

DESCRIPTIONS OF FIFTEEN NEW FISHES OF THE FAMILY  
CHEILODIPTERIDÆ, FROM THE PHILIPPINE ISLANDS  
AND CONTIGUOUS WATERS.

By LEWIS RADCLIFFE,<sup>1</sup>

*Scientific Assistant, United States Bureau of Fisheries.*

The new species of Cheilodipteridæ herein described<sup>2</sup> were collected on the Philippine expedition of the United States Bureau of Fisheries steamer *Albatross*. It is noteworthy that three of them were secured at a single haul of the beam trawl at station 5442, on the west coast of Luzon. One species, *Amia hyalina*, was taken at Talisse Island, north of Celebes, outside the Philippine Archipelago.

Genus AMIA Gronow.

A new subgenus, *Amioides*, is herein described. Because of the unnatural groupings resulting from subdivisions of the genus based on single characters, such as presence or absence of serrations on the preopercle, character of teeth, character of lateral line, etc., it has seemed preferable to await a more thorough study of the whole group before deciding whether *Amioides* is entitled to generic rank.

AMIA DIENCÆA Smith and Radcliffe, new species.

Plate 34, fig. 1.

Dorsal VI-1,9; anal II,8; scales 4+8-24.

General form elliptical-ovate; head 2.46, pointed; dorsal contour from tip of snout to insertion of spinous dorsal straight, steep; body

<sup>1</sup> In the study of this collection the writer has been associated with Dr. Hugh M. Smith, who becomes joint author of the new genera and species herein described.

<sup>2</sup> The measurements herein used represent the ratio between length of part described and the standard length from tip of snout to end of last caudal vertebra, with the exception of eye, snout, maxillary, interorbital, fins, and least depth of caudal peduncle, which are expressed in ratio to head measured from tip of snout to posterior edge of opercle (not including opercular flap). The length of caudal peduncle is measured between the verticals drawn at base of last anal ray and at end of last vertebra. Even when the last dorsal and anal rays are cleft to base they are still counted as single rays. The scale formula indicates the number of scales in a transverse row from insertion of dorsal downward and backward to and including lateral line and the number of transverse rows above the lateral line, between upper angle of opercle and end of last caudal vertebra.

deep, strongly arched dorsally, ventral outline comparatively straight, depth 2.62; caudal peduncle slender, compressed, of nearly uniform depth, depth 2.50, length 1.70; eye 2.76, prominent; snout 4.50, short; nostrils well separated, anterior circular, near edge of snout, posterior elliptical, close to eye; maxillary 1.80, reaching vertical from posterior margin of eye; interorbital 4.06; vertical margin of preopercle with a few weak denticulations, angle, horizontal margin, and crest smooth; bands of villiform teeth, broadest in front, on jaws; vomerine and palatine teeth villiform, slightly larger than the others, in a single row along the ridge of the bone; scales small, regular, ctenoid; lateral line arched.

First dorsal spine small, second 2.13, longest and strongest; the second dorsal rounded, longest ray 1.86; caudal forked; anal 2, similar to second dorsal; ventrals 1.97; pectorals 1.60.

Color in alcohol: Ground color cream-buff; a stripe obscure anteriorly (probably brilliantly colored in life), dusky black posteriorly, about three-fourths width of eye, extends from scapula with a downward sweep, becoming horizontal on caudal peduncle, to tips of median caudal rays; lines of lighter color, most distinct anteriorly, margin this stripe; a walnut-brown bar as wide as pupil from eye to base of pectoral; fins hyalin.

*Type*.—Cat. No. 70243, U.S.N.M., a specimen 4.1 cm. in length, from Sulade Island, Jolo.

AMIA PARVULA Smith and Radcliffe, new species.

Plate 34, fig. 2.

Dorsal VI-1,9; anal II,8; scales 3 + 6-24.

General shape fusiform, compressed; head 2.60, large; body slender, arch of back greater than ventral surface, depth 3; caudal peduncle tapering, slender, compressed, depth 2.75, length 1.42; eye 3, prominent; snout 4; mouth nearly horizontal, tip of lower jaw projecting; maxillary 2.25, barely reaching vertical from middle of eye; interorbital 3.97, narrow, flat; preopercular margin finely serrate, crest smooth; teeth on upper jaw small, unequal, cardiform, mainly in one row, a wide toothless space at symphysis; a group of six or seven large, unequal teeth on each side of symphysis of lower jaw, narrowing to a single row of smaller teeth on sides, no teeth on vomer and palatines (a few scattered papillary structures along the ridge of the palatines); peritoneum silvery; scales regular, ctenoid; lateral line incomplete, six well-developed pores present anteriorly.

First dorsal spine 3.20, second longest 2.40, spines weak, membranes not deeply incised; anterior rays of second dorsal longest, 1.59, distal margin slightly concave; caudal long, deeply forked, lobes rounded; anal 1.85, similar to second dorsal; ventrals 1.90; pectorals 1.40, long.

Color in alcohol: Ground color cream-buff, scales edged with brown, darkest on dorsal surface; a median line on back from occiput to caudal, blackish under dorsals, elsewhere brownish; a narrow brownish stripe from snout, over eye, along lateral line, fading out posteriorly; a brown stripe nearly as wide as pupil from tip of snout through middle of eye to tip of opercle, continued on body as a narrow black line to caudal peduncle, ending in a large yellowish white area before base of caudal; a silvery stripe underneath this for its entire length; a black line along base of anal to base of caudal; a brown stripe from middle of maxillary, under eye, across opercles, to base of pectorals; snout dusky; a large black area on tip and under side of chin; anterior margin of spinous dorsal dusky black; a dusky brownish band above base of second dorsal to tip of posterior rays; a similar band on anal; all the fins slightly dusky.

Color in life: Body translucent, dorsal surface dusky with a narrow median black line; a black line from eye ending in a brilliant scarlet blotch larger than pupil, at base of caudal, margined below by a purplish stripe on head, changing to opalescent green on body; a black stripe below this on head; chin and nose black; top of head dusky with short silvery olive stripes; lower head and breast white; fins dusky; first dorsal spine blackish; a red-brown bar slightly nearer base than tip of rays across second dorsal; anal similar to second dorsal, the brown bar slightly nearer base and a black line along base continued on lower edge of caudal peduncle; iris dark.

*Type*.—Cat. No. 70244, U.S.N.M., a specimen 3.9 cm. in length, from Tataan Pass, Tawi Tawi group.

The collection contains many specimens, of which the type is the largest. Faded alcoholic examples closely resemble the young of *A. margaritophora*, but the black area on chin is larger, the stripes are darker, the pearly spots characteristic of *A. margaritophora* are lacking, and the lateral line is incomplete.

Among the 35 examples from Saboon Island, Ragay Bay, Luzon, of which the largest is 3 cm. in length, are several females with eggs in an advanced stage of development. One example 2.7 cm. in length is gravid, and the eggs are unusually large for so small a fish.

**AMIA HYALINA** Smith and Radcliffe, new species.

Plate 36, fig. 3.

Dorsal VII-1,9; anal II,8; scales 3 + 6-21.

General form ovate, compressed; head 2.60, very pointed, dorsal profile concave, ventral slightly convex; body short and deep, back arched, depth 2.27; caudal peduncle short compressed, depth 2.25, length 1.65; eye 3.50, small; snout 3.60, depressed, nearly as long as eye; nostrils widely separated, anterior tubular, near tip of snout;

posterior large, slitlike, close to eye; mouth nearly horizontal, upper jaw slightly longer, more or less overlapping the lower; maxillary 1.70, reaching vertical from posterior margin of eye; interorbital 4, rugose, flattened; margin and crest of preopercle smooth; broad bands of small, villiform teeth on jaws, vomer and palatines; scales ctenoid; lateral line arched, incomplete, 7 well-developed pores anteriorly, indistinct traces of pores posteriorly.

Fins rounded; first dorsal spine small, second half as long as the third, the latter is longest and strongest, 2; second dorsal 1.75, median rays longest; anal 1.77; ventrals 1.75; pectorals 1.48.

Color in alcohol: Ground color buff; a dusky brown stripe from snout to eye, another from eye to throat, a third from upper third of eye across opercles to lateral line, a fourth across nape; traces of three stripes on sides, first from in front of dorsal downward toward angle of preopercle, second from under origin of dorsal to behind pectoral base, the third under middle of spinous dorsal; slight traces of mottlings on first dorsal; ventrals mottled with grayish white; other fins hyalin.

*Type*.—Cat. No. 70245, U.S.N.M., a female 4.7 cm. in length, with nearly ripe eggs, from Talisse Island, north of Celebes. Ten cotypes 3.5 to 4.3 cm. in length.

Color in life of a cotype 4 cm. long: Ground color hyalin pearl; a brownish-red stripe from snout to eye, another from eye to throat, another across nape and three downward from base of spinous dorsal, these latter more or less olivaceous; spinous dorsal mottled finely with brownish; ventrals similarly mottled but darker; other fins immaculate; abdominal regions and lower side of head with more or less silver; iris very pale pink.

AMIA DIVERSA Smith and Radcliffe, new species.

Plate 37, fig. 1.

Dorsal VII-1,9; anal II,8; scales 3 + 6-25.

General shape fusiform in outline, strongly compressed; head 2.83, pyramidal, the dorsal outline slightly concave at occiput; body deep, dorsal and ventral outline strongly arched, greatest depth 2.60; caudal peduncle long, tapering to base of caudal, slender, depth 2.23, length 1.50; eye 2.62, large; snout 4.30, short, depressed; mouth oblique, lower jaw projecting; maxillary 1.92, reaching slightly beyond vertical from middle of eye; interorbital 3.66, flat; preopercular margin finely serrate, crest and orbital bones smooth; bands of villiform teeth on jaws, those at symphysis and along outer edge of lower jaw anteriorly, unequal; a row of small teeth on ridge of vomer and palatines; peritoneum silvery white; scales regular.

Fins low; first dorsal rounded, spines weak, third and fourth longest, subequal, 2.25; anterior rays of second dorsal longest, 1.46,

margin sinuous; caudal emarginate; anal similar to second dorsal, 1.60; ventrals 1.77; pectorals 1.40.

Color in alcohol: Ground color pinkish-buff dotted with brownish, darkest in front of and at base of anal; silvery reflections on scales on sides; some of scales on back with pearl-gray edgings; a seal-brown band across tip of snout and clin through eye, continued very faintly across opercles, margined below by a silvery line, a silvery line above it on eye; a blackish bar on upper part of eye; tip of opercle brown; a small round black spot on caudal peduncle at base of caudal; fins hyalin; upper membranes of anterior dorsal spines dusky; a narrow black line along base of second dorsal to tip of posterior rays.

*Type*.—Cat. No. 70246, U.S.N.M., a female 7.8 cm. in length, with immature eggs, from a small stream in Canmahala Bay, Ragay Gulf, Luzon.

This trim little fish appears to be quite distinct from related forms, distinguishable by its coloration and deep, compressed body. The eye is larger than in *A. jenkinsi*, the lower jaw not so prominent, caudal peduncle slenderer, nuchal spots and stripes on top of head lacking; caudal spot small; brown shade on tip of opercle.

*AMIA NIGROCINCTA* Smith and Radcliffe, new species.

Plate 37, fig. 2.

Dorsal VII-1,9; anal II,8; scales 3 + 6-25.

General shape fusiform, compressed; head 2.70, large, pyramidal; body deep, contour lines symmetrical, depth 2.65; caudal peduncle slender, compressed, depth 2.40, length 1.50; eye 2.95; snout 3.88, short, pointed; nostrils close together, anterior circular, posterior slitlike; mouth oblique, tip of lower jaw rounded, projecting beyond upper; maxillary 1.87, reaching vertical from posterior border of pupil; interorbital 3.70, broad, nearly flat; margin of preopercle and crest finely serrate; orbital rim with a few weak serrations on its lower, outer margin; teeth in upper jaw, slightly unequal, villiform, in a broad band which is narrow posteriorly; small caninelike teeth at symphysis of lower jaw, followed by a narrow band of cardiform teeth; a single row of small, stocky teeth along ridge of vomer, a similar row of somewhat slenderer teeth on palatines; peritoneum silvery white with dusky punctulations; scales regular, ctenoid.

Fins low; first dorsal rounded, spines short and slender, first small, fourth longest 2.26; margin of second dorsal sinuous, anterior rays longest 1.65; caudal emarginate, lobes rounded; anal 1.85, similar to second dorsal; ventrals 1.92, rounded; pectorals 1.40.

Color in alcohol: Pinkish-buff, darkest on back, becoming silvery white on belly, everywhere punctulate with minute brownish dots; scales with silvery reflections; a brown band from tip of snout and

chin to eye; traces of a continuation of this band across opercles, most distinct at preopercle, traces of a silvery marginal line above and below; a narrow black girdle encircles caudal peduncle at base of caudal, darkest at point where it crosses lateral line; a broad, dusky, black band across anterior dorsal spines; a subbasal black band on second dorsal and anal, the black is confined to the membranes; rest of fins hyalin.

*Type*.—Cat. No. 70247, U.S.N.M., 9.1 cm. in length, taken with a beam trawl February 15, 1908, at station 5143 (lat.  $6^{\circ} 05' 50''$  N.; long.  $121^{\circ} 02' 15''$  E.), in vicinity of Jolo, at a depth of 19 fathoms, on a bottom of coral sand.

This species resembles *A. jenkinsi* Evermann and Seale from the Philippines. The lower jaw is not so pointed and projects less; nuchal spots and traces of stripes on head are lacking; the large caudal spot is replaced by a narrow black girdle, and the bands on dorsal and anal are more distinct and at a distance from base of rays. *A. spilura* (Regan) is also similar, but it has no black stripe on second dorsal nor girdle on caudal peduncle; and it has a blackish stripe at base of anal, a slightly larger eye, and ventral surface less strongly decurved.

Among the specimens from the type locality are several gravid females and a male with eggs in mouth.

AMIA UNINOTATA Smith and Radcliffe, new species.

Plate 34, fig. 3.

Dorsal VII-I,9; anal II,8; scales 3+6-24.

General form elliptical ovate; head 2.40, conic; body robust, dorsal outline strongly arched, depth 2.45; caudal peduncle slender, compressed, depth 2.37, length 1.70; eye 3.10; snout 3.70, rounded; nostrils close together, near tip of snout, the anterior tubular, the tube about three-fifths diameter of pupil in length; posterior nostril slitlike, just above and behind base of anterior; mouth nearly horizontal, lower jaw slightly projecting; maxillary 1.85, barely reaching vertical from posterior margin of pupil; interorbital 4.40, flattened, rugose; margin of preopercle and crest smooth; teeth on jaws villiform, in bands; those on vomer and palatines in a single row, along the ridge; scales regular, ctenoid; lateral line strongly arched, complete, 24 pores.

Fins rounded; first dorsal spine very small; second slender, less than half as long as the third, the latter is longest and strongest, 2.18; second dorsal 1.95; anal 2.18; ventrals 1.85, barely reaching base of anal; pectorals 1.60, tips reaching vertical to first anal spine.

Color in alcohol: Ground color sepia, margins of scales darker; a blackish slate spot about three-fourths as large as eye on side above middle of pectoral; a light-colored oblique line halves the black blotch; a slaty line from eye downward toward angle of preopercle, traces of

another behind eye on opercle; vertical fins and ventrals very dark olive brown, almost black; pectorals body color.

*Type*.—Cat. No. 70248, U.S.N.M., 5.5 cm. in length, from Bisucay Island, Cuyos Islands.

Color in life of a specimen 5.5 cm. in length from Tara Island, Mindoro Strait: Dusky, with reddish brown shades a round blackish blotch larger than pupil midway between pectoral and lateral line.

Color in alcohol of a specimen 3.9 cm. in length from dredging station 5179: Drab gray, black blotch on side very distinct.

AMIA STRIATA Smith and Radcliffe, new species.

Plate 35, fig. 1.

Dorsal VII-I,9; anal II,8; scales 3 + 6-24.

General form elliptical, compressed; head 2.60, pyramidal, upper profile straight; body oblong, dorsal surface arched more than ventral surface, depth 2.71; caudal peduncle deep, compressed, depth 2.16, length 1.64; eye 3.38; snout 4.91, short; mouth very oblique, lower jaw projecting slightly; maxillary 1.75, longer than snout plus eye, reaching vertical from posterior border of eye; nostrils large, aperture of posterior larger than anterior; interorbital 4.50, narrow, rugose; upper margin of preopercle smooth, angle with strong serrations, crest smooth; outer orbital rim crenulate; a band of unequal cardiform teeth, largest at symphysis and along inner edge of mandible; a broad toothless space in front of upper jaw, a narrow band of unequal cardiform teeth, widening posteriorly, the teeth becoming smaller, villiform; a single row of rather stout teeth along ridge of vomer and palatines; peritoneum silvery white with dusky spots; scales ctenoid.

Fins rounded, dorsal spines relatively weak, fourth longest, 2.50; soft dorsal 1.69; anal 1.93; ventrals 1.75; pectorals 1.53.

Color in alcohol: Ground color sepia-brown with iridescent silvery reflections, crossed by 10 bistre crossbands of about same width as interspaces, this color is underneath scales; spinous dorsal blackish, base of spines light; soft dorsal dusky, a darker band near base, base light; caudal bistre; anal very light; ventrals light, dusky at base; pectorals light with some dusky points; sides of head iridescent silvery, punctulate with bistre, an indistinct bar from eye downward to edge of preopercular crest.

*Type*.—Cat. No. 68403, U.S.N.M., 8.9 cm. in length taken with a beam trawl at station 5442 (lat.  $16^{\circ} 30' 36''$  N.; long.  $120^{\circ} 11' 06''$  E.), west coast of Luzon, at a depth of 45 fathoms, on a bottom of coral sand.

This species is closely related to *Amia lineata* from Japan, but the interorbital is much narrower and not so flattened, the eye is larger, the snout shorter, the maxillary longer, the cross bands darker and

of about same width as interspaces, and the fins darker. This species is found in company with *A. ellioti*.

In some of the smaller examples in the collection the fins are much darker, almost black, and distal portions of anal and ventrals blackish.

*AMIA ALBOMARGINATA* Smith and Radcliffe, new species.

Plate 35, fig. 2.

Dorsal VII-I,9; anal II,8; scales 3+6-24.

General form elliptical ovate, compressed; head 2.57, stout, upper profile slightly concave, lower convex; body deep, back arched, depth 2.57; caudal peduncle deep, compressed, depth 2.13, length 1.50; eye 3.94, small; snout 3.94, as long as eye, blunt; mouth oblique, lower jaw projecting; maxillary 1.92, short, equal to snout plus eye, not reaching vertical from posterior border of orbit; anterior nostril small, posterior large, circular; interorbital 4.85, narrow, with a low median ridge; margin of preopercle nearly smooth, a few weak denticulations present; intramarginal crest and outer orbital rim weakly crenulate; teeth in jaws small, villiformlike, rather stocky at base, in bands; a single row of teeth along ridge of vomer and palatine bones; scales regular, ctenoid.

Fins rounded; spinous dorsal lower than soft dorsal, spines relatively weak, fourth longest, 2.52; soft dorsal 1.75; anal 1.94; ventrals 1.75; pectoral 1.53.

Color in alcohol: Ground color light yellowish brown, darkest on back, with silvery reflections especially on ventral surface; spinous dorsal blackish distally; soft dorsal dusky, tips of rays blackish, a dusky band near base; caudal dusky, lower margin white; anal yellowish, first ray and tips of others white; ventral similar to anal; pectoral without white edgings; opercle margined with blackish posteriorly; sides of head silvery.

*Type*.—Cat. No. 68402, U.S.N.M., a specimen 10.2 cm. in length, from the fish market at Cavite, Luzon.

This species is distinguished by the plain coloration, white fin-margins, smooth preopercle, and short maxillary, which is as long as snout plus eye. In the related species, *A. glaga*, *carinata*, *striata*, etc., the maxillary is longer than snout plus eye.

Some ichthyologists have placed in the genus *Mionorus* those species in which the preopercle is smooth. A comparison of this species with *A. glaga* and *carinata* (margin of preopercle crenate, without serrations) and *A. lineata*, *elliotti*, and *striata* (margin of preopercle serrate) leads us to the conclusion that a separation of these species based on the character of the armature of the preopercle can hardly be called a natural classification.

## AMIA ATROGASTER Smith and Radcliffe, new species.

Plate 35, fig. 3.

Dorsal VII-I,9; anal II,8; scales about 3+6-24.

General form elliptical, elongate, more robust anteriorly; head 2.57, large, pointed; body slender, compressed, tapering, depth 3.27; caudal peduncle long, slender, compressed, depth 3.03, length 1.37; eye 3.37; snout 3.63; mouth oblique, tip of lower jaw projecting beyond upper; maxillary 2.31, short, reaching vertical from middle of eye; interorbital 4.11, flat, smooth; margin of preopercle strongly serrate, crest smooth, angle somewhat produced; mandible with a narrow band, of unequal cardiform teeth largest at symphysis; a similar band on upper jaw, the band on sides is somewhat wider and the teeth relatively smaller; a row of six or seven long slender teeth on each side of vomer; a similar row of smaller teeth along the ridge of the palatine bones; gill-rakers 5+15, long, slender; scales very deciduous.

Dorsal rounded, third spine longest, 2.64; anterior rays of second dorsal longest, 2.05, distal margin obliquely truncate; caudal forked; anterior anal rays longest, 2.17, margin sinuous; ventrals 2.26; pectorals 1.76.

Color in alcohol: Ground color cream-buff; traces of a slightly decurved, silvery-white band from scapula to base of caudal; tip of chin and snout to middle of eye dusky black; dusky points on head; iris silvery; tip of spinous dorsal blackish; caudal dusky distally; other fins hyalin; peritoneum silvery white; stomach jet black.

*Type*.—Cat. No. 70249, U.S.N.M., 5.9 cm. in length, taken with a beam trawl at station 5442 (lat. 16° 30' 36'' N.; long. 120° 11' 06'' E.), west coast of Luzon, at a depth of 45 fathoms, on a bottom of coral sand.

Of 7 cotypes 4.6 to 5.9 cm. in length, three are females with eggs in an advanced stage of development; one, evidently a male, has the mouth so filled with eggs that it is distorted and apparently incapable of being closed. The black stomachs of nearly all are well filled with food; one which was examined contained small crustaceans.

## AMIODES Smith and Radcliffe, new subgenus.

Two long slender incurved canines at symphysis of each jaw; a narrow band of cardiform teeth merging posteriorly into a row of slender canines on lower jaw; a narrow band of cardiform teeth on front of upper jaw, widening posteriorly, and an outer row of slightly larger teeth; a single row of teeth on vomer and palatines; dorsal VII-I,10; anal II,8; scales large, ctenoid; gill-rakers long, about 3+8.

The teeth are much stronger than in any other species of *Amia*, their arrangement being very similar to that found in *Synagrops* and unlike that found in *Cheilodipterus*. *Siphamia* Weber has enlarged curved teeth, which are differently arranged, however, and in the type species (*tubifer*) there is more than one row on vomer and palatines.

AMIA (AMIOIDES) GROSSIDENS Smith and Radcliffe, new species.

Plate 36, fig. 1.

Dorsal VII-I, 10; anal II, 8; scales about 3 + 6-24.

General shape oblong, compressed; head 2.63, conic, compressed; contour lines of body unsymmetrical, depth 3.10; caudal peduncle short, strongly compressed, depth 2.50, length 1.80; eye 3.43, small; snout 3.60, pointed, tip of snout to origin of dorsal nearly straight; mouth oblique, lower jaw projecting slightly; maxillary 1.90, short, reaching slightly beyond vertical from middle of eye; interorbital 4.17, broad, flat, smooth; preopercle armed with strong serrations; subopercle well developed, projecting beyond tip of opercle; a strong, two-pronged scapular spine present; a pair of long slender, recurved canines at symphysis of lower jaw (one of these much smaller in this specimen), closing between two longer canines on upper jaw into pits at symphysis; a narrow band of unequal cardiform teeth anteriorly, merging into a row of long, slender, recurved or incurved canines; teeth in upper jaw in a cardiform band widening posteriorly and becoming smaller, more uniform, an outer row of small caninelike teeth, strongest anteriorly; a row of small caninelike teeth along ridge of vomer and a similar row of smaller teeth on palatine bones; peritoneum silvery white, scales ctenoid, very deciduous.

Dorsal spines strong, the first short, the third longest, 2.05; spine of second dorsal 2.60, margin of fin nearly straight, anterior rays longest, 1.87; caudal forked; anal similar to second dorsal, second spine 2.72, longest ray 1.88; ventrals 1.93, not reaching vent; pectorals 1.58.

Color in alcohol: Ground color buff, dusky on back, silvery white reflections on sides and ventral surface; an indistinct blackish band encircling base of caudal; dorsals and caudal dusky, other fins hyalin.

*Type*.—Cat. No. 70250, U.S.N.M., 10.1 cm. in length, taken with a beam trawl at station 5442 (lat. 16° 30' 36'' N.; long. 120° 11' 06'' E.), west coast of Luzon, at a depth of 45 fathoms on a bottom of coral sand.

In *Siphamia tubifer* Weber the teeth are not so strong and differently arranged, and the gill-rakers are fewer and shorter. Apparently the group to which it belongs is quite closely related to this one. In our species the form and arrangement of the teeth are quite similar to that found in some species of *Synagrops*.

## NEAMIA Smith and Radcliffe, new genus.

Dorsal fins united, VIII, I, 9; anal II, 8; scales large, about 23, ctenoid, lateral line complete; bands of small, villiform teeth on jaws; a few scattered teeth on vomer, none on the palatines; margin of preopercle entire; fins rounded.

This genus differs from *Fowleria* in having the dorsals united, the first of 8 spines, and the lateral line complete, with none of the pores rudimentary.

*Genotype*.—*Neamia octospina*.

## NEAMIA OCTOSPINA Smith and Radcliffe, new species.

Plate 36, fig. 2.

Dorsal VIII, I, 9; anal II, 8; scales 3 + 6—22.

General form elliptical ovate, compressed; head 2.50, compressed, dorsal outline comparatively straight, ventral somewhat convex; body deep anteriorly, depth 2.50; caudal peduncle short, compressed, depth 2.15, length 1.87; eye 3.80, small; snout 4, rather blunt; nostrils close to eye, not widely separated; mouth large, nearly horizontal; jaws subequal; maxillary 1.75, reaching beyond vertical from posterior margin of eye; interorbital 5.60, narrow; margin of preopercle smooth; bands of villiform teeth on jaws; a few scattered villiform teeth on vomer, none on palatines; scales large, ctenoid, deciduous, lateral line following curvature of back, continuous, pores well developed.

Fins rounded; third dorsal spine longest and strongest, 2.24; the eighth short, at a slightly greater distance from spine of second dorsal than from the one before it, connected with spine of second dorsal by a low membrane; second dorsal high, median rays longest 1.72; median caudal rays longest; anal similar to second dorsal 2.03; ventrals 1.87, tips reaching nearly to origin of anal; pectorals 1.40.

Color in alcohol cream-buff; fins hyalin; traces of a dusky bar from eye upward toward scapula, a second from eye to angle of preopercle.

*Type*.—Cat. No. 70251, U.S.N.M., 3.7 cm. in length, from Rasa Island, Mantaguin Bay, Palawan.

## Genus CHEILODIPTERUS Lacépède.

In the species *C. lineatus*, *quinquelineatus*, and *singaporensis* the vent is more than a half-diameter of eye in advance of the anal. In the two species herein described it is even more anterior, being nearer base of ventrals than origin of anal and almost as far forward as in *Acropoma*.

## CHEILODIPTERUS NIGROTÆNIATUS Smith and Radcliffe, new species.

Plate 37, fig. 3.

Dorsal VI-1,9; anal II,8; scales 3 + 5-25.

General form elliptical; head 2.60, long, depressed; body slender, cylindrical, not strongly compressed, depth 4; caudal peduncle compressed, depth 2.90, length 1.66; eye 3.57; snout 3.67, nearly as long as eye; mouth nearly horizontal; maxillary 1.89, long, reaching vertical from posterior margin of eye; interorbital 5.10, narrow, flat, smooth; margin of preopercle smooth; mandible with a row of slender unequal canines; upper jaw with a row of unequal canines anteriorly, widening out into a band of cardiform teeth, these becoming smaller villiformlike; a single row of rather stout teeth on the vomer; a similar row of smaller teeth on palatine bones; peritoneum silvery white; position of vent cephalad, much nearer base of ventrals than origin of anal, its distance from anal 1.65 in distance from anal to base of ventrals; scales large, regular, ctenoid.

Dorsal spines feeble, first long, nearly as long as second, second and third subequal, 2.36; anterior second dorsal rays longest, 2.10, margin nearly truncate; caudal short, broad, forked; anal similar to second dorsal, 2.30; ventrals 2.27; pectorals 2.17.

Color in alcohol: Ground color silvery white tinged with yellow and dusky points; four dark longitudinal stripes, the first sepia, from interorbital along median line of back to base of caudal; the second Vandyke brown, from above eyes to upper caudal lobe; the third clove brown, encircling tip of snout, backward through middle of eye to end of lateral line; fourth almost black, from chin under eye, through base of pectoral to inferior caudal base; stripes broken up on base of caudal into irregular spots; interspaces wider than stripes, mesially washed with silver white; margins and articulations of caudal rays outlined with brown; other fins dusky.

Color in life: Stripes black, interspaces and lower surface dusky white; on head interspaces are bright yellow, area behind eye to second dorsal also yellow; first dorsal hyalin; second slightly dusky in front; caudal dusky, stripes on sides being broken into dots at base; other fins dusky or hyalin.

*Type*.—Cat. No. 70252, U.S.N.M., a specimen 8 cm. in length, from coral reefs on the northeast shore of Sacol Island, east of Zamboanga.

In this species and the one which follows the vent is nearly as far forward as in *Acropoma*. It agrees, however, in all essential characters with *Cheilodipterus*.

There are four examples in the collection, 7.5 to 8 cm. long, two from Sacol Island, one from Tutu Bay, Jolo, and one from Gomomo Island.

## CHEILODIPTERUS ZONATUS Smith and Radcliffe, new species.

Plate 38, fig. 1.

Dorsal VI-1,9; anal II,8; scales 3+5-25.

General form elliptical; head 2.61, long, depressed, pyramidal; body slender, depth 4.02; caudal peduncle compressed, depth 3, length 1.47; eye 3.34, large, its upper margin encroaching on flattened interorbital; snout 3.80, bluntly rounded; mouth large, nearly horizontal; maxillary 1.91, scarcely reaching vertical from posterior margin of orbit; interorbital 5.04, narrow, flat, smooth; preopercular margin smooth, rounded; a row of slender canines on mandible; a row of slender, unequal canines on upper jaw becoming smaller posteriorly with smaller teeth inside the main row; a few small caninlike teeth in a single row on vomer; a similar row of smaller teeth along ridge of palatine bones; peritoneum silvery white; vent anterior, nearer base of ventrals than anal, its distance from anal 1.76 in distance insertion anal to base of ventrals; scales ctenoid, regular.

Dorsal spines feeble, second longest, 2.40; anterior second dorsal rays longest, 2.03, margin nearly truncate; caudal forked; anal similar to second dorsal, 2.14; ventrals and pectorals of equal length, 2.14.

Color in alcohol: Ground color wood brown with silvery reflections; a narrow, dark chestnut brown to black stripe around snout through eye to below end of lateral line; a less distinct burnt umber stripe from above eye to upper caudal base; trace of a median stripe in front of dorsal; margins and articulations of caudal rays penciled with brown; an indistinct brown spot at base of caudal above and below end of lateral stripe; other fins pale dusky.

Color in life: Stripes black, the lower margined below with metallic green; ground color above dusky with an olive tinge shading into lavender on head; region below metallic green stripe dusky yellow; first dorsal with a slight tinge of yellow, other fins dusky hyalin.

*Type*.—Cat. No. 70253, U.S.N.M., 6.6 cm. in length, taken with dynamite at the southern end of Rita Island, Ulugan Bay, Palawan.

Color in life of the only other specimen in the collection, 6 cm. long, from Endeavor Strait, northwest coast of Palawan: Traces of a blackish stripe from nape to second dorsal; a narrow indistinct stripe from snout over eye to base of tail; a distinct black band from snout through eye to below end of lateral line, margined below by a light metallic green band of about one-half its width, body and chin below this dusky yellow, becoming bright yellow on opercle and lower part of iris; ground color between lateral stripes metallic green, becoming violet on upper part of opercle; interspaces on nape metallic green shading into lavender; converging bands on snout lavender, rest of snout dusky, washed with yellow; first dorsal and ventrals with yellow wash, other fins dusky hyalin.

This species closely resembles *C. nigrotæniatus*, but the caudal peduncle is longer, the snout shorter, and the coloration distinctive.

### Genus SYNAGROPS Günther.

Four species have previously been described, *S. japonicus* from Japan, *S. philippinensis* from the Philippines, *S. argyrea* from the Hawaiian Islands, and *S. splendens* from the Gulf of Oman.

#### SYNAGROPS SERRATOSPINOSA Smith and Radcliffe, new species.

Plate 38, fig. 2.

Dorsal IX-1,9; anal II,7; scales about 3+7-28.

General form cylindrical ovate, compressed; head 3, short, depth nearly equaling length, dorsal and ventral contour lines nearly symmetrical, convex; body short, deep, depth 3; caudal peduncle compressed, depth 2.75, length 1.46; eye 2.65, large; snout 3.93, short, rounded; mouth small, oblique; maxillary 1.93, reaching vertical from middle of eye; interorbital 3.15, broad, convex, rugose; angle and horizontal margin of preopercle strongly serrate, angle of crest with four or five strong serrations; opercle ending in two feeble spines; subopercle produced beyond opercle; posterior angle of interopercle serrate; a pair of elongate, recurved canines at symphysis of lower jaw, in front of these a broad band of unequal cardiform teeth, narrowing posteriorly to a single row of long, slender canines with a very narrow outer band of small teeth, which entirely replaces the canines posteriorly; a pair of long canines on upper jaw, wider apart and allowing pair on lower jaw to close between them; a band of villiform, almost cardiform, teeth widening out on sides of lower jaw and again narrowing posteriorly; a semilunar patch of small paved teeth on vomer and a narrow band of cardiform teeth on palatines; throat blackish, peritoneum brownish black; pyloric cæca six; scales cycloid, very deciduous.

Origin of dorsal from tip of snout 2.50 in length; dorsal spines well developed, third longest, 1.63, first with a single spinule, second with strong regular close-set serrations, projecting tip of third with a single spinule; spine of second dorsal serrate, longest ray about 2.20; caudal forked; anal similar to second dorsal, about 2.20, second spine strong, serrate, 2.32; ventrals 1.46, spine serrate; pectorals 1.30.

Color in alcohol: Ground color cream-buff, dorsal surface dusky, ventral silvery; fins dusky.

*Type*.—Cat. No. 70254, U.S.N.M., 8.1 cm. in length, taken with a beam trawl at station 5365 (lat. 13° 44' 24'' N.; long. 120° 45' 30'' E.), Batangas Bay, Luzon, at a depth of 214 fathoms.

This species is frequently taken with *S. philippinensis*. It is smaller, with a deeper body, shorter, more robust head, larger eye,

broader interorbital, shorter snout, weaker canines, and more spines bearing serrations on anterior margin.

There is a large series of specimens in the collection from the Philippines from depths of 96 to 279 fathoms. The type is a female with eggs in an advanced stage of development.

Genus HYNNODUS Gilbert.

This genus differs from *Epigonus* in having teeth on the palatines and a more elongate body.

HYNNODUS MEGALOPS Smith and Radcliffe, new species.

Plate 38, fig. 3.

Dorsal VII-I, 10; anal II, 9; scales 4 + 7-50.

General form cylindrical ovate, elongate, depressed anteriorly, compressed posteriorly; head 2.90, pyramidal, depressed, breadth at occiput greater than its depth, 1.75 in its length; body cylindrical, tapering posteriorly, slender, its breadth at base of pectorals equal to its depth, 5.30; caudal peduncle slender, elongate, compressed, depth 3.70, length 1.37; eye 2.15, very large, horizontal diameter greater than vertical diameter; snout 4.07, short, pointed; mouth small, oblique, lower jaw included; premaxillaries, maxillaries, and mandibular bones slender, weak; maxillary 2.67, short, narrow, partly covered by overhanging preorbital, reaching vertical from front of pupil; anterior nostril circular with a raised border, posterior slit-like; interorbital 4.90, concave, orbital rims noticeably raised; preopercle with a thin lamina projecting backward at angle to posterior margin of opercle, no serrations; the thin laminae of interopercles overlapping on ventral surface; opercle with a strong spine near upper angle; teeth in jaws small, incurved, not crowded together; a single row of similar teeth on vomer; palatine teeth small, very slender and quite widely separated; peritoneum silvery, washed with brown; scales small, ctenoid, deciduous, lateral line very distinct, tubes large, about one-third breadth of scale, 54 pores; head with scales.

Origin of dorsal from tip of snout 1.70 in length; dorsal spines feeble, first short, third longest, about 2.20; spine of second dorsal distinct, slender, longest ray about 2.10; anal spines slender, longest ray about 2.30; ventrals 2.44, reaching halfway to origin of anal; pectorals 2.30, rounded.

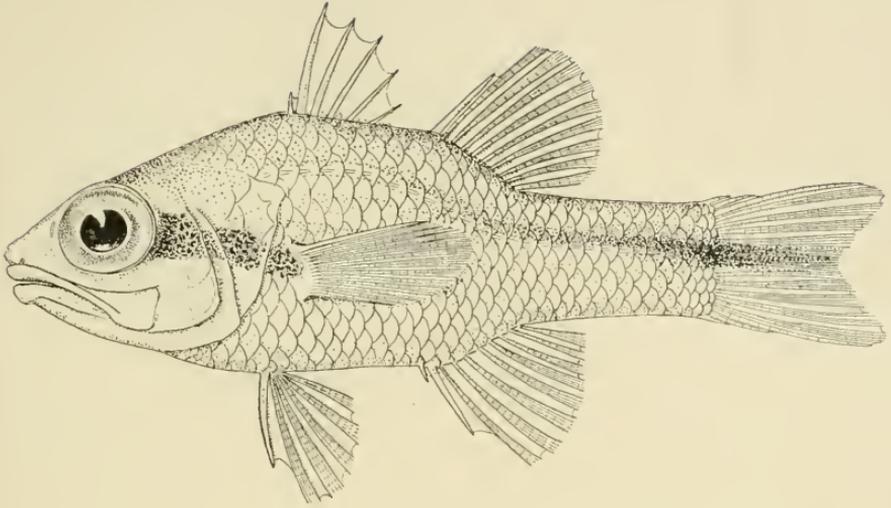
Color in alcohol: Ground color buff; scales margined with sepia, many of them entirely sepia colored, especially below the lateral line and near head; fins dusky; head dusky; opercle metallic blue shading into black posteriorly; throat blackish.

*Type*.—Cat. No. 70255, U.S.N.M., 15.6 cm. in length, taken with a beam trawl at station 5388 (lat.  $12^{\circ} 51' 30''$  N.; long.  $123^{\circ} 26' 15''$

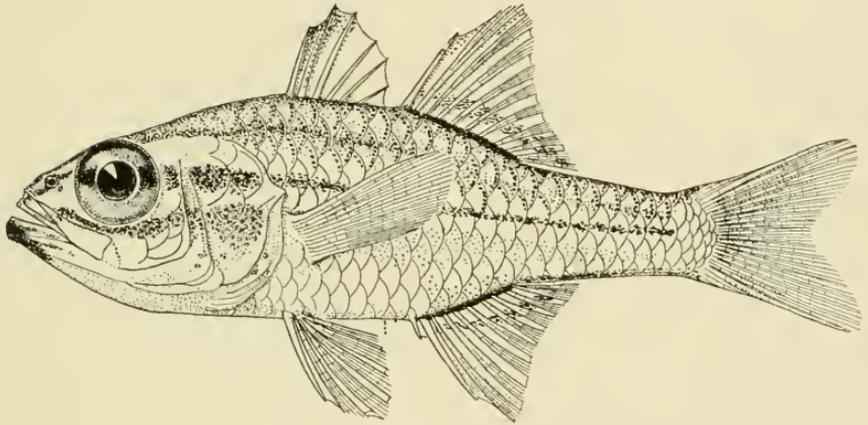
E.), between Burias and Luzon, at a depth of 226 fathoms, on a bottom of soft green mud.

This species resembles *H. atherinoides* Gilbert from the Hawaiian Islands. The latter is slenderer, has a shorter head, snout, and maxillary and a slenderer caudal peduncle.

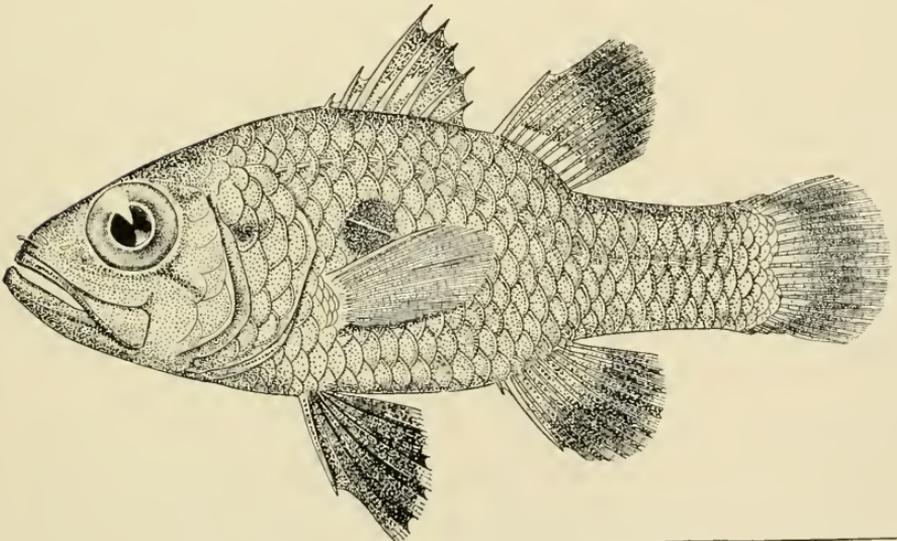
The collection contains three examples from station 5388 and one individual from station 5508, off northern Mindanao, in 270 fathoms.



1. *AMIA DIENCÆA*. (PAGE 431.) FROM THE TYPE.

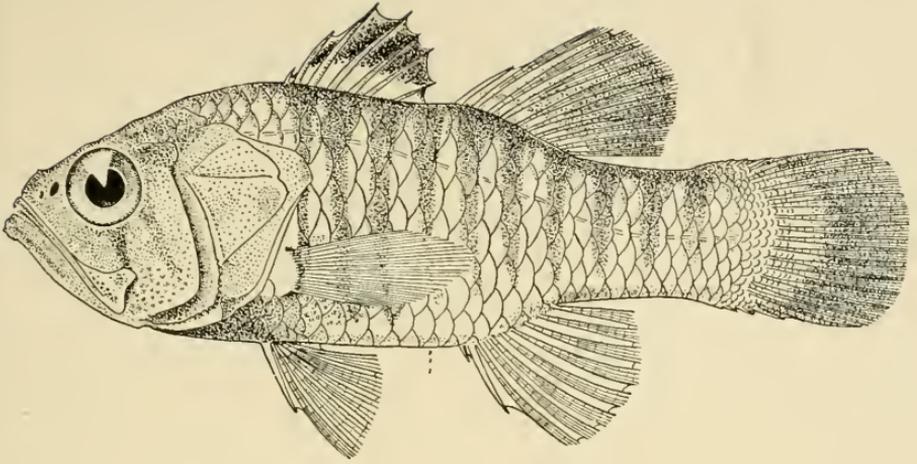


2. *AMIA PARVULA*. (PAGE 432.) FROM THE TYPE.

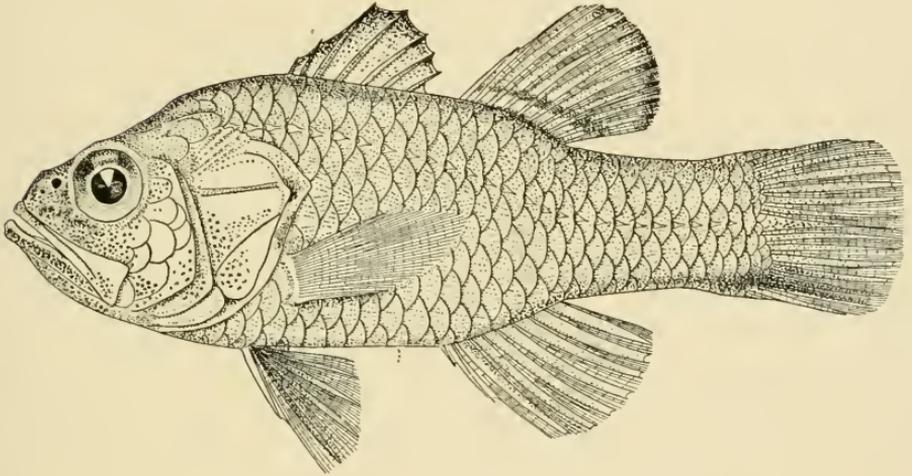


3. *AMIA UNINOTATA*. (PAGE 436.) FROM THE TYPE.

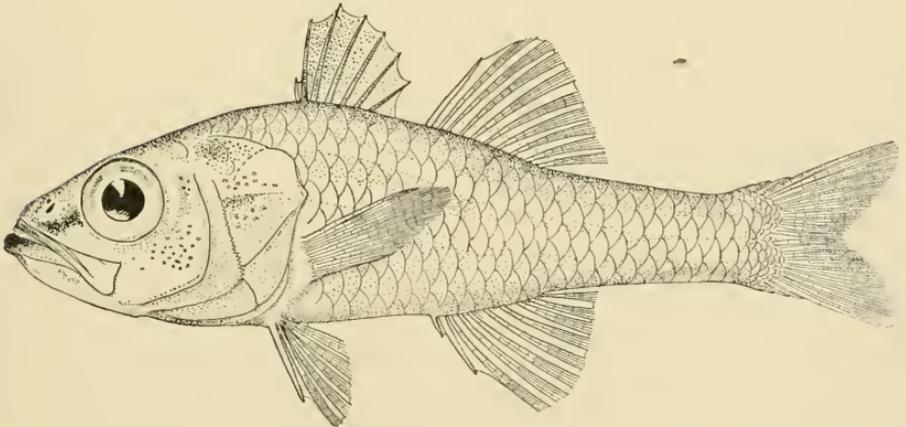




1. *AMIA STRIATA*. (PAGE 437.) FROM THE TYPE.

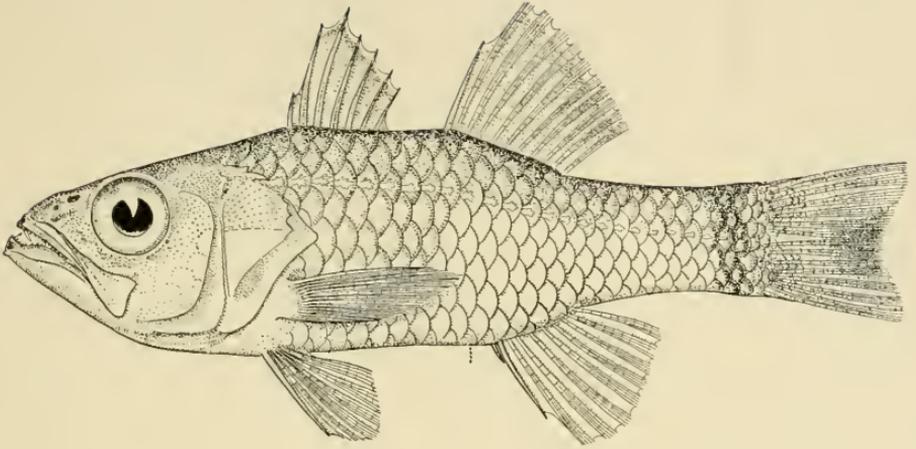


2. *AMIA ALBOMARGINATA*. (PAGE 438.) FROM THE TYPE.

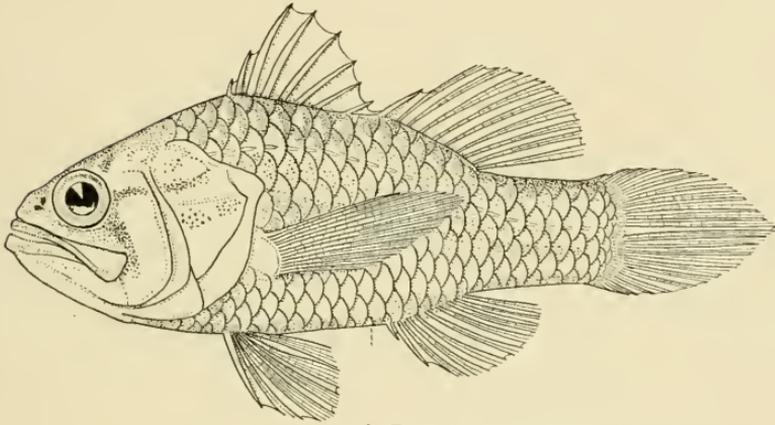


3. *AMIA ATROGASTER*. (PAGE 439.) FROM THE TYPE.

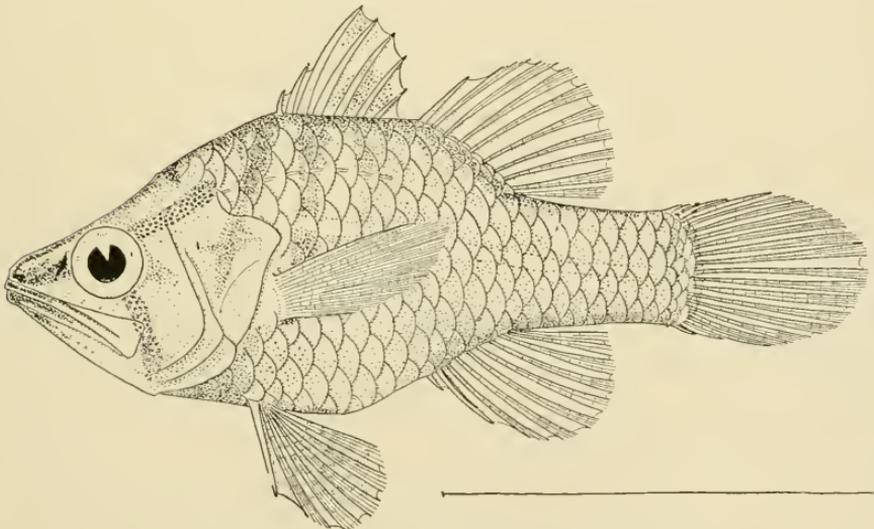




1. AMIA (AMIODES) GROSSIDENS. (PAGE 440.) FROM THE TYPE.

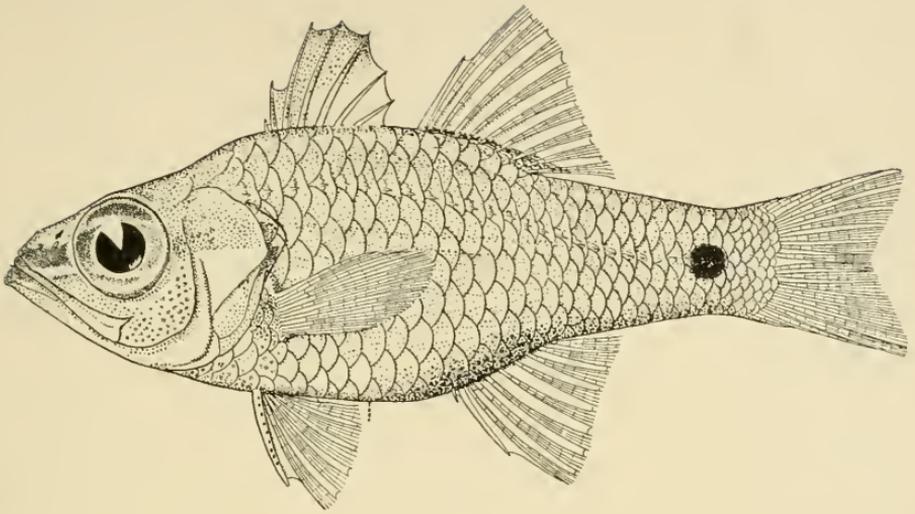


2. NEAMIA OCTOSPINA. (PAGE 441.) FROM THE TYPE.

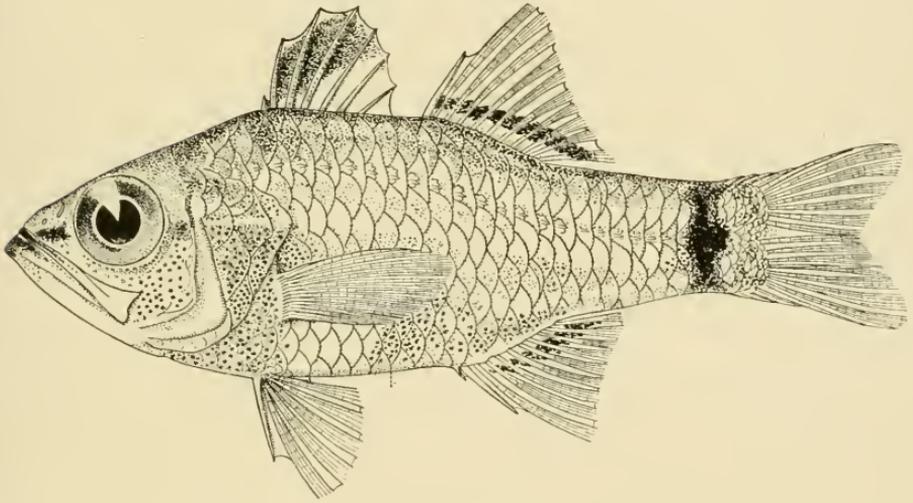


3. AMIA HYALINA. (PAGE 433.) FROM THE TYPE.

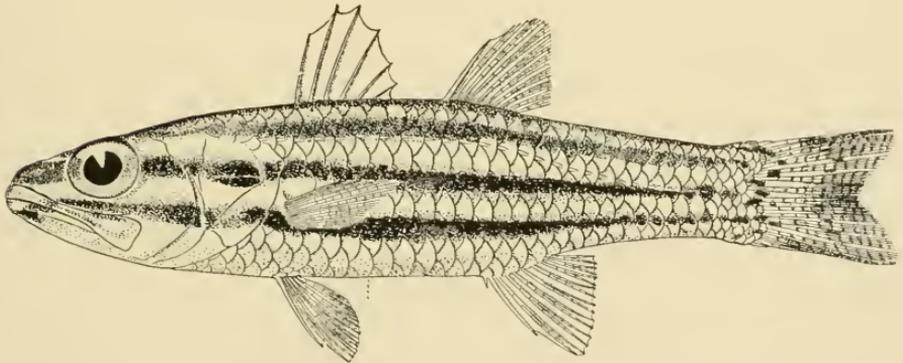




1. *AMIA DIVERSA*. (PAGE 434.) FROM THE TYPE.

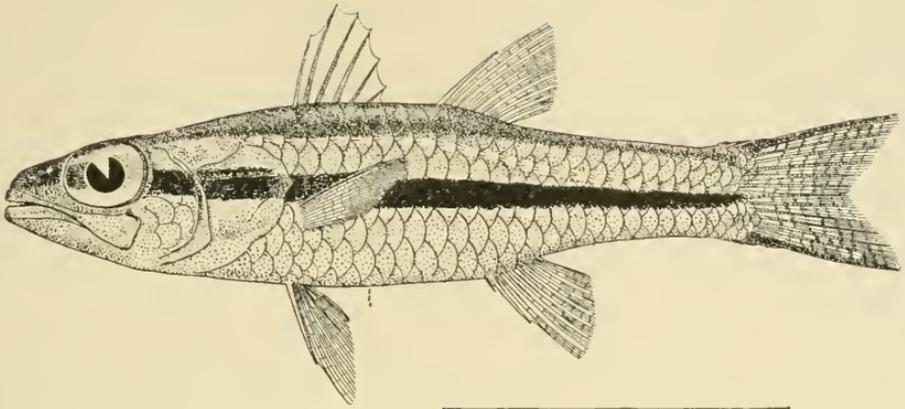


2. *AMIA NIGROCINCTA*. (PAGE 435.) FROM THE TYPE.

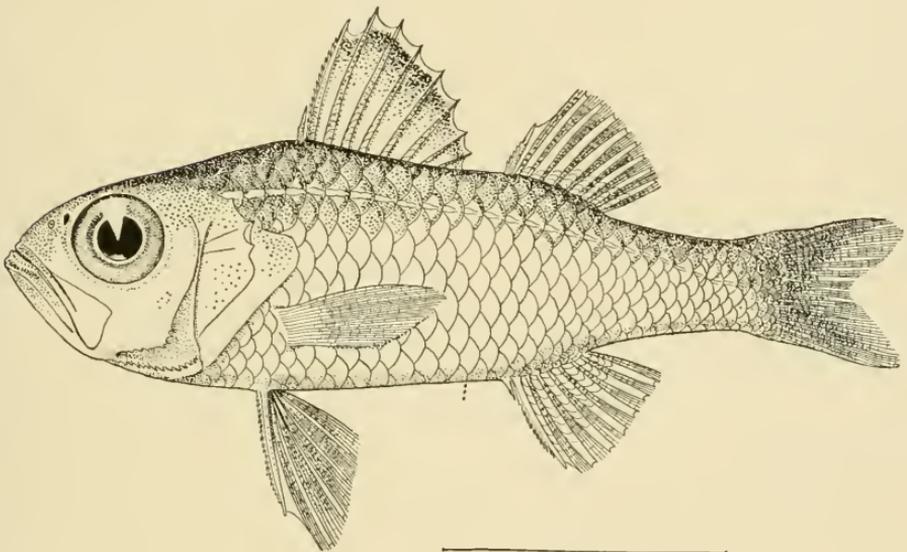


3. *CHEILODIPTERUS NIGROTÆNIATUS*. (PAGE 442.) FROM THE TYPE.

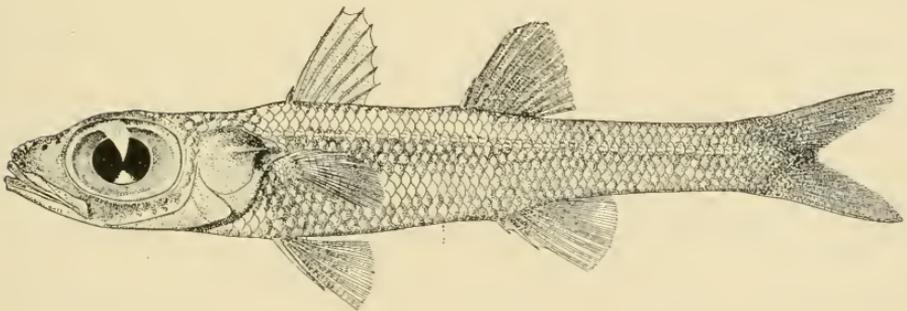




1. CHEILODIPTERUS ZONATUS. (PAGE 443.) FROM THE TYPE.



2. SYNAGROPS SERRATOSPINOSA. (PAGE 444.) FROM THE TYPE.



3. HYNNODUS MEGALOPS. (PAGE 445.) FROM THE TYPE.

