

Specimens were taken at the following stations, all in the surface tow: Nos. 3878, south of Lanai; 3889, north of Molokai; 3912, south of Oahu; 3926, west of Oahu; 3927, south of Bird Island; 3929, south of French Frigate Shoals; 3930, near Laysan Island; 3980, south of Oahu; 4009, east of Kauai; 4010, east of Kauai; 4145, west of Kauai, Bird Island.

*Dasy Scopelus pristilepis* Gilbert & Cramer, Proc. U. S. Nat. Mus., xix, 1897, 412, pl. 39, fig. 1.

#### **Neoscopelus macrolepidotus** (Johnson).

No Atlantic material has been at hand for comparison, but a single specimen from Japan<sup>a</sup> seems to agree completely with the Hawaiian specimens. No individuals were taken at the surface, but it is perhaps doubtful whether the following stations, taken with other recorded depths, can be accepted as giving the vertical range of a bottom form: Nos. 3824, off the south coast of Molokai, 222 to 498 fathoms; 3892, off the north coast of Molokai, 328 to 414 fathoms; 3973, vicinity of French Frigate Shoals, 395 to 397 fathoms; 3979, vicinity of Bird Island, 222 to 387 fathoms; 3994, vicinity of Kauai, 330 to 382 fathoms; 4014, vicinity of Kauai, 362 to 399 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; 4137, vicinity of Kauai, 411 to 476 fathoms; 4166, vicinity of Bird Island, 293 to 800 fathoms.

### Family MAUROLICIDÆ.

#### **Argyripnus ephippiatus** Gilbert & Cramer.

Three specimens were obtained at the following stations: Nos. 4085, off the north coast of Maui, 267 to 283 fathoms; 4121, off the northwest coast of Oahu, 216 to 251 fathoms.

The species has been referred by Garman (Mem. Mus. Comp. Zool., XXIV, 1899, p. 399) to the genus *Valenciennellus* Jordan and Evermann. It differs, however, in the much more anterior position of the dorsal fin in comparison with the anal, and in the widely divergent arrangement of the photophores. An adipose dorsal is well developed, a character which escaped attention in the type owing to mutilation.

*Argyripnus ephippiatus* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 414, pl. 39, fig. 2.

#### **Argyropelecus heathi**, new species. Plate 72, fig. 1.

Type, 31 mm. long, from station 4107, Kaiwi Channel, between Oahu and Molokai, depth 350 to 355 fathoms; type, No 51632, U. S. Nat. Mus.

Head 3.5 in length to base of caudal; depth 1.9. D. VII+8; A. 11<sup>b</sup>; P. 9. Depth of body less than in other species of the genus, contained 1.3 in length of trunk and tail; caudal peduncle very slender, its least depth but half its length posterior to last anal ray; eyes lateral in position but directed vertically upward, separated by a very narrow ridge; longitudinal diameter of eye 0.3 the length of the head; exposed portion vertically oblong in shape, the vertical diameter being half greater than the horizontal; pupil confined to extreme upper half of exposed area.

Cleft of mouth nearly vertical; when closed the mandible fits within the upper jaw; mandibular symphysis with a scarcely noticeable prominence; length of maxillary contained 1.2 times in head, premaxillary lying along the anterior margin of its proximal half; premaxillary teeth minute, in a single series, the lateral teeth directed toward angle of mouth; beyond end of premaxillary bone, the maxillary is provided with a single series of similar teeth, all or nearly all retrorsely set; mandibular series with slightly larger hooked teeth, in a narrow patch at symphysis, a single series laterally; no teeth can be detected on the vomer or palatine bones; gill-membranes widely joined, free from isthmus; branchiostegal rays 9; gill-rakers long and slender, 6+12 on the outer arch; pseudobranchiæ well developed; the preopercular angle bears 2 large spines, the longer one directed vertically downward, the other obliquely upward and backward; the angular bears a short triangular spine, and the clavicular symphysis a similar larger spine; the abdominal crest, between ventral and pectoral fins, formed by the union of 12 pairs of plates, each of which covers a luminous organ, the plates without ridges, serrations or spines; posteriorly, for a space corresponding to the last 3 plates, the crest is formed by a very thin bony lamella derived from the pelvic girdle, this plate increasing in height posteriorly and termi-

<sup>a</sup>Since the above was written, the Japanese specimen referred to has been made the type of a new species, *N. alcocki* Jordan & Starks (Bull. U. S. Fish Com. for 1902, 580, pl. 2, figs. 1 and 2), but as no direct comparison has been made with Atlantic material, the name is not adopted in this paper.

<sup>b</sup>A wider interspace in the middle of the series apparently indicates the loss of a ray, thus making 12 in all.

nating in a spine directed downward and backward, with a short spine at its base behind; in front of the spine, the margin of the plate is minutely serrulate; the plate before the dorsal fin is formed by fusion of the 7 protruding interspinals, which are regularly graduated in length, the last two of equal length and closely apposed, the others evenly spaced; no trace of an adipose dorsal fin; anterior anal ray under last ray of dorsal; distance from last anal ray to first rudimentary caudal ray slightly exceeding length of anal base; the anal consists of 6 closely-set anterior rays and 5 more widely-spaced shorter posterior rays; pectorals long, reaching base of ventrals. The ventrals are injured, but one fin being present, and in such condition that it can not be described. Caudal gently forked.

The genus *Argyropelecus* is supposed to be scaleless, but the species here described is covered with extremely thin, high and narrow scales, wholly similar to those of *Polyipnus*. But few of these scales remain, in scattered patches, in the type. Where they have been lost, no scale pouches are evident.

Photophores arranged as in other species of the genus: A group of 4 at the base of the lower caudal lobe, a group of 6 above the fifth to ninth anal rays, the distance separating these groups nearly twice the length of the anal series; a series of 4 between ventrals and anal, and a series of 12 along the ventral margin, between pectorals and ventrals; above the posterior portion of the ventral series is a second horizontal row of 6 spots, on a level with the base of the pectorals, and in advance of these are 2 spots at a higher level, the posterior higher than the anterior; a small spot behind lower margin of orbit, one behind and one before preopercular angle, a series of 6 on each side of breast in front of pectoral fins, and a series of 6, one at the base of each branchiostegal membrane; each spot or group of spots has a deeply pigmented area above it.

Color: Greater part of head and trunk blackish, middle of trunk with silvery sheen; snout and mandible largely translucent; caudal peduncle whitish, with a series of small black spots along anterior half of middle line, a dark blotch on middle line at base of caudal fin, and a black area in connection with each group of photophores; front of mouth whitish, back of mouth and gill cavity jet-black.

The stomach was everted in the type, indicating that it came from a considerable depth. But one specimen was secured.

#### Family CHAULIODONTIDÆ.

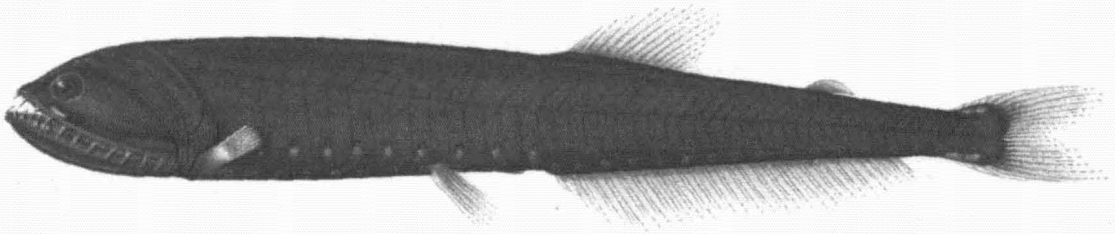
#### *Cyclothone rhodadenia*, new species. Plate 71, fig. 1.

Type, a female, 192 mm. long (excluding caudal), from station 4108, Kaiwi Channel, depth 411 to 442 fathoms; type, No. 51584, U. S. Nat. Mus.

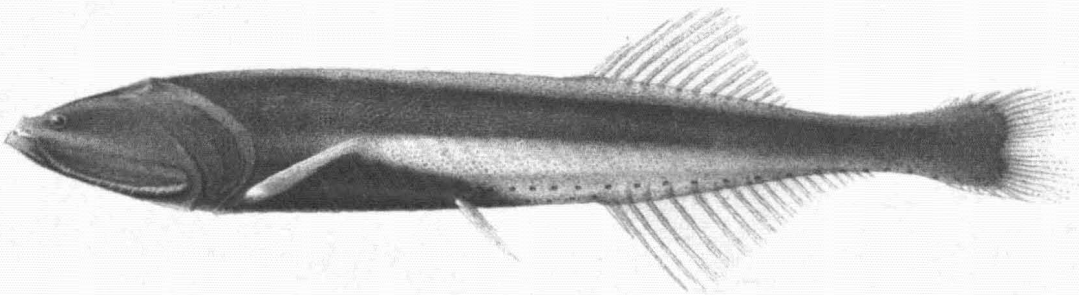
Very closely allied to *C. elongata* (Günther) (Deep-Sea Fishes, Challenger, p. 173, pl. 45, fig. B), from the Indian Ocean south of New Guinea, differing in the more numerous branchiostegal rays, the more posteriorly inserted ventrals, the more anteriorly placed adipose dorsal, the development of the glandular areas on caudal peduncle, and minor details in number and arrangement of lateral photophores.

D. 14; A. 30 or 31; P. 11 to 13; V. 8. The type and the single cotype measure respectively 192 mm. and 76 mm. in total length, exclusive of caudal fin. Below is a table of comparative measurements, expressed in hundredths of this length.

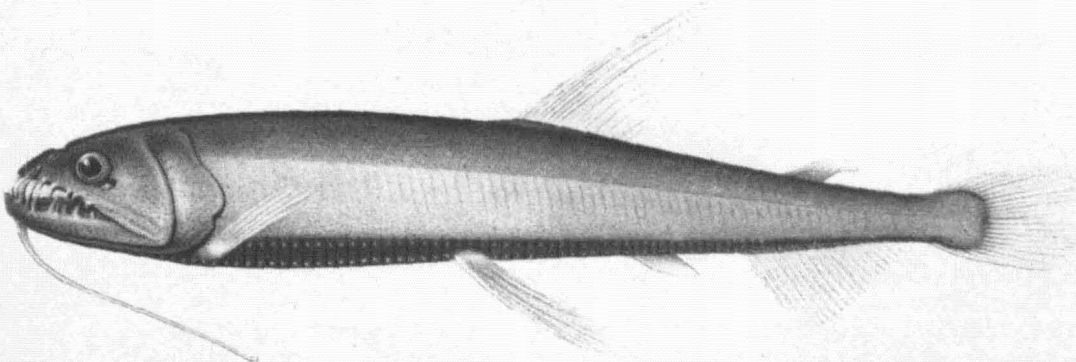
	Type.		Single cotype.
	mm.	mm.	mm.
Total length without caudal .....	192.0		76.0
Length of head (in hundredths) .....	21.5		22.5
Snout .....	4.0		4.0
Orbit .....	2.8		3.2
Interorbital width .....	4.0		3.0
Length of mouth to tip of maxillary .....	17.5		19.0
Length of mandible .....	18.5		19.0
Greatest depth of body .....	14.0		15.5
Least depth of caudal peduncle .....	4.0		4.6
Distance from snout to dorsal .....	58.0		58.0
Base of dorsal .....	11.0		11.0
Distance between dorsals .....	14.0		12.5
From front of adipose to base of middle caudal rays .....	18.5		19.0
Distance from snout to ventrals .....	44.0		44.0
Ventrals to anal .....	13.0		11.5
Base of anal .....	37.0		37.0
Caudal peduncle behind anal .....	9.0		11.0
Length of pectorals .....	9.0		8.5
Length of ventrals .....	8.0		9.0



1. CYCLOTHONE RHODADENIA GILBERT. TYPE.



2. CYCLOTHONE CANINA GILBERT. TYPE.



3. ASTRONESTHES LUCIFER GILBERT. TYPE.

Eye small, two-thirds length of snout, which equals interorbital width; interorbital space containing a pair of narrow parallel lengthwise ridges, which fork anteriorly, the branches diverging to either side of nostrils; posteriorly, these ridges extend along sides of occiput, where they gently diverge; a similar ridge extends backward above the opercles; on median line of occiput, posteriorly, is a low rounded tubercle marked with radiating ridges; suborbital covering much less than half the cheek, forming a sheath overlying upper portion of maxillary for its entire length; teeth similar in both jaws, long slender subequal canines widely and equally spaced, and separated by 8 or 10 uniformly short teeth less than one-fourth their length; 12 canines along each side of the upper jaw; head of the vomer with a pair of short bramble-like teeth hooked backward; palatines with a single series, the first 2 or 3 elongate and canine-like, the others minute; roof of mouth, inside the palatine bands, with wide patches of small prickle-like teeth, 2 or 3 of the anterior outer ones enlarged; gill-rakers of the 2 series on each arch widely different; those of the outer series very long and slender, of the usual type, those of inner series much shorter, very slender and sharp, and fixed in an erect position; those of the outer series of the first arch  $9 + 12$  in number, the longest equaling the diameter of the orbit.

Both pectoral and ventral fins are broken, so nothing can be given as to their length; distance from axil of ventrals to vent two-fifths distance from ventrals to pectorals (one-half that distance in *C. elongata*); origin of dorsal vertically over the second or third anal ray; adipose dorsal more anteriorly inserted than in *C. elongata*, above the seventh anal ray before the last, and midway between last dorsal ray and base of middle caudal ray.

In the type of *C. elongata*, Günther seemed to find traces of scale-pouches on the caudal peduncle, but in other specimens, Alcock (Ann. Mag. Nat. Hist. 1891, 127, and 1892, 354) denied the presence of scales. In our type of *C. rhodadenia*, we are fortunately able to settle this question. The integument is preserved, and but little worn. Immediately behind the head, along the edge of the shoulder-girdle and below, 5 large scales are evident, all but one covering photophores. Another similar scale was detected in relation with one of the luminous glands on the tail, and others are almost certainly present covering other photophores. The scales are excessively thin and membranous, and are wholly concealed beneath the skin. They were detected by the concentric striae showing through the somewhat hardened integument and were in 2 instances dissected out. Although the integument is in equally good condition over the general body surface, no further traces of scales could be detected. Those in connection with photophores probably would be the last to disappear in forms which were losing their scales.

The photophores are arranged as follows: Subocular 1, a definite photophore like those of the upper lateral series, located below the anterior part of the orbit, connected with a small oblong white glandular patch below and behind it; mandibulars 1, on the inner face of each ramus near the symphysis, a definite glandular body apparently connected with a small photophore; operculars 2, one indistinct, behind tip of maxillary, the other accompanied by a white glandular body, on preopercle at level of eye; branchiostegals 9, one at base of each interradiar space, except the two anterior and the two posterior spaces; pectoral 1, vertically above base of pectoral fin and immediately behind shoulder-girdle, a little nearer pectoral than line of back. Upper lateral series 12 or 13, extending from just behind pectoral fin to a point opposite front of anal, each organ consisting of an upper inconspicuous luminous body, and a lower conspicuous white gland, composed of white convoluted tubules, which communicate with the photophore proper. Lower lateral series 43, forming continuous series from the isthmus to the base of lower caudal lobe; 4 are in advance of pectorals, the 2 lines strongly converging forward, 11 between the pectoral and ventral fins, 5 between the ventrals and the front of anal, 19 along base of anal, 1 under middle of caudal peduncle, and 3 along lower lobe of caudal; the vent lies between the fourth and fifth pairs of the ventral series; the first anal pair are vertically over the third anal ray, in line with the ventral series, and spaced equally with them; the second and third pairs of the anal series diverge from anal base in an obliquely curved line having its convexity directed upward and forward, the third pair being a little above level of upper lateral series, which is discontinued before it reaches them; the fourth, fifth, sixth, and seventh pairs again approximate the anal base, but the fourth and seventh are slightly above the fifth and sixth, the 4 thus forming a curved line with its convexity downward; from the eighth on, the lines are parallel and straight, the spaces between the spots gradually increasing posteriorly; there is no interruption between the anal and caudal series; the first caudal spot lies before the first rudimentary rays, the second over the



middle of these rays, the third at a higher level, opposite the middle of the developed rays of lower lobe; a single small glandular patch on the back of the tail and 2 much larger ones below, each with a curved band of black pigment along its posterior margin. In addition to these there are along the sides numerous much smaller photophores, probably of simpler structure, arranged in definite series, each of these organs appearing as a light central dot surrounded by a narrow black ring. In one series they are arranged intersegmentally along the mid-lateral line; above and below this are two parallel lateral series, equally spaced, the spots in each series segmentally arranged and so disposed that they form with those of the other series obliquely transverse lines, those above the lateral line running upward and backward, those below, downward and backward. Others are disposed along the back and on the sides of the head, where no definite arrangement has been detected.

General color brownish black above, jet-black below; fins finely speckled, the pigment spots on rays of vertical fins usually arranged in cross-lines, which often correspond to the articulations of the rays. In life the glandular portions of all the photophores were brilliant ruby-red, including the lower portions of the upper lateral row, the lower portion of the subocular spot, the preopercular spot (surrounded by a silvery line), and the patches on upper and lower sides of caudal peduncle.

Stomach deeply caecal, the sac sharply tapering to its posterior end, extending one-third the length of the abdominal cavity; pyloric caeca large, 6 in number.

Specimens were taken at stations Nos. 4019, vicinity of Kauai, 409 to 550 fathoms, and 4108, Kaiwi Channel, 411 to 442 fathoms.

***Cyclothone canina*, new species. Plate 71, fig. 2.**

Type, 38 mm. long, from station 4005, vicinity of Kauai Island, depth 480 to 577 fathoms; type, No. 51545, U. S. Nat. Mus.

Differing from other species of the "*microdon*" group in the development of 3 pairs of slender canines near the mandibular symphysis. There are also other characteristic details of dentition, and minor differences in the proportions of the fins, the dorsal being a little larger, the anal a little shorter than in other species.

Length to base of caudal 60 mm.; head 22 hundredths of this length; snout 3.5; interorbital width 3; distance from tip of snout to end of maxillary 19; length of mandible 20; greatest depth of body 14; least depth of caudal peduncle 5; distance from tip of snout to front of dorsal 59; length of dorsal 20; distance from last dorsal ray to base of middle caudal rays 22; distance between pectorals and ventrals 22.5; from axil of ventrals to front of anal 14; length of anal base 27; distance from last anal ray to base of middle caudal rays 15; length of pectorals 12; length of ventrals 9; distance from ventrals to vent 5. D. 14; A. 18 (rarely 19); P. 13; V. 7; branchiostegals 14; gillrakers 9 + 15 or 16 on outer arch.

Mandible acute and projecting well beyond premaxillaries; teeth of mandibular series minute anteriorly, increasing in size along middle and posterior portion of jaw, 2 or 3 of the posterior teeth again diminishing; teeth not enlarged at intervals along the sides of the jaw, nearly erect, and numbering about 100 in each ramus; near the symphysis are 3 pairs of curved canines, the anterior pair smallest, the posterior largest; 3 pairs of similar incurved canines opposed to them in the premaxillaries, shorter than those in the mandible, the posterior again the largest; maxillary teeth increasing in length posteriorly, 2 or 3 of the posterior teeth again smaller; about 80 teeth in each maxillary, none of them greatly inclined forward, and none of them much larger than the corresponding mandibular teeth; every second or third tooth along middle and posterior part of the maxillary a little longer than the others, with the point turned downward; vomerine teeth forming 2 series gently converging forward, regularly increasing in size posteriorly, usually 3 in each series; palatine teeth confined to the anterior end, in 2 small detached groups, the anterior consisting of a moderate canine with 2 minute teeth to one side, which are detected with difficulty; posterior group consisting of 2 anterior teeth directed inward toward the middle line, and 2 or 3 others directed backward, the first of each set enlarged, all arranged in a single line; pterygoid teeth all small, forming a single, somewhat irregular series; gill-laminae much shorter than in related species, their length less than the width of the arch to which they are attached; outer set of gill-rakers extremely long and slender, inner set shorter, fixed in an upright position.

An occasional large scale is still attached to sides of body in one of the cotypes. There is no adipose fin.

Arrangement of photophores: Subocular 1, with a short vertical bar of black pigment behind it. Preoperculars 2, one under its lower angle, the other on level of middle of sides. Branchiostegal photophores 10 (rarely 11). In the lower lateral series there are 13 between isthmus and ventrals; 5 between ventrals and anal, the third of these opposite the vent, the fourth and fifth on the translucent strip of body wall between vent and front of anal; 11 (rarely 10) along base of anal; 3 along caudal peduncle; 2 on base of caudal, the anterior opposite the rudimentary rays, the posterior scarcely more elevated, at base of lower caudal rays; there is no break in the lower lateral series, and none of the spots are elevated. Spots of the upper lateral series 7 to 10 in number, sometimes ceasing before ventrals, sometimes continued to a point opposite the vent; all small, like those of the lower series, and not provided with special gland of convoluted tubes.

Color dark brown above and on sides, black on abdomen and sides of head; basal portion of each dorsal and anal ray and each interspinous and interhæmal bone black.

Specimens were taken at the following stations: Nos. 3981, vicinity of Kauai, 414 to 636 fathoms; 4005, vicinity of Kauai, 480 to 577 fathoms; 4018, vicinity of Kauai, 724 to 804 fathoms; 4026, vicinity of Kauai, 368 to 1021 fathoms; 4110, Kaiwi Channel, 449 to 460 fathoms; 4126, between Oahu and Kauai, 743 to 1278 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4154, vicinity of Bird Island, 636 to 850 fathoms; 4180, vicinity of Niihau Island, 417 to 426 fathoms.

Very young specimens of this species were frequently found adhering to the trawl webbing in all parts of the trawl, and this was frequently the case when the trawl had not reached the bottom. As it was taken only in deep hauls (over 400 fathoms), it must be a truly bathybial, but not a bottom form. The great reduction of the gill-laminæ is in favor of its bathybial habit.

**Cyclothone atraria**, new species. Plate 72, fig. 2.

Type, 53 mm. long (not including the injured caudal fin), from station 4187, the vicinity of Kauai Island, depth 508 to 703 fathoms; type, No. 52055, U. S. Nat. Mus.

Head 23 hundredths of total length without caudal; eye 2; distance from tip of snout to end of maxillary 19; snout 3.5; interorbital width 4; mandible 21; greatest depth (at nape) 14.5; least depth of caudal peduncle 5; distance from tip of snout to front of dorsal 58; base of dorsal 20; distance from dorsal fin to base of middle caudal ray 24.5; distance from base of pectorals to base of ventrals 23; from base of ventrals to front of anal 12; base of anal 30; distance from the last anal ray to the middle caudal ray 14; length of pectorals 12; of ventrals 10; distance from ventrals to vent 5. D. 15; A. 16; scales in about 28 transverse series, 15 or 16 in advance of the line joining first rays of dorsal and anal fins; gill-rakers of outer arch 7 + 13; branchiostegals 10.

Anterior half of maxillary containing very minute teeth, those near middle scarcely discernible; posterior half with about 17 teeth, regularly increasing in size posteriorly, all but 2 or 3 of the posterior teeth equally inclined forward and with slightly recurved tips, none of them enlarged or canine-like; premaxillary with 6 to 8 small teeth somewhat increasing in size anteriorly; mandibular teeth fine, close-set, inclining obliquely forward, those posteriorly increasing in length; anteriorly on each side are 2 widely-separated well-defined canines.

The scales have all fallen, but scars persist and are conspicuous. In other species known to us no trace of scales persists.

Color uniform black on head and body, and apparently also on the vertical fins.

Photophores are present as follows: Subocular 1; preoperculars 2; branchiostegals 9; of the lower lateral series, 13 between isthmus and ventrals (the 3 anterior crowded), 5 between ventrals and front of anal (the last nearly opposite first anal ray), 15 from front of anal to base of caudal, the latter arranged as in *C. canina*; the upper lateral series contains 8 photophores.

The type only is known.

**Family ASTRONESTHIDÆ.**

**Astronesthes lucifer**, new species. Plate 71, fig. 3.

Type, 75 mm. long, from station 4026, vicinity of Kauai Island, depth 368 to 1,021 fathoms; net probably not on the bottom; type, No. 51516, U. S. Nat. Mus.

Very closely related to *A. martensii* Klunzinger, from the Red Sea, differing in the very elongate pectorals and ventrals, and the much smaller eye.

Length to base of caudal 66 mm. Of this length the head forms 22 hundredths; diameter of orbit 4; bony interorbital width 4; length of snout 6; mouth measured from tip of snout to end of maxillary, 18; length of barbel 30; greatest depth of body 15; least depth of caudal peduncle 6; distance from tip of snout to base of dorsal 52; length of dorsal base 13; distance between dorsals 16; from front of adipose dorsal to base of middle caudal rays 21; distance from tip of snout to base of ventrals 48; length of anal base 15; distance between the lower adipose fin and the anal 7.5; length of ventrals 21; length of pectorals 18; height of dorsal 19. D. 12, the first ray very short, the last split to the base; A. 19; P. 6; V. 7.

Interorbital width equaling diameter of orbit, rather strongly grooved, and bounded on each side by 2 sharp ridges, which are closely apposed over the middle of the orbit and diverge forward and backward from this point; a minute bluntish protuberance at the upper posterior margin of the orbit, and behind this a third ridge, outside the 2 which bound the interorbital area; mandible massive, slightly protruding beyond premaxillaries; teeth notably smaller than those figured by Lütken (*Spolia Atlantica*, Scopelini, pl. 3, fig. 7) from Klunzinger's type of *A. martensii*. Near tip of mandible a very long slender canine, double on one side in the type, single on the other; nearer the symphysis a second pair, no longer than the shortest teeth on sides of mandible; teeth on one side of the mandible subequal and arranged regularly in pairs, one pair near the outer margin of the jaw alternating with another nearer its inner margin; posteriorly where overlapped by the maxillary, a few small teeth only, in line with those of inner row; arrangement less regular on the other side of the mandible, some of the teeth apparently fallen; two pairs of canines in front of premaxillaries, the inner pair not half the length of the outer; sides of premaxillaries with a few small canines like those in the mandible, apparently also arranged typically in pairs, though this is less evident; most of the canines slenderly arrow-shaped at tip; maxillary forming a trifle less than half margin of upper jaw and ending posteriorly in a short spine; it bears a single row of 15 to 20 very slender, close-set teeth, directed obliquely downward and backward; a single minute tooth on each side of the head of the vomer, a series of similar teeth on palatines; no teeth on tongue; gill-rakers represented by short spinous teeth arranged in pairs, of which 12 are present on the horizontal limb of the outer arch; barbel longer than head, with a dilated tip, reaching about to middle of pectorals.

Dorsal more anteriorly inserted than in *A. martensii*, its insertion midway between nostril and base of caudal, slightly behind insertion of ventrals; ventrals midway between end of maxillary and front of anal; when declined, the ventrals reach slightly beyond pre-anal adipose fin; front of adipose dorsal over fourth or fifth anal ray, thus far in advance of middle of fin; pectorals extending over two-thirds their distance from ventrals.

In color this species agrees with *A. martensii*, being grayish silvery on sides of head and body, brownish black above, black on under parts; fins translucent, unmarked.

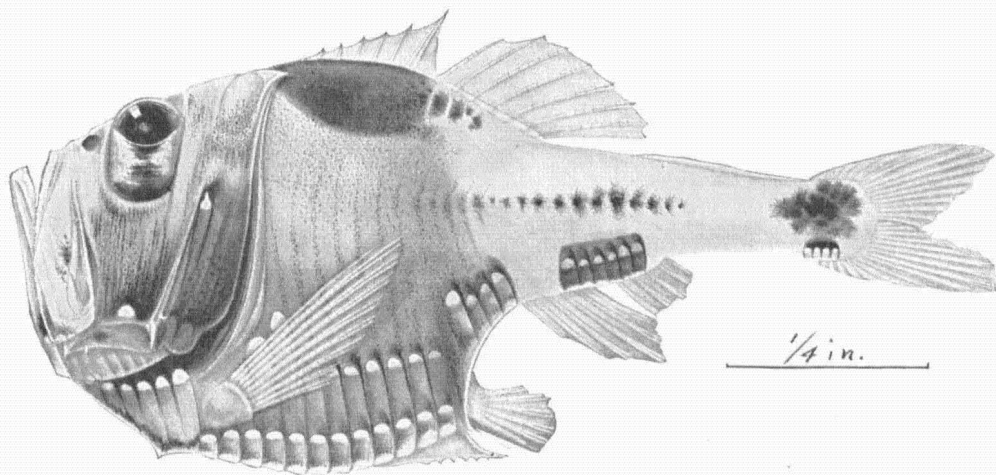
The photophores show a similar arrangement: Operculars 2. Branchiostegals 18, one for each ray. Jugulars 8, along the sides of the isthmus. Thoracics 22, 4 of these in advance of axils of pectorals. The jugulars and thoracics form continuous series, the 2 parallel anteriorly, strongly diverging posteriorly to reach the bases of the ventrals. Ventrals 22, the anterior 2 pairs in advance of the ventrals, between the diverging ends of the thoracic series. Anals 2+8, a wider interspace between the second and third; the last 2 are smaller than the others and diverge upward in a curved line. Caudals 4. The subocular photophore is shorter and rounder than in Lütken's figure, and is farther back, none of it under the pupil; its posterior end is much nearer the eye than the maxillary. The entire body is covered with minute pores, which appear black on the silvery portions, light on the blackish areas, and are arranged in more or less regular cross series.

A single cotype was obtained at station 3918, off the south coast of Oahu, depth 257-294 fathoms.

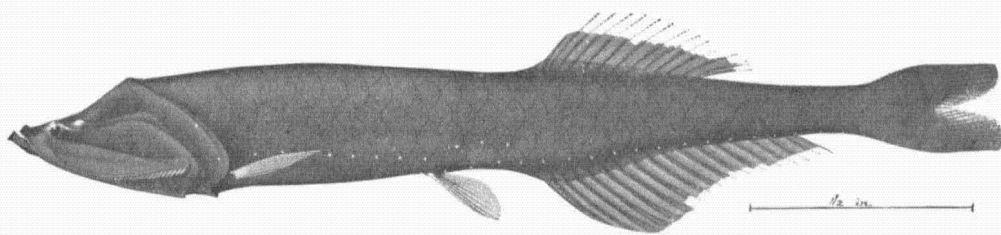
#### Family STOMIDÆ.

##### *Leptostomias*, new genus.

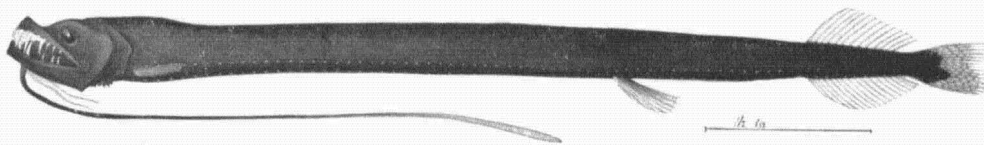
Body extremely elongate, but little compressed, without scales; mouth very wide; anterior teeth slender, fang-like, unequal, projecting outside jaws in closed mouth; a pair of slender teeth on vomer, a similar tooth on each palatine and a pair on tongue; branchiostegal rays 17; no pseudobranchiæ; eye very small; pectoral without detached ray; ventrals inferior, far behind middle of length; dorsal and



1. ARGYROPELECUS HEATHI GILBERT, NEW SPECIES. TYPE.



2. CYCLOTHONE ATRARIA GILBERT, NEW SPECIES. TYPE



3. LEPTOSTOMIAS MACRONEMA GILBERT, NEW SPECIES. TYPE.

anal opposite and nearly equal; no lateral line; head and body thickly beset with minute photophores which can be distinguished only by the aid of a lens, and are most abundant along lower half of sides; two series of larger photophores along each side of ventral line.

*Leptostomias* Gilbert, new genus of *Stomiidae* (*macronema*).

***Leptostomias macronema***, new species. Plate 72, fig. 3.

Type, 74 mm. long, from station 4177, vicinity of Niihau Island, depth 319 to 451 fathoms; type, No. 52056, U. S. Nat. Mus.

Head 13 hundredths of total length without caudal; greatest depth (at occiput) 7; greatest depth of trunk 5; depth of caudal peduncle 3; width of trunk 3; length of snout 4; diameter of orbit 2; interorbital width 3; length of upper jaw 8; length of gular filament 60; distance from tip of snout to ventrals 65; from ventrals to front of anal 21; length of ventrals 8.5; base of anal 11; distance from tip of snout to front of dorsal 85; base of dorsal 8. D. 16; A. 20; V. 8; P. 7.

Snout rather slender, much as in *Eustomias*, its upper profile concave owing to the upward projection of the premaxillaries; teeth in a single series in each jaw, slender, fang-like, alternately long and short, about 7 or 8 on each side in mandible and premaxillaries, longest teeth a pair of canines near front of upper jaw corresponding to a pair of slightly shorter canines in mandible; a single slender tooth on extreme outer angle of vomer on each side, a similar tooth near middle of each palatine, and a pair on tongue; gill-rakers short, spine-like, 9 on horizontal limb of outer arch; gular filament very long, reaching nearly to base of ventrals, expanded near tip and then again tapering.

Color of head and body jet-black; barbel black on its basal half, translucent or whitish distally; fins translucent.

Four small photophores on side of head, one a short curved bar on hinder edge of orbit, the others small round spots, one on subopercle, one near tip of maxillary, one near mandibular angle; a series of photophores on branchiostegal membrane, one for each interradiar space; in addition to the minute luminous points thickly covering the surface, there are 2 longitudinal series of photophores along each side of mid-ventral line, the lower series of each side passing between ventral fins and forming closely approximated pairs; of the latter, 42 are in front of ventral fins, 16 between front of ventrals and anal, 8 opposite base of anal, and 6 on caudal peduncle; the anterior spots of this series are somewhat irregular in arrangement. The upper longitudinal series are well below middle of sides, and extend from head to opposite front of anal, containing 63 photophores.

Only the type known.

Family PARALEPIDÆ.

***Lestidium***, new genus.

Like *Sudis*, but the skin wholly naked, except for a series of small scales along course of lateral line, which are wholly embedded and concealed beneath the skin; lateral line terminating about opposite middle of anal fin; dorsal inserted behind ventrals; adipose fin above last anal rays; mid-ventral region compressed and carinate, the fleshy keel extending from vent to isthmus; vomer toothless; premaxillaries forming entire margin of jaw and provided with a series of short, backwardly-hooked teeth; mandibles and palatines containing long fangs; branchiostegal rays 7 in number, the membranes overlapping and connate anteriorly, free from the isthmus; pseudobranchiæ present; a photophore directed downward and backward at lower orbital margin; sensory canals of head much branched, the tubes covering the opercles, mandibles, and preorbitals.

*Lestidium* Gilbert, new genus of *Paralepidæ* (*nudus*).

***Lestidium nudum***, new species. Fig. 236.

Type, 20 cm. long, from station 3899, Pailolo Channel, between Molokai and Maui, depth 283 to 284 fathoms; type, No. 51615, U. S. Nat. Mus.

Head 22 hundredths of length to base of caudal; greatest depth 8.5; least depth of caudal peduncle 2; longitudinal diameter of orbit 4; interorbital width 2.7; length of snout 11; length of maxillary 10.5; tip of snout to ventrals 54, to dorsal 61, to anal 86. D. 9; A. 33; V. 10; P. 13; lateral line with 68 concealed scales.

Body elongate, compressed, deepest at nape, thence tapering gently to the very narrow caudal peduncle; head long, posteriorly compressed; snout long and sharp; eye in posterior half of head, its vertical diameter exceeding the horizontal diameter; interorbital space and occiput nearly flat; a pair of low ridges above each orbit; mandible included within margins of upper jaw, the latter transversely arched to receive it; the rounded end of mandible upturned to fit into an emargination of the premaxillaries; premaxillaries narrow, closely apposed to maxillaries, which fail to reach the vertical from front of eye; about half the width of the narrow maxillary for its entire length slips under the free margin of the preorbital, which continues as a conspicuous fold to below front of eye; upper jaw nonprotractile; the anterior arched portion of the premaxillaries toothless; near the front, on each side, is a long, depressible canine, preceded by a much smaller depressible tooth; behind these, after a short toothless interval, is a single series of short, fixed, bramble-like teeth, hooked backward, growing minute toward angle of mouth; all of the premaxillary teeth shut outside the mandible; mandibular teeth in 2 series, an outer row of short, fixed teeth and an equal number of inner, long, fang-like canines, which are depressible; the canines are widely spaced, about 8 in number on each side; palatine teeth similar, arranged in about 5 pairs, each consisting of an outer, short, fixed tooth and an inner, depressible fang, the middle fangs on each side a little the longest; vomer toothless; on each side of middle of tongue a lengthwise series of small, depressible teeth hooked backward; anterior nostril very small, closed from in front by a short, triangular flap; it is placed high and is distant from eye 0.3 the length of snout; posterior nostril a horizontal slit midway between anterior nostril and eye, and slightly above middle of orbit; gills 4 in number, with a slit behind fourth arch; gill-rakers represented by series of short, sharp spines on each arch; pseudobranchiae well developed, occupying a pocket made by a fold of the membranous lining of the cheek and a ligamentous band from upper end of outer gill-arch; subocular photophore small, but well developed.

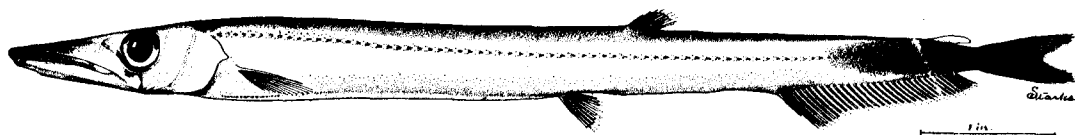


FIG. 236.—*Lestidium nudum* Gilbert, new species. Type.

Upper margin of pectoral but little below axis of body; longest rays two-fifths length of head; ventrals inserted midway between base of caudal and front of posterior nostril; front of dorsal well behind insertion of ventrals, behind middle of trunk a distance equaling half diameter of pupil; caudal forked, its lower lobe recurrent along lower line of caudal peduncle, with well-developed rays which reach to base of anal; vent overlapped by the short ventral fins, and distant from front of anal a distance about equaling length of anal base; adipose fin small, inserted above last anal rays.

The type was in perfect condition when taken, and showed no trace of scales or scale-pouches on the head or body. The lateral line is a wide tube, inclosed by a series of small scales which are wholly embedded and concealed. It does not open through tubes which penetrate the scales, but through minute pores occurring in groups of 3, above and below the scales. Posteriorly the scales diminish in size, and disappear, together with the lateral tube, opposite middle of anal fin.

Color translucent, with faint silvery luster; back a little darker; a Y-shaped blackish mark on occiput and nape; sides of snout and gill-membranes blackish; opercles largely bright silvery; a narrow black crescent around upper and lower contours of eye-ball; a narrow silvery streak anteriorly on each side of median line of abdomen, each streak with an inner line of coarse black specks; caudal peduncle washed with blackish and silvery, this area extending forward to middle of anal, but leaving a narrow translucent area above and below it; peritoneum and lining of opercles largely black; fins largely translucent; caudal a little dusky; anterior anal rays black-punctate at base; ventrals each with a small black basal spot.

Only the type specimen known; possibly captured by the trawl near the surface.

## Family STERNOPTYCHIDÆ.

*Sternoptyx diaphana* Hermann.

Several small specimens were secured, presenting no very wide differences in form or general appearance. One individual differs from all the others in having the 2 frontal ridges converging strongly backward, thus inclosing a narrowly wedge-shaped space. In other cases these ridges are parallel, their terminal spines diverging. Specimens were taken at the following stations: Nos. 3888, off the north coast of Molokai, 809 fathoms; 3904, off north coast of Molokai, 295 fathoms; 3917, off the south coast of Oahu, 294-330 fathoms; 4005, near Kauai, 480-577 fathoms; 4026, near Kauai, 368-1021 fathoms; 4105, Kaiwi Channel, 314-335 fathoms; 4110, Kaiwi Channel, 449-460 fathoms; 4111, Kaiwi Channel, 460-470 fathoms; 4154, near Bird Island, 636-850 fathoms; 4155, near Bird Island, 1164-1594 fathoms; 4166, near Bird Island, 293-800 fathoms.

*Polyipnus nuttingi*, new species. Plate 73.

Type, 83 mm. long, from station 4088, in the approach to the Pailolo Channel between Molokai and Maui, depth 297 to 306 fathoms; type, No. 51599, U. S. Nat. Mus.

Head 3.3 in length without caudal; depth 1.4; depth of caudal peduncle 8.5; horizontal diameter of eye 7.25; vertical diameter 6.25. D. 13; A. 17; P. 13; V. 7.

Closely resembling in form *P. spinosus* Günther, from the Philippines, and *P. stereope* Jordan and Starks, from Japan, but the posterior half of the body tapers more rapidly and forms a longer, slender caudal peduncle. The eye is larger, its horizontal diameter 2.2 in the head. The pair of crests on top of head are higher and very thin, provided with minute subequal spines equally spaced, the posterior 2 of these spines parallel to the others and not specialized. The post-temporals are movably articulated with the cranium, their proximal portions forming 2 slightly diverging ridges behind the occiput, each ridge minutely serrulate and terminating posteriorly in a backwardly directed spine, which is much shorter and weaker than in *P. stereope*. Through the lateral motion of the post-temporals, these spines can be approximated on the mid-dorsal line, or divaricated like the preopercular spines of cottoids. The distal limb of the post-temporal is directed downward and a little forward, its upper portion provided with a serrulate crest. There are no strong accessory spines directed downward and backward from the base of the post-temporal spine, but the serrations at the base of the spine are coarser than elsewhere. The pair of predorsal spines are weaker than in *P. stereope*, and the ridges converge less strongly forward. Both limbs of the preopercle are serrulate and the angle bears a claw-like spine hooked forward, this spine much smaller than in *P. stereope*. Cleft of mouth vertical, tip of mandible a little included; both maxillary and mandible very broad, the inferior mandibular margin serrulate, its angle with a strong triangular spine directed downward and forward; a broad supplemental maxillary bone present, with a smaller scale-like lamella overlying it proximally; premaxillary lying along anterior border of proximal six-tenths of maxillary; premaxillary teeth in a very narrow band or double series, the anterior row directed downward, the others hooked backward; the distal portion of maxillary, where it forms the border of the jaws, bears a similar single or double series of minute teeth; mandibular teeth in a slightly wider band at symphysis, in a single series laterally, those on vomer in 8 or 10 short longitudinal series, which slightly diverge backward; gill-membranes broadly united, free from isthmus; gill-rakers very long and slender, 7 (6 to 8) on vertical limb of outer arch, 15 (14 to 16) on horizontal limb; rows of gill-laminæ much longer than gill-arches; where continued above the latter, they are firmly attached along inner side of shoulder girdle; branchiostegals 9; pseudo-branchiæ large.

Front of dorsal fin midway between tip of snout and base of caudal; adipose dorsal low, the length of its base  $\frac{1}{2}$  to  $\frac{2}{3}$  the distance between first dorsal fin and upper caudal rays; origin of anal fin vertically below middle of dorsal, the distance between its last ray and the middle of caudal base equaling the vertical diameter of eye; below and in advance of pectoral base a horizontal serrated ridge, forming the margin of a wing-like expansion of the coracoid; a downwardly directed spine marks the clavicular symphysis; the length of the narrow pectoral fin equals the distance from tip of snout to hinder edge of orbit.



The scales which form the ridge along the breast are more rounded in outline and are thinner than in *P. stereope*, the ridge is lower and the striae and spines are fewer and weaker; the ridge along each side of abdomen is also much lower.

Dorsal region dark brown, a narrowly V-shaped extension of this color invading the silvery of the anterior part of the sides, extending downward to a point midway between dorsal and ventral profiles; middle of sides silvery, less brilliant than in *spinousus* and *stereope*, the abdomen and lower parts generally purplish instead of silvery; base of ventrals and base of outer caudal lobes blackish.

The luminous organs are arranged as in *P. spinousus* and *stereope*, but those above the base of the anal fin are only 11 or 12 in number, and the series is less perfectly continuous, the anterior half being placed at an angle with the posterior half of the series, the sixth spot being decidedly nearer the base of the anal than the seventh; there is also a much wider interval between the anal and the caudal series, where the two are continuous or nearly so; all the photophores are directed downward, and are visible from a point below midventral line; none of them can be seen from the back; on the other hand, the mouth is directed vertically upward and the eyes obliquely upward and outward.

Nothing is definitely known concerning the habits of these fishes. The specimens taken by the *Albatross* were probably captured near the bottom, but their stomachs contained nothing but *Globigerina* and other *Foraminifera*.

The species is named for my friend and associate on the Hawaiian Expedition, Prof. C. C. Nutting, of the University of Iowa.

The relations of *P. nuttingi* to *P. spinousus* and *P. stereope* have been given in the body of the description. *P. spinousus* and *P. stereope* agree with each other in all details of color and form, differing so far as known only in the size of the accessory post-temporal spines. *P. nuttingi* is farther removed from both of these species, differing in the darker coloration of the lower parts, the broader dark area along the back and its longer V-shaped extension below the predorsal region, the arrangement of the anal photophores, the longer, slenderer caudal peduncle, and the weaker spination. In *P. nuttingi*, the accessory spines along the lower edge of the post-temporal spine are reduced to fine serrations.

*Polyipnus laternatus* Garman (Mem. Mus. Comp. Zool., Vol. XXIV, 1899, p. 238), from the Barbados, is distantly related to these species, having palatine teeth, longer pectoral fins, and widely different form, predorsal blade, and spines. It should be eliminated from this genus. To the synonymy of *P. laternatus*, Garman refers by inadvertence Goode and Bean's figure of *Polyipnus spinousus* (Oceanic Ichthyology, pl. 39, fig. 148). The latter is merely a rough copy (reversed) of Günther's figure of the type of *P. spinousus* (Deep-sea Fishes, Challenger, pl. 51, fig. b), as appears at once on comparison. A number of disconcerting errors have crept into the list of plates and figures given in the Oceanic Ichthyology, so the greatest care must be exercised in referring to these figures. In the explanation of plate 39, fig. 148 is said to be *Argyropelecus olfersii*, while fig. 149 (labeled on the plate *Paralepis coregonoides*) is called *Polyipnus spinousus*. In this instance the names on the plate correspond with their use in the text, and the explanation of the plate should be disregarded.

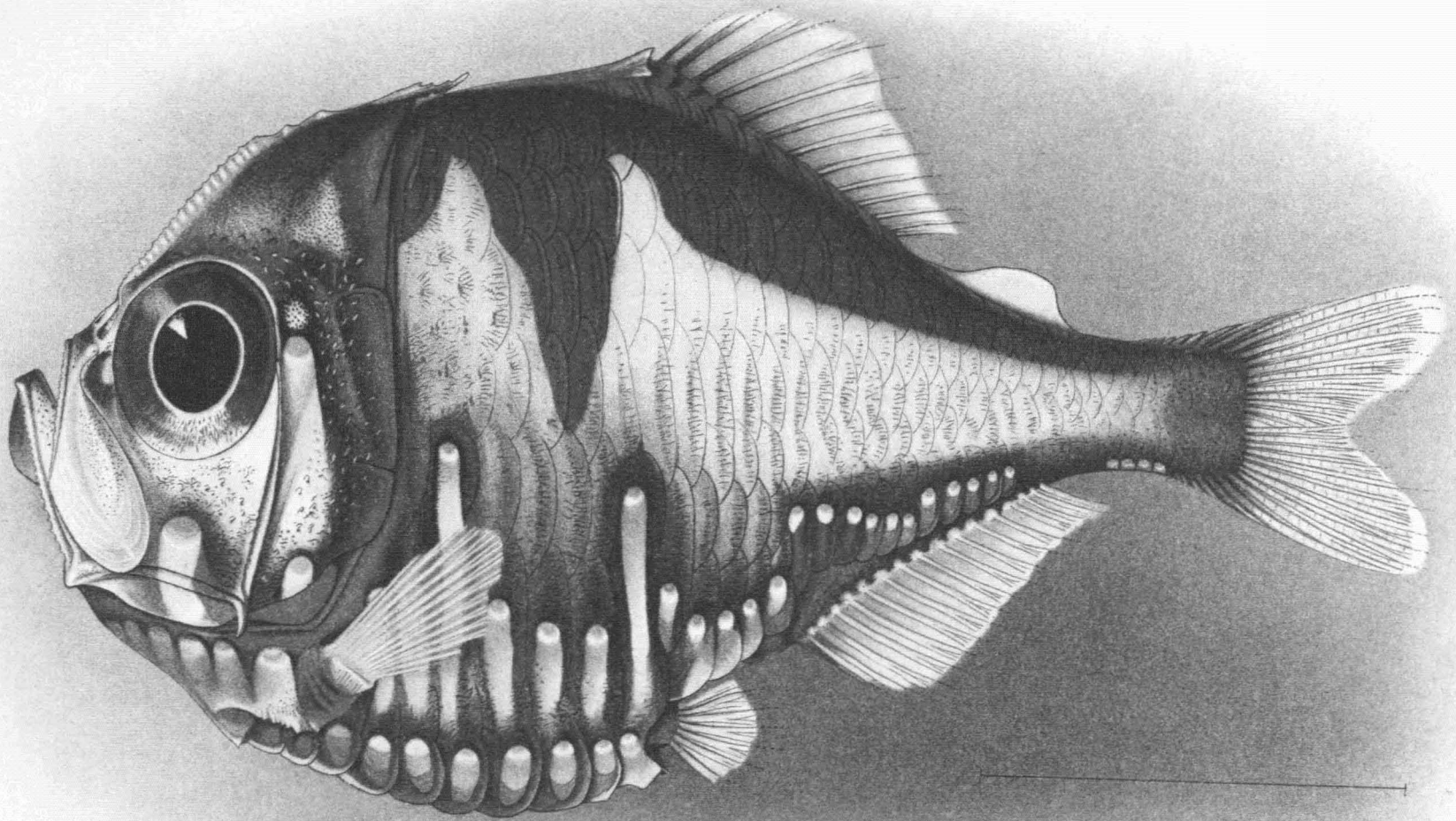
Specimens were taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 4088, approach to Pailolo Channel, 297 to 306 fathoms; 4089, approach to Pailolo Channel, 297 to 304 fathoms; 4090, approach to Pailolo Channel, 304 to 308 fathoms; 4091, approach to Pailolo Channel, 306 to 308 fathoms; 4097, approach to Pailolo Channel, 286 to (?) fathoms; 4121, off the northwest coast of Oahu, 216 to 251 fathoms; 4134, vicinity of Kauai, 225 to 324 fathoms.

*Polyipnus spinousus* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 416; not of Günther.

### Family HALOSAURIDÆ.

#### KEY TO HAWAIIAN SPECIES OF HALOSAUROPSIS.

- a. Snout not produced far beyond the mouth, its preoral length less than one-third its preocular extent.  
 b. Vertex gently arched transversely.....*kauaiensis*, p. 611  
 bb. Vertex transversely concave.....*verticalis*, p. 611  
 aa. Snout much produced beyond the mouth, its preoral length nearly half its preocular extent.....*proboscidea*, p. 612



POLYIPNUS NUTTINGI GILBERT. TYPE.

**Halosauropsis kauaiensis**, new species. Plate 74.<sup>a</sup>

Type, 655 mm. long, from station 4018, vicinity of Kauai Island, depth 724 to 804 fathoms; type No. 51612, U. S. Nat. Mus.

Length of head 40 hundredths of distance from tip of snout to vent; longitudinal diameter of orbit 5; interorbital width 6.5; preocular length of snout 16; preoral length of snout 4; length of maxillary 13; length of mandible 18; greatest depth of body 20; distance from tip of snout to front of dorsal 72; distance from tip of snout to base of ventrals 66; longest pectoral ray 21; longest ventral ray 12. D. 11 (including rudimentary ray); V. 9; P. 14 or 15; enlarged scales between gill-opening and vent 22 to 25; about 35 to 40 scales in a median series from occiput to front of dorsal; branchiostegals 13; gill-rakers 5+18 on outer arch; pyloric caeca 9.

Premaxillary band of teeth half length of maxillary band; teeth in both jaws large, arrow-shaped; palatine band tapering to a point anteriorly, and there separated by a very short interval from its fellow; at its posterior end, it is nearly as wide as the premaxillary band, and is separated from the narrower pterygoid band by about .4 its own length; pterygoid band extending far back into the mouth, and very narrow; tongue smooth; a wide band of teeth on the basibranchials; head scaleless, with the exception of the cheeks and a narrow strip above the opercles, which are covered with scales like those on body; vertex gently arched transversely. In adults the gill-rakers are short, the longest about .4 diameter of eye; in the young they are noticeably longer, more than half as long as eye; there are 5 or 6 on the vertical limb and 17 to 19 on horizontal limb of outer arch, including all rudiments.

Origin of the dorsal slightly behind middle of ventral fin, its height a third greater than the length of its base; base of ventrals below eleventh scale of lateral line, and nearer head than vent by two-thirds its own length; its outer ray shortened. In adults the inner ventral rays show union at base only, but in younger individuals they are joined by membrane nearly to their tips. Pectorals long, 1.6 in head, and falling but little short of vertical from base of ventrals; height of longest anal rays equal to half length of snout and orbit.

Scales of lateral line much enlarged. Photophores very narrow, vertically elliptical.

Color dark brown on back and sides, many of the scales with a light pearly spot at base; under parts, including snout, sides of head and subpectoral region and gill cavity, blue-black; ventrals blue-black; pectorals and dorsal dusky at base, whitish on terminal portion; anal dusky, lighter at base. Young specimens have a black vertebral band behind dorsal fin.

Taken at the following stations: Nos. 3887, off the north coast of Molokai, 552 to 809 fathoms; 3977, vicinity of Bird Island, 876 to (?) fathoms; 3989, vicinity of Kauai, 385 to 500 fathoms; 4018, vicinity of Kauai, 724 to 804 fathoms; 4019, vicinity of Kauai, 409 to 550 fathoms.

*H. kauaiensis* is most nearly related to *H. mediorostris* (Günther) from near the Philippine Islands, but the scales are much larger in the latter.

**Halosauropsis verticalis**, new species. Plate 75.<sup>b</sup>

Type, 295 mm. long, from station 4141, vicinity of Kauai, depth 437 to 632 fathoms; type, No. 51645, U. S. Nat. Mus.

Length of head 46 hundredths of distance from tip of snout to vent; longitudinal diameter of orbit 8; interorbital width 6; preocular length of snout 20; preoral length of snout 7; length of maxillary 16; length of mandible 20; greatest depth 15; distance from tip of snout to front of dorsal 77; distance from tip of snout to base of ventrals 72; longest pectoral ray 28; longest ventral ray 13. D. 11 (including anterior rudiment); V. 9; P. 14; enlarged scales between vent and gill-opening 25; about 40 to 45 scales on median line of back before dorsal fin; branchiostegal rays 12; gill-rakers 6+18 on outer arch, the longest two-thirds diameter of eye; pyloric caeca 9.

The greatest depth is at occiput, one-third length of head; snout longer than in *H. kauaiensis*; horizontal diameter of eye slightly exceeding interorbital width, equal to .3 the postocular part of the head ( $\frac{1}{3}$  in *kauaiensis* of equal size, in which it exceeds interorbital width by .2 its length); occiput deeply concave, sending forward a narrow concave groove which tapers to a point and thus terminates slightly in front of nostrils; outlines of the brain very conspicuously marked on the occiput; maxillary extending slightly beyond anterior margin of orbit; premaxillary constituting slightly less than .4 of the dentary surface of the upper jaw; teeth distinctly arrow-shaped, constricted at a point below tip, then broadened; palatine bands with a straight inner and a convex outer margin, tapering from the

<sup>a</sup> *Aldrovandia kauaiensis* on plate, by error.

<sup>b</sup> *Aldrovandia verticalis* on plate, by error.

middle toward either end; their greatest width equals that of the premaxillary bands; their anterior ends are separated by a distance about equaling one-fourth their length; pterygoid bands much narrower and longer, and separated by a narrow interspace from palatine bands; tongue smooth, basibranchials toothed as usual.

With the exception of the cheeks and a narrow area above the opercles, the head is scaleless.

Origin of dorsal over middle of ventral fin; base of ventral fins below the thirteenth enlarged scale, and nearer head than vent by about half length of fin; outer ventral ray simple, shortened, and closely adnate to the second; the inner rays of the 2 ventrals joined by membrane, which apparently extends to their tips; pectorals very long, reaching somewhat beyond front of dorsal fin; longest anal rays half as long as snout.

Color brownish black on back and sides, with a black vertebral streak behind dorsal fin; head, belly, and lower parts generally a deep blue-black, as is also the lining of mouth and gill-cavity; fins dusky translucent; photophores borne beneath a series of much enlarged scales.

This species is very close to *H. kawaiensis*, but differs in the concave vertex, the longer snout and the differing proportions.

Taken at the following stations: Nos. 3985, vicinity of Kauai, 430 to 477 fathoms; 4141, vicinity of Kauai, 437 to 632 fathoms; 4151, vicinity of Bird Island, 313 to 800 fathoms.

***Halosauropsis proboscidea*, new species. Plate 76.<sup>a</sup>**

Type, 422 mm. long, from station 4111, Kaiwi Channel, between Molokai and Oahu Islands, depth 460 to 470 fathoms; type, No. 51614, U. S. Nat. Mus.

Length of head 35 hundredths of distance from tip of snout to vent; longitudinal diameter of orbit 6; interorbital width 3.5; preocular length of snout 15.5; preoral length of snout 7; length of maxillary 9.5; greatest depth of body 15; distance from tip of snout to front of dorsal 71; distance from tip of snout to base of ventrals 67; longest pectoral ray 21; longest ventral ray 12. D. 11 (including anterior rudiment, the last ray cleft to the base, destroyed in the type); V. 9; P. 14; enlarged scales between vent and gill-opening 29; gill-rakers 4+11 on outer arch, several of the anterior being tubercular rudiments, the longest half the diameter of the eye; pyloric caeca 8.

The opercular margin is slightly nearer base of ventrals than tip of snout; snout very long as in *H. rostratu* (Günther) and *H. affinis* (Günther); middle of pupil occupying middle of length of head; horizontal diameter of the eye 0.3 postocular length of head; interorbital space very narrow, its width contained 1.4 in the ocular diameter; occiput and interorbital space flat or gently convex; maxillary extending slightly beyond anterior margin of orbit, its length 3.8 in head; premaxillaries constituting 0.3 the dentary surface of upper jaw; teeth showing a slight constriction below tip, the latter flattened but not widened; palatine bands crescentiform, the 2 fully confluent anteriorly on the median line, wider than the premaxillary bands, and tapering but little anteriorly; pterygoid bands very narrow and separated from the palatines by an interspace half the length of palatine band; tongue smooth, basibranchials with a wide band of teeth; head naked, except the usual scaly area on cheeks and above opercles.

Origin of dorsal fin but a little behind root of ventrals; base of ventrals below seventeenth enlarged scale, and nearer vent than head by half the orbital diameter; outer ventral ray shortened and adnate, the inner rays of the 2 fins united by membrane, at least in the smaller cotype; pectorals long, equaling length of snout and eye, but falling far short of base of ventrals.

Color light grayish brown, with a faint bluish tinge; a blue vertebral streak behind dorsal fin; head and a narrow streak along belly and lower side of tail blue-black, as are also the mouth and gill-cavity; dorsal, pectorals, and ventrals only faintly dusky.

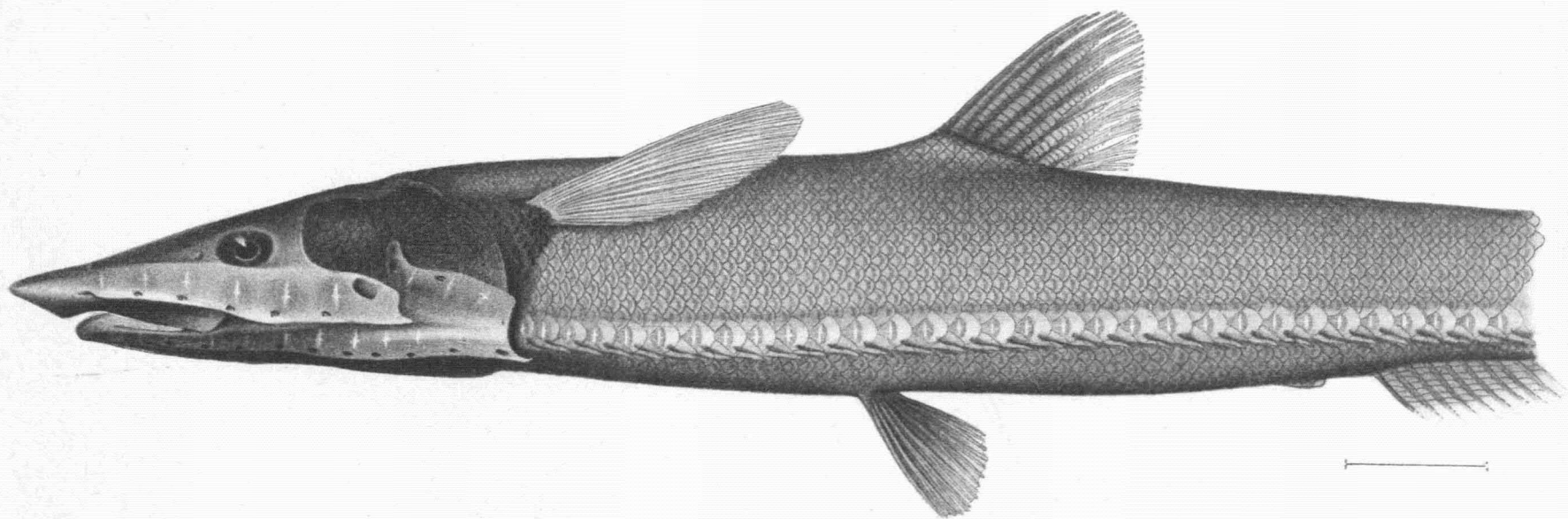
Photopores connected with a series of much enlarged scales.

A young specimen, 200 mm. long, considered a cotype, differs from the type in being everywhere jet-black, and in having the ventrals inserted a little farther forward, so that the origin of the dorsal is over the middle of their length, and their base is slightly nearer head than vent. In this specimen the gill-rakers are also 4+11; the branchiostegal rays 11.

*H. proboscidea* is closely related to *H. affinis* (Günther), from south of Japan, but has a longer, narrower head, with much narrower orbital space and more posteriorly inserted ventrals. It differs also in the anterior confluence of the palatine bands of teeth.

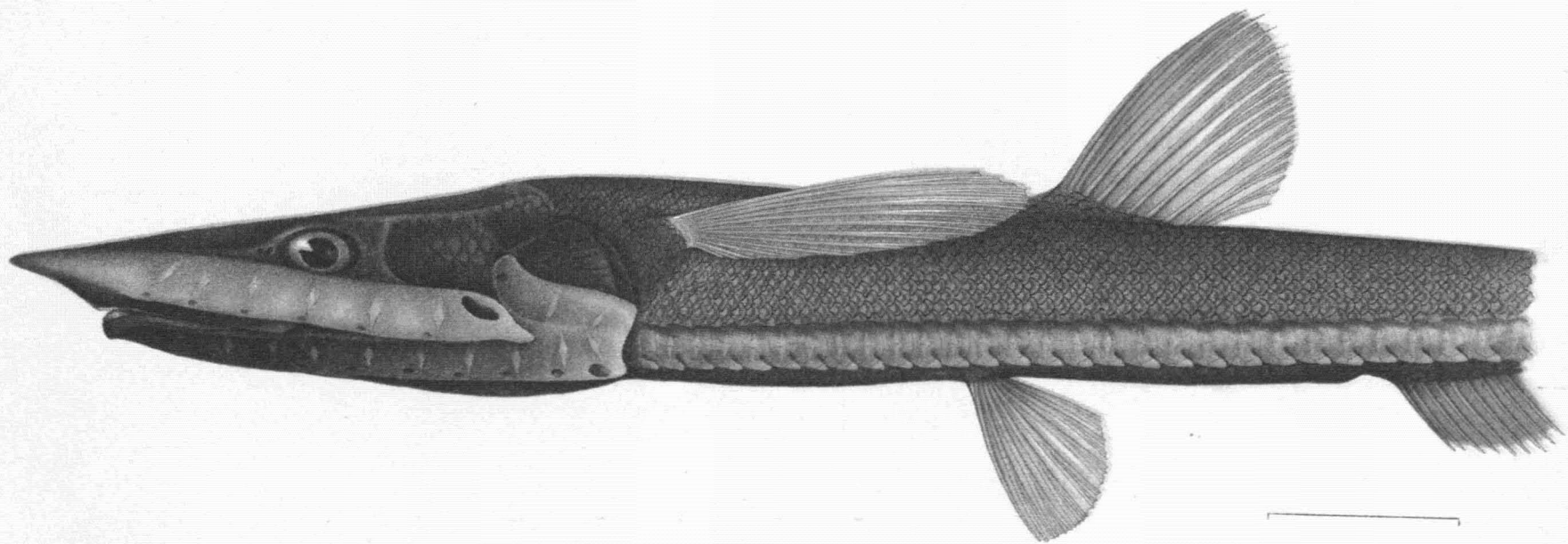
Specimens were taken at stations Nos. 4111, Kaiwi Channel, 460 to 470 fathoms, and 4138, vicinity of Kauai, 438 to 476 fathoms.

<sup>a</sup> *Alboraudia proboscidea* on plate, by error.

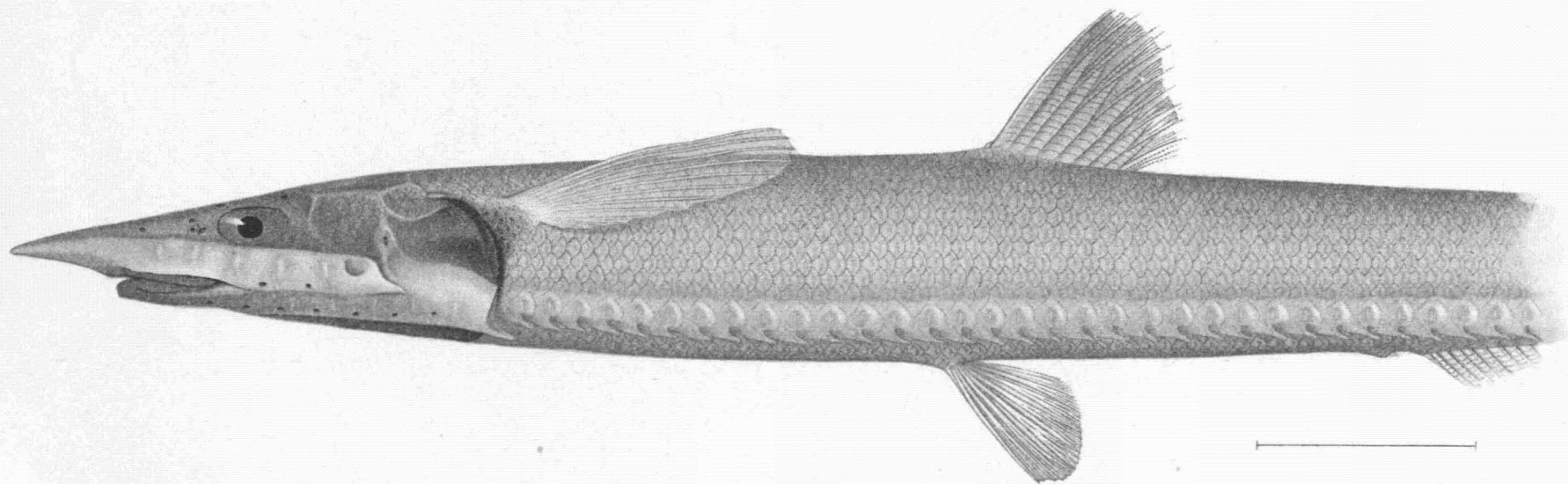


ALDROVANDIA KAUAIENSIS GILBERT. TYPE.  
*Halosaurus spars.*





ALDROVANDIA VERTICALIS GILBERT. TYPE.



ALDROVANDIA PROBOSCIDEA GILBERT. TYPE.



## Family MACRORHAMPHOSIDÆ.

**Macrorhamphosus hawaiiensis**, new species. Fig. 237.

Type, 42 mm. long, from station 3940, near Laysan Island, depth 59 to 70 fathoms; type, No. 51618, U. S. Nat. Mus.

Length of head 49 hundredths of total length to base of caudal; length of snout 28; diameter of orbit 8; interorbital width over middle of eye 7; greatest depth of body 22; distance from tip of snout to dorsal 68; length of second dorsal spine 23; base of second dorsal 6. D. v-12; A. 18, the last ray cleft to the base; P. 15.

Most nearly related to *M. japonicus* (Günther) and *M. gracilis* (Lowe), the form more slender than in *M. scolopax* (Linnaeus) or *M. sagifue* Jordan & Starks, the dorsal spine with very small spinelets

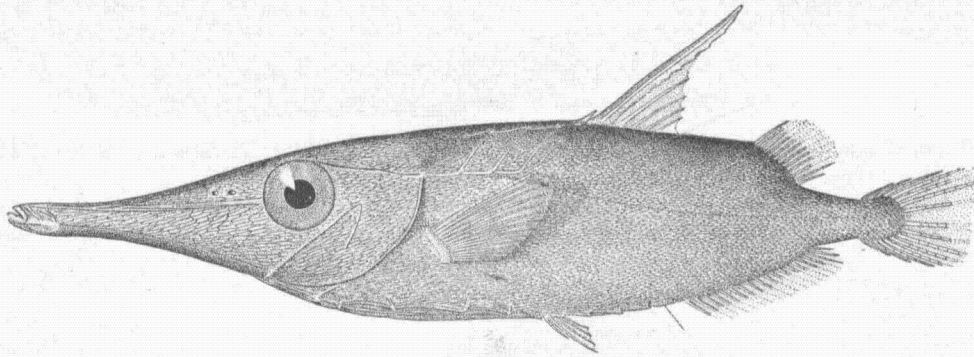


FIG. 237.—*Macrorhamphosus hawaiiensis* Gilbert, new species. Type.

along its posterior edge, perhaps smooth in adults; predorsal plate broader and less compressed than in *M. sagifue*, and top of head covered with coarser scales, the crests of which form sharply marked ridges; second dorsal spine compressed and strongly ridged, its tip reaching middle of soft dorsal, its length two-fifths the distance from gill-opening to base of caudal; in a smaller cotype, 25 mm. long, the spine reaches the second or third soft dorsal ray; ridges on top and sides of head show little or no trace of serration.

Color dark slate on back and top of head, bright silvery elsewhere.

Two specimens known from station 3940.

## Family SYNGNATHIDÆ.

**Ichthyocampus erythræus**, new species. Fig. 238.

Type, 55 mm. long, from station 3847, taken with the tangles at a depth of 23 to 24 fathoms off the south coast of Molokai; type, No. 51548, U. S. Nat. Mus.

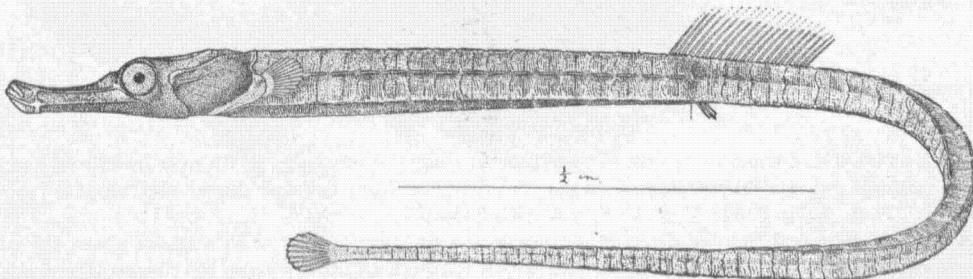


FIG. 238.—*Ichthyocampus erythræus* Gilbert, new species. Type.

Head 23 hundredths of total length; snout 6; head and trunk 38; base of dorsal 8. Dorsal with 22 rays, beginning at the anterior margin of the ring containing the vent, and continued on  $5\frac{1}{2}$  rings; pectorals with 14 rays, caudal with 6; rings 16 + 36, the anal ring enumerated with those of the trunk.

Snout short, compressed, with a thin low median crest in its proximal two-thirds, the edge of the crest minutely serrate; supraorbital rim elevated, shelving outward, continued backward and a little downward behind orbit as a wing-like ridge; occiput with a low median crest, which is not continuous, with a similar short nuchal ridge; a strong ridge along upper margin of opercle; trunk with 7 ridges—a pair of dorsal ridges, a corresponding pair of ventral ridges, a well-defined ridge along middle of each lateral face, and a low rounded mid-ventral ridge; the mid-ventral and the lateral ridges cease at anal ring, the other 4 continue on tail; all ridges are sharp, the faces between them concave; pectorals and caudal very short; a small anal with 5 rays developed immediately behind vent.

Color in life brick-red, the dorsal face crossed by 13 narrow greenish cross-bars, each narrower than one ring; a row of pearly spots along the pair of ventral ridges, one between each 2 plates.

#### Family PEGASIDÆ.

#### *Pegasus papilio*, new species. Fig. 239.

Type, 47 mm. long, from station 4149, near Bird Island, depth 33 to 71 fathoms (captured with the tangles); type, No. 51549, U. S. Nat. Mus.

Length of head 35 hundredths of total length without caudal; greatest depth 20; greatest width at base of pectorals 45; at axil of pectorals 30; distance from vent to base of caudal 41; length of snout

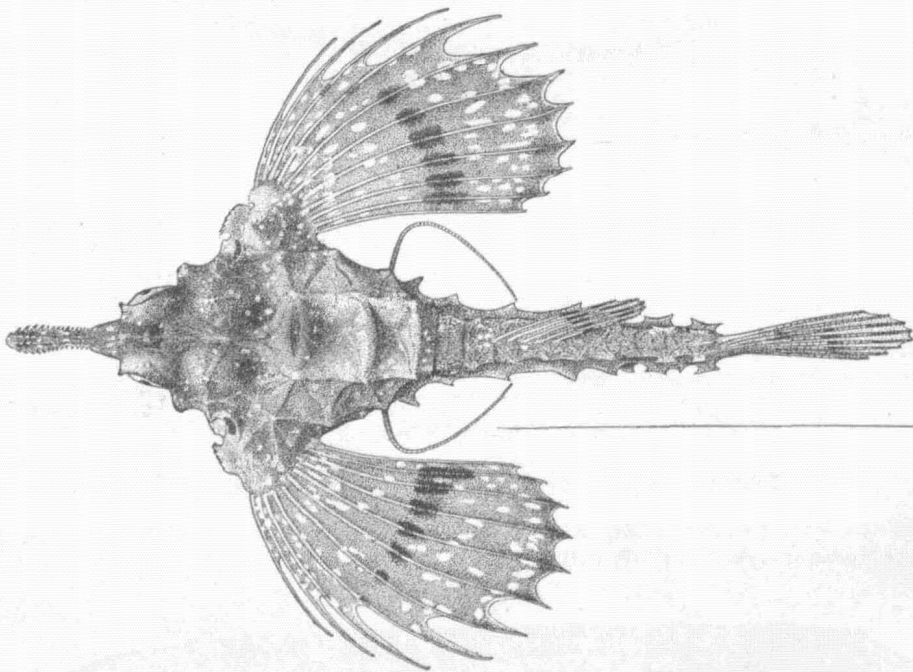
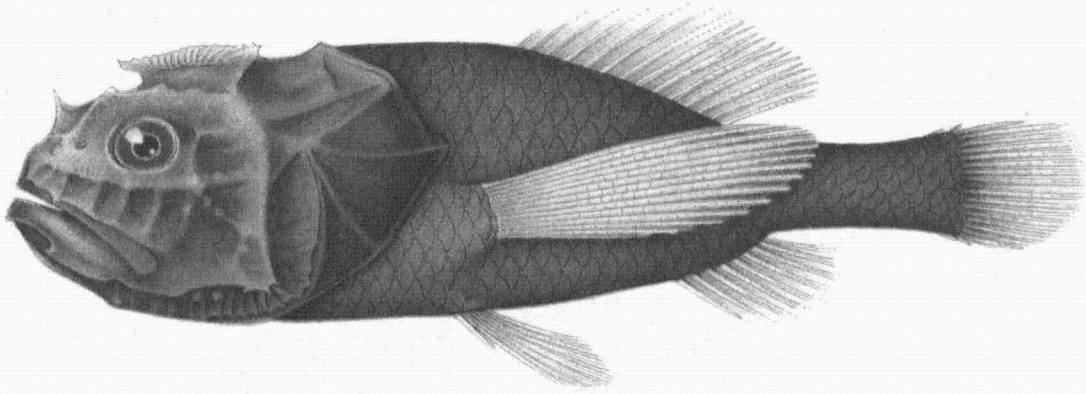


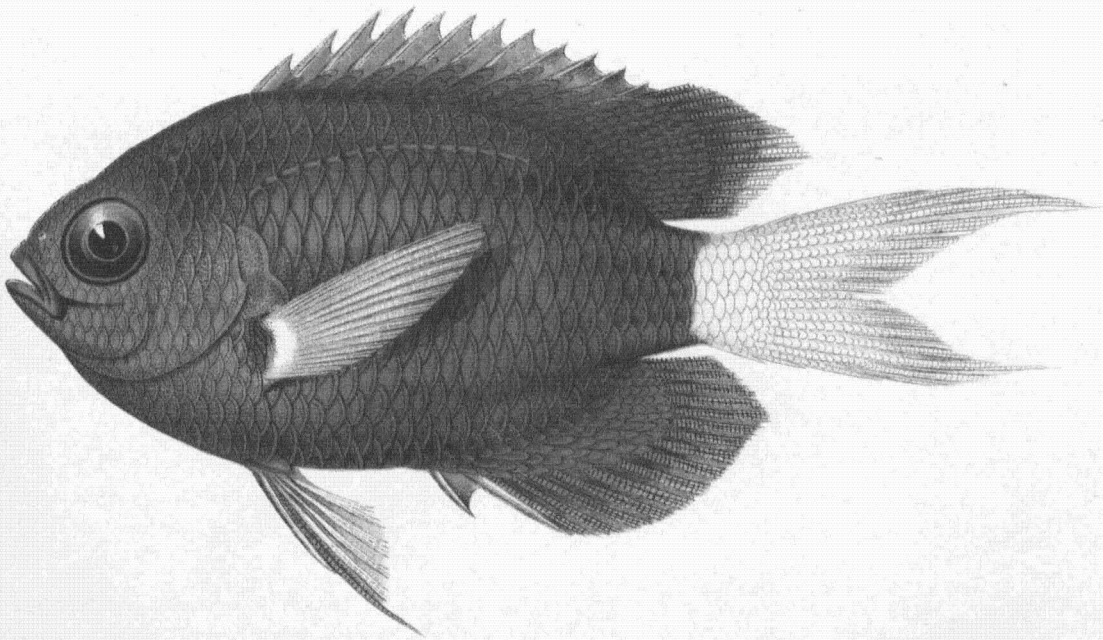
FIG. 239.—*Pegasus papilio* Gilbert, new species. Type.

18; width at middle of snout 3; length of maxillary 5; diameter of eye 8; width over middle of eye 12; longest pectoral ray 41; longest ray of caudal 21; distance from front of dorsal and anal to base of caudal 33. D. 4; A. 5; P. 11; V. 2; C. 8; tail with 8 rings.

Snout very long and slender, directed obliquely upward and forward at an angle of about  $45^\circ$  with the axis of the body; of approximately equal width throughout, and square in cross-section, each of the lengthwise ridges provided with a series of coarse retrorse spines; mouth toothless, very oblique,



1. MELAMPHAES UNICORNIS GILBERT. TYPE.



2. CHROMIS LEUCURUS GILBERT. TYPE.



having the same inclination as snout; interorbital space and occiput concave; supraorbital ridges elevated; a median and a pair of lateral conical tubercles on occiput; immediately behind occiput a pair of small pit-like depressions; behind these 4 longitudinal and 3 cross-ridges, their intersections tubercular and almost spinous, the intervening spaces concave; tail abruptly constricted behind disk; 8 caudal rings, quadrate in cross-section, the angles bearing sharp backwardly-directed spines; the last 2 or 3 rings bearing horizontal ridges at the angles, with spines at either end; on middle of sides of tail are 4 small intercalated plates, each bearing a spine directed backward, the anterior pair much smaller than the posterior; these plates alternate with those forming the angles of the tail, and are located in the intervals between first and second, second and third, fourth and fifth, and fifth and sixth plates; a strong spine directed backward on median dorsal line at base of caudal fin; and a similar smaller one below; dorsal and anal fins inserted on the second, third, and fourth caudal rings, and of equal size and opposite.

In life the head and body is olivaceous above, finely spotted with pearly white and mottled with light red; 3 indistinct double cross-bars of light red behind the pectorals, those on tail meeting below. Pectorals finely spotted with white; across middle of pectoral a wide dark reddish brown band, widest on inner rays, appearing black in spirits; near their tips, the rays are crossed with reddish brown. Dorsal barred with reddish chocolate and white; basal half of caudal rays spotted with reddish, distal half with brown, intermediate area white.

Other specimens were yellowish olive, with irregular reticulations of bright orange-red; tail barred with orange-red, the under parts pearly white; minute white spots on head, body, and pectoral fins, the latter spotted and barred with orange-red, but the blackish brown cross-band of the type very inconspicuous or wanting; caudal with 3, dorsal with 2 reddish cross-bars.

The species was taken at the following stations: Nos. 4061, off the northeast coast of Hawaii, 24 to 83 fathoms; 4149, near Bird Island, 33 to 71 fathoms; 4164, near Bird Island, 40 to 56 fathoms.

#### Family BERYCIDÆ.

##### *Melamphaës unicornis*, new species. Plate 77, Fig. 1.

Type, 31 mm. long, without caudal fin, from station 4142, in the vicinity of Kauai, at a depth of 632 to 881 fathoms; type, No. 51517, U. S. Nat. Mus.

Length of head 41 hundredths of total length without caudal; width of head 15; interorbital width 10; diameter of eye 6; length of snout 13; length of maxillary 19.5; distance from snout to hinder edge of occiput 30; to front of dorsal 55; to front of anal 69; to base of ventrals 46; length of base of dorsal 25; base of anal 10; length of pectorals 34; length of ventrals 19; greatest depth 30; least depth of caudal peduncle 8; length of free portion of caudal peduncle 21.5. D. 11, 12; A. 1, 8; P. 14; V. 1, 7; scales in lateral line 25.

Head very long, comparatively narrow; interorbital space narrow, less than twice the diameter of the small eye; snout long, high, and compressed, its anterior profile gently decurved; mouth moderately oblique, the maxillary falling a very little short of the vertical from the hinder margin of the orbit; mandible closing within the premaxillaries, but the symphysis produced into a short projecting acute tip; teeth minute, subequal, in a single, somewhat irregular series in the mandible; in 2 distinct rows, separated by an interval, in the premaxillaries; cephalic crests well developed, their margins usually finely spinous; a conspicuous pair bound the occiput, which forms thus a deep narrow groove with parallel sides; the spines on these occipital crests increase in length anteriorly and become inclined obliquely forward; a slender horn-like spine arising from middle of snout above nostrils, and directed nearly vertically upward; mandibular rami broadly winged along their outer and their inner margins, the inner meeting below to form a crest; preorbital not produced; preopercle forming a thin membranaceous structure, crossed by many transverse slender ridges, each ending in a delicate marginal spine; posterior border nearly vertical, the angle broadly rounded; two slender spines at lower posterior angle of cheek; opercle extremely thin and flexible, its margin without spines or serrations, marked by 4 ridges diverging from a common center, the lowermost nearly vertical, parallel with preopercular margin; gill-rakers slender, lanceolate, somewhat expanded, leaf-like, overlapping at base, with a few slender denticles on inner margin, 8+15 in number on outer arch; hinder edge of occiput equidistant between front of dorsal and nostril; origin of anal fin under the fifth dorsal ray before the last; free portion of caudal peduncle equal to interval between base of ventrals and front of anal; ventrals inserted

in advance of pectorals, which are inserted low; pectorals very slender, and extending nearly to middle of caudal peduncle; first 2 dorsal rays apparently spinous, but the third very distinctly articulated; one anal spine, which is compressed and rather long.

The scales have nearly all fallen.

Color, head jet-black; trunk, being partly denuded, appears light grayish or brownish, but was probably black in life, less intense than head; a distinct black bar at base of caudal, fins otherwise light, or only slightly dusky; body cavities lined with black.

A second specimen, 20 mm. long, without caudal, agrees with the type in fin-rays, scales, measurements, and color. The short median spine on snout is present.

The species was taken at stations Nos. 4005, vicinity of Kauai, 480 to 577 fathoms, and 4142, vicinity of Kauai, 632 to 881 fathoms.

#### *Caulolepis longidens* Gill.

A single specimen, 121 mm. long, taken at station 4155, near Bird Island, at a depth of 1,164 to 1,594 fathoms, agrees closely with the figure and description of the type given by Goode and Bean (Oceanic Ichthyology, p. 184, fig. 204), and with the description by Gilbert (cited below) of a specimen from the coast of California. With the exception of a slightly smaller eye, and a slightly shorter dorsal and anal (1 less ray in each fin), no differences have been detected.

*Caulolepis subulidens* Garman (Mem. Mus. Comp. Zool., vol. 24, 1899, p. 60, pl. B), from the Pacific coast of Panama, seems to be distinguished by important characters. According to the figure, the depth at front of dorsal is decidedly less than at occiput, and the profile along base of dorsal is nearly straight; the ventrals are more anteriorly inserted and the space between ventrals and anal much longer; the premaxillary bone is produced posteriorly into a long slender process, which extends well beyond the broadly rounded end of the maxillary.

Length from tip of snout to base of caudal 101 mm.; greatest depth of body 50 hundredths of this length; least height of tail 10.5; length of head (to tip of preopercular spine) 38; greatest width of head 18; interorbital width 12; length of snout 12; length of maxillary 33; length of mandible 33; diameter of orbit 7; distance from tip of snout to dorsal 51; base of dorsal 41; distance from tip of snout to anal 74; base of anal 8.5; distance from pectoral to snout 37; from ventral to snout 49.5. Dorsal 18; anal 8; pectoral 15; ventral 7; 14 disks along the course of lateral line; about 12 scales in an oblique line downward and backward from origin of dorsal fin to lateral line.

*Caulolepis longidens* Gill, Proc. U. S. Nat. Mus., VI, 1884, p. 258, Atlantic coast of the United States; Gilbert, Proc. U. S. Nat. Mus., XXI, 1898, 565, coast of southern California.

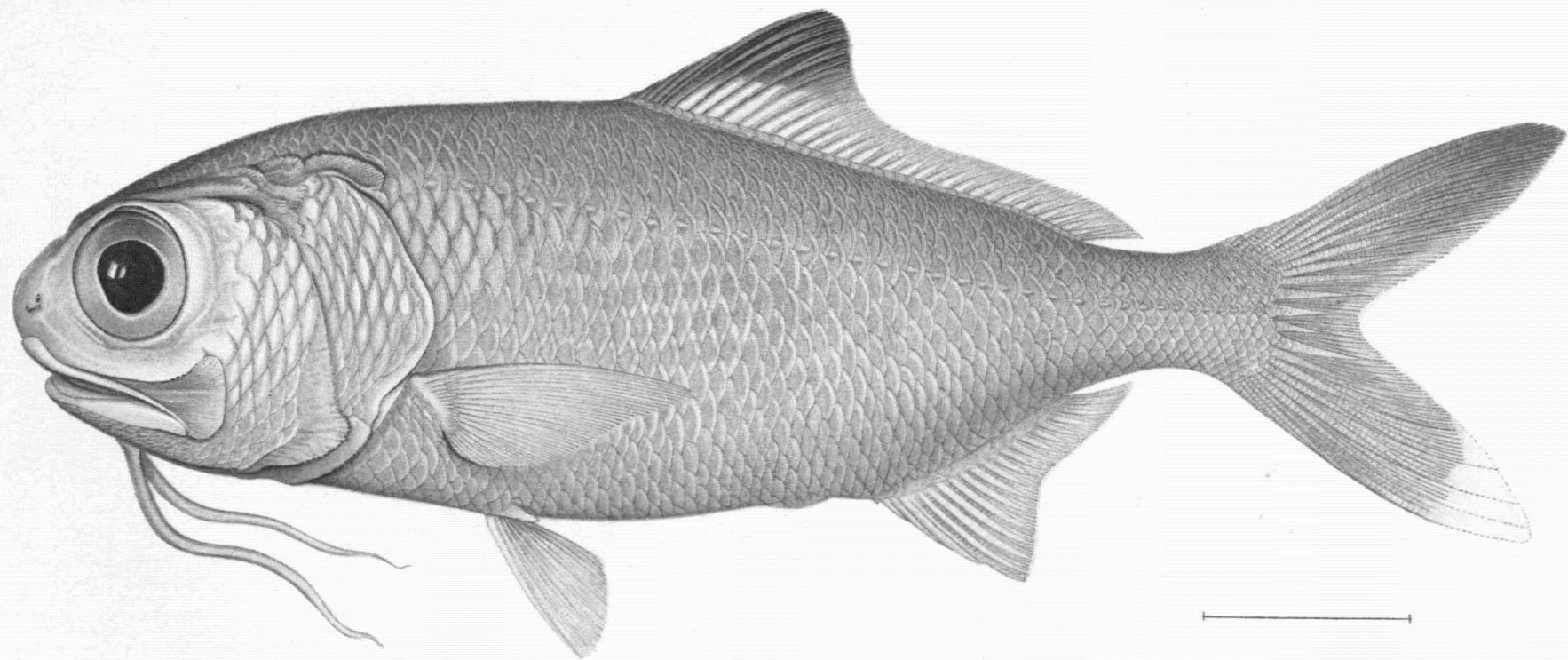
#### Family POLYMIXIIDÆ.

##### *Polymixia berndti*, new species. Plate 78.

Type, 186 mm. long, from the Honolulu market; cotype from station 4115, off the northwest coast of Oahu, depth 195 to 241 fathoms; type, No. 51607, U. S. Nat. Mus.

Length of head 36 hundredths of total length without caudal; diameter of orbit 12; interorbital width 10; length of snout 7.5; length of maxillary 20; length of barbels 27; depth of body 33; least depth of caudal peduncle 9; length of pectoral 23; length of ventral 13.5; longest ray of upper caudal lobe 24; base of dorsal 38; length of fifth dorsal spine 8.5; length of first soft dorsal ray 17.5; length of fourth anal spine 8.5; base of anal 18. D. v, 30; A. iv, 17; P. 16 or 17; V. 7; lateral line with 35 or 36 pores, 5 scales in a vertical series between lateral line and front of dorsal, 13 or 14 between lateral line and front of anal.

Form much more slender than in *P. japonica* Günther; snout bluntly rounded, protruding beyond premaxillary teeth, its apex on a level with nostrils; nostrils small, pore-like, the anterior slightly larger, located midway between apex of snout and front of orbit; snout protruding beyond the premaxilla an axial distance about equaling one-sixth its length; snout covered with soft integument, in which are ramifications of the sensory canals; barbels reaching to below pectoral base, equaling length of head anterior to preopercle; maxillary extending well beyond vertical from hinder margin of orbit; its supplemental bone forms nearly half the extreme width of its dilated posterior portion, being much wider than in *P. japonica*; teeth minute, arranged as in other species, but in very



POLYMIKIA BERNDTI GILBERT. TYPE.

broad bands; both upper and lower margins of suborbital bones, preopercle, and subopercle minutely serrated; gill-rakers long, 4 + 9 in number; anterior portion of dorsal fin sharply falcate, longest ray twice length of fifth spine; ventrals extending but halfway to vent; upper caudal lobe apparently longer than lower.

Scales much larger than in *P. japonica*, although the number of pores in the course of the lateral line is about the same. Snout and a narrow strip along each superior orbital rim scaleless, the scales forming an uninterrupted wedge-shaped extension forward on middle of interorbital space; an oblique line running backward from above middle of orbit contains 7 scales; a low sheath of scales along base of dorsal and anal fins, consisting of a single series along anterior portion of base of each fin; caudal scaled in the greater part of its length.

Color, back olivaceous, anteriorly with the distal portion of each scale largely dusky, posteriorly each scale with a black intramarginal line; lower half of sides and belly bright iridescent-silvery; opercles dusky; mouth and gill-cavity white; peritoneum blackish; fins translucent, the anterior dorsal lobe with a black tip, which is continued forward as a narrow margin over the spinous portion of the fin; terminal part of upper caudal lobe blackish.

I take pleasure in naming this species for Mr. Louis E. Berndt, market inspector in Honolulu, to whose kind assistance the expedition owed much of its success. The type of the present species was secured for us by Mr. Berndt in the Honolulu market. It was not recognized by the fishermen, and doubtless lives at greater depths than the market fishes. The single cotype was taken at station 4115, off the northwest coast of Oahu, depth 195 to 241 fathoms.

#### Family BRAMIDÆ.

##### *Collybus drachme* Snyder.

Taken at station 4176, near Niihau, 537 to 672 fathoms. The type of this species certainly entered the trawl at or near the surface.

#### Family APOGONICHTHYIDÆ.

##### *Amia maculifera* (Garrett).

Station 3875, in channel between Maui and Lanai, in 34 to 65 fathoms.

##### *Foa brachygramma* (Jenkins).

Stations Nos. 3847, off the south coast of Molokai, 23 to 24 fathoms; 3849, south coast of Molokai, 43 to 73 fathoms; 3872, channel between Maui and Lanai, 32 to 43 fathoms; 3873, channel between Maui and Lanai, 32 to 37 fathoms; 3875, channel between Maui and Lanai, 34 to 65 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms.

##### *Mionorus waikiki* (Jordan & Evermann).

Stations Nos. 3872, channel between Maui and Lanai, 32 to 43 fathoms, and 3876, channel between Maui and Lanai, 28 to 43 fathoms.

##### *Hynnodus*, new genus.

Like *Epigonus*, but the palatines with teeth, and the body much more elongate; 2 anal spines; minute teeth in jaws and on vomer and palatines; all the bones of head unarmed except the opercle, which bears a single spine; eyes very large; tubes of lateral line very large, each scale perforated by a canal which opens on the outer surface beneath an antero-posterior bridge, on the dorsal and ventral side of which are wide external pores.

*Epigonus occidentalis* Goode and Bean may be a member of this genus, although it is said to have the vomer and palatines toothless.

*Hynnodus* Gilbert, new genus of *Apogonichthyidae* (atherinoides).



**Hynnodus atherinoides**, new species. Plate 79.

Type, 117 mm. long, from station 3867, Pailolo Channel, depth 284 to 290 fathoms; type, No. 51601, U. S. Nat. Mus.

Head 31 hundredths of the total length to base of caudal; greatest depth 15; least depth of caudal peduncle 7.5; length of snout 7; diameter of orbit 14; length of maxillary 11.5; interorbital width 6; greatest width of head 16; distance from tip of snout to ventrals 33; to front of dorsal 36; distance between dorsals 12. D. VII-1, 10; A. II, 9; V. I, 5; P. 22 or 23. Scales in the lateral line 54; gill-rakers 6 + 16; branchiostegals 7.

Body extremely elongate, occiput depressed, broader than deep; snout and interorbital space flattish above, orbital rims not noticeably raised; mouth terminal, oblique; lower jaw included; maxillary in part slipping under the very narrow preorbital, not reaching vertical from front of pupil; teeth very small, slightly curved, in single series in jaws and on palatine bones, in a patch on head of vomer; tongue smooth; posterior nostril a transverse slit in front of upper part of orbit; the anterior a wide pore with raised margins, directed forward, slightly nearer eye than tip of snout; preopercle forming a narrow projecting rounded lobe at angle, but not striate; interopercle expanded below to form a very thin projecting lamina; opercle bearing a single strong spine, all other bones of head unarmed; 4 gills, with a slit behind fourth arch; pseudobranchiae very large; gill-rakers long and slender. 6 + 16 in number, the longest one-third length of maxillary.

Dorsal spines slender, the first very short, about one-eighth length of second; a definite well-developed spine at beginning of second dorsal; first anal spine less than one-third length of second; all the spines strongly compressed. As the margins of all the fins are mutilated, their shape can not be given.

The scales of lateral line persist, but all others have fallen. The extent to which the head was covered can not be ascertained.

Color dark gray, darker along margins of scales; snout blackish; dorsals and anal dusky; mouth light, but the gullet, branchial chamber, and peritoneum jet-black; opercles appear blackish externally.

Two specimens were taken at station 3867.

**Synagrops argyrea** (Gilbert & Cramer).

A rare species, but 8 specimens secured. The original account of the species may be corrected as to the following details: Depth of body 3.5 in total length without caudal; least depth of caudal peduncle 2.7 in depth of body; eye averages a little smaller, being contained 3.3 to 3.4 in head; a distinct slender supplemental maxillary bone; each ramus of lower jaw usually containing only 4 (rarely 5) canines, instead of 7 as in type; upper end of base of pectoral on a level with lower margin of orbit.

Taken at the following stations: Nos. 3867, Pailolo Channel, 284 to 290 fathoms; 3920, off the south coast of Oahu, 280 to 265 fathoms; 4084, off the north coast of Maui, 253 to 267 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms.

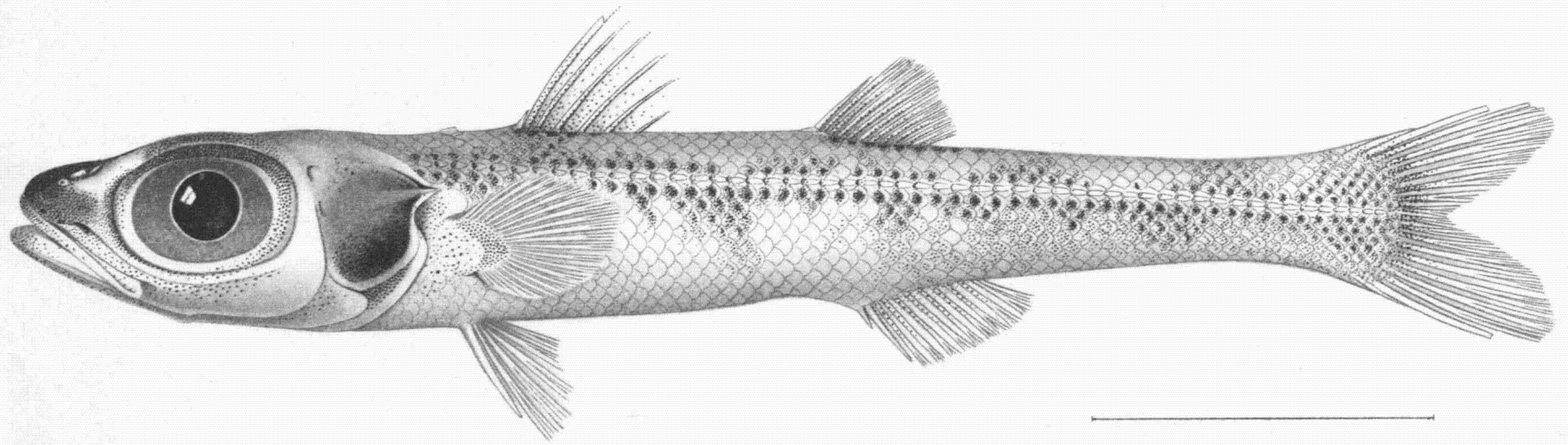
*Melanostoma argyreum* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 416, pl. 39, fig. 3.

## Family SERRANIDÆ.

**Grammatonotus**, new genus.

Closely allied to *Callanthias*, differing in having but one opercular spine, in the presence of large pores on the head, and in the tubular anterior nostril; the canines are greatly reduced in size, and the snout is not scaled in front of the eye; lateral line single, running along base of dorsal fin, ending under last ray; scales large, minutely ctenoid, rough; dorsal fin continuous, not notched; soft dorsal and anal with middle rays produced into pointed lobes; ventrals very close together, with one spine and 5 rays, the outer ray longest; preopercle entire; opercle with a single pungent spine; gill membranes narrowly united, with 6 rays.

*Grammatonotus*, Gilbert, new genus of Serranidæ (*laypanus*).



HYNNODUS ATHERINOIDES GILBERT. TYPE.

*Grammatonotus laysanus*, new species. Fig. 240.

Type, 38 mm. in total length without caudal, from station 3947, near Laysan Island, depth 97 to 199 fathoms; type, No. 51546, U. S. Nat. Mus.

Head 35 hundredths of total length without caudal; length of snout 5; length of maxillary 15; diameter of orbit 15; interorbital width 10; greatest depth of body 32; least depth of caudal peduncle 17; length of caudal peduncle 21; length anterior to dorsal fin 38; base of dorsal 47; longest dorsal spine 15; longest dorsal ray 23; length of third anal spine 13; longest anal ray 23; longest pectoral ray 25; ventrals 27. D. XI, 8; A. III, 9; P. 19; V. I, 5. Tubes in lateral line 18; transverse rows of scales between upper end of gill-opening and base of caudal 25 or 26; scales in an oblique row between point of dorsal and vent, 10 or 11.

Caudal peduncle short and deep, more than half greatest depth of body; snout very short, evenly rounded, transversely convex, as is also the interorbital space and occiput; anterior nostril with a short broad tube, in front of eye; posterior nostril a small round pore widely separated from the anterior, located on upper orbital rim but little in advance of pupil; eye very large, three-sevenths length of head; mouth oblique, short, maxillary narrow, not reaching vertical from middle of eye; suborbitals very narrow, not concealing maxillary; in sides of premaxillaries a narrow band of fine villiform teeth and an outer series of small canines, the anterior 1 or 2 teeth of outer series a little enlarged; a deep notch

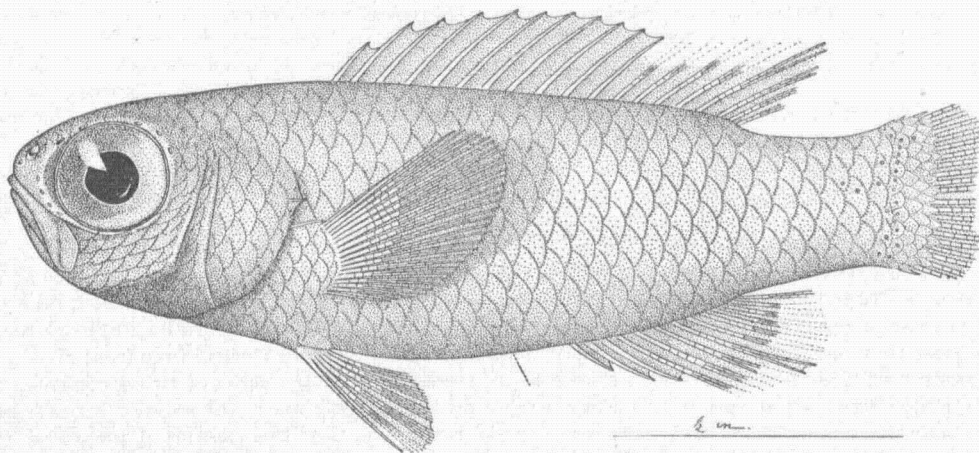


FIG. 240.—*Grammatonotus laysanus* Gilbert, new species. Type.

between premaxillary teeth anteriorly; mandible with a single series of teeth similar to outer premaxillary teeth, 1 or 2 of anterior teeth slightly enlarged; a few minute teeth on head and shaft of vomer, and on front of palatines; preopercle rounded, with entire margin; opercle with a horizontal rib ending in a single pungent spine; clavicles forming a sharp keel below on median line, embracing posterior part of isthmus and region immediately posterior; gill-membranes narrowly united anteriorly, forming a free fold across isthmus; branchiostegal rays 6; pseudobranchiae large; gill-laminae narrow, the anterior set of filaments on first arch and the posterior set on fourth arch shortened; a well-developed slit behind fourth arch; twenty long slender gill-rakers on horizontal portion of outer arch, the longest two-sevenths diameter of orbit; a series of large pores on mandible, and one extending from sides of snout around posterior half of orbital rim, and on suborbitals.

Dorsal spines slender and flexible, increasing in length to behind middle of fin; last 5 spines about equal; anterior rays of soft dorsal injured in type; fourth ray produced, overlapping rudimentary caudal rays; succeeding dorsal rays again rapidly shortened; anal spines regularly graduated, third spine about five-sixths the longest dorsal spine; anal fin, like soft dorsal, with middle rays produced into a sharp lobe; sixth and seventh rays overlapping base of caudal, the succeeding ray rapidly shortened; caudal injured in the type, its shape unknown; outer ventral ray produced well beyond spine, overlapping the vent.

Scales large, the free margins finely ctenoid, rough to the touch; head wholly scaled as far forward as front of orbits; the short snout naked; exposed portion of maxillary scaled, but no scales can be detected on mandibles, or branchiostegal membranes; lateral line<sup>a</sup> ascending rapidly to the back, and running along base of dorsal fin, separated from it by a series of narrow half-scales which more or less coincide with and overlap the scales of the lateral line.

Color in life; light purplish red on upper parts, silvery below, a few minute scattered blue spots on posterior half of caudal peduncle; pectorals translucent; other fins light purplish red; anal margined with yellow; the projecting tips of membranes of dorsal spines yellow.

Only the type known.

#### Family LABRIDÆ.

##### *Cirrhilabrus jordani* Snyder.

Station 3876, channel between Maui and Lanai, 28 to 43 fathoms.

##### *Pseudocheilinus evanidus* Jordan & Evermann.

Stations No. 3873, channel between Maui and Lanai, 32 to 37 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms; 4073, off the north coast of Maui, 69 to 78 fathoms.

#### Family POMACENTRIDÆ.

##### *Chromis leucurus*, new species. Plate 77, fig. 2.

Type, 66 mm. long, measured to tip of middle caudal rays, from station 3875, Avau Channel, between Maui and Lanai, depth 34 to 65 fathoms; type, 51587, U. S. Nat. Mus.

Length of head 32 hundredths of total length to base of caudal (50 m.); greatest depth 51; least depth of caudal peduncle 16; diameter of orbit 12; interorbital width 11; length of maxillary 9; length of snout 9; distance from tip of snout to front of dorsal 40; highest dorsal spine 19; longest dorsal ray 25; second anal spine 23; filamentous caudal rays 60; length of pectoral 35; length of ventral 34. D. XII, 14, the last ray cleft to base; A. II, 15; P. 16. Tubes in lateral line 13; cross-series of scales 20 or 21.

Body short and deep, resembling *Pomacentrus*, with a short high caudal peduncle, which does not conspicuously taper toward tail; head short and small, a little less than one-third length, eye large, a little more than one-third head; mouth small; maxillary barely reaching vertical from front of eye; in the front of each jaw a wide band of villiform teeth, preceded by a single series of strong conical acute teeth, a little flattened at base, but uniformly tapering to the acute apex; the anterior series is continued on sides of jaw, the teeth of this series much reduced in size; free margins of preorbital and preopercle entire.

Dorsal spines evenly graduated, none of them as long or strong as second anal spine; both anal and soft dorsal have acute lobes, with filamentous tips which extend well beyond base of caudal; caudal deeply forked, both lobes filamentous, produced in long thread-like streamers; outer ventral ray filamentous, reaching same vertical as pectoral, which terminates above first soft ray of anal.

Scales large, ctenoid, caducous, rather irregularly imbricated; lateral line terminating under last dorsal spine.

Color in life, deep brownish black, more intense posteriorly and on soft dorsal and anal fins; posterior half of caudal peduncle and caudal fin white, as are also tips of posterior dorsal and anal rays; a blackish spot on base of pectorals, a lemon-yellow band behind it across basal portion of fin; ventrals lemon-yellow, outer ray and spine dusky; in a young cotype, the sides are much lighter, becoming dusky on caudal peduncle; soft dorsal and anal black.

Specimens taken at stations 3875, channel between Maui and Lanai, 34 to 65 fathoms, and 3982, vicinity of Kauai, 40 to 233 fathoms.

##### *Dascyllus albisella* Gill.

Station 3968, French Frigate Shoal, 14½ to 16½ fathoms.

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<sup>a</sup>The lateral line has been omitted by error in the accompanying drawing.

## Family ANTIGONIIDÆ.

*Antigonia steindachneri* Jordan & Evermann.

One specimen 63 mm. long to base of caudal, was dredged at station 3958, vicinity of Laysan Island, depth 173 to 182 fathoms.

For comparison with *A. eos* of equal size, we add the following data:

Length of head 37 hundredths of total length without caudal; diameter of orbit 15.5; interorbital width 12; length of snout 10; maxillary 9; distance from orbit to angle of preopercle 22; greatest depth 126; least depth of caudal peduncle 16.5; length of third dorsal spine 35; first anal spine 14.5; ventral spine 27.5; length of pectoral 37. D. VIII, 38; A. III, 35; P. 14. Between the nape and the anterior portion of lateral line are 14 series of scales running parallel with predorsal profile.

Compared with adults, the young are proportionally deeper, and have the spination of bones of head much less developed, the spines projecting but little beyond the margins of the bones; the scales are very rough, and the exposed portions are much higher than long, as in adults; but the spines are almost wholly confined to the margins of the scales, those arising from the central field, which give such a densely hispid appearance to the adult, being undeveloped, or present in small number; on sides of nape, immediately behind head, is a conspicuous band of larger scales, which scarcely overlap, and are embedded and concealed except for the projecting spinous margin; behind this band, the scales are reduced in size and densely crowded; scales on cheeks are also embedded and concealed, each being represented externally by a straight, vertical, spinous ridge; except for a wedge-shaped area in middle of frontal region, bounded laterally by ridges, the top of head, including sides of occiput and the preorbital, is scaleless.

*Antigonia eos*, new species. Plate 80, fig. 1.

Type, 83 mm. in total length (67 mm. to base of caudal), from station 4102, Pailolo Channel, depth 122 to 132 fathoms; type, No. 51593, U. S. Nat. Mus.

Length of head 37 hundredths of total length to base of caudal; diameter of orbit 16; interorbital width (at middle of frontal region) 12.5; length of snout 12.5; length of maxillary 9; distance from orbit to angle of preopercle 16; greatest depth 98; least depth of caudal peduncle 14; length of third dorsal spine (the tip injured) 45; first anal spine 14.5; ventral spine 27; length of pectoral 32. D. IX, 33; A. III, 31; P. 13; V. I, 5.

Somewhat deeper and more angular than *A. rubescens* Schlegel, from Japan, and much less so than *A. steindachneri* of equal size. The young are much deeper than adults, more sharply angular, and with high filamentous spinous dorsal fin. In a specimen 25 mm. long to base of caudal the depth is 128 hundredths of this length, the height of the third dorsal spine 100. *A. rubescens* changes comparatively little with age. In *A. eos* the base of soft portion of anal fin is nearly straight, much less curved than in *A. rubescens* and *A. steindachneri*, not more arched than base of dorsal.

Serrated edges in frontal region only moderately developed, the spaces between ridges completely scaled, thus partially concealing them; margin of preorbital with a few short strong spines; vertical limb of preopercle marked with curved serrated ridges, but the margin only minutely serrate; lower margin furnished with a few short, strong teeth; a strong spine marks the articulation of mandible, this spine absent or very inconspicuous in *A. rubescens*.

Head more extensively scaled than in *A. steindachneri*, the scales covering entire frontal region, preorbital, and snout, except the oblong area for reception of premaxillary spines; occiput largely naked; both limbs of preopercle densely scaled; scales on cheeks imbricated, numerous spinules springing from the central field as well as from the margin; scales on body with exposed surfaces much longer in proportion to their height than in *A. steindachneri*; those on posterior part of body with spines much longer and denser than those on anterior parts, the anterior scales having the marginal spinules much shorter and less conspicuous than those which arise from the central field; scales completely investing anterior aspects of the ventral, the first anal, and the third dorsal spines, these spines much less grooved than in *A. steindachneri*.

Even in adults the spinous dorsal is much more elevated than in related species, both third and fourth spines greatly elongate, slender, and delicate; the tips are broken in all of our specimens; the caudal fin is gently rounded.

Color in life light red, abdomen and opercles silvery.

*A. eos* is nearer *A. rubescens* than *A. steindachneri*, agreeing with *rubescens* in weaker spination and more complete scaling of head, in shape of scales, and in the presence of 9 instead of 8 dorsal spines. The two differ strikingly in outline and in the much shorter dorsal and anal fins of *rubescens*. In 11 specimens of *eos*, not including the type, the fin rays are as follows: Dorsal, 32, 32, 32, 32, 33, 33, 33, 33, 33, 34, 34; anal, 30, 31, 31, 31, 30, 30, 30, 31, 31, 31, 31.

In 5 specimens of *A. rubescens*, from Suruga Bay, Japan (Albatross station 3734), the fin rays are as follows: Dorsal, 27, 27, 27, 27, 27; anal, 25, 25, 26, 27, 27. In both species the dorsal spines are constantly 9 in number.

Specimens were taken at the following stations: No. 3858, Pailolo Channel, 128 to 138 fathoms; 4070, north coast of Maui, 45 to 52 fathoms; 4072, north coast of Maui, 56 to 59 fathoms; 4077, north coast of Maui, 99 to 106 fathoms; 4102, Pailolo Channel, 122 to 132 fathoms; 4104, Pailolo Channel, 123 to 141 fathoms.

### Family ZEIDÆ.

#### *Stethopristes*, new genus.

Related to *Cyttopsis* and still more closely to *Zen* Jordan and Fowler. From the latter it differs in having the ventral spine greatly reduced and in having a continuous series of carinated spinous bucklers from throat to anus. From *Cyttopsis* it differs also in having 9 instead of 7 ventral rays. In *Cyttopsis* there are but 3 or 4 spinous plates, confined to the mid-ventral line behind ventral fins, the thorax being transversely flattened and without plates. In *Zen* there are in addition 2 flattened plates on the thorax, which is broad and transversely flattened, without trace of keel. In *Stethopristes* the breast is sharply keeled throughout, the ventrals appearing lateral in position.

*Stethopristes* Gilbert, new genus of *Zeidae* (*eos*).

#### *Stethopristes eos*, new species. Fig. 241.

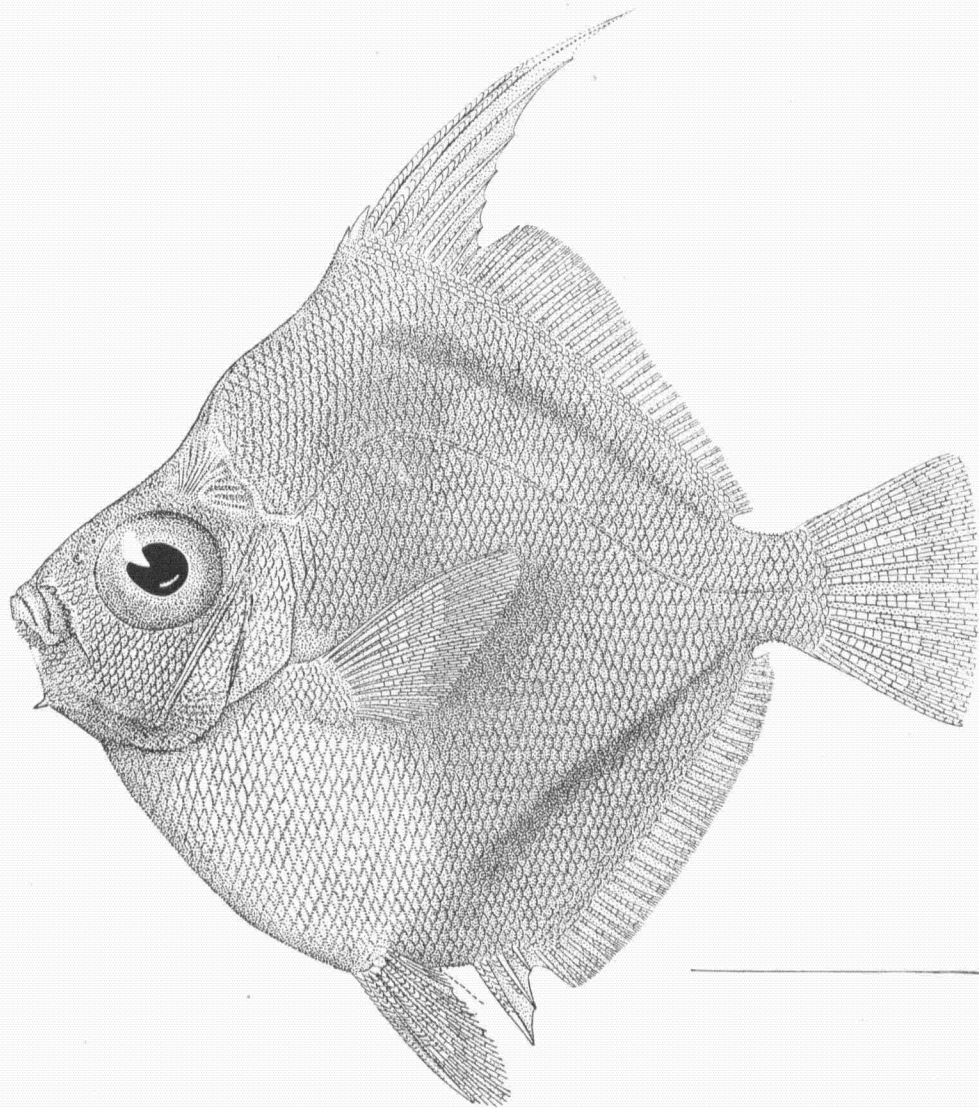
Type, 130 mm. long, from Albatross station 3867, Pailolo Channel, between Molokai and Maui, depth 284 to 290 fathoms; type, No. 51626, U. S. Nat. Mus.

Head 40 hundredths of total length without caudal; eye 17.5; least frontal width 10.5; length of snout 16.5; length of maxillary 21; greatest depth of body 53; least depth of caudal peduncle 8; length of second dorsal spine 11; longest ventral ray 43; longest pectoral ray 14. D. VII, 27, the last ray cleft to the base; A. I, 29; V. I, 9; P. 14. Pores in lateral line 82 or 88; 15 oblique rows of scales between lateral line and middle of base of soft dorsal; branchiostegals 7.

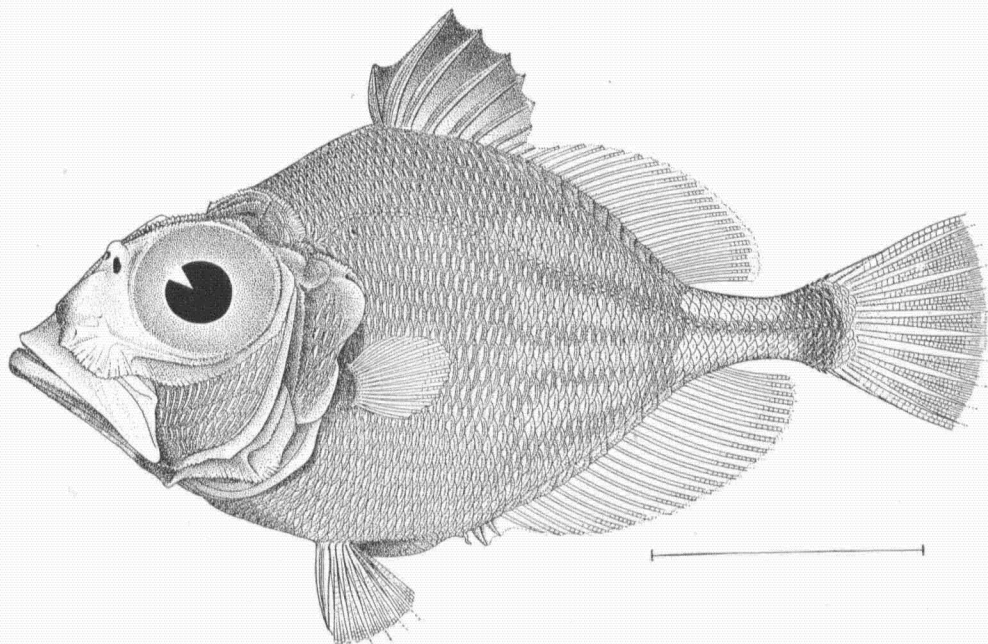
Body deeply oval, with back and belly nearly equally curved, depth greatest under middle of spinous dorsal; maxillary reaching vertical from front of pupil, its length measured from tip of snout half length of head; teeth minute, in narrow bands in jaws and on vomer, these not more than half the width of the bands in the Japanese *Zen itea* Jordan and Fowler; preorbital of moderate width only, half as wide as diameter of eye, concealing only a very little of proximal end of maxillary; eye very large, slightly greater than length of snout; interorbital space and occiput flat, the median portion occupied by a deep elongate-oval pit which lodges the long premaxillary processes; each side of occiput occupied by a plate with minutely roughened surface, sending forward a triangular process which terminates in a spinous point above front of eye; the free margin of this process forms the upper orbital rim, and is furnished with minute teeth which increase in size anteriorly; mandibles terminating posteriorly in a blunt spinous point and anteriorly in a sharp spinous projection at each side of symphysis; other bones of the head smooth, without spines or serrations; branchiostegal membranes moderately joined across throat, forming a free fold; gills 3½, the laminae short; no slit behind last gill; gill-rakers little developed, short and barely movable, 9 on anterior arch; pseudobranchiae well developed.

Anterior dorsal with strong short spines, the fin rounded in profile; second, third, and fourth spines about equal in length, two-thirds diameter of eye, the last spine joined by very low membrane to first soft ray; soft dorsal low, the rays increasing in length backward; dorsal rays, like those of pectoral and anal fins, all simple, unbranched, flattened in their distal half; anal similar to soft dorsal, but beginning and ending a little more posteriorly; it is preceded by a simple short strong curved spine, connected by membrane with the first ray; ventrals very large, their tips reaching to or beyond





1. *ANTIGONIASOMA EOS* GILBERT, NEW SPECIES. TYPE.



2. *CYTTOMIMUS STELGIS* GILBERT, NEW SPECIES. TYPE.



middle of anal fin, rays all branched nearly to base, 9 in number, preceded by a minute spine; pectorals short, rounded, not reaching vertical from vent; caudal rays deeply forked, the outer ray above and below unbranched, preceded by 4 short spines at base of upper lobe, 3 at base of lower; caudal fin rounded, its length one-fifth total length without caudal.

Scales very small, cycloid, smooth, covering entire body and cheeks; head otherwise naked; rows above lateral line oblique, not parallel with back; no enlarged scales along base of dorsal and anal fins, where are only a series of small nodular projections corresponding in number to the rays; median line of breast and belly in front of anus furnished with a series of large strongly keeled plates,

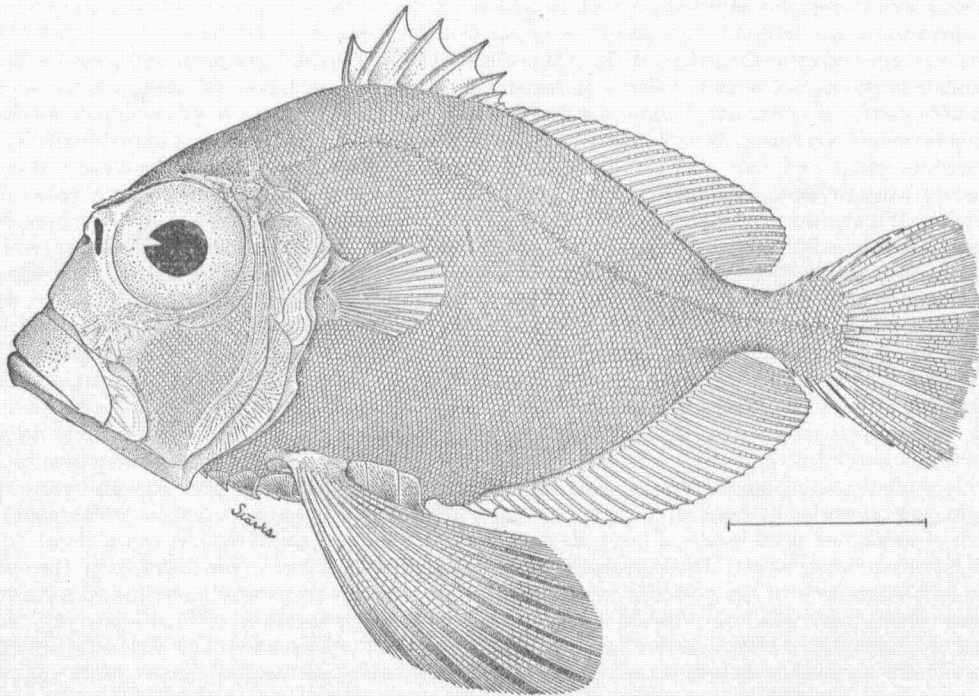


FIG. 241.—*Stethopristes eos* Gilbert, new species. Type.

the keel bearing 2 or 3 compressed, backwardly directed spines, the posterior spine, the larger projecting freely; plates 10 in number, decreasing in size anteriorly, the 3 anterior ones small, but sharply keeled and spinous. In one of the cotypes there are 29 rays each in the dorsal and anal, and 11 plates in the ventral series.

Color in life silvery, overlaid with light rose color.

Specimens were taken at stations No. 3867, Pailolo Channel, 284 to 290 fathoms, and 4134, vicinity of Kauai, 225 to 334 fathoms.

#### Family CAPROIDÆ.

#### *Cyttomimus*, new genus.

Allied to *Capromimus* Gill, from which it differs in having rough-ctenoid, instead of cycloid, scales in having the thoracic region wide and flat, without ridge or spinous scutes, and in the presence of teeth on vomer and palatine bones.

*Cyttomimus* Gilbert, new genus of *Caproidæ* (*stelgis*).

*Cytttomimus stelgis*, new species. Plate 80, Fig. 2.

Type, a female, 91 mm. long, from Albatross station 4122, near Barbers Point, south shore of Oahu, depth 192 to 352 fathoms; type, No. 51622, U. S. Nat. Mus.

Length of head 42 hundredths of total length without caudal; diameter of eye 19; interorbital width 15; length of snout 15; length of maxillary 24; greatest depth 53; least depth of caudal peduncle 7; length of second (longest) dorsal spine 17.5; length of pectoral 13. D. VIII, 23; A. II, 24. P. 14 (in both fins). V. 1, 6. Pores in lateral line 53 to 56; branchiostegals 7.

Body rhombiform, compressed, deepest below first dorsal spine, the occiput and interorbital space depressed and flattened; thoracic region wide and flat, without scutes or enlarged scales; base of dorsal and anal fins convex in profile, their outlines rapidly converging to the very slender caudal peduncle, the ventral curve greater than the dorsal; greatest depth of body slightly greater than  $\frac{1}{2}$  length to base of caudal; least depth of caudal peduncle  $\frac{2}{3}$  diameter of eye; head very large, eye large, mouth oblique, with wide cleft, very protractile; interorbital region deeply excavated to receive the long premaxillary processes, which terminate above middle of pupil; distance from tip of snout to end of maxillary equal to length of snout and half eye; maxillary bone deeply grooved longitudinally, its distal end very obliquely truncate and emarginate; a wide fold of integument, reflected backward from upper lip, extends well under the projecting preorbital, conceals the exposed portion of premaxillary spines, and covers all but the posterior ridge of maxillary bone; teeth minute, broadly conical or triangular, present in very narrow bands (having the width of about 3 teeth) in jaws and on vomer and palatine bones; premaxillary band ceasing at a point two-thirds the distance from tip of snout to end of maxillary; preorbital wide, covering a portion of the premaxillary, the margin undulated, the surface marked with fine diverging ridges, which end at the anterior margin in minute spinelets; the bone is excavated to receive 3 wide diverging canals; other bones of suborbital ring are also furnished at margin with a series of minute spines; mandible deeply grooved, the marginal ridges roughened for a portion of their length, each terminating in a strong short spine at posterior end of bone; preopercle deeply grooved, its lower limb and angle minutely serrulate on both the ridges bounding the groove; interopercle similarly with 2 spinous ridges; opercle with a vertical spinous ridge parallel with its anterior margin, but otherwise without striæ or spines; interorbital space broad and flat, its width equal to length of snout, one-third length of head, its median portion soft and membranous; supraorbital rim a heavy, bony process, longitudinally grooved, the bounding ridges of groove rough-granular; the outer ridge is continuous with the posterior orbital margin, the inner ridge extending backward to base of occiput, where it forks to form 4 short, widely diverging branches, covering occipital region; all these ridges rough-granular; branchiostegal membranes widely united to form a free fold across the isthmus, with which they are not united; branchiostegal rays 7 in number; gill-laminae narrow, inner gill-arch with a single series of filaments; gill-rakers short broad plates with roughened margins, 8 in number on horizontal limb of anterior arch; pseudobranchiae large.

Pectorals very small, inserted just below a horizontal line from lower edge of pupil, their longest rays equaling length of ventral spine; soft rays of ventral fins slightly longer than pectoral, and barely reaching first anal spine. Insertion of ventrals vertically below pectorals; pectoral rays like those of dorsal and anal fins, expanded and flattened at tip, obliquely articulated, all simple, unbranched; rays of ventral and caudal fins profusely forked; first dorsal composed of 8 spines, of which the second is much the longest and much the strongest, over twice the height of the first spine; from the second, the spines decrease regularly in length and thickness, giving a steeply rounded profile to the fin, the eighth not spine-like in appearance, resembling the rays of the second dorsal, but stiffer and not articulated; all the dorsal spines longitudinally grooved or fluted; rays of second dorsal increasing in length from the first backward to beginning of posterior third, the last rays shortened, but longer than the anterior rays; anal fin similar to soft dorsal, but beginning and ending more posteriorly; anal spines 2 in number, short, strong, curved, the first longer than the second, the 2 spines joined by membrane, the second spine connected by low membrane to the first soft ray; caudal with the posterior margin gently convex.

Body completely scaled, except a narrow strip along bases of dorsal and anal fins; cheeks scaled, head otherwise naked; scales everywhere higher than long, the exposed portions vertically linear, of cycloid type, having entire edges and concentric striæ, but the exposed surface rendered very rough by numberless minute prickles, mostly arranged in vertical cross-series on each scale; the roughest scales

are on caudal peduncle, the series of prickles decreasing in number toward head, the scales on nape and cheeks being largely smooth; scales greatly reduced in size on nape and on breast and belly, in 4 oblique rows on cheeks; breast flat, without ridge, no enlarged or carinated plates on breast or belly; dorsal and anal fins in narrow scaleless grooves, bounded by series of enlarged scales, each of which is crossed by an oblique spinous ridge; 11 or 12 such scales along base of soft dorsal and anal fins; they decrease in size anteriorly along the base of spinous dorsal, finally merging into the smaller scales of back and nape; lateral line less arched than the back, but reaching axis of body first on caudal peduncle; six lengthwise series of scales between lateral line and base of soft dorsal.

Color grayish silvery, overlaid with more or less steel-gray, and with some plumbeous streaks and markings; a plumbeous bar below eye, involving posterior end of mandibles; a narrow plumbeous streak along middle of caudal peduncle, expanding posteriorly to cover whole base of tail; above and below this streak the caudal peduncle is flesh-colored, as is also the snout, interorbital region, jaws, and branchiostegals; spinous dorsal blackish, light at base; other fins whitish, unmarked; narrow blackish streaks on supraorbital ridge, diverging from middle of snout to margin of preorbital, on lips and along mandibles.

*Capromimus abbreviatus* (Hector) is described and figured by Günther (Deep-sea Fishes, Challenger, 1887, 42, Pl. X, fig. B) as having smooth scales and naked palate. *Antigonia mulleri* Klunzinger (Sitzungsber. Akad. Wissen. Wien, LXXX, 1880, 380, Pl. V, fig. 3) is placed by Günther in the synonymy of *abbreviatus*, but the author gives no indication of the nature of the scales or of the dentition. In the original description of *C. abbreviatus* (Hector, Trans. N. Z. Inst., vii, 1875, 239-250) the scales are said to be "very narrow and rough."

Only the type is known.

#### Family CHÆTODONTIDÆ.

##### *Chætodon corallicola* Snyder.

Stations No. 4031, Penguin Bank, south coast of Oahu, 27 to 28 fathoms; 4032, Penguin Bank, south coast of Oahu, 27 to 29 fathoms; 4034, Penguin Bank, south coast of Oahu, 14 to 28 fathoms.

##### *Holacanthus fisheri* Snyder.

Stations No. 3847, off the south coast of Molokai, 23 to 24 fathoms; 3872, channel between Maui and Lanai, 32 to 43 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms; 4031, Penguin Bank, south coast of Oahu, 27 to 28 fathoms; 4032, Penguin Bank, south coast of Oahu, 27 to 29 fathoms; 4033, Penguin Bank, south coast of Oahu, 28 to 29 fathoms; 4034, Penguin Bank, south coast of Oahu, 14 to 28 fathoms.

#### Family BALISTIDÆ.

##### *Balistes bursa* Lacépède.

Station 4032, Penguin Bank, south coast Oahu Island, 27 to 29 fathoms.

#### Family MONACANTHIDÆ.

##### *Stephanolepis spilosomus* (Lay & Bennett).

Stations Nos. 4147, near Bird Island, 23 to 26 fathoms; 4148, near Bird Island, 26 to 33 fathoms; 4167, near Bird Island, 18 to 20 fathoms.

##### *Stephanolepis pricei* Snyder.

Station 4021, near Kauai, 286 to 399 fathoms.

Probably entered the trawl much nearer the surface than above indicated.

***Cantherines sandvichensis*** (Quoy & Gaimard).

One young specimen taken with tangles at station 4163, vicinity of Bird Island, depth 24 to 40 fathoms.

Sides somewhat blotched with light and dark, the dark markings assuming form of faint bars on head, and at base of dorsal and anal fins; dorsal containing 36 rays, anal 32.

## Family CANTHIGASTERIDÆ.

***Canthigaster cinctus*** (Richardson).

Three specimens of this conspicuously colored species were dredged in shallow water about the islands.

Head 40 hundredths of total length without caudal; depth of caudal peduncle immediately behind anal fin 24; length of snout 26; interorbital width 10; diameter of orbit 12; length of gill-slit 7, not descending to level of lower pectoral rays; longest pectoral ray 15; height of dorsal 17; length of caudal 31. D. 10; A. 9; P. 17.

Back compressed; interorbital space gently concave; upper profile of snout longitudinally gently concave; entire body and head, except extreme tip and lower side of snout, covered with very short slender spines; nostril minute, consisting of a very short open tube, scarcely discernible without the aid of a lens; caudal fin gently convex, with the outer rays slightly produced.

Color in life light olivaceous; back with 4 broad brownish black bars directed downward and forward; one covers the back of caudal peduncle save a narrow space immediately behind dorsal fin, and narrows downward, its pointed lower end below axis of body and beneath front of dorsal; the second bar includes base of dorsal and an area in front of fin, narrowing to a point below middle of sides; the third bar crosses nape and ends at upper limit of base of pectoral fins; the fourth covers posterior half of interorbital space; upper and lower margins of caudal fin brownish black; snout dusky; the top and sides of head and the light intervals between bars covered with light yellow spots (not bluish, as given by Vaillant and Sauvage), which are usually roundish, and smaller than pupil; these sometimes arrange themselves in lines bordering the dark bars, those about eye frequently coalesce to form longitudinal streaks, and those on lower part of cheeks may unite to form a lengthwise, more or less broken line; there may be a line also bordering gill-slit anteriorly.

Specimens were taken at the following stations: Nos. 3850, off the south coast of Molokai, 43 to 66 fathoms; 4071, off the north coast of Maui, 52 to 56 fathoms; 4128, vicinity of Kauai, 68 to 90 fathoms.

*Tetrodon (Anosmius) coronatus* Vaillant & Sauvage, Revue et Mag. de Zool. (3) III, 1875, 286.

## Family OSTRACIDÆ.

***Aracana spilonota***, new species. Fig. 242.

Type, 94 mm. long, from station 3939, vicinity of Laysan Island, depth 59 to 163 fathoms; type, No. 51630, U. S. Nat. Mus.

Head 31 hundredths of total length without caudal; greatest depth 44; greatest width (without spines) 50; width of lateral face 38; width of dorsal face 21; length of free portion of tail 19; length of snout 24; width over middle of eyes 18; diameter of orbit 16; length of gill-opening 5; longest pectoral ray 19; longest dorsal ray 15; longest caudal ray 23. D. 10; A. 9; P. 12; C. 11.

Body with 6 ridges, including a low ridge on each lateral face; no mid-dorsal or mid-ventral crest; a pair of strong spines near middle of dorsal ridges, and a corresponding but smaller pair near middle of ventral ridges, both compressed and slightly hooked backward; no other spines on body, but a series of low prominences along ventral ridges, which may develop into spines in other specimens; the body plates exhibit 5 to 7 low ridges radiating from center, each ridge with a series of small granules; abdominal plates with more prominent granules, but much less rough than in *A. aculeata* (Houttuyn); free portion of tail wholly invested with small movable plates, which cover lateral portions as fully as upper or lower sides; dorsal face gently convex, interorbital space strongly concave, upper profile of snout perfectly straight; breast not gibbous; eyes large, their diameter greater than distance separating



anterior margins of orbits; gill-opening very short, not descending to level of lower pectoral rays; caudal fin gently convex.

Color grayish olive above, lighter below; back and upper portion of sides of head, body and tail with small round brownish green spots, about one-third size of pupil; lower parts white, fins unmarked.

A specimen 36 mm. long, from station 3965, vicinity of Laysan Island, depth 116 to 147 fathoms, differs markedly in general proportions from the type. It is much broader, with wider flatter inter-

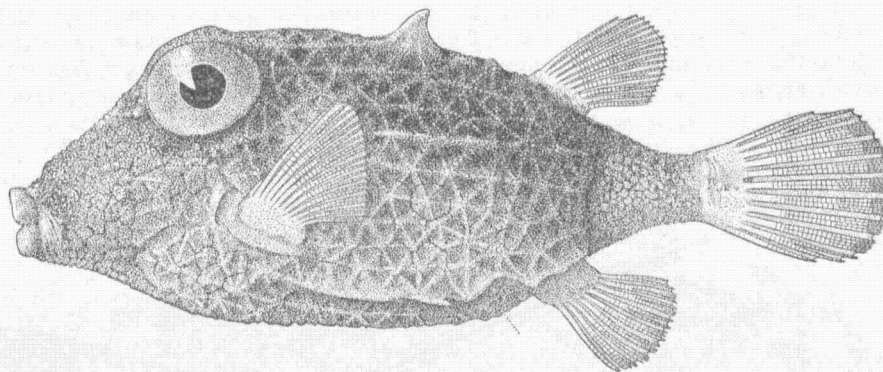


FIG. 242.—*Aracana spilonota* Gilbert, new species. Type.

orbital space, and the posterior half of the dorsal face deeply concave transversely, instead of convex. The breast is gibbous. In other respects, it agrees with the type and doubtless represents the last in the series of larval changes, which are very extensive in these forms.

But 2 specimens secured.

#### Family SCORPENIDÆ.

##### *Sebastapistes coloratus*, new species. Fig. 243.

Type, 77 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51631, U. S. Nat. Mus.

Head 47 hundredths of total length to base of caudal; diameter of orbit 16; width at middle of interorbital space 6; length of snout 11; length of maxillary 20; depth of body 38; least depth of caudal peduncle 9; longest (fourth) dorsal spine 20; eleventh dorsal spine 8; twelfth dorsal spine 15; longest dorsal ray 20; first anal spine 9; second anal spine 19; third anal spine 16; longest pectoral ray 31; longest ventral ray 24. D. XII, 9, last ray divided to base, appearing like 2 distinct rays; A. III, 5; P. 17. Tubes in lateral line 25 or 26.

Eye much longer than snout, 3 times the least width of interorbital space, which is moderately concave; from middle of interorbital space a pair of well-marked longitudinal ridges diverging anteriorly to base of nasal spines and posteriorly to occipital fossa, bridging the latter to join base of parietal ridge; occipital fossa deep, quadrate; preocular, supraocular, postocular, tympanic, parietal and nuchal spines present, the parietal and nuchal not in a straight line with the others; postocular broad and triangular, tympanic slender, erect, thorn-like, parietal and nuchal comparatively low and inconspicuous; a group of 3 or 4 very small spines on posterior orbital rim, followed posteriorly by a ridge terminating in a small spine, these in a direct line with lower suprascapular ridge and spine; a second smaller suprascapular spine, parallel with first, above point of origin of lateral line; upper preopercular spine much the largest, in a direct line with subocular ridge, and bearing a minute spinous point at its base; subocular ridge low but sharp, and bearing 3 minute spines; four short strong spines below upper preopercular spine, the second not smaller than the third; preorbital with two strong spines diverging from a common base; nasal, preocular, supraocular, parietal, preorbital, and lower preopercular spines accompanied by cutaneous flaps, which are of moderate width and mostly without

fringes; flaps also present on cheeks and opercles, along lateral line, and scattered on scales of trunk; supraorbital flap long and broad, often incised, usually extending to base of nuchal spine; maxillary not extending to below middle of the large eye; teeth very finely villiform, in a broad band in premaxillaries, a narrow band in mandibles, and still narrower bands on vomer and palatines; length of palatine band nearly equaling diameter of pupil; neither slit nor pore behind fourth gill-arch, the laminae of which are much reduced; gill-rakers short, slender, toothed, 7 freely movable on horizontal limb of anterior arch.

Spinous dorsal evenly rounded; third and fifth spines equal, fourth a little longer; second anal spine much longer and stronger than third, a little shorter than fourth dorsal; only 3 or 4 of the pectoral rays branched, the upper 2 and the lower 10 or 11 simple; pectoral base not procurvent, the lower rays but little thickened and exerted; upper rays of lower division of fin longer than the others; ventrals reaching front of anal fin; vent separated from anal fin by a distance equaling one-fourth length of ventrals.

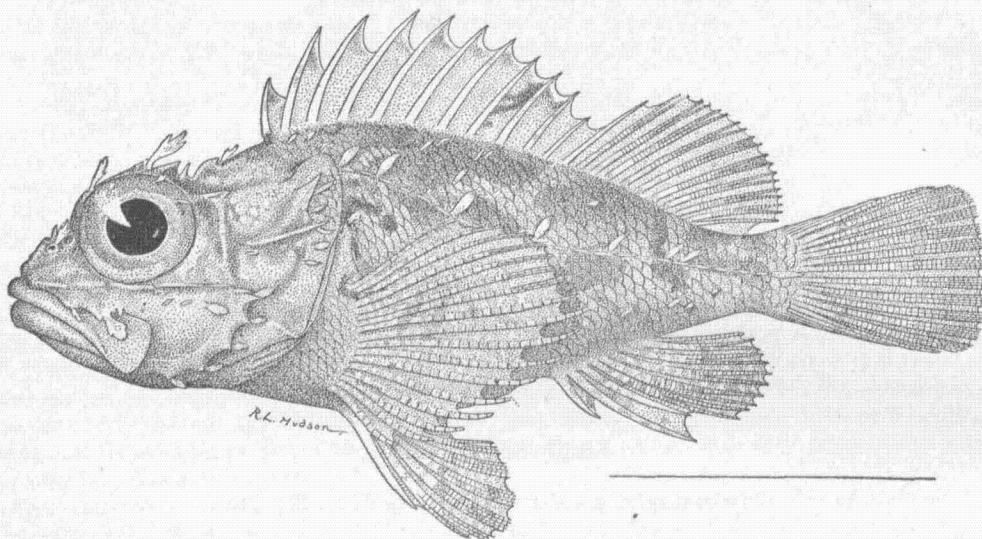


FIG. 243.—*Sebastapistes coloratus* Gilbert, new species. Type.

Scales strongly ctenoid on sides, cycloid on belly, breast, and prepectoral area, these regions all completely invested; a small patch of ctenoid scales behind eye on uppermost portions of cheeks and opercles; remainder of head wholly scaleless.

Color in spirits: Upper half of body largely bright rose-red or purplish, traversed by a few irregular curved lines of the grayish olive ground color, one crossing back under last dorsal spines, one under last soft rays; lower parts all light grayish olive; interorbital space and upper part of eye bright red, lower half of iris yellowish or golden; red blotches on cheeks, opercles, branchial membranes and roof of mouth; sides of head sometimes with bright pearly blotches, a small red spot or blotch near base of pectoral rays; dorsals reddish, with much white pigment, the red more intense near margin of fin, the tips of spines narrowly white; a small blackish spot on terminal portion of eighth to ninth dorsal spines.

Specimens were taken at stations Nos. 3849, off the south coast of Molokai, 43 to 73 fathoms, and 3850, off the south coast of Molokai, 43 to 66 fathoms.

*Scorpaenopsis altirostris*, new species. Fig. 244.

Type, 62 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51636, U. S. Nat. Mus.

Head 52 hundredths of total length to base of caudal; diameter of orbit 15; width at middle of interorbital space 7; length of snout 14; length of maxillary 24; depth of body 40; least depth of caudal



peduncle 11; longest (fourth) dorsal spine 23; eleventh dorsal spine 13; twelfth dorsal spine 17; longest dorsal ray 23; first anal spine 12; second anal spine 26; third anal spine 18; longest pectoral ray 37; longest ventral ray 27; length of caudal 34. D. XII, 9, the last ray cleft to base; A. III, 5; P. 17. Tubes of lateral line 24 or 25.

Head large, compressed, with subvertical cheeks, snout short and high, without preocular depression. The species thus more closely resembles the small brightly colored *Sebastapistes* from the South Seas than it does other species of *Scorpaenopsis*. Occipital fossa moderate, quadrate; a shallow pit below the eye; eye large, prominent, slightly larger than snout, more than twice width of interorbital space, which is deeply concave, its floor with a pair of inconspicuous ridges which do not cross the occipital fossa; at outer edge of each of these ridges near middle of interorbital space is a pair of conspicuous mucous pores; preocular, supraocular, postocular, tympanic, parietal and nuchal spines present, the tympanic duplicated (as an irregularity) in the type; parietal and nuchal spines not in a line with the others; a group of small prickles immediately behind eye on a level with upper end of gill-slit; behind these a ridge terminating in a spine, succeeded by the similar suprascapular ridge and spine; between the latter and the nuchal spine an oblique crest bearing several small spines; subocular

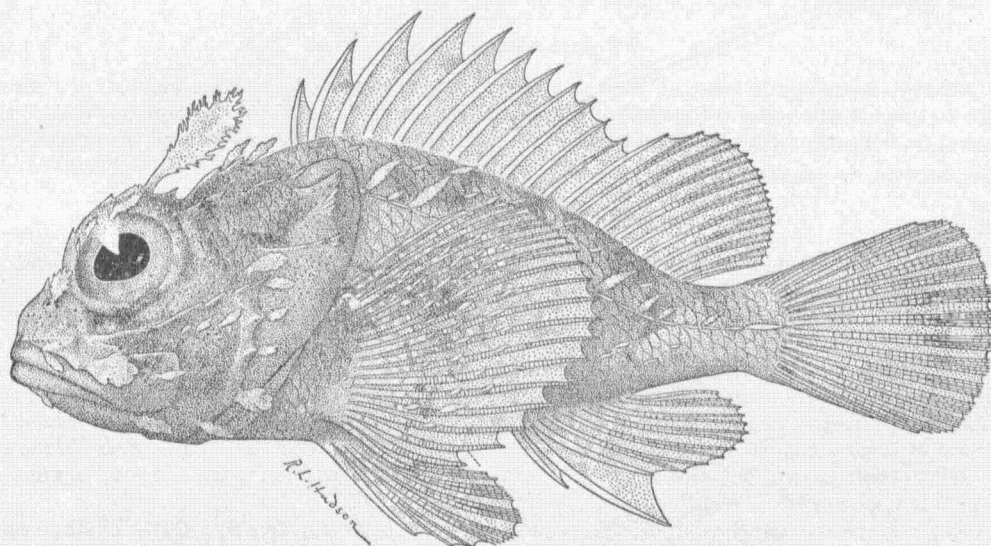


FIG. 244.—*Scorpaenopsis allirostris* Gilbert, new species. Type.

crest low and sharp, with 4 low spines directed backward, each terminating a short secondary crest, the anterior 2 a little below the main ridge; upper preopercular spine short and strong, larger than the others, in line with the subocular ridge and bearing a smaller spine at its base; four short spinous points below upper preopercular spine, regularly graduated from above; margin of preorbital with 2 strong divergent spines, the posterior compressed and much larger than the anterior; preorbital also with a small spine directed upward and backward toward eye; below upper opercular spine a number of subsidiary spines and ridges; one or more small spines and ridges may also develop below lower opercular ridge; broad cutaneous flaps present on anterior nasal tube, and on supraocular, parietal, preorbital, and lower preopercular spines; a few accompany lateral line, and a small number are scattered on trunk, sides of head, maxillary and mandible; supraocular flap very long in the type, the margin variously cleft, nearly reaching front of dorsal when depressed; it is subject to great variation in its development, and is scarcely to be distinguished in some of the cotypes; maxillary wide posteriorly, reaching vertical from posterior edge of orbit; teeth in moderate bands in jaws, in a very narrow band (about 2 series) on vomer; palatines toothless; no trace of pore or slit behind fourth gill-arch; gill-rakers very short barely movable, with enlarged spinous tips, 7 or 8 on horizontal limb of anterior arch.

Spinous dorsal evenly rounded; fourth spine longest, equaling height of soft rays; fifth higher than third; second anal spine much longer than third, and also longer than longest dorsal spine; ventrals extending beyond origin of anal; upper pectoral ray and the lower 10 rays simple, the others branched; pectoral not procurent, some of the simple rays of the lower half the longest.

Scales weakly ctenoid and somewhat deciduous on sides of body, cycloid on belly, breast, and prepectoral area; a few ctenoid scales on upper part of cheeks and opercles, the head otherwise scaleless; skin of sides and top of head quite generally covered with minute papillae, most of which inclose a central prickle, these found even upon scales of head.

Color in life, snout, upper part of head and lower jaw, purplish; preopercle with a greenish spot; occiput brown, tinged with brassy; sides of body mottled with lilac, brick-red, vermilion, greenish, and pearly bluish white; a whitish streak running from belly obliquely upward and backward to dorsal fin; dorsal mottled with red and lilac, parts of it translucent, the tips of the spines usually white; caudal clouded with vermilion, the lower part tipped with lemon; anal clouded with lake-red, tipped with lemon; pectoral lake-red, upper part yellowish olive; ventrals lake-red; throat suffused with lilac; belly white.

Six specimens were secured, all from station 3849.

**Peloropsis**, new genus.

Allied to *Scorpanopsis*, but with head and belly closely compressed, the proximal half of rostrum much contracted, the scales all cycloid, the head naked, the belly and breast completely scaled, the pectoral fin not procumbent below and the third dorsal spine much produced beyond the others.

*Peloropsis* Gilbert, new genus of *Scorpenidae* (*xenops*).

**Peloropsis xenops**, new species. Fig. 245.

Type, 152 mm. long, from station 3872, Avau Channel, between Maui and Lanai islands, depth 32 to 43 fathoms; type, No. 51604, U. S. Nat. Mus.

Head 47 hundredths of length from tip of snout to base of caudal; greatest depth 46; least depth of caudal peduncle 12; greatest thickness 22; diameter of orbit 9; interorbital width 5.5; length of snout 18; thickness of basal portion of rostrum 3.5; length of maxillary 23; length of longest (third) dorsal spine 35; fourth spine 25; eleventh spine 11; twelfth spine 14; longest soft dorsal ray 18; first anal spine 12; second anal spine 22; third anal spine 21; highest anal ray 27; length of caudal 33; pectoral 34; ventral 29. D. xii, 9, the last ray cleft to base and appearing like 2 rays; A. iii, 5, the last ray cleft to base; P. 18. Tubes of lateral line bearing no definite relation to the scales, 23 in number; scales in irregular series, about 70 vertical rows above lateral line.

Body everywhere closely compressed, greatest width (at opercles) scarcely half the depth; region between eyes and nostrils uniformly contracted and compressed to a mere keel, snout in front and the interorbital behind abruptly widened; the interorbital space very deeply channeled, without ridges, its width but little more than half diameter of eye; occipital region much contracted immediately behind orbits, upper half of orbital rim prominently elevated and separated from rest of head; nasal spines small; low preocular, supraocular, and postocular spines present, and a high compressed parietonuchal ridge, consisting of 2 fused spines; occiput with a quadrangular depression a little below level of interorbital groove, separated from this and other adjacent regions by low ridges; a pair of shallow cup-like depressions on sides of interorbital space below that portion of supraorbital rim which lies between supraocular and postocular spines; a small and a large supraocular spine, and one behind middle of orbit; a wide excavated space intervenes between orbit and subocular ridge, which bears a series of 4 low spines directed backward; the ridge joins preopercle nearly midway between first and second preopercular spines, which are short, triangular, equal in length; a shorter third preopercular spine present, and a slight protuberance representing fourth spine; margin of preorbital with 2 small lobes, each provided with an indistinct spinous point; head, body, and fins well furnished with cutaneous flaps; on head they occupy the usual positions, in connection with nasal tube, supraocular and preocular spines, lobes of preorbital, and maxillary and mandible; on sides, the largest flaps are along lateral line, smaller ones being variously scattered; broad flaps are attached to tips of anterior dorsal spines; smaller flaps and filaments scattered over dorsal and pectoral fins; mandible protruding beyond snout, its tip with a short symphyseal knob; maxillary very broad, reaching a vertical slightly



behind orbit; teeth very fine, in narrow bands on mandible and vomer, in a broad band in premaxillaries; palatines toothless; no slit or pore behind fourth arch; gill-rakers scarcely movable, spinous, few in number.

Dorsal spines compressed, the third much produced beyond the others, the first spine about equaling the eleventh, the second equaling the seventh; third, fourth, and fifth spines all higher than the soft rays; membrane from last dorsal ray joining almost entire length of caudal peduncle. Second and third anal spines about equal, the third appearing longer, the three spines seemingly graduated; ventrals reaching half-way between vent and front of anal; pectorals to opposite middle of anal base; upper pectoral ray simple, second to seventh rays forked at tip, the remaining rays simple, thickened, a little exerted, the ninth ray longest; pectoral not at all procurvent below, the base of the lowest ray vertically under or a little behind the uppermost ray.

Scales all cycloid, small, somewhat irregularly arranged, completely investing the body; head and fins wholly naked.

Color in life very brilliant. Head, body, and fins bright vermilion, upper parts of head and body darkened with olive tint, and with small scattered purplish spots, which are also found on upper half

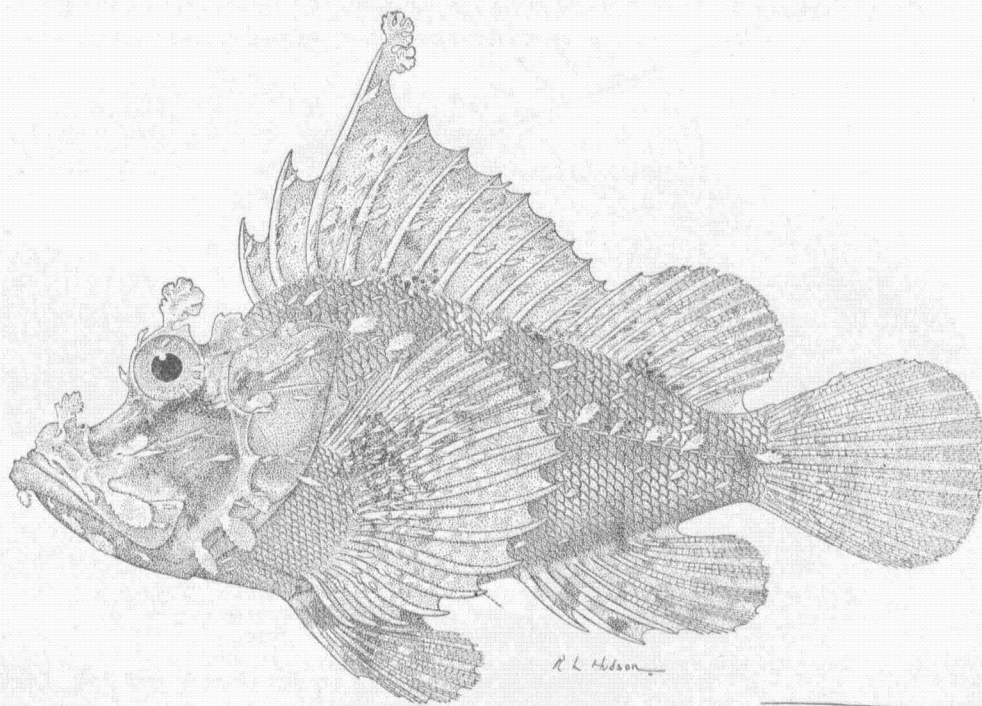


FIG. 245.—*Pcloropsis xenops* Gilbert, new species. Type.

of pectoral fin; head, lower parts of body, and fins mottled with yellowish white; flaps and tentacles narrowly edged with bright lemon-yellow; a large blackish blotch below eye, one on opercle and one at base of pectoral; a conspicuous broad, yellowish white bar on each side of compressed part of rostrum; three groups of brownish spots along base of dorsal fins; conspicuous white spots on back of tail and at base of eighth and ninth dorsal spines; a larger blotch below the latter just above lateral line.

Only the type known.

***Helicolenus rufescens*, new species. Fig. 246.**

Type, 105 mm. long, from station 4133, vicinity of Kauai, depth 41 to 165 fathoms; type, No. 51628, U. S. Nat. Mus.

Head 48 hundredths of total length to base of caudal; diameter of orbit 16; width of middle of interorbital space 5; length of snout 14; length of maxillary 24; depth of body 37; least depth caudal

peduncle 10; longest (third) dorsal spine 21; eleventh dorsal spine 9; twelfth dorsal spine 13; longest dorsal ray 17; first anal spine 7; second anal spine 22; third anal spine 15; longest pectoral ray 31; longest ventral ray 25. D. XII, 9; last ray divided to base; A. III, 5; P. 18. Pores of lateral line 25 or 26; vertical rows of scales above lateral line about 52.

Eye very large, oval, longer than snout; interorbital space very narrow, less than diameter of pupil, deeply concave; occiput gently concave, without pit or any special depression; occipital and supraorbital spines forming a single series, all the spines lying in a straight line, or the tympanic spine very slightly displaced to the side; spines all low but strong; preocular spine separated by a wide interval from 3 closely approximated over posterior part of eye, these followed by occipital and nuchal spines; occipital ridge short; two strong suprascapular spines, and 2 or 3 spines in front of these immediately behind orbit, one of the latter terminating a well-defined ridge; infraorbital ridge well-defined, bearing 3 low spines, in direct line with the uppermost and strongest preopercular spine, which bears a smaller one at its base; below this 4 small preopercular spines directed backward, the second shorter than the third; margin of preorbital bearing 2 strong spines directed downward and backward; nasal spines small. Short narrow flaps, usually fringed near tips, occur as follows: one on anterior nasal tube, and one each on preocular, supraocular, and parietal spines, the preorbital

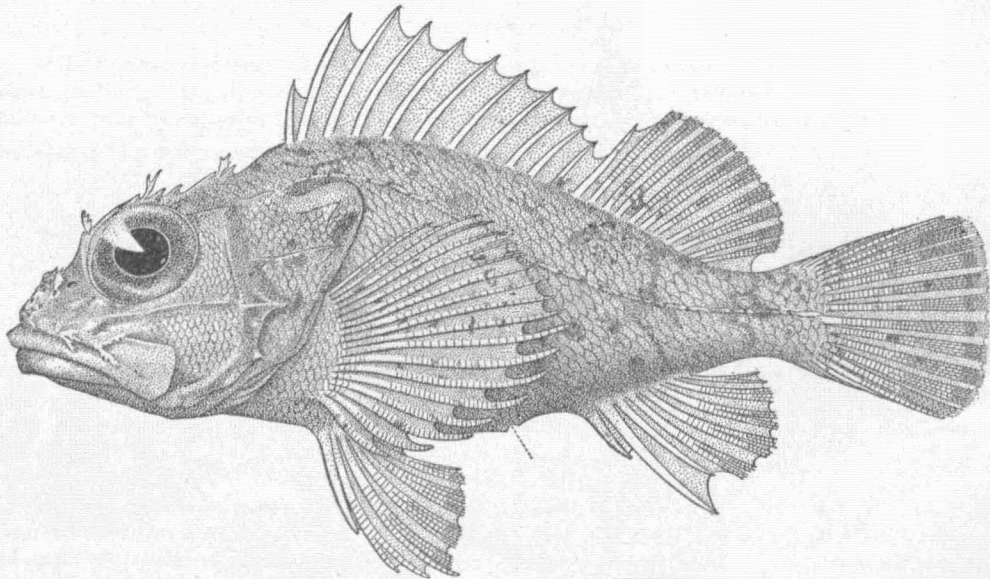


FIG. 246.—*Helicolenus rufescens* Gilbert, new species. Type.

spines and the lower 2 preopercular spines; a few simple flaps present along lateral line. Cheeks, opercles, and occiput covered with ctenoid scales, a few present also on interorbital space; snout, mouth-parts, and lower side of head scaleless; maxillary reaching a vertical from posterior margin of pupil; teeth in finely villiform bands on jaws, vomer, and palatines; branchiostegals 7, the inner extremely delicate, concealed in membrane; pseudobranchiae large; gill-rakers very short, spinous, only 7 or 8 movable on horizontal limb of anterior arch; a very narrow slit behind fourth gill-arch.

Dorsal spines low and strong, the fin deeply notched between eleventh and twelfth spines; second anal spine longer and stronger than third or any of the dorsal spines; caudal truncate; ventrals reaching vent, which is separated from front of anal by a distance equaling one-third length of ventral fins; lower 12 pectoral rays simple, thickened, free at tip, some of them produced beyond the upper branched rays; uppermost 3 or 4 rays likewise simple.

Scales thin, rather weakly ctenoid, those on belly and breast smooth; tubes of lateral line with a membranous roof.

In life, blotched with bright vermilion and pearly white, the white most conspicuous on fins and in axil of pectorals; some dusky brownish specks and mottlings scattered on body, and on dorsal, caudal, and pectoral fins. Lining membranes of mouth, gill-cavity, and body cavity white.



A second smaller specimen (78 mm. long) was taken at station 4074, off north coast of Maui, depth 78 to 85 fathoms. It differs conspicuously in length of the supraorbital tentacle, which extends beyond the nuchal spines. The pectoral rays are in this young specimen all simple. The species is closely related to *Pontinus spilistius*, described from young specimens only. It may well be that adults of the latter have some of the pectoral rays forked, in which case the species would be referred to the genus *Helicolenus*, which is of doubtful validity.

Only 2 specimens obtained.

***Pontinus spilistius*, new species. Fig. 247.**

Type, 90 mm. long, from station 4077, off the north coast of Maui, depth 99 to 106 fathoms; type, No. 51644, U. S. Nat. Mus.

Head 47 hundredths of total length to base of caudal; diameter of orbit 12; width at middle of interorbital space 4; length of snout 13; length of maxillary 21; depth of body 36; least depth of caudal peduncle 11; longest (third) dorsal spine 16; eleventh dorsal spine 8; twelfth dorsal spine 12; longest dorsal ray 17; first anal spine 6.5; second anal spine 19; third anal spine 15; longest pectoral ray 31; longest ventral ray 24.5. D. XII, 10, last ray divided to base; A. III, 5, last ray divided; P. 17. Pores in lateral line 24 or 25; vertical rows of scales above lateral line 55.

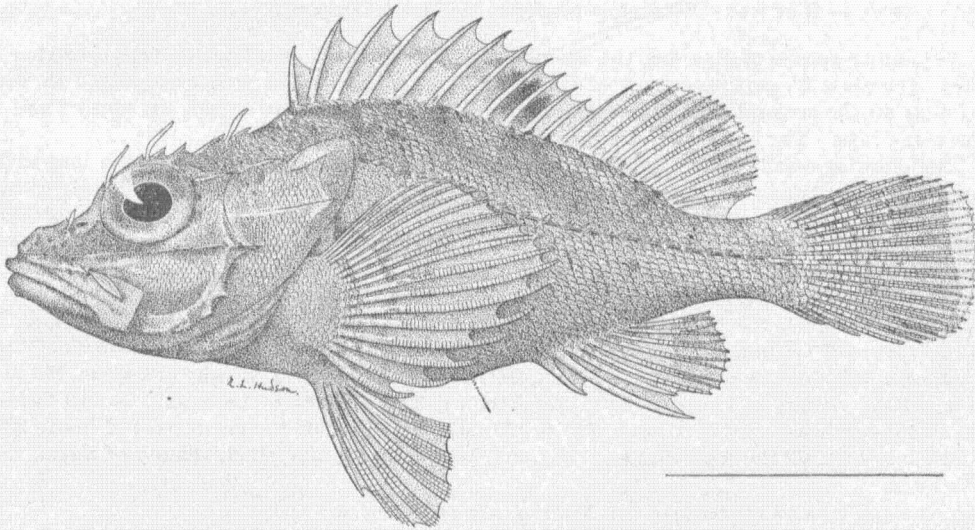


FIG. 247.—*Pontinus spilistius* Gilbert, new species. Type.

Eye shorter than snout, but more than twice width of the narrow, deeply concave interorbital space; occiput rendered concave by parietal ridges, but without pit or depression; nasal spines small; strong but low preocular, supraocular, postocular, tympanic, parietal, and nuchal spines, the postocular and tympanic displaced laterally, not in line with the others; two ridges below tympanic spine, immediately behind eye, the lower longer and stronger than the upper, and bearing a single strong spine on a level with the 2 suprascapular spines; opercular spines slender; a sharp ridge from preorbital along suborbitals to preopercle, joining the latter at base of the upper longest preopercular spine, which bears a smaller spine near its base; subocular ridge with 3 short backwardly directed spines; in the type, but 2 small preocular spines can be detected below uppermost spine, but in young specimens 2 more very minute ones are present, which evidently disappear with age; numbered from above, the latter form the second and fifth spines of the series; on margin of preorbital are 2 minute spinous points anteriorly, and a rather strong spine posteriorly; all the cirri are compressed, narrowly lanceolate, with entire edges; a pair of cirri present on nostril rim and one each at base of the preocular, supraocular, occipital, and the 2 posterior preorbital spines; a series also accompanies lateral line; maxillary falls short of vertical from middle of orbit; teeth finely villiform, in moderate bands on jaws and vomer, in a long narrow

band on palatines; branchiostegals 7, the anterior concealed; pseudobranchiae large; gill-rakers clavate, toothed, short, about one-third diameter of pupil, 9 present on horizontal limb of anterior arch; a narrow slit behind fourth gill-arch; scales on cheeks mostly smooth, those on opercles and occiput strongly ctenoid; interorbital space, snout, mouth parts, and lower side of head largely naked.

Spinous dorsal very low, rounded, the last spine much longer than the preceding spines; first anal spine very short, the second longer and stronger than the third, or than any of the dorsal spines; pectorals reaching vertical from third anal spine; all the rays simple in the type, the lower thickened, with projecting tips, the longest rays just below middle of fin; ventral fins extending a little beyond vent, which is distant from front of anal slightly more than one-third length of ventrals.

Scales moderately ctenoid, those on breast, prepectoral area, and abdomen smooth; tubes forming lateral line membranous.

Color, reddish, with dusky mottlings along back, and lighter or reddish blotches at base of dorsal fin; a broad light reddish bar on tail; snout and top of head finely speckled with olive-brown; a black spot between seventh and tenth dorsal spines, and small dark spots at base of some of the spines and rays; two small dark spots dividing base of pectoral fin into thirds; mouth and gill-cavity white.

The species was taken at stations No. 4077, off the north coast of Maui, 99 to 106 fathoms, and 4098, off the north coast of Maui, 95 to 152 fathoms.

***Setarches remiger* (Gilbert & Cramer).**

As in other species of *Setarches*, the lateral line is a very broad membranous tube overlying the scales. There are 25 or 26 segments of this tube corresponding to the sensory papillae. In young specimens all the pectoral rays are simple, but in adults all are forked except the upper 2 and the lower 5 or 6 rays. The lower undivided rays are somewhat thickened.

The following details correct those given in the original description: Snout much longer than diameter of orbit; two lower preocular spines smaller than the others, but well developed; width of dilated end of maxillary contained  $1\frac{1}{2}$  in diameter of orbit; a narrow band (or a single series) of minute teeth along entire length of palatines; ventral fins extending but  $\frac{2}{3}$  distance from their base to vent; caudal fin truncate, with rounded angles; five heavy pyloric caeca; pseudobranchiae well developed.

The species was taken at the following stations: Nos. 3865, Pailolo Channel, 256 to 283 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3883, Pailolo Channel, 277 to 284 fathoms; 3884, Pailolo Channel, 284 to 290 fathoms; 3898, Pailolo Channel, 258 to 284 fathoms; 3899, Pailolo Channel, 283 to 284 fathoms; 3925, off the south coast of Oahu, 299 to 323 fathoms; 3942, vicinity of Laysan, 146 to 222 fathoms; 3943, vicinity of Laysan, 100 to 222 fathoms; 3947, vicinity of Laysan, 97 to 199 fathoms; 4058, off the northeast coast of Hawaii, 190 to 195 fathoms; 4082, off the north coast of Maui, 220 to 238 fathoms; 4122, off the southwest coast of Oahu, 192 to 352 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

*Scorpena remigera* Gilbert & Cramer, Proc. U. S. Nat. Mus., XIX, 1897, 418, pl. XL.

***Plectrogenium*, new genus.**

Related to *Sebastosemus*, but much more slender, with broad head, the width of which equals the depth, and with dorsal fin divided to base; second anal spine longer and stronger than third; pectoral notched, its upper portion consisting of forked rays, the lower unbranched, some of them elongate, forming a projecting lobe; scales large and strongly ctenoid, covering head and pectoral fins; no occipital pit; interorbital region flattish; a series of very strong spines along sides of head.

*Plectrogenium* Gilbert, new genus of *Scorpenidae* (*nanum*).

***Plectrogenium nanum*, new species. Fig. 248.**

Type, 70 mm. long, from station 4082, off north coast of Maui, depth 220 to 238 fathoms; type No. 51598, U. S. Nat. Mus.

Length of head 40 hundredths of total length without caudal; depth of head at occiput 22; greatest width of head (without spines) 26; diameter of eye 15; width of middle of interorbital space 8; length of snout 10; length of maxillary 12; greatest depth of body 25; least depth of caudal peduncle 9; length of caudal peduncle from base of last anal ray 27; longest (fourth) dorsal spine 16; second anal spine 16; third anal spine 12; longest pectoral ray 25; longest ventral ray 22. D. x-11, 7; A. III, 5; P. 23. Scales in lateral line 28 or 29, 2½ series above lateral line, 7 series between lateral line and vent.

Body elongate, little compressed, width two-thirds depth; upper profile of head rising in a gentle unbroken curve from snout to dorsal fin; head without pits or depressions; interorbital space wide, flat or very gently concave; a series of very strong, compressed, backwardly hooked spines along lateral profile of head, 1 on preorbital, 2 on suborbital stay, and 1 on preopercular margin; a smaller cusp at anterior base of each larger one, that at base of preopercular spine larger than the others; in front of the preorbital and the anterior suborbital spines several smaller spinelets; beneath the preorbital spine a second series of short backwardly hooked spines overlapping maxillary; opercular margin with 2 spines, the lower terminating a knife-like ridge which bears 2 smaller spines; supraorbital rim not elevated, bearing a row of strong spines directed outward and backward; within these a pair of curved, diverging, finely serrulate ridges; occipital ridges very short, with diverging spines; 2 or 3 paroccipital spines; a strong suprascapular spine; mouth very small, horizontal; mandible included; maxillary narrow, scarcely reaching vertical from front of pupil; finely villiform teeth in jaws, vomer, and palatines, the palatine band very narrow, the outer series in premaxillaries a little enlarged; branchiostegals 7, membranes distinct and free; pseudobranchiae large; gill-laminae much reduced, the posterior filaments of fourth arch rudimentary; slit behind fourth arch evident; gill-rakers short, unarmed, less than one-third diameter of pupil, 11 or 12 on horizontal limb of first arch.

Spinous dorsal low, with evenly rounded contour, the fourth spine highest, the tenth very short, its membrane not joined to the eleventh, which is much longer; twelfth spine as long as ninth and but little shorter than soft rays; first anal spine about as long as third, much shorter than second; base of

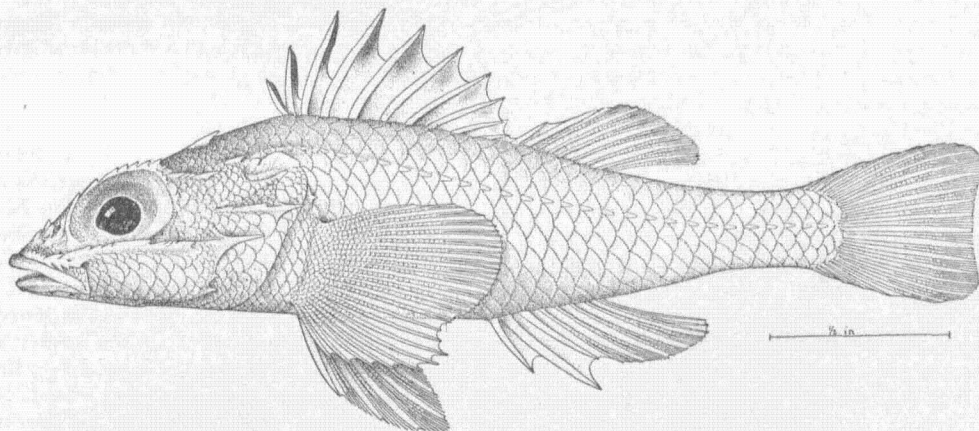


FIG. 248.—*Plectrogenium nanum* Gilbert, new species. Type.

anal equal to that of second dorsal, the 2 fins exactly opposite; upper pectoral rays slender, all but the upper 2 forked, about 8 of the lower rays simple and a little thickened, some of them produced, longer than the rays above and below them, but not so long as the longest pectoral rays, which reach to or a little beyond front of anal; third ventral ray longest, reaching first anal spine; caudal slightly emarginate.

Scales large, strongly ctenoid, those on head and pectoral fin much reduced in size; lateral line of normal type, each scale bearing a tube which opens in a pore near margin of scale; no cutaneous canal overlying the scales, as in *Setarches*; only mandibles, lips, and gill-membranes scaleless.

Color in life almost uniform rose-red; a dusky streak on membrane behind distal half of each dorsal spine, and a dusky blotch on middle of soft dorsal, these colors more intense in the young, where a faint dusky bar may often be detected beneath each dorsal fin, and a narrow streak on middle of caudal peduncle; mouth, branchial and abdominal cavities whitish.

Bones of head firm and not heavily channeled, the species not evidently adapted for life at considerable depths. Fifteen specimens were secured.

Specimens were taken at the following stations: Nos. 3952, vicinity of Laysan, 347 to 351 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, 223 to 238 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

*Tænianotus citrinellus*, new species. Plate 81.

Type, 50 mm. long, from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms; type, No. 51634; U. S. Nat. Mus.

Head 43 hundredths of total length to base of caudal; depth 54; depth of caudal peduncle 13; greatest thickness (at opercles) 14; length of snout 15; diameter of orbit 10; length of maxillary 20; interorbital width 6; first dorsal spine 23; second dorsal spine 35; longest (third) dorsal spine 37; last dorsal spine 25; first dorsal ray 30; longest dorsal ray 33; last dorsal ray 19; first anal spine 12; second anal spine 20; third anal spine 23; longest anal ray 28; longest caudal ray 35; longest pectoral ray 44; longest ventral ray 28. D. XII, 10; A. III, 6; P. 14; V. I, 5.

Body closely and everywhere about equally compressed; head scarcely wider, with vertical sides; eye immediately below upper profile; orbital rim elevated; interorbital space gently concave; three short but strong spines on supraorbital rim, the posterior the longer; two short strong spines on each side of occiput, one external and a little posterior to the other; two small weak suprascapular spines; opercle with 2 weak curved and diverging ridges, each ending in a weak spinous point; preopercle with 2 small triangular spines above angle, and a very small one below; preorbital crossed by 3 low ridges, which intersect at a common point, one running downward and forward from orbit and parallel with upper contour of snout, the second forming the anterior continuation of the suborbital ridge, the third intersecting the second nearly at a right angle, each ridge ending in an inconspicuous spinous point; nasal spines strong, closely approximate; a pair of very large supraorbital flaps reaching, when depressed, to base of first dorsal spine, each long and narrow, with its margin sparsely fringed; a large fringed cirrus arising from posterior margin of anterior nostril, which is in a short broad tube; when depressed, the nasal cirrus reaches to or beyond vertical from front of pupil; posterior nostril an oblong pore, close behind anterior; a short pedunculate flap on each side of tip of snout; a series of 3 long slender simple filaments on mid-gular line; a series of similar filaments along mandible; mouth very oblique, mandible included; maxillary broad, not slipping under preorbital, reaching a vertical from front of pupil; teeth villiform and very small, in narrow bands in jaws; a few slight asperities on vomer; palatines toothless; branchiostegal membranes moderately joined across throat, and free from isthmus; branchiostegal rays 7; pseudobranchiæ large; gills  $3\frac{1}{2}$ , no slit behind last arch; gill-rakers represented by small spinous tubercles on all the arches.

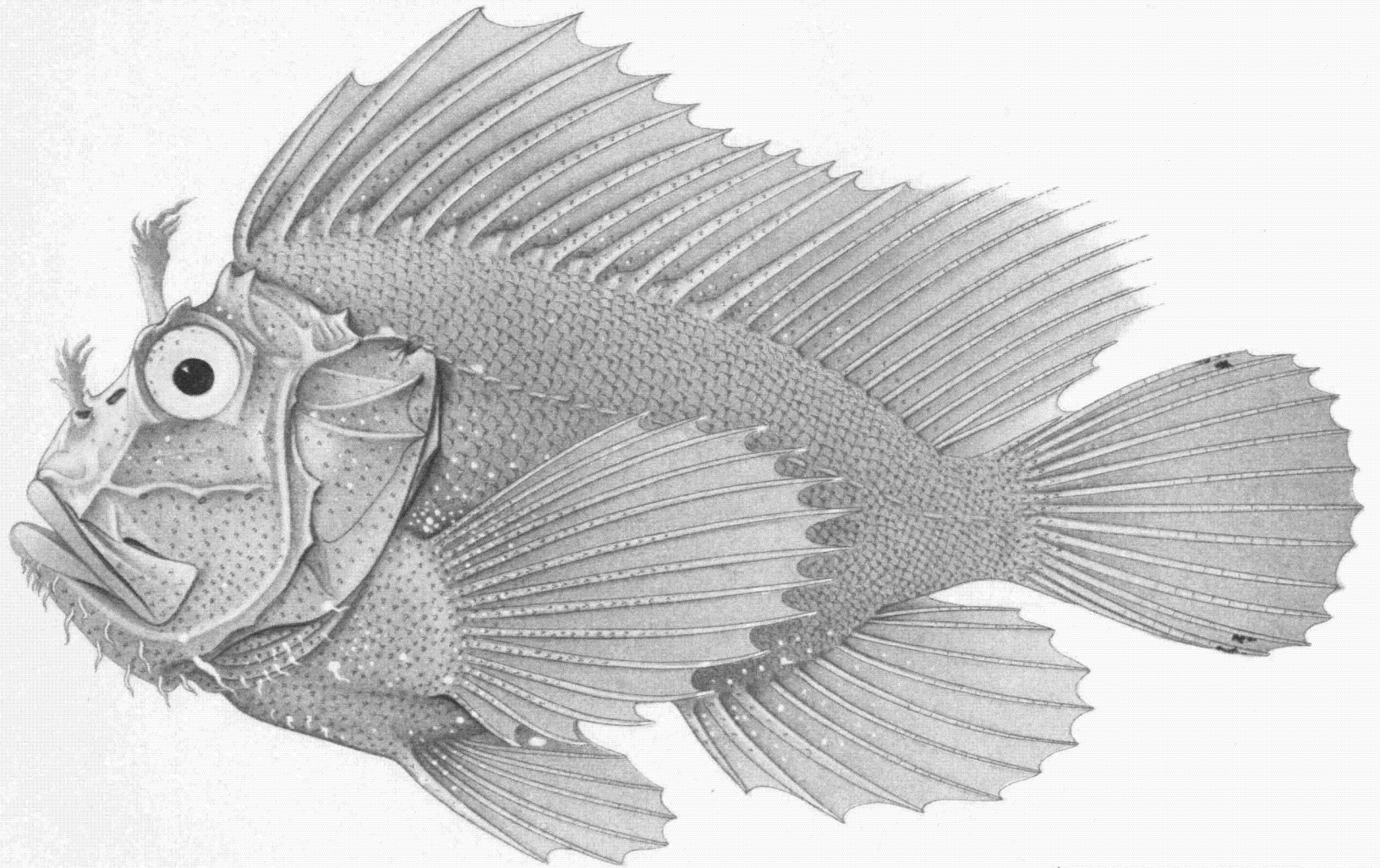
First dorsal spine inserted over posterior edge of orbit, equaling in length the next to the last spine, and two-thirds the length of the third; third spine a trifle longer than second, and the longest in dorsal fin; twelfth spine a little longer than the eleventh and obviously shorter than the succeeding ray; membrane from last dorsal ray joining caudal fin so as to include basal third of second ray; first ray short and entirely included; last dorsal ray cleft to base; anal spines regularly graduated, the third equaling in length the first dorsal spine; last anal ray cleft to base; pectoral fin long and narrow, the width of its base about one-third its length, the tips of the longest rays reaching a vertical from middle of anal fin (on right side, fin of left side still longer); ventral spine inserted vertically below upper pectoral ray, somewhat in advance of the lower, the pectoral base curved downward and backward; third ventral ray longest, failing to reach front of anal by less than one-tenth its own length; inner ventral ray attached by membrane to sides of abdomen; caudal fin rounded. With the exception of the last dorsal and anal rays, which are forked to extreme base (better, perhaps, to be considered 2 rays in each case, springing from the same basal), all the rays of the vertical fins simple; second, third, and fourth ventral rays forked for a short distance near their tips, all other ventral rays and all pectoral rays simple.

Scales small, irregular, very thin, scarcely imbricated, their outlines not to be made out until the skin is dried, appearing cycloid, but each bearing at its free edge a short spine, projecting at an angle with surface of scale; on sides of head scales are reduced to small scattered prickles; tubes of lateral line 22 in number bearing no relation to the scales; lateral line straight, oblique, not curved, parallel with outline of back; no cirri along course of lateral line; basal half of pectoral fin bearing small scales, each furnished with a minute prickle.

Color lemon-yellow, clouded with pale brownish; fins darker; dorsal and caudal with reddish brown tinge; a few minute pearly spots widely scattered on sides of head and anterior part of body and on pectoral fin, a small spot of the same color crossing each pectoral ray near its tip.

One specimen only was obtained.





TÆNIANOTUS CITRINELLUS GILBERT. TYPE.

The species of *Taenianotus* have been very insufficiently described and figured. It is by no means evident that all the specimens listed as *Taenianotus triacanthus* Lacépède are conspecific. Günther's 2 figures (Fische der Südsee, I, pl. 57, figs. A & B) differ widely in other respects besides color, and must, if correct, represent more than one species. It is impossible to identify *T. citrinellus* with any of these, or with *T. garretti* Günther, the latter from the Hawaiian Islands and described from a colored drawing only. It is represented with very broad, short pectorals, strong cephalic spines, and very short anal spines, and differs in many other important details in addition to the color.

***Dendrochirus barberi* Steindachner.**

One young specimen from station 3849, off the south coast of Molokai, depth 43 to 73 fathoms.

**Family BEMBRIDÆ.**

***Bembradium*, new genus.**

Related to *Parabembras*, from which it differs in having much larger scales, a lateral line running near middle of body (as in *Bembras*), not parallel with the back, and a short mandible included within the upper jaw.

*Bembradium* Gilbert, new genus of *Bembridæ* (*roseum*).

***Bembradium roseum*, new species. Plate 82.<sup>a</sup>**

Type, 90 mm. long, from station 3859, Pailolo Channel, depth 138 fathoms; type, No. 51617, U. S. Nat. Mus.

Head 40 hundredths of total length without caudal; depth 18; width of snout 14; length of snout 13 (to front of eyeball); eye 11; interorbital width 2; maxillary 18. D. IX-12; A. 11; V. I, 5; P. 25. Lateral line 28; 3½ horizontal series of scales above lateral line.

Body elongate, gently compressed along dorsal region; head narrow, depressed, with long snout; lower profile perfectly straight from tip of snout to tail, upper profile gently and evenly curved, highest under spinous dorsal; mouth horizontal, lower jaw shorter than upper and included within it when the mouth is closed, maxillary reaching slightly beyond front of pupil; teeth uniformly minute, forming narrow bands in jaws and on vomer and palatine bones; interorbital space a very narrow groove, the raised margins of which are minutely serrate with backwardly directed teeth; they are nearly parallel, diverging gently forward and continuing to middle of length of snout, and diverging posteriorly more rapidly, not continuing behind line of orbits; a strong triangular backwardly directed spine immediately in front of orbit and behind posterior nostril; nasal bones curved, channeled, the raised margins with uniform small teeth directed backward; a low ridge traversing cheeks from preorbital to upper portion of preopercle, passing anteriorly to the inner side of a low sharp ridge which runs the length of the preorbital; suborbital ridge rising posteriorly, almost uniformly serrate with backwardly directed teeth, 18 to 20 in number, a few of the posterior teeth only becoming slightly larger; where the suborbital ridge joins the preopercle the margin of the latter is abruptly produced to form a sharp triangular prominence which bears a double spine but little larger than the last of the suborbital series; below this, the margin of the preopercle bears 3 or 4 small spinous points, confined to the region above the angle; opercle with 2 curved diverging ridges, ending each in a spine; upper rib curving around a thinner semicircular portion of membrane at upper end of opercular flap; seen from above, this has a pore-like appearance, and functions as does the pore in *Callionymus*; top of head with short ridges ending in spines, an occipital pair, one behind each eye, and 2 pairs on post-temporals; gill-openings widely cleft, the membranes wholly free from each other; gills 3½, the laminae very narrow; a wide slit behind last gill-arch; gill-rakers short but strong, the longest about ¼ diameter of pupil, decreasing in length anteriorly from angle of arch; 6 on horizontal limb of outer arch, the anterior 1 or 2 rudimentary and immovable; branchiostegal rays 7.

First dorsal short, of sharp moderately strong spines, the third spine longest, 16 hundredths of length to base of caudal; base of first dorsal 19; base of second dorsal 30; space between dorsals 2; first ray of soft dorsal simple, all the other rays forked for distal third or fourth of their length,

<sup>a</sup>By error labeled *Bembradium roseus* on plate.

last ray split to base; anal base 27 hundredths of length; first 2 anal rays simple, others forked near tips, the last divided to base; none of the lower pectoral rays modified; some of the upper rays longest, 24 hundredths of length; lower rays progressively shortened, the base obliquely procurvent; a few of the longer middle rays forked, but most of them simple; ventral fins inserted slightly in advance of lower base of pectorals; ventral spine strong, half the length of the third ray, which is the longest, 17 hundredths of length; all ventral rays forked; caudal truncate or slightly rounded, the rays all forked, except the shortened procurvent rays at upper and lower margins of the fin.

Scales very large, those above lateral line in series parallel with the back; scales marked with very fine concentric lines having their center near the free margin; they have no radiating striæ, but the free margin is densely beset with short spines; scales thus not of the normal type, having the pectination ctenoid and the concentric rings cycloid, though the center of the rings is again abnormal in position; scales below lateral line much smaller than those on back, and becoming still smaller on belly and breast, where their margins are mostly entire; cheeks, opercles, and occiput scaled, snout and jaws naked; small scales also covering bases of caudal and pectoral fins; lateral line descending in a curve to middle of sides, which it reaches under middle of soft dorsal.

Color in life, reddish above, over an olive ground; belly whitish; the red color intensified on cheeks, on opercles, in a blotch under spinous dorsal, one under soft dorsal and one on caudal peduncle; soft dorsal and caudal barred with red, and translucent, anal and spinous dorsal uniform red; pectorals marked with irregular red blotches; ventrals silvery, tinged with red.

In the cotype, 86 mm. long, from the same locality, there are 29 scales in the lateral line, and 24 rays in each pectoral fin. No other differences have been detected.

Only 2 specimens secured.

#### Family PERISTEDIIDÆ.

##### *Peristedion hians* Gilbert & Cramer.

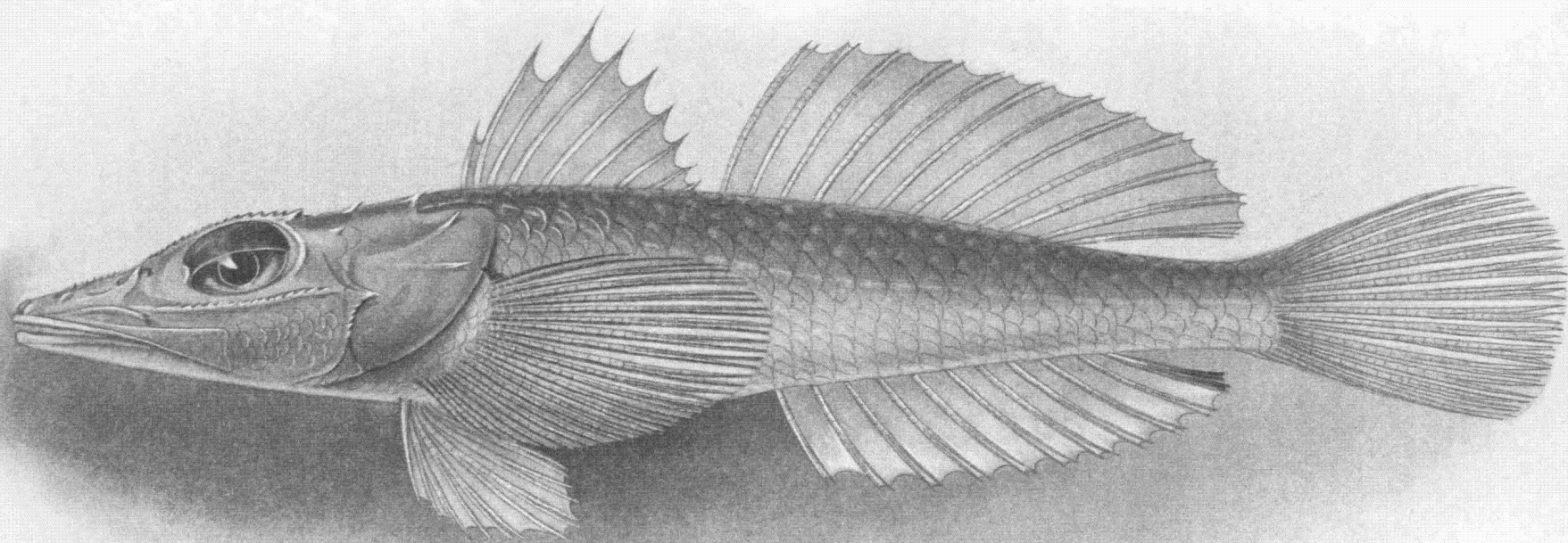
Frequently taken in depths of 225 to 350 fathoms, but never in large numbers. The following details may be added to the original description: Length of head contained 2.65 to 2.75 times in length. Of 10 specimens examined as to fin rays, 7 have D. VII, 21, A. 21; 2 specimens have D. VII, 21, A. 22; 1 has D. VII, 22; A. 22. Last dorsal spine attached by membrane to first soft ray, the notch between the 2 apparently deepest in adults. First 5 or 6 plates accompanying lateral line forming a short convex curve above pectorals. Mandibular joint opposite, or slightly in advance of, anterior third of orbit; spinous plates on mandibular rami compressed, attached by their edge; gill-rakers 4 + 22 in number, 2 or 3 at either end of series reduced to soft papillæ; 8 very short thick pyloric caeca; ovaries united posteriorly. The stomach contains the remains of small crustaceans, together with much that is unidentifiable.

Color in life dull reddish, young with much dusky marking, which is especially developed along margins of plates on head and body. Adults nearly uniform clear red. Spinous dorsal black; pectorals black, narrowly margined with white in young, in adults dusky in distal half only.

In young specimens, the lateral margins of the head show usually 2 projections which disappear with age, one below anterior border of orbit, the other below posterior border; all the spines of the head are much higher in the young, the interorbital space appearing more deeply concave. Immediately above the long preopercular spine, there develops usually in older individuals a slender spine directed upward and backward.

The species was taken at the following stations: Nos. 3839, off the south coast of Molokai, 259 to 266 fathoms; 3867, Pailolo Channel, 284 to 290 fathoms; 3911, off the south coast of Oahu, 334 to 337 fathoms; 3912, off the south coast of Oahu, 310 to 334 fathoms; 3917, off the south coast of Oahu, 294 to 330 fathoms; 3919, off the south coast of Oahu, 220 to 257 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 3988, vicinity of Kauai, 165 to 469 fathoms; 4001, vicinity of Kauai, 230 to 277 fathoms; 4085, off the north coast of Maui, 267 to 283 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; 4134, vicinity of Kauai, 225 to 334 fathoms; 4136, vicinity of Kauai, 294 to 352 fathoms.

*Peristedion hians* Gilbert & Cramer, Proc. U. S. Nat. Mus. XIX, 1897, 419, pl. XLI, figs. 1, 2.



BEMBRADIUM ROSEUS GILBERT. TYPE.



*Peristedion engyceros* (Günther).

This species has been known hitherto only from the type, which consisted of fragments of a dried specimen sent from the Hawaiian Islands to the British Museum. The investigations of the *Albatross* have now shown it to be abundant about the islands on sandy bottom at depths of 150 to 250 fathoms, about 60 specimens being secured at 17 stations. The following description is based upon this material.

Length of head, measured from front of premaxillaries to opercular margin, 2.5 in length from front of premaxillaries to base of caudal; depth 5.75; greatest width of head 3.65. D. VII, 20 (rarely 21); A. 20; P. 14 + 2.

The species differs strikingly from *P. hians* in the shape of the rostral processes, which are very slender, parallel, of nearly equal width throughout; the distance between them equals their length, and is about half length of snout without them; width of the snout opposite anterior nostril equal to its length; interorbital space deeply concave, with a median groove, which widens posteriorly; a small postocular spine, a much stronger spine at end of occipital ridges, and small spines at end of paroccipital opercular crests; upper orbital rim spinulose along its entire length; in the young are usually 2 preorbital spines which disappear in adults; behind snout, the lateral margins of head are expanded to form a thin knife-edge, which leads to the long preopercular spine; the anterior limit of the expanded edge marked by a projecting spine, to the base of which runs a vertical ridge from front of eye and an oblique ridge from middle of lower orbital margin; all the plates of the head minutely prickly; on median portion of snout 6 or 8 stronger hooked spines, distributed on the rostral ridges; interorbital width 0.65 diameter of eye, which is contained 4.4 times in head; premaxillaries protruding beyond mandible for a distance equal to 0.2 length of head; length of maxillary contained 2.3 times in head, and equal to the greatest external width at angles of mouth; the large barbel, when laid back, extending to base of ventral fins; along its anterior margin it bears a series of smaller barbels, mostly arranged in pairs; seven barbels, similar to these smaller ones, occurring on each side of symphysis, on lower lip and adjacent portions of mandible; the most posterior of these, on the mandible, is always paired; mouth toothless; gill-rakers 5 + 16 or 17, the terminal ones represented by papillæ; spinous dorsal joined to soft dorsal at extreme base; pectorals long, reaching fifteenth plate along lateral line, length of upper ray equaling distance from tip of snout to front of pupil; upper free ray contained 2.25 times in head.

Dorsal series of plates with strong backwardly-hooked spines which decrease in size posteriorly, almost disappearing on caudal peduncle; behind these 2 movable spines along base of upper caudal lobe; the upper lateral series of plates accompanies the lateral line, which opens externally in 3 pores for each plate, 1 above and 2 below the spine; behind the short anterior arch the spines are strong; 9 to 12 spines in front of middle of caudal peduncle bear at the base of the anterior side a short, strong, straight spine, directed obliquely forward; spines of ventral row of plates obsolescent, perceptible to the touch, but scarcely visible along course of anal fin; only 2 or 3 of the anterior plates of the series have well-developed spines. Dorsal series containing 29 or 30 plates, including 2 on base of caudal; 34 or 35 in upper lateral, 23 or 24 in lower lateral series, and 26 or 27 in ventral series, including 2 on base of caudal.

A specimen in life was pink, with a yellowish tinge, the tips of rostral processes, the fins and long barbels deeper pink or almost scarlet, the tips of fins and ends of barbels white; breast and belly white; upper parts of head and body marked with fine olive dots and lines, those on head arranged regularly and symmetrically; some specimens appear nearly or wholly plain, without spots and lines; pectorals whitish, streaked or spotted with olive; anal marked with 3 indistinct narrow yellowish vertical bars; other fins unmarked.

The species was taken at the following stations: Nos. 3919, off the south coast of Oahu, 220 to 257 fathoms; 3920, off the south coast of Oahu, 265 to 280 fathoms; 3938, vicinity of Laysan, 148 to 163 fathoms; 3941, vicinity of Laysan, 70 to 146 fathoms; 3957, vicinity of Laysan, 173 to 220 fathoms; 3986, vicinity of Kauai, 55 to 362 fathoms; 3993, vicinity of Kauai, 201 to 218 fathoms; 4017, vicinity of Kauai, 305 to ? 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; 4083, off the north coast of Maui, 238 to 253 fathoms; 4115, off the west coast of Oahu, 195 to 241 fathoms; 4116, off the west coast of Oahu, 241 to 282 fathoms; 4117, off the west coast of Oahu, 253 to 282 fathoms; 4132, vicinity of Kauai, 257 to 312 fathoms.

*Peristethus engyceros* Günther, Proc. Zool. Soc. Lond. 1871, 663; Günther, Fische der Südsee, 168 (text figure).

## Family HOPLICHTHYIDÆ.

*Hoplichthys citrinus*, new species. Fig. 249.

Type, a male, 175 mm. long, from Albatross station 3859, Pailolo Channel, depth 138 fathoms; No. 51610, U. S. Nat. Mus.

Very close to *H. langsdorffii* Cuvier & Valenciennes, from Japan, agreeing with that species in general proportions and in number of plates and fin rays. It differs in coloration, in the production of larger spinous lobes along lateral contour of head, in certain minor differences in the sculpturing of the lateral plates and the bones of the head, and in the shape of the fins.

Length of head 32 hundredths of total length without caudal; greatest width of head, at base of spinous ridges 22; depth of head 9; diameter of orbit 8; interorbital width 1.7; length of snout 11; length of maxillary 12; length of first dorsal spine 21; length of second dorsal ray 46; longest pectoral ray 22; longest ventral ray 12.5. D. vi-15; A. 17; P. 13+3; V. 1, 5. Lateral plates 27.

Head greatly flattened; snout wide, spatulate, its longitudinal profile concave; lateral profile of head formed by a sharp dentigerous ridge, divided into 4 well-marked lobes: a preorbital lobe, a short lobe below front of eye, a greatly expanded rounded lobe below cheeks, and a fourth lobe constituting lower margin of opercle and ending in the very long curved preopercular spine; in *H. langsdorffii* the lobes are much less expanded and convex, this being especially noticeable in the one on the cheeks, between which and the preopercular lobe is but an inconspicuous notch.

Interorbital space very narrow, channeled, the margins minutely denticulate; minutely toothed areas and ridges on snout, cheeks, opercular bones, and occiput; these regions somewhat less rough

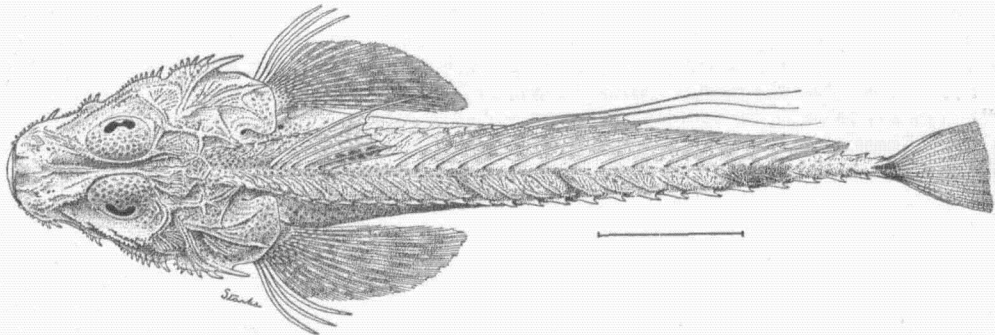


FIG. 249.—*Hoplichthys citrinus* Gilbert, new species. Type.

than in *langsdorffii* and the toothed area on the prefrontal wider; a short series of spinelets on interopercle, behind angle of mouth, and others on lower side of preorbital; opercle marked by 5 to 8 rough striae, which diverge from the upper anterior angle; the strongest of these ribs ends in the long opercular spine; a short strong humeral spine present; broad bands of minute villiform teeth on jaws, vomer and palatines; lower jaw shorter than upper, everywhere included; maxillary extending backward to a vertical which intersects orbit midway between front of orbit and front of pupil; gills very small, laminae extraordinarily short, scarcely longer than the transverse diameter of gill-arch; a single series of filaments on inner arch, which has no slit behind it; 10 or 12 short gill-rakers on horizontal limb of outer arch; pseudobranchiae well developed; branchiostegal rays 7, the membranes broadly united below to isthmus, without free fold; lower ends of gill openings separated by a distance equaling 0.15 length of head; by the great production of the opercular flap, the upper end of the gill-slit appears as a small round pore on the upper aspect of the greatly flattened head, resembling the branchial pore in *Callionymus*, but this pore is simply the upper end of the wide slit.

Dorsal fins greatly elevated in the males, as is also the case in *H. langsdorffii*, but the details in the 2 species are widely different. In *H. citrinus*, the first dorsal spine is produced and filamentous, sometimes extending well beyond origin of soft dorsal, the upper margin of the fin deeply concave; some or all of the first 4 rays of soft dorsal are still more produced and filamentous, one or more of them in extreme cases reaching, when declined, beyond base of fin; the succeeding rays are entirely



included in the membrane and are equal in height, their length half that of head; a few of the posterior rays are shortened; last dorsal and last anal rays are cleft to the base; except the modified pectoral rays and a few at base of caudal lobes, all rays are forked, those of the anal fin near extreme tip only; in males of *H. langsdorffii*, there are no filamentous or free rays; the spinous dorsal has a convex outline, and some of the middle rays of the soft dorsal are the highest in the fin; anal rays not specially produced in males of either species; in *H. citrinus*, the caudal is truncate or slightly concave, this being more marked in males, where the lower caudal rays are a little longer than the upper. In *langsdorffii*, the caudal is convexly rounded in both sexes; the lower 3 (or rarely 4) pectoral rays are simple, thickened and longer than the rays immediately above them; they are largely free, being joined to one another and to the rest of the fin by a very low membrane at extreme base. They resemble strikingly the free pectoral rays of *Trigla*. The ventral fins are subjugular in position, their insertion being in advance of pectorals; they contain 5 branched rays in addition to the spine, the inner ray the longest, the others progressively shortened. Cuvier and Valenciennes have erroneously figured the ventrals as rounded in *H. langsdorffii*.

The fin rays are very constant in this species. We have found but 2 variations from the normal formula, the dorsal spines numbering but 5 in one specimen, the free pectoral rays increased to 4 on one side of another specimen.

The body is naked, with the exception of the series of lateral plates, which agree in structure and in number with those of *H. langsdorffii*. These plates are placed obliquely antero-posteriorly, the anterior upper portion nearly horizontal, its surface roughened by from 2 to 5 minutely denticulated ridges, the lower posterior part vertical and smooth. At the angle each of these plates is provided with a very strong spine directed backward. In this species and in *langsdorffii* a minute concealed spinous point can be detected below and behind the strong spine, but in no specimen have we seen the pair of equally strong spines figured by both Cuvier and Valenciennes and by Temminck and Schlegel, as characteristic of *langsdorffii*. The pores of the lateral line occur below the spinous crest in the soft intervals between the vertical laminae. The plates are always 27 in number in both species.

Color in life very bright lemon-yellow or olive-yellow on all upper parts, including fins, white or silvery below, the boundary between the 2 colors coarsely freckled with brown spots, which cover also more or less of the back; faint traces of 4 dark cross-bars on back, seldom evident except in the young; soft dorsal translucent, with many round yellowish green spots; a basal series larger than the others, with each spot nearly half as large as pupil; a large black blotch at base of posterior dorsal spines; anal fin with a terminal orange band, but without black margin; upper margin of spinous dorsal orange; caudal with some orange, its base and terminal portion dusky. In one very young specimen, 95 mm. long, there is a broad black bar through the middle of the spinous dorsal; five dusky cross-bars are evident: 3 wide bars opposite spinous dorsal, middle of soft dorsal and end of soft dorsal, respectively, and 2 narrow bands, intermediate in position between the wide bars; there is also a very narrow sub-terminal dark line on the anal fin, similar to but fainter than that characteristic of adult specimens of *langsdorffii*. In no other specimen of *citrinus* is there a trace of the anal band.

In the stomach of one specimen were found remains of crabs and fishes. The specimens of *H. langsdorffii* with which we have compared *citrinus* were dredged by the *Albatross* May 11, 1900, at station 3717, off Hondo Island, Japan, at a depth of 75 to 100 fathoms. A specimen of the same species is at hand from Kagoshima. These differ somewhat from current descriptions and figures of *langsdorffii*, but probably belong to that species.

Specimens were taken at the following stations during the Hawaiian investigations: Nos. 3858, Pailolo Channel, 128 to 138 fathoms; 3859, Pailolo Channel, 138 to 140 fathoms; 3957, near Laysan Island, 173 to 220 fathoms; 3965, near Laysan Island, 116 to 147 fathoms; 4079, off the northeast coast of Maui, 143 to 178 fathoms; 4080, off the northeast coast of Maui, 178 to 202 fathoms; 4081, off the northeast coast of Maui, 202 to 220 fathoms; 4103, Pailolo Channel, 132 to 141 fathoms; 4114, off the northwest coast of Oahu, 154 to 195 fathoms; 4120, off the northwest coast of Oahu, 167 to 216 fathoms.

**Hoplichthys platophrys**, new species. Fig. 250.

Type, a specimen 70 mm. long, from station 3952, near Laysan Island, depth 351 fathoms; type, No. 51620, U. S. Nat. Mus.

Differing from other known species of *Hoplichthys* in the small eye, wide interorbital space, the more complete union by membrane of the modified lower pectoral rays, and the weaker spines on head and lateral plates.

Head 37 hundredths of total length without caudal; greatest width of head, at base of spine-bearing ridges 28; diameter of eye 7; interorbital width 5; length of snout 13; length of maxillary 15. D. VI-15; A. 18; P. 13+3; V. 1, 5. Plates 27.

Snout somewhat broader and more squarely truncate than in *H. citrinus*; eye very small; interorbital space much wider. The general spination of head agrees with *H. citrinus*, but the type is too young for a determination of details; spines along suborbital ridge, as well as those elsewhere on head, smaller than in *citrinus*, and not forming expanded lobes as in that species; mouth similar, with lower jaw shorter, the maxillary reaching a little past front of orbit; teeth very minute, but distinguishable in very narrow bands on jaws, vomer and palatines; branchiostegals 7.

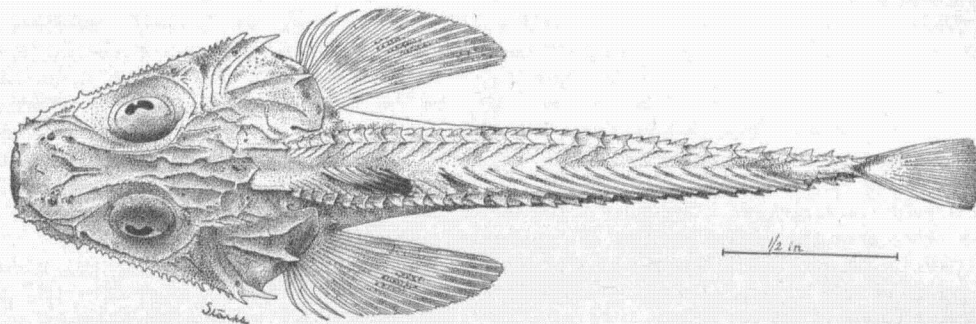


FIG. 250.—*Hoplichthys platophrys* Gilbert, new species. Type.

The structure of the fins is wholly like that of *H. citrinus*, except that the lower 3 pectoral rays are joined by membrane to one another and to the rest of the fin for more than half the length of the rays. In our smallest *citrinus*, 96 mm. long, there is no approach to this condition.

The plates agree in number and structure with the other species of the genus. There is a strong spine at the angle of each plate, with a small concealed one below and in front; the upper half of each plate contains a single denticulate ridge running downward and backward, the lowermost tooth on the ridge longer than the others. Young *citrinus* have also a single spinous ridge on upper half of each plate, the number of ridges increasing with age.

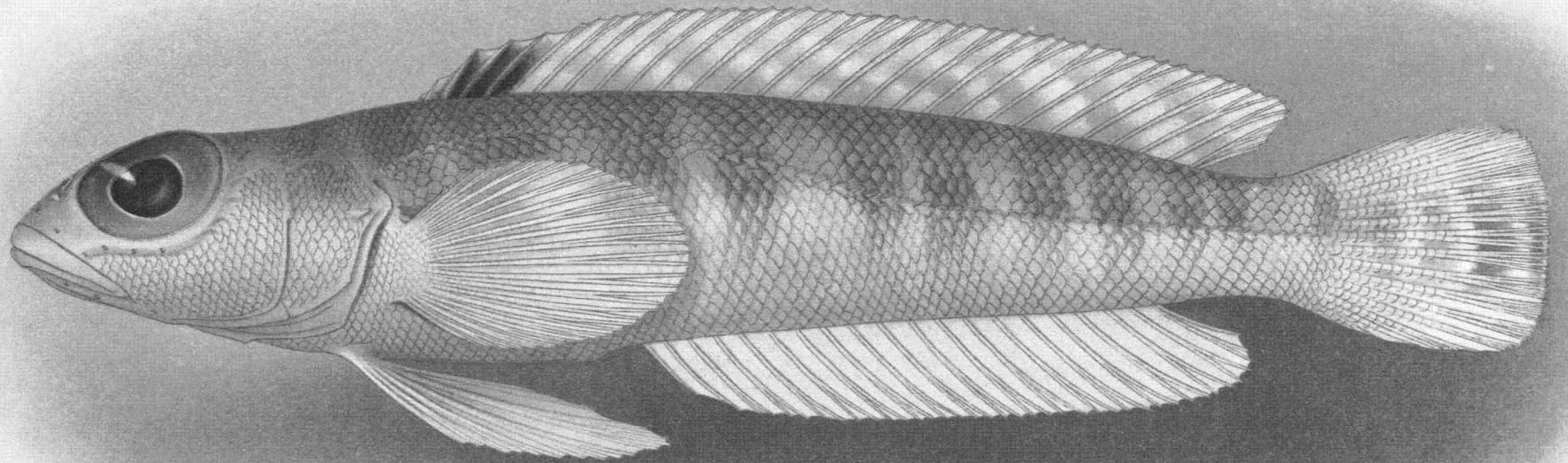
Color in spirits, light olive, without white or silvery pigment; 3 broad and 2 narrow bars on back, as in young of *citrinus* and in adults of *langsdorffii*. In *platophrys*, the bars below soft dorsal end each in a black blotch, below lateral plates. Head with some dusky markings above, and 3 small black spots below suborbital ridge; pectoral with dusky mottlings; spinous dorsal with a broad black bar occupying all but base of anterior rays, and a narrow white margin; soft dorsal with a dusky spot near base of each ray, and a dusky subterminal band; anal with a wide black submarginal band, edged with white; caudal with a dusky terminal band.

Only the type known.

## Family PTEROPSARIDÆ.

**Osurus schauinslandi** (Steindachner).

Several specimens, mostly immature, were dredged in depths of 14 to 90 fathoms. Young specimens are more uniformly colored than adults, have the caudal emarginate but not deeply forked and the lobes not produced; the ventral fins are greatly produced, much longer than in adults, reaching base of fourth or fifth anal ray. In adults, the ventrals fail to reach origin of anal.



NEOPERCIS ROSEOVIRIDIS GILBERT. TYPE.

The species was taken at the following stations: Nos. 3849, off the south coast of Molokai, 43 to 73 fathoms; 3850, off the south coast of Molokai, 43 to 66 fathoms; 3876, channel between Maui and Lanai, 28 to 43 fathoms; 4002, vicinity of Kauai, 53 to 230 fathoms; 4024, vicinity of Kauai, 24 to 43 fathoms; 4034, Penguin Bank, south coast of Oahu, 14 to 28 fathoms; 4073, off the north coast of Maui, 69 to 78 fathoms; 4075, off the north coast of Maui, 49 to 57 fathoms; 4128, vicinity of Kauai, 68 to 90 fathoms; 4158, vicinity of Bird Island, 20 to 30 fathoms.

*Parapercis pterostigma* Jenkins, Bull. U. S. Fish Com. for 1899 (1901), 402.

***Neopercis roseoviridis*, new species. Plate 83.**

Type, 71 mm. long, from station 4077, off the northeast coast of Maui, depth 99 to 106 fathoms; type No. 51650, U. S. Nat. Mus.

Most nearly allied to *N. multifasciata* Döderlein, from Japan, differing most conspicuously in the much larger eye and in the color.

Head 30 hundredths of total length, without caudal; depth 19; depth of caudal peduncle 9; maxillary 11; snout 7; eye 12; interorbital width 2. D. v-23; A. 20; P. 19 or 20. Lateral line with 55 pores (60 oblique rows running downward and backward above it); 21 scales in a cross-series from front of anal fin.

Head wide and much depressed at occiput; snout short and rounded; mouth oblique, maxillary reaching vertical from front of pupil; narrow band of villiform teeth in upper jaw, the outer series enlarged, especially anteriorly; lower jaw with a narrow band of villiform teeth anteriorly, which tapers laterally to a single series of larger teeth; a short series of enlarged teeth in a straight line in front of symphyseal part of mandibular band; a single series on vomer and palatines; a single strong opercular spine, head otherwise unarmed; gill-membranes broadly joined across throat, with a posterior free margin; branchiostegal rays 6, as in *multifasciata*.

Dorsal spines regularly graduated, the fourth and longest spine united fully by membrane to first soft ray; last dorsal ray reaching caudal base when declined; pectorals reaching vertical from first anal ray, ventrals to base of third anal ray; caudal gently convex.

Scales ctenoid, except on breast and abdomen; present on cheeks and opercles, but lacking on rest of head; lateral line convexly curved in its anterior portion, reaching axis of body at about middle of trunk.

Ground color light rose above, crossed by 5 pairs of broad brownish green bars, a single narrower dark bar across the nape; these bars correspond in position with the much narrower black bars of *multifasciatus*; no black spot at base of caudal; spinous dorsal largely black; three ill-defined cross-bars on median caudal rays; fins otherwise unmarked.

A cotype from the same station is 62 mm. long, and has the dorsal iv-23; anal 20; pectoral 19 or 20; scales in lateral line 57. Only 2 specimens obtained.

*N. multifasciata* is described and figured as having 5 dorsal spines. In 6 specimens examined, 4 have 4 spines, 2 have 5 spines.

***Bembrops filifera*, new species. Plate 84.**

Type, a male, 223 mm. long, from station 4080, off the northeast coast Maui, depth 178 to 202 fathoms; type, No. 51613, U. S. Nat. Mus.

Differing from *B. caudimacula* Steindachner in the much smaller scales, and from all known species in the filamentous first dorsal spine and the coloration.

Head 37.5 hundredths of total length (caudal excluded); snout 13; eye 8; maxillary 14.5; interorbital width 1.3; greatest depth 12; least depth caudal peduncle 5.5. D. vi-14; A. 18; P. 26 and 27; V. 1, 5. Scales in lateral line 64 or 65, 6½ between lateral line and anterior dorsal rays.

Snout very long, depressed, spatulate, longitudinal, concave, resembling a duck's beak; mandible very projecting, dentigerous area at tip protruding above upper profile of snout; cleft of mouth a little oblique; maxillary reaching a vertical little in advance of pupil, and bearing at tip a long narrowly triangular fleshy flap; teeth villiform, everywhere in bands, inner teeth always longer, curved, readily depressible; premaxillary bands greatly widened anteriorly, a wide naked area separating them mesially; teeth also continued around on exposed surface of premaxillaries, and visible from above; vomerine patch divided into 2 portions by a naked mesial furrow, the very long narrow pala-



tine bands abutting against the posterior end of each lateral half; posterior nostril a roundish or oblong pore in middle of length of snout; anterior nostril a round pore in a short tube, which is prolonged at the inner side to form a flap, and is separated from posterior nostril by  $\frac{1}{2}$  length of snout; the narrow interorbital width gently concave; gill-membranes separate, the right side overlapping, the anterior end of gill-slit well in advance of eye; branchiostegal rays 7; large pseudobranchiæ present; gills 4; posterior series of filaments on fourth arch shortened; a wide slit behind fourth arch; gill-rakers slender, toothed, 13 in number on horizontal limb of outer arch, the longest one-fourth diameter of eye; angle of preopercle with 2 closely apposed short spines, the angle projecting, the margin above angle concave. As in other species, there are 2 opercular spines and one subopercular spine, the latter and the upper opercular spine of equal length, the lower opercular spine shorter; a single strong suprascapular spine above origin of lateral line; the 5 anterior scales of lateral line bear each a strong median crest on the summit of the tube, but are not armed with spines.

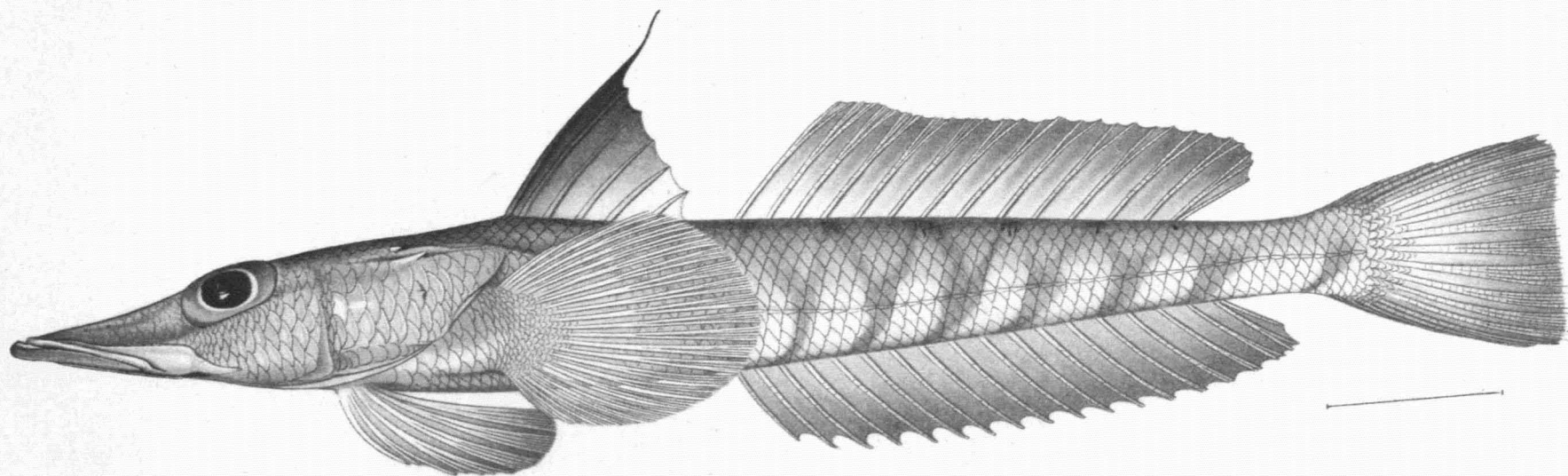
Origin of spinous dorsal above tip of opercular flap, its distance from tip of snout 38 hundredths of length to base of caudal; spines very slender and flexible, the anterior produced far beyond outline of fin, forming a filament which extends to base of third ray of soft dorsal and is 19 hundredths of the length; second spine (13 hundredths) when declined reaching tips of last 2 spines, and well separated from first dorsal ray; third and fourth spines, when declined, failing to reach tips of last spines; outline of fin slightly concave; first ray of soft dorsal longest (12 hundredths), and forked at tip as are all succeeding rays; last ray cleft to base; distance (6.5 hundredths) between last dorsal spine and first soft ray is two-fifths occupied by the membrane from the spine; anal fin beginning slightly before dorsal and ending slightly behind it, all the rays simple except the last, which is cleft to base; caudal gently rounded; middle pectoral rays longest (19 hundredths), their tips reaching vertical from second dorsal ray; ventral spine (6.5 hundredths) strong and curved, well separated from adjoining ray by movable membrane; fourth ventral ray longest (14.5 hundredths), reaching half the distance from its base to second anal ray.

Scales caducous and lost over the greater part of the head and body, most persistent along lateral line; they are thickly beset with short spines on margins, their exposed surfaces marked with fine concentric lines, which center near the free margin of the scale; scales smooth on breast and abdomen and along base of anal; their character on head can not be determined; a single series of scales on proximal part of dentary, one series on maxillary; the gular and gill membranes, and a narrow median tract on anterior half of snout naked; rest of head closely scaled.

Lateral line first curved upward toward origin of spinous dorsal, then gently decurrent, reaching its lower level opposite fourth anal ray; 5 or 6 scales between lateral line and front of soft dorsal; 4 scales between lateral line and middle of anal base; 9 series of scales between occiput and first dorsal spine.

Color in spirits, light olive brown on body, grayish on occiput, snout and opercles; upper part of eye black; iris margined with green in front and behind; a golden-green spot on anterior part of preopercle, a fainter one on the flap; very faintly marked greenish yellow blotches on back opposite third dorsal spine, third dorsal ray, and ninth dorsal ray; on lower half of side 9 conspicuous purplish dusky bands, narrower than the interspaces, running obliquely downward and forward, and reaching to or almost to base of anal; two of these bands are in front of anal fin, and do not reach midventral line; on dorsal half of body, these bars become obscure and the pattern is not evident; 2 or 3 of them, under soft dorsal, fork just above the lateral line, the branches diverging widely and reaching base of dorsal; anterior half of spinous dorsal black; soft dorsal with a vertical blackish streak lengthwise of distal half of each interradial membrane, becoming more intense toward margin of fin; tips of rays white; anal uniformly dusky; middle caudal rays whitish, dusky toward margin, with narrow whitish tips, the upper and lower rays dusky; a poorly defined small black spot on basal portion of some of the upper rays; pectorals dusky with lighter base and margin; ventral membrane blackish in distal portion, the rays white.

In the cotype, 53 mm. long, from station 4079, northeast coast of Maui, depth 143 to 178 fathoms, the fin rays are as follows: Dorsal vi-15; anal 17; pectoral 27; ventral i, 5; scales 59 to 62. In this immature specimen, the first dorsal spine scarcely protrudes beyond the other spines, the bars are confined to a series of short blotches along lateral line, and the black spot near base of upper caudal rays is very intense and conspicuous, oblong-oval, and ocellated with whitish; peritoneum jet-black. Two specimens obtained.



BEMBROPS FILIFERA GILBERT. TYPE.



**Chrionema**, new genus.

Most closely allied to *Bembrops*, from which it differs only in the absence of a fleshy flap on the maxillary. From *Pteropsaron* it differs in the ctenoid scales, the low lateral line, and the absence of the pair of strong spines pointing forward at tip of snout. The scales of the lateral line are unmodified, while in *Pteropsaron* each scale of the lateral line has its free margin produced into from 1 to 3 acute lobes.

*Chrionema* Gilbert, new genus of *Pteropsaridae* (*chryseres*).

**Chrionema chryseres**, new species. Plate 85.

Type, a female, 206 mm. long, from station 3813, off south coast Oahu Island, depth 264 to 183 fathoms; type, No. 51655, U. S. Nat. Mus.

Head 38 hundredths of total length (caudal excluded); snout 11; eye 10; maxillary (from tip of upper jaw) 15; interorbital width 1.5; greatest depth of body 15; least depth of caudal peduncle 5.5. D. VI-16; A. 24; P. 22, 23; V. 1, 5. Scales in lateral line 76 on one side, 72 on the other; 12 scales in a vertical series between lateral line and front of soft dorsal.

Snout depressed and spatulate, but its median longitudinal profile not concave; interorbital space narrow, the margins slightly raised; mandible projecting, mandibular band of teeth fitting wholly outside premaxillary band anteriorly; maxillary nearly horizontal, extending beyond anterior third of eye, without barbel or fleshy flap at tip; teeth villiform, in bands in jaws, and on vomer and palatines; premaxillary band becoming very wide anteriorly, its teeth, especially those in posterior part of band, longer, curved, and readily depressible; posterior teeth of mandibular band, and some on vomer and palatines likewise longer, curved, and depressible, the 2 halves of the vomerine band in connection across median line, forming the usual V-shaped figure; palatine bands continued farther forward than usual, so that their anterior ends overlap and lie along outer sides of posterior third of each lateral half of vomerine band; anterior nostril a rounded pore with slightly raised margin, the posterior a horizontal slit; distance separating nostrils about equal to that between posterior nostril and front of eye; gill-membranes separate, not joined to isthmus; anterior end of gill-slit in advance of tip of maxillary; gills 4; posterior series of filaments on fourth arch about half length of others; a wide slit behind fourth gill-arch; gill-rakers slender, toothed, one-tenth diameter of eye, 14 on horizontal limb of outer arch; pseudobranchiæ large; branchiostegals 7; a short strong spine at angle of preopercle, with 1 or 2 obscure spinous points above and below it; opercle ending in 2 sharp spines, the upper of which is much the longer; subopercle ending in a similar spine, which ends at about the same vertical as the upper opercular spine; no other spines or serrations on head; opercular membrane greatly produced beyond the spines, forming a scaly flap which extends beyond base of pectorals; 2 short strong "humeral" spines just above origin of lateral line; anterior scales of lateral line not spinous, as in *Bembrops platyrhynchus*.

Origin of spinous dorsal just behind head, its distance from tip of snout 38 hundredths of total length without caudal; spines very slender and flexible, the second the longest, 12 hundredths of the length, the third and subsequent spines regularly shortened; distance from base of last dorsal spine to first soft ray slightly more than half diameter of eye, but the membrane joining last spine to back extending for half this distance; there are thus but 2 free scales between the fins; first ray of soft dorsal the longest (14 hundredths), the others rapidly shortened, only the first ray simple, the last ray forked to the base; anal fin beginning in advance of soft dorsal and terminating behind its end, all the rays simple, except the last, which is forked to the base; caudal fin gently rounded; longest pectoral rays (17 hundredths) below middle of fin, those above, and especially those below the longest rapidly shortened; ventrals inserted far in advance of pectorals, vertically below preopercular angle, the third ray the longest (15 hundredths); upper 2 pectoral rays and sometimes the lowermost rays simple, the others and all the ventral rays forked.

Scales small, closely adherent, rough-ctenoid, except those on breast, which are smooth; they completely invest body, cheeks and opercles, occiput, interorbital region, and a narrow median area on basal third of snout; the remainder of snout, the mouth parts, and the whole under side of head naked; 8 series of scales are crossed by a line from preopercular angle to below middle of orbit; scales extending well on bases of pectoral and caudal fins; lateral line beginning above opercular flap, strongly declined from its origin until it approaches anterior part of anal fin, from the base of which it is separated by only 5 or 6 scales; it then runs parallel with the anal base, and regains axial line only at base

of caudal fin; scales of lateral line wholly like the others, none of them bearing spines; longitudinal rows of scales converging slightly toward the back.

Color in life, olivaceous above, finely mottled with darker brown; 4 large dusky blotches on and below middle of sides, the last at base of lower half of caudal; smaller dark blotches occur in the lighter interspaces; top of head dusky, darker areas on cheeks, on anterior and upper parts of opercles, and on lips; a number of bright golden-yellow spots on upper parts; 1 on median line of occiput, 1 on anterior part of opercle, 1 on opercular flap, and 1 at origin of lateral line; the remainder are mostly arranged in cross-series on the back, and are associated with faint darker bars, which are located at origin of dorsal, under fifth dorsal spine, under fourth and tenth dorsal rays, and just behind last dorsal ray; the yellow spots constituting these bands seem arranged in 2 longitudinal series, 1 on each side along dorsal profile, the other on the level of opercular flap; in the latter series occur some faintly marked spots intermediate between the cross-bands already indicated; lower parts of head and body uniformly whitish; peritoneum blackish.

Only the type obtained.

***Chronema squamiceps*, new species. Plate 86.**

Type, 61 mm. long, from station 4098, off north coast Maui Island, depth 95 to 152 fathoms; type, No. 51635, U. S. Nat. Mus.

Differing from *C. chryseres* in the much more complete squamation of head, in the shorter anal fin, and in coloration.

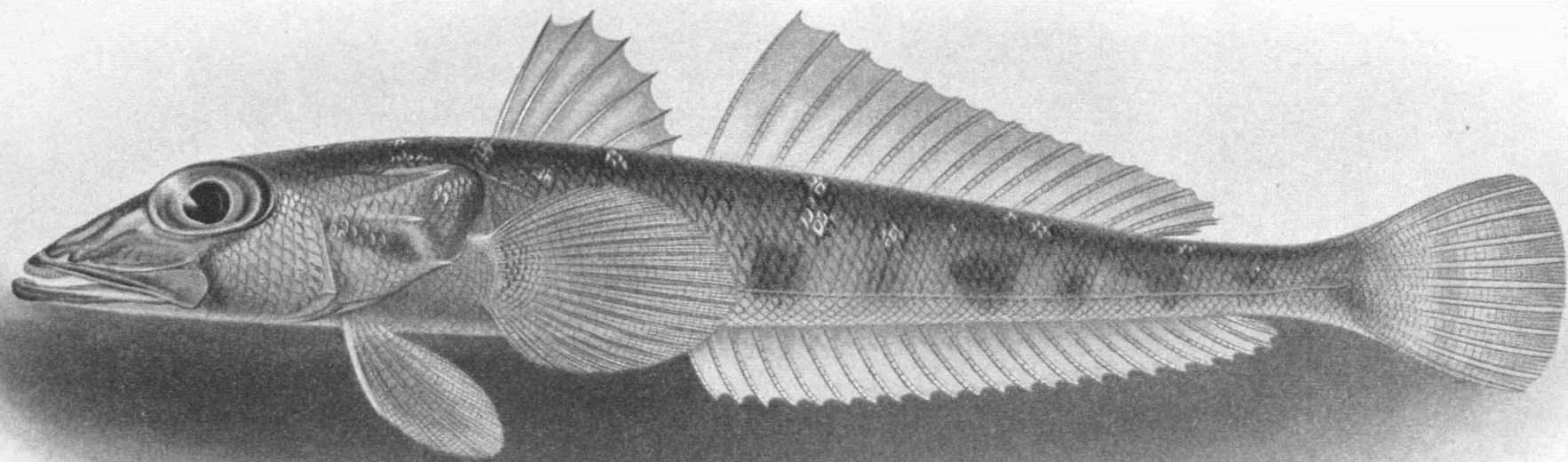
Head 35 hundredths of total length (without caudal); snout 9; eye 12; maxillary 13; interorbital width 2.3; greatest depth 14; least depth of caudal peduncle 5.5. D. vi-16; A. 18; P. 23; V. 1, 5. Scales in lateral line 67 and 69 on the 2 sides; 10 in a subvertical series between lateral line and front of soft dorsal.

Snout short, flattened, longitudinally slightly concave; interorbital space narrow, transversely convex; mandible protruding anteriorly; teeth small, depressible, present on jaws, vomer, and palatines, in narrow bands except on front of premaxillaries where they form a wide patch; vomerine band not interrupted mesially; palatine patches not overlapping vomer, but lying somewhat laterally at their anterior ends; maxillary reaching vertical from front of pupil or slightly behind that point, its tip without barbel or fleshy flap; nostrils well separated, the anterior round, the posterior a horizontal slit; gill-membranes wholly separate, the left overlapping; branchiostegal rays 7; gills 4, a slit behind last arch; pseudobranchiæ large; gill-rakers longer and more numerous than in *C. chryseres*, one-fourth the size of the large eye, 18 in number on horizontal limb of outer arch; angle of preopercle with 1 or 2 inconspicuous short spines; opercle with 2 spines, subopercle with 1, the lower opercular spine shorter than the other two; 2 short "humeral" spines, as in the preceding species.

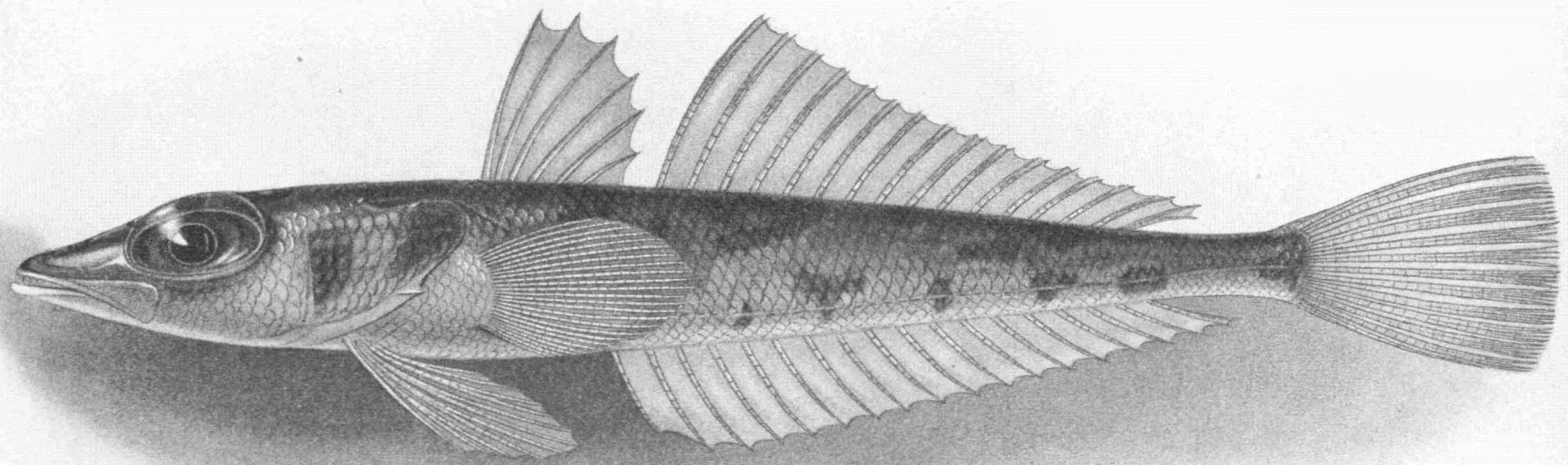
Distance of spinous dorsal from tip of snout (36 hundredths of length) slightly greater than length of head; first spine the longest (15 hundredths), the last 2 more rapidly shortened than the rest, making upper outline of fin rounded; spines very slender and flexible, the first reaching origin of second dorsal, when depressed; 3 free scales on median line between fins, 5 scales from base of last spine to first soft ray; first and all succeeding dorsal rays branched, the last forked to the base, the first ray longest (15 hundredths); last anal ray forked to base, the others simple; base of anal fin 43 hundredths of length; caudal slightly concave, with the upper lobe longer than the lower; pectoral and ventral fins agreeing in structure with *C. chryseres*.

Scales slightly larger than in *chryseres*, adherent, everywhere rough-ctenoid, except on breast; as in *chryseres*, all the scales are marked with concentric rings and have no radiating ridges; head entirely scaled, except a narrow area on median line near tip of snout, the scaled portions including the preorbital, maxillary, gular membrane, mandibles, and entire lower side of head, except apparently the branchiostegal membranes; 6 series of scales between eye and preopercular angle; lateral line descending at first in a strongly convex curve to upper axil of pectorals, thence concavely to opposite anal fin; it runs parallel with the anal, separated from its base by 6 scales, and reaches axis of body only at extreme base of caudal; anterior scales of lateral line not spinous.

Ground color light olive, whitish below, a series of 3 large V-shaped blotches on and below middle of side, with a smaller spot in the middle of each interspace; a black bar at base of caudal; three dark bars, with lighter central areas, crossing the back but failing to reach middle of sides; these are

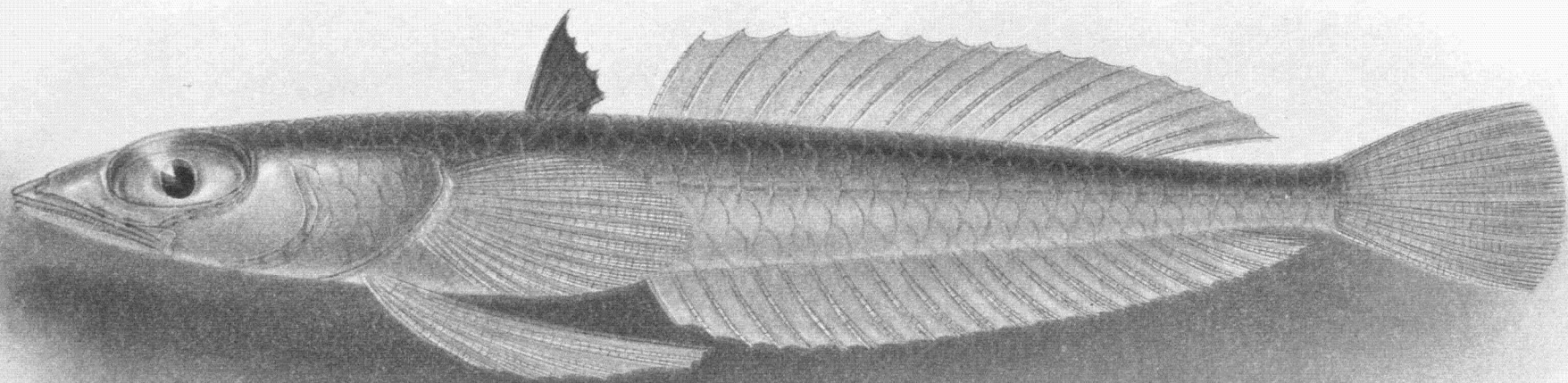


CHRONEMA CHRYSERES GILBERT. TYPE.



CHRIONEMA SQUAMICEPS GILBERT. TYPE.





PTEROPSARON INCISUM GILBERT. TYPE.



placed one behind front of spinous dorsal, one behind front of soft dorsal, and one near end of soft dorsal; a black blotch on opercular flap and a vertical one at its anterior margin; a black dot at base of each anal ray, and some dusky shading on caudal and pectorals; fins otherwise unmarked.

Only the type obtained.

***Pteropsaron incisum*, new species. Plate 87.**

Type, 52 mm. long, from station 3957, off Laysan Island, depth 173 to 220 fathoms; type, No. 51621, U. S. Nat. Mus.

Apparently very near *P. verecundum* Jordan & Snyder, from Japan (Proc. U. S. Nat. Mus., XXIV, 1902, 472), differing in the absence of darker bands on back, and in the absence of scales on cheeks. The fin-rays, scales, and general proportions seem much the same. We find the vomer toothed, whereas *P. verecundum* is said to have it naked; but this is probably an error of observation, as teeth are present also on the vomer of *P. evolans* Jordan & Snyder, in which they are likewise said to be wanting.

Head 35 hundredths of the total length without caudal; depth 12; least depth of caudal peduncle 5; length of snout 9; length of maxillary 15; eye 11; interorbital width 1; distance from tip of snout to origin of spinous dorsal 40; distance from base of last dorsal spine to origin of soft dorsal 8; base of second dorsal 40; length of pectoral 20; length of ventrals 27. D.v-17; A. 22. Scales in lateral line 30; transverse rows 6; rows above lateral line at front of second dorsal 2.

Form elongate, widest at opercles; head not conspicuously flattened above; snout short, acute, narrowly triangular as seen from above; lower profile of head rising toward tip of snout more than upper profile descends; mouth oblique, slightly narrowing posteriorly, where it is on lower side of head; maxillary reaching vertical from middle of eye; mandible everywhere included within premaxillaries; teeth all villiform, arranged in very narrow bands in jaws; roof of mouth containing a deep longitudinal mesial groove into which fits the long narrow tongue; at its anterior end the tongue becomes suddenly dilated to form a disk-shaped process which in the closed mouth lies against the vomer; median and anterior portion of vomer toothless, but each lateral portion with a small patch of villiform teeth; vomerine teeth and groove as here described, also present in *P. evolans*; we have not been able to examine *P. verecundum* in this respect; premaxillaries very protractile; premaxillary spines extending to slightly behind front of eyes; each preorbital ends anteriorly in a strong spine directed forward, the tip of snout between the 2 spines deeply notched behind the mesial portion of the premaxillaries; the tip of snout is notched and spinous also in *P. verecundum* and in *P. evolans*; opercles slightly thickened along upper margin, terminating in a very short weak spine; bones of head otherwise unarmed; opercular membrane notched posteriorly, the portion above the notch forming a broadly rounded lobe with fimbriate margin, that below the notch produced to a point opposite middle of pectoral base; below this point, the margin entire or obscurely serrulate; branchiostegals 7, the membranes not united across throat; gill-slits continued forward to below middle of eye; gills 3½, the laminae exceedingly narrow; gill-rakers represented by tubercles only, 10 of these on horizontal limb of outer arch; pseudobranchiæ developed.

Four dorsal spines closely crowded at base, as in *verecundum*; fin largely jet-black, but the first spine produced into a white filamentous tip which extends well beyond tips of other spines and four-fifths the distance from its base to origin of second dorsal when the fin is declined; anal originating below first ray of soft dorsal, and extending beyond its last ray; caudal rounded; ventrals narrow, not widely separated, inserted well in advance of pectorals and longer than pectorals; the third and fourth ventral rays equal, extending to base of fourth anal ray; ventral spine very short, as in *verecundum*.

Scales cycloid, with entire edges, except those forming the lateral line; in the latter, the free margins are incised to form 3 or 4 coarse teeth. Scales entirely similar in *P. evolans*. Opercles and occiput scaled, but snout, preorbitals, cheeks, and lower side of head naked.

In spirits, the color is light grayish or brownish above, without trace of darker bars; opercles and lower side of head, ventrals, and anal with much heavy white pigment; spinous dorsal black, with white filamentous tip to first spine; other fins unmarked. In life, the middle of the side was marked with 4 oblong, bright, yellowish green spots.

Taken at the following stations: Nos. 3957, vicinity of Laysan, 173 to 220 fathoms; 3958, vicinity of Laysan, 173 to 182 fathoms; 3966, vicinity of Laysan, 116 to 168 fathoms.

## Family CHAMPSODONTIDÆ.

*Champsodon fimbriatus*, new species. Plate 88.

Type, a female 80 mm. long, from station 4101, Pailolo Channel, depth 122 to 143 fathoms; type, No. 51629, U. S. Nat. Mus.

Differing from *Champsodon vorax* Günther (Shore Fishes, Challenger, 43, 52, pl. 23, fig. A) in the much deeper body and the shorter spinous dorsal.

Head 29 hundredths of total length, without caudal; depth 23 (19 in *vorax*); least depth of caudal peduncle 5.5; length of maxillary 19; snout 9; eye 5.5; interorbital width 3.5; distance from tip of snout to origin of dorsal 37; distance between origins of first and second dorsals 12. (In *C. vorax*, distance from tip of snout to origin of spinous dorsal 31 hundredths of length; distance between origins of dorsals 16). D. IV-19; A. 17; P. 14; V. I, 5.

Top of head flat between the ridges, which are roughened and entirely similar to those in *vorax*. Mandible projecting much at tip, but laterally included; premaxillaries with a double notch anteriorly to receive mandibular tip; a short filament on upper part of eye-ball, and a smaller broader process behind it, this process lacking in *vorax*; process on anterior margin of preorbital bearing 2 more or less diverging sharp spines, not 3 as in *vorax*. Spine at angle of preopercle similar, long, compressed at base and curved; two shorter spines directed downward and forward on horizontal limb, and some irregular serrulations on vertical limb of preopercle; opercle without spine, very thin and flexible, striate, with a wide membranous margin which is much more coarsely fringed than in *vorax*; teeth similar, but more slender and less curved; but 2 or 3 small teeth directed backward on each side of head of vomer, these working directly against 2 small patches of similar teeth on the basibranchials of the fourth arch; no tongue present; a wide slit behind the fourth gill-arch; pseudobranchiæ present; gill-rakers 2 + 12 on first arch; gill-membranes not united; anterior end of gill-slits vertically below nostrils; branchiostegals 7.

First dorsal shorter than in *C. vorax* and more posteriorly inserted; also less widely separated from soft dorsal; spines usually 4 in number (4 in 10 specimens, 5 in 5 specimens counted), while in *vorax* they are usually 5, rarely 6. Pectorals very slender and short, with very fine rays, their length equaling that of snout and half eye; ventrals with the fourth ray longest, reaching anus; caudal widely forked; all the dorsal rays save the first are once forked near the tip, the branches not divergent, the last ray cleft to base; anal rays similar to those of dorsal.

Scales a little coarser than in *vorax*; each scale subcircular, attached centrally, elevated above the general surface, the margins free; posterior margin of each side with from 3 to 6 strong spines, of which the central ones are the longest; scales closely adherent, and completely investing head and body; the breast and belly, the opercles, except only the thin membranous margin, the cheeks, snout and top of head, the maxillary, premaxillary and mandible and the gular membrane, all closely covered; two lateral lines present on side, a line on each side of occiput running backward along base of spinous dorsal, numerous lines on head, and many cross lines above the upper lateral line and below the lower. Sensory organs are lodged in small freely-projecting papillæ, which project among the scales.

Color dusky brownish on back with 3 faint broad dark cross-bars; sides and below silvery, the sides speckled with brownish; fins all whitish, unmarked.

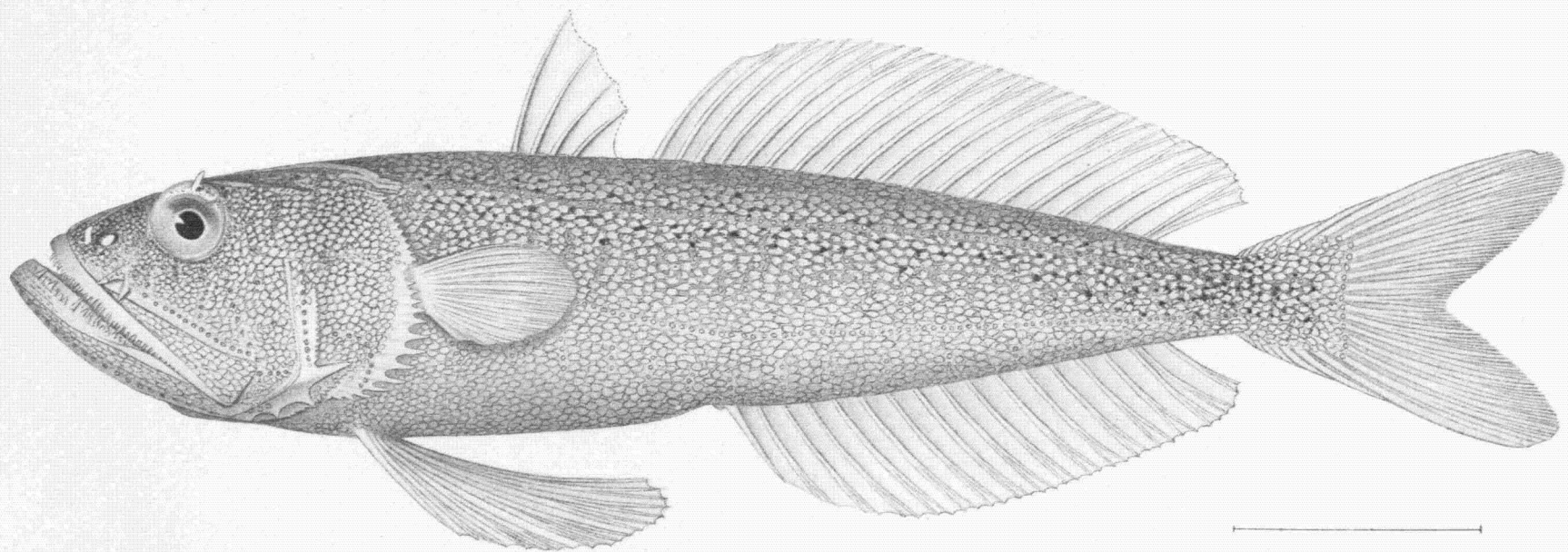
Many specimens were obtained at station 4101, but the species was not obtained elsewhere. In 15 specimens examined, the dorsal and anal fin counts are as follows: Dorsal IV-18, anal 16, 1 specimen; IV-18, anal 17, 1 specimen; IV-19, anal 17, 3 specimens; IV-19, anal 18, 1 specimen; IV-20, anal 17, 2 specimens; IV-20, anal 18, 2 specimens; V-19, anal 16, 1 specimen; V-19, anal 17, 1 specimen; V-20, anal 18, 3 specimens.

## Family CALLIONYMIDÆ.

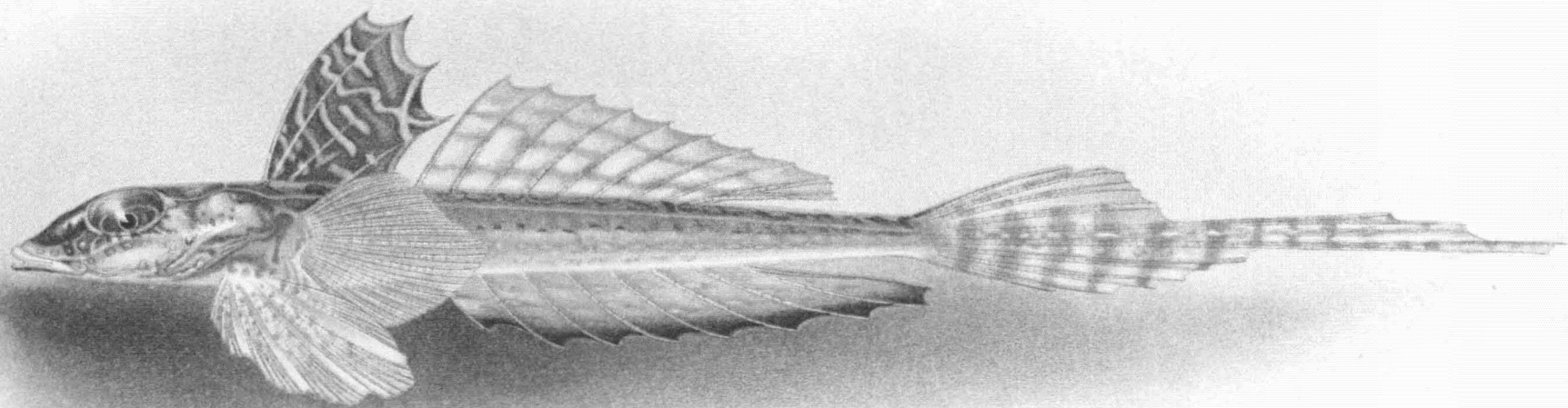
*Callionymus cæruleonotatus*, new species. Plate 89.

Type, 86 mm. long, 49 mm. to base of caudal, from station 4066, off east coast of Maui, depth 49 to 176 fathoms; type, No. 51603, U. S. Nat. Mus.

Length of head (measured to opercular margin) 31 hundredths of total length without caudal; depth 12; width at base of pectorals 17; length of snout 9; diameter of eye 9; length of maxillary 10; distance between branchial pores 9; distance from tip of snout to first dorsal spine 28; length of first



CHAMPSODON FIMBRIATUS GILBERT. TYPE.



CALLIONYMUS CÆRULEONOTATUS GILBERT. TYPE.

dorsal spine 25; distance between dorsals 8; length of caudal 75; longest ventral ray 23; longest pectoral ray 24. D. iv-9; A. 8; P. 17.

Very slender, with slender preopercular spine bearing 4 or 5 hooked spines on upper surface, in addition to the terminal spine; interorbital space very narrow, but grooved; none of the dorsal spines produced, the second the longest, the third and fourth rapidly shortened; head comparatively narrow, its width half its length; snout short, maxillary reaching vertical from front of eye; teeth villiform, in moderate bands, in jaws only; 2 or 3 enlarged teeth directed backward and forward in the inner series, in the middle of each mandibular ramus; occipital region flattened, very slightly roughened; preopercular spine slender, straight, its tip hooked up to form a spine, its upper margin furnished with 4 or 5 other spines, retrorsely hooked and evenly distributed along its whole length, not grouped at its distal end as usual in this genus; lower margin of spine with 2 or 3 minute teeth, irregular in size and position; the usual strong hooked spine present at base on outer face; preopercular spine reaching half the distance from its base to opercular margin, its length half diameter of eye.

None of the dorsal spines produced or filamentous; upper outline of fin rounded; first spine equal to second or slightly shorter, the third and fourth rapidly shortened; tips of first, second, and third spines in the declined fin reaching the same vertical, which is that of the third ray of second dorsal; soft dorsal comparatively low, the last ray falling far short of base of caudal; anal similar to second dorsal, but higher, its ray slightly passing caudal base, its length slightly greater than that of soft dorsal and its insertion a little more posterior; the 3 middle caudal rays are produced to form a filamentous process, the total length of caudal equaling length of trunk (without head); the membrane of inner ventral ray joining pectoral at the middle of its base; pectoral extending beyond tips of ventrals, both fins passing front of second dorsal; lateral line single, as usual, and with a characteristic headed appearance; it runs out on caudal fin, accompanying the fifth ray of the upper lobe for a distance equaling two-thirds diameter of eye.

Color in spirits, dusky olive on top of head and dorsal half of body, finely vermiculated with narrow dusky lines inclosing very small spots of the ground color; lower half of sides of head and body, including branchiostegal membrane, the upper surface of ventral fins with the membranes connecting them to base of pectoral, and the lower half of caudal fin golden-yellow, marked with bright blue spots and lines, each blue mark with a wide dusky margin; on lower side of head and trunk the blue spots frequently coalesce to form lengthwise lines; belly and lower parts generally plain dusky; a quadrate black blotch under spinous dorsal, a narrow dark bar under last dorsal rays, sometimes one also under first dorsal rays, and one on back of tail, these dark bars all faintly marked; a blackish streak from eye around tip of snout; spinous dorsal dusky golden, crossed by zigzag blue lines, each narrowly edged with blackish; soft dorsal translucent dusky golden, with irregular blue lines and blotches, arranged for the most part longitudinally. Anal similar to second dorsal, the blue lines more oblique, the marginal third of fin black; darker markings on caudal arranged in the form of cross-bars.

The above description is drawn from a male specimen. In females the middle caudal rays are not produced, and no trace of the blue and golden coloration can be detected. The anal is translucent, with a narrow black edge, the median caudal rays are faintly barred, and the spinous dorsal is black with narrow oblique lighter lines.

The pectoral rays vary in number from 16 to 18; one specimen has but 8 dorsal rays; otherwise the dorsal and anal fin rays present no variation.

The species was taken at the following stations: Nos. 3857, Pailolo Channel, between Molokai and Maui, 127 to 128 fathoms; 3858, Pailolo Channel, between Molokai and Mani, 128 to 138 fathoms; 4066, off the eastern coast of Maui, 49 to 176 fathoms.

#### **Callionymus corallinus**, new species. Fig. 251.

Type, 40 mm. long, from station 3873, Avau Channel between Maui and Lanai islands, depth 32 to 37 fathoms; type, No. 51581, U. S. Nat. Mus.

Length of head, from tip of snout to opercular margin in front of pectorals, 40 hundredths of total length without caudal; from tip of snout to gill-opening 33; diameter of orbit 9; length of snout 12; length of maxillary 11; greatest width of head 27; greatest depth 18; length of preopercular spine 12; distance from tip of snout to front of anal 55; length of anal base 27; length of longest dorsal spine 23; longest dorsal ray 17; longest anal ray 16; longest ventral ray 30; length of pectoral 25; length of caudal



29. D. iv-9, none of the spines produced, the last ray cleft to base; A. 8, the last ray cleft to base; V. 1, 5, the rays profusely branched, the membrane joining the pectoral fin a little above its middle; P. 18.

Form depressed anteriorly, wider than deep; occiput nearly flat; a slight prominence on each side median line, minutely rugose; bony interorbital space very narrow, less than half diameter of pupil, and not grooved; snout very narrow and sharp, longer than diameter of orbit; mouth horizontal, maxillary not reaching vertical from front of orbit; preopercular spine robust, straight, its tip reaching slightly beyond opercular margin, its inner edge with 6 or 7 strong slender curved spinelets, evenly and closely spaced, decreasing in length toward base of spine, the terminal one shorter than the one before it, but curved in the same direction; outer edge of spine smooth, but bearing a short retrorse spine near its base; gill-opening a minute pore superiorly placed.

None of the dorsal spines produced or filamentous in the type, a female; first spine longest, reaching, when declined, to base of second soft dorsal ray; second dorsal and anal fins beginning at the same vertical; caudal rounded; pectorals reaching well beyond ventrals, the latter slightly passing vent.

Ground color greenish olive above, silvery white on abdomen and throat; upper parts of head and

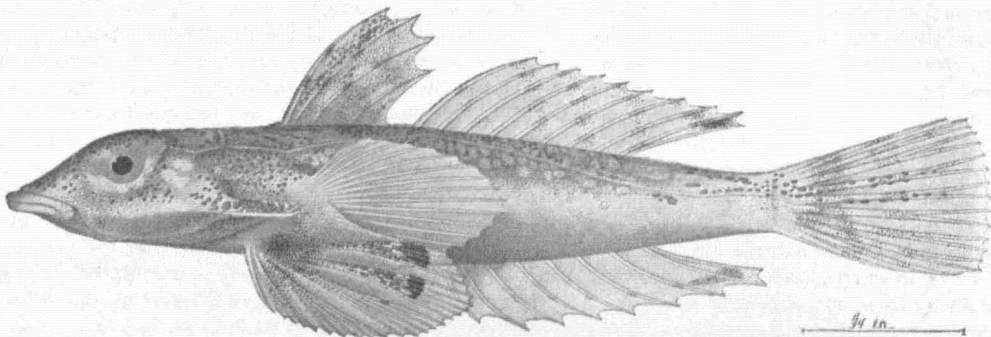


FIG. 251.—*Callionymus corallinus* Gilbert, new species. Type.

body profusely marked with reddish gilt in stripes and patches which almost wholly conceal the ground color; in addition there are many minute round spots of coral-red, covering upper part of snout, interorbital space with upper part of eyeballs, upper half of opercles, and the preopercular spine; a line of them bounds the occiput, and a few occupy the upper part of cheek; they form an inconspicuous cross-bar below spinous dorsal and 2 below soft dorsal; they occupy also the membrane between first and second dorsal spines, and a few are found on the distal half of ventrals and the median caudal rays; pectorals largely translucent; ventrals with a broad black bar at base and one at tip; membranes of spinous dorsal largely dusky, soft dorsal translucent, with 6 oblique olive-brown bars on tips of last rays, the last one blackish; anal translucent, the last rays tipped with black; caudal with 3 broad olive-brown bars, as wide as the translucent interspaces; iris silvery, tinged with red.

Only the type known.

***Callionymus rubrovinctus*, new species. Fig. 252.**

Type, 24 mm. long, from station 3876, channel between Maui and Lanai islands, depth 28 to 43 fathoms; type, No. 51580, U. S. Nat. Mus.

Head (measured to opercular edge) 34 hundredths of total length without caudal; greatest width 23; depth 16; eye 12, much longer than snout. D. iv-8; A. 8; P. 17.

Comparatively very short and heavy; snout very short, not more than two-thirds diameter of eye; mouth much more oblique than usual in the genus, maxillary reaching a little past front of eye; interorbital space very narrow, minutely grooved; occiput broad, transversely rounded, minutely roughened by anastomosing lines and points; preopercular spine very long and robust, projecting beyond opercular margin, its tip curved upward to form a slender hook, immediately anterior to which on the upper margin are two stronger hooked spines, the posterior directed upward, the anterior upward and forward; lower edge of preopercular spine smooth; the antrorse denticle at base on outer face of preopercular spine, usually present in species of *Callionymus*, is here wanting; branchial pore occupying its usual position, immediately below origin of lateral line.