

nostrils with ciliated fleshy flap; third and fourth dorsal spines longest, 2.75 in head; anterior dorsal ray longest, 1.6 in head; second anal spine longest, 2.6 in head; first anal ray longest, 1.65 in head; margin of caudal convex; pectoral short, 1.5 in head, lower rays little free at tips; ventrals pointed, reaching vent, spine 1.6 in longest ray; scales moderately large, cycloid; small scales on bases of soft dorsal, soft anal, caudal, and of pectoral; no scales on snout above or on lips; lateral line nearly straight, not concurrent with dorsal profile.

Color in life (from No. 03401) olivaceous, with narrow longitudinal lines of cardinal-red on back, becoming deep brown on lower surface; a broad white band on back posterior to base of caudal, where it becomes purple; head purplish-red, more or less deep red along margin of maxillary above, preorbital region, and side of mandible posteriorly; an orange spot with scarlet edge on lower margin of preopercle; below and posterior to margin of preopercle, blue with 3 orange bands with scarlet margins, the median with a blotch of green; interorbital width, snout above and tip of upper jaw deep olivaceous, the lower lip, groove between nasals and maxillaries, and anterior nostrils, orange; patch behind and above eye olivaceous, bordered narrowly with light blue, cardinal-red, and orange; margin of orbit blue-green; iris cardinal-red; chest purple; rudimentary caudal rays greenish yellow; fins clear blue-green; basal portion of caudal membranes paler blue; row of scales at base of soft dorsal bluish.

A fresh specimen 4 inches long (No. 03194) from Honolulu had sides faded red; an oblong olive-brown spot back of eye bordered by an orange line, which, in turn, was bounded by an orange-red line; upper lip rosy; tip of lower jaw and maxillary yellow; subopercle rosy white with 3 crossbars of orange red; chin rosy; throat black; spinous dorsal red, black at tips; soft dorsal rusty rosy at base, a middle blackish line, yellowish on outer half; caudal rosy; upper lobe yellowish at tip, the lower blackish; anal pale rosy at base, smoky black at tip; pectoral pale rosy; ventrals dull rosy, blackish edged; iris rosy with some yellow.

Color in alcohol, faded dull or pale brown, dark on back above; a white band on posterior part of back to caudal very distinct in all examples; deep brown blotch behind and above eye with narrow white brown border; 3 white streaks below preopercle with dark borders; branchiostegal region dusky; margin of spinous dorsal faintly blackish, the same color continued as a narrow blackish band across soft dorsal; margins of ventrals and anal below dusky; fins otherwise pale.

There seem to be 2 patterns of coloration, the white streak on back posteriorly and the generally paler coloration distinguishing typical individuals at all ages and in alcohol as well as in life, while in the other pattern the white stripe is never present, the general coloration is more rosy in life, and in alcohol the body is uniformly darker. Some specimens have a broad wash or band of pink on each side of back, covering most of the length of trunk.

This beautiful species is abundant at Honolulu, from which place we have 62 specimens. We have also 8 examples from Hilo and 2 from Kailua, ranging from 2.75 to 5.4 inches in length. Specimens were collected by Jenkins, Jordan and Snyder, the *Albatross*, and by us.

*Cirrhitus arcatus* Cuvier & Valenciennes, Hist. Nat. Poiss., III, 74, 1829, Isle of France (on *Perca arcata* Parkinson MS.);

Günther, Fische der Südsee, II, 70, pl. 49, figs. B & C, 1874; Günther, Shore Fishes Chall., I, VI, 59, 1880 (Honolulu).

*Cirrhitus vittatus* Cuvier, Règne Animal, Ed. 2, 146, 1829, no locality given.

*Cirrhitus (Amblycirrhitus) arcatus*, Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 490 (Honolulu).

*Cirrhitus arcatus*, Gill, Proc. Ac. Nat. Sci. Phila. 1862, 107 (Hawaiian Islands).

*Paracirrhitus arcatus*, Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 491 (Honolulu); Snyder, op. cit. (Jan. 19, 1904), 527 (Honolulu).

#### Genus 206. CIRRHITUS Lacépède.

Body oblong, compressed, formed much as in *Sciæna*, covered with large cycloid scales; head rather obtuse; scales on cheek very small; premaxillaries not produced; teeth on vomer and palatines; jaws with small canine teeth; anterior nostrils fringed; preopercle evenly curved, its edge finely serrate; soft parts of vertical fins scaled at base; dorsal rays 11 or 12; caudal truncate.

This genus contains several species, only one of which is known from the Hawaiian Islands.

*Cirrhitus* Lacépède, Hist. Nat. Poiss., V, 3, 1803 (*maculatus*).

374. *Cirrhitus marmoratus* (Lacépède). "Pō'opāa;" "Oōpukāi." Plate LXX.

Head 2.75 in length; depth 2.75; eye 5.75 in head; snout 3; maxillary 2.4; mandible 2.1; preorbital 4.8; interorbital 5.75; D. x, 11; A. III, 6; scales 6-40-8; Br. 5.

Body short and stout, moderately compressed; head heavy, longer than deep; snout bluntly conic; mouth large, slightly oblique, the jaws subequal; maxillary rather long, reaching middle of pupil; patches of villiform teeth on vomer and palatines; tongue naked; jaws with bands of villiform teeth, 2 or more enlarged canines in front of upper jaw and about 4 somewhat longer canines on each side of lower jaw; dorsal profile moderately arched, the curves strongest between nape and origin of dorsal; eye moderate, high, the supraorbital rim projecting strongly above the profile; interorbital concave; nostrils moderate, nearly circular, close together, the anterior with a bushy filament about as long as diameter of pupil; origin of dorsal over base of pectoral, its distance from snout equaling its base; dorsal spines rather strong, fourth or fifth longest, about equaling snout; dorsal rays about equal to length of spines, a little greater than longest spine; caudal truncate or slightly rounded when expanded; anal spines stout, second and third about equal in length, a little shorter than snout; anal rays moderately long, longest ray 2 in head; the 7 lowermost rays of pectoral thick and free at the posterior ends, the sixth from bottom longest, 1.8 in head or, measured from base of fin, 1.4 in head; scales large, smooth, arranged somewhat irregularly; nape, opercle, and breast with large scales; cheeks with very small scales, rest of head naked; preopercle finely serrate; opercle ending in a soft flap, projecting beyond a flat obscure spine; gill-membranes broadly connected across the isthmus.

Color in life, body marbled and blotched with bluish olivaceous brownish and white, with numerous red spots of varying sizes, the white appearing as 5 ill-defined vertical bases; head bluish white with irregular lines of yellowish or orange brown, these palest on cheek; lower jaw pale blue with cross-markings of darker blue; base of pectoral pale with yellowish-brown blotches; posterior portion of back with 4 large reddish-brown blotches, the first under the last 2 dorsal spines, the second under sixth and seventh dorsal rays, the third under last dorsal rays, fourth on upper edge of caudal peduncle; spinous dorsal pale-yellowish blue, crossed by 3 series of large orange-red spots on the membranes, the uppermost series least complete; tips of membrane of spinous dorsal whitish, above black blotches; soft dorsal pinkish with a series of redder spots along the base; caudal pale pinkish, crossed by about 4 series of bright blood-red blotches; anal pale rosy, whitish at base, with 3 series blood-red blotches; an olive blotch near middle of first and second spines; pectoral and ventral pale rosy.

Color in alcohol, head and body dark brownish, marbled and blotched with lighter; 3 or 4 dark blotches on back along base of dorsal fin, alternating with whitish blotches; a dark blotch on upper edge of caudal peduncle, bounded before and behind by a white blotch; distal portion of caudal peduncle crossed by an irregular whitish bar; tip of lower jaw black, bordered by white on each side, just back of which is an irregular dark crossbar followed by a much broader pale crossbar; branchiostegal membranes barred with black and white; spinous dorsal white at tip, with a subterminal blackish band; middle of spinous dorsal membrane with irregular white areas; soft dorsal spotted with blackish along base, the distal portion bluish or smoky; caudal pale bluish, crossed by 5 or 6 vertical series of brownish blotches; anal similar to soft dorsal; ventrals dusky bluish, unspotted; pectorals bluish beneath, dusky on outside, especially at base.

The above description is based chiefly upon a specimen (No. 04581) 9.75 inches long, from Honolulu.

This is one of the largest and most important species of the family. It seems to be abundant among the Hawaiian Islands, and is represented in our collection by 35 specimens (30 from Honolulu, 3 from Kailua, and 2 from Hilo), 4.4 to 9.75 inches long. It was collected by Jenkins, Wood, Jordan and Snyder, and by us; also by the *Albatross* at Honolulu and Puako Bay.

*Labrus marmoratus* Lacépède, Hist. Nat. Poiss., III, 492, pl. 5, fig. 3, 1801, no locality given.

*Cirrhitus maculatus* Lacépède, Hist. Nat. Poiss., V, 3, 1803, no locality given; Günther, Fische der Südsee, III, 71, pl. 51, fig. A, 1874 (Hawaiian Islands, Society Islands, Cook Island).

*Cirrhitus maculosus* Bennett, Zool. Journ., iv, 1829, 38, Sandwich Islands; Rüppell, Atlas Fische, 13, pl. 4, fig. 1, 1828.

*Cirrhitichthys maculatus*, Gunther, Cat., II, 74, 1860 (Polynesia, India, Hawaiian Islands; Ile de France); Klunzinger, Fische des rothen Meeres, 131, in Verh. Zool. Bot. Ges. Wien, XX, 1870, 798 (East coast of Africa, Polynesia);

Günther, Shore Fishes, Chall., I, 59, 1880 (Honolulu).

*Cirrhitus marmoratus*, Gill, Proc. Ac. Nat. Sci. Phila. 1862, 107 (Hawaiian Islands).

*Cirrhitus alternatus* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 122, Hawaiian Islands (young).

*Cirrhitus marmoratus*, Bleeker, Verh. Koninkl. Ak. Wet., XV, 1875, 3 (Sumatra; Amboyna); Jenkins, Bull. U. S. Fish Comm.,

XXII, 1902 (Sept. 23, 1903), 491 (Honolulu). Snyder, op. cit. (Jan. 19, 1904), 527 (Honolulu; Puako Bay, Hawaii).

*Cirrhitus (Cirrhitichthys) maculatus*, Steindachner, Denks Ak. Wiss. Wien, LXX, 1900, 490 (Honolulu; Laysan).

#### Suborder LORICATI.—The Mail-Cheeked Fishes.

This group is distinguished by a single peculiar character, the extension of the third suborbital bone across the cheek to or toward the preopercle. From the Craniomi, an offshoot from the same group in which the development of the suborbital stay is carried much farther, the present group is distinguished by the normal character of the shoulder-girdle.

#### Family LXXXIV. CARACANTHIDÆ.

This family is closely related to the *Scorpenidae*, from which the species differ in the weak, compressed body and feeble fins. The osteology has not yet been studied. Lower pectoral rays detached.

#### Genus 207. CARACANTHUS Krøyer.

Head and body very compressed, naked or with small tubercles or prickles; snout very short, truncated; no scales; several bones of the head strongly armed; the preorbital and the interopercle with a strong spine, directed downward; two separate or continuous dorsals, the first with 8 (7) spines, anal with 2; no pectoral filament; ventrals rudimentary; villiform teeth in the jaws only; branchiostegals 5; no aperture behind the fourth gill.

*Micropus* Gray, Zool. Misc., 20, 1831 (*maculatus*); name preoccupied by *Micropus* Wolf, 1810, a genus of birds.

*Caracanthus* Krøyer, Naturhist. Tidsskr., I, 1844, 267 (*typicus*).

*Amphiprionichthys* Bleeker, Nat. Tijds. Ned. Ind., VIII, 1855, 170 (*apistus*).

*Centropus* Kner, S. B. Ak. Wien, 1860, 3 (*staurophorus*).

*Crossoderma* Guichenot, Nouv. Arch. Mus., V, 1870, 194 (*madegascariense*).

a. Dorsal fins separated to the base; reddish brown, with red spots ..... *maculatus*, p. 453

aa. Dorsal fins fully connected; color plain darker brown ..... *unipinna*, p. 454

#### 375. *Caracanthus maculatus* (Gray). Fig. 198.

Head 2.75 in length; depth 1.8; snout 3.75 in head; eye 4.4; interorbital 5.5; width of mouth 2.5; D. VIII, 12; A. II, 12; P. 15; V. 1, 2.

Body deep, elevated, compressed, its greatest depth at ventrals; head deep, compressed; snout blunt, steep, rather long; eye small, high, in first third of head; mouth broad, somewhat low, without

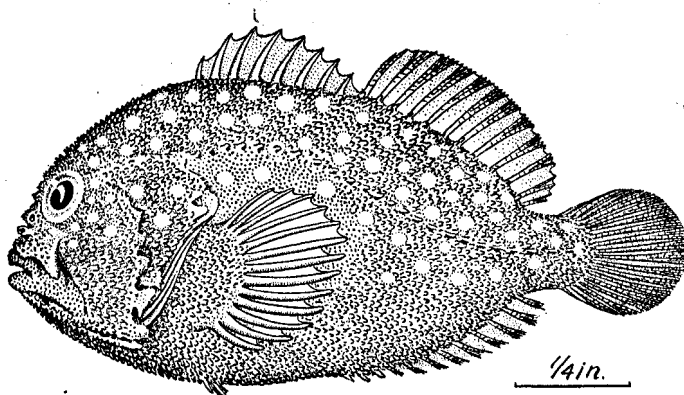


FIG. 198.—*Caracanthus maculatus* (Gray).

deep lateral cleft; lips thick, fleshy, mandible slightly produced; teeth fine, in bands; interorbital space convex; nostrils close together in front of eye, each with raised rim; preorbital with large pointed spine directed down and backward. depressible in a groove; margin of preopercle with 5

broad compressed curved spines; interopercle with strong spine; opercle with 2 compressed spines on upper margin, 1 on lower margin; spinous dorsal with rounded margin, median spines longest, third 3 in head, the 2 dorsals nearly or quite separate; caudal small, rounded, 1.5; base of anal 3.75 in body; pectoral 2 in head, lower rays thick, ventrals very small, spine short, strong; body covered with minute fleshy pointed papillæ directed backward except behind and a little above base of pectoral, those on head and in front of spinous dorsal very small and more or less rigid; lateral line running down till below first 2 dorsal rays.

Color in alcohol brown, lower surface slightly reddish, back dusky; side, back, and top of head marked with round red spots, in most of our examples turning to pale brown; fins all more or less uniform brownish. Described from an example (No. 573) 1.6 inches long, from Honolulu.

This interesting little fish is quite abundant at Honolulu and at Waikiki, being found among the coral rocks on the reefs. It is of wide distribution among the islands of the tropical Pacific. The collection contains 64 specimens 0.6 to 1.75 inches long.

*Micropus maculatus* Gray, Zool. Misc., 20, 1831-42, Island of Hao; Günther, Cat., II, 147, 1860 (Gray's type); Günther, Fische der Südsee, III, 86, 1874 (Sandwich Islands).

*Caracanthus typicus* Krøyer, Naturhist. Tijds., I, 1844, 264, 267.

*Caracanthus maculatus*, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 515, pl. xx, fig. 5 (Honolulu); Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 491 (Honolulu).

### 376. *Caracanthus unipinna* (Gray).

Head 3 in length; depth 1.85; D. VII, 12; A. II, 11.

General form and appearance of the preceding, but the dorsal fins fully united, a slight depression at their junction; preopercular spines smaller, the limb more rounded. Color, plain dark brown. Found with the preceding, but smaller and more rare, easily distinguished by the united dorsals. We have examined specimens from Makemo (*Albatross* Coll.), but have none from Honolulu, from which place, however, it has been recorded by Günther. The species called *Caracanthus apistus* may be the same as *C. unipinna*, but the soft dorsal is figured as much higher than in *C. unipinna*.

*Micropus unipinna* Gray, Zool. Misc., 20, 1831-42, Pacific; Günther, Cat., II, 147, 1860 (Gray's type); Günther, Fische der Südsee, III, 86, 1874 (Sandwich Islands; Tahiti; Vavau, Fiji; Pelew Islands, Maduro).

*Amphiprionichthys apistus* Bleeker, Nat. Tijds. Ned. Ind., VIII, 170, 1855 Cocos Islands; Günther, Cat., II, 144, 1860 (Kokos Islands); Kner, Sitzb. Ak. Wiss. Wien, 1868, 17, pl. III, fig. 8.

*Centropus sturophorus*, Kner, Sitzb. Ak. Wiss. Wien, 1860, 3 (Zanzibar).

*Caracanthus apistus*, Bleeker, Atlas Ichth. IX, pl. 416 (Scap., pl. VI), fig. 5, 1877.

### Family LXXXV. SCORPÆNIDÆ.

Body oblong, more or less compressed, the head large, and with 1 or more pairs of ridges above, which usually terminate in spines, sometimes very irregular in form; opercle usually with 2 spinous processes, preopercle with 4 or 5; mouth terminal, usually large, with villiform teeth on jaws and vomer, and usually on the palatines; premaxillaries protractile; maxillary broad, without supplemental bone, not slipping under preorbital; gill-openings wide, extending forward below; gill-membranes separate and free from the isthmus; usually no slit behind the fourth gill; scales ctenoid, or sometimes cycloid, usually well developed, sometimes obsolete; lateral line single, continuous, concurrent with the back; a narrow bony stay extending backward from the suborbital toward the preopercle; ventral fins thoracic, usually of the normal percoid form, 1, 2, to 1, 5, the rays branched; dorsal fin continuous, sometimes so deeply notched as to divide it into 2 parts, or even 3 parts, with 8 to 16 rather strong spines and about as many soft rays; anal rather short, usually with 3 spines and 5 to 10 soft rays; soft rays in all the fins usually branched, except some or all of rays of the pectorals; pyloric cœca in moderate or small number (fewer than 12). Pseudobranchiæ large; air-bladder present or absent. Actinosts moderate, inserted on the posterior edges of hypercoracoid and hypocoracoid; ribs borne on enlarged pleuraphyses; post-temporal bifurcate, normally connected; myodome more or less developed. Genera and species numerous, inhabiting all seas, but especially abundant in the temperate parts of the Pacific Ocean, where they form a large proportion of the fish fauna. They are non-migratory fishes, living about rocks, most of them of large size, and all used as food. Many of them have a venom sac at the base of the dorsal spines, and many of them are viviparous, the young being produced when about one-fourth inch in length.

- a. Dorsal fin beginning at the nape, far behind the eye; vomer with teeth.  
 b. Body scaly; no free pectoral rays; ventral rays 1, 5.  
 c. Dorsal spines not produced in long slender free tips.  
 d. Dorsal spines 13.  
 e. Palatine teeth wanting.....*Sebastopsis*, p. 462  
 dd. Dorsal spines 12 (or 11).  
 f. Bones of head with large muciferous cavities; lower pectoral rays branched; scales cycloid.....*Setarches*, p. 461  
 ff. Bones of head scarcely cavernous; scales ctenoid.  
 g. Scales on top of head ctenoid; cranium as in *Sebastes*; palatine teeth present.  
 h. Pectoral rays more or less branched below.  
 i. Eye with a long cirrus above.....*Merinthe*, p. 461  
 ii. Eye without cirrus; air-bladder none.....*Helicolenus*, p. 460  
 hh. Pectoral rays all simple.  
 j. Dorsal spines subequal.....*Pontinus*, p. 460  
 jj. Dorsal with the fourth spine much elevated.....*Iracundus*, p. 470  
 gg. Scales on top of head cycloid or wanting; cranium more rough-spinous; no air-bladder so far as known.  
 k. Palatine teeth present; preorbital with a hooked spine below.....*Sebastapistes*, p. 455  
 kk. Palatine teeth wanting; head still more rough; no hooked preopercular spine.....*Scorpaenopsis*, p. 467  
 cc. Dorsal species much produced, with slender free tips.  
 l. Pectoral very long, its rays all simple, largely free at tip.....*Pterois*, p. 463  
 ll. Pectoral fin moderate, its rays not all simple, none of them much free at tip.....*Dendrochirus*, p. 465  
 aa. Dorsal fin beginning not far behind the eye, the first rays directed forward; scales rudimentary; no teeth on vomer or palatines.....*Tenianotus*, p. 471

## Genus 208. SEBASTAPISTES Gill.

Body oblong, somewhat compressed; head large, not much compressed, naked above, and more or less uneven, with spinous ridges, often with dermal flaps; preorbital with a stout spine hooked downward; mouth large, with bands of villiform teeth on jaws, vomer, and palatines; scales mostly ctenoid, of moderate size, often with skinny flaps; dorsal fin with 12 stout spines; anal with 3 spines, the second commonly the longest; pectoral large, rounded, the base usually procurrent; some or all of the upper rays divided, the lower simple; ventrals inserted behind pectorals; no air-bladder; vertebrae 10+14=24. Species numerous in the tropical seas; dwarf fishes of singular forms and bright colors, very close to *Scorpaena*, but much smaller in size and with a characteristic spine before the eye.

*Sebastapistes* Gill in Streets, a Bull. U. S. Nat. Mus., No. 7, 62 1877, (*guttata*; includes *Scorpaena guttata* Girard; *S. strongia* Cuvier & Valenciennes, and *Sebastichtys cyanostigma* Bleeker).

- a. Body with flap-like dermal appendages.  
 b. Middle of upper jaw without cirrus.  
 c. Maxillary scarcely reaching beyond posterior edge of eye.....*ballieui*, p. 455  
 cc. Maxillary reaching beyond posterior edge of eye.....*corallicola*, p. 456  
 bb. Middle of upper jaw with cirrus.  
 d. Dorsal with 10 and anal with 8 soft rays.....*asperella*, p. 458  
 aa. Body without flap-like dermal appendages.  
 e. Supraorbital cirrus absent.  
 f. Scales on side of head well developed; scales 42.....*conorta*, p. 458  
 ee. Supraorbital cirrus present; scales 53.....*galactacma*, p. 459

377. *Sebastapistes ballieui* (Sauvage). "Poopa'a." Plate LXXII.

Head 2.25 in length; depth 2.4; eye 4.25 in head; snout 3.35; interorbital 5.65; maxillary 1.75; mandible 1.75; D. XII, 10; A. III, 5; P. 16; V. I, 5; scales 7-40-18.

Body moderately elongate, compressed, greatest depth a little before middle of spinous dorsal; back slightly elevated; snout rather short, blunt, rounded; mouth large, oblique; mandible slightly produced; maxillary reaching a trifle behind posterior edge of orbit, its distal expanded extremity 1.4 in eye; lips rather thick, fleshy; teeth fine, in broad bands in jaws; vomer with patch of fine teeth; tongue rather thick, rounded, little free in front; eye anterior, nearly in first third of head; interorbital space deeply concave; nostrils large, anterior with rather broad fleshy flap, posterior a little the

<sup>a</sup>Segregated by Gill "from their allies by the naked crown and jaws, the spinous armature of the inferior margin of the preorbital, the procurrent bases of the pectoral fins, etc. The genus is intermediate between the Sebastoid and scorpaenoid genera, and nearly related to *Parascorpaena* Blkr." *Scorpaena guttata* is a true *Scorpaena* or rather *Parascorpaena*. As this species has not the armed preorbital characteristic of *Sebastapistes*, it is presumable that the diagnosis of *Sebastapistes* rests on *S. strongius*.

larger; nasal, preocular, supraocular, postocular, tympanic, parietal, coronal, and nuchal spines present; a ridge of spines across cheek ending in a spine on edge of opercle below 3 other spines; a ridge of spines behind eye and above opercle; 2 large spines on opercle; 4 preorbital spines present; fourth dorsal spine longest, 2 in head; penultimate 4.5; last 3; third dorsal ray longest, 2 in head; second anal spine longest, 2.2; second anal ray longest, 1.8; caudal rounded, 1.5; pectoral 1.35; ventral 1.5, its spine 2.6; caudal peduncle compressed, its least depth 4; scales rather large, ctenoid; lateral line running obliquely down to base of caudal.

Color in life, head and body light olive-green; back with a large pale-blue area extending from under middle of spinous dorsal to lateral line; a similar but smaller spot under first dorsal rays, interrupted just above lateral line, then continued to base of anal spines, where it connects with the same color of belly; caudal peduncle crossed by 3 irregular lines or blotches of same color; breast pale blue, lower jaw whitish, tipped with red; upper jaw whitish, with many narrow red cross lines; cheek, opercle, and side of body with many very small, round, red spots, most numerous on head and base of pectoral; spinous dorsal dusky bluish, the membranes yellowish or greenish at tips, and a round black spot on distal part of eighth, ninth, and tenth membranes, these spots confluent; soft dorsal pale bluish, with yellowish wash near base, also near border, and with 3 or 4 series of double, short, vertical brick-red lines on the rays; caudal similar to soft dorsal; anal pale bluish and yellowish; 1 or 2 red spots on spines; pectoral pale bluish with 5 or 6 cross series of light-red spots, the lower rays with much red; ventral rosy red at base, then greenish, then rosy red, pale at tip; eye whitish, with radiating brick-red areas.

Color in alcohol, pale brown, marbled above and on side with darker; vertical fins with pale brown, the soft or rayed portions each with 2 broad series of gray-brown spots; base of caudal brownish; pectoral and ventral pale brown, the basal portion of lower rays of former, and middle of latter, deep brown; marginal portion of membrane among eighth, ninth, tenth, and eleventh dorsal spines blackish.

Described from an example (No. 625) taken at Honolulu.

We identify with this species, poorly described by Vaillant and Sauvage, a large series of specimens (85) from Honolulu, Waikiki and Hilo, ranging in length from 1.4 to 4.25 inches.

*Scorpaena ballieui* Sauvage, Rev. Mag. Zool. (3), III, 1875, 278, Sandwich Islands.

### 378. *Sebastapistes corallicola* Jenkins. Fig. 199.

Head 2.5 in length; depth 2.75; pectoral slightly less than 3 in length; ventral 3.3; caudal equal to ventral; eye 4 in head, a little shorter than snout; D. XII, 9; A. III, 5; C. 19; P. 16; V. I, 5; scales 40 in the lateral line, 6 in series from fourth dorsal to lateral line, 14 from origin of anal to lateral line; mouth but little oblique, lower jaw projecting very slightly; maxillary 1.6 in head, projecting beyond posterior margin of eye; teeth all small and simple, in bands in upper and lower jaws, bands interrupted at front; teeth on vomer in a V-shaped patch, in bands on the palatines equal in length to width of vomerine patch; suborbital 1.5 in eye; a pit below anterior lower angle of eye, anterior nostril transversely oval, with a tentacle in the inner posterior part of rim; posterior nostril simple, circular; snout with a triangular median elevation, the apex between the anterior nostrils; between each anterior nostril and apex of rostral elevation is a strong short spine; 6 spines on the upper half of ocular rim, first at upper anterior angle, second on upper rim over center of pupil, third over posterior margin of the pupil, fourth on level with upper edge of pupil, fifth back of center of pupil, sixth on level of lower edge of pupil; sixth bifid on each side, fifth bifid on right; occipital depression with 2 spines at each angle, one lateral to the other at the anterior angles, one caudad to the other at the posterior angles; a strong spine at upper end of opercle; posterior to this spine and a little above it 2 smaller spines just before upper end of gill-slit; posterior to these a single spine at upper end of gill-slit; two large diverging spines on opercle; suborbital with a bony ridge without spines except a small one on its posterior end; preorbital with 3 spines, 2 directed downward over upper edge of maxillary, the other forward over edge of premaxillary; at angle of preopercle an upper small and a lower larger spine, below these on arm of preopercle 4 decreasingly smaller spines; supraorbital tentacle well developed, just back of supraorbital spine; a tentacle back of posterior vertical spine, lapping over edge of maxillary; a strong spine at angle of shoulder-girdle above base of pectoral, sharp-pointed, projecting upward and backward; a small, less prominent spine back of this one; gillrakers short, 5+10; interorbital space slightly con-

cave, with 2 prominent ridges diverging posteriorly and ending in the 2 twin spines of those at anterior angles of the occipital depression; dorsal profile of the body much more convex, greatest depth at fourth dorsal spine; depth of caudal peduncle equal to eye, 3.5 in greatest depth of body; fourth dorsal spine the longest, a little greater than half of head; third and fifth spines equal, but little shorter than fourth; second 1.5 in third, first 1.75 in second; spines back of fourth regularly decreasing in length to next to last, which is 2 in fourth; last longer, equaling second; soft rays abruptly longer than last dorsal spines, second, third, and fourth longest, equaling longest spine; last soft rays equal to next to last spine; second anal spine longest and much thicker than others, 1.75 in head; first slender, 2 in second; third slender, 0.8 of second; first and second soft rays longest, 1.6 in head; caudal slightly rounded; pectoral round, middle rays longest; ventral rounded, second ray longest, its spine equal to sixth dorsal spine; head and fins naked.

Characters very constant. In smaller specimens the posterior spines of orbital rim not so evident as in type and in most the humeral spine smaller. Size of supraorbital tentacle varies much, in some very small or absent, in others very large, fringed, length greater than eye, equal to second dorsal spine.

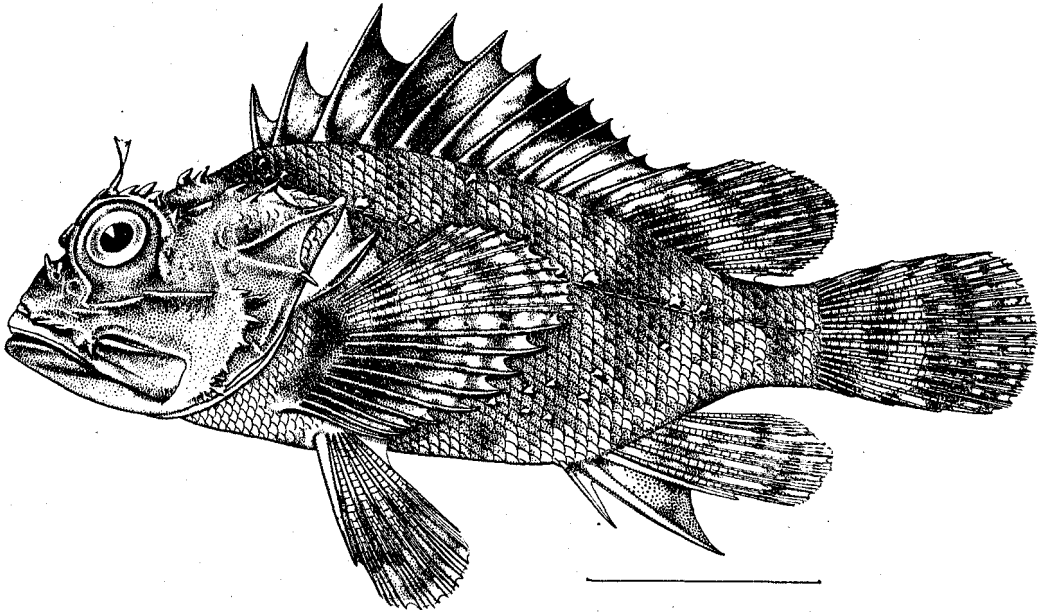


FIG. 199.—*Sebastapistes corallicola* Jenkins; from the type.

Color of fresh specimen (field No. 223), whitish, with brownish cloudings and many bright red spots on head, body, and fins; black blotch on dorsal fin on eighth to tenth spines, fin clouded with dark bars; dermal flaps white.

Another fresh example (field No. 206) golden brown on body and fins, with many very bright red spots; a black blotch on spinous dorsal on seventh and ninth spines longer than eye but not so deep.

In alcohol the color varies considerably; in some, fins distinctly banded, in others, fins plain. Some lack the black blotch on posterior part of spinous dorsal, others have it present but small, others have it well developed and reaching from sixth to eleventh spine. A series of dermal flaps along lateral line, also a number of smaller ones on lower half of side; lateral line simple, slightly convex downward posteriorly.

Color of type (field No. 236) in alcohol, head and body mottled with lighter and darker shades of brown, plain pale below; a wide pale transverse band on nape (very indistinct); spinous dorsal with dusky blotch from seventh to tenth spines on distal half of fin; other fins mottled with brown in triangular transverse bands; a dusky rim above margin of eye on eye membrane; dermal flaps white.

Resembles *Scorpena onaria* Jordan & Snyder from Japan, but differing in absence of knob at

symphysis of lower jaw, in having no spine on suborbital except on its end, in having 2 spines instead of only 1 at each anterior angle of occipital depression, and in greater length of maxillary, which does not reach beyond posterior rim of orbit in *S. onaria*.

Close to *Scorpana nuchalis* Günther, from Raratonga Island (Fische der Südsee, 1, 76, 1873); differing from that species in having maxillary reaching past the posterior rim of eye; but the third, fourth and fifth spines largest, instead of the fourth to the seventh and the black blotch on the posterior part of the spinous dorsal (7-10 spines) instead of on the forepart.

Only 3 specimens of this species known, all collected at Honolulu by Doctor Jenkins.

*Sebastapistes corallicola* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (September 23, 1903), 493, fig. 38, Honolulu.

### 379. *Sebastapistes asperella* (Bennett).

D. XII, 10; A. III, 8; P. 17; V. 1, 6; C. 12.

The prevailing color is dull fulvous, with paler indistinct patches; anterior half of dorsal fin fuscous, with a rosy spot at its commencement, posterior half hyaline, the projecting tips of the rays edged with black; caudal rounded, transparent, crossed by 2 blackish fasciæ; anal fuscous at base, transparent in the middle, and blackish at tip; pectoral crossed by 2 blackish bands, and by 2 irregular ones composed of numerous minute white points giving to them a frosted appearance; ventral fins similarly colored. The head exhibits the usual asperity of this genus, but only in a moderate degree; on its lower parts are a few short, flattened, white filaments, and similar filaments along the lateral line and on the upper parts of the body, being most numerous in the latter situation; above each eye is a rosy colored cirrus, equaling in length about three-fourths of the diameter of the orbit, and somewhat lobed along its edges; there is a short cirrus on each nostril, and another, which is pinnately branched, on the middle of each side of the upper jaw. (Bennett.)

Hawaiian Islands; not seen by us.

*Scorpana asperella* Bennett, Zool. Journ., IV, 1828, 40, Sandwich Islands; Günther, Fische der Südsee, III, 80, 1874 (after Bennett).

### 380. *Sebastapistes coniota* Jenkins. Fig. 200.

Head 2.4 in length; depth 2.75; eye 3.4 in head; snout 3.25; interorbital 7; maxillary 2; mandible 1.9; D. XII, 10; A. III, 5; P. 16; V. 1, 5; scales 7-53-14.

Body elongate, compressed, greatest depth at first dorsal spines; back slightly elevated; snout rather short, blunt, rounded; mandible large, rather strong; mouth large, slightly oblique; maxillary long, reaching below last fourth of eye; breadth of distal expanded extremity 2 in eye; fine teeth in bands on jaws, vomer, and palatines; tongue small, thick, pointed, little free in front; lips rather thin; nostrils close together, anterior with small fleshy flap; interorbital space rather narrow, concave; nasal, preorbital, supraorbital, postorbital, tympanic, parietal, and nuchal spines present; a ridge of spines from behind eye above opercle; a ridge of spines across cheek ending in a large spine on margin of preopercle, below which are 2 others; two large spines on opercle; preorbital with 4 spines; fourth dorsal spine longest, 2.7; soft rays longer, fourth longest, 2.7; second anal spine longest, 2.2; first anal ray longest, 2.35; caudal rounded, 1.9; pectoral rather small, 1.8, rounded; ventral 1.7, spine 2.25; least depth of caudal peduncle 5; scales rather small, ctenoid, except those on belly, which are smooth; lateral line oblique to base of caudal. Described from an example (No. 05769) from Honolulu.

Color in life (No. 278, O. P. J.), light olive, with dark brown mottlings, body, head, and fins covered thickly with small brown spots; posterior margin of caudal red; fins color of body.

Color in life (No. 03524), olive, with irregular brown areas on body and head; numerous small deep brown spots on head; fins olive, with brown markings, except the posterior half of the caudal, which is red, also upper and lower edges of same; edges of anal and ventral red; iris red.

Color in alcohol, brown, marbled with dark brown forming about 3 broad ill-defined vertical bands; upper surface of body covered nearly everywhere with numerous small dark brown dots also extending on all the fins; spinous dorsal with deep brown blotch at middle of base; soft dorsal and anal each with last brown vertical band of trunk extending out on the fins; caudal with brown base and deep brown blotch on outer portion; a brown streak extending back from eye, and a dark spot behind its upper margin; a deep brown blotch at tip of opercular flap.



This is the most abundant species of the family in the Hawaiian Islands, as shown by the very large series of specimens in our collection, 197 from Honolulu and 9 from the reef at Waikiki. The specimens are all small, the length ranging from 1 to 2.8 inches.

*Sebastapistes strongia*, Streets, Bull. U. S. Nat. Mus., No. 7, 62, 1877 (Honolulu); Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 515 (Sandwich Islands); not *Scorpaena strongia* C. & V., from Strong Island, Carolines.

*Sebastapistes coniertorta* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 495, fig. 39, Honolulu (type, No. 50693, U. S. N. M.; coll. O. P. Jenkins); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu).

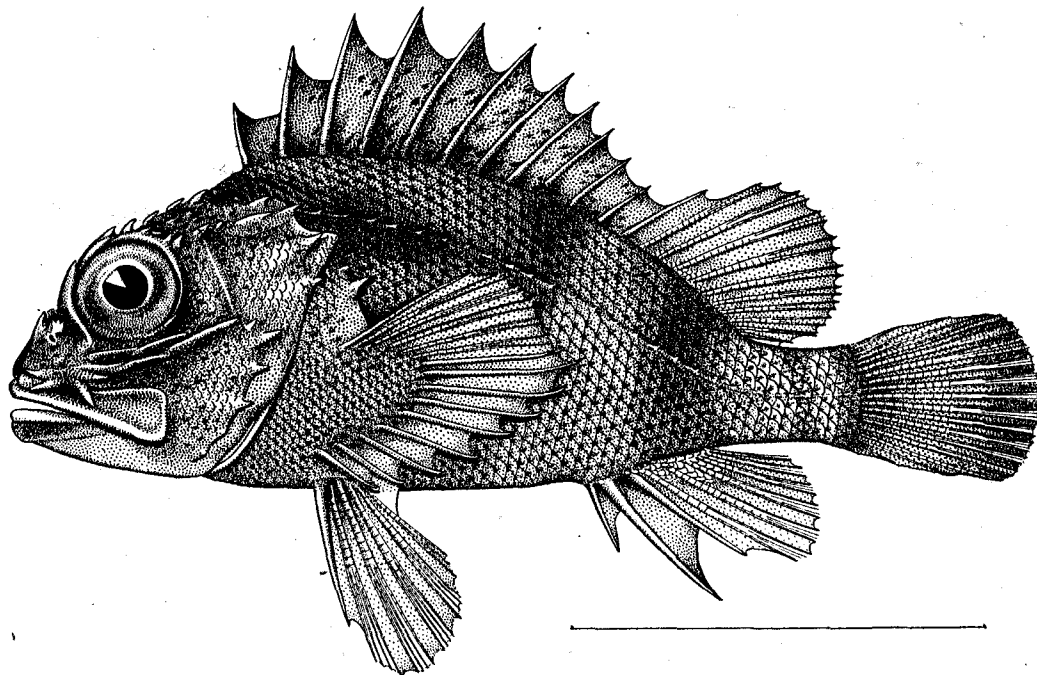


FIG. 200.—*Sebastapistes coniertorta* Jenkins; from the type.

**381. *Sebastapistes galactacma* Jenkins. Fig. 201.**

Head 2.25 in length; depth 2.7; eye 3.5 in head; snout 3.7; interorbital 6.5; D. XII, 10; A. III, 5; P. 16; V. 1, 5; scales 7–42–12.

Body elongate, compressed, greatest depth under first dorsal spines; back not elevated; snout short, blunt; mouth rather large, only slightly oblique, jaws about equal; mandible rather large, 2 in head; maxillary large, distally expanded, 1.75 in eye; teeth small, in rather broad bands on jaws, vomer, and palatines; tongue rather broad, thick, pointed, little free in front; lips rather thin; nasal, preorbital, supraorbital, postorbital, tympanic, parietal, and nuchal spines present; no coronal spines; series of spines from behind eye above opercle; 2 large preorbital spines; a series of spines below eye across cheek ending in a large spine on edge of preopercle, below 4 others; opercle with 2 spines; fourth dorsal spine longest, 2 in head; third dorsal ray longest, 2.1; second anal spine longest, curved, 1.7; first anal ray longest, 2; caudal rounded, 1.6; pectoral rounded, 1.3; ventral 1.5; caudal peduncle compressed, 4.

Color in alcohol (type), pale or whitish brown, a little darker on the back; upper surface and side variegated with darker brown; head and trunk marked with very many small whitish dots; a deep brown blotch on outer portion of spinous dorsal between fifth and ninth spines; soft dorsal with several brown wavy lines; caudal with several pale brown cross-bars; pectoral with brown and white spots on base; ventrals pale with white dots.

The above description is based chiefly on the type (No. 2175 of O. P. Jenkins's collection, 50692, U. S. N. M.), 2.6 inches long, from Honolulu, where Doctor Jenkins obtained 80 other examples from the coral rocks of the reef, ranging from 1.3 to 2.6 inches long. The species is known only from Honolulu and Waikiki.

*Sebastapistes galactacma* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 496, fig. 40, Honolulu.

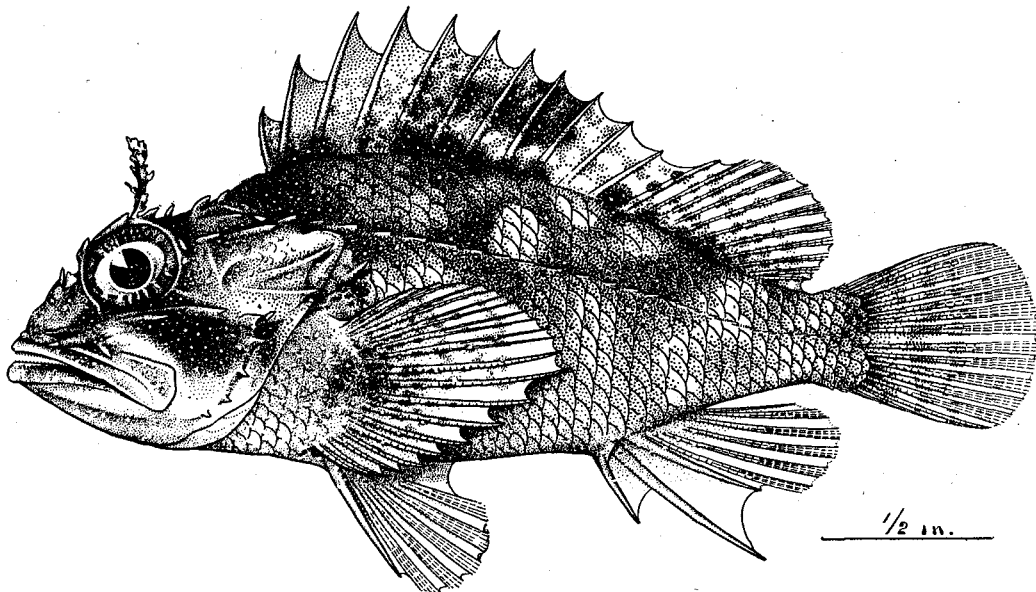


FIG. 201.—*Sebastapistes galactacma* Jenkins; from the type.

#### Genus 209. HELICOLENUS Goode & Bean.

Body oblong, somewhat compressed; head large, ctenoid scales on its tip, cheeks and opercles; several series of spinous ridges on head, but no occipital pit; mouth large, with bands of villiform teeth on jaws, vomer, and palatines; dorsal fin continuous, not deeply notched, with 10 stout spines and 10 to 12 rays; anal with 3 spines and 6 rays; pectoral broad, fan-shaped, with rays arranged in 3 groups, the first of 2 simple rays, the second of 8 or 9 branched rays, the third of 8 simple rays, sometimes prolonged, with their tips tendril-like and free from membrane for one-half their length or less; soft dorsal with tips free from membrane; suborbital keel smooth, or with a single anterior spine under eye; preorbital with spines small and hidden beneath skin; vertebrae 10 + 14 = 24; no air-bladder. Very close to *Scorpaena*, differing only in the *Sebastes*-like cranium, the 2 genera probably connected by intermediate forms.

The single Hawaiian species of this genus is fully described in Section II.

*Helicolenus* Goode & Bean, Oceanic Ichth., 248, 1896 (*dactylopterus*).

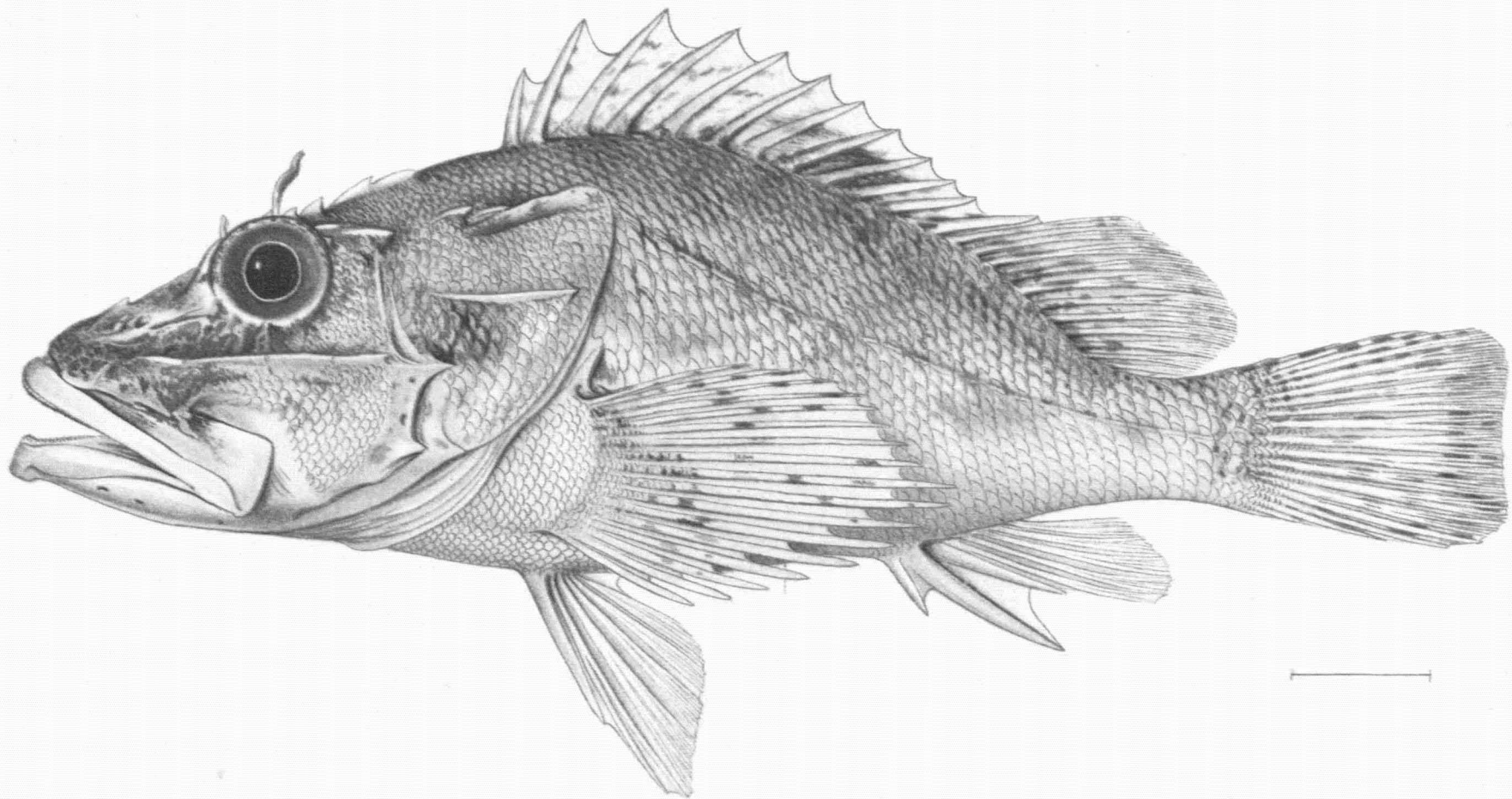
#### Genus 210. PONTINUS Poey.

This genus has the form and general structure of *Helicolenus*, differing in having the pectoral rays all simple and only their tips free; 6 to 9 rays in the anal; the suborbital keel composed of 3 distinct, differentiated, flat, knife-like spines; 2 prominent retrorse spines on each suborbital.

The single Hawaiian species of this genus is fully described in Section II.

*Pontinus* Poey, Mem. Hist. Nat. Cuba, II, 172, 1858 (*castor*).

*Sebastoptus* Gill, Proc. Ac. Nat. Sci. Phila. 1863, 208 (*kuhllei*).



MERINTHE MACROCEPHALA (SAUVAGE).

## Genus 211. MERINTHE Snyder.

Allied to *Helicolenus*, but with a long cirrus above the eye; head very long; pectoral rays all simple; dorsal spines 12, all low; head moderately armed; scales moderate, ctenoid; side of head scaly; jaws naked; teeth on vomer and palatines; gillrakers slender, few in number.

*Merinthe* Snyder, Bull. U. S. Fish. Comm., XXII, 1902 (Jan. 19, 1904), 535 (*macrocephala*).

382. *Merinthe macrocephala* (Sauvage). "*Oopu kai Nohu*." Plate 55.

Head 2 in length; depth 2.8; eye 5.5 in head; snout 2.7; interorbital 11.75; maxillary 2.2; D. XII, 11; A. III, 6; P. 17; V. I, 5; scales 9-52-22.

Body elongate, compressed, greatest depth about middle of ventral; head very long, a little deeper than broad; nasal, preocular, supraocular, postocular, tympanic, parietal, nuchal spines present; no coronal spines; 5 long spines across cheek, last forming large broad spine on lower margin of preopercle; 2 opercular spines; 2 spines directly behind eye; 2 spines on suprascapula; lower margin of preopercle with 2 broad spines; snout long; eye rather small, high, anterior; mouth large, a little oblique; maxillary long, reaching a little beyond anterior margin of eye, its distal expanded extremity 1.35 in eye; lips narrow, fleshy; teeth fine, in rather narrow bands in jaws; teeth on vomer and palatine similar, V-shaped on former and short straight narrow band on latter; tongue short, triangular, free, smooth; branchiostegals 7, large; a round thin fleshy cirrus over each eye, its length much greater than eye; dorsal spines strong, sharp pointed, third, fourth, and fifth longest and about equal, 3.75 in head; penultimate dorsal spine 0.75 in last spine; second dorsal ray longest, 3 in head; first anal spine a little less than half length of second spine, which is longest, 3 in head; first anal ray longest, 2.8 in head; caudal moderately long, truncate, 2 in head; caudal peduncle compressed, depth 4.8 in head; pectoral long, reaching below origin of first soft ray, median rays longest; ventrals rather small, 2 in head; spine 3.2 in head; origin of ventral a little in front of that of pectoral or below origin of dorsal; scales moderate, ctenoid; snout, jaws, interorbital and preorbital regions, and lower surface of head, naked; scales on top of head behind eyes, very small; gillrakers 2+9, broad, compressed, equal to longest gill-filaments or 2.8 in eye; lateral line armed with long scutes at first and sloping down obliquely to base of caudal.

Color in alcohol, pale brown, darker or mottled with deep or dusky brown on back and upper surface; several short brown lines running from front of lower margin of eye; dorsals, caudal, and pectoral sprinkled with dusky; anal with a few dusky spots. Bright orange red in life and very showy.

Described from a specimen 10.75 inches long (No. 05301) taken at Hilo; another smaller was obtained by the *Albatross* at Honolulu. Examples recently seen in aquarium at Waikiki. Reaches a weight of 4 or 5 pounds.

*Sebastes macrocephalus* Sauvage, Bull. Soc. Philo. (7), VI, 1882, 169, Sandwich Islands.

*Merinthe macrocephala*, Snyder, Bull. U. S. Fish Comm., XXII, 1902 (Jan. 19, 1904), 535 (Honolulu).

## Genus 212. SETARCHES Johnson.

Head and body compressed; head scaleless above, its bones cavernous, flat between the eyes; only 1 pair of spines at occiput; no transverse groove at occiput, only small spines or none above orbit; opercle and preopercle strongly armed with straight long spines. Eye moderate, near, but not touching, profile. Mouth terminal, broad, somewhat oblique; maxillary extending to posterior edge of eye, much expanded behind. Lower jaw somewhat projecting, the small symphyseal knob received in rostral notch. Villiform teeth on jaws, vomer and palatines. Preorbital with 2 or 3 spines. Opercle scaly. Scales cycloid, moderate. Lateral line a broad, scaleless groove with skinny (about 27 to 30) tubes. No laciniae. Dorsal deeply notched, with 12 spines, its origin in front of pectoral; soft dorsal shorter, the rays fewer than the spines. Anal inserted under end of dorsal, its spines strong, graduated. Pectoral broad and bony, with 20 or more rays, of which a considerable number of median ones are branched. Branchiostegals 6 or 7. Pyloric appendages few. Deep water.

The single Hawaiian species (*S. remiger*) of this genus is fully described in Section II.

*Setarches* Johnson, Proc. Zool. Soc. Lond. 1862, 177 (*guntheri*).

*Bathyssebastes* Steindachner & Doderlein, Denkschr. Ak. Wiss. Wien 1884, 207 (*albescens*).

## Genus 213. SEBASTOPSIS Gill.

This genus differs from *Sebastodes* in the absence of palatine teeth. D. XIII, 9 or 10; A. III, 5. No dermal flaps; cheeks and opercles scaly; preorbital with obtuse spines or none. The known species are all of very small size and are often preserved in Chinese insect boxes.

*Sebastopsis* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 278 (*polylepis*).

a. Body without dermal appendages ..... *kelloggi*, p. 462  
 aa. Body with many minute dermal appendages ..... *parvipinnis*, p. 463

383. *Sebastopsis kelloggi* Jenkins. Fig. 202.

Head 2.5 in length; depth 3.2; eye 3.35 in head; snout 3.65; interorbital 5.5; maxillary 1.65; mandible 1.6; D. XIII, 9; A. III, 5; P. 19; v. 1, 5; scales 5-31-9.

Body elongate, compressed, greatest depth about middle of trunk; back not elevated; snout rather short, blunt, rounded; mandible rather large, jaws equal; mouth large, slightly oblique; maxillary large, broadly expanded distally, 1.25 in eye; teeth fine, in narrow bands in jaws and on vomer, none on palatines; tongue thick, small, broad, pointed, free in front; lips rather thin; eye in anterior half of head; nostrils close together, anterior with elevated rim and long, thin, fleshy flap; interorbital

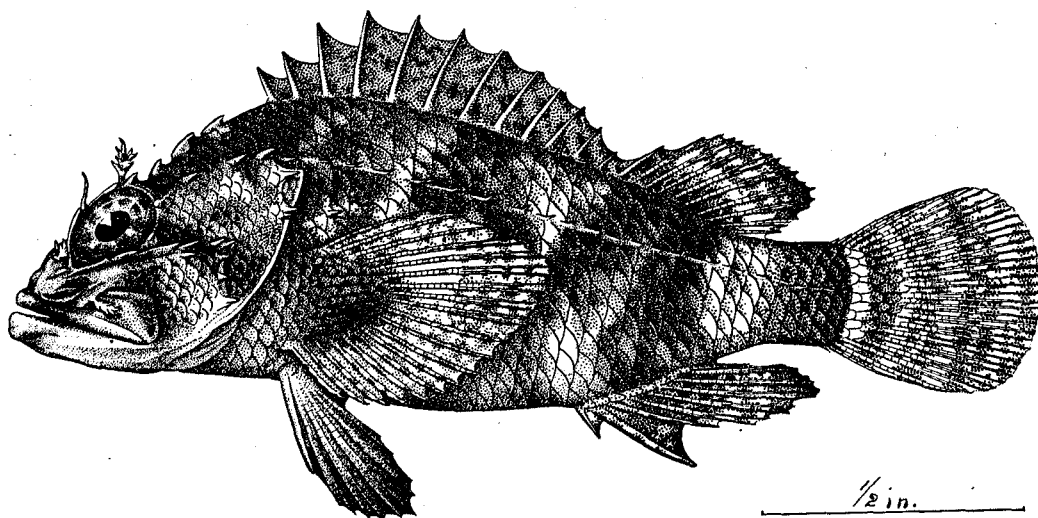


FIG. 202.—*Sebastopsis kelloggi* Jenkins; from the type.

space deeply concave; nasal, preocular, supraocular, postocular, tympanic, coronal, parietal and nuchal spines present; a row of several spines back of eye over opercle; a row of spines across cheek below eye ending in a large spine at edge of opercle, 2 below; 2 spines on opercle; preorbital and supraorbital flaps rather long and thin; dorsal spines all rather low, sixth longest, 3.65 in head; second dorsal ray 2.7; second anal spine largest, 2 in head; third anal ray 1.9; caudal rounded 1.5; pectoral 1.5; ventral 1.5; caudal peduncle compressed, its least depth 3.5; scales rather large, very finely ctenoid; head with small scales on top, cheeks and opercles; tubes of lateral line large, conspicuous, and forming a nearly straight included course to base of caudal. Described from an example (No. 637) taken at Henshaw's Pool, Hilo.

Color in life of a specimen 1.3 inches long (No. 03550), dark parts dark brown, lighter parts gray.

Color in alcohol, rich dark brown, variegated with deeper brown specks; head more or less variegated with brown above, pale or whitish beneath; a deep brown blotch below eye; a pale brown band across first half of caudal peduncle, the remaining portion and base of caudal blackish brown; side in front of caudal peduncle broadly deep brown, extending forward to middle of spinous dorsal, and including basal portion of soft dorsal and anal where it becomes black; remaining portions of soft

dorsal and anal, together with caudal, pale gray white with brownish wavy bars; pectoral with outer portion gray white barred with brownish wavy bars, basal portion black; ventral black.

We have 10 examples, 2 (including the type) taken by Jenkins at Honolulu, 5 by us at the same place, 2 by us on the reef at Waikiki, and one from Hilo. Specimens were also obtained by the *Albatross* at Honolulu. Our specimens are from less than an inch to 1.8 inches long.

*Sebastes k.Moggi* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 492, fig. 37, Honolulu (type, No. 50694, U. S. N. M.); Snyder, op. cit. (Jan. 19, 1904), 535 (Honolulu).

### 384. *Sebastes parvipinnis* (Garrett).

Head 3 in total length; depth slightly less than 3; eye nearly 4 in head. D. XIII, 10; A. III, 5; V. I, 5; P. VII, 9; C. 5, 1, 6, 5, 1, 3.

Upper and lower outlines similar, being greatly arched; eye large, circular; 4 spines along upper edge of orbit, the same number on each side of the occipital region and nape, the posterior one the larger; 2 infraorbital spines, 1 on the nasal bone, and a longitudinal row of 4 along the supratympanic region; 2 on opercle, the lower one long and projecting posterior to the margin of that bone; a stout one on humeral region, 1 on infraorbital, 3 on margin of preopercle and a longitudinal row of irregularly disposed ones on cheek; lower jaw slightly longer than upper; maxillary reaching posterior border of eye. Fine scales covering basal portions of all the fins except the ventrals, and all parts of head except the jaws and lower half of maxillary bone; minute filaments on all parts of body, most numerous on upper anterior third.

Dorsal and anal fins small, the former commencing above origin of latter; spinous dorsal very low, gently arched, constituting nearly two-thirds of fin; soft portion of anal very narrow and rounded off.

Color, head and anterior half of body grayish, passing into light carnation beneath, and obscurely clouded with dusky; posterior half of body dusky black, fading into pink beneath, maculated with small darker spots; caudal trunk pink; 2 large dusky black spots on anterior dorsal region; iris greenish-yellow; fins pinky-red; spinous dorsal being mottled with dusky, other fins dotted with pinky-brown, a bar of the same color on the caudal base. (Garrett.)

Known only from Honolulu, from the type, and another specimen obtained by the *Albatross*.

*Scorpaera parvipinnis* Garrett Proc. Cal. Ac. Sci. 1863, 105, Hawaiian Islands; Günther, Fische der Südsee, 75, LII, fig. 11, 1875 (Sandwich Islands).

*Sebastes parvipinnis*, Snyder, Bull. U. S. Fish Comm., XXII, 1902 (Jan. 19, 1904), 535 (Honolulu).

### Genus 214. PTEROIS Cuvier.

Body elongate, compressed, covered with moderate or small-sized scales, which are usually not ciliated; bones of head well armed; the upper surface of head with cirri; opercle with a spine; mouth large, with teeth on jaws and vomer, none on palatines; dorsal fin elevated, with 12 or 13 spines, which are slender, sharp, and joined by membrane only at base; soft dorsal with branched rays; anal with 3 spines and 6 to 8 branched rays; caudal rounded or truncate; ventral moderate, or long, the rays 1, 5; pectoral greatly elongate, the rays simple and largely free from the base, the tips reaching to or beyond the caudal fin.

Species of rather large size, abounding about the coral reefs in the tropical Pacific, dreaded by fishermen on account of their venomous spines. The coloration is very showy, most of the species being yellowish with dark bands.

*Pseudomonopterus* Klein, Missus, Pisces, V, 1756, 76 (nonbinomial) (*volitans*).

*Pseudopterus* Klein, same type.

*Les Pterois* Cuvier, Règne Animal, ed. I, 286, 1817 (*volitans*).

*Pterois* Oken, Isis, 1817, 1182, same type.

*Pterois* Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 351, 1829 (*volitans*).

*Macrochyrus* Swainson, Nat. Hist. Classn. Anim., II, 264, 1839 (*miles*).

*Pteroleptus* Swainson, Nat. Hist. Classn. Anim., II, 264, 1839 (*longicauda*).

*Pteropterus* Swainson, Nat. Hist. Classn. Anim., II, 264, 1839 (*radiata*).

385. *Pterois sphex* Jordan & Evermann. Fig. 203.

Head 2.4 in length; depth 2.65; eye 3.8 in head; snout 3.2; interorbital 5.2; maxillary 2.35; mandible 2; D. XIII, 11; A. III, 7; P. 16; V. 1, 5; scales 10-56-13.

Body elongate, compressed, greatest depth at first dorsal spines; back only slightly elevated; snout rather short, rounded; mouth large, oblique; maxillary reaching below anterior rim of orbit, its distal expanded extremity 1.75 in eye; teeth fine, in bands in jaws and on vomer; lips rather thin, fleshy; tongue pointed, compressed and free in front; jaws nearly equal; eighth dorsal spine longest, equal to head; penultimate spine 4; fifth dorsal ray 1.75; third anal spine longest, 2.2; third anal ray longest, 1.5; caudal rounded, elongate, 1.4; pectoral long, the rays more or less free for at least half their length; ventral 1.3 in head, reaching beyond origin of anal; ventral spine 2.1; caudal peduncle compressed, its depth 3.75; nasal spinal very small; preocular, supraocular, and postocular spines present, the upper bony ridge over eye being serrate; tympanic, coronal, parietal, and nuchal spines present, coronal very small and close together and parietal with 4 serrations; a finely serrated ridge

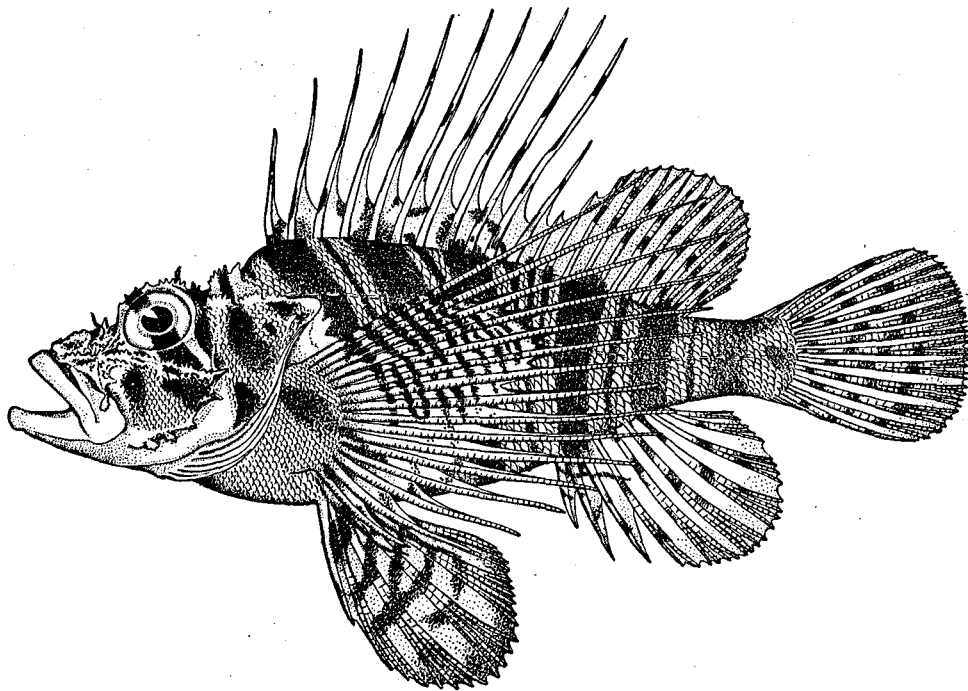


FIG. 203.—*Pterois sphex* Jordan & Evermann; from the type.

from behind eye over opercle to suprascapula; a finely serrated ridge over preorbital and cheek to margin of preopercle, ending in a strong spine, below this 2 other spines; preorbital with a strong spine over maxillary posteriorly, and with fine serrations above; scales ctenoid, present on top of head, cheeks, and opercles, head otherwise naked; tubes of lateral line single, in straight line to base of caudal; several fleshy flaps on head, 1 above eye, 1 from lower preorbital spine, and 2 from along margin of preopercle.

Color in alcohol, very pale brown, whitish beneath; side with 9 broad, deep brown bands, alternating with narrow brown bands on trunk and posterior portion of head, narrow brown bars from below penultimate dorsal spine with a narrower brown line on each side above lateral line; lower surface of head whitish, without crossbands; spinous and soft dorsal and caudal each with 4 dusky brown crossbands; base of anal with 2 broad similar bands, and soft portion of anal with 3 series of irregular crossbands; axil of pectoral above with white blotch; pectoral whitish with 10 blackish

crossbands; a brown band in front of base of pectoral extending on lower pectoral rays; ventral with dusky blotch at base, outer portion with about 5 dusky crossbands.

The only example we have seen of this species is the type, No. 50650, U. S. N. M. (field No. 05030), 6 inches long, obtained by us at Honolulu.

*Pterois sphex* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (April 11, 1903), 201, Honolulu.

Genus 215. **DENDROCHIRUS** Swainson.

Pectorals short, undivided, the rays branched; otherwise much as in *Pterois*.

*Dendrochirus* Swainson, Class. Animal., II, 180, 1839 (*zebra*).

*Brachyrus* Swainson, l. c., 263 (*zebra*).

a. Membrane of spinous dorsal connecting the spines nearly to the tips.....*barberi*, p. 465  
aa. Membrane of spinous dorsal low, between the spines.....*chloreus*, p. 465

**386. *Dendrochirus barberi* (Steindachner).** Plate LXXIII, as *D. hudsoni*.

Head 2.5 in length; depth 2.5; eye 3.4 in head; snout 3.3; interorbital 5; maxillary 2.1; mandible 1.8; D. XIII, 10; A. III, 6; P. 18; V. I, 5; scales 8-52-13.

Body elongate, compressed, rather deep, the greatest depth at fifth dorsal spine; profiles of trunk above and below more or less even; head compressed; snout short, rounded; mouth large, maxillary nearly reaching below middle of eye, its distal expanded extremity equal to half eye; minute teeth in bands in jaws and on vomer; lips thin; tongue pointed, compressed, free in front; jaws nearly equal; anterior nostrils each with a small fleshy flap; interorbital space deeply concave; fifth dorsal spine longest, 1.25 in head; penultimate spine 5.2; second anal spine longest, 2.1; third anal ray longest 1.3; caudal rounded, 1.25; pectoral 2.4 in trunk, reaching below middle of base of soft dorsal, rounded, and only membranes between lower rays slightly incised; ventral rounded, reaching base of first anal ray, caudal peduncle compressed, its least depth 3.5 in head; nasal spines very small, preocular, postocular; tympanic and coronal spines present; parietal and nuchal spines forming a single ridge; a ridge of spines behind eye above opercle; a ridge of spines below eye, ending in a spine on margin of preopercle; 2 spines below this also on margin of preopercle; no opercular spines; margin of preopercle with spine projecting down and back; skinny flap<sup>a</sup> above eye equal to its diameter, and another from preorbital spine; scales small, ctenoid; head naked except some scales on opercle, cheek, and side above; lateral line running obliquely down to base of caudal.

Color in alcohol, pale brown or whitish; side with 3 pairs of deep brown vertical bands, first on posterior part of head preceded by a deep brown streak from below eye, second on middle and posterior part of spinous dorsal, and third extending out on soft anal and basal portion of soft dorsal; soft dorsal, caudal, and anal pale or whitish; membranes of dorsal spines deeply incised in front, each spine with 3 brown crossbands; pectoral grayish with a blackish brown basal blotch and 5 blackish crossbands; ventral blackish with 2 whitish or grayish blotches.

The nominal species, *D. hudsoni*, is especially characterized by the unspotted soft dorsal, anal, and caudal. It was thought to be distinguished from *Dendrochirus barberi* Steindachner by the longer pectoral, which reaches to below the posterior dorsal rays, but this character is found not to be constant.

We have 1 specimen, 1.8 inches long, from Waikiki, and 4 others, 2 collected by us and 2 by Jenkins, all at Honolulu, and ranging from 1.8 to 4 inches long. The *Albatross* also obtained specimens at Honolulu.

*Pterois barberi* Steindachner, Denks. Ak. Wiss. Wien, LXX, 1901, taf. III, fig. 2, in the plankton between Honolulu and Cape Horn; preliminary description published in the Anzeiger, No. XVI, p. 175, June 27, 1900 (Coll. Captain Barber).

*Dendrochirus hudsoni* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (April 11, 1903), 202, Waikiki, Oahu Island; Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu).

**387. *Dendrochirus chloreus* Jenkins.** Fig. 204.

Head 2.5 in length; depth 2.75; eye 3.5 in head; snout 3.75; interorbital 6; maxillary 2.1; mandible 1.8; D. XIII, 10; A. III, 6; P. 18; V. I, 5; scales 7-54-14.

Body elongate, compressed, greatest depth at first dorsal spines; back only slightly elevated; snout

<sup>a</sup>In our Plate LXXIII, accidentally left incomplete by the artist, the ocular flap is omitted.



rather short, blunt, rounded; mouth large, oblique; mandible large, slightly produced; maxillary large, expanded distally, where its greatest width is 1.8 in eye; teeth in broad villiform bands, in jaws and on vomer, none on palatines; tongue rather broad, sharp pointed, free; lips rather thick and fleshy; seventh dorsal spine longest, 1.5; penultimate spine 4; dorsal spines free for greater part of their length, the membrane extending for nearly half their length posteriorly; fifth dorsal ray longest, 1.6; second anal spine slightly longer than second, 2.3 in head; caudal rounded, 3; pectoral rather short, reaching below base of sixth dorsal ray; fifth and sixth rays longest, the lower rays not as long, and membranes incised so that extremities are free for short distance; ventral 1.25 in head, spine 2.25; caudal peduncle compressed, its depth 3.6; scales rather large, ctenoid; nasal, preocular, supraocular, postocular, tympanic, coronal, parietal, and nuchal spines present; a ridge of spines below eye across cheek ending in a spine on edge of preopercle, and below 2 more spines; a ridge of spines from eye above opercle; scales rather large, ctenoid; lateral line sloping obliquely to base of caudal.

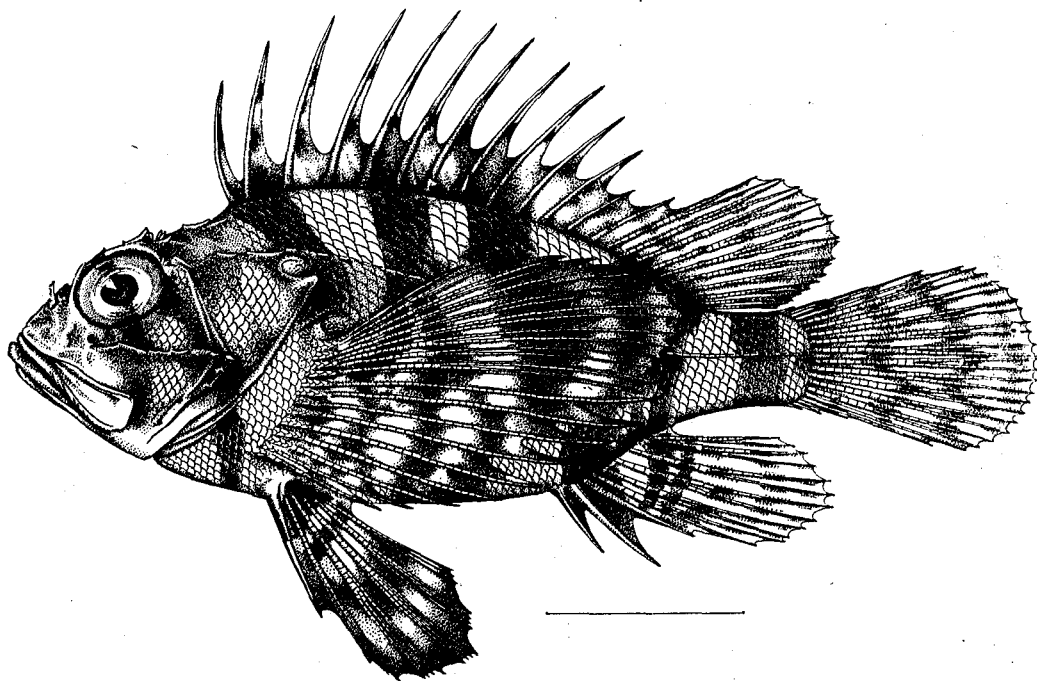


FIG. 204.—*Dendrochirus chloreus* Jenkins; from the type.

Color in life (No. 03446), 6 vertical bands on side dark olive, spaces between dirty white, and red; under surface of head rosy; round dark spots on body under opercular flap; axil and spot on inner surface of base of pectoral dark olive; markings on spinous dorsal dark olive and dull red; soft dorsal with transverse rows of olive spots surrounded by red, membranes transparent; caudal similarly colored; anal dark olive; pectoral dark olive with transverse rows of whitish spots on rays; ventrals alternating olive and dirty white; iris red.

Color in alcohol, more or less brown; side of trunk with about 6 deep brown vertical bars, the last extending down on base of anal; head deep brown above, side pale; a deep brown streak from below eye; angle of preopercle, and region about, dark brown; blotch above base of pectoral blackish brown; a brown band across chest; spinous dorsal pale brownish, each spine with about 3 broad brownish cross-bands; soft dorsal blackish brown; rays of soft vertical fins with 5 or 6 series of blotches or spots; pectoral and ventral blackish, with a number of pale cross-bands; edge of each scale very narrowly pale brown. Described from an example (No. 03446) 6.2 inches long, taken at Honolulu. Known only from Honolulu.

Besides the type and 5 cotypes collected at Honolulu by Jenkins, we have 2 examples obtained by ourselves 2.2 to 6.2 inches long, and a single example obtained recently by Mr. Berndt at Honolulu.

*Dendrochirus chlorous* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 498, fig. 41, Honolulu (type, No. 50701, U. S. N. M.; coll. O. P. Jenkins).

**Genus 216. SCORPÆNOPSIS Heckel.**

This genus differs from *Scorpena* in the absence of palatine teeth. The species are of a larger size and more peculiar appearance.

*Scorpenopsis* Heckel, Ann. Wien Mus., II, 1840, 158 (*nesogallica*).

*Scorpena* Bleeker, Tijds. Ned. Ind., III, 1852, 266 (*diabolus*).

*Scorpenichthys* Bleeker, Bijdr. Ichth. Boero, in Nat. Tijds. Ned. Ind., XI, 1856, 402 (*cirrhosus*, not of Girard).

a. Interorbital narrow, its width about equal to or less than length of eye.....*cacopsis*, p. 467

aa. Interorbital broad, its width much greater than length of eye.

b. Anterior nostril with large fringed flap.....*gibbosa*, p. 468

**388. *Scorpenopsis cacopsis* Jenkins. Plate LXXI, and Figs. 205 and 205a.**

Head 2.3 in length; depth 3; eye 6.5 in head; snout 3; interorbital 6.7; maxillary 2; mandible 1.6; D. XII, 10; A. III, 5; P. 17; V. I, 5; scales 9-52-22.

Body elongate, greatest depth at dorsal spines; back not particularly elevated; snout rather long,

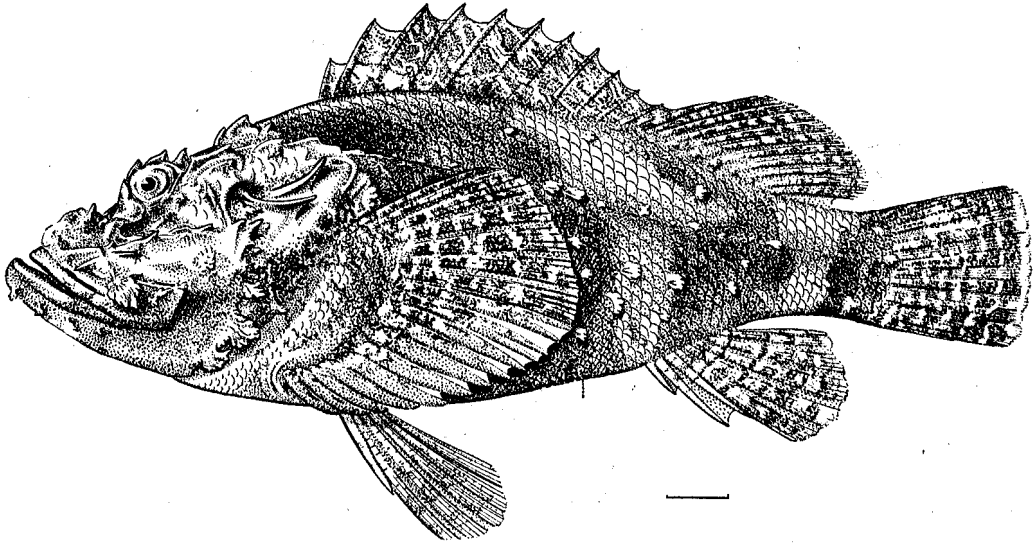


FIG. 205.—*Scorpenopsis cacopsis* Jenkins; from the type.

with an elevated prominence; mouth large, oblique, mandible large, slightly produced; maxillary large, its distal expanded extremity broad, equal to eye; teeth in broad villiform bands in jaws, those on vomer small; no teeth on palatines; tongue small, pointed, free in front; lips rather thick, fleshy; eye small, just in front of middle of head; anterior nostrils with short fleshy flap, posterior close behind, circular, without flap; interorbital space rather narrow, deeply concave; top of head with a square pit, not very deep; nasal, preocular, supraocular, postocular, tympanic, parietal, and nuchal spines well developed; a series of spines across cheek, several along preopercle, supraocular, and upper side of head; two spines on opercle; third and fourth dorsal spines longest, third 2.7 in head, last 3.7; third dorsal ray 2.5; second anal spine enlarged, 2.6; pectoral large, 1.5 in head; ventral 1.6; spine 3; caudal peduncle compressed, its depth 3.5; caudal 1.75; scales rather large, ctenoid; lateral line nearly straight to base of caudal. Described from an example (No. 05297) taken at Honolulu.

Color in life (No. 03349) rusty reddish brown, blotched and mottled with darker and lighter, a few scattered scales white or pale rosy white; top and sides of head similar to sides but darker; under parts

of head flesh-color blotched and mottled with orange red, reddish-brown, and a little yellowish; breast and belly yellowish white with a little reddish; posterior part of belly blotched with brownish red; spinous dorsal mottled brown and clay-white, a small dark blotch on base of second membrane, above this a yellowish orange bar across second and third membranes, then a very broad brownish bar from top of second to base of fifth membrane; membrane of rest of fin pale mottled whitish or clay yellow; soft dorsal similar, mottled with clay white, brownish and rosy; caudal with a broad pale bar at base then a broader brown bar mottled with darker, red and yellowish, followed by a narrower pinkish white border, the whole fin freely mottled; anal mottled brown, reddish, whitish, and yellowish; pectoral mottled and barred with brownish on base, followed by alternating bars of brownish, pale yellow, and

pinkish, the brownish confined chiefly to upper part of fin; ventrals white, crossed by rosy bars or spots, brownish toward tips; iris yellowish-brown, with small brown specks on outer part.

Another example (No. 03385) was in life brown; belly cadmium with blotches of vermilion and brown; lower jaw pale cadmium with brown spots anteriorly, posteriorly with vermilion spots; dermal flaps of lower and upper jaw, and preopercle edged with vermilion and yellow, the dermal flaps extending over maxillary and from behind pectoral to base of caudal; dorsal marbled with deep brown, slightly olivaceous, the narrower markings of cadmium, vermilion and pale blue; pectoral yellow with narrow irregular bands of brown at top, vermilion toward bottom, outlined with brown; ventral yellow at base, then vermilion marbled with deep brown; anal same as pectoral; caudal yellowish at base, then a broad irregular band of dark brown marbled with vermilion, edge pink with a few small brown spots in the pink; iris yellowish with radiating marking of dark brown from edge of pupil.

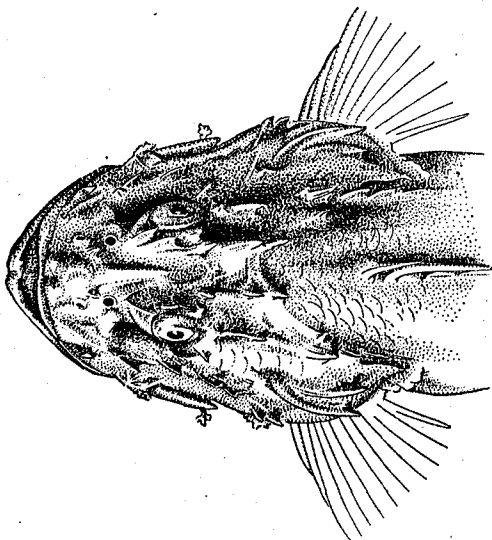


FIG. 205a.—*Scorpaenopsis cacopsis*, dorsal view of head.

Color in alcohol, dark brown, mottled with blackish, and variegated with dark lines; inside of pectoral variegated with brown, outer portion of upper rays blackish, also a large blackish brown spot on middle of spinous dorsal. One example (No. 05655) is very pale or whitish in alcohol, and the darker mottlings above are purplish. The flaps on the mandible are also rather long.

We have examined 14 specimens, all from Honolulu, 13 of which were secured by us. They range in length from 7.5 to 19.5 inches. The species is known only from Honolulu.

*Scorpaena cookii* Günther, Fische der Südsee, III, taf. IV, 1874; the drawing only, which was made by Garrett from an Hawaiian specimen of the present species. The Raoul Island species is the real *S. cookii* and a good species.

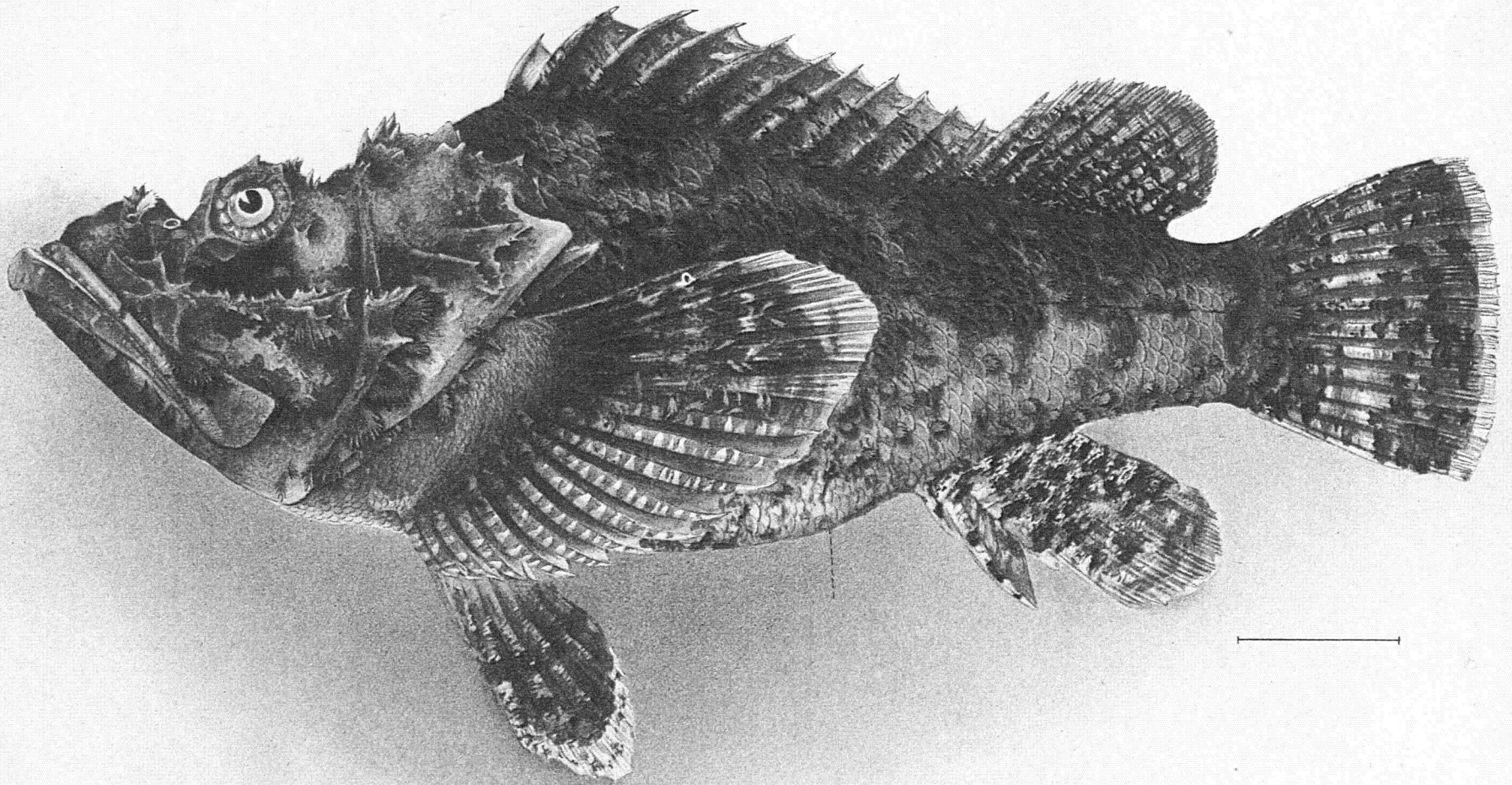
*Scorpaenopsis cacopsis* Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (June 8, 1901), 401, figs. 13 and 14, Honolulu (type, No. 49690, U. S. N. M.); Jenkins, op. cit. XXII, 1902 (Sept. 23, 1903) (Honolulu).

*Scorpaenopsis cocopsis*, Seale, Occ. Papers Bishop Mus., I, part 4, 11, fig. 5, 1901 (Honolulu).

**389.** *Scorpaenopsis gibbosa* (Bloch & Schneider). "Nōhu," "Omakaha." Plate 56<sup>a</sup> and Fig. 206.

Head 2.1 in length; depth 2.75; eye 7.25 in head; snout 3.1; interorbital 4.3; maxillary 1.8; D. XII, 10; A. III, 5; P. 18; V. I, 5; scales 9–42–22.

Body elongate, greatest depth at first dorsal spines; back elevated, swollen, or convex below first dorsal spines; snout rather long, with an elevated prominence; mouth large, oblique; maxillary large, expanded extremity broad, 6.5 in head; teeth in broad villiform bands in jaws, those on vomer small; no teeth on palatines; tongue small, pointed, free in front; lips rather thick, fleshy; eye small, a little in front of middle of length of head; a deep pit below eye; top of head with deep square pit just behind interorbital space; anterior nostril with broad fleshy flap; posterior large, without flap; four



SCORPÆNOPSIS CATOCALA JORDAN & EVERMANN. TYPE.

spines on side of snout above anterior nostril; preocular, supraocular, postocular, tympanic, parietal, and nuchal spines present; a series of spines running across cheek below eye; several large spines on lower part of preopercle; several spines on opercle; side of head above with many small spines; supra-scapular with several small spines; dorsal spines rather strong; third longest, 3.75 in head; last dorsal spine 3.8; second dorsal ray 2.7; second anal spine enlarged, a little longer than the third, 3.4 in head; first anal ray longest, 2.4 in head; caudal rounded, 2 in head; pectoral large, lower rays thick, fleshy, curved inward; sixth pectoral ray 1.7 in head, lowest 3.7; base of pectoral broad, 2.25; ventral spine strong, 3.1 in head, second ray longest, 1.9; the innermost ray joined by a broad membrane to belly; caudal peduncle compressed, its depth 4 in head; head and body with many fringed fleshy flaps; scales moderately large, ctenoid.

Color in life (field No. 03382), excessively mottled, streaked, and spotted; body dark purplish brown or claret shaded, the spaces gray tinged with sulphury yellow; head all dull brown, flaps colored like the space about; belly to axillary region whitish with reticulations and irregular marks of yellowish olive; axillary region wine-brown, finely mottled with yellowish white in streaks and spots; a few round black spots behind and in axil; inside of pectoral with a large jet-black blotch at upper part of base, bordered with orange; around this a large yellow area, then 6 oblong black spots on the mem-

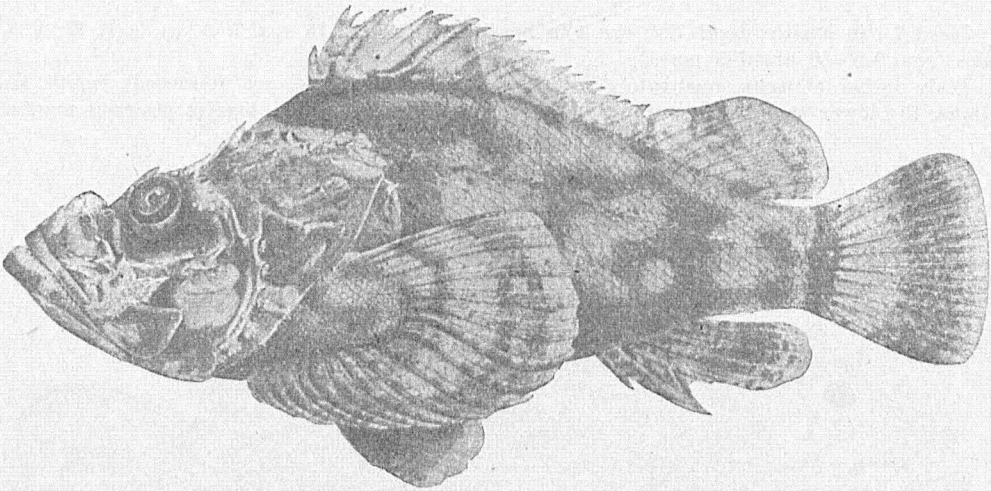


FIG. 206.—*Scorpaenopsis gibbosa* (Bloch & Schneider); after Günther.

branes of upper rays above middle, then a broad rose-red band, fading into violet below, the rim gray; ventrals bright brown and gray, red shaded on inner face; inside of branchiostegals salmon-color, striped with white, the membranes yellow; membranes of upper jaw salmon-color mottled with light yellow; tip of upper jaw orange, with a golden ridge dividing a triangular spot of indigo-blue between vomer and premaxillary; a golden line on each side in front of palatines; tip of tongue light yellow; a triangular indigo-colored spot behind teeth of tip of lower jaw; a golden streak behind it on membrane before tongue; lower lip salmon-color, especially behind, where hidden.

Color in alcohol, dark purplish, beautifully mottled with dusky and darker; head mottled above with dusky; fins with many fine dusky and brown wavy lines; base of pectoral both outside and inside brownish, the latter variegated with white and blackish brown; outer portion of inside of pectoral covering first 5 rays with a series of broad blackish spots; ventrals more or less brownish, variegated with gray and whitish; body whitish, mottled with pale brown; edges of buccal folds; inside of mouth, deep yellow; a deep blue blotch directly behind teeth in front of each jaw.

This species was obtained both at Honolulu and Hilo, and appears to be not uncommon. Our collections contain 8 excellent examples, 2 from Hilo and 6 from Honolulu, 6 to 9.5 inches long.

*Scorpena gibbosa* Bloch & Schneider, Syst. Ichth., 192, pl. 44, 1801, "habitat in America." Günther, Fische der Südsee, III, 79, pl. LIII, 1874 (Pelew, Society and Navigator islands); Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 491 (Honolulu).

*Scorpena nesogallica* Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 315, 1829, Isle of France; Haeckel, Ann. Wien Mus., II, 1840, 159.

*Scorpenichthys gibbosus*, Bleeker, Nat. Tijds. Ned. Ind., XI, 1856, 402.

*Scorpenopsis gibbosus*, Bleeker, Ichth. Spec. Pisc. Arch. Ind., 41, 1859 (Sumatra; Nias; Amboyna; Banda).

*Scorpena diabolus*, Kner, Novara Fisch., 117, tab. 6, fig. 1 (not of C. & V.), in Zoologischer, I, 1865.

*Scorpenopsis diabolus*, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 515 (Honolulu).

*Scorpenopsis catocala* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 201, Honolulu (Hilo); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu).

#### Genus 217. IRACUNDUS Jordan & Evermann.

Allied to *Helicolenus* and *Pontinus*. Body rather elongate, compressed, covered with small, weakly ctenoid scales; fins not scaly; head not depressed; formed as in *Sebastodes*, the spines moderately developed; head and body with dermal flaps; teeth on jaws and vomer, none on palatines; dorsal fin deeply divided, the spines 11 or 12, the fourth much elongate; pectoral rays undivided; anal rays III, 5 or 6; ventral rays 1, 5; caudal rounded; vent at base of first anal spine; air-bladder obsolete.

*Iracundus* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (July 9, 1903), 209 (*signifer*).

#### 390. *Iracundus signifer* Jordan & Evermann. Fig. 207.

Head 2.4 in length; depth 3.2; eye 4 in head; maxillary 2; D. x, 1, 9; A. III, 5; P. 17; V. 1, 5; scales about 9-55-30, about 45 pores.

Body rather elongate, moderately compressed, the head conic, not depressed; mouth large, oblique, the lower jaw slightly projecting, the maxillary reaching to opposite posterior margin of

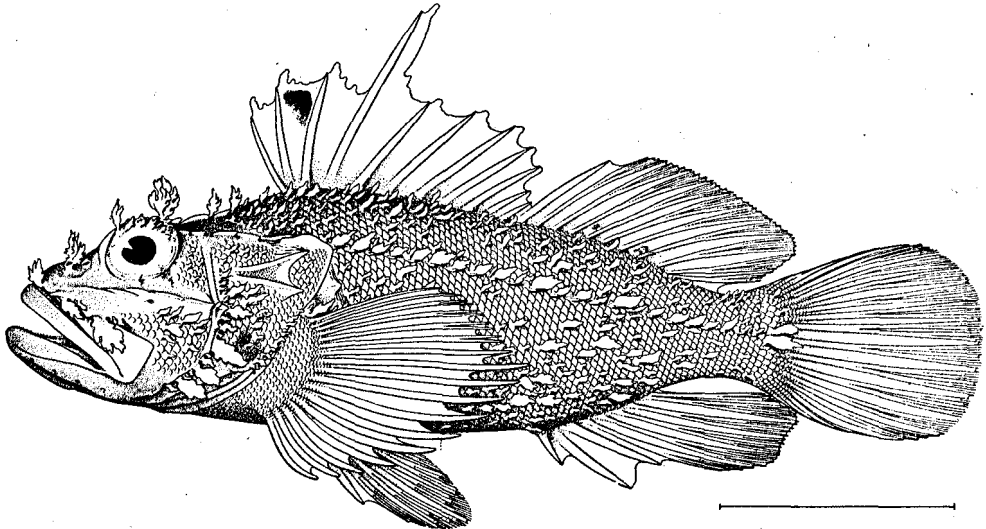


FIG. 207.—*Iracundus signifer* Jordan & Evermann; from the type.

pupil; teeth in moderate bands in the jaws, the inner teeth in the upper jaw slightly largest; vomer with small teeth; palatines toothless; interorbital area deeply concave, little wider than pupil; spines on top of head low and rather sharp, much as in *Sebastodes*; preocular, supraocular, postocular, tympanic, occipital, and nuchal spines present; a ridge with 2 spines outside the tympanic spine; preorbital moderate, about as wide as eye, with a sharp spine turned forward and a blunt spine turned backward; suborbital stay a narrow, simple ridge, reaching base of preopercular spine, which is straight and very short; 3 lower preopercular spines reduced to blunt points; opercle with 2 slender diverging spines, the upper the larger, their points not reaching edge of membrane; head with numerous broad, fleshy flaps; a fringed flap at the nostril, 2 on edge of preorbital, 2 on lower limb of preopercle, and a high fringed flap above eye, about as long as pupil; small simple flaps on the cheek, the end of the maxillary, and elsewhere on head; large pores on lower jaw, under suborbital stay, and

elsewhere; opercle and upper part of cheek with rudimentary embedded scales; jaws naked; top of head scaleless, occiput covered with thin skin and scarcely depressed; gillrakers very short, thickish, and feeble, all but about 6 reduced to mere rudiments; no slit behind last gill; body covered with small, close-set scales, which are slightly ctenoid; scales on nape small, on breast minute; lateral line conspicuous, provided with dermal flaps; numerous scattered flaps on sides of body.

Dorsal fin very deeply notched, the spines rather slender, pungent, the first a little longer than eye, the second and third subequal, about half longer, the fourth greatly elevated, 1.5 in head, almost twice height of third and fifth, which are subequal; sixth, seventh, and eighth slightly longer than fifth, tenth very short, eleventh half length of fourth; soft dorsal high, the longest rays nearly half head; rays of all the fins scaleless; caudal long, rounded, 1.4 in head; anal high, the spines graduated, the third a little longer than second, which is 2.6 in head; longest soft rays 1.8 in head; pectoral with the rays all simple, the longest 1.2 in head, lowest rays shortened and thickened; ventral fins inserted below axis of pectoral, rather long, 1.6 in head, not quite reaching anal, inner rays well free.

Color, pale in alcohol, doubtless vermilion red in life, the flaps on body pinkish; a single jet-black spot about half diameter of pupil near tip of membrane between second and third spines of dorsal.

The only examples known are the type, No. 50886, U. S. N. M. (field No. 635), a specimen 4.2 inches long, taken by us on the coral reef at Honolulu, and a specimen 3.9 inches long recently obtained by Mr. Berndt at Honolulu.

*Tracundus signifer* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (July 9, 1903), 210, Honolulu.

#### Genus 218. TÆNIANOTUS Lacépède.

Head and body high, strongly compressed, with rudimentary scales, which are concealed upon the skin; the skin roughened; mouth oblique, moderately wide; jaws with a band of velvet-like teeth; vomer and palatine without teeth; several of the bones of the head armed with prominent spines. D. XI or XII, 10 to 12; A. III, 6; dorsal fin very high; no pectoral fin appendages.

Small fishes, which are rare in the Eastern Archipelago and in the South Sea.

*Tænianotus* Lacépède, Hist. Nat. Poiss., iv, 304, 1802 (*triacanthus*).

*Les Tænianotes* Cuvier & Valenciennes, Hist. Nat. Poiss., iv, 371, 1829.

*Tænianotus* Agassiz, Nom. Zool. Index, 360, 1846 (corrected spelling).

#### 391. *Tænianotus garretti* Günther.

D. XI, 12; A. III, 6. Of this species I have only the drawing by Mr. Garrett; it appears to be different from *Tænianotus triacanthus*, not alone in the somewhat different fin formulæ, but on account of the much shorter second dorsal spine, which equals the length of the third; the membrane between the dorsal and anal fin is also much shorter. (Günther probably means the membrane between the dorsal and caudal, a statement which is not borne out by his drawings; the shape of the head was probably not drawn quite true to nature.) Color (in plate) pink, the belly bluish, with white spots; fins pinkish, mottled with darker. (Günther.)

*Tænianotus garretti* Günther, Fische der Südsee, iii, 83, pl. 57, fig. 6, 1874, Sandwich Islands.

#### Family LXXXVI. BEMBRIDÆ.

Head not very depressed, armed and scaly on the sides; body covered with rather small scales; 2 dorsals of nearly equal development, the first with 9 to 11 spines; ventrals thoracic, but inserted a little before the pectorals, with 5 soft rays and 1 spine; no pectoral appendages; villiform teeth in jaws, on the vomer and the palatine bones; 7 branchiostegals; air-bladder none.

The single Hawaiian genus and species of this family are fully described in Section II.

#### Family LXXXVII. PERISTEDIIDÆ.—The Deep-water Gurnards.

Body elongate, fusiform, covered with bony plates, each of which is armed with a strong spine; head bony; each preorbital produced into a long flat process, which projects more or less beyond the mouth; mouth small, inferior, like that of a sturgeon; teeth none; lower jaw provided with barbels; gill-membranes separate, narrowly joined to the isthmus anteriorly; gillrakers slender. Dorsal fin

continuous or divided. Pectoral fin short, with the 2 lowermost rays detached. Ventrals 1, 5, separated by a broad, flat area. Air-bladder simple. Pyloric cæca about 10. Color generally red. Deep-sea fishes; 2 or 3 genera and about 13 species known, bearing some resemblance to young sturgeons.

**Genus 219. PERISTEDION Lacépède.**

Barbels large, forming large fringed tufts at angles of mouth and on lower jaw; dorsal fins 2; characters otherwise included above.

The 2 Hawaiian species of this genus are fully described in Section II.

*Peristedion* Lacépède, Hist. Nat. Poiss., III, 368, 1801 (*malarimat=cataphractum*).

*Peristethus* Kaup, Proc. Zool. Soc. Lond. 1859, 103 (*cataphractus*); amended spelling.

**Family LXXXVIII. HOPLICHTHYIDÆ.**

Head broad, very depressed, with the snout produced and rounded anteriorly, strongly armed, and with the upper surface and sides bony; back and sides of the body covered with bony plates; 2 dorsals, the first much shorter than the second; no pectoral filaments; ventrals inserted a little before the pectorals; minute teeth in the jaws, on the vomer and the palatine bones; air-bladder none; pseudobranchiæ present.

**Genus 220. HOPLICHTHYS Cuvier & Valenciennes.**

Characters of the genus included above.

The 2 Hawaiian species of this genus are fully described in Section II.

*Hoplischthys* Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 266, 1829 (*langedorffi*).

**Family LXXXIX. CEPHALACANTHIDÆ.—The Flying Gurnards.**

Body elongate, subquadrangular, tapering behind; head very blunt, quadrangular, its surface almost entirely bony; nasals, preorbitals, suborbitals, and bones of top of head united into a shield; nuchal part of shield on each side produced backward in a bony ridge, ending in a strong spine, which reaches past front of dorsal; interocular space deeply concave; preorbitals forming a projecting roof above the jaws; preopercle produced in a very long, rough spine; cheeks and opercles with small scales; opercle smaller than eye; gill-openings narrow, vertical, separated by a very broad, scaly isthmus; pseudobranchiæ large; gillrakers minute; mouth small, lower jaw included; jaws with granular teeth; no teeth on vomer or palatines; scales bony, strongly keeled; 2 serrated knife-like appendages at base of tail; first dorsal of 4 or 5 rather high flexible spines, the first 1 or 2 spines nearly free from the others; an immovable spine between the dorsals; anal and second dorsal short, of slender rays; caudal small, lunate; pectoral fins divided to the base into 2 parts, the anterior portion about as long as the head, of about 6 rays, closely connected, the posterior and larger portion more than twice length of head, reaching nearly to caudal in the adult (*Dactylopterus*); much shorter in the young (*Cephalacanthus*); these rays very slender, simple, far apart at the tip; ventral rays 1, 4, the long fins pointed, their bases close together, the inner rays shortest; air-bladder with 2 lateral parts, each with a large muscle; pyloric cæca numerous; vertebrae 9+13=22. Warm seas; the adult able to move in the air like the true flying-fish, but for shorter distances. One genus and 2 to 4 species.

**Genus 221. CEPHALACANTHUS Lacépède.**

Characters of the genus included with those of the family. Four species known—*C. volitans* on both coasts of the Atlantic, *C. spinarella* in the East Indies, *C. petersevi* from Japan, and one from the Hawaiian Islands, East Indies, and Japan.

*Cephalacanthus* Lacépède, Hist. Nat. Poiss., III, 323, 1802 (*spinarella*).

*Dactylopterus* Lacépède, l. c., III, 325, 1802 (*pirapeda=volitans*).

*Gonicephalus* Gronow, Cat. Fishes, Ed. Gray, 106, 1854 (*macrocephalus=volitans*).



392. *Cephalacanthus orientalis* (Cuvier & Valenciennes). "Lolo-oau." Fig. 208.

Head 4.1 in length; depth 5.5; snout 2.5 in head; eye 4; mouth 2.5; maxillary 2.2; mandible 2.3; interorbital 2; D. 1—1, v—1—8; A. 7; P. 33; V. 5; scales 47,—21.

Body elongate, depressed, rather broad, lower surface flattened; head broad, depressed, quadrangular; side of head above produced backward in a long bony shield till below fourth dorsal spine; snout short, rounded, obtuse, slightly produced; eye midway between tip of snout and gill-opening, elevated; bones about orbit thick, those above elevated, mouth inferior, maxillary reaching nearly below middle of eye; lips thick, fleshy; teeth blunt, small, in bands in jaws, none on vomer and palatines; tongue broad, thick, rounded, hardly free; anterior nostril with small fleshy rim, posterior nostril higher, without rim; interorbital space broad, deeply convex, flattened in the middle; a spine on lower surface of head pointing backward over preopercle; preopercle ending in a long pointed spine which reaches nearly to the origin of the ventrals; dorsal spines rather slender, first very long, 2.8 in

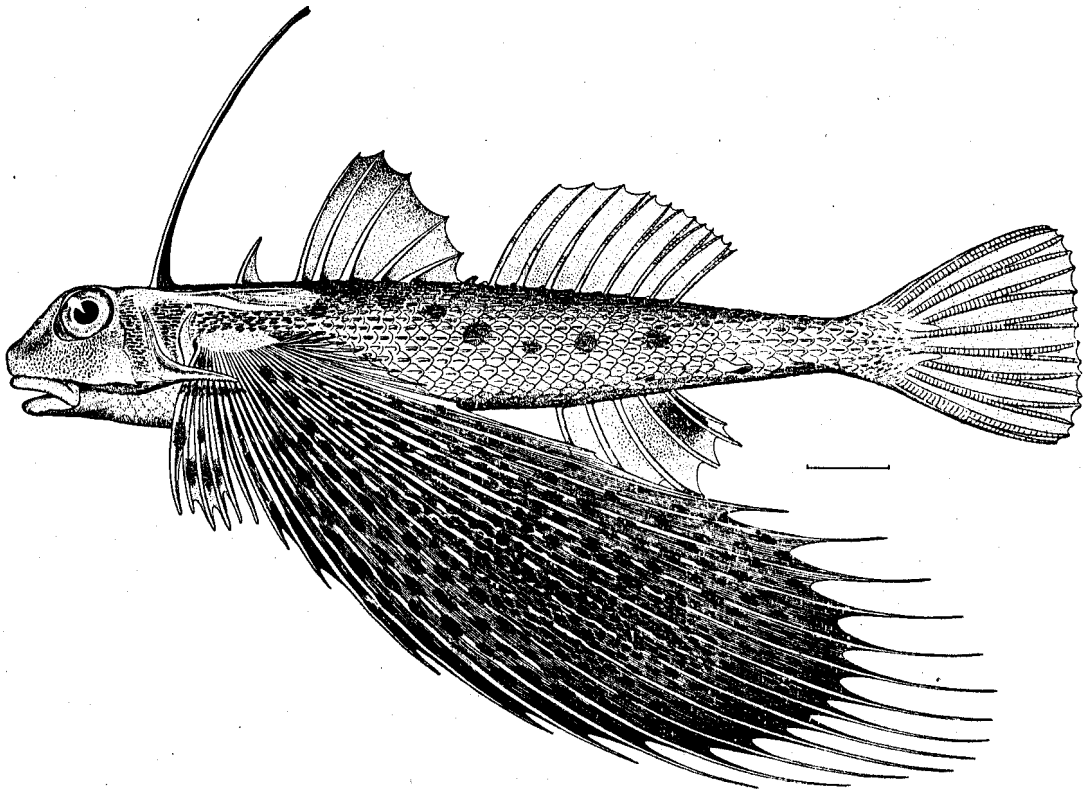


FIG. 208.—*Cephalacanthus orientalis* (Cuvier & Valenciennes).

trunk, its base nearly midway between posterior margin of eye and gill-opening, 2 free spines in front of dorsal; second dorsal spine very short, third much longer, and fourth 1.5 in head; last dorsal spine short, keel-like; origin of soft dorsal a little in advance of middle of space between base of first dorsal spine and base of caudal; anal short, without spines, and its origin nearly midway between base of caudal and gill-opening, or a little behind origin of soft dorsal; caudal truncate, about 1.2 in head; pectoral large, very elongate, reaching tip of caudal, ends of the long median rays ending in rather short filaments; ventral originating just behind base of second dorsal spine, and not reaching anus, 1.2 in head; anus with papilla; caudal peduncle long, depressed, its length nearly equal to head; scales large, each with a keel, so that longitudinal series are formed; lower side of trunk posterior to anus with 4 of the keel-like scales enlarged, the last on base of caudal below, also a keel-like scale on upper base of caudal. Described from an example (No. 04088) taken at Hilo.

A fresh specimen (No. 03433) from Honolulu was drab above, white below; orange spots less than pupil over top of head and dorsal portion of body; 4 transverse bands of golden on caudal fin; pectoral covered with dusky golden spots smaller than pupil anteriorly, larger and less distinct posteriorly; a bright bracket-shaped yellow band on upper side of dorsal about one-third distance from base to top, concave side toward base; spinous dorsal membrane olivaceous with dusky golden spots; soft dorsal membranes transparent, rays with alternating white and olive areas; ventrals golden; anal transparent with golden color on rays.

Color in alcohol, dull purplish brown, with rather large dark round spots on the back, lower surface whitish; spinous dorsal and pectorals blackish, median and basal portion of the latter first whitish, then running into grayish out on fin; pectoral with blackish and grayish spots.

We have examined 6 examples from Hilo, 3 from Honolulu, and 1 from Molokai, ranging in length from 6.5 to 14 inches.

One specimen was obtained by Doctor Jenkins at Honolulu in 1889, and the *Albatross* collected specimens at Honolulu; Puako, Molokai; Hanalei Bay, Kauai; and Lahaina, Maui.

*Dactylopterus orientalis* Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 134, pl. 76, 1829, **Indian Ocean**; Günther, Fische der Südsee, 169, 1877 (Sandwich, Society, and Paumotu islands); Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 498 (Honolulu).

*Dactylopterus japonicus* Bleeker, Nat. Tyds. Ned. Ind., VI, 1854, 396, **Waka, Japan**.

*Dactylopterus cheirophthalmus* Bleeker, Nat. Tyds. Ned. Ind., VII, 1854, 494, **Banda; Neira**.

(*ephitacanthus orientalis*, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 516 (Sandwich Islands); Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 499 (Honolulu); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu; Puako, Molokai; Hanalei Bay, Kauai; Lahaina, Maui).<sup>a</sup>

#### Suborder TRACHINOIDEI.

Ventrals typically 1, 5, jugular, sometimes with the rays reduced; nostrils, jaws, shoulder-girdle and suborbital normal; scales various; gills 3.5 or 4; dorsal spines comparatively few; soft dorsal and anal fins long; tail diphycercal.

- a. Hypercoracoid pierced by a foramen..... *Pteropsaridae*, p. 474
- aa. Hypercoracoid without foramen.
  - b. Preopercle entire; opercle and subopercle reduced, each consisting of a nearly straight, sharp, simple spine; gill-openings wide; no lateral line..... *Harpagiferidae*, p. 477
  - bb. Preopercle armed with a strong spine; gill-openings small; lateral line present..... *Callionymidae*, p. 477

#### Family XC. PTEROPSARIDÆ.

Body oblong, covered with scales; ventrals 1, 5, jugular; hypercoracoid pierced by a foramen; no subocular lamina. Species numerous, mostly tropical.

- a. Gill-membranes united, free from the isthmus; dorsal notched, not separate.
  - b. Palatines without teeth; middle spines of dorsal highest; caudal fin deeply forked..... *Osurus*, p. 474
  - bb. Palatines with teeth; last spines of dorsal highest; caudal fin not forked..... *Ncopercis*, p. 476
- aa. Gill-membranes nearly separate, free from isthmus; dorsal fins separate.
  - c. Maxillary with a fleshy flap at its tip; preopercle with 2 small spines at its angle; opercle with 2 spines.
    - Bembrops*, p. 476
  - cc. Maxillary without flap; preopercle entire; opercle with 1 distinct spine..... *Pteropsaron*, p. 476

#### Genus 222. OSURUS Jordan & Evermann.

This genus is allied to *Parapercis*, from which it differs in having the caudal fin deeply forked instead of truncate.

*Osurus* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 206 (*Parapercis schauinslandi*).

<sup>a</sup> *Cottus filamentosus* Sauvage in Vaillant & Sauvage, Rev. Mag. Zool. (3), III, 1875, 279, described from the Hawaiian Islands, seems to be *Gymnocanthus intermedius* Schlegel, a common Japanese species, and belonging to a group which does not occur in Hawaii.

393. *Osurus schauinslandii* (Steindachner). Figs. 209 and 209a.

Head 3.25 in length; depth 4.8; eye 4 in head; snout 3; interorbital 6; maxillary 2.25; mandible 2.1; D. iv, 21; A. 18; P. 16; V. 7; scales 7-60-13.

Body elongate, compressed; head rather large, its depth 1.5 in length, width 1.4; upper profile of head convex, gently rising from snout to nape; snout rather long, broad, convex; mouth large, slightly inclined, maxillary reaching a little beyond front margin of eye; lips rather broad, fleshy; teeth minute, in rather broad bands in jaws, with an outer series in each slightly enlarged; enlarged canines in front of both jaws, and several on side of each ramus of mandible; vomer with a crescentic patch of minute teeth; nostrils very small, separated a little, anterior with slight elevated rim; interorbital space rather narrow, flattened; opercular margin with a sharp spine above, lower spine with

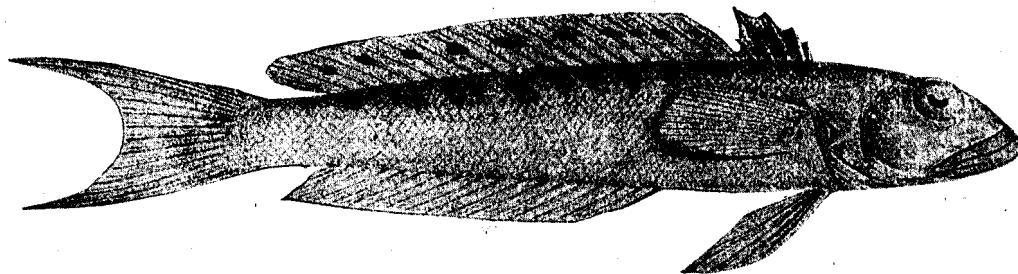


FIG. 209.—*Osurus schauinslandii* (Steindachner); after Steindachner.

denticulations; gill-opening large, membrane broad, adnate to isthmus; scales small, ctenoid; occiput, cheeks, and opercle covered with small ctenoid scales, head otherwise naked; lateral line superior at first, then gradually sloping down to base of caudal; dorsal spines robust, strong, third longest, with rather broad fleshy flaps; dorsal rays slender, flexible, anterior longest, second 2.75; anterior anal rays longest, third 2.75; caudal elongate, deeply forked, lobes equal, 3.6 in head; pectoral with median rays longest, 1.5; ventral pointed, 1.4; caudal peduncle compressed, short, its depth 3.3 in head.

Color when fresh (No. 03434) with black spots on dorsal fin surrounded by red; scarlet lines from snout through eye bordered on each side with yellow; first dorsal bright opaque scarlet, with dark

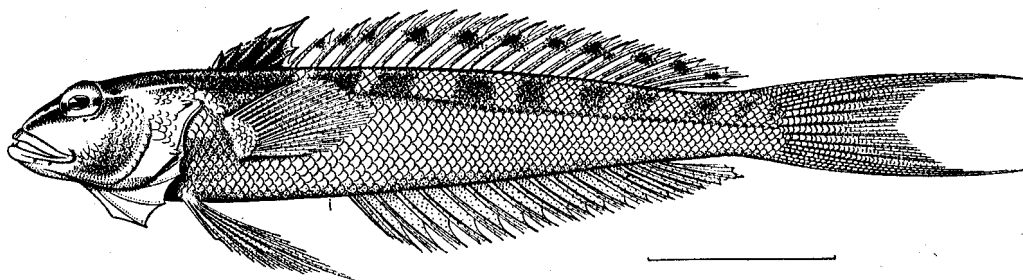


FIG. 209a.—*Osurus schauinslandii* (Steindachner). Type of *Parapercis pterostigma* Jenkins.

blotches near base; membrane of second dorsal transparent, rays yellow and rosy; outer margin of anal rosy, inner portion transparent; blotches on sides rosy, the upper row darker.

No. 03032 in life was rosy on head and body; belly white with pale yellowish-white extensions into the rosy of side; cheek rich rosy; opercle and side of snout with some yellow; lower jaw and throat yellowish-white, the jaw tipped with orange; a few dark rosy spots on top of head; dorsal white with a series of about 10 brownish-black blotches toward outer part of membranes, each surrounded by faint yellow; membranes of first 3 spines black at base, reddish orange above; anal pale orange; caudal reddish orange, distal half of lower lobe black, and 2 rather distinct red spots at base; pectoral pale rosy, yellowish at base, and in axil; ventrals pale yellow; iris rosy.

Another example had a bright scarlet and yellow stripe, from tip of snout through eye and on back, being distinct as a scarlet line in each of the dark quadrate blotches to base of caudal; caudal yellowish, with pearly blue cross streaks of spots; lower lobe red, the distal half black; spinous dorsal black, edged with scarlet; base and axil of pectoral golden.

Color in alcohol, pale brown, a little darker on head; about 8 broad brown saddle-like blotches across back; top of head brownish; a white line running from tip of snout to eye, and continued on postocular region above opercle; spinous dorsal with a large blackish blotch on middle and basal portion; about 10 blackish spots in a single series along upper portion of soft dorsal; caudal with 6 vertical series of whitish dots; anal, pectoral, and ventral pale.

This species, described originally from Honolulu, is quite common at that place, and we have specimens also from Hilo. Twenty-two examples examined are 4 to 5.5 inches long.

*Percis schauinslandi* Steindachner, Anzeiger Ak. Wiss. Wien, No. XVI, June 27, 1900, 175, Honolulu; Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 496, pl. III, fig. 5 (Honolulu).

*Parapercis pterostigma* Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (June 8, 1901), 402, fig. 15, Honolulu (Type, No. 49701, U. S. N. M. Coll. O. P. Jenkins).

*Osurus schauinslandi*, Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 505 (Honolulu); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu).

#### Genus 223. NEOPERCIS Steindachner.

Palatines with teeth; dorsal scarcely notched, the middle spines not longer than the posterior ones; dorsal rays v, 23; A. 20; scales about 60; otherwise essentially as in *Parapercis*.

The single Hawaiian species of this genus is fully described in Section II.

*Parapercis* Steindachner, Ichth. Beitr., XIII, 1883, 1072 (*ramsayi*); not of Bleeker.

*Neopercis* Steindachner, Fische Japans, III, 1884, 212 (*ramsayi*).

#### Genus 224. BEMBROPS Steindachner.

Head strongly depressed, the snout spatulate; mouth long, subhorizontal; teeth in jaws and on vomer and palatines; maxillary with a fleshy flap or barbel at tip; eyes very large, half lateral; opercle with 2 spines; angle of preopercle with 2 small spines, at least in Japanese species; preorbital entire; gill-opening very long, with 7 branchiostegals; pseudobranchiæ present; ventrals jugular; dorsal fins 2, well separated; belly flattened, back convex; scales rather large, finely ctenoid.

Small fishes inhabiting depths in Asia and America. The single Hawaiian species fully described in Section II.

*Bembrops* Steindachner, Sitzgber. Wien, LXXIV, 1, 211 (Ichth. Beitr.), V, 1876, 163 (*caudimacula*).

*Hypsicometes* Goode, Proc. U. S. Nat. Mus., III, 1880, 347 (*gobtoides*).

*Bathypercis* Alcock, Journ. Asiat. Soc. Bengal, LXII, 1893, 2, 177 (*platyrhynchus*).

#### Genus 225. PTEROPSARON Jordan & Snyder.

Body subcylindrical, depressed anteriorly, covered with large cycloid scales; lateral line continuous; head depressed, flattened anteriorly; snout produced, broadly spatulate; mouth large, the jaws subequal; maxillary without barbel; teeth small, on jaws, vomer and palatines smooth; eyes very large, largely vertical in range, separated by a very narrow ridge; suborbital very narrow; cheeks and opercles scaly; preopercle rounded, entire, but with mucous tubes near its edge; opercle with a partly concealed spine before its membranous tip; gillrakers obsolete; gill-membranes separate, free from the isthmus; dorsal fins separate, the first short, but sometimes greatly elevated; second similar to anal; caudal convex; ventrals 1, 5, well separated, a rhombic area before them, inserted before pectorals, the inner rays longest; pectorals normal; lateral line simple, median. This genus is allied to *Bembrops*, from which it differs in the absence of a fleshy flap on the maxillary.

The single Hawaiian species of this genus is fully described in Section II.

*Pteropsaron* Jordan & Snyder, Proc. U. S. Nat. Mus., XXIV, 1902, 470 (*evolans*).

## Family XCI. CHAMPSODONTIDÆ.

We place provisionally in a separate family a single genus, *Champsodon*, apparently allied on the one hand to *Uranoscopus* and on the other certainly to the *Chiasmodontidæ*, with which Doctor Boulenger places it; but the real affinities of *Chiasmodon* are equally uncertain. The family characters are included below.

## Genus 226. CHAMPSODON Günther.

Body rather elongate, fusiform, covered with small, rough, warty, scarcely imbricate scales; belly naked; head flat above, with vertical sides; cheeks and snout scaly; eyes rather small, high, and near together, mostly directed upward; a small cilium over each eye; mouth large, very oblique, the lower jaw projecting; both jaws with slender teeth of unequal size, some of those below longest, many of them long, slender, depressible canines; a few teeth on vomer, none on palatines; upper jaw with a double notch at tip; preopercle with a strong, curved spine at its angle, the spine about as long as eye, the ascending limb with small teeth; opercle rounded, unarmed; preorbital broad, with a flat, three-lobed spine; top of head with a low ridge on each side from snout to nape; gill-openings wide, the gill-membranes separate, free from the isthmus; isthmus long and narrow, not forming a hump; gill-rakers slender, of moderate length; gills 4, a slit behind the fourth; suborbitals not dilated; lateral lines 2, the lower curved upward over pectoral, both with lateral vertical branches; the cross-rows of tubes on the back more conspicuous than the lateral lines; dorsal fins 2, the first short, the second long, similar to anal; pectoral small and narrow, placed high; ventrals 1, 5, the middle rays longest, inserted before pectorals, but joined to the shoulder girdle by ligament only; caudal forked.

The single Hawaiian species of this family is fully described in Section II.

*Champsodon* Günther, Proc. Zool. Soc. Lond. 1867, 102 (*varax*).

## Family XCII. HARPAGIFERIDÆ.

This family is allied to the *Callionymidæ*, resembling them in external characters though differing very widely in the armature of the head, the preopercle being entire, the opercle and subopercle reduced, each consisting mainly of a nearly straight, sharp, simple spine; the gill-openings are much wider than in *Callionymus*, but the gill-membranes are broadly united to the isthmus; no lateral line; no scales. *Draconetta* has much in common with *Bembrops* and *Pteropsaron*.

## Genus 227. DRACONETTA Jordan &amp; Fowler.

The characters of the genus are included above. The single Hawaiian species is fully described in Section II.

*Draconetta* Jordan & Fowler, Proc. U. S. Nat. Mus., XXV, 1903, 939 (*senica*).

## Family XCIII. CALLIONYMIDÆ.—Dragonets.

Body elongate, naked; head broad and depressed; the mouth narrow, the upper jaw very protractile; teeth very small, in jaws only; preopercle armed with a strong spine; opercle unarmed; eyes moderate, usually directed upward; lateral line present, often duplicated; dorsal fins 2, sometimes united at base, the anterior with 4 flexible spines; soft dorsal and anal short, the latter without distinct spine; ventrals 1, 5, jugular in position, widely separated; pectoral fins large; gill-openings small, the membranes broadly attached to the isthmus; gills 4, a slit behind the fourth; pseudobranchiæ present; no air-bladder; vertebrae usually 8+13=21. Sexes notably different in color; dorsal fin higher in the male. Small fishes of the shores of warm seas, chiefly of the Old World, allied to the *Trachinidæ*, according to Boulenger, but resembling the *Cottidæ* in form.

a. Preopercular spine simple, sharp, spear-like, with serrate edge, but without recurved hooks above or at tip..... *Calliurichthys*, p. 478

aa. Preopercular spine not simple, with recurved tip, and with one or more recurved hooks above.

b. Ventrals entire, the outer ray not detached; head depressed; gill-opening reduced to a very small foramen on upper surface of head; lateral line single..... *Callionymus*, p. 478

Genus 228. *CALLIURICHTHYS* Jordan & Fowler.

This genus differs from *Callionymus* in the character of the preopercular spine, which is long, simple, straight or curved, and serrulate, but without recurved hooks above. A small antrorse spine at its base below; in the typical species the caudal fin is greatly elongate. The dorsal spines are graduated backward, at least the first 2 being elongate. The single Hawaiian species of this genus is fully described in Section II.

*Calliurichthys* Jordan & Fowler, Proc. U. S. Nat. Mus., XXV, 1903, 941 (*japonicus*).

Genus 229. *CALLIONYMUS* Linnæus.

This genus includes dragonets with the ventral fins entire, without detached ray, the gill-opening reduced to a small foramen, opening upward, and the lateral line single; head triangular, depressed; eyes directed upward; preopercular spine very large, hooked at tip and with one or more recurved spines above, a small antrorse spine at its base below; opercle unarmed; sexual differences strongly marked. Species numerous, living on the bottoms in warm seas. The few species in America live at a considerable depth; in the Mediterranean, in India, and in Japan they are shore fishes, swarming in all bays and living in shallow water. The 3 Hawaiian species of this genus are fully described in Section II.

*Callionymus* Linnæus, Syst. Nat., ed. 10, 249, 1758 (*lyra*).

## Group GOBIOIDEI.—The Gobies.

Body elongate, variously scaled or naked, head usually large, armed or not, the suborbital ring without a bony stay for the preopercle; gill-openings reduced, the membranes attached to the isthmus; gills 4, a slit behind the last; pseudobranchiæ present; ventral rays 1, 4 or 1, 5, inserted below the pectoral, the fins close together or united, widely separated or otherwise peculiar; dorsal fins separate or united, the first of a few weak spines, sometimes wanting; anal rather long, usually with a single weak spine, similar to soft dorsal; caudal rounded; usually no air-bladder nor pyloric cæca. Vertebrae 24 to 35. Carnivorous bottom fishes, mostly of small size in warm regions, some marine, others of the fresh waters. Three families.

## Family XCIV. GOBIIDÆ.

Body oblong or elongate, naked or covered with ctenoid or cycloid scales; dentition various, the teeth generally small, but sometimes developed into great canines; premaxillaries protractile; suborbital without bony stay; skin of head continuous with covering of eyes; eyes usually moderate, sometimes concealed; opercle unarmed; preopercle unarmed, or with a short spine; pseudobranchiæ present or absent; gills 4, a slit behind the fourth; gill-membranes more or less united to the isthmus, the gill-openings thus restricted to the sides; no lateral line; dorsal fins separate or connected, the spinous dorsal short, of 2 to 8 flexible spines, or sometimes wanting; anal usually with a single weak spine, the fin similar to soft dorsal; ventral fins close together, separate or united, each composed of a short spine and 3 or 4 soft rays, the inner rays usually longest; the ventral fins, when united, form a sucking disk, a cross-fold of skin at their base completing the cup; caudal fin convex; anal papillæ prominent; no pyloric cæca; usually no air-bladder. Carnivorous fishes, mostly of small size, living on the bottom near the shore in warm regions. Some inhabit fresh waters and others live indiscriminately in either fresh or salt water; many of them bury themselves in the mud of estuaries. Few of them are large enough to be of much food value. The species are for the most part easily recognized, but their arrangement in genera is a matter of extreme difficulty.

a. Ventrals separate; spinous dorsal present.

b. Preopercle with one or more spines; sides of head scaled.

c. Preopercle with one concealed spine at lower angle, hooked forward; scales small ..... *Eleotris*, p. 479

cc. Preopercle with 4 or 5 straight spines at lower angle, directed backward; scales large ..... *Asterropteryx*, p. 480

bb. Preopercle without spines.

d. Sides of head naked; no papillary ridges ..... *Eciota*, p. 481

dd. Sides of head scaled, with various ridges of papillæ ..... *Gobiomorphus*, p. 483

- aa. Ventrals more or less united.
- c. Inner edge of shoulder-girdle without flaps.
- f. Ventral disk not adnate to body.
- g. Body scaled anteriorly as well as posteriorly.
- h. Teeth one-rowed, some of them canine-like; scales large.....*Gobiopterus*, p. 482
- hh. Teeth in more than one row; usually no canines.
- i. Side of head without scales.
- j. Last dorsal spine not conspicuously distant from those in front of it; dorsal spines 6.
- k. Upper ray of pectoral silk-like; anal short, of about 9 rays; middle rays of caudal not greatly produced, body rather robust.....*Mapo*, p. 483
- kk. Upper ray of pectoral not silk-like; anal long, of about 15 rays; middle rays of caudal greatly produced; body more elongate; upper teeth one-rowed.....*Gobiichthys*, p. 485
- jj. Last dorsal spine conspicuously distant from those in front of it; body elongate; dorsal spines 7.  
*Vitraria*, p. 486
- ii. Side of head more or less scaly.
- l. Upper rays of pectoral silk-like, free from rest of fin; scales small.....*Chalmydes*, p. 486
- ll. Upper rays of pectoral not free from rest of fin; scales large.....*Gnatholepis*, p. 487
- gg. Body naked anteriorly, a very few scales posteriorly (typically wholly naked).....*Kelloggella*, p. 488
- ff. Ventral disk adnate to the belly.
- m. Body covered with small ctenoid scales.....*Sicydium*, p. 489
- mm. Body entirely naked.....*Lentipes*, p. 491
- ee. Inner edge of shoulder-girdle with dermal flaps; body scaly, head naked; tongue adnate).....*Awaous*, p. 491

Genus 230 **ELEOTRIS** (Gronow) Schneider.

Body long and low, compressed behind; head long, low, flattened above, without spines or crests, almost everywhere scaly; mouth large, oblique, lower jaw projecting; lower pharyngeals rather broad, the teeth small, bluntish; preopercle with a small concealed spine below, its tip hooked forward; branchiostegals unarmed; eyes small, high, anterior; isthmus broad; tongue broad, rounded; post-temporal bones very strongly divergent, their insertions close together; top of skull somewhat elevated and declivous; interorbital area slightly convex transversely; dorsal fins well apart, the first of 5 or 6 low, flexible spines; ventrals separate; scales moderate, ctenoid, 45 to 80 in a longitudinal series; vertebrae (*pisonis*) 11+15. Tropical seas, entering fresh waters.

*Eleotris* Gronow, Zooph. 83, 1763 (nonbinomial).

*Eleotris* Schneider, Syst. Ichth., 65, 1801 (*pisonis*).

*Culius* Bleeker, Archiv Néerl. des Sc. Soc. Holl., IX, 1874, 303 (*fuscus*).

394. **Eleotris sandwicensis** Vaillant & Sauvage. "Obpu." Fig. 210.

Head 2.7 in length; depth 4.25; eye 7 in head; snout 3.8; interorbital 3.25; D. vi, 10; A. ii, 8; P. 17; V. i, 5; scales 70 to 80—20.

Body elongate, depressed in front, compressed behind, greatest depth about middle of belly; head elongate, very broad, depressed, its width 1.4 in its length, and its depth 1.65; snout blunt, broad, depressed, 3.9 in head; mouth large, oblique, 2.8 in head; lips thick, fleshy; mandible large, slightly projecting; teeth fine, sharp-pointed, in rather broad bands in jaws; no teeth on vomer and palatines; tongue rather broad, free, truncate; preopercle with a small curved spine at its angle, forward and more or less concealed in the skin; interorbital space broad, flattened; nostrils well separated, anterior in a short tube; eye high, in first third of head, more or less lateral; gill-opening rather large, oblique; scales very small, ctenoid, and extending on top of head; no lateral line; dorsal fins well separated, fourth dorsal spine longest, 2.5 in head; first dorsal ray 3.65, sixth 2.3; anal inserted a little behind origin of soft dorsal, first ray 3.4, seventh 2.1; caudal elongate, middle rays longest, 1.5, rounded; pectoral rather broad, short, lower median rays the longest, 1.75; ventral 2.2; caudal peduncle long, compressed, 1.7, its depth 3; anal papilla present. Description from an example (No. 04591) taken at Hilo.

Color in life (No. 03024) dirty brownish throughout, belly paler; fins all dark; soft dorsal narrowly white-edged.

Color in alcohol dark dusky brown, lower surface pale brown with dusky on lower surface of head, 2 blackish streaks across cheek, 1 from lower rim of eye backward and the other just below; fins grayish dusky, upper margin of spinous dorsal whitish; edges of soft dorsal, anal, and caudal grayish.

Medium-sized examples have the body with longitudinal rows of dark brown or dusky spots on the upper surface; dorsals and anal more or less dusky, with small spots on the basal portion of former; caudal and pectoral fins with many narrow dark-gray crossbars. Small examples show indistinct dark brown spots on side of body, and some very small ones have about 9 broad deep-brown cross-bands over the back when viewed from above, and the side speckled and spotted with dark brown below its middle; a number of dark brown spots on chest; side of head with dark-brown lines; chin dusky. Some examples with black dots scattered along side of body.

This interesting species is very abundant in fresh, brackish, and shallow water among the Hawaiian Islands. Our collection contains a very complete series of specimens, as follows: From Honolulu 445; Waianae 41, Waialua 21, Moanalua 5, Moana Hotel 4, Waikiki 1, Hilo 119, and Kailua 1. Of those

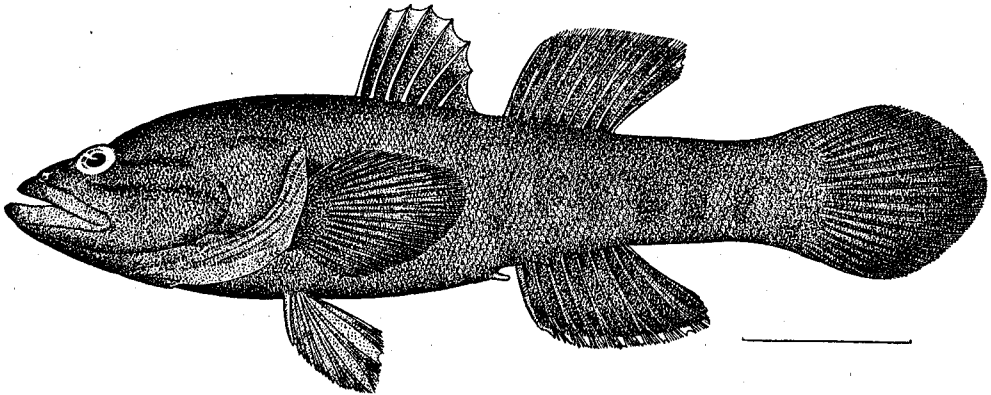


FIG. 210.—*Eleotris sandwicensis* Vaillant & Sauvage.

from Honolulu, 384 are in the collection made by Doctor Jenkins and 2 in Doctor Wood's. They vary in length from 1.2 to 9 inches. Numerous specimens were collected also by the *Albatross* at Honolulu, Waimea, and Hanalei; in Huleia and Hanapepe rivers in Kauai, and Anahulu River, Oahu.

*Eleotris sandwicensis* Vaillant & Sauvage, Rev. Mag. Zool. (3), III, 1875, 280, Sandwich Islands (description erroneous; the concealed preopercular spines being overlooked); Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 499 (Honolulu; Hilo); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu; Waimea, Hanalei, Huleia, and Hanapepe rivers, Kauai; Anahulu River, Oahu).

*Culius fuscus*, Streets, Bull. U. S. Nat. Mus., No. 7, 57, 1877 (fresh waters of Oahu); not of Bleeker.

*Eleotris fusca*, Günther, Rep. Shore Fishes Challenger, Zool., I, Part VI, 60, 1880 (Honolulu, fresh waters); Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 516 (Honolulu) (not *Pacilia fusca* Bloch & Schneider, from Tahiti a species with 52 scales).

#### Genus 231. **ASTERROPTERYX** Rüppell.

Body short, deep, compressed, covered with large, nearly smooth scales; eyes moderate; mouth moderate, the teeth medium; chin prominent; no teeth on vomer; 4 or 5 blunt spines on preopercle; dorsals separate, the first of 6 spines, the second like the anal, short and high; ventrals separate, close together, each 1, 5; gill-openings moderate; cheeks and opercles scaly; no papillar ridges; anal papilla moderate. Species rather numerous in the East Indian region, one of them ranging north to Japan and one to Hawaii.

*Asterropteryx* Rüppell, Atlas, Reise Nord Afrika, 1828, 138, taf. 34, fig. 4 (*semipunctatus*).

*Priolepis* Ehrenberg; fide Bleeker.

*Brachyleotris* Bleeker, Arch. Neerl. 1874, 306 (*cyanostigma*).

#### 395. **Asterropteryx semipunctatus** Rüppell. "*Obpu*."

Head 3.25 in length; depth 3; eye 3.5 in head; snout 3.7; interorbital 2.5 in eye; D. vi-12; A. 11; P. 18; V. 6; scales 24?-9.

Body elongate, compressed, greatest depth about origin of anal; head elongate, pointed, upper and lower profiles convex; depth of head 1.1 in length of head, width 1.6; snout rather short, blunt, rounded above; mouth small, oblique, the maxillary reaching front margin of eye; lips fleshy; man-



dible large, slightly projecting; teeth in jaws uneven, sharp pointed; no teeth on vomer and palatines; tongue broadly rounded, free in front; anterior nostril in a short tube, posterior large, circular; a rather large pore on upper side of snout between nostrils and nearer median line of head; interorbital space narrow; top of snout and interorbital space uneven; eye small, high, posterior margin a little anterior to middle of length of head; lower margin of preopercle with 4 blunt prongs; gill-opening low, its length 2; scales large, finely ctenoid; head covered with large, finely ctenoid scales except on interorbital space, snout, lips, and chin; no lateral line; dorsal fins well separated, the spines flexible, and the second produced in a long filament; first spine 1.6, second 1.25, third 1.75 in trunk; soft dorsal with last rays longest, first 2.25, ninth 1.25, last 1.8; anal similar to soft dorsal, first 2.5, ninth 1.1, last 1.9; caudal broad, round, equal to head; pectoral elongate, pointed, longer than head, 3 in trunk; ventral long, about equal to pectoral; caudal peduncle elongate, compressed, its length 1.5 in head, depth 2.

Color in alcohol, blackish, almost uniform, apparently without any traces of spots; side with about 6 vertical obscure blackish bars; fins dusky. Another example has the body similarly colored, except that it is covered with very many small bluish spots.

Apparently not common, except on the reef at Honolulu, where many specimens were collected by Doctor Jenkins. We have 1 example from Waianae and 5 from Waikiki, 0.8 to 2.2 inches long, common at Samoa.

*Asterropteryx semipunctatus* Rüppell, Atlas Fisch., 138, pl. 34, fig. 4, 1828, Red Sea; Klunzinger, Fische des Rothen Meeres, 484, in Verh. K. K. Zool.-bot. Gesell. Wien, 1871; Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 500 (Honolulu).

*Elotris cyanostigma* Bleeker, Nat. Tyds. Ned. Ind., VIII, 1855, 462, Cocos Islands.

*Eleotriodes cyanostigma*, Bleeker, Enum. Spec. Pisc. Arch. Ind., Act. Soc. Sci. Ind. Neerl. VI, 1859, 112.

*Brachylecotris cyanostigma*, Bleeker, Arch. Neerl. Sci. Nat., IX, 1874, 306; Streets, Bull. U. S. Nat. Mus., No. 7, 58, 1877 (Coral reefs of Oahu).

*Asterropteryx cyanostigma*, Snyder, Bull. U. S. Fish Comm., XXII, 1902 (Jan. 19, 1904), 536 (Honolulu).

#### Genus 232. EVIOTA Jenkins.

Allied to *Asterropteryx*. Body not greatly elongate, head not compressed into a keel; dorsal fins separate, neither dorsal nor anal elongate; sides of head naked; no papillary ridges; preopercle entire. Among the most minute of fishes, inhabiting coral masses.

*Eviota* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 501 (*epiphanes*).

#### 396. *Eviota epiphanes* Jenkins. "Oöpu." Fig. 211.

Head 2.4 in length; depth 4.5; eye 3.1 in head; snout 4.5; interorbital 2 in eye; D. vi-10, A. 9; scales 28, 7.

Body elongate, compressed, greatest depth about gill-opening, head elongate, profiles about evenly rounded in front; opercular region broadest part of head, 1.5 in length, depth 1.4; mouth rather large, oblique, maxillary reaching below middle of eye; lips rather thick, fleshy; mandible large, very slightly projecting; teeth in jaws small, sharp pointed; no teeth on vomer and palatines, interorbital space narrow, level; gill-opening rather large; scales rather large, finely ctenoid; dorsal spines flexible, rather high; soft dorsal and anal similar, anterior rays rather high, but not produced; caudal broad, rounded; pectoral long, pointed, a little longer than head; ventrals separate, close together, long, equal to head; caudal peduncle compressed, its length 1.4 in head, its depth 2. Described from an example taken at Waikiki.

Color when fresh, the specimen (No. 03440) taken in coral rocks, body bluish, more or less covered with brown spots, which also extend on dorsal and anal; spots on body cover groups of points, forming crescent-shaped spots in alcoholic examples.

Color in alcohol, pale brown, with a very faint trace of olivaceous; side marked with a number of dark-brown vertical crescents; nape before spinous dorsal with 3 deep brown crossbars and a dark-brown blotch just behind eye; side of head speckled with brown, side of trunk with about 6 vertical very pale green bars below and running to base of anal, short bars in between; spinous dorsal grayish with 4 black lines sloping down posteriorly; soft dorsal grayish, with about 7 blackish lines sloping posteriorly; other fins grayish.

Young examples have a dusky spot at base of caudal.

This small fish is common about Honolulu and Waikiki, where Doctor Jenkins obtained 50 specimens, and we have 55, 0.4 to 0.75 of an inch in length.

*Eviota epiphanes* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 501, fig. 42, Honolulu (type, No. 50720, U. S. Nat. Mus.; coll. O. P. Jenkins).

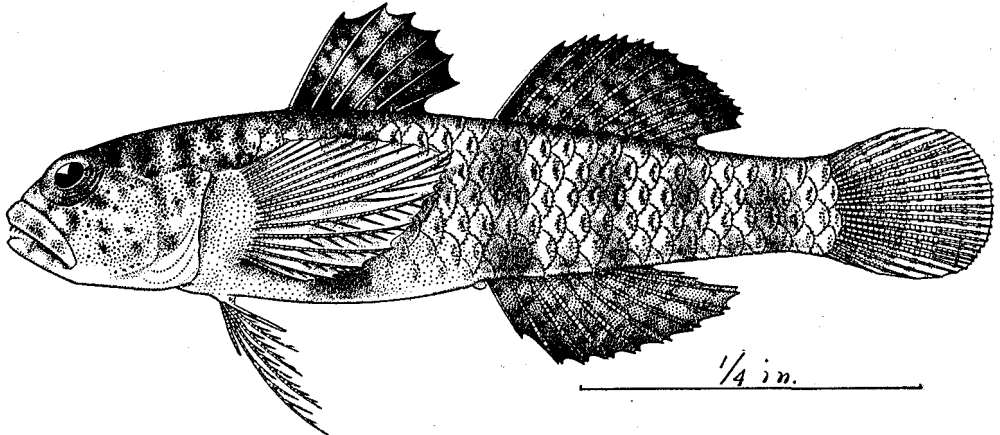


FIG. 211.—*Eviota epiphanes* Jenkins; from the type.

Genus 233. **GOBIOPTERUS** Bleeker.

Teeth on the jaws large, acute, distant, and equal on the intermaxillary, unequal in the infra-maxillary; 2 canine teeth, especially developed, behind the symphysis; head scaleless, compressed, the gape subvertical; scales 25 to 36 in longitudinal series; B. 4; D. v or vi, 8 or 9; A. 8 to 14. Allied to *Apocryptes*, but with large scales.

*Gobiopterus* Bleeker, Arch. Neerl. Ac. Soc. Holl., IX, 1874, 311 (*Apocryptes brachypterus*).

397. *Gobiopterus farcimen* Jordan & Evermann. "Óópu." Plate 59.

Head 3.25 in length; depth 3.5; eye 3.2 in head; snout 3.5; D. vi-11; A. 9; scales 28 (27 to 29)-10.

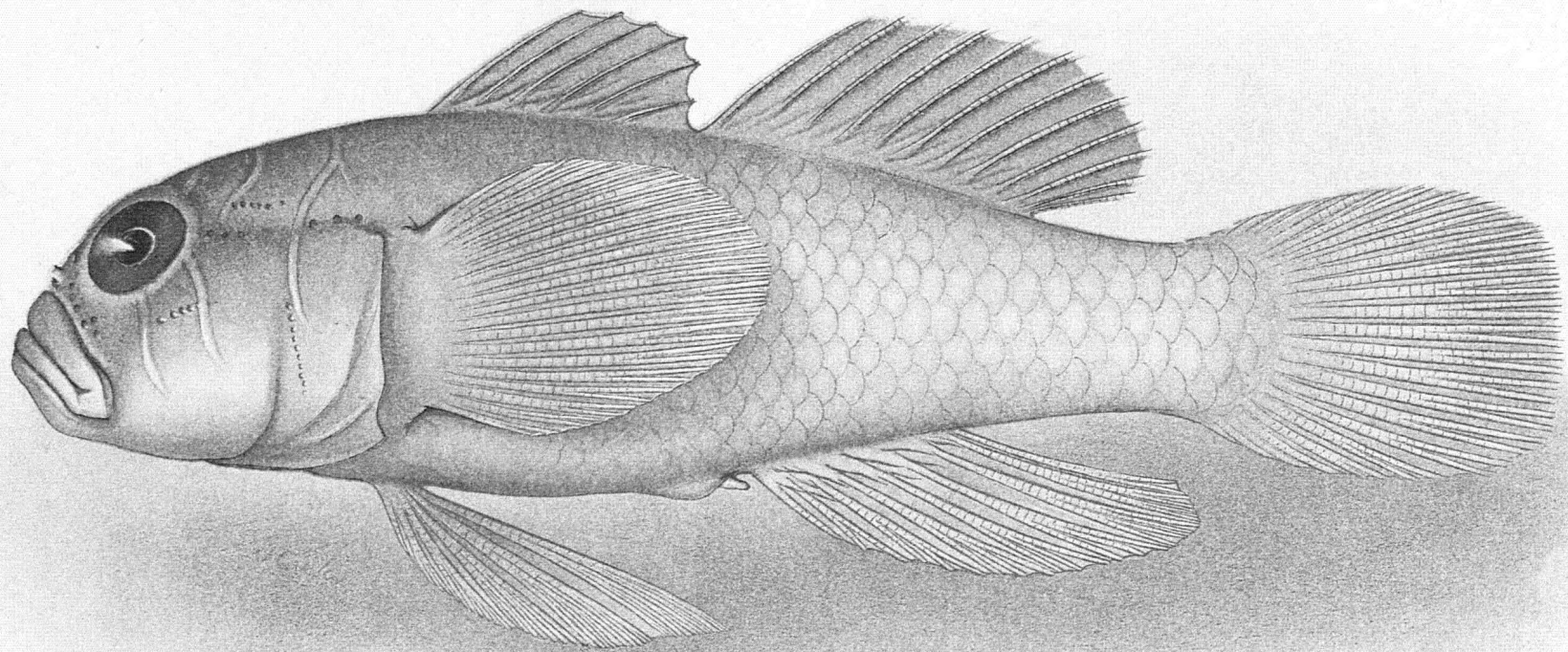
Body rather robust, compressed, greatest depth at gill-opening; head rather large, depth 1.25 in length, width 1.4; upper profile of head evenly convex from tip of snout to origin of dorsal; jaws large, mandible very large, slightly produced; mouth large, very oblique, maxillary extending beyond front margin of eye; teeth in jaws uniserial, rather large, somewhat canine-like; two small depressible canines on posterior part of bone behind anterior series; lips large, thick, fleshy; tongue not emarginate, large, thick, rounded; nostrils close together, posterior very large, in front of upper margin of orbit with elevated rim; interorbital space very narrow, concave; scales large, ctenoid; a large pore behind and above base of pectoral; gill-opening large, continued forward below; spinous dorsal small, flexible, spines ending in filaments, beginning behind base of pectoral; soft dorsal high, rays of nearly uniform length; anal with posterior rays elongate, much longer than anterior; caudal elongate, rounded; pectoral broad, round, equal to head; ventrals long, equal to head, broad, without any frenum in front; caudal peduncle compressed, its length 1.5 in head, depth 2.25.

Color in alcohol, pale brown, trunk covered all over with very pale minute brown dots; fins very pale brown, dorsals dusky, especially the spinous; 3 vertical pairs of pale brown cross-lines over side of head.

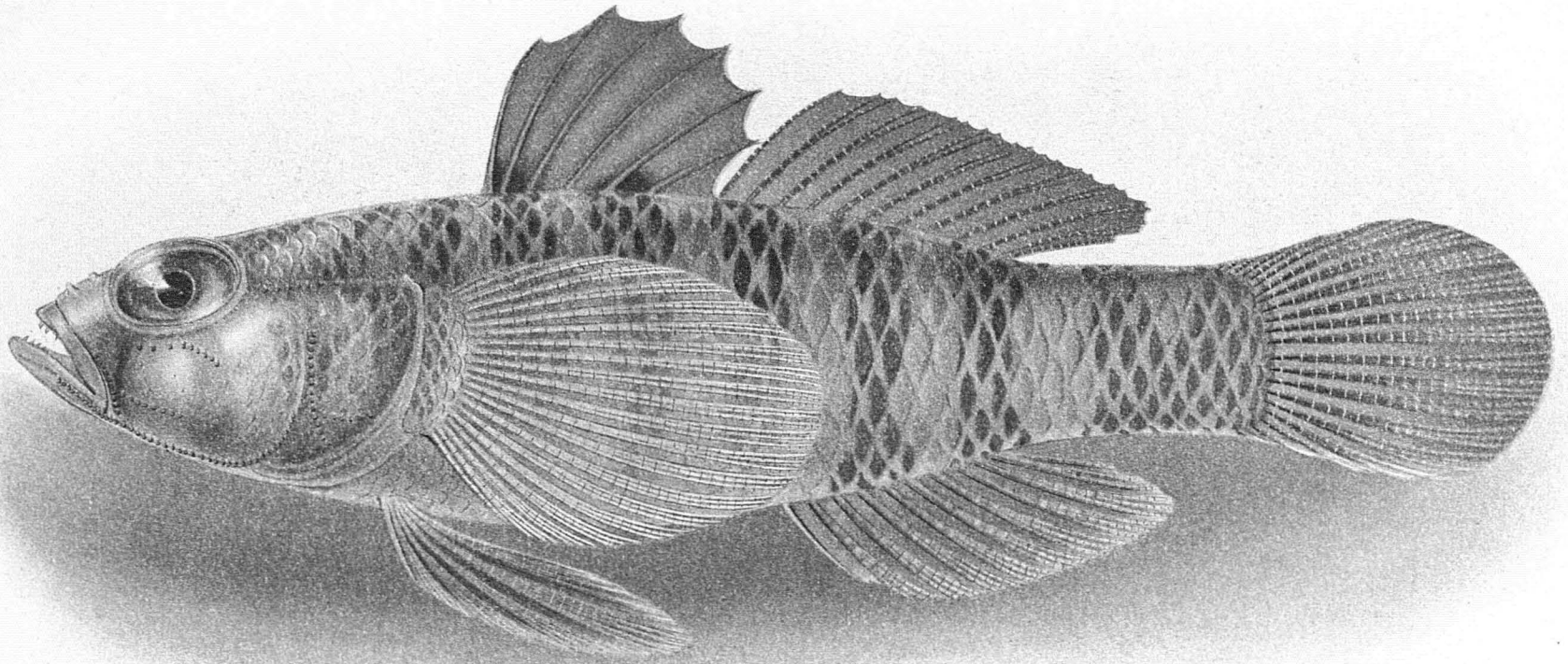
Described from an example 1.1 inches long, taken at Hilo. Type, No. 50654, U. S. N. M.

Known only from Hilo.

*Gobiopterus farcimen* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (April 11, 1903), 205, Hilo.



GOBIOPTERUS FARCIMEN JORDAN & EVERMANN. TYPE.



QUISQUILIUS EUGENIUS JORDAN & EVERMANN. TYPE.

## Genus 234. GObIOMORPHUS Gill.

Allied to *Asterropteryx*. Body robust, covered with large, ctenoid scales; snout blunt; mouth large, very oblique, with 2 series of sharp teeth in jaws, the inner depressible; side of head scaly and with several series of short papillary fringes; ventral rays 1, 5, the fins joined at base by a narrow frenum; dorsals short, the first with 6 spines, the second with 12 short rays.

The genus is distinguished from other small Eleotrids by the papillary fringes on preorbital, jaws, and opercles.

*Gobiomorphus* Gill, Proc. Ac. Nat. Sci. Phila. 1863, 270 (*gobioides*).

*Quisquilius* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 203 (*eugenius*).

398: *Gobiomorphus eugenius* (Jordan & Evermann). Plate 57.<sup>a</sup>

Head 2.8 in length; depth 3.8; eye 3.25 in head; snout 4.25; width of mouth 2.4; interorbital 2 in eye; D. vi-12; A. 10; v. 1, 5; scales 25,-12.

Body robust, compressed, greatest depth about middle of belly; head large, elongate, broad, depth 1.4 in its length, width 1.25; snout short, blunt, rounded above; jaws large, lower projecting; mouth large, very oblique, its posterior margin reaching below front of eye; upper jaw with 2 series of teeth, sharp-pointed, outer larger, the inner depressible; mandible with teeth similar to those in upper jaw; no teeth on vomer and palatines; tongue truncate, front margin not notched; eye large, high, anterior; nostrils separated, anterior in small tube, posterior close to upper front margin of eye; interorbital space narrow, very deeply furrowed; a series of fringe-like papillæ running from preorbital along upper margin of maxillary down behind corner of mouth, where it joins another series running along under surface of mandible, and continued back and upward on margin of preopercle; anterior margin of opercle with a small vertical series of papillæ, each papilla a little shorter than diameter of eye; gill-opening large, continued forward till nearly below posterior margin of eye; spinous dorsal rather small, spines flexible, with tips produced in short filaments; soft dorsal high, median rays rather longer than others; anal more or less similar to soft dorsal, posterior rays very long; caudal rather large, round; pectoral broad, round, equal to head; ventrals small, 1.25 in head, sharp-pointed, and joined at base of inner rays by a narrow frenum; caudal peduncle compressed, its length 1.6 in head, depth 2.4; scales large, ctenoid, those on upper part of head very small; snout, interorbital space, jaws, and lower surface of head naked; no lateral line.

Color in life (field No. 03554), body with transverse bands of dark brown with olivaceous tinge alternating with dirty white; edges of scales in dark brown portions lighter; dorsal, anal, and caudal dark brown, edged in part with white; pectoral light reddish brown.

Color in alcohol, brown; 12 dark brown cross bands on side, the last 6 very broad, much broader than the pale interspaces; vertical fins dark slaty; pectoral pale slaty; ventral pale on outer posterior portion, blackish slaty on inner.

Honolulu and Laysan; not rare. We have 6 examples from Honolulu and 1 from Waikiki, and the *Albatross* obtained the species at Laysan Island. Length 0.8 to 1.4 inches.

*Quisquilius eugenius* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 203, Waikiki, Oahu Island; Snyder, *op. cit.* (Jan. 19, 1904), 536 (Laysan Island).

## Genus 235. MAPO Smitt.

This genus differs from *Gobius* in the emarginate tongue and in the shorter, broader head; pectoral fins with silky rays; cheeks and opercles naked.

The genus *Gobius* is not represented in Hawaiian waters.

*Mapo* Smitt, Ofv. Kong. Vet. Akad. Stockholm, 1899, 543 (*sopator*).

399. *Mapo fuscus* (Rüppell). "*Obpu*." Fig. 212.

Head 3.4 in length; depth 4.8; eye 5.25 in head; snout 3.5; interorbital 4.35; D. vi-11; A. 9; P. 25, filaments included; scales 38,-12.

Body elongate, depressed in front, compressed behind, greatest depth about middle of belly; head elongate, broad, depressed, its width 1.2 in its length; depth 1.4; snout blunt, broad, its upper profile convex; mouth broad, maxillary reaching posteriorly below middle of eye; lips rather thick, fleshy,

<sup>a</sup> *Quisquilius eugenius* on plate.

with fringe inside; mandible large, slightly produced; teeth sharp pointed, in broad bands in jaws; interorbital space rather broad, slightly concave; nostrils rather close, anterior with a short tube; eye high, in first third of head, directed upward; gill-opening vertical, rather large, slightly oblique, 2.5 in head; scales rather large, becoming very large on side of caudal peduncle, ctenoid, crowded before dorsal, on top of head, and occiput; head, except on top, entirely naked; dorsals well separated; spines flexible, fifth 1.8 in head; first dorsal ray shortest, 2.4, last longest, 1.1, intermediate rays graduated; anal similar to soft dorsal in shape, first ray 3.75, last 1.25; caudal elongate, about 3.1 in body, roundly pointed, middle rays longest, pectoral broad, rounded, middle rays longest, and upper silky; ventrals broad, with rather broad frenum in front, 1.4 in head, and not reaching anal papilla; caudal peduncle broad, compressed, its length 2, and its depth 2 in head. Described from an example (No. 3328) taken at Honolulu.

Color when fresh, very dark, with black marblings and brown edges to scales; dorsal, anal, pectoral, and caudal all closely and finely barred with brown; ventrals brownish; not much dark below eye. An example from Waialua, when fresh, was marked with pearly blue spots on a ground of mottled light and dark olive, and reddish olive.

Other examples (Nos. 03229 and 201) show a series of 7 or 8 dusky blotches along middle of side, and when viewed from above 4 or 5 broad indistinct cross bands. These are united with a dusky line running from upper base of pectoral to middle of base of caudal, which is also confluent with the upper portions of the lateral blotches described, caudal with dusky blotches.

Very small examples have distinct dark blotches on the side, and both dorsals and caudal with fine cross lines made up of brown spots on the spines and rays. There is also a dark spot just behind the eye.

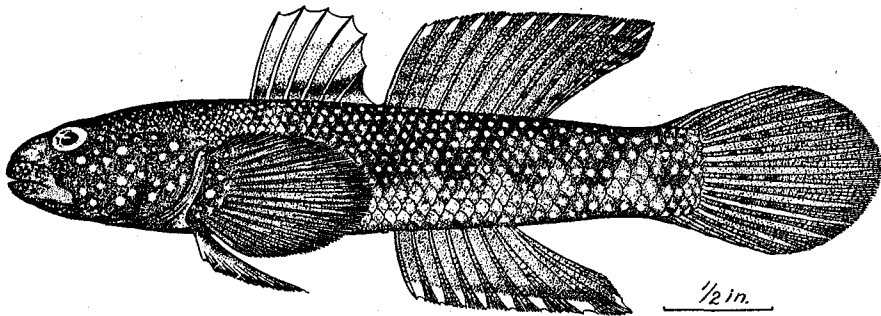


FIG. 212.—*Mapo fuscus* (Rüppell).

Color in alcohol, more or less gray-brown, side with about 10 longitudinal series of white spots, head, both dorsals, caudal, and pectoral fins with whitish spots, very small on the latter, and indistinct on the spinous dorsal; lower surface of the head, breast, and abdomen dirty whitish; top of the head finely speckled.

This widely distributed goby is exceedingly abundant in Hawaiian waters and is represented in the collection by 590 specimens from Honolulu, 59 from Hilo, 2 from Moanalua, 1 from Waialua, 20 from Waikiki, 45 from Waianae, and 57 from Kailua. Numerous examples were collected by Doctor Jenkins, and some were found by the *Albatross* at Honolulu, Waialua Bay, Puako Bay, Kealakekua Bay and Hilo. We see no differences between these and American examples (*M. saporator*).

*Gobius fuscus* Rüppell, Atl. Reis. Nördl. Af., Fisch., 137, 1828, Red Sea.

*Gobius punctillatus* Rüppell, op. cit., 138, 1828, Red Sea.

*Gobius nebuloso-punctatus* Rüppell, Neue Wirbelthiere, Fische, 139, 1835 (Mar. 1838), Red Sea; Günther, Cat., III, 25, 1861. (Examination of Rüppell's type.)

*Gobius saporator* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 56, 1837, Martinique.

*Gobius albopunctatus* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 57, 1837, Isle of France; Günther, Fische der Südsee, VI, 172, taf. CX, fig. A, 1877 (Fiji, Society, Navigator, Kingsmill, and Sandwich islands); Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 517 (Sandwich Islands); Jenkins Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 502 (Honolulu); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu; Waialua Bay, Oahu; Puako Bay and Kealakekua Bay, Hawaii; Hilo).

*Gobius padangensis* Bleeker, Nat. Tijds. Ned. Ind., I, 1849, 249, Pedang.

*Gobius breviceps* Blyth, Proc. Asia. Soc. Beng. 1858, 271, Great Andaman Island.

*Gobius homocyanus* Vaillant & Sauvage, Rev. Mag. Zool. (3), III, 1875, 280, Sandwich Islands.

*Glossogobius giurus*, Streets, Bull. U. S. Nat. Mus., No. 7, 60, 1877 (Coral reefs of Oahu); not of Hamilton.

*Gobius sandvicensis* Günther, Rep. Shore Fishes, Challenger, 60, 1880, Honolulu, fresh water.

## Genus 236. GOBIICHTHYS Klunzinger.

Body elongate, heavy forward, scaly; 2 dorsal fins; anal fin nearly as long as the second dorsal; caudal fin elongated and pointed; pectoral without silky rays; teeth of upper jaw in a single row, in which respect this genus differs from *Gobionellus* Girard.

*Gobiichthys* Klunzinger, Verhand. Zool. Bot. Gesellschaft Wien, XXI, 1871, 479 (*petersii*).

400. *Gobiichthys lonchotus* (Jenkins). "*Oōpu*." Fig. 213.

Head 4.1 in length; depth 5.2; eye 4.35 in head; snout 3.1; maxillary 1.9; width of mouth 2.6; interorbital 2 in eye; D. vi 14; A. 15; P. 19; V. 6, 6; scales 105, 22.

Body elongate, compressed, greatest depth about middle of belly; head elongate, compressed, greatest depth about 1.3 in length, width 1.6; anterior profile steep, strongly convex, snout rather long, blunt, rounded; jaws large, powerful, equal; mandible large; mouth very large, oblique, maxillary reaching below eye posteriorly but not to its posterior margin; lips rather broad, fleshy; teeth in jaws in several series, unequal, sharp-pointed, slightly curved and rather small; tongue rounded, rather thick, free in front; eye rather small, high, its posterior margin about middle of length of head; nostrils remote, anterior near front of upper lip, with elevated fleshy rim; posterior nostril much nearer eye than tip of snout; interorbital space narrow, slightly convex; gill-opening rather large, 1.8 in

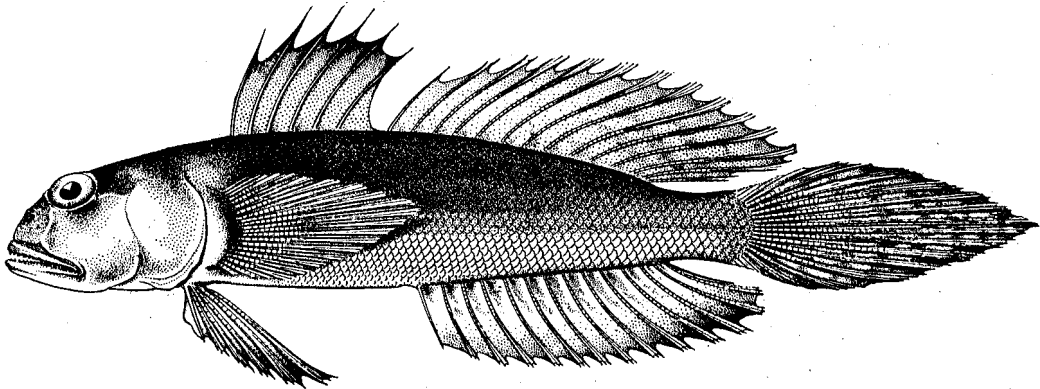


FIG. 213.—*Gobiichthys lonchotus* (Jenkins). Type of *Gobionellus lonchotus* Jenkins.

head, nearly vertical; scales very small, cycloid; head naked except top, which is densely scaled; dorsal fins separated, spines very flexible, ending in filaments, the first 2 very long; first dorsal spine equal to head, second 1.4, last 1.6; soft dorsal long, low, first ray 2.25, twelfth 1.2, last 2.25; anal similar to soft dorsal, first 2.8, thirteenth 1.4, last 2.9; caudal elongate, the median rays produced into a point, its length 2.7 in trunk; pectoral long, pointed, 3.6 in trunk, ventral large, 4 in trunk; broad frenum in front fringed, caudal peduncle compressed, its length 2 in head, depth 2.2; a narrow thin cutaneous keel between occiput and spinous dorsal.

Color in life grayish-olive, faintly netted and barred with darker, and with a median dark stripe, very faint, scarcely darker at base of caudal; head plain, with 2 dark streaks along cheek and opercle joined by 2 vertical streaks like pen marks; a round black spot just before branchiostegals concealed by the interopercle, and some small dots around it; a dark spot on eyeball above and behind; a faint dark shade below eye, and a dark cross shade on top of head behind eye; first dorsal clear olive clouded with light-reddish brown and blackish brown at base; soft dorsal olive, dotted or barred with darker olive; caudal faintly barred, most distinct on upper and lower rays; prevailing color grayish olive washed in the largest specimens only with bright orange; anal dark olive, distally blackish with dusky dashes at base of each membrane; pectorals and ventrals plain dull olive gray, the base of former with an obscure dusky blue spot, very black in the young. The head also is more distinctly barred in the young.

Color in alcohol, pale brown, side with 5 large brown blotches, and about 11 brown vertical cross-bars running closer together above to form pairs, though becoming indistinct on middle-of side; a narrow blackish line across top of head down behind and below eye to corner of maxillary; a blackish, brown blotch at base of pectoral; spinous dorsal dark gray with oblique dusky hues; soft dorsal pale with a number of longitudinal dusky lines sloping backward; anal dark gray, the membrane between the rays blackish; caudal grayish with cross series of dusky spots; pectoral pale gray; ventrals gray black, margin and anterior portion pale brown. Described from an example (No. 846) taken at Hilo. The species is common along the shores and in shallow water about Honolulu, Waikiki, and Hilo. The collection contains 43 examples 2.4 to 5.8 inches long.

*Gobionellus lonchotus* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 503, fig. 44, Honolulu (type, No. 50698, U. S. N. M.; coll. O. P. Jenkins).

#### Genus 237 VITRARIA Jordan & Evermann.

Body elongate, translucent, covered with very small, thin scales; mouth small, oblique; teeth minute; gill-opening rather narrow; dorsals small, the rays VII-11; pectoral rather long; ventrals small, united in a circular disk. Small gobies of the coral reefs, allied to the Japanese genus *Clariger*, but with the first dorsal of 7 small spines instead of 3.

*Vitraria* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 205 (*clarescens*).

#### 401. *Vitraria clarescens* Jordan & Evermann. Plate 60.

Head 4.6 in length; depth 6.7; eye 3.5 in head; snout 4.5; D. VII-11; A. I, 10.

Body elongate, slender, compressed, greatest depth between dorsal fins; head elongate; pointed, conic, depth 1.75 in its length, width 2; snout rather long, rounded; jaws prominent, upper slightly produced; mouth oblique, maxillary reaching a little beyond anterior margin of eye; teeth not evident, tongue broad, truncate; snout above interorbital space and top of head more or less flattened; nostrils well separated, anterior nearly midway in length of snout, posterior close to front of eye; eye rather large, anterior; gill-opening restricted to side, rather small; scales very small; dorsal spines flexible; first dorsal small, the last 3 spines very small (minute stubs, broken in the type), the fin beginning behind tip of ventrals; soft dorsal beginning a little nearer base of caudal than tip of snout, about over insertion of anal, anterior rays of both fins longest, those of anal gradually smaller behind, the last 2 minute and close together; caudal emarginate, lobes rounded; pectoral rather long, lower rays longest; ventrals small, united to form a small round disk whose diameter is 2.25 in head; caudal peduncle compressed, elongate, its length equal to head, its depth 2.25 in head.

Color in alcohol, very pale translucent brown, 7 V-shaped pale brown markings on upper side of body united over back; fins whitish.

We have examined 7 examples obtained at Hilo, each about 1.2 inches in length.

*Vitraria clarescens* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 205, Hilo.

#### Genus 238. CHLAMYDES Jenkins.

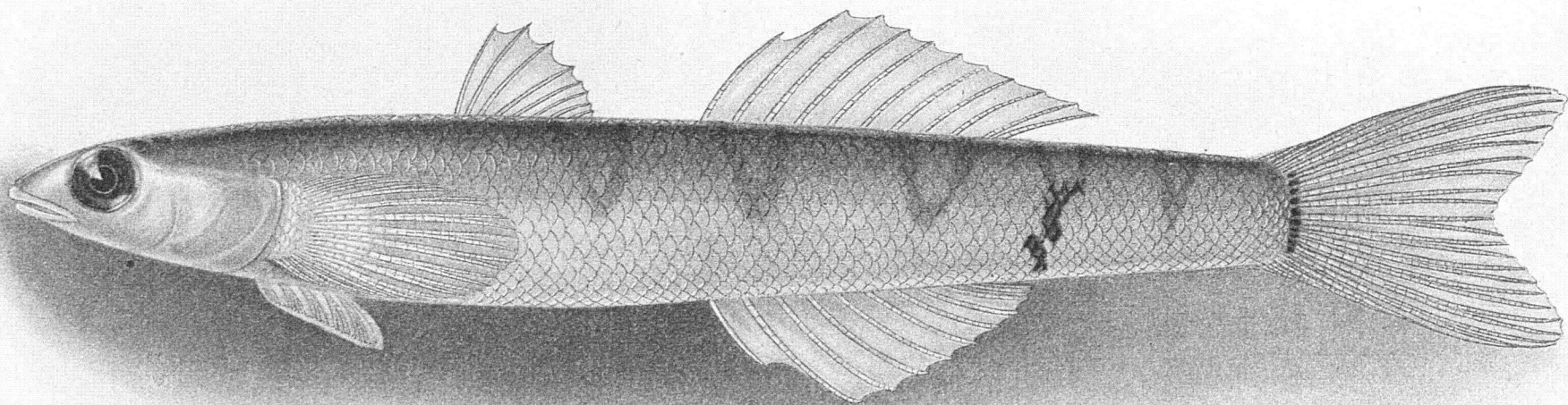
This genus is distinguished from *Gobius* and *Mapo* by the presence of scales on sides of head.

*Chlamydes* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 503 (*laticeps*).

#### 402. *Chlamydes laticeps* Jenkins. Fig. 214.

Head 3 in length; depth 4; width of head 0.8 of its length, depth 1.5 in its length; D. VI-I, 9; A. I, 8; C. 17; ventral fins united, I, 5; scales 38, -14; head depressed; ventral profile almost straight; dorsal profile rising in very gentle curve from tip of snout to nape; dorsal and ventral outlines of body straight and parallel from base of first dorsal to front of anal, from here slightly converging to base of caudal fin; height of caudal peduncle 2.25 in head, 1.6 in height of body at front of dorsal fin; mouth almost horizontal; snout flat, broad, equal to eye, 3.5 in length of head; interorbital very narrow, less than diameter of pupil; eyes inclined at angle of 45° on sides of head; snout bluntly rounded from above; top and sides of head scaled to posterior border of pupil; branchiostegals 4; teeth villiform, in bands on each jaw; an outer series of enlarged teeth in the upper jaw; fourth dorsal spine longest, 2.5 in head; rays of second dorsal of nearly uniform height, slightly longer than fourth spine, 2.3 in head; caudal





VITRARIA CLARESCENS JORDAN & EVERMANN. TYPE.

rounded; median rays 1.5 in head; middle rays of anal longest, 2 in head; median pectoral rays longest, 1.8 in head, the lower 14 rays normal, above these numerous fine silk-like rays; median rays of ventral 2 in head; basal membrane with a well-developed lobe on each side; scales ctenoid, covering body and top and sides of head, those on posterior part of body and on caudal peduncle but little enlarged, those on head smaller than body scales.

Color in alcohol, plain chestnut brown, pale below; a few darker mottlings on side of body; ventral and pectoral fins dusky brown, ventral pale.

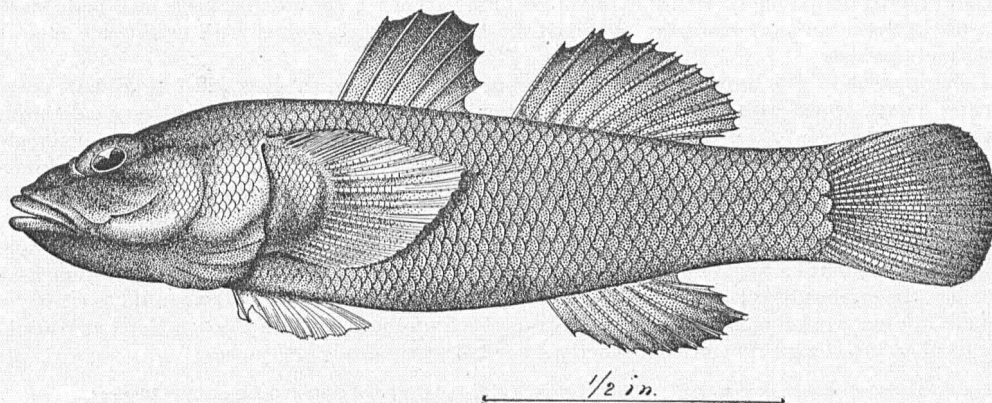


FIG. 214.—*Chlamydes laticeps* Jenkins; from the type.

This description is based on a single specimen, 1.5 inches long, taken by Doctor Jenkins in the coral rocks on the reef in front of Honolulu.

*Chlamydes laticeps* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 503, reefs at Honolulu (type, No. 50716, U. S. N. M.; coll. O. P. Jenkins).

#### Genus 239. GNATHOLEPIS Bleeker.

This genus agrees with *Rhinogobius* in all respects, except that the cheeks and opercles are covered with large scales; pectoral with silky rays; dorsal spines 6; tongue rounded.

*Gnatholepis* Bleeker, Esquisse Syst. Nat. Gobioid. in Arch. Neerl. Sc. Soc. Holl. Harlem, IX, 1874, 318 (*Gobius anjerensis*).  
*Hazeus* Jordan & Snyder, Proc. U. S. Nat. Mus., XXIV, 1902, 51 (*otakii*).

#### 403. *Gnatholepis knighti* Jordan & Evermann. "Oopu." Plate 58.

Head 3.5 in length; depth 4.25; eye 3.8 in head; snout 3.6; width of mouth 2.5; interorbital 2.25 in eye; D. vi-12; A. 12; P. 16; V. 5.5; scales 32-9.

Body elongate, compressed, not depressed in front, greatest depth at the middle of belly; head elongate, its depth 1.25 in its length, its width 1.5; snout oblique, blunt, broad; upper profile of the head obtuse, with a prominence over eye in front; mouth rather broad, the maxillary not reaching posteriorly to below front rim of orbit; lips rather thin; teeth small, sharp, in narrow bands in jaws with an outer enlarged series; no teeth on vomer or palatines; interorbital space very narrow, level; nostrils small, close together in front of eye, anterior with flap of very short, fleshy cirri; eye high, small, a little anterior; gill-opening restricted to side, nearly vertical, its length 2.25 in head; scales large, finely ctenoid, and becoming much larger on posterior side of trunk; scales small on belly in front of ventrals, cycloid; scales moderately large, cycloid on the upper part and side of head, head otherwise naked; dorsal fins well separated, spines flexible and with extremities in most cases free and filamentous; first 1.6 in head, fifth 1.7, last 2.7; soft dorsal long, last rays longest, first 1.7, last 1.25; anal similar to the dorsal, but lower, first ray 2.8, last 1.25; caudal rounded, the median rays very long, a little longer than head; pectoral with upper median rays longest, all rather fine, about equal to length of caudal; ventrals rather large, frenum uniting in front, rather broad, length equal to pectoral; caudal peduncle compressed, length 1.2 in head, depth 2.25.

Color in life, pale flesh-color, upper parts with dark brownish spots and blotches; a series of about 8 brownish blotches along middle of side; a small dark spot on base of pectoral; opercle dusky; fins all pale, spinous dorsal with brown edge; iris bluish white.

An example from Hilo, when fresh, was olive-green, rather pale, and with 7 blackish crossbands; caudal spot small and inconspicuous; black bar below eye, narrow and very distinct; back crossbarred with many spots of dusky olive; side with longitudinal streaks of dark brown spots along rows of scales, these irregular and variable, mixed, especially behind, with spots of pale sky-blue; dorsal, anal, and caudal dotted finely with dark olive; pectoral pale olive; ventrals blackish; anal plain blackish, paler at base. In most examples examined the head was finely dotted with bright pale blue on cheeks and opercles.

Color in alcohol, pale brown, side with numerous small dark brown spots and 7 large dark brown blotches; a dark brown streak below eye, and another across opercle; spinous dorsal very pale brown with about 3 blackish brown cross-lines, very distinct on first spines, running somewhat obliquely, and becoming indistinct posteriorly; soft dorsal with the spines pale or whitish brown and membranes between blackish brown; anal more or less dark gray brown; caudal very pale brown or whitish, spotted in cross-series with brown; pectoral pale brown; ventrals dark brown, paler along edges.

This small but interesting species is generally common in brackish water about Hilo and Honolulu. The collection contains a total of 123 specimens; 101 specimens from Hilo range in length from 1.1 to 2.5 inches, the average length being 1.81 inches. We have 5 specimens from Waianae 1.3 to 1.8 inches in length, the average being 1.62 inches, and 2 examples from the pond at the Moana Hotel at Waikiki, each 0.8 of an inch long. The average length of our 123 specimens is 1.81 inches.

*Acetrotogobius ophthalmotamia*, Streets, Bull. U. S. Nat. Mus., No. 7, 60, 1877 (coral reefs at Oahu); not of Bleeker.  
*Gnatholepis knighti* Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (Apr. 11, 1903), 204, Honolulu.

#### Genus 240. KELLOGGELLA Jordan & Seale, new genus.

*Kelloggella* Jordan & Seale, new genus of *Gobiidae* (*Kelloggella cardinalis* Jordan & Seale MS., from Samoa).

This genus is framed for little fishes allied to *Gobiosoma*, but with 6 dorsal spines, and the body and head more elongate. Body naked; fins moderate; teeth small and sharp. We place our single Hawaiian species in this genus, though it differs in the presence of a few rudimentary scales posteriorly.

#### 404. *Kelloggella oligolepis* (Jenkins). Fig. 215.

Head 4.5 in length; depth 5.75; eye 3.5 in head; mouth 2.75; snout 2 in eye, 4.5 in head; D. vi-11 or 12; A. 7 or 8; P. 15; V. 1, 5.

Body elongate, compressed; head elongate, blunt, depth 1.25 in its length, width 1.35; profile of snout very bluntly rounded; profile of back from head to root of spinous dorsal a little concave,

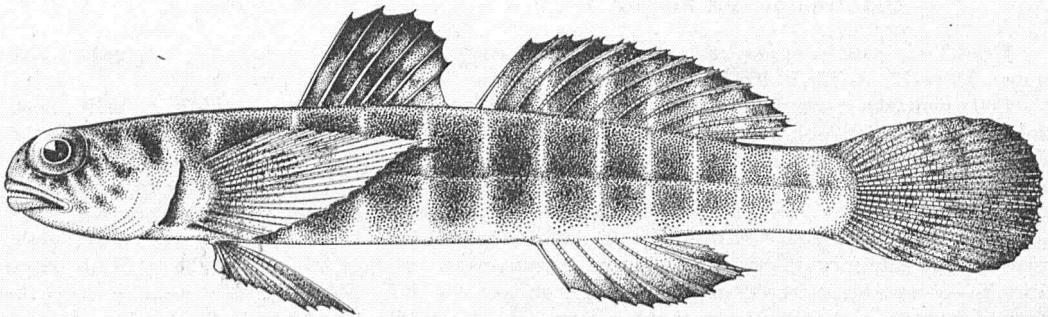
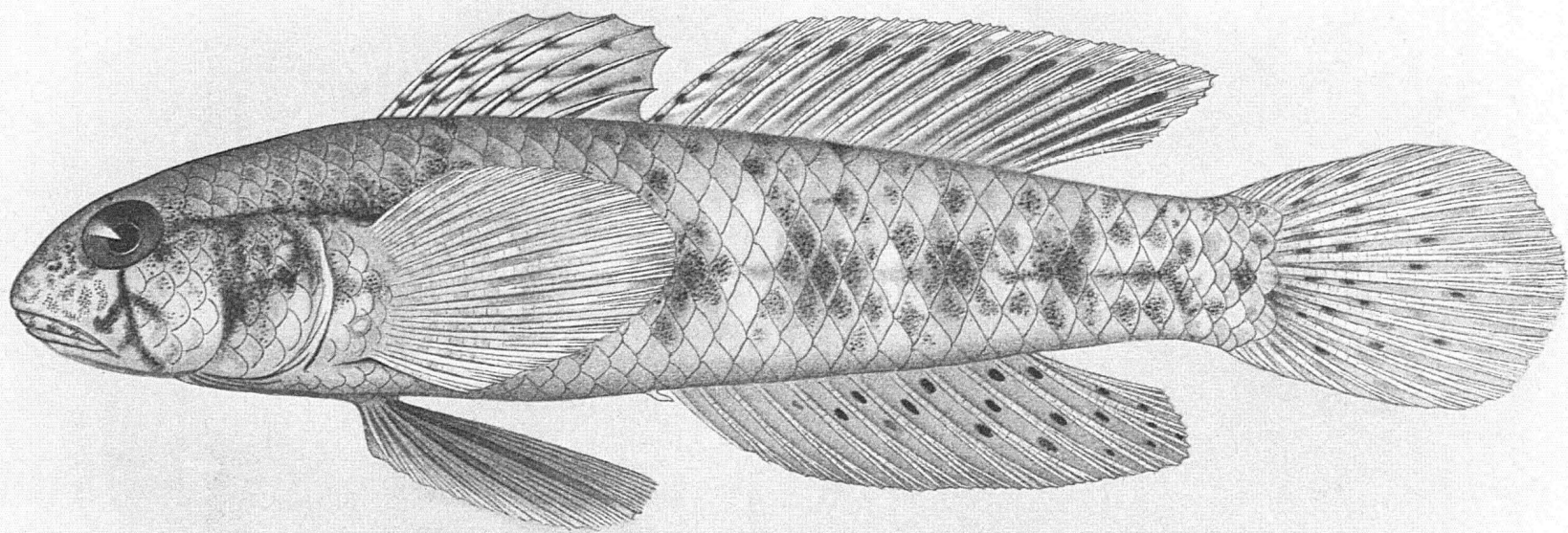


FIG. 215.—*Kelloggella oligolepis* (Jenkins); from the type.

descending from head to base of pectoral, rather gently curving from front of dorsal at base of ventral to base of caudal; snout compressed, short, jaws rather large, equal; mouth low, slightly oblique; teeth in lower jaw rather large, uniserial posteriorly along sides, and in wide band in front; inner



GNATHOLEPIS KNIGHTI JORDAN & EVERMANN. TYPE.

ones slender, straight, the outer enlarged, especially several toward front of sides of jaw, which are canine-like and bent backward; teeth of upper jaw similar, with fewer canines; vomer and palatines without teeth; eye anterior, high; top of head flat, interorbital space narrower than pupil; gill-opening low, restricted, and slightly oblique; body apparently scaleless, a few very minute scales on posterior part; first to fifth dorsal spines about equal in length, about 1 to 1.35 in head, last shorter; base of dorsal about equal to head; middle caudal and pectoral rays longest, former pointed, least depth of caudal peduncle  $2\frac{1}{4}$  in head.

Color in alcohol, plain brown, everywhere minutely punctate with black; about 12 dark brown vertical bars on side, those on caudal peduncle very indistinct, and all much wider than the narrow pale interspaces; generally 1 or 2 rather poorly defined similar bands across nape; several short radiating bands from lower border of eye.

One of the smallest of fishes. Described from the type, 17 mm. (0.67 inch) in length, taken at Honolulu by Doctor Jenkins. We have examined 10 examples from Waianae and 13 from Honolulu. The *Albatross* also obtained 2 specimens at Honolulu.

*Eupomias oligolepis* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 504, fig. 45, Honolulu (type, No. 50715, U.S.N.M.; coll. O. P. Jenkins); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu).

#### Genus 241. *SICYDIUM* Cuvier & Valenciennes.

Body subcylindrical, covered with rather small ctenoid scales; head oblong and broad, with cleft of mouth nearly horizontal; upper jaw prominent; snout obtusely rounded; lips very thick, the lower with a series of numerous slender horizontal teeth, of which sometimes only the extremities are visible; upper jaw with a single uniform series of numerous movable small teeth attached by ligament to edge of maxillary; behind this outer visible series numerous other parallel series of young teeth hidden in the gums, and succeeding the former as they become worn out or broken; lower jaw with a series of widely set conical teeth; teeth all simple, slender, the distal half bent inward nearly at a right angle; eyes of a moderate size; 2 dorsal fins, the anterior with 6 (5 to 7) flexible spines; caudal quite free; ventrals united into a short cup-shaped disk; gill-openings of moderate width; 4 branchiostegals.

*Sicydium* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 168, 1837 (*plumieri*); Gill, Proc. Ac. Nat. Sci. Phila. 1860, 101.

a. Scales rather small, 80 to 85 longitudinally; head comparatively short, 4.6 in length; dorsal and anal each with 12 rays.....*stimpsoni*, p. 489

aa. Scales larger, about 65 longitudinally; head longer, 4 in length; dorsal with 15, and anal with 18 rays.

*alboteniatum*, p. 490

#### 405. *Sicydium stimpsoni* Gill. "*Oopu*." Fig. 216.

Head 4.6 in length; depth 4; eye 7 in head; snout 2.6; interorbital 2.3; D. vi-12; A. 12; C. 16; P. 18; scales 80 to 85-22.

Body long and slender, compressed only posteriorly; head short, snout blunt, ascending abruptly then in a uniform curve to origin of dorsal fin; interorbital broad, concave; mouth horizontal, broad, its width 1.6 in head; lower lip with a fringe of short setae; teeth of lower jaw unequal slender canines, an anterior larger pair, and usually a rather large tooth on each side; teeth of upper jaw in a single close-set series, more or less concealed in the gums; eye very small, high up; snout prominent, projecting beyond the short lower jaw; gill-opening vertical, its length 2 in head.

Scales finely ctenoid, much reduced and crowded on nape, belly, anterior parts of body, and base of caudal fin; head entirely naked.

Fins well developed; dorsals and anal very high in adult males, the anterior spines and the last rays being produced and filamentous, length of second dorsal spine 1.4 to 2 times length of head; base of spinous dorsal 1.6 in head, and somewhat exceeding distance between dorsals, anterior dorsal rays 1.4 to 2 in head; last dorsal rays produced, their length somewhat less than longest dorsal spine, or about 1.4 times the head; anal similar to soft dorsal, rays shorter, the posterior one longest, 1.2 in head; caudal long, more or less pointed in the males, rounded in the females and young, the middle rays 1.2 to 1.5 times head, pectoral broad, bluntly pointed, the lateral rays short, the middle rays equal to head; ventral disk broad, its width scarcely less than its length, which is about 1.6 in head, disk free laterally and behind, the length of the posterior free portion about 2.8 to 3 in head.

Color in life of a specimen 2 inches long from Heeia, dark greenish olive; back and upper parts of sides crossed by about 14 black bars, these sometimes in pairs, head and cheeks vermiculated with

blackish and greenish; spinous dorsal smoky with a brownish blotch on base of last 2 spines; soft dorsal smoky; anal pale smoky, with a darker band near the outer edge, other fins pale dusky.

Color in alcohol, brownish black, paler below, side with about 7 more or less distinct darker vertical bars, most distinct in the young, top of head with obscure darker cross bands, fins all bluish black in adult males, paler in females and young; dorsals, anal, and caudal with small roundish pale spots, most numerous near base; pectoral dusky, without spots.

This goby was found in abundance in a small stream at Kaiwiki near Hilo, and a few specimens were obtained in Heneohe Creek at Heeia, Oahu Island. We have specimens also from Kailua, and

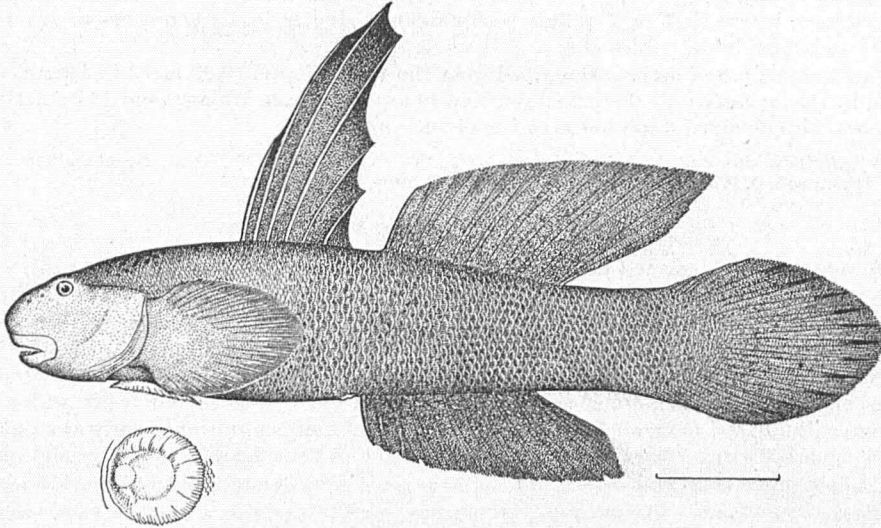


FIG. 216.—*Sicydium stimpsoni* Gill.

the *Albatross* found it in Lahaina and Wailuku rivers, Maui Island. It is strictly a fresh-water fish, attains a length of 5 to 7 inches, and is used to some extent as food.

The species was originally described by Doctor Gill, and later by Günther, from specimens obtained at Hilo.

*Sicydium stimpsoni* Gill, Proc. Ac. Nat. Sci. Phila. 1860, 101, Hilo, Hawaii, in fresh water; Günther, Cat., III, 93, 1861; Günther, Fische der Südsee, VI, 183, 1877 (Gill's description).

*Sicydium nigrescens* Günther, Chall. Rept., Zool., I, Part VI, Shore Fishes, 60, pl. xxvi, fig. C, 1880, Honolulu, fresh water; streams in the island of Hawaii.

*Sicyopterus stimpsoni*, Streets, Bull. U. S. Nat. Mus., No. 7, 59, 1877 (fresh-water streams of Oahu); Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 502 (Honolulu, fresh water); Snyder, op. cit. (Jan. 19, 1904), 536 (Lahaina and Wailuku rivers, Maui).

406. *Sicydium albotæniatum* Günther. Fig. 217.

Head 4 in length; depth 4.5; eye 6 in head; D. vi-15; A. 18; scales about 65.

Body long; head short; snout prominent, projecting beyond the short lower jaw. Scales large, not reduced but crowded anteriorly; head entirely naked; fins well developed; third and fourth dorsal spines produced, long and flexible, one-third longer than head; base of spinous dorsal 1.3 in head; distance between dorsals 3 in spinous dorsal; soft dorsal and anal long and high, but not produced; caudal long, sharply convex; pectoral broad, bluntly pointed. Color dark yellowish gray, lighter and more yellowish below; a white lateral band, slightly narrower than eye, extending from base of caudal to tip of snout, on head its upper edge at upper base of pectoral, the line running straight to tip of snout; a row of 8 large black spots on body, below the lateral band, from pectoral to base of caudal; fins all dusky, the dorsal, caudal, and anal edged with light blue, the lower third of anal with many small blue spots; anterior part of ventral disk red.

The above description is taken from Günther's figure, there being practically no description of this species in his text. The fish was not seen by us.

*Sicydium albotæniatum* Günther, *Fische der Südsee*, II, 183, taf. cx, fig. D, 1877, brooks in Sandwich Islands. On a drawing by Garrett.

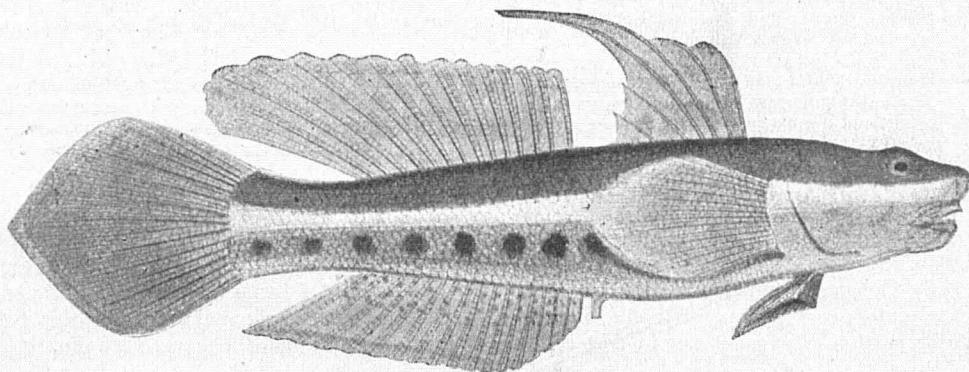


FIG. 217.—*Sicydium albotæniatum* Günther; after Günther.

#### Genus 242. LENTIPES Günther.

This genus differs from *Sicydium* in the scaleless body and in the dentition, which consists of a single row of tricuspid teeth in the upper jaw and of teeth of the same size in the lower jaw.

*Sicyogaster* Gill, Proc. Ac. Nat. Sci. Phila. 1860, 102 (*concolor*); name preoccupied.

*Lentipes* Günther, Cat., III, 96, 1862 (*concolor*).

- a. Tail without scales; dorsal rays 10.....*concolor*, p. 491  
 aa. Tail covered with small scales; dorsal rays 11.....*seminudus*, p. 491

#### 407. *Lentipes concolor* (Gill).

D. vi, 10; A. 10; body subcylindrical, naked; head oblong, depressed, with the cleft of the mouth horizontal; eyes of moderate size; lower lip with a series of minute teeth; both jaws with a single series of teeth, the anterior ones in the upper jaw tricuspid, those of the lower widely set; 2 dorsal fins, the anterior with 6 flexible spines; caudal quite free; ventral fins united to a short semicircular disk, adherent to the belly; gill-openings of moderate width. Purplish. Streams near Hilo, Hawaii; not seen by us.

*Sicyogaster concolor* Gill, Proc. Ac. Nat. Sci. Phila. 1860, 102, fresh waters of Hilo, Hawaii.

*Lentipes concolor*, Günther, Cat., III, 96, 1861 (after Gill); Günther, Rep. Shore Fish. Challenger, Zool., I, Part VI, 61, 1880 (streams of Hawaii).

#### 408. *Lentipes seminudus* Günther.

D. vi, 11; A. 10; a small fish, 2 inches long, and in an indifferent state of preservation, seems to be a second species of this genus, having the same singular dentition as *Lentipes concolor*, but the tail is covered with small scales, the head and trunk only being naked. It is an adult specimen, the ovaries being fully developed. The eyes are small, situated in the anterior half of the length of the head. The length of the head is one-fourth of the total, the caudal not included. The vent is somewhat nearer the root of the caudal than to the head. Length of specimen, 2 inches. Honolulu, in fresh water. (Günther.) Not seen by us.

*Lentipes seminudus* Günther, Rep. Shore Fish. Challenger, Zool., I, Part VI, 61, 1880, Honolulu, in fresh water.

#### Genus 243. AWAOUS Steindachner.

Inner edges of shoulder-girdle with 2 or more conspicuous dermal flaps; preorbital region very long; premaxillary and maxillary strong; lips thick; scales rather small, ctenoid, 40 to 80 in a longitudinal series; interorbital groove with a conspicuous median crest; sides of head naked; no silky rays on pectoral; dorsal spines 6; tongue broad, adnate to floor of mouth; otherwise essentially as in *Gobius*.

The species reach a large size and are confined to the fresh waters of the Tropics of America and the Hawaiian Islands. The physiognomy in each is peculiar, the snout being long and convex.

*Awaous* Steindachner, Sitz. Ak. Wiss. Wien, XLII, 1860, 285, 289; after *les Awaous* of Cuvier & Valenciennes (*Gobius ocellaris*, etc.).

*Chonophorus* Poey, Memorias, II, 274, 1861 (*bucculentus*=*taiasica*).

*Awaous* Bleeker, Esquisse d'un Syst. Nat. Gobioides, in Archiv Neer. Se. Soc. Holl. Harlem, IX, 1874, 320 (*ocellaris*); after *les Awaous* of Cuvier & Valenciennes.

- a. Body elongate, depth 4.75 in length; eye comparatively large, 6.75 in head; snout rather short, 2.2 in head; interopercle comparatively narrow, 7 in head; dorsal rays 11; anal 13; scales 52,-11; a black bar below eye....*genivittatus*, p. 492  
 aa. Body short and deep, depth 4 in length; eye small, 8.6 in head; interorbital wider, 5 in head; dorsal rays 10; A. 10; scales 63,-18.....*stamineus* p. 493

409. *Awaous genivittatus* (Cuvier & Valenciennes). "Oópu." Fig. 218.

Head 3.4 in length; depth 4.75; eye 6.75 in head; snout 3; interorbital 7; D. vi-i, 11; A. 13; P. 15; V. i, 6, 6, 1; scales 52,-11.

Body elongate, compressed; head elongate, large, its depth 1.4 in its length, width 1.7; snout blunt, rounded, very convex in profile; mouth large, oblique, 2 in head; maxillary reaching below posterior portion of eye but not to posterior rim; jaws large, terminal, the lower very slightly pro-

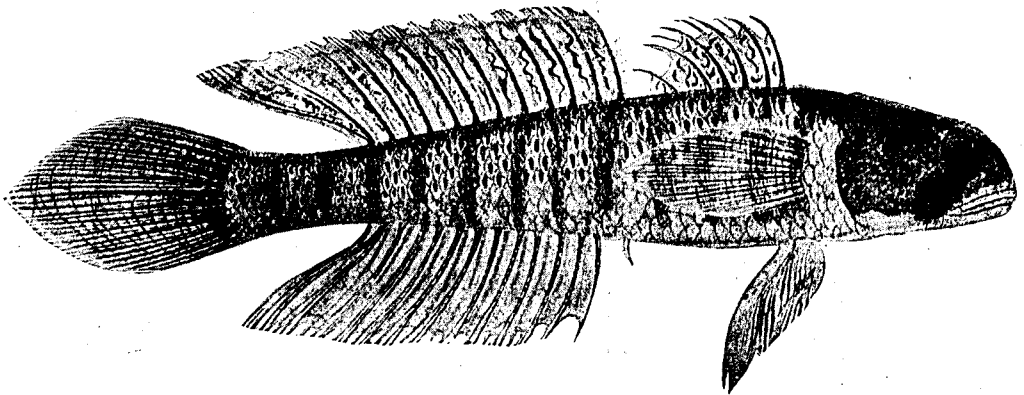


FIG. 218.—*Awaous genivittatus* (Cuvier & Valenciennes); after Günther.

duced; teeth in jaws small, unequal, sharp-pointed; vomer and palatines edentulous; lips broad, fleshy; tongue broad, more or less truncate, adnate to floor of mouth; anterior nostril very small near upper lip anteriorly, in a short tube; posterior nostril rather large, near front of eye; a large pore behind eye, and many smaller ones on top of head; interorbital space rather broad, flattened, 6 in head; cheek and side of head somewhat swollen, forming broadest part of body; gill-opening rather large, restricted to side, about 2 in head; pectoral rather long; scales small, finely ctenoid, very minute on top of head, enlarged on side of caudal peduncle; dorsal spines flexible, posterior longest; first dorsal spine 2.5 in head, fifth 1.25, sixth 2.2; first ray 2, ninth 1.1, last 1.3; anal similar to soft dorsal, first ray 3.25, ninth 1.2, last 1.7; caudal very long, middle rays longest, pointed 2.6 in head; pectoral broad, expanded, 1.1 in head; ventrals broad, 1.1, with very broad frenum in front without fringed margin; anal papilla large; caudal peduncle compressed, its length 2 in head, depth 2.75.

Color in life of an example at Honolulu, olivaceous, crossed by about a dozen black bars, the 3 below anterior part of second dorsal longest and darkest, the anterior bars obsolete in some specimens, in some running only on upper half of body, the belly being red; lower half of side and belly white; head olivaceous, a broad black band covering interocular space and extending through eye and across cheek to throat, broadening below; belly and branchiostegal region crimson; dorsal and anal pale rosy with cross streaks of brown spots; edge of dorsal fin darker rosy, of anal also darker rosy, and with a narrow white border; caudal and pectoral yellowish olive; ventrals pale rosy; iris brownish black.

Color in alcohol, pale brown, slightly darker above; each scale on the middle of side with a brownish base showing as small vertical streaks; ten narrow brown vertical cross bars on side; a broad



slaty black blotch from below eye across cheek behind maxillary; a dull bluish blotch at base of pectoral fin above; fins grayish dusky, the dorsals with narrow submarginal pale bar, rest of both fins with reticulating dusky lines. Described from an example (No. 05228) taken at Honolulu.

A common species, widely distributed throughout the tropical Pacific, abundant among the Hawaiian Islands. We have 74 specimens from Honolulu, 11 from Waikiki, 4 from Moanalua, 2 from Kaneohe Creek, near Heeia, and 38 from Hilo, ranging in length from 0.8 to 5.7 inches.

*Gobius genivittatus* Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 64, 1837, Tahiti; Günther, Fische der Südsee, VI, 170, taf. CX, Fig. C, 1877 (Tahiti, Navigator, Fiji, and Sandwich Islands).

*Awaous genivittatus*, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 517 (Sandwich Islands); Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 502 (Honolulu; fresh waters); Snyder, op. cit. (Jan. 19, 1904), 536 (Honolulu, Waimea, Hanapepe, Hanalei, Huleia rivers, Kauai; Anahulu River, Oahu).

#### 410. *Awaous stamineus* (Eydoux & Souleyet). "Oōpu."

Head 3.2 in length; depth 4; eye 8.6 in head; snout 2.2; interorbital 5; D. vi-10; A. 10; scales 63,—18.

Body short and stout, heavy forward, compressed only posteriorly, head large, broad; snout rather long, anterior profile only slightly convex from tip of snout to origin of first dorsal fin; eyes small, high up, the interorbital space little convex; mouth large, nearly horizontal, very broad, the greatest width 2.2 in head; lower jaw included, lips rather thick; maxillary reaching orbit; teeth in each jaw in a broad villiform band; tongue rounded, adnate to floor of mouth; gill-openings long, separate, the isthmus broad, length of gill-opening equaling snout; shoulder-girdle with 2 short, fleshy papillæ. Head entirely naked, breast naked, body densely scaled, the scales anteriorly somewhat reduced. Origin of spinous dorsal midway between tip of snout and base of last dorsal ray; base of spinous dorsal 2.7 in head; length of dorsal spines 1.1 in snout; soft dorsal high, the anterior rays 2.5 in head, the posterior about 3; anal similar to soft dorsal, the rays about equal; caudal long, rounded, the middle rays 1.5 in head; ventral disk short, rounded, its length twice the width of its base or equal to snout; pectoral long, pointed, 1.4 in head.

Color in life (No. 03269), dark olivaceous, with obscure dusky blotches on side; belly pale; a dark blotch at base of caudal fin; dorsals pale yellow, crossed by about 7 narrow blackish bars approximately following the margin; caudal similarly marked, with about 7 vertical blackish bars; anal dusky; pectoral and ventrals dusky olive. Another example (No. 03270), 5 inches long, differs from the one just described in having the sides more plainly vermiculated with brownish lines and in having the spot on caudal peduncle and bars on fins plainer.

Color in alcohol, pale olivaceous on back and sides, yellowish white below; side with a median series of irregular large blackish blotches, most distinct in the young; a large black blotch at base of caudal fin; spinous dorsal whitish, with blackish retrifications; soft dorsal whitish, crossed by about 7 or 8 zigzag blackish lines; caudal similar to soft dorsal, crossed by about 9 vertical zigzag blackish bars; anal dusky whitish, darkest along the middle; pectoral dusky, palest at base; a small blackish blotch at base of upper rays.

This is the common Oopu of the fresh-water streams and river mouths, and is one of the most abundant gobies occurring among the Hawaiian Islands. Numerous specimens were obtained by us at Honolulu, Waialua, Hilo, Mauna Loa, and Heneohe Creek at Heeia and Kilihi Creek in Pilihi Valley, varying from 0.8 to 12 inches in length.

*Gobius stamineus* Eydoux & Souleyet, Voy. Bonite, Poiss., 179, pl. v, fig. 5, 1841, Sandwich Islands; Günther, Rep. Shore Fish., Challenger, Zool., 1, Part VI, 59, 1880 (fresh waters of Honolulu: streams of Hawaii).

*Awaous crassilabris*, Streets, Bull. U. S. Nat. Mus., No. 7, 59, 1877 (fresh-water streams of Oahu); Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 517 (Sandwich Islands); not of Günther.

*Gobius papuensis*, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 517 (Sandwich Islands); not of Cuvier & Valenciennes.

*Awaous stamineus*, Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 502 (Honolulu); Snyder, op. cit. (Jan. 19, 1904), (Anahulu River, Oahu; Waimea, Hanalei, Hanapepe, and Huleia rivers, Kauai; Wailuku River, Maui.)

#### Suborder DISCOCEPHALI.

Bony fishes "with a suctorial transversely laminated oval disk on the upper surface of the head (homologous with a flat dorsal fin), thoracic ventral fins with external spines, a simple basis cranii, intermaxillary bones flattened, with the ascending processes deflected sideways, and with the supra-

maxillary bones attenuated backward, flattened, and appressed to the dorsal surface of the intermaxillaries; hypercoracoid (or scapula) perforated nearly in the center, and with 4 short actinosts (carpals)." (Gill.)

This remarkable group consists of a single family, *Echeneididae*.

#### Family XCV. ECHENEIDIDÆ.—The Remoras.

Body fusiform, elongate, covered with minute, cycloid scales; mouth wide, with villiform teeth on jaws, vomer, palatines, and usually on tongue; premaxillaries not protractile; lower jaw projecting beyond upper; spinous dorsal modified into a sucking disk which is placed on the top of the head and neck, and composed of a double series of transverse, movable, cartilaginous plates, serrated on their posterior or free edges. By means of this disk these fishes attach themselves to other fishes or to floating objects, and are carried for great distances in the sea. Opercles unarmed. Pectoral fins placed high; ventral fins present, thoracic and close together, 1, 5; dorsal and anal fins long, without spines, opposite each other; caudal fin emarginate or rounded; branchiostegals 7; gills 4, a slit behind the fourth; gillrakers short; gill-membranes not united, free from the isthmus; pseudobranchiæ obsolete; several pyloric appendages; no air-bladder; no finlets; no caudal keel; vertebræ more than 10+14. Genera 4; species about 10, found in all seas, all having a very wide range.

#### Genus 244. ECHENEIS (Artedi) Linnæus. Remoras.

Body rather robust, the vertebræ 12+15=27; disk shortish, of 13 to 18 laminae; pectoral rounded, its rays soft and flexible; soft dorsal and anal moderate, of 20 to 30 rays; caudal subtruncate. Species attaching themselves to large fishes, especially to sharks.

*Echeneis* (Artedi) Linnæus, Syst. Nat., ed. x, 260, 1758 (*remora*, the only species known to Artedi).

*Remora* Gill, Proc. Ac. Nat. Sci. Phila. 1862, 239 (*remora*).

*Echeneis* Gill, Proc. Ac. Nat. Sci. Phila. 1864, 60 (*remora*); not *Echeneis* Gill, 1862, restricted to *naucrates*.

*Remoropsis* Gill, Proc. Ac. Nat. Sci. Phila. 1864, 60 (*brachypterus*).

*Remorina* Jordan & Evermann, Check List Fishes, 490, 1896 (*albescens*).

#### 411. *Echeneis remora* Linnæus.

Head 4; disk 2.75; width between pectorals 5.25. D. XVIII-23; A. 25; vertebræ 12+15. Body comparatively robust, compressed behind; pectoral fins rounded, short, and broad, their rays short and flexible; ventral fins adnate to the abdomen for more than one-half the length of their inner edge; tip of lower jaw not produced into a flap; head broad, depressed; disk longer than the dorsal or the anal fin; maxillary scarcely reaching front of orbit; caudal lunate; vertical fins rather high; pectoral three-fifths length of head. Color blackish, nearly uniform above and below. Length 15 inches. Warm seas; usually found attached to large sharks. Color in life all more or less violet blackish; the lobes of the caudal paler.

We have but a single example (No. 527), 3.6 inches long, taken at Honolulu; others were taken by the *Albatross* at Hanalei Bay, Kauai, and at various dredging stations.

*Echeneis remora* Linnæus, Syst. Nat., Ed. X, 260, 1758, "in *Pelago Indico*;" Günther, Cat., II, 378, 1860; Lütken, Vid. Medd. Kjöbenhavn. 1875, 38; Jordan & Gilbert, Synopsis, 417, 1883; Günther, Challenger Report, Pelagic Fishes, XXXI, 18, 1889 (Sandwich Islands); Snyder, Bull. U. S. Fish Comm., XXII, 1902 (Jan. 19, 1904), 535 (Hanalei Bay, Kauai; Albatross stations 3869, 3879, 3887, 3934, 3938, 3973).

*Echeneis squalipeta* Daldorf, Skrivt. Nat. Selsk. Copenhagen, 1793, 157, *Atlantic Ocean between the Tropics*; Günther, Cat., II, 377, 1860 (Atlantic between the Tropics).

*Echeneis jacobæa* Lowe, Proc. Zool. Soc. London 1839, 89, *Madeira*.

*Echeneis parva* Gronow, Cat. Fish., Ed. Gray, 92, 1854, no locality; after *E. remora* L.

*Echeneis remoroides* Bleeker, Nat. Tijds. Ned. Ind., IX, 1855, 70, *Batoc*.

*Echeneis postica* Poey, Memorias, II, 255, 1861, *Havana*. (Coll. Poey.)

*Remora jacobæa*, Gill, Proc. Ac. Nat. Sci. Phila. 1862, 240.

#### 412. *Echeneis albescens* Temminck & Schlegel.

Length of disk 3.2 to 3.25 in total length; width between pectorals 5 to 5.3; number of laminae on disk 13 or 14. D. XIII-22; A. 22; angle of mouth in the vertical from the third lamina of the disk; length of ventral fins equal to the distance between root of pectoral and posterior margin of eye. Color uniform

grayish brown. (Günther.) Tropical Pacific, straying to America; a specimen taken at La Paz, Gulf of California (Streets), and 1 in the Gulf of Mexico (Bean). Recorded from the Hawaiian Islands by Fowler; not seen by us.

*Echeneis albescens* Temminck & Schlegel, Fauna Japonica, Poiss., 272, pl. 120, fig. 4, 1850, Japan.

*Remora albescens*, Jordan & Evermann, Fishes North and Mid. Amer., 2272, 1898; Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 517 (Sandwich Islands; coll. Thos. Nuttall).

## Group BLENNIOIDEA.

Body more or less elongate, naked or with scales, large or small; ventral fins small, more or less advanced in position, often wanting, the number of soft rays always fewer than 5; hypercoracoid perforate, the shoulder-girdle normally formed; skull not armed with spines; suborbital not developed as a bony stay articulating with the preopercle; pseudobranchiæ present; dorsal fin long, its anterior half and sometimes the whole fin composed of spines; anal long; tail homocercal, the caudal usually rounded, rarely forked; vertebrae numerous, especially in the Arctic species.

A large group, with ill-defined boundaries, the more primitive forms showing affinities with the *Trachinoidea*, *Cirrhitidae*, and other more typical fishes, the extremes very aberrant and passing directly into the *Ophidioidea*, and other forms lacking spines in the fins.

### Family XCVI. BLENNIIDÆ.—Blennies.

Body oblong or elongate, naked or covered with moderate or small scales, which are ctenoid or cycloid; lateral line variously developed, often wanting, often duplicated; mouth large or small, the teeth various; gill-membranes free from isthmus or more or less attached to it; pseudobranchiæ present; ventrals jugular, or subthoracic, of one spine and 1 to 3 soft rays, often wanting; dorsal fin of spines anteriorly, with or without soft rays; anal fin long, similar to soft dorsal; caudal well developed; vertebrae in moderate or large number, 30 to 80; hypercoracoid (or "scapula") perforate, shoulder-girdle normally formed; suborbital without bony stay.

Fishes of moderate or small size, mostly living near the shore in the tropical and temperate or Arctic seas; most of them carnivorous, the *Clinina*, so far as known, ovoviviparous, the rest viviparous.

- a. Clinina*: Body scaly; lateral line high anteriorly. Species ovoviviparous, so far as known..... *Enneapterygius*, p. 495
- aa. Body scaleless; teeth comb-shaped, in a single row; vomer and palatines toothless or nearly so; lateral line usually arched in front; soft dorsal about equal to spinous. Species viviparous.*
- b. A short, stout fang-like canine on each side, at least in lower jaw.*
- c. Dorsal fin entire; gill-openings wide, the membranes free from the isthmus..... Blennius, p. 496*
- cc. Dorsal fin divided; gill-openings narrow; posterior canines present..... Alticus, p. 497*
- bb. No fang-like canines in either jaw.*
- d. Blennina*: Teeth all fixed, attached to the bones of the jaws; dorsal and anal joined to the caudal; carnivorous..... *Enchelyurus*, p. 500
- dd. Salaria*: Teeth all movable, implanted on the skin of the lips; no posterior canines; herbivorous.
- e. Body elongate; D. XIII, 22; A. 25..... Salaria, p. 501*
- ec. Body short; D. XI, 13; A. 15..... Ecaltis, p. 503*

### Genus 245. ENNEAPTERYGIUS Rüppell.

Body rather robust, covered with moderate ctenoid scales; lateral line incomplete; mouth moderate, the jaws equal; no tentacle on nape; no hook on shoulder-girdle; eye large; dorsal fin divided into 3 fins, the first of 3 or 4 slender spines, the second of 10 to 24, the soft dorsal of 7 to 15 rays; caudal rounded; anal fin long; pectoral long, the lower rays simple and thickened. This genus differs from *Tripterygion* Risso, as typified by the Mediterranean species, *T. tripteronotus*, in the shorter jaws, the presence of a cirrus above the orbit, and in the larger scales. The lateral line is always incomplete. Small fishes of the rock pools of the Tropics, found in most warm seas.

*Enneapterygius* Rüppell, Neue Wirbelthiere, 2, 1838 (*pusillus*).

*Enneanectes* Jordan & Evermann, Proc. Cal. Ac. Sci. 1895, 501 (*carminalis*).

*Gullias* Evermann & Marsh, Rept. U. S. Fish Comm. 1899, 307 (*jordani*).

413. *Enneapterygius atriceps* (Jenkins). Fig. 219. •

Head 3.25 in length; depth 4.6; eye 3.5 in head; snout 3.4; mouth 2.5; interorbital 2 in eye; D. III, XIV 8-10; A. I, 20; scales 4-34-6.

Body elongate, compressed, greatest depth in middle of belly, depth of head 1.5 in its length; width of head 1.4; head pointed, triangular when viewed from above; snout blunt, pointed, oblique; jaws equal, low, and slightly produced; lips fleshy; mouth moderately large, slightly oblique; teeth in jaws fine, in bands; eye high, in first two-fifths of head, with a short filament above; anterior nostril with short fleshy flap; interorbital space narrow; three dorsal fins, first 2 divisions spinous, distinct from rayed portion; fifth dorsal spine 2 in head; second dorsal ray 2; anal fin rather low, lower than dorsal, anterior rays highest; caudal 1.4; pectoral pointed, middle rays longest, equal to head; ventral 1.75; caudal peduncle compressed, its least depth 3; lateral line inferior and straight at first until a little in front of the soft dorsal, where the tubes and pores stop; below this point a median series of deeply scalloped scales to base of caudal; scales ctenoid on side of body, belly naked.

Color in alcohol, very pale brown or whitish, side with about 6 pairs of dark brown irregularly vertical bars more or less confluent; head marked with brown dots above, becoming larger and deeper on the lower surface, where the general color is grayish; fins pale or whitish, with a few dark dots on basal portion of dorsal and anal, otherwise pale; space about gill-opening blackish in front of pectoral

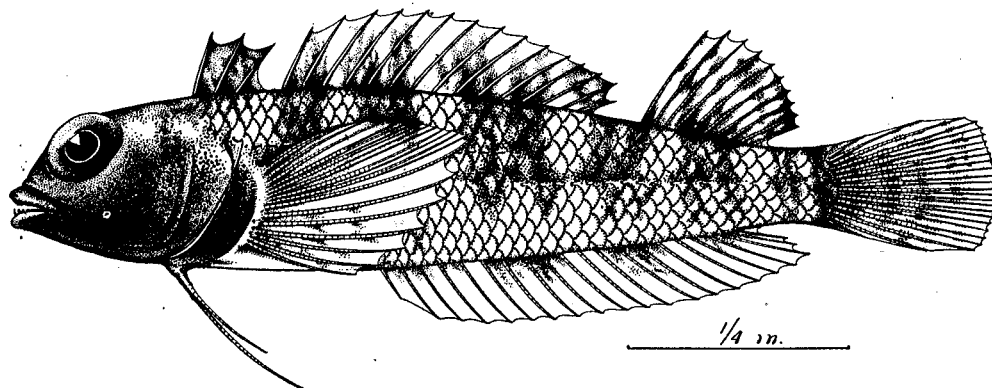


FIG. 219.—*Enneapterygius atriceps* (Jenkins). Type of *Tripterygion atriceps* Jenkins.

and with blackish spots below. Other examples, females, have the head pale, not blackish, with brown dots above and several larger on cheek opercle.

Besides the type, we have examined 9 examples, ranging in length from 0.75 inch to 1.2 inches, obtained by Doctor Jenkins at Honolulu in 1889, and 37 examples 0.6 to 1.2 inches long, collected by us at Waikiki reef, near Honolulu, in 1901.

This dainty little fish is very common in the holes in the coral rocks. It can be most successfully collected by lifting up large pieces of the rock and breaking them to pieces over a bucket or fine-meshed net.

*Tripterygion atriceps* Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 505, fig. 46, Honolulu, Hawaiian Islands. (Type, No. 50719, U. S. Nat. Mus.; Coll. O. P. Jenkins.)

Genus 246. **BLENNIUS** (Artedi) Linnaeus.

Body oblong, compressed, naked; head short, the profile usually bluntly rounded; mouth small, horizontal, with a single series of long, slender, curved, close-set teeth in each jaw, besides which, in the lower jaw at least, is a rather short and stout fang-like canine tooth on each side; premaxillaries not protractile; gill-openings wide, extending forward below, the membranes free from the isthmus or at least forming a broad fold across it; dorsal fin entire, or more or less emarginate, the spines slender; pectoral moderate; ventrals well developed, 1, 3; no pyloric caeca; lateral line developed ante-

riorly. Species numerous, lurking under rocks and algæ in most warm seas; some species in the lakes of northern Italy.

*Blennius* Artedi, *Genera Piscium*, 27, 1738.

*Blennius* Linnæus, *Syst. Nat.*, Ed. X, 266, 1758 (*galerita*).

*Salaria* Forskål, *Descrip. Anim.*, 22, 1775 (*basiliscus*).

*Pholis* Fleming, *Brit. Anim.*, 207, 1828 (*lævis=pholis*); not *Pholis* Scopoli.

*Adonis* Gronow, *Cat. Fish.*, Ed. Gray, 93, 1854 (*pavoninus=ocellaris*).

*Lipophrys* Gill, *American Naturalist*, June, 1896, 498 (*pholis*).

#### 414. *Blennius sordidus* Bennett.

D. xi, 18; P. 14; V. 2; A. ii, 19; C. 13.

Body transversely wrinkled throughout, except upon the head; extremities of the rays of all the fins projecting beyond the membrane, those of the dorsal having affixed to each a filamentous appendage; anterior ray of dorsal fin strongly curved and more free from membranous attachment than the succeeding ones, which it equals in length; opercle emarginate above; superciliary appendage palmate, about twice as long as diameter of orbit; a very short filament immediately above the lower nostril; on each side of vertex of the head is a swelling, or fleshy cushion, which descends over and covers the whole of the cheeks; teeth nearly uniform in both jaws, diminishing in size backwards; those of the upper jaw rather shorter.

Prevailing color dirty reddish brown, somewhat paler beneath, varied only by 2 or 3 large dark brown blotches on the back, that nearest to the caudal fin the most deeply colored; fins of the same color as the body, the dorsal marked with a darker spot at its anterior part and exhibiting faint traces of a darker longitudinal line near the middle of its hinder portion; the caudal fin crossed by 3 lines or series of spots of a somewhat deeper color. Hawaiian Islands. Known only from Bennett's record.

*Blennius sordidus* Bennett, *Zool. Journ.*, IV, 1828, 34, *Sandwich Islands*; Günther, *Cat.*, III, 220, 1861 (*Sandwich Islands*); Günther, *Fische der Südsee*, 193, 1877 (*Sandwich Islands*).

#### Genus 247. *ALTICUS* (Commerson) Lacépède.

This genus differs from *Salaria* in having large posterior canines and the dorsal fin usually divided into 2 parts.

*Alticus* (Commerson) Lacépède, *Hist. Nat. Poiss.*, II, 458, 1800 (*saliens*).

*Erpichthys* Swainson, *Nat. Hist. Class. Fishes*, II, 79, 275, 1839 (*atlanticus*).

*Salaria* Swainson, l. c., 274, 1839 (*vermicularis*); not of Cuvier.

*Entomacrodus* Gill, *Proc. Ac. Nat. Sci. Phila.* 1859, 168 (*nigricans*).

a. Anal rays 17; dorsal rays 14 to 16.

b. Head long, 3.3 in length; eye large, 3 in head; dorsal xi, 14.....*variolosus*, p. 497

bb. Head short, 4.25 in length; eye small, 4.5 in head; dorsal xii, 16.....*marmoratus*, p. 498

aa. Anal rays 20; dorsal rays 19.....*gibbifrons*, p. 499

#### 415. *Alticus variolosus* (Cuvier & Valenciennes).

Head 3.3 in length; depth 3.5; eye 3 in head; snout 3; width of mouth 2; interorbital 2.5 in eye; D. xi, 14; A. 17; P. 15; V. 3.

Body elongate, compressed, its greatest depth at middle of belly; depth of head 1.25 in its length; width of head 1.7; cheeks not swollen; anterior profile very steep; mouth very broad, low, slightly inferior; maxillary reaching a little behind pupil; lips thin, with small papillæ along edges; teeth fine, movable, forming an edge in jaws; two large canines in jaws; eye high, anterior, with a short fringed flap above; nostrils close together, anterior with several fleshy filaments; interorbital space narrow, concave, its width 2.5 in eye; dorsal spines flexible; first dorsal spine 1.7 in head; dorsal fins continuous, of about equal height; caudal elongate, margin rounded, a trifle less than head in length; pectoral broad at base, rays just below middle longest, a little less than head; ventral short, 1.4 in head, reaching a little more than half way to anal; lateral line arched for about first half of its length, then nearly straight but somewhat indistinct along middle of side to base of caudal; a dark fringe of filaments over nape.

Color of a fresh specimen in formalin, leather-brown, dull orange-brown on top of head; some whitish streaks before and behind eye; fringe of tentacles on nape black; little tentacles over eye

dusky; no pale spots on body; fins black; a white edge to dorsal; caudal with upper half white; anal and ventrals black; pectoral paler posteriorly.

Color in alcohol, deep brown, more or less uniform; first 3 dorsal spines whitish, upper margin same color except posteriorly, where upper portion is grayish; anal blackish, caudal blackish, upper margin whitish; pectoral and ventral gray.

Apparently not very abundant. Represented in our collections by only 6 examples, all from Honolulu. Length 2 (No. 909), 2.1, 2.3 (No. 277), 2.25, 2.5, and 2.75 inches, respectively, the average being 2.31 inches.

The fish figured and described by Günther in *Fische der Südsee* as *Salaris variolosus* (p. 203, pl. 116, fig. A), from Tahiti, is a different species.

*Salaris variolosus* Cuvier & Valenciennes, *Hist. Nat. Poiss.*, XI, 317, 1836, Guam; Fowler, *Proc. Ac. Nat. Sci. Phila.* 1900, 518 (Sandwich Islands); not of Günther, *Fische der Südsee*; Jenkins, *Bull. U. S. Fish Comm.*, XXII, 1902 (Sept. 23, 1903), 507 (Honolulu).

*Salaris nigripes* Seale, *Occas. Pap. Bishop Mus.*, I, No. 3, 1901, 127, Guam.

416. *Allicus marmoratus* (Bennett). Fig. 220.

Head 4.25 in length; depth 3.8; eye 4.5 in head; snout 3.5; width of mouth 2; interorbital 1.65 in eye; D. XII, 16; A. 17; P. 14; V. 2.

Body elongate, compressed, its greatest depth at middle of belly; depth of head 1.25 in its length; width of head 1.35; cheeks not swollen; anterior profile steep, oblique, mouth very broad, low, and slightly inferior; maxillary reaching below posterior margin of pupil; teeth very fine, villiform,

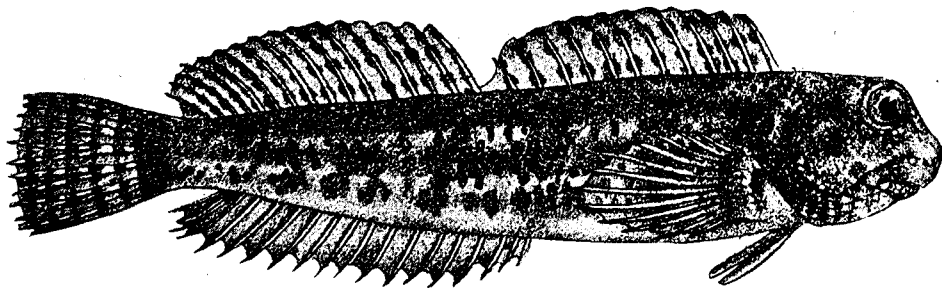


FIG. 220.—*Allicus marmoratus* (Bennett); after Günther.

movable, forming an edge; lips rather thin, covering the teeth; eye high, in anterior third of head, with small fleshy appendage above about equal to its diameter; no crest on top of head; interorbital space very narrow, concave; spinous dorsal beginning a little before posterior margin of gill-opening, the spines low, short, more or less even, first 2.2 in head; third dorsal ray longest, 1.65; anal beginning a little in advance of soft dorsal, the membranes between rays deeply incised; seventh anal ray 1.9; caudal truncate, equal to head; pectoral very broad at base, pointed, rays just below middle of fin longest; ventrals small, inserted before origin of spinous dorsal, 1.5 in head; caudal peduncle compressed, its depth 2.5; lateral line arched at first, running down abruptly before tip of pectoral to middle of side, and then straight to base of caudal.

Color in alcohol, brown, mottled with darker, lower surface paler, a black blotch behind eye; side with fine dark vertical cross-bands extending on dorsal fins; soft dorsal with oblique dusky streaks; anal with outer portion dusky; caudal with 4 dusky cross-bars; pectoral and ventral gray.

Described from an example (No. 810) taken at Kailua.

The color pattern of this species is variable, as the fish described above is without the dusky cross-bars on the right side of body. Some examples show about 5 ill-defined pairs of brown vertical mottlings. In another example (No. 1010) the colors are well preserved in alcohol; dorsal fins spotted with brown; a dark-brown spot at base of first, fourth, seventh, tenth, and between last spine and first ray; also a dark-brown spot at base of third, sixth, ninth, twelfth, and last dorsal rays; side beautifully variegated with brown, and just below the middle a row of white spots; lower surface of body white; a black streak behind eye and a black blotch above base of pectoral; lower surface of

head, lips, and front of snout with white lines and spots; tips of anal rays white, fin with a submarginal grayish band; several whitish streaks about base of pectoral.

From Kailua we have examined 35 examples from 0.8 to 5.5 inches in length, averaging 3.2 inches in length; from Hilo 6 examples from 2.6 to 5.1 inches in length, averaging 3.4 inches; 2 examples from Waianae, 2.75 and 4.25 inches, respectively; and 5 examples from Honolulu, 1.5 to 2.4 inches, average 1.9 inches.

The specimens figured in Günther's Südsee as *Salaria marmoratus* are not this species, but *A. striatus*. *Alticus marmoratus* is thus far known only from the Hawaiian Islands.

*Bleinius marmoratus* Bennett, Zool., Jour., IV, No. XIII, Art. III, 1828, 25, Oahu.

*Salaria marmoratus*, Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 305, 1836 (Ceylon); Günther, Cat., III, 248, 1861 (Sandwich Islands); Günther, Fische der Südsee, VI, 204, 1877, in part (Sandwich Islands); Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (Sept. 23, 1903), 507 (Honolulu); Snyder, op. cit. (Jan. 19, 1904), 536 (Laysan Island).

**417. *Alticus gibbifrons* (Quoy & Gaimard). Figs. 221 and 221a.**

Head 4.5 in length; depth 4.65; eye 4 in head; snout 3.65; width of mouth 2; interorbital about 2 in eye; D, XII, 19, A, 1, 20.

Body elongate, compressed, greatest depth about middle of belly; depth of head 1.25 in its length; width of head 1.25; head elongate, upper profile horizontal; interorbital space projecting forward

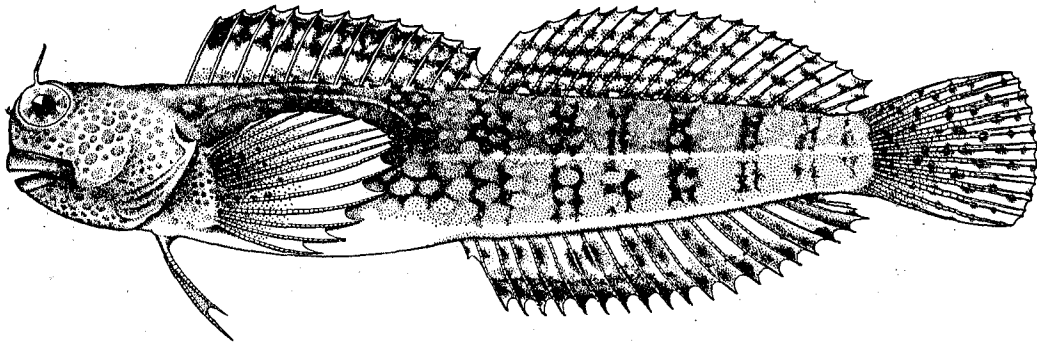


FIG. 221.—*Alticus gibbifrons* (Quoy & Gaimard). Type of *Salaria rutilus* Jenkins.

beyond tip of snout; eye high, very far forward in head, the anterior margin before front margin of snout; snout inferior, oblique, convex space between lower margin of eye and corner of mouth a little less than eye diameter; interorbital space narrow, slightly concave; mouth low, inferior, broad; teeth small, in a comb-like band in each jaw; lower jaw with strong canines; lips thin, entire, without fringe; nostrils well separated, anterior with a short flap ending in 4 thin fleshy filaments; a thin filament above the eye 1.35 in its diameter; dorsal spines distinct from soft portion of fin, somewhat flexible, third 2 in head; soft dorsal a little higher than spines, fourth ray 1.5 in head; last ray joined to upper edge of caudal peduncle by membrane; anal rather low, membranes incised along edge of fin, fifth 1.4; caudal elongate, rounded, about 1.1 in head; tenth and eleventh pectoral rays longest, a trifle over length of head; ventral 1.5; caudal peduncle compressed, its depth 2 in head; lateral line incomplete, running for about first three-fourths lengths of spinous dorsal, straight, only slightly bent down at end.

Color in alcohol, pale brown, side with about 9 pairs of brown crossbars with brown reticulating connecting lines on the back and anterior part of body, very well defined about pectoral fin; body almost everywhere marked with very numerous brown dots; lower surface of head with numerous round brown spots; a black blotch on the upper membrane of dorsal between first and second spines, and another, less distinct, between second and third; rest of upper portion of spinous dorsal with 2 series of blackish brown spots, basal portion of fin brownish; soft dorsal with 3 or 4 irregular series of blackish brown spots; margin of anal whitish, the outer portion with a series of small

blackish brown spots, and the middle with a median series of large spots of same color; caudal with dark brown spots arranged in about 5 cross-series; pectoral with many small dusky brown spots on basal portion; ventral pale.

Described from an example (No. 954) taken at Hilo.

We have 3 other specimens from Hilo, 2 from Waikiki, 4 from Kailua, and 8 from Honolulu, including the types of *S. saltans* and *S. rutilus*. Length 1 to 3 inches.

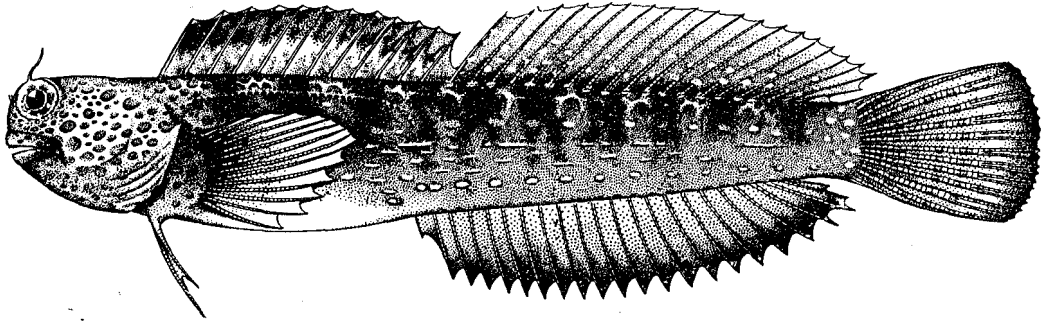


FIG. 221a.—*Alticus gibbifrons* (Quoy & Gaimard). Type of *Salarias saltans* Jenkins.

*Salarias gibbifrons* Quoy & Gaimard, Voy. de l'Uranie, Zool., 253, 1824, Sandwich Islands; Günther, Fische der Südsee, VI, 205, taf. cxiv, fig. C, 1877 (Rarotonga; Sandwich Islands); Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 517 (Sandwich Islands); Snyder, Bull. U. S. Fish Comm., XXII, 1902 (Jan. 19, 1904), 536 (Hilo; Honolulu).  
*Salarias saltans* Jenkins, op. cit. (Sept. 23, 1903), 508, fig. 48, Honolulu (type, No. 50696, U. S. Nat. Mus.; coll. O. P. Jenkins).  
*Salarias rutilus* Jenkins, op. cit., 509, fig. 49, Honolulu (type, No. 50695, U. S. Nat. Mus.; coll. O. P. Jenkins).

#### Genus 248. ENCHELYURUS Peters.

This genus is closely allied to *Petroscirtes*, differing chiefly in having the vertical fins united, the body shorter, and the gill-openings larger. Only one Hawaiian species.

*Enchelyurus* Peters, Berl. Monatsb. 1868, 268 (*flavipes*).

#### 418. *Enchelyurus ater* (Günther). Fig. 222.

Head 3.75; depth 5.25; eye 3.5; snout 4; width of mouth 3; interorbital 1.65 in eye; D. 31; A. 19. Body elongate, compressed, greatest depth about root of ventral; depth of head 1.25 in its length;

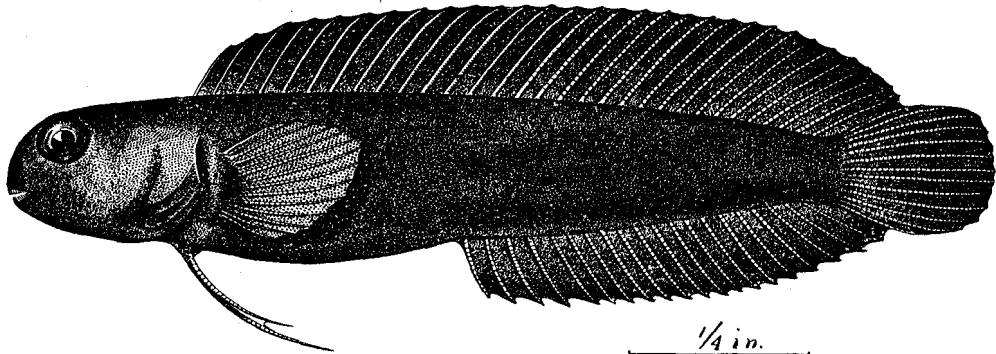


FIG. 222.—*Enchelyurus ater* (Günther). Type of *Aspidontus brunneolus* Jenkins.

width 1.75; head rather elongate, compressed, swollen a little behind, anterior profile very steep; profile of head above eye rounded, top nearly straight; eye small, high, in anterior part of head; mouth low, inferior, broad; teeth small, fine, in a single series in jaws; lips thin, rather broad;