1 on cheek veiled by maxillary, little behind eye and level with pectoral fin origin; 1 close behind ^{hind} end of maxillary expansion and another slightly higher at lower front part of subopercle; median lateral series small, 74 follow close along just above each tube of lateral line; larger and upper of 2 lower series with 19 between pectoral and ventral, 13 between ventral and anal, then 16 along above front of anal; lower or ventral series with cluster of 4 very minute photophores each side mandibular symphysis, 13 branchiostegals, 29 from isthmus, 13 between ventral and anal, 41 from anal origin to caudal.

D. III, 9, first branched ray $1 \frac{1}{2}$ in total head length; A. III, 53, first branched ray $1 \frac{4}{5}$ in head; no adipose fin; caudal damaged, $1 \frac{3}{4}$ (?), forked; least depth of caudal peduncle 7; pectoral 1; ventral $1 \frac{1}{5}$.

Brown generally where scales have fallen, scale pockets darker brown. Scales all with silvery white tints. Side of head and iris silvery white. Fins pale or whitish. Belly sooty to dusky. Photophores all narrowly ringed with blackish.

4430 D. 5591. Mabul Island (N.W.) N. 6° W., 3.1 miles (N. 4° 11' 48" E. 118° 38' 20"), Sibuko Bay, Borneo and vicinity. In 260 fathoms. September 29, 1909. Length 111 mm.

Genus TRIPLOPHOS Brauer

Triplophos BRAUER, Zool. Anzeiger, vol.25, 1902, p.282. Type Triplophos elongatus BRAUER, monotypic.

Body greatly elongated, combined head and trunk slightly over half of long tapering tail, compressed. Head moderate, compressed. Snout short. Eye small, far forward. Maxillary long, lower jaw protruding. Teeth ir-

regularly biserial above, uniserial below, strong, pointed, with smaller ones in interspaces. One or 2 minute teeth on vomer. Few small teeth at front end of each palatine. Pterygoids minutely toothed. Branchiostegals 17. No pseudobranchiae. Two series of prominent photophores each side of abdomen and 2 or more additional rows above on sides of body. Dorsal inserted before first third in total. Anal rays 57 to 61, fin length little over half fish. Caudal small, forked. Paired fins moderate.

Triplophos hemingi (Mc Ardle)

Photichthys hemingi MC ARDLE, Ann. Mag. Nat. Hist., ser.7, vol.8, 1901, p.521.

Bengal Bay, in 475 to 880 fathoms; Illustrat. Zool. Investigator, Fishes, pt.8, 1905, pl.36, fig.2.

Triplophos hemingi LLOYD, Mem. Indian Mus., vol.2, 1909, p.150 (Bay of Bengal).

- NORMAN, Discovery Rep., vol.2, 1930, p.296 (type).

Triplophos elongatus BRAUER, Zool. Anzeiger, vol.25, 1902, p.282. South of Ceylon.

Triplophos elongatum BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p. 90, pl.7, fig.4, text fig.41 (N. $4^{\circ} 56'$ E. $78^{\circ} 15'$ 3", 2000 meters).

Depth $7 \frac{4}{5}$; head $6 \frac{4}{5}$, width 3. Snout $5 \frac{1}{5}$ in head from snout tip; eye $5 \frac{1}{4}$, greater than snout, little greater than interorbital; maxillary extends 3 eye diameters behind eye, slender, length $1 \frac{1}{8}$ in head from snout tip; interorbital $6 \frac{3}{4}$, very low, slightly convex. Gill rakers 8 + 10, slender, lanceolate, $1 \frac{1}{4}$ times eye diameter; gill filaments $\frac{2}{3}$ of gill rakers.

Scales (pockets) 58 (?) in median lateral series to caudal base; 10

transversely, 18 predorsal to occiput. Scales without radiating striae; circuli moderate or 11 basally, not extended apically.

Rather large antero suborbital below front pupil edge close on lower eye edge; 1 on cheek close above and eye diameter from hind maxillary end; 1 on subopercle about same level; 4 rows of lateral photophores, upper follows body axis with 44 continuously till about last fourth in total body length; third series with 10 between pectoral and ventral; lowest or first series with concealed photophore each side of mandibular symphysis on its inner face, 10 branchiostegals, 15 on isthmus to pectoral, 11 between pectoral and ventral, 6 between ventral and anal, 40 along base and 2 more on lower surface of caudal peduncle.

D. III, 7, first branched ray $2 \frac{4}{5}$ in total head length; A. 45 (?), height anteriorly $2 \frac{1}{8}$ (?); caudal $2 \frac{1}{5}$ (?), small, forked, lobes slender; caudal peduncle very slender, depth $\frac{1}{3}$ of eye; pectoral $1 \frac{7}{8}$ (?) in total head length; ventral $2 \frac{4}{5}$ (?).

Brown, scale pockets darker. Scales brownish. Sides of head gray. Iris dark gray. Belly dusky to blackish. Fins all pale.

Indian Ocean.

3361. D. 5421. Lusaran Point Light, S. 27° E., 5 miles (N. 10° $33' 30''$ E. 122° $26'$), between Panay and Guimaras. In 137 fathoms. March 30, 1909. Length 100 mm.

Genus ICHTHYOCOCCUS Bonaparte

Ichthyococcus BONAPARTE, Iconogr. Fauna Italica, vol.3, pt.1, Pesci, fasc.27, 1840, no pagination. Type Gonostomus ovatus COCCO, designated by JORDAN, Genera of Fishes, pt.2, 1919, p.207.

Ichthyococcus BONAPARTE, Iconogr. Fauna Italica, vol.3, pt.1, Pesci, fasc.27,

1840. Type Gonostomus ovatus COCCO,
 " Coccia GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.387. Type Gonostomus
ovatus COCCO, monotypic.

Body ovate, compressed. Head compressed. Eye moderate, lateral, directed upward, telescopic. Mouth cleft small. Entire lower jaw received between dilated maxillaries. Premaxillaries very small. Maxillary forms nearly whole edge of upper jaw, with sharp and minute serrated edge. Few minute teeth near mandibular symphysis. Palate toothless. Interorbital exceedingly narrow ridge between eyes. Gill opening wide. Gill rakers short, few. Branchiostegals 10. Scales present, cycloid. Photophores conspicuous, in 2 series each side of abdomen. Body covered with silvery pigment. Dorsal rays 11 or 12, origin nearly median or before ventrals. Long low adipose fin. Anal 15 to 17, origin well behind dorsal. Caudal forked. Paired fins present.

Ichthyococcus ovatus (Cocco)

Gonostomus ovatus COCCO, Nuov. Ann. Sci. Nat. Bologna, vol.2, 1838, p.169,
 pl.5, fig.3. Messina.

Ichthyococcus ovatus BONAPARTE, Iconogr. Fauna Italica, vol.2, pt.1, Pesci,
 fasc.27, 1840, descr., pl., fig.3 (Italy); Cat. Metod. Pesc. Europ., 1846,
 p.37 (Mediterranean). - VAILLANT, Exped. Sci. Travailleur et Talisman,
 Poiss., 1888, p.104, pl.14, figs.2 - a (coasts of Morocco, 2030 meters;
 off Portugal, 950 meters). - MOREAU, Hist. Nat. Poiss. France, Suppl.,
 1891, p.111; Manuel Ichth. France, 1892, p.559 (Mediterranean, Nice). -
 * GOODE and BEAN, Oceanic Ichth., 1895, p.95, pl.30, fig.113 (copied). -
 BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol. 15, Tiefsee - Fische, 1906,

p.94, text figs. 38 - 39 (S. $2^{\circ} 38' 7''$ E. $65^{\circ} 59' 2''$, 2500 meters; S. $4^{\circ} 45'$ E. $48^{\circ} 58' 6''$, 2000 meters; S. $5^{\circ} 42' 3''$ E. $43^{\circ} 36' 5''$, 1500 meters; between Chagos and Zanzibar). - FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1911 (1912), p.570 (Italy). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612 (N. $35^{\circ} 32'$ W. $7^{\circ} 7'$, 1215 fathoms; N. 37° W. 29° , 541 to 675 fathoms). - SANZO, Mem. R. Comm. Talass. Ital., vol.27, 1913, fig. (postlarval). - JESPERSEN and TAANING, Vidensk. Medd. Dansk naturh. Foren. København, vol.70, 1919, p.218; Rep. Danish Oceanogr. Exped. Medit., No.9, vol.2, A. 12, 1926, pp.38, 57, figs. 23 - 24 (Mediterranean, Messina, Atlantic). - NORMAN, Discovery Rep., vol.2, 1930, p. 297 (Mediterranean, Eastern Atlantic, Indian Ocean).

Ichthyococcus ovatus CARRUCCIO, Atti Soc. Ital. Sci. Nat. Milano, vol.12, 1896, p.570 (Messina).

Ichthyococcus ovatus ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.57 (N. $34^{\circ} 2'$ W. $12^{\circ} 21'$, 4000 meters; N. $37^{\circ} 10'$ W. $11^{\circ} 48'$, 4750 meters).

Scopelus ovatus VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.453 (copied).

Coccia ovata GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.388 (Messina).

CANESTRINI, Fauna Italia, Pesci, 1874, p.119 (Sicily). - CARUS, Prodr. Faun. Medit., vol.2, 1892, p.568 (compiled).

Depth $2 \frac{1}{2}$ to $2 \frac{4}{5}$; head $2 \frac{3}{4}$ to $3 \frac{1}{4}$, width $2 \frac{1}{4}$ to $2 \frac{1}{2}$. Snout $2 \frac{3}{4}$ to 3 in head; eye $2 \frac{3}{4}$ to 3, equals snout, greatly exceeds narrowly restricted interorbital; maxillary reaches eye, expansion $1 \frac{3}{4}$ in eye, length $1 \frac{7}{8}$ to $2 \frac{1}{8}$ in head; interorbital $5 \frac{1}{2}$ to 7 in eye. Gill rakers $10 + 16$, short, lanceolate, slender, $\frac{2}{5}$ of gill filaments, which $\frac{1}{2}$ of eye.

Scales 30 in median lateral series to caudal base, firmly adherent and narrowly imbricated; 8 transversely, 14 predorsal. Scales each with 1 basal radiating stria; circuli moderately fine, basal, not extended basally.

Subocular photophore on infraorbital opposite front eye edge; 1 on cheek close behind upper end of maxillary; small opercular spot on lower part of opercle little below level of preopercular; upper lateral photophore much smaller, inconspicuous and close to lower lateral series, 12 between gill opening and ventral, 9 or 10 from ventral to front of anal and 5 more over front of anal; lower lateral series (really median series) as 1 close before pectoral base, 12 to 14 between pectoral and ventral, 9 to 11 between ventral and anal, 11 to 13 above anal base and 2 on lower side of caudal peduncle; lowest or ventral series as 13 pairs from isthmus to pectoral, 13 or 14 between pectoral and ventral, 8 to 10 between ventral bases and anal origin, 10 or 11 above anal base and 2 on under surface of caudal peduncle.

D. III, 9, first branched ray $1 \frac{2}{5}$ to $1 \frac{4}{5}$ in head; A. III, 13, first branched ray $3 \frac{2}{5}$ to $3 \frac{1}{2}$; caudal $1 \frac{1}{8}$ (?) to $1 \frac{1}{3}$, forked; least depth of caudal peduncle $2 \frac{7}{8}$ to $3 \frac{3}{4}$; pectoral 1 to $1 \frac{1}{4}$; ventral $1 \frac{3}{4}$ to $1 \frac{4}{5}$.

Back brown, sides and below with brilliant metallic green to violet reflections. Fins.

Mediterranean.

40078 U.S.N.M. Messina. Royal Zool. Mus. Florence. Length 27 to 41 mm. 5 examples.

49337 U.S.N.M. Messina. M. Bellotti. Length 30 to 54 mm. 7 examples.

3 examples A.N.S.P. Italy. Bonaparte Collection 46. Dr. T.B. Wilson. Length 2 to 30 (?) mm.

Genus ARGYRIPNUS Gilbert and Cramer

Argyripnus GILBERT and CRAMER, Proc. U.S.Nat. Mus., vol.19, 1897, p.414.

Type Argyripnus ehippiatus GILBERT and CRAMER, monotypic.

Body much compressed, oblong or elongate, tapers gradually to slender tail. Head longer than deep, without spines, bones thin and flexible. Eye large. Premaxillary, maxillary and mandible with single series of sharp, needle-like teeth; 1 or 2 small teeth each side of vomer; some very small teeth ^{on} each palatine. Less than 20 lower gill rakers. Scales very thin, flexible, cycloid, deciduous. Large (double) luminous organ on preopercle; lateral series of photophores from ventral and anal continuous with series above anal. Dorsal insertion premedian.

ANALYSIS OF SPECIES

- 1
a. Head 3; eye 2; interorbital 4; gill rakers 5 + 15
ehippiatus.
- 2
a. Head $2 \frac{2}{3}$; $2 \frac{2}{5}$; interorbital 8; gill rakers 4 + 13
iridescens.

Argyripnus ehippiatus Gilbert and Cramer

Argyripnus ehippiatus GILBERT and CRAMER, Proc. U.S.Nat. Mus., vol.19, 1897, p.414, pl.39, fig.2. N. $21^{\circ} 12'$ W. $157^{\circ} 49'$, 295 fathoms. - GILBERT, Bull. U.S.Fish. Comm., vol.23, pt.2, 1903 (1905), p.601 (off Maui; Oahu; 216 to 283 fathoms). - FOWLER, Mem. Bishop Mus., vol.10, 1928, p.35 (compiled). - NORMAN, Discovery Rep., vol.2, 1930, p.300 (note).

Depth $3 \frac{2}{3}$; head 3, width $2 \frac{1}{2}$. Snout $4 \frac{7}{8}$ in head from snout tip; eye 2, greatly exceeds snout or interorbital; maxillary reaches opposite hind eye edge, expansion $2 \frac{1}{2}$ in eye, length $1 \frac{1}{3}$ in head from snout tip;

eye 2, greatly exceeds snout or interorbital; maxillary reaches opposite hind eye edge, expansion $2 \frac{1}{2}$ in eye, length $1 \frac{1}{3}$ in head from snout tip; interorbital 8, depressed, low. Gill rakers $5 + 15$, $1 \frac{3}{5}$ in orbit, gill filaments $2 \frac{2}{3}$.

Scales cycloid, very caducous, all lost.

Small photophore close before and another behind eye; 1 on lower cheek above and behind hind maxillary end; 2 operculars, upper level with lower eye edge and lower slightly above small photophore on cheek; upper lateral series of 7 oblong vertical photophores from pectoral until over ventral fin base; lower or ventral series as 6 oblong vertical branchiostegals; curved row of 6 nearly circular photophores from front end of isthmus to pectoral base; 10 equidistant, circular and smaller each side of median line from pectoral to ventral; 19 photophores gradually smaller posteriorly from ventral base to about opposite third anal ray base; 5 small photophores above middle of anal base; 15 very small photophores little before end of anal base until low on lower side of caudal peduncle to origin of lower caudal lobe.

D. 10, rays all broken, base $2 \frac{1}{5}$ in total head length; A. II, 20, origin opposite eighth dorsal ray base; caudal damaged, well emarginate; least depth of caudal peduncle $3 \frac{3}{4}$; pectoral $1 \frac{1}{2}$; ventral $2 \frac{1}{2}$ (?)

Body generally pale brownish. Head with more or less blackish, snout and most of jaws whitish. Cheek and iris with silvery white. Dusky dots at bases of dorsal and front anal rays. Black spot at bases of outermost caudal rays.

Hawaiian Islands.

47708 U.S.N.M. N. $21^{\circ} 12'$; W. $157^{\circ} 53'$. Albatross Station
3472. In 295 fathoms. Length 83 mm. Type.

Argyripnus iridescens Mc Culloch

Argyripnus iridescens MC CULLOCH, Biol. Results Endeavour, vol.5, pt.4, June 8, 1926, p.169, pl.45, fig.2. Great Australian Bight south of Eucla, in } 350 to 450 fathoms; E. Long. 127° 40' in 200 fathoms. - NORMAN, Discovery Rep., vol.2, 1930, p.299 (paratypes).

Depth $3 \frac{2}{3}$; head $2 \frac{2}{3}$, width $2 \frac{2}{3}$. Snout $4 \frac{1}{5}$ in head from snout tip; eye $2 \frac{2}{5}$, greatly exceeds snout or interorbital; maxillary reaches opposite hind eye edge, expansion $2 \frac{2}{3}$ in eye, length $1 \frac{1}{3}$ in head from snout tip; interorbital 4, very low, deeply concave. Gill rakers 4 + 13, lanceolate, slender, length $1 \frac{3}{5}$ in eye; gill filaments $2 \frac{1}{3}$.

Scales very caducous, all fallen.

Preorbital photophore at lower front eye edge; veiled photophore close below hind end of maxillary; 2 operculars, upper level with lower eye edge, lower little above post-maxillary spot; 6 large branchiostegals; upper lateral series with 7 between pectoral and ventral; lower lateral series as 6 arched on isthmus before pectoral fin, 10 before ventral of which 3 before pectoral origin, 5 between ventral and anal, then 14 to 5 12 caudal, series unbroken from ventral till above anal.

D. II, 8, I, first branched ray 3 (?) in total head length; A. III, 19, I (damaged), base long as head; caudal $1 \frac{1}{5}$, deeply forked, slender lobes sharply pointed; least depth of caudal peduncle 4; pectoral $1 \frac{2}{5}$; ventral $2 \frac{4}{5}$.

Body pale brownish generally. Head whitish, with silvery white reflections. Iris silvery white. Bright silvery white stripe from preorbital photophore along lower eye edge to its middle. Photophores all set in black pigment.

Fins pale to whitish.

Great Australian Bight.

3441. D. 5542. Tagolo Light, S. 65 ° W., 12. 7 miles (N. 8 ° 49 ' 38 " E. 123 ° 34 ' 30 "), northern Mindanao and vicinity. In 219 fathoms. August 20, 1919. Length 103 mm.

Genus MAUROLICUS Cocco

Maurolicus COCCO, Nuov. Ann. Sci. Nat. Bologna, vol.2, 1838, p.192. Type

Scopelus amethystino punctatus COCCO, monotypic.

Triarcus WATTE, Trans. New Zealand Inst., vol.42, 1909 (1910), p.387. Type

Maurolicus australis HECTOR, monotypic.

Body oblong. Eye moderate. Mouth cleft wide, oblique, lower jaw projecting. Maxillary large, wide, much produced backward, receives slender premaxillary in upper concave part of its edge. Premaxillary and maxillary with sharp edge, with uniserial minute teeth. Mandible with few minute teeth. Single row of minute teeth on head and vomer. No palatine teeth. Gill opening wide. Gill rakers very long, slender, numerous. Pseudobranchiae well developed. Branchiostegals 8 or 9. Body covered with silvery pigment or scales present. Photophores large, conspicuous, ventral series more or less broken into groups, those between ventral and anal separated from those above front part of anal. Dorsal rays 9 to 12, postmedian, before anal. Long low adipose fin, hidden in skin and muscles, origin just behind last dorsal ray. Caudal forked.

ANALYSIS OF SPECIES

1		
<u>a.</u>	Dorsal rays 6; head 4	<u>oculatus.</u>
2		
<u>a.</u>	Dorsal rays 10; head 3 to 3 1/5	<u>mülleri.</u>

Maurolicus oculatus Garman

Maurolicus oculatus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.241, pl.53, fig. 3. N. 35 ° 19 ' 30 " W. 125 ° 21 ' 30 " , 10 to 300 fathoms. - NORMAN, Discovery Rep., vol.2, 1930, p.299 (note).

Depth 4; head 4. Snout $3 \frac{1}{2}$ in head from snout tip; eye $2 \frac{1}{2}$, greater than snout; maxillary reaches opposite hind eye edge, expansion $1 \frac{4}{5}$ in eye, length $1 \frac{1}{3}$ in head from snout tip; teeth very small, close, nearly regular, larger and more irregular on maxillary posteriorly; isthmus very narrow.

Photophore below nostrils before middle of front eye edge black. Lateral series 7 from over pectoral till opposite vent. Ventral series 6 branchiostegals, 3 or 4 each side of isthmus, 11 between isthmus and ventral, 5 between ventral and anal, 16 above anal, 4 between anal and caudal.

D. 6, origin about first third of total head length; A. 24, entirely behind dorsal; least depth of caudal peduncle $3 \frac{2}{3}$; pectoral $1 \frac{1}{2}$; ventral 4.

Snout whitish, belly and rest of head blackish. Muscular parts flesh color. Fins light yellowish. Size not given. (Garman)

Pacific.

Maurolicus mulleri (Gmelin)

Salmo mulleri GMELIN, Syst. Nat. Linnaeus, vol.1, 1789, p.1387 (on Salmo maxillaris edentatus MÜLLER, Zool. Danicae prodr., 1776, p.49, Denmark).

Maurolicus mülleri KROYER, Danmarks Fiske, vol.3, 1846, p.113, fig. - SMITT, Hist. Scandinavian Fishes, vol.2, 1895, p.931, pl.44, fig.3. - COLLETT, Forh. Vidensk. Selsk. Christiania, 1904, No.9, p.111.

Maurolicus muelleri NORMAN, Discovery Rep., vol.2, 1930, p.298 (S. 35 ° 1 ' 1 ')

E. $10^{\circ} 18'$, 250 meters; S. $52^{\circ} 53' 45''$ W. $64^{\circ} 37' 30''$, 191 to 205 meters; S. $34^{\circ} 4'$ W. $17^{\circ} 36'$, 292 to 402 meters; S. $33^{\circ} 42'$ E. $17^{\circ} 29'$, 310 to 402 meters; Mediterranean; Atlantic; New Zealand).

Argentina pennanti WALBAUM, Artedi Pisc., vol.3, 1792, p.47 (on Sheppy argentine PENNANT, British Zool., vol.3, 1776, p.327, pl.65, Sheppy, England).

Scopelus pennantii VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.436 (compiled). - YARRELL, British Fishes, ed.3, vol.1, 1859, p.330, figs.

Maurolicus pennantii DAY, Fishes Gr. Britain, vol.2, 1880 - 84, p.49, pl.109, fig. 2. - LILLJEBORG, Sveriges Fiskar, vol.3, pt.6, 1889, p.10. - LÜTKEN, Kon. Dansk. Vidensk. Selsk. Skr. Kobenhavn, ser.6, vol.7, 1892, p.267.

Maurolicus pennanti CARUS, Prodr. Fauna Medit., vol.2, 1893, p.569 (compiled).

JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p.577 (compiled). - HOLT and BYRNE, Dep. Agric. Tech. Instr. Ireland Sci. Invest., No.1, 1913, p.16, fig.6, Irish Atlantic Slope, 50 to 900 fathoms). -

JESPERSEN and TAANING, Vidensk. Medd. Dansk naturh. Foren. København, vol. 70, 1919, p.220. - BARNARD, Ann. South African Mus., vol.21, June 1925, p.151 (Off Cape Point, 190 fathoms; Tristan d' Acunha). - JESPERSEN and TAANING, Rep. Danish Oceanogr. Exped. Medit., No.9, vol.2, A. 12, 1926, pp.40, 57, figs.25 - 26 (Mediterranean, Messina, Atlantic).

Scopelus borealis NILSON, Prodr. Ichth. Skandinav., 1832, p.20. - VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.438 (copied).

Maurolicus borealis GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.389 (Redcar). - JORDAN and GILBERT, Bull. U.S.Nat. Mus., No.17, 1882, p.284 (copied). - GOODE and BEAN, Oceanic Ichth., 1896, p.96, pl.30, fig.111 (Provincetown; N. $28^{\circ} 36'$ W. $85^{\circ} 33'$, 111 fathoms; N. $38^{\circ} 37'$ W. $73^{\circ} 12'$, 224 fathoms; Wood's Holl). - (?). HOLT and BYRNE, Trans. Zool. Soc. London, vol.10, 1907, p.194, fig.1. - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.58 (N. $38^{\circ} 2'$ W. $10^{\circ} 44'$).

- Scopelus humboldtii (not Risso) YARRELL, British Fishes, ed.1, vol.2, 1836, p.94; ed.2, vol.2, 1841, p.161. - DE KAY, New York Fauna, Fishes, 1842, p.246, pl.38, fig.121.
- Maurolicus amethystino punctatus COCCO, Nuov. Ann. Sci. Nat. Bologna, vol.2, 1838, p.193, pl.8, fig.12. Messina. - BONAPARTE, Iconogr. Fauna Italica, vol.3, pt.1, Pesci, fasc. 27, 1841, no pagination, pl., fig7 (Italy). - GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.390 (Mediterranean); Ann. Mag. Nat. Hist., ser.4, vol.17, 1876, p.399; Trans. New Zealand Inst., vol.9, 1877, p.472. - MOREAU, Hist. Nat. Poiss. France, vol.3, 1881, p.509 (Nice); Manuel Ichth. France, 1892, p.556 ^M (Mediterranean: Nice).
- Scopelus maurolici VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.439 (on COCCO).
- Maurolicus mucronatus KLUNZINGER, Verhandl. zool. bot. Gesell. Wien, vol.21, 1871, p.593. Red Sea.
- Maurolicus australis HECTOR, Trans. New Zealand Inst., vol.7, 1873 (1874), p.250, pl.11, fig. 90 d. Head of Milford Sound and Cuttle Cove in Preservation Inlet. - WAITE, Records Canterbury Mus., vol.1, No.1, Append. 25, 1907, p.10 (reference).
- Maurolicus pennanti australis MC CULLOCH, Records Austral. Mus., vol.14, 1923, p.114, pl.14, fig.1.
- Gonostoma australis HUTTON, Trans. New Zealand Inst., vol.8, 1876, p.215.
- Triarcus australis WAITE, Trans. New Zealand Inst., vol.42, 1910, p.386, pl.38, fig.1 (Canterbury specimens of Hutton).
- Maurolicus parvipinnis VAILLANT, Mission Sci. Cap Horn, vol.6, Zool., Poiss., 1888, p.17, pl.2, fig.3 - a. Orange Bay, Terra del Fuego.
- Maurolicus japonicus ISHIKAWA, Journ. College Agric. Tokyo, vol.6, 1915, p.183, pls. 12 - 13.

Depth $3 \frac{4}{5}$ to $4 \frac{1}{4}$; head 3 to $3 \frac{1}{5}$, width $2 \frac{3}{4}$ to $3 \frac{1}{10}$. Snout $3 \frac{2}{5}$ to $3 \frac{1}{2}$ in head from snout tip; eye $2 \frac{7}{8}$ to 3, greater than snout or or very narrow interorbital; maxillary reaches $\frac{1}{2}$ in eye, expansion $1 \frac{1}{4}$ to $1 \frac{2}{5}$ in eye, length $1 \frac{2}{3}$ to $1 \frac{4}{5}$ in head from snout tip; interorbital 5 to $6 \frac{1}{4}$, low. Gill rakers 6 or 7 + 19, finely lanceolate, $1 \frac{2}{5}$ in eye; gill filaments $2 \frac{1}{2}$ in eye.

Scales 25 or 26 in median lateral series to caudal base. Scales very caducous, most all fallen.

One preorbital photophore before middle of front eye edge; 3 operculars, upper on front border of opercle level with eye center, other 2 at same level or in line or slightly above pectoral fin origin, well separated or with anterior about opposite hind edge of orbit and posterior close before origin of pectoral fin; 1 mandible far forward or near symphysis; row of 6 to 8 close set branchiostegals veiled in branchiostegal membrane level with 2 lower operculars and pectoral fin origin; upper or lateral series 9 between pectoral and ventral; lower or ventral series 6 on isthmus close set and compact, 12 abdominals below pectoral to ventral of which 2 before pectoral origin, 6 between ventral and anal, anals 1 + 15 to 18 + 8, of posteroanals only 2 over bases of last anal rays.

D. III, 7, I, first branched ray $1 \frac{3}{5}$ in total head length; adipose fin $1 \frac{7}{8}$ to $2 \frac{1}{8}$; A. III, 22 or III, 23, first branched ray anteriorly $2 \frac{1}{4}$ to $2 \frac{2}{5}$; caudal $1 \frac{1}{4}$ to $1 \frac{2}{3}$ (?), well forked; least depth of caudal peduncle $3 \frac{1}{5}$ to $3 \frac{1}{4}$; pectoral $1 \frac{3}{5}$ (?) to $1 \frac{2}{3}$; ventral 2 (?) to $2 \frac{1}{5}$.

Back brown, usually pale in alcoholics. Sides of head and body brilliant silvery white, also iris.

Fins all pale brownish.

Atlantic, Pacific and Antarctic Ocean.

- 10168 U.S.N.M. Bonaparte Collection 458. Academy of Natural Sciences of Philadelphia. Length 47 mm. As Scopelus della chiaje.
- 44596 U.S.N.M. N. (?) 28 ° 36 ' W. 85 ° 33 ' 30 ". In 111 fathoms. March 4, 1885. Albatross Station 2402 (?) Length 41 mm.
- 22048 U.S.N.M. Finnmarken, Norway. R. Collett. Length 47 mm.
- 23027 U.S.N.M. Finnmarken, Norway. R. Collett. Length 44 mm.
- 29000 U.S.N.M. N. 38 ° W. 73 °. Fish Hawk Station 1044. In 1044 fathoms. Length 44 mm.
- 30223 U.S.N.M. Provincetown, Mass., picked up on the beach. U.S.F.C. September 23, 1879. Length 42 mm.
- 40070 U.S.N.M. Messina. Royal Zool. Mus. Florence. Length 33 to 60 mm. 8 examples.
- 44594 U.S.N.M. Wood's Hole, Mass. Vinal N. Edwards. Length 48 mm.
- 44595 U.S.N.M. N. 28 ° 36 ' 00 W. 85 ° 33 ' 30 ". Albatross Station 2402. Length 48 mm.

Genus VALENCIENNELLUS Goode and Bean

Valenciennellus (JORDAN and EVERMANN) GOODE and BEAN, Oceanic Ichth., 1895, p.

513. Type Maurolicus tripunctulatus ESMARK, monotypic.

Body elongate, strongly compressed, tail more than half body, tapering. Head rather small, strongly compressed. Snout short. Eye large, advanced. Mouth cleft wide, very oblique, lower jaw projecting. Upper jaw formed by broad curved maxillary receiving anteriorly slender premaxillary. Teeth minute, curved backwards. Gill membranes free from isthmus. Luminous organs on head. Lateral series of larger more wide set photophores between pectoral

and ventral fins. Ventral series of photophores from isthmus to ventrals and between ventrals and anal, organs nearly touching one another, above anal arranged in 4 or 5 close set groups on rather large black patches. Dorsal origin little premedian, fin small, opposite anal origin. Adipose fin small, rather close behind dorsal. Anal 23 to 25, long, low. Caudal emarginate. Pectoral rays 10 to 12, fin set low or near ventral profile. Ventral rays 7 or 8, short, little premedian.

Valenciennellus tripunctulatus (Esmark)

Maurolicus tripunctulatus ESMARK, Forh. Vidensk. Selsk. Christiania, vol.13, 1870 (1871), p.488. Near Madagascar. - LUTKEN, Kon. Danske Vidensk. Selsk. Skrift. Kjoebenhaun, ser.6, vol.7, 1892, 269, pl.1, fig.6 (type; Denmark Straits between Greenland and Iceland).

Valenciennellus tripunctulatus JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47 pt.1, 1896, p.578 (copied). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612 (Gibraltar to Gran Canaria, thence to Cape Bojador, Gran Canaria to Fayal, Azores to Newfoundland; 1215 to 2886 meters). - GOODE and BEAN, Oceanic Ichth., 1895, p.513 (compiled). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.20 (Timor Sea, in 421 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.136, fig.50 (Timor material). - PAPPENHEIM, Deutsch. Südpolar Exped., vol.15, pt.2, 1914, p.182 (S. 32° W. 8° 28', 500 mm.). - PIETSCHMANN, Sitz. Ber. AKAD. Wiss. Wien, Math. - naturw. Klasse, vol.123, pt.1, 1914, p.427, pl.2, figs.4 - 5 (). - NORMAN, Discovery Rep., vol.2, 1930, p.300 (S. 33° 25' E. 6° 31', 1000 meters; S. 5° 54' E. 11° 19', 150 meters; S. 2° 43' 30" W. 00° 56' 30", 125 to 175 meters; S. 2° 49' 30" W. 9° 25' 30",

800 to 1000 meters; S. $00^{\circ} 56'$ W. $14^{\circ} 8' 30''$, 250 meters).

(?) Valenciennellus stellans GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p. 239, pl.53, fig.2. N. Lat. $30^{\circ} 31' 35''$, W. Long. $140^{\circ} 5' 30''$, 300 fathoms, off California. - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol. 15, Tiefsee - fische, 1906, p.100, text fig. 42 (Gulf of Guinea; Bay of Bengal; between Ceylon and Chagos Archipelago; east and west of SEYCHELLES).

Depth $3 \frac{3}{4}$ to $3 \frac{4}{5}$; head $3 \frac{1}{3}$ to $3 \frac{4}{5}$. Snout $3 \frac{3}{4}$ in head from snout tip; eye $2 \frac{2}{5}$, greater than snout; maxillary reaches $\frac{3}{4}$ in eye, length $1 \frac{2}{5}$ in head from snout tip; interorbital low.

Antorbital photophore below nostril, 1 below eye posteriorly on cheek, 2 opercular, 1 postocular, 4 branchiostegals. Lateral series 4 before pectoral and 6 between pectoral and ventral. Ventral series 16 or 17 between isthmus and ventrals of which 4 before ventral, row of 5 close set between ventral and anal, between anal origin and caudal 5 equidistant groups of photophores as 3, 3, 3, 2, 4.

D.7, fin height $3 \frac{1}{8}$ in total head; A. 24, uniformly low, fin height $3 \frac{1}{10}$; caudal $1 \frac{7}{8}$; least depth of caudal peduncle 3; pectoral $1 \frac{2}{5}$; ventral $2 \frac{3}{4}$.

Row of 15 to 17 black spots between opercle and caudal. Length 40 mm.
(Weber and Beaufort.)

Atlantic, Indian Ocean, Timor Sea, eastern Pacific.

Family STERNOPTICHIDAE

Body short, front part elevated, compressed or elongate and front part not differentiated by its height from posterior part. Eye large. Mouth cleft

vertical or nearly so. Small teeth in jaws, present or absent on vomer. No barbel. Gill membranes free from isthmus or attached, also sometimes delicately united. Gill rakers well developed. Gills 4. Branchiostegals 5 to 11. Pseudobranchiae present or absent. Scales absent or very loose. Preorbital postorbital and ocular luminous organs single; on mandibular symphysis, in branchiostegal membrane and on body in groups; between isthmus and ventral in ventral and lateral series, between ventral and caudal in 1 series; body without smaller scattered luminous organs; no whitish punctiform organs on fins. Dorsal origin, which may be preceded by spines, median or postmedian, above or before anal origin. Adipose fin low, totally or partly above hinder part of anal, which may be divided. Ventrals small, below or before dorsal origin.

ANALYSIS OF GENERA

- 1
a. An abrupt ventral constriction between trunk and tail; no teeth on vomer; dorsal fin preceded by large triangular transparent plate.
- 1
b. Eyes normal; space between trunk and tail filled by transparent integumentary plate; anal not divided Sternoptyx.
- 2
b. Eyes telescopic; body hatchet shaped, ventral constriction without integumentary plate; anal divided Argyropeleceus.
- 2
a. No abrupt ventral constriction between trunk and tail; eyes normal; teeth on vomer; dorsal fin preceded by forked spine; anal not divided Polyipnus.

Genus STERNOPTYX Hermann

Sternoptyx HERMANN, Der Naturforscher, pt.16, 1781, p.33. Type Sternoptyx

diaphana HERMANN, monotypic.

Sternoptix CUVIER, Règne Animal, vol.2, 1817, p.171. Type Sternoptix diaphana
HERMANN,

Body greatly elevated, compressed. Snout very short. Eye large. Mouth cleft subvertical, upper edge formed by very short premaxillaries and maxillaries. Lower jaw received in upper, hind lower angle with short spine, as also 1 at preopercle angle and symphysis of humeral bones. At pelvic symphysis 2 spines, 1 directed forward, smaller backward. Bifid spine behind vent. Numerous small unequal teeth in jaws, none on palate. Gill opening very wide, membranes joined to isthmus. Gill rakers moderate. No scales. Luminous organs 1 below and 1 behind eye, 1 opercular, group on branchiostegals, group on isthmus, series along ventral edge, series between ventrals and anals, above anal, behind anal, above pectorals. Dorsal origin postmedian. Upper edge of predorsal plate dentated and strong spine along its hind edge. Low adipose fin reaches nearly from dorsal to caudal. Caudal broadly forked. Anal on tegumentary abdominal fold between trunk and tail. Pectoral low, extends beyond small ventral.

Sternoptix diaphana Hermann

Sternoptix diaphana HERMANN, Der naturforscher, pt.16, 1781, p.8, pl.1, figs.1

-2, Jamaica. - GMELIN, Syst. Nat. Linn., vol.1, 1789, p.1150 (copied). -

WALBAUM, Artedi Pisc., vol.3, 1792, p.698 (copied). SCHNEIDER, Syst. Ichth.

HERMANN, Obs. Zool. Fishes, 1804, pp.301, 328 (copied). -

Syst. Ichth. Bloch, 1801, p.494 (copied). - VALENCIENNES, Hist. Nat. Poiss.

, vol.22, 1849, p.415 (25 leagues north of Saint Helena; W. Long. 45°

N. Lat. 29° from shark stomach). - GUNTHER, Cat. Fishes Brit. Mus., vol.

5, 1864, p.387 (compiled). - MINER, Rep. U.S. Fish Comm., pt.11, 1883

(1885), p.1 - 96 (N. $38^{\circ} 44'$ W. $72^{\circ} 38'$, 1209 fathoms). - Rep. Voy. Challenger, vol.22, 1887, p.169, pl.45, figs. D - D' (south of Australia; Kermadec Islands; Philippines; north of New Guinea; south of Yeddo; in 500 to 2500 fathoms). - VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p.102 (coast of Morocco; Azores; 1123 to 2792 meters). - GOODE and BEAN, Oceanic Ichth., 1895, p.124, pl.39, fig.146 (off Santa Cruz, 508 fathoms; N. 13° to 41° W. 18° to 62° , 229 to 1686 fathoms; Grand Banks, 150 fathoms). - GILBERT and CRAMER, Proc. U.S.Nat. Mus., vol.19, 1896, p.416 (Hawaiian Islands, in 313 fathoms). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.1, 1896, p.603 (compiled). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.331 (off Malabar coast, in 912 to 931 fathoms); Cat. Deep Sea Fishes Indian Mus., 1899, p.136 (Arabian Sea; off Malabar coast; 912 to 931 fathoms). - GILBERT, Bull. U.S. Fish. Comm., vol.23, pt.2, 1903 (1905), p.609 (off north Molokai; south of Oahu; near Kauai; Kaiwi Channel; Bird Island; 293 to 1024 fathoms). - BRAUER, Deutsch. Tiefsee Fische, 1906, p.115, text figs. 56 - 63 (south of Canaries; off Sierra Leone; Gulf of Guinea; off south west Africa between Congo mouth and Cape Colony; between New Amsterdam and Sumatra; Bengal Bay; between Ceylon and Maldives; between Seychelles and Zanzibar; west of Chagos). - WAITE, Records Canterbury Mus., vol.1, No.1, April 25, 1907, p. 11 (reference). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.54, pl.2, fig.5 (N. 31° to 36° W. 4° to 42° , 1400 to 5100 meters). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612 (Gibraltar to Gran Canaria, thence to Fayal, Azores to Newfoundland, thence to Glasgow, 1215 to 3886 fathoms). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.22 (Bali, Flores, Celebes Seas, Molucca Passage, Malinipa Strait, Ceram,

Banda Timor Seas, 828 to 2477 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, - vol.2, 1913, p.132, fig.48 (above materials). - PAPPENHEIM, Deutsch. Sudpolar Exped., vol.15, pt.2, 1914, p.183 (S. 10° to 23° W. 6° to 20° , 1200 to 3000 meters; N. 5° to 17° W. 21° 29° , (1500 to 3000 meters). - JESPERSEN, Rep. Danish Oceanogr. Exped. Medit., No.3, vol.2, A. 2, April 15, 1915, p.28. - ROULE, Rés. Camp. Sci. Monaco, vol.52, 1919, p.24 (south east of Pico, Azores, 1748 meters; between Pico and Saõ Jorge; Cape Finisterre, 3500 meters; between Portugal and Azores, 2100 meters). - VAILLANT, Rés. Camp. Sci. Monaco, vol.52, 1919, p.129 (N. 32° to 39° W. 17° to 26° , 1940 to 4261 meters). - GILCHRIST and VON BONDE, Fisher. Marine Biolog. Survey South Africa, Rep. No.3, 1922 (1924), No.7, p.9 (off Cape Point, 312 to 1014 fathoms). - BARNARD, Ann. South African Mus., vol.22, June 1925, p.154 (compiled). - NORMAN, Discovery Rep., vol.2, 1930, p.305 (S. 00° to 35° or N. 5° , W. 00° to 19° or E. 4° to 16° , 125 to 2700 meters).

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Sternoptyx diaphanus LUTKEN, Kon. Dansk. Vidensk. Selsk. Skr. Kjøbenhavn, ser.6, vol.7, 1892, p.283 (S. 4° E. 87° $50'$; S. 19° $30'$ W. 26° ; N. 28° W. 35° ; N. 30° W. 19° ; N. 46° W. 24°). - COLLETT, Rés. Camp. Sci. Monaco, vol.10, 1896, p.125 (N. 44° $1' 26''$ E. 15° $31'$; N. 38° $33' 21''$ E. 30° $28' 54''$, 1300 meters).

Sternoptyx hermanni LACEPÈDE, Hist. Nat. Poiss., vol.5, 1803, pp.612, 613
 (on HERMANN).

(?) Sternoptyx obscura GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.232, pl. 53, fig.1, N. 1° to 7° or S. 0° W. 78° to 89° , 134 to 1832 fathoms.

Depth $1 \frac{1}{10}$ to $1 \frac{1}{8}$; head $2 \frac{2}{5}$ to 3, width $1 \frac{3}{4}$ to 2. Snout $3 \frac{2}{3}$ to

5 in head from snout tip; eye $1 \frac{4}{5}$ to $1 \frac{7}{8}$. greatly exceeds snout or inter-orbital; maxillary reaches $\frac{1}{5}$ to $\frac{1}{4}$ in eye, length $1 \frac{1}{5}$ to $1 \frac{1}{4}$ in head from snout tip; interorbital $3 \frac{4}{5}$ to $4 \frac{1}{5}$, low, with deep median groove. Gill rakers 4 + 7, lanceolate, slender, subequal with gill filaments or $1 \frac{3}{4}$ in eye.

Small photophore in angle of preopercle ridge; 1 postorbital, close behind upper hind eye edge, less distinct with age; 1 on lower portion of opercle behind preopercle spine; 3 small anterior branchiostegals. Lateral series of photophores as 3 close set at same level little above to little below level of pectoral fin origin; lower or ventral series as 5 on isthmus, 10 abdominals, 3 well elevated ventrals, 3 above transparent area above anal base with single small photophore close in advance and still higher, then 4 or 5 between caudal and anal.

D. 10 to 12, first ray 2 to 3 in total head length; A. 12 to 14, fin height 3 to $3 \frac{1}{5}$; caudal 1 to $1 \frac{1}{8}$, well forked; least depth of caudal peduncle $2 \frac{1}{5}$ to $2 \frac{3}{4}$; pectoral 1 to $1 \frac{3}{4}$; ventral 3.

Silvery white, including iris. Back and head above brownish. Fins pale to whitish.

Atlantic, Indian and Pacific Oceans.

4318. D. 5671. Chenoki Point, S. 31° E., 42.5 miles (S. $1^{\circ} 5'$ E. $118^{\circ} 56'$), Macassar Strait. In 920 fathoms. December 30, 1909. Length 48 mm.

4788. D. 5317. China Sea, vicinity Formosa (N. $21^{\circ} 36'$ E. $117^{\circ} 27'$). In 230 fathoms. November 5, 1908. Length 18 mm.

4503. D. 5320. China Sea, vicinity Formosa (N. $20^{\circ} 58'$ E. $120^{\circ} 3'$). In 1804 fathoms. November 6, 1908. Length 15 to 41 mm. 3 examples

4088. D. 5606. Dodepo Island (W.) N. 3° W., 10.8 miles (N. 0° $16' 28''$ E. $121^{\circ} 33' 30''$), Gulf of Tomini, Celebes. In 834 fathoms. November 17, 1909. Length 54 mm.

D. 5437. Hermana Mayor Light, N. 69° E., 4.9 miles (N. $15^{\circ} 45' 54''$ E. $119^{\circ} 42' 45''$), west coast of Luzon. May 8, 1909. Length 30 to 52 mm. 2 examples.

D. 5185. Luzaran Light, N. 23° E., 25.50 miles (N. $10^{\circ} 5' 45''$ E. $122^{\circ} 18' 30''$), between Panay and Negros. In 638 fathoms. March 30, 1908. Length 18 mm.

D. 5618. Mareh Island, S. 69° E., 7.8 miles (N. $0^{\circ} 37'$ E. $127^{\circ} 15'$), Molucca Passage. In 417 fathoms. November 27, 1909. Length 28 mm.

D. 5619. Mareh Island (S.) S. 78° E., 7 miles (N. $0^{\circ} 35'$ E. $127^{\circ} 14' 40''$), Molucca Passage. In 435 fathoms. November 27, 1909. Length 21 mm.

D. 5647. North Island (S.), S. 87° E., 11.6 miles (S. $5^{\circ} 34'$ E. $122^{\circ} 18' 15''$), Buton Strait. In 519 fathoms. December 16, 1909. Length 22 mm.

D. 5349. Point Tabonan, N. 85° E., 45.2 miles (N. $10^{\circ} 54'$ E. $118^{\circ} 26' 20''$), Palawan Passage. In 700 fathoms. December 27, 1908. Length 28 mm.

9561. D. 5632. Selang Point (Bachian Island), N. 56° W., 12.5 miles (N. 1° E. $127^{\circ} 50'$), south of Patiente Strait. In 845 fathoms. December 2, 1909. Length 40 mm.

9868. D. 5460. Sialat Point Light, N. 24° E., 8.2 miles (N. $13^{\circ} 32' 30''$ E. $58^{\circ} 6'$), east coast Luzon. In 565 fathoms. June 10, 1909.

Length 65 mm.

2250. D. 5463. Sialat Point Light, S. $74^{\circ} E.$, 3.9 miles (N. $13^{\circ} 40' 57'' E.$ $123^{\circ} 57' 45''$), east coast of Luzon. In 300 fathoms. June 16, 1909. Length 50 mm.

D. 5120. Sombrero Island, S. $79^{\circ} 30' E.$, 19.2 miles (N. $13^{\circ} 45' E.$ $120^{\circ} 30' 30'' 15''$), Balayan Bay and Verde Island Passage. In 393 fathoms. January 21, 1908. Length 26 mm.

D. 5287. Sombrero Island, N. $68^{\circ} E.$, 11.25 miles (N. $13^{\circ} 37' 40'' E.$ $120^{\circ} 39'$), China Sea, vicinity southern Luzon. In 379 fathoms. July 20, 1908. Length 15 mm.

26235 U.S.N.M. Off Grand Banks. In 150 fathoms. Schooner "Guy Cunningham". Length 31 mm.

32659 U.S.N.M. N. $87^{\circ} 46' 30'' W.$ $74^{\circ} 00' 00''$. Albatross Station. Length 44 mm.

33471 U.S.N.M. N. $41^{\circ} 13' W.$ $66^{\circ} 00' 50''$. Albatross Station 2076. In 906 fathoms. Length 19 to 27 mm. 2 examples.

33563 U.S.N.M. N. $39^{\circ} 18' 30'' W.$ $68^{\circ} 24'$. In 1686 fathoms.

> Albatross Station 2101. Length 36 mm.

44590 U.S.N.M. N. $13^{\circ} 32' 40'' W.$ $62^{\circ} 54' 00''$ Albatross Station. Length 30 mm. 690 fathoms.

47719 U.S.N.M. N. $21^{\circ} 15' W.$ $157^{\circ} 30'$. Albatross Station 3473. Length 30 mm.

53052 U.S.N.M. N. $35^{\circ} 9' 50'' W.$ $74^{\circ} 57' 40''$. In 938 fathoms. Albatross Station 2111. Length 32 to 36 mm. 2 examples.

55288 U.S.N.M. Albatross Station 4111. Length 33 mm.

- 55289 U.S.N.M. Albatross Station 3888. Length 28 mm.
- 55290 U.S.N.M. Albatross Station 4155. Length 22 mm.
- 55291 U.S.N.M. Albatross Station 4026. Length 25 mm.
- 57884 U.S.N.M. N. $6^{\circ} 17'$ W. $82^{\circ} 05'$. 1672 fathoms. Albatross
 Station 3360. Length 33 mm., without caudal; $N. 4^{\circ} 03' W. 81^{\circ} 31'$. 899
 fathoms. Albatross Station 3380. Length 40 mm., without caudal; $N. 7^{\circ}$
 $06' W. 79^{\circ} 48'$. 1. 168 fathoms. Albatross Station 3388. Length 27
 mm., without caudal. All as Sternoptyx obscura.
- 83889 U.S.N.M. Albatross Station 2657. Length 31 mm.
- 84096 U.S.N.M. Mauna Loa, Hawaii. T. Reinhardt. Length 28 (?) mm.,
 dry example. As Polynipnus nuttingi.
- 84497 U.S.N.M. Albatross Station 2656. Length 20 mm.
- 89912 U.S.N.M. N. $32^{\circ} 50'$ W. $64^{\circ} 18'$. Mus. Comp. Zool. No. 38.
 Station 323. Length 24 to 38 mm. 6 examples.
- 1 example U.S.N.M. Albatross Station 4657. Length 34 mm.

Genus ARGYROPELECUS Cocco

Argyropelecus COCCO, Archiv. R. Acad. Peloritano, 1829, p.146. Type

Argyropeleceus hemigymnus COCCO, monotypic.

Pleurothyris LOWE, Hist. Fishes Madeira, 1843, p.64. Type Sternoptix olfersii
 CUVIER, monotypic.

Sternoptychides OGILBY, Proc. Linn. Soc. New South Wales, ser.2, vol.3, 1888
 (1889), p.1313. Type Sternoptychides amabilis OGILBY, monotypic.

Body compressed, short, front portion much higher than posterior, short v
 ventral ridge with an anterior and 2 posterior spines. Upper jaw edge formed
 by premaxillary, which enclose mandible, which furnished with prominent hook

at symphysis and at lower hind angle. Palatines with row of small curved teeth. Preopercle ventrally with 1 or 2 spines. Gill opening wide, membranes free from isthmus and each other. Gill rakers long. Branchiostegals 9. No scales. Luminous organs on head before and below eyes, on opercle, group on branchiostegals, ventral and lateral series on trunk, 3 groups on tail. Predorsal plate serrated, followed by 7 to 9 rays before anal. Long low adipose fin present. Caudal deeply emarginate. Pectoral long, low. Ventral very small.

ANALYSIS OF SPECIES.

- 1
a. Photophores in nearly continuous series.
- 1
b. Depth (without dorsal ridge) $2 \frac{1}{3}$ to $2 \frac{1}{2}$; predorsal ridge rather low, length of exposed portion of last spine more than twice in dorsal fin base affinis.
- 2
b. Depth (without dorsal ridge) $1 \frac{4}{5}$ to 2; predorsal ridge higher, length of exposed portion of last spine $1 \frac{3}{5}$ to $1 \frac{2}{3}$ in dorsal fin base gigas.
- 2
a. Postabdominal photophores in 3 groups as preanal, supraanal and caudal.
- 1
c. Single serrated abdominal spine; supraanal photophore separated from preanals by space more than half length of supraanals and from caudal by space greater than supraanal series length hemigymnus.
- 2
c. Pair of smooth abdominal spine; supraanal photophore separated from preanals by very short interspace and from caudal by space less than length of supraanal series.
- 1
d. Hind abdominal spine longer than anterior and directed forwards; adults with dorsal and abdominal ridges serrated and with double series of spines on lower edge of caudal peduncle

aculeatus.

²
d. Abdominal spines subequal or anterior longer; dorsal and abdominal ridges not serrated; no spines on caudal peduncle.

¹
e. Lower preopercle spine curved, upper very small or absent; depth $1 \frac{1}{2}$

offersi.

²
e. Lower preopercle spine straight, upper moderate or small, directed backwards; depth $1 \frac{3}{5}$

sladeni.Argyropelecus affinis Garman

Argyropelecus affinis GARMAN, Mem. Mus. Comp. Zool., vol.24, 1889, p.237.

N. Lat. $15^{\circ} 24' 40''$ W. Long. $63^{\circ} 31' 30''$, in 683 meters. - BRAUER, Deutsch, Tiefsee Exped. Valdivia, vol.15, Tiefsee-fische, 1906, p.103, text figs. 43 - 44, pl.7, fig.1 (Bay of Bengal; Chagos Islands; west of Seychelles; north east coast of Africa and Gulf of Aden; in 1000 to 2500 meters). - REGAN, Trans. Linn. Soc. London, ser.2, vol.12, Zool., 1908, p.218 (in 750 to 1000 fathoms near Farquhar Atoll). - JESPERSEN and TAANING, Rep. Danish Oceanogr. Exped. Medit., No. ; vol.2, A. 2, 1915, p.6.-- TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist., vol.52, art.1, May 16, 1925, p.11 (31° off Todos Santos Bay, Lower California, 868 fathoms). - BARNARD, Ann. South African Mus., vol.2, 1930, p. 301, fig.9 (N. $8^{\circ} 12'$ W. $18^{\circ} 49'$, 450 to 500 meters).

(?) Argyropelecus elongatus ESMARK, Forh. Vid. Selsk. Christiania, vol.1, 1870 (1871), p.489. Skibsfører Thoresen i Tønsberg i det chinesiske Hav.

Argyropelecus hemigymnus (not COCCO) Goode and Bean, Oceanic Ichth., 1895, pl. 39, fig.147.

Depth 2 to $2 \frac{1}{4}$; head 3 to $3 \frac{1}{8}$, width $2 \frac{1}{5}$. Snout $3 \frac{3}{4}$ to $3 \frac{7}{8}$ in

head from snout tip; eye $2 \frac{1}{5}$ to $2 \frac{1}{2}$, greatly exceeds snout or narrow interorbital; maxillary reaches $\frac{1}{3}$ to $\frac{1}{2}$ in eye, expansion $1 \frac{1}{2}$ to $1 \frac{7}{8}$ in eye, length 1 to $1 \frac{1}{5}$ in head from snout tip; interorbital narrow bony frenum barely $\frac{1}{8}$ of eye. Gill rakers 8 - 13, finely lanceolate, $1 \frac{1}{2}$ in eye; gill filaments $1 \frac{2}{3}$ in eye.

Preorbital photophore close below nostrils; 1 on cheek at angle of preopercle ridge; 2 operculars, upper opposite lower part of eye, lower just above and close behind preopercle angle; 6 branchiostegals. Upper lateral photophores 8 between pectoral and ventral, second highest or level with cheek photophore, first and third lowest, then third to eight gradually higher until eight high as second; lower or ventral series 6 on isthmus, 12 abdominal of which 2 before pectoral base, 4 between ventral and anal, 11 from front of anal to caudal base of which 6 above anal base.

D. VIII or IX, 9, first flexible ray $3 \frac{7}{8}$ (?) in total head length; A. 13, fin height $4 \frac{1}{4}$ (?); caudal $1 \frac{2}{3}$ (?), damaged; least depth of caudal peduncle 3; pectoral $1 \frac{1}{5}$ to $1 \frac{1}{3}$; ventral $2 \frac{3}{4}$ (?)

Largely silvery white, upper part of head and back brownish. Iris silvery gray. Photophores silvery or pale yellowish white, with surrounding tissues blackish.

Atlantic, Pacific and Indian Oceans.

$\frac{1}{2}$ 44593 U.S.N.M. N. $15^{\circ} 24' 40''$ W. $63^{\circ} 31' 30''$. In 683 fathoms.

Albatross Station 2117. Length 35 mm., caudal lost.

87563 U.S.N.M. Off Lower California. In 930 fathoms. Albatross Station 5686. Length 45 mm., caudal lost.

Argyrolepecus gigas Norman

Argyrolepecus gigas NORMAN, Discovery Rep., vol.2, 1930, p.302, fig.10. S. 32° 45' W. 8° 47', 650 meters; S. 2° 49' 30" W. 9° 25' 30", 800 to 1000 meters.

Depth $1 \frac{7}{8}$; head $3 \frac{1}{4}$ to $3 \frac{3}{4}$. Snout $3 \frac{1}{10}$ in head from snout tip; eye $3 \frac{1}{10}$, subequal with snout; maxillary extends $1 \frac{3}{4}$ eye diameters below eye, hind end midway in eye, expansion equals eye, length $1 \frac{1}{5}$ in head from snout tip; no very long teeth in lower jaw; palatines toothless or very few feeble teeth anteriorly; preopercle with strong, straight or slightly curved downwardly directed spine at angle, above which much smaller spine directed outwards. Lower gill rakers 11.

One opercular photophore, close above level of lower edge of orbit. Lateral series 8 between pectoral and ventral, first 2 higher and others subequally low. Ventral series 2 before pectorals then 10 between pectoral and ventral, 4 between ventral and anal and 10 from anal origin to caudal of which 6 over anal.

Predorsal ridge rather high of 6 graduated spines up to last, which $3 \frac{1}{2}$ in head; D. 9, sixth ray $2 \frac{1}{10}$; adipose fin low, length $1 \frac{1}{3}$; A. 13, third ray 3; caudal $1 \frac{7}{8}$; least depth of caudal peduncle $2 \frac{1}{5}$; pectoral $1 \frac{3}{4}$; ventral 6.

Length 87 mm. (Norman.)

Atlantic.

Argyrolepecus hemigymnus Cocco

Argyrolepecus hemigymnus COCCO, Archiv. R. Acad. Peloritano, 1829, p.146.

Messina. - Bonaparte, Iconogr. Fauna Italica, vol.3, pt.1 Pesci, fasc. 28,

1840, no pagination (Italy); Cat. Metod. Pesc. Europ., 1846, p.37 (Mediterranean); Rep. Voy. Challenegr, vol.22, 1887, p.167 (between Shetland and Faroe Islands). - VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p.103 (Gulf of Marsailles, Gulf of Gascony, Canaries, coast of Portugal, Coast of Morocco, 741 to 1534 meters). - ALCOCK, Ann. Mag. Nat. Hist., ser.6, vol.8, 1891, p.126 (Bay of Bengal, 1803 fathoms. - LÜTKEN, Kon. Dansk. Vidensk. Selsk. Skr. Köbenhavn, ser.6, col.7, 1892, p.283 (N. 44° to 45° W. 24° to 26° ; N. 39° W. 10° , 180 fathoms). - CARUS, Prodr. Zool. Medit., vol.2, 1893, p.568 (compiled). - GOODE and BEAN, Oceanic Ichth., 1895, p.126 (pl.39 not fig. 147) (N. $39^{\circ} 56'$ W. $70^{\circ} 35'$, 245 fathoms). - JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p.605 (compiled). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.331 (reference); Cat. Deep Sea Fishes Indian Mus., 1899, p.135 (Bengal Bay material). - BRAUER, Deutsch. Tiefsee-Fische, 1905, p.106, text fig.45 (west of Cape Colony; Bay of Bengal; between New Amsterdam and Sumatra; between Ceylon and Chagos; between Chagos and Zanzibar, 1500 to 2400 meters). - REGAN, Trans. Linn. Soc. London, ser.2, Zool., vol.12, 1908, p.219 (diagnosis in key). - ZUGMAYER, Res. Camp. Sci. Monaco, vol.35, 1911, p.51 (N. 28° to 44° W. 0° to 19° , 520 to 4900 meters). - FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1911, (1912) p. 571 (Italy). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612, fig.458 (Plymouth to Gibraltar, thence to Gran Canaria, thence to Cape Bojador, Gran Canaria to Fayal, Azores to Newfoundland, thence to Glasgow, 1215 to 4700 meters). - HOLT and BYRNE, Dep. Agric. Techn. Instruct. Ireland, Sci. Invest., No.1, 1913, p.21, figs. 7 b - 8 (Irish Atlantic Slope, 208 to 900 fathoms). - PAPPENHEIM, Deutsch Südpolar Exped., vol.15, pt.2, 1914, p.182 (S. 8° to 35° or N. 0° to 46° E. 2° to 11° or W. 6° to 34° , 1000 to 3000 meters). - JESPERSEN, Rep.

1840, no pagination (Italy); *Cat. Metod. Pesc. Europ.*, 1846, p.37 (Mediterranean) . - VALENCIENNES, *Hist. Nat. Poiss.*, vol.22, 1849, p.398 (Naples, Messina, Nice). - GUNTHER, *Cat. Fishes Brit. Mus.*, vol.5, 1865, p.385 (Messina; Mediterranean); *Rep. Voy. Challenger*, vol.22, 1887, p.167 (between Shetland and Faroe Islands). - VAILLANT, *Exped. Sci. Travailleur et Talisman, Poiss.*, 1888, p.103 (Gulf of Marsailles, Gulf of Gascony, Canaries, coast of Portugal, Coast of Morocco, 741 to 1534 meters) . - ALCOCK, *Ann. Mag. Nat. Hist.*, ser.6, vol.8, 1891, p.126 (Bay of Bengal, 1803 fathoms). - LÜTKEN, *Kon. Dansk. Vidensk. Selsk. Skr. København*, ser.6, vol.7, 1892, p.283 (N. 44° to 45° W. 24° to 26° ; N. 39° W. 10° , 180 fathoms). - CARUS, *Prodr. Zool. Medit.*, vol.2, 1893, p.568 (compiled). - GOODE and BEAN, *Oceanic Ichth.*, 1895, p.126 (pl.39 not fig.147) (N. $39^{\circ} 56'$ W. $70^{\circ} 35'$, 245 fathoms). - JORDAN and EVERMANN, *Bull. U.S. Nat. Mus.*, No.47, pt.1, 1896, p.605 (compiled). - ALCOCK, *Journ. Asiatic Soc. Bengal*, vol.65, pt.2, 1896, p.331 (reference); *Cat. Deep Sea Fishes Indian Mus.*, 1899, p.135 (Bengal Bay material). - BRAUER, *Deutsch. Tiefsee Exped. Valdivia*, vol.5, *Tiefsee-Fische*, 1905, p.106, text fig. 45 (west of Cape Colony; Bay of Bengal; between New Amsterdam and Sumatra; between Ceylon and Chagos; between Chagos and Zanzibar; 1500 to 2400 meters). - REGAN, *Trans. Linn. Soc. London*, ser.2, *Zool.*, vol.12, 1908, p.219 (diagnosis in key). - ZUGMAYER, *Rés. Camp. Sci. Monaco*, vol.35, 1911, p.51 (N. 28° to 44° W. 0° to 19° , 520 to 4900 meters). - FOWLER, *Proc. Acad. Nat. Sci. Philadelphia*, 1911 (1912), p. 571 (Italy). - MURRAY and HJORT, *Depths of the Ocean*, 1912, p.612, fig. 458 (Plymouth to Gibraltar, thence to Gran Canaria, thence to Cape Bojador, Gran Canaria to Fayal, Azores to Newfoundland, thence to Glasgow, 1215 to 4700 meters). - HOLT and BYRNE, *Dep. Agric. Techn. Instruct.*

Ireland, Sci. Invest., No.1, 1913, p.21, figs. 7 b - 8 (Irish Atlantic Slope, 208 to 900 fathoms). - PAPPENHEIM, Deutsch. Südpolar Exped., vol.15, pt.2, 1914, p.182 (S. 8° to 35° or N. 0° to 46° E. 2° to 11° or W. 6° to 34° , 1000 to 3000 meters). - JESPERSEN, Rep. Danish Oceanogr. Exped. Medit., No.3, vol.2, A. 2, April 15, 1915, p.7. - ROULE, Rés. Camp. Sci. Monaco, vol.52, 1919, p.25 (between São Miguel and Terceira, Azores, 992 meters; Gulf of Gascony; Cape Finisterre, 3500 meters; between Portugal and Azores, 2100 meters; Azores, 2600 meters). - VAILLANT, Rés. Camp. Sci. Monaco, vol.52, 1919, p.129 (N. $34^{\circ} 32' 8''$; $8^{\circ} 44' 45''$; N. $43^{\circ} 52'$; W. $9^{\circ} 5' 45''$, 1674 meters; N. $37^{\circ} 54'$; W. $24^{\circ} 43' 15''$; N. $38^{\circ} 30' 35''$; W. $28^{\circ} 16' 20''$, 349 meters; N. $32^{\circ} 36'$; W. $14^{\circ} 27' 15''$) . - BARNARD, Ann. South African Mus., vol.21, June 1925, p.153 (off Cape Point, 156 to 630 fathoms). - JESPERSEN and TAANING, Rep. Danish Oceanogr. Exped. Medit., No. , vol.2, A. 12, 1908 - 10, p.48. - NORMAN, Discovery Rep., vol.2, 1930, p.303, pl.2, fig.4 (S. 24° to 35° W. 1° to 13° E. 4° to 15° , 250 to 2500 meters).

Sternoptyx hemigymnus VALENCIENNES, Règne Animal, Ill. Poiss., 1839, pl.103, fig.3.

Salmo gasteropelecus (not PALLAS) Faujas, Ann. Mus. Hist. Nat. Paris, vol.8, 1806, p.370 (Spezzia).

Sternoptix mediterranea COCCO, Oss. pesci Messina (Il Faro, vol.4,) anno 6, 1838, p.7, fig.2. Messina.

Argyrolepecus d' urvillei VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.405. mid Atlantic. - GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.586 (copied).

(?) Argyrolepecus intermedius CLARKE, Tr. Proc. New Zealand Inst., vol.23, pt. 1, 1903 (1905), p.601, pl.72, fig.1.

Argyropelecus alcocki GOODE and BEAN, Oceanic Ichth., 1895, p.196 (name based on Alcock's 1891 record).

Argyropelecus heathi GILBERT, Bull. U.S.Fish Comm., vol.23, 1903, (1905), p.601, pl.72, fig.1. Kaiwi Channel, between Maui and Molakai, in 350 to 355 fathoms. - FOWLER. Mem. Bishop Mus., vol.10, 1928, p.35 (Alika, Hawaii).

(?) Argyropelecus intermedius CLARKE, Trans. New Zealand Inst., vol.10, 1877 (1878), p.244, pl.6 (upper figures). Hokitika. - WAITE, Records Canterbury Mus., vol.1, No.1, Ap.25, 1907, p.11 (reference).

Depth $1 \frac{2}{5}$ to 2; head $2 \frac{3}{4}$ to $3 \frac{1}{8}$, width $2 \frac{1}{8}$ to $2 \frac{1}{5}$. Snout 3 to $3 \frac{2}{3}$ in head from snout tip; eye 2 to $2 \frac{1}{2}$, greatly exceeds snout or very narrow interorbital; maxillary vertically inclined, reach $\frac{1}{2}$ in eye, expansion $1 \frac{1}{3}$ to $1 \frac{3}{5}$ in eye, length 1 to $1 \frac{1}{5}$ in head from snout tip; interorbital narrowly constricted bony ridge, very slender. Gill rakers 11 + 12, slender, $1 \frac{1}{5}$ in eye; gill filaments 3 in eye.

Preorbital photophore close below nostrils; 1 on cheek close above angle of preopercle ridge; 2 operculars, upper level with lower portion of orbit, lower close above and behind preopercle angle. Upper lateral photophores 8, second highest or little above lower opercular, third graduated up to eighth which at same level as first or both level with lower opercular; lower or ventral series 6 on isthmus before pectoral fin, 12 abdominals between pectoral and ventral bases, of which 2 before pectoral base, 4 between ventral and anal, 6 over anal base and 4 at bases of lower rudimentary caudal rays.

D. VI, to X, 7 to 10, first flexible ray 2 to $2 \frac{1}{5}$ in total head length; A. 10 or 11, third ray $1 \frac{7}{8}$ to 3; caudal $1 \frac{1}{5}$, well forked; least depth of caudal peduncle 3 to 4; pectoral $1 \frac{1}{10}$ to $1 \frac{1}{5}$; ventral $2 \frac{2}{5}$ to $2 \frac{1}{2}$.

Largely bright silvery white. Back and upper surfaces usually with brownish. Iris Gray white. Fins whitish.

Atlantic, Pacific and Indian Oceans.

10143 U.S.N.M. Mediterranean. C. L. Bonaparte. Academy Nat. Sci. Philadelphia. Length 32 or 33 mm., without broken caudals.

40053 U.S.N.M. Italy. Florence Museum. Length 26 to 34 mm. 18 examples.

51632 U.S.N.M. Hawaiian^a Islands. Albatross Station 4107. Length 35 mm. Type of Argyropelecus heathi.

92244 U.S.N.M. Straits of Messina. Milan Museum. Length 46 to 50 mm. 2 examples.

8 examples. A.N.S.P. Italy. C. L. Bonaparte 455. Dr. T.B. Wilson. Length 25 to 46 mm.

Argyropelecus aculeatus Valenciennes

Argyropelecus aculeatus VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.406.

Azores. - GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.386 (copied). - SAUVAGE, Hist. Nat. Madagascar, Poiss., 1891, p.483, pl.48, fig.5 (Réunion). - LUTKEN, Kon. Dansk. Vidensk. Selsk. Skr. København, ser.6, vol.7, 1892, p. 282 (S. 32° E. 44° 10', Indian Ocean). - GOODE and BEAN, Oceanic Ichth., 1895, p.127 (compiled). - COLLETT, Vidensk. Selsk. Forhandl. Christiania, 1903, No.9, p.108 (Azores); Zool. Anzeiger, vol.28, 1905, p.726 (Azores). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee - Fische, 1906, p.110, text fig. 47 (Collett's example). - REGAN, Trans. Linn. Soc. London, ser.2, vol.12, Zool., 1908, p.219 (diagnosis in key). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612 (Gibraltar to GRAN Canaria, thence to Cape Bojador, Gran Canaria to Fayal, Azores to New-

foundland, 1215 to 2865 meters). - JESPERSEN, Rep. Danish Oceanogr. Exped. Medit., vol.2, A. 2, 1908 - 10, p.27. - NORMAN, Discovery Rep., vol.2, 1930, p.303 (S. 34° to 35° E. 10° to 16° , 250 to 1000 meters).

(?) Argyropelecus acanthurus COCCO, Giorn. Sci. Sicilia, vol.24, 1831, p.1342 (Messina).

Sternoptyx acanthurus VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.408 (reference).

Sternoptychides amabilis OGILBY, Proc. Linn. Soc. New South Wales, ser.2, vol.3, 1888 (1889), p.1313. Lord Howe Island.

Argyropelecus amabilis MC CULLOCH, Records Australian Mus., vol.14, 1923, p.118, pl.14, fig.3.

Argyropelecus olfersii (not CUVIER) COLLETT, Arch. Math. Naturv. Christiania, vol.19, 1897, No.7, p.14 (Azores).

Depth $1 \frac{1}{3}$; head $2 \frac{3}{4}$. Snout 4 in head from snout tip; eye $2 \frac{1}{3}$, greatly exceeds snout; maxillary extends $1 \frac{2}{5}$ eye diameters below eye, about opposite its center, expansion $1 \frac{2}{5}$ in eye, length subequal with head from snout tip; interorbital low.

Lateral photophores 8 between pectoral and ventral, second highest, first next in height, others subequally low. Ventral series 6 before pectoral, 12 between pectoral and ventral, 4 above ventral before anal, 6 above anal, 4 at lower base of caudal. One opercular spot below level of pupil.

D. VI, 9, sixth spine 2 in total head, fifth ray $1 \frac{4}{5}$; adipose fin $1 \frac{4}{5}$; A. I, 6 - I, 5, third branched ray $2 \frac{1}{2}$; caudal $1 \frac{2}{5}$; least depth of caudal peduncle 3; pectoral $1 \frac{1}{3}$; ventral $3 \frac{1}{4}$.

Length to 55 mm. (Norman.)

Atlantic Ocean.

Argyrolepecus olfersii (CUVIER)

Sternoptyx olfersii CUVIER, Regne Animal, ed.2, vol.2, 1829, p.316. Atlantic Ocean.

Sternoptyx olfersii DUBEN and KOREN, Vet. Akad. Handlig. Stockholm, 1844, p.80, pl.3, fig.6. - NILSSON, Skandinav. Fauna, Fisk., 1855, p.486.

Argyrolepecus olfersii VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.408 (south east of Cape of Good Hope; between Canaries and Brazil). - LOWE, Proc. Zool. Soc. London, 1850, p.247 (Madeira). - BLEEKER, Naturk. Tydschr. Nederl. Indie, vol.21, 1860, p.56 (reference). - GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1865, p.386 (compiled). - COLLETT, Forhand. Vid. Selsk. Christiania, 1874, Tillaegsh., p.149; 1879, No.1, p.84; Nyt Mag. Naturv. Christiania, vol.29, 1884, p.102, (Norway). - GUNTHER, Rep. Voy. Challenger, vol.22, 1887, p.167 (off Cape Finisterre). - VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p.104 (off Portugal, 950 to 1615 meters). - Lilljeborg, Sveriges Norg. Fauna, Fisk., vol.3, 1891, p.3. - LUTKEN, Kon. Dansk. Vidensk. Selsk. Skrift. København, ser.6, vol.7, 1892, p.282 (N. 43° to 47° W. 23° to 27°). - VINCIGUERRA, Atti Soc. Ital. Sci. Nat., vol.34, 1892, p.331 (Canaries). - SMITT, Hist. Scandinavian Fishes, vol.2, 1895, p.925, fig.233. - GOODE and BEAN, Oceanic Ichth., 1895, p.126, pl.39, fig.148 a (N. 36° to 42° W. 16° to 74° , 144 to 2069 fathoms; Grand Banks). - REGAN, Trans. Linn. Soc. London, ser.2, Zool., vol.12, 1908, p.219 (diagnosis in key). - NORMAN, Discovery Rep., vol.2, 1930, p.304, fig.12 (S. $00^{\circ} 46'$ E. $5^{\circ} 49' 15''$, 850 to 950 meters).

Argyrolepecus olfersii COLLETT, Res. Camp. Sci. Monaco, vol.10, 1896, p.127,

pl.3, fig.14 (between Graciosa and Fayal, Azores). - JORDAN and EVER-
MANN, Bull. U.S.N.M., No.47, pt.1, 1896, p.604 (compiled). - BRAUER,
Deutsch. Tiefsee Exped. Valdivia, vol.5, Tiefsee-Fische, 1906, p.108,
text fig. 46 (Gulf of Guinea; between New Amsterdam and Sumatra; south
of Ceylon; west of Chagos Archipelago). - ZUGMAYER, Rés. Camp. Sci.
Monaco, vol.35, 1911, p.52 (N. $43^{\circ} 4' 30''$ W. $19^{\circ} 42'$; N. $44^{\circ} 19'$
W. $11^{\circ} 19'$, 4900 meters; N. $37^{\circ} 38'$ W. $10^{\circ} 53'$, 4900 meters). -
N. $37^{\circ} 38'$ W. $10^{\circ} 53'$, 4900 meters; N. $37^{\circ} 38'$ W. $10^{\circ} 53'$, 4900
meters). - MURRAY and HJORT, Depths of the Ocean, 1912, p.612 (Plymouth
to Gibraltar, thence to Gran Canaria, thence to Fayal, Newfoundland to
Glasgow, 1215 to 4700 meters). - HOLT and BYRNE, Dep. Agric. Techn. In-
struct. Ireland, Sci. Invest., No.1, 1913, p.20 (Irish Atlantic Slope,
380 to 700 fathoms). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.21
(Banda Sea, 2798 meters). - WEBER and BEAUFORT, Fishes Indo Austral.
Archipelago, vol.2, 1913, p.134, fig.49 (Banda material). - JESPERSEN,
Rep. Danish Oceanogr. Exped. ^{a.2,} ~~Medit.~~, No.3, vol.2, April 5, 1915, p.23. -
ROULE, Rés. Camp. Sci. Monaco, vol.52, 1919, p.25 (south east of Pico,
between Pico and Saõ Jorge, Princess Alice Bank, Cape Finisterre, between
Portugal and Azores, off Azores, 0 to 3500 meters). - VAILLANT, Rés.
Camp. Sci. Monaco, vol.52, 1919, p.129 (N. $36^{\circ} 54'$ W. $20^{\circ} 46' 15''$;
N. $38^{\circ} 53'$ W. $26^{\circ} 40' 45''$, 1935 meters). - BARNARD, Ann. South
African Mus., vol.21, June 1925, p.153 (off Cape Point, 460 fathoms).

Argyrolepecus lychnus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.234, pl.
J, figs. 1 - b. S. 0° to 10° W. 78° to 96° , 286 to 2232 fathoms,
Gulf of Panama. - PARR, Bull. Bingham Oceanogr. Collection, vol.2, art.
4, Oct.1931, p.17, fig.5 (abdominal spines) (N. $24^{\circ} 7'$ W. $108^{\circ} 40'$,

286 fathoms; N. $14^{\circ} 30' 30''$. $96^{\circ} 14'$, 625 fathoms; N. $11^{\circ} 5'$ W. $89^{\circ} 20' 45''$, 300 fathoms).

Argyrolepecus lichnus TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist., New York, vol.52, art.1, May.16, 1925, p.11 (off Lower California, 491 fathoms).

Argyrolepecus caninus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.235. Off Port Louis Harbor, Mauritius).

Depth $1 \frac{1}{3}$ to $1 \frac{2}{5}$; head $2 \frac{4}{5}$ to 3, width $1 \frac{3}{4}$ to 2. Snout $2 \frac{4}{5}$ to $3 \frac{1}{5}$ in head from snout tip; eye $2 \frac{1}{5}$ to 3, greatly exceeds snout or narrow interorbital; maxillary vertical, reaches opposite front eye edge to $\frac{1}{2}$ in eye, expansion $1 \frac{2}{5}$ to 2 in eye, length 1 in head from snout tip; interorbital 3 in eye, rather low, with deep median groove. Gill rakers 6 + 10, lanceolate, slender, $1 \frac{1}{4}$ in eye; gill filaments $\frac{2}{3}$ in gill rakers.

Preorbital photophore below nostrils; 1 veiled on cheek just above angle of preopercle angle or little above lower eye edge, lower larger just above and close behind preopercle angle; 6 branchiostegals. Lateral series of photophores 8, second highest or level with lower opercular, first little lower or above pectoral fin origin, then others all graduated lower to eight; lower or ventral series as 6 on isthmus, 12 abdominals to ventral of which 1 or 2 before pectoral origin, 4 between ventral and anal, 6 above anal base and 4 on lower surface of caudal peduncle.

D. VII or VIII, 9, first flexible ray 2 to $2 \frac{1}{4}$ in total head length; A. II, 10 or II, 11, first flexible ray 2 to 3; caudal 1 to $1 \frac{1}{8}$, widely emarginate; least depth of caudal peduncle $2 \frac{1}{8}$ to $2 \frac{1}{2}$; pectoral $1 \frac{1}{5}$ to 2; ventral 3 to $3 \frac{1}{4}$.

Largely brilliant silvery white. Back and upper surface of head brown.

Iris gray to silvery white. Fins all whitish.

Atlantic, Pacific and Indian Oceans.

3711. D. 5387. Bagatao Island Light (outer), S. 80° E., 27 miles (N. $12^{\circ} 54' 40''$ E. $123^{\circ} 20' 30''$), between Burias and Luzon. In 209 fathoms. March 11, 1909. Length 35 mm.

4447. D. 5525. Balicasag Island (C.), N. 11° W., 8.2 miles (N. $9^{\circ} 12' 30''$ E. $123^{\circ} 44' 7''$), between Siquijor and Bohol. In 405 fathoms. August 11, 1909. Length 45 mm.

D. 5530. Balicasag Island (C.), N. 32° E., 4.3 miles (N. $9^{\circ} 26' 45''$ E. $123^{\circ} 38' 30''$), between Siquijor and Bohol. August 11, 1909. Length 15 mm.

D. 5497. Bantigui Island, N. 64° W., 10 miles (N. $9^{\circ} 7' 15''$ E. $124^{\circ} 59' 30''$), between Leyte and Mindanao. In 960 fathoms. August 3, 1909, Length 18 to 27 mm. 4 examples.

D. 5437. Hermana Mayor Light, N. 69° E., 4.9 miles (N. $15^{\circ} 45' 54''$ E. $119^{\circ} 42' 45''$), west coast of Luzon. May 8, 1909. Length 13 or 14 mm. 2 examples.

D. 5457. Legaspi Light, S. 60° W., 5 miles (N. $13^{\circ} 12'$ E. $123^{\circ} 49' 40''$), east coast of Luzon. In 146 fathoms. June 8, 1909. Length 20 mm.

D. 5246. Luban Island (N.), S. 58° W., 4.6 miles (N. $6^{\circ} 29' 15''$ E. $126^{\circ} 18' 45''$), Pacific Ocean east of Mindanao. May 15, 1908. Length 23 mm.

D. 5184. Lusaran Light, N. 22° E., 11.25 miles (N. $10^{\circ} 18' 30''$ E. $122^{\circ} 23' 30''$), between Panay and Negros. In 565 fathoms. March 30, 1908. Length 19 to 20 mm. 2 examples.

D. 5185. Lusaran Light, N. 23° E., 25.50 miles (N. $10^{\circ} 5' 45''$ E. $122^{\circ} 18' 30''$), between Panay and Negros. In 638 fathoms. March 30, 1908. Length 15 mm. Poor example.

D. 5500. Macabalan Point Light (Mindanao), S. 20° E., 7.9 miles (N. $8^{\circ} 37' 45''$ E. $124^{\circ} 36' 45''$), northern Mindanao and vicinity. In 267 fathoms. August 4, 1909. Length 11 to 25 mm. 37 examples.

D. 5125. Nogas Island (W.), S. 11° E., 24 miles (N. $10^{\circ} 48'$ E. $121^{\circ} 48' 30''$), Sulu Sea vicinity southern Panay. In 411 fathoms. February 3, 1908. Length 11 mm. 2 examples, in very poor condition.

D. 5227. Point Origon, S. 44° E., 18.30 miles (N. $12^{\circ} 53' 45''$ E. $121^{\circ} 52' 30''$), east of Mindoro. In 322 fathoms. May 5, 1908. Length 11 or 12 mm. 2 examples, in very poor condition.

3061. D. 5447. San Miguel Point, S. 7° W., 3.5 miles (N. $13^{\circ} 28'$ E. $123^{\circ} 46' 18''$), east coast of Luzon. In 310 fathoms. June 4, 1909. Length 43 mm.

D. 5120. Sombrero Island, S. $79^{\circ} 30'$ E., 19.2 miles (N. $13^{\circ} 45' 30''$ E. $120^{\circ} 30' 15''$), Balayan Bay and Verde Uskand Passage. In 393 fathoms. January 21, 1908. Length 15 to 20 mm. 2 examples.

4804 and 4805. D. 5368. Tayabas Light (outer), N. 32° W., 21.8 miles (N. $13^{\circ} 35' 30''$ E. $121^{\circ} 48'$), Marinduque Island and vicinity. In 181 fathoms. February 23, 1909. Length 32 to 41 mm.

33296 U.S.N.M. N. $39^{\circ} 40'$ W. $68^{\circ} 28' 30''$. In 1467 fathoms.
Albatross Station 2043. Length 60 mm.

33393 U.S.N.M. N. $41^{\circ} 40' 30''$ W. $65^{\circ} 35'$. In 855 fathoms.
Albatross Station 2075 Length 41 mm.

33495 U.S.N.M. N. $42^{\circ} 22'$ W. $66^{\circ} 23'$. In 144 fathoms. Albatross

Station 2065. Length 23 mm.

35467 U.S.N.M. N. $39^{\circ} 44'$ W. $70^{\circ} 3'$. In 1058 fathoms. Albatross Station 2195. Length 42 mm.

35534 U.S.N.M. N. $39^{\circ} 33' 71''$ W. $16^{\circ} 15'$. In 1178 fathoms. Albatross Station 2208. Length 41 to 46 mm. 2 examples.

35561 U.S.N.M. N. $39^{\circ} 34' 45''$ W. $71^{\circ} 21' 30''$. In 1080 fathoms. Albatross Station 2209. Length 38 mm.

38116 U.S.N.M. Grand Banks. W. A. Wilcox. Length 45 (?) mm.

38211 U.S.N.M. N. $36^{\circ} 30'$ W. $74^{\circ} 33'$. In 859 fathoms. Albatross Station 2728. Length 64 mm.

57885 U.S.N.M. Albatross Station 3360 and 3392. Length 28 to 56 mm. As Argyropelecus lychnus.

74336 U.S.N.M. Albatross Station 2565. Length 38 mm.

86124 U.S.N.M. Gulf of Mexico. Grampus Station 10445. In 300 meters. January 25, 1917. Length 16 to 20 mm. 2 examples.

Argyropeleceus sladeni Regan

Argyropelecus sladeni REGAN, Trans. Linn. Soc. London, ser.2, vol.12, Zool. No.

14, 1908, p.218. Chagos Archipelago, Salomon, in 400 to 500 fathoms. - NORMAN, Discovery Rep., vol.2, 1930, p.304, fig.13 (S. 0° to 15° E. 10° to 11° or W. 0° to 20° , 125 to 700 meters).

Depth $1 \frac{2}{3}$ to $1 \frac{4}{5}$; head $2 \frac{7}{8}$ to $3 \frac{1}{8}$. Snout 3 to $4 \frac{1}{4}$ in head from snout tip; eye $2 \frac{1}{2}$ to $2 \frac{3}{4}$, exceeds snout; maxillary extends $1 \frac{1}{3}$ to $1 \frac{4}{5}$ eye diameters below eye, reaches opposite eye center, expansion 1 to $1 \frac{2}{3}$ in eye, length 1 to $1 \frac{1}{5}$ in head from snout tip; upper preopercular spine small, well developed, directed outwards and backwards, lower more or less straight.

One opercular photophore close above level of lower orbital edge. Lateral series 8, second highest, first next and others subequally low. Ventral series 6 on isthmus, then 2 or 3 before pectoral continuous with 9 or 10 to ventral, 4 between ventral and anal, 6 above anal and 4 at lower caudal base.

Predorsal spines 6, graduated up to last which $3 \frac{1}{2}$ to 4 in total head length; D. I, 8, third branched ray 2 to $2 \frac{1}{4}$; adipose fin low, length $1 \frac{1}{3}$ to $1 \frac{1}{2}$; A. I, 10, second branched ray $3 \frac{1}{4}$ to $3 \frac{1}{4}$; caudal $1 \frac{1}{8}$; least depth of caudal peduncle $2 \frac{4}{5}$; pectoral $1 \frac{1}{10}$; ventral 3.

Length 28 mm. (Norman.)

North and South Atlantic, Antartic and Indian Oceans.

Genus POLYIPNUS Günther

Polyipnus GÜNTHER, Rep. Voy. Challenger, vol.22, 1887, p.170. Type Polyipnus spinosus GÜNTHER, monotypic.

Snout very short. Eye large. Mouth cleft vertical, rather small, bordered above by slender premaxillaries, which followed by posteriorly expanded maxillaries. Mandible received within upper jaw. Bands of minute teeth on premaxillaries and mandible, in series on maxillary. Similar teeth on vomer. Preopercular spine strong. Spiny ridges on head and belly. Gill rakers rather long. Gill opening wide, membranes free from isthmus, delicately united. Branchiostegals 9 to 11. Body covered with large, extremely thin, deciduous scales. Luminous organs before, behind and below eye, on opercle, between branchiostegals, in groups along isthmus, ventral edge, between ventral and anal, above and behind anal, above and behind pectorals. Dorsal origin nearly median. Adipose fin low. Anal begins at last third in body. Caudal forked. Pectorals long. Ventrals short.

ANALYSIS OF SPECIES

- ¹
a. POLYIPNUS. Spines on head short or obtuse, little developed; photophores large and conspicuous.
- ¹¹
b. Black triangle of back not extending below middle of eye.
- ¹
c. Anal photophores of ventral series all at same level or nearly level with highest of lateral series.
- ¹
d. Posttemporal spine trifid and all 3 spines conspicuous, pointing down or back.
- ¹
e. Lower gill rakers 12 tridentifer.
- ²
e Lower gill rakers 18 stereocepe.
- ²
d. Posttemporal spine trifid though only main spine conspicuous; lower gill rakers 13 spinusus.
- ²
c. Anal photophores in ventral series with first 3 elevated level with height of lateral series, then 3 lower and finally rest high as first laternatus.
- ²
b. Black triangle of back extends down nearly level with lower eye edge; lower gill rakers 14 to 16 nuttingi.
- ²
a. ACANTHOPOLYIPNUS new subgenus. Spines on head large, well developed; photophores rather inconspicuous; lower gill rakers 13 fraseri.

Subgenus POLYIPNUS Gunther

Spines on head short of obtuse, little developed. Photophores large and conspicuous.

Polyipnus tridentifer Mc Culloch

~~Biol. Results Endeavour, vol.2, pt.3, July 3, 1924, p.87, pl.16, fig.4, text~~

Polyipnus tridentifer MC CULLOCH, Biol. Results Endeavour, vol.2, pt.3, July 3, 1914, p.87, pl.16, fig.4, text fig.4. Great Australian Bight, in 350 to 450 fathoms. - WAITE, Records South Austral. Mus., vol.2, No.1, 1921, p.43, fig.63.

Polyipnus spinosus (not GUNTHER) BARNARD, Ann. South African Mus., vol.21, June 1925, p.155 (part).

Depth $1 \frac{3}{4}$; head $2 \frac{3}{4}$. Snout $4 \frac{1}{2}$ in head from snout tip; eye 2, greater than snout; maxillary extends $\frac{2}{3}$ an eye diameter below eye, reaches opposite front eye edge, expansion $1 \frac{4}{5}$ in eye, length $1 \frac{1}{4}$ in head from snout tip; jaws with teeth granular exteriorly, premaxillaries with depressible biserial teeth anteriorly; several irregular rows of small depressible teeth on vomer; 1 or 2 small teeth on front end of palatines; strong spine at preopercle angle; post-temporal end in 3 very large spines each side, upper longest and lower bent downward. Lower gill rakers 12, slender.

Below eye on cheek luminous organ large as pupil. Upper opercular photophore close behind hind eye edge medially, lower spot little above and behind preopercle angle. Lateral series 7, third and seventh highest or extend trifle above level of luminous body on cheek, second next, then others all gradually smaller from first, fourth until sixth. Lower or ventral series 6 or 7 on isthmus, 10 from isthmus to ventral of which 3 before pectoral fin, 5 between ventral and anal, then level with third and seventh laterals 20 to caudal base (of which 13 over anal).

D. III, 11, first branched ray 2 in total head length; adipose fin low, length $4 \frac{3}{4}$; A. III, 14, first branched ray $2 \frac{1}{6}$; caudal $1 \frac{1}{3}$; least depth of caudal peduncle $3 \frac{4}{5}$; pectoral $1 \frac{2}{5}$; ventral $2 \frac{2}{3}$.

Back blackish brown, with minute darker specks. Small black triangle descends until level with upper edge of pupil. Small iridescent blackish spot before eye and upper part of opercle black. Eye brownish black, pupil surrounded by golden ring. Photophores strongly defined with black.

Length 93 mm. (McCulloch.)

Great Australian Bight.

Polyipnus stereope Jordan and Starks

Polyipnus stereope JORDAN and STARKS, Bull. U.S. Fish Comm., vol.22, 1902 (1904), p.581, pl.2, fig.3. Sagami Bay, Japan.

Polyipnus spinosus (not GUNTHER) BARNARD, Ann. South African Mus., vol.21, June 1925, p.155 (part).

Depth $1 \frac{3}{5}$; head $2 \frac{4}{5}$, width $1 \frac{4}{5}$. Snout $4 \frac{1}{2}$ in head from snout tip; eye $2 \frac{1}{8}$, greatly exceeds snout or interorbital; maxillary reaches $\frac{1}{4}$ in eye, expansion $1 \frac{3}{4}$ in eye, length $1 \frac{1}{4}$ in head from snout tip; interorbital 4, rather low, depressed and concave medially; opercular spine $1 \frac{3}{4}$ in eye. Gill rakers $10 + 18$, finely lanceolate, subequal with gill filaments or $1 \frac{3}{4}$ in eye.

Preorbital photophore opposite middle of front eye edge; cheek with large photophore, nearly large as pupil, on lower limb of preopercle; 2 operculars, upper opposite middle of hind eye edge, lower just behind and above preopercle angle. Upper lateral series of photophores 8, first higher than others except third and seventh, third level with lower eye edge, fourth to sixth gradually lower with fourth nearly level with lower opercular and with sixth lower than first ventral, seventh nearly level with third, eight little higher than lower

opercular; lower or ventral series as 6 on isthmus, 10 abdominals before ventrals of which at 2 at least before pectoral origin, 4 between ventral and anal, 17 from above front of anal to caudal base.

D. I, 13, third ray $2 \frac{2}{3}$ in total head length; adipose fin 3; A. 15, fifth ray 5; caudal $1 \frac{3}{4}$ (?), damaged, slightly emarginate behind; least depth of caudal peduncle $2 \frac{3}{5}$; pectoral $1 \frac{1}{5}$; ventral $2 \frac{1}{3}$.

Back brown, with 2 narrow triangular brown points invading silvery white of side and extending at least to lateral line or level of lower pupil edge. Iris gray. Under surfaces of body with grayish about photophores. Fins whitish.

Japan. Closely related to Polyipnus spinosus, differing in the dark triangles of the back extending down lower or to the lateral line. The occipital spines also short, not extending over $\frac{1}{4}$ to soft dorsal origin. In Polyipnus spinosus I find them variably extended much further or even quite to spine at front of dorsal.

51451 U.S.N.M. Sagami Bay, Japan. Albatross Station 3698. Length 58 (?) mm., caudal broken. Type.

Polyipnus spinosus Günther

Polyipnus spinosus GÜNTHER, Rep. Voy. Challenger, vol.22, 1887, p.170, pl.51, fig.B. Between Philippines and Borneo in 250 fathoms, N. Lat. $6^{\circ} 47'$ E. Long. $122^{\circ} 28'$. - ALCOCK, Ann. Mag. Nat. Hist., ser.6, vol.4, 1889, p.398 (Bay of Bengal; between north and south Sentinel Islands; in 220 to 240 fathoms); ser.6, vol.8, 1891, p.126 (Station 115, in 188 to 220 fathoms). - GOODE and BEAN, Oceanic Ichth., 1895, p.128, (not pl. 39. fig.148) (reference). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65,

pt.2, 1896, p.331 (off Andaman Islands, in 188 to 240 fathoms). - GILBERT and CRAMER, Proc. U.S.Nat. Mus., vol.19, 1896, p.416 (Hawaiian Islands, in 298 fathoms). - ALCOCK, Descr. Cat. Deep Sea Fishes Indian Mus., 1899, p.137 (off Andaman Islands). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.5, Tiefsee - fische, 1906, p.120, text figs. 64 - 66, pl.7, fig.3 (west coast of Sumatra; north east coast of Africa; in 371 to 1362 meters). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.22 (Bali, Flores, Celebes Seas, Molucca Passage, Manipa Strait, Ceram, Banda, Timor Seas, in 828 to 2477 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.130, fig.47 (Madura, Bali Seas, Macassar Strait, Molucca Passage, Arafura, Timor Seas, in 287 to 538 meters). - GILCHRIST and VON BONDE, Fisher. Marine Biolog. Survey South Africe, Rep. No.3, 1922 (1924), No.7, p.9 (off Cape Morgan and Natal Coast, 174 to 306 fathoms). - BARNARD, Ann. South African Mus., vol.21, June 1925, p.155, pl.8, fig.2 (compiled).

[Depth $1 \frac{3}{4}$ to $1 \frac{4}{5}$; head $2 \frac{3}{4}$ to $2 \frac{4}{5}$, width $1 \frac{7}{8}$ to 2. Snout
 [$4 \frac{1}{5}$ to $4 \frac{1}{2}$ in head from snout tip; eye 2 to $2 \frac{1}{10}$, greatly exceeds
 [snout or interorbital; maxillary vertical, reaches eye, expansion $1 \frac{3}{4}$
 to $1 \frac{7}{8}$ in eye, length $1 \frac{1}{5}$ to $1 \frac{2}{5}$ in head from snout tip; interorbital
 4 to 5, low, depressed medially, opercular spine half of eye. Gill rakers 5 +
 13, lanceolate, little longer than gill filaments or $1 \frac{2}{5}$ in eye.

Large luminous body on lower preopercle limb below eye, equally large as pupil; 2 operculars, upper opposite eye center, lower just above level of preopercle angle; 5 branchiostegals. Upper laterals as 8, of which first above pectoral fin, second slightly higher, third level with lower eye edge, fourth to sixth slope down posteriorly all lower than first and second and

and sixth about level with pectoral fin origin, seventh level with third, eighth level with first; lower or ventral series 6 on interorbital before pectoral fin, 10 abdominal little before pectoral base to ventral origin, 4 between ventral and anal, then 18 from over anal origin to caudal.

D. II to V, 13 or 14, fifth flexible ray 2 in total head; A. 16 or 17, third ray $2 \frac{3}{5}$ to $2 \frac{4}{5}$; caudal $1 \frac{1}{3}$ to $1 \frac{2}{5}$, well forked, lobes sharply pointed; least depth of caudal peduncle $3 \frac{1}{3}$ to $3 \frac{2}{3}$; pectoral $1 \frac{1}{3}$ to $1 \frac{3}{5}$; ventral $2 \frac{1}{3}$ to $2 \frac{4}{5}$.

Largely brilliant silvery white. Back with dark brown of rather narrow extent and 2 dark brown triangles invading silvery white till level with upper eye edge. Fins whitish.

Indian and Pacific Oceans.

D. 5535. Apo Island (C.), S. 24° W., 17 miles (N. $9^{\circ} 20' 30''$ E. $123^{\circ} 23' 45''$), between Cebu and Siquijor. In 310 fathoms. August 19, 1909. Length 57 to 75 mm. 17 examples.

4149. D. 5537. Apo Island (C.), S. 46° W., 8.7 miles (N. $9^{\circ} 11' 8''$ E. $123^{\circ} 23'$), between Negros and Siquijor. In 254 fathoms. August 19, 1909. Length 57 to 85 mm. 5 examples.

3777. D. 5388. Bagatao Island Light (outer), S. 86° E., 21 miles (N. $12^{\circ} 51' 30''$ E. $123^{\circ} 26' 15''$), between Burias and Luzon. In 226 fathoms. March 11, 1909. Length 70 mm.

D. 5260. Balanja Point, N. 28° W., 7.20 miles (N. $12^{\circ} 25' 35''$ E. $121^{\circ} 31' 35''$), off southeastern Mindoro. In 234 fathoms. June 3, 1908. Length 48 to 78 mm. 80 examples.

4381. D. 5261. Balanja Point, N. 80° W., 6 miles (N. $12^{\circ} 30' 55''$ E. $121^{\circ} 34' 24''$), off southeastern Mindoro. In 145 fathoms. June 4, 1908. Length 40 mm.

D. 5198. Baliscasag Island, S. 6 E., 10.25 miles (N. $9^{\circ} 40' 50''$ E. $123^{\circ} 39' 45''$), vicinity western Bohol. In 220 fathoms. April 9, 1908. Length 51 to 76 mm. 8 examples.

D. 5363. Cape Santiago Light, S. 79° W., 4.5 miles (N. $13^{\circ} 47' 20''$ E. $120^{\circ} 43' 30''$), Balayan Bay, Luzon. In 180 fathoms. February 20, 1909. Length 29 to 74 mm. 11 examples.

D. 5301. China Sea, vicinity Hong Kong (N. $20^{\circ} 37'$ E. $115^{\circ} 43'$). In 208 fathoms. August 8, 1908. Length 28 to 61 mm. 17 examples.

D. 5317. China Sea, vicinity Formosa (N. $21^{\circ} 36'$ E. $117^{\circ} 27'$). In 230 fathoms. November 6, 1908. Length 64 to 67 mm. 4 examples.

5777 and 5778. D. 5563. Dammi Island (N.), N. 79° W., 6.1 miles (N. $5^{\circ} 48' 12''$ E. $120^{\circ} 30' 48''$), between Jolo and Tawi Tawi. In 224 fathoms. September 21, 1909. Length 44 to 49 mm.

1791. D. 5270. Escarceo Light, S. 9° E., 4.25 miles (N. $13^{\circ} 35' 45''$ E. $120^{\circ} 58' 30''$), Verde Island Passage and Batangas Bay. In 235 fathoms. June 8, 1908. Length 60 (?) mm.

10074. D. 5291. Escarceo Light, N. 39° W., 2.20 miles (N. $13^{\circ} 29' 40''$ E. $121^{\circ} 00' 45''$), China Sea vicinity southern Luzon. In 173 fathoms. July 23, 1908. Length 56 mm.

22906. D. 5292. Escarceo Light, N. 36° W., 3.25 miles (N. $13^{\circ} 28' 45''$ E. $121^{\circ} 1' 1/2''$), China Sea, vicinity southern Luzon. In 162 fathoms. July 23, 1908. Length 69 mm.

D. 5293. Escarceo Light, N. 59° W., 6 miles (N. $13^{\circ} 28' 15''$ E. $121^{\circ} 4' 30''$), China Sea, vicinity southern Luzon. In 180 fathoms. July 23, 1908. Length 28 to 52 mm. 6 examples.

D. 5549. Jolo Light (Jolo), N. 80° E., 15.8 miles (N. $6^{\circ} 11' 15''$ E. $120^{\circ} 44' 20''$), Jolo Island and vicinity. In 263 fathoms. September 17, 1909. Length 43 mm.

D. 5626. Kayoa Island (S.E.), S. 5° W., 6.7 miles (N. $0^{\circ} 7' 30''$ E. $127^{\circ} 29'$), between Gillolo and Kayoa Islands. In 265 fathoms. November 29, 1909. Length 68 to 85 mm. 6 examples.

2984. D. 5419. Luis Point Light, N. 27° E., 17.8 miles (N. $9^{\circ} 58' 30''$ E. $123^{\circ} 46'$), between Cebu and Bohol. In 175 fathoms. March 25, 1909. Length 53 mm.

D. 5589. Mabul (N.W.) N. 3° W., 2.8 miles (N. $4^{\circ} 12' 10''$ E. $118^{\circ} 38' 8''$), Sibuko Bay, Borneo and vicinity. In 260 fathoms. September 29, 1909. Length 78 mm.

1616. D. 5590. Mabul Island (N.W.) N. 22° W., 4.3 miles (N. $4^{\circ} 10' 50''$ E. $118^{\circ} 39' 35''$), Sibuko Bay, Borneo and vicinity. In 310 fathoms. September 29, 1909. Length 80 mm.

D. 5500. Macabalan Point Light (Mindanao), S. 20° E., 7.9 miles (N. $8^{\circ} 37' 45''$ E. $124^{\circ} 36' 45''$), northern Mindanao and vicinity. In 267 fathoms. August 4, 1909. Length 22 to 26 mm. 6 examples.

D. 5501. Macabalan Point Light (Mindanao), S. 35° E., 8.2 miles (N. $8^{\circ} 37' 37''$ E. $124^{\circ} 35'$), northern Mindanao and vicinity. In 214 fathoms. August 4, 1909. Length 34 to 62 mm. 4 examples.

D. 5502. Macabalan Point Light (Mindanao), S. 35° E., 8.2 miles (N. $8^{\circ} 37' 37''$ E. $124^{\circ} 35'$), northern Mindanao and vicinity. In 214

fathoms. August 4, 1909. Length 46 to 68 mm. 17 examples.

3163. D. 5503. Macabalan Point Light (Mindanao), S. 31° E., 6.6 miles (N. $8^{\circ} 36' 26''$ E. $124^{\circ} 36' 8''$), northern Mindanao and vicinity. In 226 fathoms. length 45 to 68 mm. 76 examples.

2823 and 2824. D. 5621. Makyan Island (S.), N. 54° W., 3 miles (N. $0^{\circ} 15'$ E. $127^{\circ} 24' 35''$), between Gillolo and Makyan Islands. In 298 fathoms. November 28, 1909. Length 68 (?) to 76 mm.

2866 to 2868. D. 5367. Malabrigo Light, N. 81° E., 8 miles (N. $13^{\circ} 34' 37''$ E. $121^{\circ} 7' 30''$), Verde Island Passage. In 180 fathoms. February 22, 1909. Length 60 to 73 mm.

10094. D. 5281. Malavatuan Island (N.), S. 84° W., 4.30 miles (N. $13^{\circ} 52' 45''$ E. $120^{\circ} 25'$), China Sea, vicinity southern Luzon. In 201 fathoms. July 18, 1908. Length 62 mm.

5700. D. 5267. Matocot Point, S., 39° E., 5.50 miles (N. $13^{\circ} 42' 20''$ E. $120^{\circ} 58' 25''$), Verde Island Passage and Batangas Bay. In 170 fathoms. June 8, 1908. Length 60 mm.

D. 5265. Matocot Point, Luzon, S. 17° E., 3.30 miles (N. $13^{\circ} 41' 15''$ E. $120^{\circ} 00' 50''$), Verde Island Passage and Batangas Bay. In 135 fathoms. June 6, 1908. Length 34 mm.

D. 5268. Matocot Point, S., 50° E., 5.80 miles (N. $13^{\circ} 42'$ E. $120^{\circ} 57' 15''$), Verde Island Passage and Batangas Bay. In 170 fathoms. June 8, 1908. Length 50 to 63 mm. 6 examples.

10048. D. 5269. Matocot Point, S., 54° E., 3 miles (N. $13^{\circ} 39' 50''$ E. $120^{\circ} 59' 30''$), Verde Island Passage and Batangas Bay. In 220 fathoms. June 8, 1908. Length 51 mm.

D. 5288. Matocot Point, Luzon, S. 20° E., 5.70 miles (N. $13^{\circ} 43'$

30 " E. 121 °), China Sea, vicinity southern Luzon. In 140 fathoms.

July 22, 1908. Length 10 to 11 mm. 3 examples.

4546. D. 5593. Mt. Putri (sea tangent) Borneo, N. 52 ° W., 17. 2 miles (N. 4 ° 2 ' 40 " E. 118 ° 11 ' 20 "), Sibuko Bay, Borneo, and vicinity. In 38 fathoms. September 29, 1909. Length 72 mm.

D. 5645. North Island (N.E.), S. 10 ° W., 1. 6 miles (S. 5 ° 29 ' 6 " E. 122 ° 36 ' 6 "), Buton Strait. In 206 fathoms. December 16, 1909. Length 36 to 50 mm. 2 examples.

D. 5336. Observatory Island (N.), S. 42 ° W., 9 miles (N. 11 ° 37 ' 45 " E. 119 ° 46 '), Linapacan Strait. In 46 fathoms. December 18, 1908. Length 60 to 80 mm. 18 examples.

5746. D. 5171. Omapui Island (W.), S. 22 ° W. 12 miles (N. 5 ° 5 ' E. 119 ° 28 '), Sulu Archipelago, vicinity Sibutu Island. In 250 fathoms. February 28, 1908. Length 47 mm.

D. 5190. Pescador Island, S. 9 ° E., 10. 70 miles (N. 10 ° 8 ' 15 " E. 123 ° 16 ' 45 "), Tanon Strait, east coast of Negros. In 295 fathoms. April 1, 1908. Length 45 mm.

D. 5518. Point Tagolo Light, S. 64 ° W., 8. 7 miles (N. 8 ° 48 ' E. 123 ° 31 '), northern Mindanao and vicinity. In 200 fathoms. August 9, 1909. Length 68 to 77 mm. 6 examples.

1366. D. 5179. Romblon Light, S. 56 ° E., 4. 50 miles (N. 12 ° 38 ' 15 " E. 122 ° 12 ' 30 "), vicinity Romblon. In 37 fathoms. March 25, 1908. Length 51 mm.

3936 and 3937. D. 5221. San Andreas Island (W.), S. 27 ° E., 5. 50 miles (N. 13 ° 38 ' 15 " E. 121 ° 48 ' 15 "), between Marinduque and Luzon. In 193 fathoms. April 24, 1908. Length 60 to 65 mm.

D. 5222. San Andreas Island (W.), S. 57° E., 9.20 miles (N. 13° $38' 30''$ E. 121° $42' 45''$), between Marinduque and Luzon. In 195 fathoms. April 24, 1908. Length 52 to 57 mm. 5 examples.

D. 5592. Silungan Island (M.), N. 1° W., 6.4 miles (N. 4° $12' 44''$ E. 118° $27' 44''$), Sibuko Bay, Borneo and vicinity. In 305 fathoms. September 29, 1909. Length 48 to 58 mm. 2 examples.

4535. D. 5569. Simaluc Island (S.E.), S. 8° W., 6.4 miles (N. 5° $33' 15''$ E. 120° $15' 30''$), north of Tawi Tawi. In 303 fathoms. September 22, 1909. Length 45 mm.

4550. D. 5113. Sombrero Island, S. 7° W., 9.50 miles (N. 13° $51' 30''$ E. 120° $50' 30''$), China Sea off southern Luzon. In 159 fathoms. January 17, 1908. Length 63 mm.

D. 5116. Sombrero Island, N. 69° E., 2.50 miles (N. 13° $41' 41''$ E. 120° $47' 05''$), Balayan Bay and Verde Island Passage. In 200 fathoms. January 20, 1908. Length 32 to 76 mm. 41 examples.

D. 5118. Sombrero Island S. 47° E., 10 miles (N. 13° $48' 45''$ E. 120° $41' 51''$), Balayan Bay and Verde Island Passage. In 159 fathoms. Length 61 to 65 mm. 3 examples.

D. 5287. Sombrero Island, N. 68° E., 11.25 miles (N. 13° $37' 40''$ E. 120° $39'$), China Sea, vicinity southern Luzon. In 379 fathoms. July 29, 1908. Length 32 to 40 mm. 5 examples.

4290. D. 5662. Tana Keke Island (W.), N. 17° W., 15.5 miles (S. 5° $43'$ E. 119° $18'$), Flores Sea. In 211 fathoms. December 21, 1909. Length 67 mm.

4806. D. 5368. Tayabas Light (outer), N. 32° W., 21.8 miles (N. 13° $35' 30''$ E. 121° $48'$), Marinduque Island and vicinity. In 181 fathoms. February 23, 1909. Length 26 mm.

D. 5372. Tayabas Light (outer), N. 3° W., 4.5 miles (N. $13^{\circ} 49'$ 12" E. $121^{\circ} 36' 9''$), Marinduque Island and vicinity. In 150 fathoms. February 24, 1909. Length 50 mm.

D. 5374. Tayabas Light (outer), N. 9° E., 7.4 miles (N. $13^{\circ} 46'$ 45" E. $121^{\circ} 35' 8''$), Marinduque Island and vicinity. In 190 fathoms. March 2, 1909. Length 42 to 72 mm. 12 examples.

2291. Length 58 to 65 mm. 3 examples.

44429 U.S.N.M. Andaman Sea. Investigator Collection. Indian Museum. Length 53 mm.

47720 U.S.N.M. N. $1^{\circ} 09'$ W. $157^{\circ} 53'$. Albatross Station 3476. Length 53 mm.

86131 U.S.N.M. Gulf of Mexico. Grampus Station 10482. March 23, 1917. Length 28 mm.

Polyipnus laternatus Garman

Polyipnus laternatus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.238.

Blake 280, off Barbadoes, 221 fathoms. - NORMAN, Discovery Rep., vol.2, 1930, p.305, fig.14 (N. $13^{\circ} 25'$ W. $18^{\circ} 22'$, 900 meters).

Polyipnus spinosus (not GUNTHER) GOODE and BEAN, Oceanic Ichth., 1895, pl.39, fig.148.

Depth $1 \frac{3}{5}$; head $2 \frac{2}{3}$. Snout $4 \frac{1}{4}$ in head from snout tip; eye $2 \frac{1}{4}$, greater than snout; maxillary extends $\frac{3}{4}$ an eye diameter below eye, expansion $1 \frac{1}{3}$ in eye, reaches opposite front eye edge, length $1 \frac{1}{5}$ in head from snout tip; interorbital low.

Large luminous body on cheek directly below eye above lower preopercle

limb. Opercular photophore close behind middle of hind eye edge and apparently another behind preopercle spine. Upper lateral series 8 between pectoral and ventral, third highest, second and seventh next at same level, first little lower, then fourth and eighth level and fifth and sixth subequally lowest. Ventral series 6 on isthmus, 10 between pectoral and ventral, 4 between ventral and anal then 3 elevated level with first and second of lateral series before and over front of anal fin, then 3 and 5 over anal fin and finally 4 small close set ones at caudal base.

D. 14, third ray $2 \frac{1}{2}$ in total head length; adipose fin low, length 4; A. 16, fourth ray $3 \frac{3}{4}$; caudal $1 \frac{1}{3}$; least depth of caudal peduncle 3; pectoral $1 \frac{1}{4}$; ventral 3.

Back dark, with V-shaped extension down level to middle of eye. Length 34 mm. (Norman.)

Atlantic, West Indies. Norman says it differs from Polyipnus spinosus by the form of its post-temporal spines, presence of palatine teeth and arrangement of postabdominal photophores.

Polyipnus nuttingi Gilbert

Polyipnus nuttingi Gilbert

Polyipnus nuttingi GILBERT, Bull. U.S. Fish Comm., vol.23, pt.2, 1903 (1905), p.609, pl.73. Approach to Pailolo Channel between Molokai and Maui, in 297 to 334 fathoms; off Oahu; Kauia; in 216 to 324 fathoms. - JORDAN and JORDAN, Mem. Carnegie Mus., vol.10, No.1, 1922, p.9 (reference). - FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (cotypes; Alika, Hawaii).

Polyipnus spinosus (not GÜNTHER) GILBERT and CRAMER, Proc. U.S. Nat. Mus., vol. 19, 1897, p.416 (N. Lat. $21^{\circ} 9'$ W. Long. $157^{\circ} 53'$, in 298 fathoms). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.5, Tiefsee-fische, 1906, p.

120 (part). - BARNARD, Ann. South African Mus., vol.21, June 1925, p.155 (part).

Depth $1 \frac{3}{4}$ to $1 \frac{4}{5}$; head $3 \frac{1}{5}$ to $3 \frac{1}{3}$, width $1 \frac{2}{3}$ to 2. Snout $3 \frac{1}{2}$ to 7 in head from snout tip; eye 2 to $2 \frac{2}{5}$, greatly exceeds snout or interorbital; maxillary reaches $\frac{1}{5}$ to $\frac{1}{3}$ in eye, expansion $1 \frac{2}{3}$ to $1 \frac{7}{8}$ in eye, length $1 \frac{1}{2}$ to $1 \frac{3}{4}$ in head from snout tip; interorbital $4 \frac{4}{5}$ to 6, low, depressed medially; opercular spine short, $\frac{1}{3}$ of eye. Gill rakers 6 to 8 + 14 to 16, subequal with gill filaments or $\frac{1}{2}$ of eye.

Scales 3 in median lateral series; 9 transversely. Scales thin, transparent, simple, very caducous or mostly fallen.

Preorbital photophore close to front orbital edge medially; cheek with large photophore, little less than pupil, little higher than lower opercular and opposite middle of eye or nearly median on cheek; 2 operculars, upper level with upper pupil edge and close behind orbit, lower below upper and level with lower hind maxillary end. Upper lateral series 8, first and eighth nearly at same level and but little below lower opercular, fourth only slightly lower than first, second slightly higher or level with lower opercular, fifth and sixth lowest of series or but slightly above pectoral origin, third highest or level with lower eye edge and seventh but slightly lower though little above level of spot on cheek; lower or ventral series with 6 on isthmus, 10 abdominal before ventral of which 2 before pectoral base, 4 between ventral and anal, 11 above anal base and 4 on lower surface of caudal peduncle before rudimentary caudal rays.

D. I to III, 11 or 12, fourth branched ray $1 \frac{3}{4}$ to 2 in head; adipose fin $2 \frac{1}{5}$ to $2 \frac{1}{3}$; A. II, 13 to 15, first branched ray $2 \frac{4}{5}$ to 3; caudal $1 \frac{1}{8}$ to $1 \frac{1}{2}$, well forked; least depth of caudal peduncle 3 to $3 \frac{1}{8}$;

pectoral $1 \frac{3}{4}$ to $1 \frac{4}{5}$; ventral $2 \frac{1}{4}$ to 3 (?).

Dark brown above, with narrow V-like extension invading silvery white of flanks until down opposite level of lower eye edge. Sides and lower surfaces bright silvery white. Abdomen and under parts largely dusky to blackish, with photophores golden. Iris silvery gray. Fins all whitish.

Pacific Ocean.

51593 U.S.N.M. Hawaiian Islands. Albatross Station ^{4102.} Length 47 to 85 mm. 33 examples. Paratypes.

51599 U.S.N.M. between Molokai and Maui. In _____ fathoms. Albatross Station 4088. Length 83 mm. Type.

ACANTHOPOLYIPNUS new subgenus

Type Polyipnus fraseri new species

Body deep, strongly compressed. Head very large, compressed. Eye greatly enlarged, supero lateral, elevated. Mouth vertical, terminally superior, mandible with short spine at symphysis. Teeth in jaws very minute. Occipital spines very long, extend beyond front of dorsal. Preopercle angle with 2 divergent spines. Photophores rather small, lower opercular especially modified spheroid within gill opening and the anals in 2 small restricted groups. Coloration largely whitish or silvery white.

Diagnosis. Differs from subgenus Polyipnus chiefly in its greater spiniferous armament and comparatively smaller and less developed photophores, especially the swollen lower opercular within the gill opening,

(ακάρθος, spine; Polyipnus.)

Polyipnus fraseri new species

Depth $1 \frac{3}{5}$; head $2 \frac{3}{5}$, width 2. Snout 5 in head from snout tip; eye $\frac{13}{5}$ greatly exceeds snout or interorbital; maxillary vertical, hind upper edge extends $\frac{1}{5}$ in eye diameter, expansion 2 in eye, length $1 \frac{1}{4}$ in head from snout tip; interorbital $4 \frac{1}{2}$, low, deeply depressed concavely; preopercle ends in 2 spines, of which lower larger or half of eye; occiput with pair of long spines over-reaching dorsal fin anteriorly, each with 2 widely divergent smaller spines basally. Gill rakers 7 + 13, lanceolate, slender, little longer than gill filaments or $1 \frac{3}{4}$ in eye.

Scales apparently present in life, all now fallen and pockets indistinct. [very small and inconspicuous photophore at middle of front eye edge; rather large photophore on middle of cheek below center of eye; 2 operculars, upper opposite middle of hind eye edge, lower as larger spheroid just within gill opening behind posterior directed smaller preopercle spine; 6 close set branchiostegal photophores, anterior; lateral series on body 8, fourth lowest though little above pectoral fin origin, fifth progressively higher, then first little higher than fifth, second little higher than first, third highest or nearly level with lower eye edge, sixth level with second, seventh level with lower eye edge and eighth level with photophore on cheek; lower or ventral series as 6 on isthmus, crowded and remote from 10 abdominals, of which 2 anterior concealed in lateral view by spinescent striate bony wing like expansion below pectoral base, 4 ventrals between ventral and anal fins, cluster of 4 small spots above posterior base of anal and 4 on lower surface of caudal peduncle close before rudimentary caudal rays.

D. 10, first ray $3 \frac{1}{3}$ in total head length; no adipose fin; A. III, 9, second simple ray $3 \frac{1}{4}$; caudal $1 \frac{1}{5}$, deeply forked; least depth of caudal

peduncle $3 \frac{1}{8}$; pectoral $1 \frac{1}{6}$; ventral $2 \frac{2}{5}$ (?).

Color largely pale brown to whitish, sides and below silvery white to grayish. Dark brown band at occiput. Another similar at predorsal extending below nearly level with lower eye edge and below front of dorsal gives off short oblique triangle directed toward middle of anal fin while another extension along anal base about $\frac{2}{3}$ its extent. Except few scattered dark spots on caudal peduncle, chiefly above, no other dark markings. Photophores silvery. Fins all whitish.

Diagnosis. Characters contained chiefly in the description of the subgenus. Its coloration, combination and arrangement of photophores unlike entirely unlike those in any other member of the family.

Type No. 92324.

2462. D. 5476. San Bernadino Light, S. 37° W., 13.5 miles (N. $12^{\circ} 56' 24''$ E. $124^{\circ} 25' 24''$), east coast of Luzon. In 270 fathoms. June 24, 1909. Length 51 mm.

Family ASTRONESTHIDAE

Body rather elongate. Head compressed. Mouth large. Mandibular barbel present, very long, free at tip, sometimes absent. Maxillary forms edge of upper jaw. Teeth in jaws pointed, unequal. Teeth on gill arches well developed, often in pairs. Post-temporal impinging on occiput. Opercles narrow. Vertebrae and neural spines normal, not protruding before dorsal fin. Body naked. Postocular luminous organ present. Photophores present. Dorsal above or behind vent, before anal. Adipose fin usually present. Pectorals low, Ventrals median or postmedian.

Small fishes of the deep seas.

The following imperfectly described form, immature, may be a member of this family:

Genus GYMNOSCOPELUS Günther

Gymnoscopelus GUNTHER, Journ. Mus. Godeffroy, vol.1, pt.4, No.4, 1873, p.91 (267). Type Gymnoscopelus aphyra GUNTHER, monotypic.

Gymnoscopelus aphyra Günther

Gymnoscopelus aphyra GUNTHER, Journ. Mus. Godeffroy, vol.1, pt.4, No.4, 1873, p.91, (267). S. 50° W. 85°, near Magellan Strait.

Depth 4 1/2; head 4. Eye 3 1/2 in head.

Naked. Along median line of side, in arch of lateral line, row of very thin small scales.

Head without luminous organs. Along each side of belly row of phosphorescent bodies, on trunk centrum pearl glazed, on tail a small black spot. Only on body row of spots double. On upper edge of tail row of black spots.

D. 12; A. 13; ventral inserted below front half of dorsal, nearer snout tip than caudal base.

Whitish, with myomeres as in Leptocephalus. Length 31 mm. (Günther.)

Near Magellan Strait.

Genus ASTRONESTHES Richardson

Astronesthes RICHARDSON, Zool. Voyage Sulphur, Fishes, 1844, p.97. Type.

Astronesthes nigra RICHARDSON, monotypic.

Stomianodon BLEEKER, Verhandl. Batavia. Genootsch. (Bali), vol.22, 1849, p.10. Type Stomianodon chrysophekadion BLEEKER, monotypic.

Phaenodon LOWE, Proc. Zool. Soc. London, vol.18, 1850, p.250. Type Phaenodon ringens LOWE, monotypic.

Bathilychnus BRAUER, Zool. Anzeiger, vol.26, No.668, 1902, p.289. Type Bathilychnus cyaneus BRAUER, monotypic.

Body compressed. Snout moderate. Eye not longer than snout. Mouth wide, cleft straight, lower jaw prominent. Upper teeth with 4 long curved canines, front of lower jaw with 2. Maxillary teeth fine, subequal, directed obliquely backward. Pair of teeth on vomer. Palatines with single row of small pointed teeth, like those on tongue. Gill rakers minute. No pseudobranchiae. Branchiostegals 24. No air vessel. Post-temporal triangular plate. Stomach large. Small single luminous organ below eye. sides and body covered with very small photophores. Dorsal fin rather long. Caudal forked. Paired fins long.

ANALYSIS OF SPECIES

- 1
a. Dorsal 11, begins far behind ventrals, ends short space before anal
splendidus.
- 2
a. Dorsal 10 to 14, begins behind ventrals, ends well before anal.
- 1
b. Dorsal 12 to 14; caudal photophores continuous series; eye less than 3
in head.
- 1
c. Dorsal begins well behind ventrals.
- 1
d. Postocular luminous organ close to eye; eye 5 to 6 in head (specimens
20 to 62 mm.) filifer.
- 2
d. Postocular luminous organ close to eye; eye 3 3/4 in head (specimen
145 mm.) oculatus.
- 3
d. Postocular luminous organ remote from eye caulophorus.
- 2
c. Dorsal begins little behind ventrals.
- 1
e. Anal rays 19 to 21 similis.
- 2
e. Anal 15; barbel 1 1/2 head, ending in bulb luetkeni.

- 3
e. Anal 13; barbel shorter than head, tapering
richardsoni.
- 2
b. Dorsal 10 to 13; caudal photophores 10 to 13, 2 or 3 (sixth to ninth) above level of others; eye less 3 in head.
 1
f. Anal 19 to 22; ventral photophores 17 or 18 between pectoral and ventral, 18 to 20 between ventral and anal martensii.
 2
f. Anal 19 to 20; ventral photophores 18 to 20 between pectoral and ventral, 21 to 24 between ventral and anal lucifer.
 3
f. Anal 12 to 16 ijimai.
- 3
b.b Dorsal 12; Anal 20; eye 1/3 of head (specimen 115 mm.)
chrysophekadion.
- 3
a. Dorsal 15 to 17, begins above ventrals and ends before anal; Anal 16 to 19; ventral photophores 17 to 19 between pectoral and ventral, 27 or 28 between ventral and anal gemmifer.
- 4
a. Dorsal 14 to 21, begins above or behind ventrals, extends above anal origin, or nearly, or beyond; Anal 12 to 17; ventral photophores 5 to 19 between pectoral and ventral, 8 to 21 between ventral and anal.
 1
g. Ventral photophores 17 to 19 between pectoral and ventral, 17 or 18 between ventrals and anal.
 1
h. Barbel slender, black, with tapering white tip.
cyclophotus.
- 2
h. Barbel stout, compressed, white neopogon.
 2
g. Ventral photophores 12 to 15 between pectoral and ventral, 17 to 21 between ventral and anal.
 1
i. Dorsal 14 to 18; adult with luminous patch on shoulder
niger.

- ²
i Dorsal 16; adult with luminous patches in pelvic region and on tail, not on shoulder boulengeri.
- ³
i Dorsal 18 to 21; luminous patch on opercle cyaneus.
- ³
g. Ventral photophores 10 or 11 between pectoral and ventral, 13 to 15 between ventral and anal.
- ¹
j. Anal 17 leucopogon.
- ²
j. Anal 13 longiceps.
- ⁴
g. Ventral photophores 5 or 6 between pectoral and ventral, 8 or 9 between ventral and anal indicus.

Astronesthes splendidus Brauer

Astronesthes splendidus BRAUER, Zool. Anzeiger, vol.25, 1902, p.288. South of Ceylon, 2000 meters. - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.14, fig.2 (compiled).

Astronesthes martensi (not KLUNZINGER) BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.32, pl.2, fig.4 (type from N. $4^{\circ} 56' E.$ $78^{\circ} 15' 3''$). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec. 30, 1927, p.34 (part).

Depth $6 \frac{1}{5}$; head $3 \frac{2}{5}$. Eye $4 \frac{2}{3}$ in head; barbel little longer than head, with elongate white bulb having black spot at its tip bearing 8 fine terminal filaments.

Postocular luminous organ conspicuous, well separated from eye. Lateral photophores 37 between gill opening and anal. Ventral series 10 between isthmus and pectoral, 17 between pectoral and ventral, 20 between ventral and anal, 12 between anal and caudal.

D. 11, begins well behind ventral, end little before anal; A. 18; pectoral 18; ventral 7, slightly premedian. Dorsal adipose fin and long low ventral adipose fin.

Length 31 mm. without caudal. (Regan and Trewavas.)

Indian Ocean.

Astronesthes filifer Regan and Trewavas

Astronesthes filifer REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.14, pl.1, fig.1. N. 5 ° to 19 ° W. 23 ° to 73 °, 50 to 6000 meters, Atlantic and Caribbean Sea. - NORMAN, Discovery Rep., vol.2, 1930, p.306 (N. 4 ° 33 ' 15 " W. 16 ° 52 ' 45 ").

Astronesthes martensii (not KLUNZINGER) LÜTKEN, Dansk. Vidensk. Selsk. Skrift. København, ser.6, vol.8, 1892, p.277, fig. (N. 17 ° W. 22 °, off Cape Verde Islands).

Astronesthes martensi PAPPENHEIM, Deutsch. Südpolar Exped., vol.15, pt.2, 1914, p.167 (N. 0 ° 46 ' W. 18 ° 59 ', 3000 meters). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.34 (N. 24 ° W. 75 ° to 77 °, 6000 to 8000 feet).

Depth 6 to 8; head 3 3/4 to 4 1/2. Eye 5 to 6 in head; 2 or 3 palatine teeth each side; white barbel tapering, 2/3 of head, less in young.

Postocular luminous organ very close to eye. Lateral photophores 14 or 15 between gill opening and ventral, 19 to 22 between ventral and anal. Ventral series 10 or 11 between isthmus and pectoral, 15 to 17 between pectoral and ventral, 19 to 22 between ventral and anal, 11 or 12 between anal and caudal. About 4 small white spots between postocular luminous organ and pre-

opercle and 3 or 4 on preopercle.

D. 12 to 14, begins well behind ventrals and ends well before anal; A. 15 to 18; pectoral 8; ventral 7, little premedian. Dorsal adipose fin and rather long low one ventral.

Length 62 mm. without caudal. (Regan and Trewavas.)

Atlantic, Caribbean Sea.

Astronesthes oculatus Regan and Trewavas

Astronesthes oculatus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.15, pl.1, fig.2. N. $17^{\circ} 45'$ W. $64^{\circ} 55.5'$, 800 meters, Caribbean Sea west of St. Croix.

Depth $6 \frac{1}{2}$; head 5. Eye $3 \frac{3}{4}$; palatine teeth weak, 4 each side; barbel $\frac{2}{3}$ length of head, tapering, white on posterior side, black on anterior side; small elongate terminal bulb scarcely thicker than terminal portion of stem; interorbital $3 \frac{1}{4}$ in head.

Postocular luminous organ very close to eye. Lateral photophore 15 between gill opening and ventral, 21 between ventral and anal. Ventral series 10 between isthmus and pectoral, 16 between pectoral and ventral, 21 between ventral and anal, 11 between anal and caudal. White spots on side of head 4 between postocular luminous organ and preopercle, 3 or 4 on preopercle.

D. 13, begins behind ventral and ends well before anal; A. 15; pectoral 8; ventral 7, little premedian. Dorsal and ventral adipose fins short. Low fold of skin in mid-ventral line before ventral adipose fin but not continuous with it.

Length 145 mm. without caudal. (Regan and Trewavas.)

Caribbean Sea.

Astronesthes caulophorus REGAN and TREWAVAS

Astronesthes caulophorus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.15, fig.3. N. $13^{\circ} 35'$ W. $30^{\circ} 11'$, 300 meters, North Atlantic.

Depth $7 \frac{1}{3}$; depth 4. Eye $4 \frac{1}{2}$ in head; barbel long as head, stout, white, tip not swollen but somewhat flattened, translucent, with opaque central core; each palatine with 9 to 11 teeth.

Postocular luminous organ well separated from eye. Lateral photophores 18 between gill opening and ventral, 20 between ventral and anal. Ventral series 11 between isthmus and pectoral, 18 between pectoral and ventral; 18 between ventral and anal, 12 between anal, 12 between anal and caudal.

D. 14, inserted behind ventrals, end well before anal; A. 18; pectoral 8; ventral 7, inserted little nearer caudal base than snout end. Dorsal and ventral adipose fins present.

Length 34 mm. without caudal. (Regan and Trewavas.)

North Atlantic.

Astronesthes similus Parr

Astronesthes similus PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec. 30, 1927, p.32, figs.22 and 23. N. $24^{\circ} 29'$ W. $77^{\circ} 29'$, 8000 feet. - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.15, fig.4 (N. 13° to 35° W. 47° to 84° , 25 to 3500 meters).

Depth $5 \frac{3}{4}$ to $6 \frac{1}{2}$; head $4 \frac{1}{5}$ to $4 \frac{1}{2}$. Eye $4 \frac{1}{2}$ to 5 in head; weak palatine teeth 5 on each side; barbel 1 to $1 \frac{1}{3}$ length of head, black, ending in white bulb bearing 2 slender filaments with slightly swollen tips.

Postocular luminous organ very conspicuous, close behind eye. Lateral photophores 15 to 17 between pectoral and ventral, 23 to 25 between ventral and anal. Ventral series 10 or 11 between isthmus and pectoral, 15 or 16 between pectoral and ventral, 21 to 24 between ventral and anal, 10 or 11 between anal and caudal.

D. 12 to 14, begins little behind ventral, ends far before anal; A. 19 to 21; pectoral 8; ventral 7, little premedian. Dorsal adipose fin with short base, ventral still smaller.

Length 150 mm. without caudal. (Regan and Trewavas.)

North Atlantic, Caribbean Sea.

Astronesthes luetkeni Regan and Trewavas

Astronesthes luetkeni REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.16, fig.5 (on LÜTKEN).

Astronesthes richardsonii (not POEY) Lütken, Kon. Dansk. Vidensk. Selsk. Skrift. København, series 6, vol.7, 1892, p.273, pl.3, figs. 1 - 2. Pacific Ocean.

Depth nearly 7; head $4 \frac{1}{3}$. Eye 7 in head; barbel $1 \frac{1}{2}$ length of head, ending in long flattened bulb.

Postocular luminous organ large, nearly long as eye. Lateral photophores 32. Ventral series 6 between isthmus and pectoral, 15 between pectoral and ventral, 20 between ventral and anal, 10 or 11 between anal and caudal.

D. 13, begins close behind ventrals and ends well before anal; A. 15; pectoral 8; ventral 7. Adipose dorsal and very small adipose ventral.

Length 95 mm. without caudal. (Regan and Trewavas.)

Pacific Ocean.

Astronesthes richardsonii Poey

Astronesthes richardsonii POEY, Mem. Hist. Nat. Cuba, vol.1, 1852, p.176. Cuba.

- GÜNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.425 (copied). - LÜTKEN, Kon. Dansk. Vidensk. Selsk. Skrift. Köbenhavn. series 6, vol.7, 1892, p. p.273 (part; reference). - GOODE and BEAN, Oceanic Ichth., 1895, p.106 (not fig.125; part; reference). - GILCHRIST and VON BONDE, Marine Biolog. Survey South Africa, Report No.2, 1922 (1924), No.7, p.5 (part; reference). - Astronesthes richardsoni JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No. 47, pt.1, 1896, p.587 (part; reference). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.29 (part; reference). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.30 (part). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.17, fig.6 (compiled).

Chauliodus richardsonii POEY, Mem. Hist. Nat. Cuba, vol.1, 1852, pl.10, fig.2.

Borostomias richardsoni BARNARD, Ann. South African Mus., vol.21, pt.1, June 1925, p.135 (part).

Depth $6 \frac{1}{3}$; head $4 \frac{1}{8}$. Eye $4 \frac{3}{4}$ in head from snout tip; barbel tapering, $\frac{3}{5}$ length of head.

Lateral photophores 20 between ventral origin and front of anal. Ventral series 13 between between pectoral and ventral origins, 12 between ventral and anal, 13 between anal origin and caudal base.

D. 12, midway between snout tip and caudal base; A. 13; pectoral 6, $1 \frac{2}{3}$ in total head length; ventral rays 7, $1 \frac{1}{4}$ in head, little premedian. Adipose fin moderate.

Length 150 mm. (Regan and Trewavas.)

Cuba.

Astronesthes martensii Klunzinger

Astronesthes martensii KLUNZINGER, Verhandl. zool. botan. Gesell. Wien, vol.21, 1871, p.594. Red Sea. - LUTKEN, Kon. Dansk. Vidensk. Selsk. Skrift. København, series 6, vol.7, 1892, p. (273) 276, pl.3, figs. 6 - 7. REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.17, fig.7, (type).

Astronesthes martensi BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee - Fische, 1906, p.32 (part). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.34 (part).

Depth 7 to $7 \frac{1}{4}$; head $4 \frac{1}{2}$ to $4 \frac{3}{4}$. Eye 4 to $4 \frac{1}{3}$ in head; 11 or 12 palatine teeth each side; barbel $1 \frac{1}{3}$ length of head, slender pigmented, ending in small, white elongate bulb without appendages.

Postocular luminous organ close to eye, extended forward below eye. Lateral photophores 17 between gill opening and ventral, 20 between ventral and anal. Ventral series 10 or 11 between isthmus and pectoral, 17 or 18 between pectoral and ventral, 18 to 20 between ventral and anal, 12 or 13 between anal and caudal of which seventh, eighth and ninth at higher level.

D. 11 or 12, begins little behind ventral, ends well before anal; A. 19 to 22; pectoral 6 or 7; ventral 7, little premedian. Dorsal and ventral adipose fins short.

Length 150 mm. without caudal. (Regan and Trewavas.)

Red Sea.

Astronesthes lucifer Gilbert

Astronesthes lucifer GILBERT, Bull. U.S.Fish Comm., vol.23, pt.2, 1903 (1905),

p.605, pl.71, fig.3. Off Kauai Island, in 368 to 1021 fathoms; off south coast Oahu, in 257 to 294 fathoms. - WEBER, Siboga Exped., vol.57, Fische, 1913, p.13 (Timor Sea in S. Lat. $9^{\circ} 10.3'$ E. Long. $125^{\circ} 55.1'$ in 421 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.116, fig.42 (Timor specimen). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.32 (Hawaii). - FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (compiled). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.18, fig.8 (JAPAN).

Depth 6; head $4 \frac{1}{5}$, width $3 \frac{3}{4}$. Snout $3 \frac{3}{4}$ in head from snout tip; eye 5, $1 \frac{2}{5}$ in snout, $1 \frac{1}{5}$ in interorbital; maxillary extends $1 \frac{1}{2}$ eye diameters behind eye, expansion 2 in eye, length $1 \frac{1}{4}$ in head from snout tip; 5 premaxillary canines, second pair longest and fourth pair next in size; maxillary teeth numerous, small, posteriorly some little longer than others; 1 or 2 long canines at front of mandible with 5 gradually smaller ones on each mandibular ramus; barbel $3 \frac{2}{5}$ in combined head and body to caudal base, with small terminal bulb; interorbital $3 \frac{1}{4}$, slightly convex, depressed medially.

Conspicuous photophore close below hind eye edge; 2 operculars; 18 branchiostegals, 1 for each ray; body covered with minute pores, black on silvery portion, light on blackish areas and in more or less regular transverse series. Lateral series of photophores 21 between pectoral and ventral, 29 between ventral and anal, with 3 more over front of anal; lower or ventral series 8 from front of isthmus, then 4 to pectoral base, 19 between pectoral and ventral, 19 between ventral and anal, 18 from over front of anal to caudal base.

D. II, 10, first branched ray $1 \frac{4}{5}$ in total head length; adipose fin 3;

51516 U.S.N.M. vicinity of Kauai Island, Hawaiian Islands. In 632 to 881 fathoms. Albatross Station 4026. Length 70 (?) mm. Type.

Astronesthes ijimai Tanaka

Astronesthes ijimai TANAKA, Journ. College Sci. Tokyo, vol.23, art.3, 1908, p.9, pl.1, fig.1. Sagami Sea. - PARR, Bull. Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.31 (discussion). - REGAN and TREWAVAS, Rep. Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.18, fig.9, (copied).

Depth $6 \frac{1}{8}$; head $4 \frac{3}{5}$. Snout 4 in head from snout tip; eye $4 \frac{4}{5}$, $1 \frac{1}{4}$ in snout; maxillary extends $1 \frac{1}{3}$ eye diameters behind eye, length $1 \frac{1}{5}$ in head from snout tip; 4 long slender front upper canines, 2 in front below; 1 or 2 minute slender teeth each side of head of vomer; palatine teeth very small, slender, uniserial; barbel 3 in body without caudal, tip dilated; interorbital 4 in head. Gill rakers 3 + 11, short spinous teeth in pairs.

Suborbital luminous organ small, slightly posterior on lower eye edge. Lateral photophores 19 between pectoral and ventral, 21 behind ventral. Ventral series 8 + 3 between isthmus and pectoral, 19 between pectoral and ventral, 18 between ventral and anal (2 additional before ventral origin), 13 from anal origin to caudal (2 + 7 over anal).

D. 10 or 11, length $1 \frac{1}{3}$ in total head length; adipose fin equals eye; A. 12 or 13, fin height $2 \frac{7}{8}$ in total head; caudal $1 \frac{2}{5}$; least depth of caudal peduncle $3 \frac{2}{5}$; pectoral $1 \frac{4}{5}$; ventral $1 \frac{1}{2}$.

Dark brown, back and belly dark. Fins pale. Length 83 mm. without caudal. (Tanaka.)

Japan.

Astronesthes chrysophekadion (Bleeker)

Stomianodon chrysophekadion BLEEKER, Verhandl. Batavia. Genootsch. (Bali).
vol.22, 1849, p.10. Boeloling, Bali.

Astronesthes chrysophekadion BLEEKER, Atlas Ichth. Ind. Néerland., vol.6, 1866
- 1872, p.150, pl. (2) 278, fig.1 (type). - WEBER and BEAUFORT, Fishes
Indo Austral. Archipelago, vol.2, 1913, p.117 (copied). - REGAN and TRE-
WAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.18, fig.10,
(copied).

Depth $6 \frac{1}{4}$ to $6 \frac{2}{5}$; head $4 \frac{1}{2}$ to $4 \frac{7}{8}$, width $2 \frac{1}{2}$ to $2 \frac{3}{5}$. Snout
 $3 \frac{1}{2}$ to $3 \frac{4}{5}$ in head measured from snout tip; eye $4 \frac{1}{2}$ to $2 \frac{3}{5}$, 1 to $1 \frac{1}{4}$
in snout, $1 \frac{1}{5}$ to $1 \frac{1}{4}$ in interorbital; maxillary extends eye diameter be-
hind eye, length $1 \frac{1}{4}$ to $1 \frac{1}{3}$ in head from snout tip; interorbital $3 \frac{1}{4}$ to
 $3 \frac{2}{3}$, low, with median concave depression. Gill rakers 3 - 13, as short
double denticles; gill filaments $1 \frac{1}{5}$ in eye.

Barbel $1 \frac{4}{5}$ to 2 in total head length, ends in very small ovoid whitish
terminal bulb.

Small infero preorbital luminous organ; small luminous organ below hind
pupil edge above upper edge of maxillary; upper lateral series of photophores
17 or 18 between pectoral and ventral, 17 between ventral and anal, 3 more
above front of anal; lower or ventral series 28 from isthmus to ventral of
which 11 before pectoral origin, then 2 start inside before ventral origin 17
continuing to anal origin and 14 to caudal base with last above anal base el-
evated.

D. III, 8 or III,9, first branched ray $1 \frac{1}{3}$ to $1 \frac{2}{5}$ in total head length;
A. III, 14 or III,15, first branched ray $2 \frac{1}{8}$ to $2 \frac{1}{5}$; caudal $1 \frac{2}{5}$ to $1 \frac{3}{4}$.

forked; least depth of caudal peduncle $3 \frac{4}{5}$ to $4 \frac{1}{8}$; adipose fin $3 \frac{1}{4}$ to $3 \frac{2}{5}$; pectoral $1 \frac{3}{5}$ to $1 \frac{4}{5}$; ventral $1 \frac{2}{5}$ to $1 \frac{1}{2}$.

Back brown, also upper surface of head. Sides of head and body leaden or pale grayish silvery, which on under surface of body with numerous close-set dusky to blackish dots. Iris silvery gray. Fins all whitish, likewise barbel.

Western Pacific. Though the present species is imperfectly known only from Bleeker's account and crude figure I feel that the materials listed below pertain to it. The chief character is the short barbel, much shorter than the head in my materials. The photophores agree largely with those in Lutken's figure of Astronesthes martensi Klunzinger from the Red Sea, though in that species the barbel is shown as $1 \frac{2}{7}$ times head.

D. 5363. Cape Santiago Light, S. 79° W., 4.5 miles (N. $13^{\circ} 47'$ E. $120^{\circ} 43' 30''$), Balayan Bay, Luzon. In 180 fathoms. February 20, 1909. Length 47 mm.

D. 5563. Dammi Island (N.), N. 79° W., 6.1 miles (N. $5^{\circ} 48' 12''$ E. $120^{\circ} 30' 48''$), between Joló and Tawi Tawi. In 224 fathoms. September 21, 1909. Length 43 to 105 mm. 8 examples.

D. 5564. Dammi Island (N.), S. 85° W., 6.1 miles (N. $5^{\circ} 50'$ E. $120^{\circ} 31'$), between Jolo and Tawi Tawi. In 236 fathoms. September 21, 1909. Length 31 to 65 mm. 6 examples.

2235. D. 5566. Dammi Island (N.), S. 67° W., 6.8 miles (N. $5^{\circ} 52' 12''$ E. $120^{\circ} 31'$), between Jolo and Tawi Tawi. In 244 fathoms. September 21, 1909. Length 155 mm.

D. 5567. Dammi Island (N.), N. 81° W., 9 miles (N. $5^{\circ} 48'$ E. 120°

33 ' 45 "), north of Tawi Tawi. In 268 fathoms. September 21, 1909.

Length 62 mm.

2214. D. 5549. Jolo Light (Jolo), N. 30° E., 15.8 miles (N. 6° 1 ' 15 " E. 120° 44 ' 20 "), Jolo Island and vicinity. In 263 fathoms.

September 17, 1909. Length 64 to 128 mm. 2 examples.

D. 5551. Jolo Light (E.), N. 60° E., 18 miles (N. 5° 54 ' 48 " E. 120° 44 ' 24 "), Jolo Island and vicinity. In 193 fathoms. September 17,

1909. Length 56 mm.

3587. D. 5621. Makyan Island (S.), N. 54° W., 3 miles (N. 0° 15 ' E. 127° 24 ' 35 "), between Gillolo and Makyan Island. In 298 fathoms.

November 28, 1909. Length 112 mm.

10049. D. 5269. Matacot Point, S., 54° E., 3 miles (N. 13° 39 ' 50 " E. 120° 59 ' 30 "), Verde Island Passage and Batangas Bay. In 220

fathoms. June 8, 1908. Length 88 mm.

10086. D. 5289. Matocot Point, S. 42° E., 5 miles (N. 13° 41 ' 50 " E. 120° 58 ' 30 "), China Sea vicinity southern Luzon. In 172 fathoms.

July 22, 1908. Length 138 mm.

5747 and 5748. D. 5171. Onapui Island (W.), S. 22° W., 12 miles (N. 5° 5 ' E. 119° 28 '), Sulu Archipelago vicinity Sibutu Island. In

250 fathoms. February 28, 1908. Length 112 to 136 mm.

D. 5574. Simaluc Island (N.), S. 66° E., 5.8 miles (N. 5° 30 ' 45 " E. 120° 7 ' 57 "), north of Tawi Tawi. In 340 fathoms. September

23, 1909. Length 49 mm.

4291. D. 5662. Tana Keke Island (W.), N. 17° W., 12.5 miles (S. 5° 43 ' E. 119° 18 '), Flores Sea. In 211 fathoms. December 21, 1909.

Length 113 mm.

D. 5368. Tayabas Light (outer), N. 32° W., 21.8 miles (N. 13° $35' 30''$ E. 121° $48'$), Marinduque Island and vicinity. In 181 fathoms. February 23, 1909. Length 55 mm.

Astronesthes gemmifer Goode and Bean

Astronesthes gemmifer GOODE and BEAN, Oceanic Ichth., 1895, p.105, pl.33, fig. 124. N. 44° $25'$ W. 53° $12'$, from halibut taken in 300 fathoms. - JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No.47, pt.1, 1896, p.586 (copied); pt.4, 1900, pl.93, fig.251 (copied). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec. 30, 1927, p.30, fig.21 b (maxillary) (type). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.19, pl.1, fig.3 (N. 13° $47'$ W. 61° $26'$, 3500 meters; N. 34° W. 70° $1'$, 150 meters; N. 12° $59'$ W. 32° $49'$, 300 meters; off Sierra Leone).

Depth 5; head $4 \frac{2}{3}$, width $2 \frac{3}{4}$. Snout $3 \frac{1}{2}$ in head from snout tip; eye $3 \frac{1}{2}$, equals snout or interorbital; maxillary extends $1 \frac{1}{5}$ eye diameters behind eye, expansion $2 \frac{3}{4}$ in eye, length but (slightly less than head from snout tip; each premaxillary with 4 large canines; maxillary teeth very fine, uniform, numerous; mandible with anterior pair of long canines, then 6 or 7 graduated shorter on each ramus; barbel equals head, simple; interorbital $3 \frac{1}{2}$, low, depressed medially. Gill rakers 2 + 10, mostly as short, double or rarely triple denticles, $1 \frac{3}{4}$ in gill filaments, which $1 \frac{1}{2}$ in eye.

Small postorbital photophore below eye. Upper lateral photophores 16 between pectoral and ventral, 20 between ventral and anal, 19 (?) from opposite anal origin to caudal base; lower or ventral series 13 on isthmus to pectoral,

F. 1115, fig. 1115 (50) to total head length; dorsal fin

28 between ventral and anal 20 (?) from opposite anal origin to caudal base; branchiostegals 19.

D. II, 15, first branched ray $1 \frac{2}{5}$ (?) in total head length; adipose fin $6 \frac{1}{5}$ (?); A. II, 15, first branched ray $2 \frac{1}{3}$; caudal 2 (?), damaged, well forked; least depth of caudal peduncle $3 \frac{1}{5}$; pectoral $1 \frac{2}{5}$; ventral $1 \frac{2}{5}$.

Color gone as most of skin lost, now mostly pale uniform brownish. Iris neutral slate. Fins pale brownish.

Atlantic Ocean.

24645 U.S.N.M. N. $44^{\circ} 25'$ W. $53^{\circ} 12'$, From halibut taken in about 500 fathoms. January 26, 1890. Schooner "Polar Wave". Length 180 (?) mm.

Type. In poor preservation.

Astronesthes cyclophotus Regan and Trewavas. ←

Astronesthes cyclophotus Regan and Trewavas, Danish Dana Exped. Oceanogr. Rep., ←

No. 5, May 30, 1929, p. 19, fig. 11. N. $30^{\circ} 55'$ W. $58^{\circ} 48'$, 80 meters; N. $29^{\circ} 24'$ W. $48^{\circ} 8'$, 110 meters; N. $28^{\circ} 48'$ W. $20^{\circ} 45'$, 300 meters; N. $32^{\circ} 55'$ W. $21^{\circ} 51'$, 500 meters.

Depth 4 to 5; head $3 \frac{1}{8}$ to $3 \frac{1}{2}$. Eye 5 to $5 \frac{1}{2}$ in head, $1 \frac{1}{2}$ in snout; palatine teeth 4 to 6 each side; barbel $\frac{2}{3}$ long as head, black, with white terminal part flattened into delicate, narrow, leaf-like structure, tapering to point and with opaque axis.

Postocular luminous organ circular, behind and well separated from eye. Lateral photophores 16 to 18 between pectoral and ventral, 18 or 19 between ventral and anal. Ventral series 9 or 10 between isthmus and pectoral, 17 to 19 between pectoral and ventral, 17 or 18 between ventral and anal, 11 or 12 between anal and caudal.

D. 15 or 16, begins above ventral base and ends above or immediately before

first anal ray; A. 12 to 15; pectoral 8 or 9; ventral 7, nearer caudal base than snout tip. Small dorsal and ventral adipose fins.

Length 28 mm. without caudal. (Regan and Trewavas.)

North Atlantic.

Astronesthes neopogon Regan and Trewavas

Astronesthes neopogon REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.20, pl.11, fig.1. N. $34^{\circ} 40'$ W. $33^{\circ} 16'$, 1000 meters, North Atlantic.

Depth 7; head $4 \frac{1}{2}$. Eye 5 in head; palatine teeth rather strong, 8 on each side; barbel $\frac{2}{5}$ length of head, thick, laterally compressed, white, without any slender basal part.

Postocular luminous organ very small, well separated from eye. Lateral photophores 17 between pectoral and ventral, 19 between ventral and anal. Ventral series 10 between isthmus and pectoral, 18 or 19 between pectoral and ventral, 17 or 18 between ventral and anal, 11 between anal and caudal. Small luminous dots all over body and larger spots, some forming irregular series from pectoral to ventrals, others lateral band backwards from opercle and others scattered on back.

D. 17, begins little behind ventral and ending not far from front of anal; A. 15; pectoral 9, $\frac{3}{4}$ of head; ventral 7, median. Adipose dorsal and small adipose ventral.

Length 125 mm. without caudal. (Regan and Trewavas.)

North Atlantic.

Astronesthes niger Richardson

Astronesthes niger RICHARDSON, Zool. Voy. Sulphur, Fish, 1844, p.97, pl.50,

figs. 1 - 3. Locality unknown, supposed to be the China Seas.

Astronesthes niger GÜNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.425 (Gulf

of Guinea, Lagos, Atlantic, Gulf of Mexico, type); Rep. Voy. Challenger,

Vol.31, pt.2, 1889, p.38 (Indian Ocean; Atlantic). - LÜTKEN, Kon. Dansk.

Vidensk. Selsk. Skrift. København, series 6, vol.7, 1892, p.273, pl.3,

figs. 3 - 5 (west coast of South America). - GOODE and BEAN, Oceanic Ichth.

, 1895, pp.105, 515 (type of Chauliodus fieldii). - (?) ALCOCK, Cat. Deep

Sea Fishes Indian Mus., 1899, p.211 (off Travancore coast, in 224 to 284

fathoms). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.

30, 1927, p.36 ("so far only recorded from the Atlantic Ocean"). - REGAN

and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., May 30, 1929, p.20, fig.

12 (type) (N. 12° to 37° W. 14° to 79°, 0 to 3000 meters). - (?)

[Stomias leucopterus EYDOUX and SOULEYET, Voy. Bonite, Zool., vol.1, 1841,

p.193, pl.7, fig.4. Atlantic Ocean.

Stomias fieldii VALENCIENNES, Hist. Nat. Poiss., vol.18, 1846, p.378. Between

Mogador and New York.

Chauliodus fieldii VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.389. One

hundred and fifty leagues south east of Azores and near Saint Helena.

Esox cirrhatus (FIELD) VALENCIENNES, Hist. Nat. Poiss., vol.18, 1846, p.378

(name in text).

Phaenodon ringens LOWE, Proc. Zool. Soc. London, 1850, p.251. Madeira.

Astronesthes barbatus KNER, Sitz. Ber. Akad. Wiss. Wien, Math. - naturw.

Klasse, vol.39, 1860, p.543, pl. , fig.5. Atlantic Ocean near the Braz-

ilian coast. - GÜNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.425

(copied).

Phaenodon ringens LOWE, Proc. Zool. Soc. London, 1850, p.251. Madeira.

Astronesthes barbatus KNER, Sitz. Ber. Akad. Wiss. Wien. Math. - naturw. Klasse
 , vol.39, 1860, p.543, pl. , fig.5. Atlantic Ocean near the Brazilian coast,
 coast. - GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1864, p.425 (copied).

Astronesthes myriaster ZUGMAYER, Bull. Inst. Oceanogr. Monaco, No. 253, 1913,
 p.4. - PARR, Bull. Bingham Oceanogr. Collection. vol.3, art.2, Dec. 30,
 1927, p.35 (copied).

Depth 4 to $4 \frac{1}{4}$; head $3 \frac{2}{5}$ to $3 \frac{3}{5}$, width 2 to $2 \frac{3}{5}$. Snout $3 \frac{1}{2}$ -
 4 in head from snout tip; eye $4 \frac{1}{2}$ to $4 \frac{4}{5}$, $1 \frac{1}{5}$ to $1 \frac{1}{4}$ in snout, $1 \frac{1}{2}$
 to $1 \frac{2}{3}$ in interorbital; maxillary extends $1 \frac{1}{2}$ to $1 \frac{2}{3}$
 eye diameters behind eye, length $1 \frac{1}{5}$ in head from snout tip; pre-
 maxillary with 6 canines, second pair longest; maxillary teeth 12, graduated
 longer to last which about long as smaller premaxillary teeth; 6 or 7 canines
 on each mandibular ramus, second pair longest; barbel 4 in combined head and
 body to caudal base, terminal bulb moderately large; interorbital $2 \frac{3}{4}$ to
 $2 \frac{7}{8}$ low, depressed medially. Gill rakers 3 + 11, clusters of 2 or 3 minute
 spinules, much less than gill filaments which equal eye.

Small anterior photophore below front eye edge and larger below hind eye
 edge; 1 opercular. Lateral series of photophores 13 between pectoral and
 ventral, 19 to 20 between ventral and anal, 12 or 13 from front of anal to
 caudal; lower or ventral series 10 on isthmus before pectoral, then 12 between
 pectoral and ventral, 16 or 17 between ventral and anal, then 2 or 3 over
 front of anal base. Whole lower lateral and under portions of body studded
 with close set minute photophores.

D. II, 13 or II, 14, second branched ray $1 \frac{1}{2}$ to $1 \frac{3}{5}$ in total head
 length; . A. II, 9 or II, 10, second branched ray 2 to $2 \frac{1}{8}$; caudal $1 \frac{4}{5}$,

well forked; least depth of caudal peduncle 4 to $4 \frac{1}{5}$; pectoral $1 \frac{1}{4}$; ventral 1 to $1 \frac{2}{5}$.

Uniform brownish. Iris neutral gray. Fins paler to whitish, also barbel. Atlantic and Indian Oceans.

34538 U.S.N.M. On voyage from Mogador to New York. May 1819. Captain Field. Length 44 mm.

44592 U.S.N.M. N. $38^{\circ} 24'$ W. $71^{\circ} 52'$. Surface. Albatross Station. Length 28 or 29 mm. 2 examples.

85456 U.S.N.M. N. $36^{\circ} 45'$ W. $74^{\circ} 28' 30''$. Albatross Station. Length 33 to 38 mm. 2 examples.

Astronesthes boulengeri Gilchrist

Astronesthes boulengeri GILCHRIST, Marine Invest. South Africa, vol.2, 1902, p.103, pl.6. Cape Point Light House bearing S. 83° E. distant $35 \frac{1}{2}$ miles, in 360 fathoms; East Coast, Buffalo River North West by West distant 21 miles, in 490 fathoms. - BARNARD, Ann. South African Mus., vol.21, pt.1, June 1925, p.133, pl.7, fig.4 (types). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec. 30, 1927, p.37 (note). - REGAN and Trewavas, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.21, fig. 13 (copied).

Depth 6; head $4 \frac{1}{2}$. Eye $4 \frac{1}{2}$ in head; barbel $\frac{1}{2}$ length of head (probably broken).

Postocular luminous organ very small, below eye. Lateral photophores 35 between anal and caudal. Ventral series 7 between isthmus and pectoral, 14 between pectoral and ventral, 35 from ventral to caudal. Minute luminous spots

scattered over head and body and forming 2 rows on ventral surface. Glandular patches pinkish when fresh, white in spirit, on sides of body behind ventral region and above and below on caudal peduncle.

D. 16, inserted little behind ventrals and ending immediately before anal; A. 15; pectoral rays 8; ventral 7, inserted little nearer snout tip than caudal. Small dorsal and ventral adipose fins.

Length 213 mm. (Regan and Trewavas.)

South Africa.

Astronesthes cyaneus (Brauer)

Bathylchnus cyaneus BRAUER, Zool. Anzeiger, vol.26, No.668, 1902, p.289.

South of Ceylon, 2000 meters; Deutsch. Tiefsee Exped. Valdivia, vol.5, Tiefsee - Fische, 1906, p.35, text figs. 6 a - b, pl.2, fig.5 (type, from between Ceylon and Maldives in N. Lat. $4^{\circ} 56'$ E. Long. $78^{\circ} 15' 3''$). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.37 (compiled).

Astronesthes cyaneus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.21, fig. 14 (N. 9° to 26° W. 20° to 83° , 19 to 3500 meters). - NORMAN, Discovery Rep., vol.2, 1930, p.306 (N. $6^{\circ} 55'$ W. $15^{\circ} 54'$)

Depth 5 to $6 \frac{1}{4}$; head $3 \frac{3}{4}$ to 4. Eye 4 to $4 \frac{2}{3}$ in head, about equals snout; each palatine with 4 to 6 weak teeth; barbel slender, white, $\frac{1}{2}$ head, with age when complete ending in very small elongate bulb.

Postocular luminous organ small, close to eye. Lateral photophores 13 or 14 between gill opening and ventral, 18 to 21 between ventral and anal. Ven-

tral series 9 or 10 between isthmus and pectoral, 12 to 15 between pectoral and ventral, 17 to 19 between ventral and anal, 9 to 12 between anal and caudal.

D. 18 to 21. begins just behind ventral and ends above third to ninth anal ray; A. 14 or 15; pectoral 8, rarely 7; ventral 7, nearer snout tip than caudal base. Small adipose dorsal and ventral fins.

White or yellowish patches of glandular tissue sometimes present on head and especially lower part of opercle. sides of head and body with metallic, steely or bronze like luster, often showing blue iridescence. Length 76 mm. without caudal. (Regan and Trewavas.)

Atlantic and Indian Oceans.

Astronesthes leucopogon Regan and Trewavas

Astronesthes leucopogon REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep.,

No. 5, May 30, 1929, p. 22, pl. 2, fig. 2. N. $30^{\circ} 50'$ W. $44^{\circ} 30'$; N. 33°

N. $33^{\circ} 26'$ W. $16^{\circ} 59'$, 300 meters.

lead → Depth $5 \frac{1}{4}$ to $5 \frac{1}{2}$; head 4 to $4 \frac{2}{5}$. Eye 4 to 5 in head, equals or little greater than snout; palatine teeth 5 or 6 each side; barbel $1 \frac{1}{8}$ to $1 \frac{1}{4}$ length of head, white, tapering somewhat to blunt end.

Postocular luminous organ close to eye, extended forward. Lateral photophores 10 to 12 between gill opening and ventral, 18 or 19 between ventral and anal. Ventral series 9 or 10 between isthmus and pectoral, ~~10 or 11 between isthmus and pectoral~~, 10 or 11 between pectoral and ventral, 14 or 15 between ventral and anal, 11 or 12 between anal and caudal. Smaller photophores conspicuous, especially in 2 rows along ventral surface. Glandular white patches, probably luminous, on head between eye and premaxillary and

sides behind ventral, above ventral above pectoral.

D. 17 (ot) 18, begins above or just behind ventral base and ends above second to fourth anal ray; A. 17; pectoral 8; ventral 7 or 8, little premedian.

Small ventral adipose fin and short adipose dorsal.

Length 40 mm. without caudal. (Regan and Trewavas.)

North Atlantic.

Astronesthes longiceps Regan and Trewavas

Astronesthes longiceps REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep.,

No.5, May 30, 1929, p.23, fig.15. N. $29^{\circ} 24'$ W. $48^{\circ} 8'$, 10 meters.

Depth $4 \frac{2}{3}$; head $3 \frac{1}{2}$. Eye $5 \frac{1}{2}$ in head; 7 palatine teeth each side; barbel little longer than head.

Postocular luminous organ small, close behind eye below. Lateral photophores 13 between gill opening and ventral, 21 between ventral and anal. Ventral series 9 between isthmus and pectoral, 10 between pectoral and ventral, 13 between ventral and anal.

D. 18; A. 13; pectoral 8; ventral 7. Small adipose dorsal and smaller ventral.

Length 25 mm. without caudal. (Regan and Trewavas.)

Atlantic.

Astronesthes indicus Brauer

Astronesthes indicus BRAUER, Zool. Anzeiger, vol.25, No.668, 1902, p.287. East

of Zanzibar, in 3000 meters; Deutsch. Tiefsee Exped. Valdivia, vol.15,

Tiefsee-Fische, 1906, p.53, text figs. 5 a-b, pl.2, fig.3 (type, from Indian

Ocean between Zanzibar and Seychelles in S. Lat. $5^{\circ} 12' 5''$ E. Long. 46°

32 ' 3 " , in 3000 meters). - PARR, Bull. Bingham Oceanogr. Collection, vol. 3, art.2, Dec. 30, 1927, p.36 (compiled). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.23, pl.2, fig.3 (N. 8 ° to 28 ° W. 20 ° to 66 ° , 50 to 6000 meters). - NORMAN, Discovery Rep., vol.2, 1930, p.306 (S. 00 ° 56 ' W. 14 ° 8 ' 30 ").

Depth 4 1/2 to 5 1/2; head 3 1/2 to 4 1/4. Eye 4 to 5 in head; rather strong palatine teeth directed backwards, rather close series of 8 to 12 each side; barbel 1/2 to 1 1/2 length of head, white or very lightly pigmented, almost uniformly thick for basal 3/4, then somewhat thicker and slightly laterally compressed, near end strongly flattened in other direction and terminal part translucent with opaque axis; with age barbel 1/2 head, pigmented, tapering almost to tip, ending in a minute white bulb with pigmented strip on each side meeting over tip.

Postocular luminous organ elongated, extends forward below pupil. Lateral photophores 5 between gill opening and ventral, 6 to 8 between ventral and anal. Ventral series 5 between isthmus and pectoral, 5 or 6 between pectoral and ventral, 8 or 9 between ventral and anal, 7 to 9 between anal and caudal. Large white patches of luminous tissue present on sides of body with age, in definite positions near dorsal and ventral ends of opercle, behind and little above pectoral base, 1 before ventral, and 2 (lateral and dorsal) above.

D. 15 or 16, begins over or little behind ventral base and ends above first to seventh anal ray; A. 14 to 16, usually 14; pectoral 7 or 8; ventral 7, median.

Length 103 mm. without caudal. (Regan and Trewavas.)

Atlantic and Indian Oceans.

Genus BOROSTOMIAS Regan

Borostomias REGAN, Trans. Linn. Soc. London, series 2, vol.12, Zool., 1908, p.

217. Type Borostomias braueri REGAN, designated by Jordan, Genera of Fishes, pt.4, 1920, p.529.

Mouth cleft straight. Premaxillaries and lower jaw with strong fangs. Maxillary teeth few (7 to 10), set well apart, rather strong, erect, incurved, some or all straight and slightly barbed at end, like fangs of premaxillaries and lower jaw. Generally pair of teeth on vomer. Series of teeth on each palatine. Short strong teeth on gill arches, none on ceratohyal. Postocular luminous organ single. Dorsal rays 11 to 16, begins above or just behind ventrals, not extending above anal. Anal rays 10 to 18.

Atlantic and Indian Oceans, Gulf of Panama.

ANALYSIS OF SPECIES

- 1
a. Dorsal 11; Anal 10; vent: median between ventrals and anal
abyssorum.
- 2
a. Dorsal 11; Anal 14; vent near anal fin.
- 1
b. Eye 4 in head macrophthalmus.
- 2
b. Eye $5 \frac{2}{3}$ in head antarcticus.
- 3
a. Dorsal 13 or 14; Anal 14 to 16.
- 1
c. Barbel little shorter than head; postocular luminous organ long as eye
schmidti.
- 2
c. Barbel $1 \frac{1}{3}$ to $1 \frac{1}{2}$ times head, slender, slightly thickened white terminal part $\frac{1}{20}$ of head; postocular luminous organ shorter than eye, which 8 in head braueri.

- ³
c. Barbel $1 \frac{1}{2}$ times head; eye $6 \frac{2}{5}$ in head elucens.
- ⁴
a. Dorsal 14; Anal 18; barbel $1 \frac{2}{5}$ times head, ending in slightly thickened white part $\frac{1}{10}$ of head, with filament panamensis.
- ⁵
a. Dorsal 16; Anal 17; barbel $1 \frac{1}{2}$ times head, ending in small white bulb with 2 filaments macristus.

Borostomias abyssorum (Koehler)

Astronesthes abyssorum KOEHLER, Ann. Univ. Lyon. Paris, fasc.26, 1896, p.511, pl.27, fig.10.- PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec. 30, 1927, p.30 (copied).

Borostomias abyssorum REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.24, fig.16 (compiled).

Depth $7 \frac{1}{2}$; head $4 \frac{1}{3}$. Snout 4 in head; eye $4 \frac{1}{2}$; maxillary with about 6 large teeth; barbel little less than $\frac{3}{4}$ of head, with well marked swelling little before tip, its terminal part unpigmented.

Postocular luminous organ large. Photophores not determined.

D. 11, begins above ventral base; A. 10; pectoral 5, short; ventral 7, less than pectoral, little postmedian. Vent equidistant from ventral and anal. Length 75 mm. without caudal. (Regan and Trewavas.)

Off Atlantic coast of France.

Borostomias macrophthalmus Regan and Trewavas

Borostomias macrophthalmus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May.30, 1929, p.25, fig.17 (compiled).

Astronesthes richardsonii (not POEY) GOODE and BEAN, Oceanic Ichth., 1895, p.106, pl.33, fig.125. N. $39^{\circ} 38'$ W. $71^{\circ} 39' 45''$, 515 fathoms.

Astronesthes richardsoni JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt. 1, 1896, p. 587 (part); pt. 4, 1900, pl. 94, fig. 262 (copied). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol. 15, Tiefsee-Fische, 1906, p. 29 (part). - BARNARD, Ann. South African Mus., vol. 21, June 1925, p. 135 (part).

Astronesthes elucens (not BRAUER) PARR, Bull. Bingham Oceanogr. Collection, vol. 3, art. 2, Dec. 30, 1927, p. 28, fig. 20 (type), fig. 21-a (maxillary).

Depth $6 \frac{3}{4}$; head 5, width 3. Snout $5 \frac{1}{2}$ in head from snout tip; eye $4 \frac{1}{2}$, little greater than snout, equals interorbital; maxillary extends 2 eye diameters behind eye, length $1 \frac{1}{8}$ in head from snout tip; 6 large premaxillary canines, second or third pair longest; 9 or 10 smaller maxillary teeth; pair of large anterior lower canines with others all graduated smaller posteriorly; barbel $1 \frac{2}{3}$ in head from snout tip, simple, tapering; interorbital 4, slightly depressed. Gill rakers 3 + 13, short denticles, $1 \frac{1}{2}$ in gill filaments, which $2 \frac{1}{2}$ in eye.

Postorbital luminous body half pupil, close above maxillary below and behind eye. Upper lateral series of photophores 15 between pectoral and ventral, 12 between ventral and anal; lower or ventral series 13 (?) on isthmus, 15 between pectoral and ventral, 12 between ventral and vent, 15 from opposite anal origin to caudal.

D. II, 9, first branched ray $1 \frac{7}{8}$ (?) in total head length; adipose fin $3 \frac{2}{5}$; A. II, 12, first branched ray $2 \frac{1}{3}$ (?); caudal $1 \frac{3}{4}$ (?), damaged, well forked; pectoral $1 \frac{2}{3}$ (?); ventral $2 \frac{1}{8}$ (?); least depth of caudal peduncle $1 \frac{1}{4}$ in eye.

Body mostly blackish, where skin torn away pale brown. Iris neutral gray. Fins pale dusky to gray.

Atlantic Ocean.

35540 U.S.N.M. N. $39^{\circ} 38' 00''$ W. $71^{\circ} 39' 45''$, off Cuba. Albatross Station 2202. Length 184 (?) mm. As Astronesthes richardsoni.

Borostomias antarcticus (Lönnberg)

Astronesthes antarcticus LÖNNBERG, Zool. Anzeiger, vol.28, 1905, p.762. S. $48^{\circ} 27'$ W. $42^{\circ} 36'$, 2500 meters. - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.29 (diagnosis in key). - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art.2, Dec.30, 1927, p.30 (compiled).

Astronectes antarcticus LÖNNBERG, Wiss. Ergeb. Schwed. Südpolar Exped., vol.5, pt.6, Fishes, 1905, p.65 (type).

Borostomias antarcticus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.25 (compiled). - NORMAN, Discovery Rep., vol.2, 1930, p.306, fig.15 (S. $52^{\circ} 55'$ E. $9^{\circ} 50'$, 650 to 700 meters).

Depth $5 \frac{2}{3}$; head 5. Snout $3 \frac{2}{3}$ in head; eye $5 \frac{2}{3}$; barbel little longer than head, with unpigmented somewhat club shaped luminous organ at end; maxillary with 7 teeth.

Postocular luminous organ less than eye. Lateral photophores 56. Ventral series 35 between isthmus and ventral, 19 (?) between ventral and anal.

D. 11, begins over ventral; A. 15; pectoral 9; ventral 7, postmedian. Length 188 mm. without caudal. (Regan and Trewavas.)

South Atlantic.

Borostomias schmidti Regan and Trewavas

Borostomias schmidti REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.26, pl.3, fig.1. N. $17^{\circ} 55'$ W. $24^{\circ} 35'$, 3000 meters.

Depth 5; head $4 \frac{3}{4}$. Eye $6 \frac{1}{2}$ in head; maxillary with 8 to 10 teeth; barbel little shorter than head, with rather long, white, terminal portion, not enlarged, separated from black stem by transparent region with narrow, dark stalk in middle.

Postocular luminous organ equals eye. Lateral photophores 21 between gill opening and ventral, 15 between ventral and anal. Ventral series 10 between isthmus and pectoral, 22 between pectoral and ventral, 15 between ventral and anal, 5 + 8 between anal and caudal.

D. 13, begins just behind ventral; A. 16; pectoral 7; ventral 7, postmedian. Length 185 mm. without caudal. (Regan and Trewavas.)

North Atlantic.

Borostomias braueri Regan

Borostomias braueri REGAN, Trans. Linn. Soc. London, series 2, vol.12, Zool., 1908, p.217, pl.23, fig.1. Near Desroches Atoll, Indian Ocean, 0 to 750 fathoms. - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.26, pl.3, fig.2 (N. $12^{\circ} 11'$ W. $35^{\circ} 49'$, 2000 to 5000 meters; N. $18^{\circ} 50'$ W. $79^{\circ} 7'$, 3000 meters, west of Jamaica; type).

Depth 5 to $5 \frac{1}{2}$; head 4 to $4 \frac{1}{2}$. Eye 8 in head, less than snout; 8 to 10 maxillary teeth; lower jaw $\frac{9}{10}$ of head; barbel $1 \frac{1}{3}$ to $1 \frac{1}{2}$ length of head, slender, with slightly thickened terminal white portion about $\frac{1}{20}$ length of head.

Postocular luminous organ $1 \frac{1}{2}$ ~~in~~ eye. Lateral photophores 22 between gill opening and ventral, 15 or 16 between ventral and anal. Ventral series 10 to 12 between isthmus and pectoral, 22 to 24 between pectoral and ventral, 15 to 16 between ventral and anal, 13 (5 - 8) between anal and caudal.

D. 13 to 14, begins above or just behind ventral and ending well before anal; A. 14 to 16; pectoral 7; ventral 7, nearer caudal base than snout end. Length 175 mm. without caudal. (Regan and Trewavas.)

Atlantic and Indian Oceans.

Borostomias elucens (Brauer)

Astronesthes elucens BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.31. Gulf of Guinea in N. Lat. $0^{\circ} 55' 7''$ W. Long. $4^{\circ} 37' 6''$, in 2500 meters. - PARR, Bull. Bingham Oceanogr. Collection, vol.3, art. 2, Dec.30, 1927, p.28 (part).

Borostomias elucens REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.26 (compiled).

Apparently distinguished from Borostomias braueri by the larger eye, longer than snout and $6 \frac{2}{5}$ length of head. Barbel $1 \frac{1}{2}$ head.

Ventral photophores 10 between isthmus and pectoral, 23 between pectoral and ventral, 14 between ventral and anal, 14 between anal and caudal.

D. 14; A. 16; pectoral 7; ventral 7. Length 146 mm. without caudal. (Regan and Trewavas.)

Gulf of Guinea.

Borostomias panamensis Regan and Trewavas

Borostomias panamensis REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May.30, 1929, p.26, pl.4, fig.1. N. $6^{\circ} 48'$ W. $80^{\circ} 33'$, 3600 meters, Gulf of Panama.

Depth 6; head 5. Eye 8 in head; lower jaw $\frac{6}{7}$ of head; maxillary teeth 9; barbel $1 \frac{2}{5}$ length of head, with filament near end.

Postocular luminous organ half of eye. Lateral photophores 22 between gill opening and ventral, 17 between ventral and anal. Ventral series 11 between isthmus and pectoral, 23 between pectoral and ventral, 17 between ventral and anal, 12 (5 - 7) between anal and caudal.

D. 14, begins just behind ventral, ends well before anal; A. 18; pectoral 7; ventral 7, postmedian. Length 208 mm. without caudal. (Regan and Trewavas.)
Gulf of Panama.

Borostomias macristius Regan and Trewavas

Borostomias macristius REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep.,

No.5, May 30, 1929, p.27, pl.4, fig.2, text fig. 18 (end of barbel). N. 6° 40' W. 80° 47', 3000 meters, Gulf of Panama.

Depth 6 1/2; head 4 3/4. Eye 6 1/2 in head; barbel 1 1/2 in length of head; barbel 1 1/2 length of head, ending in small white bulb, with 2 slender filaments arising from base; terminal part of black part not swollen, bearing pair of small luminous organs.

Postocular luminous organ 1/2 eye. Lateral photophores 21 between gill opening and ventral, 15 between ventral and anal. Ventral series 11 between isthmus and pectoral, 20 between pectoral and ventral, 15 between ventral and anal, 12 (5 + 7) between anal and caudal.

D. 16, high, begins above ventrals and ends little before anal; A. 17; pectoral 8; ventral 7, median. Length 155 mm. without caudal. (Regan and Trewavas.)

Gulf of Panama.

Genus DIPLOLYCHNUS Regan and Trewavas

Diplolychnus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5,

May 30, 1929, p.27. Type Diplolychnus lucifer REGAN and TREWAVAS.

Mouth cleft straight. Fangs moderate, erect maxillary teeth curved forward, 12 to 16 in adults. Teeth on gill arches well developed. Post ocular organ with 2 luminous surfaces, larger behind and smaller below eyes, both sometimes connected by slender strip. Post-temporal replaced by strong ligament. Stomach large.

ANALYSIS OF SPECIES

- 1
a. Hind part of postocular luminous organ long as eye; barbel $1/2$ length of head, with 1 filament near end lucifer.
- 2
a. Hind part of postocular luminous organ $1/2$ of eye; barbel long as head, with 1 filaments near end mononema.
- 3
a. Hind part of postocular luminous organ $1/2$ of eye; barbel little over $1/2$ of head, with 2 filaments near end bifilis.

Diplolychnus lucifer Regan and Trewavas

Diplolychnus lucifer REGAN and TREWAVAS, Danish Dana Oceanogr. Rep., No.5, May 30, 1929, p.28, pl.5, fig.1. N. $25^{\circ} 11'$ W. $20^{\circ} 57'$, 1000 meters. Atlantic.

Depth $6 \frac{2}{3}$; head 6. Eye $6 \frac{1}{3}$ in head; barbel $1/2$ head, black stem ending in swollen part, bearing pair of luminous bodies and followed by very small white tip $1/3$ black swollen part, single very short filament near end.

Postocular part of luminous organ equals eye. small oblong luminous patch just behind preopercle. Lateral photophores 22 between gill opening and ventral, 25 between ventral and anal. Ventral series 10 between isthmus and pectoral,

25 between pectoral and ventral, 25 between ventral and anal, 12 between anal and caudal.

D. 14, begins little behind ventral, ends far before anal; A. 16; pectoral 7; ventral 7, median. Length 245 mm. without caudal. (Regan and Trewavas.)
Atlantic.

Diplolychnus mononema Regan and Trewavas

Diplolychnus mononema REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.28, pl.5, fig.2. N. $17^{\circ} 43'$ W. $64^{\circ} 56'$, 1000 meters, Caribbean Sea west of St. Croix.

Depth 6; head $4 \frac{3}{4}$ to $5 \frac{2}{3}$. Eye 5 to 7 in head; barbel long as head, like D. lucifer except white tip longer, about equals black swollen part.

Postocular part of luminous organ $\frac{1}{2}$ eye. Small oblong luminous patch just behind preopercle. Lateral photophores 22 to 25 between gill opening and ventral, 23 or 24 between ventral and anal. Ventral series 10 or 11 between isthmus and pectoral, 25 or 26 between pectoral and ventral, 22 to 25 between ventral and anal, 12 between anal and caudal.

D. 13, begins little behind ventral, ends far before anal; A. 16 or 17; pectoral 7; ventral 7, median. Length 255 mm. without caudal. (Regan and Trewavas.)

Atlantic.

Diplolychnus bifilis Regan and Trewavas

Diplolychnus bifilis REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.28, pl.5, fig.3. N. $46^{\circ} 28'$ W. $8^{\circ} 1'$, 4000 meters; off Ireland.

Depth 7; head $4 \frac{1}{2}$. Eye 5 in head; barbel little over $\frac{1}{2}$ of head, like

D. mononema, but with 2 filaments.

Postocular part of luminous organ half of eye. Lateral photophores 22 or 23 between gill opening and ventral, 20 or 21 between ventral and anal. Ventral series 9 to 11 between isthmus and pectoral, 22 to 24 between pectoral and ventral, 20 or 21 between ventral and anal, 10 or 11 between anal and caudal.

D.12, begins over or close behind ventral; A. 14 or 15; pectoral 7; ventral 7, median. Length 65 mm. without caudal. (Regan and Trewavas.)

Atlantic.

Genus HETEROPHOTUS Regan and Trewavas

Heterophotus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.28. Type Heterophotus ophistoma REGAN and TREWAVAS, monotypic.

Mouth cleft somewhat curved, very wide. Teeth small, without well marked canines. Maxillary teeth erect, numerous (15 in young to over 40 in adult). Pair of teeth on vomer and series on each palatine, Gill arches with small teeth, usually in pairs, none on hyoid arch. No post-temporal. Stomach large. ~~TE~~ Photophores in ventral series mostly grouped into little series of subcontiguous photophores. Ventrals well postmedian.

Heterophotus ophistoma Regan and Trewavas

Heterophotus ophistoma REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.29, pl.6, fig.1. N. 7° to 18° W. 32° to 79°, 600 to 2500 meters, Atlantic and Caribbean Sea.

Depth $4 \frac{3}{4}$ to $6 \frac{4}{5}$; head $3 \frac{3}{5}$ to $4 \frac{4}{5}$. Eye 5 to 8 in head; barbel $\frac{1}{2}$ to long as head, slender, black, with white tapering tip, which not or but little swollen.

Postocular luminous organ close to eye, generally longer. Lateral photophores 33 to 36 between gill opening and ventral, 16 or 17 between ventral and anal, not in groups except 4 or 5 behind opercle. Ventral series 10 or 11 (1 + 2 + 3 + 4 or 1 + 3 + 3 + 4) between isthmus and pectoral, 32 to 35 between pectoral and ventral (linear groups 1 to 5), 14 to 16 between ventral and anal (general posterior linear group 5 to 7), 13 or 14 between anal and caudal with middle ones higher.

D. 13 or 14, begins above or just behind ventral, ends before anal; A. 14 to 17; pectoral 7; ventral 7, distant from caudal $1/2$ to $2/3$ that from snout end. Length 300 mm. without caudal. (Regan and Trewavas.)

Atlantic.

Genus RHADINESTHES Regan and Trewavas

Rhadinesthes REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.29. Type Astronesthes decimus ZUGMAYER, monotypic.

Body greatly elongate. Mouth cleft straight. Teeth in jaws unequal, with small curved fangs mixed with much smaller teeth. Premaxillaries probably extend nearly to mouth angle. Maxillary short, with minute, almost vestigial teeth. Pair of teeth on vomer and series on each palatine. Teeth on gill arches small, in pairs, none on ceratohyal. Post-temporal present. Stomach large. Postocular luminous organ single.

Rhadinesthes decimus (Zugmayer)

Astronesthes decimus ZUGMAYER, Bull. Inst. Oceanogr. Monaco, No.193, 1911, p.6.;

Rés. Camp. Sci. Monaco, vol.35, 1911, p.80, pl.3, fig.6 (type from N. 44^o 24' W. 11^o 36', 4900 meters).

Rhadinesthes decimus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.29, fig.20 (type).

Depth 11; head $6 \frac{1}{2}$. Eye $6 \frac{1}{4}$ in head; maxillary equals eye; longest fang $\frac{1}{2}$ eye; barbel $\frac{1}{2}$ head to bulb, stem black with luminous patches most developed near swollen end, which separated from bulb by constriction; bulb rounded, white, with 4 filaments arising together from base; lower jaw $\frac{9}{10}$ of head.

Postocular luminous organ small, well separated from eye. An undulating white line along middle of side. Ventral photophores 6 between isthmus and pectoral, 26 between ventral and anal, 15 between anal and caudal.

D. 12, inserted far behind ventral, ends far before anal; A. 19, ends at distance from caudal equal to its own base length; pectoral 7 or 8; ventral 8, nearly median. Length 315 mm. without caudal. (Regan and Trewavas.)

Atlantic.

Genus NEONESTHES Regan and Trewavas

Neonesthes REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.30. Type Neonesthes macrolychnus REGAN and TREWAVAS, monotypic.

Body moderately long. Premaxillaries curved upwards in front and meeting at angle. Teeth in both jaws feeble. Maxillary teeth erect and similar to others. Pair of teeth on vomer and series of weak palatine teeth. Gill arches with numerous pairs of slender teeth, close set, much longer than jaw teeth, also similar series on ceratohyal. Post-temporal rather slender. Stomach rather small. Postocular luminous organ very large. Anal rays 25 to 28, ending near caudal.

ANALYSIS OF SPECIES

1		
a.	Depth 5 to 6 3/4	<u>macrolychnus.</u>
2		
a.	Depth 7	<u>microcephalus.</u>

Neonesthes macrolychnus Regan and Trewavas

- Neonesthes macrolychnus REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.30, pl.6, fig.2, text fig. 21 (end of barbel). N. 7° to 18° W. 32° to 79°, 600 to 2500 meters, North Atlantic. - NORMAN, Discovery Rep., vol.2, 1930, p.308 (S. 32° 45' W. 8° 47', 650 meters).
- (?) Astronesthes capensis GILCHRIST and VON BONDE, Fisher. Marine Biolog. Surv. South Africa, Report No.3, 1922 (1924), No.7, p.5. Off Table Bay, in 790 fathoms. - BARNARD, Ann. South African Mus., vol.21, pt.1, June 1925, p.134 (type).

Depth 5 to 6 3/4; head 4 1/2 to 5 1/2. Snout short; eye 4 to 5 in head; barbel 3/5 to 1 3/8 not heavily pigmented except small area carrying 2 white luminous organs immediately below bulb.

Postocular luminous body 3 to 5 in head, with narrow anterior subocular prolongation mostly covered by pigment layer but exposed in front. Lateral photophores 13 to 15 between gill opening and ventral, 15 to 20 between ventral and anal. Ventral series 10 to 12 between isthmus and pectoral, 15 or 16 between pectoral and ventral, 16 to 19 between ventral and anal, 13 to 18 between anal and caudal.

D. 10 to 12, short, above interspace between ventral and anal; A. 25 to 28; pectoral 8; ventral 7, premedian. Length 150 mm. without caudal. (Regan and Trewavas.)

North Atlantic.

Neonesthes microcephalus Norman

Neonesthes microcephalus NORMAN, Discovery Rep., vol.2, 1930, p.307, fig.16.

S. 15° 55' E. 10° 35', 600 to 700 meters, South Atlantic.

Depth 7; head $6 \frac{1}{3}$. Snout $7 \frac{1}{4}$ in head from snout tip; eye 4, greater than snout; maxillary extends $1 \frac{1}{5}$ eye diameters behind eye, length $1 \frac{1}{4}$ in head from snout tip; barbel $1 \frac{1}{10}$ to $2 \frac{1}{3}$ times head, hyaline stem ending in swollen white bulb prolonged terminally into fine filament and collar of pigmented tissue round base of bulb.

Postocular luminous organ 3 to 4 in head, with narrow subocular prolongation more or less covered by pigment layer. Lateral photophores 14 (?) between gill opening and ventral, 18 (?) between ventral and anal. Ventral series 9 or 10 between isthmus and pectoral, 16 or 17 between pectoral and ventral, 19 or 19 between ventral and anal, 12 (?) between anal and caudal.

D. 10, short, above interspace between ventral and anal; A. 22 or 23; pectoral rays 8; ventral rays 7, premedian.

Traces of ventral adipose fin. (Norman.)

South Atlantic.

This space to be closed up

Family CHAULIODONTIDAE

Body very long, compressed. Head much compressed, elevated. Mouth large. Teeth in both jaws with excessively long fang like canines. Maxillary enters Series of teeth on each palatine. edge of upper jaw. Small mental barbel. Opercles incomplete. Interopercle rudimentary. Gill openings very wide. No pseudobranchiae. Body covered with large, thin, caducous scales or sometimes naked. Photophores present. Dorsal and anal moderate, former inserted before ventrals or far premedian. Dorsal and ventral adipose fins present. Anal far posterior. Caudal forked.

Deep sea fishes, rather small in size, noted for their enormous fang-like teeth.

Genus CHAULIODUS Schneider

Chauliodus SCHNEIDER, Syst. Ichth. Bloch, 1801, p.430. Type Chauliodus sloani Schneider, monotypic.

Vipera (not LINNAEUS) GATESBY, Nat. Hist. Carolina Fla. Bahamas, vol.2, 1771, p.119. Type Vipera marina GATESBY, monotypic. (Inadmissible.)

Chauliodes RISSO, Hist. Nat. Eur. Merid., vol.3, 1826, p.441. Type Chauliodes schneideri RISSO, monotypic.

Leptodes SWAINSON, Nat. Hist. Animals, vol.1, 1838, p.303; vol.2, 1839, p.303. Type Chauliodus sloani SCHNEIDER, virtually. Leptodes SWAINSON proposed to replace Chauliodus SCHNEIDER.

Body compressed. Head short, bones thinly ossified. Snout very short. Eye moderate. Mouth extremely wide, cleft reaching beyond eye and lower jaw projecting. Premaxillaries with 4 long fang-like canines each side. Mandible with pointed, wide set teeth, anterior exceedingly long. None greatly enlarged teeth received within mouth. Maxillaries with fine teeth. Palatines with

single series of small pointed teeth. No teeth on tongue. Opercle very narrow. Branchiostegals numerous. Dorsal high, anterior. Adipose fin moderate, sometimes fimbriate, opposite short low anal. Caudal and pectorals moderate. Ventral large.

ANALYSIS OF SPECIES

- 1
a. Dorsal inserted close behind pectoral base; ventral photophores 29 between ventral and anal dentatus.
- 2
a. Dorsal inserted at first fourth between pectoral and ventral origins; ventral photophores 22 to 27 between ventral and anal stomias.
- 3
a. Dorsal inserted at first 3/7 between pectoral and ventral origins.
- 1
b. Ventral photophores 22 to 25 between ventral and anal origins; depth (of head) 7 to 8 danae.
- 2
b. Ventral photophores 20 to 23 between ventral and anal origins; depth (of head) 6 to 7. barbatus.

Chauliodus dentatus Garman

Chauliodus dentatus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.273.

Society Islands. - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.40 (diagnosis in key). - FOWLER, Mem. Bishop Mus., vol.10, 1928, p.34 (type). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.31 (reference).

Depth $7 \frac{4}{5}$; head $6 \frac{1}{5}$, width $1 \frac{1}{3}$. Snout 4 in head from snout tip; eye 4, equals snout; maxillary extends well back in head, expansion 2 in eye, equals head from snout tip; upper teeth with 5 long slender fangs each side,

second pair longest or slightly longer than eye; 14 compressed lanceolate maxillary teeth, alternating as many small ones; row of few small teeth on each side palatine, none on vomer; mandible with pair of large fangs twice eye, second pair $1/3$ as short, third pair little less $1/2$ as short, then 3 small pairs and finally 7 short low uniform pointed teeth; interorbital 5 in head from snout tip, depressed.

Scales 64 in median lateral series.

Upper or lateral photophores 19 between pectoral and ventral, 29 between ventral and anal. Lower or ventral series 8 on isthmus, 29 between pectoral and ventral, 14 between ventral and anal.

D. 6, begins close behind pectoral base; A. 13; pectoral rays 14 or 15; ventral rays 7.

Nearly uniform dusky brown. Length 197 mm. of broken type.

Pacific Ocean.

The above from my re-examination of the type, though the fin rays as given by Garman, as my counts in 1928 likely erroneous.

Chauliodus stomias (Shaw and Nodder)

Esox stomias SHAW and NODDER, Nat. Miscellany, vol.9, 1798, in index as pl.344

(on Vipera marina CATESBY, Nat. Hist. Carolina Fla. Bahamas, vol.2, 1771, p. 119, pl.19, Gibraltar). - SHAW, General Zool., vol.5, 1800, p.120, pl.111 (on CATESBY).

Chauliodus sloani SCHNEIDER, Syst. Ichth. Bloch, 1801, p.430. Atlantic (In

Vipera marina CATESBY, Hist. Nat. Carolina, Fla. Bahamas, vol.2, 1771, p.119, pl.19, Gibraltar). - VALENCIENNES, Hist. Nat. Poiss., vol.22, 1849, p.285, pl.657 (Sicily). - JORDAN and GILBERT, Bull. U.S.Nat. Mus., No.16, 1882, p.

285 (compiled). - VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p.102 (coast of Morocco, 1123 meters). - GOODE and BEAN, Oceanic Ichth., 1895, p.96 (Georges Bank; Old Bahama Channel, 500 fathoms; N. 13° to 39° W. 62° to 87° , 435 to 2069 fathoms). - GARMAN, Mem. Mus. Comp. Zool., vol. 24, 1899, p.274 (diagnosis). - REGAN, Trans. Linn. Soc. London, series 2, vol.12, Zool. No.14, 1908, p.218 (north of Peros Atoll to 200 fathoms). - FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1911 (1912), p.560 (Italy).

Chauliodus sloanii GUNTHER, Cat. Fishes Brit. Mus., vol.5, 1865, p.392 (type; Messina); Rep. Voy. Challenger, vol.22, 1887, p.179 (south of New Guinea, 800 fathoms; north of New Guinea, 2000 fathoms; south of Japan, 565 fathoms; mid Atlantic 2500 fathoms; north east of Bermuda 2575 fathoms). - ALCOCK, Ann. Mag. Nat. Hist., ser.6, vol.4, 1889, p.399 (Bay of Bengal and Gulf of Manaar, in 597 to 1590 fathoms); ser.6, vol.8, 1891, p.127 (Laccadive Sea, Andaman Sea, Bay of Bengal); ser.6, vol.10, 1892, p.355 (Laccadive Sea). - GOODE and BEAN, Oceanic Ichth., 1895, pl.31, fig.115. - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.332 (Bay of Bengal, in 1590 fathoms; Gulf of Manaar, 597 fathoms; Laccadive Sea); Cat. Deep Sea Fish. Indian Mus., 1899, p.144 (above materials).

Chauliodus slaonaei BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.40, text figs. 7 - 9 Gulf of Guinea; south of Cocos Keeling; off Sumatra; Bengal Bay; south of Ceylon; between Seychelles and Zanzibar; Gulf of Aden; 594 to 2200 meters). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.63 (N. 27° to 43° W. 7° to 31° , 500 to 5000 meters). - MURRAY and HJORT, Depths of the Ocean, 1912, p.611, fig.454 (Plymouth to Gibraltar, thence to Gran Canaria, thence to Cape Bojador,

Gran Canaria to Fayal, Azores to Newfoundland, 2000 to 5035 meters). -
 PAPPENHEIM, Deutsch. Sudpolar Exped., vol.15, pt.2, 1914, p.167 (N. 24°
 $41'$ W. 32° $21'$, 20 meters, southwest of Azores). - ROULE, Rés. Camp.
 Sci. Monaco, vol.52, 1919, p.26 (N. 43° $21'$ E. 7° $18'$ $15''$, 1838 meters;
 N. 36° $46'$ W. 26° $41'$, 3250 meters, Azores). - BARNARD, Ann. South
 African Mus., vol.21, pt.1, June 1925, p.141 (off Cape Point, East London
 and Durban, 300 to 790 fathoms). - REGAN and TREWAVAS, Danish Dana Exped.
 Oceanogr. Rep., No.5, May 30, 1929, p.32, fig.24 (Mediterranean, Atlantic,
 Caribbean Sea, Japan, (?) Australia). - NORMAN, Discovery Rep., vol.2, 1930,
 p.308 (S. 0° to 33° and N. 6° to 13° E. 5° to 16° to W. 00° to 18° ,
 125 to 1000 meters).

Leptodes sloanii SWAINSON, Nat. Hist. Animals, vol.2, 1839, p.298 (reference).

Chauliodus sentinotus SCHNEIDER, Syst. Ichth. Bloch, 1801, pl.85. - BONAPARTE,
 Iconogr. Fauna Italica, Pesci, vol.3, pt.1, fasc. 30, 1841, no pagination, pl.
 fig.2, (Italy).

Chauliodes schneideri RISSO, Hist. Nat. Eur. Mérid., vol.3, 1826, p.442, pl.14,
 fig.37. Nice.

Stomias schneideri CUVIER, Règne Animal, Poiss., Ill., 1839, p.97 (reference to
 plate).

Leptodes sicculus SWAINSON, Nat. Hist. Animals, vol.1, 1838, p.304, fig.65.
 Isthmus of Messina.

Stomias boa (not SCHNEIDER) CUVIER, Règne Animal, Poiss., Ed. Ill., 1839, pl.
 97 (error).

Chauliodus macouni BEAN, Proc. U.S. Nat. Mus., vol.13, 1890, p.44. N. 51° $23'$
 W. 130° $34'$, 876 fathoms, off Cape St. James, Queen Charlotte Islands. -

GILBERT, Rep. U.S. Fish Comm., pt.19, 1893 (1895), p.465 (off California, 280 to 620 fathoms). - GOODE and BEAN, Oceanic Ichth., 1895, p.513 (reference). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.1, 1896, p.585 (compiled). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee - Fische, 1906, p.40 (diagnosis in key). - GILBERT, Proc. U.S. Nat. Mus., vol. 48, 1915, p.321 (off California, 645 to 2259 fathoms).

Chauliodus maccouni GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.274 (diagnosis).

Chauliodus pammelas ALCOCK, Ann. Mag. Nat. Hist., ser.6, vol.10, 1892, p.355. Laccadive Sea, N. Lat. $8^{\circ} 49'$ E. Long. $73^{\circ} 18' 45''$, in 1370 fathoms. - GOODE and BEAN, Oceanic Ichth., 1895, p.96 (reference). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.332 (reference); Cat. Deep Sea Fishes Indian Mus., 1899, p.145 (Arabian Sea, in the neighborhood of Minnikoy, in 1370 fathoms). - GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p. 274 (diagnosis). - ALCOCK, Illustr. Zool. Investigator, Fishes, pt.7, 1900, pl. 30, fig.4. - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee - Fische, 1906, p.42 (N. $13^{\circ} 2' 8''$ E. $46^{\circ} 41' 6''$, 1200 meters, Gulf of Aden). - PAPPENHEIM, Deutsch. Südpolar Exped., vol.15, pt.2, 1914, p.167 (no locality). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5, May 30, 1929, p.31 (reference).

Chauliodus emmelas JORDAN and STARKS, Bull. U.S. Fish Comm., vol.22, 1902 (1904), p.579, pl.1, fig.2. Sagami Bay in 120 to 265 fathoms, Japan.

(?) Chauliodus danneviggi MC CULLOCH, Biol. Results Endeavour, vol.4, pt.4, Oct. 31, 1916, p.179, pl.3. Off Cape Everard, Victoria, in 180 to 240 fathoms.

Depth $6 \frac{1}{2}$ to 8; head 5 to 7, width $2 \frac{1}{2}$ to 3. Snout $3 \frac{1}{5}$ to $4 \frac{1}{4}$ in

head from snout tip; eye $3 \frac{1}{5}$ to $4 \frac{4}{5}$, little greater than snout in young to $1 \frac{1}{5}$ with age, little greater than interorbital in young to $1 \frac{1}{3}$ with age; maxillary reaches preopercle ridge; 1 to $1 \frac{1}{10}$ in head from snout tip; mandibles with (4 above and 5 below) pairs of large canines (sometimes an extra tooth may appear so tooth is double), first enormous, slender, curved slightly back and when mouth closes extend up along each side of snout well above upper eye edge; upper teeth also project along front of mandible or outside lower jaw; each palatine with 7 short straight conic teeth; interorbital $3 \frac{1}{4}$ to $4 \frac{1}{3}$, abruptly declivous behind though concave medially. Gill rakers minute obsolete denticles or not developed; gill filaments equal eye.

Scales (pockets) 49 to 52 in median lateral series; 7 transversely at dorsal origin. Scales very caducous, all fallen. Single crescentic series of 13 or 14 small infraorbital photophores, first largest and begins in small dark pigment blotch opposite front eye edge, entire series close to eye and otherwise subequal. Below and directly opposite eye center, close to maxillary edge, rather large conspicuous photophore. Maxillary, cheek and opercles with other small photophores. Moderately large photophore between each branchiostegal ray. Photophores in upper ventral row from isthmus to pectoral 10 or 11, from pectoral to ventral 19 or 20, from ventral to anal 23 to 25, from anal to caudal 10. Abdominal photophores in double median row, preventral 19, postventral 23 to 26. Many other minute photophores scattered over rest of body.

D. 6 or 7, first ray long filament extended beyond ventral origin or $2 \frac{1}{2}$ to $4 \frac{1}{4}$ in combined head and body to caudal base; ventral $4 \frac{4}{5}$ to $7 \frac{1}{4}$; adipose fin $1 \frac{1}{5}$ to $1 \frac{1}{2}$ in total head length, origin before anal fin origin; A. II, 10, opposite adipose fin, first branched ray 2 to $2 \frac{1}{10}$; caudal $1 \frac{1}{3}$ to $1 \frac{1}{2}$, forked; least depth of caudal peduncle 5 to $5 \frac{1}{4}$; pectoral $1 \frac{1}{4}$

to $1 \frac{2}{5}$.

Variably pale to dark or dusky brown, with silvery to leaden gray tinge in some specimens, especially on belly. Iris silvery or gray. Fins pale to whitish.

I cannot find that the nominal Chauliodes macouni Bean is distinct. The distinctions set forth by Jordan and Evermann as the smallest head for the Atlantic form (sloanei) as 7 and 6 for the Pacific form (macouni) surely do not hold.

Chauliodus emmelas is only known from the type. Though described as more slender than C. stomias its variation in this respect, both as to the head and depth are equalled in my series of C. stomias. The scales are given "about 60" though my count of the scale pockets show them nearer 54.

2101. D. 5216. Anima Sola Island, N. 44° W., 29.50 miles (N. $12^{\circ} 52'$ E. $123^{\circ} 23' 30''$), between Burias and Luzon. In 215 fathoms. April 22, 1908. Length 182 mm.

3481. D. 5528. Balicasag Island, (C.), N. 15° E. 5.8 miles (N. $9^{\circ} 24' 45''$ E. $123^{\circ} 39' 15''$), between Siquijor and Bohol. In 439 fathoms. August 11, 1909. Length 130 mm.

3525. D. 5424. Cagayan Island (S.), S. 11° W. 3.4 miles (N. $9^{\circ} 37' 5''$ E. $121^{\circ} 12' 37''$), Jolo Sea. In 340 fathoms. March 31, 1909. Length 168 mm.

4315. D. 5671. Chenoki Point, S. 31° E., 42.5 miles (N. $1^{\circ} 5'$ E. $118^{\circ} 56'$), Macassar Strait. In 960 fathoms. December 30, 1909. Length 143 mm.

4000. D. 5365. Cape Santiago Light, N. 73° W., 6.7 miles (N. 13°

44' 24" E. 120° 45' 30"), Balayan Bay, Luzon. In 214 fathoms. February 22, 1909. Length 168 mm.
22, 1909. Length 168 mm.

D. 5300. China Sea (N. 20° 31', E. 115° 49'), vicinity southern Luzon. In 265 fathoms. August 8, 1908. Length 130 mm.

2123. D. 5492. Diuata Point (W.), S. 45° W., 15.2 miles (N. 9° 12' 45" E. 125° 20'), between Leyte and Mindanao. In 735 fathoms. August 1, 1909. Length 182 mm.

3151. D. 5450. East Point (Batan Island), S. 36° E., 9.2 miles (N. 13° 23' 15" E. 124° 00' 30"), east coast of Luzon. In 408 fathoms. June 4, 1909. Length 235 mm.

3365 and 3366. D. 5366. Escarceo Light, S. 5° E., 7.7 miles (N. 13° 39' E. 120° 58' 30"), Batangas Bay, Luzon. In 240 fathoms. February 22, 1909. Length 135 to 155 mm. 2 examples.

3268. D. 5636. Gomomo Island (E.), N. 46° W., 6 miles (S. 1° 55' E. 127° 42' 30"), Pitt Passage. In 1262 fathoms. December 3, 1909. Length 183 mm.

2734. D. 5201. Limasaua Island (E.), S. 1° E., 14.80 miles (N. 10° 10' E. 125° 4' 15"), Sogod Bay, southern Leyte. In 554 fathoms. April 10, 1908. Length 120 mm.

4284. D. 5203. Limasaua Island (S.), S. 38° W., 5.50 miles (N. 9° 58' E. 125° 7' 40"). In 775 fathoms. April 10, 1908. Length 149 mm.

1950. D. 5233. Limasaua Island (S.), S. 70° E., 19.50 miles (N. 10° 00' 22" E. 124° 45' 06"), between Bohol and Leyte. May 7, 1908. Length 213 mm.

5690. D. 5246. Luban Island (N.), S. 58° W., 4.6 miles (N. 6° 29'

15 " E. 126^o 18 ' 45 "), Pacific Ocean, east coast of Mindanao. May 15, 1908.

Length 126 mm.

1628. D. 5590. Mabul Island (N.W.), N. 22^o W., 4.3 miles (N. 4^o 10 ' 50 " E. 118^o 39 ' 35 "), Sibuko Bay, Borneo, and vicinity. In 310 fathoms September 29, 1909. Length 145 mm.

D. 5589. Mabul Island (N.W.) N. 3^o W., 2.8 miles (N. 4^o 12 ' 10 " E. 118^o 38 ' 8 "), Sibuko Bay, Borneo and vicinity. In 200 fathoms. September 29, 1909. Length 140 mm.

4431. D. 5591. Mabul Island (N.W.) N. 6^o W., 3.1 miles (N. 4^o 11 ' 48 " E. 118^o 38 ' 20 "). In 200 fathoms. September 29, 1909. Length 115 mm. Swallowed myctophum spinosus 50 mm. long, which taken from stomach intact.

D. 5620. Makyan Island (S.) S., 44^o E., 7 miles (N. 0^o 21 ' 30 " E. 127^o 16 ' 45 "). Molucca Passage. In 358 fathoms. November 28, 1909. Length 125 mm.

3858. D. 5621. Makyan Island (S.), N. 54^o W., 3 miles (N. 0^o 15 ' E. 127^o 24 ' 35 "), between Gillolo and Makyan. In 298 fathoms. Length 160 mm.

4104. D. 5624. Maykan Island (S.), N. 7^o W., 8.9 miles (N. 0^o 12 ' 15 " E. 127^o 29 ' 30 "), In 288 fathoms. November 29, 1909. Length 148 mm.

1385 and 1386. D. 5219. Mompog Island (N.E.), N. 35^o 30 ' W., 12.25 miles (N. 13^o 21 ' E. 122^o 18 ' 45 "), between Marinduque and Luzon. In 530 fathoms. April 23, 1908. Length 132 to 208 mm. 2 examples.

2578. D. 5379. Mompog Island (E.), N. 30^o W. 37 miles (N. 12^o 59 ' 15 " E. 122^o 30 ' 40 "), Marinduque and vicinity. In 920 fathoms. March 4, 1909. Length 136 mm.

4472 and 4473 . D. 5214. Palanog Light, Masbate, S. 17° W., 2. 60 miles (N. $12^{\circ} 25' 18''$ E. $123^{\circ} 37' 15''$). In 218 fathoms. April 21, 1908. Length 91 to 174 mm. 2 examples.

513. D. 5189. Pescador Island, N. 72° E., 3. 30 miles (N. $9^{\circ} 56' 30''$ E. $123^{\circ} 15'$), Tanon Strait, east coast of Negros. In 300 fathoms. April 1, 1908. Length 171 mm.

D. 5227. Point Origon, S. 44° E., 18. 30 miles (N. $12^{\circ} 53' 45''$ E. $121^{\circ} 52' 30''$), east of Mindoro. In 322 fathoms. May 5, 1908. Length 96 to 151 mm. 8 examples. These show a distinct variation in the size of the eye, a sex distinction noticed by Brauer.

D. 5263. Point Origon, N. 85° E., 28. 3 miles (N. $12^{\circ} 38' 30''$ E. $121^{\circ} 37' 30''$), off eastern Mindoro. June 4, 1908. Length 71 mm.

7648. D. 5349. Point Tabonan, N. 85° E., 45. 2 miles (N. $10^{\circ} 54'$ E. $118^{\circ} 26' 20''$), Palawan Passage. In 730 fathoms. December 27, 1908. Length 232 mm.

5779. D. 5524. Point Tagolo Light, S. 34° W., 17 miles (N. $8^{\circ} 58' 7''$ E. $123^{\circ} 32' 45''$), northern Mindanao and vicinity. In 360 fathoms. August 10, 1909. Length 66 mm.

1443. D. 5405. Ponson Island (N.), S. 86° E., 8. 5 miles (N. $10^{\circ} 49' 20''$ E. $124^{\circ} 24' 23''$), Dupon Bay, Leyte and vicinity. In 262 fathoms. March 17, 1909. Length 188 mm.

3370 to 3372. D. 5406. Ponson Island (N.), S. 88° E. 10. 2 miles (N. $10^{\circ} 49' 3''$ E. $124^{\circ} 22' 30''$). In 298 fathoms. March 17, 1909. Length 140 to 215 mm. 3 examples.

4539. D. 5583. Si Amil Island (N.) N. 88° W. 3. 2 miles (N. $4^{\circ} 19'$

E. $118^{\circ} 56' 20''$), Sibuko Bay, Borneo and vicinity. In 447 fathoms.
September 27, 1909. Length 148 mm.

D. 5586. Sipadan Island (M.) West, 9.4 miles (N. $4^{\circ} 6' 50''$ E. $118^{\circ} 47' 20''$), Sibuko Bay, Borneo and vicinity. In 347 fathoms. September 28, 1909. Length 183 mm.

1847 and 1848. D. 5114. Sombrero Island N. 36° E., 7.2 miles (N. $13^{\circ} 36' 11''$ E. $120^{\circ} 45' 26''$), Balayan Bay and Verde Island Passage. In 340 fathoms. January 20, 1908. Length 130 to 145 mm.

D. 5120. Sombrero Island, S. $79^{\circ} 30'$ E., 19.2 miles (N. $13^{\circ} 45' 30''$ E. $120^{\circ} 30' 15''$), Balayan Bay and Verde Island Passage. In 393 fathoms. January 21, 1908. Length 64 to 154 mm. 17 examples.

D. 5287. Sombrero Island, N. 68° E., 11.25 miles (N. $13^{\circ} 37' 40''$ E. $120^{\circ} 39'$), China Sea, vicinity southern Luzon. In 379 fathoms. July 20, 1908. Length 39 to 142 mm. 5 examples.

2577. D. 5399. Tanguingui Island Light, N. 70° W., 22.8 miles (N. $11^{\circ} 21' 45''$ E. $124^{\circ} 05'$), north of Cebu. In 32 fathoms. March 16, 1909. Length 213 mm.

4504 and 4505. D. 5368. Tayabas Light (outer), N. 32° W., 21.8 miles (N. $13^{\circ} 35' 30''$ E. $121^{\circ} 48'$), Marinduque Island and vicinity. In 181 fathoms. February 23, 1909. Length 152 to 172 mm.

3126. D. 5373. Tayabas Light (outer), N. 20° E., 15 miles (N. $13^{\circ} 40'$ E. $121^{\circ} 31' 10''$). In 338 fathoms. March 2, 1909. Length 172 mm.

One example, no data. Length 155 mm.

23420 U.S.N.M. N. $44^{\circ} 30'$ W. $57^{\circ} 10'$, Banquereau Bank. In 250 fathoms. March 5, 1879. Schooner "Marion". Length 320 mm. In poor preservation.

26165 U.S.N.M. Newport, Rhode Island. Fish Hawk Station 892. Length 97 mm. Very poor.

27302 U.S.N.M. East coast of U.S. Found in lot of samples of bottom dredging. Dry mandible 25 mm. long.

32660 U.S.N.M. N. $37^{\circ} 46' 30''$ W. 74° Albatross haul 1. March 22, 1883. Length 136 mm.

35538 U.S.N.M. N. $39^{\circ} 38'$ W. $71^{\circ} 39' 45''$. Albatross Station 2202. August 19, 1884. Length 268 mm.

35556 U.S.N.M. N. $39^{\circ} 30' 30''$ W. $71^{\circ} 44' 30''$. Albatross Station 2204. August 19, 1884. Length 210 mm.

38207 U.S.N.M. Albatross Station 2729. Length 195 mm., from mutilated head.

1 example (with 39249 U.S.N.M.). Albatross Station 2738. Length 145(?) mm. Very poor.

40069 U.S.N.M. Messina. Royal Zool. Mus. Florence. September 1881. Length 59 to 200 mm. 4 examples.

1 example (with 54221 U.S.N.M.). N. $52^{\circ} 39' 30''$ W. $132^{\circ} 38'$. In 1588 fathoms. Albatross Station 3342. September 3, 1890. Length 168 mm.

74332 U.S.N.M. Albatross Station 2549. Length 198 mm. As stomias ferox.

83867 U.S.N.M. Albatross Station 2667. May 5, 1886. Length 74 mm.

91400 U.S.N.M. Albatross Station 20023. In 1100 meters. November 21, 1919. Length 133 mm.

92118 U.S.N.M. N. 39° , W. 71° , from stomach of sword fish taken in gully between Browns and Georges Banks, July 15 - August 5, 1931. Schooner "Eleanor". Capt. Thomas Brigham. Head 40 mm.

The following as Chauliodus macouni:

- 45372 U.S.N.M. N. $51^{\circ} 23'$ W. $130^{\circ} 34'$. In 876 fathoms. Albatross
Station 2860. August 31, 1888. Length 91 mm. Type.
- 46517 U.S.N.M. N. $47^{\circ} 29' 30''$ W. $125^{\circ} 43'$. Albatross Station
3070. June 2, 1889. Length 192 mm.
- 48612 U.S.N.M. N. $55^{\circ} 26'$ W. $155^{\circ} 26'$. In 695 fathoms. Albatross
Station 3340. August 29, 1890. Length 75 mm.
- 53945 U.S.N.M. N. $51^{\circ} 23'$ W. $130^{\circ} 34'$, Alaska. In 876 fathoms.
Albatross Station 2860. August 31, 1888. Length 170 mm. Very poor.
- 53946 U.S.N.M. N. $37^{\circ} 28'$ W. 123° . In 276 fathoms. Albatross
Station 3479. April 27, 1893. Length 95 mm.
- 54622 U.S.N.M. N. $43^{\circ} 46'$ W. $124^{\circ} 57'$. In 277 fathoms. Albatross
Station 2890. October 19, 1888. Length 150 mm.
- 60125 U.S.N.M. Near Funter Bay, Lynn Canal, Alaska. In 350 fathoms.
Albatross Station 4257. July 23, 1903. Alaska Salmon Investigations.
Length 92 mm.
- 60396 U.S.N.M. Naha Bay, Behm Canal, south east Alaska. In 113 to 82
fathoms. Albatross Station 4231. July 7, 1903. Alaska Salmon Investigat-
ions. Length 100 mm.
- 60607 U.S.N.M. Near Funter Bay, Lynn Canal. Albatross Station 4258.
In 300 to 313 fathoms. July 23, 1903. Alaska Salmon Investigations. Length
50 mm. to body broken off ends of depressed ventrals.
- 60797 U.S.N.M. Near Yes Bay, Behm Canal. In 130 to 193 fathoms.
Albatross Station 4235. July 8, 1903. Alaska Salmon Investigations. Length
158 mm.

74719 U.S.N.M. Staritschkof Island. In 300 fathoms. Albatross
Station 4797. June 20, 1906. Length 60 mm.

77461 U.S.N.M. Albatross Station 4393. 1904. Length 190 mm.

77462 U.S.N.M. Albatross Station 4515. 1904. Length 152 mm.

77463 U.S.N.M. Albatross Station 4544. Length 100 mm.

51464 U.S.N.M. Sagami Bay, Japan. In 120 to 265 fathoms. Albatross
Station 3697. Length 196 mm. Type of Chauliodus emmelas.

Chauliodus danae Regan and Trewavas

Chauliodus danae REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.5,
May 30, 1929, p.34, pl.7. Atlantic, Caribbean Sea, Indian Ocean, south of
New Guinea, north of New Guinea, 50 to 7000 meters. - NORMAN, Discovery
Rep., vol.2, 1930, p.308 (S. 32° to 33° W. 8° E. 6° to 9° , 650 to 1000
meters).

Depth $6 \frac{2}{5}$ (?); head $4 \frac{3}{4}$ (?), width $3 \frac{2}{3}$ (?) Snout 6 (?) in head from
snout tip; eye $4 \frac{2}{3}$ (?), greater than snout or interorbital; maxillary reaches
preopercle ridge, $1 \frac{1}{8}$ (?) in head from snout tip; 4 pairs of upper canines
and 8 lower pairs; interorbital $4 \frac{3}{4}$ (?) in head, level in front and abruptly
declivous behind well as concavely medianly. Gill rakers (?).

Scales all fallen and pockets scarcely defined, about 42 in median lateral
series to caudal base.

Large antorbital photophore distinct at lower front eye edge, though only
about 8 or 10 feeble impressions of the infraorbital crescentic rim of minute
photophores; large photophore above maxillary opposite eye center; upper lat-
eral series with 16 between pectoral and ventral fins, 22 between ventral and

and anal, thence 9 to caudal.

D. 5, first ray long and filamentous or $2 \frac{3}{4}$ in combined head and body to caudal base; adipose fin not defined anteriorly but apparently would begin at least opposite anal origin, posteriorly not extended far as hind anal edge; A. II, 10, first branched ray 3 (?) in head from snout tip; caudal $1 \frac{1}{2}$ (?), forked, lobes sharply pointed; least depth of caudal peduncle $1 \frac{2}{3}$ in eye; pectoral $1 \frac{1}{2}$ (?) in head from snout tip; ventral 1 (?)

Brownish, upper and lower margins of body blackish, ^{also} body at fin bases. Twelve dark ill defined cross bands, about wide as pale interspaces. Fins whitish. Iris gray.

89914 U.S.N.M. N. 37° W. 67° 12'. In 1500 meters. October 13, 1913. C.O.D. Iselin. Museum of Comparative Zoology. Length 70 (?) mm.

Chauliodus barbatus Garman

Chauliodus barbatus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.271, pl.K, figs.2 - 2 a. N. 6° 22' 20" W. 81° 52', 465 fathoms; N. 2° 34' W. 82° 29', 1201 fathoms; N. 3° 9' W. 82° 8', 1132 fathoms. - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.40 (diagnosis in key). - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No. 5, May 30, 1929, p.38 (Gulf of Panama, 1500 to 3500 meters).

