

First dorsal spine much produced and filamentous, extending to or slightly beyond base of last dorsal ray; second spine short, not reaching origin of soft dorsal when depressed; third and fourth spines rapidly and equally shortened; neither soft dorsal nor anal elevated; last anal ray reaching when declined to or nearly to caudal base; soft dorsal inserted more anteriorly, so that its last ray fails to reach caudal; caudal fin pointed, but with none of its rays produced or filamentous; membrane of inner ventral ray joining base of pectoral at end of its upper fourth; ventrals reaching vent; pectorals to base of second anal ray.

Color in life, back with 4 bright red bars extending nearly to middle of sides, the first bar broad, occupying nape and base of spinous dorsal; the second broader, underlying anterior half of soft dorsal; the third less than half the width of the second, located under last dorsal rays; the fourth, on caudal peduncle, again wider; lower half of sides marked with 4 irregular brownish black blotches, each forming a downward continuation of one of the red bands, the anterior blotch very small, the second the largest, the spaces between these dark blotches pearly white; a dark blotch in the middle

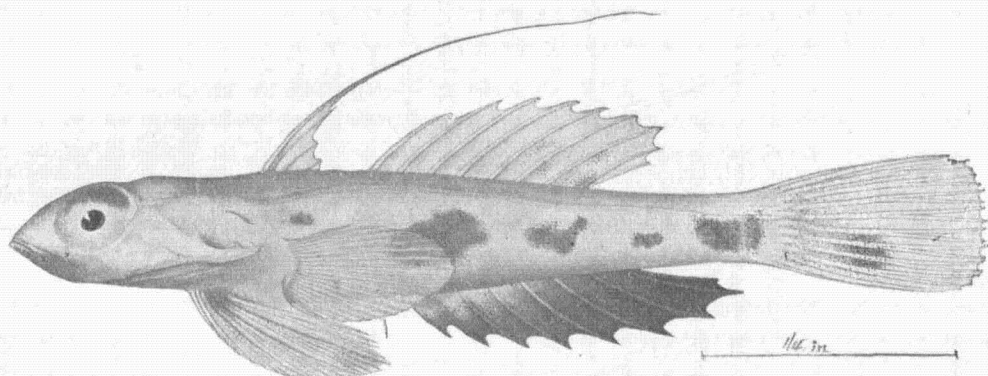


FIG. 252.—*Callionymus rubrovinctus* Gilbert, new species. Type.

of the lower caudal rays, a smaller one near tips of rays, 2 very narrow blue bands near middle of fin; anal black throughout; a small black spot in axil of ventral fins; dorsals whitish, unmarked; upper surface of head, including upper half of eye but not snout, reddish; lower parts whitish.

Two specimens here designated as cotypes, of about equal size with the type, were taken at station 3847, off the south coast of Molokai, at a depth of 23 fathoms. These have the following fin-formulas: Dorsal iv-8, anal 7; dorsal iv-9, anal 8.

The species was taken at stations Nos. 3847, off the south coast of Molokai, 23 fathoms, and 3876, channel between Maui and Lanai, 28 to 43 fathoms.

***Calliurichthys decoratus*, new species. Plate 90.**

Type, ♂, 183 mm. long (91 mm. long to base of caudal), from station 4032, Penguin Bank, off the southern coast of Oahu, 27 fathoms; type No. 51609, U. S. Nat. Mus.

Closely related to *C. japonicus* (Houttuyn), but distinguished from that and all other known species by the fin-formula, the presence (in the male) of a single filamentous dorsal spine, and the remarkably beautiful decoration of the throat and branchiostegal membranes. The caudal is exceedingly elongate, as in *C. japonicus*.

Length of head (measured to opercular margin) 30 hundredths of total length without caudal; depth 11; width at base of pectorals 20; length of snout 10; diameter of eye 7.5; length of maxillary 8; distance between branchial pores 10; distance from tip of snout to first dorsal spine 26; length of first dorsal spine 50; length of second dorsal spine 13; distance between dorsals 7; length of caudal 104; longest ventral ray 28; longest pectoral ray 22. D. vi-9; A. 8; P. 20.

Snout short, declivous, as in *C. japonicus*; maxillary barely reaching vertical from front of orbit; teeth in narrow villiform bands in jaws only; eyes large,  $3\frac{1}{4}$  in head measured to branchial pore, separated only by a sharp bony interorbital ridge which has no trace of a lengthwise groove; occipital region

slightly swollen on each side median line, the surface finely rugose; preopercular spine long, very slender, and straight, ending in a long tapering point directed backward; upper edge of spine furnished with 8 small saw-like teeth, directed toward base of spine, the anterior teeth smallest; lower edge of spine smooth; a strong hooked spine at base, on outer surface; preopercular spine extending to opercular edge, and equal in length to diameter of eye.

In males, the first dorsal spine is very long and filamentous, reaching to or beyond middle of soft dorsal. In the type, it extends to base of the seventh dorsal ray; other spines are regularly shortened; tip of last dorsal ray reaching slightly beyond base of upper caudal rays; anal fin beginning and ending slightly behind first and last dorsal rays; tip of last anal ray in the same vertical with tip of last dorsal ray; membrane of inner ventral ray joining anterior face of pectoral base at beginning of its upper fourth; longest pectoral ray reaching slightly beyond vertical of the second anal ray, the inner ventral ray falling a little short of this vertical; median caudal rays extraordinarily produced in adult males, a little exceeding length of head and trunk; the single lateral line runs out on caudal fin for a distance equaling twice diameter of eye, accompanying the fourth fully developed ray of upper caudal lobe.

Color in spirits, brownish, grayish brown, or grayish pink on dorsal region, white below; back with 4 or 5 rather indistinct darker cross-bars, and 5 small dark spots on middle of sides; a faint dark streak below eye, and one downward from base of preopercular spines; upper half of body marked also with numerous round gray spots of varying size, each spot surrounded by a blackish line; dorsal black at base and tip, the filamentous ray whitish; soft dorsal and caudal cross-banded; anal fin black, with broad white tips to the rays in adult males; upper face of ventrals dusky, paired fins otherwise unmarked; under surface of head most characteristically ornamented in adult males; a broad jet-black bar occupying median line of throat, broadening slightly on front of breast, where it terminates; from this bar there diverge on either side about 8 narrow jet-black streaks, which pursue a nearly parallel curved course over gill-membranes and over membrane joining inner ventral ray to pectoral base; each black streak is divided lengthwise by a narrow silvery line and margined above and below by wider silvery lines, the interspaces otherwise grayish silvery. Females and young males have throat unmarked, the first dorsal spine not produced, and the caudal shorter. Pectoral rays usually 20 in number but varying from 19 to 21. Dorsal and anal rays invariably as given for the type.

Specimens were taken at the following stations: Nos. 3847, off the south coast of Molokai, 23 to 24 fathoms; 3861, Pailolo Channel, 30 to 52 fathoms; 4032, Penguin Bank, south of Oahu, 27 to 29 fathoms.

A fine female specimen of this species has been subsequently presented by Mr. Max Schlemmer, who secured it at Laysan Island.

#### Family HARPAGIFERIDÆ.

##### *Draconetta hawaiiensis*, new species. Plate 91.

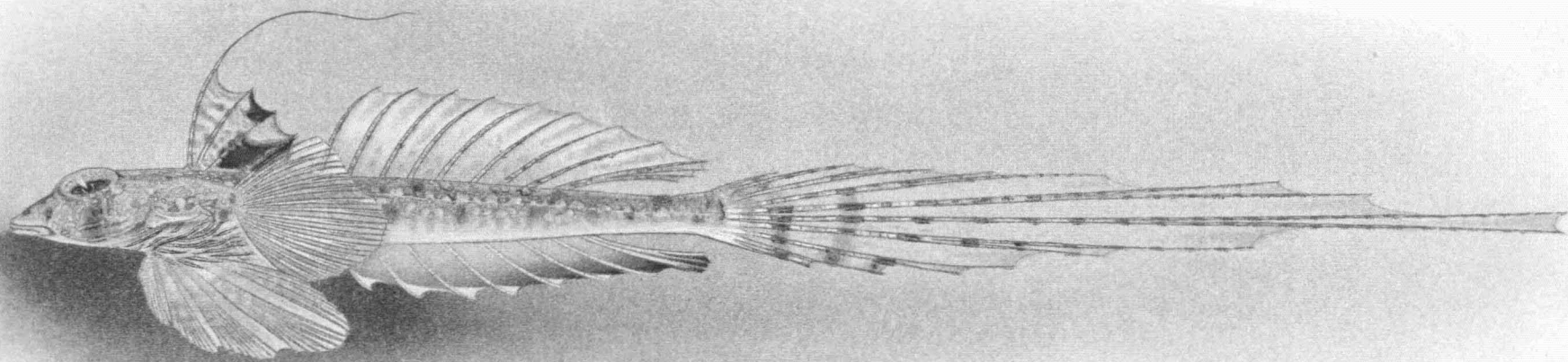
Type, 53 mm. long, from station 4102, channel between Molokai and Maui, depth 122 to 132 fathoms; type, No. 51633, U. S. Nat. Mus.

Very near *Draconetta xenica* Jordan and Fowler, from Japan (Proc. U. S. Nat. Mus., XXV, 1903, 939), differing in the smaller eye, the straight opercular spine, the longer stronger subopercular spine, the longer dorsal spines, and the longer ventral fins. In fin-formule, general proportions and color, there is close correspondence between the 2 species.

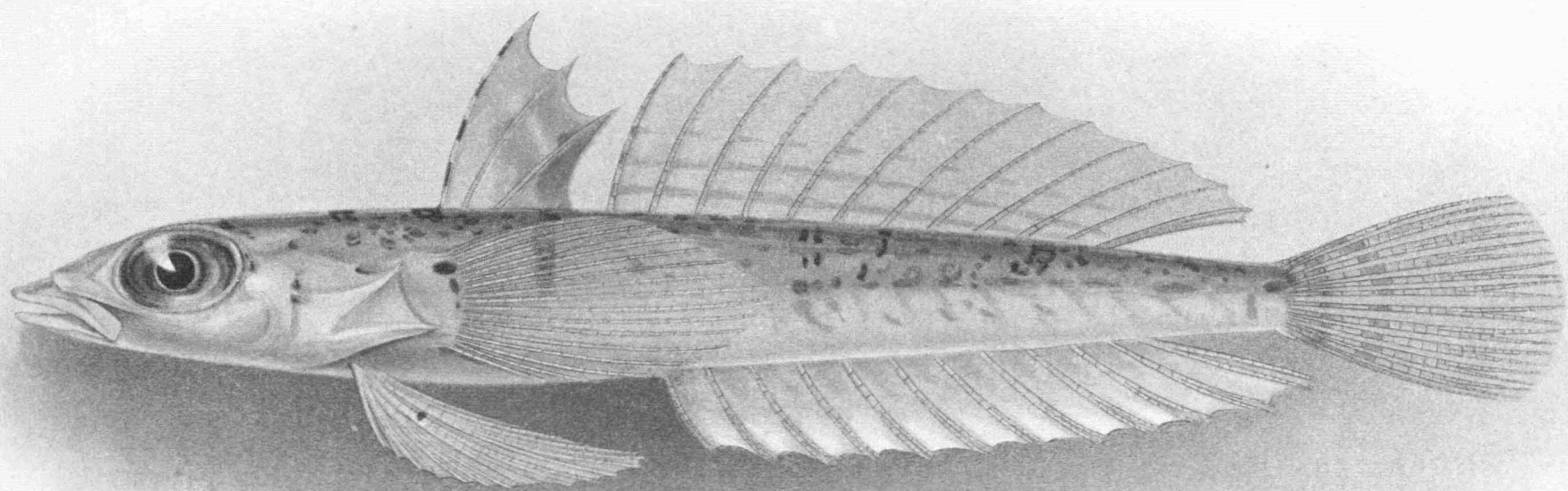
Head (measured to end of subopercular spine) 33 hundredths of total length, without caudal; depth of body 14; eye 11; maxillary 9. D. III, 12; A. 12; P. 21.

Snout short and sharp, triangular, premaxillaries projecting on middle line for more than  $\frac{1}{2}$  length of snout; premaxillaries very protractile, their spines reaching almost to middle of interorbital space; cleft of mouth horizontal, narrow, at lower side of snout, the mandible everywhere included; maxillary reaching a vertical midway between front of orbit and front of pupil; teeth all villiform, in moderate bands in the jaws only; interorbital space very narrow, about  $\frac{1}{2}$  the pupil, with a shallow groove in its anterior half only; opercle greatly reduced in size, forming a strong spine directed upward and backward; it is either straight or very little curved near its tip, and is directed toward base of upper pectoral rays. In *D. xenica*, it is shorter and more arched, directed toward a point in advance of first dorsal spine. Subopercle also developed as a long strong spine; opercular and subopercular spines diverging, the interspace filled by a soft membrane, which forms the middle portion of gill-flap; subopercular spine





CALLIURICHTHYS DECORATUS GILBERT. TYPE.



DRACONETTA HAWAIIENSIS GILBERT. TYPE.

much longer than in *D. xenica*, reaching to within half a millimeter of base of pectoral. In the type specimen of *xenica*, 65 mm. long, a space of 2 mm. intervenes between the subopercular spine and the base of the pectoral. Gill-slit entirely lateral, little wider than the distance between the tips of the 2 spines; lower end of gill-slit immediately above base of ventral spine; preopercular margin adnate, not armed; occiput slightly roughened, less so than in *xenica*.

Ventrals with their inner margin wholly free, not joined by membrane to base of pectorals, as in *Callionymus*; ventrals also less widely separated at base. In *D. hawaiiensis*, they are much longer than in *xenica*, reaching base of second anal ray; pectorals reaching well beyond ventrals.

First dorsal spine longest, the second and third of about equal length, the upper margin of fin concave; when the fin is declined, the tips of all the spines extend beyond base of first dorsal ray; soft dorsal and anal similar, low, of equal length; anal a little more posteriorly inserted; the last dorsal and anal rays fall short of base of caudal, when depressed; caudal fin short, rounded; no trace of lateral line.

Color in spirits very light gray above and below, the back with faint traces of 5 darker cross-bars; first and second cross-bars under origin and end of spinous dorsal, the third and fourth equally spaced under soft dorsal, the fifth on back of tail; dorsal region faintly spotted and mottled with darker; 5 faint ocellated round spots form a V-shaped figure with its apex on nape, the diverging arms inclosing front of spinous dorsal; posterior part of spinous dorsal black; two narrower horizontal black lines on soft dorsal, caudal with 2 faint dark bars on basal portion; two small black spots at base of pectoral; fins otherwise unmarked.

Only the type specimen was obtained.

#### Family ATELEOPIDÆ.

##### *Ateleopus plicatellus*, new species. Fig. 253.

Type, 55 cm. long, from station 3868, Pailolo Channel, 294 to 684 fathoms; type, No. 51586, U. S. Nat. Mus.

Head 15 hundredths of total length; greatest depth (at occiput) 9; length of head and trunk 31; predorsal length 17.5; preventral length 10; length of pectoral 14; longest dorsal ray 13.5; length of ventral 6. Length of snout 36 hundredths of head; preoral length of snout, measured axially, 15; interorbital width 35; diameter of eye 14; length of maxillary (measured from front of premaxillaries) 35; width between angles of mouth 26. D. 9; P. 14; V. 3; A. and C. 104.

Snout very blunt, overpassing mouth for about two-fifths its length; mouth wide, horizontal; maxillary reaching a vertical from middle of orbit, a trifle shorter than length of snout; anterior half of each premaxillary containing a very narrow band of small teeth, the posterior half, and the entire mandible, toothless. Also in *A. japonicus* Schlegel, the mandible is toothless, although described and figured with a band of teeth. Vomer and palatines toothless; premaxillaries very protractile, but the maxillary firmly adnate, skin of head passing over it without interruption; upper and lower lips finely plicate as in *Catostomoids*. Posterior nostril an oblique slit immediately in front of upper part of orbit, the anterior in a short procumbent tube with the opening directed forward; a strong protuberance above eye, a smaller one behind and above it; a pair of strong ridges running from occiput forward between eyes to snout, the space between them concave; angle of lower jaw provided with a spinous process; preopercular margin not free; opercle with a single low ridge and no spines; sensory canals of head furnished with very few minute pores; gill-openings wide, continued forward to below pupil, the membranes wholly separate, free from isthmus; 4 complete gills, the fourth arch with a slit behind it; gill-rakers short and thick, minutely toothed and a little movable, 10 in number on anterior arch; vertical limbs of all the arches adnate, or free for a very short distance next the angle, the horizontal limbs also attached anteriorly, somewhat narrowing the slits; pseudobranchiæ wanting; branchiostegals 7; skin very delicate, easily broken, scaleless; lateral line present, but inconspicuous, composed of a few large distant pores.

The anterior insertion of the dorsal fin is above the axil of the pectorals, the length of its base half postocular length of head, its tip reaching vertical from vent; pectorals failing to reach vent by a distance nearly equaling one-third their length; the ventral appears to be a simple filament, but on dissection 2 slender rays appear closely joined for their entire length, with a short rudiment at their base; they taper uniformly to their tips, which are not dilated and flattened as in *japonicus*. In the type their



length equals that of snout, and they extend one-fourth the distance between their base and the origin of anal fin; in the smaller cotypes they are a little longer, but they never reach middle of pectoral fins; in *A. japonicus*, the ventrals are much more slender and elongate, extending more than three-fourths distance to vent, and dilated and flattened at their tips.

Color dusky translucent, lips and terminal half of ventral filaments white; other fins jet-black; mouth and gill-cavities and peritoneum pale.

Contents of stomach consisting largely of very small sea-urchins, occasionally with serpent-stars and hermit crabs. The stomach is very wide, without flexure, passing directly into the capacious intestine. No pyloric cæca are developed. The liver is very small.

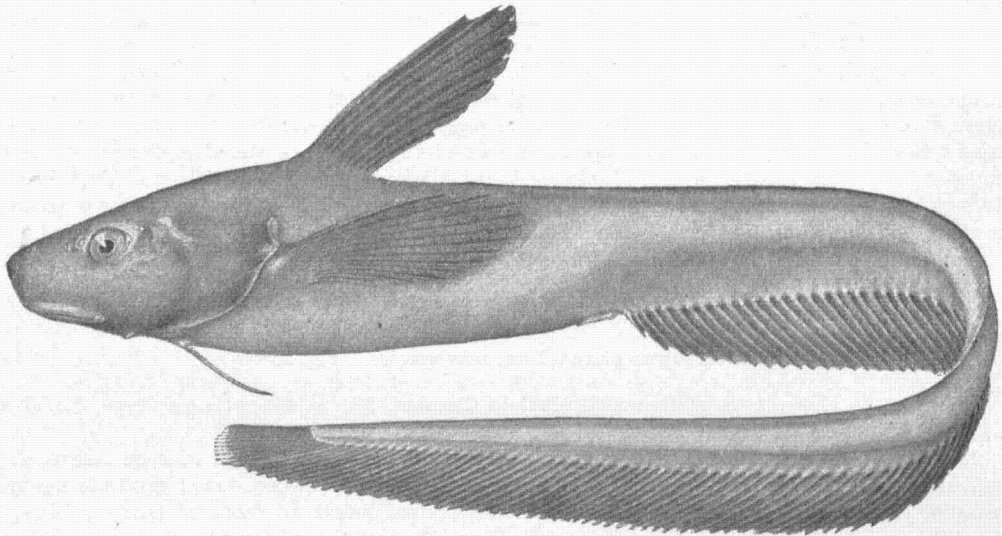


FIG. 253.—*Ateceopus plicatellus* Gilbert, new species. Type.

*A. plicatellus* agrees with *A. indicus* Alcock in the short tapering ventrals, but differs in the larger eye, the heavier, less projecting snout, the larger mouth, and the lighter color.

In the cotypes of *A. plicatellus*, which equal in size the type of *A. indicus*, the snout is broadly rounded and overpasses the mouth for a distance less than two-fifths its preocular length, the diameter of eye equals four-sevenths the length of snout, and the cleft of mouth reaches vertical from front of pupil; vertical fins and pectorals jet-black, color otherwise uniformly grayish, without trace of dark brown or purple-black.

The species was taken at stations Nos. 3868, Pailolo Channel, 294 to 684 fathoms; and 3918, off the South coast of Oahu, 257 to 294 fathoms.

#### Family LYCODAPIDÆ.

##### *Snyderidia*, new genus.

Body compressed; mouth oblique; premaxillaries protractile; mandible included; enlarged fang-like teeth present in jaws and on vomer and palatines; no barbel; preopercular margin not adnate; head without spines; gill-openings continued forward to below eye; gill-membranes separate, free from isthmus; branchiostegals 7; pseudobranchiæ present, much reduced; gill-rakers present; 4 gills, a wide slit behind fourth arch; skin thin, not lax, scaleless; no lateral line; dorsal and anal beginning near head, continuous around end of the whip-like tail; no ventrals; pectorals narrow; stomach thick-walled; pyloric cæca 2, short and thick, on opposite sides of the pylorus.

*Snyderidia* Gilbert, new genus of *Lycodapidae* (*canina*).



**Snyderidia canina**, new species. Plate 92.

Type, 309 mm. long, from station 3989, vicinity of Kauai, depth 385 to 500 fathoms; type, No. 51646, U. S. Nat. Mus.

Head 8.5 in total length; depth 10; distance from tip of snout to origin of anal 5.8; from tip of snout to origin of dorsal 7.5; diameter of eye contained 5.25 times in head, 1.2 times in interorbital width, the latter equaling length of snout.

Middle of occiput and interorbital space raised to form a rounded crest; snout protruding convexly, upper profile concave above front of eye; mouth very oblique; maxillary extending well beyond orbit, equaling half length of head, its expanded portion channeled on its outer face; mandible strong and heavy, included within premaxillaries; mandibular angle forming a sharply projecting triangular process; upper jaw bearing anteriorly a pair of long curved canines which close outside mandible, and are separated by a wide space which is toothless, or nearly so; one of the canines double; sides of premaxillary with arrow-shaped cardiform teeth in a rather wide band, a few of the anterior inner teeth of the band longer than the others and more distinctly depressible; anteriorly in the mandible a pair of long curved canines corresponding to those above, but separated by a narrow interspace and directed obliquely backward; in side of mandible an outer series of smaller teeth and an inner row of conical canines, shorter than the anterior fangs; a long fang on head of vomer, with 2 pairs of shorter conical teeth behind it, and several very small conical teeth irregularly disposed; a single series of small conical teeth on the palatines, 1 or 2 of the anterior teeth much enlarged; preopercular margin adnate in its upper half, free below; opercle bearing 2 diverging ridges and terminating posteriorly in a slender flexible process which is bound down by membrane along its upper edge; lower opercular ridge extending into a second process which overlaps the subopercle; pseudobranchiæ present as a pair only of well-developed filaments on each side; but 3 short gill-rakers developed on horizontal limb of outer arch next the angle; besides these, a number of small spinigerous tubercles, which can not be accurately estimated; a few inconspicuous pores on snout and on symphyseal portion of mandible; posterior line of occiput midway between origin of dorsal and middle of eye.

Dorsal rays all very slender and unbranched, with but few distant articulations, and joined by a very thin delicate membrane; anal similar, with thicker rays; pectoral narrow, composed of very slender unbranched rays, its length equaling that of head.

Ground color light grayish, almost wholly concealed by small quadrate or roundish pigment spots of nearly uniform size and distribution; terminal part of tail black; opercles and jaws darker, as well as prepectoral area; mouth and gill-cavity blackish, lining of abdominal walls jet-black; fins us-lucent.

A single specimen known.

**Family FIERASFERIDÆ.****Fierasfer microdon**, new species. Fig. 254.

Type, 97 mm. long, from station 3872, between Maui and Lanai islands, depth 32 to 43 fathoms; type, No. 51600, U. S. Nat. Mus.

Head 14 hundredths of total length; greatest depth 10; distance from tip of snout to front of dorsal 25; distance from tip of snout to front of anal 14. Length of maxillary 45 hundredths of head; diameter of eye 23; length of snout 20; interorbital width 13; depth of head at nape 60; greatest width of head 50; length of pectoral 50.

Head and body narrow, compressed, snout bluntly rounded, its profile nearly vertical immediately above mouth; mouth very oblique; maxillary failing to reach vertical from hinder edge of orbit; branchiostegal membranes united anteriorly, leaving about half the isthmus uncovered; teeth all comparatively small, the median line of vomerine teeth being the only conspicuous canines in the mouth, and these much smaller than in *F. homei*; a few smaller teeth on each side of median vomerine series; palatine and premaxillary teeth minute, in bands of moderate width, none of them enlarged except 2 or 3 near front of upper jaw (on one side only in type), these being small conical teeth, not canines; neither palatine nor premaxillary bands show any trace of biserial arrangement, or of enlargement of outer or inner series; outer series of mandibular teeth very small slender canines, hooked toward angle of mouth; inner teeth minute and forming a narrow band.

Pectoral fin with 16 rays; dorsal low but distinct, its origin well behind tip of pectoral.

Color whitish translucent with slight luster; end of tail rendered slightly dusky by scattered pigment spots; occiput dusky, snout and tip of mandible slightly so.

From *F. homei* (Richardson), this species differs in its small and more oblique mouth, smaller teeth, and less slender tail; from *F. brandesii* (Bleeker), in smaller teeth and longer pectoral.

Only the type is known.

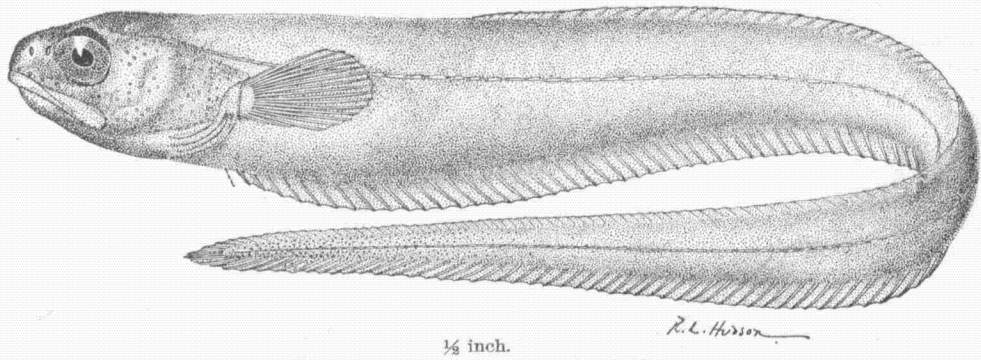


FIG. 254.—*Fierasfer microdon* Gilbert, new species. Type.

**Jordanicus** new genus (*Fierasferidæ*).

*Jordanicus* Gilbert, new genus of *Fierasferidæ* (*Fierasfer umbratilis* Jordan & Evermann).

Differing from *Fierasfer* in the depressed head, which is as broad as it is high, and especially in the adnate maxillaries and the lack of a distinct lower lip; the skin of snout and suborbital region passes without fold or other interruption over the maxillary and premaxillary, both of which are thus concealed and firmly bound down; mandible broad and flat; fleshy margin of jaw wide, flattened to an edge, extending well beyond dentary portion of jaw, but not separated by a fold from the integument covering the mandible; the mandibular teeth are opposed to the palatine band, and the expanded fleshy margin of mandible shuts within the premaxillary series both anteriorly and laterally; no pronounced fold of integument along inner margin of the mandible; branchiostegals 7.

**Jordanicus umbratilis** (Jordan & Evermann).

A single specimen, 146 mm. long, was taken in Puako Bay, Hawaii. It is exclusively a shore species, introduced here for purposes of comparison with *Fierasfer*.

The angle formed by the gill-membranes on median line below is behind eye a distance equaling half diameter of latter; premaxillary teeth minute, confined to anterior half of jaw, apparently in a single series; mandibular and palatine teeth also in single series, those on sides of mandible directed laterally toward angle of mouth, none of them enlarged; 2 or 3 vomerine teeth are the largest in the mouth, and are arranged in a longitudinal series.

*Fierasfer parvipinnis* Kaup, resembles this species in the depressed head and tumid cheeks, but according to Kaup's figure, it is a true *Fierasfer*.

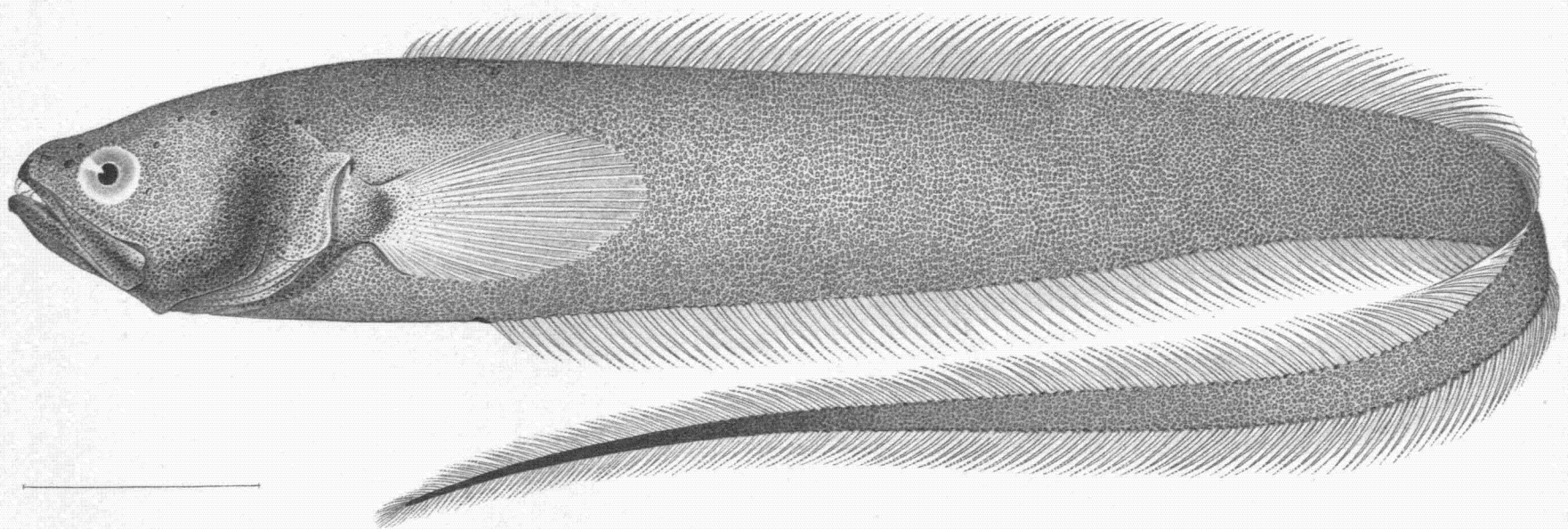
*Fierasfer umbratilis* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902, 206.

**Family GADIDÆ.**

***Antimora microlepis* Bean.**

One specimen, 465 mm. in total length, was taken at station 4185, in the vicinity of Kauai, at a depth of 1,000 to 1,314 fathoms.

The number of fin-rays is slightly below the normal for *microlepis*. Abundant material might show that the Hawaiian representative is specifically separable, but direct comparison with typical *microlepis* from Alaskan waters has developed no further differences.



SNYDERIDIA CANINA GILBERT. TYPE.

Head 26.5 hundredths of length to base of caudal; depth 21; depth of caudal peduncle 3; length of filamentous dorsal ray 23; filamentous ventral ray 24; outer ventral ray 12; pectoral 20; distance between ventrals and anal 40; length of anal base 20. Longitudinal diameter of orbit 25 hundredths of length of head; interorbital width 26; length of snout 30; distance from tip of snout to front of premaxillaries 11; length of maxillary 47, its tip noticeably behind posterior margin of orbit; length of mandibular barbel 9. D. rays 4+51; A. 38; P. 18 or 19; V. 6. About 130 transverse rows of scales on sides, the number uncertain owing to the irregularity of the series.

Teeth in narrow bands on jaws, and in a small cluster on head of vomer; gill-rakers very short, 3+11.

Body entirely denuded of scales and with light gray appearance, the membranes of scale-pouches blackish; gill-membranes and pectorals, ventrals, and caudal deep blue; lining of the gill-cavity and abdominal wall black.

In 8 specimens of *A. microlepis* from Alaska, the dorsal formula is as follows: 4-50, 4-53, 4-54, 4-54, 4-54, 4-54, 4-55. In 6 specimens the anal rays are 40, 40, 41, 42, 43, 44.

*Antimora rhina* Garman, from the Panama region, is said to differ from *microlepis* in the longer dorsal fin (4 or 5-54 to 56) and the smaller scales (145). As is seen from the dorsal formula of *microlepis* given above, the latter does not differ from *rhina* in the size of the dorsal fin. It seems probable that the 2 species are identical, especially as a careful comparison of Garman's description with typical *microlepis* fails to develop any differences.

***Læmonema rhodochir*, new species. Fig. 255.**

Type, 116 mm. long, from station 3810, off the south coast of Oahu, depth 53 to 211 fathoms; type, No. 51623, U. S. Nat. Mus.

Length of head 25 hundredths of total length without caudal; length of snout 7.5; interorbital width 3.5; longest diameter of orbit 7; length of maxillary 12; length of barbel 6; depth of body 19; least depth of caudal peduncle 2.5; length of ventrals 27; length of pectorals 18; first dorsal ray 12. D. 5-64; A. 59; P. 24; V. 2. Scales in about 130 cross-series above lateral line, 10 or 12 scales between lateral line and base of anterior dorsal rays.

Snout depressed, evenly rounded; distance between nostrils about equal to distance from posterior

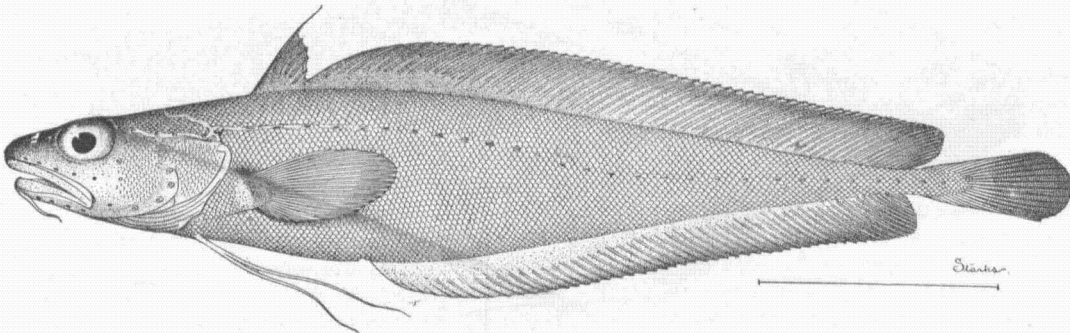


FIG. 255.—*Læmonema rhodochir* Gilbert, new species. Type.

nostril to eye; anterior nostril in a delicate tube, the posterior portion of which is the highest; interorbital region narrow, flat or very gently concave; eye comparatively small, slightly shorter than snout; snout not protruding beyond premaxillaries; mandible included; maxillary reaching a vertical from middle of eye, its length half that of head; teeth finely villiform, in a wide band on premaxillaries, a narrower band on mandible, and apparently a single series on head of vomer; palatines toothless; branchiostegals 7; gill-membranes united anteriorly by a delicate membrane which is free from isthmus; gill-rakers on outer arch 5+11, the longest  $\frac{1}{10}$  head; a moderate slit behind fourth gill; pseudobranchiae reduced, covered by membrane.

Distance from tip of snout to origin of dorsal 3.7 in total length without caudal, the front of dorsal vertically above base of lower pectoral rays; base of first dorsal equal in length to half the ocular



diameter, its first ray slightly produced, half length of head, the others regularly graduated; notch between dorsals not reaching base of fin; some of the posterior dorsal rays longer than those which precede them; median caudal rays slightly more than half length of head; vent vertically below seventh or eighth ray of second dorsal, its distance from tip of snout 0.4 total length to base of caudal; ventral rays attached for slightly more than basal third, the inner ray a little longer than the outer, extending to base of third anal ray, its length equaling that of head; pectorals reaching beyond front of anal, their length 1.4 in head; lateral line distinct throughout its course.

Scales covering head, except mouth parts, branchial membranes, suborbitals, and the greater part of snout; on snout they are confined to 2 narrow lines, which diverge forwards and pass above nostrils.

Color in life, light brownish; belly pale blue; dorsal and anal dusky, with a submarginal black streak, the margin white; caudal largely black; pectorals orange-red; ventrals white; terminal half of anterior dorsal ray white; axil of pectorals blackish.

A single specimen known.

#### Family MACROURIDÆ.

#### *Gadomus melanopterus*, new species. Fig. 256.

Type, 273 mm. long, from station 4028, vicinity of Kauai Island, depth 444 to 478 fathoms; type, No. 51606, U. S. Nat. Mus.

Head 5.7 in total length; depth 6.3; head and trunk 3.3; pyloric cæca long, 15 in number. D. 11, 9; P. 17-19; V. 9; 27 scales in an oblique series from first anal ray to middle of first dorsal.

Head and body compressed, head narrow and rather firm, mucous cavities less developed than in the majority of the species; greatest width of head equal to length of snout and eye, 0.6 the greatest depth

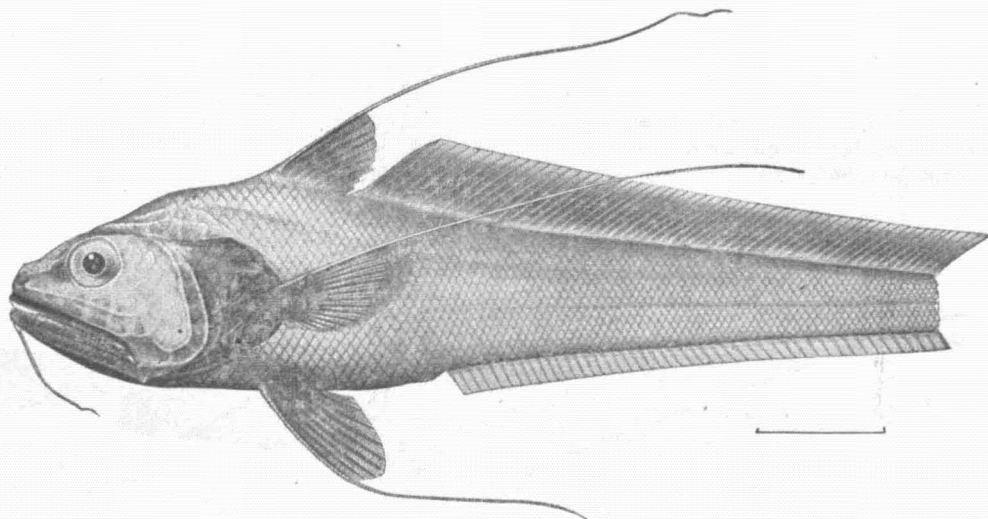


FIG. 256.—*Gadomus melanopterus* Gilbert, new species. Type.

of head; end of snout nearly vertical, profile thence to occiput gently concave; mouth large, terminal, oblique; maxillary reaching well beyond vertical from hinder margin of orbit, its length 1.7 in head; mandibular barbel very long, extremely slender and delicate toward tip, equaling length of maxillary; vertical diameter of eye 10 mm., horizontal diameter 12, interorbital width 11, length of snout 14; horizontal diameter of eye contained 4.3 times in head; hinder margin of eye 0.1 its own diameter in advance of the middle of head; teeth minute, equal, depressible, in narrow bands in each jaw, the premaxillary band extending to extreme angle of mouth, the length of mandibular band 0.2 less; mandible everywhere well included; teeth of jaws nowhere opposed; in both jaws the bands of teeth are interrupted for a short distance on median line; palate toothless; gill-openings very wide, the membranes free anteriorly, not joined to isthmus; anterior end of gill-slit in advance of vertical from front of pupil; a thick valve-like fold of membrane on outer wall of gill-cavity, parallel with outer gill, but every-

where free from it; outer set of gill-rakers of first arch numerous, long, and slender, 5 or 6 above angle, 27 below, the longest 0.6 horizontal diameter of orbit; pseudobranchiæ absent; a well developed slit behind last gill, the latter bearing 2 sets of gill-filaments; scapular foramen wholly within the hypercoracoid; branchiostegals 7.

Origin of first dorsal fin slightly in advance of base of pectoral; first ray very short, concealed in the membrane, the second slender and smooth, produced into a long unarticulated filament, the length of the spine contained 1.9 times in total length; succeeding rays all deeply forked, except the last, which is apparently simple; interval between first and second dorsals not exceeding twice the space between 2 succeeding rays of either fin; origin of second dorsal over middle of abdomen, its rays high,  $\frac{2}{3}$  length of head; tip of tail truncate, having been injured and then again surrounded by the fin; anal much lower than dorsal, the longest rays, in posterior part of fin, about 0.4 the longest dorsal rays; vent immediately in advance of anal fin; outer ventral and upper pectoral rays greatly elongate and filamentous, finely articulated throughout, with a minutely beaded appearance; ventral filament contained 3.2 in total length, pectoral filament 2.6; insertion of ventrals slightly posterior to base of pectorals.

Scales very caducous, and mostly fallen. They seem to have been absent on terminal portion of snout, and on suborbital region, but were otherwise present on top and sides of head, and on entire body; a single series of unimbricated oval scales extends the length of mandible; scales have been studied from the lateral line and adjacent areas, from the base of the dorsal fin, the region about pectoral fin, breast and belly, and the mandible; all are alike cycloid and spineless, marked with extremely numerous delicate concentric striæ; under a high power, each of the striæ is seen to be composed of a series of minute granules, which render the scale slightly rough; lateral line runs along middle of side, furnished with conspicuous pores; no lateral line along back.

Color in spirits very light brown, the margins of scale pouches black; belly, breast, gill-membranes and gular membranes, lips, and entire lining of mouth and gill-cavity jet-black or blue-black; base and axil of pectoral, and entire prepectoral area jet-black; mandible black in its symphyseal third, the remainder of its length, together with the opercles and the suborbital translucent, thus permitting the black lining to be externally visible; snout light, blackish at tip and about nostrils; fins jet-black, only the filamentous rays light; peritoneum jet-black; much black pigment also in the walls of stomach and intestines; pyloric cæca colorless.

The type only was obtained. The species is apparently closely related to *G. longifilis* Goode and Bean, *G. dispar* Vaillant, and *G. multifilis* Günther. It differs from all of them in certain minor details of measurements and fin counts, and in the black coloration of the fins. With our present knowledge of the distribution of bathybial fishes, it seems unwise to identify at long range, at least without direct comparison of adequate material. Alcock's "*Bathygadus longifilis*" from the Arabian Sea is probably distinct from Atlantic or Mediterranean species.

A young specimen, 113 mm. long, from station 4007, vicinity of Kauai, 508 to 557 fathoms, differs in the following respects: Interorbital width greater, equaling length of snout, a little longer than longitudinal diameter of eye; ventrals with 8 rays, pectorals 22 or 23, and dorsal 12; first dorsal, pectoral, and ventral rays elongate, but injured, so their length could not be determined; barbel slightly more than half length of head; fins light in color. This may represent a species distinct from *G. melanopterus*, distinguished by the wider interorbital, the more numerous pectoral rays, and the light fins. It is impossible to make any satisfactory comparison with *G. multifilis* Günther, described from a single specimen 5 inches long, taken in the vicinity of the Philippines, but *multifilis* is said to have 8 dorsal and 15 pectoral rays.

***Gadomus bowersi*, new species. Fig. 257.**

Type, 465 mm. long, from station 4151, vicinity of Bird Island, 313 to 800 fathoms; type, No. 51658, U. S. Nat. Mus.

Head 5.3 in total length; depth 6.3. D. II, 8; V 9; P 17. Gill-rakers 5+21; branchiostegal rays 7; pyloric cæca long, 18 in number.

Head very wide and deep, with greatly developed mucous canals, and delicate bones and membranes; top of head flat, sides nearly vertical; interorbital width equal to distance from tip of snout to middle of orbit, contained 2.6 times in length of head; longitudinal diameter of eye contained 1.8 times in interorbital width, 1.6 in snout, length of snout 3.4 in length of head; mouth terminal,

oblique, its width at angle .7 its length; maxillary reaching vertical through middle of head, its length contained 1.8 times in head; teeth minute, equal, arrow-shaped at tip, in a broad band in premaxillaries, where they reach angle of mouth; mandible wholly included anteriorly and laterally, its teeth not opposed to those in upper jaw; mandibular band narrower and shorter; no trace of a mandibular barbel; suborbital wide, its vertical width below middle of orbit contained 6.5 times in head and equaling greatest width of the dilated preopercular limb; distance from hinder margin of orbit to preopercular angle equal to half length of head; the middle of length of head falls behind orbit a distance equaling half diameter of pupil; the front margin of nape is midway between tip of snout and front of dorsal; two ribs diverge from upper anterior opercular angle, the upper low and flat, passing horizontally backward to end in a flat spinous point, the lower passing backward and downward, much narrower and stronger, and terminating in a definite narrow spine; rarely a trace of a third rib above the upper one described; when present, it is found only on dissection, and terminates far in advance of the upper spine; posterior portion of interopercle forming a narrow lobe which projects downward and backward beyond preopercle. Gill-membranes joined anteriorly, and forming a free fold across isthmus, with which they are not connected; anterior end of gill-slit behind orbit; width of fold half as long as eye; branchiostegals 7; gill-arches all containing double series of filaments, the fourth with

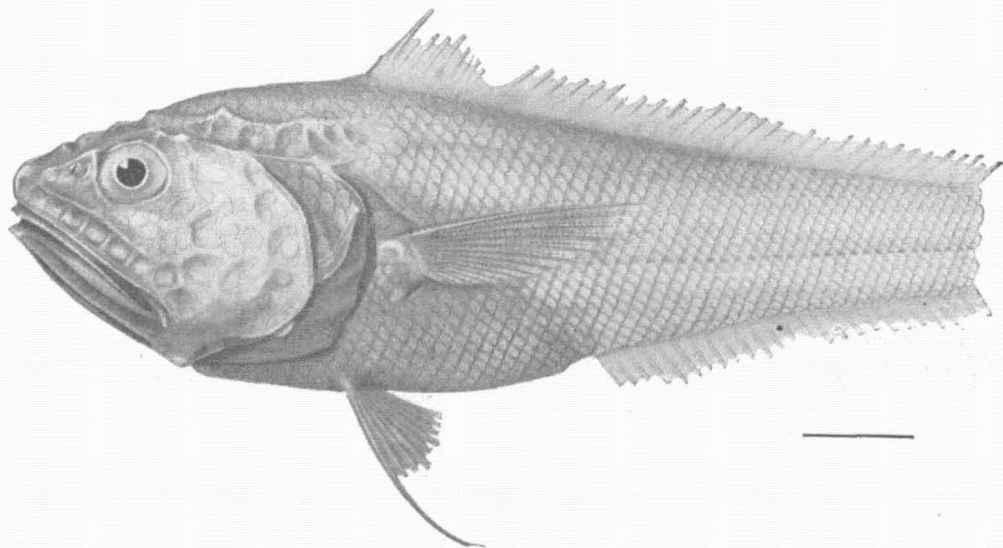


FIG. 257.—*Gadomus bowersi* Gilbert, new species. Type.

a short slit behind it; outer gill-rakers long and slender, 6+22 in number; few very small pseudo-branchial filaments; hypercoracoid perforate near middle of its height; origin of dorsal fin slightly in advance of pectorals.

Rays of the first dorsal are so badly broken in the type that nothing can be said of their character. In a cotype, 267 mm. long, from the same locality, the rays are seen to be very slender and fragile, all simple, apparently none of them produced, the second but little more than  $\frac{1}{4}$  length of head. The 2 dorsals are closely contiguous; second dorsal higher than anal, but all the rays are injured; vent separated by its own diameter from front of anal, which is vertically below eighth ray of second dorsal; pectoral long and narrow, the second ray produced beyond the others, reaching to opposite fourth or fifth anal ray, equaling distance from tip of snout to upper angle of preopercle; outer ventral ray elongate, nearly reaching vent,  $\frac{3}{4}$  length of head.

Scales unarmed, thin, fallen over the greater part of all the specimens; they are very finely concentrically striated, the striae very finely granular; lateral line not positively determined; anteriorly, it seems to be represented by a series of distant pores parallel with back along upper line of division in body musculature, but this may not be its true position; 5 scales are present between this line and base of anterior ray of second dorsal; 21 in a series upward and backward from first anal ray to base of

dorsal; scales on head very large, more than twice those on sides of body; they entirely invested head, including snout and mandible, except the gill-membranes.

Dorsal brownish on body and top of head; belly, breast, opercular and gular membranes blue-black; snout and side of head also blackish, this being especially marked in young examples, where the deeper lying black pigment is seen through the translucent surface tissues; mouth and gill-cavities and abdominal cavities lined with black.

In the 6 specimens obtained, the ventral rays are constantly 9 in number; the dorsal formula is 11, 8 in 2 specimens, 11, 9 in 4; the pectoral varies from 17 to 19, and the gill-rakers in all except the type, number 6 or 7 on the vertical limb, 22 to 24 on the horizontal limb of the outer arch.

The present species resembles in appearance *Bathygadus cottoides* Günther, from New Zealand and the Kermadec islands, but differs generically in the presence of a slit behind the last gill, and in the position of the scapular foramen. Like *B. cottoides*, it has a very soft cavernous head, with excessive development of the system of sensory canals, and very thin delicate membrane bones. The head is also very wide and subquadrate, with nearly vertical cheeks, and lacks any trace of a mandibular barbel. In addition to the generic characters, the 2 species differ in the number of dorsal and pectoral fin-rays, the number of gill-rakers, and the relative lengths of snout, interorbital width, and orbital diameter. Direct comparison of specimens has not been possible. Because of the presence of a slit behind the last gill, and the position of the scapular foramen, which is wholly within the hypercoracoid, this species is placed in the genus *Gadomus* Regan. Its relations with *G. longifilis*, the type of *Gadomus*, seem, however, remote, as is indicated by the absence of a barbel and by the entire habit of the fish.

The species was taken at the following stations: Nos. 3977, vicinity of Bird Island, 876 to — fathoms; 4007, vicinity of Kauai, 508 to 557 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4151, vicinity of Bird Island, 313 to 800 fathoms.

***Melanobranchus micronema*, new species. Fig. 258.**

Type, 235 mm. long, from station 4094, Pailolo Channel, between Maui and Molokai, depth 753 to 787 fathoms; type, No. 51643, U. S. Nat. Mus.

Head 5.2 in total length; depth 6.7; head and trunk 3.2. D. 11, 10; P. 18; V. 8. 29 scales in an oblique series upward and forward from first anal ray to base of dorsal; pyloric caeca very large, 9 in number.

Head wider and somewhat softer than in *Gadomus melanopterus*, the greatest width of head exceeding length of snout and eye, contained 1.7 times in length of head, 0.7 the greatest depth; snout wide and low, bluntish at tip, its greatest width equaling distance from its tip to posterior margin of pupil; longitudinal diameter of eye equal to interorbital width, 4.5 in the head; snout longer, 3.6 in head; mouth terminal, but little oblique, the mandible everywhere included, shutting wholly within the premaxillary teeth; maxillary extending beyond vertical from hinder margin of eye a distance equal to 0.6 diameter of orbit; mandibular barbel minute, its free portion not more than half a millimeter long; teeth minute, equal, slightly depressible, in narrow bands in each jaw, the premaxillary band reaching angle of mouth, the mandibular band shorter; palate toothless; preopercle narrow with parallel margins; opercle and subopercle terminating posteriorly in weak spinous points, which are concealed in the membrane; gill-membranes joined anteriorly, but free from isthmus, across which they form a moderate free fold; outer set of gill-rakers very long and slender, the longest .6 diameter of eye; gill-rakers 35 in number, 6 or 7 on vertical limb of arch; branchiostegals 7; gills 4, a wide slit behind last arch; no pseudobranchiae; scapular foramen between the hypercoracoid and the hypocoracoid.

Origin of first dorsal slightly in advance of base of pectorals; first dorsal spine very short and concealed, the second elongate, filiform, .9 length of head; remaining rays forked as well as articulated, except the last 3, which are simple; interval between the dorsals a trifle wider than that separating the successive rays of the second dorsal; second dorsal rays very high, the longest uninjured ray .3 length of head; tail injured, blunt at tip, surrounded by the fin; anal origin vertically below thirteenth ray of second dorsal, the rays all very short; upper pectoral ray very elongate, reaching thirty-sixth ray of second dorsal, its length (85 mm.) contained 2.7 times in total length; outer ventral ray also elongate and filamentous; injured in the type, its broken tip reaching base of fifth anal ray, 40 mm. long; a very short interval separates vent from front of anal fin; base of ventrals midway between front of anal fin and middle of mandible.



Scales fallen, with the exception of 2 or 3 along the course of the lateral line, which runs along middle of sides, and describes anteriorly a convex curve above pectoral fin; scales like those observed in other species of the genus, without spines, marked with very numerous striae, which are roughened by a series of minute prominences; they covered entire body, but their presence on head can not be verified, owing to the condition of the type.

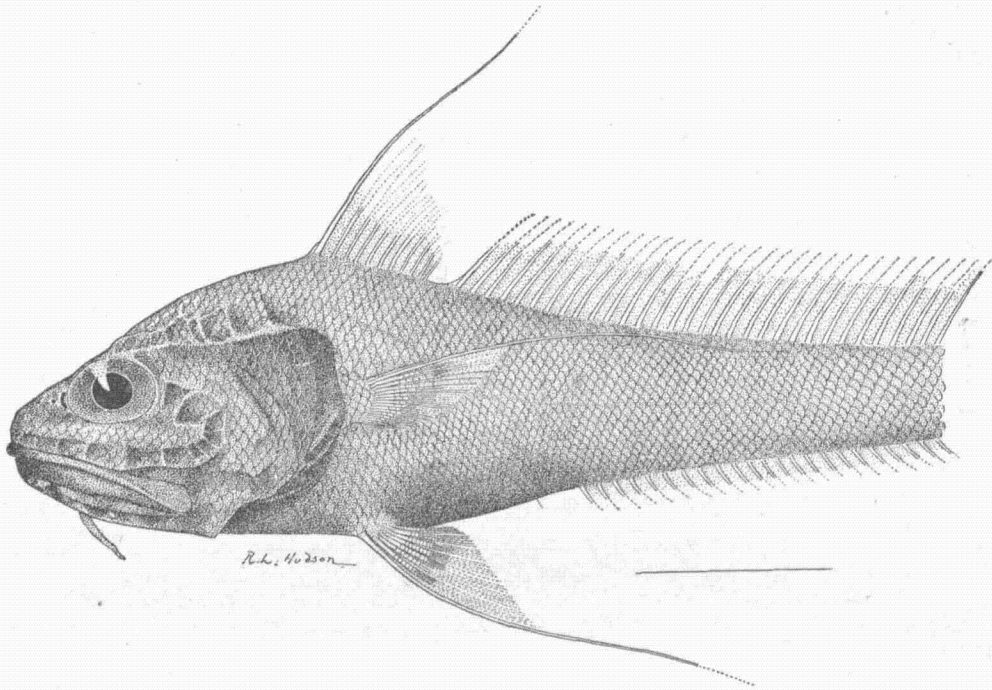


FIG. 258.—*Melanobranchus micronema* Gilbert, new species. Type.

Color, head and fins light grayish, margins of the scale pouches dusky; head light grayish on top and sides, except opercle and gill-membranes, which are black; belly, gill and gular membranes, and the inner lining of cheeks and opercles black; breast, shoulder girdle, isthmus, lips, and lining of mouth dark brownish; peritoneum dusky.

A single specimen was obtained.

***Chalinura ctenomelas* Gilbert & Cramer.**

This a very abundant species in depths of 250 to 350 fathoms.

As seen from above, the terminal portion of snout is broadly triangular, tapering rapidly forward to the angular tip, which is about on level of middle of eye; maxillary reaching to or slightly beyond hinder margin of orbit, its length slightly less than half length of head; outer series of enlarged teeth in upper jaw weakly arrow-shaped, the shape most apparent in the lateral teeth of the series; the villiform mandibular teeth are in 3 irregular series and have distinctly arrow-shaped tips, as have also those of the mandibular band, which are arranged in 2 irregular series; angle of preopercle produced, the posterior margin running obliquely upward and forward, incurved above the angle; spinelets on scales not arranged in longitudinal series, but in definite oblique series (quincunx order).

A small naked pit lying between bases of ventral fins is separated by a narrow band of scales from the scaleless area surrounding anal opening; in some specimens the 2 areas seem to be connected by a narrow naked line, in others by a broader naked streak, but it is considered probable that these conditions were due to the loss of scales; distance between dorsals varying from twice to nearly thrice the base of anterior dorsal; mouth-cavity white, black only in extreme posterior part; gill-cavity largely white anteriorly, black above gills, on opercular region, and lining of shoulder-girdle.

The stomach contains remains of small shrimp-like crustacea, and the eyes and jaws of squids.

Specimens were taken at the following stations: Nos. 3865, Pailolo Channel, 256 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3908, off the south coast of Oahu, 304 to 308 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3916, off the south coast of Oahu, 299 to 330 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4084, off the south coast of Maui, 253 to 267 fathoms; 4085, off the south coast of Maui, 267 to 283 fathoms; 4086, off the south coast of Maui, 283 to 308 fathoms; 4087, approach to Pailolo Channel, 306 to 308 fathoms; 4088, approach to Pailolo Channel, 297 to 306 fathoms; 4089, approach to Pailolo Channel, 297 to 304 fathoms; 4090, approach to Pailolo Channel, 304 to 308 fathoms; 4097, approach to Pailolo Channel, 286 fathoms; 4117, off the northwest coast of Oahu, 253 to 282 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4134, vicinity of Kauai, 225 to 334 fathoms.

*Chalinura ctenomelas* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 430, pl. xlv, fig. 2.

#### **Optonurus atherodon** Gilbert & Cramer.

One of the most abundant species of Hawaiian *Macrurids* between 250 and 400 fathoms.

The original description may be amended in the following respects: Ventral fins with 9 or 10 rays; snout short, projecting but little beyond mouth, its length contained 1.2 times in orbit, its preoral portion 3 to 4 times in orbit; median rostral ridge ending freely between orbits, not joining a transverse ridge, a delicate, thread-like cord connecting it with orbital margin; the small curved ridges on occiput, mentioned in the description of the type, are delicate long spicules bridging the excavated space between occiput and orbital margin; maxillary extending well behind middle of orbit, to a vertical line intersecting eye midway between pupil and posterior border of orbit; posterior margin of preopercle extending somewhat obliquely upward and forward; barbel about 0.3 length of orbital diameter; all the teeth in both jaws are distinctly arrow-shaped at tip; premaxillary villiform band about 6 teeth wide; mandibular band consisting of an inner irregular series of slightly enlarged teeth, and an outer irregular series of smaller teeth, both series terminating at the same point laterally.

Interspace between dorsal fins 2.5 times the base of anterior dorsal; pectorals 0.6 the length of head; pyloric caeca 97 in the single specimen examined as to this point; a distinct, small, naked pit between bases of ventral fins, separated by a narrow band of scales from the naked area around vent. The food consists of shrimp-like crustacea and squid. In life, the dorsal region is bright blue.

Taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 3979, vicinity of Bird Island, 222 to 387 fathoms; 3988, vicinity of Kauai, 165 to 469 fathoms; 4021, vicinity of Kauai, 286 to 399 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4041, off the west coast of Hawaii, 253 to 382 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4086, off the north coast of Maui, 283 to 308 fathoms; 4087, off the north coast of Maui, 306 to 308 fathoms; 4089, off the north coast of Maui, 297 to 304 fathoms; 4090, off the north coast of Maui, 304 to 308 fathoms; 4091, off the north coast of Maui, 306 to 308 fathoms; 4097, off the north coast of Maui, 286 fathoms; 4107, Kaiwi Channel, 350 to 355 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4123, off the southwest coast of Oahu, 352 to 357 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4139, vicinity of Kauai, 339 to 512 fathoms.

*Optonurus atherodon* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 431, pl. xlvi, fig. 1.

#### **Hymenocephalus antræus** Gilbert & Cramer.

The most abundant *Macrurid* about the Hawaiian Islands in depths of 250 to 350 fathoms, where it occurs in company with *Chalinura ctenomelas*, *Optonurus atherodon*, and *Malacocephalus hawaiiensis*. It is much smaller than either of these species, reaching a length of only 20 centimeters, and is characterized by the excessive development of the sensory canals, which are covered by a very delicate mem-

brane and supported by fragile plates and crests. Dentition weak, composed of minute villiform teeth in very narrow bands, the latter tapering laterally, but comprising usually at least 2 series of teeth to their ends; with considerable magnification, the teeth are seen to be dilated and flattened below the tip, distinctly lance-shaped; mouth terminal, very slightly overpassed by the prominent median point of snout; maxillary falling a little short of a point opposite hinder edge of orbit; horizontal and vertical diameters of orbit equal, 0.4 the length of head; posterior margin of preopercle extending obliquely upward and forward; a small opaque lens-like body, resembling a photophore, occupies the middle of the breast, and is connected by a raised black line below the peritoneum with a similar body immediately before the vent.

Scales very thin and deciduous, many of them smooth and unarmed, as described in the type. Others may have a few (1 to 10) short, scattered spines, wholly without definite arrangement.

In specimens taken July 21 at station 4088, the eggs have nearly reached maturity, the ovaries exceeding in size all other contents of the abdominal cavity. They are so uniform in their development in some twenty specimens examined as to suggest a definite breeding season in this species. The ovaries are completely united in their posterior third, but diverge anteriorly. The stomach contains largely digested remains of small crustacea. There are but few (about 12) pyloric caeca.

The peculiar and highly developed color-pattern of the gular membrane, sides of throat and area on outer side of base of ventrals has been pointed out in the original description of the species. In addition to the conspicuous dark line along middle of side of tail, there is a band of dark specks above this line, separated from the base of anterior part of dorsal fin by a colorless streak; below the middle of tail is a wide colorless band, then a narrow streak composed of black specks, separated from base of anal by a narrow colorless streak; posteriorly, all the dark streaks blend, the terminal portion of tail being distinctly blackish; tip of snout marked by a narrow black transverse line, often interrupted; lining of mouth largely colorless; the bands of teeth black; a transverse black arch overlying palatines and head of vomer, and a black streak on floor of mouth in front of tip of tongue; linings of shoulder girdle and branchiostegals black.

There can be no doubt of the close relationship between the 2 Hawaiian species of *Hymenocephalus* and the Atlantic *H. italicus* Giglioli, the type of the genus. They agree not only as regards the smooth dorsal spine and the large terminal mouth with narrow bands of minute equal teeth, but in the presence of the peculiar coloration above base of ventral fin, and the small tubercle on the median line of breast. In *H. italicus*, the last-mentioned characters are described by Collett (Poissons de l'Hiron-delle, 1896, p. 87), in the following terms: "Immédiatement au-dessus des ventrales, la peau du ventre est légèrement rayée, du moins chez les jeunes individus; ces raies descendent vers la ligne ventrale. En avant des ventrales, on remarque sur la ligne médiane du corps une petite protubérance mamillaire ronde." The 3 species agree also in their very small size, the great development of the cephalic mucous cavities, and the extremely caducous scales, which show a strong tendency to loss of spines. Compared with *H. italicus*, the Hawaiian species are signaled by almost total loss of the mandibular barbel, and by increase in number of ventral rays. Other species referred to *Hymenocephalus*<sup>a</sup> seem not to share the common characters above noted, and may with advantage, perhaps, be removed from the group.

Specimens were obtained at the following stations: Nos. 3865, Pailolo Channel, 256 to 283 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3898, Pailolo Channel, 258 to 284 fathoms; 3907, off the south coast of Oahu, 304 to 315 fathoms; 3908, off the south coast of Oahu, 304 to 308 fathoms; 3909, off the south coast of Oahu, 308 to 322 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3916, off the south coast of Oahu, 299 to 330 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 3925, off the south coast of Oahu, 299 to 323 fathoms; 4021, vicinity of Kauai, 286 to 399 fathoms; 4025, vicinity of Kauai, 275 to 368 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4086, off the north coast of Maui, 283 to 308 fathoms; 4087, Pailolo Channel, 306 to 308 fathoms; 4088, Pailolo Channel, 297 to 306 fathoms; 4089, Pailolo Channel, 297 to 304 fathoms; 4090, Pailolo Channel, 304 to 308 fathoms; 4091, Pailolo Channel, 306 to 308 fathoms; 4105, Pailolo Channel, 314 to 335 fathoms; 4106, Pailolo Channel, 335 to 350 fathoms; 4140, Pailolo Channel, 339 to 437 fathoms.

*Hymenocephalus antrax* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 428, pl. XLVI, fig. 2.

<sup>a</sup>The above was written before the description of *H. striatissimus*, *H. papyraceus*, and *H. lethocemus* from Japan (see Jordan & Gilbert, Bull. U. S. F. C. for 1902, pp. 612-616), all of which possess the above-mentioned characters of the genus.

**Hymenocephalus striatulus**, new species. Fig. 259.

Type, 144 mm. long, from station 4122, off the southwest coast of Oahu, depth 192 to 352 fathoms; type, No. 51611, U. S. Nat. Mus.

Very closely related to *H. antræus*, differing in the much more slender habit, the smaller eye, with the horizontal diameter much longer than the vertical, the more projecting snout, the more numerous ventral rays, and the more spinous scales.

Depth of body equaling length of snout and eye; head 4.8 in total length. D. 11, 9 (to 11, 11); V. 15 (usually 14); P. 15 (15 to 18).

Head and body very slender; anterior profile not strongly arched as in *H. antræus*; projecting point at tip of snout more prominent than in *antræus*, extending well beyond mouth; skull papery, with excessively large sensory canals inclosed by delicate membrane; mouth large, oblique; maxillary reaching vertical from hinder margin of orbit; mandibular barbel usually obsolete, to be made out in one specimen with the aid of a lens; teeth minute, in narrow bands in the jaws, the mandibular band about half width of premaxillary band; interorbital width equal to length of snout; eye elliptical, its vertical diameter contained 1.4 times in the horizontal diameter, which is 0.3 length of head; preopercular angle broadly rounded, with crenulated border, the posterior edge oblique; gill-membranes rather narrowly joined anteriorly, entirely free from isthmus; gill-slits wide, as in *H. antræus*.

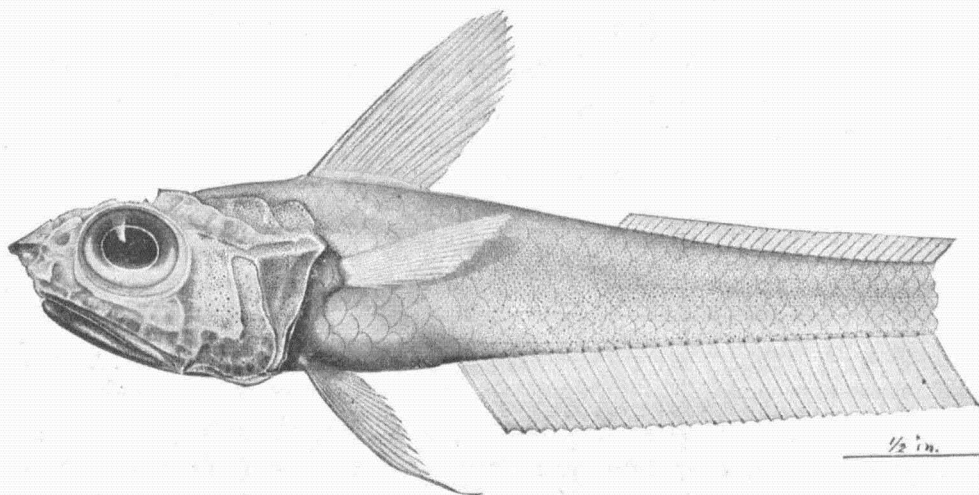


FIG. 259.—*Hymenocephalus striatulus* Gilbert, new species. Type.

Dorsal spine slender and smooth, scarcely longer than some of the succeeding rays; base of first dorsal contained 1.75 times in interspace between dorsals; first anal ray in a vertical a trifle behind last ray of first dorsal; ventrals inserted noticeably in advance of pectorals; pectorals long and slender, their tips extending to opposite fourth or fifth anal ray, their length a trifle more than half length of head; outer ventral ray filamentous, reaching to base of ninth anal ray; vent immediately in front of first anal ray, its distance from base of inner ventral ray equaling distance from the latter to mandibular angle; a small obscure lens-like body on middle line of breast, as in *H. antræus*; a similar body immediately before vent, the 2 joined by a raised strand along inner abdominal wall; scales very thin and caducous, an occasional patch only being present; 4 series between lateral line and base of first dorsal; those on breast, sides of body and tail essentially similar, and much rougher than in *H. antræus*, each usually with from 20 to 30 spines, arranged in 4 to 6 parallel oblique series (quincunx order); scales along sides of shoulder-girdle and on under side of mandible smooth.

In color, almost exactly like *H. antræus*. The body was light olive in life, with narrow dark margins to the scales on the back; lower half of caudal portion of body marked with coarse black pigment spots, many of which are arranged in oblique or horizontal rows; under a lens, the central area of many of these spots shines with metallic luster; somewhat finer specks, more closely crowded, form a wide dark band along middle of tail, which does not show the conspicuous narrow line char-



acteristic of *H. antræus*; a conspicuous black spot at base of each anal ray; dorsal rays not marked; posterior edge of occipital canal jet-black (as in *H. antræus*); a transverse black line on anterior edge of snout; lower side of head, opercle, breast, and belly black, this color extending a little beyond origin of anal fin. As in *H. antræus*, the gular membrane has a black median streak, from which diverge forward and outward a number of fine parallel black lines. A silvery streak along each side of isthmus extending backward and surrounding outer portion of ventral base, crossed with very fine parallel hair lines of black, which can be made out only by the aid of a lens; these lines are as numerous and as fine as the scale striae; lips and dentary portions of jaws black; roof of mouth shining plumbeous; branchial region largely dusky; a blackish patch in front of tongue; lining of gill-cavity largely dusky.

Specimens were taken at the following stations: Nos. 3920, off the south coast of Oahu, 265 to 280 fathoms; 3986, off Kauai, 55 to 362 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms.

***Hymenocephalus aterrimus*, new species. Plate 93.**

Type, 127 mm. long, from station 3989, vicinity of Kauai Island, depth 385 to 500 fathoms; type, No. 51649, U. S. Nat. Mus.

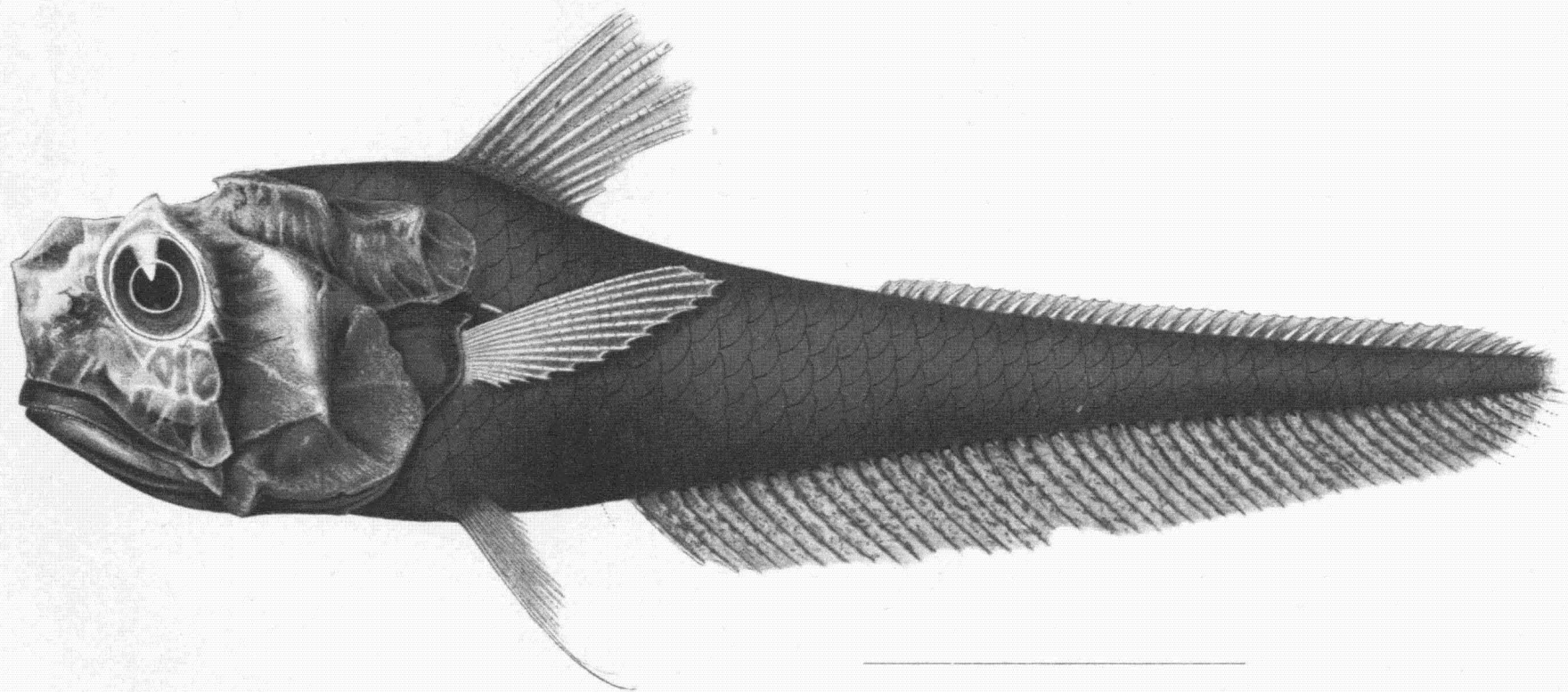
This species is jet-black, and occurs at a greater depth than *H. antræus* or *H. striatulus*. Its range is apparently between 400 and 500 fathoms, where it is found in company with *Macrourus gibber* and *Trachonurus sentipellis*. It is closely related to the other Hawaiian species of the genus, and to *H. italicus*. In addition to the papery cranial crests and the wide mucous canals bridged over with delicate membrane, the wide terminal mouth, the weak dentition and the smooth dorsal spine, the species has thin caducous scales, the peculiar striation on side of throat and region above base of pectoral fin, and the 2 minute lens-like bodies in the median line of the ventral surface.

The depth of the body varies widely with the distention of the abdomen, and also with the curvature of the back, the base of the dorsal fin sometimes forming a greater prominence than in the type. In the latter, the depth at origin of dorsal fin is contained 1.5 times in the length of the head. D. 11, 9; V. 13 (usually 14); P. 13 (sometimes 14); 3 rows of scales between position of lateral line and middle of base of first dorsal.

Head very large, compressed, with a very heavy bluntly-rounded snout, which scarcely protrudes beyond premaxillaries; mouth terminal, with the premaxillaries anteriorly wholly below orbit; cleft oblique; maxillary reaching slightly beyond vertical from posterior margin of orbit, its length 1.85 in head; teeth very short and slender, but somewhat longer than those in *H. antræus* and *H. striatulus*, arranged in narrow bands in both jaws, the inner series evidently longer than the outer but still very small; all the teeth are depressible; with a lens they are seen to be arrow-shaped at tip; barbel wanting; eye small, shorter than snout, and but half width of interorbital space; preopercle very widely expanded, its angle broadly rounded, its upper limb oblique and convexly curved; around preopercular angle the margin is rather coarsely crenate; gill-membranes moderately joined anteriorly, wholly free from isthmus; gill-slits wide, the membranous attachment to the first arch encroaching less on anterior cleft than in species of *Macrourus*; a narrow slit behind fourth arch; gill-rakers short, sessile, spinous; in uninjured specimens the tail is extremely slender.

As in related species, the first dorsal spine is minute, not evident to the eye; the second spine very slender and wholly smooth, tapering to a very fine point, but not filamentous; the succeeding ray unbranched, but articulated, the 4 following rays forked for a short distance near their tips; other rays simple, unbranched; rays of second dorsal very small, but origin of fin can be made out without difficulty; interspace between dorsals equal to 2.4 times base of anterior dorsal; second dorsal spine 0.6 length of head; origin of anal fin vertically behind first dorsal for a distance equaling diameter of pupil; anal rays high, 0.3 length of head; vent immediately in front of first anal ray; pectoral narrow and long, one of the upper rays elongate, reaching vertical of ninth anal ray, 0.6 length of head; outer ventral ray a long slender filament, reaching the same vertical as pectoral filament, 0.7 length of head; ventrals inserted in advance of pectoral base by a distance equaling diameter of pupil.

Scales large, very thin and caducous, round in outline, with parallel concentric lines whose centers coincide with those of the scales; no spines on any of the few scales examined, these including all the scales of the breast, a few above and behind bases of ventrals, those between pectorals and ventrals, those behind and above bases of pectorals, and one above bases of anterior anal rays; the scales evidently covered the entire body in life, but may have been absent on head.



HYMENOCEPHALUS ATERRIMUS GILBERT. TYPE.

Color uniform black, less intense on side of tail, and on snout and top of head, which are partly translucent; as in other species of the genus, a strip along each side of throat (concealed by the gill-flap) and an area extending above and behind base of pectorals is silvery, crossed by very fine parallel black lines, hardly to be made out without a lens; owing to deposition of black pigment, these striated areas are difficult of detection in some specimens of this species; another generic mark consists in the presence of 2 small opaque lens-like prominences on midventral line, one on middle of breast in front of ventral fins, the other immediately in advance of anal opening; the 2 are connected by a raised strand, evident on inner abdominal wall.

The largest specimen taken is 185 mm. long, with the very slender tail uninjured; the head is 35 mm., the greatest depth 27 mm. In different specimens, the interspace between dorsals varies from 2.5 to 1.5 times the base of the first.

The species was taken at the following stations: Nos. 3892, off the north coast of Molokai, 328 to 414 fathoms; 3904, off the north coast of Molokai, 295 fathoms; 3985, vicinity of Kauai, 430 to 477 fathoms; 3989, vicinity of Kauai, 385 to 500 fathoms; 3997, vicinity of Kauai, 418 to 429 fathoms; 4019, vicinity of Kauai, 409 to 550 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4139, vicinity of Kauai, 339 to 512 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms; 4180, vicinity of Niihau, 417 to 426 fathoms.

#### ***Macrourus ectenes* Gilbert & Cramer.**

This species was not obtained by the expedition of 1902; only the type is known, a young individual  $5\frac{1}{4}$  inches long. It is well distinguished from other Hawaiian species.

*Macrourus ectenes* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 423, pl. 44, fig. 1.

#### ***Macrourus propinquus* Gilbert & Cramer.**

Numerous specimens were secured and form the basis for the following notes, which include some corrections and additions to the description of the type.

Head rather small, compressed; snout short and high, its length, its depth, and the width between the nostrils all equal; median tubercle at tip of snout but slightly above middle of pupil; lower anterior profile of snout very oblique, or almost vertical; front of premaxillaries slightly in advance of nostrils; transverse width of mouth slightly less than its length; gill-membranes rather narrowly united across isthmus, with a rather wide free fold posteriorly.

Serræ of second dorsal spine coarse, widely spaced, and evenly distributed along its entire length, about 9 in number in the young, becoming smaller and more numerous (about 15) in adults; the spine becomes filamentous toward its tip, its total length about equaling that of head; the interspace between dorsals varies between three-fourths and four-thirds the length of the base of first dorsal.

Two specimens in the present collection, 23 and 27 cm. long, are much larger than the type, and have the scales provided with more numerous series of spines. Those on the middle of the sides above lateral line have 7 to 11 parallel series of rather long appressed spines, which rise independently from the scale, and are not connected by ridges; scales on head and nape are similar, but smaller and more crowded, with the series of spines parallel or slightly diverging; on the breast the spines are much shorter than elsewhere, the series parallel or slightly diverging; basal half of first dorsal whitish, contrasting strongly with the black distal half.

The pyloric cæca in four specimens number 22, 26, 30, 32. The specimens taken June 21 at station 4021 had been feeding exclusively on small eggs, with which the stomachs of all were distended. At this date the male and female reproductive glands had reached a very moderate development. On August 1, at station 4137, a single specimen was taken, larger than any other obtained, and at a greater depth. In this the eggs were mature, being extruded from the body by the pressure incident on rising to the surface. The stomach was empty and strongly contracted.

The species was taken at the following stations: Nos. 4021, off the east coast of Kauai, 286 to 399 fathoms; 4022, off the east coast of Kauai, 376 to 399 fathoms; 4137, off the east coast of Kauai, 411 to 476 fathoms.

*Macrourus propinquus*, Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 424, pl. xlii, fig. 2.

**Macrourus holocentrus** Gilbert & Cramer.

One specimen was taken at station 3909, off the south coast of Oahu, 308 to 322 fathoms.

Head and trunk very slender, the head with rounded outlines and no ridges; longitudinal profile of snout convex; interorbital space and occiput concave; suborbital flat, without ridge; spines on scales long, slender and flexible, bristle-like, closely crowded, but in rather definite parallel series, though not borne upon ridges; on head and along predorsal area, the spines shorter and frequently in radiating lines; mandible naked in this specimen and in one of the cotypes of the species. In the latter there are 8 ventral rays, in the former 9.

The following corrections and additions may be made to the original description: Median rostral tubercle on a level with middle of eye; premaxillaries anteriorly below level of eye; maxillary reaching slightly beyond middle of orbit; gill-membranes with a wide free fold where they cross isthmus; serrations of second dorsal spine small, 11 or 12 in number, evenly spaced along entire spine except the filamentous portion; second dorsal spine very slender; last rays of first dorsal not nearly reaching second dorsal when declined; length of first dorsal base 0.6 the interspace between dorsals; ventral fin, excluding outer filamentous ray, reaching base of second anal ray; back light gray, with some dusky mottlings; lower half of gill-cavity whitish.

*Macrourus holocentrus* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 425, pl. XLIII.

**Macrourus gibber** Gilbert & Cramer.

Taken at a number of localities but never abundantly. The following additions and corrections may be made to the original description.

Infraorbital ridge occupying a very oblique position, but not approaching the vertical; tip of premaxillaries far below level of middle of eye, their horizontal plane intersecting eye midway between lower margin of pupil and lower margin of orbit; teeth of outer series not enlarged; posterior margin of preopercle nearly vertical, the angle broadly and evenly rounded; gill-membranes with a narrow free posterior margin on middle line below; dorsal profile ascending strongly to origin of dorsal, then descending abruptly along base of fin, forming a conspicuous triangular hump; length of pectorals 0.7 that of head; lateral line nearly obsolete, membranous tubes present on occasional scales or groups of scales only.

Scales on back and sides thin, deciduous, furnished with very slender, closely appressed spines, which are arranged in parallel series directed somewhat obliquely downward and backward; on the back the series of spines may slightly diverge, as given in the figure above cited; spines distinct, not located on ridges; on breast and sides of head, the scales are thicker and the spines stronger, arranged in series which usually diverge; subocular ridge and the lateral pair of rostral ridges covered with very strongly spinous scales; the 3 rostral tubercles bear rosettes of strong spines; spaces between median and lateral rostral ridges naked, or with a few scattered cycloid scales; lower side of snout and anterior half of space between mouth and subocular ridge naked; mandibles naked, ending posteriorly in a spinous point, which does not project.

Taken at the following stations: Nos. 3842, off the south coast of Molokai, 495 to 506 fathoms; 3985, vicinity of Kauai, 433 to 477 fathoms; 3989, vicinity of Kauai, 385 to 500 fathoms; 3994, vicinity of Kauai, 330 to 382 fathoms; 3997, vicinity of Kauai, 418 to 429 fathoms; 4007, vicinity of Kauai, 508 to 557 fathoms; 4014, vicinity of Kauai, 362 to 399 fathoms; 4022, vicinity of Kauai, 376 to 399 fathoms; 4028, vicinity of Kauai, 444 to 478 fathoms; 4041, off the west coast of Hawaii, 253 to 382 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4112, Kaiwi Channel, 433 to 447 fathoms; 4113, Kaiwi Channel, 395 to 433 fathoms; 4137, vicinity of Kauai, 411 to 476 fathoms; 4139, vicinity of Kauai, 339 to 512 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms.

*Macrourus gibber* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 426, pl. XLIV, fig. 2.

**Macrourus burragei**, new species. Fig. 260.

Type, 265 mm. long, from station 3917, off the south coast of Oahu Island, in 294 to 330 fathoms; type, No. 51641, U. S. Nat. Mus.

Closely allied to *M. holocentrus*, but with deeper body, blunter anterior profile, larger first dorsal fin, shorter abdomen, and much smaller scales.



First dorsal 11, 10; ventral 9; pectoral 20 or 21; 14 scales in a series downward and backward from origin of first dorsal to lateral line, 11 between lateral line and origin of second dorsal (8 in *M. holocentrus*).

Head short and high, compressed, the greatest depth contained 1.2 times in its length; upper profile nearly straight from dorsal fin to snout, a very slight depression above orbits; profile of snout gently decurved to rostral tubercle, descending thence in a vertical line to front of premaxillaries; head firm, without conspicuous mucous cavities, the scales everywhere firmly adherent; snout terminating antero-superiorly in a tubercle covered with spines radiating in all directions from the center; a pair of smaller spinous tubercles are separated from the first by less than half its diameter; suborbital flat, without ridge; interorbital space narrow, very slightly concave, its width slightly less than length of snout, 0.8 diameter of orbit; upper rim of orbit encroaching on upper profile; snout 0.25 length of head; eye circular, 3.3 in head; distance from rostral tubercle to premaxillaries 0.2 length of head; front of premaxillaries far in advance of nostrils; maxillary scarcely reaching vertical from front of pupil, contained 3.25 in length of head, and equal to width of mouth; teeth in very wide villiform bands in both jaws, the outer series in the upper jaw scarcely enlarged; length of barbel 0.7 diameter of orbit; least width of the suborbital 0.3 diameter of orbit; preopercular angle not produced, the posterior margin nearly vertical, convex in its upper half, concave immediately above the angle.

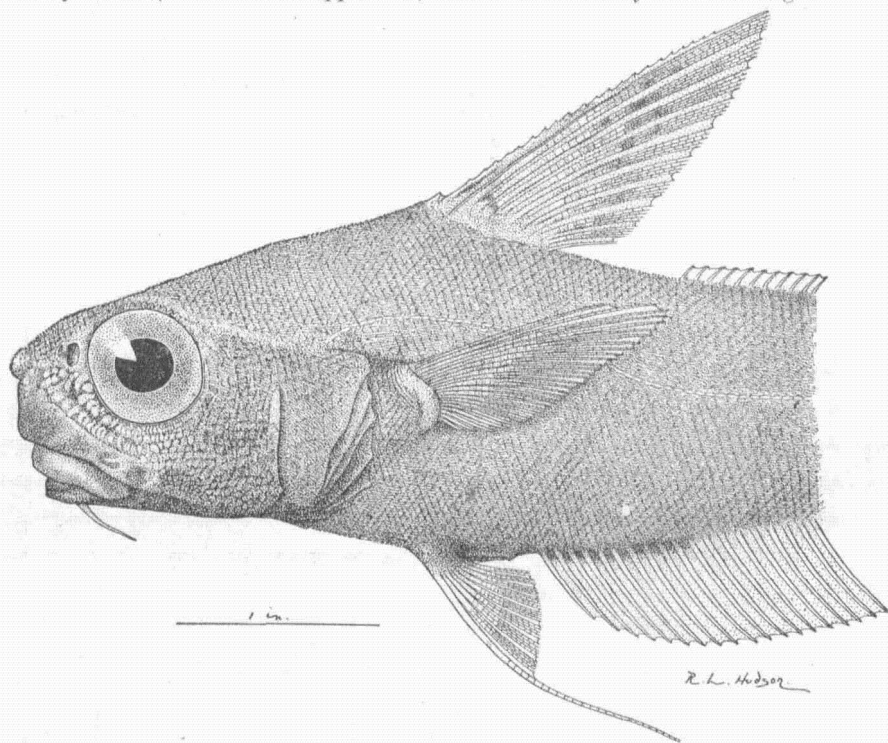


FIG. 260.—*Macrourus burragei* Gilbert, new species. Type.

First dorsal fin very long; second dorsal spine large, provided with 17 rather fine serrations evenly distributed for its entire length, its flexible portion short, its tip scarcely projecting beyond that of the first succeeding ray; total length of spine equaling distance from tip of snout to base of upper pectoral ray; rays of second dorsal very short and inconspicuous, the base of the first ray reached by the seventh ray of first dorsal; interspace between dorsals equal to base of anterior fin; first anal ray under middle of anterior dorsal, its distance from base of inner ventral ray one-half distance from latter to edge of gill-membrane; inner ventral ray reaching anal origin, the other rays extending well beyond it, the filamentous outer ray reaching base of fifteenth anal ray, its length 1.1 in that of head; pectoral wide, extending to opposite eleventh anal ray, its length 1.45 in head; a small naked pit on middle line of breast between the outer ventral rays.

Scales on back and sides densely covered with slender bristle-like spines, which are arranged in numerous parallel series somewhat difficult to determine; on head the spines are much coarser and less numerous, and the series strongly radiate; mandibles, gill-membranes, and the space below suborbitals and rostral ridge naked, the rest of head completely invested; lateral line prominent and continuous, describing a low curve above pectoral fin.

Color light grayish, cheeks and opercles not darker than sides of body; under side of snout, lips, and mandibles blackish, more or less mottled with silvery; gill-membranes purplish black, breast and abdomen dusky; mouth and gill-cavities whitish, lining of abdominal cavity bright silvery, with scattered black specks; membrane of first dorsal silvery with scattered black specks, a few small dark spots on the rays; anal whitish, blackish at base of the anterior 12 rays; pectorals and ventrals dusky, the latter with silvery pigment; ventral filament white.

One specimen only.

Named for Lieut. G. H. Burrage, U. S. Navy, navigating and executive officer of the *Albatross*, to whose efforts was directly due much of the success of the expedition.

**Macrourus obliquatus**, new species. Fig. 261.

Type, 155 mm. long, from station 4141, off the east coast of Kauai, depth 437 to 632 fathoms; type, No. 51514, U. S. Nat. Mus.

Body very long and slender, depth at origin of dorsal contained 1.6 times in head. First dorsal 11, 11; V. 12; P. 22 or 23; scales between lateral line and base of second dorsal spine 9.

Head rather long, with moderately projecting snout, and narrow inferior mouth, which is much overpassed by the snout anteriorly and by the infraorbital ridges laterally; length of snout slightly exceeding vertical diameter of orbit, contained 3.6 times in length of head, its preoral length 0.3

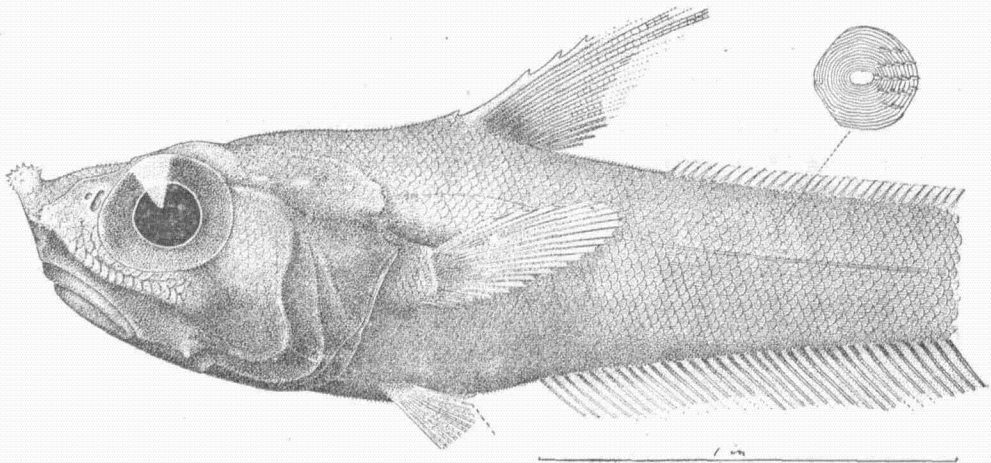


FIG. 261.—*Macrourus obliquatus* Gilbert, new species. Type.

length of head behind snout; snout terminating in a very spinous tubercle directed very obliquely upward; a pair of prominences also on side of snout where each infraorbital ridge joins the ridge which bounds the upper portion of the nasal fossa; from the median tubercle a ridge extends backward nearly to middle of interorbital space, the latter deeply concave; from the supraorbital rim a pair of curved ridges converge backward toward occiput; width of interorbital space equal to 0.7 the long diameter of orbit, which is oblique downward and backward, and equal to 0.3 length of head; front of mouth slightly in advance of nostrils; tip of maxillary scarcely reaching vertical from hinder edge of pupil, its length equaling 0.3 that of head; greatest width of mouth contained 1.7 times in its length; behind angle of mouth, on outer mandibular rim, a short strong compressed spine directed backward; teeth in rather wide villiform bands in both jaws, 12 or 14 of the outer series in the front of upper jaw, at least twice the size of the villiform teeth behind them; cheek produced downward and backward into a narrow rounded lobe encroaching on preopercle; preopercular margin not produced, its vertical

margin straight; gill-membranes rather widely joined across throat and forming a wide free border posteriorly.

Profile but little elevated at front of first dorsal, the base of which is not oblique; second dorsal spine broken, the basal portion bearing 3 strong distantly placed hooks; longest dorsal ray 0.7 length of head; second dorsal very low throughout; base of first dorsal 0.8 the interspace between dorsals; anal low, originating under middle of first dorsal; pectoral extending to opposite twelfth anal ray, its length 0.7 that of head; tips of ventrals injured, so their length can not be given; anal opening anterior in position, its distance from inner base of ventrals being 0.7 its distance from front of anal fin.

Scales on back and sides of body have all been lost; on predorsal region each scale has about 10 slender distinct spines arranged in 1 median and 2 parallel lateral series; the spines of the median series little longer than the others, none of them located on ridges; side and upper part of head, including snout, entirely invested with spinous scales; lower side of snout and anterior half of space between mouth and infraorbital ridge, naked; posterior half of supraoral area scaled continuously with the cheek; mandible with a few scales, the others apparently having been lost.

Color grayish, darkened by the broad dusky margins of the scales; sides and lower surface of head and abdomen jet-black; mouth blackish; lining of opercles black, the gill-cavity otherwise light; lining of abdominal cavity blackish; barbel whitish; ventral fins black, other fins dusky translucent.

But one specimen was procured.

**Macrourus hebetatus**, new species. Fig. 262.

Type, 125 mm. long, from station 3925, off the south coast of Oahu Island, depth 299 to 323 fathoms; type, No. 51608, U. S. Nat. Mus.

Strongly resembling *M. ectenes* Gilbert & Cramer, also from Hawaiian waters, but differing in the much smaller eye, the number of dorsal and ventral rays, the smooth rostral tubercles, the armature of scales, and the color.

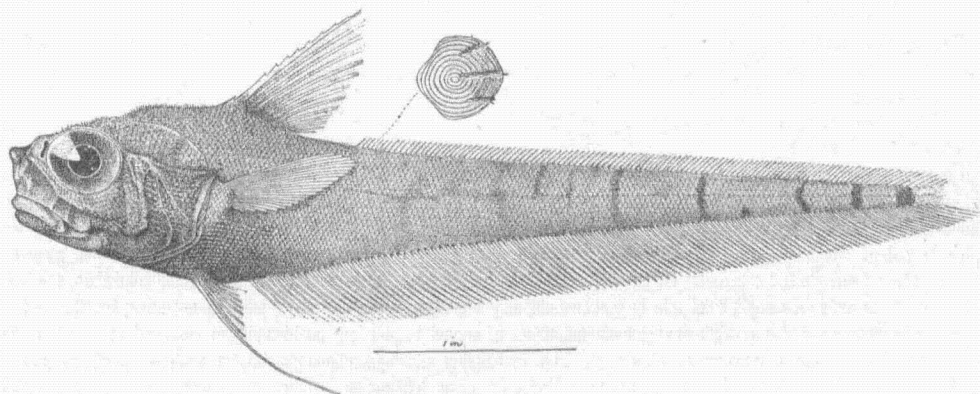


FIG. 262.—*Macrourus hebetatus* Gilbert, new species. Type.

Body rather short and deep, the depth at origin of dorsal contained 1.2 times in length of head. First dorsal II, 12; V. 8; P. 24; eleven scales in an oblique series from lateral line to base of dorsal spine.

Head short, cuboid, with vertical cheeks and vertical anterior profile to snout; axial length of the very short snout 0.7 its width, which equals the greatest diameter of orbit; snout ending in a small perfectly smooth tubercle, from which extends backward a median ridge, which is angulated at a point midway between nostrils; a sharp ridge bounds the nasal fossa above and joins the supraorbital rim; no distinct lateral pair of rostral tubercles, and no spines on any of the exposed points or ridges; mouth small, slightly oblique, scarcely overpassed by the rostral tubercle or the suborbital ridge; maxillary reaching a vertical line which crosses eye half way between its anterior edge and the front of pupil, its length 3.3 in head; upper jaw with a moderate villiform band of teeth, those of the outer series definitely enlarged, forming small canines; mandibular teeth in a narrow villiform band; barbel small, 0.25 diameter of orbit; distance from front of premaxillaries to rostral tubercle 0.7 diameter of

orbit; interorbital space concave, its width contained 1.2 in diameter of orbit; snout and lower side of head naked, save for a V-shaped patch of scales extending from the interorbital space forward, the apex of the V on median line between nostrils; a narrow band of spinous scales surrounding anterior segment of orbit; preopercular angle a little produced, its vertical margin concave; gill-membranes narrowly joined across throat and largely free from isthmus.

Second dorsal spine with 8 strong serrations, evenly spaced, none of these on the basal fourth; filamentous tip short, the entire spine contained 1.4 times in head; interspace between dorsals equal to base of the first; second dorsal very low; anal originating under third or fourth ray of first dorsal, its longest rays equal to length of snout and eye; pectorals long and slender, reaching to opposite seventeenth anal ray, their length 1.5 in that of head; filamentous ventral ray reaching base of twentieth anal ray, its length equaling that of head; distance from vent to axil of ventrals 0.7 its distance from front of anal.

Scales small, very deciduous, mostly lost in the type, 11 in a series from lateral line to base of second dorsal spine; those on back, under origin of second dorsal, have each a strong median ridge which bears 5 short strong spines directed very obliquely backward, and a pair of shorter lower ridges, parallel with the first, and bearing from 1 to 3 similar spines; on breast, head, and antedorsal region the scales are smaller and bear usually the median ridge only.

Color, back and sides grayish, checkered by narrow black lines margining the scales; sides and lower part of head and abdomen jet-black; gill-membranes blackish on inner surface as well as outer, but the lining membrane of mouth and gill-cavity otherwise whitish; peritoneum dusky silvery; along the sides and tail about 12 narrow black cross-lines, the posterior more distinct than the anterior, only a few of them complete; dorsal uniformly dusky, anal translucent, with a wide black margin; pectorals and ventrals, including the ventral filament, blackish.

Only the type known.

**Macrourus longicirrhus**, new species. Fig. 263.

Type, 590 mm. long, from station 4185, vicinity of Kauai Island, depth 1,000 to 1,314 fathoms; type, No. 51592, U. S. Nat. Mus.

Body robust, depth 5.5 in total length; head 4.55. First dorsal II, 10; V. 11; P. 21; scales between lateral line and base of second dorsal spine 6.

Head depressed above orbits, a low convex curve thence to dorsal, the base of which does not form a projection; contours of snout evenly and bluntly rounded; cheeks and suborbitals nearly vertical, without projecting ridges or prominences; interorbital convex and very wide, 3.5 times in length of head; horizontal and vertical diameters of orbit equal, 1.4 in interorbital width, 5 in head; snout projecting but little beyond mouth, its length contained 3.25 times in head; distance from premaxillaries to tip of snout 0.12 length of head; maxillary reaching a vertical from middle of orbit, its length 2.4 in head; mandible well included; premaxillary teeth in a moderate band; posterior teeth villiform; outer teeth enlarged, forming small canines, the enlarged teeth including some behind the outer series; the premaxillary band narrows laterally, but contains always smaller teeth behind an outer series; mandibular teeth uniform in size, intermediate in size between inner and outer premaxillary teeth; they form at symphysis a very broad band which tapers rapidly toward sides; barbel .17 length of head; nostrils small, the anterior round, with its posterior membranous margin elevated, the posterior vertically slit-like; preopercular angle greatly produced backward, the margin above angle deeply indented; gill-membranes widely joined anteriorly, adnate to the isthmus, without free posterior edge; branchiostegals 6; outer branchial slit very short, the arch almost wholly adnate; length of slit but 0.3 diameter of orbit; slit behind fourth arch slightly wider; pseudobranchiae present, small.

Second dorsal spine compressed, rather slender and flexible, its anterior margin furnished with a few very fine serrulations; it is produced to a short filamentous tip, which reaches base of twelfth ray of second dorsal, and is more than 0.9 length of head; first soft ray 0.8 length of head; interspace between dorsals slightly exceeding in length base of first, and contained 3.4 times in head; origin of anal vertically below beginning of last third of interspace between dorsals; all anal rays injured, the longest present being .2 the length of head, and much longer than rays of second dorsal; vent immediately in front of anal fin; outer ventral ray greatly produced, reaching base of nineteenth anal ray, 0.25 total length; pectoral reaching to opposite twenty-second scale of lateral line; none of its rays produced, the longest 1.7 in head.



Scales large, adherent, those on anterior part of head greatly reduced in size; they densely cover entire head, including snout, the suborbital region, and the posterior 0.7 of the mandibular rami; gular and gill-membranes bare; on middle of sides each scale bears numerous very short appressed spines, arranged usually in 16 or 18 parallel series; there is some irregularity in the arrangement of the spines, which sometimes break rank and show a tendency to form in quincunx order; in the smaller scales of snout and interorbital area the spines are greatly crowded, stand out vertically from the scales, and are sometimes arranged in diverging series; there are 26 series of scales in advance of origin of second dorsal fin.

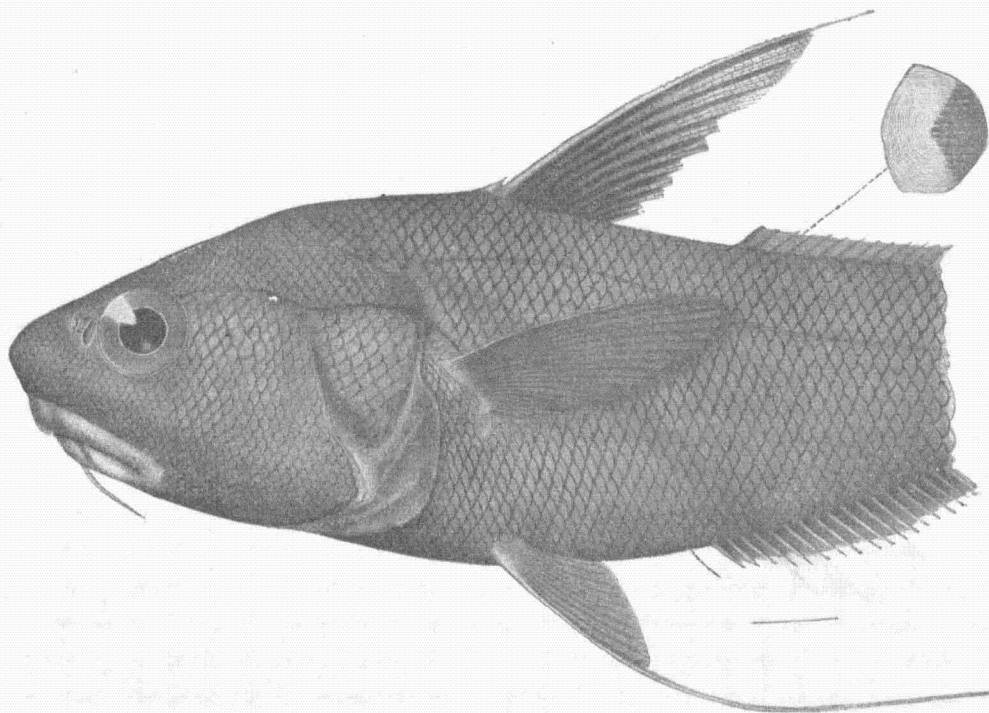


FIG. 263.—*Macrourus longicirrus* Gilbert, new species. Type.

Color uniform dark brown or purplish brown on head, body, and fins; gill-cavity similarly colored; inside of mouth lighter; peritoneum white, or only faintly dusky; barbel and ventral filaments white, dorsal filament colored like rest of fin.

Only the type known.

***Ccelorhynchus gladius* Gilbert & Cramer.**

Six specimens of this rare species were secured. In the longest specimen, 238 mm., the scales along back near first dorsal fin have 40 to 50 minute equal spinelets, arranged in about 10 series, which are parallel throughout; the spines are thus much more numerous than in the smaller type specimen and in other smaller specimens before us. In the figure of the type cited below, the enlarged cut of the scale is very poor and misleading, the spines being much smaller than there shown, and more closely set. The scales on the head have the spinelets still more minute and more numerous, arranged in slightly radiating series, and giving a rough shagreen-like texture to the head.

The following additions and corrections may be made to the type description: Barbel variable in size, and may equal 0.4 diameter of orbit; gill-membrane with a very narrow free margin behind; outer gill-slit not pore-like, but a slit 0.4 diameter of orbit; distance from inner base of ventrals to origin of anal 0.3 length of head; vent at posterior end of a well-marked naked fossa; lining of mouth whitish anteriorly, becoming dusky toward gullet; gill-cavity slightly dusky, but not black, a dark blotch on

opercle showing through; peritoneum black; abdomen externally blue-black, the color not dependent upon the peritoneal color; anal whitish anteriorly, becoming blackish behind in adults; in young, the second dorsal and anal are whitish throughout; in adults, the second dorsal is black.

Specimens were obtained at the following stations: Nos. 4116, off the northwest coast of Oahu, 241 to 282 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, off the east coast of Kauai, 283 to 309 fathoms; 4132, off the east coast of Kauai, 257 to 312 fathoms.

*Cœlorhynchus gladius* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 421, pl. XL1, fig. 3.

***Cœlorhynchus aratrum*, new species. Fig. 264.**

Related to *C. parallelus*, but differing in spination of scales and in the wholly smooth lower side of head, no scales or tubercles being present below the infraorbital ridge, except a very small patch on lower side of snout near its tip.

Type, 313 mm. long, from station 3910, off the south coast of Oahu Island, depth 311 to 337 fathoms; type, No. 51656, U. S. Nat. Mus.

Depth of body slightly more than half length of head; D. II, 8; V. 7; P. 18 or 19; pyloric caeca 9; snout long, depressed, everywhere transversely convex, longitudinally, a little concave, ending anteriorly in a short but definite slender spine; width of snout opposite front of orbit equal to its length from base of terminal spine to anterior nostril; lateral outlines of snout convex, the narrowing being

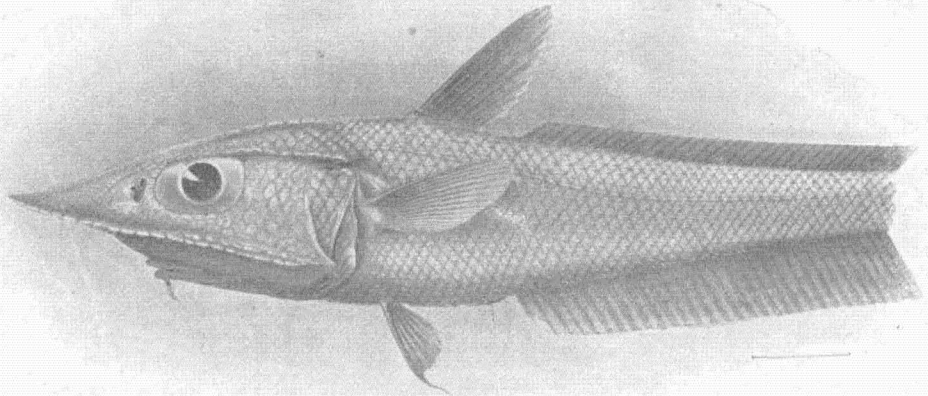


FIG. 264.—*Cœlorhynchus aratrum* Gilbert, new species. Type.

much more rapid in its terminal half; width at middle of snout more than half its length; vertical diameter of orbit contained 1.6 times in the longitudinal diameter, which equals the convex interorbital width, and is contained 1.7 times in snout; upper margin of orbit nearly straight; posterior nostril vertically elongate and weakly crescentic, the anterior a roundish pore, separated from the posterior by a narrow black strip of integument; two pairs of low but well-marked spinous ridges on top of head, the outer pair continuous with supraorbital margin, its posterior end immediately in advance of upper end of gill-slit; the inner pair begin in advance of middle of interorbital space, and run in parallel lines over occiput (in *C. parallelus* the inner pair of ridges converge strongly to near their posterior ends, then diverge); median rostral ridge not evident in well-preserved material; the strong infraorbital ridge runs from tip of snout to preopercular lobe, where it is surrounded behind and below by a wide, smooth membrane; upper limb of preopercle made concave by the strongly projecting angle; transverse width of mouth at tips of maxillaries equals half width of snout at same level, and equals length of maxillary; front of mouth opposite posterior nostril or slightly behind that point, the end of maxillary extending to a point slightly in advance of posterior edge of pupil, its length half the

preoral portion of snout, without terminal spine; teeth minute, in wide bands in each jaw, none of them at all enlarged; barbel half as long as diameter of pupil; near tip of snout, on lower side, a small patch of prickles, similar to those covering infraorbital ridge, and like them adnate to the bone; with this exception all the region below infraorbital ridge, including mandibles, is smooth, without scales, prickles, or tubercles (in *C. parallelus* all of this region, except gular and branchial membranes, is thickly beset with irregular small plates, each bearing from 1 to 3 spines); where the gill-membranes are joined across throat they form a narrow free fold; gill-rakers represented by small tubercles, 7 or 8 in number on outer arch.

First dorsal fin inserted well behind axil of pectorals; predorsal region invested with scales similar to those of sides, arranged in regular series, and scarcely reduced in size; second dorsal spine smooth throughout, very slender and weak, its terminal portion as flexible as the rays; length of dorsal spine equal to that of snout; distance between dorsals equal to base of first dorsal exclusive of the 2 spines; anal originating a trifle behind front of second dorsal; anal opening immediately before origin of anal fin, its distance from inner base of ventrals a trifle less than the distance from latter to margin of the gill-membranes on median line; this measurement remains almost constant in specimens of very different size. In a specimen of *C. parallelus* from Misaki, Japan, and in Günther's figure (Kermadec Islands) the distance from base of ventrals to vent is much greater than between ventrals and edge of gill-membrane. In *C. aratum*, the ventral filament reaches vent.

Scales of back and sides each with 6 to 15 strong spines arranged in 3 to 5 nearly parallel series. The spines stand out at an angle of 45°, those of the central series somewhat larger than those of the lateral rows, and the spines in each row increasing rapidly to the posterior one, which projects well beyond margin of scale in both median and lateral series; the spines are longer and slenderer than in a specimen of *C. parallelus* from Japan, and there is less inequality between central and lateral series; on breast, the scales have 3 to 5 short, strongly radiating series of spines, the spines shorter than those on sides; scales of lateral line have 2 equal series of spines, separated by the tube, and have fewer lateral series, or none; on head, the spines are more numerous and much slenderer, and project nearly at right angles to the surface, giving a characteristic hispid appearance to the entire top and side of head; they are arranged with less regularity, but usually in strongly diverging or stellate series; they are much more numerous than in *parallelus*, and have all the series equal or nearly so; 5 series of scales between lateral line and dorsal fins; the series running upward and backward from first scale of lateral line runs to base of dorsal spine; 4 series cross the back between dorsal fins.

Color, light brown above, whitish on lower side of snout and below pectoral fin; mouth and gill cavities and abdominal cavity lined with blue-black, this color faintly visible through opercle, gill-membrane, and abdomen; first dorsal black at base, bright white distally; pectorals, second dorsal, and anal dusky or whitish; ventrals dusky at base, then white.

Taken at stations Nos. 3910, off the south coast of Oahu, 311 to 337 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms, and 4088, Pailolo Channel, 297 to 306 fathoms.

*Ceelorhynchus parallelus* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 421; not of Günther.

#### ***Ceelorhynchus doryssus*, new species. Plate 94.**

Type, 345 mm. long, at station 4109, Kaiwi Channel, depth 442 to 449 fathoms; type, No. 51616, U. S. Nat. Mus.

Similar to *C. aratum*, but with the snout more slender and more convex; the mouth much larger, the scales on head minutely spinous, those on body much less strongly spinous, and the coloration much lighter.

Depth of body 2.2 in length of head; D. II, 7, last ray cleft to base; V. 7; P. 17.

Lateral contour of head forming a nearly straight line, the outlines of the long narrow snout scarcely at all convex, converging regularly from base to tip; upper profile of snout longitudinally concave, the deepest point in the concavity being at origin of the second third of its length; width of snout opposite front of orbits contained 1.4 in its length; at its middle, the width of the snout is half its preoral portion; the snout ends in a definite short spine; vertical diameter of orbit contained 1.6 times in its longitudinal diameter, which equals the convex interorbital width, and is contained twice in snout; upper margin of orbit much less curved than the lower or lateral margins; the pore-like anterior nostril is but a fourth the vertical length of the posterior, the 2 nostrils separated by a black membrane; ridges

on head low but distinct, the inner pair on occiput converging posteriorly, then again slightly diverging. Median rostral ridge inconspicuous; the strong infraorbital ridge ends posteriorly in a short strong spine, beyond which projects the soft membranous margin of the preopercular lobe; upper limb of preopercle gently concave in its lower half, gently convex in the upper; transverse width of mouth at tips of maxillaries equal to 0.6 width of snout at same level; front of mouth opposite anterior nostril; tip of maxillary reaching a point opposite posterior margin of pupil; length of maxillary 0.7 preoral portion of snout; teeth small, in wide bands in each jaw, none of them enlarged; barbel very slender, half diameter of pupil; gill-membranes forming a very narrow free fold across throat; 9 tubercles represent gill-rakers on outer arch.

First dorsal fin inserted directly above axil of pectoral; second dorsal spine smooth throughout and very slender and weak, the distal half as flexible as a ray, its length equaling 0.7 that of snout; the distance between dorsals equals base of anterior dorsal without its spines, and is crossed by 3 series of scales; anal originating under second or third ray of second dorsal; inner base of ventrals midway between vent and edge of branchial membrane on median line; ventral filament reaching vent; pectorals reach to a point opposite origin of anal fin.

Scales of back and sides each with a median ridge composed of imbricating spines, which increase regularly in length posteriorly, the last one projecting little if at all beyond margin of scale; also from 1 to 6 pairs of similar but very low parallel lateral ridges, which never approximate in size to the central ridge, and rarely reach margin of scales; spination much weaker than in *parallelus* or *aratum*; on breast and abdominal regions, the lateral series are much stronger than on back and sides, and are still parallel or nearly so; scales on head without spines, but roughened with minute prickles, which are arranged in more or less evident radiating or stellate series; a naked area is evident on middle of occiput, where the scales fail to meet; naked lines also follow along the ridges, and between nasal bones and rostral ridge; nasal fossa nearly as large as pupil; lower side of head wholly naked, except for a small patch of prickles near tip of snout; 5 series of scales between lateral line and second dorsal fin; 13 scales in a series upward and backward from vent to lateral line.

Color very light gray, all the fins, including ventral filament, black throughout; terminal portion of snout and lower side of head blackish; lining of mouth, gill-cavity, and peritoneum black, very faintly visible externally.

In young specimens, 125 mm. long and less, apparently belonging to this species, the scales on back and sides are essentially similar to those in adults, both median and lateral series of spines being present, and in about the same relative size. The cephalic ridges seem proportionally higher and are strongly spinous, including a median rostral ridge which loses its prominence in adults; but the intervening areas on head, as well as the breast and belly, are covered with smooth cycloid scales, a few only showing a series of median spines. Specimens less than 100 mm. long are marked by a series of 10 to 15 small black spots along base of anal fin.

Taken at the following stations: Nos. 4021, off the east coast of Kauai, 286 to 399 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4112, Kaiwi Channel, 433 to 447 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms.

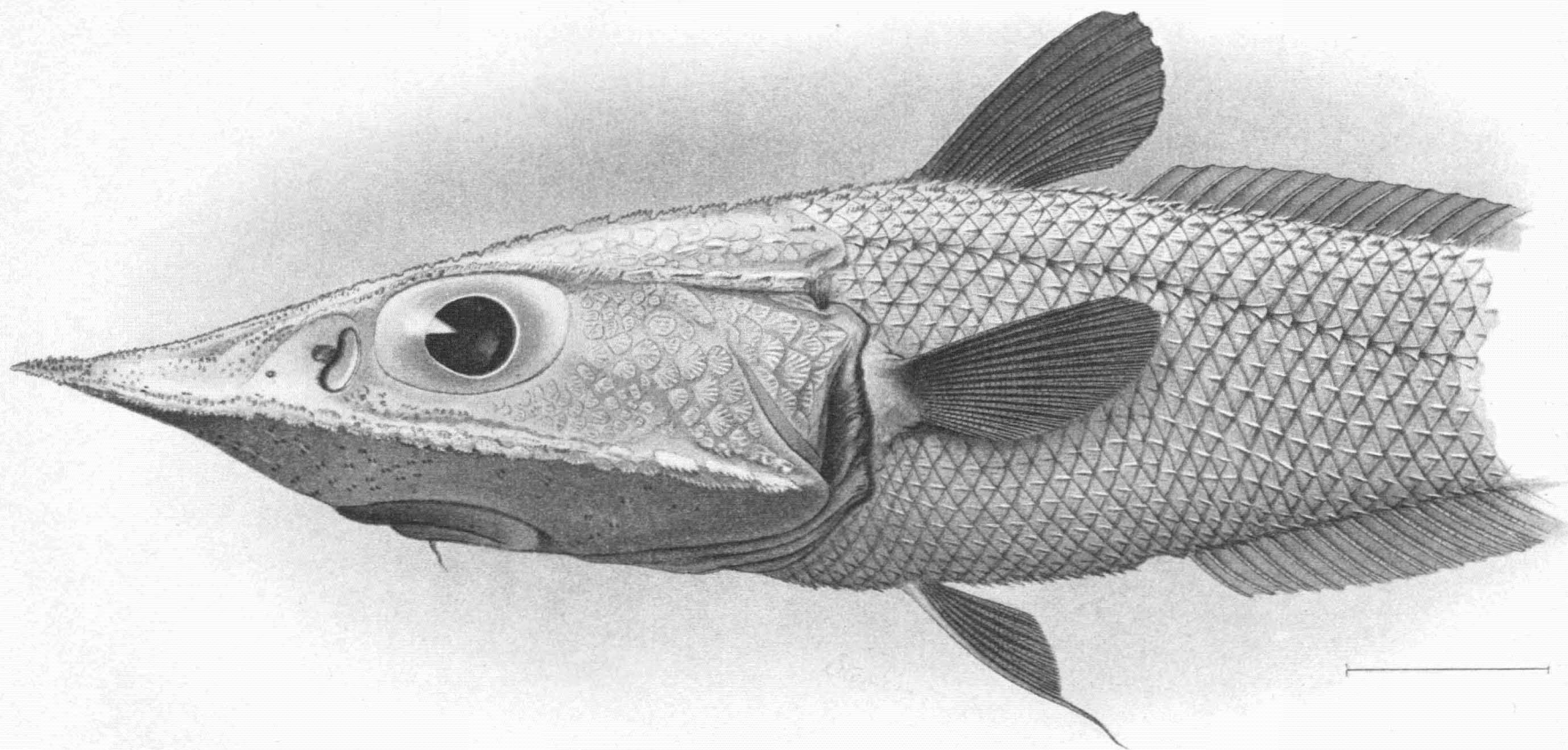
#### ***Mateocephalus acipenserinus* (Gilbert & Cramer).**

A very abundant species at depths between 200 and 400 fathoms. The following details may be added to the original description of the species.

Lateral margins of head angulated at a point immediately in front of nostrils, in front of which the contours converge much more rapidly. In this anterior segment of the snout, the lateral margin is soft and membranous, with skeletal basis, but is thickened and covered with comparatively large spinous scales; suborbital bone weakly spinulose; as it fails to join preopercle behind, it is less firmly fixed than usual; occipital region evenly rounded, without trace of the spinous ridges so conspicuous in species of *Cetorhynchus*. Mouth very small, the width posteriorly but 0.3 the width of head on same line.

Two types of coloration appear in our specimens. Some are uniform pale brown on upper parts, as in the type, others have a pale spot at base of each scale forming rather definite longitudinal streaks above lateral line. In these specimens, the top of head and the first dorsal fin are spotted or mottled with dark.





CŒLORHYNCHUS DORYSSUS GILBERT. TYPE.

The largest specimen obtained is 200 mm. long.

Taken at the following stations: Nos. 3824, off the south coast of Molokai, 222 to 498 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3979, off Bird Island, 222 to 387 fathoms; 4014, off the east coast of Kauai, 362 to 399 fathoms; 4015, off the east coast of Kauai, 318 to 362 fathoms; 4021, off the east coast of Kauai, 286 to 399 fathoms; 4025, off the east coast of Kauai, 275 to 368 fathoms; 4086, off the north coast of Maui, 283 to 308 fathoms; 4088, approach to Pailolo Channel, 297 to 306 fathoms; 4089, approach to Pailolo Channel, 297 to 304 fathoms; 4091, approach to Pailolo Channel, 306 to 308 fathoms.

*Cetocephalus acipenserinus* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 422, pl. XLII, fig. 1.

***Malacocephalus hawaiiensis*, new species. Fig. 265.**

Type, 36 cm. long, from station 3907, off south coast of Oahu, depth 304 to 315 fathoms; type, No. 51618, U. S. Nat. Mus.

Depth at origin of first dorsal 1.2 in length of head; D. 11, 11 or 12; V. 9; P. 19 or 20.

This species was secured in the Kaiwi Channel by the *Albatross* in 1891, and was taken in some abundance during the summer of 1902. It has been identified by Gilbert and Cramer with *M. lewis*, from the Atlantic, and is undoubtedly closely related to that species. There has been no opportunity

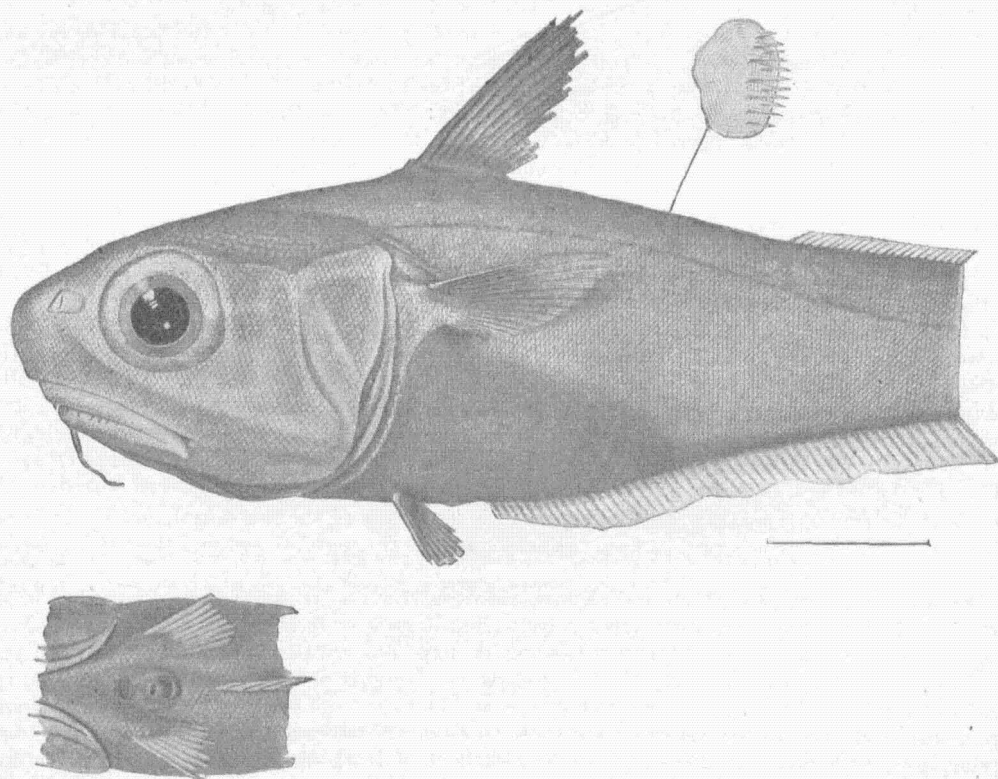


FIG. 265.—*Malacocephalus hawaiiensis* Gilbert, new species. Type.

to make direct comparison of specimens, but as Hawaiian specimens in certain important respects fail to answer the current descriptions of *M. lewis*, it seems advisable to distinguish them from that species. The descriptions of *M. lewis* are lacking in detail, and other distinctive characters may appear when specimens are directly compared. Two specimens captured by the *Investigator* in the Andaman Sea have been identified by Alcock with *M. lewis*, without further remarks.

Snout high and compressed, protruding beyond mouth for an axial distance nearly equaling half orbital diameter; anterior profile of snout very oblique; distance from its tip to premaxillaries contained 4.7 in length of head; length of snout 0.8 longest orbital diameter, and contained 3.5 times in length of head; interorbital space convex, with somewhat depressed central area, its width 0.3 length of head; longest orbital diameter very slightly more than 0.3 length of head; nasal fossa scaled in its posterior half, the longitudinal diameter of naked portion half that of pupil; length of the posterior nostril 0.4 pupil; top and sides of head without conspicuous ridges; greatest width of mouth, measured externally, contained 1.8 times in its greatest length; maxillary reaching a vertical which intersects orbit halfway between pupil and hinder margin of orbit, its length contained 2 or 2.1 times in length of head; premaxillary teeth in a double series, the outer of moderate canines, which decrease in size laterally, the inner of much smaller curved teeth directed backward; mandibular teeth uniserial, except at symphysis, where 2 teeth on either side stand behind 2 of the outer row; anterior teeth about equal to those to which they are opposed in upper jaw; lateral teeth increasing in size backward, and becoming the largest in the mouth; barbel half or slightly more than half orbital diameter; preopercular angle broadly produced backward, the posterior margin very oblique and incurved; above opercle, a wide band of scales covers scapular region, separated from neighboring scaly areas above and below by narrow naked lines; gill-membranes rather narrowly joined across isthmus, forming a fold which is entirely free; anterior gill-slit less constricted than usual, its width 3 times that of slit behind fourth gill; gill-rakers 7 in number, tubercular, but unusually prominent, slightly movable, and bearing long spinous teeth; no exposed spines in connection with opercles or shoulder-girdle.

Second dorsal spine very slender and weak, not extending beyond the tip of the following ray and not filamentous, its length 1.6 times in head, very slightly exceeding length of snout and eye; second dorsal very low, but perfectly distinct throughout its course, its first ray about over thirtieth anal ray; interspace between dorsals unusually long, equaling about 2.5 times the base of anterior fin; length of interspace is not described or figured in *M. lewis*, in which the second dorsal is said to be so low and indistinct as to render uncertain the point of origin; anal fin low, its origin vertically under third ray of first dorsal; distance from anal opening to point where edge of branchiostegal membrane crosses isthmus half length of head. In *M. lewis* Günther finds the "distance between the vent and isthmus two-thirds of the length of the head." Pectorals shorter than in *M. lewis*, half length of head, and containing constantly 19 or 20 rays, instead of 17 or 18, as in that species; outer ventral ray produced, reaching base of tenth or twelfth anal ray.

In *M. hawaiiensis*, as in *M. lewis*, there is a deep, scaleless, transversely elliptical pit between bases of ventral fins, but in the Hawaiian species the pit is smaller. The anus is equidistant from the base of ventrals and the first anal ray, or slightly nearer anal, and lies at the posterior end of a longitudinally oblong or wedge-shaped naked area, which is separated from the anterior pit by a narrow band of scales. There is no trace of a constriction dividing anal area into a posterior linear portion containing anus and an anterior oblong portion, as is figured by Günther in *M. lewis*. The descriptions by Günther and by Lütken do not, however, agree with the interpretation of the artist. Lütken describes the position of the anal opening in *M. lewis* as beneath the fourth ray of the first dorsal, and behind base of pectorals. In *hawaiiensis* a vertical from the anus traverses the pectoral base and the base of second dorsal spine.

The scales are very small, high and narrow, caducous, those on posterior part of body lost in all specimens which we have obtained; under anterior dorsal, each scale is densely covered with short spines which show no evident arrangement; scales on nape and breast similar; on top of head the spines are similar, but frequently arranged in parallel or diverging lines; no arrangement is apparent on sides of head; head very completely scaled; lips and half the nasal fossæ naked; gular membrane with spinous plates on median line only, and those on gill-membranes confined to single series accompanying rays; with these exceptions all exposed surfaces of head are densely covered; the lateral line describes a long convex curve anteriorly, and reaches middle of sides more than a head's length behind its origin.

Color olive-brown above, bluish silvery on sides of head and trunk; gill-membranes and abdomen black; mouth cavity white, gill-chamber black, except the part overlying the epihyal and ceratohyal; abdominal cavity lined with black; first dorsal, ventrals, pectorals, and anterior portions of dorsal and anal fins black.

The pyloric cæca branch profusely from a few trunk-like stems, there being about 200 terminal twigs. The stomachs contain fragments of shrimp-like crustacea and numerous eyes and jaws of squid. The latter are almost universally present, and indicate that squid form a very important element in their food.

Specimens were taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3868, Pailolo Channel, 294 to 684 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3907, off the south coast of Oahu, 304 to 315 fathoms; 3925, off the south coast of Oahu, 299 to 323 fathoms; 3979, near Bird Island, 222 to 387 fathoms; 3988, near Kauai, 165 to 469 fathoms; 4085, off the north coast of Maui, 267 to 283 fathoms; 4087, Pailolo Channel, 306 to 308 fathoms; 4088, Pailolo Channel, 297 to 306 fathoms; 4089, Pailolo Channel, 297 to 304 fathoms; 4090, Pailolo Channel, 304 to 308 fathoms; 4096, Pailolo Channel, 272 to 286 fathoms; 4097, Pailolo Channel, 286 fathoms; 4117, off the northwest coast of Oahu, 253 to 282 fathoms; 4130, near Kauai, 283 to 309 fathoms; 4134, near Kauai, 225 to 334 fathoms.

*Malacocephalus levis* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 432; not of Lowe.

#### ***Trachonurus sentipellis* Gilbert & Cramer.**

This is one of the rarer species of the group, but 14 specimens having been obtained, distributed among 10 dredge-hauls.

The margins of the scales appear distinct owing to the absence of spines around the edge, but the scales are firmly embedded, without free margins, and overlap little if at all. The spines on the anterior scales appear for the most part without definite arrangement; there are sometimes, however, one angulated vertical series near anterior margin of scale, and a median longitudinal series; lateral spines frequently fill up the interspace between these, forming thus a lozenge-shaped patch. Posteriorly where the spines are long and appressed they give an evenly villous appearance to sides of tail.

Head with contours everywhere rounded, without ridges or sharp angles; mouth barely overpassed laterally by the wide flat suborbitals, its width nearly equal to its length; narrow villiform bands of teeth in each jaw, the outer series in the upper jaw little if at all enlarged; gill-membranes widely joined at throat and wholly free from isthmus; six or seven scales between lateral line and base of anterior portion of second dorsal; length of base of first dorsal contained from 1 to 1.75 times in interspace between dorsals; all but the innermost ventral rays reach beyond origin of anal fin; distance from axil of ventrals to front of anal contained 2.25 to 2.75 times in distance from axil of ventrals to throat. Some young specimens are uniformly black. There are variations in the contour of the snout, which is sharper and narrower in some specimens than in others. The scales vary in length of spines and in distinctness of outline.

The species was taken at the following stations: Nos. 3997, vicinity of Kauai, 418 to 429 fathoms; 4007, vicinity of Kauai, 508 to 557 fathoms; 4018, vicinity of Kauai, 724 to 804 fathoms; 4028, vicinity of Kauai, 444 to 478 fathoms; 4030, vicinity of Kauai, 423 to 438 fathoms; 4106, Kaiwi Channel, 335 to 350 fathoms; 4107, Kaiwi Channel, 350 to 355 fathoms; 4109, Kaiwi Channel, 442 to 449 fathoms; 4112, Kaiwi Channel, 433 to 447 fathoms; 4113, Kaiwi Channel, 395 to 433 fathoms.

*Trachonurus sentipellis* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 429, pl. XLV, fig. 1.

### Family PLEURONECTIDÆ.

#### ***Pœcilopsetta hawaiiensis*, new species. Plate 95.**

Type, a male, 126 mm. long, from station 3858, Pailolo Channel between Molokai and Maui, depth 128 to 138 fathoms; type, No. 51638, U. S. Nat. Mus.

Head 24 hundredths in total length without caudal (27 in female cotype); length of snout, from lower eye 3, from upper eye 6 (3.5 and 7 in female); interorbital width 2 (1.5 in female); diameter of upper eye 7.5; length of maxillary 7; depth of body 54; depth of caudal peduncle 13; longest dorsal ray 11; longest caudal ray 25; length of right pectoral 17; left pectoral 11; chord of arch of lateral line 22. D. 65; A. 54; P. 10; lateral line 85.

Body dextral, deeply elliptical, very thin, transparent at bases of dorsal and anal fins; upper and lower profiles evenly and equally arched; head small; interorbital space narrow and scaled; eyes large,



even, the upper encroaching on the profile; head without spines or tubercles; mouth small, oblique, with equal jaws; length of maxillary less than 0.3 length of head; teeth slender, villiform, arranged in wide bands in jaws; more numerous on blind side, where the bands are wider and longer; on eyed side, the bands taper rapidly, becoming single series in upper jaw, soon disappearing in lower jaw; vomer and palatines toothless; gill-rakers very short, toothless, developed on both vertical and horizontal limbs of arch, 8 + 12 in number.

Dorsal fin beginning above middle of upper eye, extending, like the anal fin, to base of outer caudal rays; dorsal and anal rays all simple, scaleless, low, none of them prolonged; caudal double-truncate; the right pectoral longer than the left, its rays densely covered with series of scales; ventrals nearly symmetrical, with narrow bases, the right slightly in advance of the left.

Scales rough-ctenoid on the right side, smooth and cycloid on the left; lateral line developed on right side only, with a high anterior arch, which is obliquely truncate above, its upper line nearly straight and rising posteriorly.

Color in spirits, light olive-brown, with very fine brown spots and some faint dark spots and bars, the spots apparently arranged in a series just within upper and lower outlines, the bars apparently 4 in number, with ill-defined edges, narrower than interspaces; a series of brown blotches on basal portion of dorsal and anal fins; right pectoral narrowly black-edged; caudal with a pair of large black spots occupying middle of outer rays.

In 6 specimens, which do not include the type, the following fin and scale counts are observed: Dorsal 62, 64, 65, 65, 66, and 67; anal 53, 57, 55, 56, 58, and 58; pectoral 9, 10, 12, 11, 10, and 9; scales 85, 84, 97, 84, 84, and 90.

The species was taken at the following stations: Nos. 3832, off the south coast of Molokai, 142 to 153 fathoms; 3858, Pailolo Channel, 128 to 138 fathoms; 3957, near Laysan, 173 to 220 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms; 4080, off the north coast of Maui, 178 to 202 fathoms; 4081, off the north coast of Maui, 202 to 220 fathoms; 4082, off the north coast of Maui, 220 to 238 fathoms; 4120, off the northwest coast of Oahu, 167 to 216 fathoms.

#### **Tæniopsetta**, new genus.

Body sinistral; ventral fins lateral in position, nearly symmetrical; mouth small, teeth small, conical, equally developed on both sides, in single series; scales minute, strongly ciliated in the typical species; a strong anterior arch to lateral line; no lateral line on blind side; a narrow sharp interocular ridge in both sexes; some of anterior dorsal and anal rays prolonged and filamentous.

In addition to the typical species, the genus may include *Pseudorhombus ocellatus* Günther (Shore-fishes, Challenger, 1880, p. 56, pl. xxiv, figs. A and B), from the Admiralty Islands, although in this species the scales are said to be not ciliated.

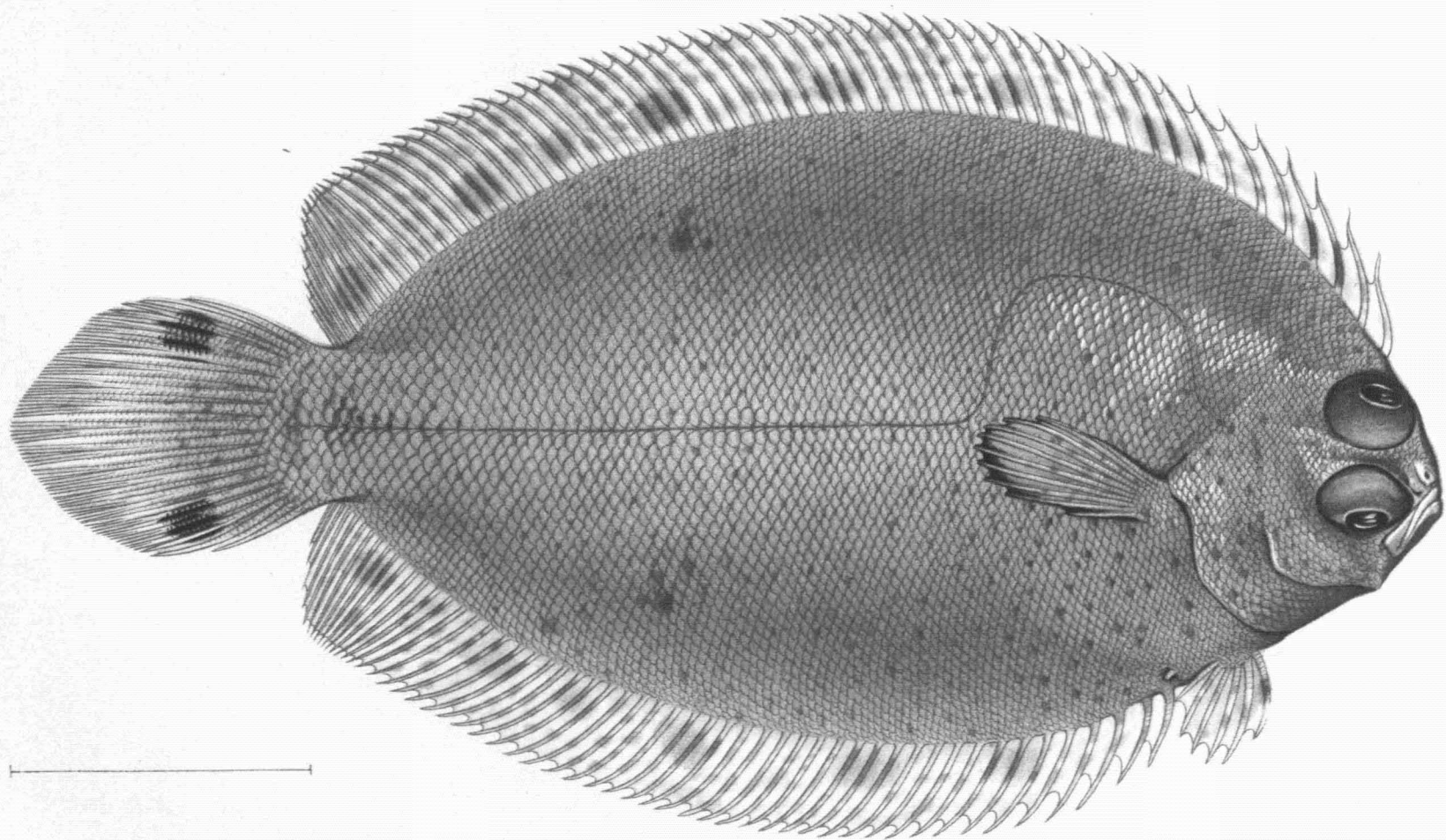
*Tæniopsetta* Gilbert, new genus of *Pleuronectidae* (*radula*).

#### **Tæniopsetta radula**, new species. Fig. 266.

Type, a male, 115 mm. long, from station 3858, Pailolo Channel between Molokai and Maui, depth 128 to 138 fathoms; type, No. 51639, U. S. Nat. Mus.

Length of head 26 hundredths of total length without caudal; length of snout from lower eye 5.5, from upper eye 9; diameter of upper eye 9; length of maxillary 7.5; depth of body 62; least depth of caudal peduncle 10; longest dorsal ray 43 (27 in female cotype); longest anal ray 45 (30 in female); longest non-filamentous dorsal ray 13; longest caudal ray 22; longest pectoral ray 16; chord of arch of lateral line 15. D. 88; A. 72; P. 13; pores in lateral lines about 110; rows of scales running upward and forward above lateral line about 140. Vertebrae 9 + 31.

Body deeply ovate; ventral outline more arched than dorsal; snout very short, its anterior profile nearly vertical, very slightly incurved opposite origin of dorsal fin; eyes large, separated by a sharp scaleless ridge, which bears a series of spinous prickles, more or less numerous in both sexes; one or more spines also present on the anterior rim of each orbit, one above premaxillaries, and one at symphysis of lower jaw; lower eye but little in advance of upper; mouth very small, oblique, maxillary not nearly reaching vertical from front of pupil, about .3 length of head; teeth close-set, conical, equal, in a single series, with a few declined teeth forming an inner series in left premaxillary near angle of mouth; vomer and palate toothless; gill-rakers nearly obsolete, but 5 very short rudiments on horizontal limb of arch.



PŒCILOPSETTA HAWAIIENSIS GILBERT. TYPE.

First dorsal ray inserted on middle of snout, slightly to right of ridge, bordered by a wide conspicuous membranous flap, the distal portion of which, on blind side, is intensely black, bordered narrowly with white; dorsal rays increasing regularly in length with wide free tips to the twelfth, those from the twelfth to the eighteenth greatly produced and filamentous, all but a narrow basal portion free from membrane; first 4 anal rays similarly produced and filamentous, the first much shorter than the others; a jet-black spot margined with white on membrane of first 3 anal rays; caudal fin lanceolate; no free caudal peduncle; right pectoral fin  $\frac{2}{3}$  left; ventral fins symmetrical, opposite and of equal length, a very strong concealed spine between them.

Scales very minute, those on left side firm, closely imbricated, strongly ciliated; those on right side more loosely imbricated, with entire edges; rays of dorsal and anal fins on the left side, and the

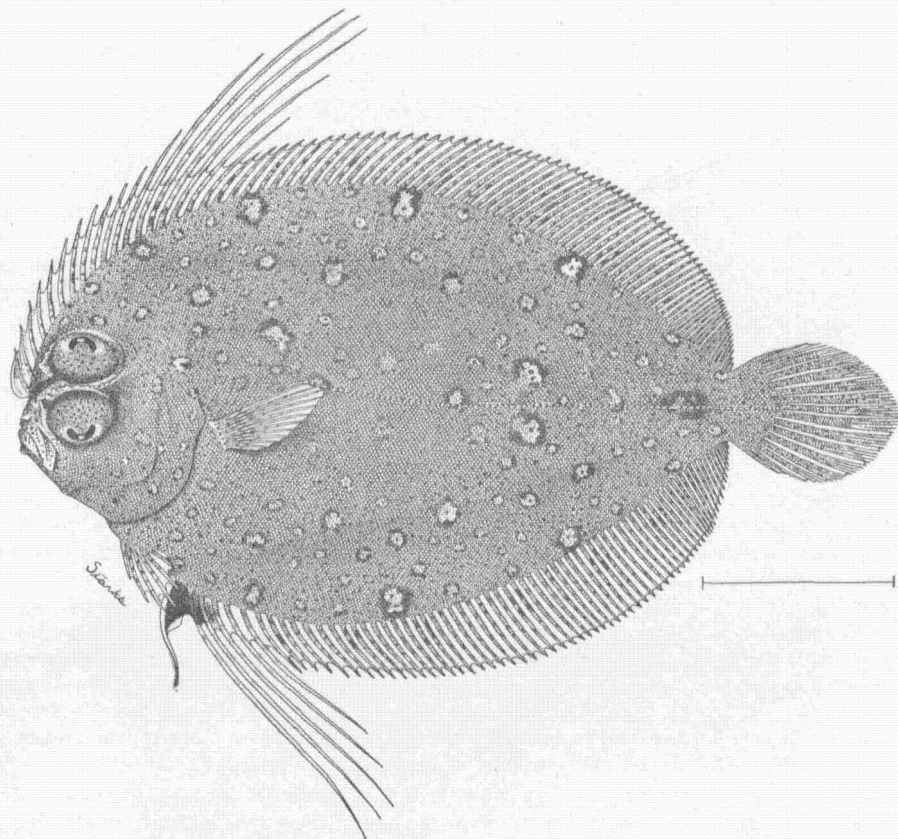


FIG. 266.—*Tentiopsetta radula* Gilbert, new species. Type.

left ventral rays each accompanied by a row of ctenoid scales; caudal rays with 2 such series; filamentous rays scaled on basal portions only; pectoral fins and right ventral scaleless; snout and mouth parts naked; anterior arch of lateral line rather low and flat-topped.

Color light olive-brown, finely mottled and speckled with darker brown; a series of brown rings along dorsal and ventral outlines, with other smaller rings scattered between these and lateral line; two pairs of rings along straight portion of lateral line with their margins frequently produced across the line, the posterior pair more conspicuous than the anterior; an elongate dark spot near base of caudal; in males a dark streak in front of lower margin of upper eye; blind side faintly mottled with dusky, posteriorly.

Females differ from males in having the orbital region somewhat less spinous, in the larger eye, and in the shorter filamentous rays of dorsal and anal. In females the tenth to thirteenth or fourteenth dorsal rays and the first to third or fourth anal rays are produced; in males the tenth or twelfth to

fifteenth or eighteenth dorsal rays and first 4 or 5 anal rays. In *T. ocellatus* the rays are not elongate in females.

In 5 specimens, among which this type is not included, the fin and scale counts are as follows: Dorsal 88, 89, 90, 92, and 93; anal 72, 72, 73, 75, and 75; pectoral 12, 12, 13, 12, and 12; pores in lateral line -, 120, 120, 115, and -.

Taken at the following stations: Nos. 3832, off the south coast of Molokai, 142 to 153 fathoms; 3853, off the south coast of Molokai, 115 to 134 fathoms; 3857, Pailolo Channel, 127 to 128 fathoms; 3858, Pailolo Channel, 128 to 138 fathoms; 3859, Pailolo Channel, 138 to 140 fathoms; 3957, Laysan, 173 to 220 fathoms; 4077, off the north coast of Maui, 99 to 106 fathoms; 4099, off the north coast of Maui, 152 to 153 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms.

#### **Samariscus**, new genus.

Like *Samaris*, but the anterior dorsal and ventral rays not greatly produced and filamentous as in that genus; scales on blind side strongly ciliated instead of smooth; integument of eyed side, including head, body, and fins, thickly beset with minute cup-shaped organs, possibly glandular in function; eyes dextral; ventrals symmetrical, laterally inserted, with 5 rays; mouth rather small; teeth in villiform bands; lateral line rising anteriorly, but without arch, present on eyed side only; scales very small, strongly ciliated on both sides; gill-openings contracted, opercle becoming adnate shortly above base of pectoral; gill-rakers nearly obsolete; right pectoral with 4 rays; left pectoral wanting; fins all scaleless, except caudal.

*Samariscus* Gilbert, new genus of *Pleuronectidae* (*corallinus*).

#### **Samariscus corallinus**, new species. Plate 96.

Type, a male, 110 mm. long, from station 3849, off south coast of Molokai, depth 43 to 73 fathoms; type, No. 51596, U. S. Nat. Mus.

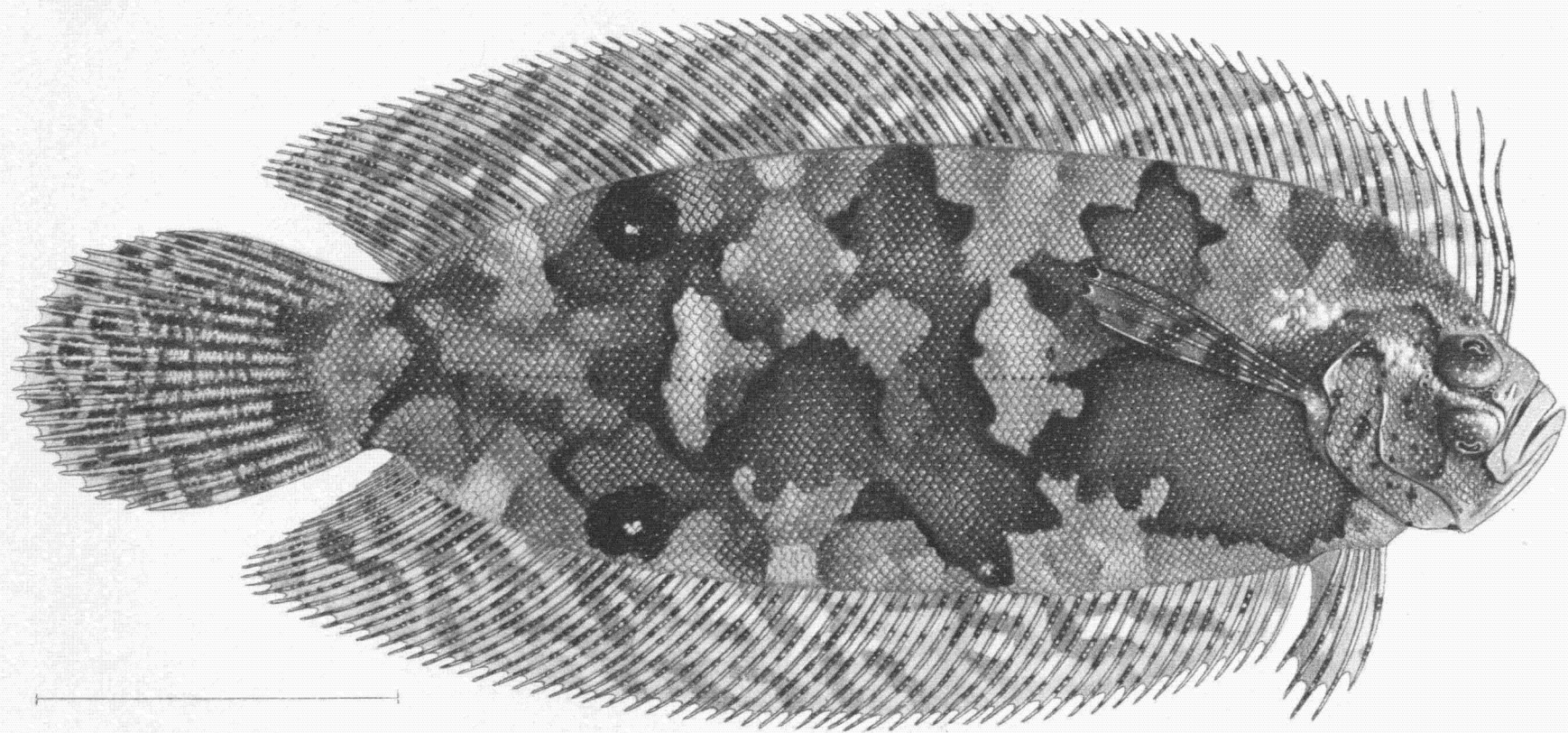
Length of head 21 hundredths of total length without caudal; length of snout, from lower eye 5, from upper eye 6; diameter of upper eye 4; interorbital width 2; length of maxillary 8.5; depth of body 37; least depth of caudal peduncle 14; length of second dorsal ray 18; length of middle dorsal rays 15; length of posterior dorsal rays 18; length of pectoral 19; length of right ventral 17; length of caudal 28. D. 76; A. 65; P 4.; V. 5; pores in lateral line 98.

Long and slender, with nearly parallel outlines; caudal peduncle deep; head very small; mouth very oblique, with strongly protruding lower jaw; maxillary extending below front of pupil; teeth very fine, in bands in both the jaws, the bands wider on blind side; vomer and palatines toothless; anterior profile indented above and in front of upper eye, which is placed slightly behind the lower; interorbital space occupied by a blunt ridge, and completely scaled; preopercular margin free; opercle becoming adnate immediately above base of pectoral fin; gill-laminae very scanty, the arches short; a slit behind last arch; gill-rakers nearly obsolete, represented by 2 or 3 rudiments only.

Dorsal fin beginning above front of upper eye; first ray inserted slightly to the blind side of ridge, its anterior membrane extending a short distance downward across snout; first 5 or 6 dorsal rays a little higher than those which follow, and extensively free; both dorsal and anal fins increasing in height toward tail, some of posterior rays extending to opposite middle of caudal fin; caudal lanceolate, from a broad base; ventrals symmetrical, composed of 5 rays each; right ventral much longer than left, but without free or filamentous rays; right pectoral very narrow, containing but 4 rays. Scales very strongly ciliated and closely imbricated on the right side, less imbricated and less spinous on the left.

Color in spirits, snout and lower jaw pinkish white; head and body coralline-red, mottled and spotted with blackish, pearly gray, and pinkish white in indescribable pattern; middle of side with 2 large cross blotches, their upper half pearly gray, their lower half pinkish, irregularly dark margined; a similar smaller spot at base of caudal, dark margined anteriorly; two round black spots with small orange center near outlines of body at origin of last third of total length; near dorsal outline, in advance of the round spot, are 2 A-shaped dark markings with apex toward the fin; a similar V-shaped spot near lower outline; fins mottled and spotted with colors like those of body, but in finer pattern;





SAMARISCUS CORALLINUS GILBERT. TYPE.

minute white "glandular" organs conspicuous, covering eyes and all fins as well as head and trunk, but absent on blind side.

In 3 cotypes from the same locality, the fin and scale counts are as follows: Dorsal 75, 76, and 77; anal 63, 63, and 63; pectoral 4, 4, and 4; ventral 5, 5, and 5; scales in lateral line 100, 99, and 99.

***Anticitharus debilis***, new species. Plate 97.

Type, a female, 173 mm. long, from station 4103, Pailolo Channel, between Molokai and Mani, depth 132 to 141 fathoms; type, No. 51657, U. S. Nat. Mus.

Closely related to *A. polyspilus* Günther (*Shore-fishes*, Challenger, p. 48, pl. 22, fig. A) from the Ki Islands, differing in the longer dorsal and anal fins, the much smaller scales, and the shorter anterior curve in lateral line.

Length of head 26 hundredths of total length without caudal; length of snout from upper orbit 7.5, from lower orbit 5.5; horizontal diameter of upper eye 7; length of maxillary 10; greatest depth 37; depth of caudal peduncle 8; longest dorsal ray 10; longest anal ray 10; longest caudal ray 17; longest pectoral ray, on left side 12, on right side 4.5; chord of curve of lateral line 12. D. 112; A. 91; P. 13; scales in lateral line 95.

Body slender, thin, and fragile, semitransparent, with deciduous smooth scales, and fragile fin rays; anterior profile of snout deeply incurved in advance of upper eye, the terminal portion of snout protruding hook-like beyond it; mouth rather large, oblique, the maxillary 0.4 length of head, reaching a point behind front of pupil; lower jaw much shorter than upper; anterior premaxillary teeth wholly outside mandibular symphysis in closed mouth; teeth in single series; all those in lower jaw and the anterior teeth of upper jaw are widely spaced moderate canines; lateral teeth in upper jaw much smaller and more closely set; vomer and palatines toothless; eyes separated in females by a very narrow bony septum, which is minutely channeled longitudinally, this accompanied by a single series of narrow scales, or the series may be interrupted over middle of lower eye; males can be at once detected by the slightly wider and more evidently grooved interorbital space, the width of which over middle of eye is about 0.3 diameter of pupil; in males, the interorbital space is scaled throughout; the vertical from the front of upper eye traverses lower eye a little in advance of pupil; no spines or tubercles on head in either sex; gill-rakers short, slender, toothed; the longest half diameter of pupil; 10 gill-rakers on horizontal limb of outer arch, none being developed on vertical limb.

Dorsal fin beginning on blind side of snout immediately behind nostril; the rays regularly graduated from the first to the longest, which is slightly behind middle of fin, none of them produced; throughout the dorsal fin the membrane extends nearly to tips of rays, leaving only extreme tips free; anal fin wholly similar; left ventral with an elongate base and inserted on ridge of abdomen, its posterior membranes slightly deflected to the left, its attachment lying immediately at left side of base of first anal ray; caudal wedge-shaped, or double truncate with a rounded tip; right pectoral much smaller than left, but with an equal number of rays.

Scales cycloid on both sides, and caducous; terminal portion of snout naked, rest of head scaly; each dorsal and anal ray accompanied by a single series of scales; caudal rays alone forked, carrying several series of scales; pectorals and ventrals naked; anterior arch of lateral line flat-topped, its chord contained 5.7 times in straight portion; no lateral line on blind side.

Coloration: Light olive-brown, finely freckled with darker brown and sparsely spotted with light, the spots irregular in outline, each surrounded by a darker ring; spots principally distributed on head and near outlines of body; two spots on lateral line, one near middle of its length, accompanied with a large dark spot; vertical fin rays finely mottled, with oblong dark blotches at intervals of 10 to 15 rays.

In 5 specimens, which do not include the type, the fin rays and scales are as follows: Dorsal 114, 114, 116, 116, and 117; anal 90, 92, 96, 92, and 95; pectoral 13, 15, 13, 14, and 14; scales in lateral line 97, 94, 98, 96, and —.

The genus *Anticitharus* is most nearly allied to *Arnoglossus*, from which it differs principally in the very fine scales.

Taken at the following stations: Nos. 3832, off the south coast of Molokai, 142 to 153 fathoms; 3957, near Laysan Island, 173 to 220 fathoms; 3958, near Laysan Island, 173 to 182 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms.

*Platophrys mancus* (Broussonet).

In addition to the specimens of this common species which were seen almost daily in the Honolulu market, others were dredged at depths of less than 75 fathoms. At station 3859, very young specimens were taken which were entirely transparent, and were very probably captured at or near the surface. Young individuals were often secured in the surface tow-nets.

Specimens were taken at the following stations: Nos. 3859, Pailolo Channel, 138 to 140 fathoms; 3875, between Maui and Lanai, 34 to 65 fathoms; 3940, vicinity of Laysan, 59 to 70 fathoms; 4070, off the north coast of Maui, 45 to 52 fathoms.

*Platophrys chlorospilus*, new species. Fig. 267.

Type, a male, 183 mm. long, from station 4074, off north coast of Maui, depth 78 to 85 fathoms; type, No. 51647, U. S. Nat. Mus.

Length of head 26.5 hundredths of total length without caudal; longest diameter of orbit 8.5; least interorbital width 6; length of snout, from lower eye 6, from upper eye 14; length of maxillary 10; depth of head across middle of upper eye 30; greatest depth of body 45; depth of caudal peduncle 10; length of left pectoral 21; chord of arch of lateral line 16. D. 108; A. 89; P. 13; scales in lateral line 90.

Body rather slender, eyes proportionately large and widely separated; profile slightly angulated in front of upper eye; mouth oblique; maxillary extending to below front of pupil; teeth in single series in both jaws; lateral premaxillary teeth small and close-set; anterior premaxillary and man-

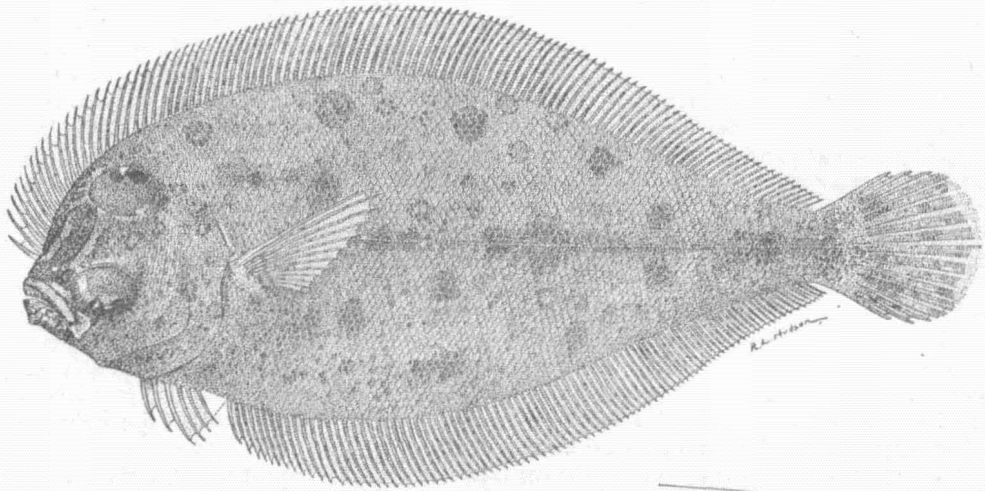


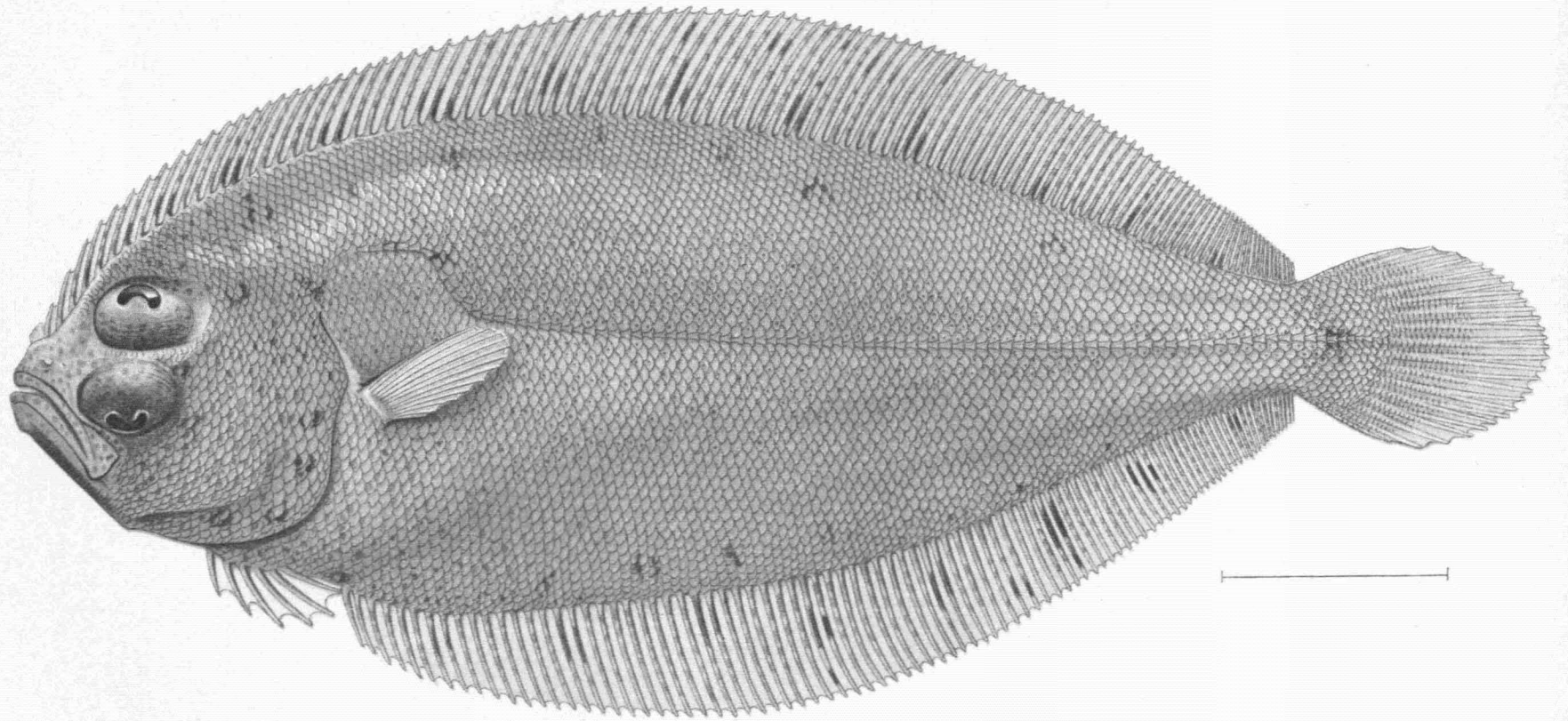
FIG. 267.—*Platophrys chlorospilus* Gilbert, new species. Type.

dibular teeth larger and more widely spaced; no teeth on vomer or palatines; interorbital space a wide shallow groove, its width less than the diameter of the large eye; no spines or protuberances about eyes or on snout; gill-rakers slender, toothless, 9 in number, the longest 0.3 diameter of pupil, wholly wanting on vertical limb of arch; slit behind last gill short, 0.3 diameter of eye.

Anterior dorsal rays free for half their length, not produced or filamentous, increasing regularly in length from the first; left ventral inserted on the pre-anal ridge, membrane of last ray deflected to left side of ridge; vertical fins all low; caudal double truncate, or doubly emarginate, median ray produced; left pectoral twice as long as right, second and third rays prolonged somewhat beyond general contour of fin. In *P. mancus* of the same size and sex, the left pectoral would be greatly produced. Caudal rays branched, other rays simple.

Scales strongly ctenoid on left side, cycloid on right side; lateral line present on left side only, its anterior arch flat-topped; chord of arch contained 4.2 times in straight portion; interorbital space and mandible scaled; a few scales on exposed part of maxillary; terminal half of snout naked; single series of scales on dorsal and anal fin-rays and double series on caudal rays.





ANTICITHARUS DEBILIS GILBERT. TYPE.



In life, ground color olive-gray, flecked with olive-brown; a series of large spots near dorsal and anal outlines of body, and some intermediate spots olive-green, with olive-brown ocellating rings; an interocular bar, and some spots on rostrum bright greenish yellow; intervals between rostral spots with much blue; vertical fins finely dotted with brown, and marked with equidistant oblong brown spots.

Only the type specimen is known.

*Platophrys inermis*, new species. Fig. 268.

Type, a female, 179 mm. long, from station 4102, Pailolo Channel, between Molokai and Maui, depth 122 to 132 fathoms; type, No. 51648, U. S. Nat. Mus.

Length of head 26 hundredths of total length without caudal; length of snout, from lower eye 5.5, from upper eye 11; diameter of upper eye 8; interorbital width 3 (5.5 in male); length of maxillary 10; depth of body 45; depth of caudal peduncle 9.5; longest dorsal ray 10; longest caudal ray 19; longest ray of left pectoral 16; chord of curve of lateral line 16. D. 106; A. 86; P. 13; scales in lateral line 87.

Body sinistral, of moderate depth; outlines evenly curved; no angle above upper eye in either sex; mouth oblique; maxillary reaching vertical from front of pupil; mandibular symphysis with no spine and scarcely protruding beyond lower profile; teeth slender, conical, in a single series in each

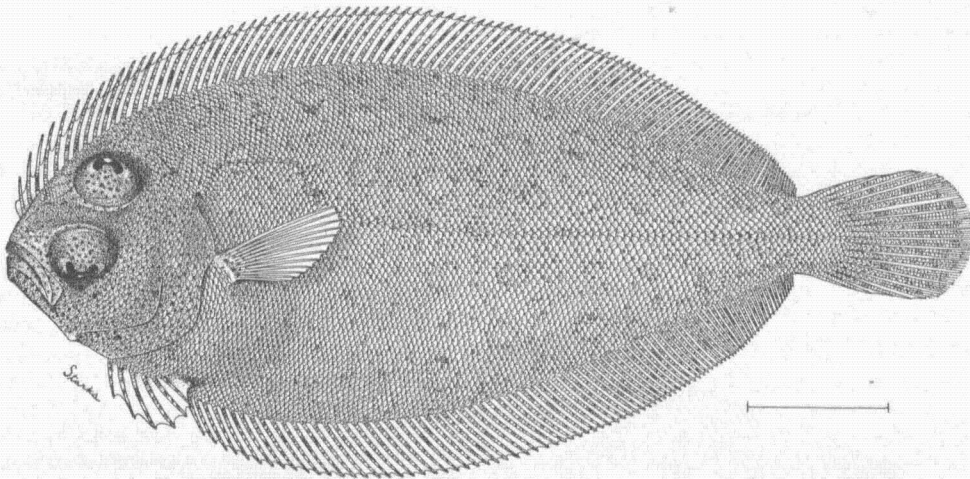


FIG. 268.—*Platophrys inermis* Gilbert, new species. Type.

jaw; palate unarmed; front of upper eye slightly behind vertical from front of pupil of lower eye; interorbital space gently concave; gill-rakers slender, short, about 0.2 diameter of pupil, 10 in number on horizontal limb of outer arch.

First dorsal ray inserted well on blind side of snout, immediately above nostrils, more widely separated than other rays, and provided anteriorly with a free membranous flap; none of the dorsal rays produced or largely free; dorsal highest at origin of its posterior third; longest dorsal ray equaling distance from tip of snout to middle of lower eye; caudal peduncle without free portion; left ventral with an elongate base, its rays all inserted on ventral ridge; membrane from last ventral ray deflected to the left, leaving the ridge, and not connecting with front of anal fin; length of pectoral equal to distance from tip of snout to middle of upper eye, its uppermost ray very short, about 0.1 second ray; all the fins, except caudal, with rays unbranched.

Scales small, those on left (eyed) side rough-ctenoid, moderately deciduous; those on right side cycloid; right side without lateral line; lateral line on left side with a short high arch, which is broadly flat-topped, the summit being a horizontal straight line; chord of arch contained  $4\frac{1}{3}$  times in posterior straight portion of lateral line. A short supplemental branch forks and forms a V behind upper eye; maxillary and snout but partly scaled; rest of head, including mandible and interorbital space, wholly scaled; rays of dorsal and anal fins each with a single row of scales; pectorals and ventrals

naked, except for 2 or 3 scales on basal portion of last 2 ventral rays; each caudal ray accompanied by a narrow band of scales.

Male specimens at hand average smaller than females. They differ only in the wider interorbital space, the slight lengthening of upper pectoral rays, which project beyond the normal margin of the fin, and the smaller eye, 3.5 in the head. The anterior profile is slightly steeper, with a very slight angle above eye. No tubercles or spines are developed on head in either sex.

Color in spirits, everywhere light brownish olive, closely freckled with fine dark spots which are most conspicuous on head; trunk with lengthwise series of round light olive spots, each surrounded by a darker ring; these conspicuous in young, but indistinct in older specimens; one series of spots, smaller and more numerous than the others, extends along bases of dorsal and anal fins; 2 or 3 well marked series of larger spots between these and lateral line; 2 or 3 light dark-edged streaks run forward and downward from upper eye to snout; rays of vertical fins finely spotted with dark, more elongate darker spots occurring at intervals along fins; pectorals unmarked.

A very young example, 45 mm. long, was taken at station 3957, near Laysan Island, 173 fathoms. The body is translucent, with small dark spots occupying the position of the future dark rings. The dorsal has 110 rays.

In 4 specimens, other than the type, the counts are as follows: Male, dorsal 113, anal 94, pectoral 13, scales 86; male, dorsal 109, anal 92, pectoral 14, scales 89; female, dorsal 108, anal 91, pectoral 13, scales 85; male, dorsal 107, anal 89, pectoral 14, scales 83.

The species was taken at the following stations: Nos. 3957, near Laysan Island, 173 fathoms; 4077, off north coast of Maui, 99 to 106 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms.

***Platophrys coarctatus*, new species. Fig. 269.**

Type, a female, 162 mm. long, station 3859, Pailolo Channel, between Molokai and Maui, depth 138 to 140 fathoms; type, No. 51602, U. S. Nat. Mus.

Length of head 25.5 hundredths of total length without caudal; length of snout, from lower eye 6, from upper eye 9; interorbital width 1; length of maxillary 9; diameter of upper eye 7; depth of body 42; depth of caudal peduncle 10; longest dorsal ray 12; longest caudal ray 20; length of left pectoral 15, of right pectoral 8. D. 120; A. 99; P. 13; scales in lateral line 96.

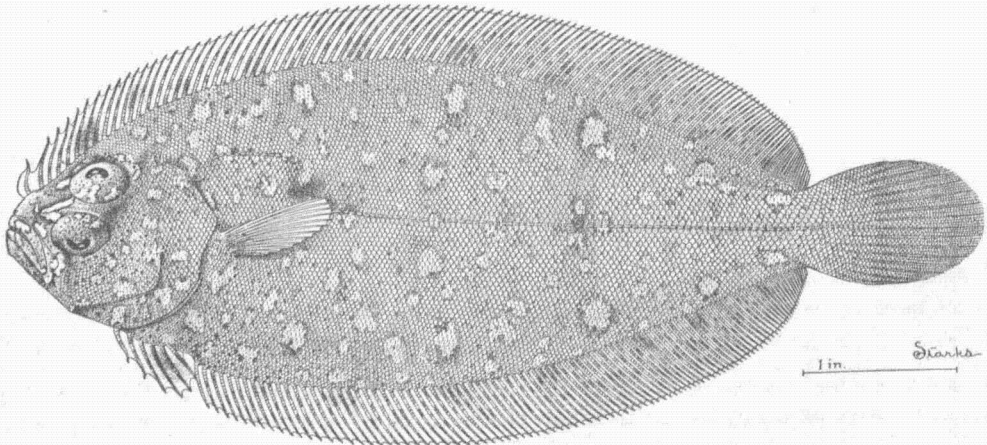


FIG. 269.—*Platophrys coarctatus* Gilbert, new species. Type.

Form regularly elliptical, with the 2 profiles evenly curved; a slight notch in middle of upper profile of snout; mouth rather small, very oblique, the maxillary not reaching vertical line from front of lower pupil; teeth in single series, present in jaws only, those on sides of premaxillaries small and close-set; anterior teeth larger and more widely spaced; mandibular teeth larger and more widely spaced than lateral premaxillary teeth; mandible massive, the 2 jaws equal, the symphysis not pro-

truding; eyes separated anteriorly by a narrow groove, not half as wide as diameter of pupil, and alike in both sexes; below posterior half of upper eye the groove is narrowed to a sharp ridge; front of upper eye over front of lower pupil; no spines or tubercles in either sex; gill-rakers slender, the longest half or less than half diameter of pupil, 10 present on horizontal limb of arch; vertical limb without appendages, as in related species.

First dorsal ray inserted on blind side of snout, immediately above nostrils, the second ray on dorsal ridge; first few dorsal rays free from membrane for about half their length, but none of them produced, the first shorter than succeeding rays, which increase regularly; left ventral inserted upon pre-anal ridge, the membrane of last ray joining body immediately to left of first anal ray; pectoral of colored side nearly twice as long as that of blind side.

Scales very small, not closely adherent, rather weakly ctenoid on the left side, cycloid on the right; lateral line present on left side only; anterior arch flat-topped, its chord contained 5 times in straight portion of lateral line; interorbital groove naked immediately above middle of upper eye, elsewhere scaly; symphyseal portion of mandible and terminal half of snout naked; exposed portion of maxillary scaled.

Color, light olive-brown, profusely covered with green spots of varying size, each surrounded with a darker ring; series of spots, larger than the others, occur near dorsal and anal outlines, and halfway between these and lateral line; a short dash in front of upper eye and one behind it; a conspicuous sharply angulated streak connecting lower anterior margin of upper eye with anterior margin of lower eye; four conspicuous spots on lateral line, two of these near together, immediately behind arch, one at middle of straight portion, and one just in advance of caudal peduncle; dorsal and anal fins finely mottled with dark, with a series of regularly arranged darker blotches.

In 5 specimens, not including the type, there are the following fin and scale counts: Dorsal 115, 115, 116, 114, and 121; anal 95, 96, 96, 93, and 98; pectoral 14, 14, 14, 13, and 14; scales in lateral line 93, 94, 94, 93, and 94.

The species was taken at the following stations: Nos. 3859, Pailolo Channel, 138 to 140 fathoms; 3938, near Laysan Island, 148 to 163 fathoms; 3957, near Laysan Island, 173 to 220 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms.

#### ***Engyprosopon hawaiiensis* Jordan & Evermann.**

Two specimens, secured at station 4067, off the north coast of Maui, depth 10 to 14 fathoms, seem referable to this species. They are much lighter in color than the type specimen from Honolulu, and are very finely mottled with light gray and brown. A series of inconspicuous dark spots along the middle of sides, and others near base of dorsal and anal, can not be detected in the type. On close examination, however, the type shows the finer mottlings. Indistinct dark and light bars traverse the interocular space. The fins are finely freckled.

The fin rays are: Dorsal 79, 80; anal 57, 58; scales in lateral line 45, 46.

#### ***Engyprosopon xenandrus*, new species. Fig. 270.**

Type, a male, 86 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51651, U. S. Nat. Mus.

Most nearly related to *E. grandisquamis* (Schlegel) from Japan, readily distinguished from that species by the larger eye, provided with a fringed membrane in the male, by the much narrower interorbital space in the female, by the more elongate body, the more numerous fin-rays, and by certain details of color.

Length of head 29 hundredths of total length without caudal; length of snout, from lower eye 7, from upper eye 17; length of maxillary 11; longest diameter of upper eye 8; interorbital width 9 (2 in a female cotype of equal size); greatest depth of body 55; least depth of caudal peduncle 12; longest dorsal ray 15; longest anal ray 13; length of caudal 22; length of pectoral 20; chord of curve of lateral line 16. D. 88; A. 66; P. 12; V. 6; vertebrae 9+26; scales in lateral line 50, not including those on base of caudal fin; 12 scales in a nearly vertical series from origin of straight portion of lateral line to base of dorsal fin.

Body comparatively elongate; anterior profile (in males) abruptly angulated above upper eye, thence descending very steeply to near tip of snout, which projects, forming a re-entrant angle with



descending profile; mouth small, oblique, maxillary scarcely reaching vertical from front of pupil, barely longer than diameter of lower eye; teeth small, villiform, in a single series in upper jaw and on sides of mandible, broadening to an irregular double series or a narrow patch near symphysis; palate smooth; vertical from front of upper eye passes through middle of lower eye (in males); interorbital width wide and deeply concave; opposing margins of orbits elevated; a strong spine immediately in advance of middle of upper eye, and a shorter compressed spine on anterior portion of its lower rim; a similar spine on upper anterior margin of lower orbit, and a slender spine near tip of snout; symphysis of lower jaw protrudes slightly, but the spine developed on chin in *E. grandisquamis* is wanting in this species; all spines wanting in females, in which also the interorbital space is of scarcely appreciable width; in the male, each eye is furnished posteriorly with a conspicuous broad semicircular membrane, the free margin of which is posteriorly directed and finely fringed; no trace of this membrane exists in females; gill-rakers short and slender, their length about half diameter of pupil, 12 in number on horizontal limb of outer arch.

Dorsal fin originating opposite the re-entrant angle near tip of snout, the first 3 or 4 rays inserted a little to the blind side of ridge, the first ray provided with a free membranous flap on its anterior

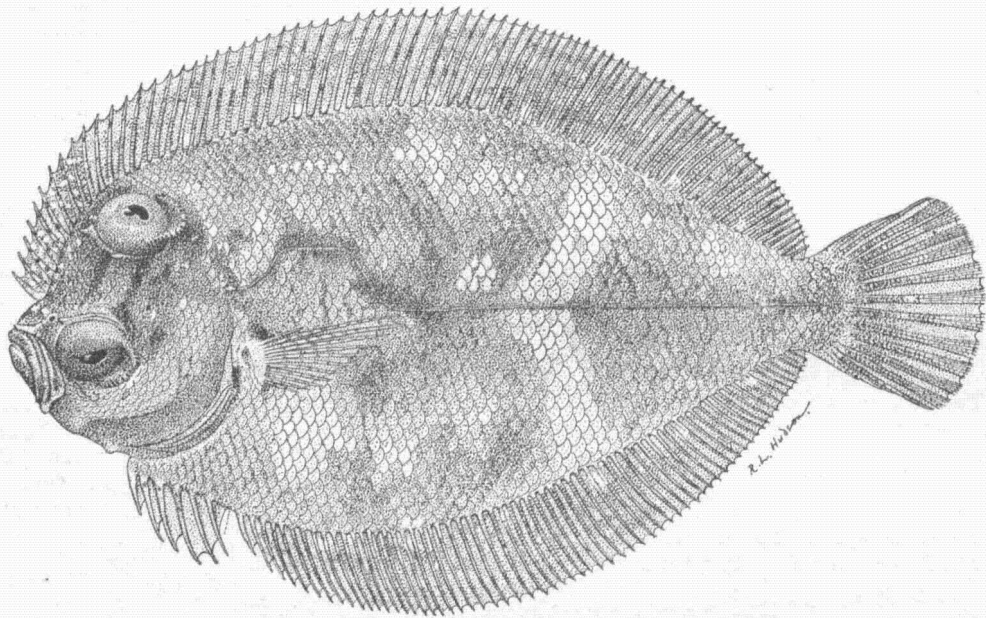


FIG. 270.—*Engyprosopon cenandrus* Gilbert, new species. Type.

edge, none of the rays elongate or with free tips; ventrals unsymmetrical, that of left or eyed side inserted on ventral ridge and having an elongate base beginning at throat, the membrane of last ray deflected to the left side of ventral ridge, and not joining first anal ray; anus displaced to the right side and lying a little posterior to origin of anal fin; right ventral with a short base, inserted laterally and posteriorly with reference to the left ventral.

Scales on left (eyed) side ctenoid and caducous, on right side cycloid and more closely adherent; cheeks, opercles, interorbital space and snout closely scaled; maxillary and mandible naked; lateral line describing anteriorly a high short curve, the chord of which is about twice its height.

Color in life, grayish on eyed side, with blackish shades and mottlings, with 3 ill-defined black spots along middle of sides and a grayish interocular bar bordered with blackish; axil of pectorals blackish; vertical fins more or less speckled; dorsal and anal usually with a subbasal series of dark spots alternating with a basal series of pearly spots; a pair of faint dark spots on caudal near its base; pectoral with a dark bar at base, a wider bar near middle of fin, and several ill-defined narrow bars on distal half; head and body with many small indistinct yellow spots; posterior half of blind side dusky,



clouded with grayish; anterior half whitish; region behind preopercle marked with many narrowly elongate vertical lemon-yellow spots; anterior part of dorsal fin and snout marked with numerous small yellow spots; dorsal and anal edged with yellow, the color extending downward on rays.

Very numerous specimens were secured, the species being abundant in depths of 40 to 100 fathoms. The males occasionally develop 3 or 4 spines about upper eye instead of the 2 present in the type. The females are mature, the ovaries lying in a backward extension of body cavity along base of anal fin. The following fin-counts indicate the variation in this respect: Dorsal 79, 84, 86, 86, 87, 87, 87, 88, 89, and 91; anal 61, 65, 66, 66, 66, 68, 68, 66, 69, and 67.

Specimens were secured at the following stations: Nos. 3846, south coast Molokai, 60 to 64 fathoms; 3848, south coast Molokai, 44 to 73 fathoms; 3849, south coast Molokai, 43 to 73 fathoms; 3850, south coast Molokai, 43 to 66 fathoms; 3861, Pailolo Channel, 30 to 52 fathoms; 3875, Avau Channel, 34 to 65 fathoms; 3940, Laysan Island, 59 to 70 fathoms; 3963, Laysan Island, 319 to 44 fathoms; 4066, east end Maui, 176 to 49 fathoms; 4070, north coast Maui, 45 to 52 fathoms; 4071, north coast Maui, 52 to 56 fathoms; 4072, north coast Maui, 56 to 59 fathoms; 4073, north coast Maui, 69 to 78 fathoms; 4075, north coast Maui, 49 to 57 fathoms; 4076, north coast Maui, 57 to 68 fathoms; 4077, north coast Maui, 99 to 106 fathoms; 4128, vicinity of Kauai, 68 to 90 fathoms; 4133, vicinity of Kauai, 165 to 41 fathoms.

*Chascanopsetta prorigera*, new species. Fig. 271.

Type, a male 225 mm. long, from station 4080, off the north coast of Maui, depth 178 to 202 fathoms; type, No. 51605, U. S. Nat. Mus.

Length of head 23 hundredths of total length without caudal; greatest depth 34; least depth of caudal peduncle 5; longest diameter of orbit 6; interorbital width 3; length of snout, from lower eye 5, from upper eye 9; length of maxillary 14; length of mandible 19; length of left pectoral 15; length of right pectoral 3; length of caudal 17; chord of arch of lateral line 12. D. 125; A. 89; P. 14; scales in lateral line 140.

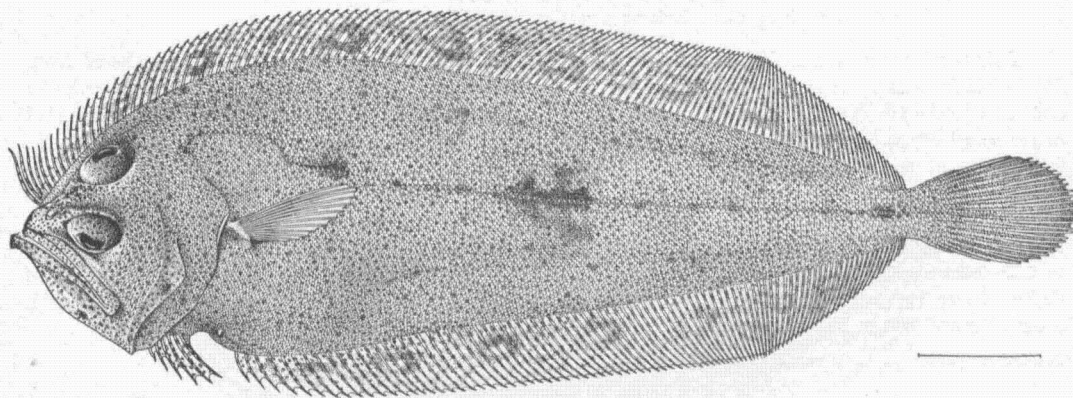


FIG. 271.—*Chascanopsetta prorigera* Gilbert, new species. Type.

Body very thin, as in *Cymicoglossus*, in shape a very elongate oval, the greatest depth immediately behind curve of lateral line, the upper and lower profiles behind this point gently converging and nearly straight; caudal peduncle free for a distance equaling half diameter of pupil. Head very deep; preopercular angle blunt; vertical height of cheeks nearly 3 times their longitudinal width; upper profile faintly incurved behind terminal part of snout; eyes well separated, interorbital space naked, deeply concave; upper eye a little behind the lower, its anterior margin in a vertical which traverses lower eye halfway between its front and front of pupil; mouth large and very oblique; maxillary very long and slender throughout, its tip reaching vertical from hinder margin of lower eye; each mandibular ramus becomes vertically dilated to form a thin lamella in the middle of its length; toward symphysis, the lower jaw becomes very narrow, the dentigerous portion protruding beyond snout for half diameter of pupil; teeth large, equal, rather distant, in single series, hooked and depressible inward; a pair of long membranous palps, each folded over longitudinally, with their free margins directed inward, depend from

roof of mouth behind vomer; they are directed forward, their tip reaching base of anterior teeth; gill-rakers nearly obsolete, 4 or 5 very short movable ones next the angle.

Dorsal fin beginning on snout immediately above anterior nostril; first ray inserted very slightly toward right side of ridge; anterior rays joined by membrane at base only, succeeding rays exerted progressively less; the first ray is longer than any of those that immediately succeed it, these decreasing rapidly to fifth or sixth ray, then slowly lengthening, the longest rays at beginning of posterior third of fin; anal fin similar, without anterior lobe; caudal lanceolate; the anterior two-fifths of base of left ventral lying between interopercles, the base lying along pre-anal ridge, its posterior membrane very short, attached immediately behind last ray, leaving a long free space between ventrals and first anal ray; left pectoral long, about two-thirds length of head; right pectoral shorter than diameter of pupil.

Scales minute, everywhere cycloid; rays of caudal fin accompanied by series of scales, other fins naked; lateral line equally and similarly developed on both sides, the anterior curve short, rather low, flat-topped, its chord contained 6 times in straight portion of lateral line.

Color very light brownish olive, everywhere coarsely flecked with light brown; peritoneum blue-black, the color visible through the thin abdominal walls; three irregular dark blotches, with black centers shading into brown, lie along lateral line, the first small, just behind curve of lateral line, the second and longest in advance of middle of straight portion, the third near tail; dorsal and anal finely mottled, with a series of inconspicuous large brown spots along basal half; caudal membrane blackish; left pectoral dusky.

The stomach was distended with the partially digested remains of some fish. Only the type is known. The species differs strikingly from *C. lugubris* Alcock (Jour. As. Soc. Beng., vol. 63, 1894, p. 129, pl. 6, fig. 4), from the Bay of Bengal, 145 to 250 fathoms, in the shape of anterior curve of lateral line. In *C. lugubris* the anterior portion of lateral line is sharply angulated above base of pectorals, while in *C. prorigera* there is the flat-topped curve common among species of *Platophrys*.

#### ***Pelecanichthys crumenalis* Gilbert & Cramer.**

This most peculiar flounder was taken sparingly on sandy and muddy bottom at depths of from 238 to 344 fathoms. It was found only in the Pailolo Channel and its approaches, and in the southerly continuation of the Kaiwi Channel, where it was originally obtained. Its food consists of shrimps and other small crustacea. The genus is probably most closely related to *Chascanopsella* Alcock.

Taken at the following stations: Nos. 3839, Pailolo Channel, 259 to 266 fathoms; 3865, Pailolo Channel, 256 to 283 fathoms; 3866, Pailolo Channel, 283 to 284 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3907, off the south coast of Oahu, 304 to 315 fathoms; 3908, off the south coast of Oahu, 304 to 308 fathoms; 3909, off the south coast of Oahu, 308 to 322 fathoms; 3910, off the south coast of Oahu, 311 to 337 fathoms; 3911, off the south coast of Oahu, 337 to 344 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 4083, off the north coast of Maui, 238 to 253 fathoms; 4097, Pailolo Channel, 286 fathoms.

*Pelecanichthys crumenalis* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 433, pl. XLVII.

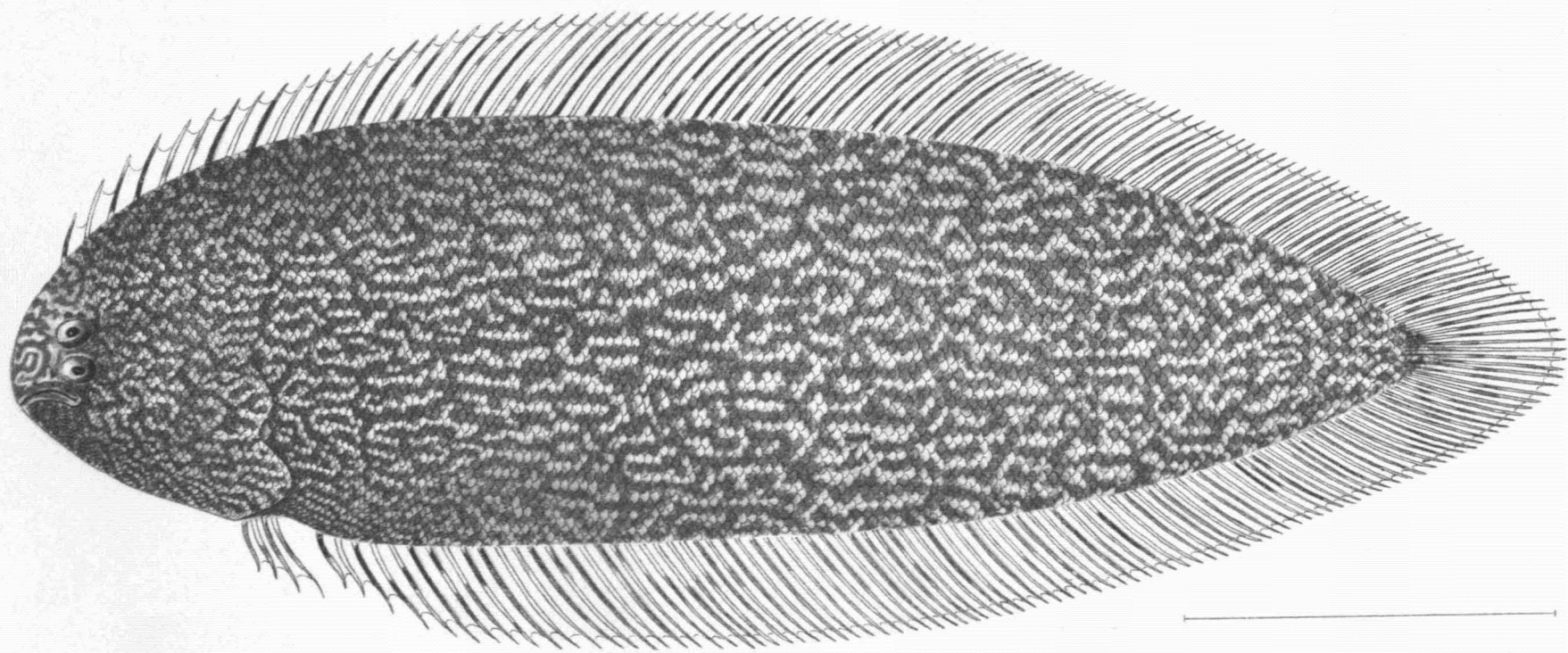
#### Family SOLEIDÆ.

#### ***Symphurus undatus*, new species. Plate 98.**

Type, 105 mm. long, from station 4114, off the northwest coast of Oahu, depth 154 to 195 fathoms; type, No. 51619, U. S. Nat. Mus.

Head 4.85 in length to base of caudal; depth 3.28. D. 97; A. 87; V. 4; C. 14; series of scales downward and backward, counted along middle of sides, 113.

Body of moderate depth, with a narrow truncate caudal base; mouth greatly curved; maxillary reaching vertical from middle of lower eye; eyes very close together, upper slightly in advance; posterior two-thirds of interorbital space occupied by a rather irregular patch of scales which encroach on eyes; between anterior portions of eyes, the usual broad flap, beneath which opens posterior nostril; anterior nostril in a long tube immediately above upper lip, and slightly nearer lower eye than extremity of snout; on blind side, the anterior nostril tube is the shorter; posterior nostril slit-like, at upper end of a vertical fold which runs upward from a point in front of angle of mouth.



SYMPHURUS UNDATUS GILBERT. TYPE.



First dorsal ray inserted over middle of eye; ventral consisting of 4 rays, its posterior membrane ruptured in the type.

Scales very strongly ciliated on both sides of body. No trace of lateral line.

Color, a warm brown, with narrow, wavy streaks of light olive, the streaks running in all directions and irregularly anastomosing; fins translucent, with frequent rays which are brown for the greater part of their length; other rays more or less brown.

A single cotype, from station 4120, off northwest coast of Oahu, 167 to 216 fathoms, shows the following formula: D. 103, A. 88; V. 4; scales 106. In this smaller specimen the anastomosing wavy lines are wider and less clearly defined.

***Symphurus strictus*, new species.**

Type, 106 mm. long, from station 3920, off the south coast of Oahu Island, depth 265 to 280 fathoms; type, No. 51624, U. S. Nat. Mus.

Head 5 in length to base of caudal; depth 4.2. D. 115; A. 102; C. 14; V. 4; series of scales running downward and backward 120.

Very elongate; mouth curved; maxillary reaching vertical from front or middle of pupil; eyes very small, close together, the upper slightly in advance of lower, between them a single series of

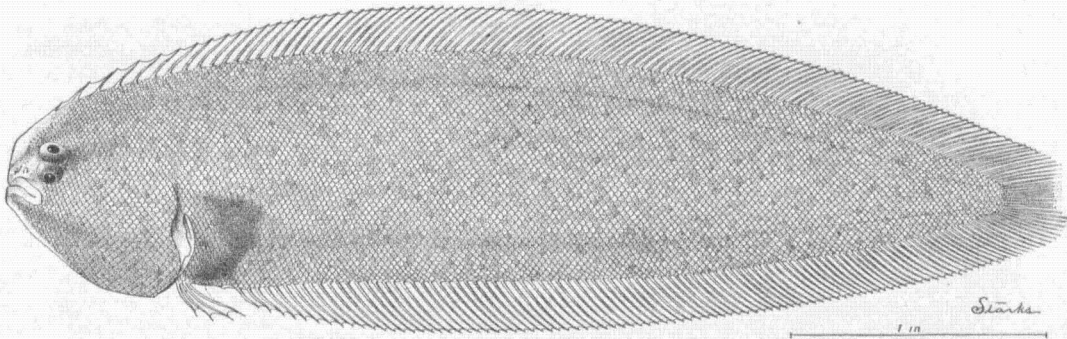


FIG. 272.—*Symphurus strictus* Gilbert, new species. Type.

scales, in addition to which, scales are sometimes present on adjacent parts of eye; anterior portion of interorbital space occupied by a wide flap, under which posterior nostril opens; right anterior nostril tubular, immediately above upper lip, slightly nearer lower eye than tip of snout; left anterior nostril slit-like, opening under upper end of a vertical fold which extends upward from behind angle of mouth; snout, jaws, and chin, and a narrow streak along profile to front of dorsal naked.

Dorsal fin beginning above middle of upper eye; caudal with a vertically truncate base, its rays easily distinguished from dorsal and anal; membranes of last ventral ray joining first anal ray above its middle. Scales adherent and very strongly ctenoid on both sides; no trace of a lateral line.

Color light olivaceous, faintly marbled with light olive-brown; indistinct narrow dark lines follow the rows of scales; fins slightly dusky, unmarked; peritoneum jet-black; color showing distinctly through the abdominal walls.

Four cotypes were secured at station 4021, off the east coast of Kauai, at a depth of 286 to 399 fathoms. In 3 of these the counts are as follows: Dorsal 108, 109, and 113; anal 95, 95, and 98; ventral 4, 4, and 4; scales 125, 117, and 114.

Family LOPHIIDÆ.

***Lophiomus miacanthus*, new species. Fig. 273.**

Type, 143 mm. in total length (from mandibular tip to margin of caudal) from station 4117, off the northwest coast of Oahu, depth 253 to 282 fathoms; type, No. 51627, U. S. Nat. Mus.

Length of head equaling distance from gill-slit to middle of caudal; width equaling its length; major diameter of eye contained 4.8 times in head, frontal width above middle of orbits 4.5; length of



snout 3.8; protruding portion of mandible 7; length of maxillary 1.9; maxillary reaching a vertical from front of pupil. D. III-11-8; A. 7; P. 21; V. 1, 5; C. 8; branchiostegals 6; vertebrae 18.

Teeth in front of mandible in about 3 series; inner series much the longest; all depressible, except some of smaller teeth of outer row; laterally, the mandibular teeth are reduced to a single series; premaxillary teeth in 2 series; in outer series, 5 or 6 of anterior teeth closely spaced, of moderate length, depressible; lateral teeth about 10 in number, short, rigid, widely spaced, slightly increasing in length toward angle of mouth; a single vomero-palatine series of very unequal teeth; each lower pharyngeal with 2 series of long teeth diverging backward; a few similar teeth forming a transverse series on each upper pharyngeal; gills 3, the fourth arch without filaments; no gill-rakers; pseudobranchiae present; gill-opening unusually wide, the membranes free from arm along entire anterior, inferior and posterior aspects of the latter, attached only to a portion of superior side of arm; supraocular rim composed of a projecting thin lamella strengthened by 3 ridges which radiate outward and forward, and terminate in short spines; two of these project outward above posterior half of eye, the third directed forward, its tip in advance of pupil; a short spine rises vertically from the point on interorbital space to which these ridges converge; immediately behind upper part of orbit, a spine marks inner end of a blunt transverse ridge; behind middle of eye are 3 lower points arranged in a lengthwise series, the anterior

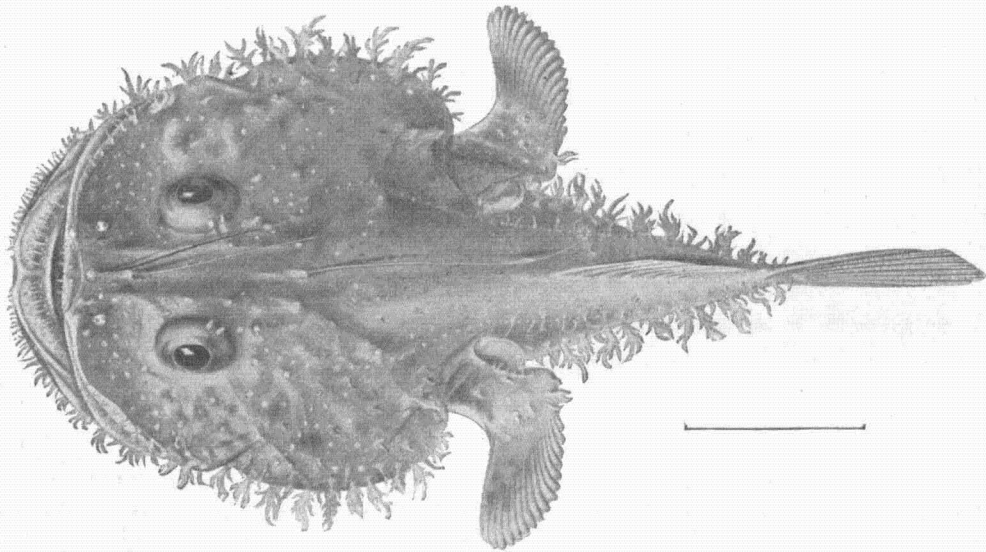


FIG. 273.—*Lophiomus miacanthus* Gilbert, new species. Type.

2 connected by a ridge; other spines on occiput and opercular bones occupy the usual position; occipital ridges prominent, bearing each a single spine, and then turned obliquely outward and backward; nasal spines double; immediately behind them, the anterior and posterior nasal openings are found near the tip of the heavy club-shaped nasal tubercle.

Anterior 2 dorsal spines close together near tip of snout; the first but little shorter than the second, which extends a little beyond base of third; first spine black, terminating in a small but conspicuous short, white, fleshy tip, which narrows to a minute cirrus; second spine grayish, without tentacles or flaps; third spine located directly between the 2 occipital spines, and reaching with its tip to or slightly beyond origin of soft dorsal; at beginning of its terminal fourth it is bordered by a short membranous expansion, which rapidly tapers and disappears; the terminal fourth is white, and a dusky bar frequently crosses membrane; second group of dorsal spines represented by a single very weak spine shorter than pupil, with sometimes the rudiment of a second; last dorsal and anal rays not bound down to caudal peduncle.

Labial fringes well developed; a series of slender nearly simple filaments accompanying lateral line; abdomen covered with widely spaced short finbriated flaps, some wide and some narrow, these white in color on a dark background, and very conspicuous.

Color in spirits, light grayish above, much mottled with darker; filaments on sides of snout arising each from a small round light spot, contrasting with the darker ground; under parts lighter; abdomen usually dark, covered with sharply contrasting white flaps; mouth and gill-cavities white, peritoneum jet-black.

Stomach globular, very large, the 2 openings immediately adjacent; intestine crossing the stomach transversely in front, communicating with it in passing, and terminating in a blind sac, which represents the single pyloric caecum; left liver lobe short; right long and narrow, extending to near middle of body cavity, its posterior end slightly hollowed out for the gall-bladder; intestine making a single short loop, its length but two-thirds total length of fish; the stomach contained the remains of a small fish, together with considerable mud, which was probably swallowed during capture of fish.

Specimens were taken at the following stations: Nos. 3998, vicinity of Kauai, 228 to 235 fathoms; 4096, approach to Pailolo Channel, 272 to 286 fathoms; 4117, off the northwest coast of Oahu, 253 to 282 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

Family CHAUNACIDÆ.

*Chaunax umbrinus*, new species. Fig. 274.

Type 54 mm. long, from station 3885, Pailolo Channel, between Maui and Molokai; type, No. 51547, U. S. Nat. Mus.

Closely related to *C. fimbriatus* Hilgendorf, from Japan, but the spines finer and shorter, the fins higher, the pectorals with more numerous rays, and the color dark.

Head 65 hundredths of total length to base of caudal; maxillary 22; interorbital width 9; length of tentacular groove 8; length of tentacle 6; diameter of eye 13; greatest depth (uninflated) 32;

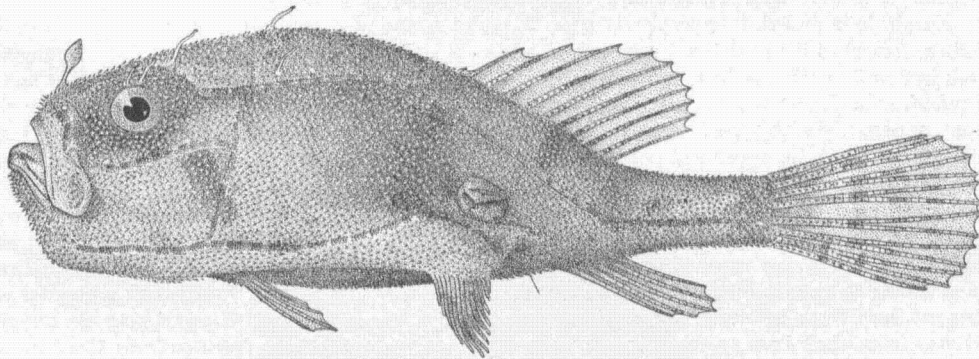


FIG. 274.—*Chaunax umbrinus* Gilbert, new species. Type.

greatest width, at base of pectorals 54; distance from tip of snout to origin of dorsal 56; length of dorsal base 34; longest dorsal ray 17; length of caudal 36; length of pectorals 17; length of ventrals 15. D. 11; A. 5; P. 14.

Tentacle somewhat shorter and thicker than in *C. fimbriatus*, occupying about three-fourths the groove; sensory canals arranged as in *fimbriatus*, but the lateral lines approach more nearly the front of dorsal fin; spines much shorter and finer, resembling shagreen; skin opaque, dark gray on upper parts, mottled and blotched with darker shades; caudal blackish, with a lighter cross-bar on basal half; pectorals black, with some grayish lines at base; ventrals yellowish; under parts grayish, uniform.

One specimen known.

## Family CERATIIDÆ.

**Miopsaras**, new genus.

Like *Mancalias* and *Cryptopsaras*, but with basal joint of the single dorsal spine thickened and greatly reduced in length, directed forward and lying concealed in a shallow pit, its distal portion represented by a short, slender, fleshy filament attached to tip of the heavy basal portion, which does not taper into it. A pair of caruncles, without median element, as in *Mancalias*.

Body narrowly compressed, back gently arched, anterior profile and cleft of mouth directed downward and forward, lower profile rising in a nearly straight line to the slender caudal peduncle; vomer and palatines toothless; gill-opening a nearly vertical slit below axil of pectoral; gills  $2\frac{1}{2}$ , the anterior arch attached for the greater part of its length, as in *Macrourus*; filaments of outer series of anterior arch but half as long as those of inner series, with which they alternate; third arch with a single series of filaments, and attached throughout; no gill-rakers developed; eyes minute and inconspicuous; pectorals short, with 18 rays; ventrals absent; skin densely covered with minute spines, which form a fine shagreen.

*Miopsaras* Gilbert, new genus of *Ceratiidae* (*myops*).

**Miopsaras myops**, new species. Plate 99.

Type, 114 mm. long (from mandibular articulation to tip of caudal), from station 4019, in the vicinity of Kauai Island, depth 409 to 550 fathoms; type, No. 51637, U. S. Nat. Mus.

Length of head from tip of snout to gill-slit 0.1 greater than vertical depth at snout; greatest width of head contained 2.7 times in length; length of snout 2.75 times; distance from tip of snout to end of maxillary 2 times. D. 4; A. 4; P. 18; C. 8.

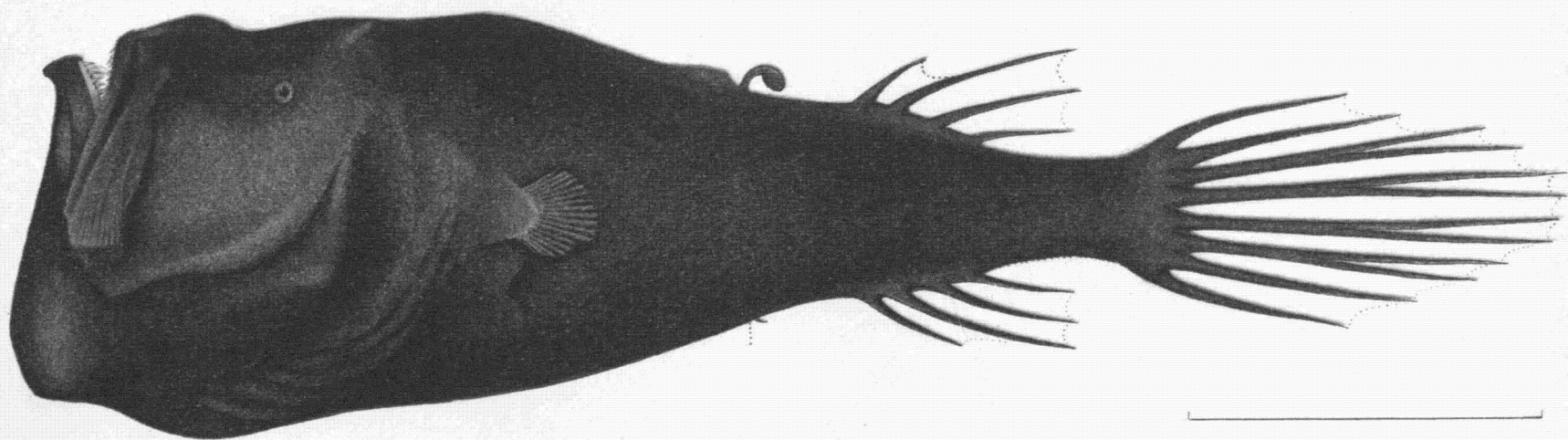
Mandible included, its symphysis provided with a strongly protruding spinous tip; mandibular teeth anteriorly in 2 ill-defined series; inner teeth long and fang-like, all depressible; premaxillary teeth in 2 or 3 poorly marked series, the largest teeth located anteriorly in the inner row, not half size of mandibular fangs; tongue, vomer, and palatines toothless; a long slender nasal tube near tip of snout, apparently with 2 perforations at its summit; gill-slit longer than pectoral fin, contained 6 times in length of head, its upper end behind lower pectoral rays, the direction of the slit downward and a little forward.

Dorsal spine inserted but little behind eye; length of basal portion less than 3 times its width, about twice diameter of eye, and about 0.1 length of head; spine directed forward, in a shallow, naked groove, the naked area narrowing in front of spine and continued well beyond it, about halfway to tip of snout; to the tip of the basal portion, at its anterior (lower) face, is attached a slender white filament, hardly to be made out with the unaided eye, the spine and filament scarcely extending halfway from their base to tip of snout; caruncles opposite each other; distance from their insertion to front of dorsal about equal to base of latter; no globular body between them, but immediately in front, on median line, a slight elevation of the integument, containing a shallow, naked pocket, opening posteriorly; no pore could be detected opening into base of this pocket; caruncles each with a very slender stalk and an enlarged globular head, the latter having a specialized area at tip, devoid of prickles and covered with a thin opaque white integument; each caruncle perforated at tip by a short slit or pore; fin rays all simple, except the 4 middle rays of caudal; longest caudal ray 0.85 length of head; pectoral very short, its length equaling that of gill-slit; vent separated from anal fin by a distance equaling base of latter.

Entire body, including all the fin rays, invested with close-set prickles; the groove for dorsal spine, the spine itself, tips of caruncles, eye, and lips the only naked areas.

Body and fins everywhere jet-black; mouth cavity whitish with dusky areas.

Only the type is known.



MIOPSARAS MYOPS GILBERT. TYPE.



## Family OGCOEPHALIDÆ.

***Malthopsis mitrigeria*** Gilbert & Cramer.

Fifty-two specimens were taken at 13 stations, the depth ranging usually from 250 to 300 fathoms.

Median portions of breast and belly as fully plated as the back; antero-lateral margin of disk furnished with 2 series of plates separated by a shallow groove; below these, posteriorly, a third series which runs from angle to point opposite posterior margin of orbit, where it turns abruptly mesad and joins its fellow across middle of breast; the naked space containing anal opening surrounded anteriorly and laterally by 2 parallel series of plates, the outer of these crossing median line immediately behind ventral fins, and continued laterally along posterior lower margin of arm; breast with 2 large plates on middle line, and a series of plates on either side which pass between bases of ventrals and diverge anteriorly; upper half of eye above pupil covered with small plates with radiating ridges, the lower series of these larger and centrally elevated; vomerine teeth minute, forming a moderate transverse band; separated from this band by a narrow line, on each side, is a small round palatine patch much less than half size of vomerine patch; tongue covered with retrorse teeth; longitudinal diameter of orbit two-fifths its distance from gill-opening; anterior nostril in a short tube, rather widely separated from posterior, which is a small roundish pore; when extended, the pectorals fail to reach tip of subopercular spine; ventrals not nearly reaching margin of disk; no functional gills on first or fourth arches.

Our specimens range in length from 33 to 80 mm. The younger individuals differ in no essential features from the adults.

In the Zoological Record for 1896, Vol. XXXIII, Pisces, page 22, Gilbert and Cramer are erroneously credited with establishing *Malthopsis* as a new genus for the reception of the present species. This error is repeated in the Index Zoologicus, 1902, page 211. A glance at the original description of *Malthopsis mitrigeria* shows that it is proposed as a new species of Alcock's genus *Malthopsis*, to which it belongs. "*Malthopsis* Gilbert and Cramer" does not exist.

Specimens were taken at the following stations: Nos. 3839, off the south coast of Molokai, 259 to 266 fathoms; 3865, Pailolo Channel, 256 to 283 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3914, off the south coast of Oahu, 289 to 292 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3918, off the south coast of Oahu, 257 to 294 fathoms; 4096, northeast approach to Pailolo Channel, 272 to 286 fathoms; 4097, northeast approach to Pailolo Channel, 286 to — fathoms; 4117, off the northeast coast of Oahu, 253 to 282 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4130, vicinity of Kauai, 283 to 309 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

*Malthopsis mitrigeria* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 434, pl. XLVIII, figs. 1, 2.

***Malthopsis jordani***, new species. Plate 100.

Type, 85 mm. long, from station 3853, off the south coast of Molokai, depth 115 to 134 fathoms; type, No. 51625, U. S. Nat. Mus.

Length of disk, excluding pectoral basis, 52 hundredths of total length without caudal; greatest width of disk 60; length of caudal peduncle, from vent, 46; greatest width of caudal peduncle 17; distance from vent to front of anal 25; diameter of eye 12; interorbital width 4.5; width of mouth, between tips of maxillaries, 11; length of caudal 25; longest pectoral ray 20; longest ventral ray 19. D. 6; A. 4; P. 13; V. 1, 5.

Interorbital space gently concave, very narrow anteriorly; upper orbital rim bearing a blunt tubercle above posterior margin, a smaller one above middle of orbit, and 2, rather indistinct, anteriorly at base of rostral process; rostral process robust, directed vertically upward, its anterior margin descending without notch or other interruption to a point below middle of orbit; rostral tentacle robust, short, not reaching margin of premaxillaries when laid forward; no narrowed stem can be distinguished below the thick oblong end or lure; mouth very narrow; a narrow band of minute teeth in front of lower jaw, with a much wider band of cardiform teeth behind it; premaxillary band narrower; entire surface of tongue beset with coarse teeth directed backward; a broad roundish patch of teeth on vomer, with an oval palatine patch on either side, separated only by narrow lines; palatine patches nearly as large as vomerine patch; anterior nostril with a reflexed margin but no tube, closely adjacent to posterior nostril, which is a long transverse slit; two double gills on each side, the anterior gill-arch very short, provided with a few spinous rakers, but without gill-filaments, the position of the

latter being occupied by a thin fleshy lamina; no functional filaments on fourth arch, a short adherent crescentic lamina sometimes present, seeming to represent the obsolete gill, its margins with divisions faintly indicated; disk comparatively narrow, with rounded outlines; lateral process projecting but little, armed with a short strong spinous point directed forward and a shorter one turned backward; dorsal surface of disk, and entire tail, covered with large and small tubercular plates, arranged much as in *M. mitrigeria*, but less numerous and much less prominent; lower surface of disk almost naked, containing only a few scattered rudimentary plates, without definite arrangement, except for the usual presence of one in middle of breast; a single series of 4 or 5 small plates crosses eye above pupil.

When bent outward and forward, the pectorals extend well beyond tip of subopercular spine; ventrals widening toward tip, their inner (posterior) rays the longer, not reaching margin of disk when extended; caudal half length of head.

Color, upper parts covered with a fine reticulum of dark lines over a grayish or light brownish ground; 2 or 3 irregular dark blotches on margin of disk, a pair on nape, an irregular lengthwise blotch above and behind gill-opening, an irregular bar below dorsal, one on middle of caudal peduncle, and a narrow one at base of caudal; a transverse dark bar crosses caudal behind its middle, and an intramarginal bar crosses pectoral. Specimens taken from the white coral sand in the vicinity of Laysan Island are nearly uniform white in color, the smallest individual, 30 mm. long, having middle of disk marked by numerous small bright white spots, on a dusky ground; faint traces of the reticulum can be distinguished on the palest specimens.

In the cotypes, the dorsal rays vary from 5 to 6, the pectorals from 12 to 13. The anal rays seem to be invariably 4.

*Malthopsis jordani* is closely related to *M. mitrigeria* and to *M. lutea* Alcock (Ann. Mag. Nat. Hist., (6), VIII, 1891, 26, pl. 8, figs. 2, 2a), all of them with comparatively narrow triangular disk and narrow interorbital space, the body covered with coarse tubercular plates. The species described by Garman from the Mexican and Central American province have wider disks, with the lateral spine directed backward, or obsolete, the interorbital space wider and more depressed, and the investment of body largely in form of prickles.

The species was taken at the following stations: Nos. 3853, off the south coast of Molokai, 115 to 134 fathoms; 3859, Pailolo Channel, 138 to 140 fathoms; 3938, vicinity of Laysan, 148 to 163 fathoms; 3965, vicinity of Laysan, 116 to 147 fathoms; 4079, off the north coast of Maui, 143 to 178 fathoms; 4101, Pailolo Channel, 122 to 143 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms.

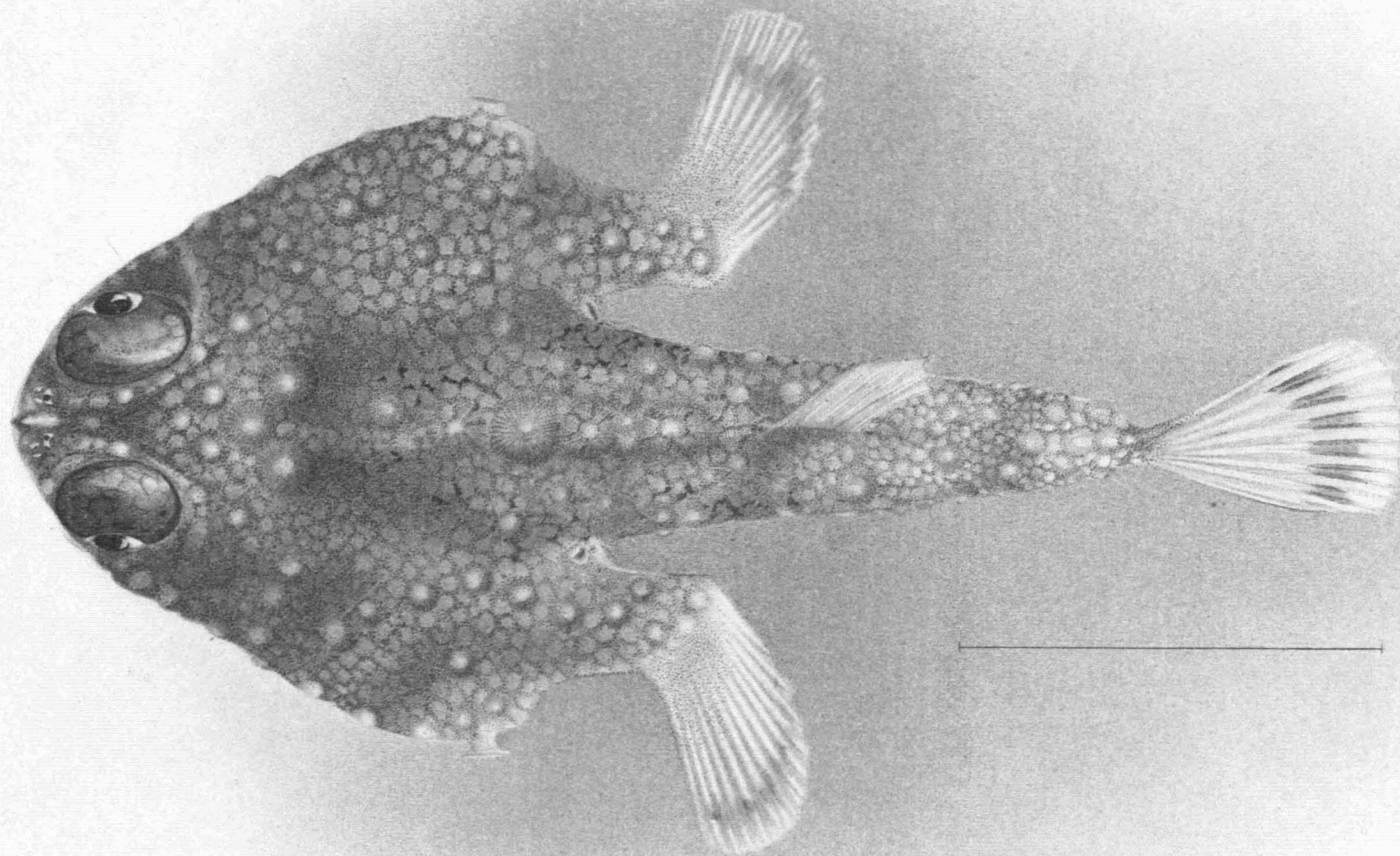
#### *Haliutæa retifera*, new species. Plate 101.

Type, 101 mm. long, from station 4076, off the north coast of Maui, depth 57 to 68 fathoms; type, No. 51597, U. S. Nat. Mus.

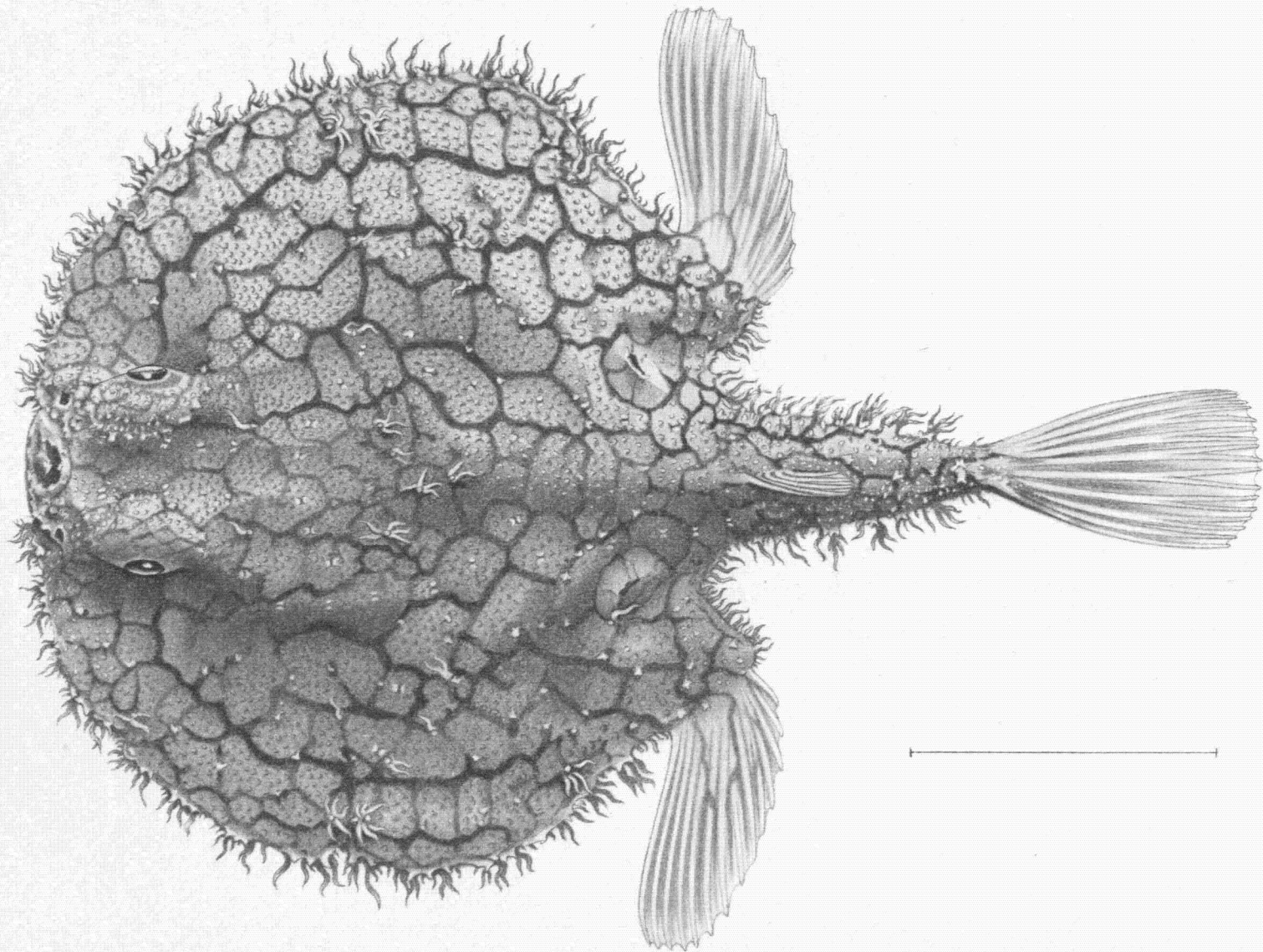
Length of disk (excluding pectoral base) 70 hundredths of total length to base of caudal; width of disk 81; length of caudal peduncle, from vent, 34; greatest width of caudal peduncle 16; diameter of orbit 12; least interorbital width 7.5; width of mouth, measured between tips of maxillaries 33; length of caudal 29; longest pectoral ray 25; longest ventral ray 18. D. 5; A. 4; P. 14; V. 1, 5.

Disk subcircular, broader than long, its width equal to distance from tip of snout to end of declined dorsal rays; head and snout not protruding at all beyond the regularly curved contour, and the carpus not exerted; snout and orbital rims a little elevated; eyes directed laterally; interorbital space concave, bounded laterally by orbital rims, anteriorly by a transverse ridge which separates it from the nasal fossæ and the tentacular cavity; anterior nostril small, with a short tube; posterior a large circular opening without tube or reflexed rims; lure trilobate, with a superior medial and a pair of hemispherical lateral lobes, the latter fringed below and separated medially by a deep cleft; teeth minute, in rather wide bands in both jaws, nearly reaching corners of mouth; vomer and palatine bones without teeth; tongue very little developed, without free tip, and toothless, broad patches of the lower pharyngeals seeming to occupy its posterior portion; gill-openings small pores, wholly on upper surface of disk, well in advance of its posterior margin; gills 2½, the anterior arch with filaments, the posterior with a well-developed series of filaments, but without a slit; branchiostegal rays 6; no pseudobranchiæ.

Upper surfaces thickly beset by minute spines, the basal portion of which presents usually a triradiate arrangement of ridges; a few somewhat larger, but similar, spines scattered without definite arrangement among the smaller ones; lateral margins of disk depressed to a sharp edge, and occupied by a firmly united series of plates, each of which bears a marginal cluster of spines corresponding to



MALTHOPSIS JORDANI GILBERT. TYPE.



HALIEUTÆA RETIFERA GILBERT. TYPE.



sensory papillæ in the groove below them; a similar double series of spinous plates accompanies lateral line on infero-lateral aspect of tail, these, as well as those along lateral margins of disk bearing clusters of filaments as well as spines; lower surface of disk wholly smooth, save for a band of small spines and minute prickles which bound lateral line below; lower surface of tail, as far forward as vent, everywhere minutely prickly; the paired flaps which conceal the sensory papillæ are borne upon horizontal projections from the accompanying plates; flaps not narrowed at base, and bearing a fringe of short filaments along their free edge; the arrangement of the mandibular series of flaps agrees with that in *Dibranchus*; in addition to the papillæ which occupy the bottom of the mandibular groove, there are 3 accessory papillæ on each side the median line, which are placed upon the anterior margin of the groove, with their paired flaps arranged laterally, not transversely to the groove as in other papillæ; accessory papillæ placed contiguous respectively to first, fourth, and fifth of regular series.

Distance from origin of dorsal to base of caudal equals one-third its distance from tip of snout; when declined, the dorsal fin reaches slightly more than half its distance to caudal base; base of second anal ray midway between vent and caudal base; tips of anal rays reaching to or nearly to base of caudal when the fin is declined; ventrals reach a little more than halfway to margin of disk.

Color in life, light olive above, shading to pinkish brown around edges of disk, all the upper parts covered with coarsely reticulating reddish brown lines; under surface light brick-red, finely dotted with pearly white; a series of elongate silvery spots follows line of papillæ on mandible and sides of disk, those on disk larger, the filaments straw-color; caudal edged below and behind with orange-red, the fin otherwise white, marked with 3 indefinite yellow cross-bands which are dusky in their dorsal portions; pectorals, ventrals, and anal light brick-red, the pectorals lighter than the others. In the smallest of the cotypes, 44 mm. long, the caudal and pectorals have a broad terminal black bar with a narrow white edge, and the dorsal has a median dark blotch on its anterior rays. No note was made of the color of the dorsal in life; in spirits, it is nearly uniform dusky, with a light margin.

Specimens were taken at the following stations: Nos. 3810, off the south coast of Oahu, 53 to 211 fathoms; 3846, off the south coast of Molokai, 60 to 64 fathoms; 3855, off the south coast of Molokai, 127 to 130 fathoms; 3856, Pailolo Channel, 127 to 127 fathoms; 3858, Pailolo Channel, 128 to 138 fathoms; 4064, off the northeast coast of Hawaii, 63 to 107 fathoms; 4076, off the north coast of Maui, 57 to 68 fathoms.

*Dibranchus erythrinus*, new species. Fig. 275.

Type, 172 mm. long, from station 3985, vicinity of Kauai, depth 430 to 477 fathoms; type, No. 51642, U. S. Nat. Mus.

Length of disk 60 hundredths of total length without caudal; greatest width 62; width of base of caudal peduncle 17; distance from anal opening to base of caudal 41; diameter of eye 12; least inter-orbital width 11; width of tentacular cavity 7.5; width of mouth 30; greatest depth of head 26; base of dorsal 9; length of caudal 21; longest pectoral ray 22; length of ventrals 17. D. 6; A. 4; P. 15; V. 1, 5.

Cephalic disk broadly ovate, the greatest width exceeding distance from tip of snout to gill-opening by a distance equaling half diameter of orbit; occipital and frontal regions elevated, evenly convex; profile descending rapidly over anterior half of orbits; rostral region short, cubical, scarcely projecting beyond mouth; tentacular cavity triangular, much wider than high; the broadly expanded tip of the tentacle trilobate; mouth very wide, the distance between angles slightly more than half length of head; teeth minute, in broad bands which nearly reach angle of mouth in both jaws; vomer, palate, and tongue edentulous; anterior gill-arch with large rakers but without filaments.

Bathyal characteristics well shown in the yielding skeleton and thinner integuments of head; dorsal surface of head, trunk, and tail everywhere thickly beset with tubercles, of which a large and a very small size predominate; all of them are strongly ridged, each ridge frequently terminating at summit in a distinct spinelet, 1 or 2 of which may considerably exceed others in length. The larger tubercles are evenly distributed and without definite arrangement on disk, those on trunk and tail disposed in 4 lengthwise series on each side, the 2 lower series forming between them a groove for the lateral line; the smaller tubercles are minute and cover densely the interspaces between the larger; margin of disk, snout, and superior orbital rim provided with similar tubercles with bifid, trifid or multifid tips; no especially developed spine on tip or on upper surface of snout; spines on margin of disk equal to those on sides of tail, and but little larger than those on posterior central portion of disk; subopercular spine small, beset with smaller spines turned in various directions; lower surface of disk

thickly covered with plates like the smaller ones on dorsal surface, those in front of ventrals somewhat enlarged; two short series of spines on tail; outside the iris, the eye is thickly beset with small prickles; lateral line distinct, deeply channeled, bordered above and below, along sides of trunk and tail, by a series of spinous plates, one pair to each papilla; a pair of flaps, with narrow pedicels and expanded fringed ends, meet above each papilla, intervening between latter and the pair of spines; structures entirely similar along edge of disk; immediately contiguous to the first, fourth, and fifth papilla on each side of symphysis is an accessory papilla placed forward on anterior margin of groove; in this, the fringed lobes and projecting spines are arranged at sides of papilla, that is, parallel with groove, instead of transversely to groove as in those of the regular series.

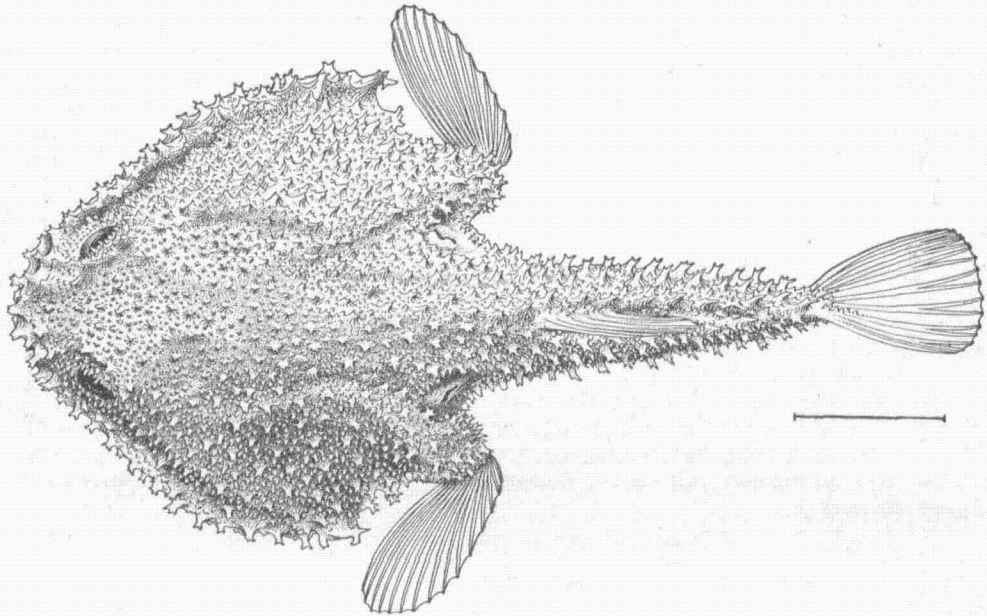


FIG. 275.—*Dibranchius erythrinus* Gilbert, new species. Type.

Distance from origin of dorsal to base of caudal a trifle more than half predorsal length; when the dorsal is declined, its tip extends halfway from its origin to caudal base; second anal ray equidistant from vent and base of caudal; when turned forward, the pectorals pass subopercular spine; ventrals not nearly reaching margin of disk.

In life, uniform light carmine-red, the blackish lining of gill-cavity and abdominal cavity faintly visible through the thin walls; lower surface suffused with purple; fins, lure, and buccal cavity unmarked; the fins deeper red or a little darker in color.

Only the type known.

***Dibranchius stellulatus*, new species. Fig. 276.**

Type, 67 mm. long, from station 4080, off the north coast of Maui, depth 178 to 202 fathoms; type, No. 51595, U. S. Nat. Mus.

Greatest width of disk at base of subopercular spine much greater than its length, equaling distance from tip of snout to middle of dorsal base; length of disk 65 hundredths of total length, without caudal; greatest width of disk, not including lateral spines, 78; longitudinal diameter of orbit 11; the slightly concave interorbital width 11; width at base of rostral projection 12; length of the projection 12; width of mouth between angles 25. D. 6; A. 4; P. 14 or 15; V. 1, 5.

Disk everywhere depressed, highest above middle of orbits; occiput broadly flattened and a little concave; antero-lateral outlines broadly rounded; snout forming a sharp, narrowly triangular projection, which is directed forward and upward, and extends well beyond mouth; outline of disk abruptly angulated at subopercular spine, gently and regularly concave from that point to base of pectoral fin; lure with a very short pedicle and a large trilobate head, the median portion of which is



vertically incised in its lower fourth; nostrils closely contiguous, the anterior in a short tube, the posterior somewhat larger, with a slightly raised rim, which is elevated to form a short flap posteriorly; premaxillary teeth in a very narrow band, which tapers laterally to a point, and is confined to anterior three-fifths of bone; mandibular band also very narrow, of not more than 2 irregular series mesially, widening a little laterally and almost reaching buccal angle; vomer, palatines, and tongue without teeth; anterior gill-arch without filaments.

Bones firmer and integuments thicker than in *D. erythrinus*; upper surface of head, trunk, and tail thickly beset with sharp spines of nearly uniform size, which arise each from a conical base bearing 4 to 6, usually 5, strong radiating ridges, which give a strikingly stellate appearance viewed from above; spines simple, except on margins of disk and along side of tail, where they are variously divided, and bear from 2 to 5 points; those on dorsal surface of tail mostly bifid, with one point much longer than the others; preopercular spines directed outward and only slightly backward, each bearing a terminal rosette of spines; rostral spine similar but slenderer; spines accompanying lateral line thicker but not longer than the others; plates and spines on lower surface of disk and tail similar to those above, but

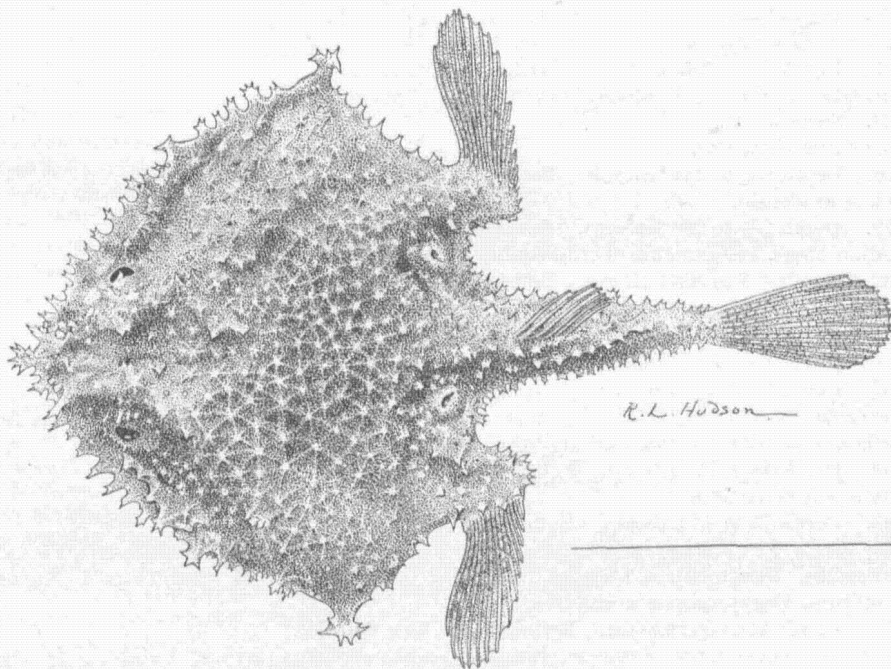


FIG. 276.—*Dibranchius stellulatus* Gilbert, new species. Type.

smaller; dorsal surface of tail with a few very small spinous tubercles, which also form series on caudal rays; iris surrounded by a ring of small spines, a number of scattered ones outside this ring. Lateral line running in a shallow groove; each papilla is inclosed between 2 flaps, with narrow bases and fimbriate margins, the flaps flanked by a pair of spines; 3 accessory papillæ of the mandibular series, as in *D. erythrinus*, placed on anterior margin of groove opposite interval between first and second, fourth and fifth, and between fifth and sixth papillæ of the regular series.

Distance from base of caudal to origin of dorsal half the distance from latter to front of orbit; when declined, the dorsal extends .6 the distance from its origin to base of caudal; base of dorsal .125 length of head; origin of anal fin slightly nearer vent than base of caudal; pectoral fin reaching base of subopercular spine, the short ventrals reaching but half-way to its tip.

Color, light olive-brown above, white below; 2 small black spots behind each eye, a second pair on each side the middle of disk, and a third pair above and in front of each gill-opening; a vertical dark shade immediately behind dorsal fin; a faint dark bar on terminal portion of dorsal and one on caudal; lining membranes of buccal, branchial, and abdominal cavities all white; lure unmarked.

Only one specimen taken.