

THE FISHES OF SAMOA

DESCRIPTION OF THE SPECIES FOUND IN THE ARCHIPELAGO, WITH A
PROVISIONAL CHECK-LIST OF THE FISHES OF OCEANIA

By DAVID STARR JORDAN AND ALVIN SEALE



FIG. 1.—*Periophthalmus barbarus* Linnaeus.

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INTRODUCTION.

The islands of Samoa, known also as the Navigator Islands, or Schiffer Insel, lie in the South Pacific Ocean in latitude 14° south and longitude 172° west. They are volcanic in character, each of the larger ones rising in a high ridge, with extinct craters, now very heavily wooded. The almost constant rains tend to make these forests very dense, feeding swift, clear streams, which carry a large volume of water considering the slight length of their courses. Each island is surrounded by a broad coral reef, the outer parts bare at low tide, with a narrow, shallow channel between the inner part and the shore. This reef is interrupted in certain regions, known as the "iron-bound" coast, where the lava rocks cease abruptly beside deep water. It is also interrupted at the mouths of certain streams, which by their fresh waters kill the coral and make a channel through the reef.

Of these islands the westernmost, Savaii, about 45 miles long by 30 miles broad, is the largest and the most recent geologically. Upolu, 40 miles by 15 miles, is near it in size and position. On the north side of the latter island is the broad V-shaped Bay of Apia, which can scarcely be called a harbor, as it is filled up by the reef with the exception of a deep and tortuous channel opposite the mouth of the river Vaisigano, a considerable stream, perhaps the largest on the islands. Upolu and Savaii are now under the German flag, with the capital at Apia. On the west side of the Bay of Apia is the long, narrow peninsula of coral sand, known as Mulinu'u, the residence of Mataafa, chief of Samoa, and the former residence of the kings of the islands. To the west of Mulinu'u is the shallow Bay of Vaitele, and to the eastward of Apia is the larger Bay of Vailele. Into Vaitele Bay flows Gasegase River. Into the Bay of Apia flows the Vailema stream and the Vaisigano River, while to the eastward Vaivasi River runs into the Bay of Vailele.

The next island in size and importance is Tutuila, 20 miles long by about 4 miles broad, which lies about a deep crater, with the two high peaks of Matabas and Peoa adjoining it. The crater has a narrow opening at one side and forms the landlocked harbor of Pago Pago, the best in Polynesia, about 2.5 miles long and 1 mile wide, with everywhere a broad rim of coral reef. There is a small stream near the head of the harbor, and there are springs along the side.

The oldest island is Manua, still farther to the eastward, nearly circular, and about 10 miles across, and there are also about six smaller islets, none of which was examined by us. The islands of Tutuila and Manua are now under the flag of the United States.

In the summer of 1902 investigation of the fish and fisheries of this archipelago was made under the auspices of the U. S. Bureau of Fisheries.^a The work was conducted chiefly from Apia and Pago Pago; and during the comparatively short time devoted to it, rich collections, numerous as to species and individuals, were obtained, and many species new to science were discovered.

The coral reefs of the South Seas literally swarm with fishes. The larger species live in the deeper channels, passing in and out with a display of brilliant colors. The smaller species, as Pomacentridæ, Blenniidæ, Chætodontidæ, live on the surface of the reefs and are segregated in pools as the tides recede. Many of these reef fishes show marked protective coloring, having the hues and markings of the reef itself. Still others show what may be termed defiant coloring, their hues of blue, scarlet, yellow, and green being in vivid contrast to the rocks about them. Nowhere are these reef fishes more brilliant than in Polynesia. It is not easy to explain the reason for these vivid hues, nor for the elaborate and striking markings which accompany them. It is clear that protective coloration is needless, for these species are exceedingly active and when disturbed move through the water like animated lightning; but why such a riot of color should exist is not evident. There is apparently no advertising end to be served, and the idea that recognition has a high value to the species has never been received with favor by naturalists. In the record of the voyage of Captain Cook is the following account of the fishes of the atoll called Palmerston Island:

At one part of the reef which bounds the lake within, almost even with the surface, there was a large bed of coral, which afforded a most enchanting prospect. Its base, which was fixed to the shore, extended so far that it could not be seen, so that it appeared to be suspended in the water. The sea was then unruffled, and the refulgence of the sun exposed the various sorts of coral in the most beautiful order; some parts luxuriantly branching in the water, others appearing in vast variety of figures, and the whole greatly heightened by spangles of the richest colors, glowing from a number of large clams, interspersed in every part. Even this delightful scene was greatly improved by the multitude of fishes that gently glided along, seemingly with the most perfect security. Their colors were the most beautiful that can be imagined: blue, yellow, black, red, &c., far excelling anything that can be produced by art. The richness of this submarine grotto was greatly increased by their various forms, and the whole could not possibly be surveyed without a pleasing transport, accompanied, at the same time, with regret that a work so astonishingly elegant should be concealed in a place so seldom explored by the human eye.

The fish fauna of Upolu and Tutuila is entirely the same, nor is there evidence of any divergence from the fauna of Tahiti, Tonga, and other islands of similar character. It is largely identical with that of the East Indies, from which nearly all

^aThis expedition was under the direction of Dr. David Starr Jordan, who was assisted in the work by Prof. Vernon Lyman Kellogg and Mr. Michitaro Sindo, of Stanford University for the Bureau, and the volunteer service of Prof. Robert Edgar Allardice, of Stanford University, and Knight Starr Jordan.

Acknowledgments for assistance of various kinds are due to the governor of Samoa, Dr. Schnee, and to Mr. H. J. Moors, of Apia; to Capt. Uriel Sebree, U. S. Navy, commandant at the station, and his officers and assistants, through whom the U. S. gunboat *Wheeling* and its equipment were placed at the disposal of the investigating party; to Mauga, chief of Tutuila, and to Tuatagaloa in Apia, through whose interest many small reef fishes were obtained; and to various Samoan assistants, chief among whom were Taa, Vaiula, Musila, and Salewale, of Apia, and Afele, of Pago Pago, whose services contributed much to the success of the work.

of its elements are clearly derived. But a number of East Indian species fail to extend their range thus far to the east, very many of them not ranging beyond the island of Papua or New Guinea. A few large species are confined to the islands of Polynesia, and many of the small ones, especially those living in crevices in the coral, seem to have originated in Polynesia. It is a general rule of distribution that with any given species the one nearest related will be found in neighboring waters, but not in the same waters. This indicates that in general species have a basis in geographical separation. But the Samoan species of *Eviota*, *Enneapterygius*, *Salarias*, and the like seem to form exceptions to this rule. Here closely related species live in the same region. Perhaps these forms originate in saltations or "mutations". More likely the isolation of different coral masses is sufficient to prevent the migration of individuals, and hence to favor the selection of fluctuations under varying conditions, thus producing distinct species in regions not far separated. As most of these little fishes are less than an inch long and local in their habit, this is possible. The conditions illustrate the remark of Dr. Elliott Coues that "migration holds species true; localization lets them slip." In other words, a species splits up into minor groups if its range is divided by barriers preventing free movement of individuals.

The previous collections of fishes from Samoa have been relatively few. The earliest recorded species, from Apia, was named *Diagramma gibbosum* by Hombron & Jacquinot in their ichthyology of the "Voyage au Pole Sud" by Dumont D'Urville, published in 1841.

Later, 1868 to 1870, the gigantic trading house of "Cæsar Godeffroy und Sohn" of Hamburg made Apia the center of its operations. Among other workings of this firm was the establishment at Hamburg of the Godeffroy Museum and the publication for a time of a "Journal des Museum Godeffroy," in which the natural history of the South Seas was elaborately treated. Among other papers on this subject, the "Fische der Südsee" of Dr. Albert Günther (1873) is especially noteworthy. This is based primarily on a series of colored life sketches of the fishes of Hawaii, Tahiti, Samoa, and other islands, made by Mr. Andrew Garrett in the several years of his residence in Polynesia. In this paper descriptions are given of most of the fishes then known from the South Seas, with excellent colored plates of a large proportion of these. Unfortunately, the Godeffroy firm fell into financial embarrassment, the publication of its journal was suspended, and the "Fische der Südsee" was never completed, ceasing abruptly in the family of *Labridæ*.

From the Godeffroys a considerable number of fishes had been earlier sent to the Museum of Vienna, where, about 1868, they had been described by Dr. Rudolph Kner and Dr. Franz Steindachner. Still later, Rev. S. J. Whitmee, a missionary resident on the island of Savaii, sent to the British Museum a large and well chosen collection from Savaii and Upolu. A part of this collection has been used by Dr. George Albert Boulenger in the preparation of the first volume of his Catalogue of Fishes of the British Museum. Outside the percoid group, however, this collection remains unstudied. A small collection also was made about 1876 by Dr. Streets, of the United States Navy. It was described in the Bulletin of the U. S. National Museum, volume VII, in 1877. A few species in the Academy of Natural Sciences at Philadelphia, collected by Mr. Caldwell, have been recorded by Mr. Henry W. Fowler.

At the time of our visit at Samoa the following species, 164 in number, were known from the Samoan Islands; about six were not taken by us; and in regard to a few there is some question of correctness of identification. The nomenclature in this list is that adopted in the present paper.

LIST OF SPECIES KNOWN FROM SAMOA PRIOR TO 1902.

<i>Fistularia petimba.</i>	<i>Lethrinus ramak.</i>	<i>Hepatus matoides.</i>
<i>Macrorhamphosus brevispinis.</i>	<i>Pharopteryx melas.</i>	<i>Hepatus aterrimus.</i>
<i>Liza caeruleomaculata.</i>	<i>Pharopteryx nigricans.</i>	<i>Hepatus lineatus.</i>
<i>Liza troscheli.</i>	<i>Upeneus vittatus.</i>	<i>Hepatus nigricans.</i>
<i>Polydactylus plebeius.</i>	<i>Mulloides samoensis.</i>	<i>Hepatus achilles.</i>
<i>Holotrachys lima.</i>	<i>Pseudupeneus barberinus.</i>	<i>Hepatus guttatus.</i>
<i>Holocentrus ruber.</i>	<i>Pseudupeneus indicus.</i>	<i>Zebrasoma veliferum.</i>
<i>Holocentrus punctatissimus.</i>	<i>Pseudupeneus moana.</i>	<i>Ostracion punctatum.</i>
<i>Holocentrus diadema.</i>	<i>Pomacentrus nigricans.</i>	<i>Balistapus aculeatus.</i>
<i>Holocentrus microstomus.</i>	<i>Pomacentrus lividus.</i>	<i>Platycephalus variolosus.</i>
<i>Holocentrus opercularis.</i>	<i>Chromis caeruleus.</i>	<i>Sebastopsis guamensis.</i>
<i>Holocentrus laevis.</i>	<i>Dascyllus aruanus.</i>	<i>Scorpænopsis gibbosa.</i>
<i>Megalaspis cordyla.</i>	<i>Abudefduf sordidus.</i>	<i>Pterois radiata.</i>
<i>Caranx forsteri.</i>	<i>Abudefduf dicki.</i>	<i>Dendrochirus brachypterus.</i>
<i>Scomberoides sanctipetri.</i>	<i>Abudefduf uniocellatus.</i>	<i>Mapo fuscus.</i>
<i>Trachinotus ovatus.</i>	<i>Abudefduf amabilis.</i>	<i>Rhinogobius neophytus.</i>
<i>Trachinotus bailloni.</i>	<i>Abudefduf leucopomus.</i>	<i>Awaous genivittatus.</i>
<i>Pempheris oualensis.</i>	<i>Abudefduf zonatus.</i>	<i>Awaous ocellaris.</i>
<i>Epinephelus merra.</i>	<i>Abudefduf bonang.</i>	<i>Zonogobius semidoliatus.</i>
<i>Epinephelus fuscoguttatus.</i>	<i>Labrichthys cyanotaenia.</i>	<i>Paragobiodon echinocephalus.</i>
<i>Epinephelus socialis.</i>	<i>Labroides dimidiatus.</i>	<i>Amblygobius phalæna.</i>
<i>Epinephelus sonnerati.</i>	<i>Cheilinus digrammus.</i>	<i>Valenciænnea violifera.</i>
<i>Cephalopholis argus.</i>	<i>Cheilinus trilobatus.</i>	<i>Asterropterix semipunctatus.</i>
<i>Cephalopholis miniatus.</i>	<i>Pseudocheilinus hexataenia.</i>	<i>Eleotris fusca.</i>
<i>Variola louti.</i>	<i>Hemigymnus melapterus.</i>	<i>Hypseleotris guntheri.</i>
<i>Paracanthistius maculatus.</i>	<i>Anampses melanurus.</i>	<i>Pseudogobiodon citrinus.</i>
<i>Kuhlia marginata.</i>	<i>Anampses diadematus.</i>	<i>Gobiodon ceramensis.</i>
<i>Amia novemfasciata.</i>	<i>Stethojulis casturi.</i>	<i>Periophthalmus barbarus.</i>
<i>Amia savayensis.</i>	<i>Stethojulis renardi.</i>	<i>Soleichthys heterorhinos.</i>
<i>Mionorus græffei.</i>	<i>Stethojulis strigiventer.</i>	<i>Parapercis tetracanthus.</i>
<i>Apogonichthys variegatus.</i>	<i>Thalassoma schwanefeldi.</i>	<i>Enneapterygius minutus.</i>
<i>Euelaticthys crassispinus.</i>	<i>Monodactylus argenteus.</i>	<i>Enneapterygius hemimelas.</i>
<i>Plectorhynchus diagramma.</i>	<i>Platax orbicularis.</i>	<i>Petrosirtes tapeinosomus.</i>
<i>Plectorhynchus orientalis.</i>	<i>Chaetodon ulietensis.</i>	<i>Petrosirtes atrodorsalis.</i>
<i>Priacanthus cruentatus.</i>	<i>Chaetodon lineolatus.</i>	<i>Petrosirtes longifilis.</i>
<i>Scolopsis trilineata.</i>	<i>Chaetodon citrinellus.</i>	<i>Alticus evermanni.</i>
<i>Scolopsis lineata.</i>	<i>Chaetodon semeion.</i>	<i>Alticus sebæ.</i>
<i>Xystema gigas.</i>	<i>Chaetodon uninaculatus.</i>	<i>Alticus variolosus.</i>
<i>Gnathodentex aurolineatus.</i>	<i>Chaetodon quadrimaculatus.</i>	<i>Alticus alboguttatus.</i>
<i>Terapon jarbua.</i>	<i>Heniochus monoceros.</i>	<i>Alticus periophthalmus.</i>
<i>Monotaxis grandoculis.</i>	<i>Holocanthus diacanthus.</i>	<i>Salarias edentulus.</i>
<i>Kyphosus waigiensis.</i>	<i>Holocanthus bicolor.</i>	<i>Salarias fasciatus.</i>
<i>Lethrinella miniata.</i>	<i>Holocanthus nicobariensis.</i>	<i>Exallias brevis.</i>
<i>Lethrinus mcensi.</i>	<i>Siganus marmoratus.</i>	<i>Antennarius drombus.</i>

The fish fauna of the Samoan Islands is one of the richest on the globe. In our short stay we obtained 475 species, of which 92 seem to be new to science. The following is a list of these new forms.

LIST OF 92 SAMOAN SPECIES BELIEVED TO BE NEW.

Himantura fai.	Chromis iomelas.	Trimma cæsiura.
Gymnothorax talofoa.	Halichæres dædalma.	Glossogobius vaisiganis.
Echidna trossula.	PlatyGLOSSUS flos-coralis.	Vailima stevensoni.
Anarchias allardicei.	Callyodon fumifrons.	Vaimosa fontinalis.
Anarchias knighti.	Callyodon kelloggi.	Mapo crassiceps.
Rhinamuræna eritima.	Callyodon maoricus.	Mars strigiliceps.
Zenarchopterus vaisiganis.	Callyodon pyrrhurus.	Rhinogobius corallinus.
Anchovia evermanni.	Callyodon ruberrimus.	Rhinogobius muscarum.
Anchovia apiensis.	Callyodon erythacus.	Chænogobius erythrope.
Myripristis sanguineus.	Callyodon upolensis.	Vitreola sagitta.
Corythoichthys sealei.	Callyodon zonularis.	Kelloggella cardinalis.
Corythoichthys waitei.	Callyodon abacurus.	Heteroleotris phaenna.
Corythoichthys mataafa.	Callyodon latax.	Heteroleotris clara.
Microphis torrentius.	Callyodon cyanogrammus.	Sicyopterus tauca.
Atherina uisila.	Callyodon ultramarinus.	Hypoleurochilus vaillanti.
Decapterus lundini.	Callyodon lazulinus.	Alticus evermanni.
Caranx gilberti.	Hepatus aquilinus.	Alticus musilæ.
Amia exostigma.	Dendrochirus sausaulele.	Alticus thalassinus.
Amia doryssa.	Sebastapistes laotale.	Salarias atkinsoni.
Foa vaiulæ.	Synchiropus lili.	Salarias garmani.
Foa fo.	Eviota afelei.	Salarias sindoni.
Apogonichthys isostigma.	Eviota smaragdus.	Salarias bryani.
Ambassis vaivasensis.	Eviota sebreei.	Blennioides tonganus.
Ambassis lafa.	Eviota pruinosa.	Petroscirtes azureus.
Pseudupeneus moana.	Eviota zonura.	Petroscirtes xestus.
Chorististium susumi.	Eviota distigma.	Enneapterygius hudsoni.
Pomacentrus eclipticus.	Eviota prasites.	Enneapterygius pardochir.
Pomacentrus vaiuli.	Eviota herrei.	Enneapterygius tusitalæ.
Abudefduf taupou.	Drombus tutuilæ.	Enneapterygius tutuilæ.
Abudefduf metallicus.	Valenciennea violifera.	Enneapterygius cerasinum.

All of the specimens are from the reefs; we had no means of fishing in the open sea. In general, we had four methods of collecting: First, the use of dynamite, by which nearly all our large fish were taken. Second, the use of poison in the pools on the reef at low tide; the poisons used were commercial chloride of lime and sulphate of copper, the first much to be preferred, and thus were obtained hundreds of small fishes, notably Pomacentridæ, Gobiidæ, Blenniidæ, and eels. Third, the use of the seine along the shores, whereby the herring and other shore fishes were taken. Fourth, the employment of divers to bring up coral heads, which when broken yield many specimens of *Eviota*, *Enneapterygius*, and the smaller eels. The larger fishes, *Callyodon* excepted, have been described long since, but most of the little fishes taken from the corals are new. This method of collecting has never been practiced by other naturalists in this region.

In the present paper are given the field notes of Professors Jordan and Kellogg, the descriptions of new species, with other notes, and enough of synonymy to complete the references given by Dr. Günther in his "Catalogue of Fishes of the British Museum" and his "Fische der Südsee", and those given by Dr. Boulenger in volume I of his edition of the British Museum Catalogue; and of those given by Jordan and Evermann and by Dr. Gilbert in their recent reviews of the fishes of Hawaii. Synonymy is given in general only when our studies have added something to the record given by these authorities. Type localities are shown in the synonymy in heavy-face type.

The colored plates are in some cases a revision of field sketches by Dr. Jordan; the others were made from specimens that had not faded. Some of the sketches are not quite accurate in certain details of scales and fin rays, but the shades of coloration are very well shown.^a

The area represented in this list comprises Hawaii, Polynesia, Melanesia, and Micronesia. It excludes New Zealand, Torres Straits, the Arafura Sea, and the islands to the westward of Waigiu and to the southward of the Louisiades; but the eastern coast of New Guinea is included. All the species we find recorded from these regions are embraced in the list. There are doubtless numerous omissions, and there are many nominal species which will be eliminated when the region is fully explored.

Of these regions, the fauna of Hawaii is much the most distinct from that of Samoa. With most of the same genera, the species of shore fishes in Hawaii are very largely distinct from those of Polynesia. This is due to the long separation of Hawaii, and perhaps to the westward direction of her ocean currents, while those of Samoa and Tahiti trend eastward. The very extensive fauna of Melanesia is essentially that of the East Indies, with the loss of some species, and the incursion of very many others from Australia. The fauna of Micronesia differs little from that of Polynesia.

The islands whose fish fauna is considered may be classified as follows:

HAWAII.

Hawaii.	Kauai.	French Frigate Shoal.
Oahu.	Niihau.	Laysan.
Molokai.	Bird.	Midway.
Maui.	Necker.	Johnston.
Lanai.		

POLYNESIA.

Fanning Islands:	Samoa, or Navigator Islands:
Palmyra.	Savaii.
Christmas.	Upolu.
Thornton.	Tutuila.
Marquesas Islands:	Manua.
Nukahiva.	Rose.
Paumotu Islands:	Tonga, or Friendly Islands:
Gambier Islands (Mangareva).	Tongatabu.
Makatea.	Vavau.
Pitcairn.	Kermadec Islands:
Tahiti, or Society Islands:	Raoul, or Sunday.
Tahiti (Otaheite).	Fiji Islands:
Raiatea (Ulietea).	Viti Levu.
Huahine.	Vanua Levu.
Billingshausen.	Ovalau.
Cook Islands:	Levuka.
Rarotonga.	Kandavu.
Austral Islands:	Kanathia.
Tubuai.	

^aThe colored drawings for the most part were made by Kako Morita; the uncolored sketches are the work of Chloe Leslie Starks, W. S. Atkinson, R. L. Hudson, and Sekko Shimada.

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MELANESIA.

New Hebrides:
 Banks Group.
 Espiritu Santo.
 Faté (Vate).
 Aneiteum.
 Tanna.
 Erromango.
 Loyalty Islands:
 New Caledonia.
 Santa Cruz Islands:
 Vanicolo (Vanikoro).
 Ticopia.
 Solomon Islands:
 Guadalcanar.
 Shortland.
 Alu.
 Bougainville.
 New Georgia.
 San Cristobal.

Bismarck Archipelago:
 Admiralty Islands.
 New Hanover.
 New Ireland (New Mecklenberg).
 Duke of York Group.
 New Britain (New Pomerania).
 L'Echiquier Islands.
 Papua, or New Guinea:
 Waigiu.
 Misol.
 Rawak.
 New Guinea.
 D'Entrecasteaux Islands.
 D'Urville Islands.
 Percy.
 Normanby.
 Moresby.
 Louisiades.

MICRONESIA.

Phoenix Islands:
 Howland.
 Sydney.
 Ellise Islands:
 Rotumah.
 Nurakita.
 Funafuti.
 Gilbert Islands:
 Makin.
 Apamana.
 Marshall Islands:
 Jaluit.
 Bonham.
 Radack Islands.

Caroline Islands:
 Kusaie (Strong or Oualan).
 Yap.
 Rug.
 Royalist.
 Pingelap.
 Ulea (Wolea).
 Ladrone Islands (Mariana):
 Guam.
 Bonin Islands:
 Marcus.
 Palau Islands (Pelew).

SYSTEMATIC LIST OF SPECIES.

Family BRANCHIOSTOMIDÆ.

AMPHIOXIDES Gill.

1. *Amphioxides pelagicus* (Günther). Deep waters of Hawaii.

EPIGONICHTHYS Peters. (*Asymmetron* Andrews.)

2. *Epigonichthys caudatus* (Willey). Louisiades.

Asymmetron caudatum Willey, Quart. Jour. Mic. Soc. 1396, 219, Louisiades.

Family SCYLLIORHINIDÆ.

CATULUS Smith.

3. *Catulus spongiceps* Gilbert. Deep seas of Hawaii.

Family HEMISCYLLIDÆ.

HEMISCYLLIUM Müller & Henle.

4. *Hemiscyllium ocellatum* (Gmelin). New Guinea (Macleay); Australia.
 5. *Hemiscyllium freycineti* (Quoy & Gaimard). Waigiü.
Scyllium freycineti Quoy & Gaimard, Voy. Uranie, 192, 1824, Waigiü.
Scyllium malaisianum Lesson, Voy. Coquille, II, 94, pl. 6, 1830, Waigiü.

ORECTOLOBUS Bonaparte. (*Crossorhinus* Müller & Henle.)

6. *Orectolobus barbatus* (Gmelin). New Guinea (Macleay); Australia; Japan.
 7. *Orectolobus dasypogon* (Bleeker). Waigiü; Alu.
Crossorhinus dasypogon Bleeker, Archiv Neerl. 1867, 400, with plate, Waigiü.

If this species is really different from the Australian *O. barbatus*, it is probable that Japanese as well as Melanesian specimens belong to it.

Family GINGLYMOSTOMATIDÆ.

NEBRIUS Rüppell.

8. *Nebrius concolor* Rüppell. New Guinea (Macleay); Indian Seas.

GINGLYMOSTOMA Müller & Henle.

9. *Ginglymostoma ferrugineum* (Lesson). New Ireland; Waigiü; India.
Scyllium ferrugineum Lesson, Voy. Coquille, II, 95, 1824.
Ginglymostoma mulleri Günther, Cat., VIII, 408, 1870.

Family CARCHARIIDÆ. *Malie; Tanäfa.*

GALEUS Rafinesque.

10. *Galeus japonicus* Müller & Henle. Laysan; Japan.

GALEOCERDO Müller & Henle.

11. *Galeocerdo tigrinus* Müller & Henle. Hawaii; Australia; Japan.

TRIENODON Müller & Henle.

12. *Trienodon obesus* (Rüppell). Aneiteum; East Indies.

PRIONACE Cantor.

13. *Prionace glauca* (Linnæus). Hawaii; warm seas.

CARCHARIAS Rafinesque.

14. *Carcharias melanopterus* Quoy & Gaimard. *Malie alamata*. Waigiü; Thornton I.; Christmas I.; Washington I.; Hawaii; Samoa.

This species, known at once by the jet black tips to its fins, is the commonest shark in the channels between the reefs of Samoa.

15. *Carcharias phorcys* Jordan & Evermann. Hawaii.
 16. *Carcharias insularum* Snyder. Hawaii.
 17. *Carcharias nesiotus* Snyder. Hawaii; Laysan; French Frigate Shoals.
 18. *Carcharias sorrah* Müller & Henle. Solomon Is. (Seale); East Indies.
 19. *Carcharias maou* (Lesson). Paumotu Is.
Squalus maou Lesson, Voy. Coquille, II, 91, pl. 1, 1830, Paumotu Is.
 20. *Carcharias pleurotænia* Bleeker. New Guinea (Bleeker); East Indies.

HYPOPRIONODON Gill.

21. *Hypoprionodon macloti* (Müller & Henle). New Guinea (Bleeker); East Indies.

Family SPHYRNIDÆ.

SPHYRNA Rafinesque.

22. *Sphyrna zygzæna* (Linnæus). *Mata-i-taliga*. Samoa; Hawaii; Fiji; New Guinea; warm seas.

The common hammerhead is abundant at the reefs of Samoa, as also at Hawaii. Two specimens preserved from Apia.

Family ALOPIIDÆ.

ALOPIAS Rafinesque.

23. *Alopias vulpes* (Gmelin). Hawaii; warm seas.

Family LAMNIDÆ.

ISUROPSIS Gill.

24. *Isuropsis glauca* (Müller & Henle). Hawaii; tropical Pacific.

CARCHARODON Smith.

25. *Carcharodon carcharias* (Linnæus). Hawaii; warm seas.

Family SQUALIDÆ.

SQUALUS Linnæus.

26. *Squalus mitsukurii* Jordan & Snyder. Hawaii; Japan.

ETMOPTERUS Rafinesque.

27. *Etmopterus villosus* Gilbert. Deep waters of Hawaii.

CENTROSCYLLIUM Müller & Henle.

28. *Centroscyllium ruscosum* Gilbert. Deep waters of Hawaii.

ISISTIUS Gill.

29. *Isistius brasiliensis* (Quoy & Gaimard). South Pacific, off Fiji; Brazil; Guinea.

Family RHINOBATIDÆ.

RHINOBATUS Bloch & Schneider.

30. *Rhinobatus granulatus* Cuvier. New Guinea; Bougainville Is.; East Indies.
 31. *Rhinobatus thouini* Müller & Henle. Hood Bay, New Guinea (Macleay).
 32. *Rhinobatus joram* Montrouzier. Louisiades.

Rhinobatus joram Montrouzier, Ann. Soc. Lyons, 1856, 220, Woodlark I. (Louisiades).

Family DASYATIDÆ.

DISCOBATUS Macleay & Macleay.

This genus is near *Urolophus*, but has no fin on the tail. The skin is smooth, the disk circular, the ventrals entire, and the teeth small. (Not *Discobatus* Garman 1880, a Japanese genus.)

33. *Discobatis marginipinnis* Macleay & Macleay. Admiralty Is.

Discobatis marginipinnis Macleay & Macleay, Proc. Linn. Soc. N. S. W. 1885, 676, pl. 46.

DASYATIS Rafinesque.

34. *Dasyatis sciera* Jenkins. Hawaii.
 35. *Dasyatis lata* Garman. Hawaii.
 36. *Dasyatis hawaiiensis* Jenkins. Hawaii.
 37. *Dasyatis kuhli* (Müller & Henle). New Ireland; East Indies.
 38. *Dasyatis trigonoides* (Castelnau). New Caledonia.

Raja (Neotrygon) trigonoides Castelnau, Proc. Zool. Soc. Vict. 1873, 121, New Caledonia; a sting ray with the spine wanting.

TÆNIURA Müller & Henle.

Tail long, with a rayless fold of skin below.

39. *Tæniura lymma* (Forskål). New Guinea (Macleay); East Indies.
 40. *Tæniura atra* Macleay. New Guinea (Macleay).

HIMANTURA Duméril.

Tail very long, without fold.

41. *Himantura fai* Jordan & Seale, new species. *Fai*. Samoa.

Snout 4.80 to base of tail; eye 2.75 in interorbital space, which is equal to snout; length of nasal opening 2.75 in interorbital.

Body broadly pentagonal, the snout very broad but somewhat pointed; disk wider than long (14.50 inches wide, 11.50 long); length of disk 3.30 times in the long whip-like tail; teeth not large, about

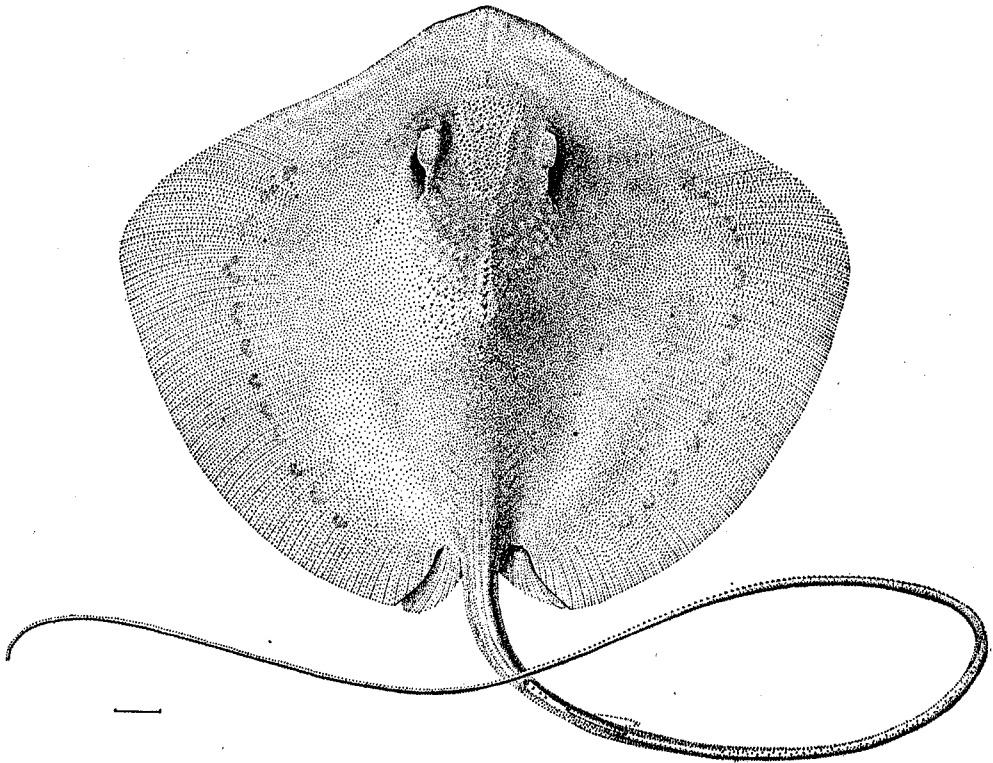


FIG. 2.—*Himantura fai* Jordan & Seale, new species. Type.

13 oblique series on upper jaw and 23 oblique series in lower; upper buccal flap with fine fringes; width of mouth 1.75 in snout; distance between lower gill-openings equal to distance from first to fifth opening; length of ventral fins slightly less than interorbital space; tail without fold of any kind, its lower surface smooth, the upper surface with scattered small prickles (spine removed by fisherman from type); a row of 10 large spinules in front of spine; seven small spines on median line of disk at its highest joint; a few scattered minute spicules scarcely showing through the skin near these spines and on interorbital region, otherwise disk perfectly smooth.

Color in spirits, back a uniform drab, top of tail dusky, under surface of disk uniform white, under surface of tail light brown.

One specimen, type no. 51712, U. S. National Museum, from Apia, Samoa. Length with tail 47 inches. The color in life was plain brown, not very dark, white below, with no reddish shades and no ocelli. The species is allied to *Himantura uarnak*, but the latter species has the disk considerably narrower.

42. *Himantura uarnak* (Forskål). New Ireland; East Indies.

43. *Himantura granulata* (Macleay). New Guinea.

Trygon granulatus Macleay, Proc. Linn. Soc. N. S. W. 1883, 598, S. E. New Guinea.

HYPLOPHUS Duméril.

44. *Hypolophus sephen* (Forskål). New Britain; East Indies.

Family AETOBATIDÆ.

AETOBATUS Blainville. (*Myliobatis* Müller & Henle.)

45. *Aetobatus punctatus* (Macleay & Macleay). Admiralty Is.

Myliobatis punctatus Macleay & Macleay, Proc. Linn. Soc. N. S. W. 1886, 675, pl. 46, fig. 1, Admiralty Is.

STOASODON Cantor. (*Aetobatis* Müller & Henle, not of Blainville.)

46. *Stoasodon narinari* (Euphrasen). Hawaii; Laysan; East Indies; West Indies.

Family MOBULIDÆ.

MOBULA Rafinesque.

47. *Mobula japonica* Müller & Henle. Hawaii; Japan.

48. *Mobula draco* (Günther). Misol.

Dicerobatis draco Günther, Voy. Curaçao, 412, 1873.

Family CHIMÆRIDÆ.

CHIMÆRA Linnæus.

49. *Chimæra purpureascens* Gilbert. Deep seas of Hawaii; Japan.

Family ELOPIDÆ.

ELOPS Linnæus.

50. *Elops saurus* Linnæus. Hawaii; Samoa; New Guinea; warm seas.

MEGALOPS Lacépède.

51. *Megalops cyprinoides* (Broussonet). Tahiti; Guam; Tubuai; Samoa; Papua; Fiji; New Hebrides (Seale); East Indies.

Megalops macropterus Bleeker, Ned. Tydschr. Dierk. 1866, 284, East Indies.

This widely diffused species is common at Samoa, inhabiting the river mouths and brackish pools in the shores. Most of our many specimens from Apia were taken in a pool in the village just east of the mouth of Vaisigano River, this pool being alternately filled by rain and by the surf in storms. None of these specimens is more than a foot long. They correspond perfectly to the *Megalops macropterus* of Bleeker, which is plainly the original *Clupea cyprinoides* of Broussonet. We much doubt the validity of any of the species detached from *Megalops cyprinoides* by Bleeker. In any case, the true *cyprinoides*, from Tahiti, is Bleeker's *macropterus*.

Family CHIROCENRIDÆ.

CHIROCENTRUS Cuvier.

52. *Chirocentrus dorab* (Forskål). New Guinea; New Britain; East Indies.

Family CHANIDÆ.

CHANOS Cuvier.

53. *Chanos chanos* (Forskål). Hawaii; New Caledonia; Samoa; New Guinea; tropical Pacific.
Common along the shores inside the reefs of Samoa.

Family ALBULIDÆ.

ALBULA Gronow.

54. *Albula vulpes* (Linnæus). Tahiti; Tonga; Hawaii; New Guinea; warm seas.

Family CLUPEIDÆ.

ETRUMEUS Bleeker.

55. *Etrumeus micropus* (Schlegel). Hawaii; Japan.

STOLEPHORUS Lacépède. (*Spratelloides* Bleeker.)

56. *Stolephorus delicatulus* (Bennett). *Nefu*. Samoa; East Indies.

About 20 specimens of this fragile little fish were taken inside the reefs of Apia and Pago Pago. Color in life, deep sky blue, sides silvery.

DUSSUMIERIA Cuvier & Valenciennes.

57. *Dussumieria acuta* Cuvier & Valenciennes. New Guinea (Macleay); East Indies.

CORICA Gray. (*Clupeoides* Bleeker.)

58. *Corica papuensis* Ramsay & Ogilby. New Guinea.

Corica papuensis Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 19, Strickland River (New Guinea).

SARDINELLA Cuvier & Valenciennes.

(*Amblygaster* Bleeker; *Sardinia* Poey.)

59. *Sardinella sirm* (Forskål). *I'a moana*; *Pelupelu*. Samoa; East Indies.

Clupea sirm Rüppell, Neue Wirbelthiere, 77, taf. 21, fig. 1, 1835, Red Sea. Günther, Cat., VII, 425, Zanzibar, Batavia. *Sardinella leigastroides*, Bleeker, Tijds. Ned. Ind., VII, 255, Manado; scales 45.

We have numerous specimens of a large sardine from the shores about Apia. It agrees closely with Günther's account of *Clupea sirm*, and must be the fish thus called by Günther. It has only a single dark spot behind the gill-opening, and the species with a series of such spots along the side (*leigaster* and *punctata*) must be different. It is, of course, an excellent food-fish.

Life colors of a specimen from Pago Pago, deep blue above, somewhat streaky along rows of scales, abruptly silvery below; a small spot behind gill-opening; tips of jaws dusky; fins small, dusky above.

HARENGULA Cuvier & Valenciennes.

(*Kowala*, *Rogenia*, and *Clupeonia* Cuvier & Valenciennes; *Paralosa* Bleeker.)

60. *Harengula commersoni* (Cuvier & Valenciennes). *Pelupelu*. Vanicolo; Samoa; East Indies.

(?) *Clupea melanura* Cuvier, Règne Anim., ed. 1, vol. II, p. 318, 1817; no description; obscure reference to Lacépède.

Clupeonia commersoni Cuvier & Valenciennes, Hist. Nat. Poiss., xx, 350, 1847, Pondicherry.

Clupeonia vittata Cuvier & Valenciennes, op. cit., 352, 1847, Vanicolo.

Harengula melanurus Bleeker, Nat. Tijds. Ned. Ind., v, 245.

Clupea atricauda Günther, Cat., VII, 426, 1869, Ceram, Amboina.

One fine specimen was taken at Apia. Life colors, caudal lobes jet black; back blue, blackish streaks along the rows of scales above, sides silvery white.

61. *Harengula gibbosa* (Bleeker). Fiji (Günther); East Indies.
 62. *Harengula chrysotænia* (Bleeker). Tahiti; East Indies.
 63. *Harengula vanicoris* Jordan & Seale, new name. Vanicolo; Papua; East Indies.
Alausa melanura Cuvier & Valenciennes, op. cit., 441, 1847, Vanicolo, New Guinea, Amboina; not *Clupea melanura* Cuvier.

Family DOROSOMATIDÆ.

ANODONTOSTOMA Bleeker.

Last ray of dorsal not produced.

64. *Anodontostoma breviceps* (Peters). Bismarck Is.; New Hanover; East Indies.
Chatoessus breviceps Peters, Berl. Mon. 1876, 848, New Hanover, Bismarck Is., Amboina.
 65. *Anodontostoma chacunda* (Hamilton-Buchanan). New Guinea (Macleay); East Indies.

KONOSIRUS Jordan & Snyder.

Last ray of dorsal filamentous, as in *Dorosoma*.

66. *Konosirus thrissa* (Linnaeus). New Guinea; East Indies; China.
Chatoessus nasus (Bloch) Cuvier & Valenciennes.

Family ENGRAULIDÆ.

ANCHOVIA Jordan & Evermann.

67. *Anchovia purpurea* (Fowler). Hawaii.
 68. *Anchovia apiensis* Jordan & Seale, new species. Nefu. Samoa.

Head 4.50 in body (to base of caudal); depth 5; eye 3.20 in head; snout 4.50; interorbital scarcely equal to eye; dorsal 1, 13; anal 1, 20; scales 34; maxillary elongate, 5 in length of head.

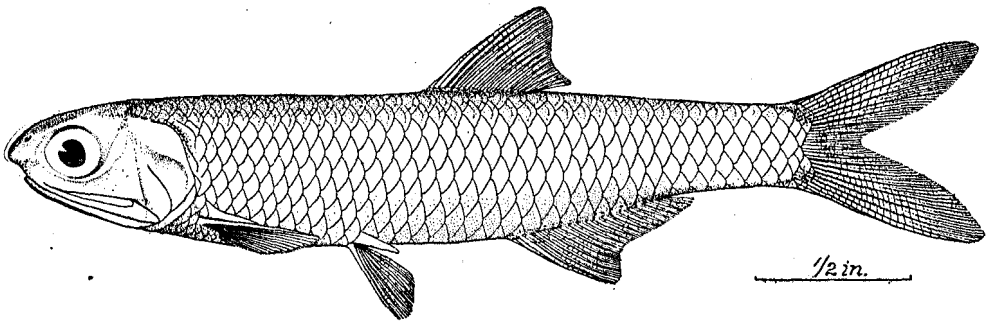


FIG. 3.—*Anchovia apiensis* Jordan & Seale, new species. Type.

Body oblong, compressed; snout produced, conical; mandible 1.45 in head; maxillary extending to posterior angle of preopercle; minute teeth in jaws, palatines, vomer, and pterygoids; gill-rakers 1.20 in eye, 30 on lower limb; insertion of dorsal nearer base of caudal than tip of snout by a distance equal to width of eye, its longest ray 1.20 in head; length of pectoral less than depth of body, 1.75 in head; insertion of ventrals equally distant between origin of pectorals and origin of anal; origin of anal under posterior third of dorsal, its base equal to distance from anterior margin of eye to posterior margin of opercle; caudal forked, its lobes equal to length of head; caudal peduncle rather deep, 2.20 in head; scales deciduous, the middle row of belly with spines.

Color in spirits white, the scales with silvery reflections, more or less punctulate with minute black dots on upper surface; cheeks and iris with gilt reflections; a dusky blotch on upper part of orbit, and on nuchal region; slight dusky shading along base of dorsal, anal, and upper base of caudal; caudal with a slight wash of dusky; other fins white. Life colors white, pale olive on back; a silvery lateral band.

Type no. 51720, U. S. National Museum, from Apia; length 3 inches. Of this small species, we have about a dozen fine specimens from the shores inside the reef at Apia.

69. *Anchovia evermanni* Jordan & Seale, new species. *Nefu*. Samoa.

Head 4 in length; depth 4.50; eye 3.75 in head; snout 1.75; dorsal 1, 13; anal 1, 30; scales 34; interorbital space equal to eye; maxillary equal to depth of fish, 4.50 in length.

Body elongate, compressed; scales large and deciduous; belly trenchant, the scales of middle row each ending in a sharp spine; snout projecting, conical; origin of dorsal midway between tip of snout and base of caudal, its longest ray equal to distance from middle of eye to posterior margin of opercle; pectoral inserted low and extending to base of ventrals, the length 1.50 in head; ventrals 2 in head, their origin nearer pectoral than base of anal; origin of anal posterior to base of dorsal, its length equal to head; caudal deeply forked, the lobes equal to length of head; numerous small teeth on the pterygoids, palatines, vomer and jaws; maxillary extending to posterior angle of preopercle, and bearing a single row of fine teeth; gillrakers scarcely equal to eye, 23 on the lower limb.

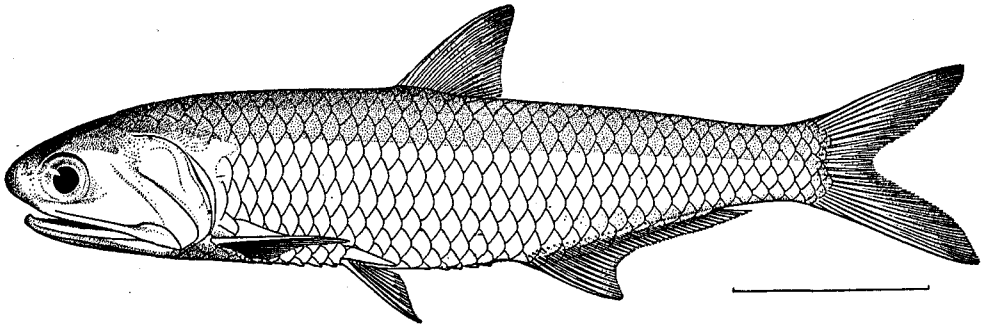


FIG. 4.—*Anchovia evermanni* Jordan & Seale, new species. Type.

Color in spirits, silvery, darker above, with a bluish wash; a golden wash on cheek; a dusky blotch on upper margin of orbit; fins all yellowish white, the caudal with an indistinct tip of dusky on end of lobes. In life one specimen had an orange blotch behind gill-opening above, dorsal and caudal chiefly light orange-brown, no silvery lateral band.

Five specimens, from Apia; type no. 51719, U. S. National Museum, 5 inches long. In all these specimens the depth is 4.66 to 4.75 in the length, instead of 4 times, as stated by Bleeker and Günther of *Anchovia belama*, the nearest known species.

This species is named for Dr. Barton Warren Evermann.

70. *Anchovia scratchleyi* (Ramsay & Ogilby). New Guinea.

Engraulis scratchleyi Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 18, Strickland River (New Guinea).

71. *Anchovia enchrasicoloides* (Bleeker). New Guinea (Macleay); East Indies.

Family AULOPIDÆ.

CHLOROPHTHALMUS Bonaparte.

72. *Chlorophthalmus proridens* Gilbert & Cramer. Deep waters of Hawaii.

Family SYNODONTIDÆ.

SYNODUS Bloch & Schneider.

73. *Synodus varius* Lacépède. Hawaii; Samoa; New Guinea; Fiji; Mangareva (Seale); Japan.

A few specimens of this widely diffused species were taken at Samoa, on the shore within the reef.

74. *Synodus kaianus* Günther. Deep seas of Hawaii; Arafura Sea.

TRACHINOCEPHALUS Gill.

75. *Trachinocephalus myops* Forster. Hawaii; warm seas.

SAURIDA Cuvier.

76. *Saurida gracilis* (Quoy & Gaimard). Hawaii; Samoa; New Guinea; Solomon Is. (Seale).

Two specimens were taken in the seine at Apia. They are more deeply colored than Hawaiian examples, but are not otherwise different. This species is common about Hawaii.

77. *Saurida grandisquamis* Günther. Louisiades; Australia.

78. *Saurida tumbil* (Bloch). Vanicolo; Waigi; East Indies.

Family BRACHYPTEROIDÆ.

BRACHYPTEROIS Günther.

79. *Brachypterois antennatus* Gilbert. Deep seas of Hawaii.

Family MYCTOPHIDÆ.

DASYSCOPELUS Günther.

80. *Dasyscopelus asper* (Richardson). New Ireland.

81. *Dasyscopelus stellatus* (Bennett). Open Pacific.

Scopelus stellatus Bennett, Whaling Voyage, II, 288, open Pacific.

82. *Dasyscopelus pristilepis* Gilbert & Cramer. Deep seas of Hawaii.

83. *Dasyscopelus spinosus* (Lütken). Deep seas of Hawaii.

NANNOBRACHIUM Günther.

84. *Nannobranchium nigrum* Gilbert. Deep seas of Hawaii.

MYCTOPHUM Rafinesque.

85. *Myctophum fibulatum* Gilbert & Cramer. Deep seas of Hawaii.

86. *Myctophum margaritatum* Gilbert. Deep seas of Hawaii.

87. *Myctophum lutkeni* Gilbert. Deep seas of Hawaii.

88. *Myctophum evermanni* Gilbert. Deep seas of Hawaii.

RHINOSCOPELUS Lütken.

89. *Rhinoscopelus oceanicus* Jordan & Evermann. Deep seas to the southward of Hawaii.

DIAPHUS Eigenmann. (*Ethopror*a Goode & Bean.)

90. *Diaphus urolampus* Gilbert & Cramer. Deep seas of Hawaii.

91. *Diaphus chrysorhynchus* Gilbert & Cramer. Deep seas of Hawaii.

92. *Diaphus adenomus* Gilbert. Deep seas of Hawaii.

CENTROBRANCHUS Fowler.

93. *Centrobranchus chærocephalus* Fowler. Deep seas of Hawaii.

94. *Centrobranchus gracilicaudus* Gilbert. Deep seas of Hawaii.

NEOSCOPELUS Johnson.

95. *Neoscopelus alcocki* Jordan & Starks. Deep seas of Hawaii; Japan.

Family MAUROLICIDÆ.

ZALARGES Jordan & Starks.

96. *Zalarges nimbarius* Jordan & Starks. Open sea between Hawaii and Seattle.

Family GONOSTOMIDÆ.

CYCLOTHONE Goode & Bean.

97. *Cyclothone rhodadenia* Gilbert. Deep seas of Hawaii.
 98. *Cyclothone canina* Gilbert. Deep seas of Hawaii.

GONOSTOMA Rafinesque.

99. *Gonostoma elongatum* Günther. Deep water off New Guinea.
Gonostoma elongatum Günther, Challenger Rept., 186, 1887, New Guinea.

Family STOMIIDÆ.

STOMIAS Risso.

100. *Stomias boa* Risso. Mid-Pacific; Mediterranean.
Stomias boa, Peters, Berl. Mon. 1876, 846, 149° 26' W., mid-Pacific.

ASTRONESTHES Richardson.

101. *Astronesthes lucifer* Gilbert. Deep seas of the Pacific.

Family IDIACANTHIDÆ.

IDIACANTHUS Peters.

102. *Idiacanthus fasciola* Peters. Open Pacific.
Idiacanthus fasciola Peters, Berl. Mon. 1876, 846, north of New Guinea, 1° 45' S., 136° W.

Family STERNOPTYCHIDÆ.

STERNOPTYX Herrmann.

103. *Sternoptyx diaphana* Herrmann. Deep seas of Hawaii; deep seas.

POLYIPNUS Günther.

104. *Polyipnus nuttingi* Gilbert. Deep seas of Hawaii.

ARGYRIPNUS Günther.

105. *Argyripnus ephippiatus* Gilbert & Cramer. Deep seas of Hawaii.

ARGYROPELECUS Cocco.

106. *Argyropelecus heathi* Gilbert. Deep seas of Hawaii.

DIPLOPHOS Günther.

107. *Diplophos pacificus* Günther. Mid-Pacific.

Family PARALEPIDÆ.

LESTIDIUM Gilbert.

108. *Lestidium nudum* Gilbert. Deep seas of Hawaii.

NEOSUDIS Castelnau.

109. *Neosudis vorax* Castelnau. New Caledonia.
Neosudis vorax Castelnau, Proc. Zool. Soc. Vict. 1878, 118, Noumea (New Caledonia).

Family HALOSAURIDÆ.

ALDROVANDIA Goode & Bean. (*Halosauropsis* Collett.)

110. *Aldrovandia kauaiensis* Gilbert. Deep waters of Hawaii, Kauai I.
 111. *Aldrovandia proboscidea* Gilbert. Deep seas of Hawaii.
 112. *Aldrovandia verticalis* Gilbert. Deep seas of Hawaii.

Family PLOTOSIDÆ.

PLOTOSUS Lacépède.

113. *Plotosus anguillaris* Bloch. *Apoa*. Samoa; Waigiu; New Guinea; Solomon Islands (Seale); Asia; East Indies.

Plotosus ikapor Lesson, Voy. Coquille, Zool. II, 132, pl. 31, fig. 3, 1830, Waigiu.

This little catfish is occasionally taken in shallow water inside the reef at Apia. The yellow stripes on the sides are very faint or wanting in our specimens, which otherwise do not seem to differ at all from specimens from Nagasaki. We therefore place the species of the South Seas (*Plotosus ikapor*, described first from Waigiu) in the synonymy of *Plotosus anguillaris*.

Color dark olive, mottled, white below; sides with scarcely a trace of pale stripes; fins dusky, especially on the edges. Young individuals more distinctly marked, with two white stripes.

CNIDOGLANIS Günther.

114. *Cnidoglanis macrocephalus* (Cuvier & Valenciennes). New Guinea (Macleay); Timor.

TACHYSURUS Lacépède.

115. *Tachysurus græffi* (Kner & Steindachner).

Arius græffi Kner & Steindachner, Sitz. Ak. Wiss. Wien, 1867, 28, Samoa.

This species is described from Samoa. Perhaps the specimen is not Samoan, but came from the East Indian region, where catfishes of this type are abundant.

116. *Tachysurus armiger* (De Vis). New Britain.

Arius armiger De Vis, Proc. Linn. Soc. N. S. W. 1884, 454, New Britain.

GALEICHTHYS Cuvier & Valenciennes.

117. *Galeichthys froggatti* (Ramsay & Ogilby). New Guinea.

Arius froggatti Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 15, Strickland River (New Guinea).

118. *Galeichthys latirostris* (Macleay). New Guinea.

Arius latirostris Macleay, Proc. Linn. Soc. N. S. W. 1884, 276.

NETUMA Bleeker.

119. *Netuma spatula* (Ramsay & Ogilby). New Guinea.

Arius spatula Ramsay & Ogilby, op. cit., 16, Strickland River (New Guinea).

120. *Netuma thalassina* (Rüppell). New Guinea (Macleay); East Indies.

HEMIPIMELODUS Bleeker.

121. *Hemipimelodus dayi* Ramsay & Ogilby. Strickland River, New Guinea.

122. *Hemipimelodus crassilabris* Ramsay & Ogilby. Strickland River, New Guinea.

LAMBERTIA Perugia.

123. *Lambertia atra* Perugia. New Guinea.

Lambertia atra Perugia, Ann. Mus. Genova 1894, 550, East New Guinea.

Family ANGUILLIDÆ.

ANGUILLA Thunberg. *Tuna*.

124. *Anguilla mauritiana* Bennett. *Tuna tafai-lautalo*; *Tuna gatala*. Waigiu; Tahiti; Samoa, in rivers; Johanna I.; Levuka and Ovalau; Fiji (Günther); East Indies.

Anguilla mauritiana Bennett, Proc. Comm. Zool. Soc. 1831, 128, Mauritius. Günther, Cat., VIII 26, Amboina, Ceylon, Philippines, Formosa, Almorah, Johanna I. Günther, Shore Fishes, Challenger, 1880, 58, Lake Waiheira (Tahiti).

Anguilla marmorata Quoy & Gaimard, Voy. Uranie, 1824, 241, Waigiu.

Muraena marmorata Kner, Novara Fische, 369, Tahiti, Hongkong.

Anguilla labrosa Richardson, Voy. Erebus and Terror, 113, 1846, South Seas.

Muraena maculata Bleeker, Atlas, Murænidæ, 9, tab. 1, fig. 2, East Indies; not of Lacépède.

Anguilla johannæ Günther, Fish. Zanzibar, 124, Johanna I.

This species is the commonest eel of the Samoan Islands, abounding in quiet waters in all the streams, and reaching a considerable size. We have about 20 specimens, mostly from Vaisigano River. The species varies considerably in the insertion of the dorsal, which is always well forward, however. The body is always finely mottled or marbled, hence the vernacular name of *tuga tafailotalo*, or "eel colored like [boiled] taro."

Life colors of one specimen from Apia, dark brown, everywhere reticulate with darker. Another was mottled olive and black; dorsal and anal edged with pale.

125. *Anguilla fidjiensis* Günther. Rivers of Fiji.

Anguilla fidjiensis Günther, Cat., VIII, 26, 1870, Kandavu and Nairi (Fiji).

This species, which we have not seen, is very close to *Anguilla mauritiana*, and seems within the limits of variation of that species.

126. *Anguilla obscura* Günther. Fiji.

Anguilla obscura Günther, Proc. Zool. Soc. Vict. 1871, 673, Fiji.

127. *Anguilla otaheitensis* Kaup. Tahiti.

Anguilla otaheitensis Kaup, Aale Hamb. Mus. 17, Tahiti.

128. *Anguilla megastoma* Kaup. *Tuna mea*. Mangareva; Aneiteum; Tahiti; Samoa; Rarotonga; Tubuai; Austral Is.; Nukahiva, Marquesas Is. (Seale).

Anguilla megastoma Kaup, Apodes 30, Megareva.

Anguilla aneitensis Günther, Cat., VIII, 34, 1870, Aneiteum. Günther, Shore Fishes, Challenger, 1880, 58, Lake Waiheira (Tahiti).

This species is uniformly colored above, pale below, with the dorsal well forward, though less advanced than in *Anguilla mauritiana*; the teeth in very broad bands, the vomerine band narrower than the maxillary bands. We have two specimens from the Vaisigano River at Apia. Kaup's type is said to come from Megarava, which is evidently a misprint for Mangareva, one of the Gambier Islands.

Life colors of a specimen from Apia, yellow brown, belly and dorsal yellow; fine yellow dots on lateral line. Much paler and more yellow than *Anguilla australis*. Dorsal fin more advanced.

129. *Anguilla sidat* Bleeker. Samoa; New Zealand.

The species seems to differ from *Anguilla australis* in having the maxillary extending beyond the eye, the vomerine teeth also extending backward almost as far as the maxillary teeth. We have one large specimen from Samoa answering to the description of this species. Were it not for the much longer maxillary we should think this the adult of *Anguilla australis*.

Life colors of a specimen from Apia, plain dark brown, yellow below; dorsal grayish dusky. Dorsal posterior.

130. *Anguilla australis* Richardson. Samoa; New Zealand; East Indies.

Of this species we have half a dozen young from the streams (Vaisigano, Gasegase) about Apia. They seem to agree perfectly with *Anguilla australis*, having the dorsal inserted a little before vent and the vomerine band of teeth considerably shorter than the maxillary band.

Family SYNAPHOBRANCHIDÆ.

SYNAPHOBRANCHUS Johnson.

131. *Synaphobranchus brachysomus* Gilbert. Deep seas of Hawaii.

Family LEPTOCEPHALIDÆ.

LEPTOCEPHALUS Gmelin.

132. *Leptocephalus marginatus* Valenciennes. *Pusi solasulu*. Hawaii; Samoa; New Guinea; East Indies.

This conger eel, common throughout the Pacific, is abundant both at Samoa and Honolulu. It is easily known by the black blotch on the pectoral fin. We have 8 examples from Samoa.

CONGRELLUS Ogilby.

133. *Congrellus bowersi* Jenkins. Hawaii.
 134. *Congrellus neo-guinaicus* (Bleeker). New Guinea.
 135. *Congrellus fijiensis* Ogilby. Fiji.
Congrellus fijiensis Ogilby, Proc. Lin. Soc. N. S. W. 1898, 288, Fiji.

136. *Congrellus guttulatus* (Günther). Samoa; Fiji.

One specimen from Apia. Life colors, light olive, with dark cross-shades; pectoral plain; vertical fins with broad dark edge; an oblique olive shade before eye.

137. *Congrellus æquoreus* Gilbert & Cramer. Deep seas of Hawaii.

PROMYLLANTOR Alcock.

138. *Promyllantor alcocki* Gilbert & Cramer. Deep seas of Hawaii.

METOPOMYCTER Gilbert.

139. *Metopomycter denticulatus* Gilbert. Deep seas of Hawaii.

VETERNIO Snyder.

140. *Veternio verrens* Snyder. Hawaii.

Family MURÆNESOCIDÆ.

MURÆNESOX McClelland.

141. *Murænesox cinereus* (Forskål). Hood Bay; New Guinea; East Indies.

Family MYRIDÆ.

MURÆNICHTHYS Bleeker.

142. *Murænichthys macropterus* Bleeker. New Caledonia; East Indies.

MYROPTERURA Ogilby.

143. *Myropterura laticaudata* Ogilby. Fiji.

Myropterura laticaudata Ogilby, Proc. Linn. Soc. N. S. W., 1897, 247, Fiji.

Family NEMICHTHYIDÆ.

NEMICHTHYS Richardson.

144. *Nemichthys scolopaceus* Richardson. North of Papua in deep water; open seas.

Nemichthys scolopaceus, Peters, Berl. Mon. 1876, 849, north of Papua in deep water.

SERRIVOMER Gill & Ryder.

145. *Serrivomer beani* Gilbert. Deep seas of Hawaii.

STEMONIDIUM Gilbert.

146. *Stemonidium hypomelas* Gilbert. Deep seas of Hawaii.

NEMATOPRORA Gilbert.

147. *Nematoprora polygonifera* Gilbert. Deep seas of Hawaii.

Family **OPHICHTHYIDÆ**.**SPHAGEBRANCHUS** Bloch.

148. *Sphagebranchus flavicaudus* Snyder. Maui, Hawaii.

DALOPHIS Rafinesque.

149. *Dalophis longipinnis* (Kner & Steindachner). Samoa.

This small species, very slender in form and having the dorsal inserted in advance of the gill-opening, is known to us from a very young example taken at Apia.

150. *Dalophis misolensis* (Günther). Misol.

Ophichthys misolensis Günther, Ann. Mag. Nat. Hist., x, 1872, 426, Misol.

MICRODONOPHIS Kaup.

151. *Microdonophis fowleri* Jordan & Evermann. Hawaii.

152. *Microdonophis macgregori* Jenkins. Hawaii.

153. *Microdonophis polyophthalmus* Bleeker. Hawaii; East Indies.

This species differs from the type of *Microdonophis* in having the dorsal inserted over the middle of the head. The body is uniformly colored.

BASCANICHTHYS Jordan & Davis.

154. *Bascanichthys pinguis* Günther. Solomon Islands.

Ophichthys pinguis Günther, Ann. Mag. Nat. Hist., x, 1872, 425, Solomon Islands.

CALLECHELYS Guichenot.

155. *Callechelys luteus* Snyder. Molokai, Hawaiian Islands.

156. *Callechelys flaris* (Günther). Misol.

Ophichthys flaris Günther, Ann. Mag. Nat. Hist., x, 1872, 425, Misol.

LEIURANUS Bleeker.

157. *Leiuranus semicinctus* (Lay & Bennett). 'Ata'ata uli. Hawaii; Japan; East Indies.

Of this species we have one large specimen from Apia. Its coloration is wonderfully close to that of *Chlevastes colubrinus*, but the black bands are broader than in the latter, and most of them do not meet the fellow on the belly. This species is widely diffused, occurring in company with the two species of *Chlevastes*, both of which are colored remarkably like it.

158. *Leiuranus cobra* (De Vis). South Seas.

Ophichthys cobra De Vis, Proc. Linn. Soc. N. S. W., 1884, 455, South Seas.

This species is said to have the head one-tenth of the length of the trunk. In other respects it agrees with *Leiuranus semicinctus*, with which it is probably identical.

BRACHYSOMOPHIS Kaup.

159. *Brachysomophis henshawi* Jordan & Snyder. Honolulu.
 160. *Brachysomophis crocodolinus* (Bennett). Tahiti; Mauritius.

MYRICHTHYS Girard.

161. *Myrichthys stypurus* Smith & Swain. Johnston I.
 162. *Myrichthys magnificus* (Abbott). Hawaii.

CHLEVASTES Jordan & Snyder.

163. *Chlevastes colubrinus* (Boddaert). Samoa; Guam; East Indies.

A few specimens from Samoa.

164. *Chlevastes fasciatus* (Ahl). Samoa; East Indies.

Muraena fasciata Ahl, De *Muraena* et *Ophichtho*, 1789, 9, East Indies.

Ophichthys colubrinus fasciatus Günther, Cat., VIII, 81, 1870, Borneo.

Ophichthys naja De Vis, Proc. Linn. Soc. N. S. W. 1884, 455, South Seas.

This species seems to us distinct from *Chlevastes colubrinus*. The head is shorter, 9 to 11 times in the length of the trunk (7 to 8 in *Chlevastes colubrinus*). The black cross-bands are less regularly

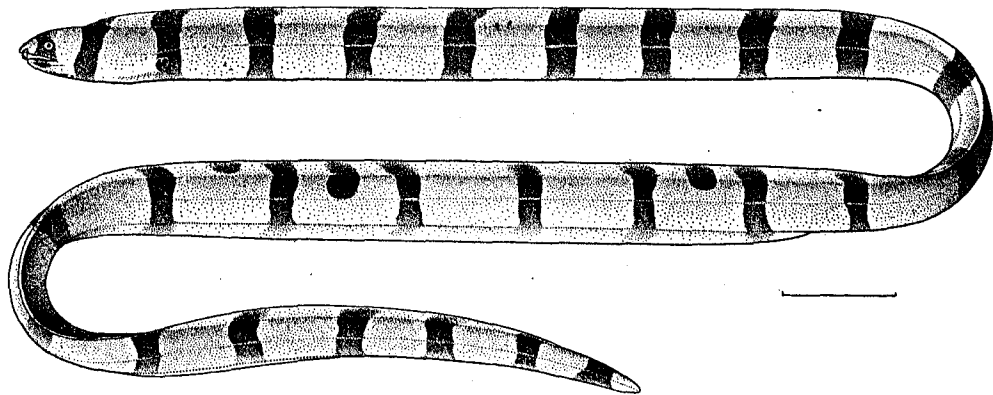


FIG. 5.—*Chlevastes fasciatus* (Ahl).

formed, having backward projections, and there is in the pale interspace usually a large rounded black spot or ocellus.

We have two large examples from the coral reef at Apia.

Family MORINGUIDÆ.

MORINGUA Gray. (Including *Aphthalmichthys* Kaup.)

165. *Moringua hawaiiensis* Snyder. Honolulu.
 166. *Moringua macrocephala* Bleeker. Samoa; East Indies.

Of this rare species, distinguished by its long head, we have one fine specimen from the harbor of Pago Pago. Depth 4 in head; head 9 in total length; pectoral minute, scale-like; gill-openings separate.

Life colors light pinkish brown, nearly uniform; head very clear translucent rosy red; caudal more orange.

This specimen was taken in salt water at the mouth of a little brook and was very tenacious of life.

167. *Moringua javanica* (Kaup). Fiji; Moluccas.

Family MURÆNIDÆ.

RHINAMURÆNA Garman.

This genus differs from *Eurymyctera* in having the anterior nostrils slit and dilated at the ends, which are produced into long flaps.

168. *Rhinamuræna quæsitæ* Garman. Marshall Is.

Rhinamuræna quæsitæ Garman, Bull. Essex Inst. 1889, 114, Marshall Is.

169. *Rhinamuræna eritima* Jordan & Seale, new species. Samoa.

Head 7.20 in total length, 2.65 in body anterior to vent; depth 2 in head; vent exactly midway between tip of snout and tip of tail; length of snout, from posterior nostril, 5.20 in head; eye 2 in snout; angle of jaws 2.20 in head; jaws curved and can not be completely closed; dorsal high 4.60 in head; anal about one-half as high as dorsal; origin of anal immediately posterior to vent; origin of dorsal about midway between gill-openings and angle of jaws; gill-openings size of eye; anterior nostrils on end of snout long, about equal to eye, terminating in an expanded disk two-thirds as wide as eye; posterior nostrils consisting of slightly elevated tubes situated on upper side of snout directly

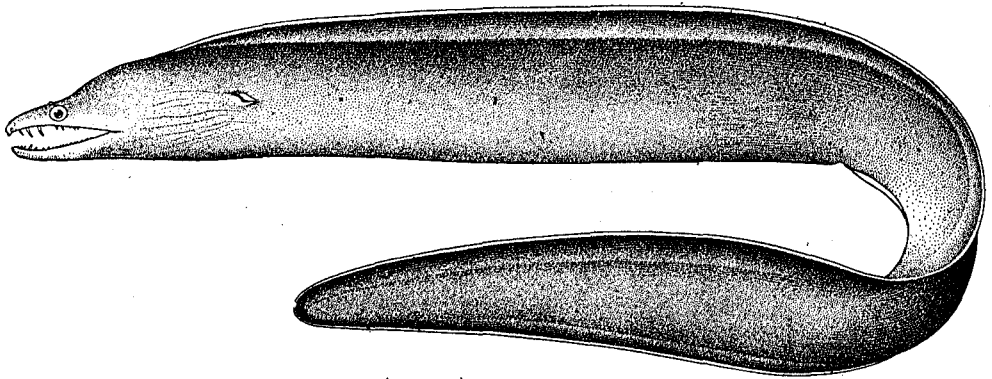


FIG. 6.—*Rhinamuræna eritima* Jordan & Seale, new species. Type.

above anterior margin of eye; top of snout flat with a narrow concave groove; depth of snout at anterior margin of eye slightly less than width; forehead evenly rounded from posterior of eyes; teeth in lower jaw in a single row of 25 sharp, concave teeth on each side, the anterior five being enlarged; posterior teeth of upper jaw small and uniserial, the anterior teeth large biserial canines, three of which are on the median line of vomer; a single row of blunt palatine teeth; throat with numerous longitudinal wrinkles.

Life colors, light-grayish brown, paler below; dorsal dusky with a sharply defined bluish white edge; anal with a faint pale edge. Color in spirits earth-brown, yellowish on belly and under part of head, dorsal and anal with distinct white margins, that of the dorsal broader, the posterior third of dorsal shading into an intermarginal black area, a yellowish wash on head posterior to eye.

This very handsome eel is known to us from a single specimen 20.15 inches long, taken at Pago Pago. Type no. 51717, U. S. National Museum.

MURÆNA Linnæus.

170. *Muræna kailuæ* Jordan & Evermann. Hawaii.

Muræna pardalis Bleeker, Atlas, Murænidæ, 86, pl. 25, figs. 1 and 2, Java, Cocos; probably not *Muræna pardalis* of Schlegel, a Japanese species.

Muræna kailuæ Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 165, Kailua (Hawaii).

Muræna lampra Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 423, fig. 3, Honolulu.

Muræna kauila Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 424, fig. 4, Honolulu.

This species is rather common about the Hawaiian reefs, but was not seen at Samoa. The receipt of additional specimens from Honolulu forces us to believe that the variation in the arrangement of

spots in this species is very great. If *M. kouila* and *M. lampra* are distinct species, we must add still two more to the list. The species is very close to the Japanese *Muraena pardalis* Schlegel, and may prove to be a variation of the latter, as Bleeker has supposed. In *Muraena kailua* the white spots on the belly are larger than in the Japanese species.

The life coloration of this species is very bright and attractive.

171. *Muraena pavonina* Richardson. South Seas.

Muraena pavonina Richardson, Voyage Sulphur, 110, pl. 53, figs. 1-6, South Seas.

ENCHELYNASSA Kaup.

172. *Enchelynassa canina* (Quoy & Gaimard). Hawaii; Samoa; Rawak; Waigiü.

Muraena canina Quoy & Gaimard, Voy. Uranie, 247, 1824, Rawak, Waigiü.

Enchelynassa bleekeri Kaup, Apodes, 72, fig. 55, 1854; locality unknown. Jordan & Snyder, Proc. U. S. Nat. Mus., xxvii, 1904, 941, Hawaii.

Gymnothorax vinolentus Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 165, Kailua (Hawaii).

Of this species 3 specimens are known besides the original type. These are the type of *G. vinolentus* from Hawaii, a very similar specimen now before us, from Samoa, and a very large example similar to Kaup's type, from Hawaii. It is one of the largest of the morays, and the most formidably armed.

EURYMYCTERA Kaup.

173. *Eurymyctera acutirostris* (Abbott). Hawaii.

Muraena acutirostris Abbott, Proc. Ac. Nat. Sci. Phila. 1860, 476, Hawaii.

Gymnothorax acutirostris Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 494, plate 18, Hawaii, same specimen.

GYMNOTHORAX Bloch. Pusi.

174. *Gymnothorax eupterus* (Günther). Raoul I.

Muraena euptera Günther, Cat., viii, 122, 1870, Raoul I.

175. *Gymnothorax waiialua* Snyder. Hawaii.

Gymnothorax waiialua Snyder, Bull. U. S. Fish Comm., xxii, 1902 (1904), 520, pl. 6, Waiialua (near Honolulu).

This species is known from a young example taken by Professor Snyder. It is very close to the Japanese-East Indian species, *Gymnothorax reticularis*, but the arrangement of the sharply defined black cross-bands is different, and the interspaces between the bands are pale, as in *Chlevasites colubrinus*.

176. *Gymnothorax petelli* (Bleeker). Hawaii; Samoa; East Indies.

Muraena petelli Bleeker, Nat. Tijds., xi, 84, Java. Günther, Cat., viii, 105, Java, Mauritius.

Gymnothorax petelli, Bleeker, Atlas, Muraenidæ, 99, tab. xxxii, fig. 1.

Muraena interrupta Kaup, Apodes, 67, fig. 51, 1854, Red Sea.

Gymnothorax leucaeme Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 427, fig. 7, Honolulu.

Of this handsome species we have 7 large specimens from Pago Pago and Apia. They agree entirely with the accounts both of *petelli* and *leucaeme*.

Life colors of a specimen from Apia, dark brown, with 19 to 22 broad black cross-bars about as wide as the interspaces; fins barred like body; interspaces on anal whitish, some of the dark bands reaching the fin, others not; interspaces on dorsal pale, whitish on edge, each interspace with a large marginal black spot; tip of the tail white (sometimes black); angle of mouth black; belly light brown, the bands anteriorly not meeting across it (a dark spot sometimes between each pair of bands).

177. *Gymnothorax meleagris* (Shaw). Samoa; Fiji; East Indies.

Muraena meleagris Shaw, Nat. Misc., pl. 220, about 1802, Pacific. Günther, Cat., viii, 100, Zanzibar, Java, Mauritius, Fiji, Seychelles.

? *Muraenopsis haui* Lacépède, Hist. Nat. Poiss., v, 646, pl. vii, fig. 2, 1803; no locality.

Thyrsoidea chlorostigma Kaup, Apodes, 89, 1854, Seychelles.

Gymnothorax chlorostigma Bleeker, Atlas, 97, tab. xxxiv, fig. 2, East Indies.

^aThis species, *Enchelynassa canina*, is said to be black, with very long needle-like teeth, and tubular nostrils. The type was only 7.5 inches long, and from the description is probably the young of *Enchelynassa bleekeri*.

Of this strongly marked species, known by its many small yellow spots, black gill-opening and white-tipped tail, we have one large specimen from Apia. Color in life bright brown, with everywhere stellate spots of yellowish white, the spots round and much smaller than eye, smaller on the head and slightly larger and much farther apart on tail; belly, chin, snout, and throat spotted like the body; fins dusky-edged, spotted; tail broadly tipped with white; gill-opening black.

178. *Gymnothorax xanthostomus* Snyder. Hawaii.

179. *Gymnothorax leucostictus* Jenkins. Hawaii.

180. *Gymnothorax goldsboroughi* Jordan & Evermann. Hawaii.

181. *Gymnothorax nuttingi* Snyder. Hawaii.

182. *Gymnothorax eurostus* (Abbott). Hawaii.

183. *Gymnothorax thyrsoideus* (Richardson). Samoa; Tonga; Guam; Faté and Tubuai (Seale); East Indies.

Muræna thyrsoidea Richardson, Voyage Sulphur, 111, 1845, not fig., China. Günther, Cat., VIII, 113, China, Pinang. Steindachner, Sitz. Ak. Wiss. Wien 1900, 514, French Pass.

Muræna griseobadia Richardson, Voyage Erebus and Terror, 89, Tonga.

Muræna prosopeton Bleeker, Nat. Tijds. Ned. Ind., IV, 300, East Indies.

Gymnothorax prosopeton, Bleeker, Atlas, Murænidæ, 88, tab. XXXIX, fig. 3.

Muræna tile, Seale, Bishop Museum, 1901, 62, Guam; not of Hamilton.

This widely diffused species may be known by its pale color and small whitish spots, with the anterior part of the head abruptly blackish. It is probably the species called *Muræna tile* by Seale.

A small specimen from Pago Pago. Color in life light gray, mottled with light purple, leaving the ground-color as pale spots; head distinctly dark purplish or blackish; iris white; gill-opening and angle of mouth pale; dorsal colored like the body, with a broad pale edge; anal pale.

184. *Gymnothorax pictus* (Ahl). *Pusi gatala*. Hawaii; Samoa; New Guinea; Tahiti; Rarotonga; Mangareva; Makatea; Shortland I. (Seale); East Indies.

This species, readily known by its pale color and purplish specklings which gradually gather together with age to form dark spots, is very common throughout the South Seas. We have about 10 specimens of various sizes from Samoa, the largest representing the form called *Gymnothorax sidereus*, which is the adult. *Gymnothorax litus*, a closely allied form, seems to us a distinct species.

Color in life of a specimen from Apia, light gray, very finely dotted and marbled with purplish gray, which is purplish brown in larger examples; adult with numerous irregular diffuse transverse bars made up of dark spots, streaks and reticulations, these being a little denser in the bars; these bars composed of three lengthwise series of denser areas, which gradually with age form series of dark spots, the uppermost on the dorsal; top of head and snout densely speckled like the body; chin and throat with scattered purplish specks, which disappear on the belly, which is white; angle of mouth and gill-opening uncolored; anal speckled like the body, the edge less spotted.

In the young there are neither spots nor bars, but the ground-color is covered with reticulations of different degrees of intensity, the fish always pale purplish with white belly.

185. *Gymnothorax litus* (Richardson). Tahiti; Marquesas Is.; Samoa; East Indies.

Muræna lita Richardson, Voyage Erebus and Terror, 84, 1846, Moluccas.

Gymnothorax pictus Bleeker, Atlas, Murænidæ, in part, tab. XXIX, fig. 1, but not description.

Muræna nigrolineata Kaup, Apodes, 66, 1854, Marquesas Is.

Muræna chrysops Kaup, Apodes, 70, 1854, Tahiti.

Of this species we have several specimens from Apia. It is close to *Gymnothorax pictus*, but is apparently distinct, having the color darker, and the lower jaw and throat profusely marked with blackish lines. This region is faintly speckled in *G. pictus*. *G. chrysops* seems to be the same species and *G. nigrolineatus* also may be the same.

Color in life of a specimen from Apia, ground-color yellowish olive, darker above, thickly covered with reticulations and specklings of dark purplish brown, darker than in *G. pictus*; some trace of irregular dark reticulated cross-streaks on tail; fins colored like the body, as are head, throat and belly; lower jaw and throat closely spotted; no black at angle of mouth nor on gill-opening; no pale edges to fins.

186. *Gymnothorax tænioides* (Günther). Samoa.*Muraena tænioides* Günther, Proc. Zool. Soc. 1871, 674, **Savaii (Samoa).**

This species is quite unlike any taken by us in Samoa. We have not seen it.

187. *Gymnothorax favagineus* Bloch & Schneider. Samoa; Faté, New Hebrides (Seale); East Indies.*Gymnothorax favagineus* Bloch & Schneider, Syst. Ichth., 525, taf. 105, **Tranquebar.***Muraena tessellata* Richard on, Ichth. Sulphur, 109, pl. 55, figs. 5-8, 1845. Günther, Cat., VIII, 106, Zanzibar, East Indies.*Gymnothorax tessellatus* Bleeker, Atlas, 93, tab. XXVII, fig. 3; pl. 28, fig. 1.*Muraena python* Kaup, Apodes, 68, fig. 53, **Africa.**

Of this East Indian species we have one small example from Samoa. It much resembles Bleeker's figure of *Gymnothorax tessellatus*. Apparently *G. isingteena*, with the spots separated by broad interspaces of the ground color, is a different species.

Color in life of a specimen from Pago Pago, pale yellowish olive, with four rows of blackish olive spots along the side, larger than eye on body, smaller on head, very regular, a similar row on dorsal and anal; belly also spotted; the ground color reduced to a broad net-work around the spots.

188. *Gymnothorax polyophthalmus* (Bleeker). Samoa; Caroline Is.; East Indies.*Muraena polyophthalma* Bleeker, Act. Soc. Ned. Ind., III, Celebes, x, 15, **Celebes.**

Of this species, hitherto known from one small example, we have two examples equally small, from Apia, and a larger one, 8.75 inches long, from Kusai Island, Caroline Group. All of them resemble Bleeker's figure very closely. The body is covered with many black spots on a light ground, the largest of them being rings with a yellow center.

Color in spirits, light olive, almost white below, with about three rows of dark olive spots as large as eye, each spot being ring-like with a yellowish center of the ground-color; besides these many small dark spots and specks; a row of ring-like spots on dorsal with many smaller specks; a row of blackish spots along base of anal; posterior half of dorsal and whole of anal with a broad unspotted edge; spots anteriorly very small; scattering spots on chin and belly; gill-opening pale; no spot at angle of mouth.

189. *Gymnothorax stellatus* (Lacépède). *Pusi pulepule*. Samoa; New Britain; East Indies.*Muraenopsis stellatus* Lacépède, Hist. Nat. Poiss., v, pp. 622, 629, 644, 1803, **New Britain.***Muraena fimbriata* Bennett, Proc. Comm. Zool. Soc., 1, 1831, 168. Günther, Cat., VIII, 108, Borneo, Amboina, Port Essington.*Muraena bullata* Richardson, Voy. Erebus and Terror, 86, 1846, **Borneo.***Muraena isingleonoides* Bleeker, Verh. Bat. Gen., xxv, Mur., 48, **East Indies.***Gymnothorax isingleonoides* Bleeker, Atlas, Muraenidæ, 91, tab. XXXV, fig. 1, East Indies.

Of this strongly marked species we have eight specimens from Apia. Lacépède's *stellatus*, with two rows of black spots, is probably the same as the *fimbriatus* of Bennett.

Color in life of one specimen, body pale reddish olive with many purplish black spots, irregular in form, about as large as eye; the oblong spots longer, the spots all narrower than the interspaces; spots arranged in about 3 rows, with a row also on dorsal fin and the lower row extending on anal; belly pale, unspotted; dorsal and anal with a yellowish margin, broader on anal, which is mostly pale; head with much smaller spots, sparsely placed; folds on neck dark, conspicuous; gill-opening pale; angle of mouth with a small black spot, a whitish spot before it on the lower jaw only; chin and snout dark.

190. *Gymnothorax buroensis* (Bleeker). Caroline Is.; Samoa; East Indies.*Muraena buroensis* Bleeker, Nat. Tijds. Ned. Ind., VIII, 79, **Buro.***Gymnothorax buroensis*, Bleeker, Atlas, Muraenidæ, 90, tab. XL, fig. 1, East Indies.

Of this species we have 10 specimens from Samoa and three from the island of Kusai, in the Carolines, collection of Mr. A. P. Lundin. The species is always very dark, with darker spots and markings, which vary considerably with age and shade of color. The tip of the tail is always white. We identify our specimens with *buroensis* with a little doubt, but there is no other species with which we can place them.

Color in life of a specimen from Apia, dark brown, a little paler below; dorsal fin high, with very obscure black bars, and behind edged with light orange; the body also faintly barred with darker. This coloration was seen in three young examples obtained from a cracked coral head.

Color in spirits (adult specimens) very dark purplish brown, with longitudinal rows of small, diffuse, irregular black spots, smaller than eye, arranged in about four irregular rows; these spots rather larger on the tail, smaller towards the head, which is not spotted; top of head and snout dark; angle of mouth not colored; gill-opening not colored; fins colored like the body, the caudal with a narrow pale edge; throat pale, unspotted; belly darker and spotted posteriorly.

191. *Gymnothorax mucifer* Snyder. Honolulu.

Gymnothorax mucifer Snyder, Bull. U. S. Fish Comm., xxii, 1903 (1904), 519, pl. 5, fig. 9, Honolulu.

This species is known from a single example from Hawaii. It strongly resembles *Gymnothorax buroensis*, but in the latter the upper teeth are in two rows.

192. *Gymnothorax laysanus* (Steindachner). Hawaii; Laysan.

Muraena laysana Steindachner, Denks. Ak. Wiss. Wien, xvi, June 27, 1900, 177, Laysan.

Gymnothorax laysanus, Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 425, Honolulu. Snyder, Bull. U. S. Fish Comm., xxii, 1902 (1904), 518, Honolulu, Hilo.

Lycodontis parvibranchialis Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 404, Hawaii.

This species is occasionally taken about the Hawaiian Islands. Dr. Steindachner's second figure representing a species finely speckled with white only may represent some other species. Fowler's *parvibranchialis* with white spots in about four rows seems to be identical with our smaller specimens.

193. *Gymnothorax polyuranodon* (Bleeker). New Guinea (Bleeker); East Indies.

194. *Gymnothorax hilonis* Jordan & Evermann. Hawaii.

195. *Gymnothorax tenebrosus* (Richardson). Tahiti (Seale).

Muraena tenebrosa Richardson, Voy. Erebus and Terror, 84, 1846; locality unknown, probably Tahiti.

196. *Gymnothorax variegatus* (Quoy & Gaimard). Guam.

197. *Gymnothorax chalazius* Waite. Tubuai; Austral Is. (Seale); Australia.

Gymnothorax chalazius Waite, Rec. Austr. Mus., v, 145, 1904, Lord Howe I.

An ally of *Gymnothorax laysanus*, recently taken by Mr. Seale at Tubuai.

198. *Gymnothorax javanicus* (Bleeker). *Pusi maoa'e*. Samoa; East Indies.

Muraena platberon Richardson, Voy. Erebus and Terror, 84, 1846, Darnley I.; not of Quoy & Gaimard.

Muraena javanica Bleeker, Nat. Tijds. Ned. Ind., xix, 241, Java.

Gymnothorax javanicus, Bleeker, Atlas, Muraenidæ, 95, tab. xxxv, fig. 2.

Of this species we have five examples from Samoa from 1½ to 4 feet in length. It is one of the largest eels of the South Seas, and the coloration is the same at all ages. The species is well separated from *G. batuensis*, with which and with several other species Dr. Günther has confounded it under the name *G. flavomarginatus*. *Muraenophis griseus* Lacépède seems to be *G. pictus*. *Muraena geometrica* = *Muraena bilineata* Rüppell is a species of *Echidna*.

Color in life of a very large specimen from Apia, brownish with blacker spots, larger behind; a large black spot around gill-opening. Another specimen from Apia in life was reddish brown with jet black spots and blotches, irregular in size but much larger than eye; about three rows on body, reducing ground-color to broad reticulations; about 40 to 50 spots in a row, those of the upper row extending on the dorsal, the spots rather larger than those in the second row; those of the third row still smaller; belly paler, with smaller black spots; head similar, the spots small, much smaller than eye; angle of mouth black; gill-opening in a large black spot; wrinkles on head dark; fins spotted and colored like the body; tip of tail with a pale edge; obscure pale edging to fins behind.

199. *Gymnothorax flavomarginatus* (Rüppell). *Pusi gatala* (spotted moray). Samoa; Hawaii; New Guinea; Norfolk I.; East Indies.

Muraena flavomarginata Rüppell, Atlas, 119, tab. xxx, fig. 3, 1828, Red Sea. Günther, Cat., viii, 119, Zanzibar, Seychelles, Batu, Norfolk Island.

Gymnothorax flavomarginatus, Bleeker, Atlas, Muraenidæ, 95, tab. xxxii, fig. 2, tab. xxxiv, fig. 3, East Indies.

Muraena batuensis Bleeker, Nat. Tijds. Ned. Ind., xii, 241, Batu.

This dull-colored moray is, with *Gymnothorax undulatus*, the most common species at Samoa, and it is occasionally taken at Hawaii. It is readily known by the small dusky spots which cover the whole body, obscuring the pale ground color. The gill-opening is black, and there is a mere trace of

a yellow edge to the vertical fins posteriorly, but hardly a yellow margin. The fore part of the head is black. This is apparently the *Muraena flavomarginata* of Rüppell, as supposed by Bleeker.

Color in life of a specimen from Apia, yellow-olive, darker above, with some yellow spots; body and fins with black spots; fins narrowly edged with yellow; front of head black.

Color of same specimen in alcohol, dusky olive, paler below; everywhere with confluent marblings or spots of purplish brown, the olive ground-color appearing as small, irregular, yellow spots or vague streaks; head a little darker; snout and tip of chin black; gill-opening in a conspicuous black spot; angle of mouth black; tip of caudal narrowly edged with yellowish white, the color extending as a very narrow edge on vertical fins; dorsal nearly black, mottled like the body; anal similar.

200. *Gymnothorax thalassopterus* Jenki

Gymnothorax thalassopterus Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (1903), 427, pl. II, Honolulu; not cotypes.

This species is known from one specimen from Honolulu. In this type, as shown in Jenkins' figure, the dark spots on the body are almost all separate, not confluent as in *G. flavomarginatus*. In all other regards the two forms seem to agree, and *G. thalassopterus* is probably only a variant individual of the latter species. The smaller cotypes from Honolulu mentioned by Dr. Jenkins are the ordinary *flavomarginatus*, the dark spots everywhere confluent as usual.

201. *Gymnothorax talofa* Jordan & Starks, new species. Samoa.

Head 7 in entire length; depth 2.33 in head; snout rather sharp, 5 in head; eye 1.80 in snout; length of mouth 1.50 in head; gill-opening smaller than pupil; lower jaw strongly hooked upward toward its tip; in the upper jaw an irregular broken series of sharp canines on each side, slightly

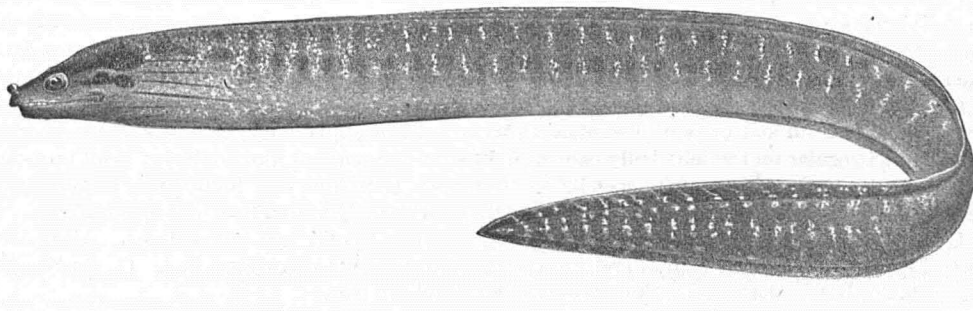


FIG. 7.—*Gymnothorax talofa* Jordan & Starks, new species. Type.

hooked backward; posteriorly an outer series of much more regular, closer-set, and smaller series somewhat directed backward; anteriorly and medially two vertical vomerine teeth longer and sharper than the others. On the lower jaw a series of teeth similar to the outer series of upper jaw, while anteriorly are 4 or 5 sharp canines irregular in length; trunk 1.33 in caudal.

Color in alcohol dark reddish brown, with whitish streaks and blotches arranged in one or two rows with a vague third row below, the ground-color forming dark cross-shades between the whitish streaks. The white markings are in fact short vertical streaks, which on the tail become narrow white wavy cross-bands, relatively conspicuous. Head and anterior part of trunk with a row of diffuse dark blotches on the cross-shades, these distinct near head, where the first one is a long wedge on the temporal region, but fading behind; angle of mouth black; a white streak from snout to vent along the median line; gill-opening pale; fins colored like body; caudal with a narrow yellowish edge; belly and throat plain brown.

Two specimens, from Apia. The type, no. 51713, U. S. National Museum, is 10 inches in length. *Talofa* is the common Samoan salutation, equivalent to the Hawaiian *aloha*.

202. *Gymnothorax detactus* Bryan & Herre. Marcus I.; Samoa; Nukahiva (Seale).

Gymnothorax detactus Bryan & Herre, Bishop Museum, II, 1903, 126, Marcus I.

Two specimens from Apia seem to be identical with this species, although Bryan and Herre do not mention the markings at the angle of the mouth.

Color in alcohol pale gray, much mottled and spotted with purplish brown, the brown forming vague branching cross-bars or streaks, much anastomosed, covering belly also, these most bar-like behind; throat and chin paler; no pale edge to fins; angle of mouth brown, with a yellow spot before it on each jaw; pores on jaws white; fins colored like the body.

203. *Gymnothorax rhodocephalus* Bleeker. Rarotonga (Seale); East Indies.

(*Gymnothorax formosus* Bleeker.)

204. *Gymnothorax lineatus* (Lesson). Tahiti; Oualan; Samoa; East Indies.

Muraenopsis lineatus Lesson, Voy. Coquille, 127, pl. 11, fig. 1, 1830, Oualan; poor figure.

Muræna flaveolus Lesson, Voy. Coquille, 128, pl. 11, fig. 2, 1830, Oualan; smaller specimen, with a better figure.

Muræna grisea Bleeker, Verh. Bat. Gen., xxii, Bali, 11, Bali; not of Lacépède.

Muræna richardsoni Bleeker, Nat. Tijds., iii, 236. Bleeker, Atlas, Murænidæ, 100, tab. XLII, fig. 2. Kner, Novara Fische, 385, Tahiti. Günther, Cat., vii, 118, Zanzibar, Amboina, Ceram, East Indies.

† *Muræna ceramensis* Bleeker, Nat. Tijds., iii, 297, Ceram.

Gymnothorax ceramensis Bleeker, Atlas, Murænidæ, 101, tab. XXXIII, fig. 3.

Muræna scoliodon Bleeker, Verh. Bat. Gen., xxv, Murænidæ, 43, Sumatra.

Muræna troscheli Bleeker, Verh. Bat. Gen., xxv, Murænidæ, 45.

Muræna vcnosa Kaup, Apodes, 68, 1854, Timor.

Thyrsoidea multifasciata Kaup, Apodes, 87, 1854, Moluccas.

Muræna vermicularis Peters, Wiegmann's Archiv, 1855, 271.

Muræna diplodon Peters, Wiegmann's Archiv, 1855, 271.

Muræna foresiana Bleeker, Nat. Tijds., vi, 334, Flores.

We refer three examples of a small moray from Apia to Lesson's *lineatus* and *flaveolus*. In this species the dorsal fin is very high, the body brown crossed by irregular darker lines, and there is, as in *G. rhodocephalus* and *G. detactus*, a dark spot between two yellow spots at the angle of the mouth. The individual specimens differ somewhat in color, enough to allow for the discrepancies in the poor figures published by Lesson. The common *Gymnothorax richardsoni* of the East Indies seems to be the same species.

Color in alcohol light reddish brown, darker above, with dark vertical broken streaks or bands, very irregular in form and more or less reticulating; at intervals broadening into dark spots; markings a little more irregular on the tail; belly pale, unspotted or else marked like the body; head unspotted; angle of mouth black, with a white spot before it on both jaws; fins very high, paler than body, the cross-streaks on body extending on dorsal and anal; no white edgings on fins; gill-opening pale.

Close to *G. stellatus*, but with the spots replaced by cross-streaks and reticulations. Also near *G. detactus* but the dorsal much higher, and the markings darker and more band-like. *G. rhodocephalus* is also related, but in that species the cross-streaks behind are pale.

205. *Gymnothorax ercodes* Jenkins. Hawaii.

206. *Gymnothorax steindachneri* Jordan & Evermann. Hawaii; Laysan.

Gymnothorax steindachneri Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 166, Honolulu.

Muræna flavomarginata var., Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 514, pl. vi, fig. 3, Laysan; not of Rüppell.

Of this species we have several specimens from Hawaii. It bears little resemblance to *Gymnothorax flavomarginatus*, under which name Dr. Steindachner figures it.

207. *Gymnothorax gracilicauda* Jenkins. Hawaii.

This species, with a long and slender tail, is recognized in the original type only, a small specimen, perhaps the young of *Gymnothorax steindachneri*.

208. *Gymnothorax undulatus* (Lacépède). *Pusi pulepule*. New Guinea; Hawaii; Samoa; Tubuai; Raiatea (Seale); East Indies.

† *Muræna marmorata* Quoy & Gaimard, Voy. Uranie, 247, 1824, Waigiü, Rawak.

This species is very abundant throughout the South Seas. We have about 8 examples, large and small, from Apia, and many from Hawaii.

Color in alcohol of a large specimen from Apia, dark brown with pale yellow or yellowish-white reticulated and undulated cross-streaks, very numerous and much narrower than the masses of ground

† The scanty description of Quoy & Gaimard is insufficient to identify this species. It is said to be reddish yellow with a ring-like arrangement of markings. The teeth are said to serrated. It is probably identical with *Gymnothorax undulatus*, but it might be any other of several species.

color; many of these streaks formed somewhat like an inverted Y; snout dark; a black spot at angle of mouth; gill-opening not black; markings on head more diffuse; black folds along side of neck; belly yellowish, marbled with brownish; fins colored like body, the anal with a narrow yellowish margin; tip of tail with a narrow pale edge.

209. *Gymnothorax berndti* Snyder. Hawaii.

STROPHIDON McClelland.

210. *Strophidon brummeri* (Bleeker). East Indies.

Recorded by De Vis, Proc. Linn. Soc. N. S. W. 1884, 457, New Hebrides.

ECHIDNA Forster.

211. *Echidna nebulosa* (Ahl). *Pusi*. Tahiti; Wahia; Tonga; Borabora; Hawaii; Samoa; New Guinea; Shortland I.; Nukahiva (Seale); East Indies.

This widely diffused species is very common about Samoa, where about 40 specimens were taken. It is relatively scarce about Hawaii.

212. *Echidna zebra* (Shaw). Samoa; Hawaii; East Indies.

This species, of a rich brown color, with narrow golden rings, is common at Samoa, where about 30 specimens were taken. It is rather scarce about Hawaii.

213. *Echidna polyzona* (Richardson). Tahiti; Nukahiva (Seale); East Indies.

214. *Echidna zonophæa* Jordan & Evermann. Hawaii.

This species is close to *Echidna polyzona*, but with the other nominal species from Hawaii it seems to differ in having the ground-color broken by mottlings. It may prove identical with *Echidna zonata*. In *Echidna polyzona*, as figured by Bleeker, the ground-color is plain dark brown as in *Echidna zebra*, covered by rings of clear yellow.

215. *Echidna zonata* Fowler. Hawaii.

Echidna zonata Fowler, Proc. Ac. Nat. Sci. Phila., 1900, 496, Hawaii.

Echidna vineta Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1904), 429, Hawaii.

Echidna polyzona Fowler, Proc. Ac. Nat. Sci. Phila., 1900, 496, Hawaii; not of Richardson.

Dr. Jenkins found this species rather common at Honolulu. We see no difference between the species called *zonata* and *vineta*.

216. *Echidna psalion* Jenkins. Hawaii.

This species is known from a single example, evidently very close to *E. vineta*, if indeed *vineta* and *zonophæa* and possibly *obscura* and *tritor* be not all color variations of the same species, *Echidna tritor*.

217. *Echidna tritor* Vaillant & Sauvage. Hawaii.

218. *Echidna obscura* Jenkins. Hawaii.

219. *Echidna leihala* Jenkins. *Pusi 'ai'aiuga*. Hawaii.

Numerous specimens taken recently at Hawaii leave little room for doubt as to the identity of the nominal species, *Echidna zonata*, *vineta*, *psalion*, *zonophæa*, *leihala*, *obscura* with *Echidna tritor*. The variations in the bands are very great, scarcely any two specimens being alike.

220. *Echidna trossula* Jordan & Starks, new species. Samoa.

Muraena nigra, Seale, Bishop Museum, 1901, 62, Guam; not of Day.

Head 7.5 in entire length; depth 2 in head; snout blunt, 6.5 in head; eye 1.5 in snout; tubes of anterior nostrils scarcely as long as diameter of pupil; cleft of mouth from tip of snout to angle 3.33 in head; teeth slightly movable except those in roof of mouth behind vomerine teeth; teeth in upper jaw in a single row on each side, anteriorly rather blunt and conical, posteriorly sharper and smaller; the one sort giving place to the other abruptly; a median row of two teeth anteriorly similar to those of anterior outer row; behind these and remote from them, extending back in the roof of the mouth

to opposite the last teeth of the outer row, a patch of blunt teeth usually in two rows, but sometimes in one, or irregularly in two; teeth in lower jaw anteriorly biserial, posteriorly uniserial, resembling in size and shape the outer series of upper jaw; gill-opening as long as eye; nuchal hump well developed; preanal portion of body equal in length to postanal.

Color dark with irregular dark brown spots, each conforming to the shape of its adjoining spots, thickly placed over a light gray ground, leaving a fine network of the latter everywhere.

Life colors in a specimen from Pago Pago, dark brown, fins and tail paler; surface finely dotted with dark points. A specimen from Apia, with head very short, had iris golden red; body brownish, very finely but sharply dotted with darker brown; no markings.

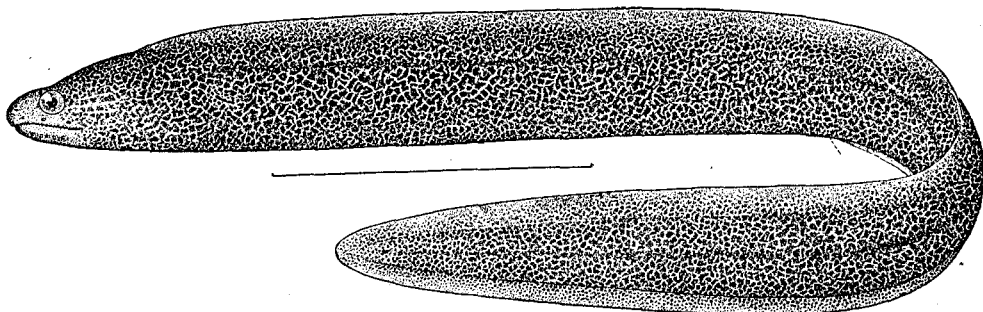


FIG. 8.—*Echidna trossula* Jordan & Starks, new species. Type.

Type no. 51714, U. S. National Museum, a specimen 6.5 inches long, from Apia.

This species, known by the presence of fine black specks all over the body, is rather common about Samoa, where a dozen specimens were taken, at Apia and Pago Pago. A small eel with a small mouth.

221. *Echidna uniformis* Seale. Guam.

Echidna uniformis Seale, Bishop Museum, 1901, 62, Guam.

222. *Echidna delicatula* Bleeker. Samoa; East Indies.

Echidna kishinouyei Jordan & Snyder, Proc. U. S. Nat. Mus., 1901, 890, with plate, Riuktu Is.

Of this species, known by the mottled purplish coloration and the anterior insertion of the dorsal, we have 7 examples from Pago Pago. The largest of these is about 18 inches long. This species is well distinguished from *E. amblyodon* of the East Indies, in having the insertion of the dorsal well in front of that of the pectoral.

Life colors of a specimen from Pago Pago, dark olivaceous green, fins paler greenish, body covered all over with brown reticulations around black spots.

223. *Echidna amblyodon* Bleeker. Marquesas Is. (Seale); East Indies.

ANARCHIAS Jordan & Starks, new genus.

Anarchias Jordan & Starks, new genus of Murænidæ (*A. allardicei*).

This genus contains small morays resembling *Gymnothorax*, but entirely lacking the anal fin; the dorsal is developed as usual.

224. *Anarchias allardicei* Jordan & Starks, new species. Samoa.

Head 8.5 in length; depth 2.3 to 2.7; snout slightly blunter than in *A. knighti*, 5.5 in head; eye 1.5 in snout; length of mouth 2.7 to 3 in head. Teeth similar to those of *A. knighti* except that there is only a single vomerine tooth; tube of anterior nostril less than half diameter of eye; large pores rather widely separated follow along the edge of mandible and border mouth above; three of them on each side of upper part of snout, the most posterior one at upper edge of eye; trunk 1.2 to 1.7 in tail. No anal fin; no distinct caudal; no pectoral.

Four specimens, two from Apia, two from Pago Pago.

Life colors of a Pago Pago specimen dark clear brown, the dorsal blackish; tip of tail bright yellow. Specimen caught in the coral by cracking the large growing heads.

An Apia specimen was brown, lighter beneath; tip of tail bright yellow.

Color in spirits, everywhere a uniform dark reddish brown darker above; tip of caudal and under part of mandible pale.

Type no. 51715, U. S. National Museum, 160 mm. in length, from Pago Pago.

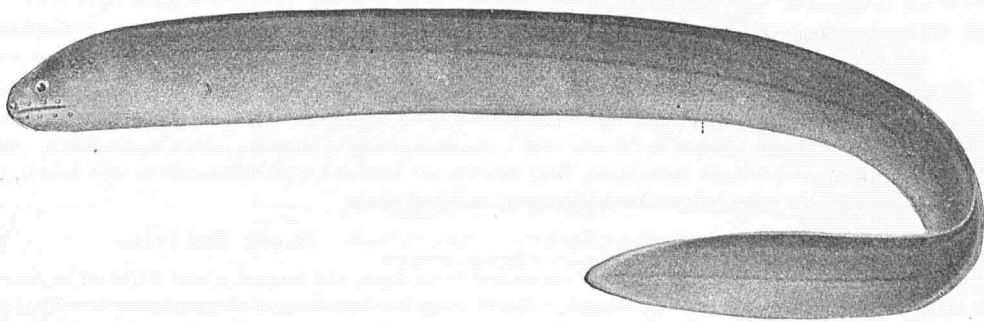


FIG. 9.—*Anarchias allardicei* Jordan & Starks, new species. Type.

225. *Anarchias knighti* Jordan & Starks, new species. Samoa.

Head 9.5 in full length; depth 2.13 in head; snout short and moderately blunt, 7.25 in head; eye 1.2 to 1.5 in snout; length of mouth, 3 in head. Teeth in two series in the upper jaw, the outer series more close-set, smaller and more regular than the inner, the inner series rather large, sharp, and of unequal length; anteriorly a pair of median vomerine teeth similar to those on the inner row; teeth of mandible in two rows and resembling those of upper jaw; tube of anterior nostril half diameter of eye; gill-opening very small, smaller than pupil. Length of trunk contained 1.17 in tail.

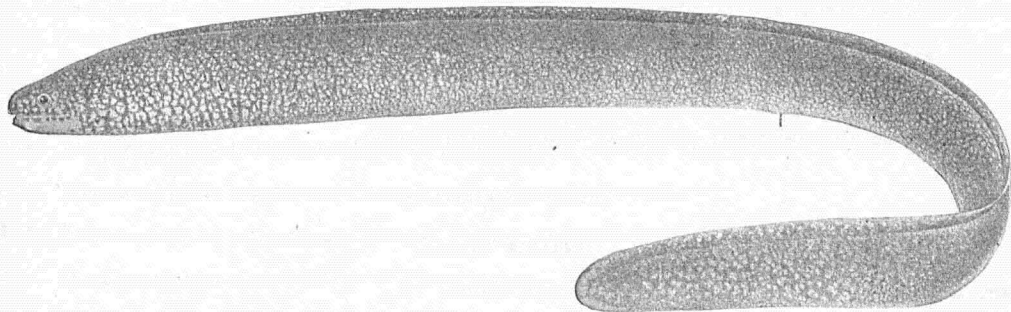


FIG. 10.—*Anarchias knighti* Jordan & Starks, new species. Type.

In spirits a network of dark lines covers the head and body over a ground color of slaty brown. These in the type cover the body everywhere except under the mandible, which is white. In the cotype the underparts are only slightly mottled, leaving them a soiled white.

This species differs from *A. allardicei* particularly in having the body mottled, and in having a slightly longer snout and mouth and a slightly larger eye. It is known from two examples taken at Apia by Prof. Robert Edgar Allardice and Master Knight Starr Jordan. Type, no. 51716 U. S. National Museum, 115 mm. in length, and the cotype, 145 mm., both from Apia.

SCUTICARIA Jordan & Snyder.

226. *Scuticaria tigrina* (Lesson). *Pusi solasulu*. Hawaii; Samoa; Borabora; Tonga; Johnston I.; Tahiti; Nukahiva (Seale).

This species is occasionally taken at Samoa and at Hawaii. It is common in the East Indies. We have 10 examples from Apia and Pago Pago.

Life colors of an example from Pago Pago, livid pale-pinkish brown with black spots.

UROPTERYGIUS Rüppell.

227. *Uropterygius marmoratus* (Lacépède). New Britain; Hawaii; Samoa; Oualan; Nukahiva (Seale).

This large eel, known by its finely mottled coloration and the paler color of its vertical fins, is occasionally taken in Samoa, whence we obtained about 10 examples. It is also sometimes taken in Hawaii.

Life colors of a specimen from Apia, dark brown, all freckled with white above and below, the white tending to form reticulations around brown confluent spots.

228. *Uropterygius macrocephalus* (Bleeker). *Pusi, Sulalulu*. Samoa; East Indies.

Of this species we have about a dozen specimens from Apia, the longest about 8 inches in length. The body in all is mottled, the caudal pale. These may be the young of *Uropterygius marmorata*, as Günther suggests, but it is not likely. We find no tube on the posterior nostrils, and so place it in a different species. It is possible that this species is not distinct from *Uropterygius micropterus* Bleeker, which differs in the shorter head.

Life colors in a specimen from Apia, livid bluish white, with fine brown reticulations.

229. *Uropterygius concolor* Rüppell. Samoa; Nukahiva (Seale); Red Sea.

Gymnomuraena fusca Peters, Berl. Mon. 1866, 524, Amboina.

In this species the color is uniform purplish red without spots, the fins scarcely paler. It agrees fairly with the accounts of *U. concolor*, and still better with that of *G. fusca*.

230. *Uropterygius leucurus* Snyder. Lanai, Hawaiian Is.

231. *Uropterygius xanthopterus* (Bleeker). Nukahiva (Seale); East Indies.

Family NOTACANTHIDÆ.

NOTACANTHUS Bloch. (*Gigliolia* Goode & Bean.)

232. *Notacanthus moseleyi* (Goode & Bean). South Pacific.

Family BELONIDÆ.

BELONE Cuvier.

233. *Belone platyura* Bennett. *Ise*. Hawaii; Samoa.

Of this species, rather common about Hawaii, one specimen was taken at Apia. It is readily recognized by the presence of gillrakers and by the large caudal keel. Anal 20; dorsal 15; tail very much depressed, flat-keeled; axil dusky.

Life colors, deep green, with blue luster above, abruptly white on sides; luster everywhere clear blue; fins pale; tip of dorsal and upper caudal lobe dusky; anal and ventral somewhat dusky.

TYLOSURUS Cocco.

234. *Tylosurus leiuroides* (Bleeker). *A'u*. Samoa; New Guinea (Macleay); East Indies.

Four specimens of this species were taken at Apia. Life colors of one of these, gray, side silvery with silvery blue lateral line; jaws bluish edged; luster bluish, no green; fins translucent bluish; dorsal a little purplish on lobe, not black; last dorsal rays low; head deeply sculptured.

235. *Tylosurus coromandelicus* (Van Hasselt). New Britain; East Indies.
(*Belone melanotus* Bleeker.)
236. *Tylosurus urvillei* (Cuvier & Valenciennes). Vanicolo.
237. *Tylosurus cancila* (Hamilton-Buchanan). New Guinea (Macleay); East Indies.
238. *Tylosurus giganteus* (Schlegel). *A'u*. Samoa; Hawaii; Levuka; Oualan; Kandavu; Fiji; New Guinea (Macleay); Tubuai Is. (Seale); East Indies; Japan.

This huge species is rather common about Samoa, as also at Hawaii and throughout the tropical Pacific. We obtained three moderate-sized and a few very large specimens from Samoa. One specimen leaped from the water to seize a charge of dynamite in the air.

ATHLENNES Jordan & Fordice.

239. *Athlenes hians* (Cuvier & Valenciennes). Hawaii; West Indies; Acapulco.

Family EXOCETIDÆ.

HEMIRAMPHUS Cuvier.

240. *Hemiramphus pacificus* Steindachner. Hawaii; Samoa.

Of this species about 20 specimens were taken with the seine near the mouth of the harbor of Pago Pago. The fish is not rare about Hawaii.

Life colors, light olive, silvery below; a clear blue line bounding silvery stripe above; all dark parts of body with bright blue luster; base of anal with blue stripe; tip of lower jaw deep orange.

241. *Hemiramphus depauperatus* Lay & Bennett. Hawaii; Marcus I.
242. *Hemiramphus affinis* Günther. *Ise lai*. Samoa; New Hebrides (Seale).

This species is the common *ise* or halfbeak, found everywhere in shallow water along the shore at Samoa. It is distinguished from related species by the insertion of the ventrals nearer base of caudal than gill-opening. We have about 50 specimens. None of our specimens have the head quite as long as indicated in Günther's description. The head with lower jaw is 2.75 to 3 in length to base of caudal.

Life colors of a specimen from Pago Pago, dorsal with blackish-edged blotch; a dusky spot in pectoral axil; lateral line and a lateral streak bright clear green; membranes of lower jaw dusky, with some red. A specimen from Apia had the lower jaw very red below; two blue streaks on each side of body.

243. *Hemiramphus laticeps* Günther. Fiji.
244. *Hemiramphus limbatus* Cuvier & Valenciennes. Guam; East Indies.
245. *Hemiramphus argenteus* Bennett. Open sea, near equator.
246. *Hemiramphus eclancheri* Cuvier & Valenciennes. Marquesas (Cuvier & Valenciennes, Seale).
247. *Hemiramphus quoyi* Cuvier & Valenciennes. New Guinea (Macleay); East Indies.
248. *Hemiramphus gaimardi* Cuvier & Valenciennes. Papua; East Indies.
249. *Hemiramphus commersoni* Cuvier. Fiji (Günther); New Guinea; Shortland I. (Seale); East Indies.
250. *Hemiramphus australiensis* Seale. Tubuai (Seale).
251. *Hemiramphus cantori* Bleeker. New Guinea (Macleay); East Indies.
252. *Hemiramphus acutus* Günther. Rarotonga.
Hemiramphus acutus Günther, Proc. Linn. Soc. N. S. W. 1841, 671, Rarotonga (Cook Is.).
253. *Hemiramphus melanurus* Cuvier & Valenciennes. Solomon Is. (Seale); East Indies.

EULEPTORHAMPHUS Gill.

254. *Euleptorhamphus longirostris* (Cuvier & Valenciennes). Hawaii; open Pacific; warm seas generally.

ZENARCHOPTERUS Gill.

255. *Zenarchopterus dispar* (Cuvier & Valenciennes), New Guinea (Macleay); East Indies.
 256. *Zenarchopterus maculosus* Garman. Fiji.
 257. *Zenarchopterus vaisiganis* Jordan & Seale, new species. Taoto.

Head, without lower jaw, 4.30 in length, with lower jaw, 2.30; lower jaw from tip of upper 3.90; eye 3.60 in head; upper jaw slightly broader than long, about equal to eye; interorbital slightly greater than eye; dorsal 12; anal 12; modified with a clasping organ, with a fleshy intromittent organ just anterior to base; scales 2-43-3; snout 3.10.

Body elongate, the depth 1.75 in head, the width 2.75; scales deciduous, the lateral line running very low on body; depth of caudal peduncle equal to interorbital space; width of preorbital in front of eye equal to pupil; opercle and preopercle entire; suborbital with more or less adipose membrane; villiform teeth in jaws, none on vomer, maxillary or tongue; gill-rakers thick, rather blunt, the longest about 2 in pupil, 12 developed on lower limb; base of dorsal fin 1.30 in head, fully one-half being on caudal peduncle, fourth and fifth rays are elongate, being about equal to base of fin; longest ray of anal, which is widened and elongate, forming one of the wings of the claspers, is about equal to length of

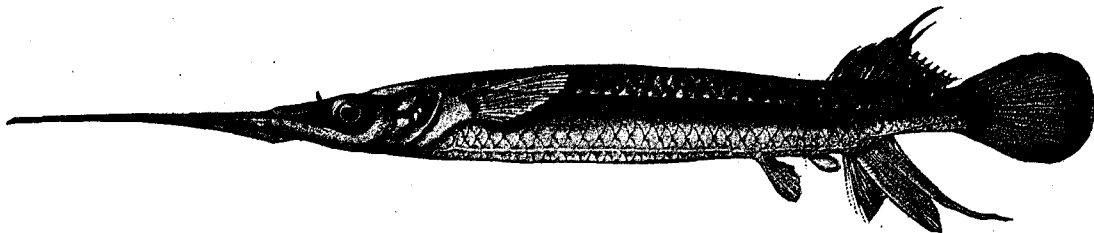


FIG. 11.—*Zenarchopterus vaisiganis* Jordan & Seale, new species. Type.

head; fleshy base of anal equal to eye; ventral small, 2.95 in head, its origin far back at beginning of posterior third of body; pectoral 1.20 in head; intromittent organ very prominent, situated between tip of ventrals and base of anal, its width 2 in length; caudal rounded, 1.20 in head.

Color in spirits, silvery below, darker above, with wash of greenish blue, a distinct dark-blue line from opercles to base of caudal; lower jaw deep blue; orbit with rim of blue; anterior of anal with dusky wash; a black spot on anterior dorsal, the fin more or less washed with dusky; caudal with dusky wash; other fins with very slight trace of dusky.

Color in life, pale olivaceous; a silvery streak along side; fins dirty-yellowish olive.

Fourteen specimens from Vaisigano River, at Apia. The type is no. 51718, U. S. National Museum, length 6 inches.

EVOLANTIA Snodgrass & Heller.

258. *Evolantia microptera* (Cuvier & Valenciennes). Hawaii; New Ireland; East Indies; Galapagos Is.

PAREXOCETUS Bleeker.

259. *Parexocetus brachypterus* (Solander). Tahiti; Hawaii; Laysan; West Indies.
 260. *Parexocetus brevipinnis* (Cuvier & Valenciennes). New Ireland.
 261. *Parexocetus rostratus* (Günther). Hawaii.

EXOCETUS Linnæus.

262. *Exocetus volitans* Linnæus. Hawaii; East Indies; Atlantic Ocean.

CYP SILURUS Swainson. *Malolo*.

263. *Cypsilurus unicolor* (Cuvier & Valenciennes). Vanicolo; sea between Auckland and Samoa; Tasman Sea.

Exocetus unicolor Cuvier & Valenciennes, Hist. Nat. Poiss., XIX, 97, 1846, Vanicolo.
Exonantes unicolor, Jordan, Guide to the Study of Fishes, II, 213, 1905.

Of this species we have 4 examples taken in the sea south of Samoa, and one from the Tasman Sea between Sydney and Auckland. All were obtained by Mr. A. P. Lundin, then navigator of the

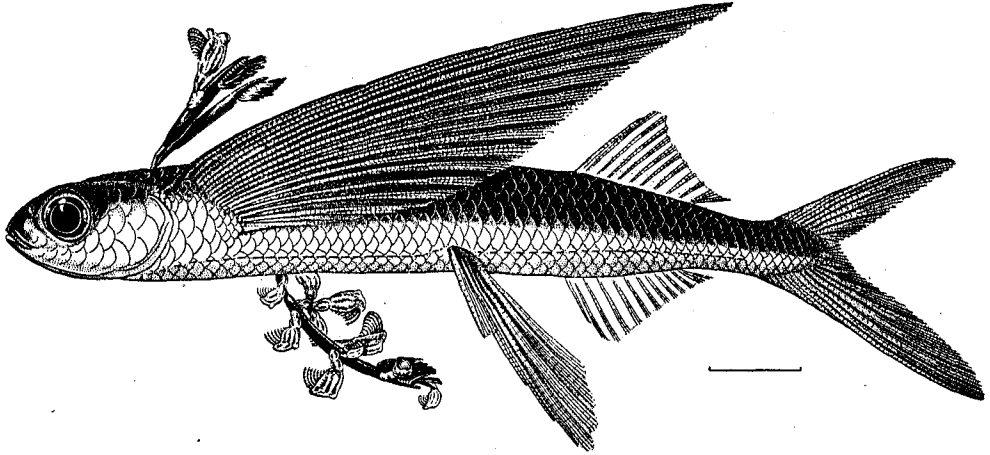


FIG. 12.—*Cypsilurus unicolor* (Cuvier & Valenciennes).

steamer *Sierra*. The species reaches a length of about 18 inches. On the specimen figured 4 parasitic copepod crustaceans (*Penella*) were attached, and on each of these were attached parasitic barnacles, *Conchoderma virgatum*, looking like a cluster of strange orchids.

264. *Cypsilurus gilberti* Snyder. Hawaii.

265. *Cypsilurus speculiger* (Cuvier & Valenciennes). Tasman Sea, between Auckland and Sydney.

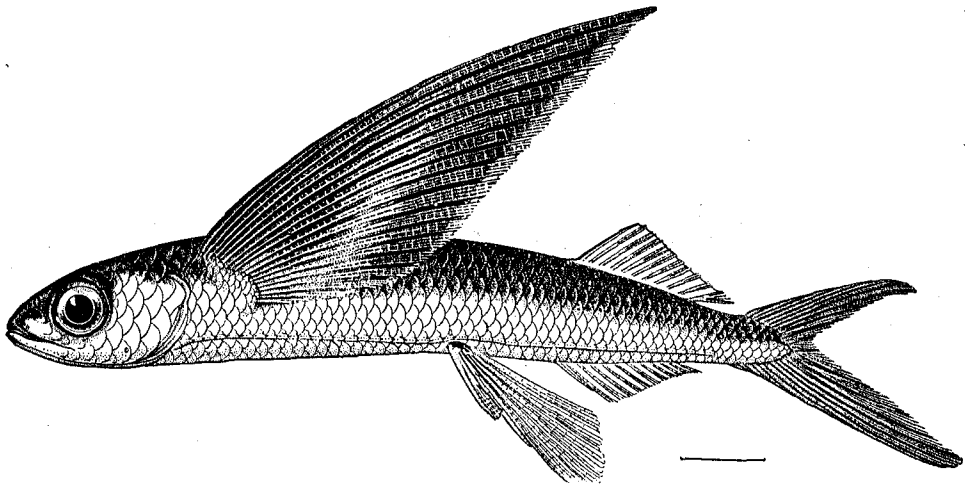
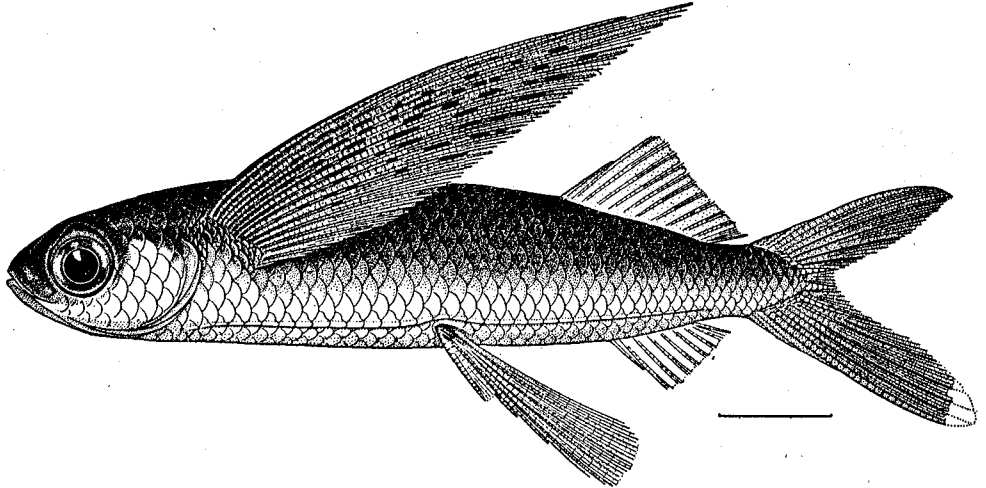


FIG. 13.—*Cypsilurus speculiger* (Cuvier & Valenciennes).

Of this species we have 5 examples taken by Mr. A. P. Lundin, in the Tasman Sea, between Sydney and Auckland. According to Dr. Lütken, this species occurs in the Atlantic also. The Atlantic species, called *Exocetus rubescens*, *roberti*, and *affinis*, and wrongly called *Exocetus volitans*, is, however, probably different, having the band on the pectoral less marked.

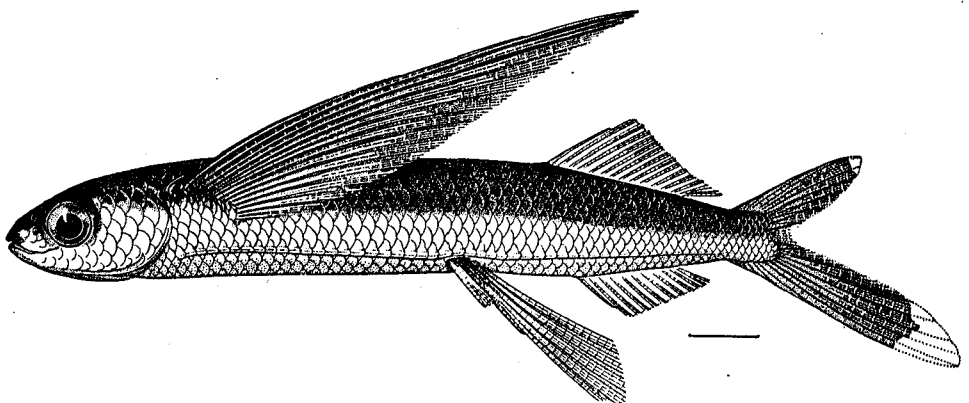
266. *Cypsilurus lamellifer* (Kner & Steindachner). Open Pacific.*Exocoetus lamellifer* Kner & Steindachner, Sitz. Ak. Wiss. Wien 1867, 384, Pacific.**267. *Cypsilurus atrisignis* Jenkins.** Hawaii; Kusai, or Strong I., Caroline Group.

Of this species, besides Dr. Jenkins's type from Hawaii, we have a second, taken at Kusai, or Strong Island, of the Caroline group, by Mr. A. P. Lundin, then navigator of the missionary vessel *Morning Star*.

268. *Cypsilurus pœcilopterus* (Cuvier & Valenciennes). New Britain; Tahiti; Caroline Is.; Samoa; East Indies.*Exocoetus spilopterus* Günther, Cat., vi, 202, Caroline Is.FIG. 14.—*Cypsilurus pœcilopterus* (Cuvier & Valenciennes).

This species is easily recognized by its plump body and spotted pectorals. Its maximum size is smaller than that of *Cypsilurus simus* and *C. quindecimradiatus*, the length being about 9 inches. Life colors of one specimen blue above, pectoral with large spots, ventrals plain, basally dusky, no red on pectoral.

One fine example flew on board the steamer *Kauau* off the western end of Tutuila, in the night.

FIG. 15.—*Cypsilurus quindecimradiatus* Fowler.**269. *Cypsilurus quindecimradiatus* Fowler.** Thornton I.; north of Samoa.

Of this well-marked species, distinguished by its long dorsal of 14 or 15 rays, its large size and the absence of pectoral markings, we have two large examples taken by Mr. A. P. Lundin in the sea to the southward of Samoa.

270. *Cypsilurus oligolepis* Bleeker. Shortland I. (Seale); East Indies.
 271. *Cypsilurus simus* (Cuvier & Valenciennes). Hawaii. Very abundant.
 272. *Cypsilurus bahiensis* (Ranzani). Hawaii, abundant; Atlantic; Panama region.
 273. *Cypsilurus naresi* (Günther). Fiji; New Hebrides.
 274. *Cypsilurus solandri* (Cuvier & Valenciennes). Tahiti; Seychelles.
 275. *Cypsilurus longibarba* (De Vis). New Britain.
Exocoetus longibarba De Vis, Proc. Linn. Soc. N. S. W. 1884, 454, New Britain; very young.
 276. *Cypsilurus katoptron* (Bleeker). Seas south of Samoa; Australia; East Indies.
Exocoetus robustus Günther, Cat., vi, 289, 1866, Australia.

A specimen of this species agreeing well with Bleeker's figure was taken by Mr. Lundin, then mate of the steamship *Sierra*, in the open sea south of Samoa. The species has black, white-banded pectorals, much as in *Cypsilurus speculiger*, but the dorsal rays are more numerous (14).

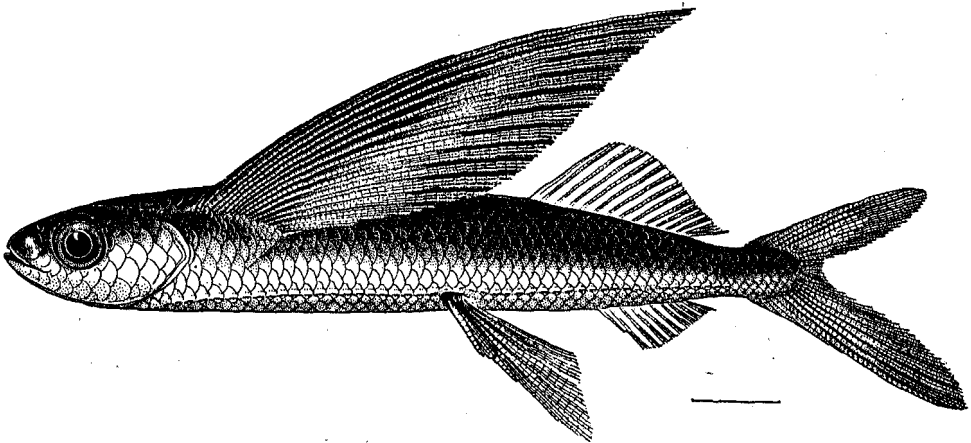


FIG. 16.—*Cypsilurus katoptron* (Bleeker).

277. *Cypsilurus arcticeps* (Günther). New Guinea (Macleay); China.

Family AULOSTOMIDÆ.

AULOSTOMUS Cuvier.

278. *Aulostomus valentini* (Bleeker). *Taotilo*. Hawaii; Samoa; Tahiti; Paumotu Is.; Johnston I.; Aneiteum; East Indies; Japan.

This common East Indian species is occasionally taken in Samoa as in Hawaii. We have one example from Apia.

Family FISTULARIIDÆ.

FISTULARIA Linnæus.

279. *Fistularia petimba* Lacépède. Fiji; Guam; Hawaii; Samoa; New Guinea; New Britain; Necker I.; Mangareva; New Hebrides; Solomon Is.; Makatea; Rarotonga; Raiatea; East Indies.

This species is common throughout the South Seas. We have a few examples from the shores at Samoa.

280. *Fistularia serrata* Cuvier. Hawaii; New Guinea; East Indies; Japan.

Family MACRORHAMPHOSIDÆ.

MACRORHAMPHOSUS Lacépède.

- 281.
- Macrorhamphosus brevispinis*
- (Kner & Steindachner). Samoa.

This species, recorded from Samoa, was not seen by us.

- 282.
- Macrorhamphosus finschi*
- (Hilgendorf). New Britain.

Centriscus finschi Hilgendorf, Nat. Freunde, 1884, 52, New Britain.

- 283.
- Macrorhamphosus hawaiiensis*
- Gilbert. Hawaii.

Family CENTRISCIDÆ.

CENTRISCUS Linnæus.

- 284.
- Centriscus komis*
- (Macleay). Palau Is.

Amphisila komis Macleay, Proc. Linn. Soc. N. S. W. III, 1878, 166, Komis (Palau Is.).

ÆOLISCUS Jordan & Starks.

- 285.
- Æoliscus strigatus*
- (Günther). New Guinea (Macleay); East Indies.

Family SOLENOSTOMIDÆ.

SOLENOSTOMUS Lacépède.

- 286.
- Solenostomus cyanopterus*
- Bleeker. Hawaii; New Guinea; East Indies.

Family SYNGNATHIDÆ.

CORYTHROICHTHYS Kaup.

- 287.
- Corythoichthys waitei*
- Jordan & Seale, new species. Samoa.

Rings 17+35; dorsal 29 or 30, situated on the first 6 caudal rings; snout slender, as viewed from above its edges parallel to the eyes, where the head is abruptly much widened; length of snout 1.2 in

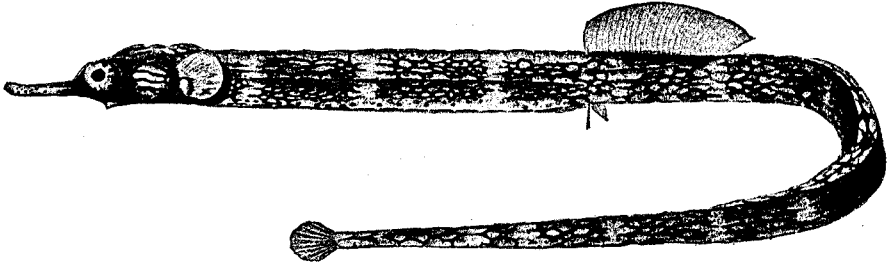


FIG. 17.—*Corythoichthys waitei* Jordan & Seale, new species. Type.

head; eyes large, produced above profile, 4.5 in head; a sharp semiconnected ridge extending from behind eyes to just behind pectoral base, three lobed, the first lobe on occiput, the other two on body plates; a sharp ridge extending back from supraorbital crest across parietal region; top of snout with a thin, low ridge; superior thoracic ridge not continuous with superior caudal ridge, but the former extending above the beginning of the latter for 3 or 4 rings; trunk contained 1.5 in caudal portion of the body; color very light, made slightly dusky by a network of fine lines along the sides, these interrupted by diffused light cross-bars on every fifth ring, just anterior to which the network of dark lines is more conspicuous and extends across the back; dark lines irregularly connected with each other, extending more or less horizontally back from the eye. In life snout rose-red, head with black stripe; general color pale yellowish; caudal bright rose-red, its upper and lower margins pale.

The type is no. 51723, U. S. National Museum, 34 inches in length. This species is named for Mr. Edgar R. Waite, the accomplished curator of the Australian Museum, now of the Canterbury Museum of Christchurch, New Zealand.

288. *Corythoichthys sealei* Jordan & Starks, new species. Samoa.

Head 7.50; snout equal to distance from middle of eye to posterior margin of opercle, the snout narrow, being scarcely one-half of eye; forehead rather abrupt; rings 16 + 32; dorsal 32 high, the rays being equal to or greater than depth of fish, the base of the fin not elevated; no crest on head or snout; only a trace of a single raised line across opercle; rings of body with six faces, those of the tail with four; distance in front of anal fin 1.75 in posterior part of body; depth 2.75 in head, slightly greater than the width; the egg sac in the male occupies the ventral portion of the sixteenth to twenty-eighth ring; length of dorsal slightly less than width of eye; caudal pin-shaped, 3 in head, anal minute, directly below third ray of dorsal.

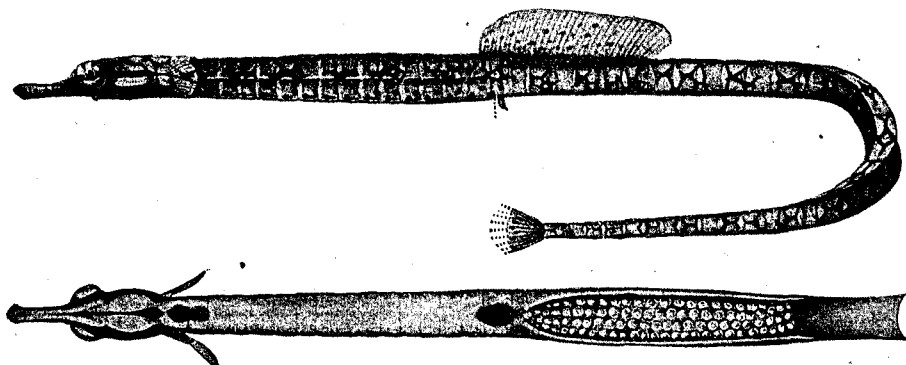


FIG. 18.—*Corythoichthys sealei* Jordan & Starks, new species. Type.

Color in life light gray spotted with reddish brown and lighter gray; snout and caudal whitish; head barred below. Color in spirits whitish, each ring with a branched greenish spangle on side and top, under surface white; two distinct greenish lines along side of head across opercle to base of pectoral, the lower one of these lines extending slightly out on the snout; top of head marked into a number (10) of irregular squares by narrow dark lines; four rings of minute dots around snout; a dark elongate black area on throat, more or less separated from a black ventral spot on first body ring; three rows of small round dots on side of body below the branched greenish spots; dorsal fin with scattered dots.

Three specimens from Apia, the type no. 51722, U. S. National Museum, 3.25 inches long.

289. *Corythoichthys mataafæ* Jordan & Seale, new species.

Head 11.75; snout 3 in head, narrow, width about 2 in eye; eye 3.75 in head; interorbital very narrow, less than one-half width of eye; rings 15+34, the minute anal fin being on the 15th ring, in the male the egg sac occupying the ventral surface of rings 15 to 26; body seven-sided, the tail but four; dorsal

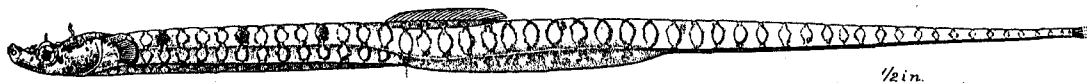


FIG. 19.—*Corythoichthys mataafæ* Jordan & Seale, new species, Type.

21, its base not elevated; opercle without a bony ridge extending across it but with numerous radiating rows of pits, the widest point of opercle with a short dermal flap; medial line of snout with a distinct crest with six teeth, the height of crest being slightly less than width of pupil on anterior half of snout, the crest not toothed; no interorbital crest, a short, fringed, dermal tentacle over each eye, its length less than width of interorbital; a single fringed tentacle on middle of nuchal region; a pair of short tentacles just below and a little posterior to eye, another pair below middle of snout; a rim-like projection over upper margin of opercle; snout rather pug-like in shape; pectoral less in length than width of opercle; caudal short, about equal to eye; anal minute.

Color whitish, each ring on each of its faces with an oval, brown-rimmed spot of silvery; under surface of tail whitish; snout with 2 rings of dusky; about 5 dusky cross lines under throat; about 5 radiating dusky lines in eye and over head.

One specimen, the type, no. 51724, U. S. National Museum, 4.20 inches long, from the coral reefs off Mulinu'u, the residence of Mataafa, chief of Upolu, a distinguished and able statesman, once king of Samoa.

290. *Corythoichthys trachypoma* (Günther). Thursday I.; Prince of Wales I.

Syngnathus trachypoma Günther, Zool. Alert, 1884, 30.

TRACHYRHAMPHUS Kaup.

291. *Trachyrhamphus* sp. Marquesas Is.

A specimen badly mutilated and therefore not in fit condition for description, was taken by Mr. Seale at Nukahiva in the Marquesas Islands. It represents probably an undescribed species.

MICROPHIS Kaup.

292. *Microphis brachyurus* (Bleeker). Taotao. Tahiti; Samoa; Aneiteum; East Indies.

About a dozen examples were taken in the Vaisigano River and in other streams about Apia. All the species of this genus in Samoa are confined strictly to fresh waters.

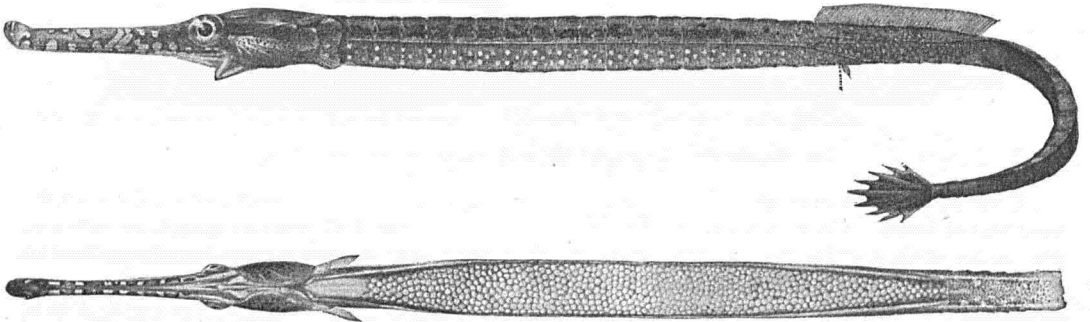


FIG. 20.—*Microphis brachyurus* (Bleeker).

Life colors of one specimen from Apia, light olive, darker on back; a bright red stripe along side from below pectoral backward to middle of trunk; head darker olive, barred with paler olive; caudal dusky olive. Another specimen was dark, speckled with whitish, a vertical orange dash behind opercle the only bright color, and seen in males only.

293. *Microphis pleurotænia* (Günther). Hawaii.

294. *Microphis sculptus* (Günther). Fiji.

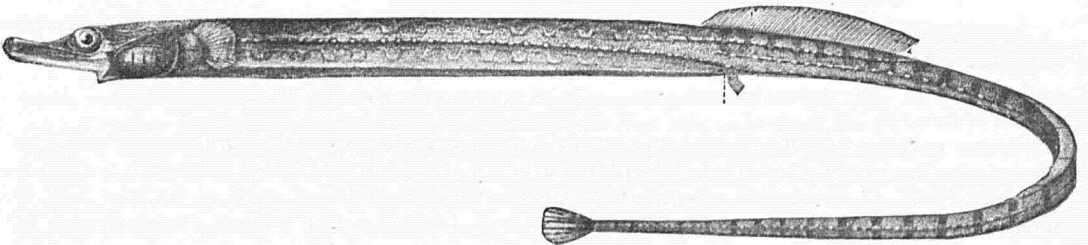


FIG. 21.—*Microphis caudatus* Peters.

295. *Microphis caudatus* Peters. Samar; Java.

Microphis caudatus Peters, Berl. Mon. 1868, 276, Samar (in fresh water), Java.

Doryichthys caudatus Günther, Cat., VIII, 182, Java.

Six specimens of this species were taken in the Gasegase River at Vaimosa, near Apia.

296. *Microphis torrentius* Jordan & Seale, new species. Samoa.

Head 9.30 to base of caudal, 4.10 in distance anterior to anal; snout 2.20 in head; width of snout 2 in its length; eye about equal to width of snout; interorbital narrow, 2 in eye; dorsal 32; anal 3; rings 16 + 33, no spines; the rings of posterior half square; abdominal rings wider, containing the egg sac; a



FIG. 22.—*Microphis torrentius* Jordan & Seale, new species. Type.

single unbranched stay across opercle; a low medium ridge on snout and 2 in interorbital; slope of forehead not abrupt; length of pectoral equal to opercle; caudal equal to snout; insertion of the minute anal almost a third nearer tip of snout than tip of caudal; anterior base of dorsal directly over anal.

Color in spirits, greenish with a slightly darker band on each ring; a distinct black line along side of snout through eye, across opercle to base of pectoral; anal with four narrow cross-bands of white.

Three specimens, taken high up in the Vaivase River, near Vaialele, to the eastward of Apia, in a swift brook running through pasture land. The type is no. 51725, U. S. National Museum, from near Apia, length 3.25 inches.

GASTEROTOKEUS Heckel.**297. *Gasterotokeus biaculeatus* (Bloch). Samoa; Papua; East Indies.**

Five specimens were taken at Apia and Pago Pago. They were caught in the seine on shallow shores inside the reefs.

Life colors of a specimen from Pago Pago, clear olive brown, finely mottled above; six round jet black spots like ink-dots on lower part of side of body; lower side of head sulphur-yellow, mottled with brown; faint brown bars at tip of tail, which is red; belly yellowish brown, with brown cross-streaks.

ICHTHYOCAMPUS Kaup.**298. *Ichthyocampus erythræus* Gilbert. Deep seas of Hawaii.****299. *Ichthyocampus papuensis* Sauvage. New Guinea (Sauvage, Bull. Sci. and Philom. 1880, 228).****HIPPOCAMPUS Rafinesque.****300. *Hippocampus fisheri*, Jordan & Evermann. Hawaii.****301. *Hippocampus hilonis* Jordan & Evermann. Hilo, Hawaii.****302. *Hippocampus kuda* Bleeker. New Guinea (Macleay, as *H. guttulatus*); East Indies.****Family PEGASIDÆ.****PEGASUS^a Linnæus, 1758 (*volitans*).**

Cataphractus Gronow, 1763 (*draco*=*volitans*).

Eurypegaseus Bleeker, 1864 (*draco*=*volitans*).

Zalises Jordan & Snyder (*umitengu*, near *draco*).

303. *Pegasus volitans* Linnæus. New Britain (Peter., Berl. Mon. 1876, 843); East Indies.**304. *Pegasus papilio* Gilbert. Deep seas of Hawaii.****PARAPEGASUS Duméril.****305. *Parapegaseus natans* (Linnæus). New Guinea; Australia; China.**

^a The genus *Pegasus* was based, by Linnæus in 1758, on a single species, *Pegasus volitans*. In 1763 the name *Cataphractus* of Gronow was based on the same species, which in 1766 Linnæus renamed *Pegasus draconis*. The same genus was called *Eurypegaseus* by Bleeker in 1864 and *Zalises* by Jordan & Snyder in 1902.

Family ATHERINIDÆ.

ATHERINA Linnæus.

306. *Atherina lacunosa* Forster. New Caledonia; New Hebrides; Fiji (Günther); Solomon Is. and New Hebrides (Seale); East Indies.
(*Atherina pinguis* Lacépède.)
307. *Atherina forskali* Rüppell. New Guinea (Macleay); East Indies.
308. *Atherina endrachtensis* Cuvier & Valenciennes. New Guinea; Australia.
309. *Atherina waigiensis* Quoy & Gaimard. Waigiu.
Atherina cylindrica Cuvier & Valenciennes.
310. *Atherina uisila* Jordan and Seale, new species. *Usila*.

Head 4.35 in length; depth 7; greatest width 7.40; eye 2.75 in head; snout 4; interorbital equal to eye; dorsal VII-1, 10; anal I, 12; scales 2-42-3; maxillary extending to below anterior margin of eye.

Body somewhat conical; head as wide as deep; interorbital space flat with two narrow grooves. Gillrakers equal in length to pupil, about 25 on lower limb; a single row of minute teeth in jaws, patches of minute teeth on vomer and palatines; origin of dorsal nearer tip of snout than base of caudal, its longest spine equal to eye; origin of soft dorsal slightly posterior to origin of anal; base

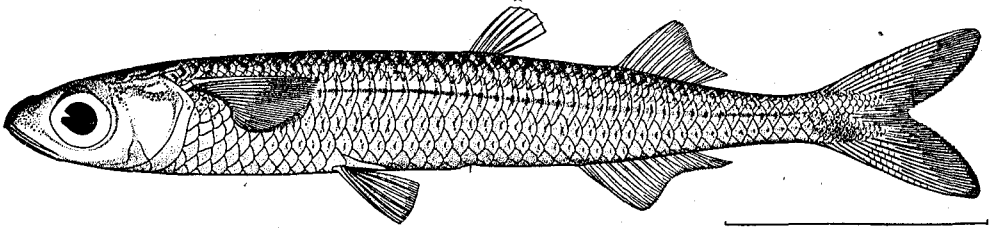


FIG. 23.—*Atherina uisila* Jordan & Seale, new species. Type.

of soft dorsal 2.50 in head; base of anal 1.75 in head; the longest rays of soft dorsal and anal equal to eye; pectoral 1.50 in head; ventral 2; caudal 1.20, deeply emarginate; 18 rows of scales in front of spinous dorsal; pectoral reaching sixth scale of lateral line; origin of spinous dorsal over the sixteenth scale of lateral line; opercle and preopercle entire.

Color in life, olive; a lateral band with a brighter streak above; lower jaw blue; a black band across pectoral, fins otherwise plain. Color in spirits, below the lateral stripe white with slight wash of pale green; margin of scales with or without fine black dots; a wide stripe of bright silver from opercle to base of caudal, at its widest point this stripe equal in width to the pupil; scales of lateral line in some specimens with darker centers, which give the appearance of a slightly darker line in the upper third of the silvery line; above the stripe the scales have darker margins and are punctulate with minute blue dots, the ground color being pale green; pectoral with a slight wash of dusky, other fins white; opercle silvery.

This species is near *Atherina lacunosa*, but seems to be different.

Forty specimens from Apia. The type is no. 51726, U. S. National Museum, length 3.75 inches.

311. *Atherina insularum* Jordan & Evermann. Hawaii.

Family MELANOTÆNIIDÆ.

RHOMBATRACTUS Gill.^a (*Aristeus* Castelnau; preoccupied.)

312. *Rhombatractus novæguineæ* (Ramsay & Ogilby). Strickland River, New Guinea.
Nematocentris novæ-guinææ Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales 1886, 13, Strickland River.
313. *Rhombatractus rubrostriatus* (Ramsay & Ogilby). Strickland River, New Guinea.
314. *Rhombatractus goldiei* (Macleay).
Aristeus goldiei Macleay, Proc. Linn. Soc. N. S. W. 1888, 269, Goldie River (New Guinea).

^aSee Ogilby, Proc. Linn. Soc. N. S. W. 1896, 124.

Family MUGILIDÆ.

MUGIL Linnæus.

315. *Mugil cephalus* Linnæus. Hawaii; Raiatea; Tahiti; New Guinea (Macleay); Nukahiva and Solomon Is. (Seale); Mediterranean; Atlantic coasts of United States; Panama; southern California; Japan; Red Sea.

(*Mugil aur* Forskål; *Mugil cephalotus* Cuvier & Valenciennes.)

316. *Mugil caldwelli* Fowler. Samoa.

Mugil caldwelli Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 524, Samoa.

This species, not recognized by us in Samoa, is probably based on the young of some other species, perhaps the common mullet of Oceania, which we have been unable to separate from the European *Mugil cephalus* or the Asiatic *Mugil aur*.

317. *Mugil broussoneti* Cuvier & Valenciennes. Cook Is.

318. *Mugil tongæ* Günther. Tonga.

319. *Mugil planiceps* Cuvier & Valenciennes. Guam; East Indies.

320. *Mugil kelaarti* Günther. Tahiti; Raiatea (Seale); East Indies.

321. *Mugil kandavensis* Günther. Kandavu; Fiji.

322. *Mugil perusi* Cuvier & Valenciennes. Vanicolo.

323. *Mugil argenteus* Quoy & Gaimard. Samoa (Günther); Australia.

This species, recorded from Samoa, was not seen by us.

324. *Mugil sundanensis* Bleeker. New Guinea (Macleay); East Indies.

LIZA Jordan & Swain.

325. *Liza melinoptera* (Cuvier & Valenciennes). *Afa*; *Fu'afa*. Vanicolo; Tonga; Samoa.

This mullet, known by the honey-colored ($\mu\acute{\epsilon}\lambda\iota\tau\epsilon\varsigma$) caudal fin and by the black pectoral, is very abundant about Samoa, and reaches a large size. About 20 specimens were taken. The name *melinoptera* (not *melanoptera*) refers to the yellow vertical fins, not to the black pectoral.

Life colors of a specimen from Apia 15 inches long: Very pale olive, silvery below; faint narrow lines along series of scales; lips pale; first dorsal pale gray, the spines dark; soft dorsal dusky, yellowish at tip; caudal pale soiled yellow; anal blackish, yellowish at tip, the last rays colorless; ventral pure whitish; pectoral mostly deep sooty black, the lower rays grayish.

Another specimen from Apia, young, with scales 26-10, anal III, 9, had first dorsal, second dorsal, and most of pectoral jet black; ventral blackish at base, edge yellowish; caudal and anal blackish washed with deep yellow, edge blackish; iris dark brown. Life colors of young specimens (scales 26) from Pago Pago, back with two or three yellowish cross blotches; pectoral black; caudal bright yellow, even in very young examples; anal yellow; ventral tipped with pale yellow.

326. *Liza cæruleomaculata* Lacépède. *Anae*; *'Ana'analagi*. Guam; New Guinea; Samoa; East Indies.

Mugil cæruleomaculatus Lacépède, Hist. Nat. Poiss., v, 385, 1803, Mauritius.

Mugil axillaris Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 131, 1836, Mauritius, New Guinea. Günther, Cat., III, 444. Scale, Bishop Mus. 1901, 66, Guam. Günther, Fische der Südsee, 216, taf. cxx, fig. B, Samoa, Red Sea, Seychelles. *Agonostomus dorsalis* Streets, Bull. U. S. Nat. Mus., VII, 102, 1877, Samoa; very young.

Life colors of a specimen from Apia, silvery, darker above; no stripes; fins pale; caudal dark at tip; a dark axillary spot; pectoral dull yellowish; iris silvery brownish. Scales 39; anal III, 9.

This is a large mullet, recognizable by the blue spot at the base of the pectoral. It is common about Samoa, where about 25 specimens were preserved.

327. *Liza troscheli* (Bleeker). *Aua*. Samoa; New Guinea; East Indies.

Mugil troschetii Bleeker, Nat. Tijd., XVI, 277, Java. Günther, Cat., III, 448, Ceylon, Borneo.

Mugil borneensis Bleeker, Nat. Tijd., II, 1851, 201, East Indies. Kner, Novara Fische, 228, Tahiti. Günther, Cat., III, 448. Günther, Fische der Südsee, 218, Tahiti.

Mugil compressus, Günther, Fische der Südsee, 217, taf. cxxIII, fig. A, Samoa; not type.

Life colors of a specimen from Pago Pago, olivaceous, dull and pale, very faint streaks along the rows of scales; anal dusky; caudal dull, colorless, with a dark streak along its whole margin above, below and behind. Anal III, 9; scales 32; maxillary uncovered; eye 3.5 to 4 in head, hence smaller than in the descriptions of *L. troscheli*.

One specimen from Apia had a slight brassy luster in life, and faint olive lateral stripes. Another was brownish above, the sides silvery, with the barest trace of striations; fins all plain, the caudal dusky at tip.

This species is very common about Samoa, entering the river mouths and brackish waters. About 30 specimens were taken.

328. *Liza compressa* (Günther). Normanby I., New Guinea (Macleay).

329. *Liza neocaledonica* (Castelnau). New Caledonia.

Mugil neocaledonicus Castelnau, 1873, 116, New Caledonia.

330. *Liza waigiensis* (Quoy & Gaimard). Waigiü; New Guinea; Bougainville Is. (Peters); Tahiti; Guam; Mangareva; New Hebrides; Solomon Is.; Raiatea and Rarotonga (Seale); East Indies.

331. *Liza papillosa* (Macleay). Normanby I.

Mugil papillosus Macleay, Proc. Linn. Soc. N. S. W. 1883, 270.

MYXUS Günther.

332. *Myxus leuciscus* Günther. Rarotonga, Cook Is.; Makatea (Seale).

CHÆNOMUGIL Gill.

333. *Chænomugil chaptali* (Eydoux & Souleyet). Hawaii; Kingsmill; Laysan.

(*Myxus pacificus* Steindachner.)

334. *Chænomugil nauticus* Bryan & Herre. Marcus I.

Chænomugil nauticus Bryan & Herre, Bishop Museum 1903, 127, Marcus I.

QUERIMANA Jordan & Swain.

335. *Querimana crenilabis* (Forster). Tahiti; Tanna; Paumotu; Kingsmill; Ponape; New Ireland; Christmas I.; Red Sea.

ÆSCHRICHTHYS Macleay.

336. *Æschrichthys goldiei* Macleay. Goldie River, New Guinea.

Æschrichthys goldiei Macleay, Proc. Linn. Soc. N. S. W. 1883, 5, Goldie River.

AGONOSTOMUS Bennett.

337. *Agonostomus plicatilis* (Cuvier & Valenciennes). Rivers of New Hebrides; New Caledonia.

338. *Agonostomus loaloe* (Macdonald). Fiji.

Gonotomyzus loaloe Macdonald, Proc. Zool. Soc. N. S. W. 1869, 38, with plate, rivers of Viti Levu (Fiji).

Family SPHYRÆNIDÆ.

SPHYRÆNA Linnæus.

339. *Sphyræna obtusata* Cuvier & Valenciennes. *Sapatu*. Samoa; Fiji; Guam; New Guinea (Macleay); Faté in the New Hebrides (Seale); East Indies.

One specimen of this species was taken at Apia. It is apparently the species figured by Günther in the *Fische der Südsee*.

Life colors, olive green, below white with bright reflections; sides with two lateral stripes of dark olive, the lower continuous, the upper along lateral line of rounded, confluent blotches; caudal rather bright olive yellow, dusky edged; lower fins white; upper pale olive; snout green. Scales very large, 76.

340. *Sphyræna forsteri* Cuvier & Valenciennes. Samoa; Tahiti; Vavau; New Guinea.

Of this species, we have one specimen from Apia. It agrees fairly with Dr. Günther's figure in the *Fische der Südsee*. The *Sphyræna forsteri* of Steindachner from Mexico is a very distinct species, *Sphyræna ensis* Jordan & Gilbert.

Life colors of the specimen from Apia: Oblique blotch on opercle and base of pectoral; black blotch on dorsal and anal; caudal largely blackish; ventral and pectoral pale; obscure dark, short bars along sides. Scales 94; pectoral not reaching quite to dorsal; ventral farther.

341. *Sphyræna helleri* Jenkins. Hawaii.

This is the offshore small-scaled species, known in Hawaii as *kawalea*.

342. *Sphyræna snodgrassi* Jenkins. Hawaii.

This is the large-scaled species, known as *kaku* in Honolulu.

343. *Sphyræna grandisquamis* Steindachner. Pacific Ocean, exact locality unknown.

Sphyræna grandisquamis Steindachner, Sitz. Ak. Wiss. Wien 1866, 446.

344. *Sphyræna megalolepis* Peters. New Ireland.

Sphyræna megalolepis Peters, Berl. Mon. 1876, 842, New Ireland.

345. *Sphyræna kenie* Klunzinger. Bougainville Is.; Red Sea.

Sphyræna kenie Klunzinger, Synopsis, 1, 823, 1870, Red Sea. Klunzinger, Roth. Meer, 129. Peters, Berl. Mon. 1876, 842, Bougainville Is.

Family POLYNEMIDÆ.

POLYDACTYLUS Rafinesque.

346. *Polydactylus plebeius* (Broussonet). *Umiumia*. Tahiti; Samoa; Solomon Is.; New Britain; Tahiti and Nukahiva (Seale); East Indies.

Polynemus plebeius Broussonet, Ich. Decas., fig. 309, 1788, Tahiti.

Polynemus lineatus Lacépède, Hist. Nat. Poiss., v, pl. 13, fig. 2, 1803, Ile de France. Günther, Cat., II, 227, Samoa, Solomon Is., Amboyna.

Polynemus plebeius Peters, Berl. Mon. 1876, 835, New Britain.

Polynemus plebeius Günther, Fische der Südsee, 103, pl. LXXVI, fig. A, Amboina; not of Günther, Cat., II, 329.

Polynemus tentatus Günther, Cat., II, 526, 1860, Amboina and Guadalcanar, Solomon Is.

This is evidently the original *Polynemus plebeius* of Broussonet, which has been much confused by subsequent authors. It was well described by Günther under the name of *Polynemus lineatus*, and earlier described by Lacépède under the same name. It is common at Apia, where 6 specimens were taken with the hook in the ship channel, and is valued as a food fish. Scales 55; 5 pectoral filaments.

The adults are very sharply striped, the dark lines along the rows of scales being conspicuous. Young examples do not show these lines clearly, and these accord better with the figure given by Broussonet. An adult example from Apia in life was white with streaks of olive brown. A young example from Pago Pago in life was entirely silvery, the fins pale with dark dots, pectoral a little more yellowish, no dark spot on base of lateral line.

347. *Polydactylus sexfilis* (Cuvier & Valenciennes). Hawaii; Johnston I.; East Indies.

Family BERYCIDÆ.

MELAMPHAES Günther.

348. *Melamphaes unicornis* Gilbert. Deep seas of Hawaii.

CAULOLEPIS Gill.

349. *Caulolepis longidens* Gilbert. Deep seas of Hawaii.

Family POLYMIXIIDÆ.

POLYMIXIA Lowe.

350. *Polymixia berndti* Gilbert. Deep seas of Hawaii.

Family HOLOCENTRIDÆ.

MYRIPRISTIS Cuvier. *Malau*.

351. Myripristis murdjan (Forskål). *Maniñiniñi*. Hawaii; Samoa; Harvey Is.; Tahiti; Fiji; Paumotu Is.; Guam; Laysan; New Hebrides, Raiatea, and Rarotonga (Seale); East Indies.

This species is common throughout the South Seas. It is the most abundant of the genus about Hawaii, and is fairly plentiful at Samoa. It is distinguished by its large scales (30), by the presence of white edges on the soft vertical fins and the absence of black tips on dorsal and anal. There is always a dark bar across the gill-opening.

352. Myripristis intermedius (Günther). *Malau*. Samoa; Kingsmill; Harvey Is.; Tahiti; Galapagos Is.

Myripristis murdjan, var. *intermedia* Günther, *Fische der Südsee*, 92, Samoa, Harvey, Kingsmill, Tahiti.

This form is common at Samoa, where about 20 examples were taken. It differs from *M. murdjan* chiefly or entirely in the presence of a black blotch on the tip of the soft dorsal and anal. Dr. Günther regards it as a mere color variation of *M. murdjan*. We should take a similar view were it not for the fact noted by Dr. Klunzinger, that in the Red Sea, and in Hawaii, where *M. murdjan* is abundant, no specimens of this type have been taken.

A specimen from the Galapagos Islands, collected by Snodgrass and Heller and recorded as *M. murdjan*, has black tips to the dorsal and anal, and would be referable to *M. intermedius*.

Color deep red, dusky on dorsal and anal, fins all bright red, pale-edged in front.

353. Myripristis adustus Bleeker. *Malau uo*. Samoa; Tahiti; Paumotu Is.; Harvey Is.; Kingsmill; New Guinea; Marcus I.; Shortland I. (Seale); East Indies.

Myripristis adustus Bleeker, *Amboina*, III, 18, East Indies. Günther, *Cat.*, 1, 22, Amboina. Günther, *Fische der Südsee*, 92, taf. 62, Tahiti, as variety of *M. murdjan*, Samoa, Paumotu, Harvey I., Kingsmill I. Bryan & Herre, *Bishop Museum*, vol. 11, no. 1, 128, Marcus I.

Myripristis botche, Day, *Fishes of India*, 169; not of Cuvier & Valenciennes.

This well-marked and handsome species is rather common about Samoa, where about 12 specimens were taken. It may be at once known from *M. murdjan* by the steel blue (not red) color, and especially by the broad black edging of both dorsals, and of the caudal and anal fins. In *M. intermedius* there is no black on the spinous dorsal or caudal.

Life colors of a specimen from Apia, gray tinged with reddish; edge of scales brown; a dark-brown blotch across opercle and axil; dorsal, anal and caudal pale pinkish gray at base, the edge broadly black, washed anteriorly with blood-red; spinous dorsal also mostly black; pectoral pale pinkish; ventral whitish.

354. Myripristis micropthalmus Bleeker. *Malau tea; Malau mataputa*. Samoa; New Guinea (Macleay); Faté, New Hebrides (Seale); East Indies.

This species is very abundant at Samoa, where about 40 specimens were taken. It has the silvery luster and dark scale-edgings of *Myripristis adustus* without the deep red shades of *M. murdjan*. Life colors were noted in various specimens as follows:

(1) Specimen from Apia. Silvery red brown, lighter than in *M. murdjan*, each scale silvery with dark edges; opercular spot blood red, not black; same color on base of pectoral; fins paler; dorsal and anal with silvery base; dorsal, anal, caudal, and ventral with pale edge; spinous dorsal orange red, its base pale grayish, blotched with orange.

(2) Specimen from Pago Pago, very deep, scales 30, maxillary entire. Brownish, sides pinkish silvery, not very red; a blackish red cross-band on opercle, shoulder, and axil; first dorsal whitish at base, scarlet above; second dorsal, anal, and caudal pink, scarlet or orange at tips, and with a distinct white edge; pectoral pale; ventral dull orange, whitish-edged.

(3) Specimen called *malau mataputa*, or swelled-face; very deep; very large-scaled. Purplish black above, very silvery on side; a blood-red band from nape to axil; preopercle and opercle nearly white; spinous dorsal pinkish below, scarlet above; soft dorsal and anal pinkish behind, scarlet on lobes, with white edge; caudal red, orange behind, the edges slightly pale; ventral and pectoral reddish, ventral white-edged.

Larger examples more red, with dusky behind pale edges of dorsal and anal; fins all bright red except white edgings.

(4) Red, dusky on dorsal and anal; fins all bright red, pale-edged in front.

(5) Larger specimen. Dorsal clear deep red.

(6) Bright clear red, the scales a little paler on centers; first dorsal bright red, the tips scarlet; other vertical fins clear red with distinct pale edges and no blackish; no stripes along anterior edge; ventral deep red with pale edge; pectoral clear red; a blackish opercular axil bar.

355. *Myripristis hexagonus* (Lacépède). Samoa; Mauritius.

Lutjanus hexagonus Lacépède, Hist. Nat. Poiss., iv, 213, 1802, Mauritius.

Myripristis hexagonus, Cuvier & Valenciennes, Hist. Nat. Poiss., III, 171. Quoy & Gaimard, Voy. Astrolabe, 5, pl. 14.

Günther, Cat., I, 27.

We refer to this species, with some doubt, two specimens, large-scaled, with little black on the opercle which ends in about five points, the one larger than the others. It is near *Myripristis murdjan*, and still nearer to *Myripristis berndti* of Hawaii.

Life colors of a specimen from Apia, light brick-red, the sides rather silvery, and no dark lines; a darker red patch on opercle and axil; a silvery crescent on iris behind; fins all red, the spinous dorsal paler at base, the others darker on lobes; anal and caudal with very inconspicuous pale edging.

356. *Myripristis berndti* Jordan & Evermann. Hawaii.

357. *Myripristis chryseres* Jordan & Evermann. Hawaii.

358. *Myripristis symmetricus* Jordan & Evermann. Hawaii.

359. *Myripristis argyromus* Jordan & Evermann. Hawaii.

360. *Myripristis sanguineus* Jordan & Seale, new species. *Malau ula*; *Segasega*. Tahiti; Samoa.

Head 3.4 in body; depth 2.50; eye 2.50 in head; dorsal x-1, 14; anal iv, 13; scales 4-38-7.

Body elongate, deep and compressed; head blunt, its length less than its depth; snout short, its length from the upper nostril equal to pupil; premaxillary slightly protractile; maxillary reaching to a

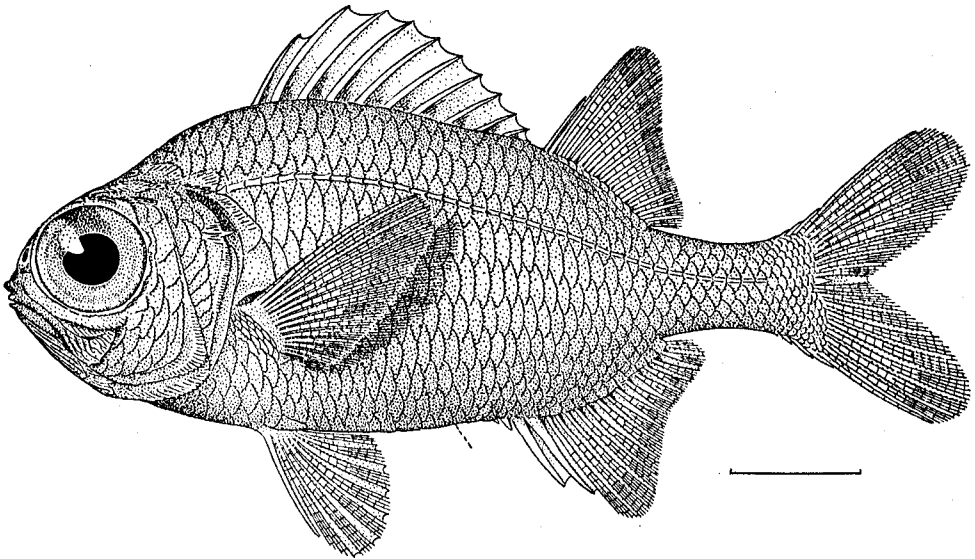


FIG. 24.—*Myripristis sanguineus* Jordan & Seale, new species. Type.

line below the posterior edge of pupil, its distal end broad, 4.50 in head, its lower posterior margin armed with blunt teeth; lower mandible 1.50 in head; bands of small teeth in jaws, vomer, and palatines; a patch of enlarged blunt outer teeth on each side of upper and lower jaw; gillrakers numerous, long and strong; interorbital space 3.85 in head; opercle striate and denticulate, with one small spine at angle; scales all striate and toothed; a row of modified scales over the nuchal region; origin of dorsal about even with lower base of ventrals and on line with the third scale of the lateral line; dorsal spines slender, the first 2.75 in head, the third longest, 2 in head; anterior dorsal and anal rays somewhat produced, their length 1.50 in head; third anal spine strongest, the fourth longest, equal to orbit; caudal emarginate; pectoral reaching to eleventh scale of the lateral line.

Color in life deep red, a black opercular spot; fins all red, the dorsal pale red with the margin deep crimson; outer margin of soft dorsal and the anal also a dark red.

Color in spirits pale yellowish, the fins a brighter yellowish; a dusky blotch at posterior margin of opercle, and a dusky wash in axil of pectoral.

One specimen, the type (no. 51721, U. S. National Museum), from Apia. Two other specimens, from Tahiti, Society Islands, are in the Bishop Museum, Honolulu. This species is distinguished by the much enlarged front teeth. It is close to *Myripristis argyromus* and *M. symmetricus*.

361. *Myripristis pralinus* Cuvier & Valenciennes. *Mamo; Malau mamo.* Port Praslin, New Ireland; Samoa; East Indies.

This species is very abundant at Samoa, where about 50 examples were taken. Our specimens agree well with the account of Günther and Sauvage. The small scales, the serrated maxillary, and the dark bar at the gill-opening are characteristic.

Life colors of a specimen from Apia crimson red, the centers of the scales not much lighter, the lower parts rosy; opercular spot deep red, almost black, base of pectoral deep red; fins bright rose, dorsal, caudal, and ventral all edged with white; shade of fins same as body; first dorsal deep red, paler at base.

362. *Myripristis carneus* Ramsay & Ogilby. Admiralty Is.

Myripristis carneus Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 474.

363. *Myripristis parvidens* Bleeker. New Ireland (Sauvage); East Indies.

364. *Myripristis multiradiatus* Günther. Vavau; Tonga; Hawaii; Samoa.

A species identical with the Hawaiian species called by us *Myripristis multiradiatus*, which is abundant at Honolulu, is very common at Samoa. It is probably the true *multiradiatus*, though we find no specimen with more than 16 dorsal rays. In the type from Vavau Dr. Günther found 18. The species is extremely close to *M. pralinus*.

Life colors of a specimen from Pago Pago light bright red; darker green across opercle, shoulder and axil; spinous dorsal scarlet, deepest on edges; other fins red like the body; pectoral, dorsal, anal and caudal with an anterior pale edge; eye very large, maxillary entire.

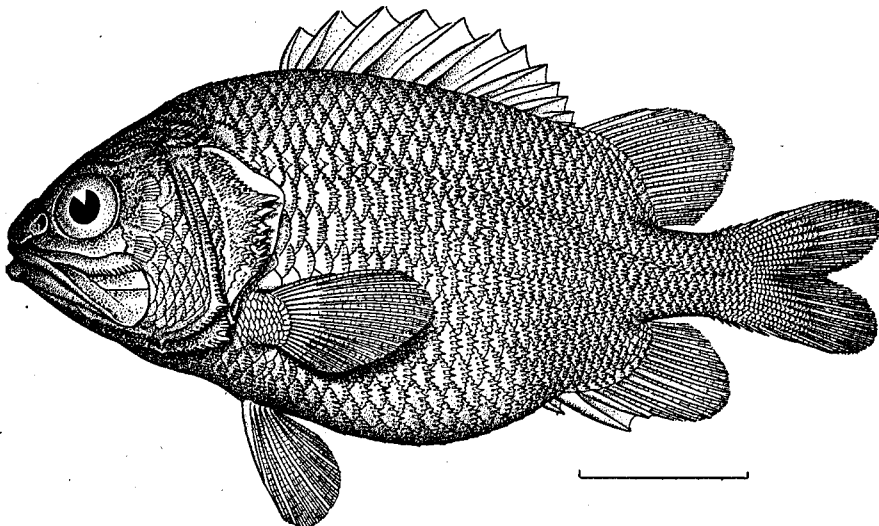


FIG. 25.—*Holotrachys lima* (Cuvier & Valenciennes).

HOLOTRACHYS Günther. (*Harpag* De Vis.)

365. *Holotrachys lima* (Cuvier & Valenciennes). *Malau mutu; Mutu.* Hawaii; Samoa; Tahiti; Laysan; Ile de France.

This species is very common at Samoa, as also about Hawaii. It is of small size and is uniform brick-red in color.

366. *Holotrachys roseus* (De Vis). South Seas.*Harpagosa rosea* De Vis, Proc. Linn. Soc. N. S. W. 1884, 448, South Seas.This species is unknown to us. It is very close to *H. lima*, and is probably the same.**OSTICHTHYS** Langsdorf.**367. *Ostichthys pillwaxi*** Steindachner. Hawaii.**HOLOCENTRUS** (Artedi) Gronow. *Malau*.**368. *Holocentrus spinifer*** Forskål. *Malau toa*. Samoa; Hawaii; Borabora; Waigi; Papua; Johnston I.; Thornton I.; Vanicolo; Tonga; Vavau; New Hebrides; Solomon Is.; Raiatea (Seale); East Indies.*Holocentrus leo* Cuvier & Valenciennes, Hist. Nat. Poiss., III, 204, 1829, Borabora and New Guinea; not *Holocentrum spiniferum* Cuvier & Valenciennes and Sauvage.

This large species is common at Samoa, and ranges from Hawaii, where it is not rare, to the Red Sea and Madagascar. It is known by its deep body and narrow, convex profile. It much resembles *H. caudimaculatus*, and the name *spinifer* is adopted for the latter species by Valenciennes and Sauvage; but as Forskål speaks of the dark spots behind the eye, which is characteristic of the species called *Holocentrus leo*, we agree with Rüppell, Bleeker, Günther, and Klunzinger in regarding the present species as the true *spinifer*, *leo* being a synonym.

Forskål and Klunzinger state that the dorsal spines of this species are envenomed. Both this species and *H. caudimaculatus* are common in the Red Sea.

Life colors of a specimen from Apia, deep red, scales with golden edges; no lengthwise stripes or violet streaks; preopercle and opercle blood-red above; axil blood-red; first dorsal same color, unmarked; dorsal, anal, and caudal scarlet, the upper and lower part of caudal redder; third and fourth spines red; ventrals scarlet, the spine pink; pectoral scarlet; cheek pale brassy red, no white stripes, except a faint streak below eye along upper edge of cheek, and a paler edge behind opercular spot. One specimen with a sharp white stripe above opercular spine.

Life colors of another specimen from Apia, deep red, scales with narrow pale edges; deep reddish black spot on opercle and across to axil; dorsal red, edged with deeper red; fins all red without pale edging; membrane of third anal spine deep red.

369. *Holocentrus caudimaculatus* Rüppell. *Tamalau mumu*; *Tameno mumu*. Samoa; Tahiti (Seale); Palau Is.; Gilbert Is.; New Guinea; East Indies.*Holocentrum spiniferum* Cuvier & Valenciennes, and of Sauvage; *Holocentrum leonoides* Bleeker.

This species is abundant about Samoa, and westward to the Red sea. It is near *H. spinifer* but the rofile is broader and not concave, and there are other differences well expressed by Klunzinger and by Sauvage. The color is deeper than in *H. spinifer*, and the white spot on the back of the tail is rarely wanting in *H. caudimaculatus*. In *H. spinifer* this is not found, but is represented by a trace of paler color.

Life colors of a specimen from Apia, all deep red; faint violet streaks on lower parts; a faint line down and backward from eye; axil deep red; fins all deep red; anal spine and front edge of ventral only whitish; a large whitish black blotch on the back of the tail behind dorsal.

370. *Holocentrus violaceus* Bleeker. *Malau tifa*; *Malau uli*. Samoa; New Guinea (Macleay); Amboina.

This very strongly marked species is common at Samoa, where about a dozen specimens were taken. It is deep violet-brown, not red, with a vertical pale streak on each scale, and a white blotch on the back of each scale. It is not known from Hawaii.

Life colors of a specimen from Apia called *malau tifa* and *malau uli*, blackish red, a vertical bar of violet silvery at base of each scale; head mostly clear dark red; a blackish spot on opercular membrane; a blood-red axillary spot; a darker red spot on upper part of opercle; first dorsal dark red with a whitish edge and a deep red line below it; second dorsal, anal, and caudal dark red with a darker anterior edge; a pink spot on back of tail; ventral red, the spine bluish; first spine and first ray of anal moderately deeper red; pectoral red; mouth small.

Life colors of a specimen from Pago Pago called *malau tifa* (pearl shell), violet pearly reflections; the color very dark, the violet pearly bars on each scale below conspicuous; a bright pink spot on back of tail.

371. *Holocentrus binotatus* Quoy & Gaimard. Samoa; Guam; Papua; Tonga; Solomon Is.

This species is rather common about Samoa, where about 30 specimens were taken. Usually one or two small dark spots are present on the membranes of the front of the spinous dorsal. There is little doubt that the original *H. binotatus* is the species called *unipunctatum* by Günther.

Life colors of a specimen from Apia, very deep red all over, with faint blue-black streaks, about 7 in number; head almost plain red, with two faint cheek stripes; fins all deep red, the dorsal with a row of dark spots and dark edges.

Life colors of a specimen from Pago Pago, very bright red, with streaks of shining golden; fins all deep red, unmarked, the vertical fins a little darker on front edge; a slightly darker spot on membranes of first two dorsal spines.

372. *Holocentrus erythræus* Günther. Hawaii; Samoa; New Hebrides; Tahiti; Harvey Is.; Kingsmill; Tahiti; Paumotu Is.; Johnston I.; Solomon Is.

Of this large and handsome species one small specimen was taken by us at Samoa. The fish is rather rare in deeper waters about Hawaii.

373. *Holocentrus furcatus* Günther. South Seas, probably New Hebrides.**374. *Holocentrus xantherythrus* Jordan & Evermann.** Hawaii.**375. *Holocentrus tiere* Lesson.** Samoa; Tahiti; Thornton I.

Holocentrum tiere (Lesson), Cuvier & Valenciennes, Hist. Nat. Poiss., III, 202, 1829, Tahiti. Lesson, Voy. Coquille, II, 221, 1830, Tahiti. Günther, Cat., I, 45.

Holocentrum pacillopteryum Bleeker, Kokos-Eilanden, 356. Bleeker, Atlas, Cocos Island. Günther, Cat., I, 35.

Holocentrus polymesiæ Fowler, Proc. Ac. Nat. Sci. Phila. 1904, 229, Thornton I.

This species is known when adult and in good condition by the two rows of pale spots on the dorsal fin. It is rather common at Samoa, where about 12 specimens were taken. *H. polymesiæ* seems to be based on a specimen in which the dorsal color has faded. *Holocentrum tiere* must be the same species. The elongate, faintly striped body, the rather large mouth, the ragged suborbital, the low weak dorsal spines, the subequal and strong opercular spines, as shown in Lesson's figure, are all traits of the species called *H. pacillopterus*.

Life colors of a specimen from Apia, deep crimson red; lower half with bright violet streaks; axil deeper red; dorsal deep red with a row of white spots and tips white; other fins deep red; ventral with paler edge and darker streak, fourth anal spine in a dark streak; pectoral red; head with deeper red blotches, but no white. Another specimen from Apia in life was red, rather bright, the sides silvery; cheek silvery with a red streak; no streaks along scales; dorsal edged with dark red with white spots; red at base; vertical fins red, the edges scarcely darker; ventral pink, axil red; pectoral pink.

376. *Holocentrus tiereoides* Bleeker. Marcus I.; New Hebrides; Solomon Is.; Tahiti (Seale); Amboina.

This species is known to us from the example taken by Bryan and Herre, which agrees well with Bleeker's account. The species is evidently very close to *H. tiere*, but the scales are much larger (40 instead of 50).

377. *Holocentrus punctatissimus* Cuvier & Valenciennes. *Malau faiumu.* Tahiti; Samoa; Hawaii; Strong I.; Guam; Marshall Is.; Paumotu Is.; Laysan; Aneiteum; Tabuai; Mangareva; Rarotonga; Faté; Makatea and Shortland I. (Seale).

Holocentrum punctatissimum Cuvier & Valenciennes, Hist. Nat. Poiss., III, 215, 1829, Caroline Is.

Holocentrum stercus-muscarum Cuvier & Valenciennes, op. cit., VII, 503, 1831.

Holocentrum diploziphus Günther, Proc. Zool. Soc. 1871, 660. Günther, Fische der Südsee, 97, Samoa, Marshall Is., Tahiti, Paumotu, Aneiteum.

Holocentrus gracilispinis Fowler, Proc. Ac. Nat. Sci. Phila. 1904, 228, Honolulu.

Holocentrus gladispinis Fowler, Proc. Ac. Nat. Sci. Phila. 1904, 225, Tahiti.

This species is common about Samoa, where about 50 specimens were taken. It is also abundant about Honolulu. The form of the body is characteristic, and the silvery color is usually, but not always, obscured by dark points irregularly scattered, giving the fish a soiled appearance.

H. gracilispinis, based on our own collections from Honolulu, we can not separate from Samoan specimens. *H. gladispinis* is based on an example from Tahiti with the preopercular spine a little

longer. The color of the dorsal is usually characteristic, but the marks often fade in spirits. This species is not recorded from the East Indies, where the closely related *H. lacteoguttatus* seems to take its place

Life colors of a specimen from Apia called *malau faiumu*, freckled red, dark across gill-opening; iris golden; first dorsal deep red on edge, other fins brick red, scarcely edged with paler; ventrals brick red. A specimen from Pago Pago was pinkish, soiled by dark dots; dorsal deep red on edge, pale at base; faint dark streaks on rows of scales; a red dash across cheek; fins light red; a dark streak along anal.

378. *Holocentrus lacteoguttatus* Cuvier & Valenciennes. New Guinea; East Indies.

Holocentrus lacteoguttatus Cuvier & Valenciennes, Hist. Nat. Poiss., III, 214, East Indies.

Holocentrus argenteum Quoy & Gaimard, Voy. Astrolabe, 677, 1835, Papua. Cuvier & Valenciennes, op. cit., III, 213.

This species is not known to us. It has not been recorded to the eastward of New Guinea. According to Klunzinger, the type of *H. argenteus*, examined by him belongs to the species, for which we adopt the name *lacteoguttatus*.

379. *Holocentrus diadema* (Lacépède). *Malau tusitusi; Malau pāuli; Malau tui.* Hawaii; Samoa; Tonga; Tahiti; Borabora; Laysan; Guam; Marcus I.; New Hebrides (Seale); East Indies.

This small species, always known by its black spinous dorsal and the alternate stripes of white and red on the body, is very common at Samoa, and equally so at Hawaii. It is in general the most abundant species of *Holocentrus* in the Pacific Ocean.

Life colors of a specimen from Pago Pago called *malau pāuli*, red, with white stripes; dorsal dusky, a continuous stripe, same as from Honolulu.

380. *Holocentrus ruber* (Forskål). Louisiades; East Indies; China; not certainly known from the South Seas.

381. *Holocentrus praslin* Lacépède. Samoa; Ruikiu Is.

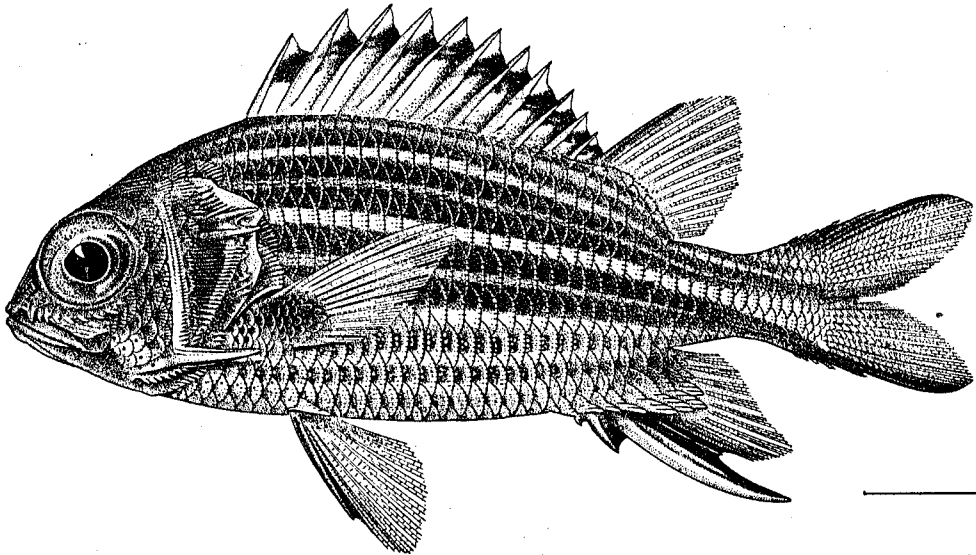


FIG. 26.—*Holocentrus praslin* Lacépède.

This species, known by its very dark lateral stripes, which seem black in spirits, is common at Samoa, but is not known from Hawaii. Life colors were noted as follows in various specimens:

(1) From Apia. Deep red, very bright, paler below; 10 longitudinal streaks, narrow and sharply defined, the four uppermost light crimson, the rest almost pure white, with brownish edge; a white stripe downward and backward from eye, a red one and a white one above it; spinous dorsal

blood red with an interrupted row of whitish spots and a whitish tip; other fins clear red, caudal with a blood red edge, as also a stripe along fourth anal spine; ventral similarly striped; pectoral pinkish.

(2) From Apia. Whitish, olive shaded; 9 stripes of brownish black, unequal in width and depth of color, separated by white and grayish and pinkish stripes, the stripe on level of eye broad and white, the two black stripes above it confluent behind as also the two below it; the white stripe from axil of anal to axil of pectoral also broad; opercle reddish black; lower part of head and breast soiled gray with blackish stripes; dorsal grayish white with blackish median band; soft dorsal light yellow, edged before with dark maroon; caudal light clear yellow, edged above and below with maroon black; anal lighter yellow, with darker anterior stripe and a black maroon blotch at base; a maroon black bar below soft dorsal made of two coalescent black stripes; ventral yellow, edged with maroon and white; pectoral reddish, the axil blackish.

(3) From Pago Pago. Very dark blood red, with whitish pink stripes; dorsal white, with median black stripe; second dorsal yellowish, with red anterior margin and blackish blotch at base; caudal yellow with maroon stripes; anal yellowish with a black stripe and a spot at base; ventral yellowish, with white and black stripe.

(4) From Apia. Deep lustrous coppery red, paler below, the dark alternating with pale stripes, the red very deep and bronze shaded above, growing paler and more diffuse below; about 7 streaks distinct; head blackish freckled bronze; dorsal dark blood red, mesially pale and pale at tips; soft dorsal, anal, and caudal golden, with maroon stripe anteriorly narrow on soft dorsal; ventral similar golden and maroon; breast soiled mottled brown and whitish; pectoral pale reddish brown.

Holocentrus ruber differs from this species chiefly in the plain colors, red striped with deeper red. Probably *Holocentrus praslin* is an "ontogenetic species" representing *H. ruber* on the coral reefs, and differing mainly in the much heightened coloration.

382. *Holocentrus ensifer* Jordan & Evermann. Hawaii; Mangareva (Seale).

383. *Holocentrus bowiei* Jordan & Snyder. Tahiti.

384. *Holocentrus microstomus* Günther. Samoa; Guam; Tonga; Hawaii; Kingsmill I.; Paumotu Is.; Harvey Is.; Tahiti; Tubuai; Raiatea and Rarotonga (Seale).

This species, well distinguished by its silvery body striped with dark, and by the dark area on the front of its spinous dorsal, is rather common about Samoa, where about 12 examples were taken. It is not rare about Honolulu. From *Holocentrus sammara*, which has somewhat the same coloration, it is known by the deeper body and smaller mouth. This species and the next, intermediate between *Holocentrus* and *Flammeo*, render the latter genus difficult of definition. We therefore place all the Pacific species in *Holocentrus*.

385. *Holocentrus scythrops* Jordan & Evermann. Hawaii; Laysan; East Indies.

(*Holocentrum argenteum* Bleeker & Steindachner, not of Quoy & Gaimard.)

This species is rather rare about Hawaii. It was not seen at Samoa. It has been once or twice described as *Holocentrum argenteum*, but the true *argenteum*, as Klunzinger has shown, is a different species (*lacteoguttatus*)

386. *Holocentrus lævis* Günther. Samoa; Louisiades; Solomon Is.; New Britain; New Guinea; Amboina.

Holocentrum goldiei Macleay, Proc. Linn. Soc. N. S. W. 1883, 352, New Guinea.

Holocentrum læve Günther, Cat., 1, 47, Louisiades, Guadalcanar, Amboyna. Günther, Fische der Südsee, 101, taf. 65, fig. B.

Holocentrum novæ-britanniæ De Vis, Proc. Linn. Soc. N. S. W. 1884, 447, New Britain; young.

Holocentrus achromopterus Fowler, Proc. Ac. Nat. Sci. Phila. 1904, 236, Samoa.

Holocentrum goldiei Macleay, Proc. Linn. Soc. N. S. W., VII, 1883, 352, New Guinea.

This species is rather common about the reefs of Samoa, where about 20 examples were taken. It resembles *H. sammara*, but the body is deeper and there is never any black on the spinous dorsal.

Life colors of a specimen from Pago Pago, the stripes less regular and fewer than in *H. sammara*, distinctly shown, the pale stripe on lateral line being dull red, dorsal paler, deep red between first and second spines, the white band much broader and more diffuse; caudal almost plain; darker red on edge of second dorsal and caudal, much deeper on anal; ventral paler red than in other; ventral and anal spines red.

387. *Holocentrus sammara* (Forskål). *Malau peapea*. Hawaii; Tahiti; Samoa; Borabora; Paumotu Is.; Solomon Is.; Guam; New Guinea; Thornton I.; Marquesas Is. (Seale); East Indies.

Labrus angulosus Lacépède, Hist. Nat. Poiss., III, 430, pl. 22, fig. 1, 1803.

Holocentrum christianum Cuvier & Valenciennes, Hist. Nat. Poiss., III, 219, 1829, Red Sea.

Holocentrum tahiticum Kner, Novara Fische, III, 1869, f. 2, pl. 16, Tahiti. Kner, Sitz. Ak. Wiss. Wien, 1864, 482, Tahiti.

Holocentrus fuscostratus Seale, Bishop Mus., 1901, 69, Guam.

Holocentrus thorntonensis Fowler, Proc. Ac. Nat. Sci. Phila. 1904, 231, Thornton I. (young).

This handsome fish is very common on the reefs at Samoa, where about 100 examples were taken. It is rare about Hawaii.

The species varies considerably in the distinctness of the dark maroon lateral stripes, but the black on the first dorsal is never absent. In the young it takes the form of an ocellus. Such a young example is the type of *Holocentrus thorntonensis*. Life colors were noted as follows in various specimens:

(1) Specimen from Apia. Silvery, with golden, red, and greenish reflections; back with four stripes of dark maroon red, the second and third brightest; head dark red above, mostly silvery, with red wash below; lips flesh color; opercle dark red above; fins pale red, the spinous dorsal broadly edged with blood red; caudal with a maroon stripe in each lobe, anal and ventral also; no pale edging.

(2) From Apia. Olive, lustrous purplish above, coppery silvery below; each scale with a large distinct coppery black spot, these forming about ten stripes; cheek whitish with black spots; head wine-shaded on lips, snout, and opercle; preopercle white; dorsal maroon, whitish spots at base, tips white; front of dorsal with large black, red-washed blotch; soft dorsal, anal, and caudal golden yellow, with a long maroon stripe on anterior rays, covering most of caudal lobes; pectoral coppery reddish; ventral white.

(3) Young specimen from Apia. Red, with a large black blotch on front of spinous dorsal, a dark red stripe in each caudal lobe and on front of soft anal; a dark band across opercle.

(4) From Apia. Silvery rose; brownish above with stripes of rosy maroon, all but one indistinct, the bright one following course of lateral line; opercle dark maroon; dark band across base of pectoral; front of dorsal with very large blotch of maroon black, fin otherwise flesh-color, tips whitish; soft dorsal yellow, transparent behind, with maroon stripe in front; anal whitish with maroon stripe; pectoral and ventral nearly white; caudal pale orange, the lobes rosy maroon.

388. *Holocentrus opercularis* (Cuvier & Valenciennes). Tahiti; New Ireland; Samoa; Palau Is.; Paumotu Is.; Guam.

This strongly marked species is well figured by Dr. Günther. Two specimens were taken at Samoa.

Life colors of one from Pago Pago, light red, each scale with a darker center and a silvery edge; dark streaks along rows of scales; head red; opercle blood red; iris very red; first dorsal jet black, with a row of white spots at base and tip; second dorsal, anal, and caudal red, with a darker bar in front and a shade of orange behind; pectoral and ventral pink; pectoral red at base; a red shade down and back from eye. Mouth large; chin prominent; anal spine long; body slender.

Family LAMPRIDÆ.

LAMPREIS Retzius.

389. *Lampris regius* (Bonnaterre). Hawaii; all warm seas.

The name *Zeus regius* of Bonnaterre and that of *Zeus guttatus* of Brünnich, both 1788, antedate *Zeus luna* of Gmelin (1789). We do not know which of these first has actual priority, but *regius* is a name preferable to the commonplace and overworked specific name *guttatus*. It is true, however, that the name *guttatus* has been more generally used than that of *regius*, and the account given by Brünnich is the best found in any early author. Following the arbitrary rule which we have adopted, the name *regius* on page 72 in Bonnaterre's work antedates *guttatus* on page 398 in that of Brünnich.

Family ZEIDÆ.

STETHOPRISTIS Gilbert.

390. *Stethopristis eos* Gilbert. Deep seas of Hawaii.

CYTTOMIMUS Gill.

391. *Cyttomimus stelgis* Gilbert. Deep seas of Hawaii.

Family SCOMBRIDÆ.

SCOMBER (Artedi) Linnæus.

392. *Scomber japonicus* Houttuyn. Hawaii; California; Japan; Atlantic.
Scomber colias Gmelin.

393. *Scomber microlepidotus* Rüppell. Solomon Is. and New Hebrides (Seale); coasts of Asia.

394. *Scomber chrysozonus* Rüppell. Bougainville Is. (Peters, Berl. Mon. 1876, 836); Red Sea.

395. *Scomber loo* (Cuvier & Valenciennes). *Ga.* Samoa; Waigiü; Fiji; Palau Is.; New Guinea (Macleay); East Indies.

This well-marked mackerel is abundant in the open channels about the reefs of Samoa, and is an excellent food fish. The species is quite distinct from *Scomber kanagurta*, with which Günther has confounded it.

Life colors of a specimen from Apia, lustrous green, silvery below; round blackish green spots on sides of back.

AUXIS Cuvier.

396. *Auxis thazard* (Lacépède). Hawaii; New Guinea; warm seas.

GYMNOSARDA Gill.

397. *Gymnosarda pelamis* (Linnæus). Hawaii; warm seas.

398. *Gymnosarda alleterata* (Rafinesque). Hawaii; warm seas.

GERMO Jordan.

399. *Germo germo* (Lacépède). South Seas; Japan.
(*Thynnus sibi* Schlegel.)

400. *Germo macropterus* (Schlegel). Hawaii; southern California; Japan.

This species is known by its elevated dorsal and anal, and especially by the citron-yellow finlets.

SARDA Cuvier.

401. *Sarda chilensis* (Cuvier & Valenciennes). Hawaii; California; Chile; Japan.

SCOMBEROMORUS Lacépède.

402. *Scomberomorus commersoni* Lacépède. New Guinea (Macleay); East Indies.

ACANTHOCYBIUM Gill.

403. *Acanthocybium solandri* (Cuvier & Valenciennes). Hawaii; warm seas.

Family LEPIDOPIDÆ.

RUVETTUS Cocco.

404. *Ruvettus pretiosus* Cocco. Hawaii; Japan; West Indies.

PROMETHICHTHYS Gill.

405. *Promethichthys prometheus* (Cuvier & Valenciennes). Hawaii; Tahiti; Australia; Japan.

LEMNISOMA Lesson. (*Gempylus* Cuvier & Valenciennes.)

406. *Lemnisoma thyrsoitoides* Lesson. Hawaii; Tahiti; West Indies.
(*Gempylus serpens* and *Gempylus cotuber* Cuvier & Valenciennes.)

Family XIPHIIDÆ.

407. *Xiphias gladius* Linnæus. Hawaii; warm seas.

Family CARANGIDÆ.

SCOMBEROIDES Lacépède.

408. *Scomberoides sanctipetri* (Cuvier & Valenciennes). *Lai.* Hawaii; Samoa; Kingsmill I.; Tahiti; Johnston I.

This widely diffused species is rather common about Samoa and Hawaii. A few specimens were taken in the channels of Apia.

409. *Scomberoides tolooparah* (Rüppell). Hawaii; New Ireland; Vanicolo; New Guinea (Macleay); East Indies.

410. *Scomberoides lysan* (Forskål). New Guinea (Macleay).

SERIOLA Cuvier.

411. *Seriola purpurescens* Schlegel. Hawaii; Japan.

412. *Seriola sparna* Jenkins. Hawaii.

NAUCRATES Rafinesque.

413. *Naucrates ductor* (Linnæus). Hawaii; Japan; warm seas.

ELAGATIS Bennett.

414. *Elagatis bipinnulatus* Quoy & Gaimard. Hawaii; Iles des Papous; New Britain (Peters); Solomon Is. (Seale); East Indies; West Indies.

MEGALASPIS^a Bleeker.

415. *Megalaspis cordyla* (Linnæus). *Atualo.* Samoa; East Indies.

Common in the open channels in the reef.

DECAPTERUS Bleeker.

416. *Decapterus pinnulatus* (Eydoux & Souleyet). Hawaii; Raiatea; Tahiti; Bonin Is.; Paumotu Is.

(*Decapterus canonoides* Jenkins.)

This species is different from *Decapterus muro-adsii* of Japan, and apparently also distinct from *Decapterus sanctihelenæ* of the Atlantic.

417. *Decapterus lundini* Jordan & Seale, new species. Samoa.

Head 3.75 in length; depth 3.20; eye 4 in head, 1.20 in snout; dorsal VI-I, 21-1; anal II, 21-1; scales small, 95 in lateral line, of which 45 are modified with plates; interorbital, 4 in head; maxillary, 3, reaching to below the anterior margin of eye, all but its posterior third hidden under the preorbital.

Body elongate, compressed, fusiform; scales covering entire body and head; adipose eyelid well developed, covering entire eye except width of pupil; small teeth in single series on jaws and palatines, slightly enlarged teeth on vomer; very minute teeth on tongue; gillrakers shorter than width of eye, 24 on lower limb; preopercle entire, opercle with small rounded nick on upper margin; base of dorsal slightly greater than anal, its longest ray 1.85 in head; first ray of anal 2 in head;

^aThe name *Megalaspis* Bleeker dates from 1851. At about the same time Angelin gave the same name to a genus of Trilobites. As to this Dr. Stejneger observes (in lit. Dec. 16, 1904): "Two straws point to the Trilobite's being the younger name. Bleeker's *Megalaspis* is mentioned in the 'Leistungen' for 1851. Angelin's name is not mentioned in the 'Leistungen' until 1852-3." There is also doubt for other reasons whether Angelin's paper appeared before 1852. We therefore retain *Megalaspis* for the genus of fishes.

pectoral 3.10 in length, extending to below the 8th dorsal ray; ventral 2 in head; caudal slightly less than head, 4.50 in length; depth of caudal peduncle, 2 in its width (with keels).

Color in spirits, silvery with wash of yellowish below, darker above, with about nine indistinct vertical brown bands as wide as eye and slightly greater than the interspaces on sides of body, fading out below lateral line; a distinct black opercular spot; a dusky wash on inner axil of pectoral; a dusky blotch on tip of snout and tip of lower jaw; a golden wash on preopercle; dorsal and anal yellowish-white with narrow dusky margin; pectoral, ventral, and caudal yellowish-white.

One specimen, type no. 51727, U. S. National Museum, from Pago Pago, length 7.25 inches, taken in a school of the common "atule" (*Trachurops*).

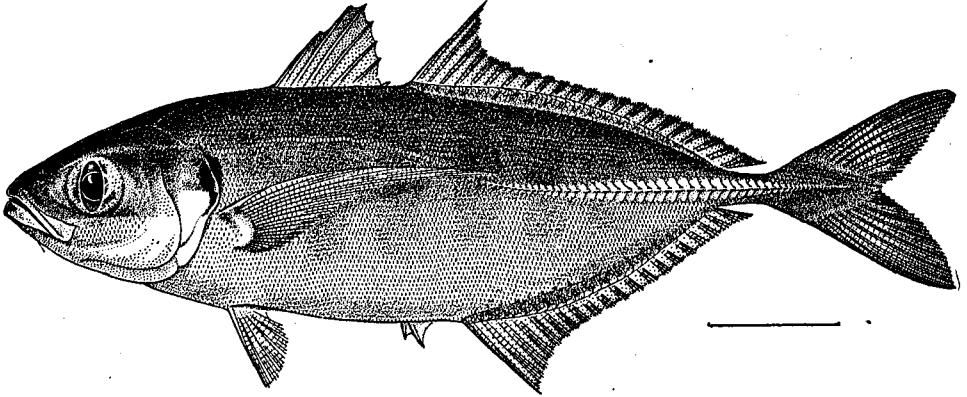


FIG. 27.—*Decapterus lundini* Jordan & Seale, new species. Type.

TRACHUROPS Gill.

In this genus there is much variation in the size of the eye. In *mauritiana* (= *torva*) the eye is smaller than in *crumenophthalma*. In the Japanese form it is still smaller. We can not yet clearly define these forms as different species.

418. *Trachurops crumenophthalma* (Bloch). *Atule*. Samoa; Hawaii; Tahiti; Solomon Is.; New Hebrides; Marquesas Is.; and Rarotonga (Seale); all warm seas.

This species is the commonest food-fish of Samoa, entering the harbors in great schools. The flesh is excellent. There is apparently no difference between *Trachurops torva* and the common *T. crumenophthalma* of the Atlantic.

CARANX (Commerson) Lacépède. (Including *Carangus* Griffith = *Tricopterus* Rafinesque, 1810.)

419. *Caranx lugubris* Poey. Kingsmill Is.; Rarotonga; Marquesas Is.; Tahiti and Solomon Is. (Seale); West Indies; Clarion Island; St. Helena.

420. *Caranx melampygus* Cuvier & Valenciennes. *Malauli*. Hawaii; Samoa; Marcus I.; New Guinea; Waigiu; Rawak; Austral Is.; Solomon Is. and New Hebrides (Seale); Clarion Is.; East Indies.

This species is the finest of the commoner food-fishes of Samoa, being especially excellent as chowder. It is abundant in the channels between the reefs, reaching a large size. Several scores of specimens were taken, a few being preserved.

Life colors of a specimen from Pago Pago, body light olive with darker olive spots; fins deep clear blue.

421. *Caranx thompsoni* Seale. Hawaii.

422. *Caranx forsteri* Cuvier & Valenciennes. *Ulua*. Samoa; Hawaii; Papua; Vanicolo; New Ireland; New Guinea; Tanna; Tahiti (Seale); East Indies.

The earliest name for the *ulua* seems to be that of *Caranx forsteri*. According to Sauvage (Poiss. Madagascar) the types of *Caranx sem* and *Caranx lessoni* have the breast naked. These must then go

into the synonymy of *Carangus ignobilis*. *Caranx kleini* (Bloch), as Dr. Klunzinger has pointed out, is not the *ulua*, but some one of the species found in Hindustan. *Caranx sexfasciatus* is the banded species of the river mouths called *Carangus rhabdotus* by Jenkins. The name *Caranx hippos* has no pertinence to this species, having been based on a specimen of "*Caranx carangus*" from South Carolina. Sauvage recognizes *Carangus forsteri* as a species distinct from the *ulua*, but his figure of the type shows no differential characters. *Caranx peroni* and *Caranx belengeri* of Cuvier and Valenciennes are also based on the *ulua*.

In life the *ulua* is easily recognized by its yellow pectoral, the anal lobe being dusky, and the dorsal not edged with black. The breast is fully scaled. *Carangus marginatus* is similar, but has the dorsal edged with blackish. *Carangus ignobilis*, like *Carangus hippos* of the Atlantic, has the breast naked except for a small central patch. The anal lobe is bright yellow, the pectoral pale. As a food-fish *Carangus forsteri*, the *ulua*, and *Carangus melampygus*, the *malauli*, are far superior to all others of this genus in the Pacific. *Caranx latus* (*fallax*) of the Atlantic is a closely related but distinct species. We adopt for the *ulua*, provisionally, the name of *Caranx forsteri*, as it seems to be the oldest properly applied to the species.

The *ulua* is the food fish par excellence of the mid-Pacific, both in Samoa and Hawaii. It reaches a large size, similar to that of the *malauli*, and it is scarcely less common than the *atule*. Hundreds of specimens were taken in Samoa, and a few preserved.

A specimen from Pago Pago in life had the anal dark, pectoral yellow in the young, growing dull with age; body green, with blue specks, the fins with blue-black luster. Dorsal rays 23 or 24; body deep; preorbital deep; breast scaly; fins high; no opercular spot.

One specimen from Apia in life had the pectoral bright yellow, anal dark; another was pale bluish silvery, the vertical fins all dusky, the pectoral bright yellow, ventral slightly dusky. Eye small; plates small.

423. *Caranx marginatus* (Gill). Hawaii; Samoa; west coast of Mexico and Panama.

Two species from Samoa seem to be referable to this species. Possibly *Caranx heberi* Bennett, from Ceylon, is the same species.

424. *Caranx ignobilis* (Forskål). *Lupo*. Samoa; Hawaii; New Guinea (Macleay); East Indies.

(*Carangus hipoides* Jenkins; *Caranx sem*, *ekala*, *lessoni*, *xanthopygus*, etc., Cuvier & Valenciennes.)

Frequently taken about Samoa.

425. *Caranx sexfasciatus* (Quoy & Gaimard). *Lupo*. Hawaii; Samoa; Vanicolo; Waigiui; Java.

This species, recently described as *C. rhabdotus* Jenkins from Hawaii, is common in the mouths of the streams of Upolu, especially the sluggish stream called Gasegase River, ascending even into the smaller brooks. One specimen was taken by us in salt water, and this has lost the cross bands and some part of the peculiar dusky shade of the others, although even in this the caudal plates are of a watery blackish color. About a dozen specimens were taken. The cross bands, very distinct in the young, grow faint with age.

This species seems to be the one figured by Quoy and Gaimard under the name of *Caranx sexfasciatus*. Jenkins's figure of *Caranx rhabdotus* represents it very fairly, and we are forced to believe that the two are the same species. From *Caranx ignobilis*, which has also the anal fin yellow, *Caranx sexfasciatus* differs in having the breast entirely scaled. In *Caranx ignobilis* the breast is naked, with a small central patch of scales as in *Caranx hippos* of the West Indies. *Caranx forsteri* has more anal rays and more (30 to 33) lateral plates. The mouth is larger in *Caranx sexfasciatus* than in *Caranx forsteri* or any other of the related species. *Caranx forsteri* shows no cross bands at the size (4 to 8 inches) of our specimens of *Caranx sexfasciatus*.

Life colors of a specimen from Gasegase River, at Apia, dark brassy with a transparent blackish wash, as usual in fishes from muddy water; 6 broad darker cross bands; a black opercular spot; no pectoral spot; anal dull yellow, the lobe not sharp; upper fins dark. Another specimen from Apia had the pectoral pale, anal yellow. A specimen from fresh water near Vailele, Upolu, in life had the body barred, an opercular spot, upper fins dusky, lower dull yellow. In a specimen from the swamp at Pago Pago the anal fin was bright yellow, caudal not so.

426. *Caranx dason* Jordan & Snyder. Hawaii.

427. *Caranx elacate* (Jordan & Evermann). Hawaii.

428. *Caranx regularis* Garman. Fiji.
Caranx regularis Garman, Bull. Mus. Comp. Zool., vol. xxxix, no. 8, 1903, 232, Fiji.
429. *Caranx parasitus* Garman. Fiji.
Caranx parasitus Garman, Bull. Mus. Comp. Zool. vol. xxxix, no. 8, 1903, 232, Fiji.
430. *Caranx boops* Cuvier & Valenciennes. New Guinea; Vanicolo; East Indies.
431. *Caranx novæ-guinæ* Cuvier & Valenciennes. New Guinea.
432. *Caranx affinis* Rüppell. Hawaii; East Indies.
433. *Caranx hasselti* (Bleeker). New Guinea (Macleay); Hawaii; East Indies.
(*Carangus politus* Jenkins.)
A specimen of *Carangus hasselti* from Negros in the Philippines agrees in every respect with Jenkins's account of *Carangus politus*.
434. *Caranx helvolus* (Forster). Tahiti(?); Hawaii.
This species, obtained by Forster on the second cruise of Captain Cook, was rediscovered by Professor Snyder in 1901.
435. *Caranx cheilio* (Snyder). Hawaii.
436. *Caranx papuensis* Alleyne & Macleay. New Guinea.
Caranx papuensis Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 325.
437. *Caranx platessa* Cuvier & Valenciennes. New Guinea (Alleyne & Macleay); Australia.
(*Caranx georgianus* Cuvier & Valenciennes.)
438. *Caranx bucculentus* Alleyne & Macleay. New Guinea.
439. *Caranx moresbyensis* Macleay. New Guinea.
Caranx moresbyensis Macleay, Proc. Linn. Soc. N. S. W. 1883, 358, Port Moresby (New Guinea).
440. *Caranx obtusiceps* (Macleay). New Guinea.
441. *Caranx cheverti* Alleyne & Macleay. New Guinea.
442. *Caranx laticaudus* Alleyne & Macleay. New Guinea.
443. *Caranx cæruleopinnatus* Cuvier & Valenciennes. New Guinea.
444. *Caranx ferdau* (Forskål). *Lupo*. Samoa; Hawaii; Tahiti; Bonin Is.; East Indies.
This species is not rare about Hawaii and was frequently taken at Samoa, where it is valued as a food fish.
445. *Caranx ajax* (Snyder). Hawaii.
446. *Caranx gymnostethoides* Bleeker. Johnston I., south of Hawaii; East Indies.
447. *Caranx speciosus*^a (Forskål). Hawaii; Samoa; New Guinea; Fiji; East Indies; Panama.
Not rare about Hawaii, and occasionally taken at Pago Pago. Life colors of a specimen from Pago Pago, green-golden with green iridescence; black transverse bars on head (through eye), next one blackish; others simply dark, fading posteriorly; caudal with blackish tips and margin.
448. *Caranx edentulus* Alleyne & Macleay. Percy I., New Guinea.
449. *Caranx armatus* (Forskål). New Britain; New Guinea (Peters, Alleyne & Macleay); East Indies.
450. *Caranx oblongus* (Cuvier & Valenciennes). Vanicolo; Oualan; New Britain; Solomon Is.; Sumatra.

This species, as originally described, has the anal rather low, the opercular spot wanting, the plates on the tail about 40. It is not clear that all the above references belong to it, although specimens from Sumatra, recorded by Mr. Fowler as *Citula oblonga*, agree fairly with the original account.

^aThe genus *Caranx* was originally based on *C. speciosus*, a species without teeth in the adult stage. *Carangus* has small even teeth; *Tricopterus*, larger, unequal teeth, and *Citula*, the dorsal rays produced, the teeth being very small. For the present we place all these species in a single genus, *Caranx*, as the subdivisions need better definition.

451. *Caranx plumbeus* (Quoy & Gaimard). *Lupo*; *Lupo ta*; *Lalafutu*; *Alālafutu*. Ile de France; Samoa.

Head 3.25 in length; depth 2.18; dorsal vi-i, 22; anal ii-i, 18; eye 3 in head; snout 2.75; maxillary 2.18, extending to below anterior margin of eye; 43 plates along straight portion of lateral line, the curved portion a third longer than the straight.

Body oblong, compressed; profile of head gibbous and keeled; anterior dorsal and anal rays elongate (male fishes have 9 and 10 dorsal rays and 7 and 8 anal rays elongate), the first dorsal ray being greater than depth of fish, 2 in length. The first anal ray is 2.75 in length; base of anal about equal to pectoral, which is 2.75 in length of fish; base of dorsal 2.20 in length; caudal deeply forked, the lobes slightly longer than head; ventrals 2 in head; opercle with small rounded nick on upper margin; scales of body small, about 100 in curved portion of lateral line; thorax naked; cheek scaled and upper part of opercle scaled; bands of minute teeth in jaws, vomer, palatines and middle of tongue; a narrow adipose eyelid; preorbital less than width of eye; mouth large, lower jaw slightly the longer; gill-rakers strong, two-thirds length of eye, 16 on lower limb.

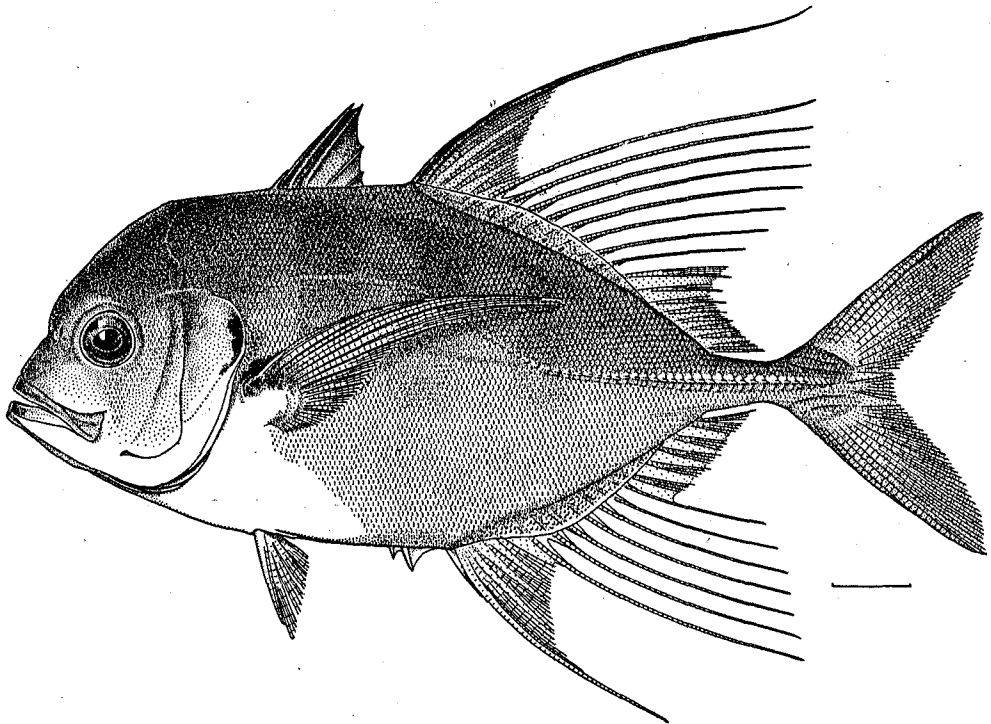


FIG. 28.—*Caranx plumbeus* (Quoy & Gaimard).

Color in spirits silvery bronze, the scales with beautiful iridescence, slightly darker above, some specimens showing slight indications of five or six wide vertical brown bands on upper half of body; a black opercular spot; a large black spot in axil of pectoral, extending on its upper base; cheek more or less blotched with golden; an indistinct dusky blotch on upper part of preopercle between the black opercular spot and eye; spines of dorsal dusky; margin of dorsal and its elongate filaments dusky; caudal with indistinct dusky margin; pectoral, ventral, and anal yellowish white, the anal showing a slight dusky wash on webs.

A specimen from Apia in life was silver-green, bluish below; axil black; opercular spot faint olive; caudal dull yellow; anal and ventral whitish, slightly olive-tinged. Dorsal and anal with one filament only. In others of the same species, males, there are numerous filamentous rays on the dorsal and anal fins.

This species belongs to the subgenus *Citula*. We have 5 specimens, 4 male and 1 female, taken in the seine at Apia and Pago Pago. The description is that of a male 12.50 inches long.

Citula plumbea Quoy & Gaimard from Ile de France, with the fin-rays as in our specimens and the depth nearly 3 in total length, is apparently identical with the species in hand. *Caranx armatus* (Forskål) may be the same, but the body is deeper in some specimens called *Caranx armatus* than in our specimens from Samoa, which we record provisionally as *Caranx plumbeus*. In *Caranx armatus* the depth is 2 to 2.5 in total length.

452. *Caranx mandibularis* Macleay. New Guinea.

Caranx mandibularis Macleay, Proc. Linn. Soc. N. S. W. 1883, 356, New Guinea.

This species belongs to *Citula*, having the first dorsal ray very long.

453. *Caranx gilberti* Jordan & Seale, new species. Samoa.

Head 3.60 in length; depth 2.20; eye 4 in head, 1.10 in snout; interorbital 2.95 in head; dorsal VI-1, 33; anal II-1, 29; scales minute, 143 on lateral line, 25 of which are modified into plates of moderate size; maxillary 2.50 in head, extending to below anterior margin of eye.

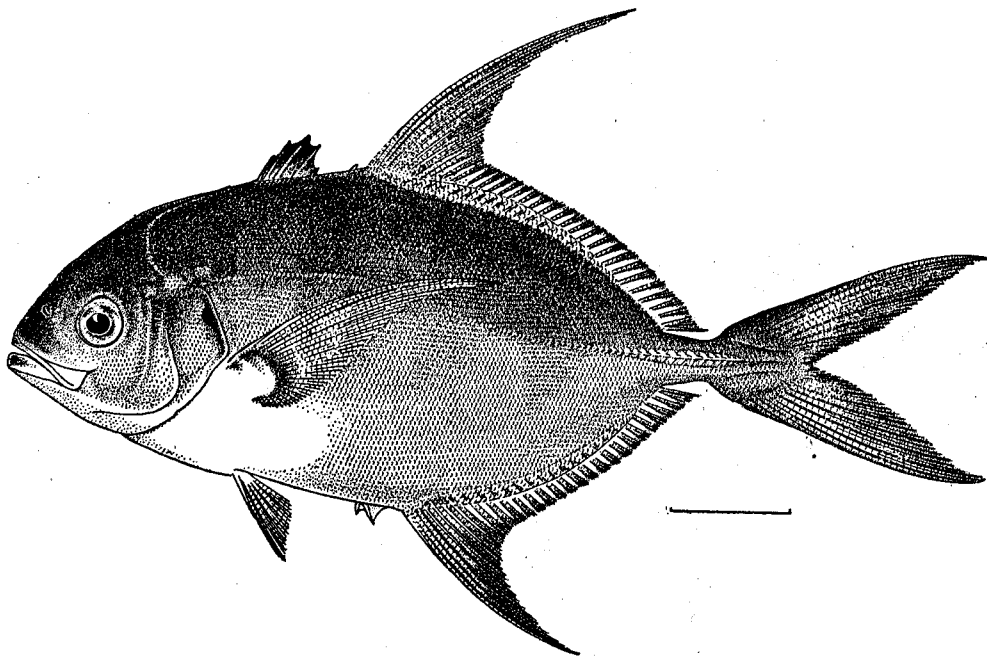


FIG. 29.—*Caranx gilberti* Jordan & Seale, new species. Type.

Body ovate, strongly compressed, shaped as usual in *Caranx*, the upper profile more ovate than lower; anterior lobes of dorsal and anal falcate, elongate and graduated, the anterior ray of dorsal longer than head, 3 in length (without caudal), anterior ray of anal equal to head; base of dorsal slightly greater than anal; pectoral reaching to below straight portion of lateral line, its length equal to base of anal, 2.75 in length of fish without caudal; length of caudal slightly less than pectoral; ventrals 2 in head; teeth in villiform bands on vomer, palatine, and tongue; jaws with patches of minute teeth in front and a single series on side, no enlarged outer teeth; gillrakers less than width of eye, 14 on lower limb; preopercle entire; opercle with slight rounded nick above; eye with adipose membrane slightly developed; head and body scaled, except thorax, which is naked; dorsal and anal enveloped in rather high shields.

Color in spirits, silvery with slight brassy tint, darker above; dorsal, anal, and caudal with slight dusky wash. There is a narrow black margin to caudal and a black line on margin of dorsal; pectoral and ventral yellowish white.

One specimen, type no. 51729, U. S. National Museum, from Pago Pago, island of Tutuila, length 8.50 inches.

ALECTIS Rafinesque.

454. *Alectis ciliaris* (Bloch). Hawaii; Samoa; New Ireland (Peters); Tahiti; Palau Is.; Kingsmill I.; New Guinea; Solomon Is.

Of this widely distributed species, we have several small specimens from Apia.

TRACHINOTUS Lacépède.

455. *Trachinotus ovatus* (Linnaeus). *Alālafutu*. Samoa; New Hebrides; New Guinea (Macleay).

Of this widely diffused species, we have three examples from Apia, one very large, nearly 2 feet in length. Life colors of one of these specimens gray, back tinged with creamy bronze; dorsal dark, the lobe largely covered with creamy bronze; ventral, anal, belly, and lips still more orange; tail black. Specimen from Pago Pago, lobes of dorsal, anal, and caudal black, washed with creamy orange; ventral and anal lobe largely orange.

456. *Trachinotus bailloni* Lacépède. Samoa (Günther); New Hebrides; Tahiti; New Britain (Peters); New Guinea (Macleay).

This species, recorded from Samoa with the preceding, was not taken by us.

457. *Trachinotus russelli* Cuvier & Valenciennes. New Guinea; East Indies.

Trachinotus coppingeri Günther, Zool. Alert, 1884, 29, Percy I. (New Guinea), in Cloudy Bay.

Family **CORYPHÆNIDÆ.****CORYPHÆNA** Linnaeus.

458. *Coryphæna hippurus* Linnaeus. Hawaii; warm seas.
459. *Coryphæna equisetis* Linnaeus. Between Tahiti and Hawaii; warm seas.

Family **BRAMIDÆ.****TARACTES** Lowe.

460. *Taractes orcini* (Cuvier & Valenciennes). South seas; Indian Ocean.

COLLYBUS Snyder.

461. *Collybus drachme* Snyder. Off Hawaii.

Family **PSENIDÆ.****PSENES** Cuvier.

462. *Psenes javanicus* Cuvier & Valenciennes. Guam; East Indies.
(*Psenes guamensis* Günther.)

CUBICEPS Lowe.

463. *Cubiceps pauciradiatus* Günther. Misol.
Cubiceps pauciradiatus Günther, Ann. Mag. Nat. Hist. 1872, 423, Misol. Regan, Ann. Mag. Nat. Hist. 1902, 123.

ARIOMMA Jordan & Evermann.

464. *Ariomma lurida* Jordan & Evermann. Hawaii.
465. *Ariomma evermanni* Jordan & Snyder. Hawaii.

Family ICOSTEIDÆ.

SCHEDEPHILUS Cuvier.

- 466.
- Schedophilus medusophagus*
- Cocco. Off Samoa (Günther).

Family STROMATEIDÆ.

LEIRUS Lowe.

- 467.
- Leirus maculatus*
- (Günther). South Seas.
-
- 468.
- Leirus paucidens*
- Günther. Between New Guinea and Japan.

Lirus paucidens Günther, Pelagic Fishes Challenger, 1888, 11, open sea north of New Guinea.

Family RACHYCENTRIDÆ.

RACHYCENTRON Kaup. (*Elacate* Cuvier.)

- 469.
- Rachycentron pondicerrianum*
- Cuvier & Valenciennes. Vanicolo; East Indies.

Family ANOMALOPIDÆ.

ANOMALOPS Kner. (*Heterophthalmus* Bleeker.)

- 470.
- Anomalops palpebratus*
- Kner. Fiji; Paumotu Is.; Celebes.

Family PEMPHERIDÆ.

PEMPHERIS Cuvier.

- 471.
- Pempheris oualensis*
- Cuvier & Valenciennes.
- Manifi*
- ;
- Fo a'ao*
- . Oualan, or Strong Island; Tahiti; Guam; Vanicolo; Samoa; Kingsmill I.; Caroline Is.; New Guinea (Macleay).

Pempheris oualensis Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 299, 1831, Oualan.*Pempheris otaitensis* Cuvier & Valenciennes, op. cit., VII, 304, 1831, Tahiti. Günther, Cat., II, 568, China, Amboyna. Kner, Novara Fische, 171, Java. Günther, Fische der Südsee, 102. Seale, Bishop Museum 1901, 74, Guam. Sauvage, Poiss. Madagascar, 286, Tahiti.*Pempheris mangula* Günther, Fische der Südsee, 102, taf. 59, fig. B, Samoa, Vanicolo, Kingsmill I., Caroline Is., Tahiti; not of Cuvier & Valenciennes.

Of this species, sharply distinguished by the presence of a large black spot on the base of the pectoral, we have about a dozen fine specimens from Samoa. Life colors of a specimen from Apia, dirty olive, sides silvery; dorsal dirty olive, its anterior rays black; caudal pale within, the outer rays dirty dull red; anal gray, its base blackish; pectoral reddish, the anterior rays quite red, its base jet black; ventral gray; axil jet black; body with some violet luster.

- 472.
- Pempheris vanicolensis*
- Cuvier & Valenciennes.
- Pula*
- . Vanicolo; Samoa; Ile de France.

Pempheris vanicolensis Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 305, 1831, Vanicolo.*Pempheris nesogallica* Cuvier & Valenciennes, op. cit., VII, 306, 1831, Ile de France.

Three specimens taken in the seine at Apia. This species is well distinguished by the entire absence of black on the base of the pectoral. Depth 2.2 in length. We see no reason for supposing this species to be identical with the Indian species *Pempheris mangula*.

Life colors of a specimen from Apia, coppery black; dorsal and anal pale, the lobes tipped with jet black; pectoral golden; ventral orange, blackish at base; no spot at base of pectoral.

Family SCORPIDÆ.

MONODACTYLUS Lacépède.

Monodactylus Lacépède, Hist. Nat. Poiss., III, 131, 1802 (*falciformis*).*Centropodus* Lacépède, op. cit., III, 303, 1802 (*rhombus*=*argenteus*).*Acanthopodus* Lacépède, op. cit., IV, 558, 1803 (*argenteus*).*Psettus* Cuvier (*argenteus*).

This genus is distinguished from *Psettias* Jordan, new genus (*sebw*) by the rounded outline of the body, which is not deeper than long. In *Psettias* it is very much deeper than long.

473. *Monodactylus argenteus* (Linnaeus). *Toto*. Samoa; New Guinea; Vanicolo; Fiji; East Indies; Australia.

Chaetodon argenteus Linnaeus, Syst. Nat., ed. x, 1758, China; after Lagerstrom. Günther, Cat., II, 488, Moluccas, Amboina, Ceylon, Australia.

Psettus argenteus, Günther, Fische der Südsee, 140, Samoa. Klunzinger, Fische Roth. Meeres, 794, Red Sea.

Scomber rhombeus, Forskål. Descrip. Anim., 58, 1775, Red Sea.

Monodactylus falciformis Lacépède, Hist. Nat. Poiss., III, 131, 1802.

Psettus commersoni Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 250, 1831, Vanicolo; after Lacépède.

This species, common in the East Indies, was found rather abundant in the harbor of Apia in the deeper water between the reefs. Eight specimens were taken. It is a valued food-fish.

Life colors of a specimen from Apia, silvery white with some dusky; a faint orbital bar. Young with three curved black cross bars on the head.

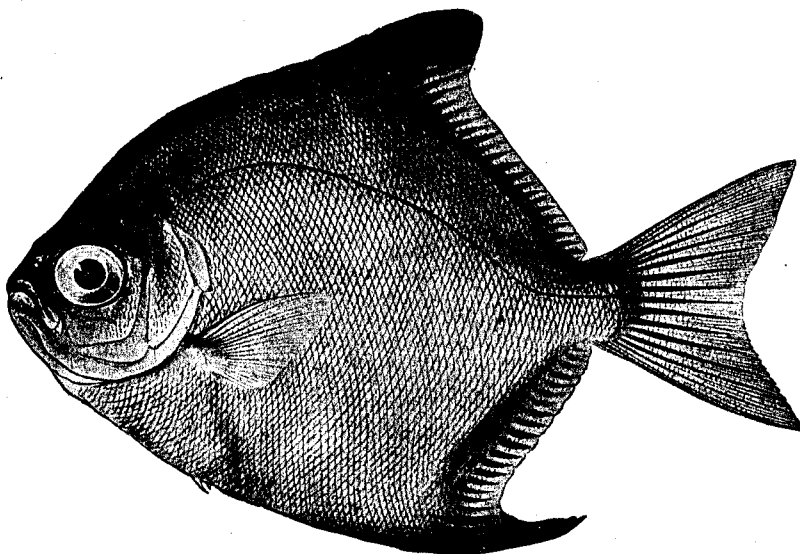


FIG. 30.—*Monodactylus argenteus* (Linnaeus).

ATYPICHTHYS Günther.

474. *Atypichthys strigatus* (Günther). Erromango, New Hebrides; Palacky; Australia.

Family KURTIDÆ.

KURTUS Bloch.

475. *Kurtus gulliveri* Castelnau. New Guinea.

Kurtus gulliveri Castelnau, Proc. Nat. Hist. Soc. Victoria, New Guinea.

Cyrtus gulliveri, Ramsay & Ogilby, Proc. Linn. Soc. N. S. W., 1886, 10, Strickland River (New Guinea).

Family APOGONICHTHYIDÆ.

AMIA Gronow^a (1763). (*Apogon* Lacépède, 1802.) *Fo*.

476. *Amia snyderi* (Jordan & Evermann). Hawaii; Samoa; Tahiti; Paumotu Is.; Tubuai; Faté, Shortland I., and Raiatea (Seale).

Apogon snyderi Jordan & Evermann, Bull. U. S. Fish Comm., XXII, 1902 (1903), 180, Honolulu.

Apogon frenatus Günther, Fische der Südsee, I, 19, taf. 19, fig. A, 1873, Hawaiian, Society, and Paumotu Is. Steindachner, Denks. Ak. Wis. Wien, LXX, 1900, 484, Honolulu. Not *Apogon frenatus* Valenciennes, Nouv. Ann. Mus. Nat. Hist., 1832, 57, pl. 4, fig. 4, nor of Klunzinger.

^a Under the rules of nomenclature adopted by us the name *Amia* Gronow (1763) becomes tenable for this genus, having priority over *Apogon* (1802) and over *Amia* Linnaeus (1766), for which genus Rafinesque's name, *Amiatus* (1815), must be used.

This large species is very common about the Samoan Islands, as also about Hawaii. We have about 40 specimens from Apia and Pago Pago. The dark spot at base of caudal above is usually distinct, though varying much in degree of definition. There is a more or less evident lateral shade, but never sharply defined.

Life colors of a specimen from Apia, brownish red; sides washed with clear light green, the edges of scales brownish red; a diffuse black bar at base of caudal, forming a pretty distinct rounded spot above lateral line and extending backward on edges of both caudal lobes; a faint dark shade from snout across eye, with a darker blotch on opercle and a rounded spot behind eye; a dusky shade on side from eye to tail on larger specimens; axil dull reddish brown; fins all dull reddish brown; first dorsal black on anterior spines; second dorsal and ventral dusky shaded.

477. *Amia frenata* (Valenciennes). New Guinea; Guam.

Apogon frenatus Valenciennes, Nouv. Ann. Hist. Nat., 1, 57, 1832, with plate, New Guinea, Guam.

This species we have failed to recognize. It is close to our *Amia exostigma*, differing in the narrower lateral band, and in the more diffuse caudal spot, which is at the end of the lateral band. It is more remote from *Amia snyderi*, which has the lateral stripe fainter, broader, and more diffuse.

478. *Amia exostigma* Jordan & Starks, new species. Samoa.

Head 2.75 in length; depth 3.3; eye 3 in head; interorbital width 5; snout 3.75; maxillary 2.25; caudal peduncle 2.67; dorsal VII-1, 9; anal II, 9; scales 2-25-5.5.

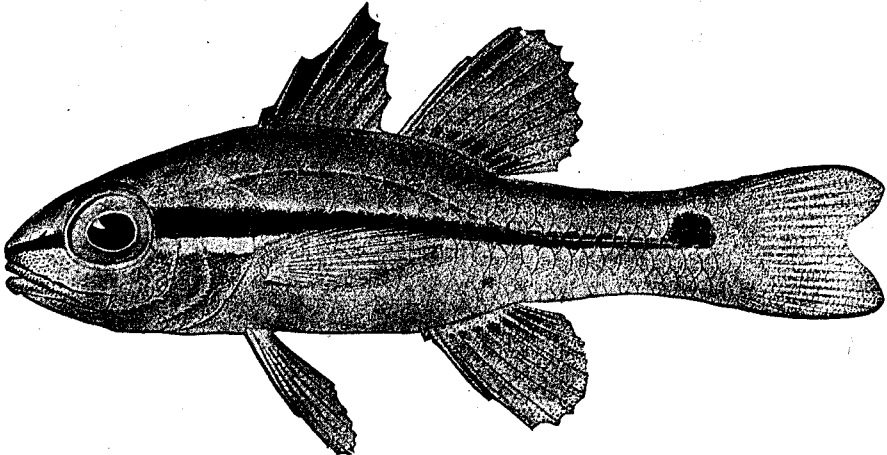


FIG. 31.—*Amia exostigma* Jordan & Starks, new species. Type.

Body slender; upper anterior profile a slight, even, unbroken curve from tip of snout to first dorsal spine; snout blunt, and projecting very slightly beyond the maxillary; maxillary extending to below middle of eye, its anterior end projecting a very little beyond tip of lower jaw; teeth in moderately wide bands on jaws, in a narrower V-shaped patch on vomer; rather large spines on both posterior edges of preopercle, those near the angle larger, all of them directed backward; gillrakers rather slender, the longest one-third the diameter of the eye, 4+14 in number, about 4 of which are represented by tubercles on the anterior end of the lower limb.

Scales everywhere ctenoid, the marginal denticulations fine and close-set, preceded by many short spinules regularly placed, forming a moderately wide band around the posterior border of each scale. Third dorsal spine longest, its length equal to distance between tip of snout and posterior margin of pupil; when fin is depressed its tip reaches a little past front of soft dorsal; first spine very short, 5 in eye; the second spine midway between these two spines in length; second dorsal with a long spine equal in length to the second dorsal base; second dorsal ray the longer, equal to length of head anterior to anterior preopercle margin; second anal spine a little longer than diameter of eye; anal placed a little posterior to soft dorsal; ventrals scarcely reaching to front of anal; pectoral reaching to above base of second anal spine.

Color in life of a specimen from Pago Pago, light olive; jet black band from snout through eye, fading behind; just above this stripe at base of caudal a round, jet black spot as large as pupil; fins

dull reddish; first dorsal spine black; a dark streak on base of dorsal and anal and upper and lower caudal lobes; cheek and breast soiled silver.

Color in alcohol, slightly dusky with fine dots; scarcely darker on back; a black lateral band from tip of snout across eye, but not involving eye, tapering backward to base of middle caudal rays; widest just behind eye; a conspicuous round black spot on caudal peduncle at base of caudal rays, just above lateral line; a short light stripe with violet reflections on opercle bordering black lateral stripe, below which opercle is silvery with violet reflections; upper and lower margins of caudal bordered with black; dusky shades at base of soft dorsal and anal.

Eight specimens from Apia and Pago Pago. This species is very close to *Amia frenata* and *A. melanorhynchus*, differing in having the very distinct caudal spot above the termination of the jet black lateral band and entirely separated from it, the band growing very faint before reaching the base of the caudal.

The lateral band is in this species very broad anteriorly, almost as broad as the eye, while in *Amia frenata* this band is narrow. In *Amia snyderi*, also a closely related species, the lateral band and its terminal spot are broad and diffuse.

The type is from Apia; it is 3 inches in length, and is no. 51732, U. S. National Museum.

479. *Amia menesema* (Jenkins). Hawaii.

480. *Amia crassiceps* (Garman). Fiji; Samoa.

Apogon crassiceps Garman, Bull. Mus. Comp. Zool., 1903, Suva (Fiji).

One large specimen taken at Apia.

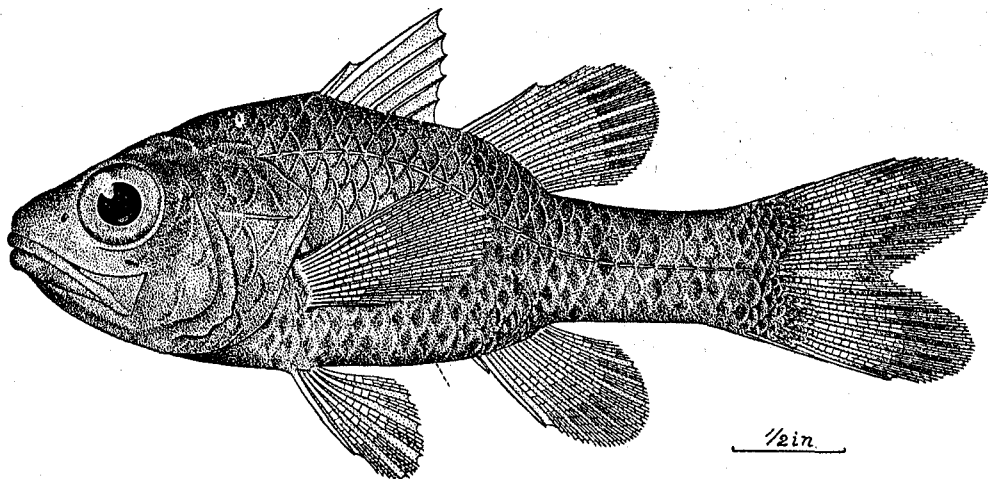


FIG. 32.—*Amia crassiceps* (Garman).

481. *Amia evermanni* (Jordan & Snyder). Hawaii.

482. *Amia orbicularis* (Cuvier & Valenciennes). Radack I.; East Indies.

483. *Amia guamensis* (Valenciennes). Guam.

Apogon guamensis Valenciennes, Ann. Mus. Nat. Hist., 1, 55, 1831, Guam.

A deep-bodied, plain-colored species with large head and one limb only of the opercle serrate; caudal notched. This species may be the same as *A. crassiceps*.

484. *Amia savayensis* (Günther). Savaii, Samoa; Tonga; Yap; Tahiti; Fiji; Faté; Shortland I. and Raiatea (Seale); East Indies.

Apogon savayensis Günther, Proc. Zool. Soc. 1871, 656, Savaii (Samoa). Günther, Fische der Südsee, 21, taf. 19, fig. b, Samoa, Tonga, Yap, Tahiti, Celebes. Seale, Bishop Mus. 1901, Fishes Guam, 76, Guam

Apogon bandanensis Steindachner; not of Bleeker, who has wrongly identified *savayensis* with *bandanensis*.

Apogon fuscus Günther, Fische der Südsee, 22, Fiji.

Apogon nubilus Garman, Bull. Mus. Comp. Zool., 1903, Suva (Fiji).

This species is very common about the Samoan Islands. We have about 100 specimens from Apia and Pago Pago. Ordinarily the color markings are very distinct. There is an oblique black streak

backward and downward from eye; about eight vertical silvery stripes on the side between pectoral and region above middle of anal; a blackish saddle on caudal peduncle, and a black and white stripe on each edge of caudal. In some specimens, however, any or all of these marks may be reduced to mere traces. The silvery cross-streaks, the most characteristic of these traits, were wanting in Günther's types. Apparently the specimen called by Günther *Apogon fuscus* was one in which all the marks were obliterated. It is certain that this is not the *fuscus* of Quoy and Gaimard, which has the caudal rounded and blotched with black. Bleeker is certainly wrong in regarding *savayensis* as the same as *Amia bandanensis*. Garman's *Apogon nubilus* is apparently the young of this species with the markings faded, although more distinct than in Günther's type.

Color in life of a specimen from Pago Pago, dusky olive, with seven narrow dull silvery cross-streaks, each dark-edged on each side; other fainter streaks curved behind; a dusky saddle on caudal peduncle, another under soft dorsal; fins dull red, first dorsal anteriorly black; a dark streak along each caudal lobe; a dusky streak behind eye.

A specimen from Apia in life was brownish olive; side with seven pinkish-white cross-streaks, each edged with brown; an oblique brownish olive bar below eye; a jet black saddle on back of tail; first dorsal blackish; other fins light brownish red; a black streak edged with orange down each lobe of the caudal; tips of soft dorsal and anal light orange-red.

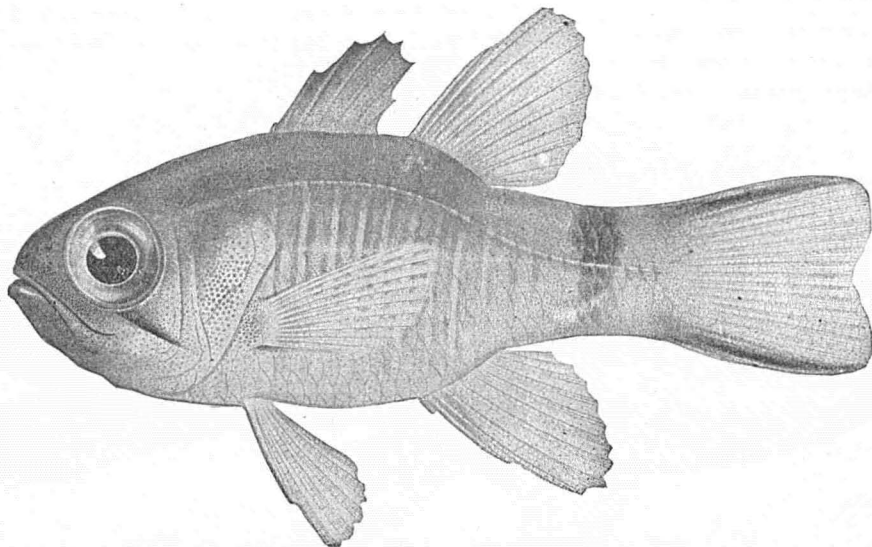


FIG. 33.—*Amia savayensis* (Günther).

The life colors of a young example from Apia were dull olive, faintly barred with paler, a large black spot before base of caudal; no other markings; first dorsal black; other fins pale grayish. Called *fo* by the Samoans.

Another specimen from Pago Pago in life was dull olive, slightly reddish, with some silvery on sides, arranged in cross-bands along muscles; a dark streak like a pencil mark across opercle, another downward and backward from eye; a faint diffuse dark blotch above lateral line from base of caudal, then joined saddlewise over back; first dorsal dusky; other fins purplish olive, the spine of second dorsal dusky. Caudal lunate; dorsal VII; preopercle serrate.

485. *Amia koilomatodon* (Bleeker). Samoa; Shortland I.; Solomon Is. (Seale); East Indies.

Head 2.60 in length; depth equal to head; eye 3.10 in head; dorsal VI-I, 10; anal II, 8; scales 2-28-6; interorbital 1.50 in eye; snout 1.20 in eye.

Body oblong, compressed, slightly elevated; caudal peduncle rather thick and strong, its depth 1.50 in length, which is equal to distance from anterior margin of eye to posterior margin of opercle; mouth large; maxillary equal to post-ocular portion of head; its distal end under posterior margin of pupil, the width of distal end slightly greater than pupil; villiform teeth on jaws, vomer, and palatine;

the two limbs of preopercle distinctly denticulate; the lower posterior limb of preorbital denticulate; gillrakers rather sharp pointed, the longest scarcely equal to pupil, 17 on lower limb; second dorsal spine much the strongest, its length 2 in head; base of soft dorsal 3 in head, its longest ray 1.80 in head; anal rounded, its base 2 in its length, the second spine 2.25 in head, its longest ray 1.75 in head; pectoral 1.45 in head, its distal end below middle of soft dorsal; ventrals reaching base of anal, their origin directly below origin of pectoral; caudal bilobed, 1.50 in head.

Color in spirits, light brownish; a black half-band at origin of spinous dorsal extending to beneath anterior third of pectoral; a second black band at origin of soft dorsal, extending down to lateral line; a third black band at posterior axil of soft dorsal, longer than second band, extending to below lateral line, in young examples extending to middle of anal base; a third very indistinct dark band over middle of caudal peduncle (in an old example this is broken up into three or four round spots); a distinct round spot on lateral line just anterior to base of caudal; a round black spot on opercle; a distinct black line from eye to angle of preopercle; anterior dorsal spine black, upper and lower margin of caudal dusky; tip of ventral and anal with dusky wash; pectoral yellow.

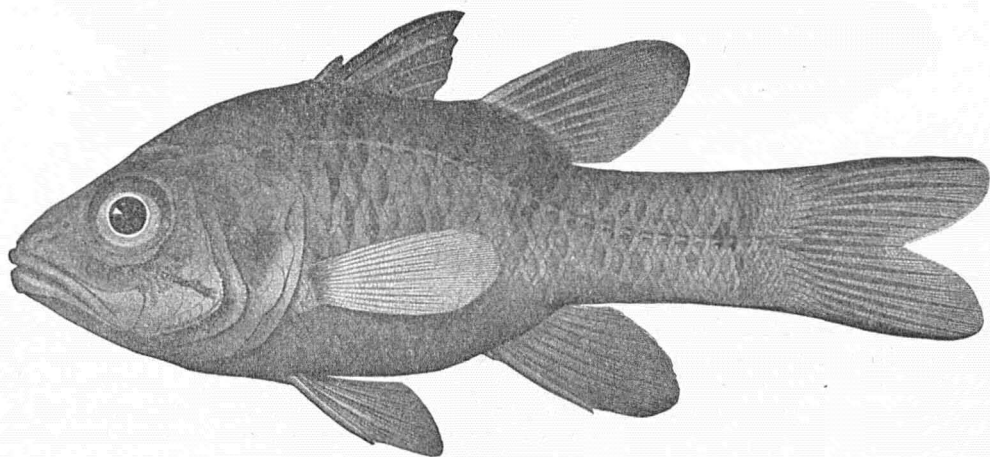


FIG. 34.—*Amia koilomatodon* (Bleeker).

Color in life of a very large specimen from Pago Pago, dark reddish olive brown; a faint darker bar under first dorsal, one under second dorsal; a small round blackish spot at base of caudal, and one on opercle before its edge; iris golden. Fins all dusky brownish red, the first dorsal darker; dorsal rather dark; dark dots confluent along base of soft dorsal. Caudal lunate; dorsal vi.

Another large specimen from Pago Pago was dark olive brown in life, much mottled, with three vague dark cross-bands; a large black spot on opercle and another at base of caudal; fins mottled brown.

We have eight specimens from Apia and Pago Pago, of a large and robust species of *Amia*, evidently allied to *Amia koilomatodon*. It has a distinct caudal spot, which is said to be wanting in the latter, but as no other differences appear, we refer our specimens provisionally to *Amia koilomatodon*. The specimen described is no. 51733, U. S. National Museum, 5.63 inches long.

486. *Amia nigripinnis* (Cuvier & Valenciennes). Bonham I.; East Indies.

487. *Amia maculifera* (Garrett). Hawaii.

488. *Amia novæ-guinæ* (Valenciennes). Papua; East Indies.

489. *Amia aroubiensis* (Hombron & Jacquinot). Samoa; Tahiti; Tubuai; Shortland I.; Nukahiva (Scale).

Apogon aroubiensis Hombron & Jacquinot, Voy. au Pole Sud, Poiss., 31, pl. 1, fig. 1, Aroub in Malaysia.

Apogon fasciatus Günther, Fische der Südsee, 19, taf. 20, fig. A.

This species very closely resembles *Amia novemfasciata*, but the colors are deeper, and the black bands, broader and continuous, do not extend on the caudal fin. There is no black spot on base of

pectoral. It is certainly a distinct species, and it is fairly represented by Dr. Günther's figure A, as well as apparently in the poor plate of Hombron and Jacquinot.

About 10 specimens from Apia and Pago Pago. Color in life of a specimen from Apia, reddish gray, with five stripes of very deep red-black, the interspaces gray; iris gray with yellowish tinge; fins all pale red; an oblique streak on each dorsal and on anal; none on caudal, the bands not converging on the fin.

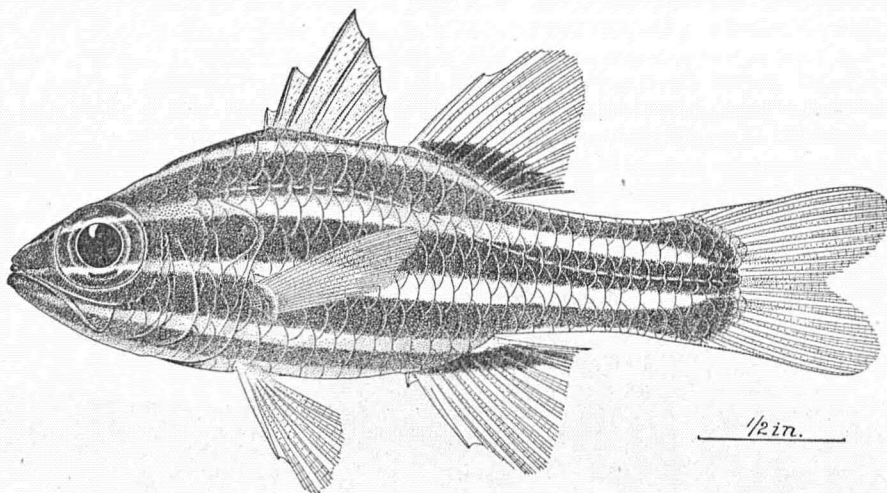


FIG. 35.—*Amia aroubiensis* (Hombron & Jacquinot).

490. *Amia novemfasciata* (Cuvier & Valenciennes). Samoa; Guam; Tahiti; Kingsmill I.; Faté (Scale); East Indies.

Apogon novemfasciatus Cuvier & Valenciennes, Hist. Nat. Poiss., II, 154, Timor and Guam.

Apogon fasciatus Quoy & Gaimard, Voy. Uranie, 344, Guam. Günther, Fische der Südsee, 19, taf. 20, fig. B, Society, Samoan, and Kingsmill islands, etc.; not fig. A. Bleeker, Atlas, tab. XLVIII, fig. 4, East Indies. Streets, Bull. U. S. Nat. Mus., VII, 100, 1877, Samoa. Seale, Bishop Mus. 1901, 76, Guam; not of White.

Head 2.50 in length; depth 2.85; eye 3.20 in head; snout 4 in head; dorsal VII-1, 9; anal II, 8; scales 2-28-6; interorbital 2 in orbit.

Body oblong, compressed; caudal peduncle strong, its depth 1.50 in its length, which is 1.35 in head; mouth large, jaws equal, maxillary 2 in head, its distal end under posterior third of eye; bands of small teeth on jaws, vomer, and palatines; gillrakers not very sharp, the longest equal to width of pupil, 14 on lower limb (12 developed); opercle entire; outer limb only of preopercle denticulate; base of spinous dorsal 1.40 in the third spine, which is the longest and strongest; base of soft dorsal 2.75 in head, its longest ray equal to distance from middle of eye to posterior tip of opercle; base of anal equal to orbit, its longest ray 1.75 in head; pectoral 1.50 in head, its distal end reaching to base of soft dorsal; ventrals 1.40 in head, their insertion directly below base of pectoral, their tips scarcely reaching base of anal fin; caudal emarginate, 1.30 in head.

Color in spirits, yellowish white, with four brown longitudinal bands about as wide as interspaces, the first extending from middle of interorbital, dividing in front of dorsal fin into two which continue along base of dorsal, uniting behind in a single line along top of caudal peduncle; the 2nd band extending from upper margin of orbit to caudal, where it runs obliquely out on fin to join the end of the third line, which extends from tip of snout through eye to tip of caudal fin; the fourth line extending from side of snout along lower part of orbit, over base of pectoral to caudal, where it extends obliquely out on the fin to join the third line at tip—three of the bands thus converging on the caudal fin, each of these bands more or less distinctly widened at about three intervals. There is also an indistinct dusky line from angle of mouth to base of ventrals; a narrow white line along side of snout; two larger dark blotches are apparent on the third body band; base and axil of pectoral dusky; a black line with a narrow light one above it through lower base of soft dorsal; a slight wash of dusky on anterior membrane of spinous dorsal, usually a narrow black line through lower part of anal, disappearing with age.

Color in life of a specimen from Apia, olivaceous, the bands black, converging on caudal; spaces anteriorly before pectoral silvery white, with bright luster; the streaks on head above very white; fins all brick-red.

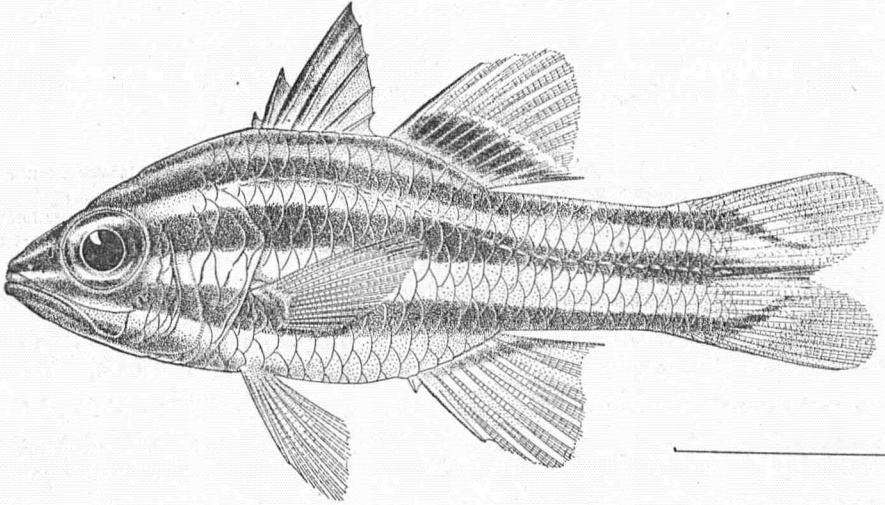


FIG. 36.—*Amia novemfasciata* (Cuvier & Valenciennes).

Another specimen has the stripes darker olive, almost black, on whiter ground; a black bar across axil, and a black spot in front of it; a stripe from angle of mouth to ventrals; fins all pale red, in younger individuals orange yellow; no black marks, except dusky streak at base of second dorsal and anal, which runs obliquely up and back; black bands convergent on caudal, the outer margin pale; first dorsal all pale.

A third specimen from the same locality has a deeper body, the black stripes more olive, none below level of pectoral; no black bar across axil; a blackish spot on lower part of opercle; fins dull

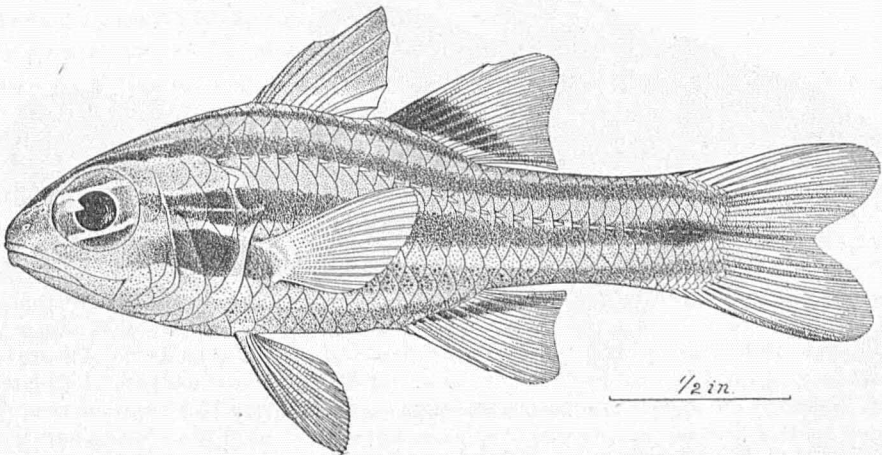


FIG. 37.—*Amia novemfasciata* (Cuvier & Valenciennes). A color variation.

red; both dorsals and anal with an oblique black cross-band; stripes on caudal less distinctly converging, the outer margin black; first dorsal all black. These specimens differ rather markedly from the ordinary ones and may represent a distinct species, but, except in color, we find no tangible characters.

This species is very abundant at Pago Pago and Apia, and we have about 100 specimens. Length 3.25 inches. We have not seen the plate of *Mullus fasciatus*, published by John White. From the account of Cuvier and Valenciennes this species, like *quadrifasciata*, has but two black stripes on each side. The present species, *Apogon fasciatus* of most authors, has five (or four) stripes on each side, two of them converging to meet the middle stripe on the caudal fin. These stripes are relatively narrow, and are again narrowed in two or three places. A black spot at the base of the pectoral is also very constant.

Concerning the types of *Apogon novemfasciatus*, Dr. Léon Vaillant writes:

Je viens d'examiner les deux *specimens* qu'on peut regarder comme types primitifs de Cuvier et Valenciennes; Ce sont deux individus isolés, l'un rapporté de Timor par Péron, l'autre de Guam par Quoy et Gaimard.

Le premier est un petit exemplaire, long de $60 + 12 = 52$ mm. en mediocre etat, en grand partie decolore; tout ce qu'on peut dire, c'est que les bandes laterales se voient sur la partie basilare de la caudale (No. 5646)

L'etat du second est plus satisfaisant. La longueur est de $40 + 12 = 52$ mm. Les trois lignes sombres laterales, se prolongent visiblement sur la caudale, la superieure, et l'inférieure convergeant nettement, l'une vers l'autre en arriere (No. 853).

The second of these specimens evidently corresponds to the *Amia novemfasciata* of the present paper, and the other, which is properly the type of *novemfasciatus*, is almost certainly a discolored example of the same species, as the black spots are seen on the base of the caudal fin. In *Apogon aroubiensis* of Hombron and Jacquinot the black spots do not encroach on the caudal fin at all.

491. *Amia amboinensis* (Bleeker). New Guinea (Macleay); Shortland I. (Seale); East Indies.
 492. *Amia sangiensis* (Bleeker). Fiji (Günther); New Guinea (Macleay); Yap (Günther); East Indies.
 493. *Amia fleurieu* (Lacépède). New Guinea (Macleay); East Indies
 (*Ostorhinchus fleurieu* Lacépède; *Centropomus aureus* Lacépède; *Apogon annularis* Rüppell; *Apogon roseipinnis* Cuvier & Valenciennes.)
 494. *Amia tænioptera* (Bennett). New Guinea (Macleay); East Indies.
 495. *Amia buruensis* (Bleeker). Normanby I.; New Guinea (Macleay).
 496. *Amia trimaculata* (Cuvier & Valenciennes). New Guinea; East Indies.

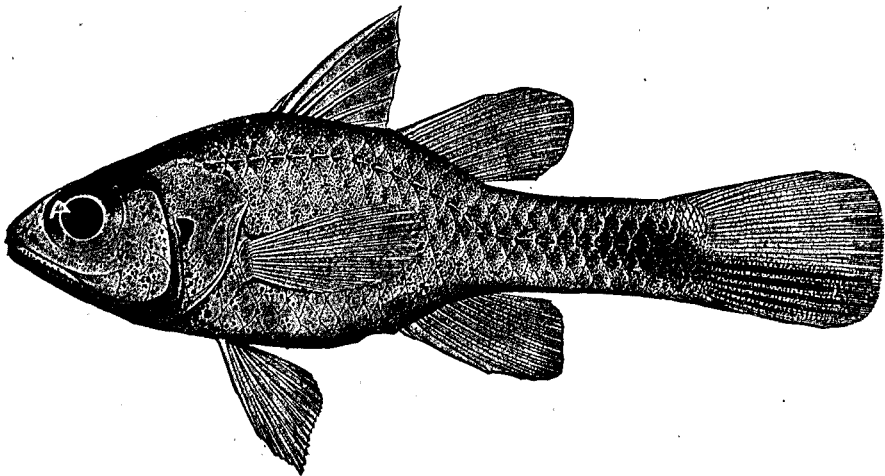


FIG. 38.—*Amia fusca* (Quoy & Gaimard).

497. *Amia fusca* (Quoy & Gaimard). Samoa.

Apogon fuscus Quoy & Gaimard, Voy. Uranie, Zool., 345, 1824, Guam.

Head 2.85 in length; depth 3; eye 2.75 in head; snout 4.80; dorsal VI-I, 8; anal II, 8; scales 2-23-6; interorbital equal to snout.

Body oblong, compressed, head and body scaled; caudal peduncle long, 3.10 in length of fish, its depth 2.55 in head; jaws even; maxillary 1.95 in head, its distal end under posterior margin of pupil;

bands of villiform teeth on jaws, vomer, and palatines; gill-rakers sharp pointed, the longest less than width of pupil, 14 on lower limb; posterior margin of opercle ending in a spine-like point which extends as a small bony stay across opercle; the posterior limb of preopercle only is serrated; lateral line evenly curved from its origin to a line with posterior axil of dorsal, the straight portion 1.50 incurved. Base of spinous dorsal 1.50 in its height, the second (upright) spine being the longest and strongest; base of soft dorsal 1.95 in its length, the soft dorsal spine being equal to base of fin, 2.90 in head; base of anal equal to depth of caudal peduncle, its longest ray 1.95 in head; ventrals scarcely reaching base of anal, equal in length to distance from middle of eye to posterior tip of opercle, their insertion being slightly in advance of pectoral; pectoral 1.50 in head, the tip on a line with middle of soft dorsal; caudal rounded, 1.20 in head.

Color in spirits yellowish white, thickly covered with minute dots; a broad black area covering most of the caudal peduncle, except its upper and lower sides, this black marking extending out and covering the lower half of the caudal fin; anteriorly this color fades out under the posterior axil of soft dorsal; there is a dusky wash on upper half of eye and on dorsal surface of head; cheek punctulate with brown dots rather larger than those of body, a small brown spot on opercle near base of the bony stay; sides of thorax rather strongly shaded with brown dots; fins yellowish white. The black color of the lower half of the caudal, which fin is not forked, is very distinctive.

One specimen from Apia, length 1.75 inches.

498. *Amia zosterophora* (Bleeker). New Guinea (Macleay); East Indies.

499. *Amia leptacantha* (Bleeker). New Guinea (Macleay); East Indies.

500. *Amia nematophora* (Bleeker). New Guinea (Macleay); East Indies.

501. *Amia cookii* (Macleay). New Guinea.

Apogon cookii Macleay, Proc. Linn. Soc. N. S. W., v, 1884, 324, New Guinea.

502. *Amia hyalosoma* (Bleeker). Puinepet I.; East Indies.

503. *Amia erythrina* (Snyder). Hawaii; Samoa.

Of this small species we have seven examples from Apia and Pago Pago. It is clear red in life, often with scattered paler spots, and some dark shading. Our specimens agree well with those from Hawaii.

A specimen from Pago Pago in life was all deep vermilion red. One from Apia was all bright red, a dusky blotch on opercle, dusky shades along base of first dorsal and on top of head; no markings.

504. *Amia doryssa* Jordan & Seale, new species. Samoa.

Apogon hypselonotus, Günther, Fische der Südsee, 20, South Seas; not of Bleeker.

Head 2.60 in length; depth 2.95; eye 2.85; dorsal VI-I, 9; anal II, 8; scales 2-26-6; interorbital equal to snout.

Body oblong, compressed, its greatest depth at origin of dorsal; body and head scaled; caudal peduncle long, 1.20 in head, its depth 2.95; jaws about even, the under one scarcely as long as upper; maxillary 1.95 in head, its distal end under posterior margin of pupil; bands of minute villiform teeth on jaws, vomer and palatines; gillrakers sharp pointed, 12 on lower limb, the longest less than pupil; opercle with three small spine-like projections on posterior margin; both limbs of preopercle with small denticulations; anterior part of lateral line with strong oblique curve under base of soft dorsal; second (upright) spine of dorsal very strong, flat, and sabre-like, its length equal to distance from anterior margin of eye to posterior margin of opercle; shape of the spinous dorsal that of an acute triangle, the base of which is 1.75 in its length; base of soft dorsal equal to orbit; the spine of soft dorsal slightly longer than base of fin, the fin rounded, its longest ray equal to distance from middle of eye to posterior margin of opercle; base of anal 1.50 in length of longest ray; ventrals below base of pectoral, their length 1.50 in head, their tips reaching to base of anal; pectoral 1.40 in head, extending to a line with sixth anal ray; caudal bilobed, the longest ray equal to distance from anterior margin of orbit to posterior edge of opercle.

Color in life, light brick-red, fins a little darker; no trace of markings. Color in spirits, yellowish white, some black shading at base of spinous dorsal; a few small dusky blotches on upper part of opercle; fins without markings.

Three specimens from Apia. The type is no. 51812, U. S. National Museum; length 1.87 inches. Dr. Günther identifies his specimens, apparently similar, with *Apogon hypselonotus*, but Dr. Bleeker is apparently correct in regarding the species of the South Seas as distinct. The species resembles *Amia erythrina*, but the dorsal spines are stronger and longer than in the latter, and the physiognomy is different.

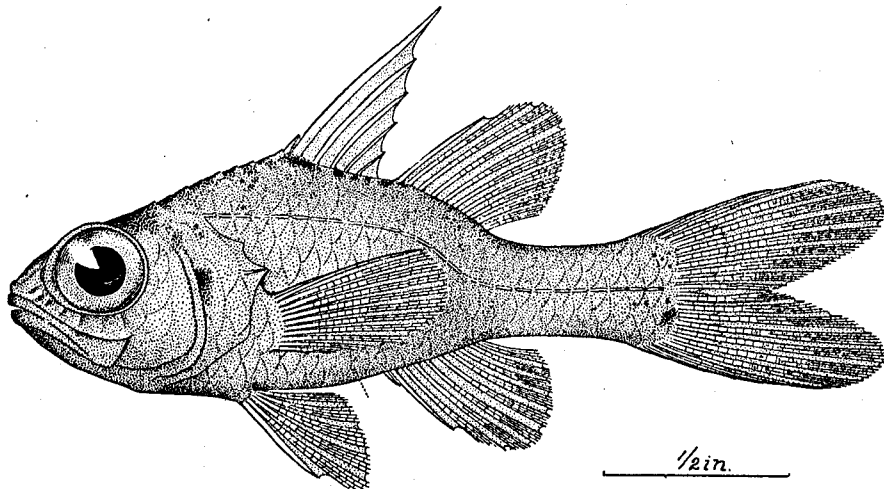


FIG. 39.—*Amia doryssa* Jordan & Seale, new species. Type.

505. *Amia lateralis* (Valenciennes). Samoa; Vanicolo.

Apogon lateralis Valenciennes, Nouv. Ann. Hist. Nat., I, 58, 1832, Vanicolo.

Head a 2.40 in length; depth 2.75; eye 3.75 in head; snout 4; dorsal vi-1, 9; anal ii, 8; scales, 1.5-26-5; interorbital scarcely equal to eye.

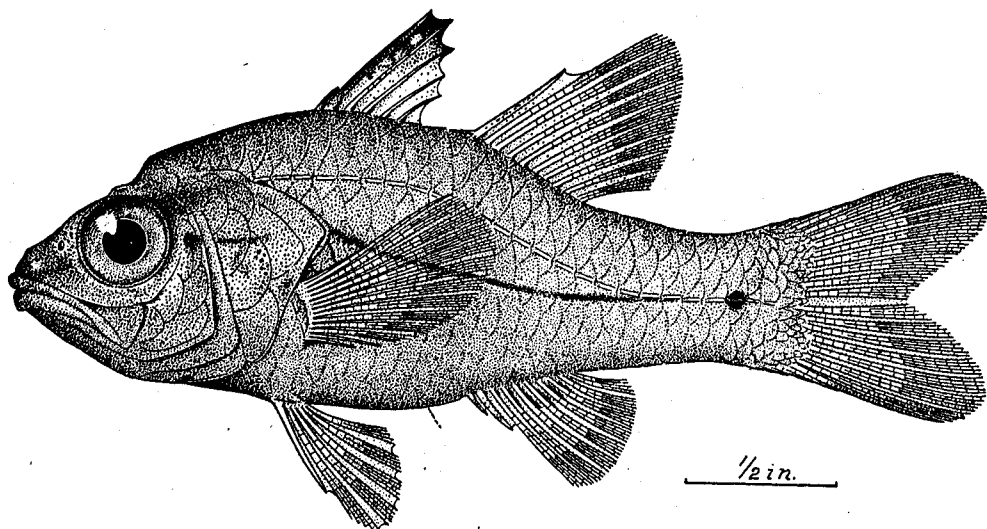


FIG. 40.—*Amia lateralis* (Valenciennes).

Body oblong, compressed, and somewhat elevated; mouth large; maxillary 2.15 in head, its distal end under posterior margin of pupil; teeth in villiform bands on jaws; vomer and palatines; cheek scaled; preopercle with the outer limb very slightly denticulate, the teeth finer above, the inner limb

^a Including opercular flap in all descriptions of *Ambassis* and *Amia*.

entire; gill-rakers strong, blunt, and finely denticulate, the longest two-thirds as long as pupil, 17 on lower limb; second dorsal spine longest, 2.20 in head; longest ray of soft dorsal, 2 in head, its base 3; caudal emarginate, the lobes rounded; base of anal, 3 in head, its longest ray, 2.50, the spines small; pectoral extending to a line with sixth dorsal ray, 1.75 in head; insertion of ventrals slightly in advance of base of pectoral, their tip extending to anal opening, their length equal to postocular part of head.

Color in spirits, dull yellowish white with a slight wash of brown; everywhere punctulate with indistinct minute dark dots the size of pin pricks; a narrow and distinct line of brown from posterior margin of opercle to base of caudal, where it terminates in a small round black dot about half the size of pupil; a short black line from posterior margin of eye to near posterior margin of opercle, a dusky blotch above this at upper end of preopercle and including the upper portion of orbit and eye; a more or less distinct dusky line from anterior of orbit down side of snout; dorsal fin with anterior spine, dusky black at tip; other fins white; opercle gilt.

Twenty-six specimens from Apia. The specimen described is 3 inches long.

This species is rather common in the sluggish waters at the mouths of the streams of Apia. From the other Samoan species it may be known by its strong likeness to the species of *Ambassis*, among which it is often found. It has always a small black spot at base of caudal and a low spinous dorsal, the long spine barely reaching base of second dorsal when compressed.

MIONORUS Kreff. Fb.

This genus has the lateral line complete, the palatine provided with teeth, and the two limbs of the preopercle both strictly entire. In *M. græffei* the body is short and greatly compressed, and the dorsals high. Other species provisionally referred to the same genus (*waikiki*, *carinatus*, *glaga*, etc.) have the general form of *Amia*.

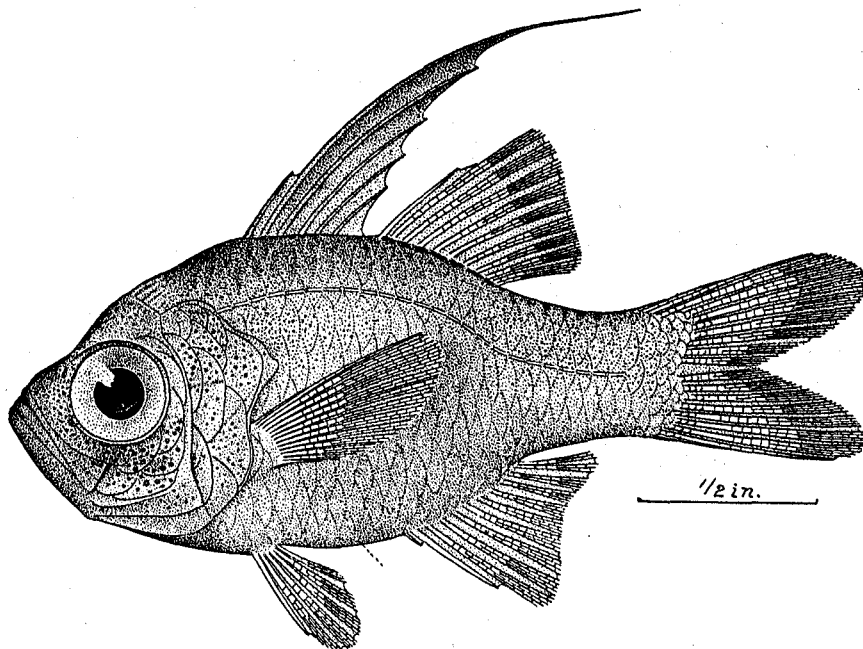


FIG. 41.—*Mionorus græffei* (Günther).

506. *Mionorus græffei* (Günther). Samoa; Marshall Is.

Apogon græffei Günther, *Fische der Südsee*, 22, taf. 20, fig. E, 1878, Boston I. (Marshall Is.). Streets, Bull. U. S. Nat. Mus., VII, 101, 1877, Samoa.

Of this pretty species we have two specimens from Apia, and ten from Pago Pago. The greatly compressed body and elongate whip-like spine are characteristic.

Color in life of a specimen from Apia, translucent, with orange shades on head; fins plain pink, the spinous dorsal dark-edged; no stripes or spots; very deep and much compressed; second dorsal spine filamentous, reaching past middle of soft dorsal.

A specimen from Pago Pago in life was light pinkish olive; no spot or bar of black; two golden bronze cross-streaks behind head; two on opercle and two or three similar streaks radiating from eye; a streak of dark points along middle line of back; first dorsal dusky, the long whip-like produced spine black; other fins plain pink, the caudal faintly dark-edged. Caudal well forked; preopercle serrate.

The other specimen from Apia, with body very deep, was translucent olive, paler below, silvery on side; a dark streak along base of dorsal; four vertical bars of bright golden bronze behind eye on opercle and front of body, these not much above or below level of large eye; upper fins pale orange; lower pale red; pectoral colorless. Scales very large; dorsal filamentous; anal 11, 10.

507. *Mionorus waikiki* (Jordan & Evermann). Hawaii.

FOA Jordan & Evermann. *Fo*.

Foa Jordan & Evermann, Bull. U. S. Fish Comm., xxiii, 1903 (July 29, 1905), 210 (type *Fowleria brachygramma*).

This genus is characterized by the entire preopercle, incomplete lateral line and by the presence of teeth on the palatines. The species are all very small in size, and they live in crevices of coral reefs.

Analysis of species of Foa.

- a. Opercle without black spot.
 b. Body and fins plain, pale *brachygramma*
 bb. Body much mottled; fins mottled.
 c. Head very large; back with broad diffuse dark cross-shades *fo*
 cc. Head moderate; no broad blackish cross-bands *vaiute*

508. *Foa brachygramma* (Jenkins). Hawaii.

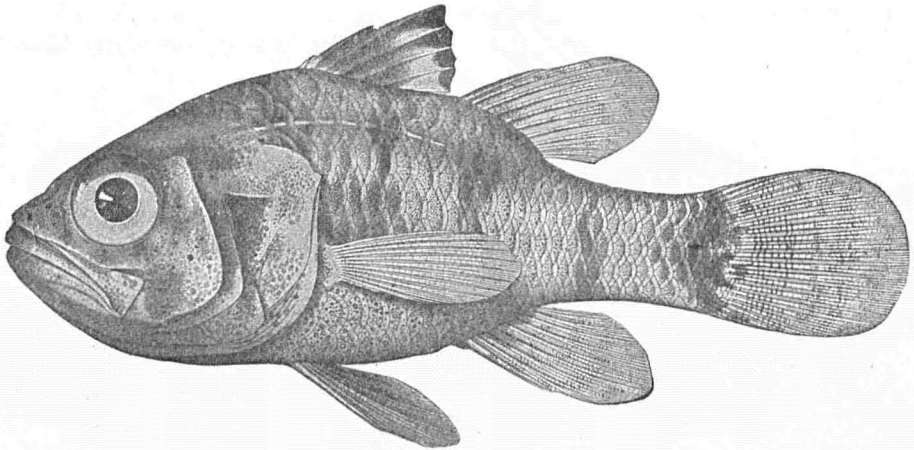


FIG. 42.—*Foa fo* Jordan & Seale, new species. Type.

509. *Foa fo* Jordan & Seale, new species. Samoa.

Head 2.20 in length; depth 2.50; eye 3.75 in head; snout 4.75 in head; dorsal VII-1, 9; anal 11, 8; scales 1-21-6; lateral line discontinued at the ninth scale from head; interorbital equal to snout.

Body oblong, compressed, rather deep; body, cheeks and opercles scaled; caudal peduncle rather short and strong, its depth 1.50 in its length, which is 1.70 in head; mouth large, the jaws equal; premaxillary equal to postocular part of head; bands of minute teeth in jaws, vomer and palatine; opercle entire; preopercle with both limbs very minutely denticulate, the denticulations being hidden under the scales; gillrakers not very sharp, rather strong, 12 on lower limb, the longest less than length of pupil; base of spinous dorsal slightly greater than its height, which is 2 in head; base of soft dorsal

3 in head, its height 1.90 in head; anal base about equal to eye, its longest ray 3 in head; pectorals 1.75 in head, extending to below middle of soft dorsal; ventral inserted directly below base of pectoral, its length 1.75 in head; caudal rounded, 1.50 in head.

Color in spirits, yellowish white, the scales shaded more or less with light brown; five diffuse, irregular vertical cross-bands of dusky, the first in front of dorsal, the second from middle of spinous dorsal, the third from base of soft dorsal, the two posterior ones encircling caudal peduncle; there is also a more or less distinct dusky area on nuchal region; dusky cross-shades under chin; the fins, except pectorals, all more or less indistinctly blotched with dusky, the spinous dorsal being black at tip with a lighter area in middle and dusky at base; anal shows indications of three or four darker cross-shades; ventral dusky; a dark spot on opercle, just posterior to eye; upper portion of orbital and snout shaded with dusky.

Of this species, well distinguished by its large head, blackish cross-bands, and by the absence of opercular spot, we have one specimen from Apia, the type, no. 51735, U. S. National Museum, 1.50 inches long. We have also 2 specimens from the Philippines. *Fo* is the Samoan name of all species of *Amia* and related genera.

510. *Foa vaiulæ* Jordan & Seale, new species. Samoa.

Head 2.50 in length; depth 3; eye 3 in head; snout equal to interorbital; dorsal VII-1, 9; anal II, 7; scales 2-21-6; lateral line continued only to tenth scale from head.

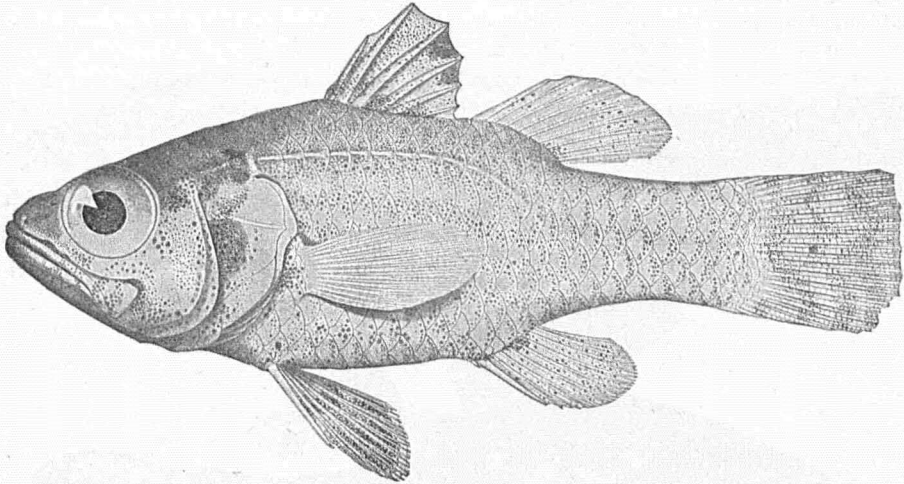


FIG. 43.—*Foa vaiulæ* Jordan & Seale, new species. Type.

Body oblong, compressed; body, cheeks, and opercles scaled; caudal peduncle rather strong, its depth 1.75 in its length, which is 1.50 in head; mouth large; jaws equal; maxillary 1.85 in head, its distal end under posterior third of eye; bands of minute teeth on jaws, vomer, and palatines; opercle entire; preopercle with very minute denticulations on each limb; gillrakers rather strong at base, sharp-pointed, the longest about two-thirds width of pupil, 7 developed on lower limb; spinous dorsal rounded, its base equal to its height; base of soft dorsal 3 in head, rounded, its longest ray 2.20; base of anal 3.50, its longest ray 2.18; pectoral 1.75, reaching anterior base of soft dorsal; ventral 1.80, its tip not reaching base of anal, their insertion below base of pectoral; caudal square, its length 1.95 in head.

Color in spirits, yellowish white, each scale shaded by numerous fine brown dots like pin pricks, darker on nuchal region, with a small but distinct black spot above opercle at origin of lateral line; some dark shadings on opercle and cheek behind and below eye; pectoral yellow, all the other fins shaded more or less with small brown dots, darkest on spinous dorsal, which also has black blotches between third and fifth spines at tip of fin and at the base; on caudal fin the dots form three irregular bands. This species is mottled somewhat as in *Apogonichthys marmoratus*, but is without opercular spot.

One specimen, type, no. 51734, U. S. National Museum, from Apia, length 1.20 inches. Named for the fisherman Vaiula, of Apia.

APOGONICHTHYS Bleeker. *Fo*.

Fowleria Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (Apr. 11, 1903), 180 (*auritus*).

This genus is based on a species, *Apogon auritus* Cuvier & Valenciennes, which we have not seen. It is, however, very closely related to three Samoan species, with which it is doubtless congeneric. These species differ from the group called *Foa* in having no teeth on the palatines. In all of them there is a large black ocellus on the opercle, and the lateral line, although interrupted, shows rudimentary pores on the caudal peduncle.

a. Opercle with a large ocellated black spot.

b. Body mottled with dusky; fins all closely chequered; lower side of head chequered *variegatus*

bb. Body deep red in life, with many pale cross-bands; fins faintly mottled; caudal blackish at tip..... *marmoratus*

bbb. Body brown; a distinct black spot at base of many scales, forming lines; fins plain *isostigma*

511. *Apogonichthys variegatus* (Valenciennes). Samoa; Tahiti; Yap; Ile de France.

?*Apogon auritus* Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 443, 1831, Ile de France; color plain, fins plain, an opercular spot.

Apogon variegatus Valenciennes, Ann. Sci. Nat., i, 1832, 55, Ile de France; body and fins mottled; an opercular spot.

Apogon auritus, Günther, Fische der Südsee, 23, Tahiti, Yap. Day, Fishes of India. Streets, Bull. U. S. Nat. Mus., vii, 1877, 100, Samoa. Sauvage, Fish. Madagascar, 141, not plate.

This species is common on the reefs about Samoa. We have ten examples from Apia and twenty from Pago Pago. It is well figured by Day as *Apogon auritus*, but the original *auritus* is said to have the fins plain. There is a black opercular spot, and the body and fins are everywhere closely mottled with light and blackish. The vertical fins especially are finely marked, the pattern suggesting that of the fins of some gobies.

This species may be the original *Apogon auritus*, but it can not be identified as that without comparison with the original type. *Apogon punctulatus* of Rüppell and *A. polystigma* of Bleeker may be the true *auritus*. At any rate, the figures diverge widely from our fish. The description of *A. auritus* of Sauvage approaches it, but his figure looks much like *Foa brachygramma*.

Life colors of a specimen from Apia, body everywhere much mottled, blackish, and gray; all the fins save the ventrals elaborately spotted and barred; jaws barred and mottled; a black ocellus on the opercle.

Another specimen from Apia was dirty olive-brown; opercle with a black pale-edged ocellus, very large and conspicuous; fins all much like the body, brown and mottled; caudal rounded.

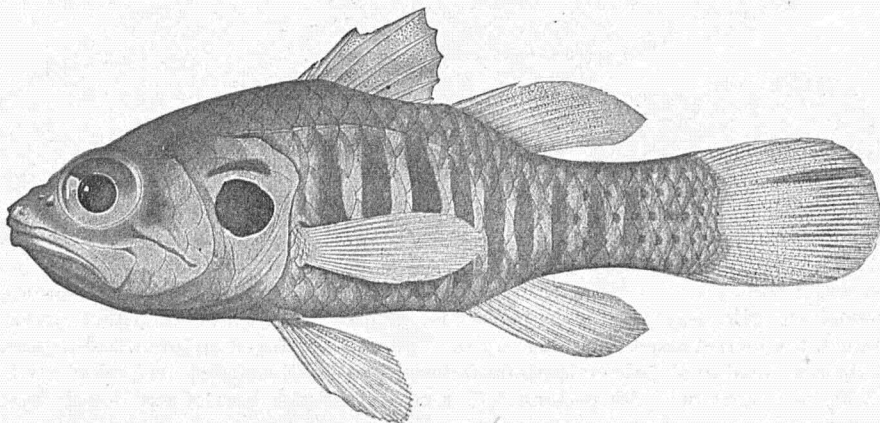


FIG. 44.—*Apogonichthys marmoratus* (Alleyne & Macleay).

512. *Apogonichthys marmoratus* (Alleyne & Macleay). *Fo mumu* (red). Samoa; North Australia.

Apogonichthys marmoratus Alleyne & Macleay, Proc. Linn. Soc. N. S. W., 1876, 268, pl. v, fig. 2, Cape Grenville (North Australia).

Of this species, distinguished by its clear red color, black opercular spot, and the body covered with pale crossbands, we have three specimens from Pago Pago, and ten from Apia. It is well separated from *Apogonichthys variegatus*. The little figure given by Alleyne and Macleay is characteristic.

Life colors of one specimen from Pago Pago, light clear brownish red, the ground-color forming about nine distinct crossbars on the body, about twice as broad as the pale olive interspaces; head mottled; a large black spot on opercle, washed with golden and surrounded by a golden ring, this spot two-thirds diameter of eye and covering most of the bone; fins all very bright cardinal red, the caudal with an irregular black shade at tip. Caudal rounded. Length $2\frac{1}{2}$ inches.

513. *Apogonichthys isostigma* Jordan & Seale, new species. Samoa.

Head 2.55 in length; depth 3; eye 4 in head; snout equal to eye; dorsal VII-1, 9; anal II, 8; scales 2-22-6, the lateral line interrupted; interorbital less than snout, 1.75 in orbit.

Body oblong, compressed, scaled, the scales covering cheeks and opercles; depth of caudal peduncle 1.30 in its length; mouth large, the lower jaw slightly the shorter; maxillary 2 in head, its distal end under posterior margin of orbit, the distal width being greater than pupil; teeth in villiform bands on jaws and vomer, no teeth on palatines; opercle entire; preopercle apparently entire, but with a few slight serrations at angle hidden under the skin; gillrakers short, the longest 2 in pupil, blunt, ending in a prickly knob, 7 developed on lower limb; base of spinous dorsal equal to its height, which is 2.10 in length of head; base of soft dorsal 1.50 in its longest ray, which is 2 in head; ventrals do not reach to the anal, their length 1.75 in head, their insertion directly below base of pectoral; pectoral 1.50 in head, terminating at the seventh round black spot on side; caudal rounded, 1.40 in head.

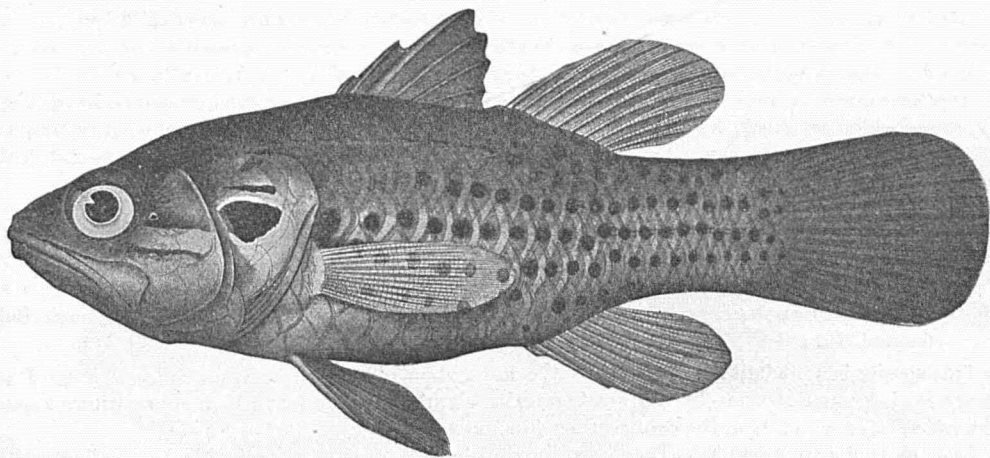


FIG. 45.—*Apogonichthys isostigma* Jordan & Seale, new species. Type.

Color in spirits, light brown, with about five rows of distinct round dots forming the center of scales along the sides, two of these lines with their origin at axil of pectoral and extending to caudal, one with its origin at posterior tip of opercle and extending to caudal, the other two usually extending from near middle of fish to caudal (very old examples show a few other scattered dots over the body); a large, black, white-edged spot on opercle, a more or less distinct dusky area extending from eye back to this spot; a narrow black line from lower part of orbit across cheek; top of head and snout dusky, a narrow dark line across opercle just above the black spot; all the fins except pectorals have a wash of dusky, the caudal being almost black; pectoral yellowish white.

Life colors of one specimen plain dark brown, each scale with a darker spot, these forming dark streaks along scales, but no marblings; large opercular ocellus with a golden edge; fins dark brown, unspotted.

This species has the large opercular ocellus found in *Apogonichthys auritus*, *polystigma*, *variegatus* and *marmoratus*. The body is, however, marked with large distinct spots, about one on each scale, arranged in regular lines; the fins are dusky but unspotted, and there is an oblique dark line below and behind the eye.

The species is nearest *Apogonichthys polystigma* Bleeker, but it does not seem to agree with Bleeker's account. It is not unlikely that Bleeker's fish is the original *Apogon auritus*. It is certainly different from *Apogonichthys variegatus*. *Apogon auritus* Seale (Bishop Mus. 1901, 76) from Guam, must be the present species.

Nine specimens from Apia. The type is no. 51736, U. S. National Museum, and is 2.67 inches long.

ARCHAMIA Gill.

514. *Archamia lineolata* (Ehrenberg). *Fo.* Samoa; Vanicolo; East Indies. (Pl. xxxviii, fig. 1.)

Apogon lineolatus Ehrenberg in Cuvier & Valenciennes, Hist. Nat. Poiss., II, 160, 1828, Red Sea. (Anal II, 14.)

Apogon macropterus Kuhl & Van Hasselt in Cuvier & Valenciennes, Hist. Nat. Poiss., II, 160, Java. (Anal II, 13.)

Apogon ceylonicus Cuvier & Valenciennes, op. cit., III, 491, Ceylon. (Anal II, 13.)

Apogon argenteus Valenciennes, Ann. Mus. Nat. Hist. 1832, 60, Vanicolo. (Anal II, 14.)

Apogon fucatus Cantor, Cat. Malay., 4, 1850, Penang. (Anal II, 16.)

Apogon notatus Day, Proc. Zool. Soc. 1870, 936, Madras. (Anal II, 16.)

This species is very abundant about the reefs of Samoa. We have about twenty specimens from Pago Pago and forty from Apia. We find no specimens with fewer than 16 soft rays in the anal fin. Possibly two species (*fucatus* and *lineolatus*) have been confounded, the latter with fewer rays.

The species is subject to considerable variation. The delicate orange cross-streaks characteristic in life mostly fade in spirits. Only in the very largest specimens is a large black scapular spot distinct; usually there is no trace of it. In some specimens there is a round black spot at base of caudal; in most there is only a diffuse black blotch or cluster of black points. In some the sides of the head are profusely speckled, in others clear silvery. All show a faint silvery horizontal streak just before and just behind eye. In all the body is deep, but there is considerable variation. The variations in color are somewhat parallel with those in *Amia savayensis*.

Life colors of a specimen from Apia, light soiled pinkish olive, with many dark specks; sides silvery; body with 18 narrow curved cross-streaks of bronze orange. A large black blotch covering whole side of tail; scapular spot obsolete; fins all light rosy. Depth 2.25 to 2.50 in length.

Another specimen from Apia was light clear pink; about 15 narrow curved cross-streaks of bright rosy, some golden on cheek; a blackish stripe across eye and cheek; a round black spot on scapular region, and a larger and blacker one on tail at middle of base of caudal; fins all rosy, the caudal dusky shaded; iris golden, before and behind.

PARAMIA Bleeker.

(*Cheilodipterus* Cuvier & Valenciennes; not of Lacépède.)

515. *Paramia quinquelineata* (Cuvier & Valenciennes). *Mata uliuli.* Samoa; New Guinea; Raiatea and Nukahiva (Seale)

This species is abundant about Samoa. We have about 40 examples from Apia and Pago Pago. The species is known at once by the black streaks, about 5 in number, which do not quite reach a black caudal spot which is in the center of a golden area.

Life colors of a specimen from Pago Pago, brownish, with about 5 stripes of black; a yellow ocellus around a black spot at the base of caudal.

A specimen from Apia was translucent olive; a round jet black spot at base of caudal with a broad golden yellow border; six black stripes along side; fins dirty translucent, the dorsal darker in front; ventral pinkish; no other red.

516. *Paramia macrodon* (Lacépède). *Tuganini.* New Guinea (Macleay); Samoa; East Indies.

(*Cheilodipterus octovittatus* Cuvier & Valenciennes.)

This large species, reaching a length of eight inches, is rather common at Samoa. We have about twenty specimens from Apia and Samoa. It is known by the diffuse black caudal blotch and by the presence of about eight dark stripes on each side.

Life colors of a specimen from Apia, pale translucent olive; with 7 to 9 streaks of soiled bronze, as wide as interspaces, the middle stripes plainer; one on middle line before dorsal; 7 on head besides a black band through eye; a broad diffuse black bar at base of caudal; fins all reddish, dusky shaded.

A larger example shows the streaks but faintly; first dorsal and ventrals tipped with black; caudal irregularly black-edged.

517. *Paramia truncata* (Günther). Misol.

Cheilodipterus truncatus Günther, Cruise Curaçao, 1872, 418, Misol.

SYNAGROPS Günther.

518. *Synagrops argyrea* (Gilbert). Deep seas of Hawaii.

Family AMBASSIDÆ.

AMBASSIS Lacépède.

Ambassis Cuvier & Valenciennes, Hist. Nat. Poiss., II, 1829 (*ambassis*).

The generic name *Chanda* has priority over *Ambassis*, as Cantor and Waite have recognized, but Fowler, the first reviser of *Chanda*, has made its type identical with the type of Bleeker's genus *Pseudambassis*. Pending a final agreement on the rule of nomenclature governing this case, we may follow Fowler's arrangement.

Ambassis, or *Chanda*, is characterized among related genera by the serrated preorbital, small teeth, large scales, complete lateral line, and the presence of about ten rays in the dorsal fin. A procumbent dorsal spine is always present, but in the Samoan species it is very small and concealed in the flesh. The weakness of this spine defines the genus *Pseudoambassis* of Castelnau, a group which we think inseparable from *Ambassis*. *Pseudoambassis* of Bleeker is apparently a valid genus, with long anal fin and small scales. *Priopis* Kuhl & Van Hasselt differs from *Aspro* in the interrupted lateral line.

Hamilton-Buchanan's *Chanda* (*ovata*=*nama*), which is the same as *Bogoda* Bleeker, is characterized by the uninterrupted lateral line, small scales, and strong curved canines. *Parambassis* Bleeker, with canine teeth and a short anal fin, is apparently a valid genus.

519. *Ambassis lafa* Jordan & Seale, new species. *Lafa*. Samoa.

Head 2.60 in length; depth equal to head; eye 3.45 in head; snout 5; dorsal VII, 1, 10; anal III, 11, scales 3-31-6; interorbital 4.

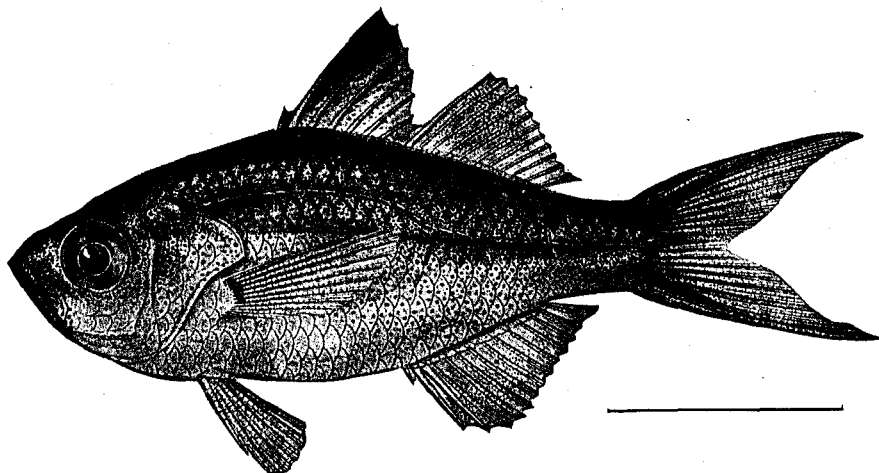


FIG. 46.—*Ambassis lafa* Jordan & Seale, new species. Type.

Body oblong, compressed, slightly elevated; profile of head slightly concave over eye; body, opercles, and cheeks scaled; mouth rather large; maxillary 2.75 in head, its distal end under anterior margin of pupil; lower jaw slightly the longer, minute villiform teeth in jaw, vomer and palatines, the inner row in jaws depressible, tongue smooth; gillrakers pointed, equal to width of pupil, 20 on lower limb; opercle entire; preopercle with flat spine at angle and the lower limb only serrated, the outer limb strongly denticulate below; depth of caudal peduncle greater than length of maxillary, 2.25 in head; second upright dorsal spine the longest and strongest, 1.50 in head; connection of soft with spinous dorsal very narrow, less than width of pupil; spine of soft dorsal 2.25 in head, the longest ray 2 in head; base of anal equal to distance from middle of eye to posterior tip of opercle, its longest ray equal to longest ray of dorsal; pectoral equal to distance from anterior of eye to posterior tip of opercle; ventral equal to base of anal; length of third anal spine 2.30 in head, the second but little shorter, the first very small; caudal deeply forked, its lobes about equal to head; the ventrals are slightly in advance of base of pectorals. Lateral line continuous.

Color in life yellowish white, darker above, the margins of each scale being shaded with minute brown dots; a dark line from base of caudal along median line of body, fading out near the opercle; tip of snout, upper part of snout, interorbital, and upper half of eye dusky; dusky shading

on first web of spinous dorsal; all the fins more or less punctulate with minute brown dots like pin points; opercle gilt; lower half of eye golden yellow; darker shadings along base of dorsal and anal, and a dusky line on under side of caudal peduncle, more distinct in the young, in which the line extends along the belly.

Color in life of a specimen from fresh water at mouth of Vaisigano River, Apia, olive, sides silvery, with a silvery lateral stripe; scales all dark-edged; fins dirty olive, with no trace of red markings, except that front of spinous dorsal is marked with dull orange.

This species is very abundant in the lower waters of the Vaisigano River and other streams of Upolu. We have upwards of a hundred specimens. The spinous dorsal is high, the spine reaching middle of second dorsal.

Type no. 51818, U. S. National Museum, a specimen 3.69 inches long, from near mouth of Vaisigano River, Apia.

520. *Ambassis vaivasensis* Jordan & Seale, new species. Lafa. Samoa.

Head 2.75 in length; depth equal to head; eye 3.10 in head; dorsal VII-1, 9; anal III, 9; scales 2-27-5; interorbital 4; snout 1.50 in eye.

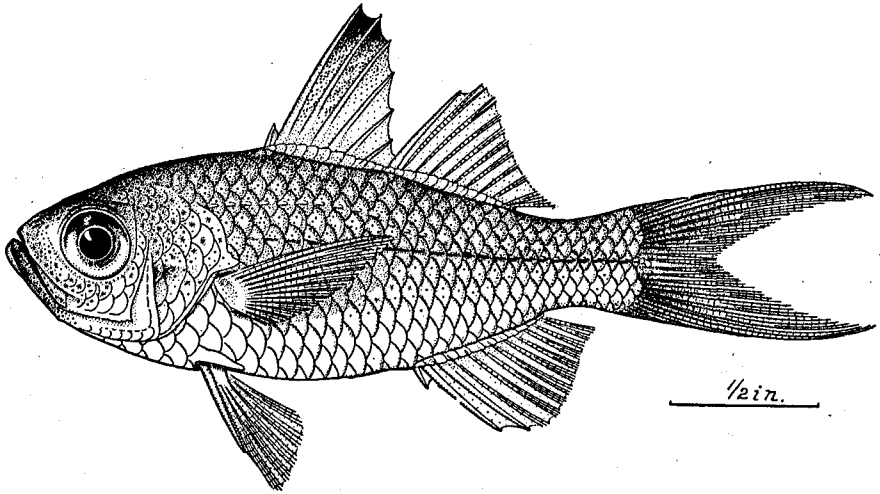


FIG. 47.—*Ambassis vaivasensis* Jordan & Seale, new species. Type.

Body oblong, compressed, scarcely elevated, the scales of moderate size, covering opercles and cheeks; mouth large; profile of head slightly concave over middle of eye; maxillary 2.75 in head, its distal end under anterior margin of pupil; lower jaw slightly the longer; bands of villiform teeth in jaws, vomer and palatines, the inner series in jaws depressible; gillrakers rather slim, sharp-pointed, longest equal to pupil, 24 on lower limb; opercle entire, ending in a sharp-pointed flap; preopercle with flat spine at angle and denticulated on its lower limb; lower margin of outer limb of preopercle toothed; depth of caudal peduncle equal to length of maxillary; second (upright) spine of dorsal the longest and very strong, 1.40 in head; connection of soft with spinous dorsal very narrow, about one-half width of pupil; spine of second dorsal 2 in head, the longest ray 1.75; caudal deeply forked, the lobes pointed, the longest ray 2.50 in length; base of anal equal to distance from middle of eye to posterior tip of opercle, its longest ray equal to longest ray of dorsal; of the three anal spines the first is very short, the second is long, 2 in head, the third is the longest, 1.80; pectoral reaching to a line with second dorsal ray, 3 in total length; base of ventrals directly over base of pectorals, length 1.50 in head; lateral line continuous.

Color in spirits, yellowish white, the back and upper part of sides slightly shaded with minute punctulations of brown; a silvery band along the median line of side from posterior margin of opercle to caudal, the band becoming more distinct posteriorly with a slight shading of brown; tip and first membrane of spinous dorsal shaded with dusky; base of caudal with slight shading of dusky, other fins white without markings; opercles gilt; upper part of orbit and eye dusky, lower part golden. The side is marked by a silvery streak with no caudal spot or crossbar.

This species is rather common in the Vaisigano, Vaivase, and other streams of Upolu.

Thirty-one specimens from Apia, Samoa. The type is no. 51819, U. S. National Museum, from Vaivase River, Apia; length 2.50 inches.

521. *Ambassis miops* Günther. Rarotonga.

Ambassis miops Günther, Proc. Zool. Soc. Lond. 1871, 655, streams of Rarotonga.

522. *Ambassis gigas* (Ramsay & Ogilby). Streams of New Guinea.

Ambassis gigas Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 9, New Guinea.

523. *Ambassis macracanthus* (Bleeker). Streams of New Guinea (Macleay); Java.

PRIOPIS Kuhl & Van Hasselt.

524. *Priopis papuensis* (Alleyne & Macleay). Streams of New Guinea.

Ambassis papuensis Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 267.

525. *Priopis agrammus* (Günther). New Guinea (Ramsay & Ogilby); North Australia.

Ambassis agrammus Günther, Ann. Mag. Nat. Hist. 1867, 57, Cape York.

TETRACENTRUM Macleay.

Dorsal fin continuous; anal spines four. Otherwise resembling *Amia* (*Apogon*).

526. *Tetracentrum apogonoides* Macleay. Streams of New Guinea.

Tetracentrum apogonoides Macleay, Proc. Linn. Soc. N. S. W. 1883, 256, Goldie R. (New Guinea).

Family KUHLIIDÆ.

KUHLIA Gill.

527. *Kuhlia rupestris* (Lacépède). *Sesele*. Samoa; Guam; Vanicolo; Fiji; Tonga; Rodriguez; Futuna; New Hebrides; Molicolo; New Guinea; Solomon Is.; Caroline Is.; Palau Is.; New Caledonia; East Indies.

This species, which closely resembles the American black bass in form and habits, is very common in all the rivers of Samoa, where it reaches a weight of 5 or 6 pounds. Many specimens were taken, most of them from the deep swimming-pool in the Vaisigano River above Apia.

528. *Kuhlia marginata* (Cuvier & Valenciennes). *Salele*. Fiji; Tahiti; Samoa; Gilbert Is.; Papua; Bonham I.; Misol; East Indies.

This species is found in the river mouths of Samoa, about a dozen specimens, mostly small, being taken in the Vaisigano River at Apia.

529. *Kuhlia urvillii* Boulenger. South Pacific; locality unknown.

530. *Kuhlia malo* (Cuvier & Valenciennes). Hawaii; Tahiti; Tubuai; Paumotu Is. (Seale); Fiji; Rodriguez; Laysan.

531. *Kuhlia tæniura* (Cuvier & Valenciennes). *Safole*. Samoa; Johnston I.; Marcus I.; Tubuai; Paumotu Is.; and Tahiti (Seale); East Indies; Galapagos Is.

This species, unlike the others of the genus, never enters fresh water, nor is it found about the reefs. It frequents the "iron-bound," or lava, coast in rather deep water. Our specimens, about a dozen in number, were taken on the northwest shore of Tutuila, opposite Pago Pago.

532. *Kuhlia caudovittata* (Lacépède). Tahiti.

Family SERRANIDÆ.

PLECTROPOMUS (Cuvier) Oken. (*Lates* Cuvier & Valenciennes.)

533. *Plectropomus calcarifer* (Bloch). New Guinea (Macleay); Australia.

PIKEA Steindachner.

534. *Pikea aurora* Jordan & Evermann. Hawaii.

CHORISTISTIUM Poey.

This genus has been hitherto known from a single species taken by Poey in Cuba, and named *Chorististium rubrum*. The discovery of a second species is most interesting.

535. *Chorististium susumi* Jordan & Seale, new species. *Susu umi*. Samoa.

Head 2.55 in length; depth 3.40; eye 4.50 in head; dorsal VI-1, 10; anal III, 8; scales 3-49-11; inter-orbital equal to eye.

Body elongate, compressed; scales of moderate size, striated and ciliated, entirely covering head and body; lateral line strongly curved, the straight portion 2 in curved; snout rather wide but acute; the lower jaw slightly the longer; maxillary 2.40 in head, extending to posterior third of eye; a distinct supplemental bone; mouth large, with broad bands of villiform teeth in jaws, vomer and palatines, the inner row in jaws slightly longer and depressible; no teeth on tongue; gillrakers equal to one-half eye, 13 on lower limb; longest spine of dorsal 2.75 in head; distance between last dorsal spine and origin of soft dorsal 4.50 in head; base of soft dorsal equal to depth of caudal peduncle, its margin somewhat rounded, its longest ray 2 in head; caudal bilobed, its longest ray 2 in head; base of anal equal to

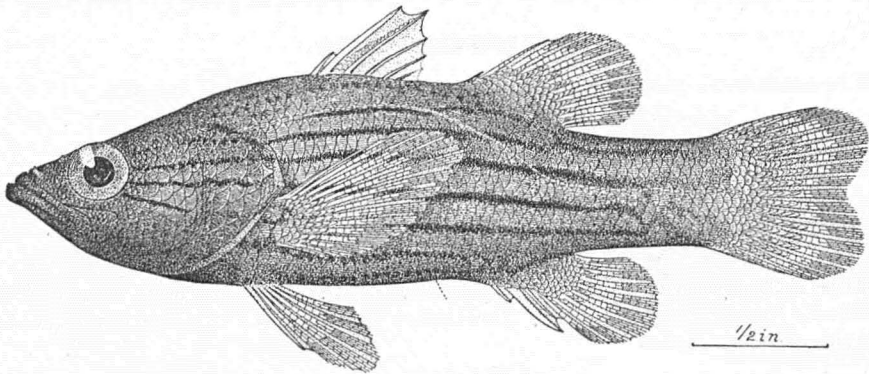


FIG. 48.—*Chorististium susumi* Jordan & Seale, new species. Type.

longest (2nd) anal spine; its longest ray 2.10 in head; pectoral equal to distance from middle of eye to posterior margin of opercle; ventrals inserted directly below the base of pectorals, their length 1.55 in head; opercle armed with three flat spines, the two lower ones closest together; preopercle slightly serrate.

Color in spirits, light brown, with seven longitudinal lines of deeper brown on sides; four of these lines arise from posterior margin of orbit and extend to or near base of caudal; the remaining three seem to arise at margin of opercles and extend about to a line with axis of soft dorsal; fins all uniform yellowish white.

Life colors of one specimen from Apia, dark brown suffused with red, redder below and behind; about seven olive-red stripes, very dark on body, these not extending much on head; fins all plain bright cherry red.

Two specimens from the reef at Apia. The type is no. 51738, U. S. National Museum, 3.10 inches long.

CENTROGENYS Richardson.

536. *Centrogenys waigiensis* (Quoy & Gaimard). New Guinea; Australia; East Indies.

PARACANTHISTIUS Bleeker.

(*Plectropoma* Boulenger, not *les Plectropomes* of Cuvier = *Plectropomus* Oken.)

537. *Paracanthistius maculatus* (Bloch). Samoa, Lousiades; Fiji; Palau Is.; New Guinea (Macleay); Faté (Seale).

One large example taken at Apia. It belongs to the form called *leopardus*, the body covered with round blue dark-edged spots, none of them elongate. This is apparently not specifically distinct from the true *maculatus*, in which these spots are larger, some of them oblong or elongate.

538. *Paracanthistius oligacanthus* (Bleeker). Caroline Is.; East Indies.

ANYPERODON Günther.

539. *Anyperodon leucogrammicus* (Cuvier & Valenciennes). *Gatala aleva*. Samoa; Ponape; Caroline Is.; New Hebrides; New Guinea (Macleay); East Indies.

Of this handsome species, 7 adult specimens were taken at Apia. Life colors of one of these, clear olive-green, with 4 faint interrupted stripes of white, the second and third widened and distinct at intervals, forming 2 white spots on side; lowest stripe very distinct across cheek; side with about 8 rows of bright orange-brown spots, not ocellated or reticulated; head with smaller spots; lower parts of head coppery red; spinous dorsal olive with 3 rows of large orange spots; second dorsal, anal, and caudal green, dorsal and anal with a spot at base of each ray; pectoral pale olive; ventral dusky olive, both unspotted. Body elongate; caudal rounded; teeth in 2 rows below.

VARIOLA Swainson.

540. *Variola louti* (Forskål). *I'a manaia*. Tahiti; Samoa; Paumotu Is.; New Hebrides; Solomon Is.; Marshall Is.; Faté (Seale).

Of this beautiful and widely diffused species, 10 specimens of different sizes were taken at Apia and Pago Pago.

Life colors of a specimen from Pago Pago, greenish above, rosy below; upper spots clear violet; lower lateral spots cherry-red; crimson on tail, the edges of spots dark, the spots largely lake; dorsal deep red, with spots of violet and lake; caudal similar, similarly golden behind; pectoral purplish, pale golden behind, violet spotted at base; ventral clear red, red spotted at base, tinged with golden at tip; spots arranged in lines, the lateral spots oblong.

541. *Variola flavimarginata* (Rüppell). Samoa; East Indies.

Serranus flavimarginatus Rüppell, Atlas Rothen Meeres, 109, 1828, Red Sea.

Variola flavimarginata, Bleeker, Verh. Ak. Amst., IV, 9, 1873, East Indies. Bleeker, Atlas Ichth., VII, 23, tab. CCLXXXIX, fig. 1.

Serranus melanotenaria Bleeker, Act. Soc. Sci. Ind. Ned., II, 1857, Amboina.

Of this rare species, overlooked by Dr. Boulenger, we have one fine specimen from Apia. It has the general form of *Variola louti*, but a very different coloration, there being a broad black band along the upper part of the side.

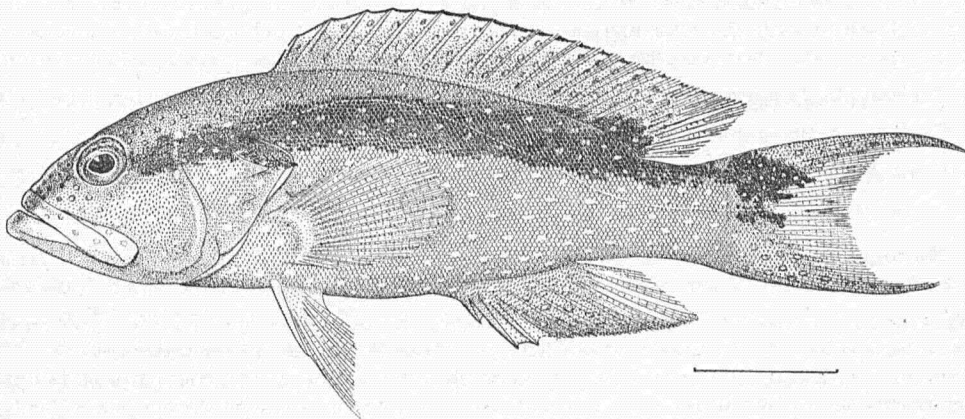


FIG. 49.—*Variola flavimarginata* (Rüppell).

Life colors, ground-color pinkish salmon, whiter region behind pectoral; a velvet blackish longitudinal band, side above brownish salmon; spots whitish below and posteriorly; elsewhere purple-pink with lake border.

CEPHALOPHOLIS Bloch & Schneider.

This genus, as here understood, differs from *Epinephelus* in having but 9 dorsal spines. There is considerable difference among the species in the form of the skull, but in this regard few of the Pacific species have been examined. It here includes *Enneacentrus* and *Petrometopon* of Gill, *Menephorus* of Poey, and *Bodianus* Cuvier (not of Bloch).

542. *Cephalopholis argus* (Bloch). *Gatala moana* (blue spotted); *Gatala uli*; *Vaiania*. Samoa; Hawaii; Borabora; New Guinea; Marquesas Is.; Papua; New Britain; Tahiti; Tubuai and Rarotonga (Seale); East Indies.

Common about the reefs of Samoa. Life colors of a specimen from Pago Pago, dark gray all over, with evenly disposed rather pale-blue spots with blackish edge; caudal with narrow white margin; dorsal with very narrow white margin on posterior half; pectoral paler than body.

543. *Cephalopholis miniatus* (Forskål). Samoa (Boulenger); Apamana; New Guinea (Macleay); New Britain (Peters); Shortland Is. (Seale).

544. *Cephalopholis boenack* (Bloch). New Guinea (Macleay).

545. *Cephalopholis urodelus* (Forster). *Mata'ili*. Tahiti; Kingsmill Is.; Harvey Is.; Paumotu Is.; Samoa; Solomon Is.; New Guinea; Uene, Society Is.; Misol; New Hebrides; Micronesia; Fanning Is.; Funafuti, Ellice Is.; Mangareva (Seale); East Indies.

Of this handsome species, 4 specimens were taken at Apia. Life colors of one, deep brick-red, darker olivaceous on back, the posterior parts almost black, the belly and sides paler and brighter red; head closely covered on sides with vermilion spots, the ground-color forming reticulations around them; body spotted with small vermilion spots which are sparse and show faintly on the ground-color; opercular flap olivaceous; dorsal dark red, the edge bright red, the narrow margin dusky; anal similar but brighter, with broader margins; traces of vermilion spots; caudal red-black, very dark, with two white cross-bands, converging behind, cutting off the dusky red corners; ventral vermilion with a dark edge; pectoral vermilion at base, then blackish, the edge broadly dull orange.

Another specimen was brown, with yellow-greenish tinge; dorsal with two yellow-white spaces interrupting brown, and with posterior third with yellow white edge; caudal with angulated transverse yellow white bar, also narrower terminal bar yellow white; anal with one yellow white blotch; ventral blackish brown; pectoral yellow white with brown blotch at base and two weakly indicated brownish cross-bands; sides of body and head with creamy white blotches.

546. *Cephalopholis leopardus* (Lacépède). *Gatala uli*. Samoa; Tahiti; Louisiades.

Of this species, 8 specimens were taken at Apia. Life colors of one of these, dark olive, with round scarlet spots on side; a black opercular spot; a black spot on tail below axil of dorsal, a smaller one behind it; dorsal reddish olive, with a scarlet margin; caudal with deep red convergent bands, a yellow stripe within each, the outer margin whitish; anal mottled red and bluish with a broad scarlet band and grayish edge; pectoral orange; ventral red; lips cream and olive mottled, reddish within.

547. *Cephalopholis aurantius* (Cuvier & Valenciennes). New Ireland; Louisiades; East Indies.

548. *Cephalopholis sexmaculatus* (Rüppell). Tahiti; Paumotu Is.

549. *Cephalopholis sonnerati* (Cuvier & Valenciennes). Kingsmill I.; Palau Is.; East Indies.

EPINEPHELUS Bloch.

550. *Epinephelus merra* Bloch. *Gatala*; *'Ata'ata pulepule*. Samoa; Marcus I.; New Ireland (Peters); Tahiti; Guam (Seale); Fiji; New Hebrides; Solomon Is.; New Guinea (Macleay).

This species is excessively common about the reefs of Samoa, the young living in every crevice, by far outnumbering all other species of this family. About 50 specimens were preserved.

Life colors of a specimen from Apia, very dark olive-brown, the ground-color reduced to hexagonal spots surrounded by whitish olive reticulations, which are broader and clearer below; spots on head smaller; fins all similarly marked; edge of dorsal dusky, with a paler streak below. Gill-rakers 12.

Another specimen from Apia was olivaceous, dark above, the spots dull orange with darker centers; those on dorsal more orange, the interspaces grayish olive; maxillary, branchiostegals, and belly also spotted. Gill-rakers 12.

551. *Epinephelus stellans* (Richardson). Samoa; East Indies.

Of this species, apparently distinguished from *Epinephelus merra* by the presence of small white spots scattered over the body, among the larger dark ones, we have 3 examples from Samoa.

552. *Epinephelus dæmeli* (Günther). 'Uo'uo. Guam; Samoa; Norfolk I.; New Guinea; Solomon Is. (Seale); Australia.

Of this species we have two large specimens from Apia. Life colors of one, very dark olive with many fine brown spots, gray reticulations around them on cheeks and jaws; five black irregular blotches on back, and two below it; one blotch on back of tail; fins all mottled and barred obscurely, reddish brown, olive and black. Ten gill-rakers.

The other specimen was olive-gray, closely covered with small dark brown spots which are larger below; a large black blotch on back of tail; fins all dusky, all spotted like the body, pectoral paler.

553. *Epinephelus fuscoguttatus* (Forskål). Samoa; Marshall Is.; Tonga; Greenwich Is.; New Guinea (Macleay, as *Serranus microdon*); East Indies.

Of this species, we have 6 specimens, large and small, from Apia. They agree fairly with Bleeker's plate.

Life colors of one specimen, olive, rather pale, with round brown spots which are narrower than the interspaces; a dark brown moustache behind the maxillary; upper jaw spotted; a black saddle on caudal peduncle; dorsal; caudal, and head spotted like body; caudal dusky behind with whitish edge; anal similar, less spotted; ventral similar; caudal with smaller spots. Gill-rakers 12; preopercle rounded, feebly notched and spined.

554. *Epinephelus corallicola* (Cuvier & Valenciennes). Samoa; Mortlock Is.; Caroline Is.; Greenwich I.; Howland I.; New Guinea (Macleay).

Of this species, we have one example from Apia. It agrees fairly with Günther's figure of *Serranus howlandi*.

Life colors, margin of caudal bright golden yellow, pectoral with margin weakly orange yellow, body with flesh-brown polygonal blotches.

555. *Epinephelus macrocephalus* (Lacépède). Kingsmill I.; Mortlock Is.; Ponape; Rodriguez; East Indies; New Guinea (Macleay).

556. *Epinephelus maculatus* (Bloch). Samoa; Papua; Marshall Is.; Caroline Is.; Shortland I.; Paumotu Is. (Seale).

Of this well-marked species, we have one young example from Apia.

557. *Epinephelus fasciatus* (Forskål). Louisiades; Tahiti; Paumotu Is.; New Britain; Bonham I.; New Guinea; Mangareva (Seale); Japan; East Indies.

558. *Epinephelus chlorocephalus* (Cuvier & Valenciennes). Tonga; East Indies.

559. *Epinephelus australis* (Castelnau). New Britain (Boulenger); Australia.

560. *Epinephelus pachycentron* (Cuvier & Valenciennes). Louisiades; East Indies.

561. *Epinephelus summana* (Forskål). Caroline Is.; New Guinea; Shortland I. (Seale); East Indies.

562. *Epinephelus megachir* (Richardson). Louisiades; New Guinea (Alleyne & Macleay as *Serranus alatus*); East Indies.

563. *Epinephelus sexfasciatus* (Cuvier & Valenciennes). Louisiades; East Indies.

564. *Epinephelus tauvina* (Forskål). Louisiades; Ponape; Palau Is.; East Indies.

565. *Epinephelus quernus* Seale. Hawaii.

566. *Epinephelus undulosus* (Quoy & Gaimard). Misol; Shortland I. (Seale); East Indies.

567. *Epinephelus spiniger* (Günther). Marcus I. (Bryan & Herre, Bishop Mus., II, 1903, 129).

568. *Epinephelus cæruleopunctatus* (Bloch). New Britain (Peters); East Indies.

569. *Epinephelus socialis* (Günther). Tahiti; Kingsmill I.; Paumotu Is.; Samoa (Boulenger).

We did not find this species, recorded from Samoa by Dr. Boulenger.

570. *Epinephelus magnificus* (Macleay). New Guinea.
Serranus magnificus Macleay, Proc. Linn. Soc. N. S. W. 1883, 229, New Guinea.
571. *Epinephelus albopunctatus* (Boulenger). Marquesas Is.
572. *Epinephelus goldiei* (Macleay). New Guinea; New Caledonia.
Serranus goldiei Macleay, Proc. Linn. Soc. N. S. W. 1883, 226, New Guinea.

ODONTANTHIAS Bleeker.

573. *Odontanthias fuscipinnis* (Jenkins). Hawaii.

PSEUDANTHIAS Bleeker.

574. *Pseudanthias kelloggi* (Jordan & Evermann). Hawaii.
575. *Pseudanthias hypselosomus* (Bleeker). New Guinea.
576. *Pseudanthias mortoni* (Macleay). New Guinea.
Anthias mortoni Macleay, Proc. Linn. Soc. N. S. W. 1883, 253, Moresby I. (New Guinea).

ANTHIAS Bloch.

577. *Anthias manadensis* Bleeker. New Guinea (Macleay); East Indies.
578. *Anthias cheirospilos* Bleeker. New Guinea (Macleay); East Indies.

CAPRODON Schlegel.

579. *Caprodon schlegeli* Günther. Hawaii; Japan.

GRAMMISTES Bloch & Schneider.

580. *Grammistes sexlineatus* (Thunberg). Samoa; Tahiti; Solomon Is.; New Guinea; New Hebrides; Kingsmill I.; Marquesas Is. (Seale). (Pl. xxxviii, fig. 2.)

Two specimens from Apia. Life colors of one of these, black with 7 irregular stripes of pale golden yellow; fins all dull reddish, the first dorsal dusky, the rest pale.

POGONOPERCA Günther.

581. *Pogonoperca ocellata* Günther. Tahiti; Misol; East Indies.

PHAROPTERYX Rüppell.

Plesiops Cuvier, Règne Animal, II, 266, 1817, repeated in 2d ed., 1828. (No type; no species known at that time.)

Plesiops Oken, Isis, 1182, 1817; name only, after Cuvier.

Pharopteryx Rüppell, Atlas, 15, 1828 (*nigricans*).

Plesiops Günther, Cat., III, 363, 1861 (*nigricans*).

The name *Plesiops*, without specified type or reference to any species, no species of the genus having been described at the time, should apparently give place to *Pharopteryx*.

582. *Pharopteryx nigricans* Rüppell. Samoa; Tahiti; Tonga; Palau Is.; Gilbert Is.; Fiji; Solomon Is. (Seale.)

Pharopteryx nigricans Rüppell, Atlas, 15, pl. iv, fig. 2, 1828, Red Sea.

Plesiops nigricans Rüppell, N. W. Fische, 5, 1835. Bleeker, Atlas Ich., IX, tab. cccxc, fig. 3. Günther, Cat., III, 363, Red Sea.

Plesiops caeruleolineatus Rüppell, N. W. Fische, 5, 1835, Red Sea.

Plesiops corallicola Bleeker, Nat. Tijds. Ned. Ind., IV, 1853, 280. Günther, Fische der Südsee, 87, taf. 58, fig. B, Tahiti, Tonga, Palau, Gilbert Is.

Plesiops nigricans Boulenger, Cat., I, 340, Zanzibar, Ceylon, China, Andamans, Sumatra, Fiji, Tonga, Samoa, Micronesia.

This species is very abundant in the reefs of Apia and Pago Pago. About 100 specimens were taken in the tide pools. Life colors of a specimen from Apia, black; head with sky-blue spots; a

black ocellus on opercle, with orange below it; fins all black; dorsal and caudal edged with white; pectoral broadly edged with scarlet. Some (male) with sky blue spots in center of opercular ocellus, and a sky-blue stripe along middle of dorsal and anal. Some with blue spots along whole of body.

583. *Pharopteryx melas* (Bleeker). Samoa; Savay; Kandavu; East Indies. (Pl. xxxviii, fig. 3.)

Plesiops melas Bleeker, Ball, 1849, 9, Ball.

Plesiops nigricans var. *apoda* Kner, Sitz. Ak. Wiss. Wien 1868, 54, Savay, Kandavu.

This species is very common in the tide pools on the reefs of Upolu and Tutuila. It is almost as common as *Pharopteryx nigricans*, but it never reaches as large a size as that species. About 60 specimens were taken. In life it is well distinguished by the broad scarlet edge of the spinous dorsal fin. The body is without blue spots or lines and there are always 11 dorsal spines, while 12 are present in all our specimens of *P. nigricans*. This leaves no doubt that *P. apoda* of Kner, based on a specimen which had lost the ventral fins, is our species, but fortunately the well-chosen name given by Bleeker is earlier.

Bleeker's description of *Plesiops melas* evidently belongs to this species, and not to *Pharopteryx nigricans*. He finds xi, 8 dorsal rays, and the color is diagnostic: "Corpore pinnisque omnibus nigerrimo maculis vel vittis nulla; membrana pinnæ dorsalis spinosæ partæ superiore tantum pellucida." This clear margin to the dorsal is, however, in life flame red.

Life colors of a specimen from Pago Pago, dark, blackish brown to black; the whitish sides finely spotted with black; dorsal with bright brick-red margin, then clear white, then broad dark-brown base, with blue line and posteriorly several short blue linear spots; caudal with orange-yellow submarginal band; blue lines in anal; ventral and pectoral pale smoky. In some specimens the caudal is black, or has a dull orange intramarginal band.

Another specimen from the same locality was black, first dorsal scarlet, edged with blue stripes on black below.

A specimen from Apia was black, iris and edge of dorsal spines scarlet; no opercular spot.

A third specimen from Pago Pago was all black, no ocellus; first dorsal edged with scarlet, a white line below it; second dorsal and caudal not pale-edged; pectoral all black.

GRAMMATONOTUS Gilbert.

584. *Grammatonotus laysanus* Gilbert. Laysan.

Family PRIACANTHIDÆ.

PRIACANTHUS Cuvier. (*Abuhamrur* Forskål.)

585. *Priacanthus cruentatus* (Lacépède). *Mata-pula*. Hawaii; Samoa; Tahiti; Caroline Is.; Japan; West Indies; Clarion Is.

This species is common throughout the Pacific. It is rather common at Apia, where about a dozen specimens were taken. It is also found at Hawaii.

Life colors of a specimen from Apia, bright light red, silvery on sides; fins much the same; dorsal, anal, and caudal with small round spots of deep red.

586. *Priacanthus alalaua* Jordan & Evermann. Hawaii.

587. *Priacanthus hamruhr* (Forskål). New Guinea (Macleay); Solomon Is. (Seale); Japan; East Indies.

588. *Priacanthus meeki* Jenkins. Hawaii.

Family LUTIANIDÆ.

LUTIANUS Bloch. (*Hobar* Forskål.)

589. *Lutianus kasmira* (Forskål). Tahiti; Samoa; Fiji; Louisiades; New Ireland; Guam; Marcus I.; New Hebrides (Seale); East Indies.

(*Holocentrus bengalensis* Bloch.)

Two small specimens of this very widely distributed species were taken at Pago Pago. Life colors of one of these, bright light golden olive with four bright blue stripes, darker edge; fins like the body, paler at base; edge of spinous dorsal deep golden.

590. *Lutianus cæruleolineatus* (Rüppell). Marcus I. (Bryan & Herre); New Guinea (Macleay); East Indies.

Mesoprion quinquelineatus Cuvier & Valenciennes, Hist. Nat. Poiss., II, 445; not of Bloch.

591. *Lutianus gibbus* (Forskål). *Ti'ava*; *Mala'i*; *Mala'i pa'pae*. Samoa; New Britain; Tahiti; New Ireland; Waigiü; Papua; Borabora (as *Mesoprion borensis* Cuvier & Valenciennes); Solomon Is. and New Hebrides (Seale); East Indies.

(*Holocentrus boultou* Lacépède; *DiaCOPE bottonensis* Cuvier & Valenciennes.)

Ten large examples were taken at Apia and Pago Pago. The species is easily known by the deep notch on the opercle.

Life colors of a specimen from Pago Pago, dark olive green, the belly bright coppery red; each scale with a fine pale blue-green spot, these forming continuous lines; head mostly coppery red; caudal peduncle abruptly (obliquely) black behind dorsal; dorsal dark brown, the soft fin with white edge, the soft rays black at base; caudal black at base, golden at tip, with a maroon stripe in each lobe; anal coppery red with a black submarginal shade and a white edge; ventral coppery red, with blackish shade; pectoral pale orange, the axil black.

A specimen from Apia was olive above, very bright coppery red below; faint pale streaks along rows of scales; dorsal coppery red, dusky shaded at base, the edge yellow; anal dusky red, edged with whitish; ventral similar to anal; pectoral light orange-red.

592. *Lutianus bohar* (Forskål). *Mumea*. Samoa; Tahiti; Paumotus; Solomon Is. (Seale); New Guinea (Macleay); Marcus I. (Bryan & Herre); Thornton I. (Fowler); East Indies.

Two large examples were obtained at Pago Pago. This fish has the reputation of being always poisonous, the only species not Plectognath of which this statement is made. The two round pale spots below the dorsal fin are diagnostic.

Life colors, deep brick red everywhere, blackish on back, each scale with a whitish vertical spot, these forming lines along the rows of scales which are very oblique above lateral line, horizontal below; a dark dash along maxillary and behind it (in one specimen only); two rounded pale blotches along base of soft dorsal; dorsal blackish maroon, a narrow pale edge; caudal dark maroon, a narrow dark edge (the lower lobe longest, the fin deeply forked); anal darker red in front, with pale edge; pectoral deep red above and in axil, pale below; ventral mesially blackish red, pale edge. Dorsal x, 13; anal III, 8; scales 8-64; canines large.

593. *Lutianus bidens* (Macleay). New Guinea.

Gonyoroge bidens Macleay, Proc. Linn. Soc. N. S. W. 1883, 230, New Guinea.

594. *Lutianus argentimaculatus* (Forskål). *A'a*; *Nanue*. Samoa; Kingsmill I.; New Britain; New Guinea (Macleay).

Mesoprion garretti Günther, Fische der Südsee, 1873, 15, taf. 13, fig. B, Kingsmill I.

Of this species four fine specimens were taken at Apia. The largest, known as *a'a*, is nearly 2 feet in length. Two others still much larger were seen but not taken. The species bears a strong superficial resemblance to *Lutianus griseus* of the Atlantic.

Life colors of a specimen from Apia, olive, flushed with very dark coppery red; belly dark coppery red; a narrow blue streak below eye; fins all deep coppery red; ventral and anal black towards edge with pale anterior margin; caudal with a narrow black margin.

Another specimen from Apia, called *ganue*, had the colors of *Lutianus griseus*, the Atlantic species—dull green, scales darker in center; lower parts, with all fins, more or less coppery red; anal pale-edged; a blue streak below eye.

595. *Lutianus olivaceus* (Cuvier & Valenciennes). Waigiü. Perhaps same as preceding.

596. *Lutianus roseus* (Cuvier & Valenciennes). Ulea, Caroline Is.

Based on a drawing, a very doubtful species. Red; dorsal XIII, 12, with blue spots. It also is probably identical with *Lutianus argentimaculatus*.

597. *Lutianus rivulatus* (Cuvier & Valenciennes). *Uuii*; *Nanue*. Samoa; East Indies.

Of this well-marked species two fine specimens were taken at Apia. Life colors of one called *lanue*, dark olive, each scale with a blue spot; belly coppery with blue stripes; head closely covered

with wavy streaks of bright blue; dorsal greenish yellow; caudal same, dusky toward tip, with dusky edge; pectoral dusky, with pale edge; anal golden, the first soft rays dusky with narrow pale edge.

A specimen called *vi'ui* was clear olive green, bronze-orange on belly; each scale above with a small round pale-blue spot; head brassy yellow, entirely covered with light clear-blue streaks and vermiculations; maxillary yellow; fins all soiled yellow, brightest on edge.

598. *Lutianus marginatus* Cuvier & Valenciennes. *Taiva; Tagau; Tamala; Lanue; Nanue.* Samoa; Tahiti; Louisiades; Vanicolo; Oualan; Thornton I.; New Hebrides and Shortland I. (Seale).

Of this species, by far the most abundant of the genus, about 40 specimens were preserved—from Apia and Pago Pago. Life colors were noted in various specimens as follows:

(1) Specimen from Apia called *taina*. Olive above, each scale edged with brassy, the belly gradually shaded to brassy orange; lower parts of head bright coppery; front of head dusky purplish, brassy about eye; dorsal blood-red, paler at base, a narrow pale edge; caudal deep wine-color with a pale edge; anal bright golden, the first soft rays darker; ventral pure golden, the first rays paler, the last duller; pectoral golden, the lower rays paler.

(2) Specimen called *tagau*, from Apia. Golden olive; yellow below; lower side of head marbled bluish gray and coppery red; dorsal scarlet, darker above, with a blackish stripe lengthwise and a whitish edge; caudal deep wine-red with whitish edge; pectoral and ventral golden; anal yellow with blackish and whitish edges.

(3) Specimen called *tamala*, from Apia. Brassy orange, bright on belly, coppery on lower part of head, dusky greenish shaded on back; head bright scarlet below with blue streaks about sub- and interopercle; dorsal scarlet with a broad black band and white edge; caudal dark wine-color, pale-edged; anal golden, darker anteriorly, and pale edged; ventral deep golden; pectoral light yellow.

(4) Also called *tamala*, from Apia. Coppery red, rather pale, greenish above; each scale edged with coppery; head deep coppery red, paler creamy red below with grayish shades; lower jaw gray; no black spot; belly yellow; dorsal blackish red, very deep paler below; soft dorsal with pale edging; caudal blackish red, edge paler; anal golden, deeper yellow anteriorly; ventral golden; pectoral transparent olivaceous.

(5) Young specimen from Apia. Very pale olive, the sides silvery gray, unmarked, the lower parts golden shaded; lower parts of head with blue and golden markings; dorsal fin pale at base, with broad edging of maroon black, and a narrow white margin; caudal grayish; dark maroon distally, with a white margin; lower fins all clear golden.

(6) From Apia. Olive green, belly orange, no spot; lower part of head scarlet over whitish; dorsal red, first with pale middle; soft dorsal dark-edged; caudal deep wine color, with white edge; ventral and anal golden; pectoral yellowish.

599. *Lutianus unicolor* (Alleyne & Macleay). Percy I.; New Guinea.

Genyroroge unicolor Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 266.

600. *Lutianus semicinctus* (Quoy & Gaimard). Waigiü; Rawak; New Guinea (Macleay); Kingsmill I.; Fiji; East Indies.

601. *Lutianus fulvus* Forster. Tahiti; Guam.

602. *Lutianus rufolineatus* (Cuvier & Valenciennes). Fiji; Waigiü; Papua; East Indies.

Diacope rufolineata Cuvier & Valenciennes, Hist. Nat. Poiss., vi, 581, 1830, Papua.

Diacope vittianus Hombron & Jacquinot, Voy. Pole Sud, 37, taf. 2, fig. 2, Fiji.

Mesoprion amboinensis Bleeker, Nat. Tijds. Ned. Ind., III, 259, Amboina.

Mesoprion melanospiros Bleeker, op. cit., 750, Celebes.

603. *Lutianus goldiei* (Macleay). New Guinea.

Mesoprion goldiei Macleay, Proc. Linn. Soc. N. S. W. 1883, 233, New Guinea.

604. *Lutianus parvidens* (Macleay). New Guinea. (Macleay, op. cit., 234.)

605. *Lutianus caudalis* Cuvier & Valenciennes. Vanicolo.

606. *Lutianus waigiensis* (Cuvier & Valenciennes). Waigiü; North Australia.

607. *Lutianus marginipinnis* (Macleay). New Guinea.

Mesoprion marginipinnis Macleay, Proc. Linn. Soc. N. S. W. 1883, 254, Normanby I. (New Guinea).

608. *Lutianus sexfasciatus* (Macleay). New Guinea.
 609. *Lutianus rubens* (Macleay). New Guinea.
Mesoprion rubens Macleay, Proc. Linn. Soc. N. S. W. 1883, 232, New Guinea.
 610. *Lutianus flavipes* (Cuvier & Valenciennes). Vanicolo; East Indies.
Diacope analis Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 584, 1830, Ile de France.
Diacope aurantiaca Cuvier & Valenciennes, op. cit., VI, 585, 1830, Vanicolo.
 611. *Lutianus lineatus* (Quoy & Gaimard). Samoa; Waigi; Guam; Christmas I.; East Indies.
Serranus limbatus Cuvier & Valenciennes, Hist. Nat. Poiss., II, 307, 1828, Guam.

Of this species we have 3 young specimens from the reef at Apia. They are reddish olive in spirits, with about 6 yellowish stripes from the snout to base of caudal; dorsal dark-edged; caudal dusky behind; notch on preopercle slight; tongue with teeth.

612. *Lutianus vitta* (Quoy & Gaimard). Waigi; Louisiades; East Indies.
 613. *Lutianus chrysotænia* (Bleeker). New Guinea (Macleay); East Indies.
 614. *Lutianus johni* (Bloch). Tahiti (Günther); East Indies.
 615. *Lutianus fulviflamma* (Forskål). Fiji; New Guinea (Macleay); Faté (Seale); East Indies.
 616. *Lutianus monostigma* (Cuvier & Valenciennes). *Taiwa uliuli*; *Vava sui*; *Feloitega*; Samoa; Tahiti; Kingsmill I.; Paumotu Is.; New Guinea (Macleay); Tubuai; Marquesas Is. and Faté (Seale).
Mesoprion monostigma Cuvier & Valenciennes, Hist. Nat. Poiss., II, 446, 1828.
Lutianus tioglossus Bleeker, Atlas, VIII, 70, tab. XLVI, fig. 4, 1877.

Of this well-marked species 12 fine specimens were taken at Apia. Life colors were noted in various specimens as follows:

- (1) Specimen from Apia called *vava sui*. Olive-green, scales on sides brassy; belly whitish tinged with golden yellow; a small, well-defined black lateral spot; fins all golden-yellow; lips orange-red; no stripe on head; axil dark.
 (2) Specimen called *feloitega*, from Apia. Color the same as in no. 1, with black axil spot, except that lower parts are shaded with coppery red; jaws bright red; fins all deep yellow; seems same except for red color.
 (3) From Apia. Coppery red, the belly paler red, the back olive; a small jet-black lateral spot; fins all bright orange yellow, the dorsal dark on edge, the soft dorsal paler; a pale streak below eye.
 (4) Specimen called *taiwa uli'uli*, from Pago Pago. Dull olive-green, without red shades; lateral spot distinct; fins above yellow olive; below more yellow, verging on orange; soft dorsal, anal, and ventral with pale edge; traces of bronze streaks along scales.

This species, often poisonous, is well distinguished by its small, well-defined lateral spot and the absence of teeth on the tongue. It is well represented in Günther's plate (Fische der Südsee, pl. 16), except that in that plate the first soft ray of the dorsal is represented as a spine. In our judgment, Günther and Sauvage are right in identifying the *monostigma* of Cuvier & Valenciennes with Bleeker's *tioglossus*.

617. *Lutianus erythropterus* (Bloch). Guam; East Indies.
Diacope lineolata Rüppell.)
 618. *Lutianus russelli* (Bleeker). Solomon Is. (Seale); East Indies.
 619. *Lutianus flaviroseus* (De Vis). New Britain.

This species is unknown to us. It bears some resemblance to *Lutianus monostigma*, but has a faint dark spot at base of caudal.

620. *Lutianus ehrenbergi* (Peters). New Ireland; New Britain; East Indies.
Mesoprion ehrenbergi Peters, Berl. Mon. 1869, 704, New Ireland, New Britain.
 621. *Lutianus aureovittatus* (Macleay). Solomon Is.

This species is unknown to us. There is a large black blotch on the lateral line, and three golden stripes along the lower part of the side.

622. *Lutianus adeti* (Castelnau). New Caledonia.
Diacopus adeti Castelnau, Proc. Zool. Soc. Victoria, III, 1873, New Caledonia.
623. *Lutianus fuscescens* (Cuvier & Valenciennes). Tahiti (Seale); East Indies; China.
624. *Lutianus niger* (Forskål). Samoa (Günther); Papua; East Indies.
 (*Mesoprion macolor* Cuvier & Valenciennes.)

This strongly marked species, the type of Bleeker's genus *Macolor*, recorded from Samoa by Dr. Günther (Fische der Südsee, p. 11) was not taken by us.

APRION Cuvier.

625. *Aprion virescens* (Cuvier & Valenciennes). Hawaii; Fiji; Tahiti; East Indies.
626. *Aprion microdon* Steindachner.
627. *Aprion latifrons* Kner. Fiji.
Sparopsis latifrons Kner, Sitz. Ak. Wiss. Wien 1868, 27, Fiji.

ETELIS Cuvier.

628. *Etelis evurus* Jordan & Evermann. Hawaii.
629. *Etelis marshi* Jenkins. Hawaii.

CHÆTOPTERUS Schlegel.

630. *Chætopterus dubius* Günther. Hawaii; Japan.
 (*Bowersia ulaula* Jordan & Evermann.)

ROOSEVELTIA Jordan & Evermann, new genus.

Rooseveltia Jordan & Evermann, new genus of Serranidæ (*Serranus brighami* Seale).

631. *Rooseveltia brighami* (Seale). Hawaii.
632. *Rooseveltia aloha* (Jordan & Snyder). Hawaii.

BOWERSIA Jordan & Evermann.

633. *Bowersia violescens* Jordan & Evermann. Hawaii.
 (*Apsilus microdon* Jordan & Evermann; not *Aprion microdon* Steindachner.)

APHAREUS Cuvier.

634. *Aphareus furcatus* (Lacépède). Tahiti; East Indies; Japan.
635. *Aphareus flavivultus* Jenkins. Hawaii.

SYMPHORUS Günther.

636. *Symphorus spilurus* Günther. Palau Is.
Symphorus spilurus Günther, Fische der Südsee, 61, taf. 47, 1873, Palau Is.

NEMIPTERUS Swainson. (*Synagris* Günther.)

637. *Nemipterus ruber* (Cuvier & Valenciennes). New Guinea; East Indies.
638. *Nemipterus tolu* (Cuvier & Valenciennes). New Guinea (Bleeker); Java.
639. *Nemipterus waigiensis* (Quoy & Gaimard). Waigiü; Rawak.
640. *Nemipterus marginatus* (Cuvier & Valenciennes). New Guinea; East Indies.
641. *Nemipterus tæniopterus* (Cuvier & Valenciennes). New Guinea (Ogilby); Australia; India.
Dentex tæniopterus Cuvier & Valenciennes, Hist. Nat. Poiss., VI, 246, 1830, no locality.
Synagris notatus Day, Proc. Zool. Soc. 1870, 684, India.
642. *Nemipterus furcosus* (Cuvier & Valenciennes). New Guinea (Macleay); East Indies.

CÆSIO Cuvier.

643. *Cæsius cæruleus* (Lacépède). Samoa; New Guinea; Solomon Is. (Seale); East Indies.

This beautiful little fish is rather common in the coral reefs, about a dozen specimens being taken at Apia. Life colors of one of these, clear light blue, very bright; a golden streak above eye and above lateral line to base of caudal; dorsal dusky gray; caudal pink, with a black stripe along each lobe; anal pinkish; ventral white; pectoral colorless, a black bar at base; a brownish mark behind eye.

644. *Cæsius erythrogaster* Cuvier & Valenciennes. New Guinea (Macleay).
 645. *Cæsius lunaris* Ehrenberg. New Ireland; New Guinea (Macleay); Solomon Is. (Seale).
 646. *Cæsius chrysozonus* Kuhl & Van Hasselt. New Guinea (Macleay); East Indies.
 647. *Cæsius argenteus* (Bloch). Gilbert Is. (Günther); East Indies.
 648. *Cæsius pisang* Bleeker. New Guinea (Macleay).

PTEROCÆSIO Bleeker.

649. *Pterocæsius tile* (Cuvier & Valenciennes). Caroline Is.; Gilbert Is.; Tahiti; Tonga.

Family MÆNIDÆ.**ERYTHRICHTHYS Schlegel.**

650. *Erythrichthys schlegeli* (Günther). Hawaii; Japan.

TERAPON Cuvier.

(*Djabub* Forskål; *Therapon* Cuvier & Valenciennes.)

651. *Terapon jarbua* (Forskål). 'Ava'ava. Samoa; Fiji; New Britain; New Guinea; Solomon Is. (Seale).

(*Holocentrus servus* Bloch.)

This species is exceedingly common in tide waters at the river mouths in Samoa. We have about 40 specimens from the mouth of the Vaisigono River. It takes the hook readily.

Life colors of a specimen from Apia, greenish gray, bands olive brown, those in caudal browner; first dorsal gray and olive; second dorsal, ventral, and anal creamy orange. Adults have the markings more faint.

652. *Terapon nasutus* Macleay. New Guinea.
Therapon nasutus Macleay, Proc. Linn. Soc. N. S. W. 1884, 258, Normanby I. (New Guinea).
 653. *Terapon interruptus* Macleay. New Guinea.
 654. *Terapon chalybæus* Macleay. New Guinea.
 655. *Terapon trimaculatus* Macleay. Goldie River, New Guinea.
 656. *Terapon caudavittatus* (Richardson). New Guinea (Macleay); Australia.
 657. *Terapon sexlineatus* (Quoy & Gaimard). New Guinea; Australia; Timor.
 658. *Terapon oxyrhynchus* Schlegel. Fiji (Günther); Japan.
 659. *Terapon puta* Cuvier & Valenciennes. New Britain; East Indies.
Therapon trivittatus De Vis, Proc. Linn. Soc. N. S. W., VIII, 457, New Britain.
 660. *Terapon argenteus* (Cuvier & Valenciennes). Kandavu, Fiji (Kner).
Therapon argenteus Kner, Sitz. Ak. Wiss. Wien, 1868, 7, Kandavu.
 661. *Terapon unicolor* Günther. Kandavu, Fiji (Kner); Australia.
 662. *Terapon theraps* Cuvier & Valenciennes. Caroline Is. (Günther); East Indies.

Family HÆMULIDÆ.

PLECTORHYNCHUS Lacépède. (*Gaterin* Forskål.)

Fowler separates from *Plectorhynchus* the species with large scales and 14 dorsal spines as *Euelatichthys*, and those with small scales and 10 dorsal spines as *Spilotichthys*. In *Plectorhynchus* (= *Diagramma*) the scales are small and the dorsal spines mostly 12 (11 to 13). Further structural differences have been noted by Waite and Ogilby (ms.).

663. *Plectorhynchus diagramma* (Lacépède). '*Ava'ava moana*. Samoa; Waigiü; Tahiti; New Guinea (Macleay).

(*Diagramma lessoni* Cuvier & Valenciennes; *Diagramma lineatum* Cuvier & Valenciennes; *Plectorhynchus cuvieri* Bleeker.)

Of this strongly marked species we have two specimens from Apia and Pago Pago. In one, about nine inches long, the pale color is yellowish, the two median bands on the side coalescing over the pectoral, and the dorsal and caudal fin being marked with black stripes and no spots; the pectoral fin has a large black median spot. This specimen corresponds closely with the original figure of *P. cuvieri* as given by Bennett.

The other specimen is nearly two feet long. The pale markings are bluish gray, the stripes on the side are all distinct, and the stripes on the dorsal and caudal are broken up into large round spots, those on the caudal forming two cross-series. The pectoral fin is unspotted. This corresponds to the figures of *Plectorhynchus lessoni* as given by Lesson, Günther, and Bleeker. Bleeker's figure of *Plectorhynchus cuvieri* represents an intermediate stage. We have no doubt that these specimens belong to one species, for which the tenable name is *Plectorhynchus diagramma*.

Life colors, young specimen from Apia, dark brown, belly white, side with five pure white stripes of varying width with deep brown interspaces; head anteriorly washed with golden, the stripes becoming yellow; dorsal striped, dark brown and light yellow; caudal redder brown and deep yellow in elaborate stripes; anal yellow with two brown red stripes; ventral golden with dark spots, its axil deep red; pectoral with a brown-red axil and basal bar, the fin yellow with a large black spot.

The Pago Pago specimen, adult, had eight dark brown longitudinal stripes on side (the eighth weak); caudal bright yellow with about 30 subcircular brown blotches and margin dark brown; dorsal yellowish like tail, with black brown margin and blotches; anal same; pectoral yellow with red axil; ventrals yellow with red axil and brown markings on posterior aspect; ground-color of body white with slight bluish tinge; the white interspaces on back strongly tinged with yellow.

664. *Plectorhynchus orientalis* (Bloch). Samoa (Günther); East Indies.

Not found by us; perhaps representing a stage in growth of *P. diagramma*.

665. *Plectorhynchus pica* (Cuvier & Valenciennes). Tahiti; Fiji.

666. *Plectorhynchus radja* Bleeker. New Guinea (Macleay).

667. *Plectorhynchus polytænia* Bleeker. New Guinea (Macleay).

668. *Plectorhynchus punctatissimus* (Playfair). Tahiti; Seychelles.

Diagramma punctatissimum Playfair, Proc. Zool. Soc. 1867, 851, Seychelles. Günther, Fische der Südsee, 27, taf. 21, Society Is., on a figure of Garrett.

669. *Plectorhynchus giganteus* (Günther). Ponape; Caroline Is.

Diagramma giganteum Günther, Ann. Mag. Nat. Hist. 1879, 6, Ponape.

670. *Plectorhynchus chætonoides* Lacépède. '*I'a mai-moana*. Samoa; Fiji (Günther); East Indies.

(*Diagramma pardalis* Kuhl & Van Hasselt; adult.)

One very large example, closely resembling the figure of the adult given by Dr. Bleeker, was taken at Apia. Life colors, olive, closely covered above with hexagonal spots of dark brown, restricting the pale olive-green ground color to reticulations; belly slate-color; all the fins spotted like the body, the spots smaller, the pectoral spotted only on the inside; caudal with a gray and then a black margin; membrane of jaws, inside of mouth, and the naked skin at opercular joints all bright blood-red.

671. *Plectorhynchus papuensis* (Macleay). New Guinea.

Diagramma papuensis Macleay, Proc. Linn. Soc. N. S. W. 1883, 237.

672. *Plectorhynchus hæmatochir* (Bleeker). New Guinea (Macleay); East Indies.

(*Plectorhynchus goldmanni* Bleeker.)

SPILOTICHTHYS Fowler.

673. *Spilotichthys centurio* (Cuvier & Valenciennes). New Guinea (Macleay); Seychelles.

674. *Spilotichthys pictus* (Thunberg). New Guinea (Bleeker); Fiji (Günther); East Indies; Japan.

EUELATICHTHYS Fowler.

675. *Euelaticthys crassispinus* (Rüppell). *Misimisi*. Samoa; East Indies.

Diagramma crassispinum Rüppell, Neue Wirbelthiere, Fische, 125, taf. 30, fig. 4, 1835, Red Sea. Günther, Cat., 1, 319.

Diagramma gibbosus Hombron & Jacquinot, Voy. Sud Pole, 46, pl. 5, fig. 5, 1854. Günther, Cat., 1, 319. Günther, Fische der Südsee, 26.

Diagramma affine Günther, Cat., 1, 319, Australia, Moluccas, Amboina, Madras, China.

Of this species we have three large examples and one small one from Apia. The small specimen has the caudal fin gray. In the others this fin is black. The small specimen and two of the large ones have the soft dorsal covered with small blackish spots. Some of these spots are seen on the caudal fin. In one specimen there are no distinct spots on the dorsal, and one faint one only at base of caudal. These specimens certainly belong to the same species, and we see no reason for separating the nominal species *affine* and *gibbosus* from it, although *P. gibbosus*, originally described from Samoa, is said to have 13 spines. This may be an individual variation or an error in counting.

Life colors of a specimen from river mouth at Apia, blackish; caudal abruptly pale gray; round black spots on dorsal, anal, and base of caudal; body unspotted; fins else blackish.

Another specimen from Apia, called *misi misi*, was dark olive, each scale with darker edge; preopercle and opercle black-edged; fins all plain dusky, the edges blacker; a few small black spots on second dorsal; no red or yellow.

676. *Euelaticthys crassilabris* (Alleyne & Macleay). New Guinea.

Diagramma crassilabris Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 271, Hall Sound (New Guinea).

This species must be very close to *P. crassispinus*.

677. *Euelaticthys obscurus* (Günther). Fiji.

Diagramma obscurum Günther, Proc. Zool. Soc. 1871, 657, Fiji.

This species is not known to us. It resembles *P. crassispinus*, but the second anal spine is much smaller than in the latter.

678. *Euelaticthys unicolor* (Macleay). New Guinea.

Diagramma unicolor Macleay, Proc. Linn. Soc. N. S. W. 1876, 261, China Straits, New Guinea.

POMADASIS Lacépède 1804.

679. *Pomadasis hasta* (Bloch). New Britain (Peters); East Indies; New Guinea (Macleay).

SYMPHYSANODON Bleeker.

680. *Symphysanodon typus* Bleeker. New Guinea.

Symphysanodon typus Bleeker, Arch. Neerl. Ind. 1878, 61.

SCOLOPSIS Cuvier. (Ghanan Forskål.)

681. *Scolopsis trilineata* Kner. *Taiwa tusi*. Samoa; Fiji; New Guinea; New Hebrides (Seale).

Scolopsis trilineata Kner, Sitz. Ak. Wiss. Wien 1868, 301, Samoa. Günther, Fische der Südsee, 31, taf. 25, fig. A. Samoa, Fiji.

This species is one of the most tastefully colored of the coral-reef fishes of Samoa. About 20 specimens were obtained at Apia and Pago Pago.

Life colors of a specimen from Apia called *taiva tusi*, pearl-gray, darker on back; forehead very dark brown, crossed by two bright blue stripes, both of which become golden yellow on eye, which is crossed by a dark brown stripe; three pearly white stripes behind eye, the middle one fainter, uniting near middle of body and proceeding to last ray of dorsal; fins pinkish gray; dorsal narrowly edged with orange; anal with pale blue; anal and soft dorsal with some orange shading; lower half of belly and head pure white.

682. *Scolopsis bilineata* (Bloch). New Guinea (Macleay); Kandavu, Fiji (Kner); Shortland I. (Seale); East Indies; Ovalau and Levuka (Günther).

683. *Scolopsis lineata* (Quoy & Gaimard). Guam; Samoa (Günther); Faté (Seale).

684. *Scolopsis ciliata* (Lacépède). Vanicolo; New Guinea (Macleay); East Indies.

685. *Scolopsis monogramma* Kuhl & Van Hasselt. New Guinea (Macleay); Faté and New Hebrides (Seale); East Indies.

686. *Scolopsis temporalis* Cuvier & Valenciennes. New Guinea (Macleay); Fiji (Günther); Vanicolo; Waigi; Louisiades; Solomon Is. (Seale).

687. *Scolopsis xenochrous* Günther. Misol.

Scolopsis xenochrous Günther, Cruise of the Curaçoa, 1873, 20.

688. *Scolopsis cancellata* Cuvier & Valenciennes. Polynesia; New Hanover (Peters); East Indies.

689. *Scolopsis margaritifera* Cuvier & Valenciennes. New Guinea (Macleay); East Indies.

690. *Scolopsis affinis* Peters. New Ireland; New Britain.

Scolopsis affinis Peters, Berl. Mon., 1876, 832, New Britain, New Ireland.

691. *Scolopsis macrophthalmus* Ramsay & Ogilby. New Guinea.

PENTAPUS Cuvier & Valenciennes.

692. *Pentapus caninus* Cuvier & Valenciennes. New Guinea (Macleay); Louisiades; Apamana; Gilbert Is. (Günther).

693. *Pentapus vittatus* (Bloch). New Guinea (Günther); Solomon Is. (Seale); East Indies.

GNATHODENTEX Bleeker.

694. *Gnathodentex aurolineatus* (Lacépède). *Tolai*. Samoa; Hervey Islands; Tonga; Gilbert Is.; Tahiti; Paumotu Is.; Marcus I.; New Guinea (Macleay); Tubuai and Mangareva (Seale); East Indies.

This species is common about Samoa, where about 15 specimens were taken.

Color of a specimen from Apia called *tolai*, light olive-gray; 6 to 8 very faint longitudinal stripes of brownish bronze above lateral line, all of them disappearing behind middle of body; still fainter streaks below lateral line; larger specimens with 5 broad, faint stripes of gold-bronze below lateral line; an oblong spot of light yellow below soft dorsal; fins all plain light reddish, the edges a little darker; opercular flap dark; inside of mouth orange.

Family SPARIDÆ.

LETHRINUS Cuvier. (*Schoür* Forskål, 1775.)

695. *Lethrinus ramak* (Forskål). *Mailafo'u*; *Magauli*. Samoa; Palau Is.; Kingsmill I.; Fiji, East Indies.

Sciæna ramak Forskål, Descr. Anim., 53, 1775, Red Sea.

Lethrinus ehrenbergii Cuvier & Valenciennes, Hist. Nat. Poiss., vi, 81, 1830, Red Sea.

Lethrinus flavescens Cuvier & Valenciennes, Hist. Nat. Poiss., vi, 299, 1836, Tonga.

Lethrinus ramak, Günther, Cat., I, 459, Red Sea, Ceylon. Günther, Fische der Südsee, 69, taf. 46, fig. B, Samoa, Palau Is., Kingsmill, Celebes.

This species is common at Samoa. Five large specimens were secured.

Life colors of a specimen from Apia called *mailafo'u*, a faint pinkish band from pectoral back; head olive; lips flesh color; dorsal dull orange mottled with gray; caudal dull orange; anal reddish; ventral pale-yellowish tinged; pectoral faintly orange; no lateral spot.

Another specimen from Apia, called *magauli*, was light green, no spot; axil black; head dark; lips and gums scarlet; dorsal light bright red; caudal dirty yellow; pectoral bright yellow, orange above; anal dull orange; ventral gray, black at tip.

696. *Lethrinus harak* (Forskål). *Mata 'ele'ele*. Samoa; New Britain; New Hanover (Peters); Faté in the New Hebrides (Seale).

Of this species 2 large specimens were taken at Apia. Life colors of one called *mata 'ele'ele*, dull olive green; fins all brick red; inside of mouth scarlet. A black lateral spot on molar teeth.

697. *Lethrinus bonhamensis* Günther. Samoa; Bonham I.; Philippines.

Lethrinus bonhamensis Günther, Fische der Südsee, 65, taf. 46, Bonham I.

A single large specimen corresponding to Günther's figure was taken at Apia. It is near *Lethrinus harak*, but is apparently distinct. We have also examined specimens of the same species in the U. S. National Museum, collected on Negros Island in the Philippines by Prof. Bashford Dean.

698. *Lethrinus papuensis* Alleyne & Macleay. New Guinea.

699. *Lethrinus amboinensis* Bleeker. Samoa; Palau Is. (Günther); East Indies.

Of this species we have 1 specimen from Apia.

700. *Lethrinus erythropterus* Cuvier & Valenciennes. Ulea.

701. *Lethrinus chrysostomus* Richardson. New Guinea (Alleyne & Macleay); Australia.

702. *Lethrinus nebulosus* (Forskål). Fiji (Günther); East Indies.

703. *Lethrinus mahsena* (Forskål). Samoa; Fiji; Palau Is.; Paumotu Is.; Waigi; Mangareva (Seale).

(*Lethrinus hypselopterus* Bleeker.)

Of this species we have 1 large example from Apia, corresponding to Günther's figure, and almost equally well to Bleeker's plate of *Lethrinus hypselopterus*.

704. *Lethrinus mahsenoides* Bleeker. New Guinea (Ramsay & Ogilby); East Indies.

705. *Lethrinus alboguttatus* Cuvier & Valenciennes. Bonin Is.

706. *Lethrinus laticaudus* Alleyne & Macleay. New Guinea.

Lethrinus laticaudus Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 276, Percy I. (New Guinea).

707. *Lethrinus moensi* Bleeker. Tahiti; Tonga; Fiji; Paumotu Is.; Harvey Is.; New Guinea; Palau Is.; Louisiades; Marquesas Is. (Seale); East Indies.

708. *Lethrinus ornatus* Bleeker. New Guinea (Macleay); East Indies.

709. *Lethrinus leutjanus* Lacépède. New Guinea (Macleay); Faté (Seale); East Indies.

710. *Lethrinus hæmatopterus* Bleeker. Fiji (Günther); New Guinea (Macleay); East Indies.

711. *Lethrinus erythracanthus* Cuvier & Valenciennes. Luganor; Mortlock Is.; Carolines.

712. *Lethrinus sordidus* Cuvier & Valenciennes. New Guinea.

713. *Lethrinus waigiensis* Cuvier & Valenciennes. Waigi.

714. *Lethrinus xanthopterus* Cuvier & Valenciennes. Ulea, Caroline Islands.

715. *Lethrinus aurolineatus* Macleay. New Guinea.

Lethrinus aurolineatus Macleay, Proc. Linn. Soc. N. S. W. 1888, 247, New Guinea.

LETHRINELLA Fowler.

This genus is distinguished from *Lethrinus* by the elongate pike-like snout and jaws.

716. *Lethrinella miniata* (Forster). *Filoa 'ava*. Samoa; Tahiti; Louisiades; Marcus I.; New Britain; East Indies.

Of this remarkable species, distinguished by the pike-like prolongation of the snout, we have 3 large examples from Apia, one of them 2½ feet long. The long snout and comparative slenderness of the teeth define the well-marked genus *Lethrinella* of Fowler.

Life colors of a specimen called *filoa va*, from Apia, pale grayish olive unmarked; mouth scarlet within; membranes of upper jaw red; dorsal, anal, and caudal grayish, mottled olive, edged with dull red; pectoral dull light olive, ventral dusky gray.

MONOTAXIS Bennett.

717. *Monotaxis grandoculis* (Forskål). *Mumu moaga*; *Loalia* (a Rarotongan word). Hawaii; Samoa; Papua; Fiji; East Indies.

This species is rather common about Samoa, as also at Hawaii. It is valued as a food fish.

Life colors of a specimen from Apia, olive green, with 2 whitish cross-bars; a black crescent at base of pectoral; dorsal brownish, reddish at tip; caudal orange, yellow at base; anal like dorsal; pectoral and ventral reddish.

718. *Monotaxis euanus* (Günther). Tonga Is.

Spharodon euanus Günther, Ann. Mag. Nat. Hist., iv, 1879, 137, *Eua* (Tonga Is.).

SPARUS (Artedi) Linnæus. (*Chrysophrys* Cuvier & Valenciennes.)

719. *Sparus australis* (Günther). New Hebrides; Australia.

Chrysophrys australis Günther, Cat., I, 494, rivers of Australia. De Vis, Proc. Linn. Soc. N. S. W. 1884, 457, Apl (New Hebrides).

720. *Sparus novæ-caledoniæ* (Castelnau). New Caledonia.

Chrysophrys novæ-caledoniæ Castelnau, Proc. Zool. Soc. Viet. 1873, 110, New Caledonia.

721. *Sparus berda* Forskål. New Guinea (Macleay); East Indies.

(*Sparus hasta*, Bloch & Schneider.)

Family KYPHOSIDÆ.

PACHYMETOPON Günther.

722. *Pachymetopon squamosum* Alleyne & Macleay. New Guinea.

Pachymetopon squamosum Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 225, Hall Sound (New Guinea).

KYPHOSUS Lacépède. (*Tahmel* Forskål, 1775.)

723. *Kyphosus fuscus* (Lacépède). Hawaii; New Hebrides (Seale); East Indies.

724. *Kyphosus lembus* (Cuvier & Valenciennes). Vanicolo; East Indies.

725. *Kyphosus sandvicensis* (Sauvage). Hawaii; Laysan; Marcus I. (Bryan & Herre).

This species seems to be almost identical with *Kyphosus elegans* Peters, a species from the west coast of Mexico.

726. *Kyphosus waigiensis* (Quoy & Gaimard). *Umue*; *Matu mutu*. Waigiü; Papua; Caroline Is.; Samoa; Palau Is.; New Guinea.

Three large specimens of this species were taken at Apia. Life color of one called *umue*, bronze brownish, with a gray spot on each scale, these forming pale bluish streaks, alternating with darker bronze streaks; no other colors; fins all dusky; pale below eye, a dark streak about it; opercle dark-edged.

727. *Kyphosus tahmel* (Forskål). New Guinea (Bleeker); East Indies.

SECTATOR Jordan & Fesler.

728. *Sectator azureus* Jordan & Evermann. Hawaii.

Family GERRIDÆ.

XYSTÆMA Jordan & Evermann.

729. *Xystæma gigas* (Günther). *Matu loa*. Samoa; Fiji; Tonga.

Gerres gigas Günther, Cat., iv, 262, Tonga. Günther, Fische der Südsee, 30, taf xxiv, fig. A, Tonga, Fiji, Samoa

Life colors of a specimen from Apia called *matu loa*; silvery with faint dark shades; no bright colors; caudal pale edged; first dorsal elevated, its edge dusky.

One large specimen and one very small one taken at Apia. Apparently this species is distinct from *X. oblongum* (Cuvier & Valenciennes) of India, with which Day unites it. *X. oblongum* is still more elongate.

730. *Xystæma argyreum* (Forster). *Matu*. Samoa; Tahiti; Waigiü; Strong I.; Tanna; Australia; East Indies.

(*Gerres waigiensis* Quoy & Gaimard.)

Compared with *X. argyreum*, *X. gigas* is less silvery, and has more distinct streaks along the rows of scales. In *X. gigas* the snout is longer than eye; the body is more elongate, and the head proportionately longer.

This species is more common at Samoa than *X. gigas*, but seems to reach a rather smaller size. We have 8 examples of different sizes from Apia and Pago Pago. Life colors of an example from Apia, silvery, without dark streaks; ventral and anal light yellow; other fins scarcely yellowish; edge of spinous dorsal dusky.

731. *Xystæma abbreviatum* (Bleeker). New Guinea (Ramsay & Ogilby); East Indies.

This can not be *Sparus erythrorus* of Bloch, which is a species of *Xystæma*, said to be from Japan. Bloch's type is more elongate, the depth being $3\frac{1}{2}$ inches, the total length $10\frac{1}{2}$ inches in the type in the Museum of Berlin.

732. *Xystæma macrosoma* (Bleeker). Samoa (Kner, Sitz. Ak. Wiss. Wien 1868, 9, Savaii); Admiralty Is. (Günther); East Indies.

This species, recorded by Kner from Samoa, was not seen by us.

733. *Xystæma punctatum* (Cuvier & Valenciennes). Vanicolo; New Britain and New Hanover (Peters); East Indies.

(*Gerres filamentosus* Cuvier & Valenciennes, adult.)

Valenciennes describes *Gerres punctatus* as having the depth $3\frac{1}{2}$ in the total length with caudal. This is true of the very young only ($2\frac{1}{2}$ inches long). In the adult it is 3 or a little less. *Gerres punctatus* is, however, evidently the same as *G. filamentosus*, and the name occurs on an earlier page of the same work.

734. *Xystæma acinaces* (Bleeker). New Guinea (Macleay); East Indies.

735. *Xystæma poeti* (Cuvier & Valenciennes). Milne Bay, New Guinea (Macleay); East Indies.

736. *Xystæma macracanthum* (Bleeker). New Guinea (Macleay); East Indies.

ULÆMA Jordan & Evermann.

737. *Ulæma bispinosum* (Alleyne & Macleay). New Guinea.

Gerres bispinosus Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 273, Hall Sound. Anal rays II, 8.

Family EQUULIDÆ.

EQUULA Cuvier.

Equula Cuvier, Règne Anim., ed. 1, vol. II, 323, 1817 (*insidiator*).

Deveximentum Fowler, Journ. Ac. Nat. Sci. Phila. 1904, 517 (*insidiator*).

738. *Equula insidiator* (Bloch). Tahiti (Kner); East Indies.

This species is separated by Fowler from *Leiognathus* as the type of a distinct genus *Deveximentum*, characterized by the vertical mouth. But the same species is the original type of the genus *Equula*, which has been regarded as a synonym of *Leiognathus*.

LEIOGNATHUS Lacépède.

739. *Leiognathus fasciatus* (Lacépède). Samoa; Fiji (Günther); New Britain (Peters); East Indies.

This species is common at Samoa, numerous specimens being taken about Apia and Pago Pago in the seine.

Life colors of a specimen from Apia, spots on sides and dorsal bars dull brassy; axil brassy and brassy shades on dorsal and anal fins.

Another specimen from Apia was silvery, faintly streaked and barred above. Dorsal spine not reaching tip of last spine in specimen 3 inches long. Young.

740. *Leiognathus obscurus* (Seale). Guam.

Leiognathus obscurus Seale, Bishop Mus. 1901, 74, Guam.

741. *Leiognathus equula* (Forskål). New Caledonia; East Indies.

Equula caballa (Cuvier & Valenciennes). Castelnau, Proc. Zool. Soc. Victoria, 1873, 114, New Caledonia.

742. *Leiognathus dussumieri* (Cuvier & Valenciennes). Tahiti (Kner, Novara Fische, 167); East Indies.

743. *Leiognathus edentulus* Lacépède. New Guinea (Macleay); East Indies.

744. *Leiognathus smithursti* (Ramsay & Ogilby). New Guinea.

Equula smithursti Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 11.

GAZZA Cuvier.

745. *Gazza minuta* (Bloch). New Guinea; New Britain (Peters); Tahiti (Kner); East Indies.

746. *Gazza equulæformis* (Rüppell). Solomon Is.; East Indies.

747. *Gazza argentaria* (Forster). Tanna; New Hebrides; East Indies.

Family MULLIDÆ.

UPENEUS Cuvier. (*Upeneoides* Bleeker.)

748. *Upeneus vittatus* (Forskål). Vete. Tahiti; Samoa; Papua; Borabora; Fiji; Marquesas Is. (Seale); East Indies.

This species is rather common about Samoa, where about a dozen specimens were taken. In life the belly is a bright sulphur-yellow. The number of bands on the caudal fin is fewer than in *Upeneus arge*, one of those on the lower lobe being very broad and black.

Life colors of a specimen called *uete*, olive, sides silvery, no red except on iris and sides of snout, side with 5 golden bands, fourth the brightest and broadest; belly bright sulphur yellow, in a broad stripe; barbels white; first dorsal black at tip, with 2 white and 2 brassy bands, one of the latter at base; second dorsal with 4 white and 4 olive oblique bands; fourth and fifth lateral bands converging on tail; upper lobe also with 3 dark oblique bands and 4 white bands; lower with 3 white and 2 dark bands, the outer one very broad, nearly as broad as eye, and black with yellow edge, twice the width of upper outer band.

749. *Upeneus arge* Jordan & Evermann. Hawaii.

This large species is common about Hawaii, but has not been seen elsewhere. It has the belly silvery white in life and the caudal bands are more numerous and more even than in *Upeneus vittatus*.

750. *Upeneus tæniopterus* (Cuvier & Valenciennes). Hawaii (Steindachner); Ceylon.

751. *Upeneus tragula* Richardson. New Guinea (Macleay); East Indies; China.

PSEUDUPENEUS Bleeker.

(*Upeneus*, *Pseudupeneus*, and *Parupeneus*, all of Bleeker.)

752. *Pseudupeneus multifasciatus* (Quoy & Gaimard). Hawaii.

This species is very common about Hawaii, where it replaces the *P. moana* of the islands of Polynesia. In the former species the bright red area among the bands on the side is behind the pectoral. In *Pseudupeneus moana* the bright yellow area is under the soft dorsal.

753. *Pseudupeneus moana* Jordan & Seale, new species. *Moana*; *Moaga*; *Maga* (juv.); *Moana faiava*. Samoa.

Upeneus trifasciatus Günther, *Fische der Südsee*, 59, taf. XLIV, fig. B, Vavau, Samoa, Amboina; not of Lacépède.

Upeneus multifasciatus Seale, *Bishop Museum*, 1, 71, 1901, Guam; not of Quoy & Gaimard.

Parupeneus multifasciatus Bleeker, *Mulloides*, 20, 1874; *Atlas, Mulluoides*, tab. iv, fig. 4.

Head 3 in length to base of caudal; depth 3.25; eye 6.10 in head; interorbital 3.75; maxillary 3 in head, its distal width greater than eye, its posterior end not reaching below anterior margin of eye by at least two-thirds width of eye; dorsal VIII-9; anal 7; scales 2-32-6; barbels long, reaching to second row of scales in front of ventrals.

Body oblong, compressed, deepest at origin of spinous dorsal; depth of caudal peduncle 2 in its length; body and head scaled; lips wide; teeth in a single row in each jaw, no teeth on vomer or palatines; preopercle entire; a short flat opercular spine; gill-rakers slim and sharp, 25 on lower limb, the longest slightly more than one-half width of eye; only two complete rows of scales between the dorsal fins; height of spinous dorsal 1.35 in head, its base 1.90; base of soft dorsal 1.95 in head, its last ray usually elongate, reaching to base of caudal; pectoral 1.35 in head; ventral 1.20 in head; base of anal 2.50 in head; its posterior ray somewhat prolonged, 1.95 in head; caudal 1.35 in head.

Color in spirits, upper half of body brownish with wash of purple, yellowish white below; a broad saddle of black on caudal peduncle; another broad black band from anterior half of soft dorsal; between these two is a bright yellow area, about as wide as the posterior black band; a narrow black band between the two dorsals, the yellow lines bordering on its posterior and anterior margins being narrow, about one scale in width; a broad, black band from anterior two-thirds of spinous dorsal; another black band in front of spinous dorsal, making in all five black vertical bands on the sides; all of these bands fade out a little below the axis of the body; there is a dusky blotch posterior to eye extending more or less distinctly upon nuchal region; a dusky line through eye and along sides of snout; spinous dorsal dusky; soft dorsal dusky at base with yellow margin, and some 4-5 narrow intermarginal lines of alternating light and dusky; the last ray of dorsal is entirely deep black; caudal dusky, with black upper and lower margins; anal yellowish with 4 intermarginal longitudinal lines of dusky; pectoral yellow; ventral yellow, the outer rays bluish.

Life colors of a specimen from Apia, dirty purplish red mottled with black and yellow, with 4 darker cross-bands; lower side of head wine red; barbels purplish; dorsal clouded dusky; second dorsal with blue and yellow streaks at tip; caudal dirty brown, edged with black above and below; anal pale violet, and with 4 violet and 4 light yellow streaks; ventral red with a purple-black edge; pectoral bright golden orange. Adult.

Another specimen from Apia, called *moana*, was olive, with golden edges and bluish base to scales; five blackish cross-bands; a black blotch behind eye; first dorsal dusky, second golden blackish at base, streaked above with bluish; caudal golden, covered with fine bluish streaks; anal dusky; ventral dusky; pectoral yellowish; barbels golden.

This species, common in the East Indies and in the South Seas, seems never to have received a distinctive specific name. The name *trifasciatus* certainly belongs to *Pseudupeneus bifasciatus*, while that of *multifasciatus* was given to the common *moana* of the Hawaiian Islands.

Twenty-five specimens from Apia. The type is no. 51737, U. S. National Museum, length 8.55 inches.

The species is known from Samoa, Guam, Tahiti, Vavau, New Guinea (Macleay), Mangareva, Rarotonga, New Hebrides, Tubuai, and Nukahiva (Seale); also from East Indies.

754. *Pseudupeneus atrocingulatus* (Kner). *Moana*; *Moaga*. Samoa (Günther); Vavau; Amboina.

Upeneus atrocingulatus Kner, XXI, 443. Günther, *Fische der Südsee*, 59, as var. C of *U. trifasciatus*, Samoa, Vavau, Amboina.

This species is close to *Pseudupeneus moana*, but the coloration is different from any specimen seen by us. We therefore regard it as a different species.

755. *Pseudupeneus bifasciatus* (Lacépède). *Matalau uliuli*; *Maga* (young). Hawaii; Samoa;

Rarotonga; Caroline Is.; Solomon Is; Marcus I.

(*Mullus bifasciatus* and *Mullus trifasciatus* Lacépède.)

This species is common both at Hawaii and Samoa, where it reaches a large size, and is highly valued as food. It is easily distinguished from related species by the two or three broad cross-shades, one under each dorsal.

Life colors of a specimen from Apia, called *matalau uliuli*, dusky violet-brown, no red; traces of faint diffuse dusky crossbars, one under first dorsal, one under second, the third on caudal peduncle; head with faint violet and golden specks and edgings; barbels black, yellow at tip; two faint paler cross-rings, one before and one behind dark bar on caudal peduncle; fins dusky; first dorsal dull bronze with pinkish rays; second dorsal and anal dull violet, with dull yellowish cross-streaks; caudal violet-black mottled with yellowish; ventral dull violet-bronze; pectoral paler, similar; a dusky bar across its base. A younger example was a little more reddish.

Another specimen from Apia was dark brownish gray, no red; three broad blackish cross-bands, the first at front of first dorsal, second under second dorsal, third on caudal peduncle; first dorsal blackish, tinged with dark red, olive at base, the rays pale violet; soft dorsal light olive with blue lines, and a broad black edge; caudal and anal similar; ventral dull red, shaded with black, a dusky bar across base of pectoral; pectoral pale reddish; barbels yellow.

A specimen called *maga* (young), from Apia, was dirty green, much marbled; a black bar below front of first dorsal and one below front of second dorsal; second dorsal and anal blackish, edged with yellow; caudal dusky olive brown, pale-edged; ventral black, pale-edged; first dorsal brown; barbels yellow; head soiled and mottled olive.

756. *Pseudupeneus semifasciatus* (Macleay). New Guinea.

Upeneus semifasciatus Macleay, Proc. Linn. Soc. N. S. W. 1884, 263, Hood Bay.

757. *Pseudupeneus porphyreus* Jenkins. Hawaii.

758. *Pseudupeneus chryserydros* (Lacépède). *Matulau*. Samoa; Hawaii; Tahiti; Faté (Seale); East Indies.

Parupeneus xanthospilurus Bleeker, Mulloides, 57, 1874, Amboina.

This species is common about Samoa, as also about Hawaii. It is well distinguished by its peculiar violaceous coloration, like the lees of wine, according to Commerson, and by the golden or pale area on the back of the tail. The barbels, as in *Upeneus cyclostomus*, are elongate. There seems to be no question that Lacépède's glowing description of the "Mullus rougeor" belongs to this species.

Life colors of a specimen from Apia, very pale violet, pinkish and greenish, not nearly so dark as in Hawaii.

759. *Pseudupeneus cyclostomus* (Lacépède). Samoa; East Indies.

Of this species we have three large specimens from Pago Pago. The species resembles *Pseudupeneus chryserydros*, but lacks the pale saddle on the tail, while the general color is clear red without markings. The barbels, as in *Pseudupeneus chryserydros*, are long, reaching past base of ventrals. The species is well represented in Sauvage's figure of *Upeneus cyclostomus*.

760. *Pseudupeneus saffordi* (Seale). Guam; East Indies.

Upeneus cyclostomus Günther, Fische der Südsee, 60, 1873, Mascarene I.; not of Lacépède.

Upeneus chryserythrus Sauvage, Poiss. Madagascar, 228; not of Lacépède.

Upeneus saffordi Seale, Bishop Museum 1901, 72, Guam.

This species was not seen by us. It is apparently the *Upeneus cyclostomus* of Günther, with short barbels, reaching preopercular margin, and with a pale area on the back of the tail.

761. *Pseudupeneus crassilabris* (Cuvier & Valenciennes). Johnston I.; Papua.

† *Upeneus tuteus* Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 521, 1831, Isle de France.

Upeneus crassilabris Cuvier & Valenciennes, op. cit., 523, Papua.

762. *Pseudupeneus chrysonemus* Jordan & Evermann. Hawaii.

763. *Pseudupeneus fraterculus* (Cuvier & Valenciennes). Hawaii (Steindachner); Seychelles; Zanzibar.

764. *Pseudupeneus tæniatus* (Kner). Fiji; China ?.

Upeneus barberinoides Kner, Novara Fische, pl. IV, 81, China; not of Bleeker.

Upeneus tæniatus Kner, Sitz. Ak. Wiss. Wien 1868, 13, Kanathia (Fiji).

Parupeneus kneri Bleeker, Ned. Dierk., IV, 142, China; after Kner.

This species was not taken by us, unless it should prove to be the young of *Pseudupeneus chrysonemus*, which shows two pale lengthwise stripes on the upper anterior portion of the body in life.

765. *Pseudupeneus barberinus* (Lacépède). *Ta'uleia*. Samoa; Palau Is.; Paumotu Is.; Harvey I.; Kingsmill I.; Solomon Is.; East Indies.

This widely diffused species is rather common about Samoa, where three large examples were taken.

Life colors of a specimen from Apia, reddish gray, with bluish and yellowish streaks on head, the scales edged with bronze; a blackish brown stripe from snout through eye to last dorsal rays; a large dark brown spot at base of caudal; dorsal reddish, brown-edged in front; second dorsal and anal with obscure yellowish cross-streaks; caudal reddish, the rays yellowish; ventral and pectoral pale, tinged with yellowish; barbels white.

A larger example redder, with marks fainter.

766. *Pseudupeneus barberinoides* (Bleeker). New Guinea (Macleay); East Indies.
767. *Pseudupeneus indicus* (Shaw). *Ta'uleia*; *Lailai*. Samoa; Tonga; Fiji; Waigiū (as *U. waigiensis* Cuvier & Valenciennes); East Indies.

Of this species we have two large specimens from Apia. The golden spot on the side of the back and the black spot on the back of the tail are characteristic.

Life colors of a specimen from Apia, olive-green, each scale darker olive at edge; a large oblong golden yellow blotch under soft dorsal; a large black blotch before base of caudal; cheek olive, with blue streaks; dorsal olive, second dorsal faintly barred with brassy; anal pinkish, similarly barred; ventral pink; pectoral pinkish; caudal pale yellowish olive, the outer rays pink; ventral bright pink; barbels pinkish.

768. *Pseudupeneus pleurostigma* (Bennett). Hawaii; Tahiti; Gilbert Is.; East Indies.
769. *Pseudupeneus pleurospilos* (Bleeker). Shortland I.; Solomon Is. (Seale); Japan; East Indies.
770. *Pseudupeneus preorbitalis* (Smith & Swain). Johnston I.; southwest of Hawaii.
771. *Pseudupeneus filamentosus* (Macleay). New Guinea.

Upeneus filamentosus Macleay, Proc. Linn. Soc. N. S. W. 1884, 263, Hood Bay.

MULLOIDES Bleeker.

772. *Mulloidis auriflamma* (Forskål). *Ula'oa*; *Vete*. Samoa; Hawaii; New Guinea; Guam; Borabora; Tubuai; Tahiti and Nukuhiva (Seale); East Indies.

† *Upeneus atherinoides* Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 526, Guam.

This species is abundant throughout the Pacific. We took several specimens in Pago Pago and about a dozen in Apia.

Life colors of a specimen from Apia called *ula'oa*, olive, belly silvery, flushed with red; a golden stripe, very bright, with yellow shades above and below; a black bar across base of pectoral; ventral and anal blackish yellow; caudal and both dorsals plain golden; pectoral colorless; no bars or spots.

Another specimen from Apia, light gray olive; back pinkish; opercles pink; a brownish yellow lateral band with yellow shades below; upper fins yellow; lower gray; yellow on sides of head; caudal dull yellow; barbels white.

773. *Mulloidis vanicolensis* (Cuvier & Valenciennes). Vanicolo; Johnston I. (Smith & Swain).
774. *Mulloidis samoensis* Günther. *Afolu*; *I'a sina* (white or lady fish—the young). Hawaii; Samoa.

This species is very abundant about Samoa, and scarcely less so in Hawaii. The small black spot on the side near the tip of the pectoral fin is very constant.

In one specimen from Apia there was a golden orange lateral band somewhat interrupted. Another specimen from this locality was pale, a broad deep dull yellow lateral stripe with yellow shades above and below; yellow dashes on sides of head, besides coppery; a small dark brown spot above end of pectoral in lateral shade; first dorsal anteriorly deep yellow, fading behind; second dorsal pale yellow, caudal bright yellow; lower parts, barbels and fins pure white.

The *i'a sina* is plainly the young of the *afolu*.

775. *Mulloidis erythrinus* Klunzinger. Hawaii; Laysan; Tahiti; East Indies.

776. *Mulloides flammeus* Jordan & Evermann. Hawaii; Raiatea and Tahiti (Seale; perhaps the young of *M. pflugeri*).
777. *Mulloides pflugeri* Steindachner. Hawaii.
778. *Mulloides zeylonicus* (Cuvier & Valenciennes). New Guinea (Bleeker); Ceylon.

Family TOXOTIDÆ.

TOXOTES Cuvier.

779. *Toxotes jaculatrix* (Pallas). New Guinea (Macleay); Faté, New Hebrides (Seale); East Indies.

Family SILLAGINIDÆ.

SILLAGO Cuvier.

780. *Sillago sihama* (Forskål). Admiralty Is. (Günther); Bougainville Is. (Peters, Berl. Mon. 1876, 836); East Indies.
781. *Sillago ciliata* Cuvier & Valenciennes. Percy I.; New Guinea (Macleay); Australia.
782. *Sillago insularis* Castelnau. New Caledonia.
Sillago ciliata or *insularis* Castelnau, Proc. Zool. Soc. Vict. 1873, 113, New Caledonia.
783. *Sillago gracilis* Macleay. New Guinea.
Sillago gracilis Macleay, Proc. Linn. Soc. N. S. W. 1884, 279, Hall Sound.

Family MALACANTHIDÆ.

MALACANTHUS Cuvier.

784. *Malacanthus parvipinnis* (Vaillant & Sauvage). Hawaii.

OCEANOPS Jordan & Seale, new genus.

Oceanops Jordan & Seale, new genus of *Malacanthide* (*M. latovittatus* Lacépède).

785. *Oceanops latovittata* (Lacépède). *Gatasami*. Samoa; Palau Is.; Papua; East Indies. (Pl. xxxix.)

This singularly beautiful fish is rather rare at Samoa. Two large specimens were taken at Pago Pago. The large size and brilliant blue coloration distinguish this species, in a very marked manner, from its dull gray-colored congeners. It has also a much longer, pike-like snout, thus unlike *Malacanthus plumieri* and *parvipinnis*. It may be held as the type of a distinct subgenus or genus—*Oceanops*—this appellation being a translation of the native name.

Life colors of a specimen from Pago Pago called *gatasami* (eye of the sea), intense violet blue; back black, with the blue reduced to streaks; jet black lateral band; belly abruptly white; dusky across base of pectoral; dorsal dusky at base, abruptly grayish above; caudal black, with a white square, bluish white stripe above, upper angle brown; anal whitish; ventral whitish; pectoral blue.

Family PSEUDOCHROMIDÆ.

PSEUDOCHROMIS Müller & Troschel.

786. *Pseudochromis fuscus* Müller & Troschel. Solomon Is.; Yap I.; Palau Is.; East Indies.

PSEUDOGRAMMA Bleeker.

787. *Pseudogramma polyacanthus* (Bleeker). Tahiti; Fiji; Marcus I.; Raiatea, East Indies.
Pseudochromis polyacanthus Bleeker, Ternate, VII, 375, 1856, Ternate. Kner, Sitz. Ak. Wiss. Wien 1867, 717, Fiji
Günther, Fische der Südsee, 159, taf. 98, fig. A, Tahiti, Raiatea. Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 523
Tahiti.
Pseudogramma polyacanthus, Bryan & Herre, Bishop Museum, vol. 11, no. 1, 1903, 139, Marcus I.

Family CIRRHITIDÆ,

CHEILODACTYLUS Cuvier.

788. *Cheilodactylus vittatus* Garrett. Hawaii.

CIRRHITUS Lacépède.

789. *Cirrhites marmoratus* Lacépède. *Potati*. Hawaii; Rarotonga; Samoa.

This species, very common at Hawaii, is not rare about the reefs of Samoa. Six specimens were taken at Apia.

790. *Cirrhites oxycephalus* Bennett. Bonham I.; Marshall group; East Indies.

PARACIRRHITES Bleeker.

791. *Paracirrhites forsteri* (Cuvier & Valenciennes). Hawaii; Marquesas Is. (Seale).

792. *Paracirrhites arcatus* (Cuvier & Valenciennes). Hawaii; New Guinea.

793. *Paracirrhites cinctus* (Günther). Hawaii.

794. *Paracirrhites hemistictus* (Günther). Kingsmill I.; Tahiti.

Cirrhites hemistictus Günther, *Fische der Südsee*, 69, taf. 50, fig. B, Kingsmill, Tahiti.

795. *Paracirrhites polystictus* (Günther). Tahiti; Kingsmill I.

Cirrhites polystictus Günther, *Fische der Südsee*, 70, taf. 50, fig. A, Kingsmill, Tahiti.

796. *Paracirrhites melanotus* (Günther). Tahiti; Raiatea.

Cirrhites melanotus Günther, *Fische der Südsee*, 72, taf. 52, fig. C, 1873, Tahiti, Raiatea.

797. *Paracirrhites punctatus* (Cuvier & Valenciennes). Savaii (Kner, Sitz. Ak. Wiss. Wien 1868, 16).

This species, obtained at Samoa by Kner, was not seen by us.

CIRRHITOIDEA Jenkins.

798. *Cirrhitoidea bimacula* Jenkins. Hawaii.

Family POMACENTRIDÆ.

PREMNAS Cuvier.

799. *Premnas biaculeatus* (Bloch). New Guinea (Macleay); East Indies.

AMPHIPRION Bloch & Schneider.

800. *Amphiprion melanopus* Bleeker. Samoa; Tonga; Ponape; Solomon Is.; Guam; Woodlark I.; New Guinea; East Indies; D'Entrecasteaux Is. (Macleay.)

Amphiprion melanopus Bleeker, *Amboina, Nat. Tijds. Ind.*, III, 561, Amboina. Günther, *Cat.*, IV, 8.

Prochilus melanopus Bleeker, *Atlas, Pomacentridæ*, 26, tab. cccci, fig. 7, 1877, Singapore, Ceram, Ternate, Amboina Solor, New Guinea.

Amphiprion ephippium Günther, *Fische der Südsee*, 225, Tonga, Samoa, Ponape, Solomon Is. Seale, Bishop Museum 1901, 82, Guam, not of Bloch.

Amphiprion monofasciatus Thiollière, *Fauna Woodlark*, 198, 1857, Woodlark I.

Of this species four specimens were taken by us at Apia, and one at Pago Pago. The specimens agree well with Bleeker's plate and with each other, and the species is no doubt a valid one.

Life colors of a specimen from Apia, deep reddish brown, the caudal peduncle bright brownish, the anterior region deep orange brown or cinnamon; a pale violet stripe across head edged before and behind with indigo-blue; ventral and anal black; dorsal reddish brown; paler behind; pectoral deep cinnamon brown; caudal pale brownish yellow.

801. *Amphiprion arion* De Vis. South Seas.

Amphiprion arion De Vis, *Proc. Linn. Soc. N. S. W.* 1884, 450, South Seas.

802. *Amphiprion polymnus* (Bloch). Palau Is.; Ponape; East Indies; Japan.

According to Günther this species, with *melanopus*, *tricolor*, *chrysopterus*, and *xanthurus*, is based on variants of *Amphiprion ephippium*. This view is open to question.

803. *Amphiprion tricolor* Günther. Palau Is.; New Guinea; East Indies.
 804. *Amphiprion xanthurus* Cuvier & Valenciennes. Samoa (Günther); Ponape.
 805. *Amphiprion chrysopterus* Cuvier & Valenciennes. Kingsmill I. (Günther); Bourbon I.
 806. *Amphiprion bicinctus* Rüppell. Solomon Is.; Guam; East Indies.
 807. *Amphiprion percula* (Lacépède). Borabora; Vanicolo; New Guinea; New Ireland; New Britain; Solomon Is.
 808. *Amphiprion papuensis* Macleay. New Guinea.
Amphiprion papuensis Macleay, Proc. Linn. Soc. N. S. W. 1888, 271.
 809. *Amphiprion perideraion* Bleeker. Palau Is.; East Indies.
 810. *Amphiprion bifasciatus* (Bloch). New Guinea; East Indies.
 811. *Amphiprion rosenbergi* Bleeker. New Guinea.

POMACENTRUS Lacépède.

812. *Pomacentrus pavo* (Bloch). *Taupou*. Samoa; Tahiti; Ponape; Bonham I.; Woodlark I.; New Britain (as *Pomacentrus notatus* De Vis, Proc. Linn. Soc. N. S. W. 1884, 451); East Indies. (Pl. XL, fig. 1.)

This beautiful little fish is very abundant about the coral reefs of Samoa, and is the handsomest of all blue fishes called *taupou*, or damsel. We have about 100 specimens. In the smaller examples the back and sides are nearly uniform sky-blue. In the adult the blue becomes differentiated as streaks and lines on each scale, the orange ground color nearly hidden by the blue markings.

Pomacentrus notatus De Vis seems to agree fully with *Pomacentrus pavo*. It is doubtless the same species.

Life colors were noted as follows in various specimens of *P. pavo*:

- (1) Specimen from Apia, called *taupou*. Brilliant sky-blue, grayer below and on caudal peduncle; a dark steely edge on each scale; head profusely spotted with blue, the spots small and darker-edged; a large black ocellus on opercular angle; dorsal blue, deep blue on distal half, the tips of first soft rays almost black; posterior rays mostly golden; caudal golden, pale blue mesially at base; anal pale blue, distally pale olive; pectoral and ventral slightly yellowish.
- (2) From Apia. Deep violet-blue, clear, the dorsal, anal and caudal, with caudal peduncle, shading into bright golden; base of dorsal and anal deep blue; a small opercular spot, none on body or axil; pectoral pale yellowish; ventral blackish.
- (3) From Pago Pago. Deepest violet-blue, intensely dark blue on back; head with many pale sky-blue dots and curved lines; two from eye to mouth; a blue line around chin; caudal peduncle and posterior part of soft dorsal and anal with whole caudal deep orange yellow; a deep black spot on opercular angle; axil with a blue dot rather faint; no spot in axil of dorsal and anal; spinous dorsal and front of soft dorsal deep blue, edged with sky-blue; ventral and pectoral pale bluish; anal and dorsal pointed; caudal pointed with unequal lobes; breast blue, with dark streaks.
- (4) From Apia. Bright blue, with indigo markings on head; a black opercular spot with a white one before it; spinous dorsal deep blue; soft dorsal golden; caudal pure yellow; anal pale yellow; no fin spots; ventral blue; belly pale blue; pectoral colorless.
- (5) From Pago Pago. Vivid blue head, shoulders and back, with numerous spots of light blue, also violet; small black opercular spot; axil unspotted; first dorsal blue, with blackish edge; second dorsal golden, black-edged; no black spot; caudal and caudal peduncle bright yellow; anal blue; ventral dusky, pectoral bluish.

813. *Pomacentrus cyanomus* Bleeker. New Guinea (Macleay).
 814. *Pomacentrus prosopotaenia* Bleeker. New Guinea (Macleay); East Indies.
 815. *Pomacentrus tæniurus* Bleeker. Tahiti and Faté (Seale); East Indies.
 816. *Pomacentrus bifasciatus* Bleeker. Boston I.; East Indies.

817. *Pomacentrus trimaculatus* Cuvier & Valenciennes. Palau Is.; Guam; Marcus I.; New Guinea (Macleay); East Indies.

This species is easily recognizable by the black spots on the side of the back. It was not taken by us. Bleeker identifies *P. perspicillatus* with *P. trimaculatus*, but the description of the former is too scanty to permit of certainty.

818. *Pomacentrus notophthalmus* Bleeker. Woodlark I.; Faté; New Hebrides (Seale); East Indies.

This species, not taken by us, is very well marked by its coloration, the anterior dorsal region being violet-brown, the rest of the body largely yellow.

819. *Pomacentrus vaiuli* Jordan & Seale, new species. *Vaiuli*. Samoa. (Pl. XL, fig. 2.)

Head 3.50 in length; depth 2; eye 2.85 in head; dorsal XIII, 14; anal II, 16; scales 3-30-9, twenty scales in lateral line proper, which ends under posterior third of soft dorsal fin; interorbital equal to eye; snout 3.40 in head.

Body compressed, elevated, the upper and lower outlines evenly rounded; depth of caudal peduncle 2 in head, its length 2.75; mouth small; maxillary reaching to below anterior margin of eye, a single series of rather flat cutting teeth in each jaw; no teeth on vomer or palatines; preorbital rather wide, 2 in maxillary, its lower posterior margin strongly toothed; suborbital very narrow, about one-half as wide as preorbital, its lower margin toothed; opercle entire; preopercle denticulate; gill-rakers rather blunt, the longest less than width of pupil; base of dorsal 1.75 in length of fish without caudal, its longest ray 1.20 in head; posterior extremities of dorsal and anal pointed; base of anal equal to head; pectoral equal to head; first rays of ventral somewhat prolonged and filiform, reaching to base of anal; caudal forked, its lobes slightly longer than head.

Color in spirits, purplish, lighter with yellowish wash on upper third of body, the colors thus being reversed from the usual coloring in fishes; scales with blue dots in the center which form numerous blue longitudinal lines on body, about 17 on each side, some more or less irregular, the upper one of the lines extending from tip of snout over interorbital space along base of dorsal; the second has its origin on nuchal region; the third has its origin at posterior of orbit; two narrow blue lines from orbit to mouth; a distinct black opercular spot; a black blue-edged ocellus on the base of the 7 posterior soft dorsal rays; dorsal yellowish with dark margin; caudal bright yellow; pectoral bright yellow; ventral and anal dark blue; the anus has 3 bands of blue dots.

Life colors were noted in various specimens as follows:

(1) Specimen from Apia called *vaiuli* (blue water). Brilliant deep blue, darkest below; the back abruptly orange-yellow with two blue stripes on each side, breaking up behind into rows of dots; no median stripe; dorsal orange with blue edge and blue dots; soft dorsal with a large, black, blue-edged ocellus; caudal and pectoral golden; ventral and anal blue-black.

(2) From Apia. Deep purplish; dull golden about gill-openings and on tail; sides of head and region of gill-opening with numerous sky-blue spots; a small round black spot on angle of opercle above black speck in axil; dorsal brownish, dull golden behind with a black, bluish-edged ocellus on base of soft dorsal; obscure blackish band along middle of spinous dorsal; anal brownish, with four or five oblique irregular blackish bands; pectoral and caudal golden; ventral blue-black.

(3) From Pago Pago. Iridescent purple-blue on sides in post-pectoral region, fading behind into brown-blue; above rich amber with blue in longitudinal series of dots; dorsal light amber with a very narrow marginal bright blue line; anal purplish brown; pectoral thin clear yellow, purple-violet below; dorsal with black ocellus with narrow blue margin on posterior end.

(4) From Apia. Back golden brown, grayish on tail; sides and belly deep blue; a row of dark blue spots along each row of scales; two dark blue stripes from snout to dorsal; dorsal golden brown, blue-shaded; a large, black ocellus, blue-edged, on the base of last soft rays; caudal pure golden; anal blue-black, with two oblique shades across it; pectoral golden; ventral blue-black.

The young of this species is remarkable for the reversal of the coloration, the back being golden, the lower parts violet black. With age, the dark coloration extends upward on the back. The black opercular spot and the black ocellus at the end of the soft dorsal remain the same at all ages. The violet spots on the side grow fainter with age but do not disappear.

Fifteen specimens from Apia and one from Pago Pago. The type, no. 51740, U. S. National Museum, is 2.75 inches long.

820. *Pomacentrus tripunctatus* Cuvier & Valenciennes. Vanicolo; Fiji; East Indies.*Pomacentrus tripunctatus* Cuvier & Valenciennes, Hist. Nat. Poiss., v, 421, 1830, Vanicolo.† *Pomacentrus trilineatus* Ehrenberg in Cuvier & Valenciennes, op. cit., v, 428, 1830, Red Sea. Sauvage, Poiss. Madagascar, 428.*Pomacentrus tenuometopon* Kner, Sitz. Ak. Wis. Wien 1838, 56, Kandavu.

This species was not taken by us. The black ocellus on the back of the tail seems to be a distinctive character. It is doubtful whether *Pomacentrus dorsalis* of Japan is the same species.

821. *Pomacentrus amboinensis* Bleeker. New Guinea (Macleay).**822. *Pomacentrus bankanensis* Bleeker.** Guam; East Indies.**823. *Pomacentrus semifasciatus* Günther.** Boston I., Marshall Group.*Pomacentrus semifasciatus* Günther, Fische der Südsee, 226, with plate, 1878, Boston I.

This species was not seen by us.

824. *Pomacentrus jenkinsi* Jordan & Evermann. Hawaii.**825. *Pomacentrus analis* Macleay.** New Guinea.*Pomacentrus analis* Macleay, Proc. Linn. Soc. N. S. W. 1893, 364.**826. *Pomacentrus melanopterus* Bleeker.** *Pu sina*; *Tu'u'u*. Samoa; East Indies.*Pomacentrus megalops* Sauvage, Poiss. Madagascar, 426; after Liénard.

Ten specimens from Apia. This species is easily separated from *P. nigricans* and other black species by the large black spot covering the whole base of the pectoral. From most of the black species it may be known by the presence of 13 dorsal spines, there being but 12 in *P. nigricans* and *P. lividus*.

Life colors of a specimen from Apia, called *tu'u'u*, all black, a large jet black spot or cross bar on base of pectoral; belly with coppery shade; gray spots on scales.

827. *Pomacentrus littoralis* Kuhl & Van Hasselt. Tahiti; Caroline Is.; Waigiu; Guam; Shortland I.; Raiatea and Makatea (Seale); East Indies.

This species is distinguished by the presence of 13 dorsal spines, a plain dusky coloration with a black spot on the tip of the opercle only, and a strongly serrate suborbital. In *P. inornatus*, which is similarly colored, this bone is nearly entire. In *P. nigricans*, *P. lividus*, and its allies or variations there are 12 dorsal spines.

This species was not taken by us. The species called *P. emarginatus* and *P. chrysurus* are almost certainly identical. They would be certainly placed in *P. littoralis* were it not stated that the caudal is yellow, and there is no mention of an opercular spot. According to Sauvage, the *littoralis* of Bleeker is a different species, properly called *Pomacentrus pristiger* Cuvier & Valenciennes.

828. *Pomacentrus inornatus* De Vis. Samoa.*Pomacentrus inornatus* (misprinted *niornatus*) De Vis, Proc. Linn. Soc. N. S. W. 1884, 451, South Seas.

Three specimens from Apia. This fish is plain blackish, without spot. The nose is distinctly blacker than the rest of the body. There are 13 dorsal spines, largely enveloped in the scaly sheath, and the suborbital is almost entire, without the strong retrorse serrations seen in most of the other black species. The species is certainly identical with *P. inornatus* of De Vis. *Pomacentrus emarginatus* seems to differ in the strongly serrated preorbital.

829. *Pomacentrus nigricans* Lacépède. *Tu'u'u*. Samoa; Fiji; Tonga; Palau; Ponape; Tahiti; Raiatea; Marquesas I. and Faté (Seale); East Indies.*(Pomacentrus scolopaeus* Quoy & Gaimard; *Pomacentrus tenuops* Lesson.)

This species is very abundant in all the pools on all the coral reefs of Upolu and Tutuila. It may be known from its intimate associate, *P. lividus*, with which Bleeker has confounded it, by the narrow preorbital, more extensively scaled forward. In both species there are 12 dorsal spines, and the preorbital is strongly serrated. Usually the color of the body is plain dusky olive, without blue spots. The dusky spot or shade on soft dorsal and on axil of pectoral is variously developed, sometimes very distinct, sometimes obscure. The blue stripe on the suborbital is usually but not always distinct.

Either this species or *P. albofasciatus* must be the original *P. nigricans* of Lacépède. In view of the fact that *albofasciatus* is perhaps a color variation, or else the female of *scolopseus*, we may adopt the name *nigricans* for the latter or for both.

Life colors of a specimen from Apia, greenish black; a sharp pale streak below eye; base of pectoral black; spinous dorsal, anal and base of soft dorsal and caudal blackish; pectoral bright yellow; rest of soft dorsal and caudal bright yellow, brightest behind.

A specimen called *tu'u'u*, from Apia, was sooty; middle of body paler olivaceous, darker above, livid bluish below; two blackish cross shades under front of dorsal; posterior parts and head black; opercle, iris, space below eye violet; axil black; fins all black, paler behind; axils of dorsal and anal very black.

A young individual from the same locality was olive; brownish anteriorly, yellowish behind middle; dorsal dull orange, with a large jet-black spot in the axil; caudal golden; anal black, with orange shade; pectoral golden with a black spot in the axil; ventral black.

The original *Pomacentrus nigricans* is described from an unknown locality in the Pacific. It is plain blue-black, the depth half the length, the preorbital serrate; dorsal XII, 17, anal II, 15. It can be no other species, as the other black ones have 13 dorsal spines. *Pomacentrus nigricans* of Quoy & Gaimard and of later writers is *Pomacentrus jenkinsi*, a species with 13 dorsal spines.

830. *Pomacentrus albofasciatus* Schlegel. *Ulavāpua*. Samoa; Palau I.; East Indies.

This species or form is abundant about Samoa, swarming in the crevices of the reefs. We have over a hundred specimens from Apia and Pago Pago. It is dull-colored, usually blue-black, with a broad whitish cross-band on the posterior part of the body. This band is never wholly absent. There is also a black pectoral spot and a black blotch, not ocellated on the last rays of the dorsal. This species is regarded by Günther as a variety of *P. scolopseus*. We find no difference except in the presence of the broad pale cross-band in *albofasciatus*. This is wanting in *S. nigricans*. It is usually but not always present in the form or species called *eclipticus*, which has in addition a short very white bar before the black dorsal spot. The three forms agree in all other regards, and are probably, as Dr. Günther has indicated, variations of *Pomacentrus scolopseus*, or *Pomacentrus nigricans*, to adopt the earliest name given to any of these dusky species with 12 dorsal spines. All the dusky species of *Pomacentrus* have 13 dorsal spines, excepting *Pomacentrus nigricans* and its allies or variations. Eight of our specimens of *Pomacentrus albofasciatus* are females. Two are apparently male, but may possibly be spent females. Both males and females are found among the specimens of *nigricans* and *eclipticus*.

Life colors of a specimen from Pago Pago, brown with vertical pale blue streaks on many of the scales; a broad, yellowish-white cross-band under last dorsal spines; a violet-pink streak below eye; violet scale above axil; axil black, as also base of pectoral; dorsal colored like body; first three spines black, rest pale; soft dorsal with large black blotch in axil; caudal dull olive-gray; anal similar, with violet dots on scales at base, and with violet edge; ventral dusky with thin violet edge; pectoral dull.

A specimen from Apia, called *ulavāpua*, was dirty olive; a yellowish cross-band under soft dorsal.

831. *Pomacentrus eclipticus* Jordan & Seale, new species. Samoa.

Head 3.20 in length; depth 2.20; eye 3 in head, equal to interorbital space; dorsal XII, 15; anal II, 12; scales 3-29-9, 19 in lateral line.

Body oblong, compressed, elevated, scales covering head and body; caudal peduncle 2 in head, its depth equal to its length; mouth small, its angle under anterior margin of eye; a single row of rather flat cutting teeth in each jaw, no teeth on vomer or palatines; opercle with a single flat spine on margin; preopercle strongly denticulate also, its width at angle of mouth equal to pupil, directly below median line of eye, preorbital width two-thirds of pupil; gillrakers not very sharp, the longest two-thirds width of pupil, 9 on lower limb; spines of dorsal graduated posteriorly, the last being the longest, 2 in head; first dorsal spine less than eye; middle ray of soft dorsal the longest, 1.45 in head; base of anal 1.25 in head, its longest spine about equal to base; pectoral 1.10 in head, its tip on line with 11th scale of lateral line; first rays of ventral slightly elongate, extending to anal opening, the length slightly greater than head; caudal forked, the lobes rounded, the upper one slightly the longer, about equal to head.

Color in spirits ranges from light yellowish brown to dark brown, almost black; the type specimen is light yellowish brown, with slight shading of dusky on head and upper surface of body; all specimens show a distinctive black spot in axil of soft dorsal with a white spot of equal size and shape just anterior to the dark spot; in size this dark spot is equal to the orbit in height and two-thirds of orbit

in width; a very distinct black spot on the upper base of pectorals which extends into the axil of the fins; a more or less distinct blue line on preorbitals, and there may be 3 or 4 indistinct pearl-colored spots on the opercles or cheeks; dorsal fin with a black blotch near margin of 3-4 spines, with a yellowish white line below; in general, the fins follow the shading of color shown on the body, the dorsal with a narrow margin of dusky, the anal with a dusky blotch; ventral with a dusky wash; iris blue.

Life colors of a specimen from Apia, dull brownish, paler behind middle of body; fins plain; a large black spot on last rays of soft dorsal; a large golden one before it; a black spot in anal axil, one in pectoral axil, and one on opercle.

A specimen from Pago Pago was black, blacker on base of last dorsal and anal rays; a short, vertical whitish bar just before the spot on dorsal; a black blotch on base of pectoral, covering axil; fins all black, the caudal and soft dorsal a little paler at tip; iris brownish; preopercle serrate, a faint rather broad blue streak below eye to tip of snout.

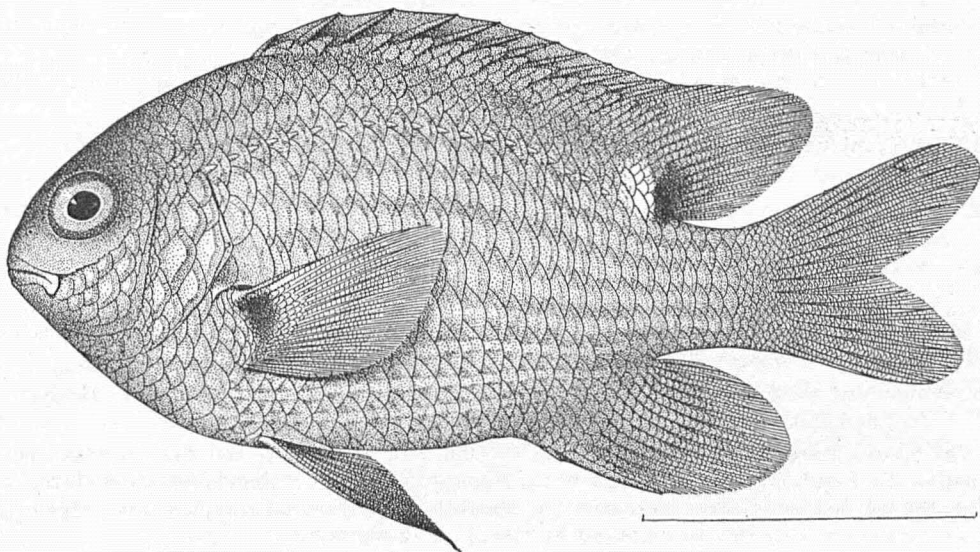


FIG. 50.—*Pomacentrus ectipticus* Jordan & Seale, new species. Type.

Of this abundant species or form, we have about 30 examples from Apia and 10 from Pago Pago. The species may be known by its plain coloration, the pectoral spot being distinct and the dorsal spot still more so, preceded by a short vertical bar, which is typically pure white. Among our specimens are both males and females, a fact which shows that this is not the male of *Pomacentrus albofasciatus*. For the present we may regard it as a distinct species.

The type is no. 51735, U. S. National Museum, from Apia, length 3 inches.

832. *Pomacentrus lividus* (Forster). *Tu'u'u sue uli*; *I'u sina*. Samoa; Vavau; Ponape; Boston I.; Borabora; Huahine; Santa Cristina; Fiji; Marcus I.; Tahiti; Guam; Faté; Nukahiva and Raiatea (Seale).

Chaetodon lividus (Forster), Bloch & Schneider, Syst. Ichth., 235, 1801, *Bolabola*.

Eupomacentrus lividus, Bleeker, Pomac., 73, 1877, East Indies generally.

Pomacentrus lividus, Sauvage, Poiss. Madagascar, 426.

Pomacentrus punctatus, Quoy & Gaimard, Voy. Uranie, 395, taf. 64, fig. 1, 1824, *Ile de France*. Günther, Cat., IV, 29. Kner, Novara Fische, 243, Tahiti, Nicobar Is. Seale, Bishop Museum, 1901, 80, Guam. Bryan & Herre, Bishop Museum, 1903, Marcus I.

Pomacentrus prosopotenoides Bleeker, Amboina and Ceram, 286.

Pomacentrus cyanospilus Bleeker, Ceram, II, 709, *Ceram*. Günther, Cat., IV, 30, East Indies. Günther, Fische der Südsee, 229, taf., Boston I., Upolu, Vavau, Ponape, Huahine, Borabora, Santa Cristina.

Pomacentrus vitianus Sauvage, Bull. Phil. Soc., III, 1879, 206, *Viti Levu* (Fiji).

This large species is very abundant in the rock pools of the coral reefs of Samoa. It is found in company with *Pomacentrus nigricans*, which it much resembles. It is, however, easily distinguished

by the broad naked preorbital, a character well shown in Günther's plate. The blue or whitish spots are generally conspicuous, especially on the sides of the head.

We can not see that *Pomacentrus vitianus* Sauvage differs in any respect from *Pomacentrus lividus*. Life colors of various specimens were noted as follows:

(1) From Pago Pago. Violet-black, with three obscure black cross-bands; eye bluish; a violet stripe below eye to snout; a violet shade on opercle; a faint dark blotch at base of pectoral; no spot, either black or white, in axil of dorsal; fins all black.

(2) Same locality. Black body and fins; axil with a black spot extending on base of pectoral; anal edged with violet-blue; fins all black.

(3) From same locality; specimen called *v'u sina* (white tail). All black, unspotted; axil and broad bar across base of pectoral black; edge of dorsal, anal, and caudal dull whitish.

(4) From Apia. Grayish black mottled with sooty gray; a round black opercular spot; no other markings; ventral black.

(5) From Apia. Dull olive brown, each scale posteriorly with a black spot; dorsal dusky, the soft dorsal dull yellow at base, with a curved black bar behind it; anal similarly marked; caudal dull yellow at base; pectoral dull orange; ventral brownish.

(6) From Apia; fins low. All grayish black; base of dorsal, anal, and caudal golden washed; axil dark.

833. *Pomacentrus devisi* Jordan & Seale, new name. South Seas.

Pomacentrus trifasciatus De Vis, Proc. Linn. Soc. N. S. W. 1884, 452, South Seas; name preoccupied.

834. *Pomacentrus onyx* De Vis. South Seas.

Pomacentrus onyx De Vis, Proc. Linn. Soc. N. S. W. 1884, 461, South Seas.

ABUDEFDUF^a Forskål.

(*Glyphisodon* Lacépède; *Stegastes* Jenyns; *Chrysiptera* Swainson; *Euschistodus* Gill; *Paraglyphidodon*, *Glyphidodontops*, *Hemiglyphidodon*, and *Amblyglyphidodon* Bleeker.)

835. *Abudefduf sordidus* (Forskål). *Ulavāpua*. Samoa; Hawaii; Tahiti; Raiatea; Bonham I.; Faté and Makatea (Seale); East Indies.

This species, recognizable by its large size, by faint dark cross-bands, and the black spot below the axil of the dorsal, is common throughout the tropical Pacific. It is abundant both at Hawaii and Samoa, but is found among lava rocks only, not about the coral reefs. A specimen from Apia in life had six dark cross-bands and the usual spot at base of last dorsal ray.

^a We have referred the question of the propriety of the use of *Abudefduf* instead of *Glyphisodon*, and of the rejection of *Abuhamrur*, *Farer*, and other quasi subgeneric names of Forskål, to our friend Dr. Leonard Stejneger. From a letter dated November 23, 1904, we quote his view of the matter, with which we fully concur:

"Forskål, we are informed, based his nomenclature and systematic arrangement principally on Linnæus, 10th ed., probably the only systematic work he had with him. It is therefore of importance to examine into the "subdivisiones" of genera which Linnæus employed. He has four kinds, for instance:

1. <i>Perca</i> , p. 289.	3. <i>Salmo</i> , p. 308.
X. <i>Pinnis dorsalis</i> 2 distinctis.	X. <i>Truttæ</i> .
XX. <i>Dorso monopterygio</i> , etc., etc.	XX. <i>Osmeri</i> .
2. <i>Cimex</i> , p. 441.	XXX. <i>Coregoni</i> .
a. <i>Apteri</i> .	4. <i>Gryllus</i> , p. 425.
b. <i>Scutellati</i> .	X. <i>Mantis</i> .
c. <i>Coleoptrati</i> , etc.	XX. <i>Acridia</i> .
	XXX. <i>Bulla</i> , etc.

Only the fourth kind of subdivision corresponds exactly to our subgenus, but the names of subdivision 3 are by common consent treated as subgenera and used as such in the singular (thus by yourself and Dr. Evermann in *Fishes of North and Mid. America*). Of course the names of the second division have never been used in this sense, and in No. 1 there are no names.

The question as to Forskål's names then resolves itself to which of these categories they are to be referred. If they are used as subgenera, or in a subgeneric sense like category 3, we must accept them.

It seems then to me that *Abudefduf* comes within category 4. Both *Chaetodon* and *Acanthurus* are in the singular, and *Abudefduf* is in no manner distinguishable from them.

On the other hand, *Perca dentibus Louti*, *Daba*, *Scarus dentibus Sidjan*, *Abu djubbe*, *Harid*, fall under category 1.

The subdivisions of *Sciæna* (p. 44) seem to me to be very much of a similar character, or, rather, they correspond almost exactly to the modern way of subdividing "commode" such large genera according to groups of species, which we

836. *Abudefduf septemfasciatus* (Cuvier & Valenciennes). *Mutu*; *Alala saya*. Samoa; Guam; Faté; Shortland I.; Rarotonga; Raiatea and Makatea (Seale); East Indies.

Of this well-marked species we have four large examples from Apia. Life colors of one of these, called *mutu*, dull olive, with black bars, six wider than interspaces; silvery streaks faint along rows of scales; pale whitish streak along spinous dorsal; everything else pale.

837. *Abudefduf saxatilis* (Linnaeus). Samoa; Waigiü; Tubuai (Seale); Marcus I.; East Indies; Japan.

This species, common from Japan to the Red Sea, is occasionally taken in the South Seas. We have one large example, corresponding to *Abudefduf waigiensis* from Apia. In Hawaii it is replaced by *Abudefduf abdominalis*, and in America by the equally closely related *Abudefduf marginatus*.

838. *Abudefduf abdominalis* (Cuvier & Valenciennes). Hawaii; Laysan.

839. *Abudefduf coelestinus* (Cuvier & Valenciennes). *Fili mana*. Samoa; Ulietea; New Guinea; Waigiü; Tahiti; Raiatea; Faté and Shortland Is. (Seale). (Pl. xli, fig. 1.)

This species is very common about Samoa, nearly a hundred specimens being taken at Apia and Pago Pago. It is perfectly well distinguished from *Abudefduf saxatilis*, and rarely inhabits the same waters. Its life color is pale sky-blue, not olive-green, and the black stripe on each lobe of the caudal is constant.

A specimen from Apia in life was vivid sky-blue with paler streaks along scales; cross-bands jet black, a black stripe on each caudal lobe.

840. *Abudefduf curacao* (Bloch). New Guinea (Macleay); Shortland I. (Seale); East Indies; Japan.

841. *Abudefduf dicki* (Liénard). *Tu'u'u*. Samoa; Ponape; Guam; East Indies. (Pl. xli, fig. 2.)

Glyphisodon untfasciatus Kner & Steindachner, Sitz. Ak. Wiss. Wien 1867, 375, Samoa.

Of this handsome and well-marked species half a dozen specimens were taken at Apia. Life colors of one of these, called *tu'u'u*, golden brown, dark, each scale with a vertical bar of dark blue; a large jet-black crescent from front of soft dorsal across body and covering most of anal; behind this abruptly pale orange-red, the color covering caudal peduncle, caudal and last rays of dorsal and anal; older examples have color deeper, clear orange-red behind black crescent; pectoral bright golden yellow, dusky behind; ventral blackish; head plain.

842. *Abudefduf lacrymatus* (Quoy & Gaimard). *I'u samasama* (yellow tail). Samoa; Guam; Yap; Howland I.; East Indies.

Of this well-marked species, black, with bluish white well differentiated spots, we have three specimens from Apia.

Life colors of a specimen called *i'u samasama*, black, with scattered round spots of deep violet-blue, on head, nose, back and sides, also on dorsal; caudal peduncle, caudal and posterior part of soft dorsal abruptly pale rayish yellow, the color of the ginger flower; fins otherwise black, the anal washed with orange; dorsal and spinous anal with violet spots; ventral black, edged with blue; axil a little dusky.

Another specimen was black (brownish) with bright violet shade on opercle and preorbital and numerous violet-blue spots on spinous dorsal, which has a narrow blue edging; axil black, dorsal black, its last rays abruptly bright orange; caudal dusky orange-brown; anal black with pale blue anterior edge; pectoral dusky; ventral blackish.

843. *Abudefduf behni* (Bleeker). Samoa; Rarotonga (Seale).

Of this species, pale brownish black, with a black axillary spot, we have one fine specimen from Apia.

do not wish to split up nomenclatorially. It is as if I should say the enormous genus of *Rana* can be subdivided for the sake of convenience into (1) the *temporaria* group; (2) the *esculenta* group, etc. That Forskål (or his editor) uses capitals and an upper case capital initial means nothing, for he also has "(C) *Immaculatæ*" exactly like *Abu hamrur*.

The case of the *Sciæna*, i. e., *Abu hamrur*, etc., is not exactly like that of *Abudefduf*, and I believe there is just difference enough to draw the line just between them. I do not believe they fulfill the conditions for being subgenera, while *Abudefduf* does."

844. *Abudefduf melas* (Bleeker). Laysan (Steindachner); East Indies.
845. *Abudefduf nigrifrons* (Macleay). New Guinea (Proc. Linn. Soc. N. S. W. 1884, 271).
846. *Abudefduf bimaculatus* (Macleay). New Guinea.
847. *Abudefduf leucogaster* (Bleeker). Shortland I. (Seale); East Indies.
848. *Abudefduf pallidus* (De Vis). New Guinea.
Abudefduf pallidus De Vis, Proc. Linn. Soc. N. S. W. 1884, 452.
849. *Abudefduf imparipennis* (Vaillant & Sauvage). Hawaii.
850. *Abudefduf filamentosus* (Macleay). New Guinea.
Abudefduf filamentosus Macleay, Proc. Linn. Soc. N. S. W. 1883, 365.
851. *Abudefduf plagiometopon* (Bleeker). New Guinea (Macleay).
852. *Abudefduf emamo* (Lesson). Borabora.
Glyphisodon emamo Lesson, Voy. Coquille, 190, 1830, Borabora.
853. *Abudefduf sindonis* (Jordan & Evermann). Hawaii.
854. *Abudefduf bankieri* (Richardson). New Guinea (Macleay); East Indies.
855. *Abudefduf anabatoides* (Bleeker). New Guinea (Macleay); East Indies.
856. *Abudefduf glaucus* (Cuvier & Valenciennes). Samoa; Guam; East Indies.
Glyphisodon glaucus Cuvier & Valenciennes, Hist. Nat. Poiss., v. 475, 1830, Guam.
Glyphisodon modestus Schlegel, Amphipr., 23, tab. 6, fig. 2, East Indies. Bleeker, Pomacentridæ, 131. Bleeker, Atlas Ichth., tab. IV, fig. 9, Sumatra, Java, Borneo, Amboina. Günther, Cat., IV, 55, Java.
Glyphisodon phaiosoma Bleeker, Verh. Bat. Gen., xxii, Ichth. Bali, 9, Bali.
- This species is common about Samoa, where about 100 specimens were taken. It resembles *Abudefduf zonatus*, but is of a washed-out blue color in life without white bar or black ocellus.
- Life colors of a specimen from Apia, pale sooty olive, yellowish on belly; fins all grayish; preopercle and preorbital with pale edge; a dull orange tint on soft dorsal and caudal; pectoral deep yellow, soiled with dusky; anal dark-edged anteriorly.
- Another specimen from Apia was violet-blackish with green luster; fins all pale bluish with yellowish tinge; ventral bright yellow; no fin spots; three whitish spots violet-tinged on sides on level of pectoral, O-shaped; more of these on other side and irregular.
857. *Abudefduf zonatus* (Cuvier & Valenciennes). *Tu'u'u*. Samoa; Fiji; New Guinea; East Indies.
Glyphisodon zonatus Cuvier & Valenciennes, Hist. Nat. Poiss., v. 483, 1830, New Guinea. Bleeker, Pomacentridæ, 138, and Atlas, 407, fig. 3, Cocos, Java, Borneo, Celebes, Ceram, Amboina, New Guinea.
Glyphisodon brownriggii Günther, Fische der Südsee, 232, taf. 127, figs. c, e, a; not of Bennett.
Glyphisodon rossii Bleeker, Kokos, 48, Cocos I.
Glyphisodon albocinctus Kner, Sitz. Ak. Wiss. Wien, 351, Fiji.
Glyphisodon leucozona Kner, Sitz. Ak. Wiss. Wien, 350, Savay; not of Bleeker.
Glyphisodon cingulatus Kner, Sitz. Ak. Wiss. Wien, lvi, 1867, 725, Fiji.

This little species is very common about Samoa, 150 specimens, of all sizes, being taken. None shows blue stripes or lines, and nearly all have a single white bar on each side. This is lost in the very oldest. In the largest of all is a distinct whitish blotch on the soft dorsal near its last rays.

Life colors of various specimens were noted as follows:

(1) Specimen called *tu'u'u*, from Apia. All blackish, with pale centers to scales; head reticulated gray and blackish; a black speck at end of opercle; caudal with yellowish shade at base; fins otherwise black; caudal and soft dorsal paler behind; pectoral dusky and black.

(2) From Apia. Dusky olive; a white cross-bar under middle of body; a black ocellus edged with white on last dorsal spines; dorsal pinkish dusky; other fins all dusky.

(3) From Pago Pago. Blue-blackish; a broad whitish gray cross-band; an obscure black spot under last dorsal spines; a jet-black spot in axil of last dorsal ray; dorsal dull orange, blackish at base; caudal dull orange; pectoral yellow, axil black; ventral and anal blackish.

(4) From Apia. Deep steel-blue, each scale with a paler center along side; a distinct white band under middle of soft dorsal; dorsal black at base, the upper two-fifths orange, not very bright; belly dusky; no opercular spot or ocellus; caudal dull orange, the edge dark; anal all blue-black, as is also ventral; pectoral golden, a black bar across its base, the axil dark.

(5) From Apia. Blackish; large white stripes along rows of scales; a whitish bar below middle of spinous dorsal; dorsal and anal dusky; soft dorsal half dusky, the tip dull orange; anal almost all dusky; caudal dull orange; pectoral bright golden, no ocelli; ventral black.

(6) From Apia. Blue-black; each scale on front part of sides with a pale gray spot; a vertical whitish bar below middle of spinous dorsal; dorsal dusky bluish below, the upper half dull orange with a pale lateral streak; anal blue-black; caudal sooty; pectoral yellow; ventral blackish.

858. *Abudefduf hemimelas* (Kner). Fiji.

Glyphisodon hemimelas Kner, Sitz. Ak. Wiss. Wien 1868, pl. VIII, fig. 25, 351, Fiji.

Glyphidodon brownriggii var. *hemimelas*, Günther, Fische der Südsee, 233.

This species is not known to us. From the figures of Kner and Günther, it would seem to be a species distinct from *A. zonatus*. Dr. Günther regards it as a "variety" of "*Glyphidodon brownriggii*;" that is, of *Abudefduf zonatus*.

859. *Abudefduf amabilis* (De Vis). Samoa; Tahiti; Oualan; Faituna; Fiji; Ponape. (Pl. XLII, fig. 1.)

Glyphisodon amabilis De Vis, Proc. Linn. Soc. N. S. W., 1884, 452, South Seas.

Glyphidodon brownriggii var. *xanthozona* Günther, Fische der Südsee, 234, taf. 127, fig. D, Oualan, Futuna, Samoa, Tahiti, Ponape; not *Glyphisodon xanthozona* Bleeker.

This species is very abundant about Samoa. Dr. Günther regards it as a "variety" of *Abudefduf zonatus* ("*brownriggii*") from which it differs wholly in color, though in little else. It is near *xanthozona* of Bleeker, but that species has yellow fins and a black ocellus on the dorsal, which is largely yellow.

Life colors of a specimen from Apia, blue-black; two yellowish white cross-bands; opercles orange; an orange streak across axil; base of pectoral dusky; dorsal dusky with a light brown tip; caudal dusky at base, then creamy with a dusky median blotch; pectoral pale yellowish.

860. *Abudefduf antjerius* (Kuhl & Van Hasselt). *Tu'u'u*. Samoa; Guam; New Ireland; Strong I.; New Guinea; East Indies. (Pl. XLII, fig. 2.)

Glyphisodon antjerius Kuhl & Van Hasselt, Anjer (Java). Cuvier & Valenciennes, Hist. Nat. Poiss., v, 481, 1830, Java.

Günther, Cat., iv, 50 (in part). Günther, Fische der Südsee, 233. Seale, Bishop Museum, 1901, 83, Guam.

Glyphisodon biocellatus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 482, 1830, Guam, Strong I., Java, New Guinea. Peters, Berl. Mon., 1876, 843, New Ireland.

Glyphisodon punctulatus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 484, 1830, Guam.

This species is known to us from about 40 small specimens. It is near *Abudefduf zonatus*, but it never has a white lateral cross-band, and it always has a vivid blue stripe from snout to dorsal. Other blue dots and lines are usually present as well as a black ocellus near middle of dorsal fin. As our specimens differ widely from *Abudefduf leucopomus*, and from *zonatus* of the same size, we must regard *antjerius* as a species distinct from *zonatus*, *brownriggii*, and *leucopomus*.

Life colors of a specimen from Apia, called *tu'u'u*, blue-black above, a bright sky-blue stripe from eye to front of dorsal; a blue-black ocellus surrounded by sky-blue on last rays of spinous dorsal; a much smaller one on last ray at base; a blue dot in axil; body becoming more orange-yellow backward and downward; pectoral, soft dorsal and caudal brilliant yellow; anal orange-red, edged with dark; pectoral orange, with anal dark-edged.

Another specimen from Apia was steel-blue, not brilliant, each scale with a vertical pale dash; a pale shade under front of spinous dorsal; a large black spot under spinous dorsal, a smaller one in axil of soft dorsal; dorsal orange, edged with dark; caudal yellowish orange with a black edging; caudal peduncle and anal orange, edged with black; ventral black; pectoral golden.

861. *Abudefduf leucopomus* (Cuvier & Valenciennes). *Tu'u'u*. Samoa; Oualan; Guam; Nukahiva; Rarotonga (Seale). (Pl. XLIII, fig. 1.)

Glyphisodon leucopomus Cuvier and Valenciennes, Hist. Nat. Poiss., v, 480, Oualan (Caroline Is.).

Glyphidodon brownriggii, "Bastarde zwischen *G. brownriggii* und *G. uniozellatus*," Günther, Fische der Südsee, 240, 235, taf. 123, fig. B, Apia, Oualan.

† *Glyphisodon antjerius* Bleeker; not of Cuvier & Valenciennes.

This species, one of the prettiest of the taupos, or damsel fishes, is common about the reefs of Samoa, where about 50 specimens were taken. All these, young or old, have a broad blue stripe along side of back. Some are otherwise nearly plain golden, others show traces of dark cross-bands. The clear-colored ones are in general the largest and brightest examples.

A. brownriggii, of Ceylon and the East Indies, has a similar blue dorsal stripe, but according to the figures of Bennett, Bleeker and Day it lacks the large black spot at upper base of caudal. All our specimens in spirits have the opercle white, with a black spot at tip. The species may, however, prove inseparable from *A. brownriggii*.

Life colors were noted in various specimens as follows:

(1) From Apia. Bluish-black with blue and golden dots; a vivid blue stripe on each side of back; a black ocellus below soft dorsal; a larger one at base of caudal above; opercle golden with a black spot; axil not black; caudal peduncle before spot pale; dorsal orange and dusky bluish in alternate stripes; caudal orange-yellow; anal yellowish with oblique bluish stripes, very faint, the outer rays dusky; belly yellow, the breast and throat dark blue; ventral dusky orange; pectoral golden.

(2) From Apia. Blue-olive, with many blue dots; belly and tail golden; a broad vivid blue stripe along back; two black spots above it, the second in axil of last ray largest; a black band nearly across base of caudal; opercle golden with a black spot; a golden bar behind pectoral; fins all golden, the soft dorsal and anal orange at tip; first dorsal soiled with bluish; anal with a blue anterior edge.

(3) From Apia. Olive, a broad stripe of intense blue from snout above to base of caudal above, the two meeting around snout and around dorsal; a broad black median band on top of head to nape; two deep blue-black spots under soft dorsal, in front and in axil, the second the larger; a small spot at upper base of dorsal; belly gradually yellow; dorsal, anal, caudal, and ventral deep orange; pectoral a little paler; a blue streak along lower side of eye.

(4) From Pago Pago. Golden; blue back; two ocelli.

862. *Abudefduf uniozellatus* (Quoy & Gaimard). *Taupou*. Samoa; Fiji; Tonga; Marquesas Is.; Futuna; Vanicolo; New Hanover; East Indies. (Pl. XLIII, fig. 2.)

(†*Glyphisodon assimilis* Günther.)

This beautiful species is very common about Samoa, where about 100 specimens were taken on the reefs. There is some difference in the color of the sexes, the females having the dorsal more or less yellow, the fin in the males being blue.

Life colors of a specimen from Apia, called *taupo*, most vivid blue with violet cross-streaks on back; scales on side with yellow dots; belly and lower part of side abruptly yellow; dorsal deep blue, the edge almost black, with a pale violet-blue median band; soft dorsal with an indigo-black blotch at base of last rays, anterior edge indigo-black, the median part blue-violet; caudal deep orange, bluish at base and above, the upper edge indigo-black; anal deep orange, its axil blue; pectoral and ventral blue, the ventral with some orange shade.

A specimen from Pago Pago was of deepest clear blue, sides with many small round golden spots; sides of head with violet specks; a black-violet streak from snout to eye, and upward and backward; three dark spots forming this streak; belly clear orange-yellow; dorsal deep blue; a large black blotch at base of last rays; soft dorsal pale orange, deep blue at base, the margin deep blue black; caudal orange-red, blue at base, the upper margin deep blue black; ventral orange-red, blue-edged; pectoral colorless.

863. *Abudefduf taupou* Jordan & Seale, new species. *Vaiuli sama; Taupou*. (Pl. XLIII, fig. 3.)

Head 3.75 in length; depth 2.75; eye 3 in head, equal to interorbital space; dorsal XIII, 11; anal II, 11; scales 2-16-9.

Body, oblong, compressed; snout rounded; a single row of fine compressed teeth in each jaw; preorbital narrow, about one-half as wide as pupil, its margin smooth and rounded; margin of preopercle smooth; head, excepting snout, scaled; depth and length of caudal peduncle equal, and equal to post-ocular part of head; fourth dorsal spine 1.50 in head; the soft rays of dorsal much longer, about equal to head; pectoral equal to head; ventral prolonged into a filament which reaches beyond origin of anal; caudal more or less rounded.

Color in spirits a deep slaty blue black; the belly abruptly yellowish white; a distinct black spot on posterior base of soft dorsal at axil; an indistinct black line extending back from the posterior of orbit; dorsal fin washed with yellowish white and having a distinct black margin which extends out to tip of fin; the lower half of fin blue; caudal yellowish white; the upper ray black; anal yellowish; ventral yellowish. Some specimens have a wash of dusky on base of anal and base of caudal.

The female fish is without the dark margin to dorsal and caudal, the fins being uniform yellowish white in spirits.

Life colors of various specimens were noted as follows:

(1) From Apia. Deep sapphire-blue or ultramarine; no spots; belly abruptly golden; dorsal brilliant scarlet, the last rays bluish with a small dark spot in axil; caudal dull bluish; anal orange; ventral orange; pectoral blue; a dark stripe through eye and a median one on top of head; these and the dorsal ocellus more distinct in the young.

(2) From Apia. Deep sky-blue; belly abruptly greenish yellow; a black stripe from snout to dorsal above; a black stripe from snout through eye to beginning of lateral line; spinous dorsal brilliant scarlet; soft dorsal pale brownish, with a large black spot at its base; caudal brownish; anal orange-red, deeper before; ventral orange; pectoral purplish, rather dark.

(3) From Pago Pago. Violet-blue, almost uniform above; belly abruptly orange-yellow; a black median streak above head; black streak through eye and snout; black streaks and dots on side of head and shoulder; first dorsal uniform scarlet; second dorsal duller, with large jet-black spot at base; caudal bluish, slightly tinged with orange; ventral and anal orange-red; pectoral dusky; no axillary or opercular spot; side with numerous fine yellow spots visible under lens.

(4) From Pago Pago. Vivid deep blue, the belly and throat from chin abruptly yellow; a narrow black streak through snout and eye up and back to shoulder; a large black spot at base of soft dorsal; spinous dorsal deep scarlet, the soft dorsal and caudal pale bluish; anal and ventrals scarlet; pectoral plain; no spots on axil or opercle.

(5) From Apia. Deepest azure blue, finely dotted with golden on sides; belly whitish; spinous dorsal light vivid scarlet, dusky at base; soft dorsal pale blue, with a large black non-ocellated spot on base, the anterior edge scarlet; caudal pale blue; pectoral same; ventral and anal scarlet.

The specimen of *Abudefduf azureus* figured by Quoy & Gaimard, from Guam, probably belongs to *Abudefduf taupo*. The original type of *Abudefduf azureus*, earlier called *Abudefduf cyaneus* by the same writers, is from Timor. This species, *Abudefduf cyaneus*, is not yet known from the South Seas.

This most beautiful little fish differs from *A. uniozellatus* in the scarlet spinous dorsal fin. About eight specimens were taken at Apia and Pago Pago.

In company with *Pomacentrus pavo*, *Abudefduf uniozellatus*, and other dainty blue species, this fish is known as *taupo* (damsel, village belle) at Samoa.

The type specimen is no. 51741, U. S. National Museum, from Apia, length 2.50 inches.

864. *Abudefduf filholi* (Sauvage). Fiji.

Glyphisodon filholi Sauvage, Bull. Soc. Philom., 1879, III, 207, Fiji.

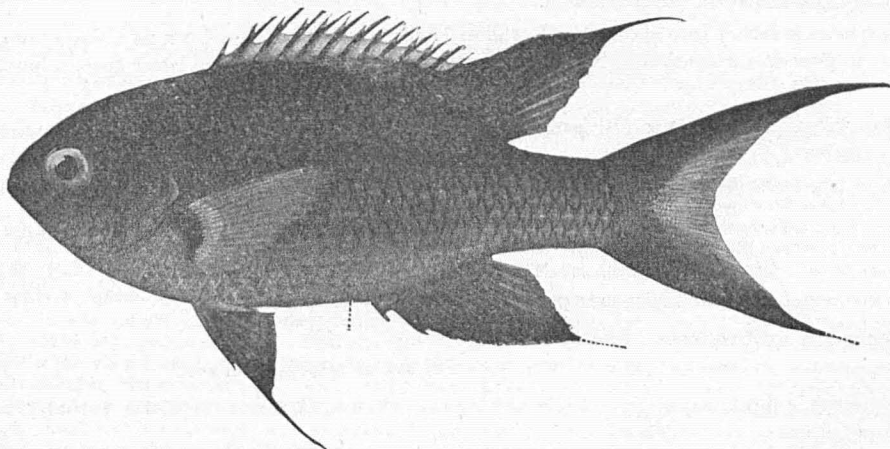


FIG. 51.—*Abudefduf metallicus* Jordan & Seale, new species. Type.

865. *Abudefduf metallicus* Jordan & Seale, new species. Pipi. Samoa.

Head 3.50 in length; depth 2.50; eye 3.25 in head; interorbital 2.80 in head; snout equaling two-thirds of eye; dorsal XIII, 10; anal II, 11; scale 2-17-7.

Body elongate, compressed, the profiles evenly curved; head rounded; preorbital narrow, about one-half the width of pupil, and very short, ending under anterior third of eye; preopercle not

toothed; opercle without spines; head entirely scaled except in front of nostrils; mouth small; a single row of small compressed teeth in each jaw; tips of all the fins except pectorals prolonged more or less into filaments; length of fifth dorsal spine 1.75 in head; pectoral equal to head; filament of ventrals reaching to base of anal, the length of the ordinary rays being much less, 1.20 in head; mid-caudal ray 1.20 in head, the outer caudal rays greatly prolonged.

Life colors of a specimen from Apia (elongate, with all fins produced), blue-black, paler below; a black bar across base of pectoral; no other marks; fins all dusky-edged in a larger specimen apparently the same.

Color in spirits, violet black, lighter below; a distinct black base to pectorals; fins blackish, the pectoral and inner part of caudal lighter; the ventrals with slight wash of bluish.

Of this beautiful species, allied to *Abudefduf cochinchinensis* of Day, we have about ten examples from Apia. The type is no. 51742, U. S. National Museum, length 3.30 inches.

DASYLLUS Cuvier.

Dasyllus Cuvier, Règne Animal, ed. II, 1829a (*aruanus*).

Tetradrachmum Cantor, Malayan Fishes, 240, 1851; substitute for *Dasyllus* on account of the prior *Dascillus* Latreille, 1796, a genus of *Coleoptera*.

866. *Dasyllus aruanus* (Linnaeus). *Mamo.* Samoa; Tonga; Tahiti; Fiji; Guam; New Guinea; Woodlark I.; Marquesas Is.; Shortland I. and Raiatea (Seale); East Indies.

This beautiful little fish is excessively common in the crevices of the coral reefs about Samoa. About 200 examples were taken by us. It is generally diffused from Polynesia to the Red Sea, but it does not occur about Hawaii. In life it is grayish dove-color with jet-black cross-bands.

867. *Dasyllus melanurus* Bleeker. Ponape; Shortland I. (Seale); East Indies.

868. *Dasyllus trimaculatus* (Rüppell). Samoa; Louisiades; Aneiteum; New Guinea; East Indies.

Of this widely diffused species we obtained three specimens in Samoa. Life colors of a specimen from Pago Pago, dusky purplish, the scales dark edged; ventral outline and caudal peduncle brassy; dorsal black, with a row of golden spots; soft dorsal rather pale; caudal and anal bleached and golden; ventral black, some golden; pectoral yellowish, a black axillary spot; a round white spot on each side of back, distinct in our specimens, but very faint in others examined, from the Philippines.

869. *Dasyllus albisella* Gill. Hawaii.

This species is rather rare about the Hawaiian Islands, and has never been seen elsewhere. It is very close to *Dasyllus trimaculatus*, but it has a white vertical bar where the latter species has a white spot.

870. *Dasyllus reticulatus* (Richardson). Kandavu; New Britain; Ponape; New Guinea (Macleay).

Heliases reticulatus Richardson, Ich. Chin., 254, 1838, Canton.

Tetradrachmum reticulatum, Bleeker, Pomacentridæ, 145, 1877, East Indies, generally common.

Dasyllus xanthosomus Bleeker, Banda, 1, 247, Banda. Günther, Cat., IV, 14, Borneo. Günther, *Fische der Südsee*, 237, Kandavu, New Britain, Ponape.

Pomacentrus unifasciatus Kner, Denk. Ak. Wiss. Wien 1869, 348, taf. 8, fig. 24, Kandavu.

This species of the East Indies was not taken by us.

871. *Dasyllus unifasciatus* (Kner).

Pomacentrus unifasciatus Kner, Sitz. Ak. Wiss. Wien 1868, 348, taf. 8, fig. 24, Kandavu.

This species is unknown to us. It is evidently very close to *Dasyllus reticulatus*, perhaps the same species.

CHROMIS Cuvier.

872. *Chromis cæruleus* (Cuvier & Valenciennes). *Pa lanu-moana; Teatea; Mamo.* Samoa; New Guinea; Ulea; Palau I.; Paumotu I.; Yap; Kingsmill I.; East Indies. (Pl. XLIV, fig. 1.)

Heliases cæruleus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 497, 1830, New Guinea, Ulea; said to have 13 dorsal spines.

Heliases frenatus Cuvier & Valenciennes, op. cit., 498, Guam; said to have 13 dorsal spines.

Heliases lepisurus Cuvier & Valenciennes, op. cit., 498, New Guinea.

Chromis lepisurus, Bleeker, Pomacentridæ, 164; Atlas, 403, fig. 7, Cocos, Java, Celebes, Sumbawa, Flores, Aru, New Guinea.

Glyphisodon bandanensis Bleeker, Ichth. Bijdr. Banda, Nat. T. Ned. Ind., II, 248, Banda.

Heliasces frenatus, Bleeker, N. Bijdr. Ich. Ceram., *ibid.*, 710; perhaps not of Cuvier & Valenciennes.

Cantharus cæruleus, Cuvier & Valenciennes, *op. cit.*, v, 342.

Heliasces cæruleus Bleeker, Vierde Bijdr. Ichth., Kokos-eil; Nat. T. Ned. Ind., VIII, 455.

Heliasces lepidurus, Günther, Cat., IV, 63. Günther, Fische der Südsee, 238, taf. 128, figs. c and d, Palau, Paumotu Is., Yap, Kingsmill I.

Glyphisodon anabatoides Day, Proc. Zool. Soc., 1870, 696, Andaman Is.

Glyphisodon amboinensis Seale, Bishop Museum, 1901, 84, Guam; perhaps not *H. amboinensis* of Bleeker.

This beautiful species is very common about Samoa, where about 100 specimens were taken in pools on the reefs. With a general blue-green coloration usually with small yellow dots, there is considerable minor variation in the markings in this species. The pale blue frenum is probably never wholly wanting, although much more conspicuous in some specimens than others.

Life colors were noted in various specimens as follows:

(1) From Pago Pago. Vivid steel-green, becoming violet-blue in spirits, silvery below; faint bluish lines along sides of belly; fins all bluish; a large black spot on base of pectoral; a narrow clear blue streak before eye; ventral sometimes pale, sometimes dusky; no other marks.

(2) From Apia; called *mamo*. Clear sky-blue with a strong greenish tinge, whitish below; no yellow, orange or brown; side with 5 or 6 dark blue streaks like pencil marks along rows of scales; axil with a blue-black spot; first dorsal deep bluish; caudal gray, with a bright blue stripe along each lobe; other fins bluish.

(3) From Apia; called *i'a lanu-moana* or blue-fish, scales 25. Vivid sky-blue with bright reflections; finely dotted with black and with fine golden yellow spots, about one for each scale; belly white; fins plain, like body; ventral darker; chin blue.

(4) From Apia. Vivid sky-blue, growing paler below; usually with small yellow dots anteriorly; axil black; spinous dorsal blue black; soft dorsal and caudal mostly bright orange; anal vivid blue; axil black; ventral pale; pectoral dusky.

(5) From Pago Pago. Clear blue-green, silvery below; some specimens rather green, others blue; three pale blue streaks on side of body; base of pectoral dusky; back of caudal peduncle deep green; fins dusky, without blue.

(6) From Pago Pago. Light blue; darker violet-blue on shoulder; whitish blue below golden on caudal peduncle and below base of second dorsal; a black axil spot; fins all dusky blue, some yellow on second dorsal; pectoral almost colorless; ventral posteriorly blackish

The nominal species *cæruleus* and *frenatus* are doubtless identical with *Chromis lepisurus*, in which case the name *cæruleus* has precedence. The type of *cæruleus* is said to have 13 dorsal spines, while *Chromis lepisurus* has 12. No other difference appears in the description. *Chromis frenatus* has a more distinct blue stripe from the snout to the eye, and the caudal lobes less produced. Both these characters are seen in young specimens. In some of our specimens especially, but not always the smaller ones, there is a sharply defined narrow blue streak from eye to snout, as in *frenatus*. In others there is a faint pale streak, and in some a dark streak a little lower down, or on the lower edge of the pale streak.

In response to a request to reexamine the original types of these species, Dr. Léon Vaillant writes (October 12, 1904):

Les types de *Heliasces* (ou *Chromis*) *cæruleus*, *frenatus* et *H. lepisurus* sont dans un état de conservation qui en permet facilement l'étude. Il y'a quatre exemplaires du *Chromis lepisurus* venant de la Nouvelle Guinée (No. 8754) deux du *Chromis cæruleus* de la même localité (No. 5644) sept du *Chromis frenatus* de Guam. (5744 et A 253.) Tous les animaux ont été rapportés par Quoy & Gaimard. Ce sont les types de l'Histoire des Poissons.

“Les caractères donnés par les auteurs de ce travail étant du caractère de coloration ne se retrouvent guère sauf par le trait argentée qui va de l'oeil au museau, qu'on voit très distinctement, et sur toutes les exemplaires du *Chromis frenatus* mais en ce que tous les exemplaires sont sensiblement plus petit que ceux des deux autres espèces, ce pouvait être un caractère de jeune âge, une sorte de livrée neotérique.

“À première vue, ce *Chromis frenatus* m'avait paru assez différent des *Chromis lepisurus* et *Chromis cæruleus* pour lesquelles l'identification ne saurait pas faire de doute, mais en prenant les dimensions exactes et les réduisant proportionnellement à les longueurs données, j'ai pu me convaincre que les différences de proportions n'étaient que apparent et dues à les difficultés qu'on éprouve de comparer des exemplaires. . . .

“En résumé, je partage tout à fait votre avis et pense comme vous que ces trois espèces n'en font qu'une, à peine serait-on autorisé à regarder le *Chromis frenatus* comme une variété.”

Dr. Vaillant notes that the caudal angles are more prolonged in the specimens called *Chromis lepisurus*, but a table of measurements sent by him shows no important difference in proportions.

873. *Chromis analis* (Cuvier & Valenciennes). *I'a lanu-moana*. New Guinea (Macleay); Samoa; East Indies.

This well-marked species is common at Samoa, where about 25 specimens were taken. Life colors of a very deep specimen from Apia, pale blue, light golden behind and on soft dorsal, anal, and caudal; sides with a few narrow bronze lines; ventral white, dusky-edged, very long; caudal, dorsal, and especially anal dark-margined; a little dusky shade at base of soft dorsal and anal behind; iris blue; a dark speck in pectoral axil.

874. *Chromis ovalis* (Steindachner). Hawaii.

875. *Chromis elaphrus* Jenkins. Hawaii.

876. *Chromis dimidiatus* (Klunzinger). Tahiti; Raiatea; East Indies.

Heliastes dimidiatus Klunzinger, Fische Rothen Meeres, 529, Red Sea.

Heliastes dimidiatus, Günther, Fische der Südsee, 237, taf. 126, fig. b, Tahiti, Raiatea.

This species was not seen by us. It is very close to our *Chromis iomelas*, but according to the figure of Dr. Günther, and the description of Dr. Klunzinger, the posterior boundary of the black area is at the front of the anal fin.

877. *Chromis iomelas* Jordan & Seale, new species. Samoa.

Head 3.30 in length; depth 2; eye 2.10 into head, equal to interorbital; dorsal XII, 11; anal II, 12; scales 2½-16-8.

Body rather deep and stout; head scaled, except between and in front of nostrils; teeth small, in several rows on each jaw; caudal peduncle short, its length equal to its depth; preorbital narrow, equal to about one-half of pupil; fourth dorsal spine about equal to postocular part of head; lobes of caudal prolonged into filaments; pectoral fin slightly longer than head; filaments of ventral reaching to base of anal.

Life colors, specimen from Pago Pago, anteriorly deep brownish black, abruptly pale lavender behind, the color deepest anteriorly; a large black ocellus on base of pectoral; fins colored like rest of body, the elongate caudal very pale lavender, the elongate ventral black.

In preserved specimens anterior from a line with base of fifth dorsal spine vertically down, the color is brown; all posterior to this line is yellowish white; base of pectorals black; ventrals black; four anterior dorsal spines black, the remainder of dorsal yellowish white; caudal and anal yellowish white.

This species is very close to *Chromis dimidiatus*, but the lavender-colored caudal region begins much in front of the anal fin. Three specimens were taken at Pago Pago. The type is no. 51743, U. S. National Museum, from Pago Pago; length 2.25 inches.

878. *Chromis axillaris* (Bennett). Raiatea (Seale); East Indies.

ACANTHOCHROMIS Gill.

Heptadecacanthus Alleyne & Macleay, Proc. Linn. Soc. N. S. W. 1876, 343 (*longicaudus*).

879. *Acanthochromis polyacanthus* (Bleeker). Faté and New Hebrides (Seale); East Indies.

Family LABRIDÆ.

CHÆROPS Rüppell.

880. *Chærops anchorago* (Bloch). Palau; Yap; New Hanover (Peters); New Guinea (Macleay). (*Chærops macrodotes* Lacépède.)

Chærops meander Cartier, from the Philippines, is doubtless the young of this species.

881. *Chærops brenchlyi* Günther. Misol.

Chærops brenchlyi Günther, Ann. Mag. Nat. Hist., 1872, 274.

882. *Chærops cyanostolus* (Richardson). New Guinea (Macleay); Australia; East Indies.

Cossyphus ommopterus Richardson, probably not *Chærops schoenleini* of Bleeker; certainly not *Cossyphus schoenleini* Agassiz.

According to Günther, the stuffed skin which is type of *C. cyanostolus* Richardson belongs to the species called *C. ommopterus* by Richardson, on the next page. This species is characterized by the black dorsal spot, which seems to be wanting in the true *Charops schoenleini*. *Charops schoenleini* of Bleeker has this spot, but also a pale spot beyond it, wanting in *C. cyanostolus*. This seems to be the same as *Charops unimaculata* of Cartier.

883. *Charops cyanodus* (Richardson). Tahiti; Australia.

VERREO Jordan & Snyder.

884. *Verreo oxycephalus* Bleeker. Hawaii; New Guinea; Australia; Japan.

VERRICULUS Jordan & Evermann.

885. *Verriculus sanguineus* Jordan & Evermann. Hawaii.

LEPIDAPLOIS Gill.

886. *Lepidaplois axillaris* (Bennett). New Hebrides; Ulea; Tahiti; Paumotu Is.; Guam; East Indies.

887. *Lepidaplois hirsutus* (Lacépède). Vavau (Günther); East Indies.

888. *Lepidaplois albotæniatus* (Cuvier & Valenciennes). Hawaii; Johnston I.

This species, very abundant about Hawaii, was not taken by us at Samoa. It reaches a considerable size, and is subject to some changes in color with growth.

We can not identify the Hawaiian species with *Lepidaplois bitunulatus* of the East Indies. The latter species, according to Bleeker's figure, has two broad, black curved stripes on the head, instead of the narrow maroon streaks seen in our species. The incomplete account given by Cuvier bears out this probable difference.

889. *Lepidaplois strophodes* Jordan & Evermann. Hawaii.

This species, thus far known from small specimens only, is occasionally taken about Hawaii. The black blotch at base of soft dorsal behind extends across the body, forming a broad black bar. This species is probably not the young of *Lepidaplois albotæniatus*, as supposed by Günther, as we have specimens of the latter of about the same size as the types of *strophodes* which have the characteristic markings of the adult. Still it is possible that these are acquired by some examples at an earlier stage than by others.

890. *Lepidaplois modestus* (Garrett). Hawaii.

891. *Lepidaplois perditio* (Quoy & Gaimard). Tonga; Saumarez Reefs; Aneiteum; Japan; Mauritius.

NESIOTES De Vis.

892. *Nesiotes purpurescens* De Vis. South Seas.

Nesiotes purpurescens De Vis, Proc. Linn. Soc. N. S. W. 1884, 453, South Seas.

LABROIDES Bleeker.

893. *Labroides dimidiatus* Cuvier & Valenciennes. Samoa and Hawaii (Günther); Palau; Yap; New Hebrides; East Indies.

This species was not taken by us.

894. *Labroides paradisæus* (Bloch). New Guinea (Macleay); East Indies.

DUYMÆRIA Bleeker.

895. *Duymæria cæruleomaculata* Günther. Aneiteum; New Hebrides.

896. *Duymæria nematoptera* Bleeker. New Guinea (Macleay); East Indies.

PSEUDOLABRUS Bleeker.

897. *Pseudolabrus unilineatus* Guichenot. Guam.

This species is perhaps the type of a distinct genus.

LABRICHTHYS Bleeker.

Labrichthys Bleeker, Flores, 331, 1854 (*cyanoætania*).

Thysanochilus Kner, Denks. Ak. Wiss. Wien, xxiv, 1865, 5 (*ornatus*).

Chærojulis Kner & Steindachner, Sitz. Ak. Wiss. Wien, liv, 1867, 393 (*castaneus*); not of Gill.

898. *Labrichthys cyanoætania* (Bleeker). *Sugale uliuli*. Samoa; East Indies.

Labrichthys cyanoætania Bleeker, Bijdr. Ichth. Flores, Nat. T. Ned. Ind., vi, 331, 1854, Flores.

Thysanochilus cyanoætania Günther, Fische der Südsee, 242.

Thysanochilus ornatus Kner, Denks. Ak. Wiss. Wien, xxiv, 1865, 5, taf. 3, fig. 1, Samoa.

PlatyGLOSSUS ocellatus (or *PlatyGLOSSUS chrysoætania* var.) Kner & Steindachner, Sitz. Ak. Wiss. Wien, liv, 1867, 377,

Upolu.

Chærojulis castaneus Kner & Steindachner, op. cit., 393, fig., young, Upolu, same specimen as *PlatyGLOSSUS ocellatus*.

We have 8 specimens of this dainty fish from Apia. It is notable for its small mouth and very wide lips. There is a posterior canine tooth and 9 dorsal spines.

Life colors of a specimen called *sugale uliuli*, dark brown, almost black, with obscure stripes of bronze and blue, very dark, and therefore faint; a black spot at base of pectoral; head with wavy blue stripes, lips yellow; dorsal colored like body, with blue edge; anal with blue edge and blue median stripe, elsewhere dark bronze; caudal like body at base, with blue curved streak, posterior part black, the edge pale; ventral blue, with black stripe; pectoral dusky greenish yellow at base.

Another specimen from Apia was jet black, with two white longitudinal streaks, the upper from end of snout to base of caudal, the other from throat alongside of belly to middle of anal; mouth golden; fins black, the caudal white edged.

899. *Labrichthys australis* Steindachner. South Seas.

Labrichthys australis Steindachner, Ichth. Mitth., viii, 1866, 476, South Seas.

EPIBULUS Cuvier.

900. *Epibulus insidiator* (Pallas). *Lapega*; *Gutu-ume*. Samoa; Tahiti; New Guinea; Raiatea and Faté (Seale); East Indies.

This singular fish, which early attracted attention, is common about Samoa. We have 49 examples from Apia and 10 from Pago Pago, and these well illustrate the wide variation in color exhibited by this fish, it being dichromatic, some individuals bright yellow, others dark olive-brown.

Life colors of a specimen from Apia called *lapega*, dark lemon-yellow, brown on top of head, with vertical bar of blackish on each scale; anal yellow and lower part of head yellow; spinous dorsal brownish, yellow at base, then greenish yellow, then brownish red, then green, then orange-brown; a deep blue spot on front of dorsal, with orange below it.

Young very dark brown; a blue spot followed by yellow on front of dorsal.

HEMIGYMNUS Günther.

901. *Hemigymnus melapterus* (Bloch). *Alati moana*; *Paumutu*; *Afataimi*; *Tagitagi*; *Sugale uli*; *Sugale aloa*. Samoa; Palau Is.; Ponape; New Guinea (Macleay); Shortland I. (Seale); East Indies.

This is a very common fish about Samoa. We have 14 examples from Pago Pago and 24 from Apia. The coloration changes with age in a marked degree. In the young the anterior half of the body is largely white.

Life colors of a specimen from Apia, called *afataimi*, or *tagitagi*, dark brownish olive; most scales brown at base, with violet blue spot mostly obscure; head dark, the cheek bright yellow, the space behind eye coppery; head everywhere with vermicular streaks, green above, blue below; lips and chin dirty grayish, unmarked; dorsal brownish red, with blue spots and two blue marginal streaks, the lower violet blue and broader; caudal dirty blue, the rays blue, the margin dirty brown; anal dull blue, with many round blue spots and a blue stripe, the edge brownish; ventral whitish, with dull

orange on first soft ray, and yellow and orange dashes behind; pectoral pale, the axil golden, the upper ray and a bar across base blue, the latter with golden and bluish edge behind; lips very thick; some scales on cheek. A smaller example has the ventrals brighter, orange and blue; otherwise it is the same.

Another specimen from Apia, a large one, was uniform blackish green, the scales showing traces of green and violet markings when examined closely; belly bronze brownish, with a violet spot on each scale, these violet shades scattered over the sides; cheek and interopercle clear olive green; lips dusky olive; a bright grass-green ring about eye; a dull dark blue blotch behind eye; preorbital, suborbital, lower and upper part of cheek and opercle dull bronze-orange with sharp vermiculations; throat reddish gray; dorsal blackish, orange, very dark, with a dark blue edge and a dark blue stripe below; many deep violet spots on membranes; caudal violet blackish, shaded with green on rays and edged with dull orange; violet spots and vermiculations; anal dusky orange, a deep violet blue intramarginal band, and with deep violet spots; ventral orange, with large blue spots; pectoral dusky bluish, paler below.

A specimen called *alati moana*, from Apia, was deep blue black with olive shades behind front of first dorsal and vent; shoulder light green with dull orange spots, the shade becoming golden olive behind gill-opening and on opercle and cheek; the breast, throat, and belly gray; pink shades on opercle; a pink stripe below eye; a large violet-coppery blotch behind eye, with deep violet spots within, these having paler centers; forehead coppery violet, mottled with green; bright blue close behind eye; dorsal violet black, with green on basal-scales, then bright blue marblings anteriorly; violet-blue spots on membranes, with marginal stripes of deep violet-blue, light pinkish brown and black; caudal olive-black, with a median narrow stripe of violet-blue from base to tip; anal brown suffused with blue, with violet-blue spots, and blue, pinkish, and black edgings; ventral colorless, olive-shaded, the anterior rays pink, margined before and behind by dusky blue; pectoral colorless, the upper edge blue. Canines 2-2; no posterior canines; a few scales on cheek; lateral line continuous.

Life colors of a specimen called *paumutu*, from Apia, posterior parts, behind middle of pectoral, deep brownish black; anterior parts abruptly soiled gray; dark brown on top of head, with bluish reticulations; upper lip gray, lower whitish; a whitish undulate streak below eye; axil black; dark brown spots about eye; dorsal dark brown, lighter above with streaks of bluish; anal similar, with a blue stripe and an orange margin; caudal with peduncle light brown, spotted with blue; pectoral colorless; ventral tinged with orange.

902. *Hemigymnus fuliginosus* (Lacépède). Samoa; Carolines; New Guinea (Macleay); East Indies.

Mullus fasciatus Thunberg, Reise nach Japan, iv, 1791, 351, pl. 314, City of "Meaco" (doubtless Miyakoshima, Temple I., one of the Riukiu group); not of White, 1790, which is a species of *Amia*.

Sparus fuliginosus Lacépède, Hist. Nat. Poiss., III, 437, 1802, Ile de France.

Sparus malapteronotus Lacépède, op. cit., 450, Ile de France.

Sparus zoncphorus Lacépède, Hist. Nat. Poiss., IV, 155, 1803; after Bloch.

Sparus meaco Lacépède, op. cit., 161; after Thunberg.

Sparus quinquefasciatus Bennett, Fishes Ceylon, 1839, pl. 23, Ceylon.

? *Tautoga mertensi* Cuvier & Valenciennes, Hist. Nat. Poiss., XIII, 308, 1839; Carolines.

Cheilinus blochi Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 1839, 108; after *Labrus fasciatus* Bloch.

Tautoga leucomus Bleeker, Billton, iv, 239, Billton; young.

Hemigymnus leucomus Günther, Cat., IV, 139, 1862.

Of this species we have one large specimen from Apia. The name *fasciatus* is not tenable for it, having been preoccupied.

ANAMPSES Cuvier. *Sugale*.

903. *Anampses cuvieri* Quoy & Gaimard. Hawaii.

904. *Anampses cæruleopunctatus* Rüppell. *Sugale lupe*. Samoa; Tahiti; Guam; New Guinea (Macleay); Rarotonga (Seale); East Indies.

This species is not common in the South Seas. We have 9 specimens from Apia.

Life colors of a specimen called *sugale lupe*, olive, the belly gradually scarlet; each scale with a violet-blue spot, edged with blackish blue, these confluent into streaks behind and below eye; dorsal orange-brown, spotted with blue and blue-edged; caudal like body, the spots smaller, the edge dusky and then whitish; anal bright orange-brown, spotted with blue and with blue edge, the lowest (basal) row of blue spots oblong; ventral orange streaked with blue; pectoral yellowish; dark brown at base.

905. *Anampses evermanni* Jenkins. Hawaii.
906. *Anampses godeffroyi* Günther. Hawaii.
Anampses godeffroyi Günther, Fische der Südsee, 252, taf. 140, 1873, Sandwich Is.
- This species is described from a drawing made by Garrett at Hilo. We have specimens from Hawaii corresponding to this drawing, but they seem to us only highly colored examples of the species called *Anampses evermanni*. Doubtless the two are identical.
907. *Anampses diadematus* Rüppell. Samoa (Günther); Paumotu Is.; Kingsmill Is.; Huahine; Misol; East Indies.
908. *Anampses neoguinaicus* Bleeker. New Guinea.
Anampses neoguinaicus Bleeker, Archiv. Neerl. 1878, 57.
909. *Anampses melanurus* Bleeker. Savaii.
Anampses melanurus Günther, Fische der Südsee, 252, Amboina.
910. *Anampses pterophthalmus* Bleeker. New Guinea (Macleay); Oualan (Günther); East Indies.
911. *Anampses fdjensis* Sauvage. Fiji.
Anampses fdjensis Sauvage, Bull. Soc. Philom. 1880, 224; Fiji.

AMPHECES Jordan & Evermann.

912. *Ampheces geographicus* (Cuvier & Valenciennes). New Guinea (Macleay); East Indies.

STETHOJULIS Günther.

913. *Stethojulis strigiventer* Bennett. Samoa (Günther); Palau; Fiji; Vavau; Ponape; New Guinea; East Indies.
914. *Stethojulis fulvoventris* Seale. Guam.
915. *Stethojulis renardi* Günther. Samoa (Günther); Guam; Ponape; East Indies.
916. *Stethojulis albovittata* (Kölreuter). Hawaii.

This species is common about the Hawaiian Islands. It is not certainly known from elsewhere, though Günther lists it from Zanzibar and Madagascar. It is well separated from *Stethojulis casturi*, its representative in Polynesia and the East Indies.

917. *Stethojulis casturi* Günther. Samoa; Palau Is.; Futuna; New Guinea; Rarotonga (Seale); East Indies. (Pl. XLV, fig. 1.)

Stethojulis albovittata, Bleeker, Atlas, 132, tab. XLIV, fig. 5, East Indies; not of Bonnatere.
Stethojulis casturi Günther, Fische der Südsee; 255, 1873, Palau, Futuna, Yap.

We have 10 specimens of this fish from the coral reef at Apia. It is readily distinguished from *Stethojulis albovittata*, with which it has been confounded, by the presence of but one stripe extending the whole length of the side. In *Stethojulis albovittata*, which is known from about Hawaii only, there are two bluish stripes from pectoral to caudal, and the interspace between them is red.

Life colors of a specimen of *S. casturi* from Apia, violet-black; abruptly livid bluish white below; a sharp boundary stripe bright sky-blue, widened behind and bordered below by pale golden; head olive green, clear on sides; four curved unequal stripes on head, sky-blue with darker edgings, (1) one above eye, including its upper edge, extending along back to last ray of dorsal, (2) a violet line behind eye to above gill-openings, (3) from angle of mouth to lower part of eye, curving above axil and becoming the blue lateral stripe on body; lowest stripe curving across cheek to join its fellow on the chin. A long crescent of vivid scarlet, including the axil. Edge of shoulder-girdle below it deep blue; dorsal dull brownish gray; caudal grayish, the median blue streak extending on it; ventral and anal colorless, pectoral also.

918. *Stethojulis trilineata* (Bloch & Schneider). New Guinea (Macleay); New Hanover (Peters); Palau Island (Günther); East Indies.

919. *Stethojulis phekadopleura* Bleeker. Samoa; Solomon Is.; Ponape; New Guinea (Macleay); East Indies.

This is a common species in the East Indies; it also occurs abundantly in the South Seas. We obtained 14 examples at Pago Pago and 54 at Apia. We have also examined specimens from Negros in the Philippines.

Life colors of Samoan specimens were noted as follows:

(1) From Apia. Back clear olive-brown with rows of bluish white dots; belly abruptly white, a golden brown boundary stripe widening into a grayish stripe below eye, edged above with a fine white line; the boundary stripe faint with age; belly with 3 or 4 rows of blackish brown spots, one in each scale; base of anal livid blue; a large black spot at base of caudal, surrounded by orange-brown (fainter and more diffuse in old examples, in which the gray stripe below eye is lost, the pale line above it remaining distinct); dorsal orange, dull with bluish and orange spots; caudal dull orange and livid bluish; ventral same, as is also the anal; pectoral colorless; iris reddish; axil unmarked. The lack of axil markings, the white dots above and dark below are characteristic.

(2) From Pago Pago. Green olive above; livid silvery below, brownish above posteriorly; head and all upper parts finely dotted with pale bluish; lower parts with larger dark brown spots in 4 rows; a pinkish white stripe before eye; a black spot on base of caudal above, faint in adult; fins all pale brownish red, the dorsal very finely checked; a pinkish streak below eye, breaking into spots behind; anal livid bluish.

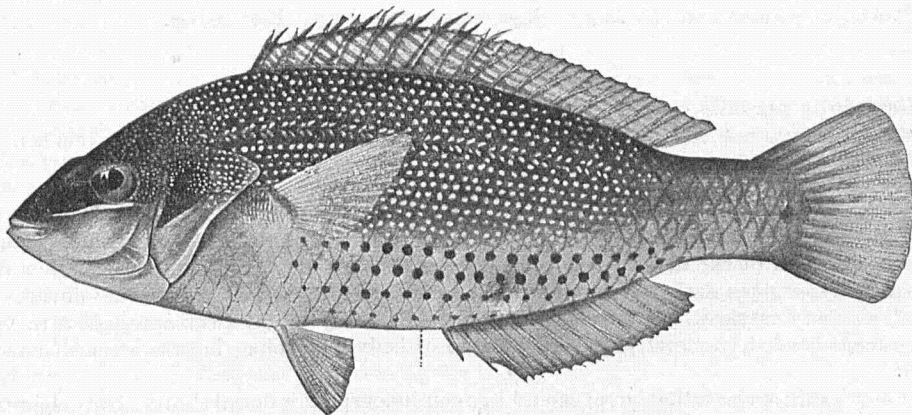


FIG. 52.—*Stethojulis phekadopleura* Bleeker.

(3) From Pago Pago. Very finely dotted above, coarsely spotted below; no axil or caudal spot; a silvery streak below eye; fins reddish; dorsal much speckled.

(4) Very young; from Pago Pago. Bright reddish brown with a pale streak below eye and another from snout above eye along side of back; bluish spots on scales and some black ones on side of belly; a black spot at base of caudal and another on upper fin rays; caudal colorless; other fins orange.

920. *Stethojulis axillaris* Quoy & Gaimard. Hawaii.

This species, as understood by us, is found only about the Hawaiian Islands, where it is rather common. Farther south it is represented by a marked subspecies or closely related species, with slenderer body and paler lower parts, *Stethojulis bandanensis* of Bleeker. It is barely possible that larger series may show the two to be identical, as supposed by Bleeker and Günther.

921. *Stethojulis bandanensis* (Bleeker). Samoa; Palau Is.; Solomon Is.; Fiji; Tahiti; New Hebrides; Ponape; New Guinea. (Pl. XLV, fig. 2.)

Julis bandanensis Bleeker, Banda, I, 254; Banda.

Stethojulis axillaris Bleeker, Atlas, Labr., 136, tab. XLIV, fig. 3, 1862, East Indies; not of Quoy & Gaimard. Günther, Fische der Südsee, 254, taf. 136, fig. c, Palau, Solomon, Fiji, Samoa, Society Is., New Hebrides, Ponape.

This species has been confused with *Stethojulis axillaris* (Quoy & Gaimard), of Hawaii, to which it is closely related. The only tangible differences are these: *Stethojulis axillaris* has the body deeper,

and the belly is not very pale, its coloration not sharply separated from that of the sides. *Stethojulis bandanensis* is a slenderer fish, and the belly is abruptly whitish, with a dark shade on each scale.

This species is very common about the coral reef at Apia, where we obtained 55 specimens. We also collected 9 at Pago Pago. Life colors of a specimen from Apia, gray, silvery on lower half; everywhere with fine lengthwise streaks of white, these broader and more conspicuous below, especially the one below eye, which has a dark streak above it; a small jet-black spot in axil of dorsal and one on upper part of caudal peduncle just before base of caudal; fins all pale (in young of 2 inches).

A specimen from Pago Pago was olive-green, posteriorly purplish; cheek abruptly golden; anterior region with fine pale dots; whitish pink spots along side; a white spot across base of pectoral; a black ocellus on last rays of dorsal, anal and base of caudal; fins otherwise light orange. Another specimen has three caudal ocelli.

Another specimen from Apia has its upper half grayish dusky with very fine bluish-white dots; a grayish lateral band, edged with dark above, a broad metallic purplish gray band below it, the belly silvery, each scale with a dark purplish-gray basal spot, two black pale-blue-edged ocelli on caudal peduncle, a black bar across base of pectoral, a bright scarlet dash in axil, with blue on each side of it; side of head below eye abruptly golden; chin and throat white; dorsal golden brown, finely dotted; caudal dull yellowish; ventral, pectoral, and anal colorless, belly livid blue at base of anal.

922. *Stethojulis filholi* Sauvage.

Stethojulis filholi Sauvage, Bull. Sci. Phil. 1880, 15 (reprint), Fiji.

923. *Stethojulis kalosoma* (Bleeker). New Guinea (Macleay); East Indies.

LEPTOJULIS Bleeker.

924. *LeptoJulis pardalis* Kner. Fiji; Guam; Samoa. (Pl. XLV, fig. 3.)

LeptoJulis pardalis Kner, Sitz. Akad. Wiss. Wien 1867, 727, taf. III, fig. 2 (fig. 9 in text), Viti Levu (Fiji Is.).

PlatyGLOSSUS nigromaculatus Günther, Proc. Zool. Soc. 1871, 666, pl. 60, Samoa.

Halichares nigropunctatus Seale, Bishop Museum, 1901, 89, Guam.

We have 4 specimens of this handsome species, taken at Apia. Life colors of one of these, clear olive-green, yellow below; everywhere with reticulations of ground-color, yellow with blue margins around the black; these marks orange-brown instead of black on forehead, lower part of head, and belly; oblique dark stripes from eye around jaws, edged with light blue; dorsal, caudal and anal similarly marked, the brown becoming distally very bright clear orange-brown; ventral yellow, orange banded; pectoral plain; dorsal edge of body clear olive brown; greenish cross-bars on head.

A canine tooth; scales rather large; lateral line continuous; a low dorsal sheath; body compressed.

MACROPHARYNGODON Bleeker.

This well-marked genus consists of small species, deep bodied and beautifully colored, the lower pharyngeals very small, with large teeth.

925. *Macropharyngodon geoffroyi* (Quoy & Gaimard). Hawaii.

926. *Macropharyngodon meleagris* (Cuvier & Valenciennes). New Guinea; Samoa; Ulea; Shortland I. (Seale); East Indies.

Julis meleagris Cuvier & Valenciennes, Hist. Nat. Poiss., XIII, 481, Ulea.

Macropharyngodon geoffroyi Bleeker, Atlas, Labr., 129, tab. XXXVII, fig. 5, Celebes; not of Quoy & Gaimard.

PlatyGLOSSUS geoffroyi, Günther, Cat., IV, 145 (copied).

This species is scarce about Samoa, one fine example being taken at Apia. Life colors, violet-brown; a large, bright-green spot edged with blue on each scale, these confluent into short stripes on the head; belly mostly light blue; a violet-black spot on breast; dorsal orange, shaded with bluish at base, edged with gray, two rows of clear green blue-edged spots; caudal dull orange, brighter on upper and lower margins and covered mesially with large greenish-blue spots; anal dull orange with three rows of greenish, blue-edged spots, the middle series confluent in a band; ventral dull orange, spotted with green; pectoral colorless, dusky at base, the axil green; a jet-black spot edged with yellow on side above and a little behind base of pectoral.

PLATYGLOSSUS (Klein) Bleeker.

This genus is very closely allied to *Halichæres*. The body is deeper and more compressed, and the scales along the base of the dorsal more elevated, forming a low sheath.

927. *PlatyGLOSSUS marginatus* (Rüppell). Samoa; Raiatea (Seale). (Pl. XLVI, fig. 1.)

Two specimens of this handsome fish were collected by us at Apia. It has not heretofore been found in the South Seas.

Life colors of one specimen, olive-black, region covered by pectoral bright cherry-red; a reddish streak along the edge of each row of scales, these clear brown on back, faint posteriorly and pinkish brown on belly; head golden-brown, much striped with dark blue; belly also blue, striped with brown; dorsal dark orange-brown spotted with dark blue, and edged with sky-blue with a dark blue bounding line; caudal deep orange-brown with dark blue spots and sky-blue edgings; a dark blue bounding line, the angles olive-gray; anal like dorsal but further edged with bright yellowish green; ventral and pectoral dark bluish; axil cherry-red.

928. *PlatyGLOSSUS notopsis* (Kuhl & Van Hasselt). Samoa; East Indies.

The young of this fish differs markedly from the adult in having four conspicuous white lines along the side and two or three similarly colored spots below the dorsal. The dorsal, in both young and old, has a small ocellus between the first and second spines, and a very large one between the first and sixth rays.

This is a common fish at Samoa. We have 40 specimens from Apia, and 49 from Pago Pago. Color in life of a specimen from Apia, almost jet-black, with very obscure whitish spots on scales; caudal paler sooty; iris red; pectoral dull olive, a black bar across base; breast and chin purplish black; dorsal, anal and ventral black, the dorsal usually with a large bluish, white-edged ocellus; caudal abruptly pale olive (side with about a dozen greenish pale streaks in younger ones); teeth small, a posterior canine; head naked; body deep, head sharp above; scales large; dorsal uniform.

Another specimen from the same locality was jet-black, with six irregular interrupted whitish lines, plainest on head; dorsal black, with a large white-edged ocellus on first soft rays; caudal abruptly bright white, a whiter stripe along anterior edge; anal and ventrals black.

Life colors of a specimen from Pago Pago, black, with very faint streaks of bluish, scarcely evident and distinct only on head; caudal abruptly muddy white; a large, black, whitish-edged ocellus on first soft dorsal rays, and a little one on first and second spines; dorsal striped throughout with dull orange; anal, ventral, and pectoral plain blackish. This is very close to another that has golden stripes, very distinct. The latter is apparently the young.

929. *PlatyGLOSSUS flos-coralis* Jordan & Seale, new species. Samoa. (Pl. XLVI, fig. 2.)

Head 3.20 in length; depth 3.50; eye 4.50 in head; dorsal IX, 12; anal III, 12; scales 2-30-8, interorbital equal to eye; snout 3 in head.

Body oblong, compressed; caudal rather deep, 2.30 in head; head unscaled; mouth somewhat protractile, jaws equal, lips thick; teeth in a single series of sharp, somewhat projecting conical teeth in each jaw, the front ones the largest; a sharp canine tooth at angle of jaws; opercle and preopercle entire; gillrakers very short, sharp, about 13 on lower limb; longest dorsal ray 2.75 in head; longest anal spine 2.80 in head; base of anal equal to length of head; pectoral 1.50 in head; anal rounded, 1.50 in head; ventral equal to length of pectoral, its tips not reaching base of anal.

Color in spirits, a dull yellowish brown with ten longitudinal blue lines on the side from head to caudal; these lines are slightly wider than their interspaces and are most distinct on anterior half of body; the caudal peduncle has a median line of yellowish white on its sides extending in from caudal fin; a bright yellow spot on base and in axil of pectoral with a smaller distinct black spot on upper part of base; head yellowish with two blue lines from interorbital to tip of snout, a blue line from anterior margin of eye to tip of snout, a curved blue line around chin over cheek across opercles to base of pectoral, below which are two indistinct blue lines; just back of orbit is a black spot forming the termination of the 4-5 lines of body; the three upper body lines extend on nuchal region, the second joining the line above, the other terminating at upper posterior margin of orbit; a blue crescent on opercular flap; dorsal with seven longitudinal bands of color, the mid one of greenish white, occupying the middle of the fin, being the widest; a broad, dark green, black-edged stripe just

below with light green at base of fin; anal similarly colored, except that the mid-band of light green is wider and there is no lighter coloring at base of fin; caudal yellowish white with the outer half covered with reticulated dark markings, tip of upper and lower margin yellowish white; pectoral and ventral yellowish white.

Life colors of three specimens from Pago Pago were as follows:

(1) Green anteriorly, becoming deep vitriol-blue behind pectorals; anterior parts with stripes of orange-red, which are very bright anteriorly and fade out behind; cheeks golden-green; head stripes very plain; axillary region very bright golden, with a black spot above; dorsal with dull, orange and greenish streaks; caudal blue with pale corners and three orange-red stripes converging and reticulating behind, crossed by horizontal streaks of black; anal with basal and terminal stripes of orange; ventral green with purple stripe; pectoral pale, its base bright golden.

(2) Greenish ground, paler and yellowish anteriorly; ten pinkish salmon longitudinal lines on sides, most pronounced anteriorly. Pectoral with yellowish axil and orange-yellow blotch just behind axil; small but distinct black blotch just in shoulder of pectoral; caudal blue-green at base and mesially with complex linear lines of pinkish salmon, these lines darker in middle portion of fin; dorsal yellowish grass-green with pinkish salmon lines and narrow blue lines; anal similar; ventral bright green with bluish tinge, pinkish salmon on anterior margins; bright blue median longitudinal line on under side of head.

(3) Bronze, with nine sharply-defined lengthwise stripes of greenish blue, as wide as interspaces; a stripe also on median line above and below; head green, yellowish below, the stripes continued on it becoming orange, those below cherry-brown; dorsal brownish orange, with grass-green stripes below and blue lines above and on edge; caudal deep black tinged with red, with blue cross-lines and three green blotches at base; anal orange with one green stripe and four blue streaks; ventral grass-green, blackish-edged; pectoral pale dusky; axil golden; a jet-black spot at base of pectoral.

This beautiful fish is rare about Samoa. We obtained but three specimens, all at Pago Pago. It is apparently close to *PlatyGLOSSUS kallochromus*, of the East Indies, but there are several notable differences in color.

The type, no. 51744, U. S. National Museum, is 2.75 inches long.

930. *PlatyGLOSSUS hœveni* (Bleeker). Samoa; New Guinea (Macleay); East Indies.

We have two examples of this East Indian fish, both from Pago Pago. Life colors of one of these, bright greenish blue, with about a dozen golden stripes, distinct from snout to base of caudal, the interspaces blue, with darker edgings; snout grass-green; iris blue, centrally red; base of caudal reddish brown; a blue-edged black ocellus at base of caudal above, and a larger one on front of soft dorsal; a small one on first dorsal spine; caudal abruptly pale, with a reddish, curved cross-band at base and a whitish bluish one behind it; fins (in young) plain; dorsal striped orange and blue; a dark spot before and one behind eye; snout yellow.

HALICHERES Rüppell.

(*Halichæres* Rüppell, type *cæruleovittata-scapularis*; *Guntheria* Bleeker; *Hemitautoga* Bleeker; *Ichthyocallus* Swainson; *Cherojulis* Gill; *Iridio* Jordan & Evermann; *Parajulis* Bleeker; *Otcynodon* Fowler.)

The proper type of the genus *Halichæres* is a species (*scapularis*) belonging to the group called *Guntheria*. If these sections are regarded as genera, the one commonly called *Halichæres* should rather stand as *Ichthyocallus*, or as *Cherojulis*, if the American species be separated from the others. But it is probably better to leave all the species with large scales, complete lateral line, and a posterior canine, *PlatyGLOSSUS* and *Macropharyngodon* excepted, together in one large genus.

931. *Halichæres scapularis* (Bennett). Shortland I. (Seale); East Indies.

† *Halichæres cæruleovittatus* Rüppell.

932. *Halichæres centiquadrus* (Lacépède). *Ifigi*. Samoa; Guam; New Guinea; Tahiti; Shortland I. and Raiatea (Seale); East Indies. (Pl. XLVI, fig. 3.)

This beautiful fish occurs from the Red Sea throughout Polynesia. We have 3 specimens from Pago Pago and 7 from Apia. Life colors of a specimen from Pago Pago; head grass-green, the stripes creamy pink, edged with blue; jaws yellow; stripes on throat of paler pink.

933. *Halichoeres notophthalmus* (Bleeker). Samoa; New Guinea; Rarotonga (Seale); East Indies.

We have 4 specimens of this East Indian fish taken at Apia. Life colors of one specimen, body gray with transverse blotches of black, very irregular; lips orange; iris red; caudal bright yellow with two confluent white blotches at base, with black between; a white blotch across spinous dorsal; a black ocellus, golden-edged, on soft dorsal; anal and pectoral pale; ventral white; a brown red stripe through eye; whitish stripe below; a brown red spot below; breast mostly black. (Young).

Another specimen was very pale olive, almost white, with three broad black irregular crossbars, the second broadest and blackest, some black spots on the pale bars along line of back; head pale; cheek with two deep blue horizontal stripes, the upper through eye to gill-opening; darker behind eye; two black spots on each side of breast, two on base of pectoral with white between; dorsal colored like body; a large white-edged black ocellus in black part; soft dorsal mottled, pale gray; caudal deep yellow with two whitish yellow spots at base, dusky between; ventral whitish; pectoral colorless; anal pale.

934. *Halichoeres trimaculatus* (Quoy & Gaimard). Samoa; Vanicolo; New Guinea; Fiji; Tahiti; Tubuai; Faté and Shortland Is. (Seale); East Indies. (Pl. XLVII, fig. 1.)

This is a common and most beautiful fish about Samoa, where it swarms in the coral reefs. We have 58 specimens from Pago Pago and 80 from Apia.

Life colors were noted in various specimens as follows:

(1) From Apia. Green, each scale with a dark grayish bronze crescent; scales of nape with orange spots; head green, with bright red stripes and spots; cheek golden, the color bounded by a green band above; creamy red marks on chin and throat, bordered by green; a large jet black spot behind shoulder, with two blue ones within it, the color extending as a bar to ventrals, green, with red spots; an indigo-black spot above lateral line before caudal; dorsal light green with three stripes of creamy scarlet; caudal orange, fading behind, a greenish edge above; anal greenish with two red stripes, the basal one narrower and deeper in color; pectoral colorless; ventral flesh color.

(2) From Apia. Bright green; each scale with a dark olive spot; head green, yellow below, with coppery red streaks and spots about eye; a small black ocellus at base of pectoral, a pink crossbar behind it; a large black spot on caudal peduncle; dorsal greenish, finely covered with coppery red lines; caudal, anal, and ventral similarly barred; belly whitish; pectoral pale.

(3) From Pago Pago. Pale bluish gray, the sides of head sometimes but not always brassy; pale blue stripes before and behind eye, below eye horizontal; tip of snout with plain oblong black spot above; side of body with six blackish cross shades, the second and third widest and more or less confluent; a large blue-black spot on side before caudal; a small black ocellus at upper base of pectoral; fins plain olivaceous; a violet-blue vertical spot on each scale of body.

(4) A larger example. Head green, golden below, the marks crimson not blue; bands more reduced; second and third still plainer; spots on scales orange brown; black pectoral spot at base above, with a green, red-edged bar below it, and a red bar across axil to ventral; throat with two red cross-bands; precaudal spot large and distinct, black rose spot obscure; fins all pale reddish, the dorsal streaked with red on green ground; nape with close-set red spots.

935. *Halichoeres dædalma* Jordan & Seale, new species. *Fataga loa*. Samoa. (Pl. XLVII, fig. 2.)

Head 3 in length; depth 3.20; eye 5.50 in head; dorsal ix, 11; anal iii, 11; scales 25; snout 3.10 in head; interorbital equal to orbit.

Body elongate, compressed, the anterior profile of head evenly pointed; depth of caudal peduncle 2.20 in head; teeth in a single series in each jaw, the anterior ones projecting canines, a single posterior canine at angle of jaw; lips rather thick, with folds; angle of jaws scarcely reaching to anterior margin of eye; opercle and preopercle entire, no scales on cheek; the last spine of spinous dorsal the longest, 3 in head; the longest soft ray 2.75; pectoral 1.50 in head; ventral 1.25; base of anal 1.85 in base of dorsal, its longest ray about 3 in head; caudal slightly rounded, 1.75 in head.

In spirits the ground color is yellowish, the upper two-thirds of body with bluish coloring forming more or less distinct bands; nine short silvery white lines over back, separating the bluish bands; belly and under surface with slight tint of pale blue; four rather distinct bands of blue extending from median line of side toward base of anal fin; head with a straight blue line from angle of jaw to midway of opercle; another blue line from distal end of upper lip through lower part of orbit, dividing first back of eye, where it is deep blue, one branch curving back and down on to lower posterior margin of opercle; may or may not unite with the dark opercular spot; the other branch extending up and ending on shoulder just above opercle; another blue line from tip of snout to upper part of orbit and extending a short distance back from orbit; two blue blotches on interorbital space one on each side of nuchal region; a black dot between 1st and 2nd dorsal spines; another, much larger, between the 2nd and 3rd dorsal rays; the outer third of dorsal fin has a number of round white spots; the inner portion is similarly colored but the spots are larger and some are paired, forming short thick bands; anal fin with a blue band through the middle which may be more or less broken up into round spots posteriorly; a row of round spots at base of fin; caudal with three rows of dusky bands and some white spots with wash of dusky at tip; pectoral and ventral yellow, unmarked.

In life a specimen from Pago Pago was much mottled, shaded with pink; a black dorsal ocellus, a black opercular blotch; a large black blotch on side; a pink silvery area below eye.

A specimen from Apia, called *fatagaloa*, was green with red-brown scallops above, the markings brighter below; a blackish blue blotch on caudal peduncle; head with red stripes and green, the edgings of the red stripes bright blue; a horizontal red stripe below the eye; opercle with a dark creamy red spot at tip, golden olive before it; dorsal green and brownish red, the green in rounded blue-edged spots; a black spot on first soft rays; caudal banded green and brownish red; anal paler green and red; ventral green and red.

This species is very common about Samoa, where we obtained 48 specimens from the reef at Apia. A dozen small immature fish, collected at Pago Pago, have been referred by us to this species. The species is very close to *Halichæres pœcilus*, but the markings are different, notably those on the cheek which form a straight stripe, not a ring or horseshoe.

The type, no. 51845, U. S. National Museum, is from Apia and is 4 inches long.

936. *Halichæres pœcilus* (Lay & Bennett). New Guinea (Macleay); East Indies.

(*Halichæres harloffii* Bleeker; *Halichæres annulatus* Fowler.)

937. *Halichæres guttulatus* (Macleay). New Guinea.

PlatyGLOSSUS guttulatus Macleay, Proc. Linn. Soc. N. S. W. 1883, 587.

938. *Halichæres opercularis* (Günther). Fiji; Samoa. (Pl. XLVII, fig. 3.)

This species is very close to *Halichæres pseudominiatus* of the East Indies. Comparing our specimens with some from Negros, we are inclined to think that *Halichæres opercularis* is a distinct species. The chief difference lies in the arrangement of the colored stripes on the head.

This species is very abundant about Samoa and about 170 specimens were taken.

Life colors of a specimen from Apia, light olive, with a net-work of dark brown lines above; side golden with two white vertical streaks anteriorly behind pectoral, a broad, bright, purple-pink band at vent, then golden with incursions of purple from the dark bands above; dorsal with vertical streaks of brownish red on yellow; a large and conspicuous black ocellus on front of soft dorsal; a smaller black spot on front of spinous dorsal; caudal yellowish, cross-banded with brownish red; anal similar, ventral pink; pectoral colorless; head brownish and streaked above, with a bright orange streak before and behind eye; a horizontal curved stripe below eye creamy yellow, bordered by light blue and rimmed with dark blue, this bending around forward on subopercle and cheeks; a black ocellus on opercle; about eight whitish spots along base of dorsal, one of them in axis of soft dorsal.

A young specimen from Pago Pago was whitish with scattered reddish spots and incomplete broad blackish transverse band; dorsal with conspicuous semi-ocellus; green, yellow and black-brown on anal; caudal clear; snout red; iris rose-red.

939. *Halichæres margaritaceus* (Cuvier & Valenciennes). Vanicolo.

This species, imperfectly described, is very similar to *Halichæres opercularis*, but no mention is made of ocelli on the dorsal fin.

940. *Halichæres macleayi* Jordan & Seale, new name. New Guinea.
PlatyGLOSSUS margaritaceus Macleay, Proc. Linn. Soc. N. S. W. 1884, 274, Hood Bay; not of Cuvier & Valenciennes.
941. *Halichæres auritus* (Cuvier & Valenciennes). Ulea.
This species, scantily described, is an ally of *Halichæres opercularis*, but nothing is said as to ocelli on the dorsal fin.
942. *Halichæres nebulosus* (Cuvier & Valenciennes). Guam (Seale); East Indies.
943. *Halichæres gymnocephalus* (Bloch & Schneider). New Guinea (Macleay); Faté (Seale); East Indies.
Labrus gymnocephalus Bloch & Schneider, Syst. Ichth., 180, 351; fide Peters.
Julis modestus Bleeker, Verh. Bat. Gen., xxii, Labr. Cycl., 26.
Halichæres modestus Bleeker, Atlas, Labr., 126, tab. xxxv, fig. 2, East Indies.
PlatyGLOSSUS modestus Günther, Cat., iv, 157, Singapore.
944. *Halichæres leporensis* (Bleeker). Guam (Seale); East Indies.
945. *Halichæres papilionaceus* (Cuvier & Valenciennes). Vanicolo.
946. *Halichæres chloropterus* (Bloch). New Guinea (Macleay); East Indies.
947. *Halichæres ornatissimus* (Garrett). Hawaii.
(*Halichæres iridescens* Jenkins.)
948. *Halichæres lao* Jenkins. Hawaii.
949. *Halichæres guttatus* (Bloch). New Guinea (Macleay).
950. *Halichæres solorensis* Bleeker. Marquesas Islands (Seale); East Indies.
951. *Halichæres melanurus* (Bleeker). New Guinea (Macleay).

PSEUDOJULIS Bleeker.

952. *Pseudojulis cerasina* Snyder. Hawaii.

CORIS Lacépède. (*Hemicoris* Bleeker.)

The genus *Hemicoris*, of Bleeker, having scales 50 to 60, differs from *Coris* only in the absence of posterior canine teeth. These are not well developed even in *Coris*, and are said to be occasionally absent. For that reason the genus probably can not be maintained.

The genus *Julis* Cuvier (not of Bleeker or Günther), having the scales 70 to 80, is better defined and is possibly worthy of retention.

953. *Coris aygula* Lacépède. Guam; Tahiti; Faté and Tubuai (Seale); Hawaii (Fowler—a doubtful record); Japan; East Indies.
954. *Coris cyanea* Macleay. New Guinea.
955. *Coris papuensis* Macleay. New Guinea.
956. *Coris variegata* (Rüppell). New Guinea (Macleay); New Hebrides; East Indies.
(Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 131.)
957. *Coris venusta* Sauvage. Hawaii.
(*Hemicoris remedius* Jenkins.)
958. *Coris multicolor* Rüppell. Aneiteum (Günther); Red Sea.
959. *Coris ballieui* Vaillant & Sauvage. Hawaii.
(*Coris schauinslandi* Steindachner.)
960. *Coris rosea* Vaillant & Sauvage. Hawaii.
(*Coris argenteostriatus* Steindachner; *Hemicoris keteipionis* Jenkins. Not *Julis rosea* Quoy & Gaimard.)
961. *Coris cingulum* (Lacépède). New Guinea (Macleay); Aneiteum (Günther); East Indies.
962. *Coris caudimacula* (Quoy & Gaimard). Rarotonga (Seale); Mauritius.

JULIS Cuvier.

963. *Julis greenovii* Bennett. Samoa; Hawaii; Manado.

This striking fish is rare about the Samoan Islands. We have three specimens from Apia. It was originally described from Hawaii, but we did not find it there. The colored plate in the report on the fishes of Hawaii is from a Samoan specimen. The coloration shown in that plate is much less bright than that in nature.

Life colors of a specimen from Apia, deep scarlet-red, each scale with an olive speck, below pure cherry-red, 5 blotches on back pure white edged with black, a black blotch on tail filled with bright blue spots; a bar on caudal black, whitish in middle; anal red with a blue edge; ventral, also pectoral, light orange-red; a row of blue spots at base of anal; dorsal clear red with a blue-black edge.

964. *Julis pulcherrima* (Günther). Hawaii; Samoa; Tahiti; Aneiteum; New Hebrides; Guam; New Guinea; East Indies.

This beautiful fish seems to be rare about Samoa, though rather common at Honolulu. We have one adult specimen from Apia, which agrees very well with Bleeker's figure.

Life colors, head coppery red with green stripes edged with violet; throat with a blackish green stripe; body reddish brown, becoming blackish behind; almost everywhere covered with small deep violet spots; crowded behind, sparse in front, none on head; dorsal bright orange, brown at base with violet-blue spots; soft dorsal cherry red; caudal plain golden yellow running on to orange on edges; anal drab orange-brown with violet markings; pectoral orange, the axil blue-black, edged with grass-green; ventral olive, with a wide maroon stripe, then a violet edge.

965. *Julis gaimardi* Quoy & Gaimard. Hawaii; East Indies?

This species is rather common about Hawaii. It is possible that the East Indian specimens called *Coris gaimardi* belong to some other species.

966. *Julis cuvieri* Bennett. New Hebrides; Ile de France.

967. *Julis flavovittata* Bennett. Hawaii; Laysan.

968. *Julis eydouxi* (Cuvier & Valenciennes). Hawaii.

969. *Julis lepomis* Jenkins. Hawaii.

HOLOGYMNOSUS Lacépède.

970. *Hologymnosus longipes* (Günther). Aneiteum.

971. *Hologymnosus elongatus* (Günther). Aneiteum.

972. *Hologymnosus semidiscus* (Lacépède). New Guinea (Macleay); Tahiti and Rarotonga (Seale); East Indies.

(*Labrus annulatus* Lacépède.)

CHEILIO Lacépède.

This genus, close to *Thalassoma*, differs in the elongate body and smaller scales. There seems to be but one species, widely distributed and varying considerably in shade of color.

973. *Cheilio inermis* (Forskål). *Masamie*; *Moai*. Hawaii; Samoa; Guam; Vanicolo; Tahiti; Aneiteum; New Guinea; East Indies.

This common and widely spread species is rather scarce at Samoa, though very abundant at Honolulu. We have one specimen from Apia.

THALASSOMA Swainson. (*Julis* Günther, not of Cuvier.) *Sugale* (choice).

This genus is distinguished by the presence of 8 dorsal spines, large scales, and no posterior canine teeth. The species are all beautifully colored.

974. *Thalassoma duperreyi* (Quoy & Gaimard). Hawaii; Johnston I.; Laysan; Mangareva, Gambier Is. (Seale); Acapulco (as *Thalassoma steindachneri* Jordan & Evermann).

(*Thalassoma clepsydratis* Smith & Swain.)

975. *Thalassoma ballieui* (Vallant & Sauvage). Hawaii; Johnston I.

(*Julis obscurus* Günther; *Thalassoma verticalis* Smith & Swain.)

976. *Thalassoma lunare* (Linnæus). New Guinea (Macleay); East Indies.

Apparently all the East Indian references to *lunaris* belong to *T. lunare* and the Polynesian references to *T. lutescens*. The species from the Riukiu Islands figured by Bloch as *Labrus viridis*, by Bennett and by Brevoort as *Julis lutescens* and described in detail by Jordan & Snyder (Proc. U. S. Nat. Mus., xxiv), as *T. lutescens*, is the true *lutescens*, being different from *T. lunare*.

977. *Thalassoma guntheri* (Bleeker). Samoa; Fanning I. (Streets, Bull. U. S. Nat. Mus., vii, 1877, 83); New Guinea (Macleay); East Indies.

We have one fine specimen from Apia, apparently referable to this species. Life colors, bright olive green, much mottled and varied; a bright crimson lateral stripe; another above it, broader, duller, more diffuse, and connected with the first by cross streaks; two oblique crimson stripes from pectoral across belly anteriorly, separated by blue-green; belly livid violet gray; head dark; a red area on preorbital; a deep blue stripe through eye from snout to opercle; a curved blue stripe bounding dark bluish brown of lower part of head; lower jaw orange with a blue stripe; dorsal bluish at base, then crimson in a broad band, then bluish, then broadly edged with green; caudal very pale reddish, this color surrounded by whitish and blue, the upper and lower rays and lobes crimson, the upper a continuation of the dorsal stripe, the lower line extending forward on caudal peduncle; anal pale livid grayish; pectoral colorless, the axil red and green, the outer half jet black; ventral colorless grayish.

978. *Thalassoma lutescens* (Solander). Hawaii; Tahiti; Fanning Is. (Streets); Marcus I. (Bryan); Riukiu Is.

979. *Thalassoma purpureum* (Forskål). Hawaii; Samoa; Tahiti; Guam; Caroline Is.; Aneiteum; Laysan; Thornton I.; East Indies.

Scarus purpureus Forskål, Descr. Anim., 27, 1775, Red Sea; not *Julis purpurea* Rüppell, and of Günther, which is *Thalassoma ruppelli* (Klunzinger).

Thalassoma purpureum Seale, Bishop Museum, 1901, 91, Guam.

Julis quadricolor Lesson, Voy. Coquille, II, 139, pl. 35, fig. 1, 1826-1830, Tahiti. Cuvier & Valenciennes, Hist. Nat. Poiss., XIII, 443, 1839, Tahiti. Bleeker, Atlas, Labr., 93, 1862, not the plate which is *Thalassoma fuscum*.

Thalassoma quadricolor, Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 462, Hawaii.

Scarus semicæruleus Rüppell, Neue Wirbelthiere 10, pl. 3, fig. 1, 1835, Red Sea.

Scarus georgii Bennett, Fish. Ceylon, pl. 24, Ceylon.

Julis erythrogaster Cuvier & Valenciennes, Hist. Nat. Poiss., XIII, 447, 1839; may be *Thalassoma cyanogaster*.

Scarus quinquevittatus Richardson, Voy. Blossom, 66, pl. 19, fig. 3.

Julis ruppelli Steindachner, Denks. Ak. Wiss. Wien 1900, 506, Laysan; not of Klunzinger.

Thalassoma immanis Fowler, Proc. Ac. Nat. Sci. Phila. 1899, 488, pl. 18, fig. 2, Caroline Is.

Thalassoma berndti (misprinted *berendti*) Seale, Bishop Museum 1901, 115, fig. 7, Honolulu.

This species is confused by Günther with *Thalassoma fuscum* under the name of *Julis trilobata*. *T. purpureum* may be known by the variegated head, with three broad scarlet wedges radiating from the eye, and by the presence of three red stripes on a blue-green ground. The fins are colored differently from those of *T. cyanogaster*. (For-color notes see Fishes of Hawaii.) In *T. fuscum* the head is plain red, and there are two rows of quadrate blotches, compared by Lacépède to Chinese characters, on each side. These are blue on a red background.

T. purpureum is widely diffused in the South Seas. We have one fine specimen from Apia, and several from Honolulu.

980. *Thalassoma cyanogaster* (Cuvier & Valenciennes). Tahiti; Samoa.

Julis cyanogaster Cuvier & Valenciennes, Hist. Nat. Poiss., XIII, 444, 1839, Tahiti; on a drawing of Solander.

Of this species, well distinguished from *Thalassoma purpureum* by its coloration, we have one fine example from Apia and one from Pago Pago.

Life colors of the specimen from Apia, bright grass-green, yellowish below with three longitudinal stripes of clear coppery red, cross-hatched; head green with many red stripes and spots; two green stripes forward from eye; a scarlet irregular streak downward and backward across preopercle and subopercle, with numerous irregular red spots and blotches behind it and above it; dorsal green at base, then orange red, then a narrower grass green stripe, then a red one, the soft rays each tipped with

grayish blue; caudal with rays pale red, the membranes bright green, the middle rays tipped with yellow, the outer with blue; anal striped, green, bright red, blue, narrow green, lighter red, finally blue; ventral greenish at base, reddish behind; pectoral dusky above without distinct spot, a green bar toward base, a scarlet one below it, then a large green patch behind opercle, with a wavy red stripe surrounding the green, pectoral black at tip; livid blue shades at throat.

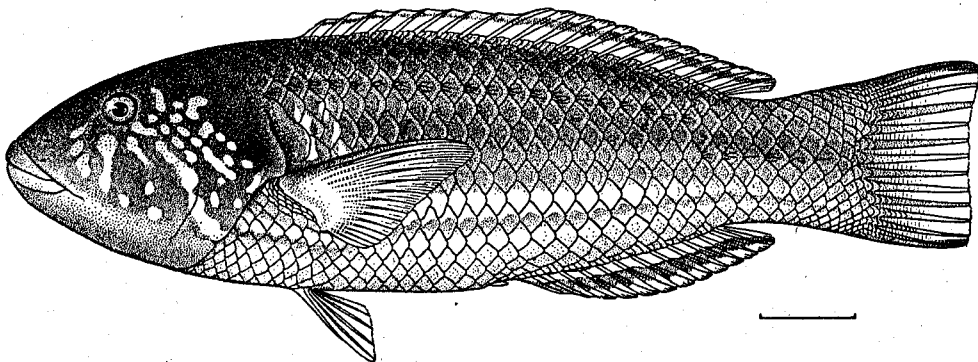


FIG. 53.—*Thalassoma cyanogaster* (Cuvier & Valenciennes).

981. *Thalassoma fuscum* (Lacépède). Hawaii; Samoa; Laysan; New Hanover; Aneiteum; Tubuai; Rarotonga and Makatea (Seale); East Indies.

Labrus fuscus Lacépède, Hist. Nat. Poiss., III, 437, 1802, Ile de France.

Labrus trilobatus Lacépède, Hist. Nat. Poiss., III, 454, 526, 1802, Bourbon, Madagascar.

Julis trilobatus, Cuvier & Valenciennes, Hist. Nat. Poiss., XIII, 437, 1839, Ile de France. Günther, Cat., IV, 187, var. A. South Africa, Mauritius, Aneitum. Peters, Berl. Mon. 1876, 843, New Hanover.

Julis formosus Cuvier & Valenciennes, op. cit., XIII, 439, 1839, Ile de France.

Julis xeruginosus Cuvier & Valenciennes, op. cit., 441, 1839, Ile de France.

Julis quadricolor Bleeker, Atlas, Labr., 93, tab. xxxiv, fig. 3, Java; not of Bennett.

Julis purpureus Steindachner, Denks. Ak. Wiss. Wien 1900, 506, Honolulu, Laysan.

Thalassoma purpureum, Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 462, Hawaii; not of Forskål.

This species, known by its green, jews-harp markings on a red ground, compared by Lacépède to Chinese script, is occasionally taken in the South Seas. We have two specimens from Apia and several from Hawaii.

Life colors of a specimen from Apia, deep red brick color, paler below, the squares deep-bluish green; head coppery olive; first dorsal creamy scarlet, the base green, the edge sky-blue; soft dorsal similar with a red intermarginal band; caudal with rays sky-blue, the membrane bronze-orange; anal orange on basal half, the rest sky-blue, a dark line separating a greenish shade at base; ventrals blue, green at tip; pectoral dusky, darker above with diffuse blackish blotch at tip; axil deep blue, a blue spot rather faint at upper angle of gill opening.

982. *Thalassoma punctatum* Seale. Guam; Rarotonga (Seale).

Julis punctata Seale, Bishop Museum 1901, 91, Guam.

This species seems to be close to *Thalassoma fuscum*, but it has a black ocellus on the back of the tail.

983. *Thalassoma umbrostigma* (Rüppell). Hawaii; Samoa; Laysan; Makatea (Seale); East Indies.

This is an abundant species at Honolulu, but seems to be scarce at Samoa. We have one adult specimen from Apia, and 6 young ones from Pago Pago. Life colors of four young specimens from the latter place were as follows:

(1) Green, bluish white below; three longitudinal bands of dark brown and rose pink; a brick red spot at tail end of each of these bands; anal bluish white with rose suffusion; caudal clear with rose suffusion; dorsal with rose-pink shading.

(2) Yellow-green above, blue green below; two longitudinal series of brick-red spots with blackish centers.

(3) Bright green; 3 lengthwise series of quadrate spots, the median largest and joined by a reddish brown shade; a spot behind eye, the median band extending through eye; upper band also

distinct, forming 8 spots, the last a speck at upper base of caudal, above sixth on body in the second band; dorsal green with a black spot behind first spine and three in a triangle at first soft ray; fins otherwise all pale green; no axil spot and no dark shade on pectoral.

(4) Bluish below, green on sides and dorsum, with pronounced rose-pink blotches and bars, darker above; pectoral with rose-pink axil; greenish yellow outside at base of pectoral and a small greenish yellow blotch on pectoral itself near base; dorsal green with dark rose-pink median line; anal with rose-pink line along base; caudal blue green with narrow pink blotches and greenish yellow margin.

984. *Thalassoma genivittatum* (Cuvier & Valenciennes). Marcus Island (Bryan & Herre, Bishop Museum, 1903, 11, 131); East Indies.

985. *Thalassoma dorsale* (Quoy & Gaimard). *Sugale sei*; *Sugale pulepule*; *Sugale fa'a'ele'ele*. Samoa; Fiji; Aneiteum; New Ireland; New Guinea; Marcus I.; Shortland I. (Seale); East Indies.

This species is common in the East Indies, Indian Ocean, and South Seas. We have 12 specimens from Pago Pago, and 16 from Apia.

Life colors of specimens called *sugale sei*, from Apia, dark green; 5 indigo blue black crossbars; a bright red lateral streak posteriorly, a fainter one above it, blue below this; 5 broad greenish coppery red bands radiating from eye, the broader anteriorly blue; a black spot before and across base of pectoral; a blue-black spot on base of tail in larger one; chin and lower part of head dark blue (males with a large black green-edged spot above pectoral); sides mottled with red; dorsal blue black; the soft dorsal broadly golden at tip, a bluish streak below the golden; a pale streak across base of spinous dorsal and pale tips; caudal translucent yellowish green, a red streak on each lobe, and a light green edge above and below; anal pale yellow with a black spot anteriorly; ventrals yellowish; pectoral yellowish; a deep blue-black stripe the whole length of dorsal, pale below, yellowish above.

986. *Thalassoma schwanefeldi* (Bleeker). Tubuai; Austral I. (Seale); East Indies.

987. *Thalassoma janseni* (Bleeker). New Guinea (Macleay); Aneiteum (Günther); East Indies.

988. *Thalassoma aneitense* Günther. Hawaii; Aneiteum; Guam; Nukahiva (Seale).

989. *Thalassoma mertensi* (Cuvier & Valenciennes). Ulea.

This species, very imperfectly described from a drawing, we do not recognize. It may be the young of *Thalassoma lunare*.

GOMPHOSUS Lacépède.

990. *Gomphosus varius* (Lacépède). Hawaii; Samoa; Guam; Fanning Is. (Streets); New Guinea (Macleay); East Indies.

This species is rather common about the Hawaiian Islands, as also about Samoa. We have 5 examples from Apia.

We are not altogether certain that the Hawaiian species, *Gomphosus pectoralis*, is fully identical with the East Indian *Gomphosus varius*, but the evidence points in that direction. Apparently *Gomphosus undulatus* and *Gomphosus pacificus* are color variations of this species.

991. *Gomphosus undulatus* Streets. Fanning Is.

Gomphosus undulatus Streets, Bull. U. S. Nat. Mus., VII, 85, 1877, Fanning Is.

This species, doubtfully separable from *Gomphosus varius*, is unknown to us.

992. *Gomphosus pacificus* Seale. Guam.

Gomphosus pacificus Seale, Bishop Museum 1901, 94, Guam.

This species is probably a color variant of *Gomphosus varius*.

993. *Gomphosus tricolor* Quoy & Gaimard. *Sugale*. Hawaii; Samoa; Tahiti; Caroline Is.; New Guinea (Macleay); Rarotonga; Makatea and Mangareva (Seale); East Indies.

This singular and beautifully colored fish is common about the Hawaiian Islands and occurs throughout the South Seas. We have two specimens from Apia and one from Pago Pago.

Life colors of a specimen from Apia called *sugale*, deep greenish black, indigo blue on head, each scale of body with a violet bar and an olive wash; a bright yellowish green bar above axil, which is black; dorsal and anal light clear green, bluish at tip; caudal blue black on edges, pale behind, mesially

light vitriol blue; pectoral with a yellowish green crossbar at base, then dusky green, black on posterior edge with a vertical median band of vivid clear blue; ventral blue black. Another was, in life, green, rather than blue; dorsal and anal yellowish green.

Life colors of a specimen from Pago Pago, dorsal blue-green growing yellowish green at margin; anal and caudal similar; body purplish green with dark pinkish maroon and light olivaceous scale markings.

994. *Gomphosus sandwichensis* Günther. Hawaii.

CIRRHILABRUS Schlegel.

995. *Cirrhilabrus jordani* Snyder. Hawaii.

996. *Cirrhilabrus solorensis* Bleeker. New Guinea (Macleay).

CHEILINUS Lacépède.

997. *Cheilinus trilobatus* Lacépède. *Sugale matamumu*; *Lalafi*. Samoa; Tahiti; New Guinea; Ladrões; Guam; Fiji; New Hebrides; Kingsmill I.; Howland I.; Ponape; Futuna; Hawaii (Quoy & Gaimard—as *Cheilinus sinuosus*, *Cheilinus polygrammus* Cuvier & Valenciennes, and *Cheilinus maculosus* Cuvier & Valenciennes); East Indies.

This wide-spread species is very abundant about Samoa. We have 26 specimens from Apia, and 9 from Pago Pago. Quoy & Gaimard record it from Hawaii, but no subsequent collector has seen it there. Life colors were noted in various specimens as follows:

(1) From Apia. Olive-gray; a series of greenish blue cross-streaks, very numerous and well-defined; pale cherry-red cross-shades between them; head with radiating streaks and spots of crimson; chin dull, blunt; dorsal light olive with cherry-red edge and intramarginal streak; soft rays mostly colorless; a little dusky spot at base; caudal dusky, edged all around with pale, the tip and edge mostly red; anal olive with green rays, and two red marginal; ventral with blue rays, an olive blotch, and a pink edge; pectoral yellow olive; dark olive at base.

(2) From Apia. Blackish green; a bright orange-red vertical stripe on each scale, these faint or obsolete posteriorly; head with many bright scarlet stripes and dashes; spinous dorsal olive-green with two scarlet stripes and about four diffuse cross-shades; soft dorsal clear pinkish orange, the rays yellow; no bars or spots; anal dark olive and pinkish orange in streaks, paler behind; no spots; caudal dark olive-green washed with scarlet at tip, yellow-olive between; ventrals pink orange, the rays dark olive-green; pectoral light yellowish olive; throat livid dusky blue; breast coppery green; caudal rounded.

(3) From Apia. Marbled olive-green with four diffuse blackish bars; each scale with a brown vertical streak; head with curved and vertical streaks and bars; spinous dorsal mottled orange, green and brown, soft translucent pink; anal similar, its edge broadly translucent pink; pectoral fleshy red; ventral olive and reddish barred.

(4) From Pago Pago. Dark olive-greenish with pinkish and greenish vertical linear scale spots; head richer dark green with pink linear and spotty markings; pectorals thin, yellowish; ventral with green rays and pink interspaces; anal with pink submarginal line and anterior half with second pink line; general color greenish and bluish; caudal dark bluish; green at base, paler at tip; small round jet-black spot before base of caudal.

998. *Cheilinus hexagonatus* Günther. Hawaii; Johnston I.

(*Cheilinus zonurus* Jenkins.)

999. *Cheilinus pulchellus* Sauvage. Fiji.

Cheilinus pulchellus Sauvage, *Bull. Sci. Philom.*, 1880, 14 (reprint), Fiji.

1000. *Cheilinus fasciatus* (Bloch). *Lalafi pulepule*. Samoa; Guam; Solomon I.; Palau I.; New Guinea; Kingsmill I.; Vavau; Ponape; Faté; Shortland I. and Rarotonga (Seale); East Indies.

This species has a wide range extending from the Red Sea to the islands of the Pacific. It is very common about Samoa; we have 50 specimens from Pago Pago and 7 from Apia. Life colors were noted in various specimens as follows:

(1) From Pago Pago. Below eye thin brick-red extending, somewhat smoky, over dorsum just in front of dorsal fin; breast region vermilion; upper head very smoky greenish with short reddish lines

radiating from eye; under jaw pale smoky; body grayish black with irregular pale narrow cross-bars; small black circular spots on sides, red ones ventrally; caudal black and whitish banded with scarlet; ocellar spots coalescing in vertical series in outer (submarginal) white band; dorsal with two narrow crimson lines—crimson pink spots—markings toward posterior end; pectoral thin brick-red; ventral crimson with blackish blotch.

(2) From Apia. Olive; body with 6 dark bars, irregular and broader than interspaces; posterior half of head and first band and breast clear cinnamon-brown, the head anteriorly olive; iris scarlet; scarlet and green dashes radiating from eye; lower jaw olive-brown; 2 darker shades across nape; some scales on body darker than others; dorsal gray, red-edged; soft dorsal brown, the last rays transparent orange; a broad pale yellow bar across base of caudal, the fin with 2 black bars and finely crossed by orange lines; caudal truncate; anal barred at base like body, the edge mottled scarlet, the last rays translucent, tinged green and orange; ventral bright orange red washed with black; pectoral brownish, scarlet at base; lower part of sides with some round brown spots.

(3) From Apia. Greenish above, reddish below, with dark shade on each scale; 5 whitish olive cross-bands, much narrower than interspaces, the one at base of caudal broadest; snout paler olive; dorsal and anal colored like body, not dotted; caudal with 2 dark cross-bands; last rays of dorsal and anal pinkish translucent; sides of breast and belly with dark brown spots. Caudal truncate.

(4) Specimen called *lalafi pulepule*. Apparently much in common with the preceding, but with additional colors. Whole shoulder region from base of dorsal across opercle and base of pectoral to breast and including ventrals deep ferruginous red, the ventrals very deep red; dorsal colored like body, but with scarlet edge and two rows of scarlet spots on anterior soft rays; anal spotted with scarlet, yellowish translucent behind, as is soft dorsal; some scarlet spots on yellowish band of anal, between two dark spots; scarlet streaks radiating from eye; dark greenish olive, with five narrow pale olive cross bands; the widest at base of caudal; caudal with two dark bands.

1001. *Cheilinus digrammus* (Lacépède). *Sugale; Lalafi.* New Guinea; Louisiades; Fiji; Samoa; Palau Is.; Shortland I. (Seale); East Indies.

We have eight specimens of this species from the coral reef at Pago Pago, where it is common. Life colors of one specimen, greenish gray with weak salmon-brown scale-blotches; weak salmon diffusion below; pink copper lines on upper head; on lower head purple-brown lines; lips olive-green, also upper head; dorsal with pinkish margins; anal with almost crimson splashes; ventral with crimson coloration at base; pectoral unmarked, thin saffron rays; caudal with blue-green rays, paling and faintly reddish yellow at tips.

1002. *Cheilinus undulatus* Rüppell. Samoa; Tahiti; Fanning Is.; New Guinea; Vavau; Paumotu Is.; Caroline Is.; Palau Is.: Oualan (as *Cheilinus festivas*); Tonga (as *Cheilinus godeffroyi* Günther, Proc. Zool. Soc. London 1871, 666, pl. 66, young).

This handsome and widely distributed fish was found only at Pago Pago, where we obtained two large specimens. Life colors of one of these, olive-gray, a black area on each scale, these becoming brownish reticulations on breast; streaks before and behind eye black; orange streaks on head below eye, bluish streaks above. Vertical fins all checkered with black bars; tip of caudal bright pale yellow; ventral pale gray.

The other specimen was livid white under head, with salmon-yellow spots and curving linear blotches; salmon-yellow spots on lips; head above light umber with slaty blue-gray lines; sides greenish olive (grayish green?), with vertical blackish brown spots tapering to point above and below; region below pectorals light-yellow greenish with fine purplish red lines; pectoral clear, with greenish yellow tinge at base; ventral thin greenish; dorsal coarsely mottled brownish, with greenish yellowish white spots; caudal similar with yellow margin; from eye two brown-black lines running forward and back with small spot between hinder two near eye.

1003. *Cheilinus unifasciatus* Streets. Fanning Is.

Cheilinus unifasciatus Streets, Bull. U. S. Nat. Mus., VII, 1877, 82, Fanning Is.

This species is unknown to us. Dr. Streets regards it as very close to *Cheilinus rhodochrous* of Günther.

1004. *Cheilinus ceramensis* Bleeker. Aneiteum; East Indies.

1005. *Cheilinus nigropinnatus* Seale. Guam.*Cheilinus nigropinnatus* Seale, Bishop Museum 1901, 86, Guam.1006. *Cheilinus oxycephalus* Bleeker. New Guinea (Macleay).1007. *Cheilinus oxyrhynchus* Bleeker. Palau Is. (Günther); East Indies.1008. *Cheilinus kittlitzii* Cuvier & Valenciennes. Ulea.*Cheilinus kittlitzii* Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 105, 1839, Ulea; on a drawing.*Cheilinus sanguineus* Cuvier & Valenciennes, l. c., Ulea; on a drawing.1009. *Cheilinus roseus* Cuvier & Valenciennes. Ulea.*Cheilinus roseus* Cuvier & Valenciennes, l. c., Ulea; on a drawing by Mertens.1010. *Cheilinus bimaculatus* Cuvier & Valenciennes. Hawaii.

THALIURUS Swainson.

Dorsal spines 10, otherwise essentially as in *Cheilinus*.1011. *Thaliurus chlorurus* (Bloch). *Sugale gasufi*. Samoa; Yap; Ponape; Tahiti; Tonga; Fiji; Palau Is.; New Hebrides; Paumotu Is.; East Indies.

This common and widely distributed species is abundant at Samoa. We have 4 examples from Pago Pago and 25 from Apia. Life colors were noted in various specimens as follows:

(1) From Pago Pago. Dark olive, scales anteriorly and below each with a round blackish-brown spot; those posteriorly and on back each with a median grayish shade, each forming streaks along rows of scales; a round dusky blotch behind tip of pectoral; another on same line behind it, with traces of two others, the last at base of caudal; dorsal mottled like back, the edge scarlet; soft dorsal translucent orange, deep scarlet at base, with a row of white dots; caudal dark orange, with rows of white dots, and angular white vermiculations at base; anal dark brown, paler behind, with many rows of white dots; ventral dark orange, profusely dotted with white; head with scarlet streaks and dashes; jaws barred with brown.

(2) From Apia. Mottled brown, very dark, not pale below; some dark spots on scales deep brown; head with scarlet spots and dashes, its lower parts blackish green; pale parts of dorsal, anal, and caudal cherry-red with spots of whitish green or grayish blue; ventral very dark-brown red with gray spots, small; pectoral plain reddish.

(3) From Apia. Dark olive, with blackish brown streaks on head; blackish brown spots on scales anteriorly and grayish spots on back and posterior parts; fins much mottled; anal and ventral with small round whitish dots; dorsal edged with dull orange, the posterior rays translucent, tinged with orange-red at base; caudal much mottled, olivaceous washed with orange-red at tip; anal dark olive, dull orange at tip with many white spots; ventral similar, darker; pectoral colorless, yellow at base; caudal truncate.

(4) From Pago Pago. Complexly and irregularly mottled with greenish, brownish, and reddish indications, most marked on dorsal, of three transverse bars; eye with green iris and red circumorbital ring; under side in front of ventrals with bluish-white spots and cross-bars. Spines of dorsal blue green; at base of tail a small but distinct ocellus, with sky-blue pupil, then narrow black line, then yellow going off unevenly into reddish; caudal greenish-blue web, whitish spines; small red cross spots on web and longitudinal spots on rays.

(5) From Apia. Olive with many darker spots and mottlings, a vague row of 4 small blackish spots between pectoral and caudal, the first largest; head with brown streaks; dorsal yellowish and brownish and olive, the last rays clear; caudal with 4 or 5 dark-brown bars; anal and ventral like spines dorsal, many spots but none stellate.

(6) From Apia. Everywhere excessively mottled, olive, black, and reddish; radiating dark-brown streaks about eye; last soft rays of dorsal translucent pink.

PSEUDOCHEILINUS Bleeker.

This genus is well defined, as shown by Professor Snyder, by the peculiar structure of its partly divided cornea. The species are small and the deep-blue pigment in the fins persists in alcohol.

1012. *Pseudocheilinus octotænia* Jenkins. Hawaii.

1013. *Pseudocheilinus hexatænia* Bleeker. *I'a tusitusi*. Samoa; Tahiti; Phoenix I.; East Indies. (Pl. XLIV, fig. 2.)

Cheilinus pittaclus Steindachner, Sitz. Ak. Wiss. Wien, LIV, 1866, 376, fig. 1, Samoa.

We have 18 examples of this pretty little fish taken at Apia.

Life colors of a specimen called *i'a tusitusi*, deep purplish blue with six orange stripes which fade on tail; tail rather abruptly grass-green, paler and yellowish behind; black at upper part of peduncle; head rosy, bluish above; chin with two black dots; breast blue; ventrals deep blue; anal purplish, anteriorly deep blue; dorsal orange anteriorly, becoming brownish behind; pectoral colorless; a black dot behind dorsal.

1014. *Pseudocheilinus evanidus* Jordan & Evermann. Hawaii.

NOVACULICHTHYS Bleeker.

1015. *Novaculichthys woodi* Jenkins. Hawaii.

1016. *Novaculichthys tæniurus* (Lacépède). *Molemole*. Hawaii; Samoa; Vanicolo; New Guinea; East Indies.

This species varies considerably with age. Our smallest specimens have nine black streaks radiating from the eye. As the individual grows older these are reduced to four, two upward and backward and two downward and backward. Still later, only those running downward and backward remain. These finally also disappear leaving the head in the adult quite plain. The other markings, the cream-colored band at base of caudal, the black bar across base of pectoral, the black spot on front of spinous dorsal, and the cross streaks on dorsal and anal change but little with age. In the young the first two dorsal spines are much elevated, as in *Novaculichthys kallosomus*, which differs mainly in the brighter coloration, with white markings on head and body.

Very common in the crevices of the reefs about Samoa, as also about Hawaii. We have one specimen from Pago Pago and 13 from Apia.

Life colors of an Apia specimen, olive-slate, with yellow olive shading on the scales; axil black; a golden spot on first pectoral ray at base; dorsal pale olive, with inky blotch on first rays, the fin obliquely barred with grayish; caudal dusky, a grayish bar across base; pectoral, anal, and ventral olive gray.

Other specimens from Apia, male and female, the former with banded head, were light brown; seven cross bands of dark brown; dorsal and pectoral shaded with dull orange; soft dorsal, anal, and caudal paler, shaded with yellowish; ventral dusky, dull orange washed, with white spots toward tip; a pure white spot in axil; head pale-orange washed below.

1017. *Novaculichthys macrolepidotus* (Bloch). New Guinea; Waigi; East Indies.

1018. *Novaculichthys kallosomus* Bleeker. Hawaii; Samoa; East Indies.

We have one small specimen of this handsome East Indian fish, taken at Pago Pago. Two others, larger in size, were obtained by Snyder and Berndt at Honolulu. All are bright green in life.

Life color of a specimen from Pago Pago, brilliant grass-green with pencil-like streaks of black and bands of dark olive, these bands becoming bronze olive on the fins, markings on body of creamy white, those above greenish white; fins greenish gray, except for markings; ventral dark green.

A colored drawing made in Pago Pago from this specimen is published in Jordan & Evermann's report on the Fishes of Hawaii.

HEMIPTERONOTUS Lacépède.

1019. *Hemipteronotus pentadactylus* (Linnæus). New Guinea (Macleay); East Indies.

1020. *Hemipteronotus umbrilatus* Jenkins. Hawaii.

1021. *Hemipteronotus copei* Fowler. Hawaii.

Hemipteronotus copei Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 508, Hawaii.

1022. *Hemipteronotus baldwini* Jordan & Evermann. Hawaii.

(*Hemipteronotus jenkinst* Snyder, young female.)

XYRICHTHYS Cuvier.

1023. *Xyrichtys niveilatus* Jordan & Evermann. Hawaii.

INIISTIUS Gill.

1024. *Iniistius pavoninus* (Cuvier & Valenciennes). Hawaii.

1025. *Iniistius aneitensis* (Günther). Aneiteum.

1026. *Iniistius carneoflavus* (Peters). Dana Island.

Xyrichtys carneoflava Peters, Berl. Mon. 1876, 843, Dana I.

We have not seen this species, and we do not find Dana Island on any map. There is a Dana peak in Fiji, and part of the collection described (*H. M. S. Gazelle*) by Peters, came from Fiji. Most of it was from the New Hebrides.

1027. *Iniistius niger* (Steindachner). Hawaii.

GYMOLUTES Günther.

1028. *Gymolutes leclusei* (Quoy & Gaimard). Hawaii.

Family **SCARICHTHYIDÆ**.**SCARICHTHYS** Bleeker.

1029. *Scarichthys auritus* (Kuhl & Van Hasselt). New Guinea (Macleay); Aneiteum (Günther); Rarotonga (Seale); East Indies.

1030. *Scarichthys cæruleopunctatus* (Rüppell). New Guinea (Macleay); Rarotonga (Seale); East Indies.

Depth 3.50 in length; eye 3.75 in head, 1 in preorbital portion of head, and 1 in interorbital space; dorsal x, 10; anal III, 9; scales of lateral line 24.

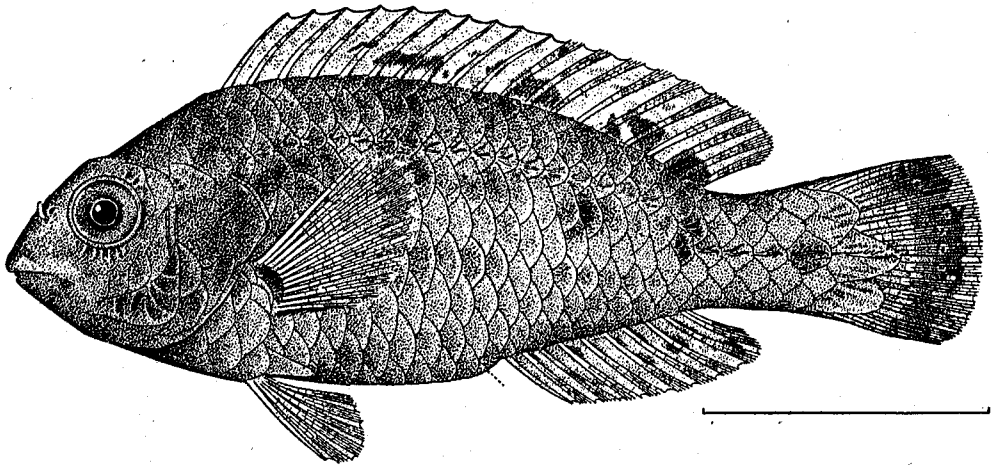


FIG. 54.—*Scarichthys cæruleopunctatus* (Rüppell).

Body oblong, compressed; lateral line interrupted, the tubules two-branched; teeth and nostrils generic; profile of head slightly different from other species of *Scarichthys*, being slightly concave above the posterior margin of the eye, and the snout with a slope slightly greater than 45°; caudal peduncle 2.30 in head; the tubules on orbitals and preopercle quite prominent; base of anal fin 2.75 in base of dorsal; length of pectoral 1.40 in head; ventral 2.

Color in spirits, dull coppery green without white dots; about five zones of darker greenish on the body, the first above base of pectoral and over shoulder, the second below the seventh and eighth

dorsal spines, the third below the first to third dorsal rays, the fourth below the fifth to seventh dorsal rays, and the fifth below the axil of the dorsal; a dark blotch on base of pectoral, and another in the posterior axil of the dorsal, this dark spot occupying the base of the last four dorsal rays; the dark zones of color on the body, with the exception of the anterior one, invade the basal half of the dorsal fin; pectoral white, without marks; ventral with indistinct darker markings; anal with five bands of dusky; caudal greenish, the tip white, and a white cross-band near the tip. Related to *S. auritus*, but the markings different.

SCARIDEA Jenkins.

1031. *Scaridea balia* Jenkins. Hawaii.
 1032. *Scaridea zonarcha* Jenkins. Hawaii.
 1033. *Scaridea aerosa* Jordan & Snyder. Hawaii.

CALOTOMUS Gilbert.

1034. *Calotomus irradians* Jenkins. Hawaii.
 1035. *Calotomus sandwichensis* (Cuvier & Valenciennes). Hawaii.
 1036. *Calotomus moluccensis* (Cuvier & Valenciennes). New Guinea (Macleay); Aneiteum; East Indies.
 1037. *Calotomus waigiensis* (Quoy & Gaimard). New Guinea; Waigiu; East Indies.

Scarus waigiensis, Quoy & Gaimard, Voy. Uranie, 288, 1824, Waigiu.

Scarus spinidens, Quoy & Gaimard, Voy. Uranie, 289, 1824, Waigiu, same type. Bleeker, Atlas, Scar., 13, tab. 11, fig. 3, Amboina.

Callyodon spinidens, Günther, Cat., IV, 215, Waigiu.

Callyodon waigiensis, Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 296, 1839, Waigiu.

Callyodon hypselosoma, Bleeker, Amboina, VI, 425, Amboina.

1038. *Calotomus snyderi* Jenkins. Hawaii.
 1039. *Calotomus cyclurus* Jenkins. Hawaii.
 1040. *Calotomus carolinus* (Cuvier & Valenciennes). Caroline Is.
 1041. *Calotomus brachysomus* (Bleeker). New Guinea (Macleay); East Indies.

CALLYODON Gronow (1763).

(*Scarus* Forskål; 1775; not of Gronow, 1763.)

We regret that the exigencies of the law of priority require the suppression of the time-honored name of *Scarus*; it was first used in 1763, for a species of *Labrus*.

ANALYSIS OF POLYNESIAN SPECIES OF CALLYODON.

- a. CALLYODON. Jaws whitish or rosy.
 b. Species with the coloration in life chiefly dark red or brown, sometimes golden or clouded, never largely deep blue or green.
 c. Lip narrow, not covering more than half of upper jaw.
 d. Scales on cheek in two rows.
 e. Color blackish-red; caudal fin largely scarlet.....*pyrrhurus*
 ee. Color not as above.
 f. Sides with pale spots, more or less regularly arranged; young with lengthwise pale streak.....*bennetti*
 ff. Olive; scales with darker centers; fins black.....*platodon*
 fff. Dull red, brighter below, almost unmarked.....*miniatus, goldiei*
 ffff. Leaden gray, unmarked.....*borborus*
 fffff. Color brownish yellow.....*labiosus*
 dd. Scales on cheek in three rows; dark red-brown, each scale on side with three dark streaks.....*ruberrimus*
 cc. Lip broad, covering more than half of upper jaw.
 g. Scales on cheek in two rows.
 h. Color dark red-brown, nearly uniform.
 i. Side of tail with a dusky shade.....*purpurcus*

- ii. Back greenish.....*flholi*
 iii. Dorsal reddish brown, edged with purplish black.....*erythrodon*
 iii. Dorsal rosy, edged with black.....*moensi*
 iii. Caudal lunate, not edged behind with gray.....*brunneus*
 iii. Caudal lunate, dusky, edged behind with gray.....*erythacus*
 iii. Caudal rounded, paler at base; body deep.....*ahula*
 hh. Color greenish, with five brown cross-bars.....*mutabilis*
 gg. Scales on cheek in three rows.
 j. General color dark red or dark brown, without cross shades of blackish or golden (caudal tipped with gray); *lacerta* (belly with pale streaks); *lepidus*; *paluca*; *upolensis*.....*dubius*
 jj. General color violet, posteriorly chiefly yellow.....*macrocheilus*
 jjj. General color olivaceous, the border of each scale darker.....*balincensis*
 jjj. General color olivaceous; a golden wash or oblique cross-band behind pectoral.....*oviceps*
 jjj. General color golden brown; the back with five dark cross-bands.....*zonularis*
 ccc. Lips and scales on cheek undescribed.
 k. Color mostly red.....*roseiceps*, *cruentatus*
 kk. Color largely varied.....*ocellatus*
 bb. Species largely deep blue or deep green, the color scarcely fading in spirits; head usually more or less variegated; the fins often with red, and usually edged with blue.
 l. Lip narrow, not covering more than half of upper jaw.
 m. Cheek with two rows of scales.
 n. Forehead with variegated markings.....*perspicillatus*, *brighami*
 nn. Forehead plain or with a narrow cross-streak.....*quoyi*, *lupus*, *jonesi*
 mm. Cheek with three rows of scales.....*papuensis*, *moresbyensis*
 ll. Lip broad, covering more than half of upper jaw.
 o. Scales on cheek in two rows.....*gilberti*, *bataviensis*, *abacurus*, *formosus*
 oo. Scales on cheek in three rows.
 p. Color green anteriorly, coffee-brown posteriorly.....*dimidiatus*
 pp. Color green with darker cross-shades.....*zonatus*
 ppp. Color nearly uniform anteriorly and posteriorly.
 q. Back golden, much spotted anteriorly with clear blue.....*spilonotus*,
putcheilus, *blochi*, *frenatus*
 qq. Back without spots as above.....*globiceps*, *epinus*, *pronus*,
jenkinsi, *fumifrons*, *kelloggi*, *tricolor*, *dussumieri*, *pyrrhostethus*, *pepo*, *fasciatus*
 III. Lips and scales on cheeks undescribed.....*festivus*, *frontalis*, *forsteri*
 aa. PSEUDOSCARUS. Jaws green or blue.
 r. Coloration largely dark red, the jaws deep blue; lip largely covering upper jaw; scales on cheek in three rows.
 s. Head without green markings.....*prasiognathus*
 ss. Head with dark green streaks and markings.....*maoricus*
 rr. Coloration brown, the fins black-edged.....*nuchtipunctatus*
 rrr. Coloration largely deep green or blue.
 t. Lip covering less than half of upper jaw.
 u. Scales on cheek in two series.....*tatax*, *celebicus*,
cypho, *troscelli*, *macleayi*, *gymnognathos*
 uu. Scales on cheek in three rows.....*jordani*, *strongylocephalus*, *microrhinus*
 tt. Lip covering more than half of upper jaw.
 v. Scales on cheeks in two rows; belly with blue streaks.....*cyanogrammus*
 vv. Scales on cheeks in three rows.....*ultramarinus*, *lazulinus*, *cyanognathus*
 uul. Lips and scales undescribed.....*merlensi*, *spilurus*, *wattei*

1042. *Callyodon pyrrhurus* Jordan & Seale, new species. *Fuga mumu*. Samoa.

Head 2.75 in length; depth 3.75; eye 7.50 in head; dorsal IX, 10; anal III, 9; scales 2-24-6; two rows of scales on cheek; lower limb of preopercle bare; snout 2.13 in head; interorbital 3.10.

Body oblong, compressed; anterior part of head bluntly rounded, the snout slightly gibbous; depth of caudal peduncle 2.70 in head; a pair of strong posterior canines on upper jaw, none on lower; lips rather narrow, the upper scarcely covering one-half and the lower about one-third of teeth; base of dorsal fin 1.78 in length without caudal, its longest ray 3 in head; base of anal 1.45 in head, 2.16 in base of dorsal; pectoral 1.45 in head; ventral 1.98; caudal 2, truncate or slightly lunate.

Color in spirits olive-brown, the base of scales slightly darker; chin and thorax with slight wash of yellowish; tip of lips yellowish; indistinctly yellowish from eye to angle of mouth; dorsal fin blackish, with some yellowish mottlings on posterior third of soft dorsal; anal fin dusky, unmarked; pectoral dusky, more or less blotched with bluish wash; ventral similar to pectoral; caudal bright yellow, its 3 margins with a narrow line of black; iris yellow; teeth greenish.

Color in life of a specimen from Apia, clear olivaceous sooty, a little paler on tail; axil olive-black; dorsal, anal, pectoral and ventral like body, dorsal and pectoral with black edge; caudal deep brownish red, with a blackish edge.

Another specimen from Apia was dark purplish gray, almost black; throat and belly about the same; a little olive on throat; first dorsal, pectoral and ventral like body; axil blackish; soft dorsal washed with red; caudal clear dark red, edged with black, the upper and lower rays dusky.

Life colors of a specimen from Pago Pago, dark purplish gray, centers of scales blackish; axil dark; dorsal, anal, ventral and pectoral black; soft dorsal dull orange with a black edge (some velvety green-black); caudal brilliant scarlet, its edge dark.

Eight specimens from Apia and Pago Pago. The type is no. 51748, U. S. National Museum, from Pago Pago, length 9.75 inches.

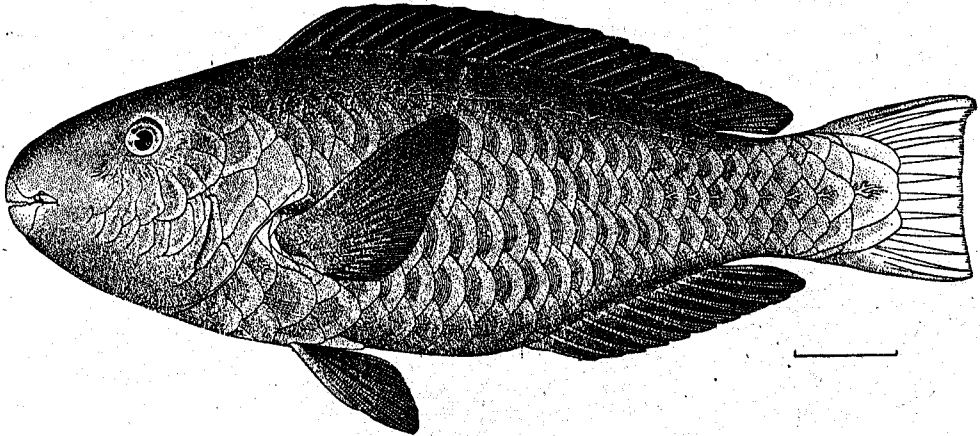


FIG. 55.—*Callyodon pyrhrurus* Jordan & Seale, new species. Type.

1043. *Callyodon bennetti* (Cuvier & Valenciennes). *Amasapupema*. Hawaii; Samoa.

Scarus bennetti Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 270, Sandwich Is. Jenkins, Bull. U. S. Fish Comm., xxiii, 1903, 470, Honolulu.

We have 6 examples of this fish, from Apia. Teeth rosy, dusky at base, uncovered; no canines; two rows of scales on cheek; caudal truncate.

Life colors of a specimen from Apia, blackish brown, a bronze-black area on each scale; snout, lips, and below bright dark cinnamon; belly dark red-brown; dorsal cinnamon, mottled and dark edged; caudal truncate, soiled red-brown; anal similar, almost black; ventral similar to anal; pectoral dark brown, fading below; axil dark.

Another specimen from Apia was violet brown, clear on belly, darker on back; sides olive shaded, the scales mottled; forehead, chin and throat vinous red brown; dorsal deep vinous brown, blackish on edge; caudal similar, paler, a broad dusky shade at tip; axil with a dark cross-shade; anal and ventral like dorsal; pectoral a little paler.

1044. *Callyodon platodon* (Seale). Guam.

Pseudoscarus platodoni (misprint) Seale, Bishop Museum 1901, 96, Guam.

1045. *Callyodon miniatus* (Jenkins). Hawaii.

Scarus miniatus Jenkins, Bull. U. S. Fish Comm., xix, 1899 (Aug. 30, 1900), 62, fig. 20, Honolulu.

1046. *Callyodon goldiei* (Macleay). New Guinea.

Pseudoscarus goldiei Macleay, Proc. Linn. Soc. N. S. W. 1883, 590.

1047. *Callyodon borborus* (Jordan & Evermann). Hawaii.

Scarus borborus (misprint for *borborus*) Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 197, Honolulu.

1048. *Callyodon labiosus* (Macleay). New Guinea.

1049. *Callyodon ruberrimus* Jordan & Seale, new species. *Fuga ulapo*. Samoa.

Head 2.75 in length; depth 3.20; eye 8.25 in head; dorsal ix, 10; anal iii, 9; scales 2-24-6; three rows of scales on cheek, the lower row of only 2 scales, almost covering lower limb of preopercle.

Body elongate, compressed, the anterior of head bluntly rounded, the snout somewhat gibbous; depth of caudal peduncle 2.85 in head; six rows of scales in front of dorsal; a single posterior canine of small size in upper jaw; lips narrow, covering only one-half, or less than one-half, of teeth, the upper lip narrower than lower; base of dorsal 1.85 in head, its longest ray 3 in head; base of anal 1.85, 2.75 in base of spinous dorsal, its longest ray 3.10 in head; pectoral 1.50; ventrals 2; caudal deeply lunate, exposed outer ray 1.80; exposed midray 4.

Color in life of a specimen from Apia, clear reddish brown; coppery red on throat, breast and belly; each scale with three radiating marks of dark brown; lips red. Dorsal reddish brown, dusky edged; caudal dark brownish red; other fins brownish red, a little paler; ventral bright red; teeth pale.

Color in spirits, dull olive-brown, lighter below, being yellowish white on under part of head and body; lips without color bands, the tips being yellowish; there is a wide dark bar of color descending

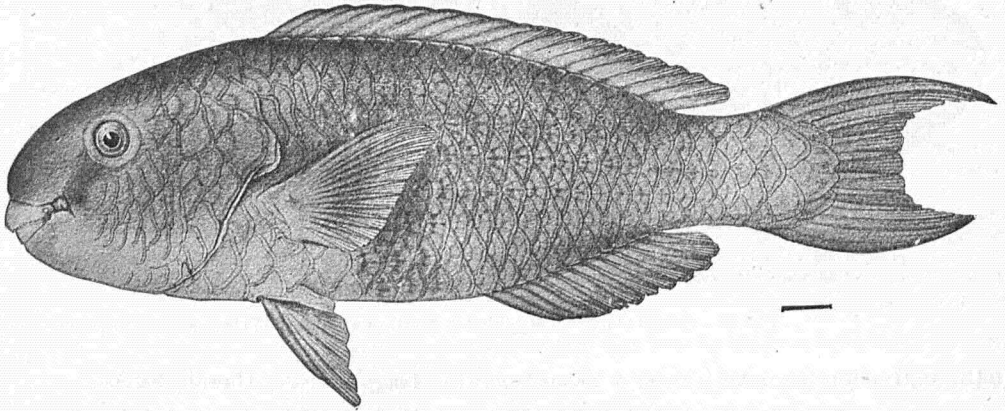


FIG. 56.—*Callyodon ruberrimus* Jordan & Seale, new species. Type.

vertically from fourth to seventh dorsal spines to belly; in most of its length the bar is indistinct and made up of black spots, but beneath the posterior part of pectorals it is very distinct; a blackish spot at angle of mouth; a slight trace of a dusky line from lower part of orbit to axis of mouth; a whitish blotch on gill-membranes at isthmus; three dark olive radiating marks on each scale; dorsal fin dull pale green, darker posteriorly, the margin dusky; anal dull grayish green; pectoral brownish, the posterior portion becoming yellowish; ventral dull yellowish; caudal olive-brown; iris golden; teeth pale.

Onespecimen from Pago Pago, Samoa. Type, no. 51749, U. S. National Museum, length 20.25 inches.

1050. *Callyodon purpureus* (Cuvier & Valenciennes). Samoa; Ulea.

Scarus purpureus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 277, 1839, Ulea.

Head 2.75 in length; depth 2.75; eye 7.25 in head; dorsal ix, 10; anal iii, 9; scales 2-24-6; two rows of scales on cheek, the lower limb of preopercle bare; snout 2.25; interorbital 3.10.

Body oblong, compressed; anterior profile bluntly rounded, upper jaw prominent; depth of caudal peduncle 2.25 in head; a very small posterior canine in upper jaw; lips narrow, scarcely covering one-half of upper jaw and less than one-half of lower; five rows of scales in front of dorsal; base of dorsal 1.75 in length without caudal, its longest ray 2.95 in head; base of anal 1.50 in head, 2.30 in base of dorsal; pectoral 1.40; ventral 2.10; caudal slightly rounded.

Color in spirits, dull olive brown; a purplish wash on top of head and snout, lighter on under part of head, thorax and belly; 3 or 4 indistinct darker lines on side of belly; caudal peduncle with a

large roundish black blotch at base of caudal; tip of lips yellowish; caudal and anal dark brown, without markings; pectoral yellowish; ventral yellowish, splashed with brown; caudal yellowish, shaded with irregular blotches of brown; a fine line of gray at the tip with darker intermargin; iris golden; teeth white.

In life dark purplish brown, almost unmarked, but with a large rounded blackish blotch at base of caudal.

Three specimens from Apia. The specimen described is 9.35 inches long.

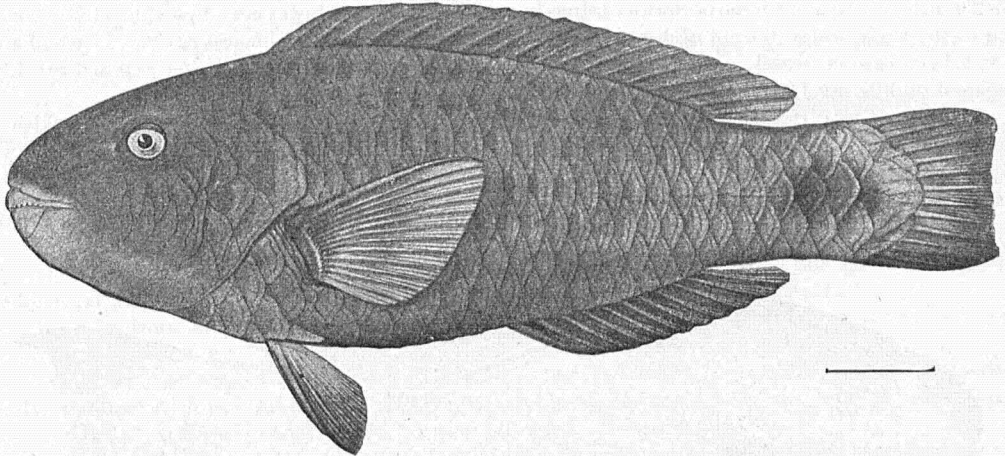


FIG. 57.—*Callyodon purpureus* (Cuvier & Valenciennes).

1051. *Callyodon filholi* (Sauvage). Fiji.

Pseudoscarus filholi Sauvage, Bull. Sci. Philom. 1880, 15 (reprint), Fiji.

1052. *Callyodon erythrodon* (Cuvier & Valenciennes). *Fuga 'avasai*. Samoa; Laysan; Tahiti and Faté (Seale).

Scarus erythrodon Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 255, 1839, Ile de France.

Scarus sumbawensis Bleeker, Banda, v, 104, Sumbawa. Seale, Bishop Museum 1901, 97, Guam. Steindachner, Denk. Ak. Wiss. Wien 1900, Laysan.

Head 2.75 in length; depth 3; eye 7 in head; snout 2.35; interorbital 3; dorsal IX, 10; anal III, 9; scales 2-24-6; two rows of scales on the cheek, the lower opercular limb naked.

Body oblong, compressed, the anterior profile of head bluntly rounded; depth of caudal peduncle 2.75 in head; no posterior canines; upper lip broad, covering more than two-thirds of teeth, lower lip covering one half of teeth, in the young the teeth are fully covered; four rows of scales in front of dorsal; base of dorsal 1.75 in length without caudal, its longest ray 3.75 in head; base of anal 1.50, 2.25 in base of dorsal; pectoral 1.50; ventral 2.10; caudal slightly rounded.

Life colors of a specimen from Pago Pago, dark purplish brown, the scales lighter edged, the belly tinged with bright red; dorsal reddish brown, clear behind, finely mottled with dark olive, edged with blackish; caudal dull violet brown, with some darker mottlings and a pale edge; anal dusky wine color, with a dark and a pale edge; ventral vermilion, rather bright; pectoral dull brownish, translucent behind.

Color in spirits, violet-olive, dorsal and anal fins darker, without distinctive markings; pectoral yellowish gray; ventrals grayish, darker at tips, caudal grayish with dusky blotches more or less in form of bands, a very narrow line of gray at margin with submarginal dusky area; usually a dusky blotch posterior to eye; iris golden; lips yellowish; teeth white.

Numerous specimens from Pago Pago. The specimen described is 8.30 inches long.

1053. *Callyodon moensi* (Bleeker). Tahiti and Faté (Seale); Celebes.

Scarus moensi Bleeker, Celebes, XIII, 54.

1054. *Callyodon brunneus* (Jenkins). Hawaii; Samoa.

Scarus brunneus Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (1900), 59, fig. 16, Honolulu.

We have 2 specimens from Apia which agree with cotypes of this species from Honolulu.

1055. *Callyodon erythacus* Jordan & Seale, new species.

Head 3 in length; depth 3.10; eye 7 in head; snout 2.65; interorbital 3.25; dorsal ix, 10; anal iii, 9; scales 2-24-6, two rows on cheek; lower limb of preopercle bare.

Body oblong, compressed; anterior of head evenly rounded and rather blunt; depth of caudal peduncle 2.01 in head; a pair of large posterior canines in upper jaw, none on lower jaw; lips wide, almost covering teeth; three scales in front of dorsal; base of dorsal 1.25 in head, its longest ray 2.35; base of anal 1.20, 2.14 in base of dorsal; pectoral 1.20 in head; ventral 1.75; caudal lunate, outer exposed ray 1.95, exposed middle ray 3.95.

Color in life, dirty purplish brown; belly coppery red; head plain; dorsal brown, blackish at margin anteriorly, pale posteriorly; a white streak along base of dorsal spines; caudal purplish brown, with pale edge; anal mottled brown with dark and pale edge; ventral mottled coppery brown-red; pectoral pale; dark in axil; caudal lunate.

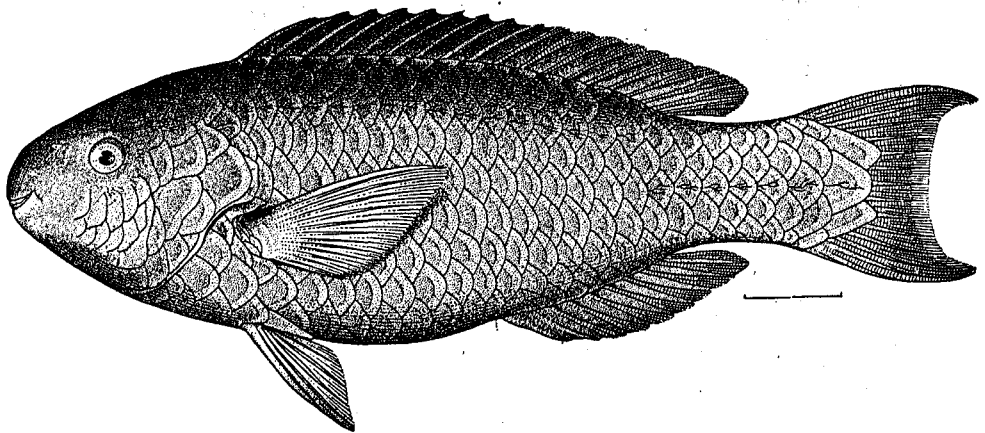


FIG. 58.—*Callyodon erythacus* Jordan & Seale, new species. Type.

Color in spirits, dull olive-brown, the base of scales darker, under part of head and belly lighter; three more or less distinct whitish lines along side of belly; a dusky blotch on axil and on posterior part of opercle; a dusky blotch on upper part of eye; top of head dull greenish; lips without distinct bands except two slight traces of greenish around lower lip; dorsals dusky, the membranes around the spines gray; some gray blotches between the bases of the rays, a slight wash of gray on posterior tip of fin; anal dusky, some grayish blotches at base; pectoral grayish; ventral grayish; caudal mottled dusky with grayish posterior tip.

This species is close to *Callyodon lacerta*, differing in the pale or red breast, in purplish, not orange, edge to fins, and in having but two rows of scales on cheek. The jaws are well covered, and posterior canines present.

One specimen, the type no. 51750, U. S. National Museum, from Apia, length 10.50 inches.

1056. *Callyodon ahula* (Jenkins). Hawaii.

Scarus ahula Jenkins, Bull. U. S. Fish Comm., 1899 (1900), 61, fig. 19, Honolulu. Snyder, Bull. U. S. Fish Comm., 1902 (1904), 531, Honolulu.

1057. *Callyodon mutabilis* Gronow. New Guinea (Macleay); Shortland I. (Seale); Celebes; Amboina.

Callyodon mutabilis Gronow, Cat. Fish., ed. Gray, 1854, 86, Amboina.
Pseudoscarus pentazona Bleeker, Atlas, I, Scar., 46, tab. xi, fig. 1, Celebes.

1058. *Callyodon dubius* (Bennett). Hawaii; Samoa; Tahiti; Tubuai and Raiatea (Seale).*Scarus dubius* Bennett, Zool. Jour., iv, 37, Sandwich Is.*Pseudoscarus dubius* Günther, Cat., iv, 229, Sandwich Is., Fiji Is.

We have 3 specimens of this species from Apia.

1059. *Callyodon lacerta* (Cuvier & Valenciennes). Samoa; East Indies.*Scarus lacerta* Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 217, 1839, Pondicherry.*Pseudoscarus xeruginosus* Günther, Cat., iv, 229; not *Scarus xeruginosus* Cuvier & Valenciennes.This is the commonest *fuga*, or parrot-fish, at the Samoan Islands. We have about 60 specimens from Apia and 16 from Pago Pago.

Head 3.10 in length; depth 2.75; eye 6.50 in head; dorsal ix, 10; anal iii, 10; scales 2-24-6, three rows on cheek, the lower row of 4 scales on lower limb of preopercle.

Body oblong, compressed, the anterior profile bluntly rounded; depth of caudal peduncle 2.10; a posterior canine in upper jaw; lips wide, fully covering all but tip of teeth; five scales in front of dorsal fin; base of dorsal 1.75 in length of fish without caudal, its lower ray 3.14 in head; base of anal 1.25 in head, 2.50 in base of dorsal, its longest ray 3.75 in head; pectoral 1.14; ventral 2; caudal rather deeply lunate 1.14. The specimen described is 9.55 inches long, from Pago Pago.

Life colors of various specimens were as follows:

(1) Dark dull purplish olive; chin and space below eye paler; vertical fins marbled with dull reddish purple, no clear markings; a dark bar across throat. Specimen from Apia.

(2) Also from Apia. Dull olive, shaded with lilac-brown; a blackish blotch above pectoral; base of pectoral dusky; fins all dull lilac-brown.

(3) From Pago Pago. Dirty mottled blackish olive; iris dusky; three silver streaks along side of belly; axil black; dorsal mottled with salmon colored patch at tips of third and fourth spines; caudal brown mottled, tips paler; anal dusky; pectoral and ventral mottled olive.

(4) From Pago Pago. Body mottled olive-brown; iris golden; three dull silvery streaks along side of belly; axil black; dorsal olive with salmon tinge, edge black; caudal dull olive, medially salmon; anal blackish; pectoral brownish, tinged with salmon; ventral dirty gray.

(5) From Pago Pago. Dark olive-brown, more olive on cheek; three well defined whitish streaks along side of belly; belly dark, like sides, or a little paler; dorsal dark reddish brown, with an orange edge; caudal pale and redder, but still plain reddish brown; anal a little darker; pectoral and ventral similar; forehead darker brown; a dark axillary spot.

(6) From Pago Pago. Purplish brown, with olive shades along sides; reddish on breast; dorsal reddish, edged with purplish; caudal plain reddish brown, lunate; pectoral dull orange, the lower rays purplish; ventral redder; anal olive and purplish; a dark shade across branchiostegal region.

Color in spirits, a dull olive-brown, lighter below, 3 distinct white lines on each side of belly and a wide indistinct blackish band-like area on side below posterior two-thirds of spinous dorsal, invading the lighter coloring of the belly; top of snout with slight wash of purplish; dorsal brownish, unmarked; anal brownish, lighter at base; pectoral grayish; ventral yellowish, gray at tip; caudal brownish, unmarked; iris golden; teeth white.

1060. *Callyodon lepidus* (Jenyns). Tahiti; Rarotonga (Seale).*Scarus lepidus* Jenyns, Zool. Beagle, Fish., 108, 1842, Tahiti.**1061. *Callyodon paluca* (Jenkins).** Hawaii.*Scarus paluca* Jenkins, Bull. U. S. Fish Comm., 1889 (1900), 60, fig. 18, Honolulu. Snyder, Bull. U. S. Fish Comm., 1902 (1904), 531, Honolulu.**1062. *Callyodon upolensis* Jordan & Seale, new species.** Samoa.

Head 3 in length; depth 3; eye 4.95 in head; dorsal ix, 10; anal iii, 9; scales 2-24-6, three rows on cheek, the lower row of three scales on lower limb of preopercle; snout 3 in head; interorbital 3.18.

Body oblong, compressed; anterior profile rather pointed; depth of caudal peduncle 2.55 in head; no posterior canines; lips wide, almost covering tip of teeth; base of dorsal fin 1.85 in length without caudal, its longest ray 2.50 in head; base of anal fin 1.50 or 2.50 in base of dorsal; pectoral 1.45 in head; ventral 1.98; caudal almost square, the upper and lower margin of fin scarcely produced.

Color in spirits, dull brown, the center of each scale lighter, giving the appearance of about 8 lighter longitudinal stripes; tip of snout, chin, thorax, and belly a shade lighter than body color, the lips and side of snout with slight wash of dull yellowish; a yellowish blotch on opercle; dorsal fin dull yellowish with wash of dusky and a darker margin; anal, ventral, and caudal yellowish with wash of dusky; pectoral yellow; iris yellow; teeth white.

The young are similar in coloring to adults, except that the fins do not show so much dusky, being without the dark tip to dorsal, but with a narrow dark line at base of dorsal and anal.

Three specimens from Apia, 2.10 to 4.50 inches long. The type is no. 51751, U. S. National Museum, 4.50 inches long, from Apia.

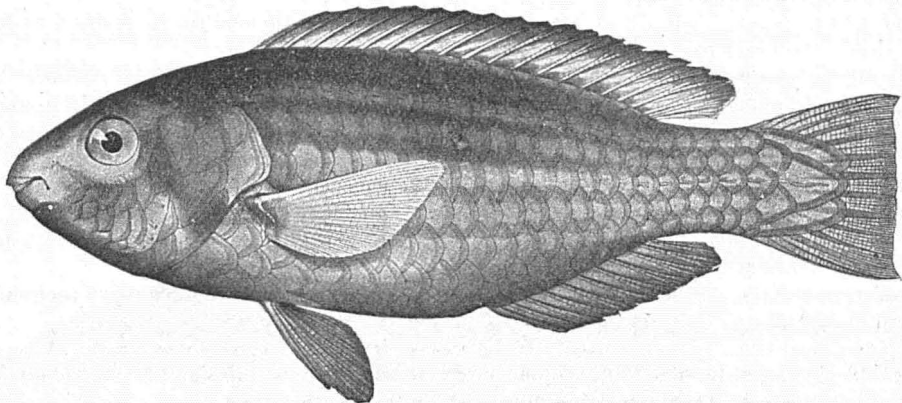


FIG. 59.—*Callyodon upotensis* Jordan & Seale, new species. Type.

1063. *Callyodon macrocheilos* (Bleeker). Faté, New Hebrides (Seale); East Indies.

(*Scarus macrocheilos* Bleeker, Gilolo, 60.)

1064. *Callyodon balinensis* (Bleeker). *Fuga pa'i*; *Fuga pa'ipa'i*; *Fuga mea*. Samoa; East Indies.

Scarus balinensis Bleeker, Verh. Bat. Gen., xxii; Bijdr. Ichth. Bali, 8.

Pseudoscarus balinensis Bleeker, Atlas, I, 39, tab. xvi, fig. 3, Bali, Banda.

Head 3.10 in length; depth 3.10; eye 6.50 in head; dorsal ix, 10; anal iii, 9; scales 2-24-6, three rows on cheek, the lower row of three scales on lower part of preopercle; snout 2.50 in head; interorbital 3.10.

Body oblong, compressed, rather elongate; the anterior of head rather pointed; depth of caudal peduncle 2.12 in head; no posterior canines; lips wide, covering all but small tip of jaws; seven rows of scales in front of dorsal; dorsal 1.85 in length without caudal, its longest ray 2.75 in head; base of anal 1.20 in head, 1.25 in base of dorsal, its longest ray 3 in head; pectoral 1.25 in head; ventral 1.70; caudal moderately lunate, 1.12 in head.

Color in spirits, dull, grayish, lighter below; four yellowish lines along sides of belly, lower lip yellowish, upper lip grayish; a slight dusky wash on posterior margin of opercle and at axis of pectoral; dorsal grayish with dark margin, and a lighter submarginal line, the fin somewhat splashed with yellowish; anal yellowish, with dark margin, and a few dusky blotches at base; pectoral yellowish; ventral yellowish, with narrow indistinct darker margins; caudal dark grayish; a fine line of gray at tip, with a narrow submarginal dusky line; iris golden; teeth white.

Description of a specimen 11 inches long, from Apia. We have 10 specimens from this locality.

Life colors of one specimen drab, the scales above edged with bronze brown; a faint diffuse blotch of darker drab on lateral line, above vent; dorsal gray with a brownish reddish submarginal band, the edge bluish gray; caudal grayish olive, darker at edge; anal light reddish brown, the edge bluish; ventral pale reddish; pectoral rather bright yellow, axil black; head plain gray.

Another specimen in life was rather light brown, the belly pinkish brown; each scale above margined all around with clear olive brown; lower jaw abruptly pale brown with shades of livid bluish; dorsal dull orange, grayish at base, with a blue-black edge; anal brighter orange, with a broader edge of blue black; caudal grayish at base, then sooty brown, the edges dusky blue; ventral light orange,

edged with bluish; pectoral dusky yellow, edged before with bluish; lips reddish, the upper dark; side of belly with three pale stripes.

1065. *Callyodon oviceps* (Cuvier & Valenciennes). *Fuga uli*. Tahiti; Samoa.

Scarus oviceps, Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 244, Tahiti.

Pseudoscarus oviceps, Günther, Cat., iv, 225; copied from Valenciennes.

Head 3.10 to end of vertebræ; depth 3.10; eye 6.75 in head; dorsal ix, 10; anal iii, 8; scales 2-24-6; three rows on cheek, the lower row of three scales on lower limb of preopercle.

Body oblong, compressed, the anterior of head broadly rounded, the snout in front of eye slightly gibbous; depth of caudal peduncle 2.10 in head; no posterior canines; lips broad, covering teeth; six scales in front of dorsal; longest ray of dorsal 2.75 in head; base of anal 1.14, 1.95 in base of dorsal, its longest ray 3.10 in head; pectoral 1.30 in head; ventral 1.90; caudal lunate 1.18.

Life colors of an immature example from Apia, light olive, golden on sides of head; below a dark brown diffuse band from snout through eye to gill-opening; two diffuse yellowish shades from spinous dorsal downward, a darker area between; fins dull pinkish olive, the caudal darker above and below; the ventral almost white.

An adult example, also from Apia, was dusky mottled olive, almost black on back anteriorly; a dull golden area bounding the black, from cheek to end of pectoral, then obliquely upward; another yellow blotch on back behind it; a whitish stripe below eye bounding the yellow; dorsal reddish brown with a black edge which fades behind; caudal lunate, dull orange brown; anal brownish red, rather bright, paler at base; ventral colorless; pectoral colorless, blackish above toward tip; lips reddish brown; chin and below clear brown, the belly whitish. Brighter colored than the preceding specimen.

A specimen from Pago Pago was slaty blackish above; broad pale greenish-yellow blotch below eye and running up to dorsum about even with tip of pectoral when laid back; below whitish; ventrals and anal thin salmon scarlet; dorsal with blackish margin and base, and broad median, rather dark, reddish band; pectoral dark near anterior margin, then yellowish, then uncolored.

Color in spirits brownish, darker above, a yellowish band from middle of dorsal fin obliquely down to point of pectorals, a similar but much smaller and less distinct band down from middle of soft dorsal; upper part of head dusky with bluish wash distinctly separated from yellowish lower half of head by a dark line from snout through lower part of eye to posterior margin of opercles; tip of the lips yellowish; dorsal brownish with yellowish blotches, the posterior tip of fin being yellowish; anal, pectoral, and ventral yellowish, unmarked. Some specimens show a slight dusky wash on pectoral; caudal grayish; iris golden; teeth white.

Seven specimens from Apia and 5 from Pago Pago. The one described is 8.55 inches long, and was obtained at Apia. The species is rather common at Samoa.

1066. *Callyodon zonularis* Jordan & Seale, new species. *Fuga mea*. Samoa.

Head 3 in length; depth 3; eye 6.75 in head; snout 2.10; interorbital 2.85; dorsal ix, 10; anal iii, 9; scales 2-24-6, three rows on cheek, the lower row of four scales, covering the lower limb of preopercle.

Body oblong, compressed; snout gibbous; caudal peduncle thick and strong, its depth equal to snout; no canines; lips covering more than two-thirds of upper teeth; gill-rakers small, numerous; opercle and preopercle entire; six scales in front of dorsal; origin of dorsal over posterior margin of opercle; longest dorsal spine 3.20 in head, the longest ray 2.50; base of anal 1.50, 2.30 in base of dorsal, its longest ray 3 in head; pectoral 1.20; ventral 1.98, its origin on line with middle of base of pectoral; caudal square.

Life colors of a specimen from Apia, olive yellow, clear golden in a bar behind pectoral; back with four dusky crossbars overlying yellow; a blackish shade on side of head across eye; breast and lips creamy reddish; fins all yellow, shaded like neighboring parts of body, the pectoral clear yellow; traces of pale golden streaks along side of belly; also a diffuse yellow lateral stripe.

A specimen from Pago Pago had a pale greenish yellow suffusion over body; four indistinctly marked smoky bands from dorsum half way down sides, fading ventrally; belly yellowish whitish, also ventral; cheeks rather yellow; lips saffron; black bar behind eye; caudal reddish saffron.

Color in spirits grayish white, with 5 wide oblique bands of black which extend over back and to about the median line of sides, the bands of greater width than the interspaces, the first at origin

of spinous dorsal, and more or less amalgamated with the dusky upper half of head, the second band from fifth to eighth dorsal spines, the third from first to fifth dorsal rays, the fourth from seventh to tenth dorsal rays, and the posterior band, which is very indistinct and more or less united with the fourth, on the middle portion of caudal peduncle; a black band from eye to posterior margin of opercle, the dusky upper half of head sharply separated from lighter lower half by a line of dusky with a whitish line below it, extending from orbit to angle of mouth; lips yellowish; teeth yellowish; iris dusky with inner ring of golden; dorsal grayish, the dusky bands of body invading the fin more or less; caudal grayish; pectoral, ventral, and anal yellowish white, unmarked.

This strongly marked species is common at Samoa; we have three examples from Apia and ten from Pago Pago.

Described from the type, no. 51752, U. S. National Museum, from Pago Pago, length 10.50 inches.

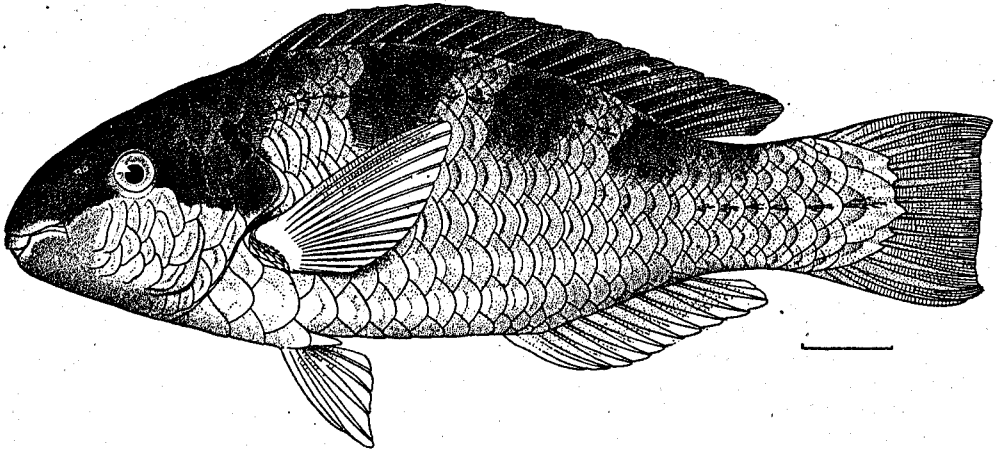


FIG. 60.—*Callyodon zonularis* Jordan & Seale, new species. Type.

1067. *Callyodon roseiceps* (Cuvier & Valenciennes). Ulea, Caroline Is.

Scarus roseiceps Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 279, 1839, Ulea.

1068. *Callyodon cruentatus* (Cuvier & Valenciennes). Ulea.

Scarus cruentatus Cuvier & Valenciennes, op. cit., XIV, 277, Ulea.

1069. *Callyodon ocellatus* (Cuvier & Valenciennes). Caroline Is.

Scarus ocellatus, Cuvier & Valenciennes, op. cit., XIV, 278, Caroline Is.

Pseudoscarus ocellatus, Günther, Cat., IV, 283; after Valenciennes.

1070. *Callyodon perspicillatus* (Steindachner). Hawaii; Johnston I.

Scarus perspicillatus Steindachner, Denks. Ak. Wiss. Wien, XLI, 1879, 16, taf. IV, fig. 1, Sandwich Is. Smith & Swain, Proc. U. S. Nat. Mus. 1882, 184, Johnston I. Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (1903), 470, Honolulu. Jordan & Evermann, Bull. U. S. Fish Comm., XXIII, 1903 (1905), 847, fig. 149, Honolulu, Puako Bay, Johnston I.

This large and beautiful scaroid is rather rare. It is highly esteemed by the Hawaiians as a food fish.

1071. *Callyodon brighami* (Bryan & Herre). Marcus I.

Scarus brighami Bryan & Herre, Bishop Museum, 1903, II, 131, Marcus I.

Described from a single specimen collected at Marcus Island by William Alanson Bryan.

1072. *Callyodon quoyi* (Cuvier & Valenciennes). New Ireland; Shortland I. (Seale); East Indies.

Scarus quoyi Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 278, 1839, New Ireland. Bleeker, Ternate, II, 607, Ternate.

Pseudoscarus quoyi, Bleeker, Atlas Ich., I, 29, tab. VI, fig. 3, Ternate. Günther, Cat., IV, 289; after Bleeker.

1073. *Callyodon lupus* (Fowler). Thornton I.

Scarus lupus Fowler, Proc. Acad. Nat. Sci. Phila. 1899, 491, Thornton I.

1074. *Callyodon jonesi* (Streets). Fanning Is.*Scarus jonesi* Streets, Bull. U. S. Nat. Mus., VII, 1877, Fanning I.**1075. *Callyodon papuensis* (Macleay). New Guinea.***Pseudoscarus papuensis* Macleay, Proc. Linn. Soc. N. S. W. 1888, 590.**1076. *Callyodon moresbyensis* Macleay. New Guinea.***Pseudoscarus moresbyensis* Macleay, l. c., New Guinea.**1077. *Callyodon bataviensis* (Bleeker). *Tapoli*; *Laea mumu*. Samoa; Guam; East Indies.***Scarus bataviensis* Bleeker, Java, IV, 342, Batavia. Seale, Bishop Museum 1901, 96, Guam.*Pseudoscarus bataviensis* Bleeker, Atlas Ichth., 48, tab. XII, fig. 8, Batavia.

Head 3 in length; depth 3.10; eye 6.75 in head; dorsal IX, 10; anal III, 9; scales 2-24-6; two rows of scales on cheeks, the lower of six scales; lower limit of preopercle bare; lips wide, covering two-thirds or more of teeth; snout 2.50 in head; interorbital 1.20 in head.

Body oblong, compressed, the anterior profile evenly pointed; depth of caudal peduncle 2.10 in head; tubules of lateral line usually with but one or two very short branches; a strong posterior canine above and below; four scales in front of dorsal; longest dorsal spine 3 in head, the longest ray 2.75 in head, base of anal 1.25 in head; 2 in base of dorsal; pectoral 1.20 in head; ventral 1.75 in head; caudal deeply lunate, length of exposed outer ray 1.25 in head, exposed inner ray, 6 in head.

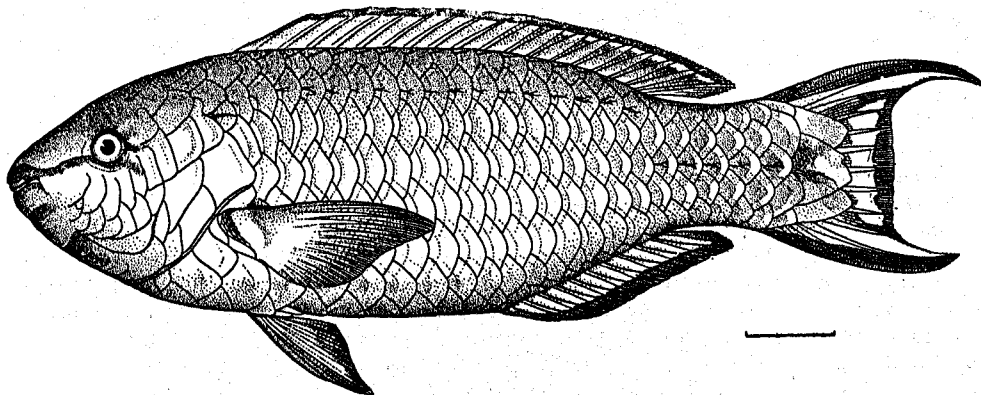


FIG. 61.—*Callyodon bataviensis* (Bleeker).

Life colors of a specimen from Apia, olive-green, with shades of rich light brown on side, becoming purplish olive on head, purplish gray on forehead and clear blue-green behind, the shades changing gradually; green stripes about eye; lips clear blue; a blue stripe across creamy red of lips; centers of scales on caudal peduncle dusky; dorsal orange, with a bluish dull median shade; a bright blue stripe at base and edge; caudal lunate, bright blue, especially on the margin, with shades of light grayish orange-brown; anal orange-brown, the margin blue with a bright orange-red stripe; pectoral blue, deeper above; axil blue; teeth white.

Color in spirits dull gray with wash of yellowish, the center of scales on posterior half of body showing a slight tint of pale green, darker on top of head; a bright green line through lower part of orbit along side of snout and around upper lip; also a green line on lower lip; chin yellowish, with a green cross-band and a green triangular patch on lower part of head uniting with its fellow on opposite side at middle of isthmus; a green line from isthmus through ventrals, along base of anal to caudal; two indistinct greenish lines on each side of belly; a dusky blotch on upper part of orbit; dorsal with a rather irregular broad yellowish margined center of green, the tip of fin with a broad line of deep green, a more or less broken line at base; outer third of anal deep green, the inner two-thirds yellowish, a narrow green line at base; pectoral greenish, slightly darker at axil; ventral with mid-portion yellowish surrounded by a broad green margin; caudal with outer rays, posterior margin, and base green, the inner portion of fin and two or three rays of each lobe yellowish white.

Of this species we have 5 specimens from Apia.

1078. *Callyodon gilberti* (Jenkins). Hawaii; Laysan.

†Scarus bataviensis, Steindachner, Denk. Ak. Wiss. Wien, LXX, 1900, 508, Honolulu, Laysan.
Scarus gilberti Jenkins, Bull. U. S. Fish Comm., 1899 (1900), 59, fig. 17, Honolulu.

This scaroid is rather rare at Honolulu. It is close to *C. bataviensis*, but apparently distinct.

1079. *Callyodon abacurus* Jordan & Seale, new species. *Fuga meamea*. Samoa. (Pl. xxxiii.)

Head 2.85 in length; depth 2.90; eye 8.50 in head; snout 2.20; interorbital 3; dorsal ix, 10; anal iii, 9; scales 2-26-6, two rows on cheek, the lower preopercle limb bare.

Body oblong, compressed, the anterior profile bluntly rounded, the snout slightly gibbous; two large posterior canines on upper jaw, none on lower; upper lip broad, covering two-thirds or more of upper jaw; lower lip narrow, covering less than half of jaw; depth of caudal peduncle 2.45 in head; longest ray of dorsal 3; base of anal 1.30, 2.10 in base of dorsal; pectoral 1.35 in head; ventral 2; caudal slightly lunate.

Color in life of a specimen from Apia, bright green, the tail bright blue, a golden shade before it; belly creamy yellow; a dark shade behind pectoral; scales with broad brown bar which becomes an orange spot on posterior parts; cheeks green; forehead purplish olive; lips orange, yellow-edged, with a bright blue stripe across each, these meeting, running through the eye and sending a blue stripe to angle of mouth; the blue stripe green behind with an orange stripe below it; opercle edged with orange, preceded by a green stripe, a brown blotch above; dorsal bright blue with a continuous median stripe of golden; caudal (slightly lunate) bright blue, with golden bronze stripe on each lobe and cross spots and vermiculations at base; ventral golden with bright blue anterior edge; pectoral black, golden washed, and edged in front with blue.

A larger example is rather golden than green, the dusky purplish area above pectoral more marked, the dorsal and caudal with marks of purplish brown rather than orange; eye blue above a green streak before it. In all specimens the blue caudal peduncle has a large golden spot on each scale, giving a checkered appearance.

A specimen from Pago Pago was colored as follows: Upper and under lips, bars on under side of head, ventrals except a pinkish salmon median blotch, margin of dorsal and anal, and median longitudinal ventral line, all light blue; darker blue suborbital line from upper lip; postorbital blotches dark green next eye, lighter green farther back; top of head smoky olive green, farther back lighter green; body anteriorly yellowish-reddish-greenish with pinkish yellow coloration on sides of head and almost yellow on underside of head and bordering median ventral blue line; body posteriorly bluish-green with pinkish-yellowish-brown markings or checkers, one on each scale; portions of dorsal, anal, and caudal which are not blue, yellowish salmon.

Color in spirits, dull yellowish; caudal peduncle green with three longitudinal rows of round yellow spots; a broad dusky band occupying all the nuchal region to base of third dorsal spine, this band extending obliquely down and back on the side to a line with base of anal fin and lower margin of pectoral; margin of lips yellow; top of head and snout purplish; a green line with dark margins at upper margin of orbit, another short one at posterior margin of orbit, and a third from opercle along lower part of orbit down side of snout around upper lip, a branch descending to axil, and another branch around lower jaw posterior to yellow margin; dorsal fin yellowish white, the margin and base each with a band of green; anal colored similar to dorsal except the distal blue band is broader; pectoral dark purplish; ventral yellowish with a slight trace of bluish margins; caudal green with some scattered round yellowish spots, the middle portion of fin lighter; iris golden; teeth green.

We have 13 specimens of this beautiful species from the coral reef at Apia and 2 from Pago Pago. The type is no. 51754, U. S. National Museum, 12.75 inches long, from Pago Pago.

1080. *Callyodon lauia* Jordan & Evermann. Hawaii.

This may be the same as *Callyodon formosus*.

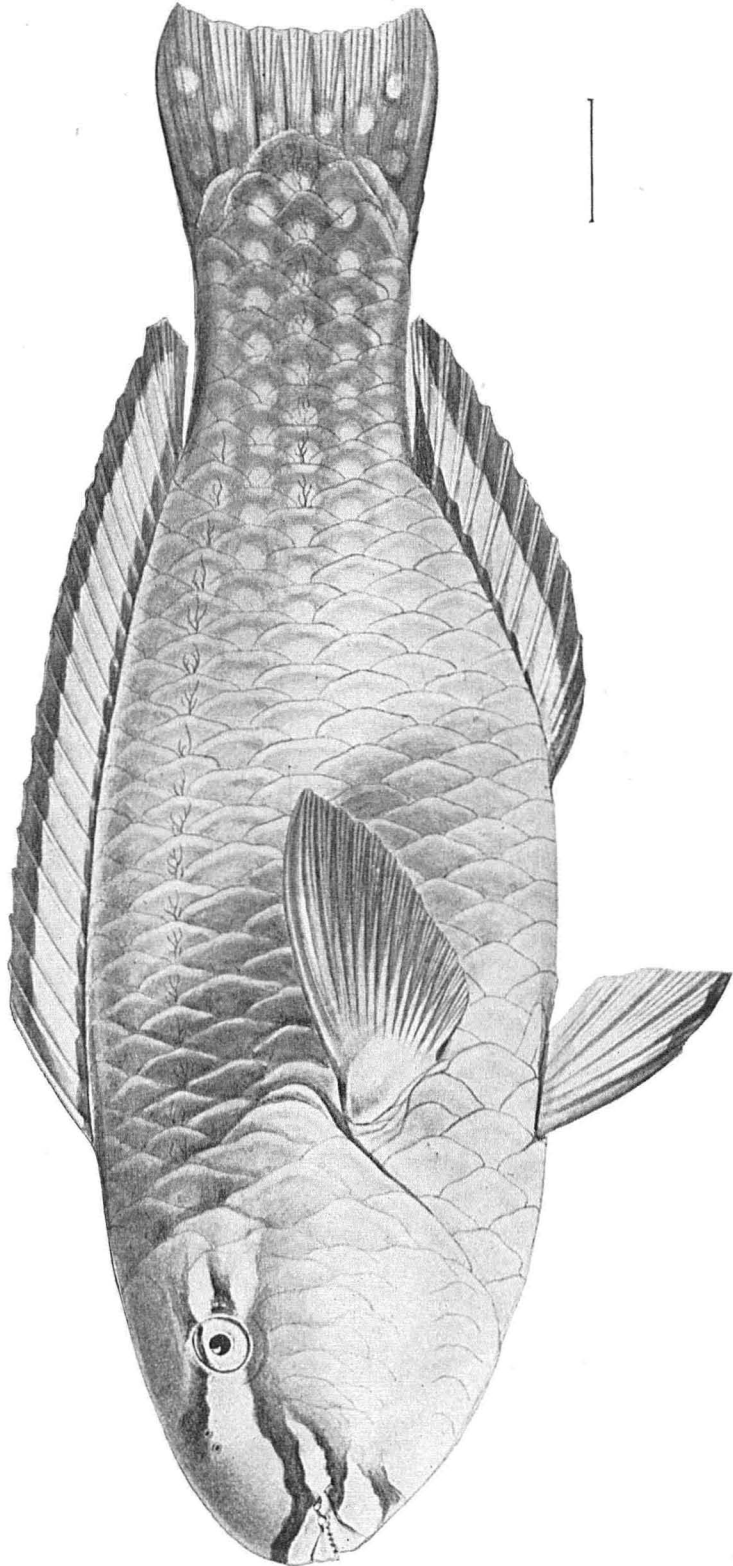
1081. *Callyodon formosus* (Cuvier & Valenciennes). Hawaii.

Scarus formosus Cuvier & Valenciennes, Hist. Nat. Poiss., XIV, 283, 1839, Sandwich Is.

The description of *Callyodon formosus* seems to apply fairly well to *Callyodon lauia*. *Callyodon jenkinsi* is also closely related.

1082. *Callyodon dimidiatus* (Bleeker). Papua; Shortland I. (Seale).

Scarus dimidiatus Bleeker, New Guinea, 17, Papua.



CALLYODON ABACURUS JORDAN & SEALE, NEW SPECIES. TYPE.

1083. *Callyodon zonatus* (Macleay). New Guinea.*Pseudoscarus zonatus* Macleay, Proc. Linn. Soc. N. S. W. 1883, 591.**1084. *Callyodon spilonotus* (Kner). Samoa; Fiji. (Pl. XLVIII, fig. 1.)***Pseudoscarus spilonotus* Kner, Sitz. Ak. Wiss. Wien, LVIII, 60, taf. IX, fig. 26, 1868, Kandavu (Fiji).

Head 3.12 in length; depth 2.85; eye 7 in head; snout 2.50; interorbital 2.75; dorsal IX, 10; anal III, 9; scales 2-24-6; three rows on cheek, the lower row of four scales on lower limb of preopercle.

Body oblong, compressed, the anterior profile bluntly rounded; depth of caudal peduncle 2 in head; a distinct upper and lower posterior canine; lips rather wide, covering more than half of upper jaw, and all but tip of lower jaw; five rows of scales in front of dorsal; base of dorsal 1.90 in length of fish without caudal, its longest ray 2.50 in head; base of anal 1.14, 1.95 in base of dorsal, its longest ray 2.75 in head; pectoral 1.20; ventral 1.75; caudal lunate.

Color in life of a specimen from Apia, deep blue, violet-brown-shaded on the back anteriorly, clear blue on the throat; creamy drab on the breast; anterior part of back down to pectoral closely spotted with bright blue-green; three blue stripes on side of belly and a median stripe; dorsal orange-brown, blue on edge, brighter behind, greenish blue at base; a row of round blue-green median spots; anal dull crimson, blue-green at base, blue on edge; caudal bright yellowish green, blue on angle, a purple red stripe on each lobe; ventral creamy, edged with blue; pectoral green with a violet-drab cross-bar at base and a violet-drab lengthwise stripe; throat bright blue; cheeks bright green; forehead bright violet-gray with a green cross-band and green stripes and spots behind eyes.

Another specimen from the same locality was deep greenish blue, tinged with reddish brown above, reddish below, each scale being brown at base; three blue-green stripes on side of belly; throat clear blue; snout and cheeks green blue; a brown band across eye, crossed by a green curved line; dorsal blue at base, the edge orange, with a row of green spots mesially; soft dorsal with more orange, the spots larger; caudal clear, green, with blue-green edges and a stripe of orange in each lobe; anal like dorsal, the red median stripe deeper orange-brown, the green spots smaller, the blue margin broader; pectoral blue-green, with long median orange-brown band; ventral blue-green, mesially orange-yellow.

A third specimen from Apia was deep bright orange-brown, more orange behind, the sides below becoming more pink, the belly orange yellow; the cheeks light vitriol-green, the lower jaw and throat clear livid blue, the upper jaw blue; two blue lines before eye, narrow, clear, and undulated; three behind eye, separated by orange-brown; head above dark brown, faintly spotted with dark blue; scales of anterior half of body above each with many small round blue spots, these coalescing in vermiculations behind eye; edge of opercle brown; posteriorly each scale centrally greenish blue, the brown forming broad edgings; caudal peduncle posteriorly bright green; sides of belly with one median (ventral line) and three other stripes, formed of a large blue spot on each scale, the hue of the ventral stripe sky-blue, the others progressively greener and more continuous; dorsal bright orange-brown, with a broad sky-blue margin, the basal scales bluish and green, the soft part with a median row of green spots; an irregular blackish blotch under third spine; caudal clear grass-green, edged above and below with bluish; an orange stripe along the next to lowest ray; a small orange spot at its base; anal dark orange, a broad sky-blue margin; bluish-green spots at base; ventral sky-blue in front, the rest orange-yellow; pectoral dusky in axil, an orange-brown band across base, the fin clear green, bluish above, with an orange-brown lengthwise stripe; some yellow edges to scales of lower part of head.

A specimen from Pago Pago was blue-green with yellowish-salmon scale spots; caudal grass-green with blue edging; on top of head orange-salmon markings; same color on dorsal and anal where not blue green; belly yellow white with robin's-egg-blue blotches; color in spirits, grayish with slight tints of green; upper half of body a shade darker and with scales of anterior half dotted with small round gray spots—three or four on each scale; three or four longitudinal green lines on sides of belly; tips of lips yellowish; about four greenish bands radiate from or pass through the eye, the lower one extending from opercles through lower part of eye around snout, joining its fellow of opposite side and dividing very distinctly the upper dark color of head from the lower lighter half. There is one additional green line around snout above this, and a short cross-line on anterior interorbital, a single green line around lower jaw; upper base of pectoral black; dorsal fin with a deep blue-green band at base, middle, and tip of fin, the fin otherwise yellowish; middle band more or less broken up into blotches; anal with bluish-green band at base and tip, the fin otherwise pale green; pectoral grayish green, blotched

with darker above, dusky at base; ventral yellowish, the first rays pale green; caudal with upper and lower margins pale green, middle portion yellowish, iris golden, teeth white.

Six specimens from Apia. Description from a specimen 10 inches long.

1085. *Callyodon pulchellus* (Rüppell). New Hanover I.; East Indies.

Scarus pulchellus Rüppell, Neue Wirbelthiere, 25, taf. 8, fig. 3, 1835, Red Sea.

Pseudoscarus pulchellus Bleeker, Atlas, 1, Scar., 34, tab. x, fig. 3, Java, Celebes. Günther, Cat., iv, 219, 1862, Mauritius, China. Peters, Berl. Mon. 1876, 843, New Hanover.

1086. *Callyodon blochi* (Cuvier & Valenciennes). New Guinea (Macleay); New Hanover (Peters); East Indies.

Scarus viridis Bloch, Ausl. Fische, taf. 222, 1790; not of Bonnaterre 1788.

Scarus blochi Cuvier & Valenciennes, Hist. Nat. Poiss., iv, 219, 1839, Java.

Pseudoscarus viridis, Bleeker, Atlas, 1, Scar., 45, tab. xvii, fig. 2, East Indies. Peters, Berl. Mon. 1876, 843, New Hanover.

Scarus chrysopomus Bleeker, Verh. Bat. Gen., xxii; Labr. Cycl., 53, East Indies.

Pseudoscarus chrysopoma, Günther, Cat., iv, 221, 1862, East Indies.

We follow Peters in the arrangement of the synonymy of this species and the next, noting that the name *viridis* is preoccupied in *Callyodon*.

1087. *Callyodon frenatus* (Lacépède). New Hanover; Louisiades; East Indies.

Scarus frenatus Lacépède, Hist. Nat. Poiss., iv, 13, pl. 1, fig. 2, 1802, no locality.

Pseudoscarus frenatus, Bleeker, Atlas, 1, Scar., 40, tab. xvi, fig. 2, Celebes. Peters, Berl. Mon. 1876, 844, New Hanover.

Pseudoscarus viridis, Günther, Cat., iv, 220, Louisiades; not *Scarus viridis* Bloch, nor of Bonnaterre.

1088. *Callyodon globiceps* (Cuvier & Valenciennes). Tahiti.

Scarus globiceps Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 242, Tahiti. Jenyns, Voy. Beagle, Fishes, 106, Tahiti. Günther, Cat., iv, 224, Tahiti.

1089. *Callyodon spinus* (Kner). Fiji.

Pseudoscarus spinus Kner, Sitz. Ak. Wiss. Wien 1868, 62, taf. ix, fig. 27, Kandavu (Fiji).

1090. *Callyodon pronus* (Fowler). Thornton I.

Scarus pronus Fowler, Proc. Acad. Nat. Sci. Phila. 1899, 490, Thornton I.

1091. *Callyodon jenkinsi* (Jordan & Evermann). Hawaii.

Scarus jenkinsi Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 195, Honolulu.

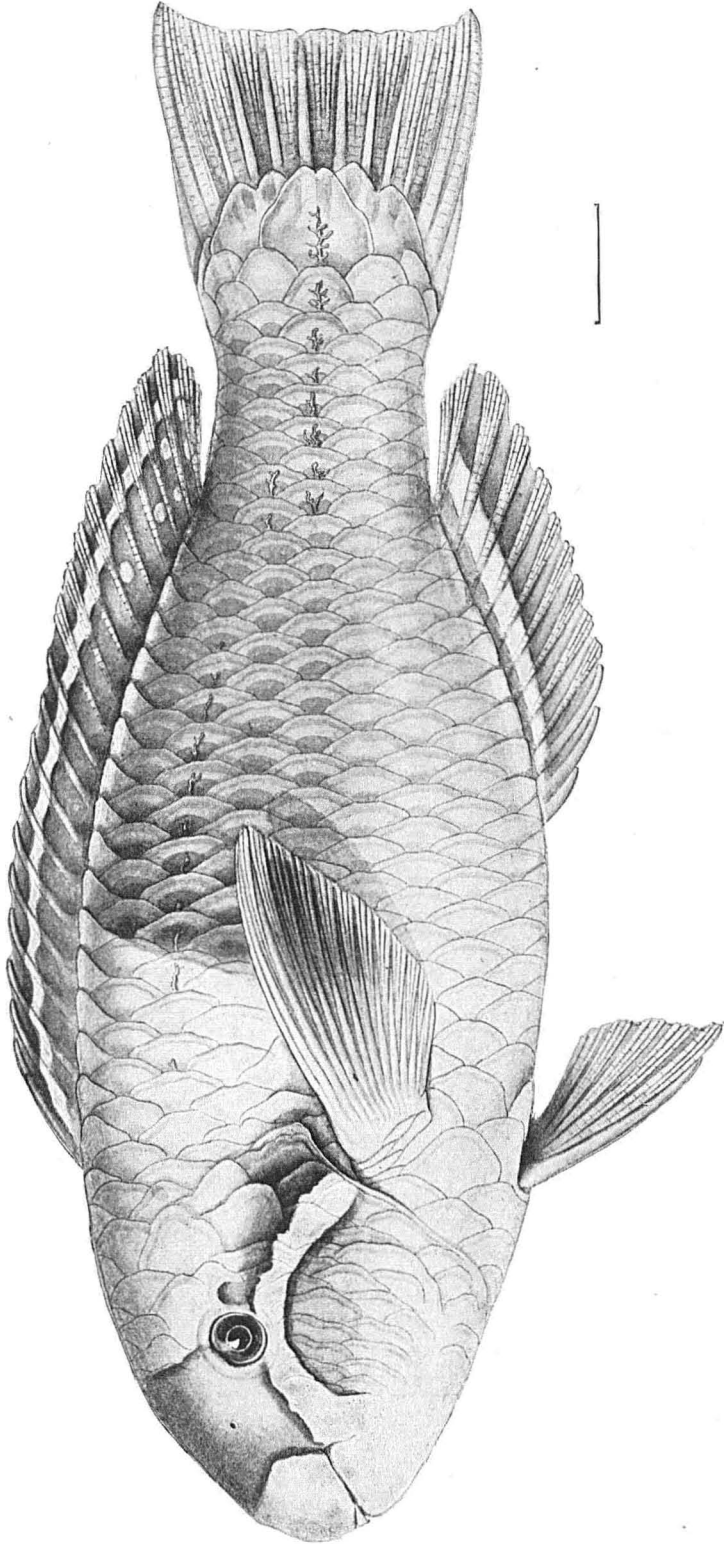
1092. *Callyodon fumifrons* Jordan & Seale, new species. Samoa. (Pl. xxxiv.)

Head 2.95 in length; depth 2.75; eye 8.50 in head; snout 2.01 in head; interorbital 2.75; dorsal ix, 10; anal iii, 9; scales 2-24-6, 3 rows on cheek, lower row of two large scales on lower limb of preopercle.

Body oblong, compressed; anterior of head bluntly rounded; upper jaw rather prominent; depth of caudal peduncle 2.12 in head; no posterior canines; lips very wide and thick, fully covering the lower teeth, and covering all but small tip of upper teeth; six scales in front of dorsal fin; base of dorsal fin 1.90 in length without caudal, its longest ray 2.75 in head; base of anal 1.25, 2 in base of dorsal, its longest ray 3 in head; pectoral 1.15 in head; ventral 1.95; caudal slightly lunate, length of exposed middle ray 2.20.

Life colors: Forehead, chin, and throat bright sky-blue; crown behind forehead with broad transverse bar of smoky lavender; angulated green-blue band from blue chin to eye and postero-ventrally to gill opening; behind eye color of crown with greenish brown suffusion; below suborbital band greenish brown; anterior half of dorsum and upper sides robin's-egg blue; dorsal with two pinkish-brown longitudinal lines with the included space bluish green; pectoral color of suborbital band with pinkish purple broad central space; ventral robin's-egg blue with sky-blue anterior margin; hinder half of body more dark greenish than front part and scales broadly edged basally with brownish, growing pink brown posteriorly; caudal blue green with pink-brown markings at base; anal color of caudal with dark pink band along base; teeth white.

A young example had the following colors in life: Teeth white; lower lip sky blue; upper lip sky blue with narrow salmon margin; an angulated blue-green broad line from angle of mouth to eye and to gill opening; forehead smoky blue; below this band greenish brown with pink edging; above it a broad olive-brown band, then bright green; top of head violet-brown; pectoral bright blue, with dark purple median blotch; body blue green with pinkish-brown scale markings so arranged as to make on



CALLYODON FUMIFRONS JORDAN & SEALE, NEW SPECIES. TYPE.

posterior two-fifths of body green pentagons, with broad pinkish-brown borders; ventral sky-blue; anal green blue, with pink-salmon basal lines; caudal green blue with four complete and several short longitudinal bars of pinkish brown; dorsal blue, margin with two pink-salmon lines and included space, then blue green.

Color in spirits: Anterior half of body to a line with sixth dorsal spine is pale pea-green; posterior to this line the color is darker, with a tint of bluish; a wide bright green line with narrow blue margins extends from posterior margin of opercle forward under eye, curving down under chin, the upper margin touching eye and the axis of mouth, this band lost on the pale green general color of the chin; anterior third of snout bright green, separated from darker color of upper part by a narrow navy-blue line; a more or less distinct dusky band from eye to posterior margin of opercle above the bright green line; a narrow margin of yellowish on upper lip; dorsal with a margin of bluish and a lighter submarginal line of grayish, the general color of fin green, with some purplish on posterior portion; outer two-thirds of anal pale green; inner third bluish-green crossed by two narrow lines of blue; pectoral greenish with purplish wash through center; ventral uniform pale green; caudal rather dark uniform green; iris golden; teeth white.

Four specimens from Pago Pago. The type is no. 51745, U. S. National Museum, length 13 inches.

1093. *Callyodon kelloggii* Jordan & Seale, new species. Samoa.

Head 3 in length; depth 2.75; eye 7.25 in head; snout 2.25; interorbital 2.75; dorsal ix, 10; anal iii, 9; scales 2-24-6; 3 rows on cheek, the lower row of one large scale covering anterior half of preopercular limb, and a minute scale anteriorly; lips broad, covering two-thirds or more of teeth.

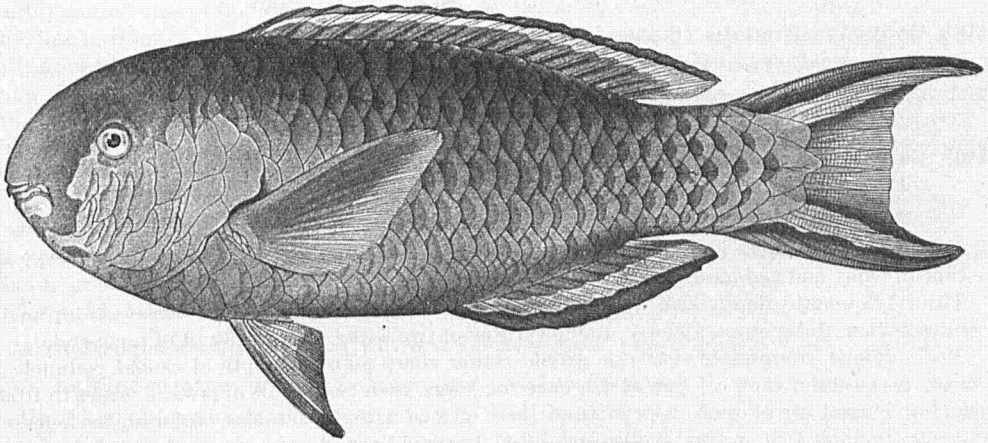


FIG. 62.—*Callyodon kelloggii* Jordan & Seale, new species. Type.

Body oblong, compressed; anterior profile bluntly rounded, the forehead being somewhat gibbous; depth of caudal peduncle 2 in head; teeth with posterior canine above and below; three rows of scales in front of dorsal, longest dorsal ray 2.50 in head, base of anal 1.30 in head, 2 in base of dorsal, the longest ray 2.75 in head; pectoral 1.10 in head; ventral 1.55 in head; caudal deeply lunate; exposed outer ray 1.25 in head, middle ray 3.25 in head. Color blue in life, with markings described below.

Color in spirits, dull olive-brown, top of head and an irregular line around chin livid green, a line of green on lower lip; a round green spot at end of lower limb of preopercle; a round green spot on isthmus with a green line just posterior to spot; a large yellowish area covering most of opercle and posterior part of cheek; a green line on lower half of orbit; three or four round green spots in front of anal; iris golden; teeth white; lower two-thirds of dorsal and a broad marginal line green, a rather wide submarginal line of yellowish white; the outer and the inner third of anal green, the middle third whitish, the white color taking its origin at base of third spine; pectoral unmarked, greenish; ventral broadly margined with green, the mid-portion being yellowish; caudal with upper and lower margins bright green with an intramarginal line of whitish which is bordered by very dark green; middle portion of caudal whitish with a wash of very pale green, no posterior marginal line or marking.

One specimen from Apia, type no. 51746, U. S. National Museum, length 11.50 inches. Named for Vernon Lyman Kellogg.

- 1094. *Callyodon tricolor*** (Bleeker). Shortland I. (Seale); East Indies.
Scarus tricolor Bleeker, Verh. Bat. Gen., xxii, Labr. Cycl., 59, East Indies.
- 1095. *Callyodon dussumieri*** (Cuvier & Valenciennes). Faté (Seale); East Indies.
Scarus dussumieri Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 252, 1839, Seychelles.
Pseudoscarus dussumieri, Bleeker, Atlas, I, Scaridæ, 46, tab. viii, fig. 1, Java.
- 1096. *Callyodon pyrrhostethus*** (Richardson). Faté and Rarotonga (Seale); East Indies.
Scarus psittacus Forskål, Descr. Anim., 29, 1775, Red Sea, not *Scarus psittacus* L.
Scarus pyrrhostethus Richardson, Ich. Chin., 262, 1838, Canton.
Pseudoscarus pyrrhostethus, Günther, Cat., iv, 223.
- 1097. *Callyodon pepo*** (Bennett). New Guinea (Macleay); East Indies.
Pseudoscarus cantori Bleeker.
- 1098. *Callyodon fasciatus*** (Cuvier & Valenciennes). Faté (Seale); East Indies.
Scarus fasciatus Cuvier & Valenciennes, op. cit., 222, 1839, Moluccas.
Scarus rivulatus Cuvier & Valenciennes, op. cit., 223, 1839, Java; name preoccupied.
Scarus rivulatoïdes Bleeker, Verh. Bat. Gen., xxii, Labr. Cycl., 55, East Indies.
Scarus micrognathus Bleeker, op. cit., 56, East Indies.
Pseudoscarus rivulatus, Günther, Cat., iv, 222, East Indies.
- 1099. *Callyodon festivus*** (Cuvier & Valenciennes). Polynesia.
Scarus festivus Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 282, 1839, no locality.
- 1100. *Callyodon frontalis*** (Cuvier & Valenciennes). Oualan.
Scarus frontalis Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 280, 1839, Oualan (Caroline Is.).
- 1101. *Callyodon forsteri*** (Cuvier & Valenciennes). Tahiti.
Scarus forsteri Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 275, Tahiti.
- 1102. *Callyodon prasiognathus*** (Cuvier & Valenciennes). *Amasapupema*. Samoa; New Ireland. (Pl. XLVIII, fig. 2.)
Scarus prasiognathus Cuvier & Valenciennes, op. cit., 272, 1839, New Ireland.

We have 5 specimens of this fish from Pago Pago. It seems not to have been collected since the time of Quoy and Gaimard.

Head 3 in length; depth 2.85; eye 5.95 in head; snout 2.75; interorbital 3; dorsal ix, 10; anal iii, 9; scales 2-24-6, three rows on cheek, the lower row of two scales on lower limit of preopercle.

Body oblong, compressed; anterior profile rather sharp-pointed; depth of caudal peduncle 2.10 in head; no posterior canines; lips broad, covering more than two-thirds of jaws; 6 scales in front of dorsal fin; longest ray of dorsal 2.55 in head; base of anal 1.25, 2.10 in base of dorsal, its longest ray 3 in head; pectoral 1.30; ventral 1.80; caudal 1.40, the middle portion rounded, the rays very slightly produced.

Color in life, uniform very dark coppery brown; fins of same shade, much mottled; teeth deep blue.

Color in spirits, brown, a tint of bluish or violet on head; dorsal dark bluish with some blotches of gray on soft dorsal; pectoral purplish; ventral grayish, darker at tip; anal grayish, irregularly blotched with purplish; caudal purplish, darker at tip; margin of upper lip grayish; teeth green; iris golden.

The specimen described above is 7.50 inches long.

- 1103. *Callyodon maoricus*** Jordan & Seale, new species. *Moalefuga*. (Pl. XLVIII, fig. 3.)

Head 3 in length; depth 2.95; eye 5.95 in head; snout 2.20; interorbital 2.95; dorsal ix, 10; anal iii, 9; scales 2-24-6, three rows on cheek; lower row of 3 scales which almost cover the lower limb of preopercle.

Body oblong, compressed; anterior profile evenly rounded, the tip of head rather bluntly pointed; depth of caudal peduncle 2.30 in head; a single small posterior canine on upper jaw; upper lip wide, almost covering upper teeth, lower lip less wide, covering about two-thirds of lower teeth; base of dorsal fin 1.85 in length without caudal, its longest ray 2.95 in head; base of anal 1.30 in head, its

longest ray 2.85 in head; caudal almost square, 1.75 in head; some specimens have outer rays prolonged; pectoral 1.14 in head; ventral 1.80 in head.

Life colors of one specimen, brilliant dark copper-red; lips and belly brighter; a bright blue-green stripe across upper jaw; two across lower, with 3 irregular green spots behind; dark green marks radiate from eye; a bright oblong spot of pale green above opercle; teeth deep blue; dorsal dark orange, dark shaded below and a broad edge of deep blue; caudal dark coppery, edged all around with bright blue, the stripe largest below; anal coppery red, with a very broad edge of deep blue; ventral coppery red, edged with blue; pectoral deep coppery red.

A large adult specimen was deeper in color and bluer than the type, but similar in all essentials: Teeth bluish; body deep reddish brown; upper lip brilliant green-blue with narrow pinkish margin; upper head smoky greenish brown, green-blue circumorbital ring, narrow; sides of head below eye paler, then irregular greenish longitudinal band; under head robin's-egg blue in front, paler behind with saffron-yellow, faint, ring-like blotches with small robin's-egg blue spot within; sides blue-green with broad pinkish brown basal edging on scales; dorsal with blue margin, saffron-pink median space with dark greenish blotches in series, weak to wanting anteriorly; ventral pale blue with bright blue anterior margin; pectoral smoky bluish, smokiest just before tips of rays; caudal green blue, bluer along dorsal and ventral margins, with uneven bluish pink at base and smoky clouds in web; anal like dorsal with the green blotches coalescent.

Color in spirits, dark brown, almost black; some specimens purplish, with a yellowish wash on belly, thorax, and under part of head, some specimens not lighter below; top of head green, tip of snout yellow; margin of lips yellow; a deep green line around upper third of upper lip; two green lines around lower lip, one near tip of lip, the other, which is margined with yellow, from lower part of orbit around base of lip, more or less united with green line running back on isthmus; a greenish black just in front of lower limb of preopercle, and a line of green dots along lower margin of lower limb of opercle; dorsal fin greenish; a wide, deep bluish green margin, with a sub-marginal area of yellowish; anal similar in color to dorsal; pectoral brownish with tint of blue; ventral yellowish with green margin, purple in some specimens; caudal bluish green, margin of deep bluish green; iris golden; teeth green; jaws well covered, deep blue; 3 rows of scales on cheek; a posterior canine. Caudal somewhat lunate.

Three specimens of this beautiful and strikingly marked species were secured at Pago Pago. It is called by the fishermen *Maolifuga* (Maori parrot-fish) because the green markings on the face suggest closely the paint on the face of a Maori chieftain. The species is near *Callyodon prasiognathus*, differing in the green marks on the head, and the deep blue edgings to the fins.

Type, no. 51747, U. S. National Museum, from Pago Pago, 10.25 inches long.

1104. *Callyodon nuchipunctatus* (Cuvier & Valenciennes). Fiji (Günther); New Guinea (Macleay).

1105. *Callyodon latus* Jordan & Seale, new species. *Laea pulepule*; *Laea mumu*. Samoa. (Pl. XLIX.)

Head 3.10 in length; depth 2.75; eye 7.50 in head; dorsal IX, 10; anal, III, 10; snout 2.10 in head; scales 2-24-6; two rows of scales on cheeks; lower limb of preopercle bare.

Body oblong, compressed, the anterior profile evenly rounded; caudal peduncle strong, its depth 2.10 in the head; tubules of lateral line with several branches; a single small canine tooth on upper jaw at angle; lips thin, covering the basal third of the teeth; four rows of scales in front of the dorsal fin; longest dorsal spine 2.10, the longest ray of about equal length; base of anal 1.75 in head, 2.75 in base of dorsal, its longest ray 2.50 in head; pectoral 1.30 in head; ventral 1.50 in head; caudal lunate, the exposed outer ray 1.50 in head, exposed middle ray 3.50 in head.

Life colors, all clear deep blue, some scales on sides with brownish edges; jaws blue; lips blue; angles of mouth brownish red; head with slaty red markings about eyes and a band between them; dorsal slaty with blue base and edging and some spots; caudal blue with slaty blue markings; anal with slaty edgings and spots; ventral blue with olive center; pectoral blue with blackish slaty center.

Color in spirits uniform dull bluish green on body, a shade lighter below; the top of head and about eye is splashed with blotches, lines or dots of dull gray, irregular in form, and varying in different specimens. The short lines may either radiate from eye, or reticulate over head, or extend down the side of snout; either a line or row of dots at angle of jaws usually extending around under jaw; either a line or row of dots over the snout just in front of nostrils; no light colored line on upper jaw; teeth green; dorsal green, with oblique lines and margin of blue; anal similar in color to dorsal;

pectoral bluish without markings; ventral pale bluish green; caudal green with four or five irregular blue lines; iris golden.

Three large specimens of this fish were obtained at Apia. A specimen was taken at Rarotonga by Mr. Seale. It is a handsome and showy species.

The type is no. 51755, U. S. National Museum, and is 15 inches long, from Apia.

1106. *Callyodon celebicus* (Bleeker). Guam; East Indies.

Scarus celebicus Bleeker, Celebes, v, 253, Celebes. Seale, Bishop Museum 1901, 95, Guam.

Pseudoscarus celebicus Bleeker, Atlas Ichth., I, 26, tab. xv, fig. 2, Celebes. Günther, Cat. IV, 237, Sea of China.

1107. *Callyodon cyanogrammus* Jordan & Seale, new species. Samoa.

Head 2.75 in length; depth 2.75; eye 7.95 in head; snout 2.15 in head; interorbital 2.95; dorsal ix, 10; anal iii, 9; scales 2-24-6, two rows on cheek; lower limb of preopercle bare.

Body oblong, compressed, the upper profile from origin of dorsal to middle of snout almost straight; from this point to base of lower jaw the profile is bluntly rounded; a single small posterior canine on upper jaw; upper lip broad, covering two-thirds or more of upper teeth, lower jaw narrow, covering less than half of lower teeth; depth of caudal peduncle 2.50 in head; three scales in front of dorsal fin; longest ray of dorsal about 3 in head; base of anal 1.50; 2.20 in base of soft dorsal,

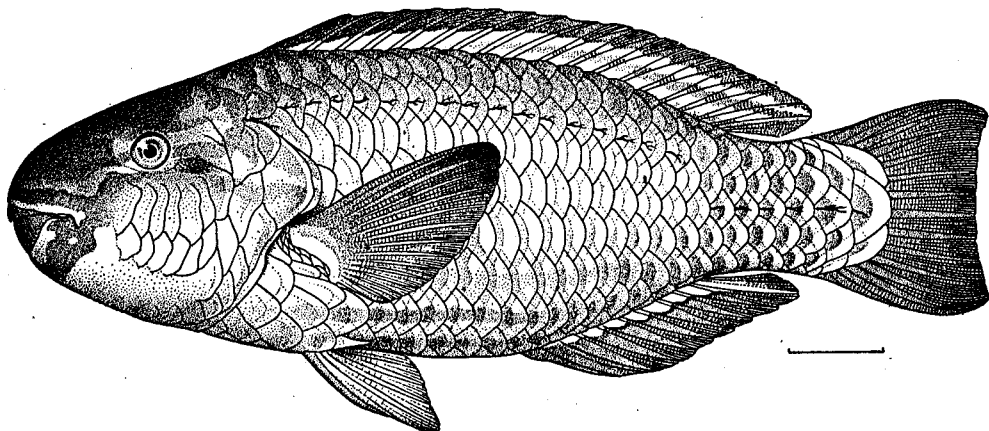


FIG. 63.—*Callyodon cyanogrammus* Jordan & Seale, new species. Type.

its longest ray about 3 in head; pectoral 1.35; ventral 2, its origin slightly posterior of a line with pectoral and dorsal; caudal very slightly emarginate, longest exposed ray 2 in head; exposed middle ray 3.50.

Color in life, green, brownish green on back, washed with golden behind middle of pectoral, the region midway between middle of anal and dorsal being distinctly bright yellow; scales above brown edged, those below edged with pinkish; head dark brownish above, the sides mostly bright greenish blue; belly light clear blue, as is caudal peduncle; cheeks golden washed; three green stripes, with purplish drab behind eye; lips blue, green behind and whitish in front; side of belly with four bright-blue stripes, one median, the interspaces of bright pinkish brown, which might be described as three pale brownish red stripes through the blue; dorsal deep gray-blue in the distal half, the rays brownish; the proximal half light greenish white, with a median green shade most distinct behind; caudal clear blue with some brassy shades; anal clear green, bright blue at edge, with a stripe made of greenish white spots at base; ventral blue green, deeper and bluer on edge; pectoral greenish blue, its upper distal third a diffuse blackish blotch, the breast at its base deep blue; teeth and jaws blue.

Color in spirits, back light brown, sides dull yellowish green; lower part of belly through sides and caudal peduncle pale green; three rather distinct greenish longitudinal lines on sides of belly; top of head, including nuchal region and snout, purplish; margin of lips yellowish; iris golden; teeth green; a green line with darker margins extending around lips posterior to yellow margins, these lines uniting at angle and extending back through lower part of orbit across the cheek to posterior

margin of opercle; a short, indistinct green line through upper part of orbit extending back to upper margin of opercle; upper third of dorsal green, the color broadening and extending to base of fin anteriorly; lower two-thirds of fin yellowish with a more or less distinct greenish central area which broadens posteriorly and anteriorly is represented by dusky blotches on webs; anal livid green, a narrow yellow line at base which extends out to tip of seventh anal ray; pectoral greenish, the tip purplish; ventral uniform pale green; caudal uniform dark green.

This species is represented by one specimen from Apia, the type, no. 51756, U. S. National Museum, length 10.50 inches.

1108. *Callyodon cypho* Seale. Guam.

Scarus cypho Seale, Bishop Museum 1901, 95, Guam.

Head 3 in length; depth 3.20; interorbital 3.50; dorsal ix, 10; anal iii, 9; pectoral 14; scales 2-24-6, lateral line interrupted, the tubes branched; two rows of scales on cheek, with five scales in lower row, preopercular limb bare; pharyngeal teeth pavement-like, about twice as long as wide, the anterior ones the longest; teeth quite projecting, their length equal to orbit, two posterior canines at angle of upper jaw.

Body oblong, compressed, the upper profile of back quite convex; snout much produced; lips narrow, scarcely covering one-half of jaws; caudal lunate; pectoral 1.33 in head, its base 5, their shortest ray 4; ventral 1.50; base of anal 1.50, 2.83 in base of dorsal; 4 scales in front of dorsal, and 4 behind, its base convex, its posterior rays longest, 3 in head.

Color in spirits a uniform light green, a darker blotch extending over top of head and upper part of opercles; teeth greenish at base with white margin; lips a brighter green with a wash of yellowish, a narrow black line near their margins; fins greenish, dorsal with narrow intramarginal line of black, anal with a broad edge of brighter green, a narrow black line through its outer third, inner two-thirds white with wash of green; ventrals white with slight greenish wash; caudal green, lighter in center, with a dusky intramarginal line.

In spirits the coloring is similar to *Callyodon bataviensis*. The type, no. 160, Bishop Museum, is 9.5 inches long, from Guam.

1109. *Callyodon troscheli* (Bleeker). Laysan; East Indies.

Scarus troscheli Bleeker, Batavia, 408, Java.

Pseudoscarus troscheli Bleeker, Atlas Ichth., 1, 25, tab. vii, fig. 2, Java. Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 508, Laysan.

1110. *Callyodon macleayi* Jordan & Seale; new name. New Guinea.

Pseudoscarus frontalis Macleay, Proc. Linn. Soc. N. S. W. 1883, 590; not of Cuvier & Valenciennes.

1111. *Callyodon gymnogonathos* (Bleeker). New Guinea (Macleay).

1112. *Callyodon jordani* (Jenkins). *Galo*; *Laea galo*. Hawaii; Samoa.

Pseudoscarus jordani Jenkins, Bull. U. S. Fish Comm., XIX, 1889 (1900), 63, fig. 21, Honolulu.

We have 1 fine specimen of this large and brilliant parrot-fish, 20 inches long, from Apia. The species is highly valued at Honolulu by the natives, who eat it raw. A color drawing of the specimen from Apia is published in Jordan & Evermann's report on the fishes of Hawaii.

Head 2.85 to end of vertebrae; depth 3.75; eye 8.75 in head; snout 2.25 in head; interorbital 2.85; dorsal ix, 10; anal iii, 9; scales 2-24-6, 3 rows on cheek, the lower row of 3 scales on lower limb of preopercle.

Body oblong, compressed, anterior profile bluntly pointed, the snout in front of eye being gibbous; depth of caudal peduncle 2.80 in head; a distinct upper posterior canine; lips rather narrow, covering about one-half of upper jaw and one-third of lower; 6 rows of scales in front of dorsal; longest ray of dorsal 3.90 in head; base of anal 1.75, 2.75 in base of dorsal, its longest ray 3 in head; pectoral 1.50; ventral 1.90; caudal deeply lunate, the upper and lower rays prolonged.

Color in life, green, bright, clear, on back and posteriorly; belly and head bright blue, the belly pale; nape and shoulder region with a deep wash of purplish brown; cheek and opercle washed with golden; lips very blue, each with a pale creamy red band; sky-blue clouds on throat; iris golden; a pale drab streak before eye; dorsal with blue spines and rays, and a deep blue margin verging on black anteriorly; the color of the spines and rays varying with that of the body, blue, then purplish, and posteriorly green; orange ground-color of the membrane growing brighter behind and encroaching on

the green, so that the last rays are green at base and blue at margin; caudal purplish brown toward the bluish base, then green, blue, and finally light orange on the edge; the lobes and upper and lower margins deep blue; anal dull orange, blue-shaded at base, the distal half bright blue; ventral greenish blue, the membranes mostly orange; pectoral greenish blue, the edge faintly orange.

Color in spirits, dull yellowish, shading into green anteriorly; a slight wash of purplish on head and nuchal region; two green bands around lower lip, the anterior one forming the margin, the posterior one uniting more or less with green coloring on isthmus; margin of upper lip yellow; an irregular green line from orbit to angle of jaws, and two or three indistinct green lines on cheek; a dark blotch back of eye, and on posterior lobe of opercle; posteriorly the scales of body have a slight wash of greenish on margin; spinous dorsal greenish, with darker margin; soft dorsal yellow, except its lower anterior third which is greenish; anal broadly margined with green, inner part of fin grayish, with some greenish blotches; pectoral green, with yellowish posterior margin; ventral green, their mid-portion yellowish; caudal green with some darker blotches, the margin yellowish; iris golden; teeth green.

1113. *Callyodon strongylocephalus* (Bleeker). Tahiti (Seale); Java.

Scarus strongylocephalus Bleeker, Java, II, 439, Java.

1114. *Callyodon microrhinos* (Bleeker). Fiji (Günther); New Guinea (Macleay).

1115. *Callyodon ultramarinus* Jordan & Seale, new species. *Fuga galu-moana*. Samoa.

Head 2.80 in length; depth 2.75; eye 8 in head; snout 2.20; interorbital 3; dorsal IX, 10; anal III, 9; scales 2-24-6, three rows on cheek, the lower row of 7 unjoined scales on lower limb of preopercle.

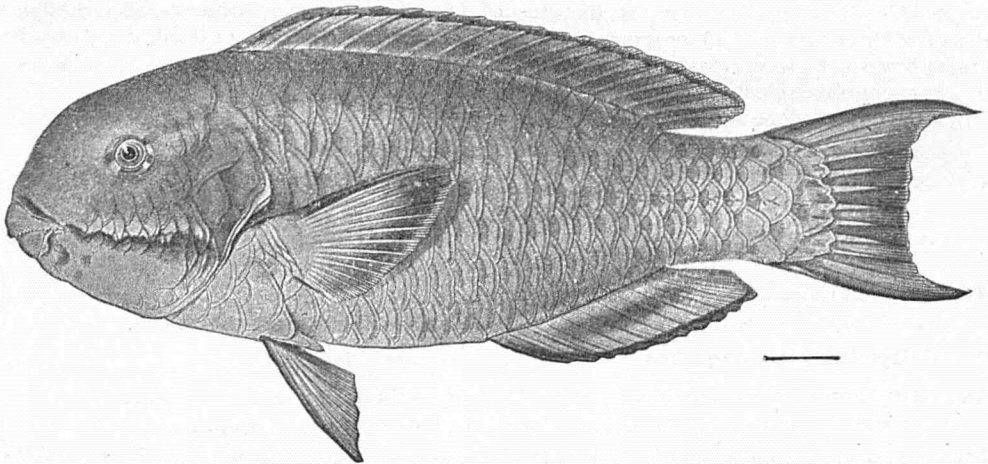


FIG. 64.—*Callyodon ultramarinus* Jordan & Seale, new species. Type.

Body oblong, compressed; anterior of head not evenly rounded because of the strongly gibbous forehead; depth of caudal peduncle 2.25 in head; three rows of scales in front of dorsal; two small blunt posterior canines in upper jaw, none in lower; lips narrow, not covering one-half of teeth in either jaw; base of dorsal fin 1.75 in length without caudal, its longest ray 2.40 in head; base of anal 1.50, 2.35 in base of dorsal, its rays longer than rays of dorsal, the longest ray 2.75 in head; pectoral 1.25; ventral 1.90; caudal lunate, exposed outer ray 1.75, exposed inner ray, 2.95.

Life colors of one specimen were dark greenish blue, rather abruptly slaty blue below, the two colors separated by a broad irregular blackish area which passes below the eye and around the snout; head-pad violet-blue; lips and throat brilliant blue green; a stripe of same back to base of pectoral, then upward along opercular edge; caudal peduncle clear blue green; dorsal dull olive, with a bright blue margin; caudal violet with blue spots on margin and posterior edge; anal light blue violaceous, edged with deep blue; ventral bluish, edged with bright blue; breast light blue; pectoral light blue with a median violet band, iris orange; no red or orange or yellow.

Another specimen, from Apia, was clear bluish green, of the same shade everywhere above the pectoral; each scale with a brown base and edge; lower parts of a clear crockery blue, less shaded with brown; head olive-green above, clear bright brown on the sides, golden olive on throat; lower lip orange, then a broad blue stripe, a narrow orange and a narrower blue one separating from the olive of throat; breast and median line of throat blue; upper lip blue with a narrow orange edge; dorsal dull orange, its margin bright blue; a series of large green spots mesially; caudal bright blue, an orange-brown streak in each lobe, brown shades at base; anal dull dark orange, its edge bright blue with a broad greenish blue median-stripe; pectoral blue, with a longitudinal stripe of brown; ventral pale blue, with a bright blue edge; iris blue with a golden ring within.

A specimen from Pago Pago was brassy green, livid bluish below and more bluish on caudal peduncle, head more smoky; each body scale with reddish brown edge; dark green streaks radiating from eye; upper lip deep blue, margined with reddish; lower lip blue, with reddish edge and a yellow cross-band from angle of mouth; an angular blue green band from angle of mouth to gill opening far below eye; axil dusky; dorsal smoky orange, edged with blue, a median blackish stripe posteriorly; caudal bright blue, darker on margin and edge; anal blue washed with orange, with blue margin and a median stripe; pectoral blue, with blackish submarginal band; ventral robin's-egg blue, with bluer margin.

Another specimen from Pago Pago was very rich dark Nile green, with dark purplish brown scale-edgings, behind eye dark green linear blotches, and farther back a single light gold-green oblong blotch, edged with blackish; teeth blue; upper lip broadly scarlet, then green, then narrowly scarlet, then merging into fuliginous; lower lip narrowly margined with scarlet, then bluish green, then smoky lilac, then bluish green, then smoky lilac; ventrals lilac, with navy-blue anterior margin and sky-blue posterior margins; pectoral dark lilac-purplish, with bluer margins; anal with bright sky-blue margin and pinkish submarginal line merging into greenish; dorsal like anal; caudal with very light blue margin and mixed greenish bluish and thin yellowish green in middle; dorsal and ventral margins sky-blue, with pinkish salmon inside.

Color in spirits dull green with a wash of bluish, darker above, somewhat purplish on top of head, lighter below, shading into a pale green on under part of head, thorax, and belly; the very narrow margin of lips yellowish, the upper lip with a single dark bluish green band above the yellow margin, and with a narrow yellowish area above the blue line; a rather wide and very distinct bluish green line extends around under the jaw from which two other lines also extend around under the jaw, all the bands uniting near angle of mouth and extending back across the cheeks to posterior margin of opercles, on a line with upper base of pectorals; about 5 very short purplish lines radiate from eye; a lighter blotch at base of caudal; dorsal fin margined with deep blue, the spinous portion of fin pale green, the soft portion more or less blotched with purplish, the color assuming a rather wide band-like form in middle of fin; anterior, posterior, and outer margins of anal fin deep blue, an incomplete blue line at base, body of fin dull grayish, with wide blue band through center; pectorals greenish, the upper margin deep blue, the posterior margin gray with intramarginal dusky area; ventral pale green with first and second rays blue; caudal with upper and lower margins blue; the distal end of fin broadly margined with purplish about two irregular purplish bands near base; iris golden; teeth green.

Of this fish we have 7 specimens, all large, from Apia and Pago Pago. One from Apia, a very large example $2\frac{1}{2}$ feet long, has the fleshy pad on the forehead highly developed. A specimen similar to this was taken by Mr. Seale at Mangareva. The type is no. 51757, U. S. National Museum, 13 inches long, from Pago Pago.

1116. *Callyodon lazulinus* Jordan & Seale, new species. *Fugausi*. Samoa.

Head 2.85 in length; depth 2.85; eye 7.50 in head; dorsal ix, 10; anal iii, 9; scales 2-24-6; three rows of scales on cheeks, the lower row of four scales covering lower limb of preopercle.

Body oblong, compressed; anterior of head bluntly rounded; the snout slightly gibbous; depth of caudal peduncle 2.20 in head; no posterior canines; lips rather wide, covering slightly more than one-half of teeth; five scales in front of dorsal; base of dorsal 1.90 in length without caudal, its longest ray 3 in head; base of anal 1.50 in head, 2.10 in base of dorsal; pectoral 1.20 in head; ventral 2 in head; caudal deeply lunate, the upper and lower rays much prolonged, the upper slightly the longest, 1.10 in head.

Life colors of a specimen from Apia, deep blue-green, the head above and shoulders indigo; not much brown shade on scales; upper lip, stripe below eye, and streaks about eye clear blue-green; a red stripe on upper lip; lower with two of reddish brown, two of clear blue; breast and lower parts clear blue; dorsal blue in front and on edge, green at base behind; a median band of deep reddish brown; caudal deeply lunate, blue-green with a band of deep brown on each lobe; anal purplish blue at base, then a clear blue line, then bluish green, blue at tip; ventral purplish blue behind, greenish blue in front; pectoral clear green above, blue below, with a blue-brown dark stripe between; teeth blue.

A young example from Pago Pago had the iris white; above eye black-green; below eye green-blue; sides green-blue with brown-maroon scale markings; pectoral with longitudinal median blackish blotch and very bright anterior edge; ventral robin's-egg blue on anterior margin, salmon tinge within; anal bright green blue with pink-salmon basal band; dorsal green-blue with pink-salmon median band; caudal green-blue with pink-salmon blotches; green black stripe through eye and snout forming patch on opercle and one behind eye; teeth sky-blue; upper lip green-blue with maroon margin; lower lip with broad salmon-maroon bar behind margin and pinkish irregular blotch farther back.

Color in spirits pea-green, top of head and shoulders back to sixth dorsal spine and to a line with eye dark bluish green, with shading of purplish; this color separated very distinctly on line with eye from the pea-green of lower half of head; a short pea-green line through upper part of eye; tip of

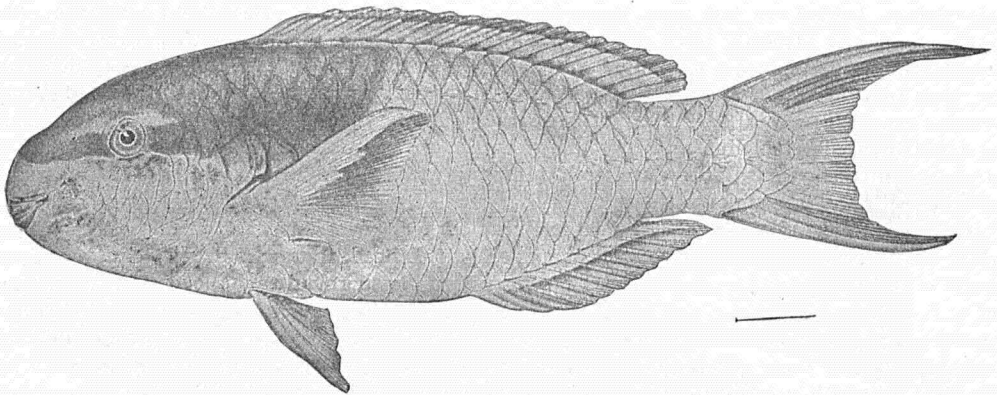


FIG. 65.—*Callyodon lazulinus* Jordan & Seale, new species. Type.

snout and lips pea-green, with an indistinct but slightly darker greenish line around upper lip, and two similar but broad lines on lower lip, the posterior one zigzagging down from eye to anterior margin of isthmus; a bluish spot on isthmus; dorsal greenish with a darker submarginal line, lower part of fin with an indistinct dusky line at base anteriorly and some dusky blotches posteriorly; outer two-thirds of anal yellowish green, the inner third pea-green, this pea-green area margined by narrow line of dusky; pectoral markings conspicuous, the upper four rays being olive-green, the middle portion purplish; the margin gray; ventral uniform greenish; caudal with outer rays bright green, the sublateral rays grayish, the middle of fin bright green; the distal margin is grayish; iris golden; teeth very dark green, almost dusky.

Fifteen specimens from Apia and Pago Pago. The type is no. 51758, U. S. National Museum, from Apia, length 12.90 inches.

1117. *Callyodon cyanognathus* (Bleeker). Faté and Shortland I. (Seale); East Indies.

Scarus cyanognathus Bleeker, Verh. Bat. Gen., xxii, 62, Java.

Pseudoscarus cyanognathus, Günther, Cat., iv, 234, Java.

1118. *Callyodon mertensii* (Cuvier & Valenciennes). Ulea.

Scarus mertensii Cuvier & Valenciennes, Hist. Nat. Poiss., xiv, 281, 1839, Ulea.

1119. *Callyodon spilurus* (Cuvier & Valenciennes).

Scarus spilurus Cuvier & Valenciennes, op. cit., 279, 1839, Caroline Is.

Family ANTIGONIIDÆ.

ANTIGONIA Lowe.

1120. *Antigonia steindachneri* Jordan & Evermann. Hawaii; Japan.
 1121. *Antigonia eos* Gilbert. Hawaii.

Family EPHIPPIDÆ.

EPHIPPIUS Cuvier.

- Ephippus* Cuvier, Règne Annual, ed. 1, 335, 1817 (*argus*).
Scatophagus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 136 (*argus*).
Cacodoxus Cantor, Malay. Fish., 163, 1850 (*argus*: substitute for *Scatophagus* on account of the earlier genus *Scatophaga*).
 1122. *Ephippus argus* (Gmelin). New Guinea (Macleay); New Britain (Peters, Berl. Mon., 1876, 833).
 1123. *Ephippus multifasciatus* (Richardson). New Guinea; East Indies.
Scatophagus multifasciatus Alleyne & Macleay, Proc. Linn. Soc. N. S. W., 1883, 277, New Guinea.

DREPANE Cuvier & Valenciennes.

- Drepane* Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 129, 1831 (*punctata*).
Harpochirus Cantor, Malay. Fish., 162, 1850 (*punctata*); substitute for *Drepane*, there being genera of prior date, *Drepana*, *Drepanis*, *Drepanus*, and *Drepania*.
Cryptosmilia Cope, Trans. Am. Phil. Soc. 1867, 401 (*luna*).
 1124. *Drepane punctata* (Gmelin). Samoa (Günther); New Ireland (Peters); East Indies.

PLATAX Cuvier.

1125. *Platax orbicularis* (Forskål). *Pe'ape'a uli*. Samoa; Tahiti; Papua; Fiji; New Ireland; Shortland I. (Seale); East Indies.
Chaetodon orbicularis Forskål, Descr. Anim., 59, 1775, Red Sea.
Platax orbicularis, Günther, Fische der Südsee, 140, Tahiti. Klunzinger, Fische Rothen Meeres, 118, Red Sea; with good diagnosis of the two species.
Chaetodon vespertilio Bloch, Ichth., 67, taf. 199, fig. 2, 1787, East Indies.
Platax vespertilio, Bleeker, Atlas, Chæt., 74, tab. XVII, fig. 1, tab. XVIII, figs. 2 and 3, Sumatra, New Guinea, and all other East Indian islands. Peters, Berl. Mon., 1876, 836, New Ireland.
Chaetodon pentacanthus Lacépède, Hist. Nat. Poiss., IV, 454, 471, tab. 11, fig. 2, 1803, Pacific Ocean.
Platax albipunctatus Rüppell, Atlas, 69, taf. 18, fig. 4, 1828, Red Sea.
Platax ehrenbergi Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 221, 1831, Red Sea.
Platax guttulatus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 227, pl. 186, fig. 1, 1831, Ile de France.

This fish, widely distributed throughout the East Indies, is rather common about Samoa. We have three specimens taken in the seine at Pago Pago and two from Apia.

The species is distinguished from the next by the fact that the middle cusp of each tooth is longer than the others. The scales are considerably larger than in *Platax teira*, and the anterior profile is a little less vertical. The color is similar in the two species, the cross-bands disappearing with age.

A specimen from Apia was olive-gray, with blackish on the fins; no bright colors. A young example from Pago Pago was blackish in life, with a diffused blackish ocular band; breast soiled yellowish; base of pectoral with a large black spot; caudal abruptly whitish; ventral black; dorsal ∇ , 37; scales 63.

1126. *Platax teira* (Forskål). Palau Is; New Guinea; East Indies.

Chaetodon teira Forskål, Descr. Anim., 60, 1775, Red Sea.
Platax teira, Günther, Fische der Südsee, 141, 1876, Palau Is. Bleeker, Atlas, Chæt., 73, tab. XVII, fig. 2, tab. XX, fig. 1; Sumatra, New Guinea, Borneo, and all the East Indian islands. Klunzinger, Fische Roth. Meeres, 119, Red Sea.
 Jordan & Fowler, Proc. U. S. Nat. Mus., XXV, 1903, 526, Formosa, Riukiu Is., Tokyo, Kagoshima, Bonin Is., Kezen.
Chaetodon arthriticus Bell, Philos. Trans. 793, 8, pl. 6, Sumatra.

Platax gaimardi Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 216, 1831, New Guinea.

Platax dorsalis Bleeker, Derde Bijdr. Celebes, 758, 1852, Celebes.

Platax xanthopus Bleeker, Verh. Bat. Gen., xxiii, 28, 1850, Sumatra.

This species, known by the smaller scales, is common in the East Indies and northward to southern Japan. It is recorded by Günther from the Palau Islands.

1127. *Platax pinnatus* Bleeker. New Guinea (Macleay).

Family CHÆTODONTIDÆ.

FORCIPIGER Jordan & McGregor.

Forcipiger Jordan & McGregor in Jordan & Evermann, Bull. 47 U. S. Nat. Mus., 1898, 1671 (*longirostris*).

This genus differs from *Chelmon* Cuvier in the long and high spinous dorsal, which is composed of 12 stout spines (9 in *Chelmon*). The snout, as in *Chelmon*, is very long and slender, bearing the short, forcep-like jaws at the end. From *Prognathodes*, a genus still more closely related, *Forcipiger* differs in the small scales, there being about 75 in a horizontal series.

1128. *Forcipiger longirostris* (Broussonet). Hawaii; Samoa; Tahiti; Paumotu Is.; Kingsmill I.; Tonga; Raiatea (Seale); East Indies; Clarion Is. (as *Forcipiger flavissimus* Jordan & McGregor).

This curious and brightly colored fish ranges widely through the South Seas and eastward to the off-shore islands of Mexico. It seems to be nowhere common, and but one specimen was found by us at Pago Pago. A few specimens were taken also at Honolulu.

Color in life bright yellow, from a line connecting front of dorsal with axil of pectoral and a point behind ventrals; scales of side shaded with orange; top of snout to nape and opercular region jet black; lower parts of head and breast abruptly black; dorsal, anal, ventral, and pectoral yellow; a large black spot on last rays of anal; caudal grayish.

A specimen from Pago Pago was in life brilliant yellow, deeper and orange-shaded behind, a black triangle on head, livid white below; ventral and pectoral yellow; caudal colorless; a large jet black spot on anal.

MEGAPROTODON Guichenot.

Megaprotodon Guichenot, Rev. Zool., 1848, 12 (*bifascialis*).

Eteira Kaup, Arch. Nat., xxvi, 1860, 147 (*triangularis*).

This genus is characterized by the constant presence of four anal spines. It is close to the group called *Linophora* in *Chatodon*, having the series of scales meeting at right angles. The body is oblong and compressed, the soft dorsal and anal produced and concave on the margin. Outer teeth of lower jaw a little longer than inner. The genus or subgenus *Gonochatodon* is near *Megaprotodon*, but it has the body almost as deep as long, as in *Coradion*.

1129. *Megaprotodon trifascialis* (Quoy & Gaimard). *Mutu uli*. Samoa; Guam; Tahiti; East Indies. (Pl. I, fig. 1.)

Chatodon trifascialis Quoy & Gaimard, Voy. Uranie, II, 379, pl. 62, fig. 5, 1824, Guam, Batu. Young with the caudal pale instead of black as in the adult.

Chatodon triangularis Rüppell, Atlas, 42, pl. 9, fig. 3, 1828, Red Sea.

Megaprotodon triangularis, Seale, Bishop Museum 1901, 101, Guam.

Chatodon strigangulus Solander, in Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 42, 1831, Tahiti. Günther, Fische der Südsee, 35, pl. 26, fig. A, Polynesia.

Megaprotodon strigangulus, Bleeker, Atlas, Chæt., 54, tab. XIII, fig. 4, Java, Batu, Celebes, Halmahera, Cerem Banda, Amboina, Timor, Obi-major.

Chatodon bifascialis Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 48, 1831, Guam.

Chatodon leachi Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 49, 1831, no locality.

This species, generally common throughout the East Indies, is abundant about the coral reefs of Samoa. The young closely resemble the adult in form and general color, but differ in the markings posteriorly. A broad dark band includes the soft dorsal and anal. This grows narrower with age, and finally vanishes. In the young the caudal is yellow with a narrow dark cross-band. In the adult it is black, with a narrow pale band near its tip. The nominal species *trifascialis* is the young of the one called *triangularis* or *strigangulus*. The name *trifascialis* has priority.

Fifteen specimens from Apia and Pago Pago. One from Apia was in life gray, white below, V-shaped stripes, bright grayish blue, the angle toward the head; ocular band broad, edged with white

and golden; snout and forehead gray, with orange marks about jaws; two oblong whitish clouds on side just above level of eye, the one ending near end of pectoral, the other at base of soft dorsal; dorsal orange, dusky behind on base of soft dorsal, edged with orange, black and white; caudal black, edged above and below with orange-yellow; a golden yellow cross-band, a black, then a drab edge; anal creamy orange, edged with black and white; ventral yellowish white; pectoral colorless, orange-yellow at base.

Small specimens have the tail yellow, not black as in the adult; a broad black band involving soft dorsal and anal and the space between.

GONOCHEOTODON Bleeker.

Body very deep; dorsal and anal fins nearly vertical posteriorly. Sides with vertical streaks, meeting at an angle along the axis, the angle pointing forward.

1130. Gonochætodon triangulum Cuvier & Valenciennes. New Guinea (Macleay); East Indies.
(*Chætodon triangulum*, *baronessa*, and *karraf*, Cuvier & Valenciennes.)

CHÆTODON (Artedi) Linnæus. *Tiftifi*.

ANALYSIS OF POLYNESIAN SPECIES OF CHÆTODON.

- a. LINOPHORA: Rows of scales of anterior part of body running upward and backward, each marked by a dark line, those of posterior part of body running downward and backward almost at right angles with the first; snout acute.
- b. Dorsal fin with the first soft ray prolonged into a whip; a black ocellus below it; ocular band broad; ventral pale; two black lines across caudal.
- c. Dorsal fin with a black ocellus below the prolonged ray.....*setifer*
- cc. Dorsal fin without black ocellus.....*auriga*
- bb. Dorsal fin without produced ray; no black ocellus; ocular band broad, white-edged; a broad black band across base of dorsal to middle of base of anal; two black bands on caudal; ventral pale.....*vagabundus*
- aa. Scales not arranged as above indicated, or at least not marked by lines meeting at an angle.
- d. Scales large, arranged in rows which are very distinct, both upward and backward and downward and backward, forming a checker-board appearance; scales on middle of body very large.
- e. Ocular band very broad below; a black band on soft dorsal; a broad, black band on caudal; ventral pale; snout sharp.....*raftlesi*
- ee. Ocular band not broader than eye; a short black nuchal bar; dorsal and anal narrowly edged with dark; caudal with a dark line; ventral yellow.....*xanthurus*
- dd. Scales not arranged as above indicated.
- f. Scales unequal, those on middle parts of body larger than the others, the series usually extending upward and backward, at least posteriorly; teeth very small.
- g. CHÆTODONTOPS: Snout acute, concave in upper profile.
- h. Ocular band mesially yellow, with dark edges.
- i. Body with 7 oblique dark stripes running upward and backward; caudal with a black crossbar; ventral pale.....*pelewensis*
- hh. Ocular band black.
- j. Ocular band broad, as broad as eye.
- k. Body with two dark violaceous cross-bands coalescent above, with narrow vertical streaks between them; caudal peduncle with a jet-black spot; a black line across caudal; ventral pale.....*ulietensis*
- kk. Body without black cross-bands.
- l. Black area at base of soft dorsal broad, sending oblique streaks downward and forward across the body; no black area on shoulder; ventral pale.....*lineolatus*
- ll. Black area at base of soft dorsal narrow, the oblique cross-streaks along rows of scales orange; shoulder region black, with a median triangular orange area on each side; ventral pale..*lunula*
- jj. Ocular band faint or narrow, not so broad as eye.
- m. Ocular band obscure; a black band from soft dorsal across to anal; caudal with a black bar; ventral dark.....*flavirostris*
- mm. Ocular band distinct, narrower than eye.
- n. Body with numerous V-shaped cross-bands, the angle toward the head; a broad yellow band across soft dorsal to anal; ventral dark.....*mertensi*
- nn. Body with about six dark, curved cross-bands, each scale posteriorly with a black spot; back with a dark shade; fins mostly yellow.....*dironi*
- mmm. Back blackish; side with oblique dusky lines; a black spot at base of anal spines; a black spot on breast, and two on base of caudal peduncle; a pale blotch on side of back; ventral pale; entire contour of body yellow.....*melannotus*
- gg. Snout obtuse, the profile not concave; ocular band very broad, extending from the nape to the ventral, edged on both sides with yellow; snout black; body dusky, dove-colored above, each scale with a yellowish spot; anal and band across caudal peduncle black; tips of last rays of anal fiery red; two black lines across caudal.....*reticulatus*

- ff.* LEPIDOCHEYODON: Scales unequal, those of the middle part of the body above largest; teeth much larger than in related species; rows of scales nearly horizontal; snout moderate; the profile projecting above eye.
- o.* Side of back with a large black ocellus, often produced downward in a wedge-shaped blotch; ocular band broad, meeting its fellow on breast; a black band on margin of dorsal and anal across caudal peduncle; ventral pale; caudal plain *unimaculatus*
 - oo.* Side of body with a black cross-blotch from last dorsal spines to above anal spines; ocular band broad below; ventral black; caudal plain; teeth undescribed *trichrous*
 - ooo.* Side of body from front of anal backward entirely blackish; a black bar from front of dorsal to ventral, which is black; ocular band broad *kleini*
- fff.* RABDOPHORUS: Scales subequal, the series extending horizontally or slightly extending posteriorly; teeth small; snout obtuse or moderately acute.
- p.* Soft dorsal with its first ray produced and whip-like; snout acute.
 - q.* Back with a large black saddle-shaped area covering most of the dorsal and edged with white below; ocular band very narrow and faint; ventral pale; caudal plain. *ephippium*
 - qq.* Body bright orange, with blue spots along the rows of scales; ocular band broad, distinct; base of dorsal and anal black; ventral pale; caudal plain *semeion*
 - pp.* Soft dorsal without elongate or whip-like ray; snout obtuse or slightly acute, not convex above.
 - r.* Body with about six transverse cross-bands; ocular band narrow, faint, a black spot above it; a reddish band on caudal peduncle; caudal with a black bar; ventral pale *punctatofasciatus*
 - rr.* Body without dark cross-bands.
 - s.* Body with about 10 narrow dark cross-streaks, each a row of small spots; ocular band narrow; a black bar across caudal peduncle; anal with a narrow dark edge; ventral pale *miliaris*
 - ss.* Body with many oblique dark cross-streaks, each a series of spots along the row of scales, those above ascending, those below horizontal; no black on caudal peduncle; anal with a broad black streak and a bright yellow one above it; ocular band narrower than eye, sharply defined *ctrinellus*
 - sss.* Body without series of streaks, either oblique or vertical.
 - t.* Ocular band present; snout obtuse.
 - u.* Ocular band preceded by a black bar.
 - v.* Black bar before eye covering snout; a black bar behind ocular band; body with dark streaks along rows of scales; a black area surrounded by golden on dorsal, anal and caudal; ventral pale; a black spot on breast *trifasciatus*
 - vv.* Black bar before eye, not covering upper lip, which is pale; a black area above eye; three black bands behind eye, the first one extending backward to last ray of soft dorsal; body with 6 oblique orange stripes; caudal with two black stripes; anal with one; ventral pale *ornatissimus*
 - uu.* Ocular band not preceded by a black bar.
 - w.* Side of body with a black spot or ocellus; ocular band moderate, edged with blue; no black on fins.
 - x.* Sides of body below with 2 or 3 blue streaks; lateral spot a rounded ocellus *bennetti*
 - xx.* Sides of body below with about 13 faint streaks; lateral spot large, oblong *speculum*
 - ww.* Side of tail with a black ocellus; pale streaks along rows of scales; no black on fins; ocular band pale-edged *plebeius*
 - www.* Side of body and tail without ocellus.
 - y.* Back blackish, with two whitish blotches; ocular band orange, with dark edges; fins pale, with dark lines *quadrinaculatus*
 - yy.* Body with diffuse dark spots; ocular band broad, diffuse; snout black; ventral black; no yellow *corallicola*
 - tt.* Ocular band none; body with about nine oblique stripes of clear blue; caudal peduncle and posterior part of dorsal black; caudal with a broad black band; ventral pale; snout rather acute *fremblyi*

1131. *Chaetodon setifer* Forskål. *S'v'u*; *Tifitifi sama*. Hawaii; Samoa; Johnston I.; Guam; Tubuai; Rarotonga and Faté (Seale); East Indies.

Chaetodon setifer Bloch, Ichth., tab. 426, fig. 1, 1788, **Coromandel**. Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 77, Bolabola, Ile de France. Günther, Fische der Südsee, 36, taf. 26, fig. 3, Sandwich Is. Smith & Swain, Proc. U. S. Nat. Mus., v, 1882, 137, Johnston I. Seale, Bishop Museum, 1901, 98, Guam.

Tetragonopterus auriga Bleeker, Atlas, Chaet., 47, tab. XI, Sumatra, Java, and all islands of the East Indies; not *Chaetodon auriga* of Forskål.

Chaetodon auriga, Steindachner, Sitz. Ak. Wiss. Wien 1900, 488, Honolulu; not of Forskål.

This fish is common throughout the South Seas. We have 45 specimens from Apia and Pago Pago, where next to *Chaetodon vagabundus* it is the most abundant of the *tifitifi*s. It is known at once by the black ocellus on the dorsal, one of the rays of which is produced. The dorsal ocellus with other

characters separates the species from the closely related *Chaetodon auriga* of the southern coasts of Asia. The lines at right angles on the body are also characteristic. The name *tiftifi* is given to all chaetodonts in Samoa, though primarily applied to *Zanclus canescens*. *Tifi* means angle; *tiftifi* the horns of the moon. The word corresponds to *kihikihi* of the Hawaiians.

Life colors of a Samoan specimen, anteriorly gray, posteriorly deep lemon-yellow, with opposing stripes of violet-gray; forehead gray, with deep orange-yellow cross streaks; ocular band broad, meeting its fellow below; soft dorsal edged with black, with a large black spot; a yellow streak on soft dorsal within the blackish edge; filament black before, yellow behind; caudal lemon-yellow; band light bright yellow, bordered before and behind with brown; tip of caudal translucent; anal gray at base, orange behind and outside, edged with a black line and yellow; pectoral and ventral clear gray.

1132. *Chaetodon auriga* Forskål. Melanesia; East Indies.

Chaetodon auriga Forskål, Descr. Anim., 60, 1775, Red Sea. Günther, Cat., II, 7, Red Sea.

This species of the Indian region is not certainly known from the islands of the Pacific.

1133. *Chaetodon vagabundus* Linnæus. *Tiftifi mata-ume; Samasama.* Samoa; Vanicolo; Fiji; Faté; Shortland and Raiatea (Seale); East Indies.

Chaetodon vagabundus Linnæus, Syst. Nat., I, 465, Indies. Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 50, 1831, Ile de France, Vanicolo, Amboina. Günther, Fische der Südsee, 43, everywhere in Polynesia.

Tetragonopterus vagabundus, Bleeker, Atlas, Chæt., 48, tab. XVI, Sumatra, Java, Celebes, and all other islands of the East Indies.

This fish, abundant throughout Polynesia, is by far the most abundant species of the group at Samoa. Seventy specimens were taken at Apia and Pago Pago. The species is not one of the brightest in color. In the presence of narrow streaks meeting at right angles it resembles *Chaetodon setifer*, but it has neither dorsal filament nor ocellus.

Life colors of one specimen, gray, olivaceous above, becoming golden behind; oblique streaks of purplish gray meeting at angles; ocular band broad, not pale-edged except below in front; forehead gray, with six orange cross-shades; first dorsal black, with a median yellow streak which widens to cover most of soft dorsal; a broad black margin to soft dorsal; a black bar at its base, edged before and behind with yellow, which crosses caudal peduncle, ending below on center of anal; anal otherwise dark yellow, grayish at base, with black and light yellow edge; spines very pale yellow; caudal golden yellow with a black crescent, a black crossbar behind it, and a colorless tip; ventral and pectoral pale.

This species seems obviously near *Chaetodon setifer*, and lends some support to Bleeker's group *Linophora*.

1134. *Chaetodon xanthurus* Bleeker. New Britain; East Indies.

Chaetodon xanthurus Bleeker, Act. Soc. Ind. Ned. Amboina, 58, Amboina. De Vis, Proc. Linn. Soc. N. S. W. 1884, 467, Apl, New Britain.

Tetragonopterus mertensi Bleeker, Atlas, Chæt., 50, tab. XVI, fig. 3, Amboina; not type.

1135. *Chaetodon rafflesi* Bennett. Samoa; Palan; Fiji; Waigiü; Papua; New Hanover; East Indies.

Chaetodon rafflesi Bennett, Life of Raffles, 689, 1830, Sumatra. Günther, Fische der Südsee, 44, taf. 35, fig. c., Melanesia, Palau, Fiji. Peters, Berl. Mon. 1876, 832, New Hanover.

Tetragonopterus rafflesi Bleeker, Atlas, Chæt., 49, tab. XIV, Sumatra, Java, Bawean, Celebes, Sumbawa, Timor, Halmahera, Ternate, Ceram, Amboina, Goram, Aru, Waigiü, New Guinea.

Chaetodon princeps Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 33, 1831, New Ireland.

This pretty species is rare about Samoa, nine specimens in all being taken at Apia and Pago Pago. Günther's figure is fairly good, but the color is too pale, the fish being more olive in shade. The checker-like orange markings on the edges of the scales give a characteristic mosaic appearance.

Colors in life, deep yellow, greenish-tinged on body, very bright on fins; the body checkered with two sets of pinkish brown cross-streaks on edges of scales, these colors purplish on small scales at base of fin; snout brown; forehead gray; chin bright yellow; ocular band broad, whitish-edged only below in front; soft dorsal greenish on scales, then clear brown; then clear yellow, black and yellow; spines brownish, with greenish membranes; anal yellowish-green and purple-dotted on scales, then clear brown with two yellow bars on last rays and a yellow edge, with a black and white bounding line; caudal clear yellow with a black band, broadest in the middle, clear yellow behind, the edge clear gray; pectoral gray; ventral bright golden.

- 1136. *Chaetodon pelewensis* Kner.** *Tifitifi i'u sama* (orange-tailed). Palau Is.; Samoa; Tonga; Tahiti; Paumotu Is.; New Hebrides; Faté (Seale).

Chaetodon pelewensis Kner, Sitz. Ak. Wiss. Wien 1868, 306, Palau Is. Günther, Fische der Südsee, 43, taf. 31, fig. B, Tonga, Palau, Samoa, Tahiti, Paumotu, New Hebrides.

Of this handsome little *Chaetodon* we secured 6 specimens from Apia and Pago Pago. From most other species, *Chaetodon pelewensis* is known by the yellow median stripe on the black ocular band.

Life colors of a specimen from Apia, yellow-olive, clear yellow behind, gray on sides; forehead black; ocular band yellow, edged on each side by black and gray; preorbital yellow; yellow on preopercle; dots and wavy bands purplish black; dorsal brown-olive, clearer behind, a broad golden edge set off by a black line; caudal peduncle clear bright orange, as in *Holacanthus (flavissimus)*, then light yellow, then black, the fin mostly translucent; anal creamy brown, with a black streak above and below, the edge soiled greenish gray; ventral dusky; pectoral colorless; a black blotch on nape before dorsal.

- 1137. *Chaetodon ulietensis* Cuvier & Valenciennes.** Samoa; Paumotu; Tahiti; Guam; Kingsmill I.; Raiatea (Seale).

Chaetodon ulietensis Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 39, 1831, Ulietea.

Chaetodon falcula Günther, Fische der Südsee, 39, taf. 27; Paumotu, Tahiti, Harvey, Samoa, Kingsmill I.; not of Cuvier. Seale, Bishop Museum 1901, 101, Guam.

Of this fish we have 8 specimens from Apia and 4 from Pago Pago. It is well distinguished from the closely related *Chaetodon falcula* of the East Indies, with which Bleeker and Günther have confounded it.

Colors in life, light gray or clear whitish, slightly brownish in front, bluish mesially, with two broad cross-bands of deep drab, the posterior deepening to black above, both fading below but evident below the level of the pectoral fin; above they extend on the dorsal fin, the anterior bar narrowed and sharply turned backward at base of spinous dorsal; the two cross-bands and the pale interspace marked by 15 or 16 narrow, sharp, nearly vertical lines of drab-black, like pencil marks, these corresponding to the rows of scales; area behind second lateral band clear golden-yellow on body and fins; ocular stripe broad, deep black, without edge; snout dusky above; an oblong vertical jet-black spot crossing narrowest part of caudal peduncle; spinous dorsal clear light yellow along edge; soft dorsal and anal golden yellow like the body; dorsal with two narrow brown streaks not parallel, then light yellow, brown, and finally a blackish edge; anal spines bright light yellow, the fins with three dark parallel streaks, two brown, one black, then a golden edge; caudal golden yellow, with a black curved cross-streak and a broad transparent edge; pectoral colorless; ventral soiled white; forehead with faint brownish yellow cross-streak. Another specimen with bands black rather than violet.

- 1138. *Chaetodon lineolatus* Cuvier & Valenciennes.** Hawaii; Samoa; New Hanover; New Guinea; Faté (Seale); East Indies.

Chaetodon lineolatus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 40, 1831, Ile de France. Quoy & Gaimard, Voyage de l'Astrolabe, 381, 1835, Ile de France. Günther, Fische der Südsee, Hawaii, Samoa, Tahiti, Kingsmill I. Steindachner, Sitz. Ak. Wiss. Wien 1900, 469; Honolulu.

Tetragonopterus lineolatus, Bleeker, Atlas, Chæt., 51, tab. xv, Cocos, Sumbawa, Flores, Ternate, Amboina, Banda.

Chaetodon lunatus (Ehrenberg) Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 57, 1831, Red Sea.

Chaetodon ozycephalus Bleeker, Ternate, 9de Beidr., 603, Ternate. Peters, Berl. Mon. 1876, 232, New Hanover.

Chaetodon tallii Bleeker, Banda, 3de Beidr., 97, Banda.

This large and handsome species is common at Honolulu and westward to the East Indies. It is recorded from Samoa, but we did not find it there.

- 1139. *Chaetodon lunula* (Lacépède).** *Tifitifi laumea*. Hawaii; Samoa; Papua; Oualan; Tahiti; Rarotonga; Nukahiva; Makatea and Tahiti (Seale).

Pomacentrus lunula Lacépède, Hist. Nat. Poiss., IV, 507, 1803, Ile de France.

Chaetodon lunula, Cuvier & Valenciennes, Hist. Nat. Poiss., 59, pl. 173, 1831, Ile de France, Prince of Wales I., New Guinea, Australia. Günther, Fische der Südsee, 42, Hawaii, Tahiti.

Chaetodon biocellatus Cuvier & Valenciennes, Hist. Nat. Poiss., 62, Oualan; young.

Tetragonopterus fasciatus, Bleeker, Atlas, Chæt., 44, tab. XII; not *Chaetodon fasciatus* Forskål; Java, Bawean, Borneo, Celebes, Sangi, Timor, Halmahera, Buro, Amboina, Ceram, New Guinea.

This splendid species is rather common about Samoa, as at Honolulu. It has been confounded by Bleeker and others with *Chaetodon fasciatus* Forskål of the Red Sea. The varied markings of the

shoulders, with the broad white postocular band, are characteristic in the adult. The changes in the young are well figured by Dr. Günther.

We have 15 specimens from Apia and Pago Pago. One was colored in life as follows: Deep golden, a little olive-tinged and more dusky on back; chin gray; patch behind ocular stripe clear gray; oblique black band bordered before and behind by clear golden brown, a blackish blotch at first dorsal spine with golden brown behind it; spot on caudal peduncle and stripe on dorsal golden; a brown shade across dorsal and anal besides black tips and dark brown bands; ventral golden with some dusky; pectoral and edge of caudal colorless.

1140. *Chætodon flavirostris* Günther. Vavau; Tonga; Faté (Seale).

Chætodon flavirostris Günther, *Fische der Südsee*, 41, Vavau (Friendly Is.).

1141. *Chætodon mertensi* Cuvier & Valenciennes. *Tifitifi pa'ipa'i*. Paumotu Is.; Samoa.

Chætodon mertensi Cuvier & Valenciennes, *Hist. Nat. Poiss.*, VII, 47, 1831; after a drawing by Mertens from a specimen from an unknown locality. Günther, *Fische der Südsee*, 45, taf. 36, fig. B, Paumotu.

Of this rare species, hitherto known only from the scanty original description and from the excellent figure given by Dr. Günther, we have four specimens from Apia and Pago Pago. This species is known by the presence of four distinct angular cross-bands, with some fainter ones. Behind these is a broad yellow cross-band involving most of the dorsal and anal.

The species (*Chætodon xanthurus*) called *Tetragonoptrus mertensi* by Bleeker is distinct from this species.

Colors of a specimen from Pago Pago, bluish gray; rich orange-yellow behind last dorsal spine, on body and dorsal and anal fins, including all of soft dorsal and most of anal; forehead and a scapular bar dark brown; ocular stripe broader above, where it is white-edged, the two not meeting below; five V-shaped blackish cross-bars on body behind shoulder, the angle toward the head; 4 rows of spots in concavity of last bar, between it and the immaculate golden area; first dorsal light yellow; second with edge of black and light yellow; anal dusky gray in front, edged with orange, posteriorly like dorsal; caudal light yellowish gray at base, then deep orange-yellow, edged with a fine line of black, then yellow; ventral soiled gray; pectorals plain.

1142. *Chætodon dixonii* Regan. New Hebrides.

Chætodon dixonii Regan, *Ann. Mag. Nat. Hist.*, 1904, 276, New Hebrides.

1143. *Chætodon melannotus* Bloch & Schneider. *Tifitifi pulepule pa'ipa'i*. Samoa; Fiji; New Guinea (Macleay); East Indies.

Chætodon melannotus Bloch & Schneider, *Syst. Ichth.*, 224, 1801, Moluccas. Günther, *Fische der Südsee*, 44, Samoa, Fiji. Day, *Fishes of India*, 108, pl. 28, fig. 1, India. Steindachner, *Ichth. Beitr.*, XVI, 230, 1893, Fiji.

Chætodon dorsalis Cuvier & Valenciennes, *Hist. Nat. Poiss.*, VII, 70, Moluccas; name preoccupied.

Chætodon marginatus (Ehrenberg) Cuvier & Valenciennes, *Hist. Nat. Poiss.*, VII, 57, Massuah; name preoccupied.

Chætodon abhortani Cuvier & Valenciennes, *Hist. Nat. Poiss.*, VII, 58, Ile de France.

Tetragonoptrus melannotus Bleeker, *Atlas, Chæt.*, 43, tab. XIV, Batu, Celebes, Flores, Timor, Ternate, Ceram, Amboina, Goram, Banda.

This species is rather rare about Samoa, only seven specimens being taken at Apia and Pago Pago. The diffuse black spot at the base of the anal and the black spot at the throat are characteristic traits. Day has given a fair figure of the species.

Life colors of a specimen from Apia, gray, the contour all bright yellow; a broad, blackish patch occupying the whole back, this edged below by dull whitish; a large whitish blotch in the middle of the back; scales with dusky rows of diffuse blackish spots running upward and backward, these more streak-like above, the spots separate below, most distinct at base of anal, where they are gathered into an oblique jet-black spot of irregular outline; a black streak along lateral line posteriorly, widened into a jet-black blotch below last soft dorsal rays; a smaller black blotch above last anal ray on edge of caudal peduncle; ocular band narrow, edged on both sides with bright yellow; region before it brownish yellow, clear yellow at throat, a dusky spot on breast; spinous dorsal deep brownish yellow; soft dorsal dusky, then yellow, then a broad blackish band with a black line above, then clear yellow, with a dusky edge; anal broadly clear yellow, with a brownish shade across it, then dusky, then a black line, then clear yellow; caudal bright yellow, with a narrow, dusky shade, then a blackish cross line, the posterior half translucent; pectoral colorless, light yellow at base; ventral golden yellow.

Another specimen from Apia had the lower half of side light bluish gray, above blackish with a pale area; margin all around yellow, golden below, orange above, with black markings, pectoral and also broad tip of caudal colorless.

1144. *Chaetodon reticulatus* Cuvier & Valenciennes. *Matagi pulepule*; *Tifitifi a'au*. Samoa; Tahiti; Ulea; Paumotu Is.; Rarotonga and Raiatea (Seale).

Chaetodon reticulatus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 32, Tahiti, Ulea.

Chaetodon collaris Günther, Fische der Südsee 40, Paumotu; not of Bloch nor of Bleeker.

? *Chaetodon bellicosus* Quoy & Gaimard, Voy. Astrolabe, 1835; a handsome brown-colored species seen at Guam but not secured; "bit at the finger when approached."

This splendid species is rather rare about Samoa, only 12 specimens being taken at Apia and Pago Pago. It is quite different from *Chaetodon collaris* of the East Indies, with which it has been confounded by Günther, who gives a good figure, but the colors of the fish are brighter than his plate would indicate. The scarlet patch on the anal is especially characteristic.

Life colors of a specimen from Apia, black, dove-gray above and behind ocular band; spots on scales bright yellow below, gray above; edge of ocular stripe golden; forehead and snout drab; lips golden; dorsal drab, edged with golden, with a dark and white streak; caudal black, then drab, black, yellow, black, then a drab edge; anal black, being scarlet behind, with 2 black stripes, a dull yellow one, the edge white; ventral and breast black, continuous with ocular band; pectoral colorless.

1145. *Chaetodon unimaculatus* Bloch. *Tifitifi pulepule*; *Tifitifi samasama*. Hawaii; Samoa; Tahiti; New Guinea (Macleay); Bonham I.; Faté (Seale); East Indies.

Chaetodon unimaculatus Bloch, Ichth., taf. 201, 1787, Tahiti. Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 72, Tahiti.

Günther, Fische der Südsee, 37, Bonham I., Tahiti, Samoa. Günther, Cat., III, 11, Amboina.

Chaetodon sphenosptilus Jenkins, Bull. U. S. Fish Comm., XIX, 1893 (1901), 395, Honolulu.

Tetragonoptrus unimaculatus, Bleeker, Atlas, Chæt., 45, tab. XIII, Java, Solor, Timor, Amboina, Ternate, Boro, Ceram, Banda.

This handsome species is widely diffused throughout the South Seas and to the East Indies and Hawaii. We have 20 examples from Samoa. The single black spot on the side well characterizes the species.

Life colors of a specimen from Apia, clear bright light yellow, becoming bluish gray below; ocular band broad, meeting below; faintly edged with gray; snout gray; golden edges to scales making faint oblique yellow streaks on shoulder; black lateral spot, broadly surrounded by gray, with a wedge-shaped downward extension of dusky gray; dorsal light bright yellow, a black bar across its posterior part and across caudal peduncle and anal fin, where it is narrower, the band bordered before and behind by gray, the posterior edge very narrow; caudal colorless; anal deep golden yellow, darker than dorsal; ventral deep golden yellow; pectoral colorless.

Another specimen was in life light golden above; gray beneath shoulders and front of sides, with V-shaped vertical bars of deep yellow, the angle directed toward the tail; ocular band very broad from front of dorsal, meeting across breast; snout and forehead gray; a large round black spot on middle of side of back, surrounded by gray; dorsal and anal clear yellow; a dark bar posteriorly on both, extending across caudal, edged on both sides with gray; posteriorly this is the margin of the dorsal and anal fins, both with whitish edge; caudal grayish white at base behind bar; rest of fin like pectoral, translucent with black dots; ventral golden yellow.

Compared with Hawaiian specimens there is a tendency in these to form a larger spot, more extensively produced into wedge-shaped process below. There is no other difference.

Chaetodon unimaculatus differs strikingly from *Chaetodon ephippium* and *ulietensis* in the teeth, which are stronger, not flexible, not more than two series functional, those of the two halves of each jaw converging toward median line. The horizontal series of enlarged scales on anterior part of sides are less marked than the oblique series, but are distinguishable and usually continuous with the horizontal series of smaller scales behind. The larger scales have margin unequally curved (*Lepidochætodon*), but this character seems to have little value.

1146. *Chaetodon trichrous* Günther. Tahiti.

Chaetodon trichrous Günther, Fische der Südsee, 40, pl. 36, Tahiti; on a drawing. Jordan & Snyder, Proc. U. S. Nat. Mus., XXIX, 1905, 355, fig. 2, Tahiti.

This species is known from an incorrect drawing made by Andrew Garrett, and published by Dr. Günther, and from a specimen, also from Tahiti, taken by Mr. Henry P. Bowie.

1147. *Chaetodon kleini* Bloch. Yap; New Britain; East Indies.

Chaetodon kleini Bloch, Ichth., IV, 7, taf. 218, fig. 2, after Klein. Günther, Cat., II, 22, Amboina, Mauritius. Peters, Berl. Mon. 1876, 832, New Britain.

- Chaetodon melanomystax* Bloch & Schneider, Syst. Ichth., 1801, 224.
Chaetodon melastomus Bloch & Schneider, op. cit., 224, Tranguabar.
Chaetodon flavescens Bennett, Proc. Comm. Zool. Soc., 1830, 1, 61, Mauritius.
Chaetodon virescens Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 30, 1831.

1148. *Chaetodon ephippium* Cuvier & Valenciennes. *Tiftifi taiona; Tiftifi ila; Tiftifi tusi.* Hawaii; Tahiti; Samoa; Kusai; Borabora; Guam; Tonga; New Guinea (Macleay); Woodlark I.; East Indies; Rarotonga, Raiatea, and Faté (Seale).

- Chaetodon ephippium* Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 80, 1831, pl. 174, Moluccas, Borabora, Tahiti.
 Günther, Fische der Südsee, 36, taf. 27, Tonga, Tahiti. Seale, Bishop Museum 1901, 97, Guam.
Chaetodon principalis Cuvier & Valenciennes, op. cit., 81, East Indies; on a drawing by Renard (young, showing a black area on and above the anal).
Chaetodon mulsanti Thiollière, Fauna Woodlark, 163.
Tetragonopterus ephippium, Bleeker, Atlas, Chæt., 36, tab. xvi, Cocos, Java, Celebes, Flores, Timor, Ternate, Amboina, Ceram, Haraucka, Goram, New Guinea.

This beautiful species is common in the coral reefs about Samoa. We have also a specimen from Kusai, Caroline Islands.

The species is known at once by the large black saddle, with a long filament on the soft dorsal above it. It is well figured by Günther, although the ground-color is darker than indicated by him. A young example has the dark anal area indicated in the description of *Chaetodon principalis*.

Twenty-five specimens from Apia and Pago Pago. Life colors of one from Apia, light grayish olive, side with five or six streaks of light violet; edge of opercle violet; side of head grayish; a grayish preorbital patch; black ocular stripe very narrow and faint; a narrow dark streak like a pencil-mark from fourth dorsal spine downward and forward nearly to base of pectoral; snout and breast bright orange-yellow, brighter anteriorly; a bright orange-yellow streak across base of pectoral within and without; back with black saddle, broadly edged below with white; spinous dorsal yellow at tip, then gray, then a black streak, then orange-brown, then olive with blackish lines; filaments orange, edged before with yellow, behind with white; soft dorsal black, edged with yellow, orange-brown, black, white, and finally blackish; anal white, edged with yellow, grayish orange, grayish yellow, and finally blackish, the yellow predominating; the orange a bright streak; caudal translucent dark gray with deep orange blotch at base, the edges and posterior border orange-yellow.

In adults the ocular band is well marked only on the upper and lower borders of the eye, rapidly fading out on the cheek and supraocular region. In young individuals it is continued downward and backward across cheek and interopercle, and upward and backward to meet its fellow at the nape, but even in the young it is most intensely black near the eye. In the young the anal fin is blackish with a broad, light, submarginal band and blackish edge, and the caudal peduncle is crossed by a black ring, widest at the mid-lateral line.

1149. *Chaetodon semeion* Bleeker. Samoa; Tahiti; Thornton I.; Shortland I. (Seale).

- Chaetodon semeion* Bleeker, Verh. Kon. Ak. Wet., XVII, Chæt. 67, Vierde Bijdr. Ichth. Cocos, Nat. 1. Ned. Ind., VIII, 450, 1855, Keeling I. Günther, Fische der Südsee, 37, taf. 28, Tahiti, Samoa. Fowler, Proc. Ac. Nat. Sci. Phila. 1899, 492, Thornton I.
Tetragonopterus semeion Bleeker, Atlas, Chæt., 37, tab. XII (poor), Cocos, Celebes, Goram.

This species, one of the most beautiful of the group, is rare in the South Seas, and scarcely more common in the East Indies. We have but one specimen from Apia, which was colored in life as follows: Deep rich lemon-yellow or orange-yellow, with blue-black dots on the scales; forehead gray; ocular band black; pectoral and ventral lemon-yellow; dorsal yellow, streaked with blackish, the tips of the spines light clear yellow, a blue line separating this from the body color; last part of dorsal largely black, edged with dark yellow, light yellow, grayish and blackish, finally brownish; dorsal filament yellow; anal with less black and much more orange, otherwise similar; caudal light brownish, translucent behind, the upper and lower edge, also the middle brownish, a yellowish inner stripe lining the brown margin.

1150. *Chaetodon punctatofasciatus* Cuvier & Valenciennes. Hawaii; East Indies.

- Chaetodon punctatofasciatus* Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 28, no locality.
Chaetodon punctatolineatus Gronow, Cat. Fish, ed. Gray, 1854, 70, locality unknown.
Chaetodon multineatus Garrett, Proc. Cal. Ac. Sci. 1863, 65, Hawaii. Günther, Fische der Südsee, 44, taf. 34, fig. B, Sandwich Is.
Tetragonopterus punctatofasciatus, Bleeker, Atlas, Chæt., 40, tab. XII, Buro, Obi-major, Solor, Amboina, Banda, Aneiteum.

Of this rare species very few specimens are known. The specimens from the Hawaiian Islands called *multicinctus* are probably identical with *Chaetodon punctatofuscatus*, originally described from an unknown locality, but located by Bleeker in the East Indies.

Bleeker finds 6 to 8 dark bars on his species, and figures 8. Those seen by us, all from Hawaii, have, like the type of *Chaetodon multicinctus*, but 6 bars.

1151. *Chaetodon miliaris* Quoy & Gaimard. Hawaii.

Chaetodon miliaris Quoy & Gaimard, Voy. Astrolabe, 280, Maui, Hawaii. Günther, Fische der Südsee, in part, Sandwich Is. Steindachner, Sitz. Ak. Wiss. Wien 1900, 489, Honolulu, Laysan. Jordan & Evermann, Bull. U. S. Fish Comm., XXIII, 1903 (1905), 371, fig. 163, Honolulu.

Chaetodon mantelliger Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (1901), 394, Honolulu.

This little fish much resembles *Chaetodon citrinellus*, but the lines of dots form vertical stripes, and the anal is nearly plain, without the broad stripes of black and of glossy yellow characteristic of *Chaetodon citrinellus*. *Chaetodon miliaris* seems to be confined to the Hawaiian Islands.^a

1152. *Chaetodon citrinellus* (Broussonet). *Tifitifi uli*; *Tifitifi lanifi*; *Manini*. Samoa; Fiji; Paumotu Is.; Bonham I.; Papua; Tahiti; Rarotonga; Raiatea and Faté (Seale).

Chaetodon citrinellus (Broussonet) Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 27, Guam. Günther, Fische der Südsee, 47, pl. 35, fig. B (poor figure), Paumotu, Tahiti, Bonham, Samoa, Fiji. Jordan & Evermann, Proc. U. S. Nat. Mus. 1902, Formosa.

Tetragonopterus miliaris, Bleeker, Atlas, Chæt., 39, tab. xv, Sumatra, Padang, Java, Celebes, Sangi, Ternate, Buro, Amboina, Ceram, New Guinea, not *Chaetodon miliaris* of Quoy & Gaimard.

This species is distinguished from *Chaetodon miliaris*, which it much resembles, by a bright golden stripe just above (dorsad) a jet black stripe along the edge of the anal fin. The dark stripes extend in most specimens for the whole length of the body. *Chaetodon citrinellus* is one of the smallest species, rarely exceeding four inches. It is common about the coral reefs of Samoa. We have 15 specimens from Pago Pago and 50 from Apia.

Life colors of a specimen from Apia, dull light yellow olive, with series of blue spots along rows of scales; forehead brown, clear; ocular band narrowly edged above on both sides with grayish white, this border yellow-washed in larger examples; anal with a broad, black edge above a band of bright yellow; caudal plain orange, rather bright; soft dorsal yellow, with a narrow black, then a white line.

1153. *Chaetodon trifasciatus* Park. *Tifitifi tala*. Hawaii; Samoa; Woodlark I.; Raiatea and Shortland I. (Seale); East Indies.

Chaetodon trifasciatus Mungo Park, Trans. Linn. Soc., III, 34, 1792, Sumatra.

Tetragonopterus trifasciatus, Bleeker, Atlas, Chæt., 35, tab. xv, Sumatra, Java, Celebes, and all other East Indies.

Chaetodon vittatus Bloch & Schneider, Syst. Ichth., 227, 1801, Sumatra, after Park. Günther, Fische der Südsee, 41, Paumotu. Günther, Cat., III, 23, Ceram, Amboina.

Chaetodon tau-nigrum Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 32, Guam, young.

? *Chaetodon austricus* Ruppell, Neue Wirbeltiere, 30, taf. 9, 1835, Red Sea.

Chaetodon ovalis Thiohière, Fauna Woodlark, 164, 1857, Woodlark I.

Chaetodon melapterus (Gulchenot) Mamiard, Réunion, 6, Ile de Réunion.

This species is rather common about Samoa, 42 specimens being in our collection. It is rather rare about Honolulu, where it is taken, however. We have one young example corresponding to *Chaetodon tau-nigrum*. The species is common in the East Indies.

^a We may here add an uncertain species:

***Chaetodon* species.**

Chaetodon miliaris Günther, Fische der Südsee, 46, in part; coloration of taf. 35, fig. A, taken from a drawing by Garrett.

The coloration shown in Günther's plate of *Chaetodon miliaris* is not at all that of the species in question, which is not known outside of Hawaii. We have notes on two young examples from Samoa corresponding to Günther's plate, but we have not been able to find the specimens from which the notes were taken. These probably represent a species still undescribed.

Life colors of a specimen from Apia, olive yellow; clear yellow on head and breast; small bright blue stripes along rows of scales; soft dorsal with black edge; anal with a wider one, and a white stripe at base with one at edge; a black blotch on base of caudal peduncle, with two bright yellow spots and edged before and behind with pale; caudal behind bar whitish. Young.

Another specimen, from the same locality, was gray with oblique dark blue stripes upward and backward; whole outline of body deep golden yellow; ocular band broad, the part before it golden; dorsal and anal all golden, the soft dorsal dark at base and with a dark edge, the dorsal and anal brighter yellow near the edge; caudal colorless, a broad black bar at base surrounded by golden, this not on the fin.

Colors in life of a specimen from Apia, creamy orange, grayer above, with many streaks of violet blue; head with jaws blackish, forehead brown; a golden streak, then the ocular band, then a whitish streak, yellow below, then brownish, whitish, and purplish black, the black stripe parallel with the ocular band; spinous dorsal light yellow with a purplish line below; soft dorsal yellow, black, yellow, violet, gray-purplish, violet-gray, the outside creamy brown, the black surrounded by golden; caudal peduncle slaty, then whitish, golden, black, golden, and transparent, the black forming a broad bar; anal with a golden stripe at base, then black, becoming rich brown on spines, then golden, then dark brown, then golden, the black area surrounded by golden as on the dorsal; breast golden with a black blotch; ventral golden; pectoral pale yellow.

- 1154. *Chaetodon ornatissimus* (Solander).** *Tifitifi a'au*. Hawaii; Samoa; Tahiti; Guam; New Guinea; Rarotonga (Seale); East Indies.

Chaetodon ornatissimus Solander, in Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 22, 1831, Tahiti. Günther, Fische der Südsee, 38, with plate, Sandwich Is. Seale, Bishop Museum 1901, 100, Guam.

Tetragonopterus ornatissimus, Bleeker, Atlas, Chæt., 32, tab. xi, Amboina, New Guinea.

Chaetodon ornatus Gray, Zool. Misc. 1834, 33, Sandwich Is.

A large and very handsome species generally common in the South Seas and northward to Hawaii. We have 15 examples from Hawaii and Pago Pago. It is readily known by the presence of six oblique stripes of orange on the side of the body.

Life colors of a specimen from Apia, gray; head and belly golden; five or six black vertical stripes across head, the interspaces yellow, these all parallel with the ocular band, which is the broadest; three orange bars before pectoral; six oblique stripes on body upward and backward, of rich orange-brown; a seventh stripe of dark brown on anal, this edged with a narrow black streak, then clear yellow, then black; dorsal with two yellow and a black stripe; caudal with two black stripes and a dull yellowish stripe between; base of fin gray; ventral golden; pectoral dull orange; breast anteriorly black at the meeting of the ocular bands.

- 1155. *Chaetodon bennetti* Cuvier & Valenciennes.** Tahiti; Paumotu Is.; Gilbert Is.; Kingsmill I.; East Indies.

Chaetodon bennetti Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 84, Sumatra. Günther, Fische der Südsee, p. 37, pl. 29, fig. A, Paumotu, Tahiti, Gilbert Is., Kingsmill I.

Chaetodon vinctus Bennett, Zool. Beechey's Voy. 62, pl. 17, fig. 1, 1849, Sumatra.

Tetragonopterus bennetti, Bleeker, Atlas, Chæt., 34, tab. XIV, Sumatra, Java, Halmahera, Amboina.

- 1156. *Chaetodon speculum* Cuvier & Valenciennes.** New Guinea (Macleay); East Indies.

- 1157. *Chaetodon plebejus* (Broussonet).** South Seas (Tahiti?); New Guinea (Macleay); India.

Chaetodon plebejus (Broussonet) Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 68, South Seas. Günther, Fische der Südsee, 35, taf. 32, fig. B, same specimen. Day, Fishes of India, 104, pl. 26, from Broussonet's specimens, Andaman Is.

This species was long known from Broussonet's original type only, supposed to be from the South Seas, and preserved in the British Museum for one hundred and thirty years. The presence of four anal spines would necessitate the reference of the species to *Megaprotodon*, but the number is certainly accidental, as in other regards the species is a true *Chaetodon*. Day counts three dorsal spines only in his description, presumably drawn from a specimen from the Andaman Islands. His figure is from Broussonet's specimen and shows four. The species is recorded by Macleay from New Guinea.

- 1158. *Chaetodon quadrimaculatus* Gray.** Hawaii.

Chaetodon quadrimaculatus Gray, Zool. Misc., 33, 1831, Sandwich Is. Günther, Fische der Südsee, 38, taf. 30, fig. A, Upolu, Sandwich Is. Jordan & Evermann, Bull. U. S. Fish Comm., XXIII, 1903 (1905), 373, pl. XLIX, Hawaii.

This fish is rather common about Honolulu. It has been recorded by Günther from Samoa, the figure published differing a good deal from our specimens of the fish. The species is well distinguished by the black back with two pale blotches and by the mesial yellow of the ocular stripe.

- 1159. *Chaetodon corallicola* Snyder.** Hawaii.

Chaetodon corallicola Snyder, Bull. U. S. Fish Comm., XXII, 1902 (1904), 53, with pl. 11, fig. 20, Albatross Station 4032, on Penguin Bank, south coast of Oahu I.

This species is known only from the specimens collected by the *Albatross*. It is a dull-colored species, with a broad, diffuse ocular band. It is an ally of *Chaetodon flavirostris*.

1160. *Chaetodon fremblii* Bennett. Hawaii; Laysan.

Chaetodon fremblii Bennett, Zool. Journ. iv, 42, 1829, Sandwich Is. Günther, Fische der Südsee, II, 39, taf. 29, fig. B, Sandwich Is. Steindachner, Sitz. Ak. Wiss. Wien 1900, 488, Laysan.

Chaetodon fremblit, Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 24, 1831; after Bennett.

This handsome species, well distinguished by its stripes of clear blue, has been found only about the Hawaiian Islands, where it is rather rare.

MICROCANTHUS Swainson.

Microcanthus Swainson, Class. Anim., II, 1839, 215 (*strigatus*).

This genus differs from *Chaetodon* chiefly in the small scales, there being about 60 in the lateral line. The soft dorsal and anal are shorter than is usual in *Chaetodon*, the fin formula of the typical species being dorsal XI, 17; anal III, 14. It is in fact doubtful whether the genus contains another species, as the other species with small scales have the soft fins many-rayed and constitute Bleeker's genus *Hemiaurichthys* (type *polylepis*), which is apparently a valid genus, with no close relation to *Microcanthus strigatus*.

1161. *Microcanthus strigatus* (Cuvier & Valenciennes). Hawaii; East Indies.

This species, common in southern Japan and the East Indies, is occasionally taken about Hawaii. It was found there by Garrett, by Jenkins, and by Jordan & Evermann.

HENIOCHUS Cuvier & Valenciennes.

Heniochus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 92, 1831 (*macrolepidotus*).

Taurichthys Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 146, 1831 (*varius*).

Diphreutes Cantor, Malayan Fishes, 159, 1850 (*macrolepidotus*); substitute for *Heniochus*, on account of *Henioche*, a prior genus of *Lepidoptera*.

This genus is characterized by the deep body and by the prolongation of one of the dorsal spines. The species are all marked by dark cross-bands.

1162. *Heniochus acuminatus* (Linnæus). *Laulaufau*. Hawaii; Samoa; Fiji; New Britain; New Hanover; New Guinea; East Indies.

Chaetodon acuminatus Linnæus, Syst. Nat., ed. x, 272, 1758, Indies; after *Chaetodon fasciatus fusca*.

Chaetodon macrolepidotus Linnæus, Syst. Nat., ed. x, 274, 1758, Indies; after *Chaetodon lineatus utriusque 2-nigris*, of Artedi.

Heniochus macrolepidotus, Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 93, 1831, Molucca, Ile de France, Manilla, New Guinea, Trincomalee. Günther, Fische der Südsee, 48, taf. 37, Polynesia.

Taurichthys macrolepidotus, Bleeker, Atlas, Chæt., 29, tab. v, fig. 1, Luzon, New Guinea, Singapore, Sumatra, and all East Indian islands.

This widely distributed species is not common in the South Seas. We have specimens from Hawaii and a single large specimen from Apia.

The latter in life showed the following colors: Head gray; snout black above, a gray streak between eyes; no ocular band; two black bands, the first including the short dorsal spines across to breast, ventrals, and whole front of anal; second including last dorsal spines and most of soft anal; a short white bar behind this; second dorsal and caudal bright golden; pectoral golden; lips pale; long spine white.

The name *acuminatus* has two pages priority over *macrolepidotus*.

1163. *Heniochus permutatus* Bennett. Tahiti; Samoa; New Guinea; Woodlark I.; East Indies.

Heniochus permutatus Bennett in Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 99, 1831, no locality.

Heniochus chrysostomus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 99, 1831, Tahiti. Günther, Fische der Südsee, 49, taf. 39, fig. A, Paumotu, Tahiti.

Taurichthys chrysostomus, Bleeker, Atlas, Chæt., 29, tab. iv, fig. 2, Flores, Ternate, Ceram, Amboina, Banda, Goram, New Guinea.

Heniochus melanistion Bleeker, Bydr. Ich. Banda, Banda.

Heniochus drepanoides Thiollière, in Montrouzier, Fauna Woodlark Island, 166, Woodlark I.

This species is rather rare about Samoa, where 7 specimens were taken, 5 from Pago Pago, and 2 from Apia. It is apparently identical with the species called *Heniochus permutatus* by Bennett, suc-

cinctly described as having the colors of *Heniochus macrolepidotus* reversed, black for white and white for black.

Life colors of a specimen from Apia, 3 bands dark brown, the first blackish, alternating with white; yellowish tinged in places; the snout and lips orange; forehead dull orange with a black median stripe; dorsal colored like the body, the posterior part and caudal dull yellowish; ventral black; anal with a black, gray-edged ocellus in the center of the black area, most distinct in the young; long dorsal spines black, the tips of the spines whitish.

1164. *Heniochus intermedius* Steindachner. Pacific.

Heniochus intermedius Steindachner, Sitz. Ak. Wiss. Wien 1893, 222, locality unknown.

1165. *Heniochus monoceros* Cuvier & Valenciennes. Samoa (Günther); Tahiti; East Indies.

Heniochus monoceros Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 100, 1831, Ile de France. Günther, Fische der Südsee, 49, taf. 38, Samoa, Tahiti.

Taurichthys monoceros, Bleeker, Atlas, Chæt., 28, tab. III, fig. 3, Java.

This rare species is recorded by Dr. Günther from Samoa. It was not seen by us.

1166. *Heniochus varius* (Cuvier & Valenciennes). Samoa; East Indies.

Taurichthys varius Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 148, pl. 181, East Indies.

Taurichthys varius Bleeker, Atlas, Chæt., 27, tab. III, fig. 2, Batu, Java, Celebes, Timor, Amboina, Ceram, Banda.

Taurichthys viridis Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 152, Amboina.

One specimen of this species was taken by us at Apia. Otherwise the species is not recorded from Polynesia. Life colors, olive brown, blackish below where black streaks follow the rows of scales; lips, head, and nape black; breast gray, not black, as figured by Bleeker; a grayish olive band to front of spinous dorsal; a clear white bar from tip of long dorsal spine to lower base of caudal; dorsal olive, the first spines dusky; caudal pale olive; ventral, anal, and pectoral black.

HOLACANTHUS Lacépède. *Alamu.*

Holacanthus Lacépède, Hist. Nat. Poiss., IV, 525, 1803. (*H. tricolor*; scales large; caudal forked.)

Genicanthus Swainson, Class. Fishes, II, 212, 1839. (*G. lamarckii*; scales large; caudal forked.)

Centropyge Kaup, Wiegmann's Archiv, XXVI, 138, 1876. (*C. tibicen*; erroneously said to have four anal spines.)

Chætodontoplus Bleeker, Archiv Neerl. Sci. Nat., XII, 26, 1876. (*C. mesoleucus*; isthmus broad.)

Acanthochætodon Bleeker, Archiv Neerl. Sci. Nat., XII, 5, 1876. (*A. lepidolepis*; isthmus narrow; body elevated.)

Angelichthys Jordan & Evermann, Check-list of fishes, 420, 1896. (*A. ciliaris*.)

Preopercle with a stout spine; dorsal spines 12 to 14. The species of this genus are almost all gaudily colored and some of them reach a large size. They differ widely among themselves, but not so as to permit generic subdivision. The different subgeneric groups—*Holacanthus*, with relatively large scales and angular dorsal and anal; *Angelichthys*, with strong spines on the preopercle; *Chætodontoplus*, with very small scales and rounded dorsal and anal; *Acanthochætodon*, with moderate sized scales and elevated dorsal and anal—are recognizable groups. Another subgenus equally well marked may be based upon *Holacanthus fisheri*, a species with strong spines on the preorbital. Most of the species in the South Seas belong to the typical subgenus *Holacanthus*.

1167. *Holacanthus diacanthus* (Boddaert). *Aimeo; Alamu.* Samoa; Paumotu Is.; Tahiti; New Guinea; East Indies.

Chætodon diacanthus Boddaert, De Chæt., 1772.

Holacanthus diacanthus Günther, Fische der Südsee, 50, taf. 40, fig. B, Samoa, Tahiti, Paumotu. Bleeker, Atlas, Chæt., 65, tab. VI, fig. 5, Celebes, Flores, Ceram, Java, Amboina, Timor, New Guinea, Banda.

Chætodon fasciatus Bloch, Ichth., taf. 195, 1788, after Boddaert.

Chætodon boddaerti Gmelin, Syst. Nat., 1243, 1788, after Boddaert.

Chætodon dur Gmelin, Syst. Nat., 1255, 1788, after Bloch.

This lavishly gaudy fish is very common about the coral reefs of Samoa. About 16 specimens were preserved from Apia and Pago Pago. Life colors of one from Apia, about 9 broad curved stripes, pale blue with dark-blue edges, the interspaces deep orange-yellow, pale yellow below; another narrow blue stripe at base of caudal; two others above eye; lips yellow; a blue curved streak below eye;

lower parts livid gray; stripes of body extending back on dorsal above them, in paler yellow and purplish blue; upper part of fin of deep orange with two pale-blue stripes with dark-blue edge; second dorsal almost black-orange, washed with dark; caudal light clear yellow, with a few dark specks; anal with many stripes of steel-blue and orange, the margin black-blue; ventral golden-yellow, edged anteriorly with dusky; pectoral colorless; a median blue streak on forehead; serrated edge of preopercle blue; preopercular spine blue.

1168. *Holacanthus bicolor* Bloch. *Ulapua*. Samoa; Hawaii (Günther); Solomon Is.; New Guinea; East Indies.

Chaetodon bicolor Bloch, Ichth., taf. 206, Indies; plate from this species; description confused with the American species, *H. tricolor*.

Holacanthus bicolor, Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 168, 1831, East Indies. Günther, Fische der Südsee, 51, taf. 39, fig. B, Samoa, Solomon Is., Hawaii. Bleeker, Atlas, Chæt., 61, tab. VII, fig. 3, Sumatra, Flores, Solor, Ternate, Ceram, Amboina, Saparua, Banda, Aru, New Guinea.

This handsome species is moderately common about the coral reefs of Samoa. We did not find it at Hawaii, and it is possible that Garrett's sketch on which the Hawaiian record rests was made at Tahiti. The coloration of this species is almost exactly that of the West Indian "rock beauty," *Holacanthus tricolor*, but the form of the body and fins is different.

Four specimens were taken at Apia, and 8 at Pago Pago. Life colors of one from Pago Pago, anteriorly brilliant yellow, slightly brownish tinged above pectoral, bordered behind by clear yellow which covers throat, breast, pectoral, and ventral; body posteriorly lustrous blue-black, the color including anal and most of dorsal; caudal and end of caudal peduncle brilliant yellow; a broad, blue-black bar connecting eyes above, this bar fading below; an orange spot above gill-opening; edge of opercle orange; lower lip slightly bluish; four orange spots below it, the anterior largest; spine of preopercle grayish blue.

1169. *Holacanthus flavissimus* Cuvier & Valenciennes. *Lega; Aimeo*. Ulea; Samoa; Fiji; Tahiti; New Hebrides; Harvey Is.; Kingsmill I.; Raiatea.

Holacanthus flavissimus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 197, 1831, Ulea.

Holacanthus luteolus Cuvier & Valenciennes, Hist. Nat. Poiss., VII, 197, 1831, Tahiti; on a drawing by Parkinson.

Holacanthus cyanotis Günther, Cat., II, 517, 1860, Aneiteum. Günther, Fische der Südsee, 52, taf. 40, fig. A, New Hebrides, Kingsmill, Tahiti, Harvey, Samoa, Fiji.

Holacanthus monophthalmus Kner, Sitz. Ak. Wiss. Wien 1867, 714, fig. 2, Raiatea, young. Kner, op. cit., 1868, 16, Savay.

Holacanthus ocularis Peters, Berl. Mon. 1868 147, South Seas.

Five specimens from Apia, 12 from Pago Pago. This beautiful species is rather common about the coral reefs of Samoa. The first good account of it is that of Dr. Günther, under the name of *Holacanthus cyanotis*. *Holacanthus flavissimus* is evidently the same, the blue markings on the head being inconspicuous in faded specimens.

Life colors of a specimen from Apia, clear deep yellow, citron-yellow below, fins all the same; dorsal, anal, and caudal with very narrow bright blue edge; a deep blue ring around orange eye; a deep violet-blue bar on opercle with an orange edge behind; preopercular spines and two bars across chin slaty blue; two slaty spots on breast; upper lip slaty. Gill membranes scarcely joined to isthmus.

1170. *Holacanthus bispinosus* Günther. *Tu'u'u pulepule mumu*. Hawaii (Günther); Samoa; Tahiti; New Hebrides; Amboina.

Holacanthus bispinosus Günther, Fische der Südsee, 51, pl. 56, fig. c, Tahiti, New Hebrides, Hawaii. Bleeker, Atlas, Chæt., 60, tab. VI, fig. 1, Amboina.

This very small and neatly colored species resembles a *Pomacentrus*. It is rare about the reefs at Tutuila, but two specimens being taken at Pago Pago. It was not found by us at Hawaii. The plate in the Fishes of Hawaii is taken from a specimen from Pago Pago.

Life colors, deep orange- or copper-red, clearer below; the head, back, and vertical fins blue-black, the dark color forming about 18 narrow dark cross streaks on side as wide as the ground color; breast and belly orange; sides of head dull orange, the lips and spines violet; lower lip very bright blue; anal and dorsal edged with blue; caudal with a broader blue stripe inside the margin; pectoral yellow, dusky at base; ventral orange, edged with blackish.

1171. *Holacanthus navarchus* Cuvier & Valenciennes. New Guinea (Macleay); East Indies.

1172. *Holacanthus loriculus* Günther. Tahiti.

Holacanthus loriculus Günther, Fische der Südsee, 53, taf. 40, fig. 6, Tahiti.

This species is known only from a drawing by Mr. Garrett of a specimen 2½ inches long, taken from the stomach of an *Epinephelus* at Tahiti.

1173. *Holacanthus arcuatus* Gray. Hawaii.

Holacanthus arcuatus Gray, Zool. Misc. 33, 1831, Hawaii. Günther, Fische der Südsee, 50, taf. 32, fig. c, same specimen.

Of this species only the original type specimen from Hawaii is known.

1174. *Holacanthus fisheri* Snyder. Hawaii.

Holacanthus fisheri Snyder, Bull. U. S. Fish Comm., xxii, 1902 (1904), 532, pl. 11, fig. 21, Hawaii.

This species, notable for the great size of its preorbital spines, is known from numerous specimens taken about the Hawaiian Islands.

1175. *Holacanthus imperator* (Bloch). Papua; Guam; Tahiti; Paumotu Is.; East Indies.

Chelodon imperator Bloch, Ichth., taf. 94, 1788, Moluccas.

Holacanthus imperator, Günther, Fische der Südsee, 53, taf. 41, fig. a, Tahiti, Paumotu, Ile de France, Red Sea. Seale, Bishop Museum, vol. 1, no. 3, 104, 1901, Guam.

Acanthochatodon imperator, Bleeker, Atlas, Chæt., 70, tab. v, fig. 2, pl. 12, fig. 4, Celebes, Amboina, New Guinea.

This large and showy species was not seen by us at Samoa.

1176. *Holacanthus marianus* Seale. Guam.

Holacanthus marianus Seale, Bishop Museum, vol. 1, no. 3, 104, 1901, Guam.

This species, apparently distinct from *H. imperator*, is unknown to us.

1177. *Holacanthus nicobariensis* (Bloch & Schneider). Samoa; Misol; Tahiti; Waigiu; Guam; East Indies.

Chelodon nicobariensis Bloch & Schneider, Syst. Ichth., 219, pl. 50, Nicobar Is.; misprinted *Nicobarcensis*, an error corrected in the errata.

Holacanthus nicobariensis, Günther, Fische der Südsee, 54, Misol, Tahiti, Samoa. Seale, Bishop Museum, vol. 1, no. 3, 106, 1901, Guam.

Acanthochatodon nicobariensis, Bleeker, Atlas, Chæt., 69, in part (the plate represents some other fish), Timor Amboina, Ceram, Waigiu.

Holacanthus geometricus Lacépède, Hist. Nat. Poiss., iv, 537, 1803.

This beautiful fish seems to be rare about Samoa. A single young specimen was taken in a tide-pool at Pago Pago. Life colors, blue-black, the concentric streaks part white, part pale blue, the widest and the fin edgings pure white; ventrals blue edged.

1178. *Holacanthus bishopi* Seale. Guam.

Holacanthus bishopi Seale, Bishop Museum, vol. 1, no. 3, 106, 1901, Guam.

This species is apparently distinct from *H. nicobariensis*.

1179. *Holacanthus semicirculatus* Cuvier & Valenciennes. New Guinea (Macleay); Waigiu; New Ireland; Woodlark; East Indies.

Holacanthus semicirculatus Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 191, Buru, Waigiu, New Ireland.

Acanthochatodon semicirculatus Bleeker, Atlas, Chæt., 69, pl. 8, fig. 5, Sumatra, Java, Timor, and the islands of the East Indies generally.

Chatodon microlepis Bleeker, Fish. Sumatra, 257, Sumatra.

Holacanthus iburu Thiollière, in Montrouzier, Fauna Woodlark, 169, 1857, Woodlark I.

This species, common in the East Indies, extends eastward to Melanesia, but has not been found about Samoa.

1180. *Holacanthus alternans* Cuvier & Valenciennes. New Britain; Madagascar.

Holacanthus alternans Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 193, 1831, Madagascar. Peters, Berl. Mon. 1876, 832, New Britain.

Family ZANCLIDÆ.

ZANCLUS (Commerson Ms.) Lacépède.

- Zanclus* (Commerson Ms.) Lacépède, Hist. Nat. Poiss., iv, 473, 1803 (*cornutus*).
Pomacanthus Lacépède, Hist. Nat. Poiss., iv, 1803, 517 (*canescens*, etc.).
Zanclus Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 102, 1831 (*cornutus*).
Gonopterus Gronow, Cat. Fish., ed. Gray, 77, 1854 (*mærens*).
Gnathocentrum Guichenot, Ann. Maine et Loire, ix, 1866, 4 (*centrognathum*; young).
1181. *Zanclus canescens* (Linnæus). *Tiftif*; *Galafa*. Hawaii; Samoa; Papua; Waigiü; Woodlark I.; East Indies; Revillagigedo Is.
- Chaetodon canescens* Linnæus, Syst. Nat., ed. x, 272, 1758, Indies; after Artedi, young.
Pomacanthus canescens Lacépède, Hist. Nat. Poiss., iv, 517, 1803.
Zanclus canescens Günther, Cat., ii, 493, 1860. Bleeker, Atlas, 78, tab. v, fig. 3, 1877-8, Celebes, Amboina. Jordan & Fowler, Proc. U. S. Nat. Mus., 549, 1902, Misaki (Japan).
Chaetodon cornutus Linnæus, Syst. Nat., ed. x, 273, 1758 after Artedi, adult. Lacépède, Hist. Nat. Poiss., iv, 473, 1803, pl. 2, fig. 1. Jordan & Evermann, Fish North and Mid. Amer., ii, 1687, 1898.
Zanclus cornutus Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 102, pl. CLXXVII, 1831. Bleeker, Atlas, 77, tab. iv, figs. 1, 2, 1877-8, Sumatra, Java, Celebes, Ceram, New Guinea, Waigiü, etc.
Zanclus centrognathus Cuvier & Valenciennes, Hist. Nat. Poiss., vii, 528, 1831, near equator, 75 E.
Gonopterus mærens Gronow, Cat. Fish., ed. Gray, 77, 1854, India.
Chaetodon nudus Gronow, Cat. Fish., ed. Gray, 76, 1854, Mari indico.
Zanclus montrouzieri Thiollière, in Montrouzier, Fauna Woodlark, 168, 1857, Woodlark I.

This species is everywhere common throughout the Pacific Ocean, from the off-shore islands of Mexico to Hawaii and southern Japan. We have 20 examples from Apia and 3 from Pago Pago.

Family ACANTHURIDÆ.

HEPATUS Gronow, 1763.

(*Teuthis* Linnæus, 1766; *Harpurus* Forster; *Acronurus* Gronow, 1854.)

1182. *Hepatus achilles* (Shaw). *Pone v'umumu*. Hawaii; Samoa; Marcus I.; Rarotonga and Makatea (Seale).

This beautiful fish is rare about Samoa, as about Hawaii. We have two large specimens from Pago Pago and one from Apia. The red tail-patch is very brilliant in life.

1183. *Hepatus aliala* (Lesson). *Alamea samasama*; *Loata*. Oualan; Samoa; New Guinea; Guam; Clarion Is.

This well-marked species is not rare about Samoa. We have ten specimens from Apia and Pago Pago. It is found also on the off-shore islands of Mexico.

Life colors of a specimen from Apia, called *alamea samasama*, olive-black; pure black in front; dorsal dusky mottled olive with black and blue edge, and a bright yellow line at base, which widens and covers most of last ray of dorsal; caudal drab gray with a pale violet-gray edge and a golden crescent; spine golden; anal like dorsal in color; pectoral and ventral blackish, both edged with grayish blue, edged in front with sky-blue; a whitish patch below eye and a white ring around throat behind chin; edge of opercle light golden olive.

1184. *Hepatus olivaceus* (Bloch & Schneider). Tahiti; Paumotu Is.; Samoa; Palau Is.; Hawaii; New Guinea; East Indies.

This species, easily recognized by the mark at the shoulder, is frequently taken about Hawaii and Samoa. We have 5 examples from Samoa.

Color in life of a specimen from Apia, lemon-yellow, olive-shaded above; fins all yellow with dark edgings; axil and tip of caudal bright orange-yellow; a blackish brown stripe on pectoral, extending to its middle, without edging in young. Another specimen from Apia was black, with orange-black edged stripe, and a third was bright brownish yellow, the black stripe mesially bright orange.

1185. *Hepatus pyriferus* (Kittlitz). Ulea.

Acanthurus pyriferus Kittlitz, Senckenberg Museum, i, 193, taf. 12, fig. 2, 1834, Ulea. Gunther, Fische der Südsee, 118.

Acanthurus armiger Cuvier & Valenciennes, Hist. Nat. Poiss., x, 234, 1835.

This species is unknown to us.

- 1186. *Hepatus nigricans*** (Linnaeus). *Utiuli maia*; *Pu sina*. Tahiti; Paumotu Is.; Samoa; Fiji; Harvey Is.; Bougainville Is.; Gilbert Is.; New Guinea; East Indies.

Chaetodon nigricans Linnaeus, Syst. Nat., ed. x, 1758, Red Sea; after Artedi.

Chaetodon gahhm Forskål, Descr. Anim., 64, Red Sea.

Acanthurus gahm, Günther, Fische der Südsee, 113, taf. 74, Tahiti, Paumotu, Samoa, Harvey Is., Bougainville Is., Gilbert Is.

This widely distributed species is rather common about Samoa. We have ten specimens. In all the adult specimens the caudal fin has no white ring at base; being except for the pale crescent at tip dark brown like the body. In one young example the caudal fin is abruptly gray.

The name *Chaetodon nigricans*, based on a fish from the Red Sea, dusky, with the caudal whitish, could be no other species. *Acanthurus doreënsis* is probably the same, the anal rays miscounted.

Life colors of a specimen from Apia called *utiuli maia*, very dark olive; fins black; a black oblong stripe or spot behind gill opening on level of eye extending about to middle of pectoral; this is black, faintly and narrowly edged with pale blue; pectoral with a golden vertical stripe, behind which the fin is colorless; caudal conspicuously edged with white; dorsal and anal with dark and light blue, the streak very narrow, faint on dorsal; ventral reddish brown on inner rays; no white spot before eye; lips dark; no caudal ring nor axil spot.

A specimen from Pago Pago called *i'u sina*, was black, with brownish shade; no streaks, but a sanding of darker specks; a horizontal oblong black stripe or spot from angle of gill opening toward near end of pectoral; fins all black, the anal narrowly edged with clear blue; dorsal more narrowly edged with black; caudal very lunate, edged with white; pectoral with a bright yellow cross-bar.

- 1187. *Hepatus doreënsis*** (Cuvier & Valenciennes). New Guinea.

Acanthurus doreënsis Cuvier & Valenciennes, Hist. Nat. Poiss., x, 220, Dorey Harbor (New Guinea).

This species has the coloration of the young of *Hepatus nigricans*. It is said, however, to have but 20 soft rays in the anal fin, a number lower than in any other species. It is perhaps the young of *Hepatus nigricans*, perhaps that of *H. elongatus*, a species in which the caudal shows usually a narrow pale edge. It is, however, by Macleay recorded as a distinct species.

- 1188. *Hepatus aterrimus*** (Günther). Samoa.

Acanthurus aterrimus Günther, Proc. Zool. Soc., 1871, 660, Savay. Günther, Fische der Südsee, 114, taf. 77, fig. B, Savay.

This species, described from Samoa, was not seen by us. The deep body and the white crescent on the caudal are the characteristic traits.

- 1189. *Hepatus lineatus*** (Gmelin). *Alogo*. Tahiti; Samoa; Guam; New Guinea; Faté (Seale); Zanzibar.

Chaetodon lineatus Gmelin, Syst. Nat., 1246, 1789, "America, Australis et India."

Acanthurus lineatus Günther, Fische der Südsee, 111, taf. 70, Samoa, Tahiti, Zanzibar. Kner, Novara Fische, 210; Tahiti. Streets, Bull. U. S. Nat. Mus., VII, 100, Samoa.

Teuthis lineatus Seale, Bishop Museum, 1901, 103, Guam.

This gaudily colored species is very common about Samoa. We have about 50 examples from the reefs at Apia and Pago Pago.

Life colors of a specimen from Apia, deep blue stripes, each with a pale median line, alternating with golden stripes; belly livid blue, the breast golden, the region behind ventrals orange; two golden and two vertical cross-stripes at base of tail; dorsal olive with pale blue stripes and blue edge; caudal blackish with blue crescent; anal olive-green, pale blue at edge, orange at base; ventral orange, with a deep blue edge; pectoral orange at base, dusky behind, with sky-blue spots.

- 1190. *Hepatus dussumieri*** (Cuvier & Valenciennes). New Guinea; Hawaii; East Indies.

Acanthurus argenteus Quoy & Gaimard, Voy. Uranie, 873, 1824, pl. 63, fig. 3, Maui; larva, the species uncertain, nearest *Teuthis dussumieri*, perhaps *T. matoides*.

Acanthurus dussumieri Cuvier & Valenciennes, Hist. Nat. Poiss., x, 201, 1835, Ile de France. Günther, Fische der Südsee, 112, taf. 72, Hawaii. Steindachner, Sitz. Ak. Wiss. Wien 1900, 493, Honolulu.

† *Acanthurus lineolatus* Cuvier & Valenciennes, Hist. Nat. Poiss., x, 207, 1835, Indian Ocean.

This species is the commonest of its genus about the Hawaiian Islands. We did not find it at Samoa.

1191. *Hepatus atramentatus* Jordan & Evermann. Hawaii; Samoa; Laysan; Marcus I.; Tahiti.

Acanthurus lineolatus Günther, Fische der Südsee, 112, taf. 73, fig. A, Tahiti; not of Cuvier & Valenciennes. Steindachner, Sitz. Ak. Wiss. Wien 1900, 493, Honolulu.

Teuthis atramentatus (by misprint *atrimentatus*) Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 198, Hawaii. Snyder, Bull. U. S. Fish Comm., xxii, 1902 (1903), 533, Laysan. Bryan & Herre, Bishop Museum 1903, 133, Marcus I.

Of this species, rather common at Hawaii, we found but one specimen in Samoa. The body is striped with blue, as in *Hepatus dussumieri*, but there is an ink-like spot at the base of the last dorsal and anal rays.

1192. *Hepatus elongatus* Cuvier & Valenciennes. *Unavau*. Hawaii; Samoa; New Hebrides; Palau; Tahiti; Marcus I.; Guam; Faté, and Tubuai (Seale).

Chaetodon elongatus Lacépède, Hist. Nat. Poiss., iv, 471, pl. 6, fig. 2, 1803, Pacific Ocean.

Acanthurus nigrorhis Cuvier & Valenciennes, Hist. Nat. Poiss., x, 208, 1835, Hawaii.

Acanthurus bipunctatus Günther, Cat., III, 331, Sea of China, Fiji Is. Steindachner, Sitz. Ak. Wiss. Wien 1900, 494, Honolulu.

Acanthurus nigros Günther, Cat., III, 332, New Hebrides. Günther, Fische der Südsee, 110, New Hebrides, Palau, Tahiti.

Teuthis bipunctatus Jordan & Fowler, Proc. U. S. Nat. Mus. 1901, 554, Riukiu Is., Kotosho, Formosa. Bryan & Herre, Bishop Museum 1903, 134, Marcus I.

Teuthis mata Seale, Bishop Museum, 1901, 107, Guam; not of Cuvier & Valenciennes.

This species is common about Samoa, and also about Hawaii. It is often distinguishable by the black blotch at base of soft dorsal and anal, but in dark colored examples, as most of ours are, this spot is inseparable from the black ground-color of the fins. The body is very dark brown, without stripes. *Hepatus mata* Cuvier & Valenciennes of India, has the same color but the profile is straight and not so steep.

Of the various names given to fishes of this sort we have chosen as earliest the name *elongatus* of Lacépède. While his description amounts to little, and that of Cuvier & Valenciennes is scarcely better, his figure represents this species, which differs from all others in being plain blackish brown on body and fins, the black spot on last rays of dorsal and anal distinct only in paler specimens.

In this species the body is uniform brown; the caudal has usually a narrow pale edge and the snout is usually dusky.

1193. *Hepatus fuliginosus* (Lesson). Oualan, or Strong I.

Acanthurus fuliginosus Lesson, Voy. Coquille, II, 149, pl. 27, fig. 2, 1830, Oualan.

This species is said to have the lips blue, the body brownish with faint bluish streaks, and but 20 soft rays in the anal. We have not seen it. It may be identical with *Hepatus elongatus*.

1194. *Hepatus bariene* (Lesson). Waigiü.

Acanthurus bariene Lesson, Voy. Coquille, II, 149, 1830, Waigiü.

Acanthurus nummifer Cuvier & Valenciennes, Hist. Nat. Poiss., x, 234, 1835, Waigiü; same type.

1195. *Hepatus celebicus* (Bleeker). Tahiti; Solomon Is.; East Indies.

Acanthurus celebicus Bleeker, 1852, 761, Celebes, Ternate. Günther, Fische der Südsee, 115, taf. 73, fig. B, Solomon Is., Tahiti.

1196. *Hepatus leucopareius* (Jenkins). Hawaii.

Teuthis leucopareius Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 476, fig. 28, Honolulu.

1197. *Hepatus matoides* (Cuvier & Valenciennes). *Umelei*. Hawaii; Samoa; Fiji; Oualan; Bougainville I.; New Guinea; East Indies.

Acanthurus matoides Cuvier & Valenciennes, Hist. Nat. Poiss., x, 204, 1835, Oualan. Sauvage, Poiss. Madagascar, 340; same type. Peters, Berl. Mon. 1876, 835, Bougainville I.

Acanthurus annularis Cuvier & Valenciennes, op. cit., x, 209, 1835, Ile de France.

Acanthurus blochii Cuvier & Valenciennes, op. cit., x, 239, 1835, Ile de France, Seychelles.

Acanthurus xanthopterus Cuvier & Valenciennes, op. cit., x, 215, 1835, Seychelles.

Acanthurus tamarii Cuvier & Valenciennes, op. cit., x, 236, 1835, Ile de France.

Teuthis guntheri Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 477, pl. 29, Hawaii.

This species is characterized by the pale ring at the base of the caudal, the body being plain brown or nearly so, and the vertical fins with a few distinct stripes. Taking the account given by Sauvage as authentic, we are unable to separate the species called *xanthopterus*, *blochii*, and *guntheri* from the scantily described *matoides*.

The species is common about Hawaii, and Samoa as well. We have about a dozen specimens from Samoa from 2 to 10 inches in length. The largest, a little more elongate than shown in Jenkins's figure, shows a very distinct bluish streak along base of dorsal. This, with the pale caudal band and the yellow margin to the pectoral, are characteristic of this species.

Life colors of a young specimen from Apia, dusky olive, with very faint bluish horizontal streaks; a whitish olive ring around caudal peduncle; dorsal and anal with faint bluish horizontal streaks; pectoral more or less pale.

1198. *Hepatus bishopi* (Bryan & Herre). Marcus I.

Teuthis bishopi Bryan & Herre, Bishop Museum 1903, 134, Marcus I.

This species is based on an adult example, very close to *Hepatus matoides* but probably distinct, as the pectoral is without yellow and the dorsal and anal not striped. The profile is also somewhat S-shaped.

1199. *Hepatus umbra* (Jenkins). Hawaii.

Teuthis umbra Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 477, Honolulu.

This species is rather rare about Honolulu. It is very similar to *Hepatus matoides*, differing chiefly in the absence of lines on the fins.

1200. *Hepatus aquilinus* Jordan & Seale, new species. Palagi samasama.

This species is allied to *Hepatus matoides*, but is much more elongate, with the profile more convex than in any other species, the general form more distinctly elliptical. We have a single very large specimen from Apia.

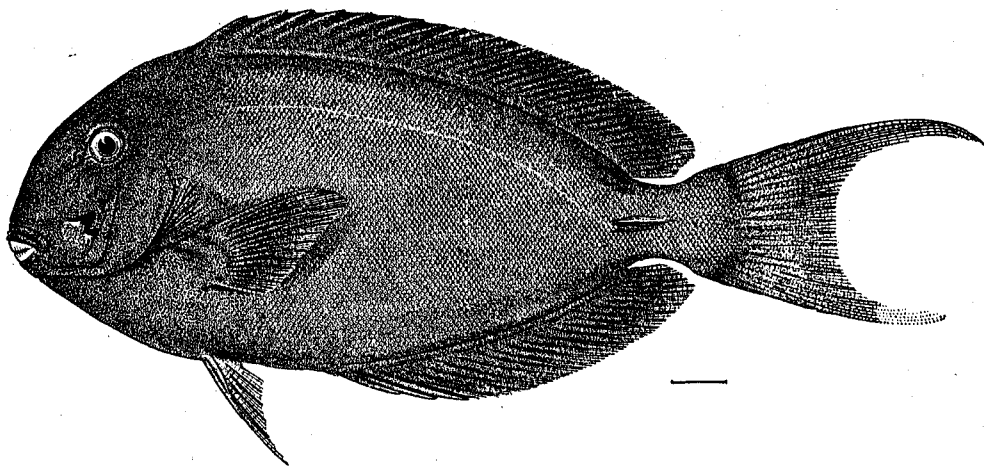


FIG. 66.—*Hepatus aquilinus* Jordan & Seale, new species. Type.

Head 4 in length; depth 2.12; eye 5 in head; dorsal ix, 26; anal iii, 24; scales small, about 1.25 in lateral line; snout 1.25 in head; interorbital 2.85; spine on caudal peduncle fully a third greater than width of orbit.

Body compressed, elevated, anterior profile rounded, slightly gibbous in front of eye; depth of caudal peduncle 2.50 in head, the spine distinct, equal in length to about two-thirds of depth of peduncle; mouth small; teeth flat, their margin toothed, 16 teeth in upper jaw, 21 in lower jaw; distance from tip of snout to origin of dorsal 2.55 in length without caudal; posterior margin of dorsal rounded, its longest ray 2 in head; base of anal 2 in length without caudal, 1.45 in base of dorsal, longest anal ray 2 in head; pectoral equal to head; ventral 1.25 in head; caudal deeply lunate, the marginal rays being prolonged, longest outer ray 2.50 in length without caudal, middle ray 1.50 in head.

Color in life, purplish brown with some bluish shades on tail; very faint traces of stripes; dorsal with four horizontal olive-bronze and gray stripes; anal with five and a dark edge; caudal very deeply lunate; pectoral with posterior half golden; ventral dark olive; no black spot on dorsal or anal; caudal dark, without pale edge; caudal peduncle dark; olive about eye, and a streak to snout.

Color in spirits, uniform dark brown, shaded somewhat darker, almost black at tip of snout and chin; base of caudal spine dusky; all the fins except pectoral dusky, almost black, darker than body color; anterior two-thirds of pectoral dusky, posterior third yellowish white; no black spots at axil of any fins; iris golden.

Type no. 51759, U. S. National Museum, from Apia, length, 17 inches.

1201. *Hepatus flavoguttatus* (Kittlitz).

Acanthurus flavoguttatus Kittlitz, Senckenberg Museum, 195, 1834, Caroline Is.

Acanthurus kittlitzii Cuvier & Valenciennes, Hist. Nat. Poiss., x, 222, 1835, Caroline Is.

1202. *Hepatus marginatus* (Cuvier & Valenciennes). Caroline Is.

Acanthurus marginatus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 221, 1835, Laganor, one of the Carolines.

1203. *Hepatus triostegus* (Linnæus). *Manifi.* Samoa; Tahiti; New Guinea; Fiji; Faté; Rarotonga and Nukahiva (Seale); East Indies.

Acanthurus zebra De Vis, Proc. Linn. Soc. N. S. W., 1884, 447, Duke of York I.

This species is the most abundant of the genus about Samoa, swarming everywhere on the reefs. The black bar through the pectoral does not descend much below the fin, the caudal mark is a vertical bar or else two spots in a vertical line, and the adults have the white of the belly bounded above by an undulating dark line.

Life colors of a specimen from Apia reef, called *manifi*, light olive, darker on back, silvery below; bars black. This seems like *sandwichensis*, but lacks one cross-band and is very pale; only four bands on sides.

1204. *Hepatus sandvicensis* (Streets). Hawaii; Johnston I.; off shore islands of Mexico.

Acanthurus triostegus sandvicensis Streets, Bull. U. S. Nat. Mus., VII, 67, 1877, Honolulu.

Acanthurus triostegus, Smith & Swain, Proc. U. S. Nat. Mus. 1882, 138, Johnston I. Steindachner, Sitz. Ak. Wiss. Wien, 1900, 493, Honolulu, Laysan.

Teuthis triostegus, Jordan & Evermann, Fishes North & Mid. Amer., II, 1690 (description not synonymy), 1898, off-shore islands of Mexico.

This is the most abundant species of the genus about Hawaii, where it replaces the closely allied *Hepatus triostegus*. The differences, although slight, are constant.

1205. *Hepatus guttatus* (Forster). *Moana; Aau.* Tahiti; Hawaii; Samoa; New Hebrides; Kingsmill I.; Palau; Guam; New Guinea.

Acanthurus guttatus Forster, in Bloch & Schneider, Syst. Ichth., 1801, 215. Günther, Fische der Südsee, 109, taf. 69, fig. A, New Hebrides, Tahiti, Samoa, Kingsmill I., Palau, Sandwich I. Seale, Bishop Museum 1901, 110, Guam.

This strongly marked species is common at Samoa, whence we have 20 specimens. At Hawaii it is rather rare.

Life colors of a specimen from Apia, called *moana* and *a'au*, dark brownish olive, paler olive behind; a whitish vertical bar above vent; spots on posterior parts white; caudal olive-yellow, blackish behind; ventral bright yellow, dusky edged; pectoral dusky olive, paler above; no yellow; anal dull orange.

LARVAL FORMS OF HEPATUS.

Larval forms of *Hepatus*, constituting the supposed genus *Acronurus* of Günther, abound in all warm seas. In all cases, these are deep in body, with a large silvery area on the thorax, and with the scales replaced by vertical striæ. These forms can be identified only with great difficulty, and chiefly by means of the count of fin-rays. The following have been described from the Pacific Ocean:

Acanthurus argenteus Quoy & Gaimard, Voy. Uranie, 373, pl. 63, fig. 2, 1824, Maui. This is probably the young of *Hepatus dussumieri*, possibly of *Teuthis matoides*.

Acanthurus striatus Quoy & Gaimard, Voy. Uranie, 373, pl. 63, fig. 3, 1824, Guam. This is regarded by Günther as the young of *Ctenochetus strigosus* (*striatus*), an identification which is probably correct. We have, however, three different species of young fish, all having the coloration ascribed to *Acanthurus striatus*, two of them from Samoa and one from Tahiti. We can identify but one of them, the *Ctenochetus*, which is, without much doubt, the form originally named *striatus* by Quoy & Gaimard.

Acanthurus orbicularis Quoy & Gaimard, in Cuvier & Valenciennes, Hist. Nat. Poiss., x, 237, 1835, Guam. This can not be identified.

Acanthurus brevispinus Günther, Cat., III, 346, 1861, from unknown locality; defies conjecture.

CTENOCHÆTUS Gill.

Ctenodon Swainson, Nat. Hist. Fish, II, 256, 1839 (*strigosus*); name preoccupied.

Ctenochætus Gill, Proc. U. S. Nat. Mus., 1884, 277 (*strigosus*).

This genus contains species with slender movable teeth, each dilated at the apex.

1206. *Ctenochætus striatus* (Quoy & Gaimard). *Palagi*; *Ponepone*; *Aau*. Hawaii; Samoa; Aneiteum; New Ireland; New Britain; New Guinea; Guam; Carolines; Tahiti; Raiatea; Faté; Rarotonga; Tubuai and Shortland I. (Seale).

Acanthurus striatus Quoy & Gaimard, Voy. Uranie, 373, 1824, Guam, larva.

Acanthurus strigosus Bennett, Zool. Journ., IV, 1828, 41, Sandwich Is. Cuvier & Valenciennes, Hist. Nat. Poiss., x, 243, 1835. Günther, Cat., III, 342, 1861, Sandwich Is. Günther, Fische der Südsee, IV, 116, taf. 79, figs. B and C, 1875, Sandwich Is. Seale, Bishop Museum, 1901, 109, Guam. Peters, Berl. Mon., 1876, 885, New Britain.

Acanthurus (Ctenodon) strigosus, Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 494, Honolulu.

Acanthurus ctenodon Cuvier & Valenciennes, Hist. Nat. Poiss., x, 241, pl. 289, Caroline Is. Günther, Cat., III, 342, Aneiteum, East Indies. Peters, l. c., New Britain, New Ireland.

This species is generally common throughout Oceania. We found it abundant both at Hawaii and Samoa. The faint spots about the head and the faint streaks along the sides disappear in spirits.

Life colors of a specimen from Apia, called *palagi*, blackish brown, unmarked; dorsal with very faint horizontal streaks of bluish and bronze; anal very obscurely marked in the same way; caudal deeply forked; no stripes on body.

Another specimen was exactly like *Hepatus atramentatus*, but the profile of the head was much more convex; many wavy blue and bronze stripes on a blackish ground.

COLOCOPUS Gill.

Colocopus Gill, Proc. U. S. Nat. Mus. 1884, 279 (*lambdurus*).

This genus differed from *Hepatus* in having but two or three soft rays in the ventral fins.

1207. *Colocopus lambdurus* Gill. New Britain; Kingsmill I.; New Guinea (Macleay); Mauritius.

Acanthurus hepatus Günther, Fische der Südsee, 115, taf. 75; not *Teuthis hepatus* Linnæus, which name properly belongs to the American species usually known as *cæruleus*. Peters, Berl. Mon. 1877, 885, New Britain.

Colocopus lambdurus Gill, Proc. U. S. Nat. Mus., 1884, 279 (after Günther), Kingsmill I., Mauritius.

ZEBRASOMA Swainson.

Zebрасoma Swainson, Nat. Hist. Anim., II, 256, 1839 (*velifer*).

Scopas Kner, Novara Fische, 1865, 212 (*scopas*).

This genus differs from *Hepatus* in the short spinous dorsal of 4 or 5 graduated spines; soft dorsal high; snout short, projecting at an angle.

1208. *Zebрасoma flavescens* (Bennett). *Samasama*. Hawaii; Marcus I.; Guam; New Guinea (Macleay).

Acanthurus flavescens Bennett, Zool. Journ., IV, 1828, 40, Hawaii.

Zebрасoma flavescens, Steindachner, Sitz. Ak. Wiss. Wien 1900, 493, Honolulu. Bryan & Herre, Bishop Museum, 1903, 234, Marcus I.

Acanthurus virgatus Vaillant & Sauvage, Ann. Sci. Nat., 1875, 283, Honolulu.

Acanthurus agana Seale, Bishop Museum, 1901, 110, Guam.

This species is rather common about the Hawaiian Islands, and is reported from Guam under the name of *Zebрасoma agana*. *Zebрасoma virgatum* must be the young of this species, with blue spots on the head and brown blue streaks and pale cross-shades on the body. The description differs from *Zebрасoma flavescens* as the young of *Zebрасoma rhombeum* differs from the adult.

This species apparently agrees with *Zebрасoma rhombeum* in all respects except color. Were it not for its geographical separation we should follow Günther in uniting *rhombeum* with *flavescens*. The two are in fact probably the same species, the name *flavescens* being the older.

1209. *Zebрасoma rhombeum* (Kittlitz). *Iliu*; *Ali palagi*. Samoa; Ulea; Fiji; Aneiteum; East Indies.

Acanthurus rhombeus Kittlitz, Senckenberg Museum, I, 1834, 196, pl. XIII, fig. 16.

Acanthurus scopas Cuvier & Valenciennes, Hist. Nat. Poiss., x, 245, pl. CCXC, 1835, Ile de France, Ulea. Bleeker, Nat. Tijds. Ned. Ind., 1851, 348. Guichenot, Sagra Hist. Cuba, 122, 1851, Cuba by error. Günther, Cat., III, 342, 1861, Ceram, Sandwich Is., Aneiteum.

Acanthurus altivelis Cuvier & Valenciennes, op. cit., x, 249, 1835, Ile de France.

Acanthurus goramensis Cuvier & Valenciennes, op. cit., x, 1835, Goram, young.

This species ranges widely through the East Indies. We have 50 specimens from Apia and Pago Pago. The yellow form, called *flavescens*, we did not find in Samoa. The two forms, *flavescens* and *rhombeum*, are without much doubt color variations of one dichromatic species.

Life colors were noted in various specimens as follows:

(1) Specimen from Apia, called *iliu*. Dark olive, somewhat clouded (a curved light blue streak behind the eye, parallel with the golden iris, in young only); everywhere fine oblong light blue spots, smaller and sharply defined on side of head, not evident on snout nor along the back; larger below and behind; fins all plain olive-black, the pectoral lighter olive; caudal spine bluish white; a short oblique streak of light olive above pectoral.

(2) An older example with light blue wavy streaks on body, not spots; streak above pectoral light yellow and very conspicuous; no blue behind eye; pectoral scarcely olive.

(3) From Apia. Dark brown, grayish behind, with about 20 fine bluish white cross-streaks; a whitish lateral streak above pectoral; fins all dusky. Larger ones more sharply colored.

(4) From Pago Pago. Posterior half of body fuliginous, darkest behind and merging anteriorly into yellow-green with fine pale blue specks; olive-green above eyes; iris yellow.

(5) From Apia. Blackish; faint bluish horizontal lines over body as in *Hepatus lineolatus*; a yellowish white short band above pectoral; head unspotted; fins dark.

(6) Specimen from Pago Pago, called *iliu*. Blackish brown; head, breast, and shoulders everywhere covered with fine bluish white dots; body with horizontal wavy stripes of the same color, on a bronze-brown ground; fins dusky olive, unstriped; dorsal, anal, and caudal with a fine paler edge; pectoral dark orange, dusky above and below; a long whitish stripe above pectoral.

(7) One specimen was almost black, the spots very distinct, the stripes mostly obsolete; the yellowish white line reduced to a round bright yellow spot near gill-opening, wanting on the other side; iris pink red, not gray as usual.

1210. *Zebrasoma rostratum* (Günther). *Ali*. Tahiti; Samoa.

Acanthurus rostratus Günther, Fische der Südsee, 117, taf. 66, fig. B, Tahiti.

This species is close to *Zebrasoma rhombeum*, but the snout is longer, the fins rather higher, and the color almost black. We have two examples from Apia, a little smaller than Günther's type, and with the body deeper.

Life colors of a specimen called *iliu*, black, with brownish tinge; snout reticulate; a vertical bar behind pectoral golden olive, with blue cross streaks; a similar bar from beginning of dorsal across opercle and obliquely across breast; five blue stripes and four olive between; below pectoral obscurely reticulate, with bluish around dull olive spots; fins uncolored; caudal with narrow pale edge; caudal spine black, as are all fins.

1211. *Zebrasoma veliferum* (Bloch). *Lupo*. Hawaii; Samoa; Fiji; East Indies.

Acanthurus velifer Bloch, IX, 106, taf. 427, fig. 1, 1788.

Acanthurus blochii Bennett, Proc. Zool. Soc. 1835, 207.

Acanthurus hypselopterus Bleeker, Nat. Tijds. Ned. Ind., VI, 1854, 313, Flores. Günther, Fische der Südsee, 1875, 117, Fiji Is. Steindachner, Denks. Ak. Wiss. Wien, LXX, 1900, 494, pl. IV, fig. 1, Honolulu.

Zebrasoma hypselopterus Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (1903), 479, Honolulu. Snyder, Bull. U. S. Fish Comm., XXII, 1902 (1904), 533, Honolulu.

This species is rather common about Samoa, whence we secured four examples. It is even more frequent about Honolulu. Our largest example, about a foot long, corresponds very closely to Bloch's figure of *velifer*. The caudal is dark, and the body is crossed by many dark cross-streaks, which cross six or seven obscure dark cross-shades, the most distinct being the ocular and scapular bands. In younger examples the cross-streaks are fainter, and in still younger they are wanting. The face is spotted with pale and the six or seven dark cross-bands become more distinct. This form from 4 to 8 inches long represents *hypselopterus*. Still younger forms have the snout and caudal yellow. We have none which correspond exactly either to *desjardini* or to *ruppellii*.

Life colors of a specimen from Pago Pago, violet-black with four distinct yellowish cross-bands (grayish in formalin); these and rest of body crossed by regular dark bronze streaks; broad black ocular band reaching base of ventrals; head before it with network of bluish white spots; another dark area from base of dorsal to front of anal; fins blackish; caudal with narrow pale edge; breast unspotted.

A specimen from Apia, called *lupo*, had the snout and forehead dark yellow; ocular streak black

edged with gray; then a broader black band edged with gray; then four brown bands, yellow between, then the caudal peduncle black, the pale stripe before it narrow; tail yellow, grayish behind, thus seven dark bands; dorsal and anal dusky deep yellow, the dorsal with some spots behind; ventral golden.

ACANTHURUS Forskål.

(*Monoceros*, *Naso*, and *Naseus* of authors.)

1212. *Acanthurus unicornis* (Forskål). *Ili'ilia segi*; *Ume*; *Umelei*. Hawaii; Samoa; Aneiteun; Guam; Tahiti; Waigiü; New Guinea; Raiatea (Seale); East Indies; Japan.

This species, widely diffused through the tropical Pacific and varying excessively at various stages of growth, is common about Hawaii. At Samoa we found it rather scarce, but four specimens being obtained. The caudal spines are bluish on a pale ground, while those of *Acanthurus lituratus* are orange.

Life colors of a specimen from Apia, dark olive, brownish below, paler on tail; spines clear blue; dorsal light brown, with light bluish spots and a dark edge; caudal dusky, paler behind; anal clear orange-brown, with a row of pale blue spots at base, then two pale bluish stripes and a whitish edge; pectoral and ventral mottled orange-gray.

Another specimen from Apia was grayish black, the spines dark blue; caudal peduncle brown, paler; dorsal light orange, with oblique bluish streaks; caudal gray; anal light orange, with horizontal bluish streaks; head, pectoral and ventral gray.

1213. *Acanthurus brevirostris* (Cuvier & Valenciennes). Hawaii; Tahiti; Kingsmill I., New Guinea; Ile de France.

Naseus brevirostris Cuvier & Valenciennes, Hist. Nat. Poiss., x, 277, pl. 291, 1835, East Indies, Ile de France, New Guinea. Günther, Cat., III, 349, 1861. Günther, Fische der Südsee, 121, taf. 79, fig. A, 1875, Kingsmill I., Tahiti. *Acanthurus brevirostris* Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 481, Honolulu. Snyder, Bull. U. S. Fish Comm., xxii, 1902 (1904), 534, Honolulu.

This species, rather common about Hawaii, was not found in Samoa.

1214. *Acanthurus incipiens* Jenkins. Hawaii; Samoa.

Acanthurus incipiens Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 480, Honolulu.

Two specimens were seen at Samoa, similar in form to Jenkins's type. One of these is plain blackish, the other covered with blue spots. The caudal fin in both is blackish. This fin is largely yellow in *Acanthurus brevirostris*, otherwise we might regard *Acanthurus incipiens* as the young of that species. It is apparently an immature form.

Life colors of one specimen from Apia, black, with a brownish shade; upper parts with small rounded spots of deep violet-blue; belly paler, slaty; lips blue; a blue streak below eye; dorsal dark brown, slightly bluish on spines, dusky on edge; ventral dark brown, paler behind, the edge blackish; anal dark brown with two dark blue streaks and a dusky edge; ventral and pectoral dark brown; caudal black with a faint trace of a pale edge. No trace of horn or of spines on tail. Length, 6 inches.

1215. *Acanthurus annulatus* (Quoy & Gaimard). Tonga; Palau; Aneiteun; Fiji; Guam.

Priodon annulatus Quoy & Gaimard, Voy. Uranie, 377, 1824, Polynesia, young. Seale, Bishop Museum, 1901, 118, Guam.

Naseus marginatus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 280, 1835, Tonga; not *Acanthurus marginatus* Kittlitz. Günther, Fische der Südsee, 122, Palau, Aneiteun.

Monoceros marginatus Seale, Bishop Museum 1901, 114, Guam.

Priodon annularis Cuvier & Valenciennes, Hist. Nat. Poiss., x, 302, pl. 294, 1835, Guam, young.

1216. *Acanthurus tuberosus* Lacépède. Guam; Aneiteun; New Guinea; Mauritius.

Naso tuberosus Lacépède, Hist. Nat. Poiss., III, 111, 1802, Ile de France.

Naseus tuberosus, Günther, Fische der Südsee, 123, Aneiteun, Ceylon, Zanzibar, Mauritius.

Acanthurus nasus Shaw, Gen. Zool., v, 376, pl. 51, 1803, Ile de France.

Naseus carolinarum Quoy & Gaimard, Voy. Uranie, 375, pl. 63, fig. 1, 1824, Guam.

Naseus tuber Cuvier & Valenciennes, Hist. Nat. Poiss., x, 290, 1835, Ile de France.

Naseus tonganus Quoy & Gaimard, in Cuvier & Valenciennes, Hist. Nat. Poiss., x, 292, 1835, Tonga; specimen immaculate.

Naseus punctulatus Steindachner, 1874.

This species we have not seen. It is probably rare in Polynesia.

^a This species, marked by green blotches, is imperfectly described, and has not been recognized by recent authors. It is perhaps nearest *Acanthurus tuberosus*.

1217. *Acanthurus metoposophron* (Jenkins). Hawaii.

Callicanthus metoposophron, Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 481, fig. 31, Honolulu.

1218. *Acanthurus vlamingi* (Cuvier & Valenciennes). Marshall Is.; Aneiteum; East Indies.

Naseus vlamingi Cuvier & Valenciennes, Hist. Nat. Poiss., x, 293, 1835, Moluccas. Günther, Fische der Südsee, 123, Ebon, Marshall Is., Aneiteum, Ceram. Fowler, Proc. Ac. Nat. Sci. Phila., 1899, 193, South Seas.

1219. *Acanthurus lituratus* (Forster). *Il'ilia*; *Umelei*; *Ume*. Tahiti; Hawaii; Samoa; Johnston I.; Guam; New Guinea; East Indies.

Acanthurus lituratus Forster, in Bloch & Schneider, Syst. Ich. 1801, 218, Tahiti.

Harpurus lituratus Forster, Descr. Anim., 218, 1844, Tahiti.

Naseus lituratus, Günther, Fische der Südsee, 124 (with plate representing "*garretti*"), Sandwich Is., Tahiti, Red Sea.

Monoceros lituratus Seale, Bishop Museum 1901, 112, Guam.

Apisurus elegans Rüppell, Atlas, Fische, 61, tab. xvi, fig. 2, 1828, Red Sea.

Prionurus coume Lesson, Voy. Coquille, II, 151, 1830, Tahiti.

Naseus lituratus Smith & Swain, Proc. U. S. Nat. Mus. 1882, 139, Johnston I. Steindachner, Sitz. Ak. Wiss. Wien 1900, 495, Honolulu.

? *Monoceros garretti* Seale, Bishop Museum 1901, 112, Guam.

This species is common at Samoa, as about Hawaii. In both places, and almost equally abundant, occurs the form described as *Monoceros garretti*. The only permanent difference seems to be this—in the true *lituratus* there is a line of clear blue along the base of the dorsal, and in *garretti*, old and young, this is wanting. As we find no other difference, the senior author is very doubtful as to whether *Acanthurus garretti* is a valid species.

Life colors were noted in various specimens as follows:

(1) Specimen from Apia called *ume*. Dark olive, brownish below, paler on tail; spines clear blue; dorsal light brown, with light bluish spots and a dark edge; caudal dusky paler behind; anal clear orange-brown, with a row of pale blue spots at base, then two pale bluish stripes and a whitish edge; pectoral and ventral mottled orange-gray.

(2) From Apia (young of preceding?). Dusky olive; belly yellowish brown; lips yellowish brown; a blue streak along base of dorsal, which is black except for a long white stripe; caudal dark olive, edged with greenish, then white; anal dull orange, edged with black; two anal spines dull orange; ventral dull orange.

(3) Specimen called *umelei*, *ume*, also from Apia. Grayish black, the spines dark blue; caudal peduncle brown, paler; dorsal light orange with oblique bluish streaks; caudal gray; anal light orange, with horizontal bluish streaks; head, pectoral, and ventral gray.

(4) Specimen from Apia called *umelei*. Dusky grayish, yellowish above eye; a bluish streak along base of dorsal; caudal whitish behind; dorsal and anal deep maroon red and dusky.

(5) Specimen called *il'ilia*. Black, brownish tinged; dorsal black, a pale blue streak at base, the edge gray with black margin and a row of bluish spots; spines orange; caudal black, with broad white edge; anal orange, black and white on margin, olive green at base; ventral olive orange; pectoral black; lips brown, a light yellow-brown streak from eye.

1220. *Acanthurus garretti* (Seale). Guam; Hawaii; Samoa.

Monoceros garretti Seale, Bishop Museum, 1901, 112, Guam.

This species, if such it be, is distinguished from *Acanthurus lituratus* by the absence of a blue line along the base of the dorsal and by the yellow spots on caudal peduncle separated by sharply defined black area. It is found at Hawaii and Samoa with *Acanthurus lituratus*. It is represented in Günther's plate of *Naseus lituratus* in Fische der Südsee. It is probably a color variation of *Acanthurus lituratus*—a view not shared by the junior author, however.

AXINURUS Cuvier & Valenciennes.**1221. *Axinurus thynnoides* Cuvier & Valenciennes. New Guinea; East Indies.**

Family SIGANIDÆ.

SIGANUS Forskål. Lo.

1222. *Siganus marmoratus* (Quoy & Gaimard). *Lo pa'u'ulu*. Samoa; Fiji; Guam; New Hanover; New Britain; Tahiti; East Indies.

Amphacanthus marmoratus Quoy & Gaimard, Voy. Uranie, Zool., 367, 1824, Guam.

Teuthis marmoratus Günther, Fische der Südsee, 93, Caroline Is. Peters, Berl. Mon., 1876, 885, Amboina, New Hanover, New Britain.

Siganus marmoratus Seale, Bishop Museum 1901, 111, Guam.

Amphacanthus guamensis Cuvier & Valenciennes, Hist. Nat. Poiss., x, 163, 1835, Guam.

Amphacanthus scaroides Bleeker, Nat. Tijds., 853, 262, East Indies.

Teuthis striolata Günther, Fische der Südsee, taf. LIX, fig. A (not description), Samoa, Tahiti.

This species is very common about Samoa. We have 40 specimens from Apia and Pago Pago.

It is possible that the specimens called *Teuthis striolata* by Günther, from Samoa, belong to this species, which is very close to *Siganus striolatus*, the body a little deeper than in the latter. Günther's figure of *striolatus* is much like *Siganus marmoratus* except that the body in the latter is deeper and the fins more sharply banded. In the type of *striolatus* the fins are said to be immaculate.

Life colors of a specimen from Apia called *lo*, olive green above, livid gray below; vermiculations of bluish gray around dark olive; fins similar, browner, also vermiculated or blotched.

1223. *Siganus nebulosus* (Quoy & Gaimard). Guam; East Indies.

Amphacanthus nebulosus Quoy & Gaimard, Voy. Uranie, 1824, 369, Timor, Guam, Port Jackson.

Amphacanthus maculosus Quoy & Gaimard, op. cit., 370.

This mottled species we have not seen, and it may not belong to the South Seas. Probably the specimens from Guam belong to *Siganus marmoratus*.

1224. *Siganus striolatus* (Günther). Samoa (Günther); New Hebrides; Solomon Is.; Tonga; Tahiti; Raiatea (Seale).

Teuthis striolata Günther, Cat., III, 319, 1861, New Hebrides. Günther, Fische der Südsee, 89, New Hebrides, Solomon Is., Samoa, Tonga, Tahiti.

This species is unknown to us.

1225. *Siganus concatenatus* (Cuvier & Valenciennes). Kusai; Palau Is.; East Indies.

Amphacanthus concatenatus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 127, 1835, Buru, Java.

Teuthis concatenatus, Günther, Fische der Südsee, 88, Palau Is., East Indies. Günther, Challenger, Shore Fishes, 46, 1880, Admiralty Is.

Not found in Samoa. We have a specimen from Kusai, Caroline Islands, collected by Mr. A. P. Lundin.

1226. *Siganus vermiculatus* (Cuvier & Valenciennes). Admiralty Is.; New Guinea; Shortland I. (Seale); East Indies.

Amphacanthus vermiculatus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 126, 1835, New Guinea, Java, Ile de France.

Teuthis vermiculatus, Günther, Challenger, Shore Fishes, 1880, 46, Admiralty Is.

1227. *Siganus puellus* (Schlegel). Apamana; Gilbert Is.; Palau Is.; East Indies.

Amphacanthus puellus Schlegel, Bydr., 1852, 39, East Indies.

Teuthis puellus, Günther, Fische der Südsee, 91, Apamana, Palau.

1228. *Siganus doliatus* (Cuvier). Vanicolo; Fiji; Ponape; Palau Is.; New Hebrides; New Britain; Raiatea (Seale); East Indies.

Amphacanthus doliatus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 132, 1835, Buru, Vanicolo.

Teuthis doliatus, Günther, Fische der Südsee, 96, New Hebrides, Fiji, Palau, Ponape. Kner, Novara Fische, 209, Ponape. Peters, Berl. Mon., 1876, 885, New Britain.

1229. *Siganus lineatus* (Cuvier & Valenciennes). Vanicolo; New Guinea.

- 1230. *Siganus fuscescens* (Houttuyn).** Palau Is.; Howland I. (Günther); Marcus I. (Bryan & Herre); Japan.

Siganus doliatus Cuvier, Regne Animal.

Centrogaster fuscescens Houttuyn, Mem de Haerl., xx, 333, Nagasaki.

Amphacanthus albopunctatus Schlegel.

This species, characteristic of southern Japan, is recorded from the South Seas, but was not found by us.

- 1231. *Siganus argenteus* (Quoy & Gaimard):** Guam.

Amphacanthus argenteus Quoy & Gaimard, Voy. Uranie, Zool., 368, 1824, Guam.

Teuthis argentea Günther, Fische der Südsee, 90, locality unknown.

- 1232. *Siganus canaliculatus* (Park).** Vanicolo; New Britain; East Indies.

Chaetodon canaliculatus Mungo Park, Trans. Linn. Soc., III, 1797, 478, Sumatra.

Amphacanthus margaritiferus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 145, 1835, Amboina, Vanicolo.

Teuthis margaritiferus, Peters, Berl. Mon. 1876, 835, New Britain. Günther, Challenger Shore Fishes, 46, 1880, Admiralty Is.

- 1233. *Siganus vitianus* (Sauvage).** Fiji.

Teuthis vitianus Sauvage, Bull. Phil. Soc., VI, 173; Fiji.

- 1234. *Siganus oligostictus* (Kner).** Fiji.

Teuthis oligostictus Kner, Sitz. Ak. Wiss. Wien 1868, 30, Fiji.

- 1235. *Siganus punctatus* (Bloch & Schneider).** *Lo 'ele'ele*. Tonga; New Caledonia; Guam; Fiji; Samoa; East Indies.

Amphacanthus punctatus Bloch & Schneider, Syst. Ichth., 1801, 210, Pacific Ocean (Tonga, New Caledonia).

Siganus hexagonatus Bleeker, Nat. Tijds. Ned. Ind., VII, 1854, 41, East Indies. Seale, Bishop Museum 1901, 111, III, Guam.

Teuthis hexagonata, Günther, Fische der Südsee, 80, Fiji, Samoa.

This species is abundant at Samoa. We have about 10 specimens from Apia and Pago Pago. This is certainly the species called *hexagonatus* by Bleeker, and it is without much doubt the *punctatus* of Bloch and Schneider, as Forster's notes, copied by Schneider, indicate a compressed species with small yellow spots on a bluish ground. Kner (Novara Fische) records some similar species as *Amphacanthus guttatus* Bloch from Java and Ponape, but the *Amphacanthus guttatus* of Bloch and Schneider is another species of *Siganus*.

Life colors of a specimen from Apia called *eheli*, deep dusky blue, the color forming a network around bronze orange spots; vertical fins marked in like fashion, but duller; pectoral olive; ventral blackish gray. Body deeper than in *Siganus rostratus*.

- 1236. *Siganus rostratus* (Cuvier & Valenciennes).** Palau; Tahiti; Guam; Samoa; Gilbert Is.; Raiatea; Tubuai; Fate and Shortland I. (Seale); Zanzibar.

Amphacanthus rostratus (Cuvier & Valenciennes), Hist. Nat. Poiss., x, 158, 1835, Red Sea.

Teuthis rostratus Günther, Fische der Südsee, 89, with plate, Palau, Tahiti, Gilbert Is., Zanzibar.

Siganus rostratus, Seale, Bishop Museum 1901, 112, Guam.

This species is colored very much like *Siganus punctatus*, but the body is more elongate, the caudal fin still more deeply forked. We have four large specimens from Apia.

Life colors of one of these, sky-blue, dark above, vermiculated with golden; dorsal mottled olive; caudal dusky, paler behind; anal dusky; ventral gray, barred with dark olive; pectoral golden.

- 1237. *Siganus corallinus* (Cuvier & Valenciennes).** Palau Is.; East Indies.

Amphacanthus corallinus Cuvier & Valenciennes, Hist. Nat. Poiss., x, 139, 1835, Seychelles, East Indies.

Teuthis corallinus, Günther, Fische der Südsee, 88, Palau.

- 1238. *Siganus studeri* (Peters).** New Britain.

Teuthis studeri Peters, Berl. Mon. 1876, 834, New Britain.

LO Seale, new genus.

Lo Seale, new genus of *Siganidae* (type *Amphacanthus vulpinus* Schlegel & Müller).

This genus is defined by the short tubular snout. *Lo* is the vernacular name applied to all the *Siganidae* in Samoa.

1239. *Lo vulpinus* (Schlegel & Müller). Solomon Is.; Palau Is.; Alu, Solomon Is. (Seale); East Indies.

Amphacanthus vulpinus Schlegel & Müller, Bydr. Dierk., v. 1852, 88, East Indies.
Teuthis vulpinus, Günther, Fische der Südsee, 91, Solomon Is., Palau Is.

This species, distinguished by the deep body, the slender elongate snout, and the peculiar coloration, is known to us from one specimen, brought by Mr. Seale from Alu, one of the Solomon Islands. We present a figure taken from this specimen, together with Mr. Seale's notes upon it.

Head 3.3 in length; depth 2.2; eye 4 in head; interorbital equal to eye; snout 2 in head; scales minute; dorsal XIII, 10; anal VII, 9; ventral 1-3-1.

Body compressed, snout produced, mouth small; a single row of small flat teeth fixed in each jaw, 12 on each side; opercle striate; none of the dorsal or anal spines greatly elongate; the dorsal spines, excepting the short anterior one, of about equal length, the longest 2 in head; anal spines similar, the longest 2; soft rays of dorsal, 1.75; ventral 1.4; caudal emarginate, the lobes rounded; caudal peduncle short, its depth equal to eye.

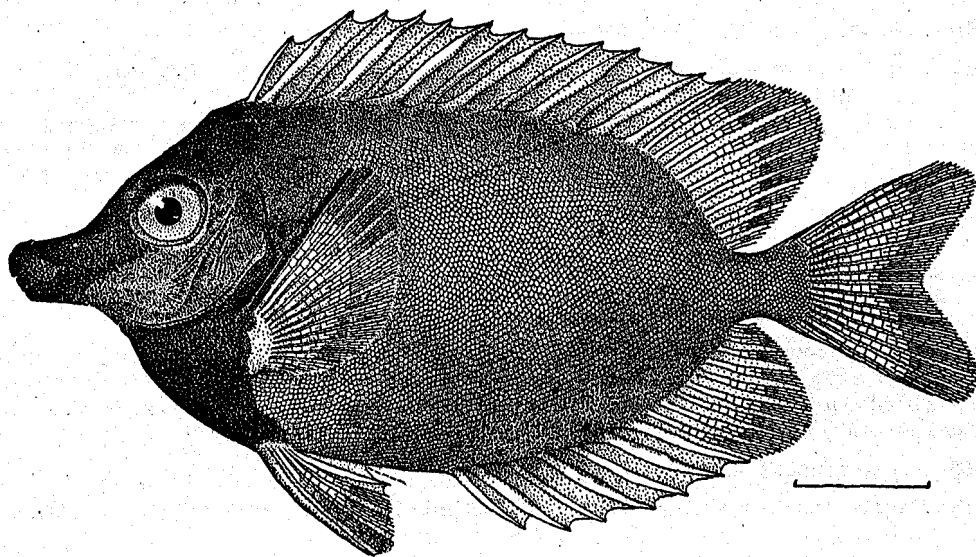


FIG. 67.—*Lo vulpinus* (Schlegel & Müller).

Color in life, light bistre brown; thorax and first ray of pectoral deep black; head and shoulders a deeper brown than the body; caudal, dorsal, and anal orange; spines of ventral and the first ray dusky; pectoral yellowish, with a slight dusky wash.

Color in spirits, dull grayish brown, thorax and head much darker; anterior ray of pectoral black; fins yellowish white.

One specimen (no. 1325 Bishop Museum) from Alu, one of the Solomon Islands, length, 7 inches.

Family BALISTIDÆ.

BALISTES (Artedi) Linnæus. *Sumu*.

1240. *Balistes vidua* Richardson. *Sumu pa'epa'e mumu*; *Sumu i'u mumu*. Hawaii; Samoa; Nukahiva (Seale).

Life colors of a specimen from Pago Pago called *sumu pa'epa'e mumu*, body dark smoky, paling a little below; pectoral canary-yellow with black edge; dorsal white with black margin; anal same; caudal Chinese white at base, the rest scarlet.

1241. *Balistes castaneus* Richardson. Pacific; west coast of Mexico.

Balistes castaneus Richardson, Voy. Sulphur, 126, pl. 59, figs. 5, 6, Pacific, locality unknown. Regan, Ann. Nat. Hist. 1902, 297, Pacific, same specimen.

Balistes polylepis Steindachner, Ich. Beitr., v, 21, 1876, Magdalena Bay, Mazatlan, Acapulco. Jordan & Evermann, Fishes North & Mid. Amer., II, 1700, 1893, Lower California, Panama.

According to Regan's account this is a true *Balistes*, and agrees very closely with *Balistes polylepis* Steindachner, a species common from Cerros Island to Panama. We have also a specimen from San Diego. Richardson's specimens probably came from the Panama region, and it is likely that the species does not belong to the Polynesian fauna at all.

1242. *Balistes capistratus* Shaw. Hawaii; Nukahiva (Seale); East Indies.**1243. *Balistes niger* Bonnaterre.** New Guinea; East Indies.

(*Balistes conspicillum* Bloch & Schneider.)

1244. *Balistes bursa* Bloch & Schneider. Hawaii; Nukahiva (Seale); East Indies.**1245. *Balistes viridescens* Bloch & Schneider.** New Guinea (Macleay); East Indies.**1246. *Balistes nycteris* Jordan & Evermann.** Hawaii.**1247. *Balistes chrysopterus* Bloch & Schneider.** *Sumu pa'epa'e*. Samoa; Aneiteum; Micronesia; New Britain; Faté (Seale).

Balistes niger Mungo Park, Trans. Linn. Soc., III, 37, 1791, Sumatra; not of Bonnaterre, 1788, which is *Balistes niger* = *Balistes conspicillum*. Günther, Cat., VIII, 218, Red Sea, Mauritius, Ceylon, Sumatra, Amboina, Aneiteum, Micronesia, Zanzibar. Day, Fish Ind., 688, pl. 181, fig. 1, Malaysia. Peters, Berl. Mon. 1876, 852; New Britain.

Balistes armé Lacépède, Hist. Nat. Poiss., I, 336, 382, 1798.

Balistes chrysopterus Bloch & Schneider, Syst. Ichth., 466, 1801, Coromandel.

Balistes mungopark Lacépède, Hist. Nat., Poiss., IV, 682, 1803; after Park.

Balistes subarmatus Gray & Hardwicke, Ill. Ind. Zool., India.

Balistes albicaudatus Rüppell, Neue Wirbelthiere, 54, XVI, fig. 1, 1835, Red Sea.

Balistes verrucosus Gronow, Syst., ed. Gray, 33, 1854; not of Bonnaterre.

Balistes armatus, Bleeker, Atlas, v, 115, tab. cccxvi, East Indies; name after Lacépède.

Of this East Indian species we obtained two specimens at Samoa, where it is apparently rare. Life colors of a specimen from Apia called *pae pae*, olive-gray, without color, whitish about jaws; a whitish band across lower jaw, another across chin, the latter extending backward across lower part of cheek; caudal gray with a blackish cross-streak and a white crescent at edge.

1248. *Balistes fuscolineatus* Seale. Hawaii.**1249. *Balistes fuscus* Bloch & Schneider.** Fiji (Günther); Tahiti (Seale); New Guinea (Macleay); East Indies.**1250. *Balistes flavomarginatus* Rüppell.** *Sumu laolao*. Samoa; New Britain (Peters); New Guinea (Macleay); Shortland I. (Seale); East Indies; Japan.

A single large specimen of this East Indian species was taken at Apia. It agrees closely with Bleeker's figure. According to Dr. Peters, this is the *Balistes brasiliensis* of Bloch and Schneider. The description of Schneider agrees fairly, but it is confused with some of the American species and purports to be drawn from an American specimen.

Life colors of a specimen from Apia called *sumu laolao*, light olive-green, the head abruptly creamy reddish brown, sides with many blackish spots covering or partly covering individual scales; back more brownish; first dorsal brownish with dusky membrane; second dorsal dusky brownish at base with orange-brown edge; anal same; caudal orange-brown, deeper on edges and margin with a dusky crescent; pectoral pale orange; naked "grooves" on cheek raised, reddish brown, the scaly stripes darker.

BALISTAPUS Tilosius.**1251. *Balistapus aculeatus* (Linnæus).** *Sumu uliuli*. Hawaii; Samoa; Johnston I.; Fiji; Guam; New Guinea; Marcus I.; New Ireland; East Indies.

Monacanthus chvertii Alleyne & Macleay, Proc. Linn. Soc. N. S. W., 1876, 355, New Guinea.

Balistes aculeatus Steindachner, Sitz. Ak. Wiss. Wien, 1900, 517, Samoa, Laysan. Peters, Berl. Mon. 1876, 852, New Ireland. Swain & Smith, Proc. U. S. Nat. Mus., v, 1882, 139, Johnston I. Seale, Bishop Museum 1901, 115, Guam. Bryan & Herre, Bishop Museum 1903, 135, Marcus I.

This handsome species is generally common at Honolulu and Samoa, thence throughout the South Seas and East Indies.

1252. *Balistapus rectangulus* (Bloch & Schneider). *Sumu pulepule*. Hawaii; Guam; Marcus I.; Samoa; New Guinea; Faté and Nukuhiva (Seale).

This pretty species is rather common about Hawaii, thence through the South Seas and East Indies. We have a few specimens from Samoa.

1253. *Balistapus undulatus* (Bloch & Schneider). *Sumu uli*. Samoa; New Britain; New Guinea; New Hanover; Guam; Tahiti; Shortland I., Faté and Raiatea (Seale); East Indies.

Of this common East Indian species we have about a hundred specimens from the reefs of Samoa, where it is very abundant. It was not seen at Honolulu.

Life colors of a specimen from Apia called *sumu uli*, deep livid olive green, shaded on back and head; stripes anteriorly, scarlet on chin, yellow on lower lip; body covered by oblique stripes running forward and backward; brassy orange on head; violet streaks on snout and side of head; golden brown stripes on side; first dorsal golden, with blue spots; second dorsal golden, orange at base, violet blue lower, the membranes bluish; caudal centrally yellow-orange, with violet stripes on margin; anal like dorsal; a black patch on caudal peduncle; pectoral scarlet, black at base, pale at tip.

1254. *Balistapus oire* (Bennett). Raiatea; Tahiti.

Balistes oire Bennett, Whaling Voyage, II, 262, 1840, Raiatea, Tahiti.

1255. *Balistapus papuensis* (Macleay). New Guinea.

Balistes papuensis Macleay, Proc. Linn. Soc. N. S. W. 1884, 279.

1256. *Balistapus verrucosus* (Linnæus). New Ireland; New Guinea; Shortland I. (Seale); East Indies.

CANTHIDERMIS Swainson.

1257. *Canthidermis rotundatus* (Procé). South Seas?; Philippines; East Indies.

1258. *Canthidermis angulosus* (Quoy & Gaimard). Hawaii (Quoy & Gaimard); Laysan; Galapagos Is. (Snodgrass & Heller); East Indies.

Balistes angulosus Quoy & Gaimard, Voy. Uranie, Zool. 210, 1824, Maui. (Dorsal 23, anal 20. Color black, fins high.)
Balistes aureolus, Richardson, Voy. Sulphur, Fishes, 126, pl. 59, fig. 1, 2, East Indies. Günther, Cat., VIII, 215, 1870, young, East Indies. Steindachner, Sitz. Ak. Wiss. Wien 1900, 517, Laysan.

Of this species we know the published descriptions only, and these do not distinguish it from *Canthidermis rotundatus*. *Balistes aureolus*, from the East Indies, based on young examples, is said to differ from *Canthidermis rotundatus* in the larger scales. *Balist s willughbei* Bennett from Mazatlan and *Balistes adspersus* Tehudi from Peru belong in this neighborhood.

In all our explorations we have taken no species of *Canthidermis* in the Pacific.

XANTHICHTHYS Richardson.

1259. *Xanthichthys lineopunctatus* (Hollard). Hawaii; Revillagigedo Is.; Bourbon I.

(*Xanthichthys mento* Jordan & Gilbert.)

This species, not rare in rather deep water about volcanic rocks in the neighborhood of Hawaii, was not seen in Samoa. It occurs among the Revillagigedo Islands off the coast of Mexico, and at Laysan. The West Indian species, *Xanthichthys ringens*, is probably different, but the species called *Balistes lineopunctatus* by Hollard, based on an example from Bourbon Island, is apparently the Hawaii-Mexican species.

1260. *Xanthichthys rivulatus* (Rüppell). Faté, New Hebrides (Seale); Red Sea.

MELICHTHYS Swainson.

1261. *Melichthys radula* Richardson. Hawaii; Marcus I.; Johnston I.; Laysan; offshore islands of Mexico.

(*Melichthys bispinosus* Gilbert.)

ABALISTES Jordan & Seale, new generic name.

Abalistes Jordan & Seale, new generic name in *Balistidae* (*stellaris*).

Leiurus Swainson, Nat. Hist. Fish., II, 326, 1839 (*L. macrophthalmus*); not of Swainson, op. cit., 242, which is *Gasterosteus*.

This strongly marked genus is known at once by the depressed tail. The name *Leiurus*, first used for a stickleback, is not available for it.

1262. *Abalistes stellaris* (Bloch & Schneider). Fiji (Günther), Louisiades (Günther); Australia; East Indies.

Family MONACANTHIDÆ.

CANTHERINES Swainson.

1263. *Cantherines sandwichensis* (Quoy & Gaimard). *Aimeo*. Hawaii; Samoa; Guam (Seale); East Indies; Clarion I.

Of this species, common at Hawaii and on the offshore islands of Mexico, we have three specimens from Apia and one from Pago Pago. All specimens from Hawaii and Mexico and Samoa are uniformly dark colored, none showing the network of pale lines about dark spots characteristic of the East Indian variety called *pardalis*. Of the Samoan species, one is covered with a network of brown lines arranged honeycomb fashion, while the others are plain. The West Indian species *Cantherines pullus* is very similar to *Cantherines sandwichensis*. In any event the last-mentioned name must stand, being prior to all others.

Life colors of a specimen from Apia, rich purple-black, unmarked; pectoral, second dorsal, and anal golden; first dorsal and caudal black; lips black.

Another specimen from Apia was dark gray, reticulate with olive brown; second dorsal and anal light yellow, with a bluish streak along the base; caudal dirty yellow. Spine unserrated; ventral spine immovable.

1264. *Cantherines albopunctatus*^a (Seale). Hawaii; Tahiti.

¹ *Monacanthus howensis* Ogilby, Rec. Austr. Mus., 1889, Lord Howe I. Waite, Austr. Mus., 1901, pl. VIII, Lord Howe I.

Monacanthus albopunctatus Seale, Occ. Papers Bishop Museum, vol. I, no. 4, 13, fig. 6, Honolulu.

Pseudomonacanthus multimaculatus Regan, Ann. Nat. Hist., 1902, 299, with plate, Tahiti.

Cantherines albopunctatus Jordan & Evermann, Bull. U. S. Fish Comm., XXIII, 1903 (1905), 420, Hawaii.

This species is very close to *Cantherines howensis* described by Ogilby and figured by Waite from Lord Howe Island. That species has, however, but 33 dorsal rays, while *albopunctatus*, with the same form and color, is said to have 38.

1265. *Cantherines punctulatus* (Regan). Tahiti.

Pseudomonacanthus punctulatus Regan, Ann. Nat. Hist., 1902, 298, with plate, Tahiti.

1266. *Cantherines armatus* (Garman). Fiji.

Alutera armata Garman, Bull. Mus. Comp. Zool., 1903, Fiji.

This species we have not seen. It is apparently well distinguished by the numerous (over 40) soft rays in the dorsal and anal. Ventral spine immovable; dorsal spine barbed.

1267. *Cantherines nigricans* (Macleay). New Guinea.

Monacanthus nigricans Macleay, Proc. Linn. Soc. N. S. W. 1883, 596.

1268. *Cantherines fuliginosus* (Macleay). New Guinea.

Monacanthus fuliginosus Macleay, op. cit., 596.

AMANSES Gray.

Amanes Gray, Indian Zoology, 1830 (*hystrix*).

Trichoderma Swainson, Nat. Hist. Fish., II, 1839 ("scapus").

In the males of this genus there is a sheaf of long needle-like spines, about ten in number and nearly as long as the head on each side of the tail. In the female a brush of shorter spines takes the place of these. In other regards the genus is close to *Cantherines*.

^a This species and the next two, having the dorsal spine serrate, belong to the subgenus *Pseudomonacanthus*.

1269. *Amanses scopas* (Cuvier). *Sisitui*. Samoa; New Guinea (Macleay); East Indies.

Of this singular species we have four fine examples from Apia, the first recorded from Polynesia. Life colors of a specimen called *sisitui*, dark brown, a little paler below, a little darker on head and tail; dorsal anal and pectoral colorless, the rays olive, with some bluish on membranes, caudal black; spines of side black at base.

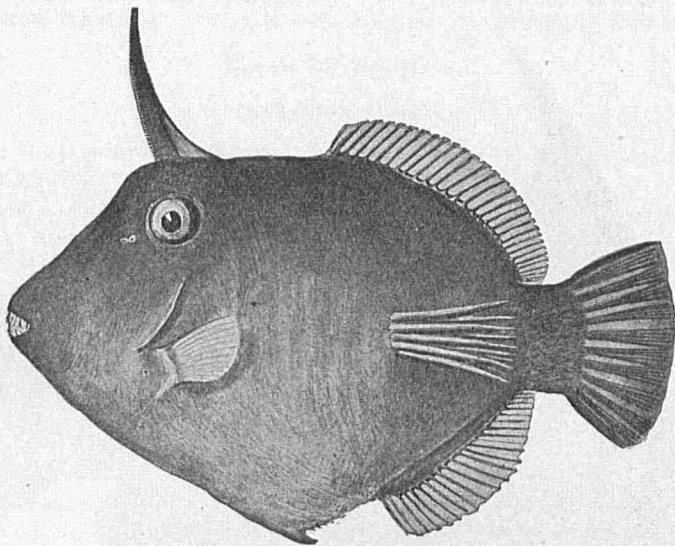


FIG. 68.—*Amanses scopas* (Cuvier).

OXYMONACANTHUS Bleeker.

This genus is near *Cantherines*, from which it differs in the elongate form and very long, sharp snout. Unlike the other filefishes, the single species of this genus is gaudily colored.

1270. *Oxymonacanthus longirostris* (Bloch & Schneider). *Aleva*. Samoa; Guam; Fiji; New Caledonia; East Indies. (Pl. I, fig. 2.)

Of this fantastic little fish we have about 15 specimens, none over 3 inches long, from the reefs of Apia and Pago Pago. Life colors of one from Apia, sky blue with rows of bright orange spots; ventral flap orange; a brown area above it with fine white dots; fins pale; dorsal and anal reddish, the caudal yellowish brown with two faint broad cross shades; breast light green.

CHÆTODERMIS Bleeker.

1271. *Chætodermis penicilligerus* (Cuvier). New Guinea; East Indies; Australia.

MONACANTHUS Cuvier.

This genus is characterized by the movable ventral spine. In most of the species the ventral flap is moderate, and the dorsal spine serrated. These belong to the subgenus *Stephanolepis*, which differs from *Monacanthus* only in the reduction of the ventral flap, a character of slight importance.

1272. *Monacanthus chinensis* (Bloch). New Guinea (Macleay); East Indies; China.

1273. *Monacanthus melanocephalus* Bleeker. *Pa'u-mea*; *Moloasi*. Samoa; New Guinea (Macleay); East Indies.

Monacanthus melanocephalus Bleeker, Nat. Tijds. Ned. Ind., v, 95, East Indies. Bleeker, Atlas, v, 127, tab. CCXXIII, fig. 1, East Indies. Günther, Cat., VIII, 242; from Bleeker's type.

Monacanthus janthinosoma Bleeker, Nat. Tijds. Ned. Ind., VI, 503, East Indies.

Monacanthus aspricaudus Hollard, Ann. Sci. Nat. 1854, II, 530, Batavia.

Of this well-marked species we obtained about a dozen specimens from Apia and one from Pago Pago, the first record in Polynesia. It reaches a small size, and is known at once by the checkered

band at the end of the caudal fin. The dorsal and anal fins are checkered with black, but these markings are faint in the young. The gill-opening lies in a dark bar.

Life colors of a specimen from Apia called *pa'u-mea*, dull blackish green; black around gill-opening; bluish around vent; membrane of first dorsal spine bright orange; soft dorsal and anal finely mottled blue and orange; edges translucent; caudal bright orange with round yellow spots, the edge with four alternating wavy streaks of blue and orange; side of abdominal cavity livid bluish.

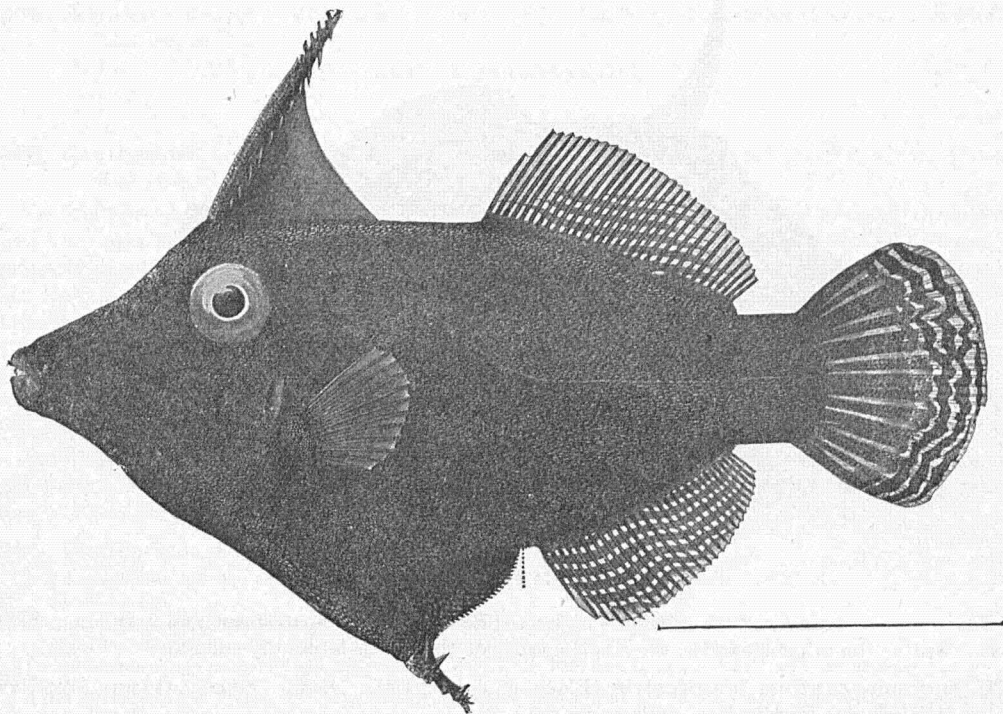


FIG. 69.—*Monacanthus melanocephalus* Bleeker.

Another specimen has the sides very finely marked with wavy blue streaks, most distinct on bluish lower parts, but very faint; dorsal membrane dull yellow; blue and orange streaks on dorsal more evident; ventral flap blackish.

1274. *Monacanthus pilosomus* Bennett. Hawaii.

1275. *Monacanthus pricei* Snyder. Kauai I., Hawaii.

1276. *Monacanthus nitens* Hollard. Tonga.

This species is unknown to us. It has the dorsal rays 30; anal 24; and the color is brownish without distinct spots or stripes. The dorsal spine is serrated, and the armature of the ventral spine is very strong. The spine, being large, is probably movable, but this is not stated. The species probably belongs to the section *Stephanolepis* of *Monacanthus*.

1277. *Monacanthus flicauda* Günther. New Guinea.

Monacanthus flicauda Günther, Challenger Report, Fishes, 50, 1880.

PARALUTERES Bleeker.

1278. *Paraluteres prionurus* (Bleeker). New Guinea; East Indies.

OSBECKIA Jordan & Evermann.

1279. *Osbeckia scripta* (Osbeck). Hawaii; New Guinea (Macleay); East Indies; west coast islands of Mexico.

1280. *Osbeckia liturosa* (Shaw). Tahiti.*Balistes liturosus* Shaw, Gen. Zool., v, 405, 1803, Tahiti.*Monacanthus liturosus*, Günther, Cat., VIII, 253; copied.This species was probably founded on a large example of *Osbeckia scripta*.**ALUTERA (Cuvier) Oken.****1281. *Alutera monoceros* (Linnaeus). Hawaii; New Guinea (Macleay); East Indies.****Family OSTRACIIDÆ.****OSTRACION Linnaeus.****1282. *Ostracion tuberculatum* Linnaeus. *Moamoa uli*. Samoa; Fiji; Guam; New Guinea; Marcus I.; New Britain (Peters: Berl. Mon. 1876, 852); East Indies.**

This species, known by the round blue-black spots, is moderately common about Samoa. We have six specimens from Apia and Pago Pago. One of these was yellow in life, the others olive. This species seems well separated from its Japanese cognate, *Ostracion immaculatum*. The species, called *Ostracion trigonum* and *Ostracion cubicum*, is identical with *Ostracion tuberculatum*.

Life colors of a specimen from Apia called *moamoa*, dark olive brown with bluish spots, which are white in spirits; fins dull golden, blackish at base; caudal with a few rounded black spots at base.

All the specimens from Pago Pago had blue-black spots; one with the caudal deep orange yellow, the other fins paler yellow; another with the caudal dusky shaded with light yellow, the other fins bright yellow.

1283. *Ostracion nasus* Bloch. Guam; East Indies.**1284. *Ostracion ornatum* Hollard. Marquesas Is.***Ostracion ornatus* Hollard, Ann. Sci. Nat., VII, 1857, 166, Marquesas Is.

This well-marked species, distinguished by the two pale lateral stripes, is unknown to us.

1285. *Ostracion lentiginosum* Bloch & Schneider. *Moamoa uliuli*. Hawaii; Samoa; Guam; Johnston I.; East Indies.

This species, common in the East Indies and South Seas, occurs both in Hawaii and Samoa. We have eight examples from Apia and Pago Pago. The color is plain dark olive, with small whitish spots above, below, and on sides.

Life colors of a specimen from Apia, blackish brown, spotted everywhere with grayish white, marbled on orange shades; caudal and belly also spotted; other fins olive; dorsal blackish at base.

1286. *Ostracion sebæ* Bleeker. *Moamoa samasama*. Hawaii; Samoa; New Guinea (Macleay); East Indies.*Ostracion sebæ* Bleeker, Verh. Bat. Gen., XXIV, 32, taf. 6, fig. 13, East Indies.*Ostracion bombifrons* Hollard, Ann. Sci. Nat., 1857, VII, 168.*Ostracion camurum* Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (1901), 396, fig. 9, Honolulu.

Four specimens of this handsome species were taken on the reef at Apia. The color, well shown in Bleeker's figure, is characteristic, especially the undulating yellow stripe, most distinct on the tail.

The species is not rare on rocky shores about Hawaii, whence it was described as *Ostracion camurum*. The yellow undulating stripe is sometimes faint in Hawaiian examples, but these often agree fully with the Samoan.

1287. *Ostracion oahuensis* Jordan & Evermann. Hawaii.

This species is known from two examples from Honolulu. It is near *Ostracion sebæ*, but the spots are smaller, with none on the sides of the body.

LACTORIA Jordan & Fowler.*Lactoria* Jordan & Fowler, Proc. U. S. Nat. Mus., XXV, 278, 1903 (*cornutus*).**1288. *Lactoria galeodon* Jenkins. Hawaii.***Ostracion diaphanus* Steindachner, Denks. Ak. Wiss. Wien, LXX, 517, 1900, Laysan, Hawaii; not of Lacépède.

This species is rather rare about Hawaii, all the examples seen being small. It is nearly related to *Lactoria diaphana* of Japan.

1289. *Lactoria schlemmeri* Jordan & Snyder. Laysan.*Lactoria schlemmeri* Jordan & Snyder, Proc. U. S. Nat. Mus., xxvii, 945, 1904, Laysan.**1290. *Lactoria cornuta* (Linnaeus). *Moamao*. Samoa; Fiji; Guam; Marcus I.; New Guinea; Tahiti and Shortland I. (Seale); East Indies; Japan.**

Of this fantastic species, the most abundant of the group in the East Indies, we have two specimens from Apia. Dr. Günther records it from Fiji, Seale from Guam, and Bryan & Herre from Marcus Island. In the length of the horns this species is subject to considerable variation.

ARACANA Gray.**1291. *Aracana spilonota* Gilbert. Hawaii.****Family TETRAODONTIDÆ.**

Species of this group are more abundant in the East Indies than in the South Seas. About Samoa they are not very common. They are known as *sui* and are regarded as poisonous, although none of the species has the bad repute possessed at Hawaii by *Tetraodon hispidus*.

SPHEROIDES (Lacépède) Duméril.**1292. *Spheroides oceanicus* (Jordan & Evermann). Hawaii.***Lagocephalus oceanicus* Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 199, 1902 (1903), Honolulu.

This species is known from two young examples taken at Honolulu. It is a typical *Lagocephalus*, close to the European *Spheroides penmani*. There is a most perfect gradation between the type of *Lagocephalus* and that of *Spheroides*.

1293. *Spheroides sceleratus* (Forster). Tahiti; New Guinea (Macleay); East Indies.**1294. *Spheroides hypselogeneion* (Bleeker). Fiji; Samoa; East Indies; Australia.***Tetraodon hypselogeneion* Bleeker, Nat. Tijds. Ned. Ind., iii, 300, East Indies. Bleeker, Atlas, v, 61, tab. cccxiii, fig. 6, East Indies. Günther, Cat., viii, 277, 1870, Zanzibar, Seychelles Fiji, Australia

Of this species we found four examples, two at Apia and two at Pago Pago. The coloration is well represented in Bleeker's plate. The specimens from Apia have the dark bars on the head and the dark lateral stripe strongly marked.

Life colors of a specimen from Apia, dark olive, much speckled with whitish; a dark lateral stripe with a creamy area below it; belly yellowish; iris golden yellow; four dark bars on side of head between gill opening and snout, most distinct below eye; fins unicolorated.

1295. *Spheroides oblongus* (Bloch). Faté (Seale); East Indies.**1296. *Spheroides florealis* Cope. Hawaii.**

This species is known to us from a few young examples from Hawaii.

1297. *Spheroides insularum* De Vis. New Hebrides.*Spheroides insularum* De Vis, Proc. Linn. Soc. N. S. W., viii, 456, 1884, Api (New Hebrides).**1298. *Spheroides lævis* (De Vis). South Seas.***Tetraodon lævis* De Vis, Proc. Linn. Soc. N. S. W., viii, 456, 1884, South Seas.**TETRAODON Linnaeus.**

This genus contains short-bodied species, with the nasal tentacle bifid, without opening. The species are especially abundant in the East Indies.

1299. *Tetraodon aerostaticus* (Jenyns). Tahiti; Guam; New Guinea (Macleay); Faté (Seale); Japan; East Indies.*Tetraodon lineatus* Bloch, Ausland. Fische, i, 1785, 128, pl. cxli, and of various authors (not of Linnaeus). Schlegel, Fauna Japonica, Poiss., 287, pl. cxxv, fig. 2, 1847, Nagasaki.

Crayracion lineatus Bleeker, Atlas, v, 70, tab. ccvi, fig. 1, tab. ccxii, fig. 1, Bali, Singapore, Celebes, Amboina.
Tetraodon aërostaticus Jenyns, Voyage Beagle, 152, 1842, locality unknown.
Tetraodon lineatus, Kner, Novara Fische, 409, Tahiti.

This species, common from Japan to the East Indies, is recorded by Günther from Fiji, by Kner from Tahiti, and by Seale from Guam. The black stripes on the abdomen on this and other species disappear with age.

It is very close to *Tetraodon stellatus* Bloch & Schneider, of the East Indies, with which Dr. Günther identifies it. The latter has, however, the dorsal spotted, like the caudal, besides other minor differences. In *Tetraodon aërostaticus* the dorsal is immaculate. The back in both is profusely spotted with black.

1300. *Tetraodon mappa* Lesson. New Guinea (Macleay); East Indies.

1301. *Tetraodon hispidus* Linnæus. *Sue.* Hawaii; New Guinea; Samoa; Aneiteum; New Hanover (Peters); China; East Indies; Panama.

† *Tetraodon hispidus* Linnæus, Syst. Nat., ed. x, 1758, '83, China; after Lagerstrom (probably this species, the spots not indicated in Lagerstrom's figure); Syst. Nat., ed. XII, 1766, 411.

Tetraodon hispidus, Günther, Cat., VIII, 297, 1870, Red Sea, Zanzibar, Ceylon, Mozambique, Port Natal.

Tetraodon perspicillaris Rüppell, Atlas Fische, 63, Red Sea.

Tetraodon imphutus Jenyns, Voy. Beagle, Fish, 152, 1842, Vanicolo.

Crayracion imphutus (as *latema* in plate), Bleeker, Atlas, v, 71, tab. ccv, fig. 3, Sumatra, Cocos, Solor, Timor, Batjan, Amboina, Banda.

Tetraodon laterna Richardson, Voy. Sulphur, 1842, 124, pl. LXI, fig. 2, Canton; after an incorrect drawing by John Reeves. Richardson, Ichth. China, 199, 1846, Canton.

Arethron laterna, Bleeker, Enum. Pisc. Archip. Ind., 200.

Tetraodon hispidus (*semistriatus*), Günther, Cat., VIII, 1870, 297, Amboina, Aneiteum, Australia.

Arethron crethizon Jordan & Gilbert, Proc. U. S. Nat. Mus., v, 1882, 631, Panama.

This species is very abundant in the lagoons and mullet ponds about Honolulu. It is regarded as excessively poisonous, *muki-muki*, or deadly death, being its local name. A single specimen nearly a foot long was taken at Apia. It is common in the East Indies, and we can see no difference between Hawaiian specimens and others from the Riukiu Islands. It is not certain, however, that this species is the original *Tetraodon hispidus* of Linnæus.

The Samoan specimen is nearly smooth, dark olive, with round brown spots on sides of head as well as on sides and back of body; base of caudal fin with many round spots, smaller than those on body; dark stripes on belly persistent; gill-opening black with white rings; eye with white rings; vent pale; tip of caudal dusky and unspotted.

1302. *Tetraodon reticularis* Bloch & Schneider. New Guinea; New Britain; Guam; East Indies.

Tetraodon reticularis Bloch & Schneider, Syst. Ichth., 1801, 506, Malabar. Günther, Cat. VIII, 296, Amboina, Celebes, Pinang. Peters, Berl. Mon., 1876, 863, New Britain. Seale, Bishop Museum 1901, 119, Guam.

Arethron testudinarius Müller, Arch. Nat., IX, 330.

Crayracion testudineus Bleeker, Atlas, v, 71, tab. ccxii, fig. 3, East Indies; not *Tetraodon testudineus* of Linnæus.

1303. *Tetraodon nigropunctatus* Bloch & Schneider. *Sue.* New Guinea; Fiji; Samoa; East Indies. (Pl. xxxv.)

Tetraodon nigropunctatus Bloch & Schneider, Syst. Ichth., 1801, 507, Tranquebar. Günther, Cat., VIII, 293, Zanzibar, Amboina, Flores, Sumatra, Halmahera.

Crayracion nigropunctatus, Bleeker, Atlas, v, 74, tab. ccvi, fig. 4, East Indies.

Tetraodon diadematus Rüppell, Atlas Fische, 65, pl. xvii, fig. 3, Red Sea.

Tetraodon trichoderma Bleeker, Nat. Tijds. Ned. Ind., v, 532, Sumatra; examples with long bristles.

Tetraodon trichodermatoides Bleeker, Nat. Tijds. Ned. Ind., vi, 336, Flores.

Arethron melanorhynchus Bleeker, Nat. Tijds. Ned. Ind., ix, 111.

Tetraodon nigropunctatus var. *citrinella* Günther, Cat., VIII, 293, 1870, Fiji; bright yellow examples.

This species is very common about Apia and Pago Pago. It is known as *sui*, and is regarded as poisonous. Most of our specimens are very typical, brown with black vent and snout, the caudal edged with pale, and the spinules short. Some similarly colored have the body covered with bristles so long as to give the appearance of coarse fur. Others are intermediate in this regard, and one has the ground-color bright lemon-yellow. It seems clear that all belong to the same species that Günther has indicated.

We have 20 specimens from Apia and Pago Pago. Life colors of one from Apia, blackish olive, unmarked, the spines white; gill-opening black; all the fins dull olive, the posterior part fading to yellow, brightest on pectoral. Some have sparse black spots on belly. Others are dark olive above, bright yellow below, with or without black spots. Margin of caudal always yellowish, vent always black.

One specimen from Pago Pago, the variety *citrinellus*, was lemon-yellow, the back irregularly blackish olive.

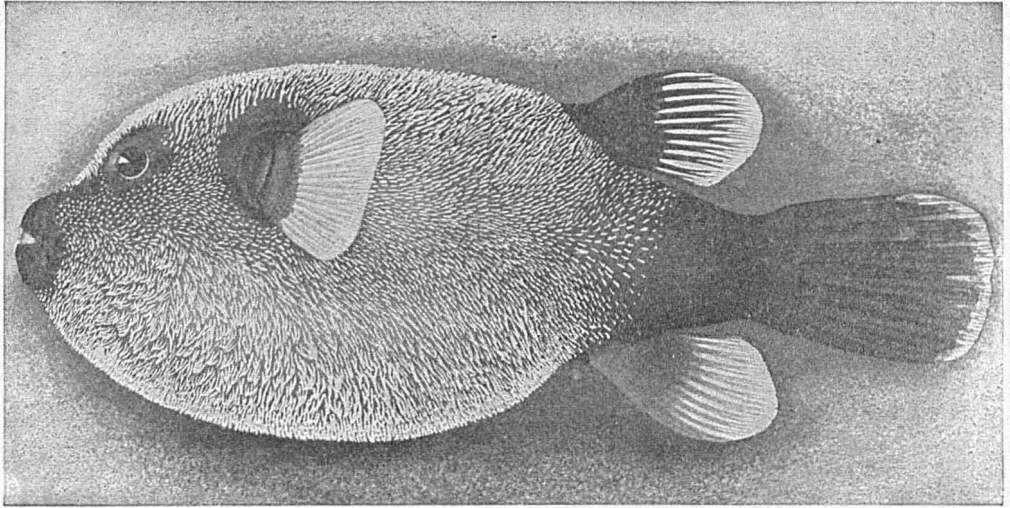


FIG. 70.—*Tetraodon nigropunctatus* Bloch & Schneider.

1304. *Tetraodon immaculatus* Bloch & Schneider. Fiji (Günther); Samoa; New Ireland; Micronesia; New Caledonia; Faté; Shortland I. (Seale); New Guinea; East Indies.

ADULT EXAMPLES.

Tetraodon immaculatus Bloch & Schneider, Syst. Ichth. 1801, 507; after *Tetraodon sans tache* of Lacépède, I, 475.

Günther, Cat., VIII, 291, Natal, Zanzibar, Mauritius, Pinang, New Caledonia, Australia.

Crayracion immaculatus, Bleeker, Atlas, v, 75, tab. ccxi, fig. 1, East Indies.

Tetraodon sordidus Rüppell, Atlas Fische, 64, 1828, Red Sea.

Tetraodon parvus De Joannes, Mag. Zool. 1835, IV, pl. 15.

Tetraodon scaber Eydoux & Souleyet, Voy. Bonite, 214, pl. 10, fig. 1.

Tetraodon basilevskianus Basilevsky, Mem. Soc. Mosc., x, 1855, 202.

Tetraodon kunhardtii Bleeker, Nat. Tijds. Ned. Ind., 197.

Tetraodon aspilus Bleeker, Nat. Tijds. Ned. Ind., II, 495, East Indies.

YOUNG EXAMPLES.

Tetraodon manillensis Procé, Bull. Philom. 1822, 130, Manila. Peters, Berl. Mon. 1876, 853, Amboina, New Ireland.

Crayracion manillensis Bleeker, Atlas, v, 69, tab. ccviii, fig. 2, East Indies.

Tetraodon virgatus Richardson, Voy. Erebus and Terror, 62, pl. 39, figs. 8 and 9, 1846.

Tetraodon immaculatus var. *virgatus*, Günther, Cat., VIII, 292, Ceram, Amboina, Philippines, Cape York, Sydney, Micronesia.

Tetraodon carduus Cantor, Malay, Fish, 375, 1850, Pinang.

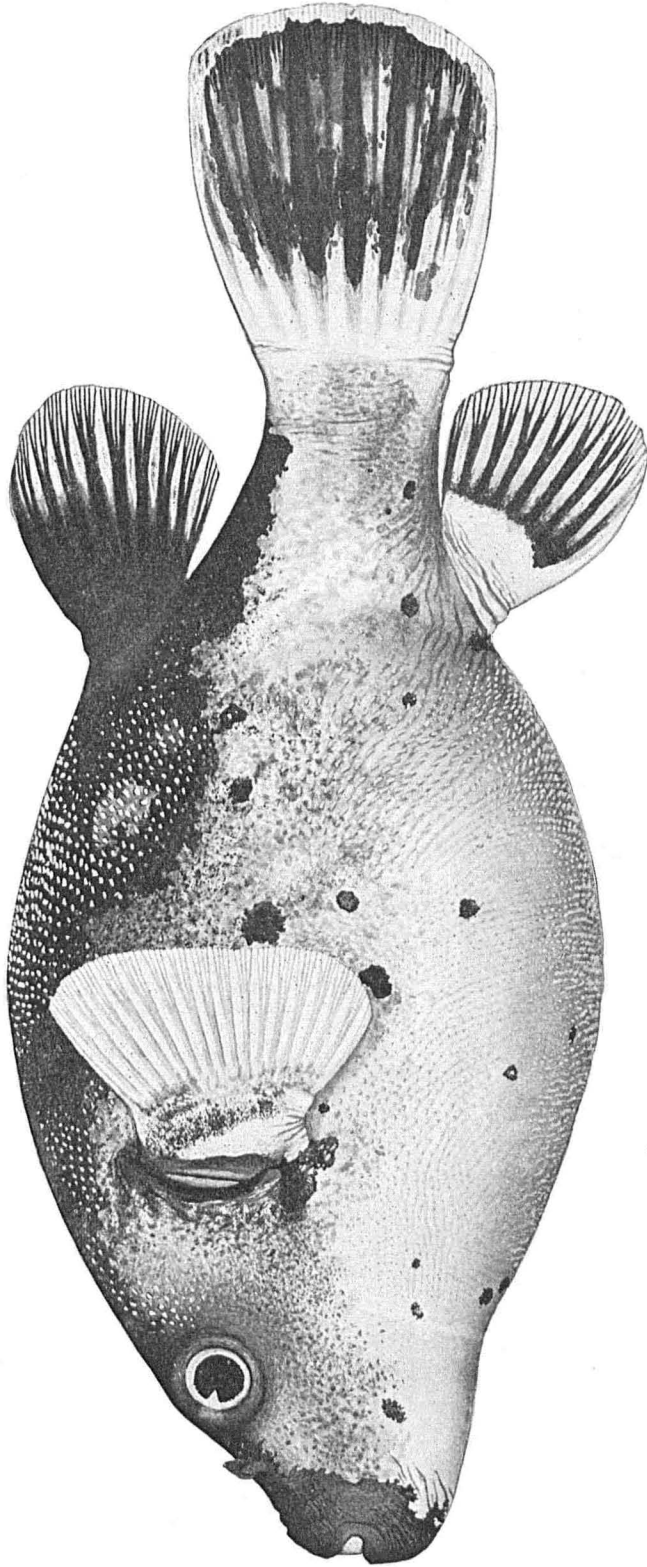
Holacanthus pilosus Gronow, Syst., ed. Gray, 28, 1854.

Dilobomycter longicaudus Bibron, Rev. Zool. 1855, 279.

Tetraodon immaculatus, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, Samoa.

Of this species we have five young from Apia, agreeing very closely with Dr. Bleeker's figure of *Crayracion manillensis*. The color is greenish with about 8 dark streaks on each side, the caudal dark with darker edge, the gill-opening black.

Apparently Dr. Günther is right in regarding *Tetraodon manillensis*, with the back streaked, as the young of *Tetraodon immaculatus*, in which species the back is plain olive. Specimens before us from Negros, in the Philippines, show that the black stripes on the back disappear with age. Both Günther and Bleeker record specimens of the striped form, *manillensis*, of 10 to 12 inches in length. All our



TETRAODON NIGROPUNCTATUS BLOCH & SCHNEIDER.

Samoa specimens are young, and all have the black stripes, but we have no doubt that they are specifically identical with the unstriped *Tetraodon immaculatus*. The best distinctive character of this species is the black edge to the caudal.

Color in life of a specimen from Apia, olive, white below, striped all over back and sides of belly with dark olive; fins pale gray, the caudal edged all around with black.

1305. *Tetraodon lacrymatus* Cuvier. Hawaii; Raiatea (Seale).

Tetraodon lacrymatus Cuvier, in Quoy & Gaimard, Voy. Uranie, Fishes, 204, 1824, Maui.

Ovoides latifrons Jenkins, Bull. U. S. Fish Comm., xix, 1899, (1901), 398, fig. 10, Honolulu.

Tetraodon meleagris, Smith & Swain, Proc. U. S. Nat. Mus., v, 1882, 141, Johnston I.; not of Lacépède.

This species, which is probably different from *Tetraodon meleagris* of the East Indies, is known from the Hawaiian Islands. The specimens from Johnston Island, called *Tetraodon meleagris*, probably belong here, as well as the type of *Tetraodon latifrons*. *Tetraodon meleagris* is found in the seas of tropical Japan and China. The single specimen examined by us from the Riu Kiu Islands is apparently different from those called *Tetraodon latifrons*. The species called *latifrons* must be the same as the *lacrymatus*, described long before, from the same waters.

1306. *Tetraodon ophryas* Cope. Samoa; Tahiti; Mangareva (Seale).

Tetraodon ophryas Cope, Trans. Am. Phil. Soc. 1870, 479, Samoa.

† *Tetraodon setosus* Rosa Smith, Bull. Cal. Ac. Sci., II, 6, 1886, west coast of Mexico.

Ovoides ophryas, Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 528, pl. xx, fig. 2; after Cope's type.

This species is known only from the original type from Samoa. It may be identical with *Tetraodon setosus* of the Mexican coast. *Tetraodon meleagris* Lacépède, from Asia, figured by Jordan & Fowler (Proc. U. S. Nat. Mus., xxiv, 253, fig. 8), also is allied to it.

1307. *Tetraodon giganteus* Castelnau. New Caledonia.

Tetraodon giganteus Castelnau, Proc. Zool. Soc. Victoria, 1873, 121, New Caledonia.

CANTHIGASTER Swainson.

(*Psilonotus* Swainson; *Tropidichthys* Bleeker; *Anosmius* Peters; *Eumycterias* Jenkins.)

This genus consists of small globe-fishes with the back angulated and the nostrils obsolete or little developed. The earliest name, *Canthigaster*, is defined without mention of any species, but the context admits of no doubt as to the species intended. The slightly better development of the nostrils in *Eumycterias* Jenkins is a character of very light weight, and the genus *Eumycterias* can not be maintained.

1308. *Canthigaster solandri* (Richardson). *Sue mimi*. Tahiti; Samoa; Guam; Raiatea (Seale).

Tetraodon solandri Richardson, Voy. Sulphur, Fish, 125, pl. 57, fig. 4-6, 1845, Tahiti. Richardson, Voy. Samarang, 19, 1848, Tahiti.

Tropidichthys papua, Seale, Bishop Museum 1901, 118, Guam; probably not of Bleeker.

† *Tetraodon papua* Bleeker, Journ. Ind. Arch., II, 638, New Guinea.

This little species from Tahiti was originally described as having the body covered with greenish yellow spots, each with a dark border with blue cross streaks between the eyes, with some of the stripes on the back extended as streaks; caudal with blue spots, forming interrupted blue streaks. As one of our Samoan species agrees perfectly with this description, we identify it as *Canthigaster solandri*. The fish called *solandri* by Steindachner from Laysan seems to be *Canthigaster jactator*. The specimens from Guam, called *Tropidichthys papua*, evidently belong here. *Canthigaster papua* Bleeker, from New Guinea, is evidently closely related, but it has the blue streaks on the back more or less confluent into lines.

In our eight typical examples of *Canthigaster solandri*, from Apia, the spots are small on the cheek and snout and distinctly blue in color. In eight examples from Pago Pago, the spots on the body are duller, and those on the chin, throat, and cheek, as far back as the gill-opening, are dark bronze-blue, eye with radiating streaks, caudal distinctly barred. This may be a distinct species, but it seems to intergrade perfectly with the typical form, one specimen of the latter having larger bronze-blue spots at the throat. We have about 25 specimens from Apia and Pago Pago.

Life colors of two specimens from Apia, dark brown, orange on side, yellow below, with a median blue, orange-edged streak before vent; sides with round sky-blue spots, most distinct on head; caudal orange, barred with blue spots; dorsal, anal, and pectoral clear translucent; a black spot at base of dorsal.

A series of six specimens, mostly from Pago Pago, were very aberrant. Life colors of one of these, rich orange-brown, paler bright orange on snout, light orange on belly; everywhere round pale blue spots edged with darker blue, these largest on side of belly, smaller on side of tail, deepest on middle of back; a faint blue median ventral streak; blue cross-streaks on snout and as far back as behind eye, 7 in all, the posterior darker edged; spots confluent into a streak on front of back; a black spot below dorsal, with 4 blue spots and streaks about it, a curved blue streak above it on fin; back of tail with spots only; tail orange, with blue spots in vertical rows, and a dark blue edge; fins otherwise colorless orange, with blue spots about vent.

In alcohol these specimens have the spots larger and sparser, and the spots below the eye and on the ventral pouch are very much enlarged, separated by a narrow network of the ground-color; chin and throat with an irregular patch of olive; streaks across eye very distinct; spots on sides of snout generally brown, the color very different from that of the spots on the body.

Life colors of a young individual from Apia, dark olive with blue spots; blue stripes on head and a black blue-edged ocellus at base of dorsal; caudal with pale blackish cross-streaks.

1309. *Canthigaster papua* (Bleeker). New Guinea; East Indies.

1310. *Canthigaster jactator* (Jenkins). Hawaii; Laysan.

This species, profusely covered with large pale spots, was found on the reef about Honolulu. The specimens called by Steindachner *Tetraodon solandri*, from Laysan, seem to be the same. A very near relative is *Canthigaster punctatissimus* from the Panama region and the Galapagos.

1311. *Canthigaster biteniatus* (Jenkins). Hawaii.

?*Tetraodon caudofasciatus* Günther, Cat., VIII, 804, 1870, no locality with plate.

Tetraodon caudofasciatus, Steindachner, Denks. Ak. Wiss. Wien 1900, 518, Laysan.

Eumycterias biteniatus Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (1901), 400, fig. 12, Honolulu.

This species is found about Honolulu. In coloration it is almost exactly identical with the common Japanese species, *Canthigaster rivulatus* Schlegel. In view of the remote habitat, the Hawaiian species may be kept provisionally distinct.

Apparently the species called *Tetraodon caudofasciatus* by Steindachner is the same as *Canthigaster biteniatus*. The original *Tetraodon caudofasciatus* of Günther is from an unknown locality. It may be the same also, as the difference in description is slight. The back is said to be spotted with brown in *Canthigaster caudofasciatus*, and the caudal is crossed with dark bands. These traits are not found in *Canthigaster biteniatus* nor in *Canthigaster rivulatus*.

1312. *Canthigaster caudofasciatus* (Günther). Laysan (Steindachner, as *T. callisternis* Ogilby).

1313. *Canthigaster janthinus* (Vaillant & Sauvage). Hawaii.

Tetraodon janthinus Vaillant & Sauvage, Ann. Mus. 1875, 286, Honolulu.

This species, an ally of *Canthigaster psegma*, has not been recognized since it was originally taken by Ballieu at Honolulu. We should regard *janthinus* and *psegma* as identical, were it not that Sauvage describes the lateral spots as large, and the dorsal fin is stated to be black. Only the caudal is black in *Canthigaster psegma*.

1314. *Canthigaster psegma* (Jordan & Evermann). Hawaii; Samoa.

This species has been found about Honolulu and about Samoa. The Samoan examples, four in number, differ a little from the original types, especially in having less clearly defined streaks about the eyes.

We have two large specimens from Apia. The species is very close to *Canthigaster oahuensis* as figured by Dr. Jenkins. The markings of the head and fins are almost identical, and the oblong black spots on the sides are the same. But our specimens show no trace whatever of stellate blue spots, and these are very conspicuous in *Canthigaster oahuensis*.

Life colors of a specimen from Apia, dark olive with orange-brown shades and faint blue spots; blue and bronze streaks with a few blue specks radiating from eye; cheeks brownish gray with thick-set dark-blue spots above and bronze spots behind them; dorsal and anal pale olive, a black bar across base of each; no black blotch on back; caudal dusky, blackish; pectoral dusky; cheek closely covered with close-set dark spots, which form narrow oblique brown streaks in front; sides of belly with oblong black spots, all smaller than pupil.

Another specimen from Apia was brownish black; cheek grayish with blue-black spots, forming streaks below; side with a few blackish streaks and blue spots; middle line of belly darker; dorsal and anal dusky at base; caudal all black, the fins otherwise colorless.

1315. *Canthigaster epilamprus* (Jenkins). Hawaii.

1316. *Canthigaster oahuensis* (Jenkins). Hawaii.

This species is found in the reefs about Honolulu, where it is apparently rare. It is one of the deep-bodied species, like *Canthigaster psegma*.

1317. *Canthigaster cinctus* (Solander). Tahiti; Samoa; New Guinea (Macleay); Hawaii; East Indies.

Tetraodon gronovii Cuvier, Regne Anim., ed. II, 1827, no description.

Tetraodon cinctus Solander, Richardson Voy. Samarang, 19, 20, 1850, Tahiti; on a drawing by Solander.

Tropidichthys valentini Bleeker, Nat. Tijds. Ned. Ind., IV, 130, 1853, Amboina.

Tropidichthys valentini Bleeker, 3de Bijdr. Amboina, 130, Amboina.

Pelionotus valentini Bleeker, Atlas, Gymnodontidæ, v, 80, tab. CCVIII, fig. 4.

Tetraodon valentini Günther, Cat., VIII, 305.

Holacanthus ballistiformis Grönow, Cat. Fish, ed. Gray, 1854, 25.

Tetraodon coronatus Vaillant & Sauvage, Ann. Mus. 1875, 285, Hawaii.

This species, distinguished at once by two blackish cross-bars, was seen by us at Hawaii only. The species called *coronatus* is certainly the *cinctus* of Solander.

Tetraodon cinctus is described as studded above with small round dots, which are also found on the caudal fin. Besides these there are two oblique black bars which embrace the fore part of the belly, the interval between them light yellow; traces of other dark bars appear behind.

It is evidently identical with *Canthigaster coronatus*. Dr. Gilbert's single specimen of the latter from Hawaii agrees perfectly with Günther's description of *Canthigaster valentini*. Bleeker's figure, however, differs in showing blue streaks on the head, the posterior far less developed, and the caudal fin unspotted, the black stripes on its lower and upper margins less plain than in *coronatus*.

Bleeker's description fits well the specimen obtained in Hawaii by Dr. Gilbert, and there seems no reason for doubting the identity of *C. cinctus* and *C. coronatus* with the East Indian form, *Canthigaster valentini*. The name *cinctus* has priority.

1318. *Canthigaster compressus* (Procé). Faté (Seale); East Indies.

(*Tetraodon striolatus* Quoy & Gaimard.)

1319. *Canthigaster bennetti* (Bleeker). New Guinea (Macleay); East Indies.

Family DIODONTIDÆ.

DIODON Linnæus.

1320. *Diodon hystrix* Linnæus. *Tauta*. Samoa; Hawaii; Tahiti; Guam; Johnston I.; New Guinea; all warm seas.

Occasionally taken in Samoa. We have 2 specimens.

1321. *Diodon holacanthus* Linnæus. Laysan (Steindachner, Denks. Ak. Wiss. Wien 1900, 518, as *Diodon sexmaculatus*); warm seas.

This species may be the young of the preceding.

1322. *Diodon nudifrons* Jenkins. Hawaii.

CHILOMYCTERUS Bibron

1323. *Chilomycterus affinis* Günther. Hawaii; Lower California; Galapagos Is.; Japan.

Family MOLIDÆ.

RANZANIA Nardo.

1324. *Ranzania makua* Jenkins. Hawaii; Japan.

Family SCORPÆNIDÆ.^a

MERINTHE Jordan & Evermann.

1325. *Merinthe macrocephala* (Sauvage). Hawaii.

1326. *Merinthe bandanensis* (Bleeker). Faté (Seale); East Indies.

Scorpæna bandanensis Bleeker, Banda, I, 237, 1851, Banda.

Scorpæna haplodactylus Bleeker, Ceram, II, 698, 1852, Ceram.

Scorpæna haplodactyla, Günther, Cat., II, 117, Banda, Ceram, Fiji(?).

IRACUNDUS Jordan & Evermann.

1327. *Iracundus signifer* Jordan & Evermann. Hawaii.

SEBASTOPSIS Gill.

1328. *Sebastopsis parvipinnis* (Garrett). Hawaii (Garrett); Raiatea.

Scorpæna parvipinnis Garrett, Proc. Cal. Ac. Sci. 1863, 105, Sandwich Is., Raiatea. Günther, Fische der Südsee, 75, taf. 51, fig. D, Raiatea.

This species is known to us only from the accounts of Günther and Garrett. It seems well distinguished by its low dorsal spines.

1329. *Sebastopsis kelloggi* Jenkins. Hawaii.

This little fish is abundant about the Hawaiian islands. It is close to *Sebastopsis guamensis* (*polylepis*), but it differs from all the Polynesian species examined by us in having, besides an auxiliary spine, four spines on the edge of the preopercle. There are three of these spines in *Sebastopsis guamensis* and *Sebastopsis scabra*.

1330. *Sebastopsis guamensis* (Quoy & Gaimard). La'otale. Samoa; Tahiti; Guam; Caroline Is.; Tonga; Palau; Fiji; East Indies.

Scorpæna rawakensis Quoy & Gaimard, Voy. Uranie Zool., 325, 1824, Rawak.

Scorpæna guamensis Quoy & Gaimard, Voy. Uranie Zool., 326, 1824, Guam.

Sebastopsis guamensis, Streets, Bull. U. S. Nat. Mus., VII, 96, Samoa. Fowler, Proc. Acad. Nat. Sci. Phila. 1900, 521, Tahiti.

Scorpæna guamensis, Klunzinger, Fische Rothen Meeres, Tahiti. Günther, Fische der Südsee, 74, Caroline Is., Red Sea, Samoa, Fonga, Palau.

Scorpæna rubropunctata Ehrenberg in Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 324, 1829, Red Sea.

Scorpæna chilioprista Rüppell, Neue Wirbelthiere, 107, taf. 27, fig. 3, 1835, Red Sea. Günther, Cat., II, 121.

Sebastes polylepis Bleeker, Nat. Tijds. Ned. Ind., 1851, II, 173, Amboina. Günther, Cat., II, 106, Amboina, East Indies.

Sebastopsis erinacea Garman, Bull. Mus. Comp. Zool., XXXIX, 8, 231, pl. I, fig. 2, Viti Levu (Fiji).

Sebastes minutus Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 348, 1829, Moluccas, Ladrões, Society Is. Günther, Cat., II, 106.

Of this species we have about 50 specimens from Samoa. It is well separated from *Sebastopsis scabra* by the shorter anal spine. It is impossible for us to tell certainly what species was intended in the descriptions of *Scorpæna guamensis* and *minutus*, but this species is certainly the *guamensis* of Günther and Klunzinger, as also the *polylepis* of Bleeker and the *erinacea* of Garman. We can not identify *Scorpæna rawakensis*.

Life colors of a specimen from Apia, light olive with many brown spots and three dark brown cross-shades; a white bar across base of caudal; fins all reddish brown, bright brick-red at tip, barred with pale bluish gray; throat and belly dark.

Another specimen was dusky brown, four dusky cross-bars, sides with greenish reticulations around dusky spots; fins all closely reticulated reddish brown and bluish gray; throat paler.

1331. *Sebastopsis scabra* (Ramsay & Ogilby). Samoa; north Australia.

Sebastes scaber Ramsay & Ogilby, Proc. Linn. Soc. N. S. W., X, 1885, Shark reef (Australia).

^a *Scorpæna vaigiensis* from Waigiu (Quoy & Gaimard, Voy. Uranie, 324) we can not place. It has dorsal XIV, 11, anal III, 5.

This species is distinguished from *Sebastopsis guamensis* by the very much longer second anal spine. It is equally abundant at Samoa, and has doubtless been confused by authors with *Sebastopsis guamensis* under that and other names. We have about 40 examples from crevices in the reefs of Apia and Pago Pago. *Seabra* has an orbital tentacle.

Life colors of a specimen from Pago Pago, brown, the fins barred with brownish red; a large jet black spot on opercle; ventrals and belly yellowish.

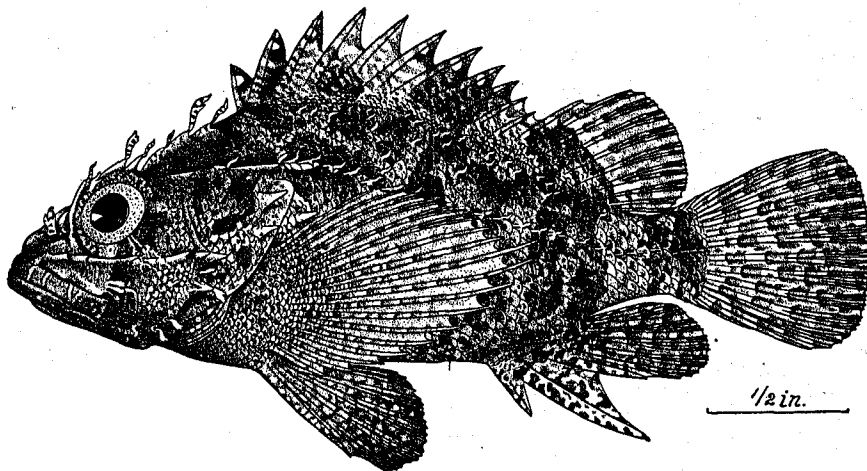


FIG. 71.—*Sebastopsis scabra* (Ramsay & Ogilby).

1332. *Sebastopsis novæ-guinæ* (Sauvage). New Guinea (Nouv. Arch. Mus. 1878, 129).

SCORPÆNOPSIS Bleeker.

1333. *Scorpænopsis cirrhosa* (Thunberg). Tahiti (Günther); New Guinea (Macleay); Japan; East Indies.

1334. *Scorpænopsis gibbosa* (Bloch & Schneider). *Nofu*. Tahiti; Palau; Hawaii; Samoa; New Guinea; East Indies.

(*Scorpænopsis catocala* Jordan & Evermann, Hawaii.)

This species is rather common about Samoa, where we obtained three good-sized specimens, and still more common about Hawaii. It is certain that the *diabolus* of Cuvier & Valenciennes is the same as the *gibbosa* of Bloch & Schneider. The characters used by Bleeker to distinguish these species can not be trusted. *S. gibbosa* is best known by its wide, depressed interorbital area, much wider than the eye, and by the deep nuchal pit; there is a black band at the shoulders covering part of the spinous dorsal fin and a black notch at tip of upper jaw. *Scorpænopsis catocala* from Hawaii and *Scorpæna nesogallica* from Ile de France can not be separated from *S. gibbosa*.

There is a broad black band on the inner side of the pectoral fin near the margin, and this, in the adult, breaks up into spots.

Life colors of a specimen from Apia, violet-black, the dark shades light olive-gray, the throat very dark; lining membranes of jaws bright yellow; axillary region light gray, mottled with olive; belly creamy yellowish; pectoral banded with black, orange and yellow within, grayish at tip; ventrals black, pale-edged; caudal with a broad black band, pale gray at base and tip; spinous dorsal with a purple blotch continued as a band on body.

Another specimen, from the same locality, was dark reddish brown, light bright reddish brown below; fins with the pale parts all reddish brown of varying shades; axil dark with pale spots.

1335. *Scorpænopsis cacopsis* Jenkins. Hawaii; Tahiti.

1336. *Scorpænopsis novæ-guinæ* Cuvier & Valenciennes. Samoa; New Guinea.

†*Scorpæna novæ-guinæ* Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 320, 1829, New Guinea.

Scorpæna papuensis Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 321, 1829, New Guinea.

Scorpæna gibbosa, Günther, Cat., II, 119. Sauvage, Poiss. Madagascar, 279; not of Schneider.

This species, distinguished from the true *Scorpaenopsis gibbosa* by the narrow interorbital and smoother body, is known to us from a single example from Samoa. Among its best distinctive characters is that of the very long second anal spine, a feature not shown in the plate of Quoy & Gaimard, who may have had some other species in mind.

Life colors of a specimen from Apia, blackish, the belly creamy yellowish, with no red and no orange except in the inner angle of ventrals; all pale markings creamy white or creamy brown, a little orange-shaded in dorsal and anal and inner edge of ventral; inner side of pectoral olive with orange shades next to the black cross-band; axil olive with round brown spots.

1337. *Scorpaenopsis altirostris* Gilbert. Hawaii.

1338. *Scorpaenopsis zanzibarensis* (Playfair). New Guinea (Günther); Zanzibar.

SCORPENA (Artedi) Linnæus.

1339. *Scorpena cooki* Günther. Raoul I.; Cook Is.; Raiatea (Seale).

Scorpena cooki Günther, Fische der Südsee, 78, taf. 55, Raoul I.

SEBASTAPISTES GILL.

1340. *Sebastapistes dentatus* (Günther). Palau Is.

Scorpena dentata Günther, Fische der Südsee, 76, 1878, Palau Is.

1341. *Sebastapistes coniora* Jenkins. Hawaii.

1342. *Sebastapistes galactacme* Jenkins. Hawaii.

1343. *Sebastapistes corallicola* Jenkins. Hawaii.

?*Scorpena asperella* Bennett, Zool. Jour., iv, 1829, 40, Sandwich Is. Günther, Fische der Südsee, 80, Hawaiian Is. *Sebastapistes corallicola* Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 493, Honolulu.

It is impossible to identify Bennett's *S. asperella* with certainty. It is probably *Sebastapistes corallicola*, the red spot on the dorsal and the tentacle over the eye favoring this identification.

1344. *Sebastapistes ballieui* (Sauvage). Hawaii.

1345. *Sebastapistes coloratus* Gilbert. Hawaii.

1346. *Sebastapistes albobrunneus* Günther. Palau Is.

Scorpena albo-brunnea Günther, Fische der Südsee, 77, 1878, Palau Is.

1347. *Sebastapistes strongius* (Cuvier & Valenciennes). Oualan, or Strong Island; Amboina.

We are unable to identify this species. Were it not for the plain-colored lower parts of the head, in the figure of Quoy & Gaimard, we should regard *Sebastapistes la'otale* as this species.

1348. *Sebastapistes laotale* Jordan & Seale, new species. *La'otale*. Samoa; Rarotonga.

Scorpena tristis, Günther, Fische der Südsee, 77, Rarotonga; not of Klunzinger.

Head 2.45 in length; depth 2.75; eye 4 in head; dorsal XII, 10; anal III, 6; about 22 modified scales in lateral line; snout 3.50 in head; interorbital 1.50 in eye, this space very concave with two small longitudinal ridges.

Body oblong, moderately compressed; depth of caudal peduncle equal to eye; mouth large; maxillary 1.75 in head; minute teeth in jaws and vomer, none on palatines; head spinate, preorbital ending in two sharp spines, one directed forward, the other downward and back, a strong spine at posterior end of the bony stay of cheek; three distinct spines below at the angle of preopercle; four distinct supraocular spines and four spines on each side of nuchal region; posterior nostril with a distinct spine, the anterior nostril with a short divided tentacle; opercle with three spines from its posterior part; origin of dorsal fin at posterior part of nuchal region, its longest spine 2.75 in head; base of anal fin 2.25 in length of head; second anal spine 2 in head; pectoral 1.20; ventral 1.80; caudal rounded 1.50 in head.

Life colors of a specimen from Pago Pago called *la'otale*; black and gray, with rosy tinge on caudal. Another from the same place has the red rosy salmon, the ground-color whitish, it and the rosy everywhere finely speckled with black points. A specimen from Apia was purplish black, mottled with gray with scarcely any shades of pink; the chin profusely barred.

Color in spirits, grayish mottled with brown, which takes somewhat the form of 6 irregular cross-bands, the first of which encircles the sides and upper part of head at eye, and the last one encircles the base of caudal fin; each side of lower jaw marked with about 6 alternating white and brown spots; a similar marking shown on upper jaw; dorsal fin with oblique brown bands, caudal with a wide brown band near the middle and tipped with white, and with about 5 dusky bands; ventral with 3 dusky bands; pectoral spotted with dusky black at the base, caudal with a wide brownish area near the middle.

This species is common in the tide-pools of the coral reefs of Samoa with *Sebastopsis scabra* and *Sebastopsis guamensis*, as described by Klunzinger. It differs from *Sebastapistes tristis* in the absence of orbital cirrus. Otherwise it agrees very closely with that species, but not one of our examples shows any trace of the orbital cirrus, which is well developed in *S. tristis*.

Many specimens from Apia. The type is no. 51761, U. S. National Museum, length 2 inches.

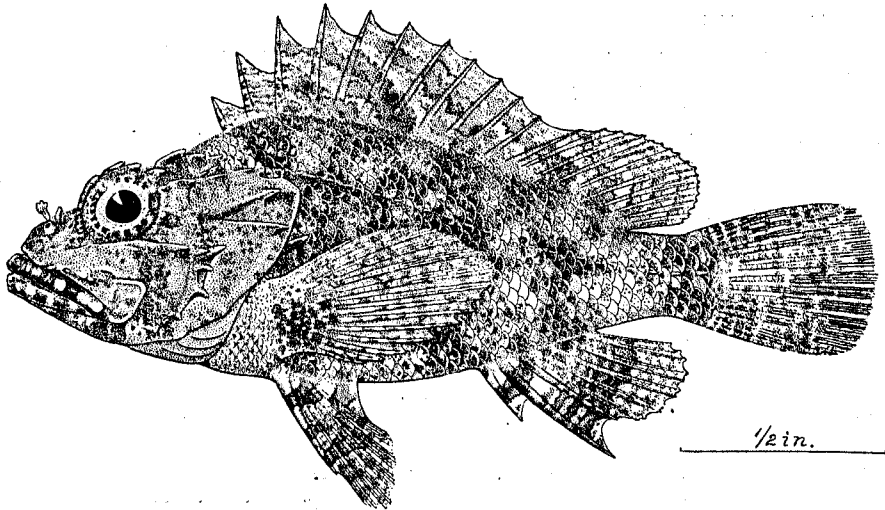


FIG. 72.—*Sebastapistes laotale* Jordan & Seale, new species. Type.

1349. *Sebastapistes tristis* (Klunzinger). Guam; Red Sea; Philippines.

Scorpena tristis Klunzinger, Syn. Fische Rothen Meeres, 802, 1870, Red Sea.

Scorpena bakeri Seale, Bishop Museum 1901, 126, Honolulu; op. cit., vol. I, no. 3, 120, Guam.

This species, distinguished by its orbital cirrus and by the blackish cross bands on the lower jaw, was not taken by us. Seale's description of *Scorpena bakeri* agrees well with Klunzinger's account, and may be the same fish. Günther's *Scorpena tristis* is said to have not "Hautläppchen." This may be our *Sebastapistes laotale*. We have examples of *S. tristis* from the Philippines, with the orbital cirrus well developed.

1350. *Sebastapistes lanarius* (Cuvier & Valenciennes). Guam.

1351. *Sebastapistes nuchalis* (Günther). Rarotonga.

Scorpena nuchalis Günther, Fische der Südsee, 76, 1873, Rarotonga.

SETARCHES Günther.

1352. *Setarches remiger* (Gilbert & Cramer). Deep seas of Hawaii.

1353. *Setarches fdjiensis* (Günther). Fiji.

Setarches fdjiensis Günther, Challenger Fishes, 87, 19, Fiji.

PONTINUS Poey.

1354. *Pontinus spilistius* Gilbert. Deep seas of Hawaii.

B. B. F. 1905—25

HELICOLENUS Goode & Bean.

1355. *Helicolenus rufescens* Gilbert. Deep seas of Hawaii.

PLECTROGENIUM Gilbert.

1356. *Plectrogenium nanum* Gilbert. Deep seas of Hawaii.

CENTROPOGON Günther.

1357. *Centropogon australis* (White). Erromango; Palacky; Australia.

AMBLYAPISTUS Bleeker. .

1358. *Amblyapistus tænianotus* (Cuvier & Valenciennes). Melanesia (Seale); East Indies.

1359. *Amblyapistus vestitus* (De Vis). South Seas.

Tetraroge vestitus De Vis, Proc. Linn. Soc. New South Wales 1884, 496, South Seas. (Dorsal xvi, 9.)

TÆNIANOTUS Lacépède.

1360. *Tænianotus triacanthus* (Lacépède). Tahiti; Raiatea (Günther); East Indies.

1361. *Tænianotus garretti* Günther. Hawaii.

1362. *Tænianotus citrinellus* Gilbert. Hawaii.

MINOUS Cuvier & Valenciennes.

1363. *Minous pictus* Günther. New Guinea.

(*Minous pictus* Günther, Challenger Fishes, 1880, 41.)

DENDROCHIRUS Swainson.

1364. *Dendrochirus zebra* (Cuvier & Valenciennes). Guam; Palau Island; Fii; New Guinea; East Indies.

Pterois zebra Cuvier & Valenciennes, Hist. Nat. Poiss., iv, 367, Ile de France. Günther, Fische der Südsee, 82, Indian Ocean, Pelew I. Seale, Bishop Museum 1901, 122, Guam. Garman, Bull. Mus. Comp. Zool., vol. xxxix, 232, Fiji. Günther, Cat., II, 126, Amboina.

1365. *Dendrochirus brachypterus* (Cuvier & Valenciennes). Samoa (Günther); East Indies.

1366. *Dendrochirus sausaulele* Jordan & Seale, new species. *Sausaulele*. Samoa. (Pl. LII, fig. 1.)

Head 2.45 in length; depth 2.80; eye 3.55 in head, equal to snout; interorbital 2 in eye; dorsal XIII, 10; anal III, 6; pectoral 17; scales 8-44-13; maxillary 2.50 in head, reaching to below anterior third of eye.

Body elongate, compressed, profiles of trunk evenly curved; snout short, rounded; bands of minute teeth in jaws and vomer; a simple orbital tentacle one-half length of eye; a simple fleshy flap prolonged into a tentacle over anterior nostril; five simple tentacles on the anterior margin of snout; a wide flap from lower anterior margin of preorbital, and two similar flaps from lower limb of preopercle; a single small nasal spine on each side of snout; four orbital and seven nuchal spines on each side; bony stay of cheek without distinct spines; a small sharp spine on preopercle at posterior termination of the bony stay and two small spines below this on the angle; gillrakers short, 10 on lower limb; depth of caudal peduncle scarcely equal to eye; pectoral fin 2.10 in length, reaching to below posterior axil of dorsal, the membranes of lower rays only being slightly incised; ventral reaching to origin of anal; caudal and anal of about equal length, 2.50 in head.

Color in spirits, dull whitish with seven broad brown bands around the body, first over nuchal region, where the band is broken and the mid segment is in advance, second from origin of dorsal through axil of pectoral, third from 4th-5th dorsal spines, fourth from 8th-9th dorsal spines, fifth from 1st-3d dorsal rays, sixth from 7th-9th dorsal rays, the seventh band circling the caudal peduncle and sending a brown line back to base of caudal; a narrow indistinct line between the 2d and 3d bands and another between the 4th and 5th bands; a black line from base of orbital tentacle through eye to posterior end of bony stay; a dark blotch on cheek below anterior part of bony stay, another on

side of snout, and another round spot on anterior part of interorbital; eye with five radiating black lines; fins all with black cross bands except the ventral, which is bluish; axil of pectoral black, with an upper and lower white spot, and some white dots on inner base of rays; a black spot on base of pectoral, and on lower part of opercle; under part of head and top of snout white.

Four specimens from Apia, where it lurks in the crevices of the reefs. The type is no. 51760 U. S. National Museum, 4.85 inches long, from Apia. We have also one specimen from Pago Pago, represented in the accompanying colored figure.

1367. *Dendrochirus chloreus* Jenkins. Hawaii.

1368. *Dendrochirus barberi* (Steindachner). Hawaii.

(*Dendrochirus hudsoni* Jordan & Evermann.)

PTEROIS Cuvier.

1369. *Pterois sphex* Jordan & Evermann. Hawaii.

1370. *Pterois volitans* (Linnaeus). *Sausaulele*. Samoa; Tahiti; Palau s.; New Guinea (Macleay); New Britain (Peters); East Indies. (Pl. LI.)

This large and violently stinging fish is not rare about Samoa, where half a dozen examples were taken. Life colors of one from Apia called *sausaulele*, blackish red, fading to pale olive-brown posteriorly, the front of head abruptly bright pale brownish red; body covered by narrow sharply defined white streaks, bounding black streaks of the ground color, one pair below eye, one pair across nape; 5 more streaks on body, the first three Y-shaped, divided above and one of them below also; breast and belly with alternating white and blackish cross-bars; cirrus black, light red at tip; dorsal light and dark red; soft dorsal, anal, and caudal with dark cross-bars; ventral deep red, streaked with white, the spine white; pectoral dusky red, with two white crescents at base and a white axillary spot, the rays bright pink-red; two horizontal dark-edged streaks on caudal peduncle; interorbital pale pink.

1371. *Pterois radiata* Solander. Tahiti; Paumotu Is.; Samoa; Kingsmill I.

One specimen, called *sausaulele*, was taken by us at Samoa. Life colors, black with whitish streaks, these brownish red on head; long dorsal rays reddish brown at tip.

1372. *Pterois vittata* Sauvage. Marquesas Is.

Pterois vittata Sauvage, Nouv. Arch. Museum, 1878, 135, Nukahiva.

PELOROPSIS Gilbert.

1373. *Peloropsis xenops* Gilbert. Deep seas of Hawaii.

INIMICUS Jordan & Starks.

1374. *Inimicus maculatus* (Cuvier & Valenciennes). Waigi; New Britain; New Guinea.

Inimicus maculatus Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 434, 1829, Waigi. Lesson, Voy. Coquille, 210, plate 20. Günther, Cat., II, 150, Waigi.

Pelor maculatum, Peters, Berl. Mon. 1876, 834, New Britain.

SYNANCEJA Bloch & Schneider. (*Synancidium* Müller; *Synanceichthys* Bleeker.)

According to Bleeker, the genus *Spurco*, or *Synanceichthys*, to which our species belongs, differing from *Synanceja* in the absence of palatine teeth, can not be maintained as a distinct genus, these teeth being frequently wanting in *Synanceja horrida*.

1375. *Synanceja verrucosa* Bloch & Schneider. *Nofu*. Samoa; Fiji; Tahiti; New Hanover; Strong I.; Borabora; Guam; New Guinea (Macleay); East Indies.

Synanceia thersites Seale, Bishop Museum, vol. I, no. 3, 1901, 121, Guam.

This most uncomely fish abounds in the tide pools of the coral reefs of Samoa. It is much dreaded by the natives on account of its poisonous dorsal spines.

A specimen from Apia called *nofu* in life was the color of coral sand, the surface mud-colored, with concealed orange patches showing on head and body; caudal with a blackish cross-band; a whitish cross-band at base and one at tip.

EMMYDRICHTHYS Jordan & Rutter.

1376. *Emmydrichthys vulcanus* Jordan & Rutter. Tahiti.

Emmydrichthys vulcanus Jordan & Rutter, Proc. Cal. Ac. Sci., 2d ser., VI, 1896, 562i, Society Is. (by error stated to be from Hawaii).

This species is known only from the original type from Tahiti.

Family CARACANTHIDÆ.

CARACANTHUS Kröyer.

1377. *Caracanthus maculatus* Gray. *Tu'u'u*. Hawaii; Samoa; Tahiti.

This little fish is not rare in the coral reefs of Samoa, where several specimens were taken in company with *Pseudogobiodon citrinus*.

Life colors of a specimen from Apia called *tu'u'u*, dark uniform, coppery brown.

AMPHIPRIONICHTHYS Bleeker.

This genus is very close to *Caracanthus*, differing in the continuous dorsal fin. It was taken by us with the preceding on the reefs of Honolulu.

1378. *Amphiprionichthys unipinna* (Gray). Hawaii; Tahiti; Vavau; Fiji; Palau Is.; East Indies.

Family PLATYCEPHALIDÆ.

PLATYCEPHALUS Bloch.

1379. *Platycephalus punctatus* Cuvier & Valenciennes. Vanicolo; Guam (Seale, Bishop Museum, 1901, 129); East Indies.1380. *Platycephalus otaitensis* (Parkinson). Tahiti.

Cottus otaitensis Parkinson, in Cuvier & Valenciennes, Hist. Nat. Poiss., IV, 241, Tahiti.

1381. *Platycephalus quoyi* Bleeker. New Guinea (Macleay); East Indies.1382. *Platycephalus tentaculatus* Rüppell. Palau Is.; East Indies.1383. *Platycephalus nematophthalmus* Bleeker. New Guinea (Macleay); East Indies.1384. *Platycephalus serratus* Cuvier & Valenciennes. New Ireland (Peters, Berl. Mon., 1876, 839); East Indies.1385. *Platycephalus variolosus* Günther. Samoa.

Platycephalus variolosus Günther, Fische der Südsee, 167, taf. cix, fig. A, Samoa.

1386. *Platycephalus isacanthus* Cuvier & Valenciennes. New Guinea; East Indies.

INSIDIATOR Jordan & Snyder.

1387. *Insidiator pristiger* Cuvier & Valenciennes. New Guinea; East Indies.1388. *Insidiator bataviensis* Bleeker. Ponape (Günther, Fische der Südsee, 167); East Indies.1389. *Insidiator spinosus* (Schlegel). New Guinea (Bleeker); Japan.

Family BEMBRADIDÆ.

BEMBRADIUM Gilbert.

1390. *Bembradium roseum* (Gilbert). Deep seas of Hawaii.

Family HOPLICHTHYIDÆ.

HOPLICHTHYS Cuvier & Valenciennes.

1391. *Hoplichthys citrinus* Gilbert. Deep seas of Hawaii.1392. *Hoplichthys platophrys* Gilbert. Deep seas of Hawaii.

Family PERISTEDIIDÆ.

PERISTEDION Lacépède.

1393. *Peristedion engyceros* Günther. Deep seas of Hawaii.
 1394. *Peristedion hians* Gilbert & Cramer. Deep seas of Hawaii.
 1395. *Peristedion liorhynchus* Günther. Admiralty Is. (Fish. Challenger, 1880, 46).

Family CEPHALACANTHIDÆ.

CEPHALACANTHUS Lacépède.

1396. *Cephalacanthus orientalis* (Cuvier & Valenciennes). Hawaii; New Guinea; Waigiu; Tahiti (Seale); East Indies.

Family GOBIIDÆ.

ANALYSIS OF GENERA OF GOBIIDÆ FOUND IN THE SOUTH SEAS.

[This table is quite tentative, many of the genera named being of uncertain boundaries and doubtful value.]

- A. Soft dorsal and anal free from the caudal; no pit above the opercle.
 B. Spinous dorsal present; ventral fins well developed.
 C. Ventral rays, 1, 5.
 D. Ventral fins more or less divided.
 E. ELEOTRINÆ: Ventral fins wholly separate; pectorals normal; eyes normal.
 F. Body scaly.
 G. Vomer with teeth; a caudal ocellus; scales small.....BOSTRYCHUS
 GG. Vomer without teeth.
 II. Scales small (fewer than 50).
 I. Sides of head naked; one or more dorsal spines produced.....VALENCIENNEA
 II. Sides of head scaly; none of the dorsal spines produced; head depressed.
 J. Preopercle with a small hook or antrorse spine at its angle.....ELEOTRIS
 JJ. Preopercle unarmed.....GUAYINA
 III. Scales moderate or large (fewer than 50).
 K. Snout broad, flat, depressed; sides of head scaly.....OPHIOCARA
 KK. Snout moderate.
 L. Top of head with bony crests; a black spot at base of pectoral.....BUTIS
 LL. Top of head without crests.
 M. Sides of head scaly; scales large.
 N. Sides of head with vertical series of small cirri; lower jaw heavy; body robust....GOBIOMORPHUS
 NN. Sides of head without cirri.
 O. Preopercle with 2 or 3 rather strong upturned spines; body robust.....ASTEROPTERIX
 OO. Preopercle unarmed; body compressed, the form and habit similar to that of *Fundulus*; head pointed, depressed.....HYSELEOTRIS
 MM. Sides of head naked; preopercle unarmed.
 P. Nuchal region entirely naked.....EVIOTA
 PP. Nuchal region fully scaled.....TRIMMA
 FF. Body entirely naked, slender, and elongate.
 Q. Dorsal fins separate, the second moderate.....HETERELEOTRIS
 QQ. Dorsal fins connected, the second many-rayed; chin very prominent; tongue notched.....VITREOLA
 EE. PERIOPHTHALMINÆ: Ventral fins partly united at the fleshy base; pectoral with a scaly muscular base; eyes more or less stalked; scales very small, cycloid; tongue short, rounded, adnate; isthmus broad.
 R. Dorsal rays x to xv-12; teeth not horizontal and not exerted.
 S. Scales minute (80 to 100).....PERIOPHTHALMUS
 SS. Scales larger, about 55.....PERIOPHTHALMODON
 DD. GOBINÆ: Ventral fins completely united; pectoral without scaly muscular base; eyes not erectile.
 T. Ventral fins not adnate to the belly, in a short rounded disk; upper teeth not movable.
 U. Body scaly.
 V. Vomer without teeth.
 W. Teeth not all in one series in each jaw.
 X. Caudal fin not lanceolate nor greatly produced; teeth all simple, no barbels.
 Y. Cheeks and opercles each well scaled.
 Z. Scales small; pectoral with silky rays above.....CHLAMYDES
 ZZ. Scales large; tongue notched; pectoral without silky rays.....GNATHOLEPIS
 YY. Cheeks naked; opercles scaly; scales of body large.....VAIMOSA
 Y'Y'. Cheeks and opercles naked.

- a. Scales large, ctenoid; dorsal and anal fins short.
 b. Tongue truncate or rounded at tip; isthmus rather broad; lower jaw usually not strongly projecting.
 c. Pectoral without silk-like rays above.
 d. Preopercle with 2 small hooked spines at angle; dorsal spine rigid OPLOPOMUS
 dd. Preopercle unarmed; shoulder-girdle without fleshy slips; dorsal spines slender.
 e. Dorsal spines 7..... ABOMA
 ee. Dorsal spines 6.
 f. Head almost spherical; body short and plump; small canines present..... PARAGOBIODON
 ff. Head not spherical.
 g. Body before dorsal fin largely naked; head very large; mouth subvertical ZONOGOBIOUS
 gg. Body before dorsal chiefly scaled.
 h. Ventrals short, cup-like; body elongate; head depressed; small canines present VAILIMA
 hh. Ventrals well developed.
 i. Head very large, with cross-lines of minute cirri (as in *Gobiomorphus* and in *Mars*)..... DROMBUS
 ii. Head without cross-lines of tubes or cirri RHINOGOBIOUS
 cc. Pectoral fin with several free silk-like rays above..... GOBIUS
 bb. Tongue emarginate at tip.
 j. Pectoral with free silk-like rays; dorsal spines, 6; mouth moderate..... MAFO
 jj. Pectoral without free silk-like rays above; mouth large, oblique, the chin very prominent..... GLOSSOGOBIOUS
 aa. Scales 36 or more; pectoral without silk-like rays.
 k. Tongue emarginate; lower jaw projecting; mouth large..... CHENOGOBIOUS
 kk. Tongue entire (so far as known).
 l. Shoulder-girdle with fleshy slips or flaps; dorsal and anal short, of about 11 or 12 rays; scales moderate, ctenoid; preorbital region broad; tongue adnate to floor of mouth; fresh-water species.
 ll. Cheeks naked..... AWAOUS
 ll'. Cheeks closely scaled EXYRIAS
 ll. Shoulder-girdle without fleshy flaps; dorsal and anal long (15 to 20 rays).
 m. Body opaque; caudal rounded; dorsal spines 6.
 n. Scales moderate (50 to 60), ctenoid; lower jaw with small canines..... AMBLYGOBIUS
 nn. Scales minute, cycloid; no canines; jaws not opening widely..... CRYPTOCENTRUS
 mm. Body elongate, translucent; caudal emarginate; mouth small; dorsal spines seven..... VITRARIA
 XX. Caudal fin lanceolate, much produced; no barbels at chin.
 o. Eye with fleshy cirrus above..... PSELAPHIAS
 oo. Eye without cirrus.
 p. Mouth very large, the maxillary produced backward somewhat as in *Opisthognathus*..... WAITEA
 pp. Mouth moderate; no canines; soft dorsal and anal moderate, of 12 to 20 rays.
 q. Outer teeth moderately enlarged; upper pectoral rays silk-like GOBIUCHTHYS
 qq. Outer teeth setaceous and movable; lower jaws flat and thin; no silk-like rays..... GOBIONELLUS
 WW. Teeth all uniserial; canines present; soft caudal more or less pointed.
 r. Scales rather large (25 to 35); soft dorsal and anal short..... GOBIOPTERUS
 rr. Scales moderate (40 to 50); soft dorsal and anal of about 23 rays APOCRYPTODON
 rrr. Scales very minute, about 200; soft dorsal and anal of about 30 rays..... PSEUDAPOCRYPTES
 VV. Vomer with about 3 large blunt teeth; head with numerous lines of small cirri running in various directions
 scales rather small; fins moderate..... MARS
 UU. Body naked or very nearly so.
 s. Body rather elongate, not greatly compressed.
 t. Dorsal spines 6; snout very blunt; soft dorsal longer than anal..... KELLOGGELLA
 ss. Body greatly compressed and elevated.
 u. Canines present, small GOBIODON
 uu. Canines wanting..... PSEUDOGOBIODON
 tt. Ventral fins short, round, cup-shaped, adnate to the belly; outer teeth more or less flexible, peculiarly formed.
 v. Body scaly or chiefly so.
 w. Teeth clavate, not pointed.
 x. Scales small (50 to 80); body well scaled SICYOPTERUS
 xx. Scales large, about 40; trunk partly naked anteriorly..... MICROSCYDIUM
 vv. Body naked or largely naked; upper front teeth tricuspid..... LENTIPES
 AA. GOBIODINÆ. Soft dorsal and anal very long, joined to the caudal; body eel-shaped, the scales minute or wanting
 no pit above opercle; eyes minute; teeth very long, curved; dorsal moderate, its rays about vi, 16..... GOBIOIDES

BOSTRYCHUS Lacépède.

Eleotrids with vomerine teeth, as in the American genus *Philypnus*.

1397. *Bostrychus sinensis* Lacépède. Oualan; Kanathia, Fiji; East Indies; China.

VALENCIENNEA Bleeker.

1398. *Valencienna muralis* Quoy & Gaimard. Tucopia, Vanicolo; Fiji; East Indies; Australia.

1399. *Valencienna longipinnis* Lay & Bennett. Fiji (Günther), Riukiu Is.

Eleotris longipinnis Lay & Bennett, Zool. Beechey's Voyage, 64, tab. 20, fig. 30, Riukiu Is. Günther, Fische der Südsee, 190, Fiji.

Recorded by Günther from Fiji. The species is very close to *Valenciennea muralis*, with which it is identified by Jordan & Snyder (Proc. U. S. Nat. Mus., xxiv, 42) from the Riukiu Islands. Dr. Günther, however, regards it as distinct.

1400. *Valenciennea strigata* (Broussonet). Tahiti; Fiji; Samoa (Günther); East Indies.

Gobius strigatus Broussonet, Ichth., Dec. 1, pl. 1, 1782, Tahiti.

Eleotris strigata, Günther, Fische der Südsee, 190, taf. 111, fig. F, Fiji, Samoa, Tahiti.

The species was not taken by us at Samoa. It is easily recognized by the much longer dorsal and anal fins. Dorsal vi, i, 18; anal i, 16.

1401. *Valenciennea violifera* Jordan & Seale, new species. *Tu'oto*. Samoa. (Pl. LII, fig. 2.)

Head 3.45 in length; depth 5; eye 5 in head; dorsal vi-i, 12; anal i, 12; scales 75; interorbital 5.50; snout 3.10.

Body elongate, compressed; snout rounded; mouth large, lips rather thick, the angle of the jaws under middle of eye; jaws with 2 rows of small, curved, sharp-pointed teeth; opercle and preopercle entire; gillrakers short, soft, with elongate point on lower limb; caudal peduncle strong, its depth 2.50 in head; origin of spinous dorsal on line with base of ventrals; third and fourth spines of first dorsal slightly elongate, 1.14 in head; base of soft dorsal equal to head, its longest ray about 2 in head; base of anal 1.20 in head, its longest ray 1.25 in base, its origin midway between base of caudal and posterior margin of eye; pectoral 1.30 in head; ventral 1.90 in head; caudal rounded, equal to head.

Life colors of a specimen from Apia (very young), very pale olive, with two faint livid blue lateral streaks connected with cross lines of the same color; fins all pale; dorsal tipped with black.

An adult specimen from Pago Pago was light olive, mottled with pale pinkish brown; a pinkish brown stripe from lower pectoral axil straight to base of caudal; six violet spots darker edged, on side of head; one on base of pectoral; dorsal light reddish, a jet black spot edged with white on the tips of the longest spines; caudal pale, mottled light green and pink at base; the larger examples have a black spot on upper part of caudal; blue spots plainer; anal light yellow; pink brown at base and dark-edged, often pink at base and edge; ventral and pectoral pale; pectoral without dark in axil.

Color in spirits dull yellowish white with tint of brown; some specimens show traces of 7 dusky blotches along back; five or six bluish white spots on opercle and cheek; an indistinct brownish line from axil of pectoral to caudal; belly and chin bluish white; third and fourth spines of dorsal tipped with black; spinous and soft dorsal with indistinct blue lines; caudal (except in young) with a black blotch on its upper middle portion; anal with narrow dark line at margin and another near the base; some specimens show a dusky tip to caudal; pectoral and ventral unmarked.

This handsome species is common in the crevices of the coral reefs about Apia and Pago Pago. It seems to be distinct from the two species *muralis* and *sexguttata* of the western Pacific. It has the head markings of the latter with the body markings of the former.

Seven specimens from Pago Pago and 23 from Apia. Specimens also from the island of Negros, P. I., collected by Dr. Bashford Dean.

The type is no. 51771, U. S. National Museum, 4.60 inches long, from Apia.

ELEOTRIS (Gronow) Bloch & Schneider.

1402. *Eleotris fusca* (Bloch & Schneider). *Pa'ofu*. Samoa; Tahiti; Oualan; Fiji; Guam; Waigiui; Vanicolo; Aneiteum; Solomon Is.; New Hebrides; Borabora; Tubuai and Nukahiva (Seale); East Indies.

Fifty-three specimens from the lower course of Vaisigano River at Apia and from Gasegase River in the neighboring village of Vaimosa; 15 specimens from brackish water at Pago Pago.

This species is widely distributed through the South Seas. It is common in the sluggish waters of the lower reaches of the Vaisigano and other streams.

Eleotris sandwichensis of Hawaii, a species entirely similar in size, appearance, and habit, differs in having larger scales.

1403. *Eleotris sandwichensis* Vaillant & Sauvage. Streams of Hawaii.

GUAVINA Bleeker.

This genus resembles *Eleotris*, but lacks the preopercular spine characteristic of that genus.

1404. *Guavina gyrynooides* (Bleeker). New Guinea (Macleay); Palau Is.; East Indies.
 1405. *Guavina immaculata* (Macleay). New Guinea.

Eleotris immaculatus Macleay, Proc. Linn. Soc. N. S. W. 1883, 69, 268, New Guinea

OPHIOCARA Gill.

Ophiocara Gill. Proc. Ac. Nat. Sci. Phila. 1863, 270 (*ophiocephala*).

This genus is characterized by the large scales and short depressed head, the form being like that of the genus *Ophiocephalus*. Cheeks scaly.

1406. *Ophiocara porocephala* (Cuvier & Valenciennes). Palau Is.; Caroline Is.; New Ireland; Vanicolo; New Guinea (Macleay); East Indies.
 1407. *Ophiocara aporos* (Bleeker). Fiji; Gilolo; Oualan; East Indies.
 1408. *Ophiocara cantoris* (Günther). Fiji; East Indies.
 1409. *Ophiocara macrolepidota* (Bloch). Fiji; New Guinea (Macleay); East Indies.

BUTIS Bleeker.

1410. *Butis butis* (Hamilton-Buchanan). New Guinea (Macleay); East Indies.

GOBIOMORPHUS Gill.

This genus contains short-bodied Eleotrids with large scales, the cheeks and opercles naked, and the cheeks with rows of papillae.

1411. *Gobiomorphus eugenius* (Jordan & Evermann). Hawaii.
 1412. *Gobiomorphus sclateri* (Steindachner). Tahiti; Samoa.

Eleotris sclateri Steindachner Ichth. Beitr., VIII, 157, 1880, Tahiti.

This handsomely colored little fish occurs in some abundance in the reefs about Apia and Pago Pago. We have 7 specimens from Apia and 5 from Pago Pago.

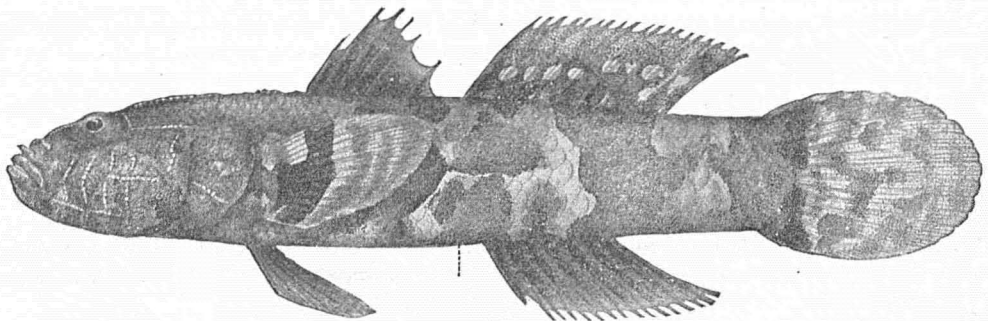


FIG. 73.—*Gobiomorphus sclateri* (Steindachner).

Life colors of a specimen from Apia, light gray, with three broad brown cross-bands; first dorsal yellowish spotted; second dorsal brown, yellowish at tip, mottled; caudal profusely spotted; anal and ventral blackish; pectoral barred; head very much mottled.

Another, from Pago Pago, was grayish white, with blackish brown transverse bands; everywhere with black points; on dorsal and caudal weak blotches of thin yellowish.

Still another, a very small specimen from Apia, was pale gray, with a black bar at base of caudal; two black dots below eye; four yellowish white cross-bars, alternating with black; a jet-black spot in axil; fins whitish, scarcely dotted.

ASTERROPTERIX Rüppell. (*Brachyleotris* Bleeker.)

In this genus the body is short and robust, the scales large, the sides of the head scaly, without papillary ridges; paired fins not fringed. Small fishes of the coral reefs.

1413. *Asterropteryx semipunctatus* Rüppell. Hawaii; Samoa; Tahiti; Palau Is.; East Indies. (Pl. xxxvi, fig. 1.)

This small fish is rather common in the crevices of the reefs about Samoa. We have 55 specimens from Apia and 1 from Pago Pago. The blue spots, distinct only in the largest examples, are subject to much variation.

Life colors of an Apia specimen—a compressed eleotrid with scaly head, large scales, and filamentous first dorsal—dark olive-brown; a dark bar below eye; base of spinous dorsal blackish; soft dorsal and anal dark gray; dorsal paler on upper half; caudal gray; ventral dark gray.

Another from Apia was brownish black with obscure markings, and still another had the head with pale blue spots, edged with darker; pectoral bright olive, dusky at base; caudal light brownish, with black spots above, ocellated with gray and some black below; fins dusky.

HYPSELEOTRIS Gill.

Hypseleotris Gill, Proc. Ac. Nat. Sci. Phila. 1863, 270 (*cyprinoides*).

Giuris Sauvage, Bull. Soc. Philom. 1879, 15 (*vanicolensis*; no definition).

?*Carassiops* Ogilby, Proc. Linn. Soc. N. S. W. 1897, 784 (*compressus*).

Caulichthys Ogilby, Proc. Linn. Soc. N. S. W. 1897, 784 (*guntheri*).

This genus is made up of handsome fresh-water fishes, with the appearance and habit of *Fundulus*, swimming freely in the water, not lying on the bottom as is the habit with most gobies.

The genus *Caulichthys* Ogilby, based on *Eleotris cyprinoides*, is synonymous with *Hypseleotris* of Gill.

1414. *Hypseleotris guntheri* (Bleeker). *Malu vai*. Streams of Samoa, Oualan, and Fiji.

Eleotris cyprinoides Günther, Cat., III, 118, Oualan; not of Cuvier & Valenciennes.

Asterropteryx guntheri Bleeker, Ver. Med., XI, 1876, after Günther.

Eleotris guntheri Günther, Fische der Südsee, 186, taf. 113, fig. A, Oualan, Savaii, Fiji.

We have about 100 specimens from Vaisigano, Gasegase, Vailima, and other streams about Apia. The native name is *malu vai*.

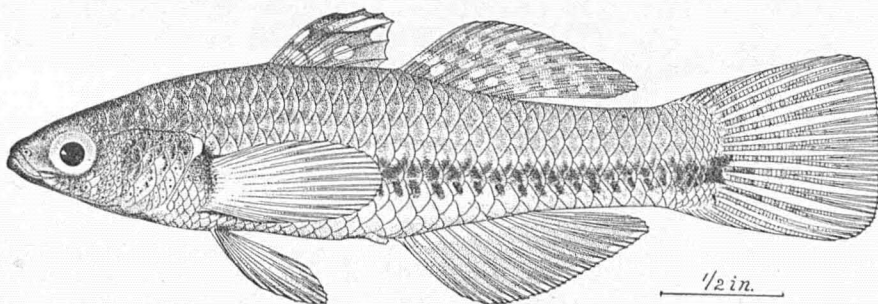


FIG. 74.—*Hypseleotris guntheri* (Bleeker).

This handsome goby is found in abundance in all the fresh waters of Upolu. Unlike others of this group it does not lie on the bottom, but swims freely. In appearance, as in habits, it has much in common with cyprinodont fishes.

A specimen from Apia showed no bright colors; a black lateral band, pectoral black, a black spot on caudal. It agrees fairly well with Günther's short account of the species.

1415. *Hypseleotris vanicolensis* (Sauvage). *Vanicolo*.

Eleotris (*Giuris*) *vanicolensis* Sauvage, Bull. Soc. Philom. 1880, 54, *Vanicolo*.

1416. *Hypseleotris macrolepidotus* (Bloch). Palau; Fiji; New Hebrides; East Indies.

1417. *Hypseleotris godeffroyi* (Günther).

Eleotris godeffroyi Günther, Fische der Südsee, 188, *Raiatea*, Tahiti.

A diminutive fish of the coral reefs, not seen by us.

EVIOTA Jenkins.

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

This genus contains Eleotrids of diminutive size, none (except *E. abax*) an inch in length, abounding in the pools on the coral reefs and in the heads of corals. The species are very numerous about Samoa. Much of our large collection was obtained by a native boy named Afele, who would dive for the coral heads and crack them in a boat, "The Coral Queen," picking up the little fishes from the deck.

The fringing of the ventral rays and lower rays of the pectorals is a characteristic of this genus. It is especially distinguished from *Asterropteryx* by the naked sides of the head and by the entire preopercle.

The earliest known species of this genus and much the largest in size is *Eviota abax*, described by Jordan & Snyder, from Misaki, in Japan.

1418. *Eviota epiphanes* Jenkins. Hawaii.

1419. *Eviota miniata* (Seale). Guam.

Eleotris miniatus Seale, Occ. Papers Bishop Museum, i, no. 3, 1901, 125, Guam.

1420. *Eviota zonura* Jordan & Seale, new species. *Lili*. Samoa.

Head 3.50 in length; depth 4.50; eye 3 in head; dorsal vi,11; anal 9; scales 28.

Body elongate, compressed; anterior profile rounded; caudal peduncle 2 in head; mouth of moderate size; angle of mouth below middle of eye; small sharp-pointed teeth in jaws; males with prominent papillæ near origin of anal, the females with a sac; distance from origin of spinous dorsal to snout 2.50 in length of fish without caudal; height of spinous dorsal about equal to its base; base of soft dorsal

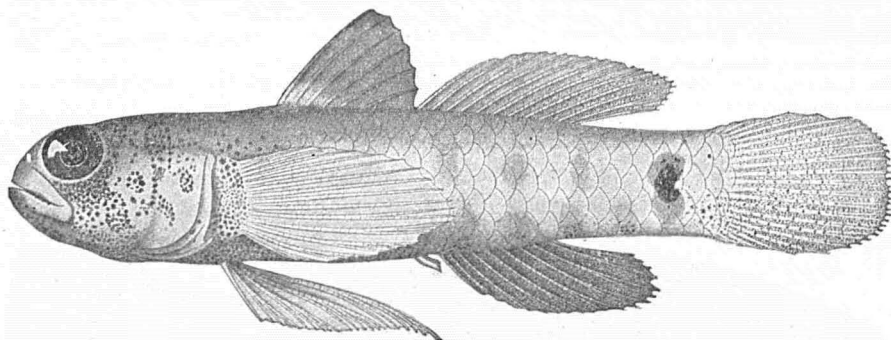


FIG. 75.—*Eviota zonura* Jordan & Seale, new species. Type.

1.25 in head, its longest ray 1.50 in head; origin of anal under second dorsal ray, nearer to base of caudal than to eye, length of its base 1.75 in head; pectoral longer than head, the tip on a line with first anal ray, about equal to length of ventrals; ventrals have their origin directly below the base of pectorals, their posterior extremity extending to base of anal papillæ; caudal rounded, 1.14 in the head.

Life colors of a specimen from Apia, olive, with orange-brown cross-bars; a black bar before base of caudal; fins brown dotted, the anal with blackish half bars at base. Length three-fifths of an inch.

A specimen from Pago Pago was bright grass-green, with round orange spots on head; scales on body edged with orange; four or five faint dark cross-bars (not plain at base of anal); a large blackish bar-like spot just before base of caudal; first dorsal dusky, mottled with orange; second dorsal pale, with rows of orange spots; caudal dusky below, pale green above, with some orange spots; anal dusky, mottled with orange; pectoral and ventral pale green. Another specimen from Pago Pago was translucent bluish green; small orange spots and irregular black dots.

Color in spirits, yellowish white, a distinct black spot on caudal peduncle, three scales from base of caudal fin; six dusky bands extending a short distance vertically up from base of anal fin; these are usually darker at base of fin; shadings of dark spots on sides and top of head (this varies greatly and is absent in some specimens); caudal fin black; spinous dorsal at anterior base is white; the upper

two-thirds and posterior base is black; soft dorsal shaded slightly with dusky; caudal with indications of many narrow vertical lines, the fins white.

Of this species we have 16 specimens from Apia and 28 from Pago Pago. The type is no. 51776, U. S. National Museum, seven-eighths of an inch in total length.

1421. *Eviota prasites* Jordan & Seale, new species. *Lili*. Samoa.

Head 3.20 in length; depth 4; eye 3.50 in head; dorsal vi, 9; anal 9; scales 22.

Body elongate, compressed; caudal peduncle 2 in head; mouth of moderate size, the lower jaw slightly protruding; angle of jaw under anterior of pupil; small, sharp-pointed teeth in jaws; intromittant organ of males prominent; distance from origin of spinous dorsal to snout 2.75 in length of fish without caudal; anterior dorsal spines more or less elongate, sometimes very much longer than head, this elongation perhaps confined to the males, as in others the spines are shorter; base of soft dorsal about equal to its longest rays; pectoral slightly longer than head; ventral of equal length or less than pectoral, its origin posterior to origin of pectoral; caudal rounded, about 1.50 in head.

Life colors of a specimen from Pago Pago called *lili*, translucent yellowish white with brown pink points (under microscope rose red spots with brown pigment specks) arranged along dorsum and

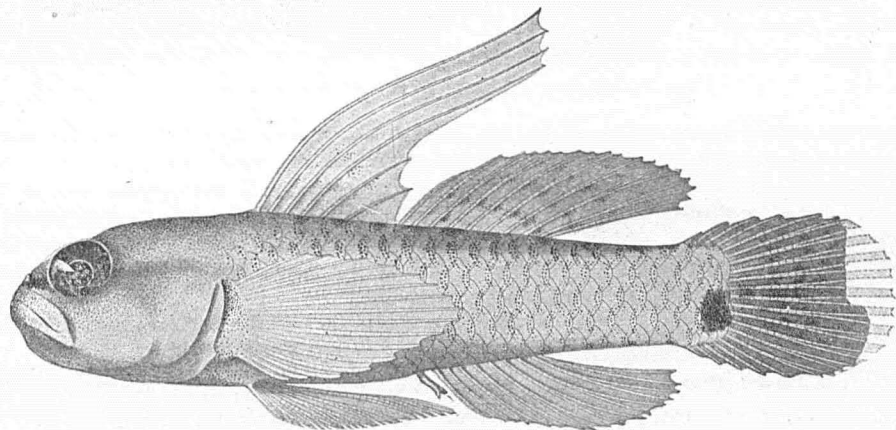


FIG. 76.—*Eviota prasites* Jordan & Seale, new species. Type.

very weakly in narrow transverse bars on sides; all fins rosy; eye with two greenish yellow longitudinal bands, dorsal one continued on forehead. Another specimen from this locality was very pale grayish with dark specks and markings.

Color in spirits, yellowish white, the margin of the scales shaded with fine black dots; a distinct black spot on lower posterior portion of caudal peduncle at base of caudal; usually a more or less distinct dusky blotch above this spot on the upper base of the caudal; a black stripe from upper posterior part of opercle through the eye and around snout; another black stripe around lower lip; a dusky blotch in upper axil of pectoral; darker shadings along the back, taking the form of more or less regular black spots along base of the dorsal; six indistinct dark band-like spots along the base of anal and under part of caudal peduncle; all the fins excepting the pectoral, which is white, have a dusky shading of fine dots; the spinous and soft dorsal have dark spots arranged in regular longitudinal lines, about four of these lines on the soft dorsal; caudal with five bands of dusky formed by separated dusky spots.

Five specimens from Pago Pago. The type is no. 51768, U. S. National Museum, length 1 inch.

1422. *Eviota afelei* Jordan & Seale, new species. Samoa.

Head 3.20 in length; depth 4.20; eye 3.40 in head; scales 27; dorsal vi, 10; anal 8.

Body elongate, compressed, the anterior profile rounded, the jaws equal; depth of caudal peduncle 2 in head; angle of jaws under middle of eye; sharp-pointed teeth in jaws; the inner row of lower jaw seems to have enlarged, curved canine-like teeth; nasal tubule distinct; origin of spinous dorsal slightly posterior to line with origin of ventrals, its longest spine 1.50 in head; the base is greater than the

height of fin; base of soft dorsal 1.10 in head, its longest ray equal to base; pectorals slightly greater than length of head; base of anal about equal to its longest ray; pectoral reaching to a line with base of anal; origin of dorsal nearer base of anal than tip of snout; origin of ventrals posterior to origin of pectorals, their length about equal to pectorals; caudal rounded, its length 1.20 in head.

Color in spirits, whitish, the margin of scales shaded with minute dusky dots; 9 distinct dusky spots along lower side of body—3 on caudal peduncle, 3 at base of anal fin, and 3 on belly; all of

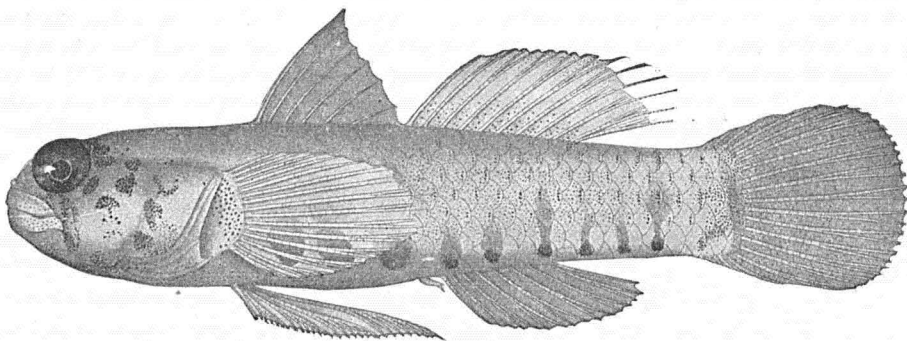


FIG. 77.—*Eviota afelei* Jordan & Seale, new species. Type.

these tend to extend more or less up on the side of body where they fade out; the abdominal blotches are much the largest; side of head with about 6-8 irregular brown blotches more or less run together, one forming a band from eye to angle of mouth, two on the opercle, one or two on preopercle, and two or three just posterior of eye; nuchal region shaded darker; an indistinct dusky blotch on the caudal peduncle, three scales from base of caudal; some specimens with faint traces of dusky spots along the back; spinous dorsal and anal dusky, other fins only slightly shaded with minute dark dots like those on the margin of the scales.

Ten specimens from Pago Pago, collected from coral heads by the Samoan boy, Afele, of Pago Pago. Type no. 51763, U. S. National Museum, five-eighths inch long, from Pago Pago.

1423. *Eviota smaragdus* Jordan & Seale, new species. Samoa.

Head 3.75 in length; depth 4.50; eye 3 in head; scales 24; dorsal vi, 10; anal 9.

Body elongate, compressed; the anterior profile of head rounded, the jaws equal; caudal peduncle 1.75 in head; jaws with small, sharp curved teeth; anterior rays of first dorsal elongate and filiform,

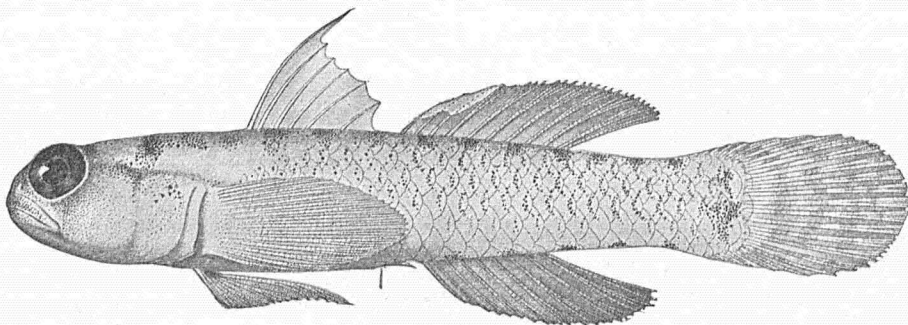


FIG. 78.—*Eviota smaragdus* Jordan & Seale, new species. Type.

except in young, their longest ray when fin is prone extending to middle of soft dorsal; base of soft dorsal equal to length of head, the longest ray 1.75 in head; base of anal 1.20 in head, its longest ray 1.50; pectorals slightly greater than length of head, ventrals having their origin below base of pectorals and extending to the anal papillae; caudal rounded, 1.10 in head.

One specimen from Pago Pago in life was greenish yellow, with bright red spots and black points; reddish spots on caudal; two black spots at the nape.

Another specimen from Pago Pago was translucent, bright grass-green, with orange-brown specks on each scale along side; 12 orange-brown short bars along back, on each side of dorsal a black bar across nape and opercle and one behind eye; orange dashes under chin; a scarlet bar, sharply defined, across base of pectoral, deep green before it; five dark violet-brown bars across base of anal; dorsal brownish, the spines dull orange, the first soft ray dusky; caudal greenish barred with orange; anal violet brown; pectoral and anal green; throat deep blue-green, with a heart-shaped orange spot; anal papilla deep green.

Color in spirits, yellowish white, the scales usually margined with black dots; a characteristic marking is the presence of two large distinct black spots on posterior nuchal region above the opercle; in addition to these spots there are 13 dark band-like spots on the dorsal surface; nuchal region and upper part of head shaded with small dots; 6 indistinct dark blotches along base of anal and lower margin of caudal peduncle; a dusky band-like blotch at base of caudal fin; excepting the pectorals all the fins have a slight shading of dusky, the anal being the darkest; the caudal with four dusky bands.

Twelve specimens from Pago Pago. The type is no. 51764, U. S. National Museum, length 1 inch.

1424. *Eviota distigma* Jordan & Seale, new species. Samoa.

Head 3.10 in length; depth 4.10; eye 3.18 in head; dorsal vi, 9; anal 9; scales 24.

Body elongate, compressed; caudal peduncle 2.10 in head; mouth rather small, maxillary not reaching to below middle of eye; minute sharp teeth in the jaws; intromittant organ of males

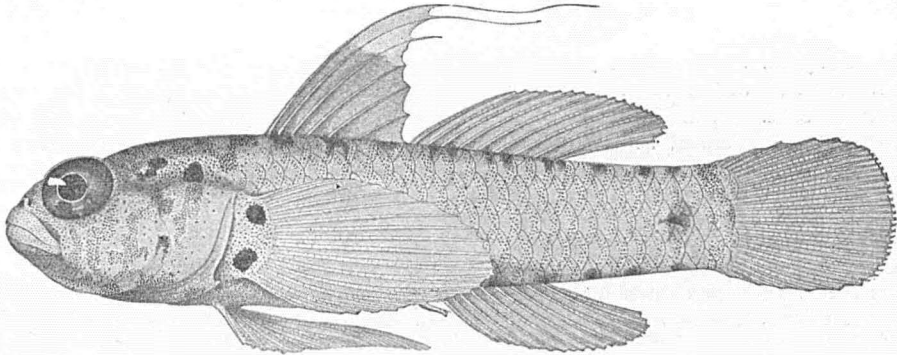


FIG. 79.—*Eviota distigma* Jordan & Seale, new species. Type.

prominent; origin of spinuous dorsal nearer snout than posterior axil of soft dorsal; the two anterior dorsal spines elongate and filiform, reaching when in repose the posterior axil of soft dorsal; the base of the fin 1.50 in head; base of soft dorsal 1.45 in head, the longest ray 1.75 in head; base of anal 2.80 in head, its longest ray 1.75; pectorals slightly longer than head; ventrals of about equal length and extending to tip of anal fin; caudal rounded, 1.20 in head.

A very small fish from the crevices of the coral reefs at Pago Pago. Easily known by the two black spots at the base of the pectoral, these rarely faint or obsolete.

Life colors of a specimen from Pago Pago, translucent gray, with faint bluish green anteriorly; small orange spots with many black points; interior blackish transverse bars showing through distinctly.

Color in spirits yellowish white, with slight shading of dusky. The type specimen has two distinct round spots on base of pectoral, a black spot on side of caudal peduncle with an indistinct vertical band through it and around peduncle; two black spots above opercle; about 10 black blotches taking the form of short bands over the back, in some specimens extending indistinctly to ventral surface; 6 dusky band-like spots along base of anal and caudal peduncle; margin of the scales usually shaded with minute brown dots; opercle and nuchal-region with brown blotches, some forming more or less irregular lines; the 2 dorsal fins about equally shaded with dusky; pectoral white; caudal, anal, and ventral with dusky shadings.

Fourteen specimens from Apia and Pago Pago. The type is no. 51767, U. S. National Museum, from Pago Pago, length five-eighths inch.

1425. *Eviota sebreei* Jordan & Seale, new species. Samoa.

Head 3.35 in length; depth 5; eye 3.25 in head; scales 26; dorsal vi, 9; anal 10.

Body elongate, compressed; anterior profile of head rounded; jaws equal; the snout, however, more pointed than in other species of *Eviota*; caudal peduncle 2 in head; jaws with small sharp-pointed teeth; angle of jaws below middle of eye; base of spinous dorsal greater than its height, its base 1.30 in head; base of soft dorsal 1.20 in head; pectoral 1.10 in head; the ventrals slightly longer, reaching to base of anal, their origin posterior to base of pectorals; caudal rounded, 1.20 in head.

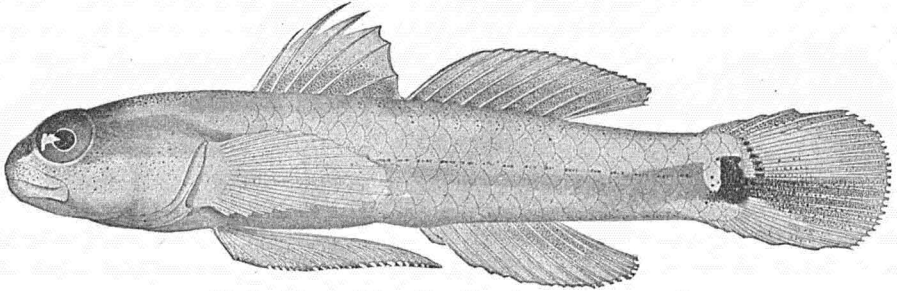


FIG. 80.—*Eviota sebreei* Jordan & Seale, new species. Type.

Color in spirits white; a wide grayish band from posterior of eye along lower part of side to caudal; a narrow brown line from posterior of eye along middle of body to caudal; a big deep black blotch on base of caudal, which extends out upon the fin; a dark line from eye down side of snout; upper half of spinous dorsal whitish, lower half dusky; soft dorsal, anal, and caudal more or less shaded with dusky; pectoral and ventral white.

One specimen, no. 51765, U. S. National Museum, from Apia, length 0.65 inch.

1426. *Eviota herrei* Jordan & Seale, new species. Samoa.

Head 3.10 in length; depth 3.75; eye 2.75 in head; scales 24; dorsal vi, 9; anal 8.

Body rather short and thick for a fish of this genus; anterior profile rounded, the lower jaw slightly the longer; minute round, pointed teeth in each jaw, those of upper jaw rather widely

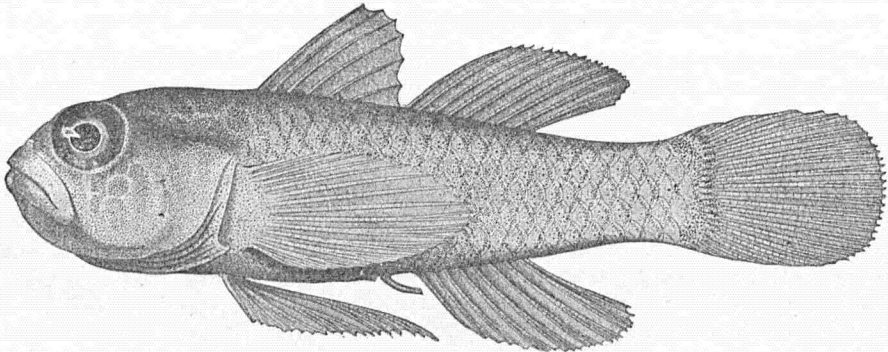


FIG. 81.—*Eviota herrei* Jordan & Seale, new species. Type.

separated; caudal peduncle thick, its depth 2 in head; origin of spinous dorsal slightly posterior to a line with origin of ventrals, its height about equal to its base; base of soft dorsal equal to its longest ray; pectoral long, extending to below the 7th ray of soft dorsal; origin of anal much nearer base of caudal than tip of snout, its base less than length of its longest ray; ventrals reaching base of anal, their origin directly below and scarcely in advance of origin of pectorals; caudal rounded, 1.20 in head.

Life colors of a specimen from Apia, gray, scales orange-edged; fins clear orange, barred with grayish.

Color in spirits whitish, with scales margined with dusky dots, giving the fish a brownish appearance; the shadings on the head with light lines reticulating more or less distinctly, and separating the marking with irregular spots, or squares or polygons; a very indistinct dusky blotch on sides of caudal peduncle, 3 scales from base of caudal; most specimens (including type) show about three indistinct longitudinal white lines on the sides; there is a dark line from posterior of eye to upper posterior margin of opercles; some specimens show 6 indistinct dusky spots along base of anal and lower surface of caudal peduncle; the two dorsal fins and the anal dusky; other fins but slightly shaded with dusky.

This species closely resembles *Eviota distigma*, differing in the larger mouth, and in having usually but one spot at base of pectoral.

Three specimens (237) from Pago Pago and five from Apia. The type is no. 51769, U. S. National Museum from Apia, length 0.75 inch.

Named for Mr. W. C. T. Herre.

1427. *Eviota pruinosa* Jordan & Seale, new species. Samoa.

Head 3.20 in length; depth 5; eye 3.50 in head; dorsal vi, 9; anal 8; scales 28; snout 4 in head.

Body elongate, compressed, the head rather pointed; the mouth small; angle of jaw under anterior margin of eye; opercles and preopercles entire; teeth minute, in jaws only; a distinct tube at nostril; depth of caudal peduncle 2 in head, also about 2 in its length; anal papilla distinct; origin of

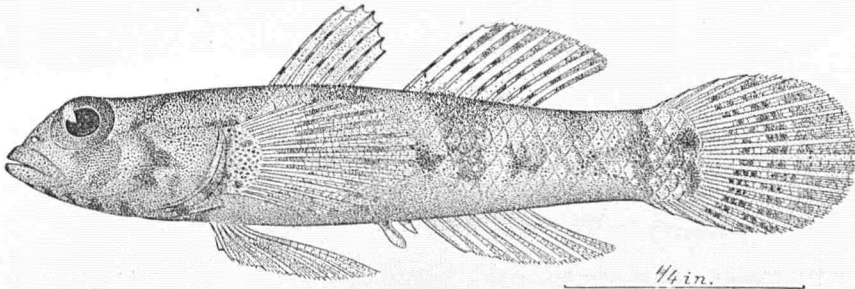


FIG. 82.—*Eviota pruinosa* Jordan & Seale, new species. Type.

spinous dorsal slightly posterior to line with axil of ventrals, the longest spine 2 in head; base of soft dorsal 1.50 in head, its longest ray 1.75 in head; anal similar to soft dorsal, its base and length of rays being slightly less; pectorals extending to a line with base of soft dorsal, 1.12 in head; ventrals separate, their tips extending to anal opening; caudal rounded, 1.20 in head.

Life colors of a specimen from Pago Pago, white with blackish mottlings and very faint orange yellowish dashes; a faint dusting of whitish as though frosted.

Color in spirits yellowish white, shaded with brownish; five or six dark blotches along the side rather distinct wide dusky blotch extending down from base of each dorsal fin, a distinct white stripe between the two, and a white stripe over anterior base of spinous dorsal; two dusky blotches at base of caudal; a rather black spot directly posterior to eye; cheeks and usually under part of head more or less blotched with dusky; dorsal fins marked by three or four rows of oblique dark spots; caudal with about five dusky bands; pectoral with four or five narrow indistinct lines, and usually with about four dark spots on base; anal and ventral unmarked.

Two specimens from crevices in the coral reefs at Pago Pago. The type is no. 51779, U. S. National Museum, length 0.90 inch.

TRIMMA Jordan & Seale, new genus.

Trimma Jordan & Seale, new genus of Gobiidae (*cæsiura*).

This genus, typified by *Trimma cæsiura*, is near *Eviota*, but the region before the dorsal is fully scaled. In texture the species is firmer and less translucent.

1428. *Trimma cæsiura* Jordan & Seale, new species. Samoa.

Head 3.10 in length; depth 4.50; eye 3.18 in head; dorsal vi, 8; anal 9; scales 25 from posterior margin of opercles; snout 5 in head; interorbital less than pupil.

Body elongate, compressed; anterior profile rounded, the lower jaw slightly the longer, the angle under anterior margin of eye; several rows of small, sharp teeth in each jaw; opercles and preopercles entire; depth of caudal peduncle 2.50 in head; origin of dorsal fin above base of pectorals, its longest spine 1.75 in head, slightly greater than length of fin; base of soft dorsal about equal to its longest ray, 2.50 in head; base of anal 1.75 in head, scarcely equal to its longest ray; the origin of anal much nearer base of caudal than tip of snout; pectoral scarcely equal to head; ventral 1.10 in head; caudal rounded, 1.50 in head.

Life colors of the type from Apia plain bright red, with a gray spot on back of tail and gray spots on many scales of back and head; fins all bright red.

Color in spirits yellowish white, the margin of the scales thickly shaded with dusky; lighter below; 3 dark bands across interorbital space; cheek shaded with scattered dark brown dots which take the form of 2 or 3 short stripes down from the eye; snout and lips shaded with brownish;

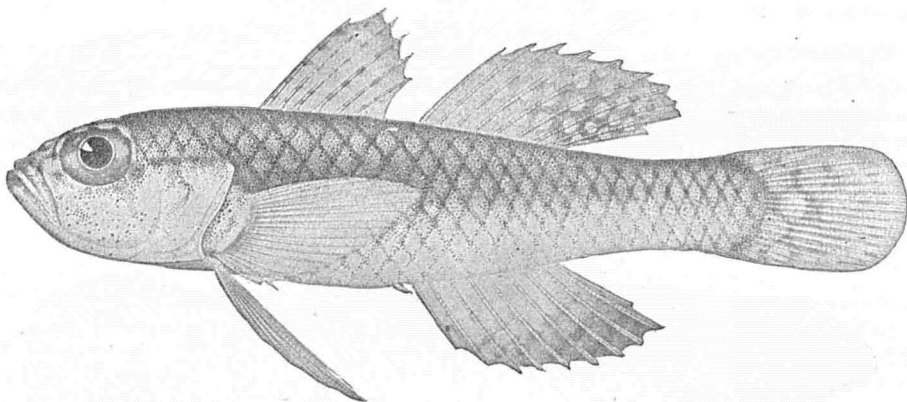


FIG. 83.—*Trimma caesiura* Jordan & Seale, new species. Type.

slightly darker shadings along upper margin of opercle and base of pectoral; scattered over body are a few darker dots of coloring shading into the marginal coloring of the scales; spinous dorsal yellowish, with indistinct oblique bands; soft dorsal darker with round, lighter spots; caudal yellowish white with dusky blotches; anal shaded with dusky blotches; pectoral and ventral yellowish.

One specimen from Apia, no. 31772, U. S. National Museum, length 1.26 inches.

HETERELEOTRIS Bleeker.

Heteroleotris Bleeker, Arch. Neerl. 1875, 306 (*diadematus*).

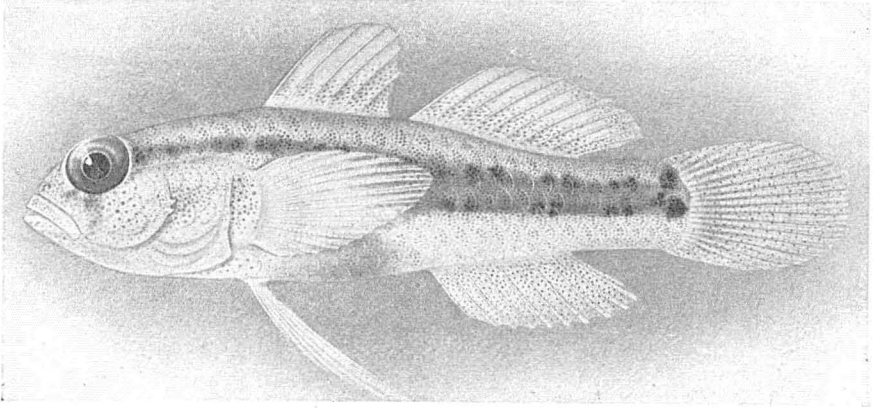
This genus contains small eleotrids of elongate form, the body translucent and scaleless. The type species *Heteroleotris diademata* of the Red Sea is near the species described below.

1429. *Heteroleotris clara* Jordan & Seale, new species. Samoa. (Pl. xxxvi, fig. 2.)

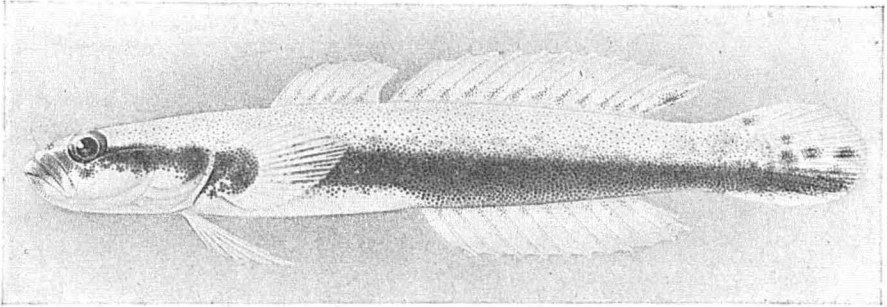
Head 4 in length; depth 6.50; eye 4.25 in head; dorsal vi, 13; anal i, 11; snout 5 in head.

Body elongate, compressed; lower jaw considerably the longer; the opening to tip of mouth is above the median line of body; the angle of jaws is under the anterior margin of eye; mouth large, with small teeth in jaws, also teeth on the palatines; tube at nostril rather distinct; opercles and preopercles not denticulate; depth of caudal peduncle 2.60 in head; origin of spinous dorsal on a line with middle of pectoral rays, its base 1.75 in head, its longest spine 3.50 in head; base of soft dorsal a third longer than head, 2.87 in length without caudal; base of anal longer than head, 3.25 in length without caudal, its origin midway between middle of eye and base of caudal, its longest ray 2.50 in head; pectorals about equal to head; ventrals separate, situated slightly anterior to base of pectorals, the tip a little more than midway to base of anal; caudal rounded, 1.20 in head.

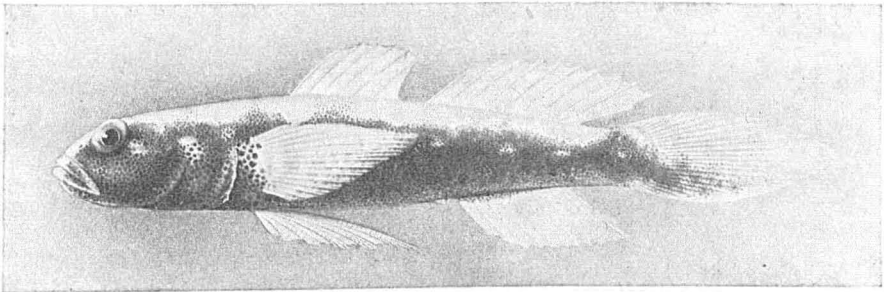
Life colors of a specimen from Pago Pago creamy white, thickly dotted with dark brown points; on each side a single broad black-brown band extending from tip of snout to tip of caudal; caudal otherwise clear with yellowish suffusion; below dead flesh-white.



1. ASTERROPTERYX SEMIPUNCTATUS RÜPPELL.



2. HETERELEOTRIS CLARA JORDAN & SEALE, NEW SPECIES. TYPE.



3. HETERELEOTRIS PHAENNA JORDAN & SEALE, NEW SPECIES. TYPE.

Color in spirits yellowish white, a broad deep brown band from tip of snout to tip of caudal and below the median line of body; this band is broader and diffused along base of anal fin; tip of under jaw dusky; the base of anal and the dorsals with indistinct dusky band-like spots at the base of each ray and spine; three or four dark spots on caudal above the black band; posterior ray of dorsal with a black spot on its middle portion; remaining fins white, unmarked.

Two specimens from Pago Pago. The type is no. 51773, U. S. National Museum, length 1 inch.

1430. *Heteroleotris phaenna* Jordan & Seale, new species. Samoa. (Pl. xxxvi, fig. 3.)

Head 3.12 in length; depth 5; eye 4.50 in head; snout 4.50; dorsal vi, 10; anal i, 10; no scales.

Body elongate, compressed, snout rounded, with dull point, the lower jaw being the longer; angle of mouth under anterior half of eye; mouth rather large, with minute pointed teeth in the jaws; depth of caudal peduncle 3 in head; opercles and preopercles entire; origin of spinous dorsal slightly posterior to line with axil of ventrals; base of spinous dorsal 1.75 in head, its longest spine 2.50 in head; base of soft dorsal 1.10 in head, its longest ray 2.10 in head; base of anal 1.75 in head, its origin about midway between base of pectorals and base of caudal; pectorals scarcely equal to length of head; origin of ventrals below axil of pectoral, their tips reaching to anal opening; ventrals separate, joined at base; caudal long, its rays graduate to tip, length greater than head.

Color in life, black below, the top of the head and the back abruptly white.

Color in spirits, the upper third of body and head white, the lower two-thirds black, the black running out on lower half of caudal fin, and the white running around tip of head, the black coloring on base of pectorals, and to some extent on sides of head taking the form of deep black spots; fins all yellowish white, except the black on lower part of caudal.

One specimen, the type, 0.75 inch, from the reef at Pago Pago, no. 51786, U. S. National Museum.

VITREOLA Jordan & Seale, new genus.

Vitreola Jordan & Seale, new genus of Gobiidae (*V. sagitta*).

This genus is distinguished from *Heteroleotris* by the very slender, naked body and the form of the head and dorsal fin. The body is slender and perfectly translucent, the head sharply pointed, the point being formed by the very heavy lower jaw.

1431. *Vitreola sagitta* Jordan & Seale, new species. Samoa. (Pl. xxxvii, fig. 1.)

Head (to tip of under jaw) 3.50 in length; depth 9; eye situated on dorsal surface of head, 2 in snout; dorsal vi, 13; anal i, 13; snout 6 in head; the anterior projection of lower jaw about equal in length to snout.

Body elongate, compressed; anterior profile of head formed by the long, conical projection of the lower jaw; opening of mouth on the dorsal profile; the angle of jaws under anterior margin of eye; minute teeth in jaws and palatines, tongue deeply bilobed; the lower membrane of opercles, posterior and lower margin of preopercles, the upper and lower jaw all have distinct tooth-like fringes on their marginal membrane; depth of caudal peduncle 5 in head; origin of dorsal on line with tip of pectorals, the fin incised to one-half its depth, the anterior spines being placed much nearer each other than the posterior spines; the base of dorsal is 1.75 in length of fish without caudal; base of anal 2.75, its origin slightly nearer to base of caudal than to eye, its longest ray 3 in head; pectoral very short, about 4 in head; ventrals separate, short, 2.50 in head, their origin slightly anterior to origin of pectorals; caudal rounded, 1.90 in head.

In life, clear translucent white without dots or color of any sort.

Color in spirits white, shaded above the median line with an irregular band of brownish dots which extend from snout to base of caudal; fins white, unmarked.

Three specimens from Pago Pago. The type, 1.45 inches long, is no. 51784, U. S. National Museum.

PERIOPHTHALMUS Bloch & Schneider.

1432. *Periophthalmus barbarus* Linnæus. *Mano'o*; *Talae*. Samoa; Fiji; Waigiu, Oualan; Tonga; Palau Is.; New Guinea; Faté (Seale); East Indies. (Fig. 1, p. 174.)

Gobius barbarus Linnæus, Syst. Nat., ed. xii, 460, 1766, no locality. Pectorals fan-shaped; dorsal xii-13.

Periophthalmus koctreuteri Bloch & Schneider, Syst. Ichth., 65, 1801, locality unknown.

Periophthalmus kalolo Lesson, Voy. Coquille, iii, 146, 1830, Waigiu, New Ireland, Oualan.

Periophthalmus argentilineatus Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 191, Oualan, New Guinea, Irawaddy R.

Of this species we have 8 specimens from Aua, on the north shore of Tutuila, 9 from Pago Pago, 50 from mouth of Vaisigono River at Apia, and 1 from Apia collected by Dr. Lung, U. S. N., in 1890.

This extraordinary little fish is very abundant in the sluggish and brackish waters in the mouths of the streams of Samoa. It abounds especially in muddy bayous, freely leaving the water to climb bushes, to skip through the grass or to lurk under piles of stones to await the returning tide. It is exceedingly quick of movement and very tenacious of life. Specimens placed in a pail of formalin escaped when the lid was raised.

Life colors of one from a mud puddle at Apia, mottled gray; speckles on head pure white, others dull whitish; silvery cross-streaks on side, some light and a few dark streaks on body; dorsal with spots of pure bluish white below, then black, then edged with dull white; second dorsal reddish brown above, then a white band, then a black one, then dull olive reticulations around pale spots; caudal light and dark olive; anal pale grayish; ventral gray, with dusky center; upper surface black, pale edged; under side of head livid gray, with pale or white spots; pectoral dotted much like caudal.

A specimen taken in coral sand in the sea at Pago Pago was olive, back with nine dark cross-bands, unequal, some of them oblique; head and sides with gray dots and marblings; a dark bar from front of eye down and forward; one down and back from posterior part of eye; first dorsal very small, VII, with a dark bar at base; second with oblique black cross-streaks; caudal with four or five dark cross-streaks; pectoral with a black dot at base above and faint cross-streaks; ventral and pectoral pale; ventral separate. In spite of the small number of dorsal rays, this specimen is probably identical with the others of this variable species.

PERIOPHTHALMODON Gill.

This genus is close to *Periophthalmus*, differing in the shorter spinous dorsal, the ventrals mostly united in the adult.

1433. *Periophthalmodon schlosseri* (Pallas). Fiji; New Guinea (Ramsay & Ogilby); East Indies.

1434. *Periophthalmodon australis* (Macleay). New Guinea.

Periophthalmus australis Macleay, Proc. Linn. Soc. N. S. W. 1884, 334.

CHLAMYDES Jenkins.

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

This genus has the general character of *Gobius*, including the silk-like fringe to the pectorals, but the cheeks and opercles are covered with scales.

1435. *Chlamydes laticeps* Jenkins. Hawaii.

1436. *Chlamydes cotticeps* (Steindachner). Tahiti.

Gobius cotticeps Steindachner, Sitz. Ak. Wiss. Wien 1880, 237, Tahiti.

GNATHOLEPIS Bleeker.

Gnatholepis Bleeker, Arch. Neerl. 1875, 318 (*anjerensis*).

Hazeus Jordan & Snyder, Proc. U. S. Nat. Mus., xxiv, 1902 (1901), 51 (*otakii*).

This genus has the character of *Rhinogobius*, except that the cheeks and opercles are covered with large scales. The species are small, pale in color, and live about the coral reefs. *Gnatholepis thompsoni* is found in the West Indies, *Gnatholepis otakii* in Japan. The tongue is notched in *Gnatholepis deltoides*, *thompsoni*, *knighti*, and *otakii*. *Gnatholepis anjerensis* we have not seen, but the scanty description approaches *G. deltoides*.

1437. *Gnatholepis deltoides* (Seale). Guam; Samoa.

Gobius deltoides Seale, Occ. Papers Bishop Museum, vol. I, no. 3, 1901, 125, Guam.

?*Gobius anjerensis* Bleeker, Blennioiden en Gobioiden, 1850, 251, Anjer (Java).

?*Gnatholepis anjerensis* Bleeker, Arch. Neerl., ix, 318, 1875. "Caput superne lateribusque squamatum."

This species apparently differs from *Gnatholepis anjerensis* (Bleeker), the type of the genus *Gnatholepis*, in the smaller scales and more elongate body. The scanty description of the latter, with no reference to the color, renders it difficult to make a positive identification. The longer caudal, 4½ instead of 5 in total length, also may be distinctive.

Gnatholepis knighti from Hawaii is very close to the present species, but has smaller scales, 32-9. The coloration is very similar to that of our specimens called *Gnatholepis samoensis*.

We have 35 specimens from Apia and two from Pago Pago.

Life colors of *Gnatholepis deltoides*, from Apia, plain gray and mottled, with no color; a sharp band across head and through and below eye.

Another specimen from Apia was pale gray, a black bar at base of caudal; two black dots below eye; 4 yellowish white cross-bars, alternating with black; a black spot on middle of base of pectoral; fins whitish, scarcely dotted. Tongue notched.

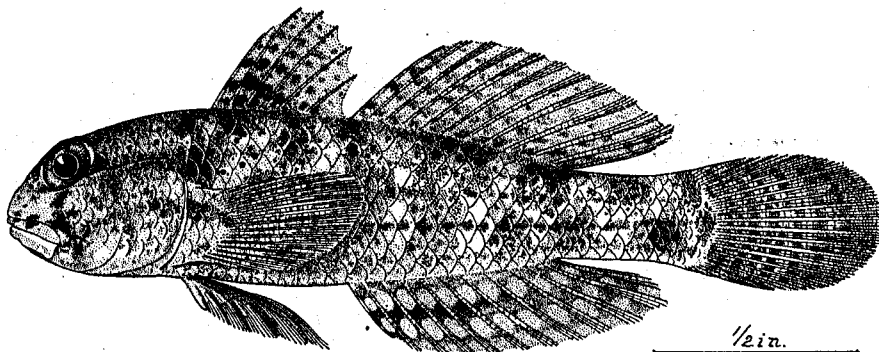


FIG. 84.—*Gnatholepis deltoides* (Seale).

1438. *Gnatholepis knighti* Jordan & Evermann. Hawaii.

Gnatholepis knighti Jordan & Evermann, Bull. U. S. Fish Comm., xxii, 1902 (1903), 204, Honolulu.

This little fish is found in abundance in coral pools and tide ponds in the Hawaiian Islands.

1439. *Gnatholepis canalaë* (Sauvage). New Caledonia.

Gobius canalaë Sauvage, Bull. Soc. Philom. 1881, 102, Canala, in New Caledonia.

1440. *Gnatholepis maculipinnis* (Macleay). New Guinea.

Gobius maculipinnis Macleay, Proc. Linn. Soc. N. S. W. 1884, 267. (Dorsal VII.)

VAIMOSA Jordan & Seale, new genus.

Vaimosa Jordan & Seale, new genus of Gobiidae (*V. fontinalis*).

This genus differs from *Gnatholepis* and *Rhinogobius* in having the cheeks naked and the opercles covered with large scales. The species inhabit mountain brooks of the South Sea Islands. The type is *Vaimosa fontinalis*, from the Gasegase stream at Vaimosa in Upolu. *Gobius javanicus* Bleeker probably belongs to the same genus.

1441. *Vaimosa fontinalis* Jordan & Seale, new species. Samoa.

Head 4 in length; depth 4.75; eye 3.85 in head; dorsal vi, 9; anal 9; scales 37 from posterior margin of opercles; the scales are much smaller on anterior of body; head from a line with posterior of eyes unscaled; no scales on cheeks or opercles; interorbital spot equal to eye; snout equals two-thirds of eye.

Body elongate, compressed; the head bluntly rounded; mouth moderate, the angle under middle of eye; small teeth in jaws, none on vomer or palatines; opercle and preopercle entire; nuchal region concave; caudal peduncle strong, its depth 2 in head; origin of spinous dorsal over the anterior third of pectoral rays, its longest spine 2 in head; base of soft dorsal 1.20 in head, equal in length to its longest ray; base of anal 1.25 in head, equal in length to its longest ray; pectoral equals length of head; ventrals united, 1.20 in head, their origin below base of pectorals; caudal rounded, equal to length of head.

Life colors of a specimen from the Gasegase River at Apia (1.5 inches long), olive; 3 black spots at base of caudal; body with dusky shades; side of head with 3 oblique blackish stripes, meeting obscurely across throat; spinous dorsal reddish at base, the upper half black; other fins obscurely marked.

Color in spirits, dull greenish with about 7 broad irregular block-like dusky bands over back and on side, more or less connected on median line of body and near base of dorsal fins; lower third of

body unmarked, but with 2 or 3 indistinct lines under chin; 5 or 6 short curved dusky lines on side of head; 1 from angle of mouth to posterior margin of preopercle where it forms a crescent-like curve upward, uniting with a line from the posterior of eye and another from below the eye; a short line from lower anterior margin of eye to middle of each side of jaw; a short line from upper posterior part of eye to opercle; a black blotch just above upper axil of pectoral; a spot on base of spinous dorsal dusky, a white line near the top, and a lighter area at base; remaining fins dusky; 2 black spots at base of caudal fin.

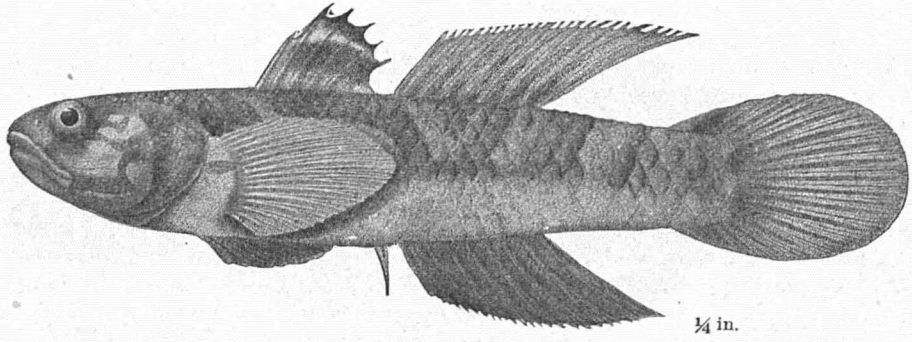


FIG. 85.—*Vaimosa fontinalis* Jordan & Seale, new species. Type.

Common in the streams of Upolu and Tutuila, with *Vailima stevensoni*, but in water less swift.

We have 23 specimens from Vaisigano River and 8 from Vaillima brook and tributaries near Apia, 2 specimens from Gasegase River at Vaimosa near Apia, and 42 specimens from the stream at Pago Pago.

The type is no. 51776, U. S. National Museum, from near Apia, length 2 inches.

1442. *Vaimosa notospila* (Günther). Streams of Fiji.

Gobius notospilus Günther, Fische der Südsee, 173, taf. 110, fig. B, 1873, Namusi in Viti Levu (Fiji).

OPLOPOMUS Steindachner.

Centrogobius Bleeker, Arch. Neerl. 1875, 321 (*notacanthus*); not *Oplopoma* Girard.

This genus is characterized by the presence of a small spine on the preopercle. The dorsal spines are rigid. In other respects it resembles *Rhinogobius*.

1443. *Oplopomus oplopomus* (Cuvier & Valenciennes). Tahiti; East Indies.

Gobius oplopomus Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 66, 1839, Red Sea. Günther, Fische der Südsee, 170, Philippines, Macao, Tahiti.

Gobius bitelatus Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 89, 1839, Red Sea.

Gobius notacanthus Bleeker, Goram, 110, Goram.

ABOMA Jordan & Starks.

Aboma Jordan & Starks, Proc. Cal. Ac. Sci. 1895, 497 (*etheostoma*).

This genus differs from *Rhinogobius* in the presence of 7 dorsal spines.

1444. *Aboma græffei* (Günther). Rivers of Fiji.

Gobius græffei Günther, Fische der Südsee, 179, Viti Levu, in fresh water.

This species unknown to us is recorded by Günther and Kner from the streams of Fiji.

PARAGOBIODON Bleeker.

Paragobiodon Bleeker, Arch. Neerl. 1875, 309 (*melanosoma*).

This well-marked group is distinguished by the very clabby body, subglobular head, short cup-shaped ventrals, and by the presence of numerous short prickles or filaments on the head. The scales are large, the sides of the head naked and the fins short. The lower jaw has 2 small canines. The resemblance of these species to *Gobiodon* indicates no close affinity.

1445. *Paragobiodon echinocephalus* (Rüppell). Tonga; Samoa; Tahiti.

Gobius echinocephalus Rüppell, Atlas Fische, 136, 1828, Red Sea. Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 134, 1839, Massuah, Red Sea. Klunzinger, Fische Roth. Meer., 475, Red Sea. Günther, Fische der Südsee, 175, taf. 108, fig. D, Samoa, Tahiti, Tonga, Meduro, Port Bowen, China Sea, Red Sea.

Gobius amiciensis Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 133, 1839, Tonga. Sauvage, Poiss. Madagascar, 352, pl. xli, Madagascar (figure bad, scales given by error as 38 in text).

Of this remarkable species we have 11 specimens from the coral reef at Apia, and 3 from Pago Pago. The fish is not rare in the crevices of the coral reefs. It reaches a length of little more than an inch, but all our specimens are less than an inch in length.

The genus *Paragobiodon* is separated from *Rhinogobius* by the short plump body, the globular head, the presence of papillæ on the skin of the head, by the short, cup-shaped ventrals, and by the short oblique mouth, with two small canines. The scales are large, the fins short, the first dorsal with 6 spines, and the sides of the head are without scales.

Life colors of a specimen from Pago Pago, all fins and body up to base of dorsal and pectoral black; in front of that smoky red or flesh color; finely rugose and punctate; ventrals fused to form a fleshy rugose and papillate pad.

Another specimen from Apia was in life golden-yellow, with the fins all deep brownish black, mouth very small, lips black, iris red, head more brownish.

A third specimen from this locality differs in the yellow pectoral and ventral, the pectoral dusky at tip. (This may be a female.) A faint pale edge to anal, etc.; vertical fins deep blue-black.

1446. *Paragobiodon xanthosomus* (Bleeker.) Samoa.

Gobius xanthosoma Bleeker, Ceram, II, 103, Ceram, Buru, Celebes, Amboina.

? *Gobius waitei* Garman, Bull. Mus. Comp. Zool., xxxix, 1903, 234, pl. 3, fig. 3, Great Barrier Reef of Australia.

Other specimens which we identify as *Paragobiodon xanthosomus* are yellowish brown throughout, the fins scarcely darker. Twenty-two specimens were all taken in the reef at Apia in company with *Pseudogobiodon citrinus*, which they much resemble in color.

Gobius waitei is a species of *Paragobiodon* closely resembling the present species.

ZONOGOBIUS Bleeker.

Zonogobius Bleeker, Arch. Neerl. 1875, 323 (*semifasciatus*=*semidoliatus*.)

This genus includes diminutive gobies of varied coloration, similar to *Rhinogobius* but with the nape and whole head naked, the head large, and the mouth almost vertical. Tongue pointed; pectoral without silk-like rays; teeth moderate; preopercle with a slight fringe of papillæ.

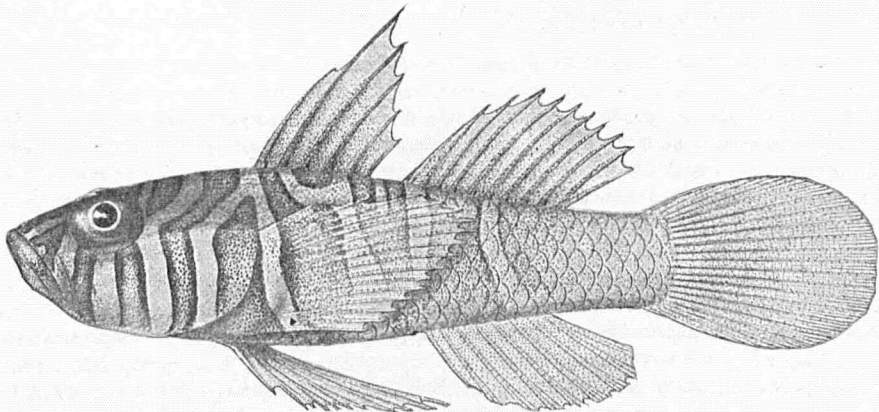
1447. *Zonogobius semidoliatus* (Cuvier & Valenciennes). *Mano'o*. Vanicolo; Samoa; Tonga; Huahine; East Indies.

FIG. 86.—*Zonogobius semidoliatus* (Cuvier & Valenciennes).

This dainty little fish is rather common in the coral reefs about Apia and Pago Pago. It reaches a length of less than an inch. We have 18 specimens from Pago Pago and 4 specimens from Apia.

Life colors of one from Apia; brown anteriorly, olive-yellow behind; anterior parts to vent sharply marked by blunt gray cross-bars, each darker edged; fins dull olive-yellow, the dorsals with a pale and a dark band; the ventrals with a dusky center.

A specimen from Pago Pago was clear olive, paler behind; anterior parts to middle of soft dorsal with seven bluish white dark-edged cross-bands, the one behind eye forking above, the next forking below; both dorsals finely checked, bluish and pale orange; anal dark, pale edged; caudal yellowish; ventral mesially dusky; ventral and pectoral pale olive. The first dorsal of this specimen is filamentous.

Another specimen from Apia was greenish, with orange stripes alternating with bluish ones; fins dull golden.

VAILIMA Jordan & Seale, new genus.

Vailima Jordan & Seale, new genus of Gobiidae (*stevensoni*).

This genus consists of gobies allied to *Rhinogobius* with long bodies, depressed head and peculiar physiognomy, the ventral fins short and rounded. It is near *Rhinogobius*, but is distinguished by the more elongate body, the low mouth with two small canines, and the short, cup-shaped ventrals. Scales large; head scaled above only; dorsal vi, 10; anal 11.

1448. *Vailima stevensoni* Jordan & Seale, new species. *Pa'ofu*. Samoa.

Head 4.50 in length; depth 5.75; eye 3.50 in head; dorsal vi, 10; anal i, 10; scales 34 from posterior margin of opercles; snout 3; interorbital concave, 3.20 in head.

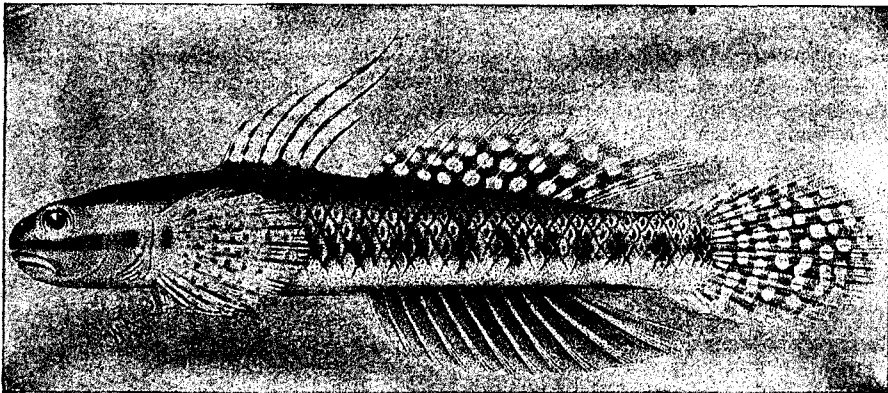


FIG. 87.—*Vailima stevensoni* Jordan & Seale, new species. Type.

Body elongate, compressed; anterior of head rounded; the upper part of snout and interorbital taken up by a broad concave groove, which extends to base of spinous dorsal; head and nape depressed, with small scales; mouth rather small, the angle under anterior margin of eye; lips broad; a row of small, sharp-pointed teeth in jaws, none on vomer or palatines; opercles and preopercles entire; gillrakers very small; depth of caudal peduncle 2 in head; origin of spinous dorsal over axis of ventrals, the third and fourth spines elongate, the fourth about a third longer than head; base of soft dorsal 3.75 in length of fish without the caudal, the posterior ray longest, 1.30 in base of fin; base of anal and its rays about equal to soft dorsal; pectorals 1.18 in head, their tips under the last spine of first dorsal; ventrals united, disk-like, short, 1.50 in head; diameter of disk about 2 in head; caudal large, rounded, its length 3.75 in length without caudal.

Life colors of a specimen from Gasegase River at Tambiyou, near Apia, olive-green; scales mottled golden and black; a black lateral band, interrupted by grayish spots; first dorsal cherry-red; spines with black spots; second dorsal reddish with dark checkers; caudal clear yellow above, then a median dash of cherry reddish, the lower half yellowish; all but upper edge closely reticulated, dark around pale spots; anal dark; ventral dirty yellow; pectoral yellow, checked with black; head with an olive lateral band.

Other specimens (female) with less red and yellow; 2 lateral bands, very distinct on head, the lowest broken into 3 dark cross-bars; anal dotted with black.

Color in spirits, a light mottled brownish, lighter below; a distinct row of black blotches along the side, these blotches about 14 in number, and all more or less connected; anterior to pectoral fin these blotches take the form of a dusky band, across the side of head and around the snout; another very indistinct dusky band about the width of eye above the blotches on sides, also extends out of upper side of head, and around upper part of snout; some specimens show about 7 whitish cross-bands over the back; spinous dorsal yellowish with about 5 oblique lines of dark dots; soft dorsal with dark lines reticulating in many ways, forming ring-like figures around white dots; caudal fin colored like soft dorsal, except that the dark lines run more regularly, forming 7 or 8 irregular cross-bands; anal uniform dusky; pectoral yellowish, crossed with about 8 narrow lines of dusky; ventral yellowish.

A beautiful little goby found on the bottom of swift streams near Apia. Its motions are remarkably lizard-like, and the pale yellow spots glisten as the fish moves. Seen in the Vaisigano River, the Gasegase River, and the Vailima Brook, from which we have 19 specimens. We have one from Pago Pago. It was abundant in the Vailima Brook on the estate of Robert Louis Stevenson, for whom the species is named.

The type is no. 51775, U. S. National Museum, from Gasegase River, at Vaimosa, Samoa, length 2 inches.

DROMBUS Jordan & Seale.

This genus, typified by *D. palackyi* from the Philippines, has the head crossed with rows of cirri as in *Mars* and in *Gobiomorphus*. The scales are much larger than in *Mars*, and the ventrals are united. There are no teeth on the vomer.

1449. *Drombus tutuilæ* Jordan & Seale, new species. Samoa.

Head 2.75 in length; depth 4.5; eye 3.5 in head; snout 4.2; scales rather large, about 23 from posterior margin of opercle; dorsal vi, 8; anal 8.

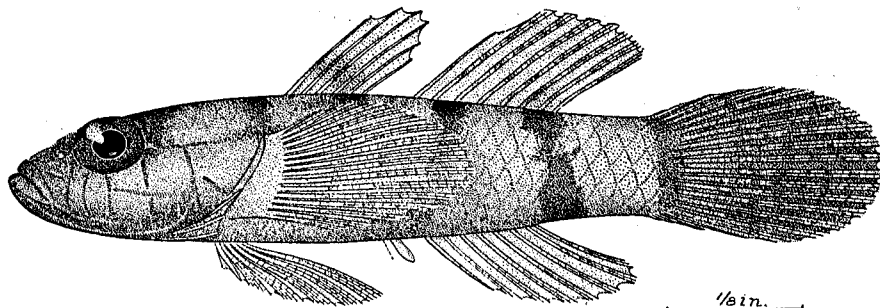


FIG. 88.—*Drombus tutuilæ* Jordan & Seale, new species. Type.

Body elongate, compressed, anterior profile rounded; lower jaw the longer, projecting; head roughened with numerous raised lines of rather large size which radiate from eye; others cross the cheek, snout, and nuchal region, these probably functioning as mucus canals; minute teeth in jaws, none on vomer or palatines; caudal peduncle 2.6 in head; origin of spinous dorsal slightly posterior to a line with axil of ventrals, the longest spine 2 in head; base of soft dorsal about equal to its longest ray, 1.75 in head; anal similar to soft dorsal, its base slightly less; pectorals rounded, rather long, the tips under base of fifth dorsal ray; ventrals united into a flat disk which reaches to anal opening; caudal rounded, about 1.1 in head.

Color in spirits, yellowish white, with 5 rather distinct vertical bands of black, the first at posterior margin of opercle, the second from posterior half of spinous dorsal, the third from anterior half of soft dorsal, the fourth from posterior half of soft dorsal obliquely down to axil of anal, the fifth at base of caudal fin; there is also a dusky blotch on nuchal region just back of eye; top of head more or less dusky; fins slightly darker than the body coloring, the dark bands of the body extending more or less upon the dorsal fins; otherwise the fins apparently without distinct markings.

One specimen from Pago Pago, type no. 51770, U. S. National Museum, length 0.75 inch.

1450. *Drombus filamentosus* (Sauvage). New Caledonia.*Gobius filamentosus* Sauvage, Bull. Sci. Philom., 1883, 157, New Caledonia.

This species is said to have a multitude of small filaments on the lower side of the head and elsewhere. We therefore refer it, with much doubt, to our genus *Drombus*.

RHINOGOBIUS Gill.

(*Ctenogobius* Jordan & Snyder, not of Gill; *Coryphopterus* Gill; *Mugilogobius* Smith.)

The genus contains small gobies allied to *Gobius*, but of feeble organization and with no silky rays to the pectoral. The profile of the head is convex, anteriorly rounded. It differs from *Ctenogobius* in having the tongue convex at tip and not forked or notched.

1451. *Rhinogobius corallinus* Jordan & Seale, new species. Samoa.

Head 3.2 in length; depth 5; eye 3.1 in head; dorsal vi, 10; anal 8; scales 34.

Body elongate, compressed, largest at pectoral girdle; anterior profile of head obliquely pointed; mouth small, the angle under the anterior of eye; small sharp-pointed teeth in jaws; opercle and pre-

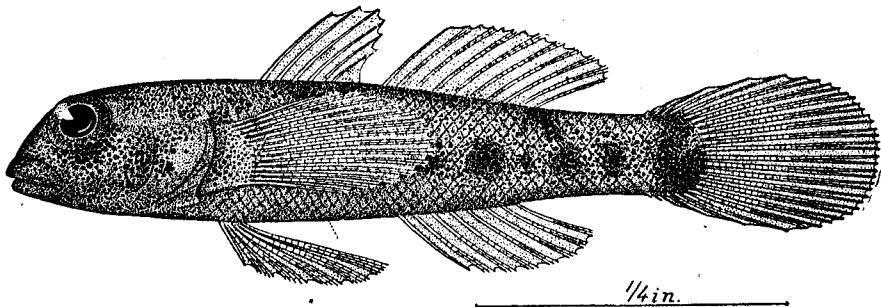


FIG. 89.—*Rhinogobius corallinus* Jordan & Seale, new species. Type.

opercle entire; caudal peduncle slender, its depth 2.5 in head, 2.2 in its length; origin of spinous dorsal slightly posterior to line with axil of ventrals; the longest spine 1.95 in head; base of soft dorsal 1.2 in head, its longest ray 2.1; anal similar to soft dorsal, its base and length of rays slightly less, the origin of the fin nearer to base of caudal than eye; pectorals greater than length of head, the tips extending to below base of fifth dorsal ray; ventrals very large, united and extending to base of anal; caudal rounded, equal to length of head.

Color in life of a specimen from Pago Pago, light gray with 3 dark brown cross-bars on back, the third black, forming 2 confluent spots at base of caudal; five quadrate black spots along side, the last being the lower part of the caudal bar; a narrower dark vertical spot between each pair; head grayish, dotted; caudal pale orange, faintly barred; dorsal pale, faintly barred with darker; pectoral, anal, and ventral pale.

Color in spirits, yellowish white with a slight shading of brown; about 9 brownish blotches along side; 3 bands of brown over the back, the first at base of spinous dorsal, the second at posterior base of soft dorsal, the third encircling base of caudal; side of head shaded with small black dots forming a more or less distinct blotch under eye; 2 indistinct blotches near upper axil of pectoral; fins unmarked, except an indistinct shading of dusky on caudal; 2 or 3 indistinct dusky spots on dorsal.

One specimen from Pago Pago, type no. 51780, U. S. National Museum, length 0.75 inch.

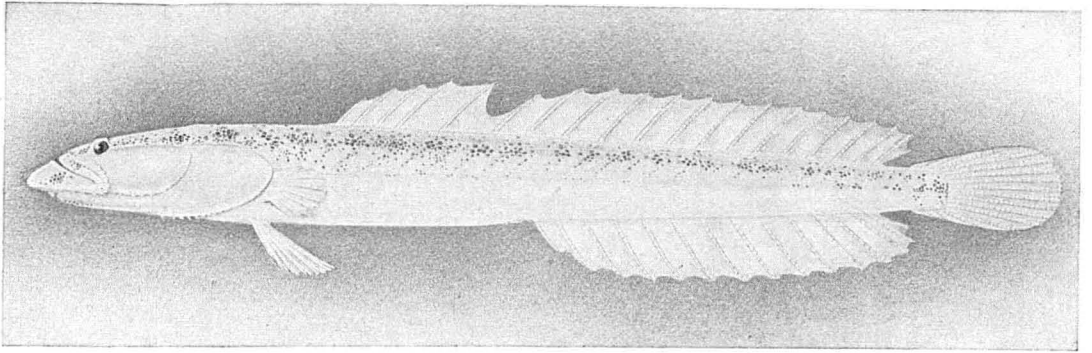
1452. *Rhinogobius circumspectus* (Macleay). New Guinea.

Gobius circumspectus Macleay, Proc. Linn. Soc. N. S. W. 1884, 268, Milne Bay (New Guinea).

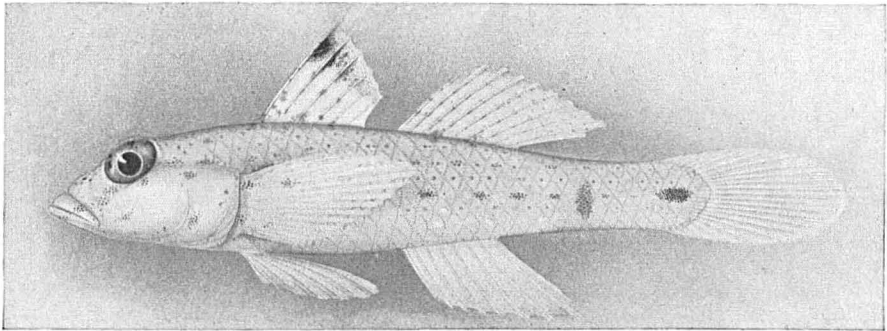
1453. *Rhinogobius neophytus* (Günther). Samoa; Ponape; Tahiti; Huahine. (Pl. xxxvii, fig. 2.)

Gobius neophytus Günther, Fische der Südsee, 174, taf. 108, fig. E, Ponape, Huahine, Apia, Tahiti.

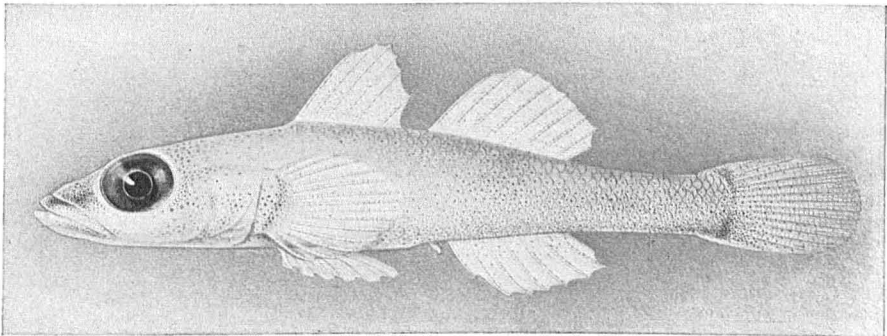
Three specimens from Pago Pago, one from Apia, the body more slender than shown in Günther's figure. In the slender pointed head this species differs notably from other species of *Rhinogobius*. The lower jaw is projecting; the mouth oblique and placed low, the preorbital region being very broad;



1. *VITREOLA SAGITTA* JORDAN & SEALE, NEW SPECIES. TYPE.



2. *RHINOGOBIUS NEOPHYTUS* (GÜNTHER).



3. *CHÆNOGOBIUS ERYTHROPTUS* JORDAN & SEALE, NEW SPECIES. TYPE.

tongue entire, its substance translucent. *Rhinogobius muscarum* agrees with *R. neophytus* in these respects and perhaps the two should form a distinct genus.

Color in life perfectly translucent, with spots of dark orange, and some of pure black, one especially on caudal peduncle.

1454. *Rhinogobius muscarum* Jordan & Seale, new species. Samoa.

Head 3 in length; depth 5; eye 3.25 in head; scales about 25; dorsal vi, 9; anal 10.

Body elongate, compressed, anterior profile rounded; upper jaw slightly the longer and overhanging the lower; tongue not notched; angle of mouth under middle of eye; depth of caudal peduncle 3 in head; teeth on jaws and vomer, a clump of enlarged teeth in middle of lower jaw; tube at nostril rather distinct; anal papilla distinct; origin of spinous dorsal on a line with axil of pectoral, the

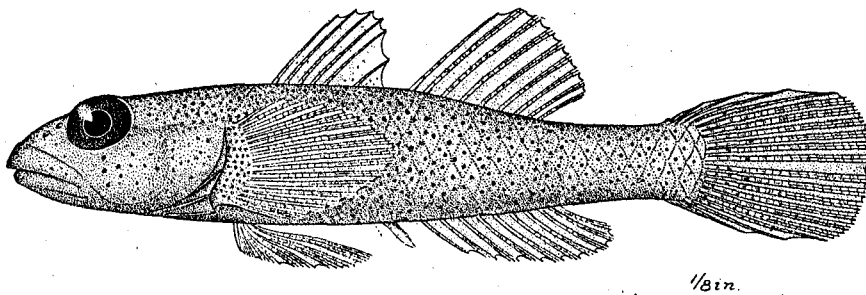


FIG. 90.—*Rhinogobius muscarum* Jordan & Seale, new species. Type.

height of the fin being about equal to its base; base of soft dorsal equal to its longest ray; base of anal 1.5 in head, its longest ray 2.75 in head, the origin of the fin slightly nearer base of caudal than posterior margin of eye; pectoral 1.2 in head; ventrals united and disk-shaped, the anterior margin of the membranous cup with 2 lobe-like points; ventrals rather short, not reaching to base of anal; caudal 1.2 in head.

Life colors of a specimen from Apia, translucent whitish with rather large black points and with angulated transverse narrow yellow bars; yellow markings on head.

Color in spirits, yellowish white, covering all the body with distinct round black spots slightly larger than pin points; head, thorax, and belly with fewer spots; dorsal fins showing a few scattered dark specks, caudal showing several bands of minute dots; anal with a few scattered dark spots; ventrals marked indistinctly with dusky dots; pectoral white with numerous dark dots on base.

Six specimens from the coral reef of Pago Pago. Type no. 51782, U. S. National Museum, length 0.7 inch. This species belongs to the same group as *Rhinogobius neophytus*, distinguished from typical *Rhinogobius* by the shape of snout and translucent body.

1455. *Rhinogobius nebulosus* (Forskål). Samoa; Papua; Palau Is.; Raiatea (Seale); East Indies.

Gobius nebulosus Forskål, Descr. Anim., 24, 1775, Red Sea.

Gobius criniger Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 82, 1837, Dorey Harbor, New Guinea, Malabar.

Two specimens from the mouth of the Vaisigano River at Apia. Olive-green in life with darker blotches and spots.

GObIUS (Artedi) Linnæus.

As now restricted the genus *Gobius* (type *Gobius niger* of Europe) includes the Old World species only, having the dorsal rays about vi-12, the scales rather large, silk-like, the teeth not large, and the tongue rounded.

1456. *Gobius ornatus* Rüppell. Samoa; Fiji; Yap; New Guinea (Macleay); Ponape (Kner, Novara Fische, 173); Shortland I. (Seale); East Indies.

Nape scaly; tongue rounded; upper rays of the pectoral somewhat silky. This species represents the typical genus *Gobius* and is found in shallow waters over coral sand behind the coral reefs of Apia. It is not very common. Our specimens are all immature and have but a trace of the pearly spots on the sides of the head and body. We have 4 specimens from Apia and 9 from Pago Pago.

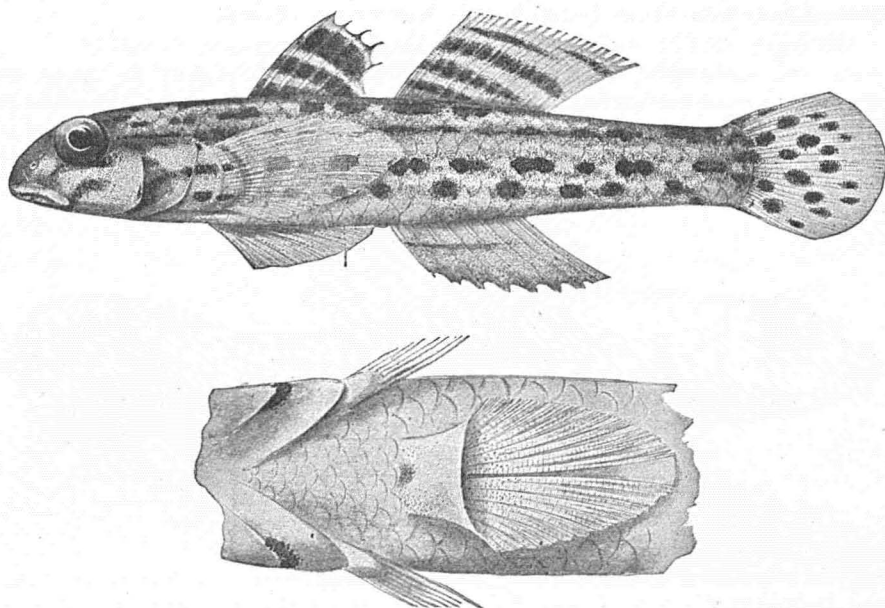


FIG. 91.—*Gobius ornatus* Rüppell.

1457. *Gobius elegans* Cuvier & Valenciennes. Vanicole; New Guinea.

1458. *Gobius caledonicus* Sauvage. New Caledonia.

Gobius caledonicus Sauvage, Bull. Sci. Philom. 1879, p. 8, New Caledonia.

1459. *Gobius oligolepis* Bleeker. New Hebrides (Seale); East Indies.

1460. *Gobius concavifrons* Ramsay & Ogilby. New Guinea.

Gobius concavifrons Ramsay & Ogilby, Proc. Linn. Soc. N. S. W. 1886, 12, New Guinea.

MAPO Smitt.

Mapo Smitt, Afh. Vet. Kong. Ak. Stockholm 1899, 543 (*soporator*).

This genus is very close to *Gobius*, differing chiefly in the emarginate tongue. One of the species is the most widely distributed of the gobies.

1461. *Mapo fuscus* (Rüppell). *Pa'ofu*. Samoa; Hawaii; Fiji; Tahiti; Nukahiva and Makatea (Seale); West Indies; East Indies; Panama.

Gobius albopunctatus Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 57, 1837, Ile de France.

This species is very common throughout the South Seas, living by preference in rocky tide pools, away from the coral reefs, in the region known as "iron-bound coast." Five of our specimens are from Vailele, 5 miles east of Apia; 3 from Aua, on the north shore of Tutuila, and 49 from the rocks near Point Distress at Pago Pago.

Tongue notched; upper rays of pectoral silk-like; head broad; first dorsal vi, low.

Life colors of a specimen from Pago Pago, grayish olive, with oblong irregular spots of orange brown, lighter or darker, and forming irregular lines; a dark dash below eye; head speckled with gray and brown; dorsals spotted like body; caudal more spotted, with a dark brown marginal band and a pale tip; anal paler, also with a dark cross-shade; pectoral pale, spotted, with 3 blackish spots at base; ventral pale. A larger example was darker and browner, with traces of 3 broad cross-bands.

Those found in lava are largely black. The young have black cross-bands which vanish with age. Those from Panama and Clarion islands show a little spotting of white and a trace of a black lengthwise band.

We have thus far failed to separate the Pacific species called *Gobius albopunctatus* from the widely diffused and very common *Gobius* or *Mapo saporator* of the American coasts.

1462. *Mapo crassiceps* Jordan & Seale, new species. Samoa.

Head 3 in length; depth 4.75; eye 4.5 in head; dorsal vi, 10; anal 9; scales 32 counting from posterior margin of opercle; interorbital very narrow, scarcely wider than profile of eye; snout 3.75 in head; tongue emarginate.

Body elongate, compressed, largest at head, the cheeks being extremely gibbous, the head being as wide as long, and much wider than deep; cheeks and interorbital region naked; mouth rather large, with several rows of small sharp-pointed teeth; angle of jaws not reaching to below middle of eye; jaws equal in length; opercle and preopercle entire; about 12 fine silky rays on upper base of pectoral; depth of caudal peduncle 2.95; origin of spinous dorsal posterior to a line with axil of

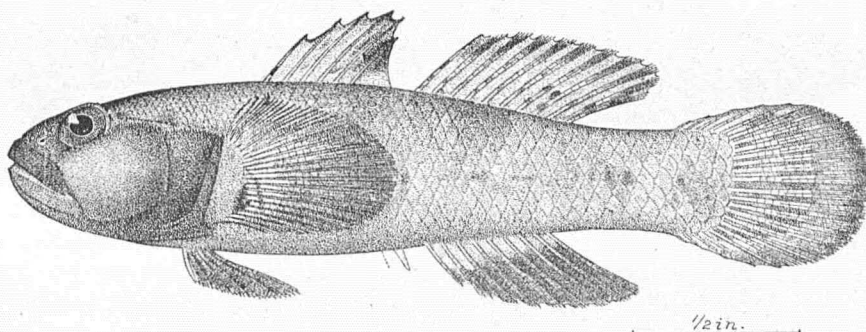


FIG. 92.—*Mapo crassiceps* Jordan & Seale, new species. Type.

ventrals; base of spinous dorsal 2 in length; base of soft dorsal 1.75 in head, its longest ray 2.5 in head; base of anal 2.18 in head, longest ray about 2 in head, origin of anal midway between base of caudal and posterior margin of preopercle; pectorals 1.1 in head, the tips on a line with origin of soft dorsal; ventral disk 2 in head, the anterior membrane of the fin with 3 points; caudal rounded, 1.25 in head.

Color in spirits, whitish with slight dusky wash, a small black dot just back of eye; opercle and base of pectorals usually darker; posterior part of spinous dorsal with a black blotch; soft dorsal dusky, darker in middle; caudal dusky; anal dusky, lighter on base, pectoral and ventral dusky.

Life colors of a specimen from Apia, yellowish-olive, mottled all over with blackish and grayish; grayish spots on cheeks; fins all dusky, more or less barred; axil dusky.

The species is very close to *Mapo fuscus*, differing in the tumid cheeks and plain coloration.

Nine specimens from Apia taken in the mouth of the river Vaisigano and one from the Bay of Apia. The type is no. 51777, U. S. National Museum, from Apia, length 2.1 inches.

GLOSSOGOBIUS Gill.

1463. *Glossogobius vaisiganis* Jordan & Seale, new species. Samoa.

Head, to tip of lower jaw, 3 in length; depth 5.5; eye 6 in head; dorsal vi, 10; anal 10; scales 29; snout 3.6 in head; interorbital very narrow, scarcely greater than pupil; eyes on dorsal profile.

Body elongate, compressed, largest at pectoral girdle; head pointed, the lower jaw the longer, about one-half the width of eye, longer than upper jaw; mouth large, the angle below the posterior margin of eye; several rows of fine sharp-pointed teeth in the jaws and on vomer; tongue deeply forked; caudal peduncle 3.25 in head; anal papilla distinct; origin of spinous dorsal slightly posterior to line with axil of ventral, its base 3 in head; base of soft dorsal 1.5 in head, its longest ray 2 in head; anal fin similar to soft dorsal, its size slightly smaller and its origin a little posterior to line with origin of soft dorsal, its origin nearer to base of caudal than to eye; pectoral extending to a line with origin of soft dorsal; origin of ventrals directly below base of pectoral, their tip extending to anal papilla; ventral fins united and with a shallow membranous cup; caudal rounded, 1.5 in head.

Life colors of a specimen from Vaisigano River, dark olive, with lighter yellowish olive; no bright colors. Dorsal vi-1, 9.

Color in spirits, olive-brown, lighter below, 7 dusky blotches along median line of sides, and about 6 narrow blackish longitudinal lines along middle of scales; a black spot on base of pectoral with a short black line below it; head more or less mottled with black blotches, some lighter dots and lines on lower jaw; spinous dorsal yellowish, a broad black band crossing its upper third; soft dorsal dusky yellow with about 5 indistinct blackish oblique bands; caudal with about 6 vertical dusky bands, the lower part of the bands being the broader; anal colored similar to soft dorsal; pectoral yellowish with indication of 5 or 6 narrow darker lines; ventrals dusky with white margin.

This species has the form, general coloration, and forked tongue of the Japanese species, *Glossogobius brunneus*, but it differs in some details of coloration, notably the presence of dark lengthwise streaks.

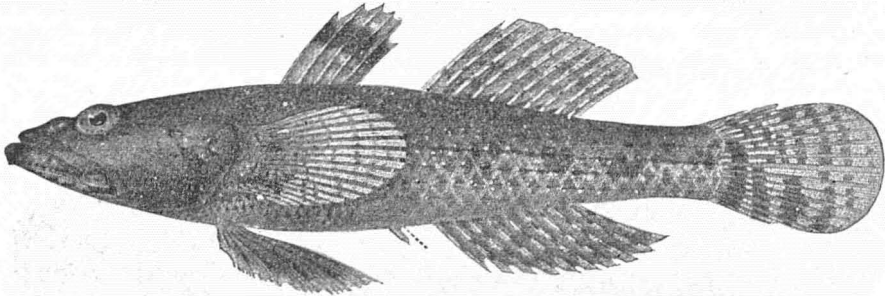


FIG. 93.—*Glossogobius vaisiganis* Jordan & Seale, new species. Type.

Four specimens from the lower reaches of Vaisigano River at Apia, and one specimen from Pago Pago. The type is no. 51774, U. S. National Museum, from Vaisigano River, near Apia, length 3 inches.

CHÆNOGOBIUS Gill.

We refer a Samoan species to this Japanese genus. It agrees with the type in the elongate body, the small scales, the projecting lower jaw, notched tongue, and in the short fins, the dorsal having but 6 spines.

1464. *Chænogobius erythroptus* Jordan & Seale, new species. Samoa. (Pl. xxxvii, fig. 3.)

Head 3.1 in length; depth 5.5; eye 3.2 in head; dorsal vi, 9; anal 7; scales about 41 counting from posterior margin of opercle; snout 3.4 in head.

Body elongate, compressed; snout pointed, the under jaw decidedly the longer; mouth large, the angle under the anterior margin of eye; teeth in jaws in a single row, with some of the anterior ones enlarged and distinct; teeth on vomer, none on palatines; tongue notched at tip; opercle and preopercle entire; anal papilla distinct; depth of caudal peduncle 2.7 in head; spinous dorsal with its origin above base of ventrals, its longest spine 2 in head; base of soft dorsal 1.75 in head, its longest ray about 2; anal similar to soft dorsal, its base and length of rays slightly less; origin of anal about midway between eye and base of caudal fin; pectoral 1.75 in head; in the type specimen the upper 5 rays are not connected except on basal half, but they may have been torn loose accidentally; ventrals united, disk-shaped; the anterior membrane with 2 points, the diameter of disk 2 in head; caudal rounded, 1.75 in head.

Life color, pearly white above; sides darker and with black points; eye rosy around pupil; rosy longitudinal preocular bars on head.

Color in spirits, almost uniform white, with scattered fine dots like pin points, a slight dusky blotch at base of caudal, one on snout, and another posterior to eye; markings all indistinct; fins without markings, except some very fine scattered dots like pin pricks.

One specimen, from Pago Pago, type no. 51781, U. S. National Museum, length 0.6 inch.

AWAOUS Steindachner.

Les Awaous Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 95, 1837 (*ocellaris*, etc.).

Awaous Valenciennes, Steindachner, Verh. Akad. Wiss. Wien 1860, 289, after Cuvier & Valenciennes, no explanation; no type named, reference to Valenciennes implied.

Chonophorus Poey, Syst. Gob., 320 1874, (*bucculentus*=*banana*).

Awaous Bleeker, Rev. Gob., 320, 1875 (*ocellaris*).

Trichopharynx Ogilby, Proc. Linn. Soc. N. S. W. 1897, 769 (*crassilabris*).

This genus contains large gobies of the tropical rivers, characterized by a peculiar physiognomy, and by the presence of small fleshy flaps on the shoulder-girdle; tongue adnate to floor of mouth. It is probable that the generic name *Awaous* should be adopted for this group, on the strength of its use in a subgeneric sense by Steindachner.

1465. *Awaous stamineus* (Valenciennes). Hawaii.

1466. *Awaous ocellaris* (Broussonet). *Mano'o*; *P'a pala*. Tahiti; Samoa; Rarotonga; Fiji, in streams.

Gobius ocellaris Broussonet, Dec. Ichth., pl. 142, 1782, Tahiti, coll. Solander. Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 98 1837, Ile de France. Günther, Fische der Südsee, 177, taf. 108, fig. c, Samoa, Rarotonga, Viti Levu.

We have 2 specimens from the stream at Pago Pago and 20 specimens of various sizes from the Vaisigano River at Apia. The species is common in the river where the current is broad and swift. It reaches a length of 6 inches. There are scales on upper edge of cheeks and opercles, not on the whole side of head as shown in Günther's figure.

Life colors of 2 specimens from Apia, called *mano'o ia pala*, mottled green; dorsals and anal red-tinged; a large black ocellus on dorsal; caudal with 2 or 3 black bars; soft dorsal with 3 black bars; anal reddish, pale-edge; ventral reddish. Adult males nearly black with black lower fin.

1467. *Awaous crassilabris* (Günther). Rivers of Oualan; Aneiteum; Shortland I. (Seale).

Gobius crassilabris Günther, Fische der Südsee, 178, 1873, Oualan, Aneiteum.

This species is common in the streams of Malanesia. It was not taken by us. It resembles *Awaous ocellaris*, but lacks the black ocellus on the dorsal. It may not be different from *Awaous guamensis*.

1468. *Awaous guamensis* (Cuvier & Valenciennes). Guam.

Gobius guamensis Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 103, 1837, streams of Guam. Sauvage, Bull. Sci. Phil. 1879, 7, Guam.

1469. *Awaous genivittatus* (Cuvier & Valenciennes). *Teli*. Rivers of Hawaii; Fiji; Samoa; Tahiti; New Hebrides.

Gobius genivittatus Cuvier & Valenciennes, op. cit., 64, 1837, Tahiti. Günther, Fische der Südsee, 170, taf. 910, fig. c, Tahiti, Fiji, Samoa, Hawaii.

Abundant in the quiet pools and sluggish reaches of the Vaisigano and other rivers. We have 5 specimens from Vaisigano River.

EXYRIAS Jordan & Seale, new genus.

Exyrias Jordan & Seale, new genus of Gobiida: (*Gobius puntangoides* Bleeker).

1470. *Exyrias puntangoides* (Bleeker). Ponape; Shortland I. (Seale); Cebu.

Gobius puntangoides Bleeker, Nat. Tijd. Ned. Ind., v, 1853, 242.

This East Indian species, not seen by us, resembles an *Awaous*, although figured as having the cheeks fully scaled.

AMBLYGOBIUS Bleeker.

Amblygobius Bleeker, Arch. Neerl. 1875, 322 (*sphinx*).

Odontogobius Bleeker, Arch. Neerl. 1875, 323 (*bynoensis*).

This genus is distinguished by the small scales, the robust form, and the presence of strong canines in the lower jaw. The species, like most of those of the related genus, *Pterogobius*, are cross-banded. We can see no generic differences separating *Odontogobius* from *Amblygobius*.

1471. *Amblygobius semicinctus* (Kner). Fiji; Oualan.

Gobius semicinctus, Kner, Sitz. Ak. Wiss. Wien, 34, Oualan, Fiji.

1472. *Amblygobius phalæna* (Cuvier & Valenciennes). Vanicolo; Samoa; Palau Is.; Tonga; Faté (Seale).

Gobius phalæna, Cuvier & Valenciennes, Hist. Nat. Poiss., xii, 92, 1837, Vanicolo. Günther, Fische der Südsee, 178, taf. 111, Palau, Samoa, Tonga.

This handsome species is rather common on the soft bottom behind the coral reefs of Apia. It is closely related to *Amblygobius bynoensis*, the genus being characterized by the presence of rather strong canines on the side of the jaw. Scales small, covering top of head, and extending on opercle above; pectorals with no silk-like rays; dorsal vi, 15; anal 14.

Life colors of a specimen from Apia, dark olive; 5 dark brown bands, each edged on both sides with light blue, the bands broader than the grayer interspaces; from middle of each brown band a narrower bar crosses the back; head with many oblong and round sky-blue spots darker than the interspaces; 2 rows of orange spots on each side of nape; a round black shoulder spot; some bluish oblong dashes on front of side; first dorsal olive, with a black central blotch and a black edge; second dorsal mottled gray, then edged with light yellow, black and brown; caudal brownish, dusky behind; a black ocellus near base above; anal grayish with a row of whitish spots at base and a black edge; ventral black, paler centrally; pectoral bright golden yellow, with a blue horizontal streak and 2 blue spots at base. Body compressed, the scales rather small.

Another specimen, male, has 4 plain black cross-bars and 5 ocelli on caudal irregularly placed; the black margin broader, the dorsal with 2 rows of bluish dots, the anal with a bluish streak.

A third specimen from this locality was olive-green with round spots of grayish blue on head surrounded by dark blue streak; first dorsal olive with a black spot; second dorsal olivaceous mottled with dark brown; caudal light brownish with 2 black spots; a black spot above gill-opening; lower fins pale.

Seven specimens from Apia.

1473. *Amblygobius papuanus* (Peters). New Guinea.

Gobius papuanus Peters, Berl. Mon. 1876, 839, New Guinea.

1474. *Amblygobius sphinx* (Cuvier & Valenciennes). New Guinea; East Indies.

A very robust species with black cross-bands.

CRYPTOCENTRUS Ehrenberg.

Cryptocentrus (Ehrenberg) Bleeker, Arch. Neerl. 1875, 322 (*cryptocentrus*).

This genus, as understood by us, comprises species allied to *Rhinogobius* but covered with small scales, instead of large ones.

1475. *Cryptocentrus leucostictus* (Günther). Tonga.

Gobius leucostictus Günther, Proc. Zool. Soc. 1871, 664, Tonga. Günther, Fische der Südsee, 176, Tonga.

This species, which we have not seen, seems to belong near *Cryptocentrus*.

VITRARIA Jordan & Evermann.

1476. *Vitraria clarescens* Jordan & Evermann. Hawaii.

PSELAPHIAS Jordan & Seale, new genus.

Pselaphias Jordan & Seale, new genus of Gobiidæ (*Gobius ophthalmonemus*).

This genus is close to *Gobionellus* (*hastatus*), and still closer to *Oxyurichthys* (*belosso*), differing from both in the presence of a tentacle above the eye.

1477. *Pselaphias ophthalmonemus* (Bleeker). Samoa; Fiji; Akyab; East Indies.

Gobius ophthalmonema Bleeker, Nat. Tijds. Ned. Ind. 1856, xii, 208.

Euctenogobius ophthalmonemus, Günther, Fische der Südsee, 180, taf. 111, fig. B, Tonga, Fiji, Akyab.

Life colors of an Apia specimen, a black bar below eye; dull olive with quadrate and other blotches along side; back mottled; no pale spots; no bright colors; fins much mottled; dorsal with a black blotch on last rays.

Three specimens from a sluggish bayou of Vaisigano River at Apia. Dorsal filamentous.

WAITEA Jordan & Seale, new genus.

Waitea Jordan & Seale, new genus of Gobiidae (type *Gobius mystacina*).

This genus, of which *Gobius mystacina* is the type, is close to *Gobionellus*, but it has the maxillaries produced backward after the fashion of *Opisthognathus*. It is named for Mr. Edgar R. Waite, of Sydney, the excellent curator of fishes in the Australian Museum (now at the Museum of Christchurch, New Zealand).

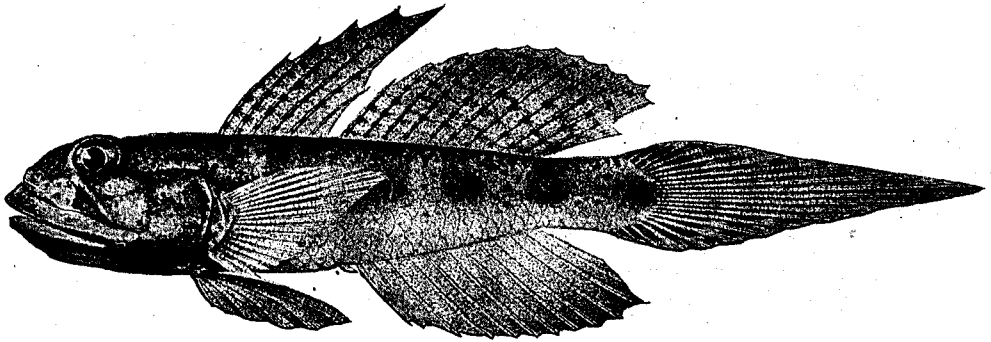


FIG. 94.—*Waitea mystacina* (Cuvier & Valenciennes).

1478. *Waitea mystacina* (Cuvier & Valenciennes). Samoa; Java.

Color nearly plain olive-green.

GOBIICHTHYS Klunzinger.

This genus has the elongate body and sharp caudal fin of *Gobionellus*, but the upper teeth are in one series.

1479. *Gobiichthys lonchotus* (Jenkins). Hawaii.

1480. *Gobiichthys papuensis* (Cuvier & Valenciennes). New Guinea; East Indies.

GOBIONELLUS Girard.

This genus contains elongate species with the caudal fin produced, the lower jaw flat, and the teeth small, in bands.

1481. *Gobionellus atriclypeus* (Garman). Fiji.

Gobius atriclypeus Garman, Bull. Mus. Comp. Zool., 1903, 233, xxxix, with plate, Fiji.

This species, from Fiji, is unknown to us. From the slender form and acuminate caudal and the teeth in bands we refer it to *Gobionellus*.

GOBIOPTERUS Bleeker.

Gobiopterus Bleeker, Arch. Neerl. 1875, 311 (*brachypterus*).

This genus differs from *Apocryptes* in the large scales and short dorsal and anal.

1482. *Gobiopterus farcimen* Jordan & Evermann. Hawaii.

APOCRYPTODON Bleeker.

Scales about 50.

1483. *Apocryptodon fasciatus* (Macleay). New Guinea (Proc. Linn. Soc. N. S. W. 1884, 268).

PSEUDAPOCRYPTES Bleeker.

Pseudapocryptes Bleeker, Arch. Neerl. 1875, 327 (*lanceolatus*).

This genus is said to differ from *Apocryptes* (*bato*) in the tumid teeth and the minute scales.

1484. *Pseudapocryptes lanceolatus* (Bloch & Schneider). Tahiti (Kner, Novara Fische, 180); East Indies.

1485. *Pseudapocryptes punctularum* (De Vis). South Seas (probably Banks Group).

Gobiosoma punctularum De Vis, Proc. Linn. Soc. N. S. W. 1884, 449.

This species, and the closely allied *Gobiosoma guttulatum* Macleay from Australia, said to be scaleless, must be based on specimens of *Pseudapocryptes*, in which the minute scales have been overlooked. They have no affinity with *Gobiosoma*.

MARS Jordan & Seale, new genus.

Mars Jordan & Seale, new genus of Gobiidae (*strigiliceps*).

This genus, typified by *Mars strigiliceps*, has the appearance of an ordinary goby with small scales, as in *Cryptocentrus*, which it much resembles. On the vomer, however, are 2 or 3 large blunt teeth, and the head is provided with minute filaments and pores arranged in straight lines and running in various directions, somewhat as in *Quisquilius* and in *Drombus*. The canals on the planet Mars perhaps justify the name of this genus.

1486. *Mars strigiliceps* Jordan & Seale, new species. Samoa.

Head 3.2 in length; depth 5; eye 4 in head; snout 5 in head; dorsal vi, 11; anal i, 9; scales 65, counting from posterior margin of opercle.

Body elongate, compressed, the anterior profile rounded; jaws equal; mouth rather large, the angle below middle of eye; several rows of small, sharp-pointed teeth in jaws; rather large blunt

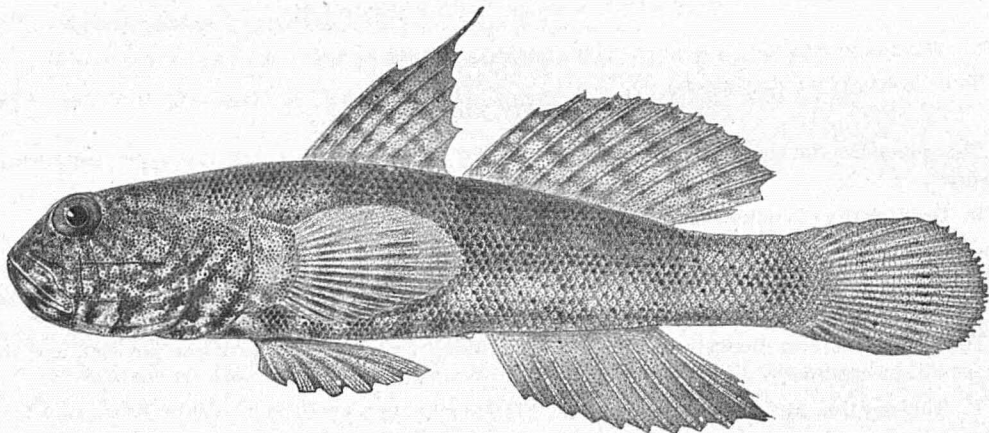


FIG. 95.—*Mars strigiliceps* Jordan & Seale, new species. Type.

teeth on palatines and vomer, no teeth on tongue; opercle and preopercle entire; head without scales; a number of fine distinct raised chain-like lines radiating from eye and extending over or across the cheek; one across the nuchal region, joined by 3 or 4 other similar lines which run longitudinally on nuchal region; these probably serve as a mucus system; caudal peduncle 2.75 in head; second spine of soft dorsal elongate, filiform, about equal to length of head; base of soft dorsal 1.25 in head, its longest ray 1.75 in head; anal similar to soft dorsal, but with base and the anterior rays slightly shorter; pectorals 1.1 in head, the tips under origin of soft dorsal; ventrals united, rather elongate, 1.25 in head, a distinct shallow membranous cup at base, the membrane entire; caudal rounded, about 1.25 in head.

Life colors, dark olive with 4 narrow grayish cross-bands, rather obscure; front of head dusky; lower part of head bronze-olive, with 6 sharply defined irregular white cross-bands; similar fainter cross-bands on belly; the white bar from front of spinous dorsal crossing base of pectoral and forming a ring about body; base of pectorals with white marblings; fins dusky olive with no clear markings; scales small; head with numerous lines of small pores each with a minute filament.

Color in spirits gray, with slight bluish wash; about 4 indistinct dusky blotches along side, the blotch on side of caudal peduncle being most distinct; 5 distinct bands of black alternating with bluish white surrounding the under part of head and throat, the posterior band white and extending

from upper posterior margin of opercle around thorax at base of ventrals; about 5 light-blue bands around belly; 3 indistinct lighter lines over the back, 2 on nuchal region and 1 extending obliquely down from base of spinous dorsal; dorsal fins grayish with about 5 oblique dusky lines; 2 or 3 indistinct dusky bands on caudal; pectoral with 3 or 4 very indistinct dusky cross-bands, the base of the fin bluish with 2 or 3 dusky blotches; anal and ventral dusky without distinct marking.

One specimen from Apia. Type no. 51778, U. S. National Museum, length 2 inches.

KELLOGGELLA Jordan & Seale, new genus.

Kelloggella Jordan & Seale, new genus of Gobiidæ (*cardinalis*).

Brilliantly colored little fishes, allied to *Gobiosoma*, the body naked, but with only 6 dorsal spines, the body and head more elongate. Coral reefs of Samoa. The genus, typified by *Kelloggella cardinalis*, is named for its discoverer, Vernon Lyman Kellogg, professor of entomology in Stanford University.

1487. *Kelloggella cardinalis* Jordan & Seale, new species. Samoa. (Pl. LIII, fig. 1.)

Head 4.5 in length; depth 6; eye 4 in head; dorsal vi, 13; anal 9; no scales; interorbital one-half of eye; snout 4.

Body elongate, compressed; anterior profile rounded; the lower jaw a little the shorter, the angle under middle of eye; small sharp teeth in jaws, none on vomer or palatines; opercle and preopercle entire; width of gill-opening 2.1 in head; caudal peduncle strong, its depth 1.5 in head; origin of spinous dorsal posterior to a line with base of ventral; base of spinous dorsal 1.15 in head, its longest spine 2 in head; base of soft dorsal 2.8 in length of fish without caudal, its longest ray 2 in head; pectoral slightly longer than head, its tip on line with sixth dorsal spine; ventrals small, 1.2 in head, their origin below axil of pectorals, their tips on line with base of fifth dorsal spine; the 2 fins fully united; caudal rounded, equal to head.

Life colors of the type specimen clear grass green, rather pale; both dorsals, caudal, and anal bright cherry-red; anal greenish in front; pectoral and ventral green. Two larger specimens were greenish black, more greenish anteriorly; dorsal and anal bright orange edged with black; pectoral and ventral bright golden green; caudal gray.

Color in spirits, a uniform dull green, a little less shaded on head and belly; fins all yellowish white; some specimens with a dusky margin to dorsals, caudal, and anal; the dorsals are also darker at base.

Three specimens from Pago Pago. The type is no. 51785, U. S. National Museum, length 1.12 inches.

1488. *Kelloggella oligolepis* (Jenkins). Hawaii.

This species bears little resemblance to the genus *Erynnias* to which it has been referred. It may be provisionally placed in *Kelloggella*, from which it differs in form and in the presence of a few scales on the posterior part of the body.

GOBIODON Kuhl & Van Hasselt.

Gobiodon Kuhl & Van Hasselt, Bleeker, Boroe, 407, 1851 (*histrio*).

Small, deep-bodied gobies, entirely scaleless; jaws with canine teeth.

1489. *Gobiodon histrio* (Kuhl & Van Hasselt). Tonga; East Indies.

1490. *Gobiodon rivulatus* Rüppell. Tahiti; Guam; Tonga; Bonham I.; Vavau; Solomon Is.; Meduro; New Britain (Peters, Berl. Mon. 1876, 840); East Indies.

1491. *Gobiodon ceramensis* Bleeker. Fiji; East Indies.

Gobiodon ceramensis, Günther, Fische der Südsee, 180, Fiji.

1492. *Gobiodon atrangulatus* Garman. Fiji.

Gobiodon atrangulatus Garman, Bull. Mus. Comp. Zool. xxxix, 1903, 235, Fiji.

1493. *Gobiodon flavidus* De Vis. Banks Group, east of New Guinea.

Gobiodon flavidus De Vis, Proc. Linn. Soc. N. S. W. 1884, 449.

1494. *Gobiodon axillaris* De Vis. Banks Group, east of New Guinea.

1495. *Gobiodon lineatus* De Vis. Banks Group, east of New Guinea.

1496. *Gobiodon inornatus* De Vis. Banks Group, east of New Guinea.

PSEUDOGOBIODON Bleeker.

Pseudogobiodon Bleeker, Arch. Neerl. 1875, 309 (*citrinus*).

No canine teeth, otherwise like *Gobiodon*.

- 1497. *Pseudogobiodon citrinus* (Rüppell).** *Ulitui* (big-head). Samoa; Ponape (Günther); East Indies.

This species is very abundant in the coral reefs at Apia, where we obtained 32 specimens. The ground color varies from yellow to brown, but the blue vertical stripes are very constant.

One specimen in life from Apia, yellow-olive; fins all orange, the edges deep orange, the first dorsal edged with black; iris orange. Another was brown, tinged with orange; a blue line down from eye; a black opercular spot with a vertical blue line before and behind it; orange deepest under eye and on edge of pectoral. Other specimens were blackish olive; fins all broadly edged with blackish orange; no black edge on dorsal; a black spot on end of opercle.

- 1498. *Pseudogobiodon verticalis* (Macleay).** New Guinea.

Gobiodon verticalis Macleay, Proc. Linn. Soc. N. S. W. 1884, 333.

SICYOPTERUS Gill.

Sicyopterus Gill, Proc. Ac. Nat. Sci. Phila. 1860, 101 (*stimpsoni*).

Lower jaw with 2 canines in front, snout tumid, projecting over the small mouth; body with small scales.

- 1499. *Sicyopterus stimpsoni* Gill.** Streams of Hawaii.

Sicyopterus stimpsoni Gill, Proc. Ac. Nat. Sci. Phila. 1860, 101, streams of Hawaii.

Sicydium nigrescens Günther, Shore Fishes Challenger, 60, 1880, streams about Hilo.

- 1500. *Sicyopterus tæniurus* (Günther).** Fiji; Aneiteum; Samoa; in streams.

Sicydium lagocephalus Kner, Sitz. Ak. Wiss. Wien 1868, 85, Viti Levu (Fiji), Namusi stream; not of Cuvier & Valenciennes.

Sicydium macrostetholepis Kner, op. cit., 35, Samoa; not of Bleeker.

Sicydium tæniurum Günther, Fische der Südsee, 183, Viti Levu, Aneiteum, New Hebrides. Ogilvie-Grant, Proc. Zool. Soc. London 1884, 161, Aneiteum, Viti Levu.

Life colors of a specimen from Pago Pago, dark olive; 7 or 8 diffuse spots along side; a trace of lateral stripe along head; a black bar below eye; caudal pale olive with 3 black lengthwise stripes, the upper and lower oblique; dorsals plain dusky olive; pectoral plain olive; scales small; first dorsal pointed; ventral very small; head depressed; mouth inferior; teeth large; body low.

Two specimens agreeing very well with Günther's figure were taken in the stream at Pago Pago.

- 1501. *Sicyopterus albotæniatus* (Günther).**

Sicyopterus albotæniatus Günther, Fische der Südsee, 184, Hawaii.

This fish is known only from the drawing of Mr. Andrew Garrett, made at Hilo, and published by Dr. Günther.

- 1502. *Sicyopterus pugnans* (Ogilvie-Grant).** Samoa (Grant).

Sicydium pugnans Ogilvie-Grant, Proc. Zool. Soc. London 1884, 160, pl. xi, Savaii.

This species, from the rivers of the island of Savaii, was not seen by us.

- 1503. *Sicyopterus tauæ* Jordan & Seale, new species.** Samoa.

Head 4.5 in length; depth 6.75; eye 4 in head; dorsal vi, 13; anal 11; scales about 62; snout 3.5; interorbital 3 in head.

Body elongate, compressed; the snout somewhat projecting, overhanging the small mouth; minute teeth in jaws and on vomer and palatines; depth of caudal peduncle 2 in head; origin of spinous dorsal posterior to line with distal end of ventrals, its longest spine 1.5 in head; base of soft dorsal 3.45 in length without caudal, its longest ray about 1.35 in head; anal similar to soft dorsal, its longest ray about 1.5 in head; origin of anal distinctly below origin of soft dorsal, being about equally distant between tip of snout and base of caudal fin; pectoral, 1.1 in head; ventral disk 2 in head, the anterior membranous margin of the cup entire; caudal almost square, its length 1.1 in head.

Color in spirits, yellowish with 7 rather broad bands of brownish over the back and down on side to a little below median line, the posterior one being at base of caudal and forming a complete dusky ring around caudal base; a row of about 10 small dark spots along base of soft dorsal; a dusky line at base of anal; sides and top of head somewhat shaded with minute dark dots; fins without distinct markings, a dark spot between eye and angle of mouth.

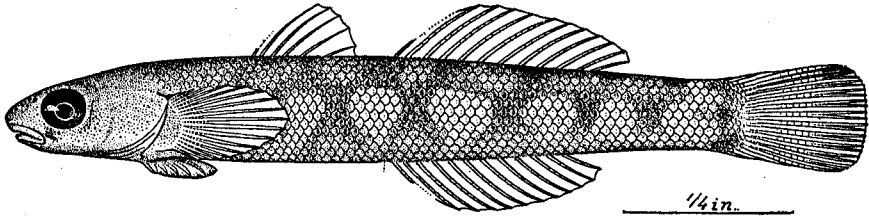


FIG. 96.—*Sicyopterus taua* Jordan & Seale, new species. Type.

One specimen, type no. 51786, U. S. National Museum, from Vaisigano River, Apia; length 1.35 inches. It is named for Tauga, a Rarotonga man, the most skillful of the fishermen of Apia.

MICROSICYDIUM Bleeker.

Microsicydium Bleeker, Arch. Neerl. 1875, 315 (*gymnauchen*).

This genus may be provisionally distinguished from *Sicyopterus* by the large scales, 30 to 40.

1504. *Microsicydium elegans* (Steindachner). Tonga.

Sicydium elegans Steindachner, Sitz. Ak. Wiss. Wien 1879, 152, Tonga.

This strikingly colored species is well distinguished by its large scales (32). It was not taken by us.

LENTIPES Günther.

Body naked, or nearly so.

1505. *Lentipes concolor* (Gill). Rivers of Hilo, Hawaii.

1506. *Lentipes seminudus* Günther. Rivers of Hilo, Hawaii.

This species, which we have not seen, may be the type of a distinct genus.

GOBIOIDES Lacépède.

1507. *Gobioides totoyensis* Garman. Fiji.

Gobioides totoyensis Garman, Bull. Mus. Comp. Zool., vol. xxxix, no. 8, 1901, 235, Totoya (Fiji Is.).

Family ECHENEIDIDÆ

PHTHEIRICHTHYS Gill.

1508. *Phtheirichthys lineatus* (Menzies). Pacific Ocean (Günther, Fische der Südsee, 156); tropical Atlantic (as a parasite on barracudas).

LEPTECHENEIS Gill.

1509. *Leptecheneis naucrates* (Linnæus). *Talitiduli*. Samoa; Hawaii; New Guinea; warm seas generally.

One very large specimen of this common fish was taken at Apia. Dorsal xxiv, 37. Life color, all dark brown; lateral band obscure.

ECHENEIS (Artedi) Linnæus. (*Remora* Gill.)

1510. *Echeneis remora* Linnæus. Hawaii; warm seas generally.

REMORINA Jordan & Evermann.

1511. *Remorina albescens* (Schlegel). Marcus I. (Bryan & Herre, Bishop Museum, 1903); New Guinea; China and Japan; America.

REMOROPSIS Gill.

1512. *Remoropsis brachyptera* (Lowe). Pacific Ocean; warm seas; Japan.

Family PLEURONECTIDÆ.

PLATOPHRYS Swainson. *Ali*.

1513. *Platophrys mancus* (Broussonet). *Ali*. Samoa; Johnston I.; New Guinea; Bougainville Is.; Rarotonga; Tahiti; Makatea; Tubuai and Faté (Seale); East Indies.

Pleuronectes mancus Broussonet, Ich. Decas., 1782, with plate, Tahiti; not *mancus* of Risso or Günther = *Platophrys podas*.

Rhombus macropterus Quoy & Gaimard, Voy. Uranie, 236, 1824, Rawak (New Guinea), on a rough drawing.

Rhombus pavo Bleeker, Kokos, III, 177, Kokos.

Rhomboidichthys pavo, Günther, Cat., IV 435; East Indies. Peters, Berl. Mon. 1876, 844, Bougainville Is.

This species is common on the sandy shores of Samoa, where it reaches a considerable size. It may be readily distinguished from *Platophrys pantherinus* by the larger number of anal rays (about 80), by the more varied coloration, by the form of the arch of the lateral line, and by other characters. It has been found at Johnston Island, but has not yet been recorded from Hawaii. We have 6 specimens, large and small, from Apia and Pago Pago.

Life colors of a specimen from Apia, yellowish gray; spots bluish gray with rim of darker gray; those on fins grayish white and grayish orange; 2 dark spots on lateral line.

1514. *Platophrys pantherinus* (Rüppell). *Ali*. Hawaii; Samoa; Marquesas Is.; East Indies.

Passer marchionessarum Valenciennes, Voy. Venus, Poiss., 344, pl. 9, Marquesas Is.

This species is very common about Hawaii. It is not rare about Samoa, where it is confounded with *Platophrys mancus* by the natives under the name of *ali*. We have 4 specimens from Apia. It is easily distinguished on comparison of specimens, the constantly smaller number of anal rays being diagnostic.

1515. *Platophrys chlorospilus* Gilbert. Deep seas of Hawaii.

1516. *Platophrys inermis* Gilbert. Deep seas of Hawaii.

SCÆOPS Jordan & Starks.

1517. *Scæops spilura* (Günther). New Guinea.

Rhomboidichthys spilurus Günther, Challenger Fishes, 1880, 47.

1518. *Scæops xenandrus* Gilbert. Deep seas of Hawaii.

ENGYPROSOPON Günther.

1519. *Engyprosopon arenicola* Jordan & Evermann. Hawaii.

1520. *Engyprosopon hawaiiensis* Jordan & Evermann. Hawaii.

PSEUDORHOMBUS Bleeker. (*Rhombiscus* Jordan & Snyder.)

1521. *Pseudorhombus triocellatus* (Bloch & Schneider). Tahiti (Kner, Novara Fische, 1867, 284); East Indies.

This East Indian species is once recorded from Tahiti. We doubt the accuracy of the record.

1522. *Pseudorhombus guttulatus* Macleay. New Guinea.

Pseudorhombus guttulatus Macleay, Proc. Linn. Soc. N. S. W. 1884, 276.

1523. *Pseudorhombus ocellatus* Günther. Admiralty Is.

Pseudorhombus ocellatus Günther, Challenger Fishes, 1880, 46.

PÆCILOPSETTA Günther.

- 1524.
- Pæcilopsetta hawaiiensis*
- Gilbert. Deep seas of Hawaii.

TÆNIOPSETTA Gilbert.

- 1525.
- Tæniopsetta radula*
- Gilbert. Deep seas of Hawaii.

ANTICITHARUS Günther.

- 1526.
- Anticitharus debilis*
- Gilbert. Deep seas of Hawaii.

SAMARISCUS Gilbert.

- 1527.
- Samariscus corallinus*
- Gilbert. Hawaii.

CHASCANOPSETTA Gilbert.

- 1528.
- Chascanopsetta prorigera*
- Gilbert. Deep seas of Hawaii.

NEMATOPS Günther.

- 1529.
- Nematops microstoma*
- Günther. Admiralty Is.

Nematops microstoma Günther, Challenger Fishes, 1880, 57.**PELECANICHTHYS** Gilbert & Cramer.

- 1530.
- Pelecanichthys crumenalis*
- Gilbert & Cramer. Deep seas of Hawaii.

Family **SOLEIDÆ**.**SOLEICHTHYS** Bleeker.

- 1531.
- Soleichthys heterorhinos*
- (Bleeker). Fiji (Günther); Samoa (Kner); East Indies.

MICROBUGLOSSUS Günther.

- 1532.
- Microbuglossus nigrostriolatus*
- (Kner & Steindachner). Fiji.

Solea nigrostriolata Kner & Steindachner, Sitz. Ak. Wiss. Wien 1870, 427, Viti Levu (Fiji).**ASERAGGODES** Bleeker.

- 1533.
- Aseraggodes melanostictus*
- (Peters). Bougainville Is.

Achirus melanostictus Peters, Berl. Mon. 1876, 845, Bougainville Is.

- 1534.
- Aseraggodes pellucidus*
- (Bennett). Open Pacific.

Achirus pellucidus Bennett, Whaling Voyage, 277, 1840, Pacific, open sea.

This larval sole has not been recognized since the original description. We do not know to what genus it belongs.

PARDACHIRUS Günther.

- 1535.
- Pardachirus pavoninus*
- (Lacépède). Faté; New Hebrides (Seale); East Indies.

ZEBRIAS Jordan & Snyder.

- 1536.
- Zebrias dicholepis*
- (Peters). New Hanover; Bismarck Is.

Synaptura dicholepis Peters, Berl. Mon. 1875, 844, New Hanover (Bismarck Is.).**SYMPHURUS** Rafinesque.

- 1537.
- Symphurus undatus*
- Gilbert. Deep seas of Hawaii.

- 1538.
- Symphurus strictus*
- Gilbert. Deep seas of Hawaii.

Family **URANOSCOPIDÆ**.**URANOSCOPIUS** Cuvier.

- 1539.
- Uranoscopus sulphureus*
- Cuvier & Valenciennes. Tonga.

Uranoscopus sulphureus Cuvier & Valenciennes, Hist. Nat. Poiss., VIII, 495, 1831, Tonga. Günther, Cat., II, 229, Tonga.

1540. *Uranoscopus fuscomaculatus* Kner. Kandavu in Fiji.
Uranoscopus fuscomaculatus Kner, Sitz. Ak. Wiss. Wien 1868, 319, Kandavu (Fiji).
1541. *Uranoscopus papuensis* Bleeker. Waigiu.

Family CHAMPSODONTIDÆ.

CHAMPSODON Günther.

1542. *Champsodon vorax* Günther. Admiralty Is.; Japan.
1543. *Champsodon fimbriatus* Gilbert. Hawaii.

Family PERCOPHIDIDÆ.

MACRIAS Gill & Townsend.

1544. *Macrias amissus* Gill & Townsend. Deep seas of the Southern Pacific.
Macrias amissus Gill & Townsend, Science, 1901, 937, Pacific, deep sea.
 Known from the type only. Said to be the largest bathybial fish known.

Family PTEROPSARIDÆ.

PARAPERCIS Bleeker.

1545. *Parapercis tetracanthus* (Lacépède). Ta'oto. Samoa; Fiji; Guam; Palau Is.; East Indies.

Percis tetracanthus Bleeker, Nat. Tijds. Ned. Ind. 1853, 458. Günther, Cat., II, 241, Fiji, Amboina. Günther, Fische der Südsee, 138, taf. XCIII, fig. B, Pelew, Samoa, Fiji.
Parapercis tetracanthus Garman, Bull. Mus. Comp. Zool., XXXIX, no. 8, 233, Fiji.
Parapercis cephalopunctatus Seale, Bishop Museum 1901, 124, Guam.

Of this interesting species, half a dozen specimens were obtained in the reefs of Apia.

Life colors of one specimen: The dark markings bright olive brown, the belly white, the upper parts light olive; no red; a large pure white spot on caudal with black before it.

1546. *Parapercis hexophthalma* (Ehrenberg). Fiji (Günther); Louisiades; East Indies.
1547. *Parapercis xanthozoma* (Bleeker). Shortland I.; Solomon Group (Seale); East Indies.
1548. *Parapercis alboguttata* (Günther). Misol.
Percis alboguttatus Günther, Ann. Mag. Nat. Hist. 1872, 422, Misol.

OSURUS Jordan & Evermann.

1549. *Osurus schauinslandi* (Steindachner). Samoa.
Parapercis pterostigma Jenkins, Bull. U. S. Fish Comm., XIX, 1899 (1901), 402, fig. 15, Honolulu.

NEOPERPCIS Steindachner.

1550. *Neopercis roseoviridis* Gilbert. Hawaii.

BEMBROPS Steindachner.

1551. *Bembrops filifera* Gilbert. Hawaii.

CHRIONEMA Gilbert.

1552. *Chrionema chryseres* Gilbert. Hawaii.
1553. *Chrionema squamiceps* Gilbert. Hawaii.

OSOPSARON Jordan & Starks.

1554. *Osopsaron incisum* Gilbert. Hawaii.

Family HARPAGIFERIDÆ.

DEACONETTA Jordan & Fowler.

- 1555.
- Draconetta hawaiiensis*
- Gilbert. Deep seas of Hawaii.

Family RHYACICHTHYIDÆ.

RHYACICHTHYS Boulenger.

Platyptera Cuvier & Valenciennes, Hist. Nat. Poiss., XII, 321, 1835 (*aspro*); name preoccupied.
Rhyacichthys Boulenger; Ann. Mag. Nat. Hist. 1903 (*aspro*).

- 1556.
- Rhyacichthys aspro*
- (Kuhl & Van Hasselt). Swift rivers in the Solomon Is. (Günther, Fische der Südsee, 191); East Indies.

Family CALLIONYMIDÆ.

CALLIURICHTHYS Jordan & Snyder.

1557. *Calliurichthys simplicornis* (Cuvier & Valenciennes). Guam.
 1558. *Calliurichthys decoratus* Gilbert. Hawaii.
 1559. *Calliurichthys japonicus* (Houttuyn). New Guinea (Günther); Japan.

CALLIONYMUS Linnæus.

1560. *Callionymus cooki* Günther. Rarotonga.
Callionymus cooki Günther, Proc. Zool. Soc. 1871, 605, Rarotonga. Günther, Fische der Südsee, 192, taf. 118, fig. B, Rarotonga.
 1561. *Callionymus calauropomus* Richardson. New Ireland (Peters, Berl. Mon. 1876, 841); Australia.
 1562. *Callionymus cæruleonotatus* Gilbert. Hawaii.
 1563. *Callionymus rubrovinctus* Gilbert. Hawaii.
 1564. *Callionymus corallinus* Gilbert. Hawaii.

SYNCHIROPUS Gill.

1565. *Synchiropus microps* (Günther). Tonga.
 1566. *Synchiropus lineolatus* (Cuvier & Valenciennes). Bougainville I. (Peters, Berl. Mon. 1876, 841); East Indies.
 1567. *Synchiropus lili* Jordan & Seale. *Lili*. Samoa. (Pl. LIII, fig. 2.)

Head 3 in length; depth 5; eye 3.5 in head; dorsal iv-8; anal 7; lateral line complete, running near base of dorsal fins; interorbital equal to pupil; snout 4 in head.

Body elongate, widest at base of pectoral, compressed posteriorly; the anterior profile rounded to the mouth; lower jaw slightly the longer; angle of mouth under anterior margin of eye; mouth small, protractile, with minute teeth in jaws; caudal peduncle 3.75 in head; preopercular spine very strong with 2 strong curved claws, one of which is directed inward; origin of dorsal fin directly above posterior margin of opercle, its longest spine 2 in head; base of soft dorsal 1.1 in head; pectoral 1.3 in head, its tip under third ray of dorsal; base of the large ventrals entirely anterior to base of pectorals, the anterior margin of the base being anterior to preopercular spine; base of anal 1.1 in head, its origin an equal distance from tip of snout and base of caudal fin; caudal rounded, 1.1 in head.

Color in spirits dark brown with tint of green, white below; 3 rather wide irregular bands of white over the back, the first of these at posterior end of spinous dorsal and at origin of soft dorsal, this band separated above by a small brown band, but the whole area joining into one band on the lateral line; second white band at middle of soft dorsal, third over caudal peduncle, the 3 joined by irregular blotches of whitish; 3 round white spots below median line of body, and a few scattered small white dots over body; small blue dots over cheeks; 3 dark bands on underpart of head alternating with

white bands; spinous dorsal brown, the base black, with 4 distinct black ocelli on upper half of fin, posterior to which are 4 vertical blue lines; soft dorsal with about 4 irregular oblique dusky bands; caudal with a broad black band near middle, and a half band on upper posterior part; anal dusky, with narrow white tip, a broad black intramarginal area and some narrow oblique blue lines; pectoral clear yellow; ventral blackish with white band near middle, and a white margin.

Life colors, black mottled with dark gray; pectoral yellow, edged broadly with golden.

Two specimens from Apia. Type no. 51762, U. S. National Museum, length 1.35 inches.

Family BATRACHOIDIDÆ.

OPSANUS Rafinesque.

1568. *Opsanus dubius* (White). New Guinea (Macleay); Australia.

MARCGRAVIA Jordan.

1569. *Marcgravia grunniens* Linnæus. New Guinea (Macleay); East Indies.

1570. *Marcgravia diemensis* (Richardson). New Guinea (Günther, Challenger Rept. 1880, 39); Australia.

Family BLENNIIDÆ.

ENNEAPTERYGIUS Rüppell. (*Enneanectes* Jordan; *Gillias* Evermann & Marsh.)

This genus as understood by us includes most of the Pacific species referred to *Tripterygion*. It differs from *Tripterygion* as typified by the Mediterranean species, *T. tripterygion*, in the shorter jaws, the presence of a cirrus above the orbit, and in the larger scales. The lateral line is always incomplete. The species found in coral heads in Samoa are all minute, similar in size and habit to the species of *Eviota*, but those found on the coast of Japan are much larger.

1571. *Enneapterygius minutus* (Günther). Samoa.

Tripterygium minutum Günther, Fische der Südsee, 211, taf. 118, fig. D, 1876, Apia.

Described from a specimen an inch long taken at Apia, from which place we have a similar example. Apparently the fin rays were wrongly counted by Günther, as ours has the dorsal rays III-XI, 10.

1572. *Enneapterygius atriceps* (Jenkins). Hawaii.

1573. *Enneapterygius hemimelas* (Kner & Steindachner). Samoa.

Tripterygium hemimelas Kner & Steindachner, Sitz. Ak. Wiss. Wien, LIV, 1860, 372, Samoa. Günther, Fische der Südsee, 210, 1876, Samoa.

Life colors of a specimen from Apia, deep red mottled with dusky; posterior half of head blackish olive above and below; posterior half of trunk abruptly black, with 3 white rings; fins all cherry-red, the caudal abruptly pale red.

Another specimen from this locality had the middle third of body strongly rosy, also pectoral, ventral, and anal, and head in front of eyes; behind eyes and in front of pectoral greenish with yellow spots and rosy and black points; hinder third greenish yellow and brownish bands alternately; caudal clear with slight rosy tinge.

Five specimens from Apia and one from Pago Pago.

1574. *Enneapterygius tusitalæ* Jordan & Seale, new species. Samoa.

Head 3.30 in length; depth 5.20; eye 3.10 in head; dorsal III-XI-9; anal 17; scales 29, 9 in the lateral line. Another specimen had dorsal III-XI-8; anal 16.

Body elongate, compressed, largest at shoulder-girdle; snout pointed, the angle of mouth under the anterior margin of eye; minute teeth in jaws; middle of first dorsal fin over the posterior tip of opercle; base of second dorsal equal to head, its longest spine 2 in head; base of third dorsal 2 in head; base of anal 2.4 in length of fish without caudal, the origin nearer tip of snout than base of caudal; pectorals long, 2.75 in fish without caudal, the tips under the posterior third of second dorsal; ventrals 2.1 in head, situated anterior to base of pectorals; caudal rounded, 1.14 in head.

Color greenish in life, the fins dark. In spirits, owing to the thick dots of brown all over the body, this fish has a dusky appearance, but the ground color is really dull yellowish white; many of

the brown dots, especially on the cheek, belly, and thorax are modified into distinct ocelli, the center being a black dot with the surrounding ring of brown; the cheek and a line to tip of snout are deep black; no dark bands on the body, but traces of about 5 indistinct whitish blotches; dorsal fins slightly shaded with 5 dark dots without lines; pectoral and caudal very dark, without bars or spots; anal also thickly dotted with fine black specks, but not so dark as caudal or pectoral; eye golden with one dark line through its length.

This species is very near *T. pardochir* and an examination of a series may prove them to be identical.

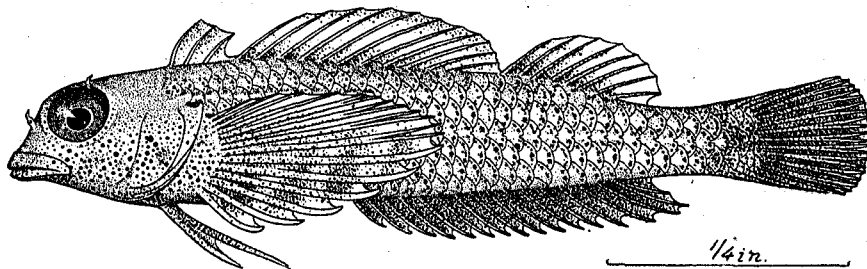


FIG. 97.—*Enneapterygius tusitala* Jordan & Seale, new species. Type.

We have about 10 specimens from the reef at Apia. Type no. 51800, U. S. National Museum, from Pago Pago, length 0.85 inch. Named for the "tusitala" (story-teller) of Samoa, Robert Louis Stevenson.

1575. *Enneapterygius pardochir* Jordan & Seale, new species. Samoa.

Head 3.5 in length; depth 4.14; eye 3.1 in head; snout 4.5 in head; interorbital narrow, one-half as wide as eye; dorsal III-XI-9; anal 18; scales 33; lateral line short, ending under posterior third of second dorsal.

Body elongate, compressed, scaled; depth of caudal peduncle 3 in head; the lower anterior profile of head slightly produced; angle of mouth under anterior third of eye; snout rather pointed and beak-

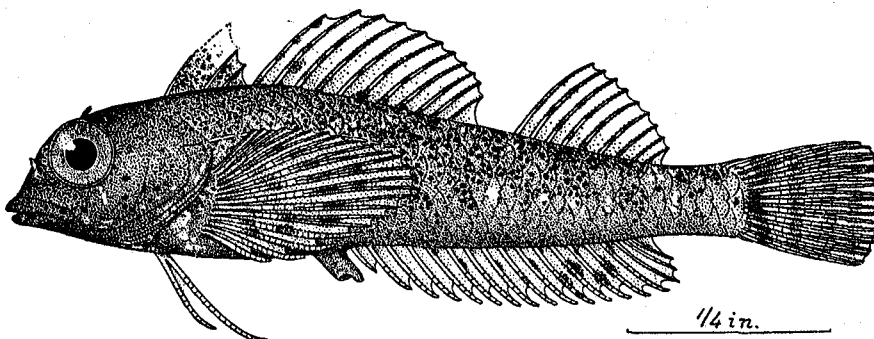


FIG. 98.—*Enneapterygius pardochir* Jordan & Seale, new species. Type.

like; minute teeth in jaws; a minute simple tentacle over eye and at nostril; middle of first dorsal over the posterior margin of opercles; base of second dorsal slightly greater than length of head, its longest spine 1.9 in head; 2 rows of scales between the second and third dorsal; base of third dorsal 1.4 in head, its longest ray 2 in head, its distal end some distance from the caudal; a very prominent anal papilla modified into an intromittent organ in males; anal fin rather long, its base 2.5 in length of fish, its origin under the base of the sixth spine of second dorsal and its distal end on a line with end of soft dorsal, the origin of the fin nearer tip of snout than base of caudal; pectoral equal to length of head, its tip under the ninth spine of second dorsal; ventral 1.5 in head, its origin anterior to base of pectoral; caudal rounded, 1.5 in head.

Life colors of various specimens were as follows:

(1) From Apia. Cherry-red with darker bars, most distinct and paired along side; iris scarlet; fins all reddish, barred with brown; a black dot surrounded by pale at base of caudal.

(2) From Pago Pago. Rose-pink, with bands of dark brown-red, and of white; pectoral, dorsal, and caudal barred with dark red-brown.

(3) From Pago Pago. With marks showing through from inside; outside whitish with abundant black points; transverse blackish bar; pectoral barred.

(4) From Apia. Bright green, with bronze dots; sides with large white spots; 2 white dots at base of caudal; pectoral banded white and reddish brown; iris golden; upper fins pale and dotted; lower darker, the anal dark brown barred with white.

(5) Less green than the preceding, with traces of a brown lateral band.

Color in spirits, from yellowish white to light brown with shading of darker brown spots, which in young specimens show a tendency to form vertical irregular bands along sides, this showing only at base of dorsal in type; the distinctive markings found on all specimens are 4 dark bands across the pectoral, and 4 similar bands on the caudal, the 2 near the base the most distinct; dorsal fins also with 3 or 4 oblique dark band-like rows of blotches on their spines and rays; a few larger black spots on cheeks and opercles.

Of this well-marked species we have 15 specimens from Pago Pago and Apia. Type no. 51799, U. S. National Museum, from Apia, length 1.06 inches.

1576. *Enneapterygius tutuilæ* Jordan & Seale, new species. Samoa.

Head 3 in length; depth 4; eye 3.1 in head; dorsal III-XII-9; anal 18; scales about 33; lateral line ending under middle of second dorsal.

Body elongate, compressed, scaled; depth of caudal peduncle equal to eye; lower profile of head projecting, the large eyes forming a convexity in the profile, otherwise the profile somewhat rounded

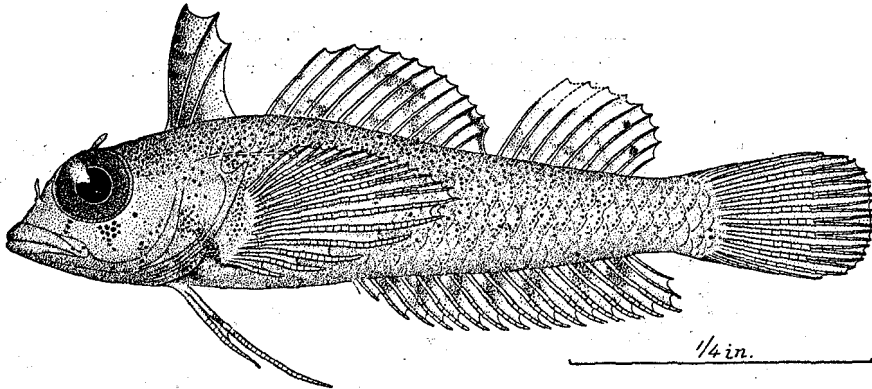


Fig. 99.—*Enneapterygius tutuilæ* Jordan & Seale, new species. Type.

to the mouth, angle of mouth under middle of eye; snout rather pointed; minute teeth in jaws; a short simple tentacle over eye and at nostril; first dorsal fin rather high and distinct, its base in front of posterior margin of opercle; base of second dorsal about equal to head, its longest ray 2.5 in head; base of third dorsal 1.75 in head, its longest ray 2.25 in head; origin of anal under sixth spine of second dorsal, its base 2.5 in length of fish without caudal; its origin at equal distance between tip of snout and base of caudal; pectoral slightly greater than length of head; caudal rounded, 1.25 in head; ventral situated anterior of pectoral, its length 1.25 in head.

Life colors of one specimen, greenish pinkish, with about 9 dark cross-bars, which become blackish bars across base of anal; a green bar between 2 white ones at base of caudal; fins barred with reddish brown; first and second dorsal blackish; head dotted and mottled with reddish.

Another specimen was translucent yellow white with many fine points, some rose-red, some black-brown, mixed all over body and fins; head darker; the fine spots weakly segregated into transverse bars, more distinct on belly.

Color in spirits, yellowish white, shaded with black spots tending slightly toward wide band-like arrangements on back; a heart-shaped dusky area on nuchal region; the most conspicuous marking is the 7 distinct vertical black bands of the anal fin; one dark band just in front of lower base of pectoral; a black spot in front of intromittent organ, 2 or more dark blotches below the eye; a dusky

wash on anterior of first dorsal fin; second and third dorsals each with about 4 rather irregular oblique blotches of dusky; caudal without markings; pectoral with 4 dusky blotches, ventral with 2 dusky bars.

Four specimens from the reef at Pago Pago. The type is no. 51801, U. S. National Museum, length 0.75 inch.

1577. *Enneapterygius cerasinus* Jordan & Seale, new species. Samoa.

Head 3.5 in length; depth 4.5; eye 3 in head; dorsal III-XII-9; anal 15; scales about 36; lateral line extending to below posterior part of second dorsal.

Body elongate, compressed, scaled; depth of caudal peduncle 3.15 in head; head pointed, the mouth small; minute teeth in jaws; angle of mouth under anterior margin of pupil; a minute orbital and nasal tentacle; middle of first dorsal fin not so high as second dorsal, its base 1.2 in height; base of second dorsal slightly longer than head, its longest ray 2 in head; a space of one and one-half rows of scales between second and third dorsal, base of third dorsal 1.45 in head, its longest ray 2 in head, its last ray two-thirds of eye; origin of anal under seventh spine of second dorsal, midway between tip of snout and tip of caudal, its base 2.3 in length of fish without caudal, its longest ray 2.5 in head; pectoral 1.14 in head; caudal slightly shorter; ventral 1.5 in head, the origin anterior to pectoral.

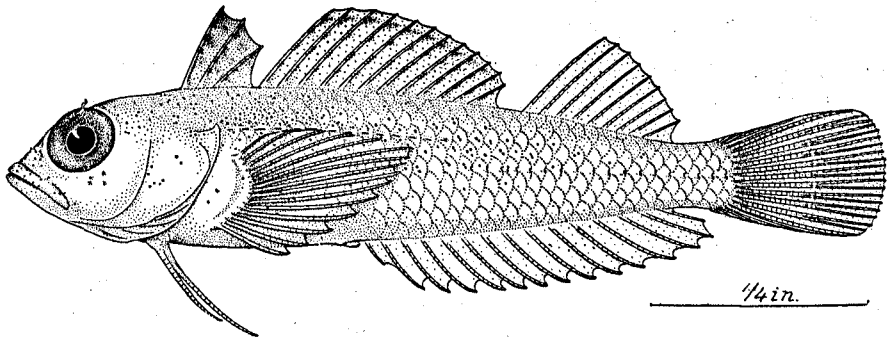


FIG. 100.—*Enneapterygius cerasinus* Jordan & Seale, new species. Type.

Life colors, clear reddish brown marbled with olive; 2 blackish brown dots at base of caudal; pectoral mostly plain scarlet; caudal pale orange; other fins feebly barred with brownish.

Color in spirits, yellowish white with a few scattered dark specks on upper half of body and head; 4 distinct black dots below eye; a few minute dots on snout and maxillary; anterior dorsal with 4 indistinct oblique bands of dusky; the second dorsal with an indistinct dusky submarginal band with indications of 3 other longitudinal dusky bands, these being seen only under a good lens; all the other fins uncolored.

One specimen, type no. 51802, U. S. National Museum, from Apia, length 1 inch.

1578. *Enneapterygius hudsoni* Jordan & Seale, new species. Samoa.

Head 3.2 in length; depth 4.5; eye 3 in head; dorsal III-XIV-10; anal 20; scales about 40; lateral line extending to anterior third of last dorsal.

Body elongate, compressed, scaled, except head and a rather broad area on each side of first and second dorsal; apparently a well developed system of mucus canals about the head; depth of caudal peduncle equal to eye; anterior profile of head with the mouth slightly produced, forming an angle somewhat greater than 45°; mouth small, the angle being under the middle of eye; minute teeth in jaws; a small fringed tentacle at nostril; posterior margin of first dorsal over posterior margin of opercle, fin high, its base 1.95 in height; second dorsal extending to above the tenth anal ray; the base of last dorsal 1.5 in head, its longest ray 3 in head; origin of anal under base of seventh spine of second dorsal, its base 2.25 in length of fish without caudal, its origin nearer tip of snout than base of anal; pectoral slightly longer than head; ventral 1.75 in head; caudal rounded, about 1.5 in head.

Color in spirits, yellowish white with rather irregular brownish blotches, which are more regular along the middle of sides, forming round dusky spots with slight oblique upward projections, these

dark spots alternate with distinct white spots; top of head shaded darker, a rather distinct black band from eye down sides of snout to near the tip; a number of fine black dots on opercle; an indication of about 5 dusky bands, alternating with bands of white dots over the back; anal fin with dusky spot at base; a rather prominent dusky spot on lower part of opercle; another just below eye; 3 dusky blotches on pectoral; a slight dusky wash on posterior margin of second dorsal; 2 indistinct oblique bands on last dorsal; first dorsal with scattered dark dots; caudal without markings.

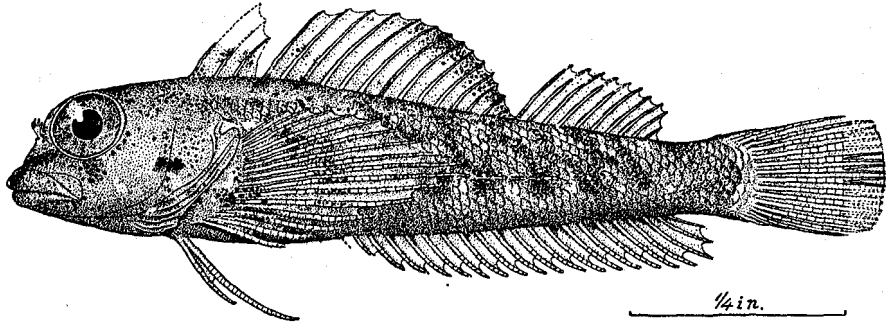


FIG. 101.—*Enneapterygius hudsoni* Jordan & Seale, new species. Type.

One specimen from Apia, type no. 51798, U. S. National Museum, length 1 inch. Named for Mr. R. L. Hudson, the artist.

CRISTICEPS Cuvier & Valenciennes.

1579. *Cristiceps roseus* Günther. New Guinea.

SAUVAGEA Jordan & Seale, new generic name.

Sauvagea Jordan & Seale, new generic name in Blenniidae (*caledonica*).

Lepidoblennius Sauvage, Rev. Zool. 1874, 337 (*caledonicus*); not of Steindachner, 1867.

This genus, with 2 dorsals, the first of 8 spines, and the body scaly, is an ally of *Clinus*. The name *Lepidoblennius* is preoccupied. We may therefore give the genus a new name in honor of its discoverer, Dr. H. E. Sauvage, of Boulogne-sur-mer.

1580. *Sauvagea caledonica* (Sauvage). New Caledonia.

Lepidoblennius caledonicus Sauvage, Rev. Zool. 1874, 338, New Caledonia.

BLENNIUS Linnæus.

1581. *Blennius sordidus* Bennett. Hawaii.

Blennius sordidus Bennett, Zool. Journ., IV, 1829, 34, Honolulu. Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 256, 1835, Honolulu. Günther, Fische der Südsee, 193, taf. 113, fig. D, Sandwich Is.

1582. *Blennius canescens* Garman. Fiji.

Blennius canescens Garman, Bull. Mus. Comp. Zool., vol. xxxix, no. 8, 1903, Fiji.

1583. *Blennius tonganus* Jordan & Seale, new name. Tonga.

Blennius cristatus, Günther, Fische der Südsee, 194, taf. 113, fig. E, Tonga; not of Linnæus.

This species from Tonga, characterized by the long row of nuchal filaments, is unknown to us. Dr. Günther identifies it with *Blennius cristatus* Linnæus, a species of the West Indies, originally described from Ascension Island. It is not at all likely that this Pacific species is identical with *Blennius cristatus*, and we therefore propose for it the new name *B. tonganus*.

HYPLEUROCHILUS Gill.

This genus differs from *Blennius* in having the gill-openings restricted to the sides, the membranes not forming a free fold across the isthmus as in *Blennius*.

1584. *Hypleurochilus vaillanti* Jordan & Seale, new species. Samoa.

Head 3.75 in length; depth 4; eye 2.75 in head; dorsal XII, 15; anal 17; lateral line consisting of about 6 separated pores.

Body elongate, compressed; the anterior profile of head rounded, the mouth slightly produced beyond the forehead; angle of mouth under anterior margin of eye; mouth rather small with a single row of teeth in jaws and a pair of curved fang-like canines in under jaw; gill-openings rather narrow, 2.2 in head; dorsal fin not incised, extending to base of caudal, the membrane of the fin united to rays of the caudal; origin of anal under first dorsal ray, nearer tip of snout than base of caudal, its distal end extending to caudal fin, where its membrane is slightly united to caudal; longest anal ray 1.75 in head; pectoral 1.2 in head; ventral 1.3 in head, the origin anterior to origin of pectoral; caudal rounded, 1.5 in head.

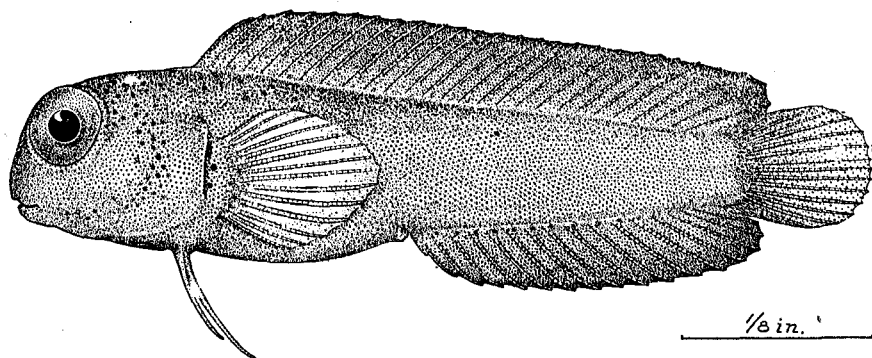


FIG. 102.—*Hypleurochilus vaillanti* Jordan & Seale, new species. Type.

Life colors, anterior part fuliginous; posterior third greenish with mottling of fine black points; top of head covered with small round black dots; 1 or 2 similar dots on base of pectoral; dorsal and anal plain brown, darker than body; caudal pale olive-green.

Color in spirits, yellowish white shaded everywhere with minute dusky dots like pin pricks, a few larger dots on top and sides of head; 2 distinct black dots on base of pectoral fins; fins colored like body, the dorsal and anal being a shade darker.

One specimen, length 0.56 inch, type no. 51788, U. S. National Museum, from Pago Pago, Samoa.

1585. *Hypleurochilus periophthalmoides* (Macleay). New Guinea.

Blennius periophthalmoides Macleay, Proc. Linn. Soc. N. S. W. 1883, 269. (Apparently a *Hypleurochilus*; teeth not described.)

ALTICUS (Commerson) Lacépède. *Mano'o*.

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

Alticus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 337, 1836 (*alticus*).

Eripichthys Swainson, Class. Anim., II, 275, 1839 (*atlanticus*).

Rupiscartes Swainson, Class. Anim., II, 275, 1839 (*alticus*).

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

This genus differs from *Salarias* in the presence of posterior canines in one or both jaws. In both genera the teeth are loosely inserted, and the gill-membranes form a broad fold, free from the isthmus.

The case of *Alticus*, quoted by Lacépède from manuscripts of Commerson, is parallel to that of *Zanclus* (vs. *Pomacanthus*), and of *Antennarius* (vs. *Histrio*), and in all these cases we allow precedence to the earlier name.

1586. *Alticus saliens* (Forster). Tanna; Samoa; New Britain; Vavau; Nukahiva (Seale). (Fig. 111, p. 439.)

Plennius saliens Forster, Itin., II, 343, 1788, Tanna.

Blennius saliens, Lacépède (*Alticus saltatorius* Commerson), Hist. Nat. Poiss., II, 468, 1800, New Britain.

Blennius amphibius Walbaum, Artedi Pisc., III, 187, 1792, Tanna, after Forster.

Blennius tridactylus Bloch & Schneider, Syst. Ichth., 1801, 176; after *Blennius gobioides* Forster.

Salarias tridactylus, Günther, Fische der Südsee, 200, taf. 117, figs. c, d, Vavau.

Salarias alticus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 337, 1836.

Blennius gobioides Forster, Descript. Anim., 283, 1844, Tanna.

This wiry little blenny covers the lava rocks on the "iron-bound coast" of the Samoan Islands; leaping on the bare rocks in the sun like a lizard and leaping into the sea with the greatest velocity when disturbed. It is not found in the coral. At Apia it swarms in the wreck of the German warship *Adler*, but it could not be taken there by any means at our disposal.

We have 7 specimens from Pago Pago. Life colors of one of these, violet-black, with a few pale bluish spots along middle of side; dorsal pale-edged; body with about 9 pale, poorly defined, transverse double bars, which form a series of pale spots along middle of side; throat and belly pale, becoming yellowish posteriorly; anal pale in some specimens, the rays faintly spotted with black specks; in others this fin is colored like the dorsal, and nearly or quite as dark; caudal and pectoral black.

1587. *Alticus periophthalmus* (Cuvier & Valenciennes). Ticopia; Samoa; Santa Cruz; Rarotonga; Futuna; Tahiti; Mangareva; Nukahiva and Makatea (Seale); India.

Salarias periophthalmus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 311, pl. 323, 1836, *Ticopia*. Günther, Fische der Südsee, 207, taf. 114, figs. D, E, Santa Cruz, Samoa, Rarotonga, Futuna, Society Is., Savail. Day, Fishes of India, 333, pl. 69, fig. 5, Andamans Is.

Salarias andamanensis Day, Proc. Zool. Soc. 1869, 611, Andamans Is.

Life colors of a specimen from Apia, body mottled gray-olive and purplish, the latter in paired bars, or inverted Y-shaped, about 8 in number; side with a few oblong spots of bright violet, arranged in 2 rows, about 5 in each row; an orange blotch behind eye, with a greenish violet bar behind it; a greenish violet dash below eye; cirri orange; dorsal much mottled brown, grayish and orange, the edge pale, with orange spots; caudal pale above, purplish black below, ending in blackish orange, the lower lobe darkest; anal mainly black, orange at base; pectoral pale, never sprinkled with black dots as in *Alticus evermanni*.

Another specimen was light olive; 9 quadrate spots or bars of dark brown along side, these alternating above with another series of irregular blotches; crest high, edged with dull red; second dorsal and upper part of caudal edged with creamy red, rather bright; cirri pink.

Other specimens have the margin of the spinous dorsal with dark spots; still others have the spinous dorsal plain and in some both dorsals are crossed by the dark bars on the body. In some specimens the characteristic blue spots on the sides are obsolete.

This species is abundant in the coral reefs at Samoa; we have 50 specimens from Apia and 4 from Pago Pago.

1588. *Alticus evermanni* Jordan & Seale, new species. Samoa.

Salarias nitidus Günther, Fische der Südsee, 200, taf. 113, fig. G, Samoa; not *Salarias nitidus* Günther, Cat., III, 243, from China. Seale, Bishop Museum 1901, 127, Guam.

Head 4.75 in length; depth 6; eye 4 in head; dorsal XII, 21; anal 25; lateral line short, ending under tenth dorsal spine; interorbital equal to one-half of eye; angle of mouth under posterior margin of eye, slightly posterior.

Body elongate, compressed, anterior profile slightly subvertical, the forehead projected beyond the jaws; a divided orbital tentacle whose length equals two-thirds diameter of eye; a short four-fringed tentacle at nostril; a row of small movable teeth in jaws, with the posterior canines present; dorsal fin notched to one-half its depth, the origin of the fin slightly in advance of posterior margin of opercle, and its posterior membrane not extending on the anal, its longest spine 1.75 in head, its longest ray 1.5 in head; origin of anal nearer head than base of caudal, the base of fin 2 in length of fish without caudal; pectoral 1.18 in head; ventral 2 in head; caudal square, its length equal to head; a slight ridge on top of head.

Color in life, ground-color a pale olive-brown, with 9 broad transverse bars of darker brown, fading out below, but above extending well up on the dorsal fin; a round black spot in the fourth transverse bar, a little above middle of body; body thickly sprinkled with small oblong or linear pearly or bluish-white spots, most conspicuous posteriorly, where they form irregular longitudinal rows on the lower part of the body; upper part of head with round white spots, which extend backward above lateral line to posterior end of spinous dorsal; in some specimens numerous small black dots below this on anterior part of body; underside of head pale, with irregular violet streaks; dorsal spines tipped with black; spinous dorsal with irregular horizontal streaks of violet, in some specimens fading to yellowish white; 3 narrow dark longitudinal streaks near the broad pale margin of soft dorsal; caudal and anal plain dusky; pectoral yellowish, with 5 transverse rows of conspicuous dark dots.

In spirits our large series shows a great intergradation of color among the individuals of this species, but the following marks are constant in all: 5 lines of black spots on the pectoral; 2 dusky bands over the head, one directly behind the eye down to angle of mouth, the other over nuchal region on posterior border of preopercle; caudal washed with dusky; anal with a dusky wash on entire fin; body grayish, slightly tinted with blue to purplish, some specimens banded with darker gray, others having scarcely a trace of bands; the type with 9 very distinct vertical dark bands, wider than the interspaces, along the side of body; a number of round yellowish white spots over head and shoulders; some pearl-blue spots on posterior part of body; a round spot on middle of body under anterior of soft dorsal—some of the specimens not showing this spot at all, and others showing it only on one side; dorsal (in type) with the brown bands of body extending up into the fin, a number of rather indistinct narrow longitudinal lines on upper half of fin, the spinous dorsal tipped with black; some specimens with a row of dark spots along middle of dorsal, others with no black dots, but a large number of fine narrow lines on outer half of fin, and between these in many forms our series show an almost perfect gradation; belly usually with a more or less decided purplish wash. The younger individuals show less of color markings, some being almost uniform gray on body.

Twenty-one specimens from Apia. The type is no. 51789, U. S. National Museum, length 3.5 inches. These specimens agree fairly with *Salarias nitidus* of Günther's *Fische der Südsee*, from Samoa. The type of *Salarias nitidus* from the China Sea is apparently a different species. The species resembles *Alticus periphthalmus*, but may be known at once by the spotted pectoral.

Named for Dr. Barton Warren Evermann.

1589. *Alticus caudolineatus* (Günther). Tahiti; Samoa; Makatea and Nukahiva (Seale).

Salarias caudolineatus Günther, *Fische der Südsee*, 209, taf. 116, fig. F, 1876, Otaheite.

We have 3 specimens of this very handsome blenny from the reef at Apia, where it is the commonest species in the coral pools, and 7 specimens from Pago Pago.

Life colors of a specimen from Apia, gray; lengthwise dark olive streaks like pencil-marks on side; no bright colors except on the crest, which is edged with orange-red; an orange dash on eye above; 9 transverse double brown bars on side, running from base of dorsal to the lowest lengthwise streak; caudal with from 7 to 9 transverse rows of dark dots; dorsal pale; 3 rows of small dark dots running longitudinally across both dorsals; traces of 2 more rows on the soft dorsal in some specimens; anal pale, with a row of faint brown dots posteriorly, near the base of the rays; pectoral pale, unspotted.

1590. *Alticus aneitensis* (Günther). Aneiteum.

Salarias aneitensis Günther, *Fische der Südsee*, 205, taf. 118, fig. A, 1876, Aneiteum.

1591. *Alticus gibbifrons* (Quoy & Gaimard). Hawaii; Marcus I.

Salarias gibbifrons Quoy & Gaimard, *Voy. Uranie*, 253, 1824, Maui. Snyder, *Bull. U. S. Fish Comm.*, xxii, 1902 (1904), 536, Honolulu, Hilo; not of Cuvier & Valenciennes.

Entomacrodus gibbifrons, Bryan & Herre, *Bishop Museum*, ii, 1903, 188, Marcus I.

Salarias sallans Jenkins, *Bull. U. S. Fish Comm.*, xxii, 1902 (1904), 508, fig. 48 (male), Honolulu.

Salarias rutilus Jenkins, *op. cit.*, 509, fig. 49 (female), Honolulu.

1592. *Alticus striatus* (Quoy & Gaimard). *Mano'o a'au*. Samoa; Nukahiva (Seale).

Salarias striatus (Quoy & Gaimard) Cuvier & Valenciennes, *Hist. Nat. Poiss.*, xi, 309, 1835, Ile de France.

Salarias marmoratus, Günther, *Fische der Südsee*, 204, taf. 116, fig. B; not type.

Two specimens from Aua in Tutuila, the species occurring in the sea along the "iron-bound coast", not in the coral reefs.

Color in life, white ground-color with dark spots on side with purplish blue tinge; spots on caudal smoky; belly white; head with a weak bluish streak behind eye; lower side of head with 3 white stripes radiating from the throat on each side; dorsals irregularly and obliquely streaked with dark; caudal with about 6 irregularly transverse rows of dark spots; anal pale, its edge dusky; pectoral plain, uncolored.

Dr. Günther has evidently confused this species with *Alticus marmoratus*, which was described by Bennett from the Sandwich islands, and has since been collected there by Dr. Jenkins, by Jordan & Evermann, and by Professor Snyder at Laysan Island. Fishes from other localities described under the name of *S. marmoratus* belong to still other species. This is apparently the species called *Salarias striatus* by Quoy & Gaimard, but it is probably different from *Salarias arenatus* Bleeker. It is called "the outside skippy", *mano'o a'au* in the Samoan vernacular.

1593. *Alticus marmoratus* (Bennett). Hawaii; Laysan.

Salarias marmoratus Bennett, Zool. Journ., iv, 35, Hawaii; not of Günther. Snyder, Bull. U. S. Fish Comm., xxii, 1902 (1904), 536, Laysan.

1594. *Alticus griseus* (De Vis).

Salarias griseus De Vis, Proc. Linn. Soc. N. S. W. 1884, 450, South Seas.

This scantily described species is unknown to us. The presence of tentacles at the nape indicates a resemblance to *Alticus marmoratus*.

1595. *Alticus coronatus* (Günther). Solomon Is.; Samoa; Nukahiva (Seale).

Salarias coronatus Günther in Brechley, Cruise of the Curaçoa, 424, pl. 33, fig. B, Solomon Is. Günther, Fische der Südsee, 206, taf. 116, fig. E, Solomon Is.

Of this rare fish we have 14 examples from the coral reefs at Apia. Color in life, light green with about 8 paired cross-bands of reddish brown; stripes across chin and throat dusky; sides and top of head with small round whitish spots, which extend backward along base of spinous dorsal. *Alticus evermanni* has the same kind of dots on its head, but they are differently arranged.

In alcohol the paired cross-bands fade, leaving 2 longitudinal rows of small brown dots, prominent only posteriorly; dorsals pale, colorless; dorsal spines tipped with black; anal pale, dusky-edged; caudal pale, unspotted; pectoral with from 3 to 5 irregular transverse rows of dark brown spots.

1596. *Alticus variolosus* (Cuvier & Valenciennes). Guam; Samoa; Tonga; Hawaii.

Salarias variolosus Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 317, pl. 330, 1836, Guam. Günther, Fische der Südsee, 203, taf. 116, fig. A, Samoa, Tonga, Society Is. Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 518, Sandwich Is. Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1904), 507, Honolulu.

Salarias nigripes Seale, Occ. Papers Bishop Museum, vol. 1, no. 3, 1901, 127, Guam.

Eight examples of this widespread Polynesian blenny were obtained at Apia, from the lava rocks.

Color in life, jet-black with brownish shade; pectoral edged below with cherry-red, spinous dorsal with brownish; the upper anterior portion abruptly pale, its boundary extending from the tip of near the last spines forward to the base of the first; no distinct spots; caudal above and below with pale dull olive; upper portion of caudal always more or less pale, the pale color not sharply defined; fins otherwise nearly black; body unmarked; 7 narrow dark blue cross-bars on body and a dark blue line from nape to opercle.

1597. *Alticus albo guttatus* (Kner). Samoa; Fiji.

Salarias albo guttatus Kner, Sitz. Ak. Wiss. Wien, LVI, 1867, 16, pl. 4, fig. 4, Samoa. Günther, Fische der Südsee, 205, taf. 118, fig. B, Kandavu.

Of this pretty little blenny but 3 specimens have previously been collected, 1 at Samoa and 2 at Kandavu, one of the Fiji Islands. We have 18 specimens from Apia and 3 from Pago Pago.

Color in life of a specimen from Pago Pago, a faint red blotch behind eye; eye with 7 red spots in iris; body pale olivaceous green, with white spots; a large blue spot on each side of the throat.

Another specimen from Apia in life was olivaceous brown, with pale oblong horizontal spots on sides; head speckled with small round white spots; a large steel-blue spot on each side of the throat; faint orange spots on base of dorsal; soft dorsal and caudal pale; faint olive bars on middle of caudal; tip of caudal cherry-red; anal dusky; pectoral pale, its base spotted like head.

1598. *Alticus guttatus* (Cuvier & Valenciennes). Vanicolo; Samoa.

Salarias guttatus Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 308, Vanicolo. Günther, Cat., III, 250 (copied). Günther, Fische der Südsee, 204.

This rare little fish was described from 2 small specimens from Vanicolo, and seems not to have been collected since. We have 2 specimens, 25 millimeters in length, from Apia. They differ from the types in having a small crest, colored like the body.

Color in alcohol, ground-color of body uniform pale brown, with about 4 rows of dark-brown spots, made up of numerous fine specks, the spots in the two lower rows much larger than those in the upper rows; 2 rows of oblong, pearly white spots, commingled with the two lower rows of brown spots; above these are numerous small pearly spots; head covered with many small pearly and brown specks, commingled; a dark streak behind eye; behind this a dark band extending from nape diagonally downward and forward to throat; under side of head pale, with white specks; a small black spot on each side of throat; chin and upper lip with black streaks; belly pale; margin of dorsal dark;

a narrow dark longitudinal band near base of soft dorsal; anal clear, its edge dusky; caudal clear; basal portion of pectoral covered with pearly white spots, otherwise clear. Another specimen agrees exactly with the above, but lacks the pearly spots.

1599. *Alticus thalassinus* Jordan & Seale, new species. Samoa.

Head 4.5 in length; depth 5; eye 4 in head; dorsal XII, 14; anal 18; interorbital one-half as wide as eye; a short curved lateral line ending under tenth dorsal spine.

Body elongate, compressed, the head blunt, the anterior profile almost vertical; an outer row of fine movable teeth in the jaws; posterior canines present; a short, fringed orbital tentacle, its length less than width of eye; a minute fringed tentacle at nostril; dorsal notched to about one-half its depth; origin of dorsal directly above posterior margin of opercle, its posterior membrane not united with caudal, its longest ray 1.75 in head; origin of anal midway between snout and base of caudal, its longest rays 2.2 in head; total length of pectoral about equal to head, ventral small, slightly anterior to pectoral, 2.25 in head; caudal rounded 1.14 in head.

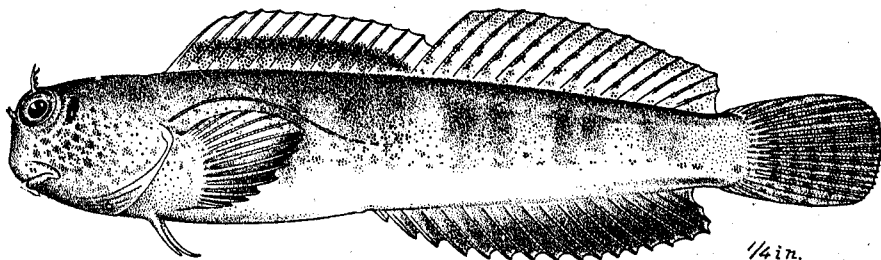


FIG. 103.—*Alticus thalassinus* Jordan & Seale, new species. Type.

Life colors, green, with dark brown bands and many spots arranged in cross-series; chin and spot behind eye blackish; a broad dark band on basal half of spinous dorsal; margin clear; soft dorsal with 3 longitudinal rows of large dark spots, its margin dusky; caudal irregularly streaked with transverse bars of brownish black; anal blackish brown, the tips of the rays white; lower part of pectoral dusky; upper portion clear.

Color in spirits, whitish, with slight wash of pale green, head rather thickly covered with round spots made up of minute brown dots like pin-pricks, a deep black spot the size of pupil just posterior to eye; upper half of body with scattered brown dots assuming indistinct band-like arrangements on sides; chin with a dark blotch; caudal with 6 brown cross-bands; spinous dorsal with dark shading through its center; soft dorsal with about 3 rows of brown dots and a dark margin to fin; anal dusky shaded, with lighter margin; pectoral and ventral slightly shaded with dusky; iris golden.

Three specimens from Apia. The type is no. 51795, U. S. National Museum, length 1.5 inches.

1600. *Alticus musilæ* Jordan & Seale, new species. Samoa.

Head 4.1 in length; depth 4.1; eye 2.1 in head; dorsal XII, 14; anal 17; interorbital one-half width of eye.

Body elongate, compressed; profile of head vertical; a short lateral line, ending brokenly under the posterior margin of spinous dorsal; an outer row of moveable teeth in each jaw; posterior canines present; origin of dorsal on line with posterior margin of opercle, the fin not extending posteriorly upon base of caudal, its longest spine 2.2 in head, the fin notched to its base; a short fringed orbital tentacle, and a very short fringed nasal tentacle; pectoral fin equal to head; ventral small, situated anterior to pectoral, its length equal to postocular part of head; base of anal about 3 in length of fish, its longest ray 2.25 in head; caudal rounded, its length equal to head.

Life colors, light cherry-red, 8 pairs of bars of crimson brown, a red brown spot behind eye; fins pale reddish, dotted, the caudal whitish; cirri red; front and top of head thinly spotted with small reddish brown specks; chin and sides of head thickly spotted; a few brown spots scattered about over body; from 1 to 3 larger, round blue-black dots on body under pectoral.

Color in spirits, whitish with slight wash of pale green; head and shoulders with a few small scattered brown dots; a small black spot behind eye, less than size of pupil; body with 2 or 3 longi-

tudinal rows of brown dots; fins without color or markings except a few small irregular dark spots on dorsal and caudal.

Four specimens from Apia. The type is no. 51790, U. S. National Museum, length $1\frac{3}{8}$ inches.

The species is named for Musila, of Apia, a young Samoan of fine parts whom we found efficient as a fisherman.

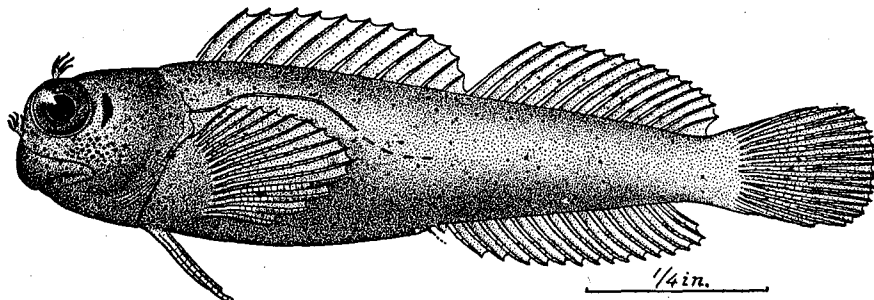


FIG. 104.—*Alticus musila* Jordan & Seale, new species. Type.

1601. *Alticus sebæ* (Cuvier & Valenciennes). Fiji; Tahiti; Samoa (Günther).

Salarias sebæ Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 323, 1835, East Indies. Kner, Sitz. Ak. Wiss. Wien 1868, 41, Fiji. Günther, Fische der Südsee, 202, Samoa, Fiji, Tahiti.

This species, known by the lengthening of the first 1 to 3 dorsal spines, was not taken by us.

1602. *Alticus sealei* (Bryan & Herre). Marcus I.

Entomacrodus sealei Bryan & Herre, Occ. Papers Bishop Museum, ii, 1903, 138, Marcus I.

SALARIAS Cuvier. *Mano'o*.

Scartes Jordan & Evermann, Check-List Fishes, 471, 1896 (*rubropunctatus*), name preoccupied by *Scartes* Swainson, 1829, a genus of mammals.

Scartichthys Jordan & Evermann, Fishes North and Mid. Amer., iii, 2395, 1900 (*rubropunctatus*).
Not *Salarias* Forskål = *Blennius*.

1603. *Salarias zebra* Vaillant & Sauvage. Hawaii.

(*Salarias cypho* Jenkins, Honolulu.)

This species is very abundant in the rock-pools of the lava about Hawaii, being the commonest of all the blennies in that region. It has not been found elsewhere.

1604. *Salarias sertatus* Garman. Fiji.

Salarias sertatus Garman, Bull. Mus. Comp. Zool., xxxix, 1903, 237, Fiji.

This species, which we have not seen, resembles *Alticus saliens* in form and in habits, but is uniformly colored.

1605. *Salarias lineatus* Bleeker. Samoa; Faté (Seale); East Indies.

Salarias lineatus Bleeker, Verhand. Batav. Genootsch., xxii, Blenniidae and Gobiidae, 18. Günther, Cat., iii, 264, Java. Day, Fishes of India, 832, pl. Lxx, fig. 8 (male), Red Sea, Andaman Is., Malay Archipelago.

We have 5 specimens from Pago Pago and one from Apia. Life colors of one from Pago Pago, dark olive; side with about 6 to 8 dark lengthwise stripes, the 3 or 4 lowermost more continuous and regular, the upper very wavy, these interosculating with each other so that the back and region behind head show dark network; 6 paired blackish cross-shades on back and sides; fins dull olive; dorsals separate, the first with oblique dashes at base and a dusky edge, second with oblique streaks like those on body, the edge pale; caudal dusky; anal pale, the edge dark; pectoral and ventral rather pale; head with vertical marblings; 2 converging lines on base of caudal. Dorsal xii-24. Differing from current descriptions in having no crest; tentacles small. The other specimens have a high crest.

Another specimen from Pago Pago was blackish olive, with a bright yellow or tawny shade in life; 5 or 6 diffuse cross-shades on back; side with 4 or 5 series of short oblong horizontal dashes of

paler olive, forming interrupted lines, the lowest nearly continuous; some dark cross-shades on lower part of head; fins dark olive; dorsal and caudal pale edged; tentacle and crest dull olive. Dorsal notched, the spines higher than the soft rays.

1606. *Salarias fasciatus* (Bloch). Samoa; Tonga; Vanicolo; Ponape; East Indies.

Blennius fasciatus Bloch, II, 112, taf. 162, fig. 1, 1870, Japan.

Salarias quadripinnis Rüppell, Atlas Fische, 112, taf. 28, fig. 2, 1828, Red Sea. Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 318, 1836, Timor, Tongatabu, Vanicolo.

Salarias fasciatus Cuvier & Valenciennes, op. cit., 324, 1836. Günther, Fische der Südsee, 201, taf. 115, fig. G, Ponape.

Salarias semilineatus Kner, Sitz. Ak. Wiss. Wien, LVI, 1867, fig. 3, Samoa.

Life colors of a specimen from Apia, brown, with oblong bluish spots; numerous small dark dots and dashes on sides, back of head and above pectoral, soon fusing and becoming lines which extend backward to below middle of soft dorsal; dorsal brown with greenish white spots and brown dots, its edge creamy red; caudal olive, speckled with brown and whitish, its upper edge washed with cherry-red; anal like dorsal, dusky-edged; pectoral and ventral barred; belly livid; eight dark shades at base of dorsal.

We have about 80 specimens of this species from the coral reef at Apia, where it is very common; we have also 6 specimens from Pago Pago.

1607. *Salarias biseriatus* (Cuvier & Valenciennes). *Mano'o a'au.* Tahiti; Samoa.

Salarias biseriatus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 316, 1828, Tahiti. Kner, Novara Reise, Fische, 197, taf. 8, fig. 4, 1865, Tahiti. Günther, Fische der Südsee, 208, Tahiti.

Life colors of a specimen from Pago Pago, blackish olive, violaceous below; sides with 4 rows of violet-white round spots, the third series most distinct and regular, the spots of the fourth row larger and more diffuse; fins all dark, nearly plain.

Another example was blackish olive with 8 to 11 white partial bands across belly and base of anal, often not distinct before vent; head with small bluish white spots; a row of these spots more distinct along upper line of ventral bars, others on sides forming a second irregular row, usually gathered in pairs, one above the other, about 6 pairs of dark blotches along base of dorsal; fins dark, mottled with darker; a black spot on front of first dorsal; soft dorsal with oblique pale streaks; caudal dusky olive; ventral black; pectoral olive, with fine white dots. Dorsal divided, XII, 18.

A young individual from Pago Pago was violet-black or brown, with some 7 or 8 pale cross-streaks, violet-tinged, narrower than the interspaces; 4 or 5 sharply defined white spots along side; head with violaceous and greenish mottlings; caudal light yellow; dorsals dusky, mottled; anal pale; ventral and anal dusky-translucent. Dorsal divided; no crest.

Two specimens from near Aua, on the north shore of Tutuila, together with 152 other examples from the same place, taken with dynamite among the lava rocks on the "iron-bound coast." One specimen from Apia.

1608. *Salarias sindonis* Jordan & Seale, new species. Samoa.

Head 4.2 in length; depth 5.75; eye 3 in head; interorbital space scarcely equal to eye; dorsal XII, 19; anal 21; lateral line short, ending under posterior part of spinous dorsal.

Body elongate, compressed, the anterior profile of head rounded, the forehead not projecting; angle of jaws under middle of eye; a short, simple orbital tentacle and a minute, fringed nasal tentacle; teeth in jaws in a single series, no posterior canines; dorsal fin incised to one-half its depth, its origin over posterior margin of opercle, and its distal end terminating some distance anterior to caudal base, the greatest vertical height of the fin about 3.5 in head; origin of anal nearer tip of snout than base of caudal, considerably in advance of soft dorsal, the fin long, its base equal to distance from tip of snout to origin of the fin, its longest ray 2.5 in head; pectoral equal to length of head; caudal rounded, 1.25 in length of head.

Life colors, translucent gray, the head black, the body with about 6 pairs of dark cross-bands; conspicuous dark spots along base of dorsal; fins all pale, the concave caudal whitish; top of head with many round, dark-brown dots; on nape these form a crescent, the horns of which reach posterior margins of eyes; within this crescent the dots form a large spot; body and fins everywhere thickly sprinkled with minute black specks.

Another specimen was dark blackish green, with darker cross-bands and no other colors; top of head and nape covered with many comparatively large, round, brown dots; body and fins everywhere covered with minute black dots.

Color in spirits, ground-color yellowish white, thickly punctulate with minute dark dots, these taking the form of numerous (18-20) rather irregular vertical bands on sides of body, some of the bands more or less connected at top; in older examples the bands seem to group themselves in pairs and become fewer in number; a characteristic oblique black band on the head from nuchal region through eye to middle of each maxillary; the dark markings of body extending a little way into dorsal, the fin also shaded slightly with minute dark dots; anal white, with slight tint of dusky; pectoral, ventral, and caudal whitish, without distinct markings.

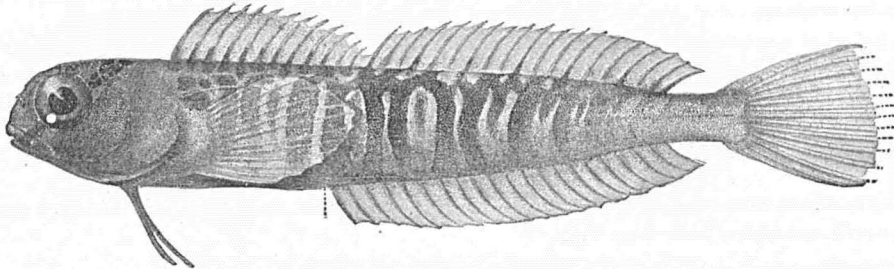


FIG. 105.—*Salarias sindonis* Jordan & Seale, new species. Type.

Numerous specimens (50) collected at Pago Pago, by Mr. Michitaro Sindo, for whom the species is named. The type is no. 51792, U. S. National Museum, length 0.99 inch.

1609. *Salarias atkinsoni* Jordan & Seale, new species. Samoa.

Head 3.75 in length; depth 3.75; eye 2.75 in head; interorbital equal to one-half of eye; dorsal XIII, 17; anal 21; a short lateral line ending under eighth dorsal spine.

Body elongate, compressed, rather short; anterior profile of head vertical; the angle of mouth under posterior third of eye; depth of caudal peduncle 2.75 in head; a simple, short orbital tentacle, a small fringed one at nostril; teeth in a single row in each jaw, no posterior canines; dorsal fin incised almost to base, the incision being broadly rounded; origin of dorsal about 1 spine in front of posterior margin of opercle, its distal end reaching to base of caudal, not attached to caudal by

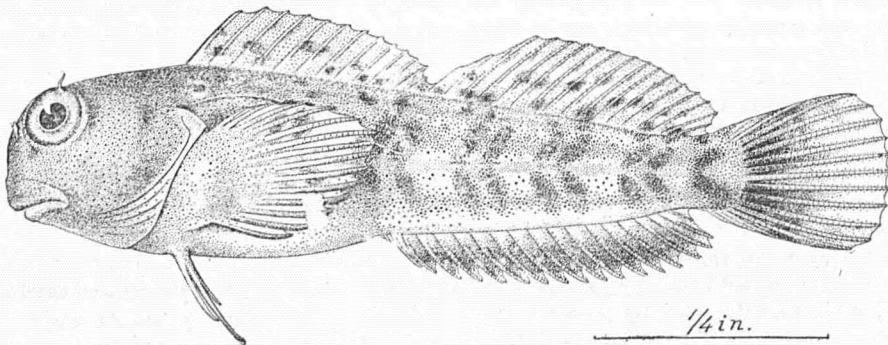


FIG. 106.—*Salarias atkinsoni* Jordan & Seale, new species. Type.

membrane; longest spine of dorsal 2.3 in head, longest ray 1.85 in head; origin of anal slightly anterior to dorsal incision, its base 2.5 in fish without caudal, its origin an equal distance from tip of snout and base of caudal, its longest ray 2.5 in head; pectoral scarcely equal to length of head, its tip under tenth dorsal spine; ventral about 1.75 in head; caudal rounded, 1.25 in head.

Color in spirits, dull whitish with slight tint of pale green; 6 very distinct pairs of dark bands on sides, which are divided in the middle by a narrow space, the portion of line above being sloped obliquely forward, those below obliquely back; no marking on chin or throat; dorsal fin with distinct brown spots scattered through it; anal with a narrow margin of white and a broad intramarginal band of black, fading into whitish at base of fin; caudal with dusky blotch at base; other fins uncolored.

One specimen from Pago Pago, type no. 51791, U. S. National Museum, length 0.98 inch. Named for the artist, Mr. William Sackston Atkinson.

1610. *Salarias rivulatus* Rüppell. Samoa; Paumotu Is.; Tahiti; East Indies.

Salarias rivulatus Rüppell, Atlas, Africa, 114, 1828, Red Sea.

Salarias quadricornis Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 329, pl. 329, 1836, Ile de France. Günther, Cat., iii, 255, Indian Ocean, Chinese Sea. Günther, Fische der Südsee, 209, taf. 117, fig. B, Upolu, Paumotu, Tahiti.

Life colors of a specimen from Pago Pago, dark olive; several pairs of darker brown cross shades, the last 3 resolving themselves into oblique streaks upward and backward; soft dorsal with oblique dark streaks; caudal plain; anal dusky-edged. No crest; dorsal divided.

Another specimen from the same locality was olive, with about 8 pairs of dark cross-bars, with cross-streaks between, the last obscure; a dark oblique streak behind eye; dorsal with horizontal rows of light olive spots, these more oblique on second dorsal; anal dusky-edged, with 2 pale blue longitudinal lines; fins otherwise dusky olive.

A third specimen from Pago Pago was blackish olive in life, with a series of dark marblings and spots above lateral line, most distinct posteriorly, fainter below; dorsals similarly marbled; head dark; cirri dusky; fins all blackish, uncolored; anal with 2 faint pale longitudinal lines. A younger one shows faint paired dark cross-bands.

About 75 specimens from the coral reefs of Apia and Pago Pago, where it is very abundant.

1611. *Salarias edentulus* (Bloch & Schneider). Huahine; Samoa; Paumotu; Bonham; Rarotonga; Faté; Nukahiva and Makatea (Seale); East Indies.

Blenius edentulus Bloch & Schneider, Syst. Ichth., 172, 1801, Huahine.

Salarias forsteri Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 815, 1836; described from Forster's specimen from Huahine.

Blenius tritincatus Forster, Descr. Anim., 231, 1844, Huahine.

Salarias edentulus, Günther, Cat., iii, 252, 1861, Polynesia, eastern parts East Indies. Günther, Fische der Südsee, 206, taf. 117, fig. A, Samoa, Paumotu, Bonham, Rarotonga.

Life colors of a specimen from Apia, dark olive, the body and fins much spotted with bright reddish brown; belly livid bluish; caudal pale, slight yellowish below; anal pale-edged.

A specimen from Pago Pago had several dark, irregular, paired cross-bands on body, with dark brown dots along base of anal and on caudal peduncle; dorsal divided, with oblique rows of black dots besides numerous whitish ones; anal with 2 rows of dots and a whitish edge; pectoral and ventral plain olive; no crest; tentacles small.

Another Apia specimen was dark bluish-olive, with dark-brown markings; head and anal blue-black; caudal mostly black; caudal peduncle with several rows of brown dots; spinous dorsal with 2 longitudinal rows of dark dots; soft dorsal with several oblique rows of dots; caudal and pectoral plain dusky; anal dusky, pale-edged.

We have 60 specimens from Apia and Pago Pago, where it swarms in the crevices of the coral reefs.

1612. *Salarias meleagris* Cuvier & Valenciennes. New Caledonia; New Hanover; Nukahiva and Makatea (Seale).

Salarias meleagris Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 232, 1836, Tasmania. Günther, Fische der Südsee, 208, taf. 116, fig. G, New Caledonia, Cape York, Zanzibar. Peters, Berl. Mon. 1876, 841, New Hanover.

This species, unknown to us, is recorded from Melanesia and Polynesia, but these specimens may be distinct from the original type, which came from Tasmania.

1613. *Salarias garmani* Jordan & Seale, new species. Samoa.

Head 4.18 in length; depth 5; eye 3 in head; interorbital equal to one-half of eye; dorsal XIII, 21; anal 24; a short, indistinct lateral line ending under the ninth dorsal spine; a short, simple tentacle over eye, another over nostril.

Body elongate, compressed, the anterior profile of head vertical; caudal peduncle about equal to eye; angle of jaws under posterior third of eye; teeth in jaws in single series, no posterior canines; dorsal fin incised two-thirds of its height, the incision being posterior to origin of anal; origin of dorsal directly over posterior margin of opercle, its distal end at base of caudal, the membrane not attached to caudal fin, the height of longest dorsal spine 2.1 in head, and of the longest ray 1.75 in head; anal fin long, its base 2.2 in length of fish without the caudal, its origin being under base of tenth dorsal spine and nearer tip of snout than base of caudal by a distance about equal to depth of caudal peduncle; longest ray of anal 1.75 in head; pectoral slightly longer than head; ventral 1.95 in head; caudal rounded, 1.2 in head.

Color in life gray-green, everywhere finely punctate with black; indications of broad transverse bars, most pronounced on middle of body; subsurface spots lilac-red anteriorly, orange-red posteriorly; anterior two-fifths of body white below; dorsal fin clear, with many fine black specks, more or less definitely arranged in 2 longitudinal rows; other fins all clear, with numerous tiny black specks; on anal they form a dusky submarginal band, the tips of the rays white.

Color in spirits, dull light gray with a wash of pale green, slightly darker above; 7 pairs of indistinct vertical bands of darker coloring along sides, a distinctive brown band from lower anterior margin of eye vertically down to middle of each maxillary; no markings on chin or throat; dorsal with numerous, more or less regular brown spots; 2 dusky blotches on base of caudal; otherwise the fins are without distinct markings of any kind.

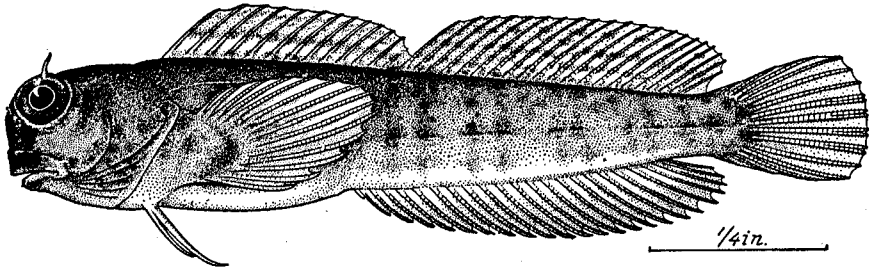


FIG. 107.—*Salaria garmani* Jordan & Seale, new species. Type.

One specimen, the type, no. 51792, U. S. National Museum, from Apia, length 1.2 inches. Named for Prof. Samuel Garman.

1614. *Salaria hasselti* Bleeker. Fiji; Loyalty Is.; Faté (Seale).

Salaria hasselti Bleeker, Nat. Tijds. Ned. Ind., 1, 257, fig. 14, Java, Sumatra, Cocos. Günther, Fische der Südsee, 210, Fiji, Loyalty Is.

1615. *Salaria bryani* Jordan & Seale, new species. Samoa.

Head 4 in length; depth 5.5; eye 3.1 in head; interorbital very narrow, less than width of pupil; dorsal XII, 22; anal 21; lateral lines short, ending near tip of pectoral.

Body oblong, compressed, anterior profile of head rounded; forehead scarcely projecting over mouth; angle of jaws under posterior margin of eye; a short simple tentacle over eye and a minute fringed tentacle at nostril; teeth in jaw in a single series; no posterior canine teeth; dorsal fin incised

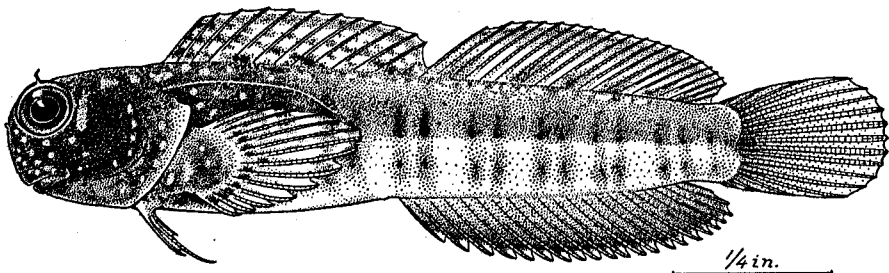


FIG. 108.—*Salaria bryani* Jordan & Seale, new species. Type.

almost to base; its origin a little anterior of posterior margin of opercle, its incision directly over origin of anal, its posterior extremity ending on base of caudal but not attached to caudal; base of anal 2.45 in length of fish, its origin nearer tip of snout than to base of caudal, the distance between tip of snout and origin of the fin, considerably greater than base of fin; longest ray of anal 2 in head; pectoral equal to head; ventral minute, 1.85 in head; caudal rounded, 1.1 in head.

Color in spirits dull light gray, with 8 vertical double dark bands on side, these bands about equal to interspaces; head and shoulders punctulate with yellowish white spots; head shaded darker than other parts; 2 dusky bands under chin; a single row of rather distinct black dots across pectoral; a

few scattered dusky blotches on spinous dorsal; anal with margin of white with intramarginal area of dusky, other fins unmarked.

One specimen, the type no. 31794, U. S. National Museum, from Apia, length 1½ inches. Named for William Alanson Bryan, curator in the Bernice Pauahi Museum, in Honolulu

1616. *Salarias gilberti* Bryan & Herre. Marcus I.

Salarias gilberti Bryan & Herre, Occ. Papers Bishop Museum, II, 1903, 137, Marcus I.

1617. *Salarias marcusii* Bryan & Herre. Marcus I.

Salarias marcusii Bryan & Herre, Occ. Papers Bishop Museum, II, 1903, 137, Marcus I.

1618. *Salarias paulus* Bryan & Herre. Marcus I.

Salarias paulus Bryan & Herre, Occ. Papers Bishop Museum, II, 1903, 136, Marcus I.

1619. *Salarias holomelas* Günther. Palau Is.; Vavau.

† *Salarias fuscus* Rüppell, Neue Wirbelthiere, Fische, 135, taf. 32, fig. 2, 1835, Red Sea.

† *Salarias ruficaudus* Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 328, 1836, Red Sea.

† *Salarias phaeosoma* Bleeker, Batoc, 317, Batoc.

Salarias holomelas Günther, Ann. Mag. Nat. Hist. 1872, Cebu.

Salarias fuscus, Günther, Fische der Südsee, 202, taf. 116, fig. c, 1873, Palau, Vavau.

This strongly marked species is not represented in our collections. It is close to *Salarias fuscus* of the Red Sea, but we may retain it as a different species, as according to Dr. Günther the caudal is black in *S. holomelas* and yellow in *S. fuscus*.

1620. *Salarias atratus* Macleay. New Guinea.

Salarias atratus Macleay, Proc. Linn. Soc. N. S. W. 1882-3, 361.

1621. *Salarias goesii* Bleeker. New Guinea.

EXALLIAS Jordan & Evermann.

Exallias Jordan & Evermann, Bull. U. S. Fish Comm., XXIII, 1903 (1905), 503 (*Salarias brevis* Kner).

1622. *Exallias brevis* (Kner). *Mano'o gatala*. Samoa; Hawaii.

Salarias brevis Kner, Sitz. Ak. Wiss. Wien 1866, 334, taf. 16, fig. 18, Savaii. Günther, Fische der Südsee, 203, taf. 118, fig. c; after Kner. Jenkins, Bull. U. S. Fish Comm., XXII, 1902 (1903), 506, Honolulu.

Of this species only 15 specimens are known, 14 from Hawaii, the other from Savaii. We obtained no specimens in Samoa, but Dr. T. D. Wood obtained in Honolulu one specimen, which is now in the Stanford University Museum.

PETROSCIRTES Rüppell.

Petroscirtes Rüppell, Atlas Fische, 110, 1828 (*mitratus*).

Blennechis Cuvier & Valenciennes, Hist. Nat. Poiss., x, 1836, 279 (*filamentosus*).

Aspidontus (Cuvier) Quoy & Gaimard, Voy. Astrolabe, III, 1834, 719 (*taeniatus*).

Omobranchus (Ehrenberg, pl. XI, fig. 91) Swainson, Class. Fishes, II, 1839, 274 (*fasciolatus*).

1623. *Petroscirtes longifilis* Kner. Samoa.

† *Petroscirtes mitratus* Rüppell, Atlas Fische, III, taf. 28, fig. 1, 1823, Red Sea. Günther, Fische der Südsee, 198, Samoa.

† *Petroscirtes barbatus* Peters, Wiegmann's Archiv, 1855, 248, Mozambique.

† *Petroscirtes hypselopterus* Bleeker, Amboina, VI, 423, Amboina.

Petroscirtes longifilis Kner, Sitz. Ak. Wiss. Wien 1866, LIV, 5, Samoa.

Life color of a specimen from Apia olivaceous, with broad dark cross-bars; head much banded below; dorsal yellowish, barred and spotted with black; anal similar; caudal pale with cross-bars of dots; ventral long, dotted or barred, as is the pectoral. Dorsals 2, the first short and elevated in front.

We have 2 specimens of this fish from Apia. Dr. Günther identifies it with *P. mitratus*, thus throwing nearly all the species with elevated anterior dorsal spines into one, an arrangement open to serious question. We may provisionally retain the name *longifilis*, applied to a Samoan specimen.

1624. *Petroscirtes filamentosus* (Cuvier & Valenciennes). Papau; Paumotu Is.; Huahine; East Indies.

Blennechis filamentosus Cuvier & Valenciennes, Hist. Nat. Poiss., XI, 280, 1836, pl. 326, Papua.

Petroscirtes filamentosus, Günther, Fische der Südsee, 196, taf. 114, fig. B, 1873, Paumotu, Huahine.

Petroscirtes rostratus Bleeker, Act. Soc. Sci. Ind. Netherl., II, 62, Amboina.

1625. *Petroscirtes azureus* Jordan & Seale, new species. Samoa.

Head 4 in length; depth 5.5; eye 4.5 in head; snout projecting, 3.20 in head; dorsal 37; anal 27; interorbital equal to orbit; chin with 6 small barbels.

Body elongate, compressed, naked; depth of caudal peduncle 2.2 in head; mouth narrow, situated on the ventral surface of head, overhung by snout; a single outer row of round pointed teeth in each jaw, 18 in upper and 26 or more in lower, with several additional inner rows in lower jaw, an immense curved fang-like tooth on each side of lower jaw, the length of which is two-thirds of eye; one small tooth on head of vomer; a single dorsal fin, whose origin is on nuchal region just above the posterior margin of postorbital, and which terminates at base of anal, its anterior rays not filamentous, the vertical height of the fin about 3.2 in head; origin of anal midway between tip of snout and base of caudal, vertical height of fin equal to orbit; caudal rounded, equal in length to pectoral, 1.65 in head; origin of ventral in front of pectoral, its length 2.18 in head.

Life colors olivaceous, a deep blue-black lateral band, broader and more distinct indigo-color behind; dorsal, anal, and caudal jet-black, edged with white, the indigo-black caudal V-shaped, leaving the angles of the fin broadly white; head with the dark band continued forward as brown, edged above and below with black; pectoral and ventral clear, uncolored.

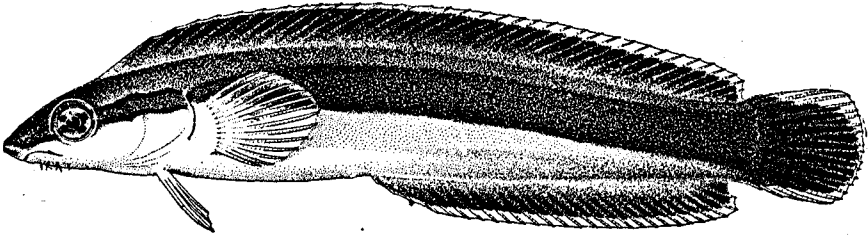


FIG. 109.—*Petroscirtes azureus* Jordan & Seale, new species. Type.

Color in spirits yellowish brown; thorax, belly, and chin lighter, a darker band with black margins from snout to posterior margin of opercle, from this point to the caudal the entire band becoming black and broadening until it occupies the base of caudal and entire fin except the upper and lower posterior margins and tip, which are yellow; anal black with yellow margin; caudal dusky, becoming black posteriorly, with a narrow margin of yellow; pectoral and ventral white.

This handsome fish is close to *Petroscirtes filamentosus*, but differs in having 8 barbels or tentacles on the chin and throat, and in not having the anterior dorsal spines elongate.

One example from Apia, type no. 51796, U. S. National Museum, length 3.75 inches.

1626. *Petroscirtes grammistes* (Cuvier & Valenciennes). Yap; East Indies.

Blennechis grammistes, Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 285, 1836, East Indies.

Petroscirtes grammistes Günther, Fische der Südsee, 197, 1873, taf. 115, fig. F, Yap, China.

Petroscirtes anema Bleeker, Amboina and Ceram, 273.

This handsome species, with 3 black stripes, is unknown to us.

1627. *Petroscirtes rhynorhynchus* Bleeker. Palau Is.; Faté (Seale); East Indies.

Petroscirtes rhynorhynchus Bleeker, Amboina and Ceram, 273. Günther, Fische der Südsee, 195, taf. 115, fig. E, Palau.

This species is unknown to us. It has 2 black lateral bands besides 1 on the dorsal.

1628. *Petroscirtes tæniatus* (Quoy & Gaimard). Tahiti; Papua; Caroline Is.; Tonga; Guam; Paumotu; Fiji; East Indies.

Aspidontus tæniatus Quoy & Gaimard, Voy. Astrolabe, 719, pl. 19, fig. 4, 1834, Guam.

Petroscirtes tæniatus Günther, Fische der Südsee, 195, Tahiti, Papua, Carolines, Tonga, Paumotu, Fiji.

Petroscirtes paradiscus Bleeker, Amboina, v, 495.

This species we have not seen.

1629. *Petroscirtes tapeinosoma* Bleeker. Samoa (Günther); Faté; Raiatea and Nukahiva (Seale); East Indies.

Petroscirtes tapeinosoma Bleeker, Amboina, 64, Amboina. Günther, Fische der Südsee, 195, taf. 115, fig. D, Apia.

This species, with 2 black stripes besides 1 on the dorsal, is unknown to us. It is near our *Petroscirtes azureus*.

1630. *Petroscirtes atrodorsalis* Günther. Samoa. (Pl. LIII, fig. 3.)

Petroscirtes atrodorsalis Günther, Fische der Südsee, 198, taf. 115, fig. B, Samoa.

We have 2 specimens of this rare and handsome little fish, from Pago Pago.

Life colors, clear dark blue, becoming golden on caudal peduncle and caudal fin; 2 sky-blue stripes on eye; a black stripe from edge of pupil to origin of dorsal; dorsal with a broad median band of jet-black, its margin white; caudal pale golden; other fins dusky bluish; a black spot in axil of pectoral.

1631. *Petroscirtes xestus* Jordan & Seale, new species. Samoa.

Head 2.85 in length; depth 2.75; eye 2.2 in head; dorsal 26; anal 17; interorbital equal to eye.

Body elongate, compressed, largest at head; anterior profile rounded, snout less than one-half of eye; angle of jaws below middle of eye; teeth in a single row in jaws, a pair of large curved fang-like canines in each jaw, those of the lower jaw largest; gill-opening reduced to a narrow slit less in width

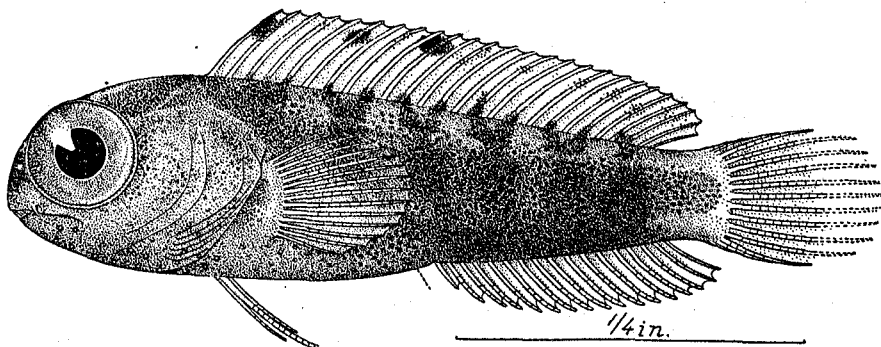


FIG. 110.—*Petroscirtes xestus* Jordan & Seale, new species. Type.

than one-half diameter of eye; a single continuous dorsal fin whose origin is slightly anterior to gill-opening and whose distal end does not extend quite to base of caudal; base of anal fin 3 in length of fish without caudal, its longest ray 3.95 in head; origin of anal much nearer base of caudal than tip of snout, its distal end not reaching quite to base of caudal; pectoral 1.95 in head; ventral 2 in head, their base slightly anterior to base of pectoral; caudal rounded, 1.75 in head.

Color in life, light clear brownish red, with a broad silvery lateral stripe from eye to base of caudal; 6 dark cross-shades on body; top of head bright silvery, as if coated with mercury; throat and belly white, sprinkled with silvery spots; dorsal clear with a submarginal row of dark blotches; other fins all clear.

Color in spirits, silvery with small brown spots and shadings, yellowish white along base of dorsal; 7 or 8 incomplete vertical cross-bands on the side about as wide as interspaces, these most distinct at base of dorsal; nuchal region set with a heart-shaped coloring like new silver, a silvery wash less bright on sides of head, thorax, and belly; in front of ventral a number of prominent bright silvery dots with darker margins; dorsal with a few dusky spots, otherwise fins yellowish white.

Two specimens from Pago Pago. The type is no. 51797, U. S. National Museum, from Pago Pago, length 0.56 inch.

1632. *Petroscirtes elongatus* Peters. Fiji; East coast of Africa.

—*Petroscirtes elongatus* Peters, Wiegmann's Archiv 1855, 249, Zanzibar, Mozambique. Günther, Fische der Südsee, 196, Fiji.

Petroscirtes ovalenensis Günther, Challenger Fishes, 1880, 85, Fiji.

1633. *Petroscirtes lineolatus* Kner. Fiji.

Petroscirtes lineolatus Kner, Sitz. Ak. Wiss. Wien, LVIII, 1868, 331, taf. 6, fig. 17, Kandavu. Günther, Fische der Südsee, 197, taf. 115, fig. A (after Kner).

1634. *Petroscirtes semilineatus* Kner. Fiji.

Petroscirtes semilineatus Kner, Sitz. Ak. Wiss. Wien, LVIII, 1868, 332, Kandavu. Günther, Fische der Südsee, 197; after Kner.

1635. *Petroscirtes obliquus* Garman. Samoa.

Petroscirtes obliquus Garman, Bull. Mus. Comp. Zool., vol. xxxix, no. 8, 1903, 237, with plate, Fiji.

Of this species we have one example from Apia more brightly colored than in Mr. Garman's figure, but with the characteristic oblique streaks.

Color in alcohol olive-brown with darker brown spots and diagonal or angled stripes; a large round dark spot behind eye; under side of head pale, with 5 narrow, dark cross-stripes; belly blue; a row of large dark spots on back and base of dorsal; fin otherwise dusky; margin of spinous dorsal pale; caudal pale, unspotted; anal dusky; pectoral pale, minutely spotted with darker; ventral pale.

1636. *Petroscirtes germaini* Sauvage. New Caledonia.

Petroscirtes germaini Sauvage, Bull. Soc. Philom. 1883, 158, New Caledonia.

This species, cross-banded, is quite unlike any other known to us.

ENCHELYURUS Peters.

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

This genus differs from *Petroscirtes* in having the vertical fins confluent, the body short and deep. The typical species is from the Philippines.

1637. *Enchelyurus ater* (Günther). Hawaii; Samoa; Tahiti.

Petroscirtes ater Günther, Fische der Südsee, 199, taf. 115, fig. E, 1873, Tahiti.

Aspidontus brunneolus Jenkins, Bull. U. S. Fish Comm., xxii, 1902 (1903), 510, fig. 50, Honolulu.

This rare little fish seems to be rather common at Samoa. We have 25 examples from Pago Pago and 16 from Apia. Günther describes the ventrals as reaching the anal, but in his figure the fins are much shorter. Our specimens show much variation in this character, some having the ventrals twice as long as others; but 2 examples have them as long as shown in Günther's figure.

Jenkins' specimens from Hawaii, called *Aspidontus brunneolus*, seem to be identical with ours from Samoa.

Color in life of a specimen from Apia, uniform blackish, becoming clear olive green on caudal. Other specimens in alcohol have the head and body uniform black-brown, slightly lighter than fins, which are black.

Family GOBIESOCIDÆ.**CREPIDOGASTER Günther.****1638. *Crepidogaster lineatus* Sauvage. New Caledonia.**

Crepidogaster lineatus Sauvage, Bull. Soc. Philom. 1883, 158, New Caledonia.

TRACHELOCHISMUS Brisout de Barneville.**1639. *Trachelochismus pinnulatus* (Forster). Fiji (Kner, Sitz. Ak. Wiss Wien 1868, 55); New Zealand.****Family CONGROGADIDÆ.****CONGROGADUS Günther.****1640. *Congrogadus marginatus* Vaillant & Sauvage. Hawaii.****1641. *Congrogadus subducens* Richardson. New Guinea (Günther); Australia.****Family XENOCEPHALIDÆ.****XENOCEPHALUS Kaup.****1642. *Xenocephalus armatus* Kaup. New Ireland.**

Xenocephalus armatus Kaup, Wiegmann's Archiv, 1858, 86, New Ireland. Günther, Cat., iv, 399.

Family FIERASFERIDÆ.

FIERASFER Cuvier.

1643. *Fierasfer homei* Richardson. Hawaii; Samoa; Fiji; New Britain; New Hanover; Tahiti (Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 523); East Indies, not "Tasmania."

The type locality is Timor, and our species is identified with the one described by Richardson. Richardson's other specimen is doubtless not from Tasmania, and there is no reason for regarding *Fierasfer brandesi* as a species distinct from *Fierasfer homei*.

Our two Samoan specimens were taken from *Holothuria*, one at Apia, the other at Pago Pago. Another specimen was taken by Mr. W. K. Fisher at Hawaii, from the cloaca of a holothurian (*Stichopus*, n. sp.).

Color in life of a specimen from Apia, translucent with bluish and reddish shades anteriorly. Body with dark cross-shades in adult.

1644. *Fierasfer microdon* Gilbert. Hawaii.

JORDANICUS Gilbert.

1645. *Jordanicus umbratilis* (Jordan & Evermann). Hawaii.

This species is known from a few examples taken about lava rocks in Hawaii. One specimen in the Museum of Stanford University, was obtained at Hilo by Mr. H. W. Henshaw from the cavity of a holothurian. From its dark color, this species might be supposed to inhabit crevices of rocks only.

1646. *Jordanicus boraborensis* (Kaup). Borabora.

Fierasfer boraborensis Kaup, Apodes, 160, 1850, Borabora.

This species has not been recognized by writers subsequent to Kaup.

1647. *Jordanicus parvipinnis* (Kaup). New Ireland; Hanover; Tahiti.

Fierasfer parvipinnis Kaup, Apodes, 160, pl. 16, fig. 2, 1850, New Ireland. Peters, Berl. Mon. 1876, 844, New Hanover. Günther, Cat., iv, 383, after Kaup. Fowler, Proc. Ac. Nat. Sci. Phila. 1900, 523, Tahiti.

This species was not seen by us.

RHIZOIKETICUS Vaillant.

1648. *Rhizoiketicus carolinensis* Vaillant. Caroline Is.

Rhizoiketicus carolinensis Vaillant, Comptes Rendus, 1898, 745, Caroline Is.

Family LYCODAPODIDÆ.

SNYDERIDIA Gilbert.

1649. *Snyderidia canina* Gilbert. Deep seas of Hawaii.

Family BROTLIDÆ.

DINEMATICTHYS Bleeker.

1650. *Dinematichthys iluoceteoides* Bleeker. *Tapotopoto*. Samoa; East Indies.

Of this species we have half a dozen specimens from Apia and Pago Pago, where it lives in pools on the reef. These specimens vary widely in the ground color, some being grayish with golden shades, and others bright orange-red. They agree well with Günther's description.

Life colors of a specimen from Apia, brilliant orange-red, the color varying a little with individuals, the head more orange. Another was grayish, the posterior parts golden shaded, the last rays of dorsal, anal, and caudal golden.

BROTULA Cuvier.

1651. *Brotula multicirrata* Vaillant & Sauvage. Hawaii.

(*Brotula townsendi* Fowler.)

1652. *Brotula marginalis* Jenkins. Hawaii.

NEMATOBROTULA Gill.

1653. *Nematobrotula ensiformis* (Günther). Aneiteum; New Hebrides.

Brotula ensiformis Günther, Cat., IV, 372, 1862, Aneiteum, New Hebrides.
Nematobrotula ensiformis Gill, Proc. Ac. Nat. Sci. Phila. 1863, 252.

Family **ATELEOPIDÆ**.**ATELEOPUS** Schlegel.

(*Podateles* Boulenger, the name unnecessarily changed on account of the prior name *Atelopus*.)

1654. *Ateleopus plicatellus* Gilbert. Deep seas of Hawaii.

Family **GADIDÆ**.**ANTIMORA** Günther.

1655. *Antimora microlepis* Gilbert. Deep seas of Hawaii.

LÆMONEMA Günther.

1656. *Læmonema rhodochir* Gilbert. Deep seas of Hawaii.

Family **MACROURIDÆ**.**GADOMUS** Regan.

1657. *Gadomus melanopterus* Gilbert. Deep seas of Hawaii.

1658. *Gadomus bowersi* Gilbert. Deep seas of Hawaii.

MELANOBRANCHUS Regan.

1659. *Melanobranchnus micronemus* Gilbert. Deep seas of Hawaii.

CHALINURA Goode & Beane.

1660. *Chalinura ctenomelas* Gilbert & Cramer. Deep seas of Hawaii.

OPTONURUS Günther.

1661. *Optonurus atherodon* Gilbert & Cramer. Deep seas of Hawaii.

HYMENOCEPHALUS Giglioli.

1662. *Hymenocephalus antræus* Gilbert & Cramer. Deep seas of Hawaii.

1663. *Hymenocephalus striatulus* Gilbert. Deep seas of Hawaii.

1664. *Hymenocephalus aterrimus* Gilbert. Deep seas of Hawaii.

MACROURUS Bloch.

1665. *Macrourus ectenes* Gilbert & Cramer. Deep seas of Hawaii.
 1666. *Macrourus propinquus* Gilbert & Cramer. Deep seas of Hawaii.
 1667. *Macrourus holocentrus* Gilbert & Cramer. Deep seas of Hawaii.
 1668. *Macrourus gibber* Gilbert & Cramer. Deep seas of Hawaii.
 1669. *Macrourus burragei* Gilbert. Deep seas of Hawaii.
 1670. *Macrourus obliquatus* Gilbert. Deep seas of Hawaii.
 1671. *Macrourus habenatus* Gilbert. Deep seas of Hawaii.
 1672. *Macrourus longicirrhus* Gilbert. Deep seas of Hawaii.

CÆLORHYNCHUS Giorna.

1673. *Cœlorhynchus gladius* Gilbert & Cramer. Deep seas of Hawaii.
 1674. *Cœlorhynchus aratrum* Gilbert. Deep seas of Hawaii.
 1675. *Cœlorhynchus doryssus* Gilbert. Deep seas of Hawaii.

MATÆOCEPHALUS Berg.

(*Cœlocephalus* Gilbert & Cramer, not of Agassiz.)

1676. *Matæocephalus acipenserinus* (Gilbert & Cramer). Deep seas of Hawaii.

MALACOCEPHALUS Günther.

1677. *Malacocephalus hawaiiensis* Gilbert & Cramer. Deep seas of Hawaii.

TRACHONURUS Günther.

1678. *Trachonurus sentipellis* (Gilbert & Cramer). Deep seas of Hawaii.

Family **LOPHIIDÆ**.**LOPHIOMUS** Gill.

1679. *Lophiomus miacanthus* Gilbert. Deep seas of Hawaii.
 1680. *Lophiomus naresi* Günther. Admiralty Is.; New Guinea.
Lophius naresi Günther, Challenger Fishes, 1880, 56.

CHIROLOPHIUS Regan.

1681. *Chirolophius moseleyi* Regan. Admiralty Is.
Chirolophius moseleyi Regan, Ann. Mag. Nat. Hist. 1900, 280.

Family **CERATHIDÆ**.**CHAUNAX** Lowe.

1682. *Chaunax umbrinus* Gilbert. Deep seas of Hawaii.

MIOPSARAS Gilbert.

1683. *Miopsaras myops* Gilbert. Deep seas of Hawaii.

Family ANTENNARIIDÆ.

ANTENNARIUS (Commerson) Lacépède. (*Histrio* Fischer.)

1684. *Antennarius commersoni* (Lacépède). Hawaii; Raiatea; Borabora; Tahiti; Shortland I. (Seale); East Indies.
1685. *Antennarius niger* (Garrett). Hawaii.
Chironectes niger Garrett, Proc. Cal. Ac. Sci. 1864, 107, Honolulu.
1686. *Antennarius leprosus* Eydoux & Souleyet. Hawaii.
1687. *Antennarius rubrofuscus* Garrett. Hawaii.
1688. *Antennarius sandwichensis* Bennett. Hawaii.
(? *Antennarius horridus*, Bleeker, East Indies.)
1689. *Antennarius laysanius* Jordan & Snyder. Laysan.
1690. *Antennarius hispidus* (Bloch & Schneider). Misol (Günther); Raiatea (Seale); East Indies.
1691. *Antennarius striatus* Shaw. Tahiti; Solomon Is. (Günther, Fische der Südsee, 162, taf. 99, fig. B); East Indies.
1692. *Antennarius duescus* Snyder. Hawaii.
1693. *Antennarius nexilis* Snyder. Hawaii.
1694. *Antennarius dorehensis* Bleeker. New Guinea.
1695. *Antennarius nummifer* (Cuvier). Samoa and Raiatea (Günther; perhaps *Antennarius drombus*); East Indies.

This species seems to be very close to *Antennarius drombus*, differing perhaps in having the dusky shade below the soft dorsal intensified as a black ocellus. The specimens from Samoa and Raiatea, noted by Dr. Günther, probably belong to *Antennarius drombus*, if, indeed, the 2 species are distinct.

Antennarius coccineus (Lesson, Voy. Coquille, 143, pl. 16, fig. 1, 1830), from Mauritius and the East Indies, differs from *Antennarius nummifer* chiefly in the red color. It is equally near *Antennarius drombus*. It is not unlikely that *Antennarius coccineus* is identical with *Antennarius nummifer*, and that the species is not found in Polynesia, where it is replaced by *Antennarius drombus*.

1696. *Antennarius drombus* Jordan & Evermann. Hawaii; Samoa.

This small, dull-colored species is known from 2 specimens from Hilo, Hawaii, and from 1 taken by us at Samoa. None of the other species was obtained by us in Samoa.

In *Antennarius drombus* the dorsal filament or bait is short, and the last ray of dorsal and anal is adnate to the body. *Antennarius coccineus*, as figured by Bleeker, may be this species, but the type figured by Quoy & Gaimard must be something else.

In life our single Samoan specimen was dull mottled olive-green with blackish markings, and a few dull orange blotches, irregular and diffuse; no red. When captured, this fish swells its body like a *Tetraodon*.

1697. *Antennarius bigibbus* Lacépède. Hawaii.

PTEROPHRYNE Gill.

1698. *Pterophryne histrio* (Linnaeus). New Guinea (Bleeker); East Indies.

Family OGCOEPHALIDÆ.

MALTHOPSIS Alcock.

1699. *Malthopsis mitrigeria* Gilbert & Cramer. Deep seas of Hawaii.
1700. *Malthopsis jordani* Gilbert. Deep seas of Hawaii.

HALIEUTÆA Cuvier.

1701. *Haliutæa retifera* Gilbert. Deep seas of Hawaii.

DIBRANCHUS Peters.

1702. *Dibranchus erythrinus* Gilbert. Deep seas of Hawaii.

1703. *Dibranchus stellulatus* Gilbert. Deep seas of Hawaii.

TETRABRACHIUM Günther.

1704. *Tetrabrachium ocellatum* Günther. New Guinea.

Tetrabrachium ocellatum Günther, Challenger Fishes, 41, 1880.

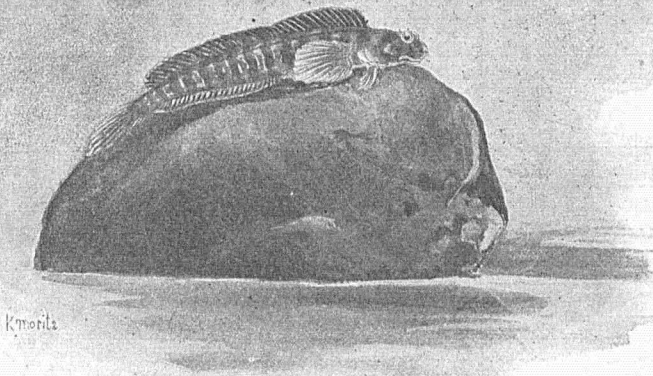


FIG. 111.—*Allicus saliens* (Forster).

VERNACULAR NAMES OF FISHES HEARD IN HAWAII AND SAMOA.

In the following table, the vernacular names heard by us in Hawaii and Samoa are brought together for purposes of comparison. The Samoan names as given here were obtained by Professors Jordan and Kellogg in Apia and Pago Pago, most of them from the fishermen Taua and Vaiula. The authors are indebted to Mr. Edwin Gurr, of Pago Pago, for a preliminary correction of these names, and to Mr. W. E. Safford for a very much more careful revision of their spelling and meaning, and for the following glossary of the principal nouns and adjectives in the list. It may be noted that *h* in Hawaiian is replaced by *s* or *f* in Samoan, and that *k* in Hawaiian is replaced by *t* in Samoan. Intercourse between the two groups of islands has in recent years tended to corrupt the Samoan pronunciation, and we often hear in Apia, *kifkifi* and the like, when *tiftifi* is the correct Samoan form. The Samoan *g* (as in Pago Pago or Ga) is pronounced like *ng*. The vowels are pronounced as in Italian, *ou* not being a diphthong.

From Lorin Andrews's Hawaiian-English Dictionary we copy the following table, showing the shifting of the consonants in the Polynesian languages:

Fakaofu.	Samoa.	Tonga.	New Zealand.	Rarotonga.	Tahiti.	Hawaii.	Marquesas.
F	F	F	W or H	Wanting	F or H	H	F or H
K	'	K	K	K	'	'	K
L	L	L	R	R	R	L	Wanting
M	M	M	M	M	M	M	M
N	N	N	N	N	N	N	N
NG	NG (G)	NG	NG	NG	Wanting	M	N or NG
P	P	P or B	P	P	P	P	P
S	S	H	H	Wanting	H	H	H
T	T	T	T	T	T	K	T
V	V	V	W	V	V	W	V

NAMES OF SPECIES.	HAWAII.	SAMOA.
Shark	Mano	Malie, Tanifa.
<i>Carcharias melanopterus</i> .....	.....	Malie alamata.
<i>Sphyrna zygaena</i>	Mano kihikihi	Mata-i-taliga.
<i>Himantura fai</i> .....	.....	Fai.
<i>Stoasodon narinari</i>	Hihimanu .....	.....
<i>Mobula japonica</i>	Hihilua .....	.....
<i>Elops saurus</i>	Awa .....	.....
<i>Albula vulpes</i>	Oio .....	.....
<i>Chanos chanos</i>	Awa awa, Puawa, Awa kala- moko.	.....
<i>Etrumeus micropus</i>	Omaka, Makiawa .....	.....
<i>Harengula commersoni</i> .....	.....	Pelupelu.
<i>Sardinella sirm</i> .....	.....	Pelupelu, I'a moana.
<i>Stolephorus delicatulus</i> .....	.....	Nefu.
Anchovia	Naua	Nefu.
<i>Plotosus anguillar</i> .....	.....	Apoa.
<i>Trachinocephalus myops</i>	Kawalea .....	.....
<i>Synodus varius</i>	Ulae .....	.....
<i>Saurida gracilis</i>	Ulae .....	.....
<i>Anguilla</i>	Paka	Tuna.
<i>Anguilla mauritiana</i> .....	.....	Tuna gatala, Tuna tafa'i-lau- talo.

Vernacular names of fishes heard in Hawaii and Samoa—Continued.

Names of Species.	HAWAII.	SAMOA.
<i>Anguilla megastoma</i>		Tuna mea.
<i>Leptocephalus marginatus</i>	Puhi aha	Pusi solasulu.
<i>Leiuranus semicinatus</i>		'Ata'ata uli.
<i>Muraena kailua</i>	Puhi kauila; puhi oa.	
<i>Gymnothorax</i>	Puhi	Pusi.
<i>Gymnothorax flavomarginatus</i>		Pusi gatala.
<i>Gymnothorax pictus</i>	Puhi wela	Pusi gatala.
<i>Gymnothorax undulatus</i>	Puhi laumilo	Pusi pulepule.
<i>Gymnothorax stellatus</i>		Pusi pulepule.
<i>Gymnothorax javanicus</i>		Pusi maoo'e.
<i>Echidna nebulosa</i>	Puhi kapa	
<i>Echidna leihala</i>	Puhi leihala	Pusi 'ai'aiunga.
<i>Scuticaria tigrina</i>		Pusi solasulu.
<i>Tylosurus giganteus</i>	Aha'aha, Auau	A'u.
<i>Tylosurus leiuroides</i>		A'u.
<i>Athlennes hians</i>	Aha-aha	
<i>Belone platyura</i>		Ise.
<i>Hemiramphus affinis</i>		Ise lai.
<i>Hemiramphus depauperatus</i>	Ihe, Me'e-me'e, Puihi	
<i>Euleptorhamphus longirostris</i>	Iheihii	
<i>Parexocetus brachypterus</i>	Puhiki'i	
<i>Zenarchopterus vaisiganis</i>		Taoto.
<i>Cypsilurus</i>		Malolo.
<i>Cypsilurus simus</i>	Malolo	
<i>Aulostomus valentini</i>	Nunu	Taotito.
<i>Microphis brachyurus</i>		Taotao.
<i>Atherina uisila</i>		Uisila.
<i>Liza melinoptera</i>		Afa, Fue'afa.
<i>Liza troscheli</i>		Aua.
<i>Liza caeruleomaculata</i>		Anae, 'Ana'analagi.
<i>Chaenomugil chaptali</i>	U'ou'oa (Wau wau)	
<i>Mugil cephalus</i>	Ama ama, Anae	
<i>Sphyræna helleri</i>	Kaku	
<i>Sphyræna commersoni</i>	Welea	
<i>Sphyræna obtusata</i>		Sapatu.
<i>Polydactylus plebeius</i>		Umiumia.
<i>Polydactylus sexfilis</i>	Moi	
<i>Lampris regia</i>	Laukipala, Lauipala	
<i>Holocentrus</i>	Aleihi	Malau.
<i>Holotrachys lima</i>		Malau mutu, Mutu.
<i>Myripristis</i>	U'u	Malau.
<i>Myripristis pralinius</i>		Malau mamo, Mamo.
<i>Myripristis microphthalmus</i>		Malau mataputa, Malau tea.
<i>Myripristis sanguineus</i>		Malau ula, Segasega.
<i>Myripristis chryseres</i>	Pau'u	
<i>Myripristis adustus</i>		Malau suo.
<i>Myripristis murdjan</i>	U'u	Manifnifi.
<i>Holocentrus spinifer</i>		Malau toa.
<i>Holocentrus caudimaculatus</i>		Tamalau mumu, Tameno mu- mu.
<i>Holocentrus violaceus</i>		Malau tifi, Malau pāuli.
<i>Holocentrus diadema</i>		Malau tusitusi, Malau pāuli, Malau tui.
<i>Holocentrus punctatissimus</i>		Malau faiumu.
<i>Holocentrus sammara</i>		Malau peapea.
<i>Lemnisoma thyrstitoides</i>	Hauliuli	
<i>Scomber loo</i>		Ga.
<i>Germo germo</i>	Ahi	
<i>Scomberoides sanctipetri</i>	Lai, Papiopio	Lai.
<i>Gymnosarda pelamis</i>	Aku	
<i>Gymnosarda alleterata</i>	Kawa kawa, Ahua	
<i>Acanthocybium solandri</i>	Ono	
<i>Seriola purpurascens</i>	Puakahala, Kahala	

Vernacular names of fishes heard in Hawaii and Samoa—Continued.

NAMES OF SPECIES.	HAWAII.	SAMOA.
Decapterus sanctæ-helenæ.....	Opelu.....	
Megalaspis cordyla.....		Atualo.
Trachurops crumenophthalma.....	Akule.....	Atule.
Caranx forsteri.....	Omilu, Ulua, Papiopio, Pa'u pa'u.	Ulua.
Caranx melampygos.....		Malauli.
Caranx affinis.....	Amuka, Puakahala.....	
Caranx sexfasciatus.....		Lupo.
Caranx ignobilis.....		Lupo.
Caranx ferdau.....		Lupo.
Caranx speciosus.....	Paopao, Ulua pau'u.....	
Caranx plumbeus.....		Lupo ta, Lupo, Lalafutu, Alāla- futu.
Alectis ciliaris.....	Ulua kihikihi.....	
Trachinotus ovatus.....		Alālafutu.
Pempheris oualensis.....		Manifi, Fo a'ao.
Pempheris vanicolensis.....		Pula.
Monodactylus argenteus.....		Toto.
Coryphæna hippurus.....	Mahihi, Mahimahi.....	
Kuhlia malo.....	Aholehole.....	
Kuhlia rupestris.....		Sesele.
Kuhlia marginata.....		Salele.
Kuhlia tæniura.....		Safole.
Amia.....	Upapalu.....	Fo.
Apogonichthys marmoratus.....		Fo mumu.
Paramia macrodon.....		Tuganini.
Paramia quinquelineata.....		Mata uliuli.
Ambassis lafa.....		Lafa.
Ambassis vaivasensis.....		Lafa.
Chorististium susumi.....		Susu umi.
Anyperodon leucogrammicus.....		Gatala aleva.
Variola louti.....		I'a mañaña.
Epinephelus dæmeli.....		'Uo'uo.
Epinephelus merra.....		Gatala, 'Ata'ata pulepule.
Epinephelus quernus.....	Hapu'u pu'u.....	
Cephalopholis urodelus.....		Mata'ili.
Cephalopholis argus.....		Gatala moana, Gatala uli, Vai- ania.
Cephalopholis leopardus.....		Gatala uli.
Priacanthus cruentatus.....	Aweoweo.....	Mata-pula.
Priacanthus alalaua.....	Alalaua.....	
Lutianus gibbus.....		Ti'ava, Mala'i, Mala'i pa'epa'e.
Lutianus marginatus.....		Lanue, Nanue, Taiva, Tagau, Tamala.
Lutianus rivulatus.....		Uiui, Nanue.
Lutianus argentimaculatus.....		'A'a, Nanue.
Lutianus monostigma.....		Taiva uliuli, Feloitega, Vava sui.
Lutianus bohar.....		Mumea.
Aprion virescens.....	Uku.....	
Apsilus microdon.....	Ukikiki.....	
Etelis marshi.....	Ulaula.....	
Etelis evurus.....	Koi.....	
Bowersia violescens.....	Opakapaka.....	
Bowersia ulaula.....	Ulaula koa'e.....	
Lethrinus ramak.....		Maila fo'u, Magauli.
Lethrinus harak.....		Mata 'ele'ele.
Terapon jarbua.....		'Ava'ava.
Lethrinella miniata.....		Filoa 'ava.
Monotaxis grandoculis.....	Mu, Mamamo.....	Mumu moaga, Loalia (Raro- tongan word).
Gnathodentex aurolineatus.....		Tolai.
Scolopsis trilineata.....		Taiva tusi.

Vernacular names of fishes heard in Hawaii and Samoa—Continued.

NAMES OF SPECIES.	HAWAII.	SAMOA.
<i>Euelatichthys crassispinus</i>		Misi misi.
<i>Plectorhynchus diagramma</i>		'Ava'ava moana.
<i>Plectorhynchus chaetodonoides</i>		I'a mai moana.
<i>Xystæma gigas</i>		Matu loa.
<i>Xystæma argyreum</i>		Matu.
<i>Kyphosus waigiensis</i>		Matu mutu, Umue.
<i>Kyphosus fuscus</i>	Mamamo	
<i>Mulloides auriflamma</i>	Weke	Vete, Ula oa.
<i>Mulloides samoensis</i>	Weke	I'a sina, Afolu.
<i>Pseudupeneus moana</i>		Moaga, Moana, Maga, Moana faiava.
<i>Pseudupeneus multifasciatus</i>	Moana	
<i>Pseudupeneus bifasciatus</i>	Moana	
<i>Pseudupeneus chryseydros</i>		Matalau, Uliuli, Maga.
<i>Pseudupeneus indicus</i>		Matalau.
<i>Pseudupeneus barberinus</i>		Ta'uleia, Lailui.
<i>Oceanops lativittata</i>		Ta'uleia.
<i>Malacanthus parvipinnis</i>	Maka'a	Gatasami.
<i>Upeneus arge</i>	Weke pueo, Weke pahulu	
<i>Upeneus vittatus</i>		Vete.
<i>Mulloides flammeus</i>	Weke ula	
<i>Cirrhitus marmoratus</i>	O'opukai'a, po'opa'a	Potati.
<i>Paracirrhites forsteri</i>	Pilikoa, Hilupilikoa	
<i>Paracirrhites arcatus</i>	Pilikoa	
<i>Paracirrhites cinctus</i>	Pilikoa, Oopukahaihai, po'opa'a	
<i>Cheilodactylus vittatus</i>	Kikakapu	
<i>Dascyllus aruanus</i>		Mamo.
<i>Dascyllus albisella</i>	Pa'apa'a	
<i>Pomacentrus albobfasciatus</i>		Ulavāpua.
<i>Pomacentrus pavo</i>		Taupou.
<i>Pomacentrus melanopterus</i>		I'u sina, Tu'u'u.
<i>Pomacentrus jenkinsi</i>	Kole	
<i>Pomacentrus vaiuli</i>		Vaiuli.
<i>Pomacentrus nigricans</i>		Tu'u'u.
<i>Pomacentrus lividus</i>		Tu'u'u sue uli, I'u sina.
<i>Abudefduf celestinus</i>		Fili mana.
<i>Abudefduf sordidus</i>		Ulavāpua.
<i>Abudefduf septemfasciatus</i>		Alala saga; Mutu.
<i>Abudefduf dicki</i>		Tu'u'u.
<i>Abudefduf abdominalis</i>	Mamama	
<i>Abudefduf lacrymatus</i>		I'u samasama.
<i>Abudefduf leucopomus</i>		Tu'u'u.
<i>Abudefduf uniozellatus</i>		Taupou.
<i>Abudefduf taupou</i>		Vaiuli sama, Taupou.
<i>Abudefduf metallicus</i>		Pipi.
<i>Chromis cæruleus</i>		Teatea, Mamo, I'a lanu-moana.
<i>Chromis analis</i>		I'a lanu-moana.
<i>Epibulus insidiator</i>		Lapega, Gutu-ume.
<i>Labrichthys cyanotænia</i>		Sugale uliuli.
<i>Anampses</i>	Hilu	Sugale.
<i>Anampses cæruleopunctatus</i>		Sugale lupe.
<i>Anampses cuvieri</i>	Opule	
<i>Hemigymnus melapterus</i>		Paumutu, Alati moana, Sugale aloa, Sugale uli, Tagitagi.
<i>Lepidaplois albotæniatus</i>	A'awa	
<i>Lepidaplois strophodes</i>	A'awa	
<i>Lepidaplois modestus</i>	A'awa	
<i>Halichæres centiquadrus</i>		Ifigi.
<i>Halichæres lao</i>	Lao	
<i>Halichæres ornatissimus</i>	Ohua pa'awela	
<i>Halichæres dædalma</i>		Fataga loa.
<i>Thalassoma</i>	Hinalea	Sugale.

Vernacular names of fishes heard in Hawaii and Samoa—Continued.

NAMES OF SPECIES.	HAWAII.	SAMOA.
Thalassoma purpuraceum	Opule, Olale, Palaea, Hou, Awela.	
Thalassoma fuscum	Awela, Olale	Sugale.
Thalassoma duperreyi	Hinalea, Lauhi, A'laihi	
Thalassoma dorsale		Sugale sei, Sugale fa'a 'ele'ele, Sugale pulepule.
Thalassoma ballieui	Hinalea huahine	
Coris schauinslandi	Hilu mele mele	
Julis lepomis	Hilu lawili, Uhu	
Julis gaimardi	Hinalea lolo	
Julis pulcherrima	Hinalea lolo	
Novaculichthys tæniurus		Molemole.
Macropharyngodon geoffroyi	Hinalea akilolo	
Gomphosus tricolor	Akilolo	Sugale. . .
Cheilio inermis	Kupou pou	Masamie, Moai.
Cheilinus fasciatus		Lalafi pulepule.
Cheilinus digrammus		Sugale, Lalafi.
Cheilinus hexagonatus	Po'ou	
Cheilinus trilobatus		Lalafi, Sugale matamumu.
Thaliurus chlorurus		Sugale gasufi.
Pseudocheilinus hexatænia		I'a tusitusi.
Calotomus sandwichensis	Uhu	
Callyodon prasiognathus		Amasapupema.
Callyodon maoricus		Moalefuga.
Callyodon pyrrhurus		Fuga mumu.
Callyodon bennetti		Amasapupema.
Callyodon ruberrimus		Fuga ulapo.
Callyodon erythrodon		Fuga 'avasai.
Callyodon balinensis		Fuga pa'i, Fuga pa'ipa'i, Fuga mea.
Callyodon oviceps		Fuga uli.
Callyodon zonularis		Fuga mea.
Callyodon bataviensis		Tapoli, Laea mumu.
Callyodon formosus	Lauia	
Callyodon abacurus		Fuga meamea.
Callyodon gilberti	Panuhunuhu	
Callyodon latax		Laea pulepule, Laea mumu.
Callyodon paluca	Palukaluka	
Callyodon jordani		Galo, Laea galo.
Callyodon ahula	Uhu uliuli, Panuhunuhu	
Callyodon ultramarinus		Fuga galu-moana.
Callyodon lazulinus		Fugausi.
Megaprotodon trifascialis		Mutu uli.
Chaetodon setifer	Kikakapu	Si'u, Tiftifi sama.
Chaetodon citrinellus		Tiftifi uli, Tiftifi lauifi, Manini.
Chaetodon vagabundus		Tiftifi mata-ume, Samasama.
Chaetodon reticulatus		Tiftifi a'o, Matagi pulepule.
Chaetodon trifasciatus		Tiftifi tala.
Chaetodon lunula		Tiftifi laumea.
Chaetodon unimaculatus	Kikakapu	Tiftifi pulepule, Tiftifi sama sama.
Chaetodon melannotus		Tiftifi pulepule pa'ipa'i.
Chaetodon ornatissimus	Kikakapu	Tiftifi a'au.
Chaetodon mertensi		Tiftifi pa'ipa'i.
Chaetodon pelewensis		Tiftifi I'u sama.
Chaetodon ephippium		Tiftifi ila, Tiftifi taiona, Tiftifi tusi.
Holacanthus		Alamu.
Holacanthus diacanthus		Aimeo, Alamu.
Holacanthus bicolor		Ulapua.
Holacanthus flavissimus		Legu, Aimeo.
Holacanthus bispinosus		Tu'u'u pulepule mumu.
Heniochus acuminatus		Laulaufau.

Vernacular names of fishes heard in Hawaii and Samoa—Continued.

NAMES OF SPECIES.	HAWAII.	SAMOA.
Zanclus canescens	Kihikihi, Loulu	Tiftifi, Galafa.
Platax orbicularis		Pe'ape'a uli.
Hepatus matoides	Walu	Umelei.
Hepatus lineatus		Alogo.
Hepatus aliala		Loata, Alamea samasama.
Hepatus triostegus		Manifi.
Hepatus sandwichensis	Manini	
Hepatus dussumieri	Pualu	
Hepatus atramentatus	Maikoiko	
Hepatus olivaceus	Nae-nae	
Hepatus nigricans		I'u sina, Uliuli maia.
Hepatus achilles		Pone i'u mumu.
Hepatus aquilinus		Palagi samasama.
Hepatus elongatus	Mai'i	Unavau.
Hepatus guttatus	Api	Moana, Aau.
Ctenochætus striatus	Kolo	Palagi, Ponepone, Aau.
Zebрасoma rhombeum		Ali palagi, Iliu.
Zebрасoma flavescens	Laipala	Samasama.
Zebрасoma veliferum	Api, Maneoneo	Lupo.
Zebрасoma rostratum		Ali.
Acanthurus lituratus	Pakala kala, Kala	Ili'ilia, Umelei, Ume.
Acanthurus unicornis	Kala	Ili'ilia segi, Ume, Umelei.
Siganus marmoratus		Lo pa'u'ulu.
Siganus punctatus		Lo 'ele'ele.
Balistes	Humuhumu, U'i'ui	Sumu.
Balistes chrysopterus		Sumu pa'epa'e.
Balistes vidua		Sumu i'u mumu, Sumu pa'epa'e mumu.
Balistes flavomarginatus		Sumu laolao.
Balistapus undulatus		Sumu uli.
Balistapus rectangulus	Pu'a humuhumu, Humuhumu nukunuku apua'a.	Sumu pulepule.
Balistapus aculeatus		Sumu uliuli.
Amanes scopas		Sisitui.
Cantherines sandwichensis	O'ililepa, Ohua	Aimeo.
Monocanthus melanocephalus		Moloasi, Pa'u-me'a.
Monocanthus spilosomus	O'e o'e, Oilii	
Oxymonacanthus longirostris		Aleva.
Osbeckia scripta	O'ililepa, Ohua	
Alutera monoceros	Loulu	
Lactoria cornuta		Moamoa.
Ostracion tuberculatum		Moamoa uli.
Ostracion sebæ		Moamoa samasama.
Ostracion oahuensis	Moa	
Ostracion lentiginosum	Moamoa wa'a	
Lactoria galeodon	Makukana	Moamoa uliuli.
Tetraodon hispidus	O'opuhue Keke, Makimaki	Sue.
Tetraodon nigropunctatus	Makimaki	Sue.
Canthigaster solandri		Sue mimi.
Canthigaster epilamprus	Pu'u olai	
Chilomycterus affinis	O'opuhue	
Diodon hystrix		Tauta.
Ranzania makua	Apahu, Makua	
Sebastopsis guamensis		La'otale.
Sebastopistes laotale		La'otale.
Scorpaenopsis gibbosa	Nohu, Omakaha	Nofu.
Synanceja verrucosa		Nofu.
Dendrochirus sausaulele		Sausaulele.
Cephalacanthus orientalis	Lolo'au, Pina'o	
Caracanthus maculatus		Tu'u'u.
Parapercis tetracanthus		Ta'oto.

Vernacular names of fishes heard in Hawaii and Samoa—Continued.

Names of Species.	HAWAII.	SAMOA.
<i>Leptecheneis naucrates</i> .....	.....	Talitaliuli.
<i>Synchiropus lili</i> .....	.....	Lili.
<i>Periophthalmus barbarus</i> .....	.....	Mano'o, Talae.
<i>Hypseleotris guntheri</i> .....	.....	Malu vai.
<i>Eleotris fusca</i>	O'opu, Okuhekuhe.	Pa'ofu.
<i>Valenciennea violifera</i> .....	.....	Ta'oto.
<i>Zonogobius semidoliatus</i> .....	.....	Mano'o.
<i>Vailima stevensoni</i> .....	.....	Pa'ofu.
<i>Awaous ocellaris</i> .....	.....	Mano'o, I'a pala.
<i>Awaous genivittatus</i> .....	.....	Teli.
<i>Awaous stamineus</i>	O'opu .....	.....
<i>Eviota prasites</i> .....	.....	Lili.
<i>Mapo fuscus</i> .....	.....	Pa'ofu.
<i>Pseudogobiodon citrinus</i> .....	.....	Ulitui.
<i>Salarias</i>	Poa'o	Mano'o.
<i>Exallias brevis</i>	Poa'o kauila	Mano'o gatala.
<i>Alticus</i> .....	.....	Mano'o.
<i>Alticus striatus</i> .....	.....	Mano'o a'au.
<i>Platophrys pantherinus</i>	Paki'i	Ali.
<i>Platophrys mancus</i> .....	.....	Ali.
<i>Brotula marginalis</i>	Puhi palamoana .....	.....
<i>Dinematichthys iluoceteoides</i> .....	.....	Tapotopoto.

GLOSSARY OF PRINCIPAL WORDS COMPOSING NATIVE NAMES OF SAMOAN FISHES.

By W. E. SAFFORD.

The following vocabulary, based chiefly on notes taken in Samoa during the months of February, March, April, and May, 1888, was obtained from native fishermen, all of whom showed the greatest interest in telling me of the fishes of the reef, the ocean, and the stream, distinguishing those which were best for food from those which were unwholesome or poisonous, and warning me against those armed with stinging spines and those lurking in holes in the coral which inflict severe wounds with their sharp teeth. One of the most interesting lists I secured from an old native who was fishing for sharks from a canoe lying under our stern at Leone Bay. This man would attract the attention of a shark by shaking in the water a number of half shells of cocoanuts strung loosely on a stick, rim to rim. The shark would approach to within a few fathoms of the canoe to find out the cause of the commotion; then the native would throw out a bait (*māūnu*), consisting of a fish's head attached to a string, and draw it gently toward the canoe, the shark following. When the shark was within reach, the fisherman would seize a heavy club he had in readiness and strike the shark a violent blow on the head to stun it, then slip a noose (*maea*) over its head and, holding it alongside the canoe, dispatch it with a knife. This was to me an example of the most primitive method of fishing. The rattle he called *tui-ipu* (string of cups); the shark was one of the kind called *malie*. The fisherman told me of a larger kind, called *tanifa*, which was known to attack men while swimming, and as he found an interested listener he followed his account with a list of the principal fishes of Samoa. The names I wrote down at once, later correcting the orthography with the aid of Dr. George Pratt's excellent dictionary

of the Samoan language. Afterwards I supplemented my list by additional information obtained at native feasts and from fishermen returning from the reefs with their spears and nets and from their exciting chase for bonitos in their swift canoes provided with poles and trolling lines. Of course I could only record the native names, without attempting to do more than determine the genera or families of the most conspicuous kinds. The present work of Doctor Jordan makes it possible for the first time to identify the species of nearly all of the fishes in my list.

In this list there are certain names marked with an interrogation point. These I was unable to check with my list or to explain in a satisfactory manner. Some of the names of fishes are primitive, like *atu*, *pusi*, *fai*, and are widespread throughout Polynesia; others have a definite significance, such as *i'a sina*, white fish; *i'u-sama-sama*, yellow-tail; and others, like the long-beaked *aleva*, take their names from those of birds or other natural objects. I have included also the principal adjectives, verbs, and nouns from which compound names of fishes have been formed.

'a'a, *n.* A snapper, *Lutianus argentimaculatus*.

aau, *n.* A name applied to two lancet-fishes, *Hepatus guttatus* and *Ctenochaetus striatus*. See *au*, a sharp fish spine, a needle.

a'au, *n.* The coral reef; *akau* (New Zealand), the border of land near the sea.

afa, *n.* A cord, or sinnet, braided from cocoanut-fiber, a string.

afa'afa, *n.* Name applied to a thread-fin, *Polydactylus plebeius*, a fish with its pectoral fins modified into string-like organs of touch.

afo, *n.* A fishing line. *Aho* (Hawaii and Tahiti), a line or cord.

afolu, *n.* Name applied to a surmullet, *Mulloides samoensis*, a fish with thread-like barbels growing from the throat.

ago, *v.* To mark a pattern for tattooing; to mark with charcoal.

aimeo, *n.* Name applied to file-fishes of the genera *Holacanthus* and *Cantherines*.

alala, *n.* Plates or scales of tortoise-shell.

alala-saga, *n.* Name applied to a demoiselle-fish (*Abudefduf septemfasciatus*) with tortoise-shell-like markings.

alālafutu, *n.* Name applied to a pompano, *Trachinotus ovatus*, and to *Caranx plumbeus*, fish having the first rays of the dorsal fin more or less filamentous.

alamu (alamea?), *n.* Name applied to species of *Holacanthus*.

alamea, *n.* A many-rayed sea-urchin.

alamea, *n.* A surgeon-fish, *Hepatus aliala*.

alati-moana (?), *n.* *Hemigymnus melapterus*.

aleva, *n.* A little file-fish with beak-like snout, *Oxymonacanthus longirostris*.

aleva, *n.* Name of a bird (*Eudynamis taitensis*).

ali, *n.* A flounder (*Platophrys*); name applied also to a flat fish (*Zebrasoma*) with a superficial resemblance to a flounder.

ali-palagi, *n.* *Zebrasoma rhombeum*.

aloalo, *n.* The lagoon between the beach and the reef.

alogo, *n.* A beautifully marked surgeon-fish, *Hepatus lineatus*.

alomātū, *adj.* Partially dry.

'analagi, 'ana'analagi, *n.* A mullet-like, spotted fish, *Liza caeruleomaculata*.

anaana (Tahiti), *adj.* Beaming, shining; *kanakana* (Paumotu), bright, radiant; *kana* (New Zealand), the eyeballs.

'anae, *n.* The name of a fish (*liza* sp.); *kanae* (New Zealand), the gray mullet; *anae* (Tahiti) a mullet; *anae* (Hawaii), a mullet.

anefe, *n.* Name applied to young of *lo* (*Siganus* sp.).

'ao, *adj.* Small, slender.

apoa, *n.* An eel-like fish with stinging dorsal spine, *Plotosus anguillaris*.

- apo (Hawaii), *v.* To catch, to hook into; *apoapo* (Samoa), to poise a spear.
- 'ata'ata, *n.* A name applied to several fishes of the genera *Epinephelus*, *Cephalopholis*, and *Leiurus*.
- ata'ata (Hawaii), *n.* The falling off of the scarf skin after drinking awa; *akaa* (Hawaii), not cohering; *ataa* (Tahiti), split up into patches or areoles not adhering. Possibly the name applied to the sea-basses or groupers on account of their spotted coloration.
- 'ata'ata pulepule, *n.* A sea-bass, *Epinephelus merra*.
- 'ata'ata uli, *n.* Dark-colored 'ata'ata.
- atu, *n.* A bonito (*Gymnosarda pelamis*). *Aku* (Hawaii), a bonito.
- atualo, *n.* A bonito, *Megalaspis cordyla*.
- atule, *n.* The "goggle-eyed jack," or horse mackerel, *Trachurops crumenophthalma*. *Akuke* (Hawaii); *aturere* (New Zealand), a highly prized fish.
- atunga-loloa, *n.* "Long-fin," a crevallé, *Caranx hasselti*.
- atunga, *n.* The fin of a fish.
- au, *n.* A fish-spine, a needle.
- a'u, *n.* Name applied to hound-fishes, *Tylosurus giganteus*, etc.
- aua, *n.* Name applied to a young 'anae, *Liza troscheli*.
- ava, *n.* The name of a very scaly fish.
- 'ava'ava, *n.* *Terapon jarbua*. *Kawa* (New Zealand), name of a traditional being which hung like a veil upon the forehead of the eel-god, Tuna.
- 'ava'ava moana, *n.* *Plectorhynchus diagramma*.
- 'avasai, *adj.* Perhaps 'avasia, burnt by the sun.
- 'ele'ele, *n.* *Siganus punctatus*. 'Ele (Samoa) rust, red earth; *ereere* (Tahiti), black, dark, also blue; *elele* (Hawaii) dark-colored-black, blue.
- fa'a moana, *adj.* Pelagic, a name applied to fish found in schools far out from shore. *Moana* (Samoa), the ocean; *moana* (Hawaii, New Zealand), the ocean.
- fai, *n.* A sting-ray, *Himantura fai*. *Whai* (New Zealand), a sting-ray; *fai* (Tahiti), a sting-ray; *vai* (Fiji), a sting-ray.
- faiumu, *v.* To cook an oven of food.
- fataga loa, *n.* *Halichæres dedalma*.
- felo, *adj.* Light yellow.
- fili, *n.* Sinnet, braided cocoanut fiber; *fili mama*, a ring braided of cocoanut fiber.
- filoa, *n.* *Lethrinella miniata*.
- fo, *n.* Name applied to fishes of the genus *Amia* and related genera.
- fo mūmū, *n.* *Apogonichthys marmoratus*.
- foa'ao, *n.* *Pempheris ovalensis*.
- fui, *n.* A collection or cluster.
- fui-fui-atu, *n.* A school of bonito.
- fuga, *n.* Name applied to parrot-fishes (Callyodontidæ).
- fuga 'avasai, *n.* *Callyodon erythron*.
- fuga galu-moana, *n.* *Callyodon ultramarinus*.
- fuga mea, *n.* *Callyodon balinensis*; *C. zonularis*.
- fuga meamea, *n.* *Callyodon obscurus*.
- fuga mūmū, *n.* *Callyodon pyrrhurus*.
- fuga pa'ipa'i, *n.* *Callyodon balinensis*; *C. oviceps*.
- fuga ulapo, *n.* *Callyodon ruberrimus*.
- fuga usi, *n.* *Callyodon oviceps*.
- ga, *n.* A mackerel, *Scomber loo*.
- galo, *n.* A full-grown *usi*.
- galo, *n.* *Callyodon jordani*.
- galu, *n.* Wave. *Galu-tai* (Samoa), wave-of-the-sea; *galu-moana* (Samoa), wave-of-the-ocean; *gagalu*, to be rippled, as the water by a fish swimming near the surface.
- galu-moana, *adj.* Mispronunciation of *lanu-moana*, sea-blue.
- galafa (?), *n.* *Zanclus canescens*.
- gata, *n.* A snake. *Ngata* (Tonga, Fiji), a snake; *ngata* (New Zealand), a snail or slug.

- gata-sami, *n.* *Oceanops lativittata*. Gata-sami (Samoa), sea-snake; sami (Samoa), the sea, salt water. (Perhaps *matasami*, said to mean eye of the sea.)
- gatala, *adj.* Name applied to a number of spotted fishes, especially sea-basses of the genera *Epinephelus* and *Cephalopholis*. Naka (Hawaii), to split or break open, as the ground in a drought; nakaka (Hawaii), full of cracks; ngatata (New Zealand), full of cracks, as skin which is chapped.
- gatala, *n.* *Epinephelus merra*.
- gatala aleva, *n.* *Anyperodon leucogrammicus*.
- gatala moana, *n.* *Cephalopholis argus*.
- gatala uli, *n.* *Cephalopholis leopardus*; *C. argus*.
- gutu-umi, *n.* *Epibulus insidiator*. Gutu (Samoa), mouth, snout; umi, drawn out, elongated.
- i'a, *n.* Fish; the general name in Samoa for all fishes except the bonito. Ika (New Zealand, Tonga, Marquesas, Fiji), the general name for fish; ikan (Malay); guihan (Guam).
- i'a lanu-moana, *n.* "Fish color-of-the-ocean," a name applied to *Chromis ceruleus* and *C. analis*.
- i'a mai-moana, *n.* A name applied to *Plectorhynchus chatodonoides*.
- i'a pala, *n.* *Awaous ocellaris*.
- i'a sina, *n.* *Mulloidis samoensis*.
- i'a tusitusi, *n.* *Pseudocheilinus hexatænia*.
- i'a ui, *n.* Name applied to a large eel.
- i'a vai, *n.* A name sometimes applied to fresh-water eels.
- ifigi (?), *n.* *Halichæres centiquadrus*.
- ila, ilaila, *adj.* Spotted, or marked.
- 'ili, *n.* A rasp or file; a saw.
- 'ili'ilia, *n.* *Acanthurus tituratus* (juv.); *A. unicornis*.
- ili, *n.* A fan.
- iliū (ili-i'u), *n.* *Zebrosoma rhombeum*.
- inato, *n.* *Kuhlia rupestris*.
- ise, *n.* A half-beak (*Hemiramphus*) and *Belone platyura*. Ihe (New Zealand), a gar-fish or half-beak; ihe (Hawaii, Tahiti), a spear; ihe (Marquesas), a fish with a long beak.
- i'u, *n.* The tail of a fish; the end of anything. Hiku (New Zealand), the tail of a fish or-reptile; iku (Tonga), the tail of animals; ikur (Malay), the tail of animals, the train of a garment; hii (Hawaii), the tail of a fish.
- i'u-mumu, *adj.* Red-tailed.
- i'u-samasama, *n.* Yellow-tail, *Abudefduf lacrymatus*.
- i'u-sina, *n.* White-tail, *Pomacentrus melanopterus*.
- lae, *n.* The part between the lip and the chin without hair. Lae (Hawaii), any projecting part; the forehead.
- laea, *n.* Name applied to several fishes of the genus *Callyodon*.
- laea galo, *n.* *Callyodon jordani*.
- laea mumu, *n.* *Callyodon bataviensis* and *C. latax*.
- laea pulepule, *n.* *Callyodon latax*.
- lai, *n.* A mackerel, *Scomberoides sanctipetri*.
- lailai (?), *n.* *Pseudipeneus indicus*.
- laitiiti, *adj.* Small.
- lalafi, *n.* *Cheilinus diagrammus*. Lafi (Samoa), to hide away.
- lalafi pulepule, *n.* *Cheilinus fasciatus*.
- lālāfutu, *n.* *Caranx armatus*.
- lanifi, *adj.* Thin. (See *manifi*.)
- lanu, *n.* Color.
- lanu-moana, *adj.* Sea-color, sky-blue.
- laolao, *adj.* Smooth.
- laotale, *n.* Fishes with poisonous spines, *Sebastes guamensis*, and *Sebastes laotale*.
- lau, *n.* A leaf. Lau-taro, a taro leaf; lau-ulu, hair (foliage) of the head.
- laulaufau, *n.* *Heniochus permutatus*.

- lele, *v.* To fly.
- lega, *adj.* Yellow, turmeric.
- lega, *n.* A yellow fish, *Holocanthus flavissimus*.
- lili, *n.* *Synchiropus lili*.
- lo, *n.* Name applied to several fishes of the genus *Siganus*.
- lo-mea, *n.* Name applied to young fry of *lo*, *loloa*, and *aneke* (*Siganus* species). In Guam these are caught in great quantities and preserved by the natives, who call them *mañahag*.
- lo pa'u'ulu, *n.* *Siganus marmoratus*. *Pa'u-'ulu* signifies "rind of a bread-fruit," which is composed of a number of areoles.
- loa, *adj.* Long.
- loata, *n.* *Hepatus aliala*.
- logouli, *n.* Name applied to the *maomao* when it is changing color to become a *pala'ia*.
- loloa, *n.* Name of a fish (*Siganus*).
- lese pule (?), *n.* *Cæsius cæruleureus*.
- lupa, *n.* *Zebrosoma veliferum*.
- lupe, *adj.* Sometimes incorrectly used for *pule* (spotted).
- lupo, *n.* *Caranx ignobilis*; *C. sexfasciatus*.
- lupo tā, *n.* A large lupo.
- mago, *n.* Name for one kind of shark. *Mango* (New Zealand), *mano* (Hawaii), *mao* (Tahiti), names for sharks.
- mai, *prep.* From; *mai-moana* (Samoa), from the ocean, pelagic.
- mala'i, *n.* A snapper (*Lutianus* sp.).
- mala'i pa'epa'e, *n.* *Lutianus gibbus*.
- malau, *n.* Name applied to squirrel-fishes (*Myripristis* and *Holocentrus*).
- malau faiumu, *n.* A rose-colored fish with silver lines, *Holocentrus punctatissimus*, called also *malau matapua'a*.
- malau mataputa, *n.* A squirrel-fish, *Myripristis microphthalmus*, called also *malau tea*.
- malau tea, *n.* A squirrel-fish, *Myripristis microphthalmus*.
- malau vai, *n.* A fish entering fresh-water streams, *Hypseleotris guntheri*.
- malauli, *n.* A cavally, *Caranx melampygus*.
- malie, *n.* General name applied to sharks.
- malie alamata, *n.* *Carcharias melanopterus*. *Malie alo* (belly-shark), name applied to a shark found inside the lagoon; *malie tua* (back shark), another kind round outside the lagoon.
- mālolo, *n.* General name for flying-fishes (*Cypsilurus* sp.). *Malolo* (Hawaii), name for flying-fishes (*Parexocetus*, etc.).
- mamo, *n.* Name applied to *Chromis cæruleus*, *Myripristis pralinius* and *Dascyllus aruanus*. They feed on coral reefs.
- mānaia, *adj.* Handsome; a dandy, or beau.
- manifi, manifinifi, *adj.* Thin. A name applied to *Hepatus triostegus*, *Holocentrus spinifer*, *Pempheris ovalensis*, and *Pseudupeneus* sp. *Nihinihi* (Hawaii), anything standing on the edge, a sharp ridge.
- manini, *n.* The name of a fish, *Hepatus triostegus*.
- mano'o, *n.* Name applied to blennies, or to goby-like fishes frequenting stones along the edge of the sea.
- mano'o, *n.* *Awaous ocellaris*; *Alticus alboguttatus*.
- mano'o a'au, *n.* *Alticus striatus*.
- mano'o gatala, *n.* *Salarias brevis*.
- maomao, *n.* Name applied to young *pala'ia*.
- māoa'e, *n.* *Gymnothorax javanicus*.
- masamie (?), *n.* *Cheilio inermis*.
- mata, *n.* Eyes; face; appearance.
- mata-'ele'ele, *n.* *Lethrinus harak*.
- mata-i-taliga, *n.* Name applied in Samoa to the hammer-head shark, *Sphyrna zygaena*, signifying "eyes-in-ears."
- mata-pula, *n.* Name applied to a red-and-white mottled fish, *Priacanthus cruentatus*, having its iris marked with bright red blotches. (See *pula*.)
- matagi pulepule, *n.* *Chætodon reticulatus*.

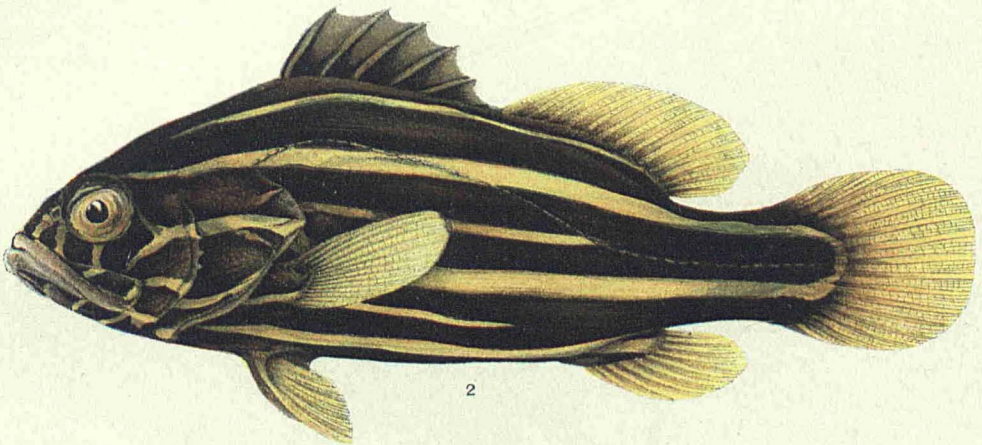
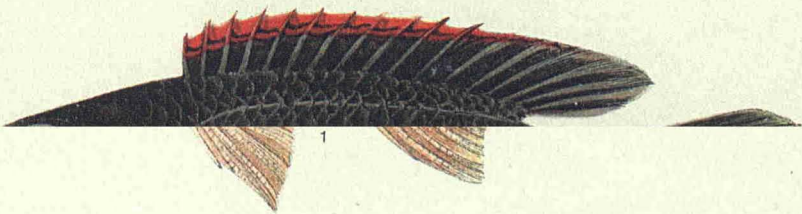
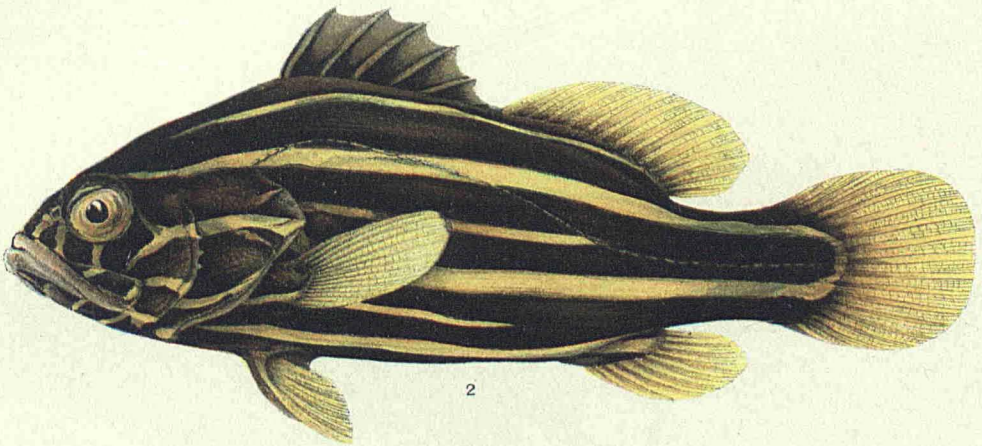
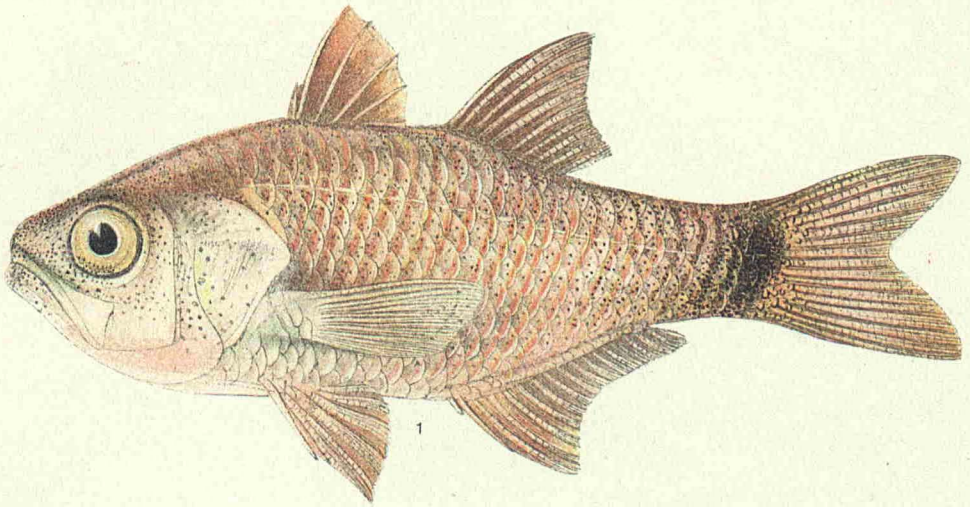
- matagi, *n.*, *v.* Wind; to blow.
- matalau, *n.* *Pseudupeneus chryserydros*. Name probably derived from barbels, called *lau*, like *lau ulu*, hair of the head.
- matalau uliuli, *n.* *Pseudupeneus bifasciatus*.
- matu, *n.* *Xystæma argyreum*.
- matu loa, *n.* *Xystæma gigas*.
- matu mutu, *n.* *Kyphosus waigiensis*.
- mea, meamea, *adj.* Young; an infant.
- mea, meamea, *adj.* Yellowish brown, brownish; *mea* (Tahiti), to be red, as the skin after eating fish.
- mea-sili, *adj.* Exceedingly young.
- mqimi, *v.* To urinate.
- misimisi, *n.* *Plectrohynchus crassispinus*.
- misimisi, *v.* To smack the lips.
- moai (?), *n.* *Cheilio inermis*.
- moaga, *n.* *Pseudupeneus* sp.
- moaga faiava, *n.* *Pseudupeneus moana*.
- moamoa, *n.* *Lactoria cornuta*, a horned trunk-fish. In Hawaii *moamoa* signifies a sharp point or spur at the stern of a canoe; the word may possibly be derived from *moa* (cock), as many of the Ostraciidæ have spurs.
- moamoa samasama, *n.* *Ostracion sebæ*. (See *samasama*.)
- moamoa uli, *n.* *Ostracion tuberculatum*.
- moamoa uliuli, *n.* *Tetraodon hispidus*.
- moana, *n.* *Hepatus guttatus*.
- moana, *n.* The ocean.
- moana, *adj.* Ocean-blue. *Lanu-moana*, color of the ocean, sea-blue, sky-blue.
- molemole, *n.* *Novaculichthys tæniurus*.
- moloasi, *n.* *Monacanthus melanocephalus*.
- moloasi, *n.* A toadstool; fungus.
- mu, *v.* To glow, to become red.
- mumea, *n.* *Lutianus bohar*.
- mumu, *n.* To be red or ruddy, a sign of beauty.
- mumu moana, *n.* *Monotaxis grandoculis*.
- mutu, *n.* *Holotrachys lima*, a red squirrel-fish.
- mutu, *adj.* to be cut off, blunt, truncated.
- mutu uli, *n.* *Megaprotodon trifasciatus*.
- nanue, *n.* Name applied to several species of snappers (*Lutianus* species). The word is sometimes pronounced *lanue* or *nganue* by the Samoans, who are apt to be careless in their use of consonants.
- nefu, *n.* A name applied to small fish swimming in shoals, like anchovies. The name probably has the same origin as *nefunefu* (Samoa), to be turbid; *nehunehu* (Hawaii), a multitude; *nehu-tai* (New Zealand), sea-spray.
- nofu, *n.* Name applied to toad-fishes, *Scorpenopsis gibbosa*, and *Synanceja verrucosa*. *Nohu* (Mangaia), the name of a fish having poisonous spines; *nufu* (Guam), a toad-fish, *Synanceja verrucosa*.
- pa'e, pa'epa'e, *adj.* White; light-colored.
- paipai (New Zealand), *n.* A cutaneous disease; *paipai* (Hawaii), to peel off, as the bark of a tree or the skin of an animal.
- pa'ipa'i, *n.* The name of a fish. *Pa'ipa'i* (Samoa), useless, to no purpose. In many cases *pa'ipa'i* is probably a corruption of *pa'epa'e*, white.
- pala, *n.* Mud; *parapara* (New Zealand), mud, dirt.
- pala 'ia, *n.* The name of a fish which is called *maomao* when very young and *logouli* when changing to the adult stage.
- palagi, *n.* A name applied to *Ctenochætus striatus*.
- palagi samasama, *n.* *Hepatus aquilinus*.
- pa'ofu, *n.* Name applied to *Eleotris fusca*, *Mapo fuscus*, and other gobies; *oopu* in Hawaii.
- pa'u, *n.* Skin, rind, bark.
- pa'u'ulu, *n.* The rind of the breadfruit. A name applied to *Siganus marmoratus*.

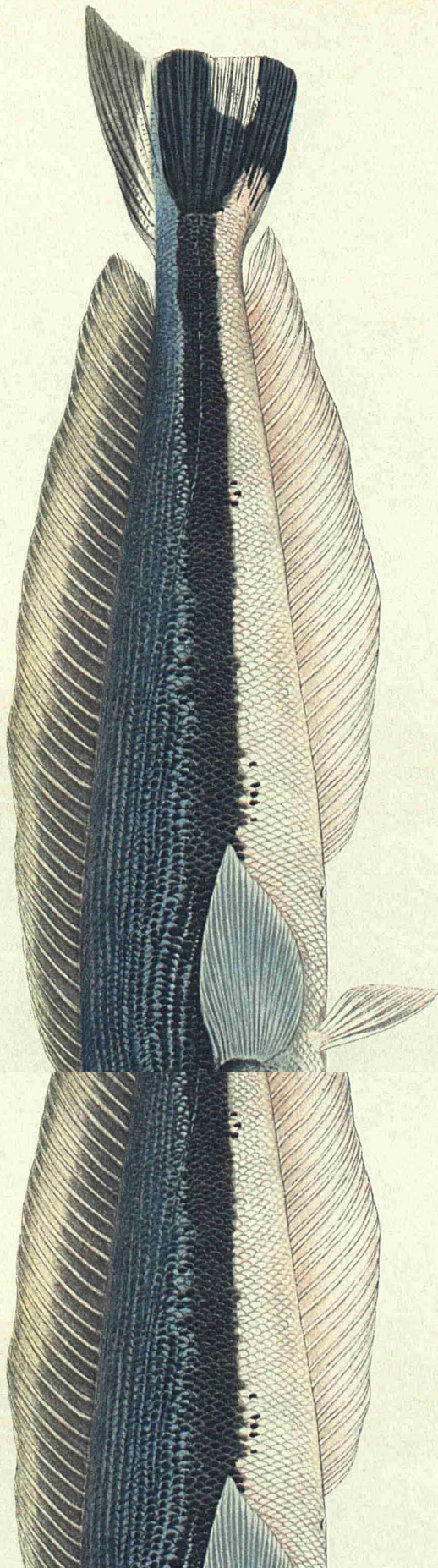
- pa'u-mai-moana, *n.* A poetic name applied to the bonito.
- pa'u-masunu, *n.* A poetic name applied to the bonito.
- pa'u-mea, *n.* *Monacanthus melanocephalus*.
- pāuli, *adj.* Purple.
- paumutu (?), *n.* *Hemigymnus melapterus*.
- pe'ape'a, *n.* A bat; a swift (bird).
- pe'ape'a uli, *n.* *Platax orbicularis*.
- pela, *n.* A name applied to the floa (*Lethrinella miniata*).
- pelupelu, *n.* *Harengula commersoni*.
- pine, *n.* A shoal of young fishes.
- pipi, *n.* *Abudefduf metallicus*.
- pipine, *n.* The name of a fish.
- poi, *n.* The name of a small fish.
- pone, *n.* A name applied to surgeon-fishes, *Hepatus* species.
- pone i'u mumu, *n.* *Hepatus achilles*.
- potati (?), *n.* *Cirrhitus marmoratus*.
- pua'a, *n.* A hog; mata-pua'a, hog-faced.
- pula, *adj.* Shining, glowing. *Pura* (Tahiti), a spark of fire; *pura* (Mangaia), having anything like dust in the eyes.
- pulepule, *adj.* Spotted; striped with various colors. *Pulepule* (Hawaii), spotted, speckled, of various colors; *bulebule* (Tonga), spotted.
- pusi, *n.* General name for sea-eels (*Gymnothorax*, *Echidna*, *Leptocephalus*). *Puhi* (Hawaii), a sea-eel; *puhi* (New Zealand), a large eel; *puhi* (Tahiti), an eel; *puhi* (Mangaia), a sea-eel, which bites severely.
- pusi 'ai'aiuga, *n.* *Echidna leihala*.
- pusi gatala, *n.* *Gymnothorax pictus*; *G. flavomarginatus*.
- pusi pulepule, *n.* *Gymnothorax undulatus*.
- pusi sulusulu, *n.* *Scuticaria tigrina*.
- pusi tafa'ilautalo, *n.* Same as *tuna tafa'ilautalo*, an eel.
- safole, *n.* A fish found in salt water, *Kuhlia tæniura*.
- saga, *n.* Flipper of a turtle.
- sama, samasama, *adj.* Yellow.
- samasama, *n.* *Zebрасoma flavescens*.
- sami, *n.* The sea; salt water. *Gata sami* ("sea-snake"), *Oceanops lativittata*.
- sausau, *v.* To flutter the wings.
- sausaualele, *n.* "To fly fluttering," *Dendrochirus sausolele*.
- sega, *n.* A paroquet kept in captivity for the sake of its red feathers.
- segasega, *n.* *Holocentrus ruber*.
- segi, *v.* To burn a scar as a beauty-spot.
- segisegi, *n.* *Acanthurus unicornis*, a species having brightly colored spots about the spurs on the tail.
- sele, *n.* A bamboo knife. *Hele* (Tonga), a bamboo knife; *sele* (Fiji), a bamboo knife.
- sesele, *n.* A perch-like fish found in fresh water, *Kuhlia marginata*; when full grown called *inato*.
- sila, *n.* Extremity of rainbow.
- si'u, *n.* The name of a fish.
- si'u muti, *n.* The name of the *lalafi* (*Cheilinus diagrammus*) when full-grown.
- siuli (?), *n.* *Chaetodon setifer*.
- sisi, *n.* Eyes of a cocoanut.
- sisitui, *n.* *Amanses scopas*, a file-fish with spines on each side of tail.
- sola, *v.* To run away; to escape.
- solasulusulu, *v.* To flee and hide away.
- soloalalo, *n.* One kind of sea-eel.
- sue, *adj.* To be puffed out; to project, as a fat belly.
- sue, *n.* A name applied to puffers (*Tetraodon*).
- sue mimi, *n.* "Urinating puffer," *Canthigaster solandri*.

- sugale, *n.* General name applied to wrasse-fishes of the genera *Anampses*, *Thalassoma*, and *Cheilinus*; meaning choice.
- sugale, *n.* *Gomphosus tricolor*; *Thalassoma fuscum*; *Cheilinus diagrammus*.
- sugale aloa, *n.* *Hemigymnus melapterus*.
- sugale 'ele (?), *n.* *Thalassoma dorsale*.
- sugale gasufi, *n.* *Cheilinus chlorurus*.
- sugale sa'a'ele'ele, *n.* *Thalassoma dorsale*.
- sugale lupe (pule ?), *n.* *Anampses caeruleopunctatus*, a blue-spotted wrasse.
- sugale mata-mumu, *n.* *Cheilinus trilobatus*.
- sugale pulepule, *n.* *Thalassoma dorsale*.
- sugale uliuli, *n.* *Labrichthys cyanotænia*.
- sulu, *v.* To take refuge in.
- sulusulu, *v.* To hunt with a torch.
- sumu, *v.* To stick into the body like a spear.
- sumu, sumusumu, *n.* Name applied to trunk-fishes or trigger-fishes (*Balistes*).
- sumu i'u-mumu, *n.* *Balistes vidua*.
- sumu-pa'epa'e, *n.* *Balistapus chrysopterus*.
- suma-pa'epa'e mumu, *n.* *Balistes flavomarginatus*.
- sumu pulepule, *n.* *Balistapus rectangulus*.
- sumu uli, *n.* *Balistapus aculeatus*.
- sumu uliuli, *n.* *Balistapus aculeatus*.
- susu, *n.* Nipples, teats.
- susu umi, *n.* *Chorististium susumi*.
- tā, *n.* To jump a somersault. *Lupo ta*, *Caranx plumbeus*.
- tafa'i, *n.* To break off, as a leaf.
- tagi, *v.* To weep; to mourn.
- tagitagi, *n.* *Hemigymnus melapterus*.
- tagau, *n.* *Lutianus marginatus*.
- tai, *n.* Sea, salt-water.
- tāiva, *n.* Name applied to a snapper, *Lutianus marginatus*, and to *Scolopsis trilineata*.
- tāiva uliuli, *n.* *Lutianus monostigma*.
- ta'i-ono, *adj.* Six by six; by sixes; six on a side.
- tala, *n.* The spur of a cock, barb of a spear.
- talae, *n.* *Periophthalmus barbarus*, air-breathing fish found in mangrove swamps; mangrove-hopper.
- tali, *v.* To wait for; to stand by to do something.
- taliuli, *v.* To steer, without assisting to paddle.
- talitaliuli, *n.* One who follows in the train of another; one who waits about for food. Name applied to the pilot-fish, *Leptecheneis naucrates*.
- talinga, *n.* Ear. *Taringa* (New Zealand), ear; *dalinga* (Fiji), ear; *talinga*, *tainga* (Malay), ear; *talanga* (Guam), ear.
- tamala, *n.* Name applied to young *taiva*.
- tanifa, *n.* A large man-eating shark (*Carcharias*). *Taniwha* (New Zealand), a water-monster; *daniva* (Fiji), one kind of shark.
- tao, *n.* A spear. *Tao* (Polynesia generally), a spear; *kao* (Hawaii), a spear or javelin; to throw or dart a spear.
- taotao, *n.* *Microphis brachyurus*.
- tao-tito, *n.* *Aulostomus valentini*. *Tito*, to fall headlong.
- taoto, *n.* *Parapercis tetracinctus*; *Zenarchopterus vaisiganis*; *Valenciennæ violifera*.
- ta'uleia, *n.* *Pseudupeneus indicus*; *Ps. barberinus*.
- taupou, *n.* A virgin; the princess of a village. A name applied to several demoiselle-fishes, especially to *Pomacentrus pavo*, *Abudefduf unioellatus*, and *Abudefduf taupou*.
- tea, teatea, tetea, *adj.* White, light-colored, albino. *Kea* (Hawaii), white.
- tega, *n.* Thigh; upper arm.
- ti'ava, *n.* *Lutianus gibbus*.

- tifi, *v.* To adorn. *Kihi* (Hawaii), the outside corner or projection of a thing, the apex of a leaf; *kihi-kihi* (Hawaii), the curving of the horns of the moon, the curving of the wings of a bird; *mano kihi-kihi* (Hawaii), the hammer-head shark.
- tifitifi, *n.* General name for chaetodonts or butterfly-fishes and small fishes resembling them.
- tifitifi a'au pulepule, *n.* *Chaetodon ornatissimus*.
- tifitifi 'ao, *n.* *Chaetodon reticulatus*.
- tifitifi laumea, *n.* *Chaetodon lunula*.
- tifitifi tala, *n.* *Chaetodon trifasciatus*.
- tifitifi, *n.* *Zanclus canescens*.
- tifitifi ila, *n.* *Chaetodon ephippium*. *Ila*, a birthmark on the skin.
- tifitifi i'u-sama, *n.* *Chaetodon pelewensis*.
- tifitifi lauifi, *n.* *Chaetodon citrinellus*.
- tifitifi magina (?), *n.* *Chaetodon citrinellus*.
- tifitifi mata-niu, *n.* *Chaetodon vagabundus*.
- tifitifi paipai, *n.* *Chaetodon mertensi*.
- tifitifi pulepule pa'ipa'i, *n.* *Chaetodon melanotus*.
- tifitifi pulepule samasama, *n.* *Chaetodon unimaculatus*.
- tifitifi sama, *n.* *Chaetodon setifer*.
- tifitifi taiono, *n.* *Chaetodon ephippium*.
- tifitifi tusa, *n.* *Chaetodon ephippium*.
- tifitifi uli, *n.* *Chaetodon citrinellus*.
- tito, *n.* *Aulostomus valentini*, a trumpet-fish; *tito* (Samoa), to dart or fall headlong.
- tolai, *n.* A name of two birds, *Petroica pusilla* and *Myzomela nigriventris*.
- tolai, *n.* *Gnathodotex aurolineatus*.
- toto, *n.* *Monodactylus argenteus*.
- tui, *v.* A spine; to thread a needle; to run a string through.
- tuna, *n.* An eel, *Anguilla* sp. *Tuna* (New Zealand), an eel; *tuna* (Tonga), an eel; *duna* (Fiji), an eel; *tona* (Madagascar), the largest kind of eel.
- tuna gatala, *n.* *Anguilla mauritiana*.
- tuna tafa'ilautalo, *n.* See *pusi tafa'ilautalo*.
- tusi, *n.* *Scolopsis trilineata*.
- tusitusi, *n.* Striped. -*Tusi*, to mark.
- tusa, *n.* To be equal; the same on both sides.
- tu'u'u, *n.* Name applied to fish with a broad, compressed body, as *Pomacentrus nigricans*, *Abudefduf leucopomus*, and *Abudefduf dicki*.
- tu'u'u pulepule mumu, *n.* *Holocanthus bispinosus*.
- uga vai, *n.* *Hepatus elongatus*.
- ui, *adj.* Dark colored; *ili-ui*, dark-skinned.
- ui, *v.* To pass along.
- uisila, *n.* Name applied to *Atherina* sp.
- 'ula, 'ula 'ula, *adj.* Red. *Kula* (Tonga), red; *kura* (New Zealand), red; *ura* (Tahiti), red feathers; *ulaula* (Hawaii), red; *kulakula* (Fiji), red.
- ulavapua, lava-ula-pua, vala-ula-pua, *adj.* Black in the fore and hind parts and white in the middle.
- ulavapua, *n.* *Pomacentrus albofasciatus*; *Abudefduf sordidus*.
- ula pua, *n.* *Holocanthus bicolor*.
- uli, uliuli, *adj.* Dark blue, black.
- uli, *v.* To steer.
- ulitui, *n.* *Pseudogobiodon citrinus*.
- uliuli (usiusi?), *n.* *Megaprotodon trifascialis*.
- ulu, *n.* Head.
- 'ulu, *n.* Breadfruit.
- ulua, *n.* *Caranx forsteri*.
- ume, *n.* A name applied to surgeon or lancet fishes, species of *Hepatus* and *Acanthurus*.
- umelei, *n.* *Hepatus matoides*, *Acanthurus lituratus*, *Acanthurus unicornis*.

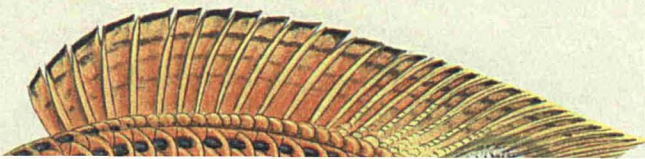
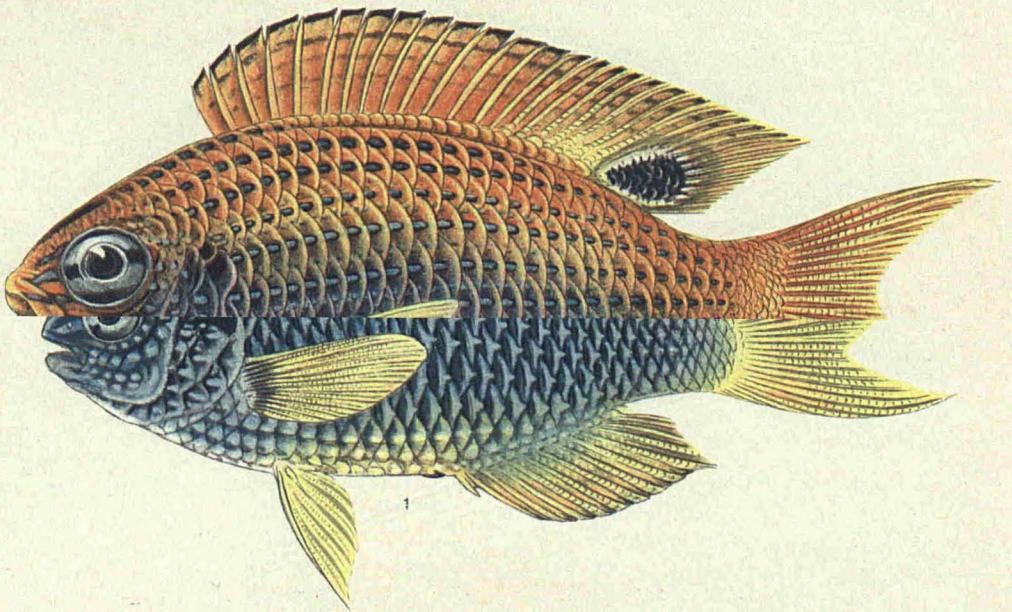
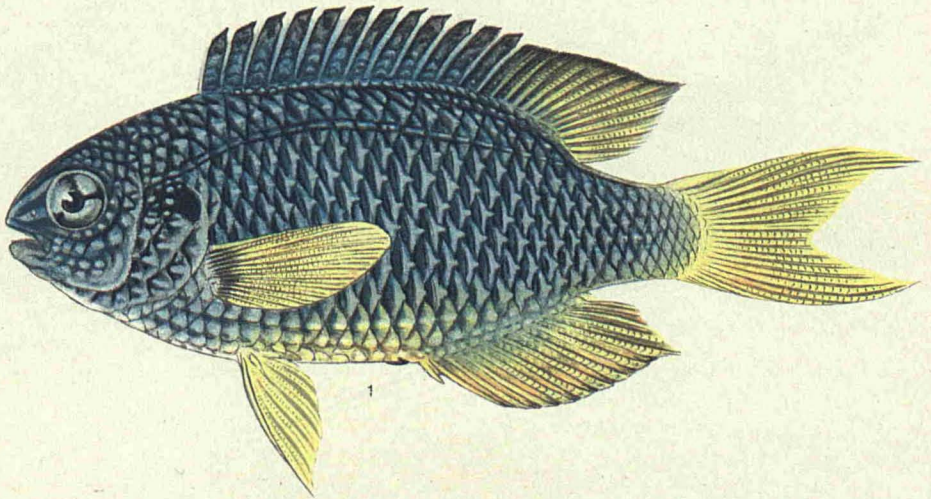
- umi, *v.* To lengthen out. (See *gutu umi*, *Epibulus insidiator*, from the protractile jaws.)
umue (?), *n.* *Kyphosus waigiensis*.
usi, usiusi, *adj.* Green.
usiusi, *n.* *Callyodon* (juv.).
usiusi (?), *n.* *Megaprotodon trifascialis*.
va'a, *n.* Boat, canoe; *vaka* (Tonga), a boat; *waka* (New Zealand), a canoe; *waa* (Hawaii), a canoe.
vae, *n.* Foot, leg.
vai, *n.* Fresh water; *wai* (Hawaii and New Zealand), fresh water.
vaiuli sama, *n.* *Abudefduf taupou*, *Pomacentrus vaiuli*.
vete, *n.* A surmullet, *Upeneus vittatus*. *Weke* (Hawaii), *Mulloidis* sp.

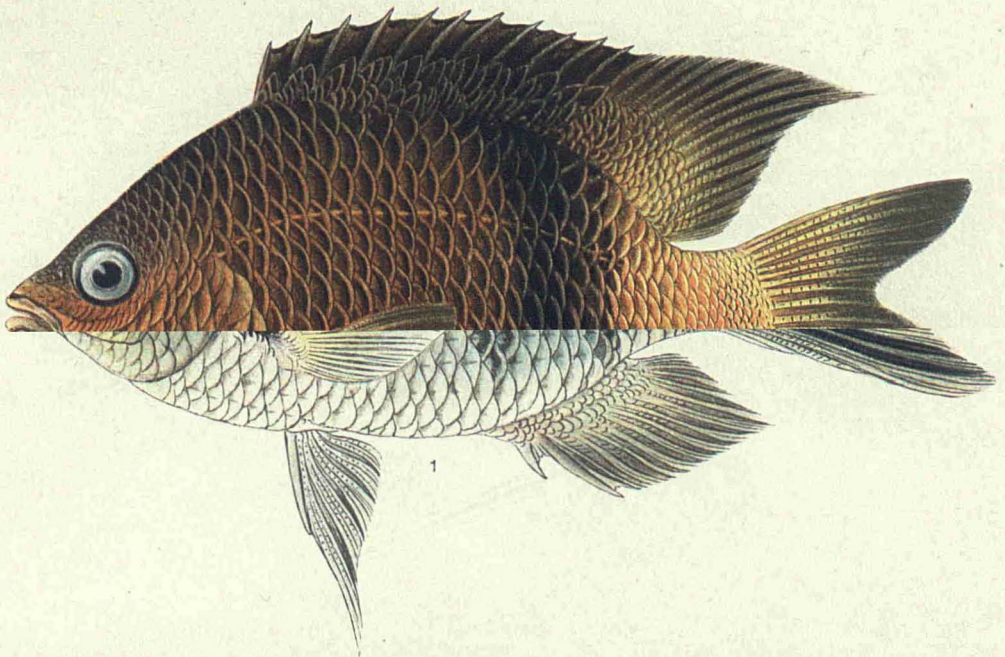
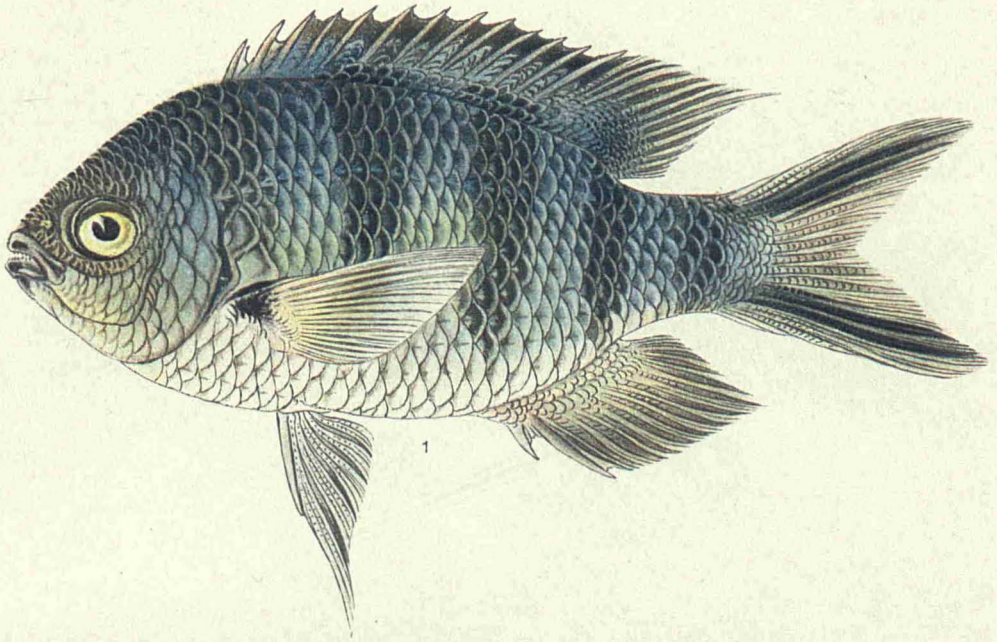


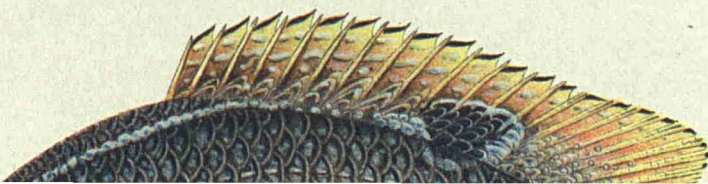
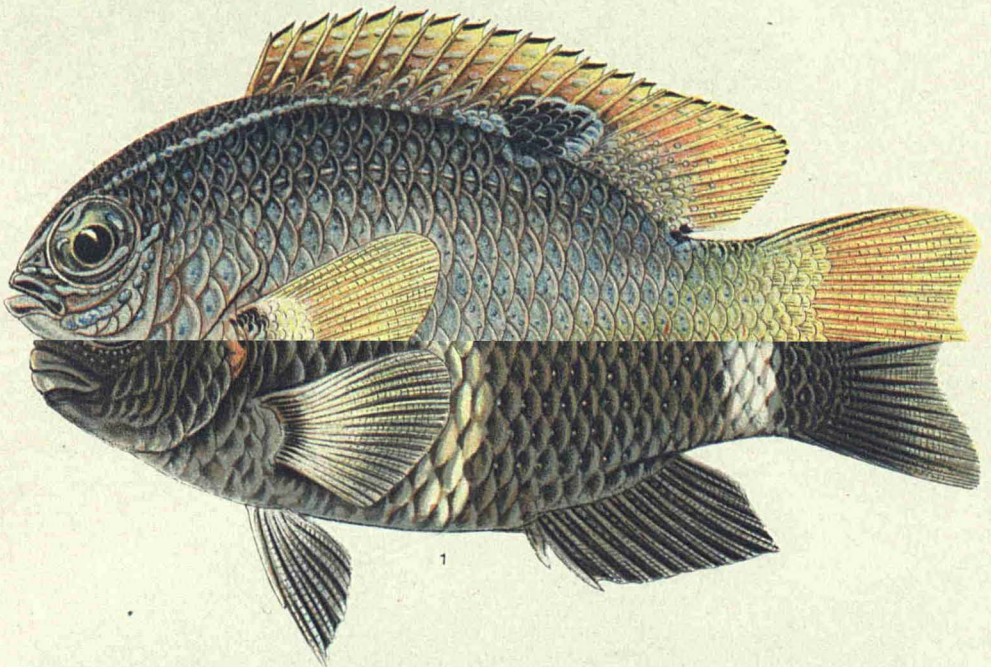
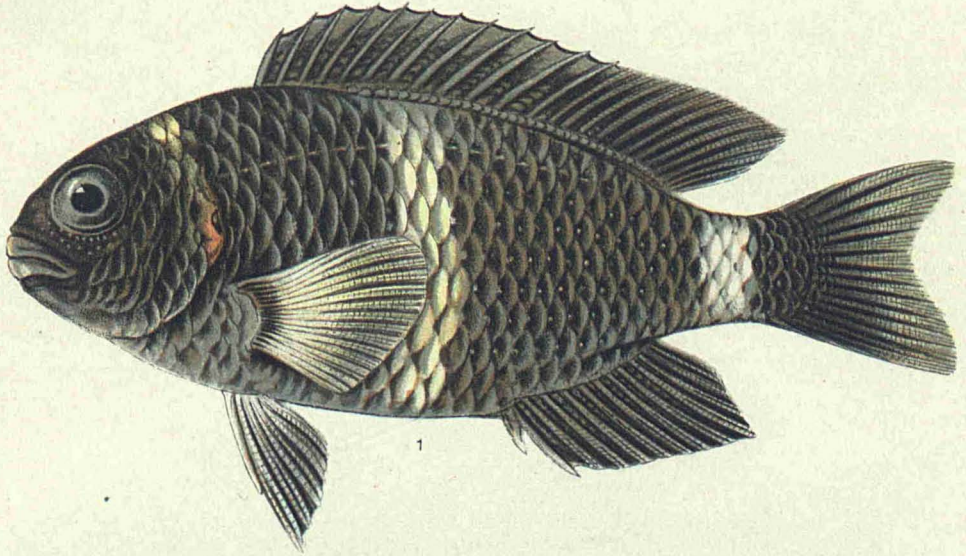


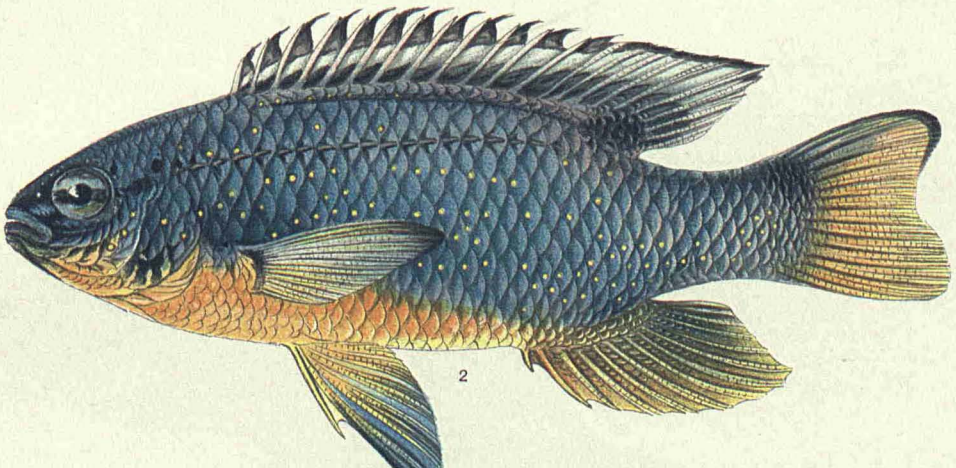
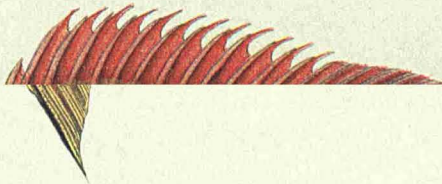
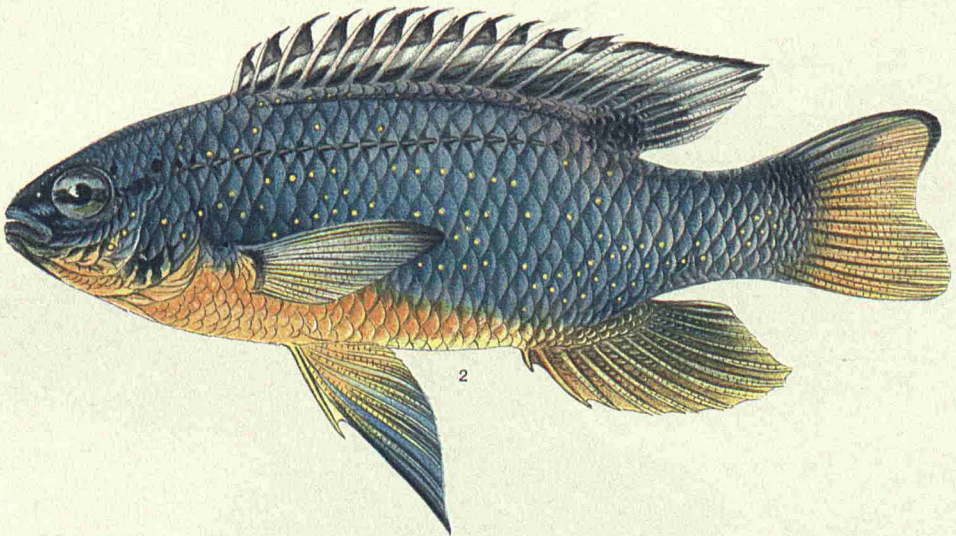
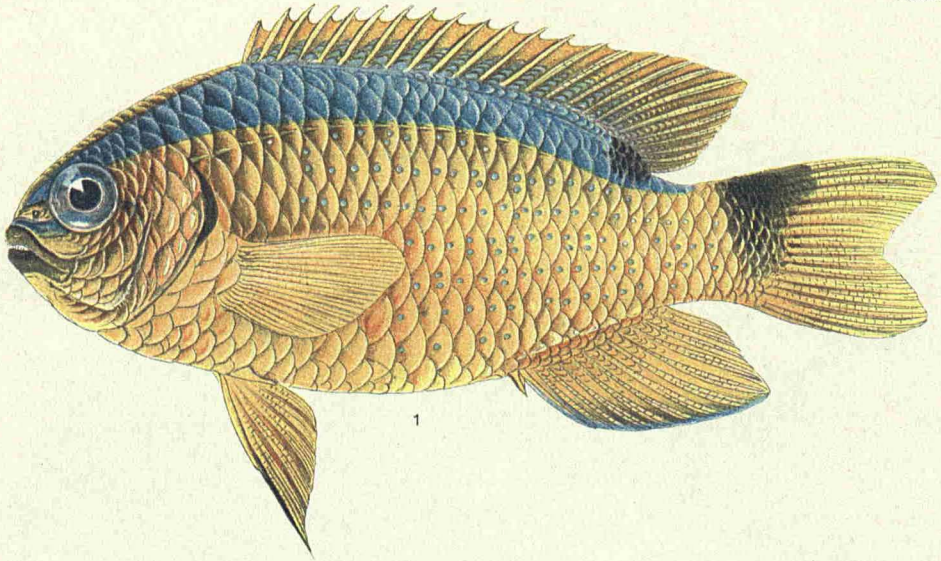
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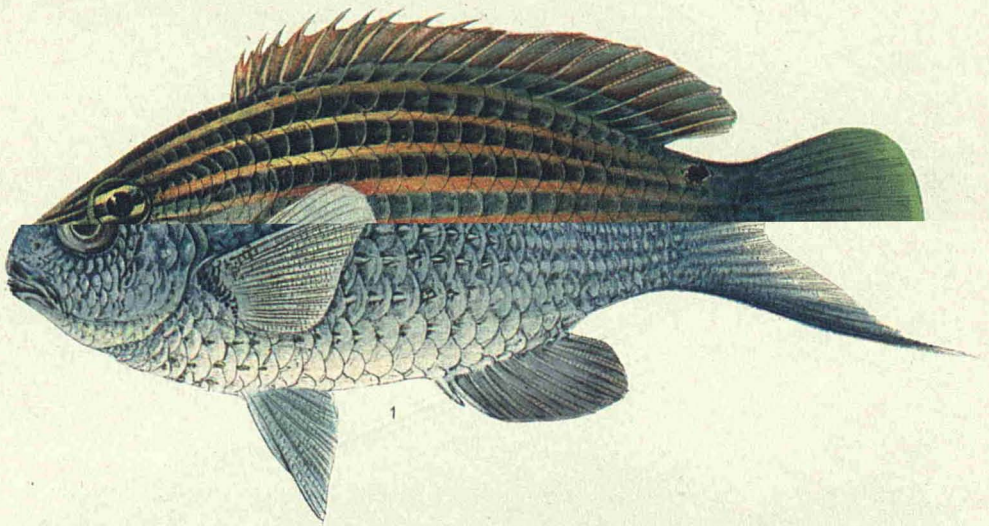
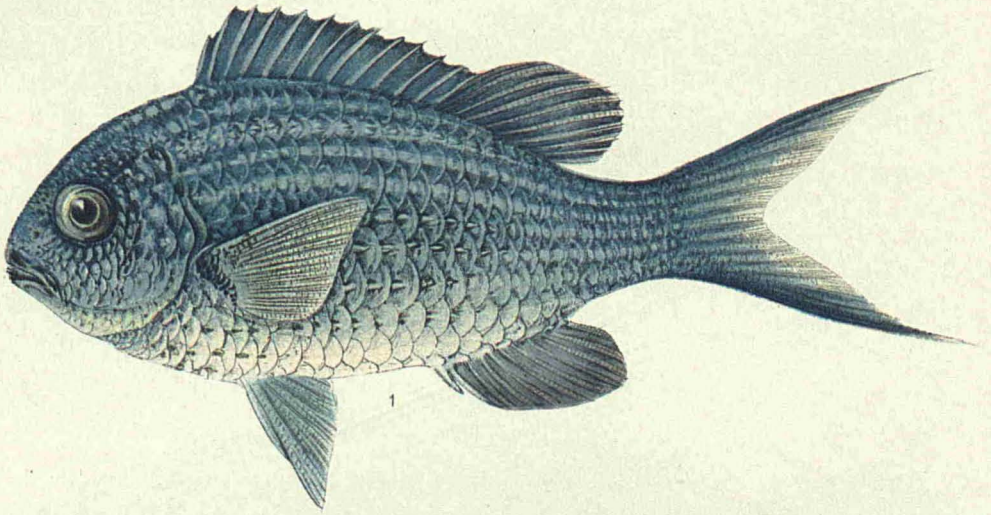
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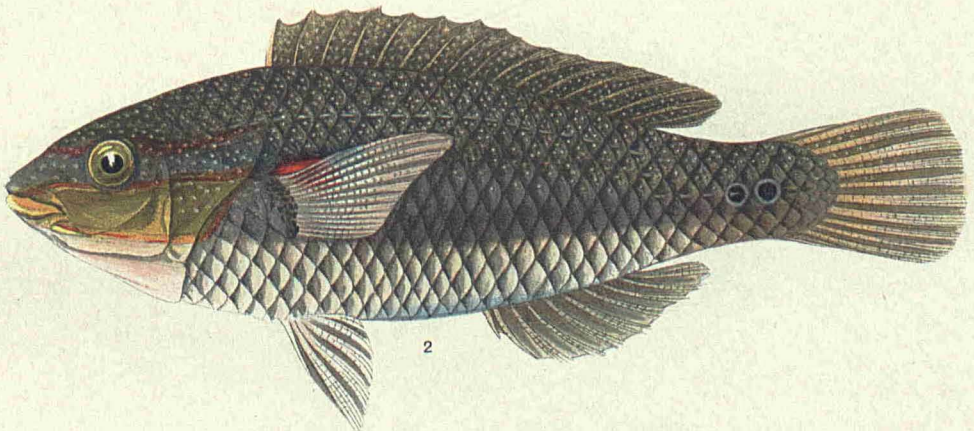
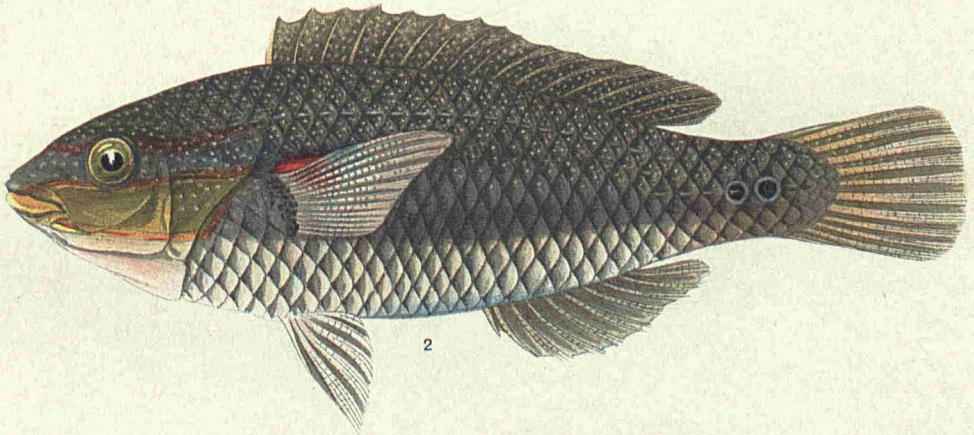
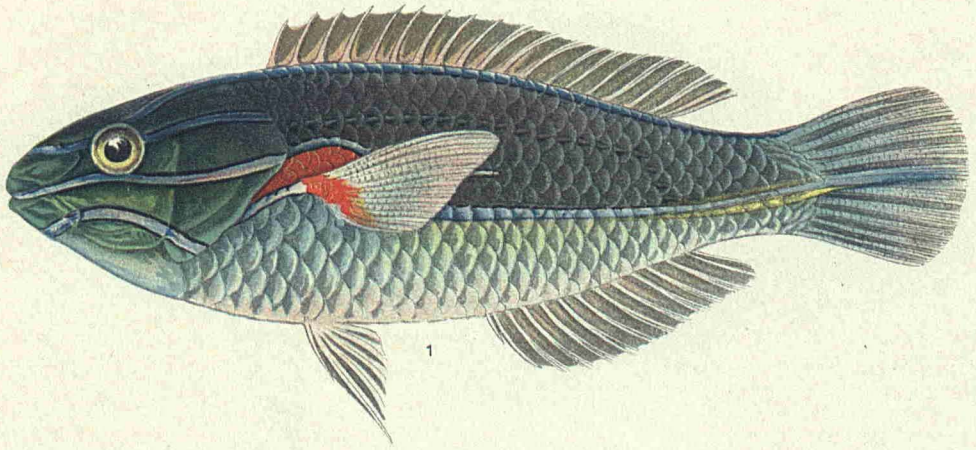


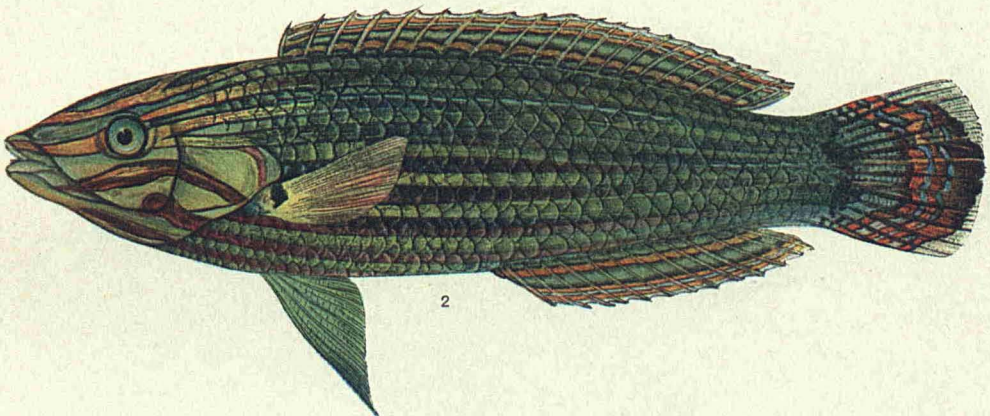
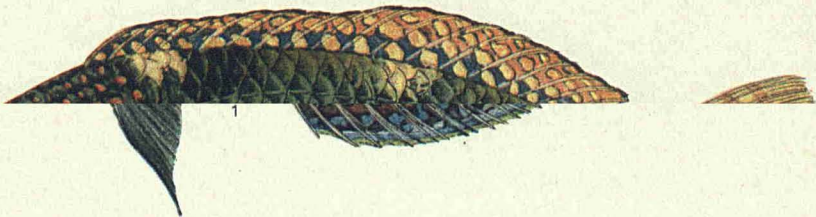
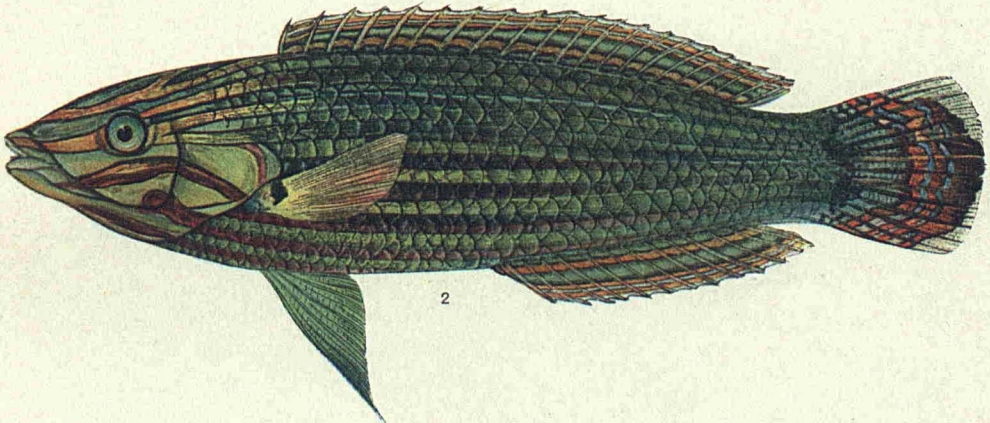
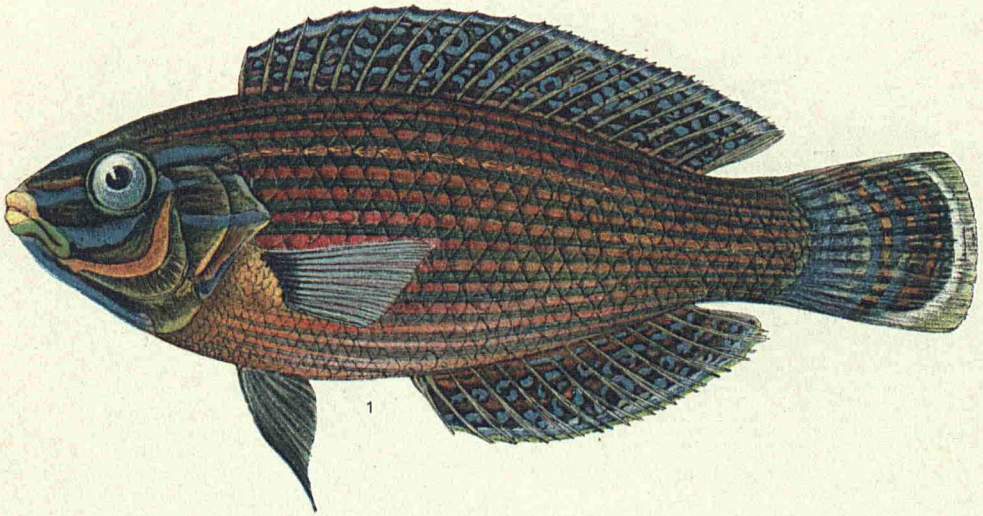


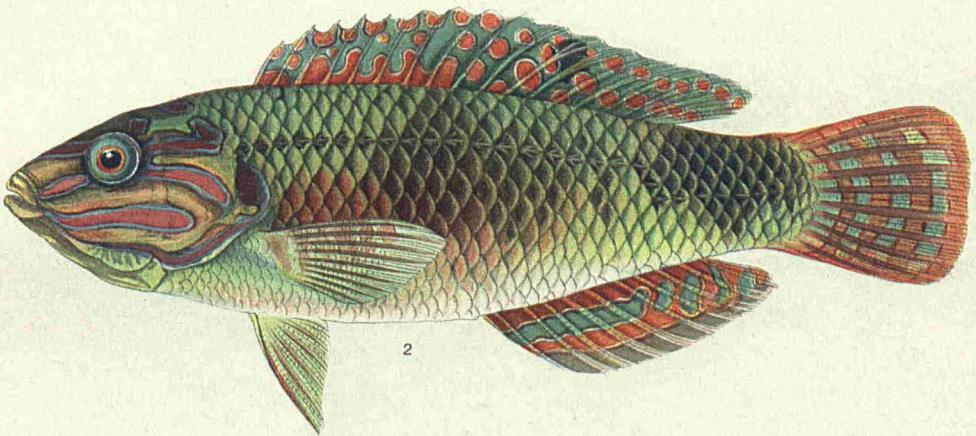
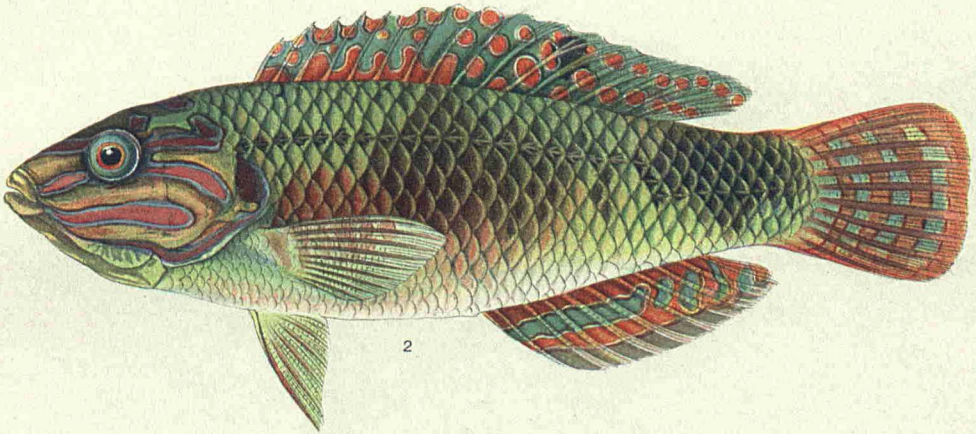
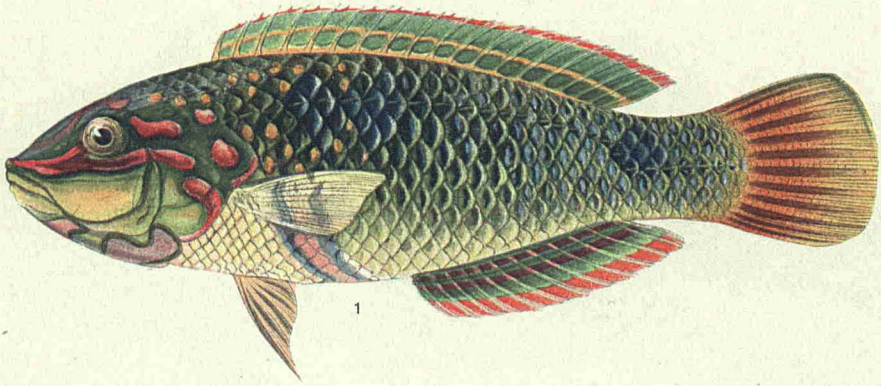


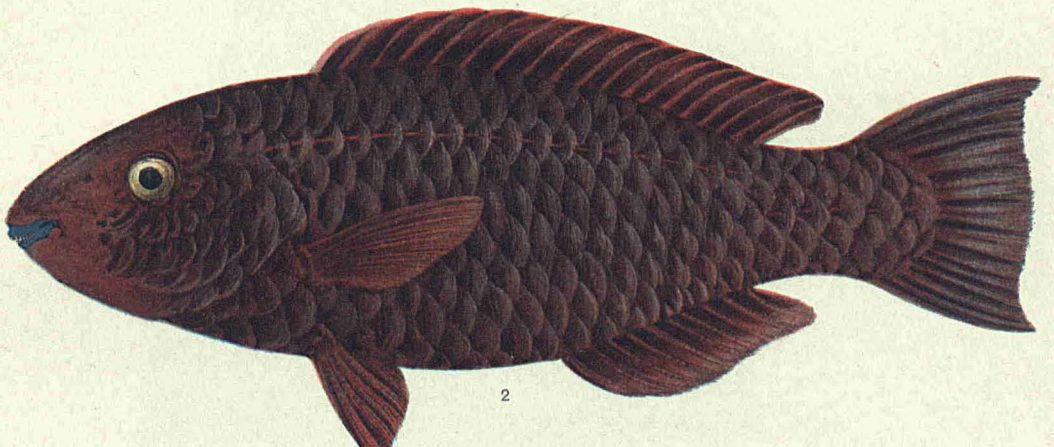
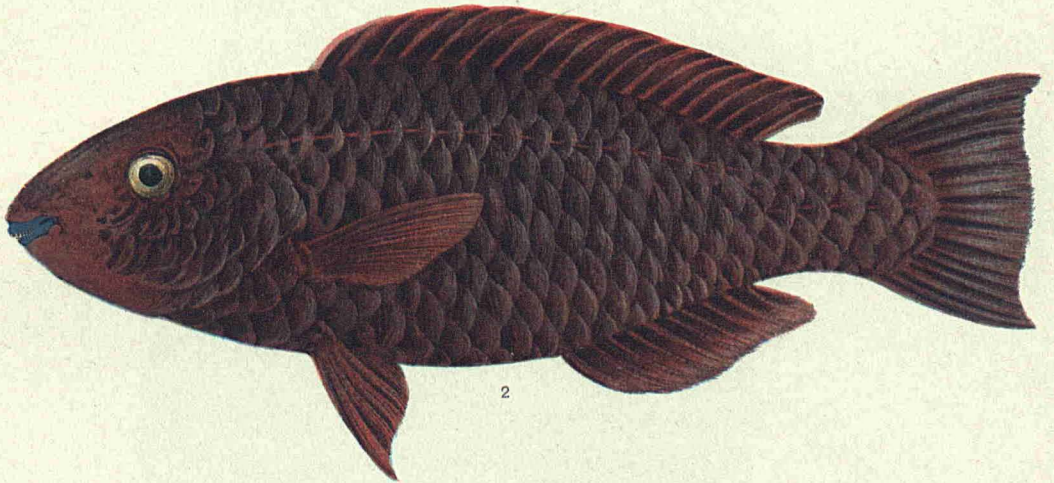
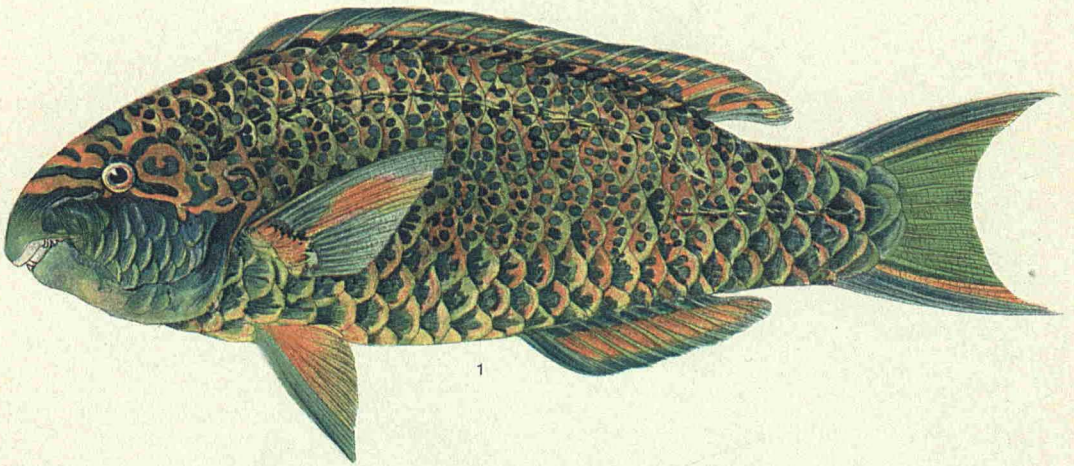


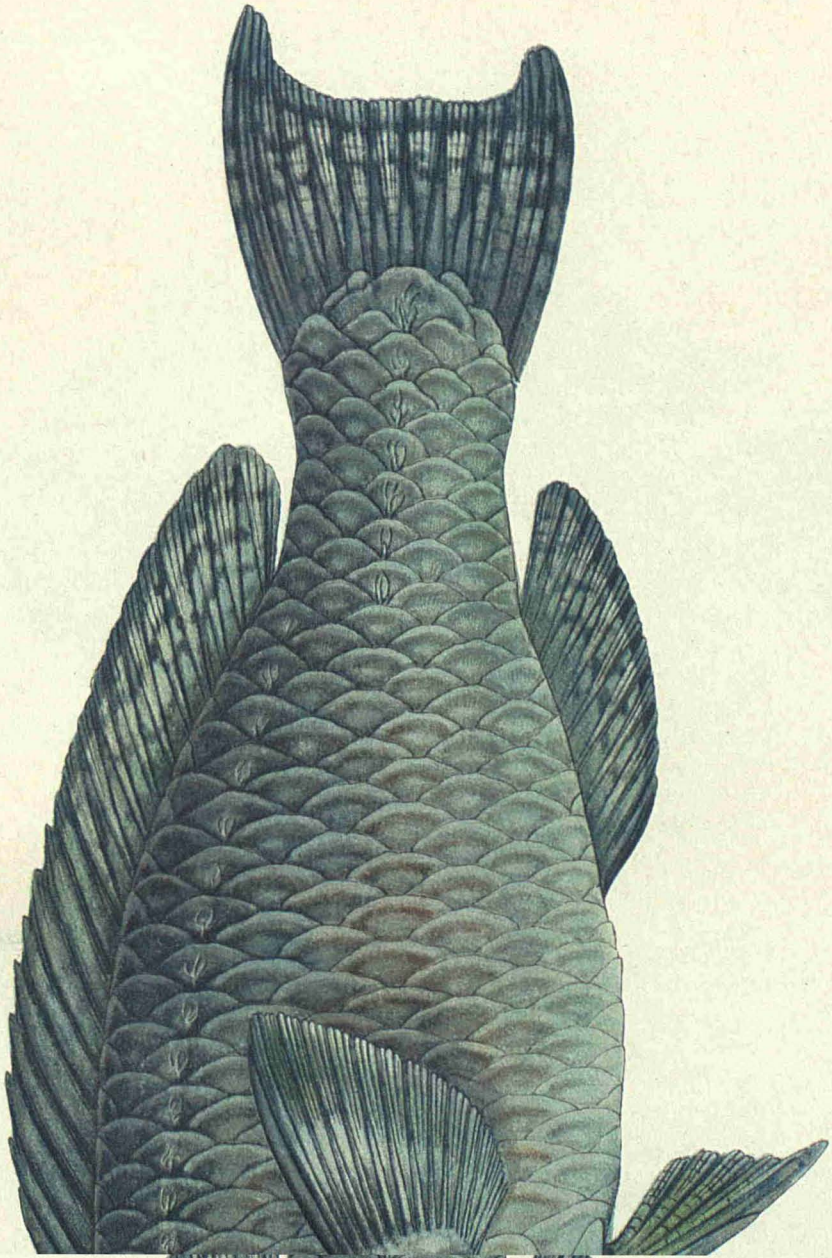




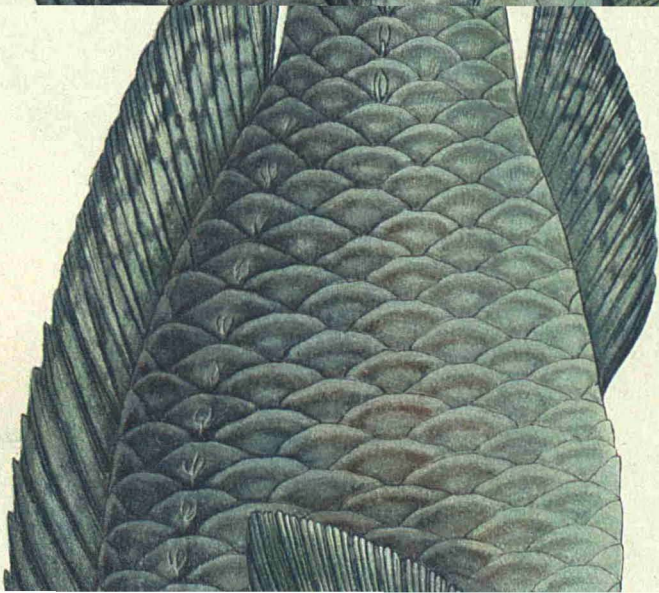




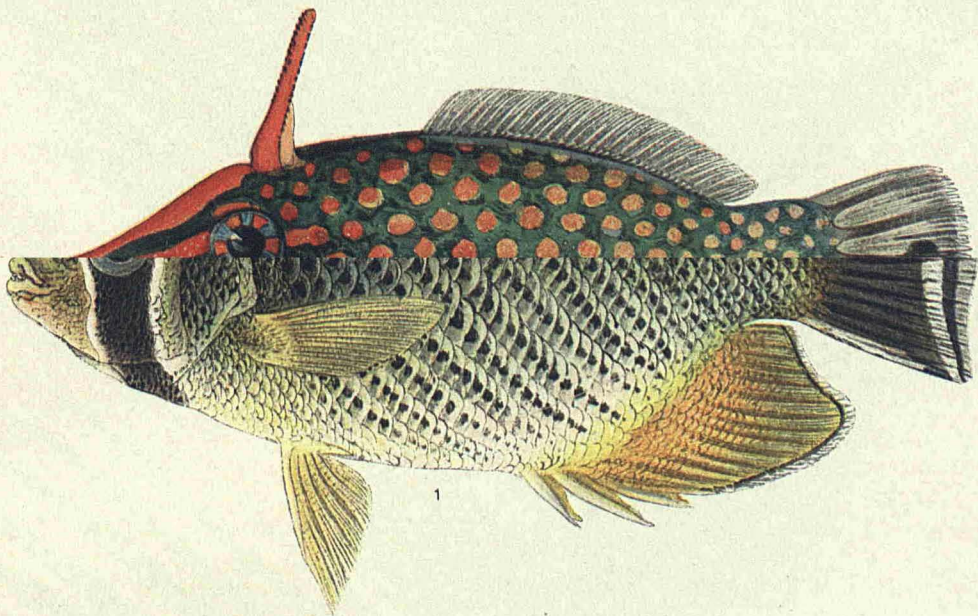
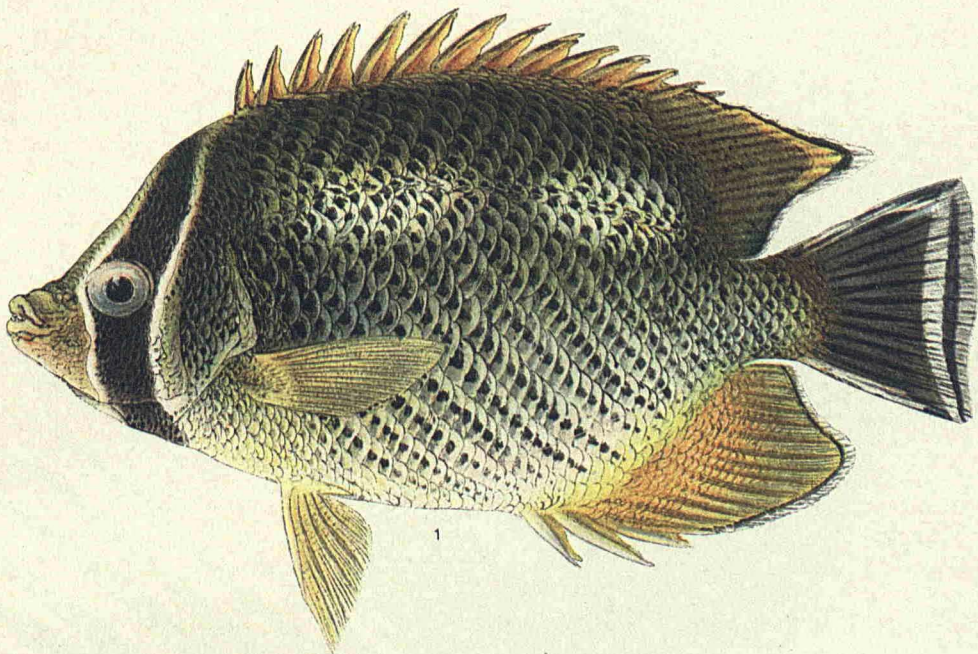


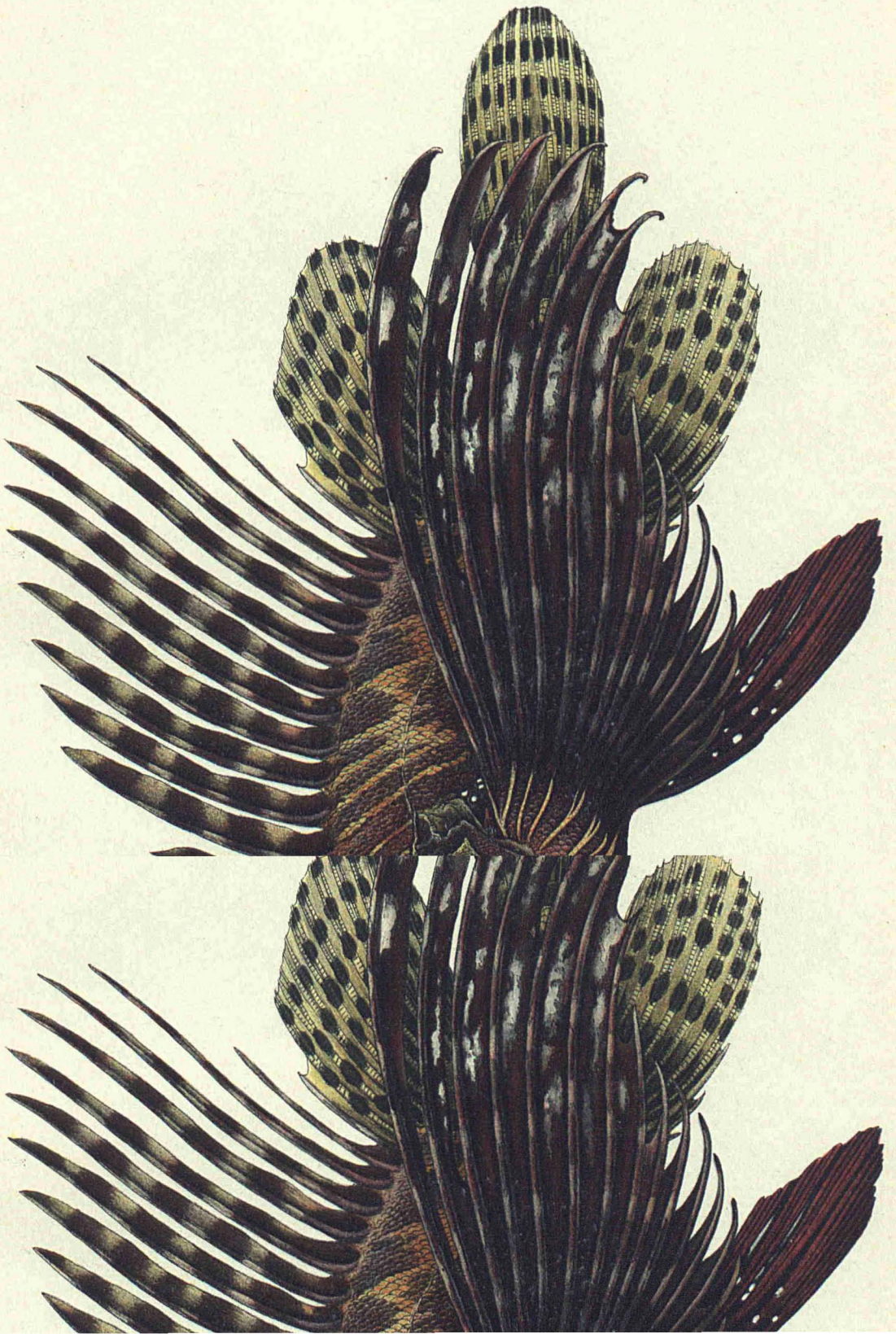


CALLYODON LATAJ JORDAN & SEALE. TYPE



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PTEROIS VOLITANS (LINNÆUS)

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