



THE UNIVERSITY  
OF ILLINOIS

LIBRARY

590.5

FI

v.21

BIOLOGY

NATURAL  
HISTORY

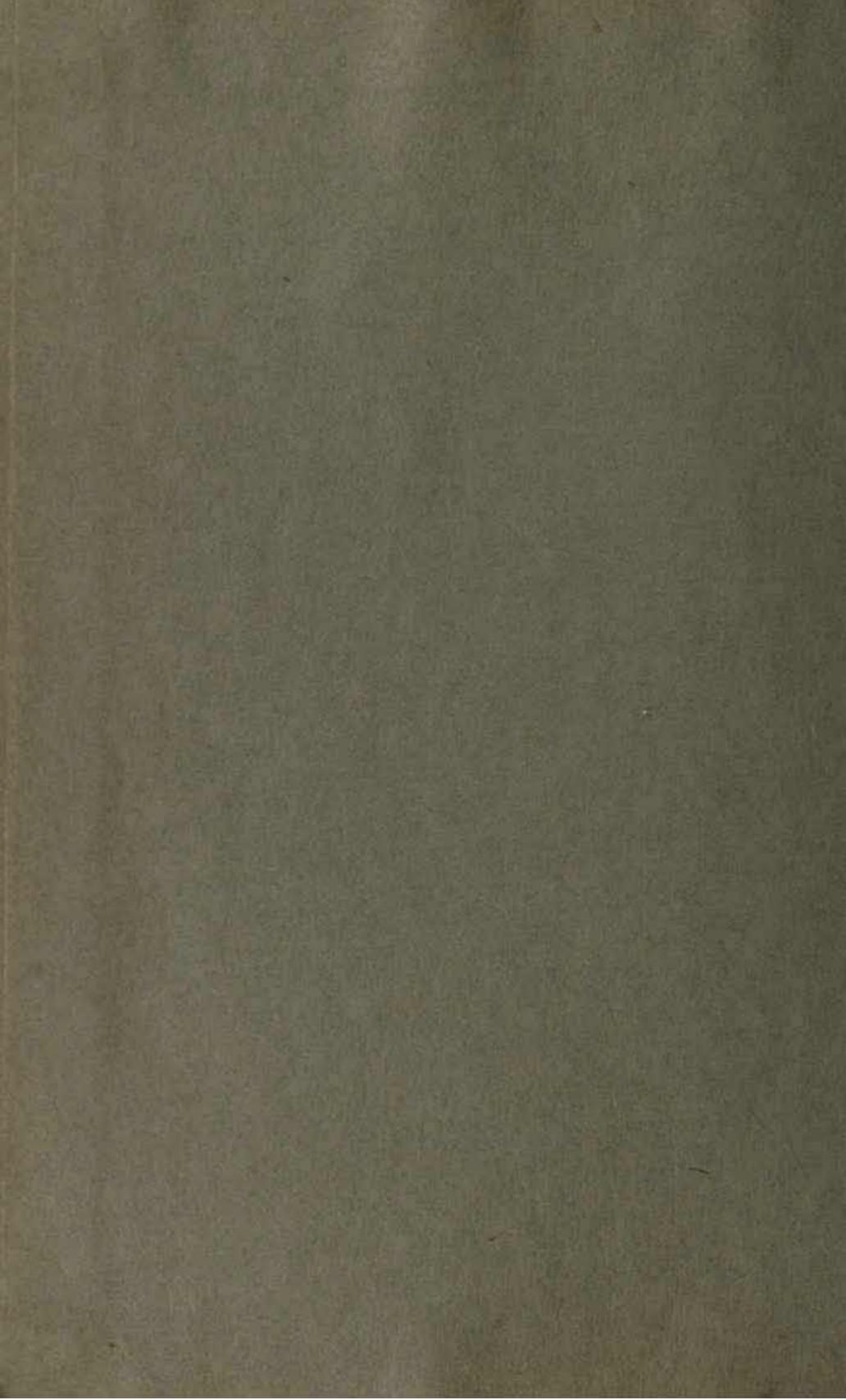
SEP 28 1939

Return this book on or before the  
*Latest Date* stamped below. A  
charge is made on all overdue  
books.

U. of I. Library

DEC 25 1940

17625-S



ZOOLOGICAL SERIES

---

FIELD MUSEUM OF NATURAL HISTORY

FOUNDED BY MARSHALL FIELD, 1893

VOLUME XXI

---

FISHES OF  
THE CRANE PACIFIC EXPEDITION

BY

ALBERT W. HERRE

CURATOR OF ZOOLOGICAL MUSEUM, STANFORD UNIVERSITY

---

REPORTS ON RESULTS OF  
THE CRANE PACIFIC EXPEDITION

THE LIBRARY OF THE  
APR 30 1936  
UNIVERSITY OF ILLINOIS

WILFRED H. OSGOOD

CURATOR, DEPARTMENT OF ZOOLOGY  
EDITOR

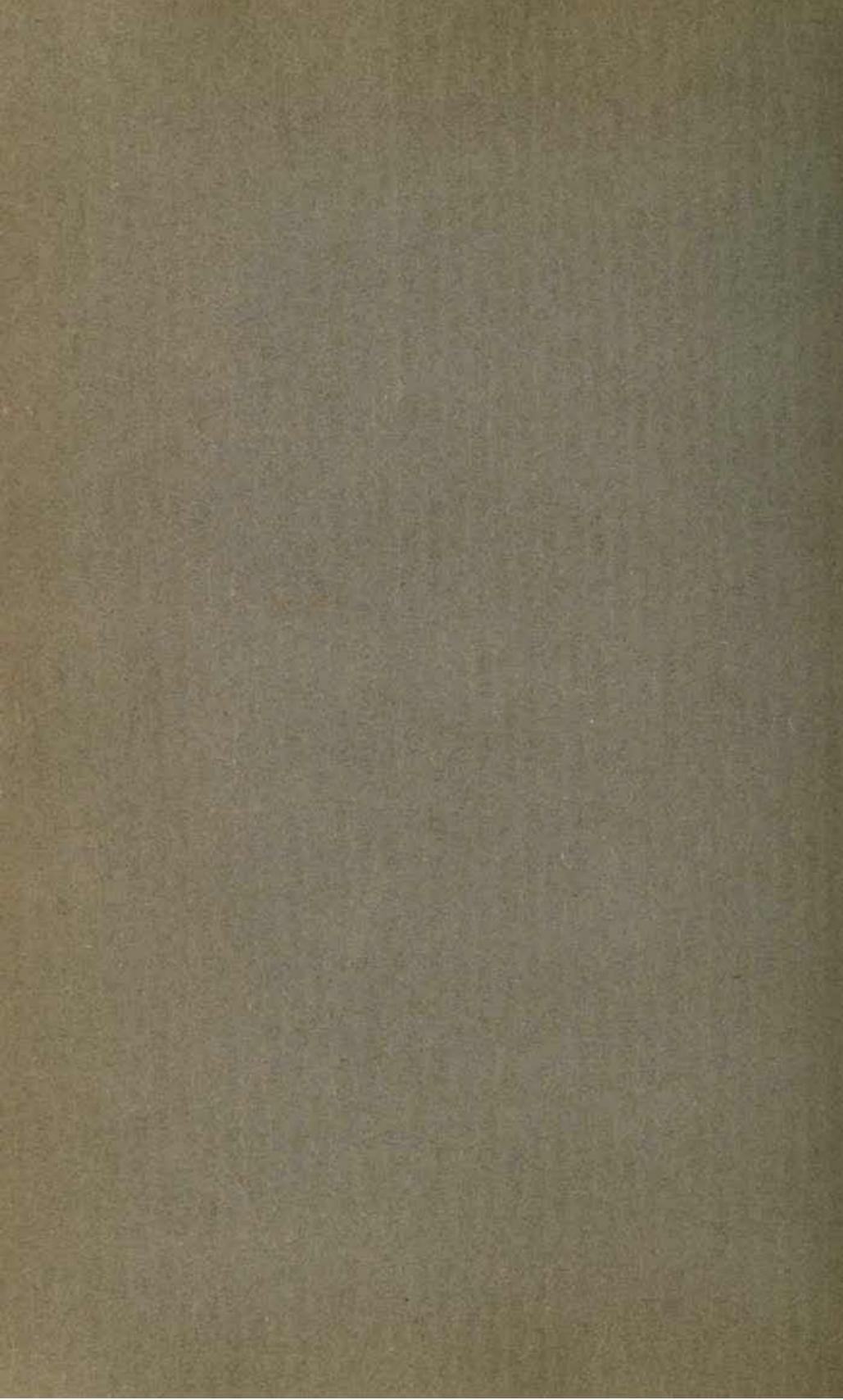
---

PUBLICATION 353



CHICAGO, U. S. A.

APRIL 15, 1936







ZOOLOGICAL SERIES

---

FIELD MUSEUM OF NATURAL HISTORY

FOUNDED BY MARSHALL FIELD, 1893

VOLUME XXI

---

FISHES OF  
THE CRANE PACIFIC EXPEDITION

BY

ALBERT W. HERRE

CURATOR OF ZOOLOGICAL MUSEUM, STANFORD UNIVERSITY

---

REPORTS ON RESULTS OF  
THE CRANE PACIFIC EXPEDITION

---

WILFRED H. OSGOOD,

CURATOR, DEPARTMENT OF ZOOLOGY

EDITOR

---

PUBLICATION 353



CHICAGO, U. S. A.

APRIL 15, 1936

THE LIBRARY OF THE  
APR 30 1936  
UNIVERSITY OF ILLINOIS

PRINTED IN THE UNITED STATES OF AMERICA  
BY FIELD MUSEUM PRESS

550.2  
FI  
V. 21

N.H.L.

### CONTENTS

	PAGE
List of Illustrations . . . . .	5
Introduction . . . . .	7
New Fishes . . . . .	11
List of Species by Localities . . . . .	12
Fishes Collected from Cocos Island to the Solomon Islands, Inclusive . . . . .	22
Fishes from the Sepik River, New Guinea . . . . .	433
Index . . . . .	461



## LIST OF ILLUSTRATIONS

	PAGE
FIG. 1. <i>Cypselurus alienus</i> Herre . . . . .	13
FIG. 2. <i>Myripristis undecimalis</i> Herre . . . . .	75
FIG. 3. <i>Myripristis mooreanus</i> Herre . . . . .	79
FIG. 4. <i>Micrognathus suvensis</i> Herre . . . . .	87
FIG. 5. <i>Atherina ovalaua</i> Herre . . . . .	91
FIG. 6. <i>Mionorus pacificus</i> Herre . . . . .	135
FIG. 7. <i>Kuhlia bilunulata</i> Herre . . . . .	146
FIG. 8. <i>Nesiotes purpurascens</i> De Vis . . . . .	166
FIG. 9. <i>Pempheris dispar</i> Herre . . . . .	170
FIG. 10. <i>Gnathodentex oculo-maculatus</i> Herre . . . . .	201
FIG. 11. <i>Parupeneus bilineatus</i> (Cuvier and Valenciennes) . . . . .	213
FIG. 12. <i>Sebastapistes badio-rufus</i> Herre . . . . .	263
FIG. 13. <i>Pomacentrus cranei</i> Herre . . . . .	289
FIG. 14. <i>Halichoeres fijiensis</i> Herre . . . . .	313
FIG. 15. <i>Thalassoma cranei</i> Herre . . . . .	320
FIG. 16. <i>Ptereleotris (Encaeura) evides</i> (Jordan and Hubbs) . . . . .	341
FIG. 17. <i>Alepideleotris tigris</i> Herre . . . . .	351
FIG. 18. <i>Macgregorella badia</i> Herre . . . . .	352
FIG. 19. <i>Macgregorella santa</i> Herre . . . . .	353
FIG. 20. <i>Gnatholepis corlettei</i> Herre . . . . .	356
FIG. 21. <i>Vaimosa balteata</i> Herre . . . . .	359
FIG. 22. <i>Vaimosa osgoodi</i> Herre . . . . .	360
FIG. 23. <i>Callogobius ocellatus</i> Herre . . . . .	362
FIG. 24. <i>Ctenogobius aterrimus</i> Herre . . . . .	364
FIG. 25. <i>Ctenogobius malekulae</i> Herre . . . . .	368
FIG. 26. <i>Cingulogobius naraharæ</i> (Snyder) . . . . .	372
FIG. 27. <i>Aparrius aurocingulus</i> Herre . . . . .	373
FIG. 28. <i>Amblygobius insignis</i> Seale . . . . .	376
FIG. 29. <i>Amblygobius myersi</i> Herre . . . . .	378
FIG. 30. <i>Cryptocentrus geniornatus</i> Herre . . . . .	380
FIG. 31. <i>Cryptocentrus leucostictus</i> (Günther) . . . . .	381
FIG. 32. <i>Atuona tricuspidata</i> Herre . . . . .	383
FIG. 33. <i>Papenua pugnans</i> (Grant) . . . . .	386
FIG. 34. Teeth of <i>Stiphodon elegans</i> (Steindachner) . . . . .	388
FIG. 35. <i>Callionymus cooki</i> Günther . . . . .	392
FIG. 36. <i>Gobiesox paradiseus</i> Herre . . . . .	393
FIG. 37. <i>Enneapterygius punctulatus</i> Herre . . . . .	398
FIG. 38. <i>Tagusa delicata</i> Herre . . . . .	399
FIG. 39. <i>Spinoblennius spiniger</i> Herre . . . . .	400
FIG. 40. <i>Petroscirtes kulambangrae</i> Herre . . . . .	401
FIG. 41. <i>Salarias walensis</i> Herre . . . . .	414
FIG. 42. <i>Arius leptaspis</i> (Bleeker) . . . . .	437
FIG. 43. <i>Arius solidus</i> Herre . . . . .	439
FIG. 44. <i>Hemipimelodus papillifer</i> Herre . . . . .	442
FIG. 45. <i>Zenarchopterus sepikensis</i> Herre . . . . .	443

FIG. 46. <i>Melanotaenia kabia</i> Herre . . . . .	444
FIG. 47. <i>Rhombosoma sepikensis</i> Herre. . . . .	446
FIG. 48. <i>Apogon abo</i> Herre . . . . .	448
FIG. 49. <i>Eleotris macrolepis</i> (Bleeker) . . . . .	452
FIG. 50. <i>Boroda malua</i> Herre . . . . .	455

# FISHES OF THE CRANE PACIFIC EXPEDITION

BY ALBERT W. HERRE

## INTRODUCTION

The Crane Pacific Expedition, financed and headed by Mr. Cornelius Crane, left Boston November 16, 1928, in the yacht *Illyria* for the South Sea Islands. The author, representing Stanford University, which was cooperating with Field Museum, accompanied the Expedition as ichthyologist.

The first important stop was made at Port-au-Prince, Haiti. Here, with the generous and enthusiastic aid of the late Dr. George F. Freeman, director of the Service Technique, and his staff, a series of fresh-water fishes was obtained. These will be reported upon later, pending a revision of West Indian Cyprinodontidae by Dr. George S. Myers, of the United States National Museum.

During the next stop, at Panama, thirteen species of fresh-water fishes were collected at Barro Colorado, the island biological reserve in Gatun Lake, Canal Zone. A number of other species were seen, some of considerable size, but they could not be obtained because facilities were lacking. Characins, cichlids, and poecilids are present in the lake in great numbers, some of the large cichlids being very beautiful. Their iridescent spots of changeable green and blue, which are so brilliant as they swim about, become dull and soon disappear when they are removed from the water.

The *Illyria* sailed from Panama December 30, headed for Cocos Island. This beautiful island has a rich fish fauna but our stop was too brief to secure a representative collection. Many kinds of fishes seen in great numbers could not be obtained in the few hours available.

At the Galapagos Islands collections were made at the following localities: Tagus Cove and Turtle Bay, Albemarle Island; Narborough Island; Academy Bay, Indefatigable Island; South Seymour Island; Eden Island; and Post Office Bay, Charles Island.

The fishes of the Galapagos Islands are remarkable for their number and variety. No region known to me offers more to the sportsman and scientific man alike than the waters surrounding this great group of lava-strewn, cactus-infested volcanic islands. The wealth of large game fishes and of sharks is astonishing.

The number of kinds, their size, and the number of individuals are all amazing. Three months in the Galapagos would give an energetic collector a wealth of new or little-known fishes.

Very brief stops were next made at Hiva Oa and Nuka Hiva, two islands of the Marquesas group. Enough was secured to show that any student of fishes would be richly repaid for a few months spent in collecting here. For example, I obtained at Nuka Hiva a tiny banded goby hitherto known only from the Riu Kiu Islands south of Japan, far away on the other side of the Pacific in the northern hemisphere.

A short stop was made at Takaroa, one of the Tuamotu Archipelago. Here was the largest display and greatest number of species of chaetodonts or butterfly fishes I have ever been fortunate enough to see together at any one time and place. They swarmed about the landing place like trout in a fish hatchery at feeding time, and fairly crowded one another out of the water in their eagerness to get scraps of food thrown to them. Unfortunately, none could be secured, as the firing machine for exploding dynamite would not work and our ship had put out to sea with all the fishing gear aboard.

A few hours were spent at Makatea, another of the Tuamotus. The fish fauna of this island is relatively poor, as Makatea rises from comparatively deep water with very little reef on which fishes may dwell.

A longer stop was made at Tahiti. Collections were made at Papeete, Maraa, in the Papenoo River, and at the neighboring island of Moorea. Very valuable assistance was given by his excellency Mons. Bouge, Governor of French Oceania; the American Consul, Mr. Lewis V. Boyle; Mr. and Mrs. Guild, Americans residing at Maraa, who placed their native boatmen at my disposal; and Mr. Charles B. Nordhoff, the well-known author.

A few hours at Bora Bora added to the collection and indicated the riches of its waters awaiting exploration.

Large additions were made at Fiji, collecting being done at Suva, capital of the archipelago, on Viti Levu Island; at Nukulau, a small island where the quarantine station is located; and at Ovalau Island. The reefs around Nukulau are one of the two best collecting grounds for coral reef tide pool fishes that I have ever been fortunate enough to observe.

From Suva the *Illyria* sailed to the New Hebrides, where important additions were obtained at the following places: Vila, Efaté Island; Bushman Bay, Malekula Island; Wala Island; Malo Island;

Hog Harbor and Turtle Bay, Espiritu Santo Island. Mr. Ewan Corlette, of Bushman Bay, and Mr. Robertson, of Hog Harbor, were both exceedingly helpful.

The Solomon Islands were next visited, stops being made at Ugi Island; Tulagi, the seat of government; Auki, Malaita Island; Tenibuli, Ysabel Island; Kulambangra Island; Hathorn Sound, New Georgia Island; and Shortland Island.

Captain Hill, the administrative official at Tenibuli, was of great assistance, giving the services of his native fisherman. This man was a highly competent naturalist who not only knew a vast variety of fishes but knew their habits and when and where each kind could be found. Three days with him were just an indication of what might be accomplished were one able to work with him for as many weeks.

The fish fauna of the New Hebrides and the Solomons are two of the least-known of the world. Their fishes have been but little collected, and any naturalist spending a season in either group would not only reap a rich harvest of new or insufficiently known species but would add very greatly to our knowledge of the geographic distribution of Indo-Pacific fishes.

Rabaul, on the island of New Britain and capital of former German New Guinea, was the next stop, but there was almost no opportunity to collect fishes while there. No stops were made along the vast unworked reefs on the north coast of this large and almost unexplored island; the *Illyria* sailed direct for New Guinea.

Some collecting at night was done at Madang and Sek on the north coast, after which we entered the Sepik River and sailed 405 miles up this great stream. The river was in flood, which precluded seining or working the sand bars and shore line. Very few fish were obtained but many of those secured were new. The fishes of the northern half of New Guinea are very imperfectly known. Two months on the Sepik during July and August, the time of lowest water, would unquestionably yield a rich harvest of new species.

A half day was spent in collecting at Manokwari, Dutch New Guinea, and two days and a half at Waigiu Island. Both of these are classic localities where the types of a number of species were obtained long ago, but no extended systematic collecting has ever been done at either place.

At Ternate, one of the Moluccas or Spice Islands, a region of island volcanos of extraordinary beauty and interest, a few speci-

mens were secured in the market and the night was spent in fishing by electric light.

Lembah Strait, Celebes, was the next anchorage and some reef and shore fishes were collected.

Part of an afternoon and three hours the next forenoon were spent on the coral reef at Taruna, Sangi Island, one of the Sangir group, a chain of lovely volcanic islets between Celebes and Mindanao.

Taruna harbor is an ancient volcanic crater with a narrow fringe of coral on one side, and is a place of charm and beauty. Here I saw the largest and most gorgeously colored coral reef fishes that I have encountered in nearly ten years of field study and observation in the tropical Pacific.

At Sandakan, British North Borneo, I left the *Illyria*. While awaiting a steamer for the Philippine Islands I spent two weeks collecting fish at the Sandakan market and at a fresh-water stream eight miles away. Mr. D. D. Wood, Conservator of Forests, was of very great service, and little could have been done without his generous assistance. At Jolo, capital of the Sulu Islands, further collections were made and field work for the Crane Expedition was completed.

A great deal of time was spent at every anchorage in fishing with a submarine electric light at night. By this means many rarities and other highly interesting species were secured that could not have been obtained otherwise. Whenever possible an attempt was made to secure fresh-water fishes, but our stops were too brief to allow trips away from the seacoast or to the interior of islands.

Reef fishes were obtained chiefly by the use of dynamite as time was too short to permit the use of other means. This method is open to the serious objection that certain abundant species are very rarely or never secured by it. Chloride of lime was used to poison tide pools and proved to be a very valuable means of obtaining pomacentrids, gobies, and small fishes in general. It is of little value in securing eels or other fishes that hide in the interstices of coral, or in getting the larger blennies and other active fishes that leave in a hurry when the water begins to get offensive to them. Neither is it of any value in really large pools, with their great wealth and variety of fish life.

No attempt has been made to give the complete synonymy of the fishes listed, but enough has been given to indicate their position.

In giving the length the caudal fin has not been included except where it is expressly stated.

Five hundred and eighty-five species of fish are listed as follows: Caicos Passage, West Indies, 1; Gatun Lake, Panama, 13; Pacific Ocean, 541; Sepik River, New Guinea, 30.

In the Pacific the number of species collected at each island or group of islands was as follows: Cocos, 24; Galapagos Islands, 65; Marquesas, 45; Tuamotu Islands, 40; Tahiti, 115; Moorea, 49; Bora Bora, 39; Fiji Islands, 153; New Hebrides, 140; Solomon Islands, 191.

### NEW FISHES

Many forms not previously described were collected. Because of unavoidable delay in publication of the general Report, these new fishes have been described elsewhere. They include:

One new family, Disparichthyidae.

Seven new genera: family Disparichthyidae, *Disparichthys*; family Eleotridae, *Alepideleotris*; family Gobiidae, *Atuona*, *Gladiogobius*, *Papenua*; family Blenniidae, *Spinoblennius*, *Tagusa*.

One new subgenus: family Ariidae, *Brustiarius*.

Fifty-one new species:

South coast of Cuba and from Caicos Passage, West Indies: family Exocoetidae: *Cypselurus alienus* (Fig. 1).

Galapagos Islands: family Apogonidae, *Mionorus pacificus*; family Eleotridae, *Alepideleotris tigris*; family Gobiesocidae, *Gobiesox paradiseus*; family Blenniidae, *Spinoblennius spiniger*, *Tagusa delicata*.

Marquesas Islands: family Gobiidae, *Atuona tricuspidata*.

Tuamotu Archipelago: family Holocentridae, *Myripristis undecimalis*; family Scorpaenidae, *Sebastapistes badio-rufus*.

Society Islands: family Holocentridae, *Myripristis mooreanus*; family Serranidae, *Anthias mooreanus*.

Fiji Islands: family Atherinidae, *Atherina ovalaua*; family Synbranchidae, *Micrognathus suvensis*; family Kuhliidae, *Kuhlia bilunulata*; family Labridae, *Halichoeres fijiensis*; family Gobiidae, *Aparrius aurocingulus*, *Callogobius ocellatus*, *Macgregorella badia*, *Vaimosa osgoodi*.

New Hebrides: family Muraenidae, *Gymnothorax efatensis*; family Gobiidae, *Gnatholepis corlettei*, *Macgregorella santa*, *Ctenogobius malekulae*; family Blenniidae, *Enneapterygius punctulatus*, *Salarias walensis*.

Solomon Islands: family Lethrinidae, *Gnathodentex oculomaculatus*; family Pempheridae, *Pempheris dispar*; family Pomacentridae, *Pomacentrus cranei*; family Labridae, *Thalassoma cranei*;

family Gobiidae, *Amblygobius myersi*, *Ctenogobius aterrimus*; family Blenniidae, *Petroscirtes kulambangrae*.

Sepik River, New Guinea: family Disparichthyidae, *Disparichthys fluviatilis*; family Ariidae, *Arius solidus*, *Arius kanganamanensis*, *Arius (Brustiarius) nox*, *Hemipimelodus papillifer*; family Hemirhamphidae, *Zenarchopterus sepikensis*; family Melanotaeniidae, *Melanotaenia kabia*, *Melanotaenia rosacea*, *Rhombosoma sepikensis*; family Apogonidae, *Apogon abo*; family Eleotridae, *Boroda malua*; family Gobiidae, *Glossogobius koragensis*.

Waigiu Island: family Syngnathidae, *Bombonia uxorius*; family Gobiidae, *Cryptocentrus geniornatus* (Fig. 30); *Ctenogobius waigiensis*, *Gladiogobius ensifer*, *Vaimosa balteata* (Fig. 21); family Callionymidae, *Callionymus wilburi*; family Blenniidae, *Enneapterygius waigiensis*.

## LIST OF SPECIES BY LOCALITIES

## WEST INDIES

*Cypselurus alienus* Herre

## GATUN LAKE, CANAL ZONE

<i>Aequidens caeruleopunctatus</i> (Kner and Steindachner)	<i>Gambusia nicaraguensis</i> Günther
<i>Agonostomus monticola</i> (Bancroft)	<i>Gobiomorus dormitor</i> (Lacépède)
<i>Astyanax ruberrimus</i> Eigenmann	<i>Mollienisia sphenops</i> (Cuvier and Valenciennes)
<i>Brachyrhaphis episcopi</i> (Steindachner)	<i>Piabucina panamensis</i> Gill
<i>Brycon striatulus</i> (Kner)	<i>Roeboides guatemalensis</i> (Günther)
<i>Cichlasoma maculicauda</i> Regan	<i>Thyrina chagresi</i> (Meek and Hildebrand)
<i>Compsura gorgonae</i> (Evermann and Goldsborough)	

## COCOS ISLAND

<i>Acanthurus aliala</i> Lesson	<i>Kuhlia taeniura</i> (Cuvier and Valenciennes)
<i>Acanthurus triostegus</i> (Linnaeus)	<i>Lutianus jordani</i> (Gilbert)
<i>Apogon atradorsatus</i> Heller and Snodgrass	<i>Manta birostris</i> (Walbaum)
<i>Carcharinus cerdale</i> Gilbert	<i>Melichthys radula</i> (Solander)
<i>Carcharinus galapagensis</i> (Snodgrass and Heller)	<i>Myripristis murdjan</i> (Forskål)
<i>Carcharinus platyrhynchus</i> (Gilbert)	<i>Myripristis occidentalis</i> Gill
<i>Chaetodon nigrirostris</i> (Gill)	<i>Paranthias furcifer</i> (Cuvier and Valenciennes)
<i>Coryphaena hippurus</i> Linnaeus	<i>Pomacentrus arcifrons</i> Heller and Snodgrass
<i>Dactyloscopus pectoralis</i> Gill	<i>Priacanthus cruentatus</i> (Lacépède)
<i>Echeneis remora</i> Linnaeus	<i>Rupiscartes atlanticus</i> (Cuvier and Valenciennes)
<i>Epinephelus labriformis</i> (Jenyns)	<i>Triaenodon obesus</i> (Rüppell)
<i>Eroplites viridis</i> (Valenciennes)	
<i>Gymnothorax pictus</i> (Ahl)	
<i>Holocentrus suborbitalis</i> Gill	

## GALAPAGOS ISLANDS

<i>Abudefduf saxatilis</i> (Linnaeus)	<i>Apogon atradorsatus</i> Heller and Snodgrass
<i>Alepidoleotris tigris</i> Herre	<i>Bathygobius fuscus</i> (Rüppell)
<i>Antistremus surinamensis</i> (Bloch)	<i>Bodianus eclancheri</i> (Valenciennes)
<i>Arbacia truncata</i> Heller and Snodgrass	

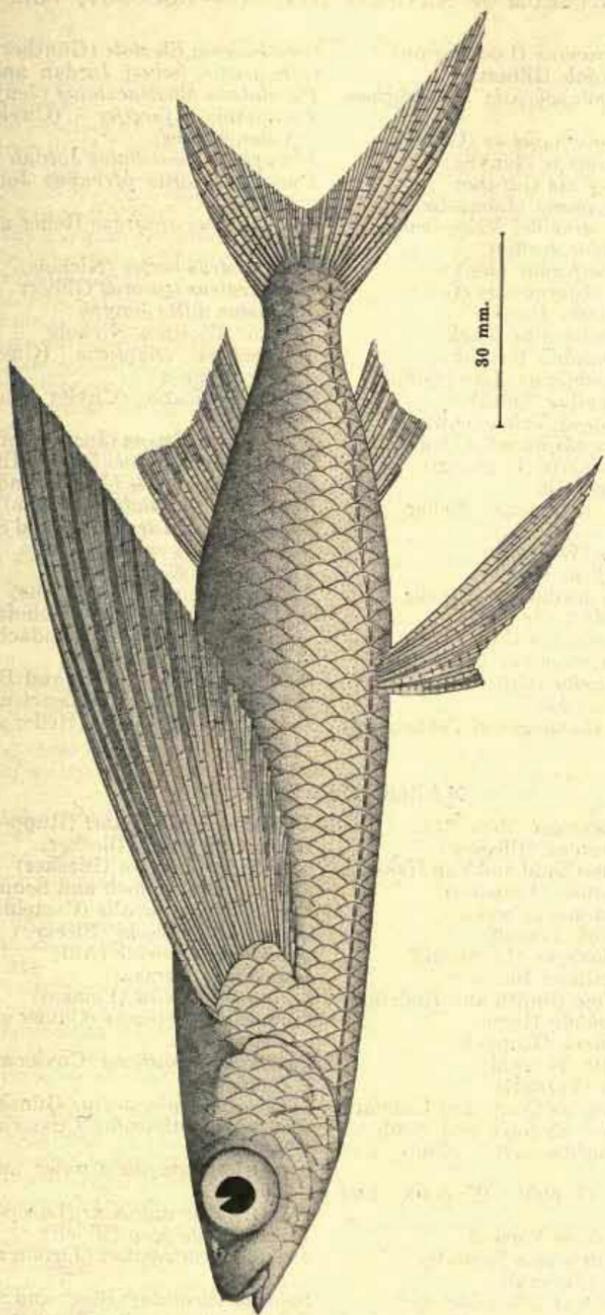


FIG. 1. *Cypselurus alienus* Herre, West Indies.

- Calamus brachysomus* (Lockington)  
*Carcharinus cerdale* Gilbert  
*Carcharinus galapagensis* (Snodgrass and Heller)  
*Carcharinus platyrhynchus* (Gilbert)  
*Caulolatilus princeps* (Jenyns)  
*Chilomycterus affinis* Günther  
*Coryphaena hippurus* (Linnaeus)  
*Doydixodon freminvillei* Valenciennes  
*Emmion bristolae* Jordan  
*Epinephelus labriformis* (Jenyns)  
*Eucinostomus californiensis* (Gill)  
*Gobiesox paradiseus* Herre  
*Gymnothorax chilospilus* Bleeker  
*Gymnothorax funebris* Ranzani  
*Gymnothorax undulatus* (Lacépède)  
*Halichoeres dispilus* (Günther)  
*Holacanthus passer* Valenciennes  
*Hyporhamphus unifasciatus* (Ranzani)  
*Katsuwonus pelamis* (Linnaeus)  
*Labrisomus xanti* Gill  
*Malacocentrus zonogaster* Heller and Snodgrass  
*Manta birostris* (Walbaum)  
*Mionorus pacificus* Herre  
*Mugil thoburni* Jordan and Starks  
*Mycteroperca olfax* (Jenyns)  
*Nematistius pectoralis* Gill  
*Neohunnus macropterus* (Schlegel)  
*Nexilarius concolor* (Gill)  
*Ogilbia ventralis* (Gill)  
*Ophioblennius steindachneri* Jordan and Evermann  
*Opisthonema libertate* (Günther)  
*Orthopristis forbesi* Jordan and Starks  
*Paralabrax albomaculatus* (Jenyns)  
*Paranthias furcifer* (Cuvier and Valenciennes)  
*Platophrys constellatus* Jordan  
*Pneumatophorus peruanus* Jordan and Hubbs  
*Pomacentrus arcifrons* Heller and Snodgrass  
*Pomacentrus beebii* (Nichols)  
*Pomacentrus leucurus* Gilbert  
*Prionotus miles* Jenyns  
*Runula albolinea* Nichols  
*Rupiscartes atlanticus* (Cuvier and Valenciennes)  
*Sarda chiliensis* (Cuvier and Valenciennes)  
*Sardinella thrissina* (Jordan and Gilbert)  
*Scomberomorus maculatus* (Mitchill)  
*Scorpaenodes zyris* (Jordan and Gilbert)  
*Spheroides annulatus* (Jenyns)  
*Sphyræna idiasies* Heller and Snodgrass  
*Spinoblennius spiniger* Herre  
*Tagusa delicata* Herre  
*Thunnus thynnus* (Linnaeus)  
*Umbrina galapagorum* Steindachner  
*Xenichthys agassizii* Steindachner  
*Xenichthys xanti* Gill  
*Xenocys jessiae* Jordan and Bollman  
*Xesurus laticlavus* (Valenciennes)  
*Zonogobius rhizophora* (Heller and Snodgrass)

## MARQUESAS ISLANDS

- Abudefduf brownriggi* (Bennett)  
*Abudefduf leucozona* (Bleeker)  
*Abudefduf melas* (Kuhl and Van Hasselt)  
*Abudefduf saxatilis* (Linnaeus)  
*Abudefduf sordidus* (Forskål)  
*Acanthurus aliata* Lesson  
*Acanthurus triostegus* (Linnaeus)  
*Anguilla mauritiana* Bennett  
*Apogon angustata* (Smith and Radcliffe)  
*Atuona tricuspidata* Herre  
*Bathygobius fuscus* (Rüppell)  
*Caranx ignobilis* (Forskål)  
*Caranx sanson* (Forskål)  
*Caranx sexfasciatus* Quoy and Gaimard  
*Caranx stellatus* Eydoux and Souleyet  
*Carcharinus melanopterus* (Quoy and Gaimard)  
*Chaenomugil chaptali* (Eydoux and Souleyet)  
*Chaetodon fasciatus* Forskål  
*Chaetodon ornatissimus* Solander  
*Chanos chanos* (Forskål)  
*Chlamydes cotticeps* (Steindachner)  
*Chonophorus genivittatus* (Cuvier and Valenciennes)  
*Cingulogobius naraharæ* (Snyder)  
*Coelomotus argulus* (Peters)  
*Dascyllus trimaculatus* (Rüppell)  
*Decapterus lajang* Bleeker  
*Echidna amblyodon* (Bleeker)  
*Eleotris fusca* (Bloch and Schneider)  
*Epinephelus australis* (Castelnau)  
*Gymnothorax boschi* (Bleeker)  
*Gymnothorax pictus* (Ahl)  
*Liza sehelii* (Forskål)  
*Lutianus kasmira* (Forskål)  
*Lutianus marginatus* (Cuvier and Valenciennes)  
*Lutianus monostigma* (Cuvier and Valenciennes)  
*Myripristis intermedius* Günther  
*Parupeneus bilineatus* (Cuvier and Valenciennes)  
*Polynemus sexfiliis* Cuvier and Valenciennes  
*Pomacentrus nigricans* (Lacépède)  
*Pomacentrus paro* (Bloch)  
*Pristiapogon snyderi* (Jordan and Evermann)  
*Salarias edentulus* (Bloch and Schneider)  
*Salarias marmoratus* (Bennett)  
*Stiphodon elegans* (Steindachner)  
*Trachurops macrophthalmus* (Rüppell)  
*Upeneus vittatus* (Forskål)

## TUAMOTU ISLANDS

<i>Abudefduf teucopomus</i> (Cuvier and Valenciennes)	<i>Gymnothorax pictus</i> (Ahl)
<i>Abudefduf sordidus</i> (Forskål)	<i>Heniochus monoceros</i> Cuvier and Valenciennes
<i>Acanthurus aliala</i> Lesson	<i>Holocentrus diadema</i> Lacépède
<i>Acanthurus elongatus</i> (Lacépède)	<i>Holocentrus microstomus</i> Günther
<i>Acanthurus triostegus</i> (Linnaeus)	<i>Liza borneensis</i> (Bleeker)
<i>Amanses scopas</i> (Cuvier)	<i>Lutianus marginatus</i> (Cuvier and Valenciennes)
<i>Aulostomus valentini</i> (Bleeker)	<i>Lutianus monostigma</i> (Cuvier and Valenciennes)
<i>Balistapus aculeatus</i> (Linnaeus)	<i>Myripristis murdjan</i> (Forskål)
<i>Balistes vidua</i> Solander	<i>Myripristis undecimalis</i> Herre
<i>Bathygobius fuscus</i> (Rüppell)	<i>Naso brevirostris</i> (Cuvier and Valenciennes)
<i>Blennius tonganus</i> Jordan and Seale	<i>Ostracion cornutus</i> Linnaeus
<i>Cantherines pardalis</i> (Rüppell)	<i>Ostracion tuberculatus</i> Linnaeus
<i>Caracanthus maculatus</i> (Gray)	<i>Paragobiodon echinocephalus</i> (Rüppell)
<i>Cephalopholis argus</i> Bloch and Schneider	<i>Platophrys mancus</i> (Broussonet)
<i>Chaeton ulietensis</i> Cuvier and Valenciennes	<i>Pomacentrus nigricans</i> (Lacépède)
<i>Choerodon ulietensis</i> Cuvier and Valenciennes	<i>Pomacentrus pavo</i> (Bloch)
<i>Ctenochaetus striatus</i> (Quoy and Gaimard)	<i>Priacanthus hamrur</i> (Forskål)
<i>Dascyllus trimaculatus</i> (Rüppell)	<i>Pseudocheilinus hexataenia</i> (Bleeker)
<i>Epibulus insidiator</i> (Pallas)	<i>Salaria edentulus</i> (Bloch and Schneider)
<i>Eviota afelei</i> Jordan and Seale	<i>Sebastapistes badio-rufus</i> Herre
<i>Forcipiger longirostris</i> (Broussonet)	<i>Zanclus cornutus</i> (Linnaeus)

## SOCIETY ISLANDS

<i>Abudefduf brownriggi</i> (Bennett)	<i>Caranx melampygus</i> Cuvier and Valenciennes
<i>Abudefduf coelestinus</i> (Cuvier and Valenciennes)	<i>Caranx sanson</i> (Forskål)
<i>Abudefduf dicki</i> (Liénard)	<i>Caranx sexfasciatus</i> Quoy and Gaimard
<i>Abudefduf uniozellatus</i> (Quoy and Gaimard)	<i>Caranx stellatus</i> Eydoux and Souleyet
<i>Acanthurus aliala</i> Lesson	<i>Carapax homei</i> (Richardson)
<i>Acanthurus gahn</i> (Forskål)	<i>Carapax parvipinnis</i> (Kaup)
<i>Acanthurus lineatus</i> (Linnaeus)	<i>Cephalopholis argus</i> Bloch and Schneider
<i>Acanthurus matoides</i> Cuvier and Valenciennes	<i>Cephalopholis mintiatus</i> (Forskål)
<i>Acanthurus triostegus</i> (Linnaeus)	<i>Chaenomugil chaptali</i> (Eydoux and Souleyet)
<i>Achirophichthys kampeni</i> (Weber and Beaufort)	<i>Chaetodon auriga</i> Forskål
<i>Aetobatus narinari</i> (Euphrasen)	<i>Chaetodon citrinellus</i> Broussonet
<i>Anguilla mauritiana</i> Bennett	<i>Chaetodon fasciatus</i> Forskål
<i>Anthias mooreanus</i> Herre	<i>Chaetodon strigangulus</i> Solander
<i>Apogon apogonides</i> (Bleeker)	<i>Chaetodon trifasciatus</i> Mungo Park
<i>Apogon arobianensis</i> Hombron and Jacquinet	<i>Chaetodon ulietensis</i> Cuvier and Valenciennes
<i>Apogon bandanensis</i> Bleeker	<i>Chaetodon unimaculatus</i> Bloch
<i>Apogon exostigma</i> (Jordan and Seale)	<i>Chaetodon vagabundus</i> Linnaeus
<i>Apogon frenatus</i> Valenciennes	<i>Cheilinus chlorourus</i> (Bloch)
<i>Apogonichthys perdit</i> Bleeker	<i>Cheilinus trilobatus</i> Lacépède
<i>Asterropteryx semipunctatus</i> Rüppell	<i>Cheilodipterus macrodon</i> (Lacépède)
<i>Aulostomus valentini</i> (Bleeker)	<i>Cheilodipterus quinquelineatus</i> Cuvier and Valenciennes
<i>Balistapus aculeatus</i> (Linnaeus)	<i>Chonophorus genivittatus</i> (Cuvier and Valenciennes)
<i>Balistapus undulatus</i> (Park)	<i>Chonophorus ocellaris</i> (Broussonet)
<i>Balistes bursa</i> Bloch and Schneider	<i>Chromis caeruleus</i> (Cuvier and Valenciennes)
<i>Balistes vidua</i> Solander	<i>Chromis dimidiatus</i> (Klunzinger)
<i>Canthigaster margaritatus</i> (Rüppell)	<i>Chromis dimidiatus iomelas</i> Jordan and Seale
<i>Canthigaster solandri</i> (Richardson)	
<i>Caranx ignobilis</i> (Forskål)	

- Coris aygula* Lacépède  
*Coris pulcherrima* Günther  
*Corythoichthys conspicillatus* (Jenyns)  
*Ctenochaetus striatus* (Quoy and Gaimard)  
*Ctenochaetus strigosus* (Bennett)  
*Cypselurus spilopterus* (Cuvier and Valenciennes)  
*Dascyllus aruanus* (Linnaeus)  
*Dascyllus trimaculatus* (Rüppell)  
*Decapterus sanctae-helenae* (Cuvier and Valenciennes)  
*Diodon hystrix* Linnaeus  
*Echidna nebulosa* (Ahl)  
*Eleotris fusca* (Bloch and Schneider)  
*Encheliophis vermicularis* J. Müller  
*Enchelyurus ater* (Günther)  
*Epibulus insidiator* (Pallas)  
*Epinephelus merra* Bloch  
*Epinephelus ongus* (Bloch)  
*Eriota afelei* Jordan and Seale  
*Eriota distigma* Jordan and Seale  
*Fistularia petimba* Lacépède  
*Forcipiger longirostris* (Broussonet)  
*Gymnothorax pictus* (Ahl)  
*Gymnothorax richardsoni* (Bleeker)  
*Halichoeres centiquadrus* (Lacépède)  
*Halichoeres daedalma* Jordan and Seale  
*Halichoeres trimaculatus* (Quoy and Gaimard)  
*Hentiochus permutatus* Bennett  
*Holacanthus flavissimus* Cuvier and Valenciennes  
*Holocentrus caudimaculatus* Rüppell  
*Holocentrus diadema* Lacépède  
*Holocentrus laevis* Günther  
*Holocentrus microstomus* Günther  
*Holocentrus opercularis* Cuvier and Valenciennes  
*Holocentrus rubellio* Seale  
*Holocentrus sammara* (Forskål)  
*Holocentrus spinifer* (Forskål)  
*Holocentrus tiereoides* Bleeker  
*Holotrachys lima* (Cuvier and Valenciennes)  
*Kuhlia marginata* (Cuvier and Valenciennes)  
*Kuhlia taeniura* (Cuvier and Valenciennes)  
*Kyphosus cinerascens* (Forskål)  
*Lethrinus miniatus* (Forster)  
*Lethrinus variegatus* Ehrenberg  
*Liza melinoptera* (Cuvier and Valenciennes)  
*Liza seheli* (Forskål)  
*Liza troscheli* (Bleeker)  
*Liza raiensis* (Quoy and Gaimard)
- Lutianus marginatus* (Cuvier and Valenciennes)  
*Lutianus monostigma* (Cuvier and Valenciennes)  
*Megalops cyprinoides* (Broussonet)  
*Microphis brachyurus* (Bleeker)  
*Monotaxis grandoculis* (Forskål)  
*Mugil engeli* Bleeker  
*Mulloidichthys auriflamma* (Forskål)  
*Mulloidichthys samoensis* (Günther)  
*Myripristis intermedius* Günther  
*Myripristis minterphthalms* Bleeker  
*Myripristis mooreanus* Herre  
*Myripristis murdjan* (Forskål)  
*Myripristis pralinius* Cuvier and Valenciennes  
*Ostracion cornutus* Linnaeus  
*Ostracion tuberculatus* Linnaeus  
*Papenua pugnans* (Grant)  
*Paragobiodon echinocephalus* (Rüppell)  
*Parupeneus barberinus* (Lacépède)  
*Parupeneus bifasciatus* (Lacépède)  
*Parupeneus moana* (Jordan and Seale)  
*Polynemus indicus* Shaw  
*Pomacentrus lirus* (Forster)  
*Pomacentrus nigricans* (Lacépède)  
*Pomacentrus pavo* (Bloch)  
*Priacanthus cruentatus* (Lacépède)  
*Pseudogramma polyacanthus* Bleeker  
*Pterois radiata* Cuvier and Valenciennes  
*Ruvettus pretiosus* Cocco  
*Scarus erythrodon* Cuvier and Valenciennes  
*Scarus globiceps* Cuvier and Valenciennes  
*Scarus troscheli* Bleeker  
*Scorpaenodes guamensis* (Quoy and Gaimard)  
*Scorpaenodes scabra* (Ramsay and Ogilby)  
*Sebastapistes bynoensis* (Richardson)  
*Stiphodon elegans* (Steindachner)  
*Stolephorus japonicus* (Houttuyn)  
*Teuthis striolata* Günther  
*Teuthis vermiculatus* (Cuvier and Valenciennes)  
*Thalassoma hardwicke* (Bennett)  
*Thalassoma lutescens* (Lay and Bennett)  
*Thalassoma umbrostygma* (Rüppell)  
*Trachurops macrophthalmus* (Rüppell)  
*Tylosurus melanotus* (Bleeker)  
*Uropterygius concolor* Rüppell  
*Zanclus canescens* (Linnaeus)  
*Zanclus cornutus* (Linnaeus)  
*Zebрасoma flavescens* (Bennett)  
*Zonogobius semidoliatus* (Cuvier and Valenciennes)

## FIJI ISLANDS

- Abudefduf brownriggi* (Bennett)  
*Abudefduf coelestinus* (Cuvier and Valenciennes)  
*Abudefduf curacao* (Bloch)  
*Abudefduf glaucus* (Cuvier and Valenciennes)

- Abudefduf leucozona* (Bleeker)  
*Abudefduf melas* (Kuhl and Van Hasselt)  
*Abudefduf saxatilis* (Linnaeus)  
*Abudefduf unio-cellatus* (Quoy and Gaimard)  
*Acanthurus triostegus* (Linnaeus)  
*Aetobatus narinari* (Euphrasen)  
*Ambassis vaiasensis* Jordan and Seale  
*Amblygobius phalaena* (Cuvier and Valenciennes)  
*Amphiprion frenatus* Brevoort  
*Aparrius aurocingulus* Herre  
*Aphthalmichthys abbreviatus* Bleeker  
*Aphthalmichthys javanicus* Kaup  
*Apogon bandanensis* Bleeker  
*Apogon exostigma* (Jordan and Seale)  
*Apogonichthys auritus* (Cuvier and Valenciennes)  
*Apogon novemfasciatus* Cuvier and Valenciennes  
*Asterropteryx semipunctatus* Rüppell  
*Atherina forskali* Rüppell  
*Atherina ovalua* Herre  
*Balistapus aculeatus* (Linnaeus)  
*Balistapus undulatus* (Park)  
*Balistes viridescens* Bloch and Schneider  
*Bathygobius fuscus* (Rüppell)  
*Bostrichthys sinensis* (Lacépède)  
*Bregmaceros atripinnis* (Tickell)  
*Bregmaceros mclellandi* Thompson  
*Caecula longipinne* (Kner and Steindachner)  
*Callionymus cooki* Günther  
*Callogobius ocellatus* Herre  
*Callogobius sclateri* (Steindachner)  
*Canthigaster bennetti* (Bleeker)  
*Canthigaster solandri* (Richardson)  
*Caranx melampygus* Cuvier and Valenciennes  
*Caranx sexfasciatus* Quoy and Gaimard  
*Chaetodon citrinellus* Broussonet  
*Chaetodon vagabundus* Linnaeus  
*Chirocentrus dorab* (Forskål)  
*Choeroichthys sculptus* (Günther)  
*Chonophorus genivittatus* (Cuvier and Valenciennes)  
*Chonophorus ocellaris* (Broussonet)  
*Corythoichthys fasciatus* (Gray)  
*Cryptocentrus leucostictus* (Günther)  
*Cryptocentrus voighti* (Bleeker)  
*Ctenogobius decoratus* (Herre)  
*Ctenogobius neophytus* (Günther)  
*Ctenogobius scapulopunctatus* (Beaufort)  
*Cymolutes lecluse* (Quoy and Gaimard)  
*Cypselurus rondeletii* (Cuvier and Valenciennes)  
*Echeneis naucrates* Linnaeus  
*Eleotris fusca* (Bloch and Schneider)  
*Eleotris melanosoma* Bleeker  
*Enchelyurus ater* (Günther)  
*Engraulis apiensis* (Jordan and Seale)
- Engraulis heterolobus* (Rüppell)  
*Engraulis zollingeri* Bleeker  
*Enneapterygius pardochir* Jordan and Seale  
*Epinephelus merra* Bloch  
*Eviota afelei* Jordan and Seale  
*Eviota distigma* Jordan and Seale  
*Eviota viridis* (Waite)  
*Ezocoetus volitans* Linnaeus  
*Gerres kapas* Bleeker  
*Gerres macracanthus* Bleeker  
*Gerres macrosoma* Bleeker  
*Glossogobius biocellatus* (Cuvier and Valenciennes)  
*Glossogobius celebius* (Cuvier and Valenciennes)  
*Gnatholepis deltoides* (Seale)  
*Gobius ornatus* Rüppell  
*Grammistes sexlineatus* (Thunberg)  
*Gymnothorax favagineus* Bloch and Schneider  
*Gymnothorax pictus* (Ahl)  
*Gymnothorax richardsoni* (Bleeker)  
*Gymnothorax undulatus* (Lacépède)  
*Halichoeres binotopsis* (Bleeker)  
*Halichoeres fijensis* Herre  
*Halichoeres hoeveni* (Bleeker)  
*Halichoeres kallochroma* (Bleeker)  
*Halichoeres opercularis* (Günther)  
*Halichoeres trimaculatus* (Quoy and Gaimard)  
*Harengula melanura* (Cuvier)  
*Hemiramphus dussumieri* Cuvier and Valenciennes  
*Hemiramphus far* (Forskål)  
*Hepsetia pinguis* (Lacépède)  
*Hypseleotris güntheri* (Bleeker)  
*Ichthyocampus kampeni* M. Weber  
*Kuhlia bilunulata* Herre  
*Kuhlia rupestris* (Lacépède)  
*Kyphosus waigiensis* (Quoy and Gaimard)  
*Leiognathus dussumieri* (Cuvier and Valenciennes)  
*Leiuranus semicinctus* (Lay and Bennett)  
*Lethrinus leutjanus* (Lacépède)  
*Liza melinoptera* (Cuvier and Valenciennes)  
*Liza oligolepis* (Bleeker)  
*Liza sehelii* (Forskål)  
*Liza troscheli* (Bleeker)  
*Liza waigiensis* (Quoy and Gaimard)  
*Lutianus argentimaculatus* (Forskål)  
*Lutianus fulviflamma* (Forskål)  
*Lutianus marginatus* (Cuvier and Valenciennes)  
*Lutianus monostigma* (Cuvier and Valenciennes)  
*Macgregorella badia* Herre  
*Megalops cyprinoides* (Broussonet)  
*Micrognathus brevirostris* (Rüppell)

- Micrognathus sutensis* Herre  
*Mugil dussumieri* Cuvier and Valenciennes  
*Mugil kandavensis* Günther  
*Muraenichthys macropterus* Bleeker  
*Myripristis murdjan* (Forskål)  
*Novaculichthys laeniourus* (Lacépède)  
*Ophiocara porocephala* (Cuvier and Valenciennes)  
*Paraperca cylindrica* (Bloch)  
*Periophthalmus barbarus* (Linnaeus)  
*Petrosciartes obliquus* Garman  
*Petrosciartes zestus* Jordan and Seale  
*Platiphrys pantherinus* (Rüppell)  
*Pomacentrus eclipcticus* Jordan and Seale  
*Pseudochidna brummeri* (Bleeker)  
*Pseudochromis tapeinosoma* Bleeker  
*Pseudogramma polyacanthus* Bleeker  
*Rastrelliger brachysoma* (Bleeker)  
*Salarias alboguttatus* Kner  
*Salarias caudolineatus* Günther  
*Salarias edentulus* (Bloch and Schneider)  
*Salarias fasciatus* (Bloch)  
*Salarias lineatus* Cuvier and Valenciennes  
*Salarias margaritatus* (Kendall and Radcliffe).  
*Salarias periophthalmus* Cuvier and Valenciennes  
*Scarus erythrodon* Cuvier and Valenciennes  
*Scorpaenodes scabra* (Ramsay and Ogilby)  
*Sebastapistes bynoensis* (Richardson)  
*Spheroides lagocephalus* (Linnaeus)  
*Sphyræna barracuda* (Walbaum)  
*Sphyræna jello* Cuvier and Valenciennes  
*Stephanolepis melanocephalus* (Bleeker)  
*Stephanolepis tomentosus* (Linnaeus)  
*Stelthojulis axillaris* (Quoy and Gaimard)  
*Stelthojulis strigiventer* (Bennett)  
*Stiphodon elegans* (Steindachner)  
*Stolephorus delicatulus* (Bennett)  
*Tetraodon immaculatus* Bloch and Schneider  
*Tetraodon reticularis* Bloch and Schneider  
*Teuthis striolata* Günther  
*Thalassoma hardwicke* (Bennett)  
*Therapon argenteus* (Cuvier and Valenciennes)  
*Therapon jarbua* (Forskål)  
*Trachurops macrophthalmus* (Rüppell)  
*Vaimosa osgoodi* Herre  
*Valenciænnea muralis* (Quoy and Gaimard)  
*Xiphias gladius* Linnaeus  
*Zenarchopterus dispar* (Cuvier and Valenciennes)  
*Zonogobius semidoliatus* (Cuvier and Valenciennes)

## NEW HEBRIDES

- Abudefduf brownriggi* (Bennett)  
*Abudefduf glaucus* (Cuvier and Valenciennes)  
*Abudefduf leucozona* (Bleeker)  
*Abudefduf saxatilis* (Linnaeus)  
*Abudefduf sordidus* (Forskål)  
*Abudefduf taupou* Jordan and Seale  
*Abudefduf uniozellatus* (Quoy and Gaimard)  
*Acanthochromis polyacanthus* (Bleeker)  
*Acanthurus elongatus* (Lacépède)  
*Acanthurus flavoguttatus* Kittlitz  
*Acanthurus gahn* (Forskål)  
*Acanthurus lineatus* (Linnaeus)  
*Acanthurus triostegus* (Linnaeus)  
*Aetobatus narinari* (Euphrasen)  
*Albula vulpes* (Linnaeus)  
*Aphthalmichthys javanicus* Kaup  
*Apogon bandanensis* Bleeker  
*Apogon frenatus* Valenciennes  
*Apogon novemfasciatus* Cuvier and Valenciennes  
*Apogon robusta* (Smith and Radcliffe)  
*Asterropteryx semipunctatus* Rüppell  
*Atherina endrachtensis* Quoy and Gaimard  
*Atherina forskali* Rüppell  
*Balistapus undulatus* (Park)  
*Bathygobius fuscus* (Rüppell)  
*Callogobius sclateri* (Steindachner)  
*Caranx ignobilis* (Forskål)  
*Caranx sexfasciatus* Quoy and Gaimard  
*Cephalopholis argus* Bloch and Schneider  
*Cephalopholis urodelus* (Bloch and Schneider)  
*Chaetodon fasciatus* Forskål  
*Chaetodon triangulum* Kuhl and Van Hasselt  
*Chaetodon trifasciatus* Mungo Park  
*Chaetodon unimaculatus* Bloch  
*Chanos chanos* (Forskål)  
*Cheilinus chlorourus* (Bloch)  
*Cheilinus diagrammus* (Lacépède)  
*Cheiloprion labiatum* (Day)  
*Choeroichthys sculptus* (Günther)  
*Chromis caeruleus* (Cuvier and Valenciennes)  
*Chromis dimidiatus* (Klunzinger)  
*Chromis ternatensis* (Bleeker)  
*Corythoichthys conspicillatus* (Jenyns)  
*Corythoichthys corrugatus* (Weber)  
*Ctenochaetus strigosus* (Bennett)  
*Ctenogobius baliuroides* (Bleeker)  
*Ctenogobius malekulae* Herre  
*Cypselurus altipennis* (Cuvier and Valenciennes)  
*Echidna nebulosa* (Ahl)  
*Enchelyurus ater* (Günther)

- Engraulis tri* Bleeker  
*Enneapterygius minutus* (Günther)  
*Enneapterygius punctulatus* Herre  
*Epibulus insidiator* (Pallas)  
*Epinephelus caeruleo-punctatus* (Bloch)  
*Epinephelus merra* Bloch  
*Eviota smaragdus* Jordan and Seale  
*Eviota viridis* (Waite)  
*Gerres filamentosus* Cuvier  
*Gnatholepis corlettei* Herre  
*Gnatholepis gemmeus* Herre  
*Gobiodon quinquestrigatus* (Cuvier and Valenciennes)  
*Gobiodon rivulatus* (Rüppell)  
*Gobius ornatus* Rüppell  
*Grammistes sexlineatus* (Thunberg)  
*Gymnothorax efatensis* Herre  
*Gymnothorax javagineus* Bloch and Schneider  
*Gymnothorax pictus* (Ahl)  
*Gymnothorax undulatus* (Lacépède)  
*Halichoeres miniatus* (Kuhl and Van Hasselt)  
*Halichoeres notopsis* (Kuhl and Van Hasselt)  
*Harengula melanura* (Cuvier)  
*Harengula moluccensis* Bleeker  
*Hemigymnus melapterus* (Bloch)  
*Heniochus permutatus* Bennett  
*Holacanthus nicobariensis* (Bloch and Schneider)  
*Holacanthus semicirculatus* Cuvier and Valenciennes  
*Holocentrus microstomus* Günther  
*Holocentrus ruber* (Forskål)  
*Holocentrus tiereroides* Bleeker  
*Kuhlia marginata* (Cuvier and Valenciennes)  
*Kuhlia rupestris* (Lacépède)  
*Leiognathus fasciatus* (Lacépède)  
*Lethrinus harak* (Forskål)  
*Liza troscheli* (Bleeker)  
*Lutianus fulviflamma* (Forskål)  
*Lutianus marginatus* (Cuvier and Valenciennes)  
*Lutianus monostigma* (Cuvier and Valenciennes)  
*Lutianus semicinctus* Quoy and Gaimard  
*Macgregorella santa* Herre  
*Megalaspis cordyla* (Linnaeus)  
*Megalops cyprinoides* (Broussonet)  
*Monodactylus argenteus* (Linnaeus)  
*Mugil longimanus* Günther  
*Mulloidichthys samoensis* (Günther)  
*Myripristis adustus* Bleeker  
*Myripristis murdjan* (Forskål)  
*Myripristis violaceus* Bleeker  
*Naso lituratus* (Forster)  
*Nesioles purpurascens* De Vis  
*Ophiocara porocephala* (Cuvier and Valenciennes)  
*Paragobiodon echinocephalus* (Rüppell)  
*Paraplagusia bilineata* (Bloch)  
*Parupeneus moana* (Jordan and Seale)  
*Periophthalmus barbarus* (Linnaeus)  
*Plesiops melas* Bleeker  
*Plesiops nigricans* (Rüppell)  
*Polynemus plebeius* Broussonet  
*Pomacentrus albofasciatus* Schlegel and Müller  
*Pomacentrus amboinensis* Bleeker  
*Pomacentrus littoralis* Kuhl and Van Hasselt  
*Pomacentrus lividus* (Forster)  
*Pomacentrus nigricans* (Lacépède)  
*Pomacentrus notophthalmus* Bleeker  
*Pomacentrus tropicus* Seale  
*Pomacentrus violascens* (Bleeker)  
*Priopis buruensis* (Bleeker)  
*Ptereleotris (Encaeura) erides* (Jordan and Hubbs)  
*Salarias belemnites* De Vis  
*Salarias caudolineatus* Günther  
*Salarias edentulus* (Bloch and Schneider)  
*Salarias guttatus* Cuvier and Valenciennes  
*Salarias periophthalmus* Cuvier and Valenciennes  
*Salarias saliens* (Forster)  
*Salarias walensis* Herre  
*Scarus erythrodon* Cuvier and Valenciennes  
*Scatophagus argus* (Linnaeus)  
*Scolopsis bilineatus* (Bloch)  
*Scomberoides loloo-parah* (Rüppell)  
*Scorpaenodes guamensis* (Quoy and Gaimard)  
*Scorpaenodes scabra* (Ramsay and Ogilby)  
*Stolephorus delicatulus* (Bennett)  
*Thalassoma hardwicke* (Bennett)  
*Therapon jarbua* (Forskål)  
*Trachinotus bailloni* (Lacépède)  
*Upeneus sulphureus* Cuvier and Valenciennes  
*Uropterygius concolor* Rüppell  
*Uropterygius marmoratus* (Lacépède)  
*Zanclus cornutus* (Linnaeus)  
*Zembrasoma flavescens* (Bennett)  
*Zonogobius semidoliatus* (Cuvier and Valenciennes)

## SOLOMON ISLANDS

- Abudefduf bankieri* (Richardson)  
*Abudefduf bengalensis* (Bloch)  
*Abudefduf coelestinus* (Cuvier and Valenciennes)

- Abudefduf curacao* (Bloch)  
*Abudefduf dücki* (Liénard)  
*Abudefduf lacrymatus* (Quoy and Gaimard)  
*Abudefduf melas* (Kuhl and Van Hasselt)  
*Abudefduf metallicus* Jordan and Seale  
*Abudefduf saxatilis* (Linnaeus)  
*Abudefduf unioellatus* (Quoy and Gaimard)  
*Acanthochromis polyacanthus* (Bleeker)  
*Acanthurus gahn* (Forskål)  
*Acanthurus lineatus* (Linnaeus)  
*Acanthurus matoides* Cuvier and Valenciennes  
*Aetobatus narinari* (Euphrasen)  
*Amanes scopas* (Cuvier)  
*Ambassis commersoni* Cuvier and Valenciennes  
*Ambassis miops* Günther  
*Amblygobius insignis* Seale  
*Amblygobius myersi* Herre  
*Apogon amboinensis* Bleeker  
*Apogon bandanensis* Bleeker  
*Apogon compressus* Smith and Radcliffe  
*Apogon exostigma* (Jordan and Seale)  
*Apogon frenatus* Valenciennes  
*Apogon hartfeldi* Bleeker  
*Apogon hyalosoma* Bleeker  
*Apogon leplacanthus* Bleeker  
*Apogon melas* Bleeker  
*Apogon multilineatus* Bleeker  
*Apogon novemfasciatus* Cuvier and Valenciennes  
*Apogon orbicularis* Kuhl and Van Hasselt  
*Apogon rhodopterus* Bleeker  
*Apogon sangiensis* Bleeker  
*Archamia zosterophora* (Bleeker)  
*Atherina forskali* Rüppell  
*Balistapus undulatus* (Park)  
*Balistes viridescens* Bloch and Schneider  
*Bathygobius fuscus* (Rüppell)  
*Butis amboinensis* (Bleeker)  
*Butis gymnopomus* (Bleeker)  
*Caesio caeruleaureus* Lacépède  
*Caesio chrysozona* Kuhl and Van Hasselt  
*Caesio erythrogaster* Kuhl and Van Hasselt  
*Caranx sexfasciatus* Quoy and Gaimard  
*Caranx stellatus* Eydoux and Souleyet  
*Cephalopholis cyanostigma* (Kuhl and Van Hasselt)  
*Cephalopholis kendalli* Evermann and Seale  
*Cephalopholis leopardus* (Lacépède)  
*Cephalopholis pachycentron* (Cuvier and Valenciennes)  
*Cephalopholis rogae* (Forskål)  
*Cephalopholis urodelus* (Bloch and Schneider)  
*Chaetodon bennetti* Cuvier and Valenciennes  
*Chaetodon fasciatus* Forskål  
*Chaetodon octofasciatus* Bloch  
*Chaetodon rafflesi* Bennett  
*Chaetodon triangulum* Kuhl and Van Hasselt  
*Chaetodon trifasciatus* Mungo Park  
*Chaetodon vagabundus* Linnaeus  
*Cheilinus chlorourus* (Bloch)  
*Cheilinus fasciatus* (Bloch)  
*Cheilinus oxyrhynchus* Bleeker  
*Cheilodipterus macrodon* (Lacépède)  
*Cheilodipterus quinquelineatus* Cuvier and Valenciennes  
*Cheiloprion labiatus* (Day)  
*Choerodon anchorago* (Bloch)  
*Chromis caeruleus* (Cuvier and Valenciennes)  
*Chromis ternalensis* (Bleeker)  
*Clenochaetus strigosus* (Bennett)  
*Ctenogobius aterrimus* Herre  
*Ctenogobius filamentosus* (Sauvage)  
*Ctenogobius suluensis* (Herre)  
*Echeneis naucrates* Linnaeus  
*Eleotris fusca* (Bloch and Schneider)  
*Eleotris melanosoma* Bleeker  
*Engraulis heterolobus* (Rüppell)  
*Epibulus insidiator* (Pallas)  
*Epinephelus coeruleo-punctatus* (Bloch)  
*Epinephelus malabaricus* (Bloch and Schneider)  
*Epinephelus merra* Bloch  
*Epinephelus ongus* (Bloch)  
*Fistularia petimba* Lacépède  
*Gnathodentex oculo-maculatus* Herre  
*Gnatholepis puntangoides* (Bleeker)  
*Gymnothorax undulatus* (Lacépède)  
*Halichoeres gymnocephalus* (Bloch and Schneider)  
*Halichoeres hoeveni* (Bleeker)  
*Halichoeres purpurascens* (Bloch and Schneider)  
*Halichoeres scapularis* (Bennett)  
*Hemiglyphidodon plagiometopon* (Bleeker)  
*Hemiramphus dussumieri* Cuvier and Valenciennes  
*Hemiramphus far* (Forskål)  
*Holacanthus sexstriatus* Kuhl and Van Hasselt  
*Holacanthus vroliki* Bleeker  
*Holocentrus binotatus* Quoy and Gaimard  
*Holocentrus caudimaculatus* Rüppell  
*Holocentrus cornutus* Bleeker  
*Holocentrus diadema* Lacépède  
*Holocentrus lacteo-guttatus* Cuvier and Valenciennes  
*Holocentrus laevis* Günther  
*Holocentrus sammara* (Forskål)  
*Holocentrus spinifer* (Forskål)  
*Holocentrus unipunctatus* Günther  
*Holocentrus violaceus* Bleeker

- Kuhlia marginata* (Cuvier and Valenciennes)  
*Kuhlia rupestris* (Lacépède)  
*Kyphosus cinerascens* (Forskål)  
*Labrichthys cyanotaenia* Bleeker  
*Lethrinus haematopterus* Schlegel  
*Lethrinus harak* (Forskål)  
*Lethrinus hypselopterus* Bleeker  
*Liza vaigiensis* (Quoy and Gaimard)  
*Lo vulpinus* (Schlegel and Müller)  
*Lutianus biguttatus* (Cuvier and Valenciennes)  
*Lutianus bohar* (Forskål)  
*Lutianus chrysotaenia* Bleeker  
*Lutianus fulviflamma* (Forskål)  
*Lutianus gibbus* (Forskål)  
*Lutianus kasmira* (Forskål)  
*Lutianus lineatus* (Quoy and Gaimard)  
*Lutianus malabaricus* (Bloch and Schneider)  
*Lutianus marginatus* (Cuvier and Valenciennes)  
*Lutianus oligolepis* Bleeker  
*Lutianus rivulatus* (Cuvier and Valenciennes)  
*Lutianus russelli* (Bleeker)  
*Lutianus semicinctus* Quoy and Gaimard  
*Macgregorella santa Herre*  
*Macolor macolor* (Lesson)  
*Micrognathus brevisrostris* (Rüppell)  
*Monolaxis grandoculis* (Forskål)  
*Mulloidichthys samoensis* (Günther)  
*Myripristis adustus* Bleeker  
*Myripristis intermedius* Günther  
*Myripristis leiognathos* Valenciennes  
*Myripristis murdjan* (Forskål)  
*Parupeneus barberinus* (Lacépède)  
*Parupeneus moana* (Jordan and Seale)  
*Pempheris dispar* Herre  
*Pentapus caninus* (Cuvier and Valenciennes)  
*Periophthalmus barbarus* (Linnaeus)  
*Petroscirtes kulambangrae* Herre  
*Plectorhinchus celebicus* Bleeker  
*Plectropomus oligacanthus* Bleeker  
*Plesiops nigricans* (Rüppell)  
*Pomacentrus amboinensis* Bleeker  
*Pomacentrus bankieri* (Richardson)  
*Pomacentrus caeruleus* Quoy and Gaimard  
*Pomacentrus cranei* Herre  
*Pomacentrus dorsalis* Gill  
*Pomacentrus lividus* (Forster)  
*Pomacentrus melanopterus* Bleeker  
*Pomacentrus moluccensis* Bleeker  
*Pomacentrus nigricans* (Lacépède)  
*Pomacentrus notophthalmus* Bleeker  
*Pomacentrus paro* (Bloch)  
*Pomacentrus simsiang* Bleeker  
*Pomacentrus tripunctatus* Cuvier and Valenciennes  
*Priopsis buruensis* (Bleeker)  
*Pterois antennata* (Bloch)  
*Rhabdamia cypselurus* Weber  
*Scarus abacurus* (Jordan and Seale)  
*Scarus balinensis* Bleeker  
*Scarus dimidiatus* Bleeker  
*Scarus dubius* Bennett  
*Scarus erythrodon* Cuvier and Valenciennes  
*Scarus frenatus* Lacépède  
*Scarus pectoralis* Cuvier and Valenciennes  
*Scarus quoyi* Cuvier and Valenciennes  
*Scarus zonularis* (Jordan and Seale)  
*Scolopsis ciliatus* (Lacépède)  
*Scolopsis leucotaenia* Bleeker  
*Scolopsis margaritifera* Cuvier and Valenciennes  
*Scomberoides tol* (Cuvier and Valenciennes)  
*Sparus berda* Forskål  
*Sphyræna barracuda* (Walbaum)  
*Stephanolepis tomentosus* (Linnaeus)  
*Stolephorus delicatulus* (Bennett)  
*Teuthis doliata* (Cuvier)  
*Teuthis hexagonata* (Bleeker)  
*Teuthis lineata* (Cuvier and Valenciennes)  
*Teuthis oramin* (Bloch and Schneider)  
*Teuthis puella* (Schlegel)  
*Teuthis rostrata* (Cuvier and Valenciennes)  
*Thalassoma cranei* Herre  
*Thalassoma lunare* (Linnaeus)  
*Thalassoma schwanefeldi* (Bleeker)  
*Therapon cancellatus* (Cuvier and Valenciennes)  
*Upeneus tragula* Richardson  
*Zebrafoma flavescens* (Bennett)  
*Zebrafoma veliferum* (Bloch)  
*Zenarchopterus dispar* (Cuvier and Valenciennes)  
*Zenarchopterus kampeni* M. Weber

## SEPIK RIVER, NEW GUINEA

- Anguilla pacifica* J. Schmidt  
*Anguilla spengeli* Weber  
*Apogon abo Herre*  
*Arius kanganamanensis* Herre  
*Arius leptaspis* (Bleeker)  
*Arius (Brustiarius) nox* Herre  
*Arius solidus* Herre  
*Boroda malua* Herre  
*Butis amboinensis* (Bleeker)  
*Chonophorus lachrymosus* (Peters)  
*Disparichthys fluviatilis* Herre  
*Eleotris macrolepis* (Bleeker)  
*Eleotris melanosoma* Bleeker

<i>Glossogobius celebius</i> (Cuvier and Valenciennes)	<i>Mogurnda mogurnda</i> (Richardson)
<i>Glossogobius giuris</i> (Buchanan Hamilton)	<i>Muraenichthys schultzei</i> Bleeker
<i>Glossogobius koragensis</i> Herre	<i>Ophiocara aporos</i> (Bleeker)
<i>Hemipimelodus papillifer</i> Herre	<i>Ophiocara porocephala</i> (Cuvier and Valenciennes)
<i>Hypseleotris guntheri</i> (Bleeker)	<i>Parambassis confinis</i> (Weber)
<i>Kuhlia marginata</i> (Cuvier and Valenciennes)	<i>Priopis buruensis</i> (Bleeker)
<i>Melanotaenia kabia</i> Herre	<i>Pristis perotteti</i> Müller and Henle
<i>Melanotaenia rosacea</i> Herre	<i>Rhombosoma sepikensis</i> Herre
	<i>Zenarchopterus sepikensis</i> Herre

## FISHES COLLECTED FROM COCOS ISLAND TO THE SOLOMON ISLANDS, INCLUSIVE

### Family CARCHARHINIDAE

#### *Carcharinus cerdale* Gilbert.

*Carcharinus cerdale* Gilbert, Fishes of Panama, MS., 1898, in Jordan and Evermann, Fishes N. & Mid. Amer., Bull. 47, U. S. Nat. Mus., 3, 1898, p. 2746; Meek and Hildebrand, Fishes Panama, Field Mus. Nat. Hist., Zool. Ser., 15, 1923, p. 47, pl. 1, fig. 2.

The head is depressed, with long, narrow, flat, sharp-pointed snout; the serrate teeth are broader and more oblique above than below, 26 to 28 teeth in each jaw; the lateral teeth above are notched on the outer side, with 1 or 2 denticles behind the notch; the second dorsal is small, over or behind the middle of the anal base, its posterior angle much produced, its base 6 to 9 times in the interspace between the dorsals; the anal is a little larger than the second dorsal, its margin more deeply concave, the posterior lobe pointed; the upper caudal lobe is very long, 3.9 to 4.3 times in the length, the lower lobe broad, a little less than half as long as the upper lobe; the short pectoral does not reach to the end of the first dorsal base.

The color varies from bluish gray to light gray above, the belly and lower parts paler to whitish; the fins are all grayish to dusky, the pectoral sometimes black-tipped.

A female specimen was caught at Lat. 6° 18' N. and Long. 84° 14' W. Its head and trunk were 1,235 mm., its caudal 570 mm. in length. The skull only was kept. Numerous specimens, 1.6 to 2 meters in length were caught at Tagus Cove, Albemarle Island, and South Seymour Island, Galapagos, but were all too bulky to preserve.

#### *Carcharinus galapagensis* (Snodgrass and Heller).

*Carcharias galapagensis* Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 343—Galapagos Islands.

This species has the fins always uniform in coloration with the body, from embryos to adults 2 meters in length; they are never white-margined as in *C. platyrhynchus*.

This shark swarms in the waters of the Galapagos Islands and about Cocos Island. I have never seen sharks of this genus in such abundance as in these two localities. A great many of this species were caught by hook and line, or harpooned. The largest captured was a little less than 2 meters in length to the caudal base. From Tagus Cove, Albemarle Island, 3 specimens of the following dimensions were taken: length of head and trunk, 555, 575, 620 mm.; of caudal, 225, 241, 246 mm.

### *Carcharinus melanopterus* (Quoy and Gaimard).

*Carcharias melanopterus* Quoy and Gaimard, Voy. Uranie, Zoologie, 2, 1824, p. 194, pl. 43, figs. 1, 2—Waigiu, Mariannes; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 38, pl. 1.

This species is readily recognized as it is the only Polynesian shark having all the fins with deep black tips; the head is very broad and depressed, with a short, obtusely rounded snout; the teeth are in 25 to 31 rows above and below.

Many small specimens were obtained at Nuka Hiva, Marquesas Islands, when a large school of *Trachurops macrophthalmus* was captured by a seine haul on the beach. These sharks were from 750 mm. to 1,275 mm. long. Many more specimens were seen swimming about in the harbor, but none were more than 1,800 mm. long. Other small specimens were seen at Tahiti and Fiji.

### *Carcharinus platyrhynchus* (Gilbert).

*Eulamia platyrhynchus* Gilbert, Proc. U. S. Nat. Mus., 1891, p. 544 (in part)—Clarion Island, Socorro Island, Magdalena Bay, Lower California; Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 36 (in part).

The very flat, broadly rounded snout is a little more than the width of the mouth and less than the distance between the nostrils; the base of the first dorsal is 2.5 times in the dorsal interspace.

This species, readily recognized by the white tips and posterior margin of the pectorals and dorsal, and pale or whitish tips to the caudal lobes, is common at Tagus Cove, Albemarle Island, Galapagos. Specimens were also caught at Cocos Island. Three specimens from Tagus Cove were kept, their lengths as follows: head and trunk, 500, 520, 572 mm.; caudal, 190, 210, 235 mm.

***Triaenodon obesus* (Rüppell).**

*Carcharias obesus* Rüppell, Neue Wirbelt., Fische, 1835, p. 64, pl. 18, fig. 2—Red Sea.

*Triaenodon obesus* Müller and Henle, Plagiost., 1841, p. 55, pl. 20; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 344; Garman, Mem. Mus. Comp. Zool., 36, 1913, p. 163; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 22, fig. 7.

This species is readily recognized by its broad, blunt, much depressed head, extremely short, wide, and obtuse snout with the nostrils very close to its margin, and characteristic dentition. The teeth are in 40 to 45 rows above, 40 to 47 below, more or less oblique in the upper jaw, especially along the sides, and erect in the lower jaw, with a long sharp median cusp and one or two smaller cusps on each side. The first dorsal is nearer to the ventrals than to the pectorals, its tip extending beyond the middle of the ventrals; the second dorsal is larger than the anal, their origins opposite.

The color in alcohol is more or less brownish or rusty brown above, paler to whitish beneath; the tips of the dorsals and upper caudal lobe are milky white, the margins of the other fins dark or blackish.

This common species of the Indian Ocean and East Indies was recorded by Snodgrass and Heller from Cocos Island. Our Expedition caught a specimen at Cocos Island also; its head and trunk measured 667 mm., the caudal 236 mm.

## Family AETOBATIDAE

***Aetobatus narinari* (Euphrasen).**

*Raja narinari* Euphrasen, Kong. Svens. Vet. nya Handl., 11, 1790, p. 217, pl. 10—St. Bartholomew, West Indies.

*Aetobatus narinari* Blainville, Journ. Phys., Chem., Hist. Nat., 83, 1816, p. 261; Gudger, Pub. 183, Carnegie Inst., Washington, 1914, pp. 243-323; on page 317 is a complete synonymy; author summarizes all our knowledge of this ray, with 10 plates and 19 text figures.

The color of fresh specimens is dark brown, bluish, or blue black, with many yellowish or bluish white spots scattered over the entire upper surface, the size and number of the spots varying considerably, and often absent altogether on the head; the under side is white.

This large and strikingly colored ray is found throughout the tropical Atlantic, Indian, and Pacific oceans. Specimens more than a meter wide were seen at Tahiti, and smaller specimens in the New Hebrides, Solomon Islands, and Dutch New Guinea. Specimens of large size were also observed at Lembah Strait, Celebes.

It is common in the market at Sandakan, British North Borneo, and in the Philippines throughout. On the island of Jolo I have examined specimens more than 2 meters in diameter. In spite of the abundance of this ray it is difficult for the traveler to secure material for his collections, because they are ordinarily entirely too large for any available container. A specimen from Sandakan had a length of 325 mm., a breadth of 575 mm., and the very slender tail was 1,230 mm. long.

#### Family MOBULIDAE

##### *Manta birostris* (Walbaum).

*Raja birostris* Walbaum, *Artedi Piscium*, 1792, p. 535; after *Diabolus marinus* Willughby.

At Cocos Island several specimens were seen, one or two passing repeatedly under a small launch in which I was seated. These rays were about ten feet in breadth and on the upper surface were reddish in color, of the hue known as dregs of wine.

Many huge specimens were seen in the Galapagos Islands, especially in the channel between Albemarle and Narborough Islands, in the general region of Tagus Cove and Turtle Bay, Albemarle. Some of them were more than sixteen feet across. To see one of these enormous creatures leap into the air at least ten feet above the water, exposing its vast gleaming white under surface, is an unforgettable sight.

These giant devil rays swim with great rapidity. They have a habit of swimming a few feet below the surface with the upturned triangular tip of each gigantic wing-like pectoral fin projecting above the water, so that from a little distance it seems as though two huge sharks were swimming ten to twenty feet apart, with their dorsal fins projecting.

Mr. Cornelius Crane spent a good deal of time trying to harpoon some of the devil rays, but they were easily able to elude or out-distance a fast motor launch. We were therefore unable to secure any specimens.

#### Family MEGALOPIDAE

##### *Megalops cyprinoides* (Broussonet).

*Clupea cyprinoides* Broussonet, *Ichthyologia*, Dec. 1, 1782, p. 27, pl. 9—fresh water, Tanna Island, New Hebrides (pages and plates not numbered).

*Megalops cyprinoides* Günther, *Cat. Fishes Brit. Mus.*, 7, 1868, p. 471; Bleeker, *Atlas Ichth.*, 6, 1866-72, p. 87, pl. 270, fig. 4; Weber and Beaufort, *Fishes*

Indo-Austr. Arch., 2, 1913, p. 5, fig. 4; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 27.

Dorsal 17 to 20; anal 23 to 28; there are 35 or 36 scales in the lateral line plus 3 more on the caudal base, 6 scales above and 6 below the lateral line. The depth is 3.3 to 3.5, the head 3.5 to 4 times in the length; the eye is 2.6 to 3.4 times in the head, longer than the snout. The last dorsal ray is produced into a long filament; the maxillary extends to beneath the posterior part of the eye or even beyond its hind border.

The color is bright silver, bluish dorsally, whitish below; the dorsal, caudal, and upper part of the pectorals are dusky or black, the rest of the fins colorless. In alcohol the color is bluish black above, the sides dusky brown, paling to yellowish beneath, with more or less silvery luster over all; the dorsal and caudal are black or blackish, the other fins pale, the pectoral dusted with blackish specks on the inside.

A specimen, 183 mm. long, was taken from a creek flowing into Bushman Bay, Malekula Island, New Hebrides. A number of large specimens were seen in a small fresh-water pool a few miles from Papeete, Tahiti, but the owner would not allow any to be caught. Large specimens were also seen in the market at Suva, Viti Levu Island, Fiji.

#### Family ALBULIDAE

##### *Albula vulpes* (Linnaeus).

*Esox vulpes* Linnaeus, Syst. Nat., ed. 10, 1758, p. 313—Bahama Islands.

*Albula vulpes* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 411, pl. 68, fig. 179; Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), p. 55, fig. 9; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 7, fig. 5.

Dorsal III, 15; anal I, 8; there are about 75 scales in a longitudinal series. The depth is 5.6, the head 3.1, the caudal 4 times in the length; the eye is 3.6, the snout 2.75 times, the least depth of the caudal peduncle nearly 4 times in the head. The body is elongate, the head long and pointed, the large eye covered with an adipose lid; the mouth is inferior, the caudal deeply forked; there is a median band of elongate membranous scales along the back; the origin of the dorsal is a little nearer to the tip of the snout than to the caudal base; the origin of the ventrals is beneath the posterior third of the dorsal; the small anal is very far back, near the caudal.

The color is silvery, the fins usually colorless, or margined with dusky. Many specimens have dusky longitudinal lines along the

back and upper part of the sides and others have a dozen or fifteen dusky crossbars along the upper half. My specimens have both longitudinal and crossbanded dusky markings.

Three young specimens, 35 to 56 mm. in length, were taken at Bushman Bay, Malekula Island, New Hebrides.

### Family CHANIDAE

#### *Chanos chanos* (Forskål).

*Mugil chanos* Forskål, Descr. Anim., 1775, p. 74; Bloch and Schneider, Syst. Ichth., 1801, p. 116.

*Mugile chani* Bonnaterre, Encyclop. meth., Ichthy., 1788, p. 180.

*Mugil salmoneus* (Forster) Bloch and Schneider, Syst. Ichth., 1801, p. 121; Forster, Descr. Anim., ed. Lichtenstein, 1844, p. 299.

*Chanos arabicus* Lacépède, Hist. Nat. Poiss., 5, 1803, p. 396; Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 135.

*Palah bontah* Russell, Fishes of Coromandel, 2, 1803, pl. 207.

*Tooleloo* Russell, Fishes of Coromandel, 2, 1803, pl. 208.

*Lutodeira indica* Van Hasselt, Algern. Konst. en Letterb., 1823, p. 333; Bull. Sci. Nat. (Ferussac), 2, 1824, p. 92.

*Lutodeira chanos* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 18, pl. 5, fig. 1, a and b.

*Cyprinus (Leuciscus) palah* Cuvier, Regne Anim., ed. 2, 2, 1829, p. 222, after Russell.

*Cyprinus tolo* Cuvier, Regne Anim., ed. 2, 2, 1829, p. 222, after Russell.

*Leuciscus zeylonicus* Bennett, Proc. Zool. Soc. Lond., 1832, p. 184.

*Leuciscus (Ptycholepis) salmoneus* Richardson, Ann. Mag. Nat. Hist., (1), 11, 1843, p. 489; Gray, in Dieffenbach, Travels in New Zealand, 2, 1843, p. 218.

*Chanos mento* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 141.

*Chanos chloropterus* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 141; Kner, Reise Novara, Fische, 1865, p. 341.

*Chanos nuchalis* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 142.

*Chanos orientalis* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 143; Eydoux and Souleyet, Zool. Voy. Bonite, Atlas, Poiss., pl. 7, fig. 1; Kner, Reise Novara, Fische, 1865, p. 341.

*Chanos cyprinella* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 144.

*Chanos lubina* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 145, pl. 533; Günther, Cat. Fishes, 7, 1868, p. 474; Bleeker, Atlas Ichth., 6, 1866-72, p. 82.

*Chanos salmoneus* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 146; Günther, Cat. Fishes, 7, 1868, p. 472; Bleeker, Atlas Ichth., 6, 1866-72, p. 81, pl. 272, fig. 4; Günther, Report Challenger Exp., Zoology, 1, 1880, pt. 6, Shore Fishes, p. 61; Day, Fishes India, 1878, p. 651, pl. 166, fig. 2; Boulenger, Trans. Linn. Soc. Lond., (2), 12, 1909, p. 291.

*Lutodeira salmonea* Richardson, Zool., Erebus and Terror, Fishes, 1844-48, p. 58, pl. 36, figs. 1 and 2.

*Butirinus argenteus* and *maderaspatensis* Jerdon, Madras Journ. Lit. and Sci., 15, 1849, pp. 343, 344.

*Chanos pala* and *tolo* Cantor, Cat. Malayan Fishes, 1849, pp. 278 and 282.

*Chanos indicus* Bleeker, Enum. Pisc. Arch. Ind., Act. Soc. Sci. Indo-Neerl., 6, 1859, p. 160.

*Lutodeira chanos* Günther, Fishes of Zanzibar, 1866, p. 120.

*Lutodeira chloropterus* Playfair, Proc. Zool. Soc. Lond., 1867, p. 868.

*Chanos chanos* Klunzinger, Verh. Zool. Bot. Gesell. Wien, 21, 1871, p. 605;

Jordan and Evermann, Bull. U. S. Nat. Mus., 47, (1), 1896, p. 414;

Steindachner, Denk. Akad. Wiss. Wien, 70, 1900, p. 514; Jenkins, Bull. U. S.

Fish Comm., 22, 1902 (1903), p. 432; Jordan and Evermann, Proc. U. S.

Nat. Mus., 25, 1903, p. 327; Jordan and Snyder, Proc. U. S. Nat. Mus.,

28, 1904, p. 123; Jordan and Evermann, Bull. U. S. Fish Comm., 23,

pt. 1, 1903 (1905), p. 56, fig. 10; Jordan and Seale, Bull. Bur. Fish.,

25, 1905 (1906), p. 186; Jordan and Herre, Proc. U. S. Nat. Mus., 31,

1906, p. 622; Jordan and Seale, Bull. Bur. Fish., 26, 1907, p. 4; Ever-

mann and Seale, Proc. U. S. Nat. Mus., 31, 1907, p. 505; Jordan and Richard-

son, Bull. Bur. Fish., 27, 1908, p. 236; Günther, Fische der Südsee, 3,

1910, p. 387; Weber, Siboga Exp., Fische, 1913, p. 3; Weber and Beaufort,

Fishes Indo-Austr. Arch., 2, 1913, p. 15, fig. 8; Jordan and Tanaka, Annals

Carnegie Mus., 17, 1927, p. 260; Fowler, Fishes Oceania, Mem. Bishop

Mus., 10, 1928, p. 28; Herre, Phil. Journ. Sci., 38, 1929, p. 498, fig. 1.

Dorsal II, 12 to 14; anal II, 8 or 9; pectoral I, 15 or 16; ventral I, 10 or 11; there are 75 to 85 scales in the lateral line to the caudal base, plus 5 to 11 more on the latter; there are 12 or 13 scales above and 10 or 11 below the lateral line; vertebrae 26+18=44. The elongate, compressed body becomes thicker with age, the head relatively shorter and broader in large, old specimens; the depth is 3.5 to 3.75 times, the head 3.5 to 3.8 times in the length; the large eye is covered with a thick adipose lid, 2.75 to 3.5 times in the head, usually 3.25 to 3.5; the broad snout is usually three-fourths of the eye; the interorbital is broad, flat, equal to the eye in small or medium-sized specimens; in very large or mature specimens it becomes convex and a fourth or half more than the eye; the origin of the dorsal is nearer to the caudal base than to the tip of the snout; the large, scaly, basal sheath of the dorsal is elongated posteriorly; the anterior dorsal ray is falcate, 1.3 to 1.4 times in the head; the anal is much smaller than the dorsal, its height 3.36 to 5.9 times in the head; the very large, deeply forked caudal is 2.44 to 2.88 times in the length; the pointed pectoral is 1.6 to 1.85 times, the ventral 1.85 to 2.15 times in the head.

The color in life is brilliantly silver over all, brilliant glossy blue or bluish olive above, the top of the head yellowish olive, the

sides whitish, white beneath. There are opalescent and golden glints on the sides of the head; the dorsal is yellowish, the pectoral, anals, and ventrals more or less yellow; the caudal is gray or colorless, with a blackish posterior margin. Sometimes the inside of the pectoral and ventrals is dusky or black. The color in alcohol is bluish above, the sides merging gradually into white beneath, a brilliant silver luster over all; the fins are all whitish, or the dorsal and caudal dusky; the eye is more or less deep reddish yellow.

Two specimens, 135 and 142 mm. in length, were taken from a small fresh-water pool a few yards from the seashore, Nuka Hiva Island, Marquesas. Another, 235 mm. long, was collected at Bushman Bay, Malekula Island, New Hebrides, and a young one, 88 mm. long. Adult specimens are from 700 mm. to 1.5 meters in length.

This swift, powerful swimmer ranges the tropical Indo-Pacific from the Pacific coast of Mexico to the east coast of Africa. Its leaping powers are astonishing. Both Mr. Alvin Seale and myself have seen fish of this species leap vertically into the air to a height of 7 meters or more. This is the most important fish in the Philippines, economically, more than \$25,000,000 being invested in its culture near Manila. Large sums are also invested in fish ponds for its keep in Java and elsewhere.

### Family CHIROCENTRIDAE

#### *Chirocentrus dorab* (Forskål).

*Clupea dorab* Forskål, Descr. Anim., 1775, p. 72—Red Sea; Russell, Descr. and Fig. 200 Fishes, 1803, p. 78, pl. 199.

*Chirocentrus dorab* Rüppell, Neue Wirbelt., Fische, 1835, p. 81; Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 150, pl. 565; Bleeker, Atlas Ichth., 6, 1866-72, p. 92, pl. 271, fig. 3; Day, Fishes India, 1878-88, p. 652, pl. 166, fig. 3; Jordan and Herre, Proc. U. S. Nat. Mus., 31, 1906, p. 641; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 18, fig. 11.

Dorsal IV, 13; anal III, 30; pectoral I, 12. The depth is 5.8, the head 5.4 times in the length; the eye is covered with a very large adipose lid, 4.6 times, the snout 3.25 times in the head; the snout is short, the mouth nearly vertical, with very prominent chin, the long, curved maxillary extending to beneath the middle of the eye; the dorsal is short, far back, its origin opposite that of the very long anal, the base of the latter 4.25 times in the length; the deeply forked caudal is broken in my specimen; there is a very large axillary scale above and a smaller one below the pectoral. The body is very greatly compressed, so that its Malay name of "knife fish,"

*Ikan parang*, is well deserved; the small scales are deciduous, very few being present on my specimen; on the caudal base are 2 very large scales.

The color in life is deep blue above, with green streaks on the sides, the lower half silvery white, with a golden stripe along the side separating the two colors. The color in alcohol is blackish along the back, leaden on the upper part of the sides, the rest pale yellowish, with silvery luster wherever scales are present.

Here described from a specimen, 325 mm. long, which leaped aboard a motor launch that was running along near Ovalau Island, Fiji, at night.

#### Family CLUPEIDAE

##### *Sardinella thrissina* (Jordan and Gilbert).

*Clupea thrissina* Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, p. 353—Cape San Lucas, Lower California.

*Sardinella thrissina* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 430; Meek and Hildebrand, Fishes Panama, Field Mus. Nat. Hist., Zool. Ser., 15, 1925, p. 185.

Dorsal 16; anal 15; there are 40 scales in a longitudinal, 10 in a transverse series; the depth is 3.33, the large, blunt head 3.75 times in the length; the eye is 3 times in the head; there are 16+13 strong ventral scutes, the belly much compressed.

The color is bluish above, paler below, with a bright silver luster; on the shoulder is a circular black spot; the fins are colorless. In alcohol they become very pale yellowish, the sides of the head bright silver, and a silver band along the middle of the side to the tail; the top of the head, base of the dorsal, anal and caudal dotted with black specks.

There were 160 specimens, 21 to 30 mm. in length, caught at South Seymour Island, Galapagos; 10 specimens of the same size were taken at Eden Island, Galapagos.

##### *Harengula melanura* (Cuvier).

*Clupea melanura* Cuvier, Regne Anim., ed. 2, 3, 1829, p. 318—Tahiti.

*Clupea (Harengula) melanura* Bleeker, Atlas Ichth., 6, 1872, p. 111, pl. 269, fig. 5; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 72.

*Harengula melanura* Sauvage, Poiss. Madagascar, 1891, p. 492.

*Sardinella melanura* Fowler, Mem. Bishop Mus., 10, 1928, p. 30.

*Harengula commersoni* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 186; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 244.

Dorsal III, 13; anal III, 16 to 18; there are 38 to 40 scales in a longitudinal series to the caudal base, plus 3 or 4 more on the latter, and 11 in a transverse series between the dorsal and ventral origins; there are 16 or 17 preventral and 11 postventral abdominal scutes. The depth is 3.7 to 3.85, the head 4 to 4.2 times in the length. The forked caudal equals the depth. The eye is equal to the snout, 3.4 to 3.75 times; the least depth of the caudal peduncle 2.5 times in the head. The body is elongate, fusiform, compressed, the snout blunt, the lower jaw projecting, the maxillary reaching under the anterior third of the eye or more, but not to the middle of the pupil; the dorsal origin is nearer to the tip of the snout than to the caudal base; the ventral origin is below the second third of the dorsal, the anal origin much behind the posterior extremity of the dorsal.

The color in life is deep sea green or blue above, the sides silvery, the tips of the caudal black. In alcohol the color is slaty blue or dusky brownish above, with violet reflections, with a black line from the scapular region to the upper part of the caudal base, below this silvery white to yellowish with silvery reflections; the fins are largely colorless or whitish, the dorsal darker anteriorly, and the caudal tips broadly black.

At Nukulau Island, Fiji, 5 specimens, 35 to 40 mm. long, were obtained. In the New Hebrides large schools of this sardine were seen, and 62 specimens were taken at Bushman Bay, Malekula Island, 47 to 110 mm. in length.

### **Harengula moluccensis** Bleeker.

*Harengula moluccensis* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 609—Ternate, Amboina, Ceram.

*Clupea (Harengula) moluccensis* Bleeker, Atlas Ichth., 6, 1866-72, p. 107, pl. 263, fig. 2—Amboina, Ceram; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 81.

*Harengula Kunzei* Bleeker, Nat. Tijds. Ned. Ind., 12, 1856-57, p. 209.

*Clupea (Harengula) Kunzei* Bleeker, Atlas Ichth., 6, 1866-72, p. 107, pl. 263, fig. 1.

*Harengula künzei* Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 243.

Dorsal IV, 15; anal II, 14 or 15; there are 42 to 44 scales in a longitudinal series to the caudal base, 10 or 11 in a transverse series, and 13 predorsal scales; gill-rakers about 35 on the lower arch; there are 16 preventral abdominal scutes and 13 postventral. The depth is 3.4 to 3.5 times in the length, the head equal to the depth

or with only a minute difference. The eye is 3.2 to 3.3, the snout 3.4 to 3.6, the interorbital 4.8 to 4.9, the least depth of the caudal peduncle 2.85 to 2.95 times in the head, the caudal shorter than the head. The lower jaw projects beyond the upper and the maxillary extends to the middle of the eye; there are teeth on the tongue, palatines, and pterygoids; the veinules on the sides of the head extend upon the body behind the upper part of the opercles; the origin of the dorsal is nearer to the tip of the snout than to the caudal base; the origin of the ventrals is under the anterior part of the dorsal; the scales are firmly adherent, with 4 or 5 vertical striae.

The color in alcohol is bluish to brownish above, the sides yellowish with a silvery sheen; the top of the dorsal is blackish.

Four specimens, 89 to 101 mm. in length, were collected at Vila, Efaté Island, New Hebrides.

### **Opisthonema libertate** (Günther).

*Meletta libertatis* Günther, Proc. Zool. Soc. Lond., 1866, p. 603—Libertad, San Salvador.

*Opisthonema libertate* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 433; Meek and Hildebrand, Marine Fishes Panama, 1, 1923, p. 188.

*Clupanodon libertatis* Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 348.

The last dorsal ray is produced in a long filament about equal to the head. Dorsal 15 to 17; anal 19; scales 46 to 48.

The color is silvery, more or less bluish along the back, and with a blackish spot at the shoulder; the tips of the caudal are black.

Fifteen specimens in very poor condition, ranging in length from 20 to 31 mm., were taken at Eden Island, Galapagos.

### **Stolephorus delicatulus** (Bennett).

*Clupea delicatula* Bennett, Proc. Zool. Soc. Lond., 1, 1831, p. 168—Mauritius.

*Spratelloides delicatulus* Bleeker, Atlas Ichth., 6, 1866-72, p. 96, pl. 264, fig. 3; Günther, Fische der Südsee, 3, 1909-10, p. 383; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 20.

*Stolephorus delicatulus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 186; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 243; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 29.

Dorsal II, 9 or 10; anal II, 7; there are 35 or 36 scales in a longitudinal series to the caudal base and 3 more on the latter, 7 or 8 in a transverse series, and 13 to 15 before the dorsal. The depth

of the fusiform body is 4.5 to 5.5, the head 3.5 to 4.25 times in the length. The eye and snout are about equal, 3 to 3.6 times in the head. The origin of the dorsal is nearer to the tip of the snout than to the caudal base; the origin of the ventrals is nearer to the anal than to the base of the pectorals.

The color in alcohol is dusky above, the sides brownish with minute dots, with a silvery luster over all.

A specimen, 46 mm. long, was taken at Ovalau Island, Fiji, by the aid of electric light, and by the same method 30 specimens, 20 to 47 mm. long, were taken at Turtle Bay, Espiritu Santo Island, New Hebrides. In the same way 65 specimens, 17 to 33 mm. long, were taken at Tulagi Harbor, Solomon Islands, and 40 specimens, from 12 to 34 mm. long, at Hathorn Sound, New Georgia Island.

### *Stolephorus japonicus* (Houttuyn).

*Atherina japonica* Houttuyn, Verh. Hollands. Maatsch. Wet. Haarlem, 20, 1782, p. 340—Japan.

Dorsal 12; anal 13. There are 42 to 45 scales in a longitudinal series. The scales are very deciduous.

There is a very broad silvery band from the head to the base of the caudal, bordered above by a black line; the top of the head is dusky, its sides bright silver; there is a black line along the back from the top of the head to the base of the caudal, and a silver stripe extending from the head along the middle of throat and belly to the caudal.

We have 52 specimens, 16 to 36 mm. long, from Tahiti.

## Family ENGRAULIDAE

### *Engraulis apiensis* (Jordan and Seale).

*Anchovia apiensis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 187, fig. 3—Apia, Samoa; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 33.

Dorsal I, 13; anal I, 16 to 20; the scales are very deciduous, 32 to 36 in a longitudinal series. The depth is 5.1 to 5.3 times, the head 3.9 to 4 times in the length. The eye is about 3 to 3.2 times, the snout 4.8 to 5 times in the head. The elongate maxillary extends to the posterior margin of the opercle, about 5 times in the total length. The deeply forked caudal equals or may exceed the head. The origin of the anal is under the posterior third of the dorsal.

The color in alcohol is yellowish white, with the dorsal scales more or less punctulate or outlined by blackish dots, the top of the head black or very dark brown, a blue black blotch on the upper margin of the eye, a row of black dots along the base of the anal, and the caudal more or less blackish, especially basally.

Here described from 8 specimens, 38 to 60 mm. in length, caught by electric light in Suva Harbor, Viti Levu Island, Fiji. Another specimen, 56 mm. long, was taken while seining the Mbureta River, Ovalau Island, Fiji. These were compared with paratypes from Samoa.

***Engraulis heterolobus* (Rüppell).**

*Stolephorus heterolobus* Rüppell, Neue Wirbelt., Fische, 1835, p. 79, pl. 21, fig. 4—Massaua, Red Sea; Bleeker, Atlas Ichth., 6, 1866-72, p. 126, pl. 265, fig. 1; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 44.

*Engraulis heterolobus* Günther, Cat. Fishes Brit. Mus., 7, 1868, p. 392; Klunzinger, Abh. Zool. Bot. Gesell. Wien, 21, 1871, p. 596.

Dorsal 13 to 14; anal 16 to 18; there are 36 scales in a longitudinal series, plus two more on the caudal base, 8 or 9 in a transverse series; gill-rakers 22. The depth of the elongate body is 5.5, the head 3.8 to 3.9, the caudal 4.8, the anal base 5.8 times in the length. The eye is 3.75, the very prominent, pointed snout 5 times in the head. The maxillary is dilated posteriorly where it overlies the angle of the mouth, its extremity rounded and narrowed, reaching to the hind margin of the preoperculum; the dorsal origin is much behind that of the ventrals and nearer to the caudal base than to the tip of the snout; the origin of the anal is just behind a vertical from the base of the last dorsal ray; the caudal is forked; there are 5 spiny scutes between the pectorals and ventrals; the scales are very easily detached, mostly gone in my specimens.

The color in alcohol is pale yellowish, the sides of the head silvery iridescent, and with a bright silver band from the angle of the opercle to the middle of the caudal base, the lower half of the body with beautiful pearly iridescence.

Ten specimens, 30 to 58 mm. in length, were taken by the aid of electric light in Suva Harbor, Viti Levu Island. The description is from 2 specimens, 57 and 58 mm. in length. There were 400 specimens, 30 to 40 mm. in length, caught by electric light lure at Tulagi, capital of the Solomons. A very large school of adult anchovies apparently of this species was seen under the dock, swimming about in the manner so characteristic of the members of this

group of fishes. A delay of two hours in getting nets from the *Illyria* prevented our obtaining any specimens, as the school left when the tide turned.

### *Engraulis tri* Bleeker.

*Engraulis tri* Bleeker, Verh. Bat. Gen., 24, 1852, Haringach., p. 40—Java; Day, Fishes India, 1878-88, p. 630, pl. 158, fig. 6.

*Stolephorus tri* Bleeker, Atlas Ichth., 6, 1866-72, p. 128, pl. 262, fig. 1; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 47.

Dorsal I, 14 or 15; anal III, 17 to 19; there are 33 or 34 scales in a longitudinal, 8 or 9 in a transverse series. The depth is 4.5 to 5, the head 3.6 to 3.7, the caudal 4 to 4.2, the anal 4.5 to 5.2 times in the length. The eye is 3.5 to 3.75, the pointed, projecting snout 5 times in the head. The maxillary extends to the gill opening, its posterior end pointed. The origin of the dorsal is nearer to the caudal base than to the tip of the snout and is about midway between the front margin of the eye and the caudal base. The origin of the anal is below the middle of the dorsal. The caudal is deeply forked. The scales are very thin and deciduous, my specimens being largely naked. There are 4 or 5 scutes with long slender spines between the pectorals and ventrals. There are 23 or 24 stout, serrulated gill-rakers, the longest about three-fourths an eye-diameter in length.

The color in alcohol is pale yellowish, the sides of the head silvery, with black on the nape, and black edgings on the dorsal scales, a row of black dots at the anal base, and some blackish shading on the caudal, especially marginally. A silvery lateral band was present in life.

Here described from 20 specimens, 31 to 55 mm. in length, collected at Bushman Bay, Malekula Island, New Hebrides.

### *Engraulis zollingeri* Bleeker.

*Engraulis zollingeri* Bleeker, Journ. Ind. Arch., 2, 1849, p. 73—Macassar, Celebes; Günther, Cat. Fishes Brit. Mus., 7, 1868, p. 387.

*Stolephorus zollingeri* Bleeker, Atlas Ichth., 6, 1866-72, p. 127, pl. 264, fig. 2; Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 44.

Dorsal I, 14; anal I, 15; there are apparently 42 scales in a longitudinal series from the upper angle of the gill opening to the caudal base and 8 or 9 in a transverse series, but as nearly all the scales have fallen it is difficult to make out their exact number. Bleeker gives the longitudinal number as doubtfully 38; there are 5 spiny scutes between the pectorals and the ventrals. The depth

is 6.44, the head 4.46, the length of the anal base 6.44, the pectoral 8.25 times in the length. The eye is 3.25, the snout 4.33, the least depth of the caudal peduncle about 3 times in the head. The body is slender, elongate, the snout blunt, projecting, the large mouth inferior, the maxillary truncate behind and extending no farther posteriorly than the weak mandible. The dorsal origin is midway between the snout and the caudal base. The origin of the anal is behind the posterior end of the dorsal. The forked caudal, said to be 5 in length, is damaged in my specimen. There are 27 flattened gill-rakers on the lower limb, with a double series of spines on the inner side. The scales are very deciduous.

The color in alcohol is yellowish, the sides of the head glistening silver, and a broad silver band extending from the gill opening to the caudal base.

Here described from a specimen, 58 mm. long, caught while fishing with electric light in Suva Harbor, Viti Levu Island, Fiji.

This little anchovy, hitherto known only from the East Indies, is one more proof of the close biological relationship of the Fiji Islands fauna with that of the East Indies.

#### Family ANGUILLIDAE

##### *Anguilla mauritiana* Bennett.

*Anguilla mauritiana* Bennett, Proc. Comm. Zool. Soc. Lond., 1831, p. 128;  
Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 245, figs. 100  
and 102.

*Muraena manillensis* Bleeker, Atlas Ichth., 4, 1864, p. 10, pl. 188, fig. 2—  
Manila.

The dorsal begins much in advance of the anus, the distance from the origin of the dorsal to the anus usually greater than the distance to the head; the length of the head is usually more than but may be equal to the distance from the gill openings to the dorsal origin; the tail exceeds the length of the head and trunk together. The maxillary teeth form a broad band, longitudinally divided by a toothless groove; the intermaxillary and vomerine teeth form a broad band separated from those of the maxillaries on either side by a concave toothless groove; the teeth of the mandibles are separated at the symphysis by a groove and those of each side of the lower jaw are divided lengthwise by a rather wide and toothless groove.

In life this eel is usually grayish or yellowish brown, marbled with darker; the belly and throat are paler brown, or yellow, or

even white. The color above may be any shade from olive green mottled with dark brown to clay yellow clouded with darker.

One specimen, 480 mm. long, was collected in a creek at Atuona, Hiva Oa Island, Marquesas, and 2, 415 and 470 mm. long, were taken from the Papenoo River, Tahiti.

To see a Tahitian put on diver's goggles, plunge into the rushing torrent of the Papenoo, locate an eel under some boulder, and emerge with it in his bare hands, or in a small, open dip net, is to behold an amazing and almost unbelievable feat.

### Family MYRIDAE

#### *Muraenichthys macropterus* Bleeker.

*Muraenichthys macropterus* Bleeker, Act. Soc. Sci. Indo-Neerl., 2, 1857, p. 91—Amboina; Bleeker, Atlas Ichth., 4, 1864, p. 31, pl. 151, fig. 3; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 245; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 275; Herre, Phil. Journ. Sci., 23, 1923, p. 154; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 40.

The depth is 23 to 30, the head 6.6 to 8, the tail 1.68 to 1.88 times in the length, the head and trunk 1.15 to 1.45 times in the tail. The eye is about twice in the snout. The mouth extends beyond the eye. The upper jaw extends noticeably beyond the lower. The teeth are in two rows in the jaws and on the vomer, sub-conical, those on the vomer larger and more granular. The dorsal origin is nearer to the gill opening than to the anus, its distance from the latter 1.2 to 1.5 more than the length of the head.

The color in alcohol is pale yellowish to brownish.

A specimen, 91 mm. long, was caught in Suva Harbor, Viti Levu Island, Fiji, while fishing by electric light.

### Family OPHICHTHYIDAE

#### *Leiuranus semicinctus* (Lay and Bennett).

*Ophisurus semicinctus* Lay and Bennett, in Beechey's Voy. Blossom, 1839, p. 66, pl. 20, fig. 4—Oahu(?).

*Leiuranus semicinctus* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 54; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 294, fig. 137; Herre, Phil. Journ. Sci., 23, 1923, p. 163; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 44.

The elongate body is cylindrical or nearly so, the depth from 46 to 60 times, the head 12 to 15 times in the length. The small eye is 1.5 to 2 times in the snout. The mouth is small with feeble

jaws, and extends to the posterior border of the eye. The dorsal begins over the small pectorals, which are twice as long as the eye. The low vertical fins do not extend to the tip of the tail.

Alcoholic specimens are cream-colored to whitish brown, with from 21 to 35 broad dark brown or blackish bands, much wider than the interspaces. These bands may or may not meet below, but are usually continuous beneath on the tail.

One specimen of this pretty little snake-like eel was taken at Nukulau Island, Fiji, its length 168 mm.

Described from East Indian specimens.

### **Achirophichthys kampeni** (Weber and Beaufort).

*Brachysomophis* (*Achirophichthys*) *kampeni* Weber and Beaufort, *Fishes Indo-Austr. Arch.*, 3, 1916, p. 316, figs. 150 and 151—Mbai River, New Guinea.

*Achirophichthys kampeni* Herre, *Phil. Journ. Sci.*, 24, 1924, p. 108.

The depth is 24.4 times, the head 7.67 times in the length. The tail is 225 mm. long, the head 58 mm., and the trunk 162 mm. in length, the tail therefore a trifle more than 50 per cent of the total. The distance of the origin of the dorsal behind the gill opening is 4.7 times in the head. The head and trunk are cylindrical and robust, the jaws and snout weak and pointed. The lower jaw is much shorter than the upper, so that the intermaxillary teeth are before the mandible and overlap it when the jaws are closed. The mouth is large, reaching far behind the small eye, which is contained nearly 20 times in the head and about 2.5 times in the pointed snout. The dorsal and anal fins are both low and extend almost to the tip of the tail.

In life the color is muddy olive above, yellow below the conspicuous lateral line, which is marked by a row of circular yellow dots. The dorsal fin is like the back in color, the anal fin yellow like the belly. The color in alcohol is dark olive brown above, yellow below the lateral line.

The type of this species, 323 mm. long, was collected near the mouth of the Mbai River, on the north coast of Dutch New Guinea. In 1922 I collected a second specimen, 395 mm. long, at Lamug, a hamlet on the Pinacanauan River, in the mountains of north-eastern Luzon, perhaps seventy-five miles from the sea. From the Papenoo River, Tahiti, about a kilometer from the sea, was obtained a third specimen—a female, 445 mm. long, ready to spawn.

This find enormously extends the range of this singular-appearing snake eel. It is doubtless common enough in many places. The people in the village where the specimen was obtained in north-eastern Luzon seemed well acquainted with it. If I could have remained in the locality a week instead of only a few hours a number of specimens would have been collected. Careful search in the mountain streams of all the large islands between Luzon and Tahiti would doubtless reveal the presence of numbers of this little-known eel.

### **Caecula longipinne** (Kner and Steindachner).

*Sphagebranchus longipinnis* Kner and Steindachner, Sitzungsber. Akad. Wiss. Wien, 54, 1867, p. 390, fig. 14—Samoa.

*Dalophis longipinnis* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 194.

*Ophichthys longipinnis* Günther, Fische der Südsee, 3, 1909–10, p. 404.

*Caecula longipinne* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 46.

The depth is 40 times, the head 12 times in the length. The tail is a little longer than the head and trunk together. The snout is very flat and pointed. The origin of the dorsal is nearer to the tip of the snout than to the gill opening.

The color is uniform brown, paler below, the under side of the head whitish.

A young, slender specimen, 61 mm. long, was collected on the reef at Nukulau Island, Fiji. Older and larger specimens would not be so slender.

### Family MORINGUIDAE

#### **Aphthalmichthys abbreviatus** Bleeker.

*Aphthalmichthys abbreviatus* Bleeker, Ned. Tijds. Dierk., 1, 1863, p. 163—Prigi, Java; Atlas Ichth., 4, 1864, p. 17, pl. 145, fig. 1.

In a specimen, 198 mm. long, the depth was 43.8 and the head 9.9 times in the length. The distance from the anus to the origin of the anal is one-fourth of the head.

The color in life was coral red with a pearly luster; in alcohol it is brownish to pale whitish yellow.

Another specimen, 235 mm. long, has the depth 48.95 times, the head 12.8 times in the length. This specimen has well-developed pectorals, their length 5.4 times in the head. Of the many specimens from various East Indian localities that I have studied, this is the only one with the pectorals more than mere vestiges.

The color in alcohol is brown above, the caudal and snout pale; the under side, as far back as the origin of the anal, is bright silver.

Both the above and a third specimen, 71 mm. long, were obtained from the tide pools at Nukulau Island, Fiji.

This species strongly resembles some of the large parasitic nematodes belonging to the genus *Ascaris*.

### **Aphthalmichthys javanicus** Kaup.

*Aphthalmichthys javanicus* Kaup, Arch. Natur., 22, 1856, p. 68—Java; Herre, Phil. Journ. Sci., 23, 1923, p. 191; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 47.

*Moringua javanica* Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 342.

Two large specimens of this very slender, worm-like eel were obtained from a tide pool on the reef at Nukulau Island, Fiji. The length of one was 510 mm., depth 80, the head 17 times in the length. The other, 330 mm. long, has the depth 73, the head 13.5 times in the length. There is no trace of pectorals. The dorsal and anal are reduced to mere thread-like folds and are only slightly developed around the tip of the rather blunt tail. The head is small, weak, depressed, with relatively stout and projecting lower jaw. The mouth extends far behind the eyes which are very small, rudimentary, and covered with thick skin. The origin of the anal is almost the length of the head behind the anus.

The color in life is clear red. In alcohol it is dark brownish red, the jaws, snout, and posterior sixth of the trunk pale yellowish brown.

Two specimens, 128 and 210 mm. long, from Wala Island, New Hebrides, also belong here. They are both uniform pale yellow in alcohol.

### Family MURAENIDAE

#### **Echidna amblyodon** (Bleeker).

*Muraena amblyodon* Bleeker, Act. Soc. Sci. Indo-Neerl., 1, 1856, p. 72—Manado, Celebes.

*Echidna amblyodon* Bleeker, Atlas Ichth., 4, 1864, p. 79, pl. 166, fig. 1; Herre, Phil. Journ. Sci., 23, 1923, p. 200, fig. 11.

This little eel is separated from its congeners by its color and teeth. There are 5 rows of stout teeth on the intermaxillary plate, those of the middle row largest, the outer teeth smallest. The vomerine teeth are continuous with those of the intermaxillary plate; there is a double row of teeth on the maxillaries, those of

the inner row much the larger; the anterior half of the mandible has a double row of teeth on each side, the other half a single row.

The color in alcohol is uniform brown, more or less marbled with darker, especially posteriorly, the throat and belly paler and sprinkled with darker brown spots; there is no white blotch at the angle of the mouth and no white spot on the upper lip.

In *E. delicatula* the dorsal origin is three-quarters of the head length from the tip of the snout; in *E. amblyodon* the dorsal begins slightly before the gill openings.

One specimen, 60 mm. long, was collected at Atuona, Hiva Oa Island, Marquesas Group.

### *Echidna nebulosa* (Ahl).

*Muraena nebulosa* Ahl, Dissert. Muraen. et Ophichth., 3, 1789, p. 5, pl. 1, fig. 2  
—East Indies; Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 130; Day, Fishes India, 1878-88, p. 673, pl. 172, fig. 2.

*Echidna nebulosa* Fowler, Proc. Acad. Nat. Sci. Phila., 1900, p. 524; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 110, pl. 1; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 348, fig. 170; Herre, Phil. Journ. Sci., 23, 1927, p. 197, pl. 10, fig. 3; Whitley, Records Austr. Mus., 16, 1927, p. 7; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 49.

*Muraena ophis* Rüppell, Atlas, Fische, 1828, p. 116, pl. 29, fig. 2.

*Muraena variegata* Richardson, Zool., Voy. Erebus and Terror, Fishes, 1844-48, p. 94, pl. 47, figs. 1-5 and 11-16.

*Echidna variegata* Bleeker, Atlas Ichth., 4, 1864, p. 80, pl. 168, fig. 2.

The depth is 15 to 20, the head 9.5 to 10 times in the length. The head and trunk together equal the tail, or may be a trifle longer or shorter. The eye is 8 to 12 times in the head, 1.6 to 2.5 times in the snout, which is 5 to 6 times in the head. The maxillary teeth are very small, bluntly conical or granular, in one row. The intermaxillary has 2 large blunt teeth in the middle, surrounded by about a dozen similar, often smaller teeth. On the vomer are 6 to 10 similar teeth in 2 parallel rows. The teeth in the lower jaw are in 2 rows, those of the inner row largest, the teeth at the symphysis largest of all.

The color in alcohol is yellowish, brownish or whitish, with two rows of large irregular dendritic or stellate black blotches, each enclosing 1 to 3 white or yellow spots. The upper row is along the back and dorsal fin, the other on the lower half of the body. The spaces between the blotches are thickly strewn with fine dark lines and spots.

This eel is a savage biter, and is common in Polynesia and the East Indies, although we have few specimens. One, 255 mm. long, was taken at Tahiti; and one, 198 mm. long, at Wala Island, New Hebrides.

**Pseudechidna brummeri** (Bleeker).

*Muraena brummeri* Bleeker, Nat. Tijds. Ned. Ind., 17, 1858-59, p. 137—Atapupu, Timor.

*Pseudechidna brummeri* Bleeker, Nat. Tijds. Dierk., 1, 1863, p. 272.

In life this is an extraordinarily active and unusual looking, ribbon-like fish. The color is very pale yellowish gray and the eel is almost transparent, or at least translucent, so it seems ghost-like, a veritable wraith. The dorsal and anal are both very high; anteriorly the dorsal equals or exceeds the depth of the body, but posteriorly it is more than half again the depth of the trunk below while the anal is equally high; both are perfectly transparent, each with a bluish white marginal line. As the eel darts about with incredible speed this marginal blue line seems to be floating in space since the transparent fin supporting it is invisible.

This eel is of singular beauty in life. Unfortunately in alcohol it not only loses its unique beauty but is thickened and coarsened, while like many other Muraenidae it shrinks considerably in size.

One specimen, 570 mm. long, was captured on the reef between Suva and Nukulau Island, Fiji.

**Gymnothorax boschi** (Bleeker).

*Muraena boschi* Bleeker, Verh. Bat. Gen., 25, 1853, Muraen., p. 52; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 386.

*Gymnothorax boschi* Bleeker, Atlas Ichth., 4, 1864, p. 105, pl. 190, fig. 3; Herre, Phil. Journ. Sci., 23, 1923, p. 218.

*Gymnothorax monochrous* Bleeker, Atlas Ichth., 4, 1864, p. 106, pl. 47, fig. 2.

This eel is recognized by its uniform brown color, low dorsal less than half as high as the body, the maxillary teeth in one row, 3 long depressible canines in a row on the central line of the intermaxillary plate, the head and trunk a little longer than the tail, and no dark patch over the gill openings.

At Nuka Hiva Island, Marquesas, a young moray, 60 mm. long, which agrees with East Indian specimens of this species, was collected.

**Gymnothorax chilospilus** Bleeker.

*Gymnothorax chilospilus* Bleeker, Atlas Ichth., Muraen., 4, 1864, p. 103, pl. 189, fig. 2—Benkulen; Herre, Phil. Journ. Sci., 23, 1923, p. 223, pl. 11, fig. 1.

*Gymnothorax sagenodeta* Bleeker, Atlas Ichth., Muraen., 4, 1864, p. 100, pl. 184, fig. 4 (not of Richardson).

*Gymnothorax samalensis* Seale, Phil. Journ. Sci., 4, Section A, 1909, p. 492.  
*Muraena chilospilus* Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 370, fig. 188.

Depth 15 to over 19, head 7 to 8 in length. Tail a tenth longer than head and trunk together; eye circular, 8.6 to 9.6 in head, over middle of gape, 1.4 to 1.6 in the snout. Anal low, dorsal less than half the body depth. Dorsal origin slightly before the gill openings, which are much narrower than the eyes.

In alcohol the color is brown, with wavy, anastomosing, more or less complete, dark brown crossbands, plainest on the tail and vertical fins, often absent, especially anteriorly. The belly and throat are paler, yellowish to grayish. The head is brown with a dark brown spot at the angle of the mouth and a large white spot on the lower jaw before the angle of the mouth. Sometimes there is a white streak on the upper jaw in front of the angle of the mouth. The pores on the jaws are in white spots.

One specimen was collected on Eden Island, Galapagos, with a length of 150 mm. The description is from Philippine specimens.

#### *Gymnothorax efatensis* Herre.

*Gymnothorax efatensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 384.

Depth 15, head 8.68 in length. Eye 7.6, snout 6.33, gape 2.37 in head. Length of tail is half total. Eleven sharp, pointed teeth on premaxillary plate, the one at tip smaller than the others. Two depressible teeth, the first very small, on the middle line of the premaxillary. A double row of teeth on maxillary, the inner of rather small, slender, depressible teeth, the outer row minute, fixed. A double row of blunt, rounded teeth (8 pairs) on vomer. A row of 18 to 20 sharp, fixed, backward-pointing teeth on each side of lower jaw, also an inner row of 3, much larger, depressible teeth near tip. Gill openings ventral in position.

Color in alcohol yellowish white, covered with minute irregular spots and markings of purplish brown so that the ground color is reduced to a reticulated maze of fine lines. Dorsal and anal paler.

One specimen, taken from the stomach of a sea-snake at Vila, Efaté Island, New Hebrides.

#### *Gymnothorax favagineus* Bloch and Schneider.

*Gymnothorax favagineus* Bloch and Schneider, Syst. Ichth., 1801, p. 525, pl. 105—Tranquebar; Herre, Phil. Journ. Sci., 23, 1923, p. 222, pl. 11, fig. 2.

*Gymnothorax isingteena* Bleeker, Atlas Ichth., 4, 1864, p. 92, pl. 181, fig. 1.  
*Muraena tessellata* Richardson, Voy. Sulphur, Fishes, 1844, p. 109, pl. 55, figs. 5-8.

*Gymnothorax tessellatus* Bleeker, Atlas Ichth., 4, 1864, p. 93, pl. 171, fig. 3; pl. 172, fig. 1.

*Gymnothorax favagineus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 199.

*Muraena favaginea* Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 378, fig. 187.

*Lycodontis favaginea* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 57.

Depth 16 to 21; head 7.5 to 9 times in length; eye 10 to 12 times in head, twice in snout. The mouth is large, its gape 2.3 to 2.5 times in the head. The head and body are covered with large polygonal or rounded black spots, larger than the interspaces of the pale yellowish or whitish ground color, or the interspaces may be reduced to lines forming a network about the spots in the variety *tesselatus*.

A specimen, 245 mm. long, was caught with a seine in a small river flowing into Suva Harbor, Viti Levu Island, Fiji, about 3 or 4 miles from salt water and above the influence of the tide. It is the *G. tessellatus* of Bleeker and is like the figure given under that name in his Atlas.

A small specimen, 78 mm. long, was secured at Bushman Bay, Malekula Island, New Hebrides.

#### **Gymnothorax funebris** Ranzani.

*Gymnothorax funebris* Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon., 4, 1840, p. 76—Brazil.

*Lycodontis funebris* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 396.

A small specimen, 130 mm. long, of this moray was obtained at South Seymour Island, Galapagos Islands. The color is uniform, very dark brown.

#### **Gymnothorax pictus** (Ahl).

*Muraena picta* Ahl, De Muraena et Ophichth., 3, 1789, p. 6, pl. 2, fig. 20—East Indies; Day, Fishes India, 1878-88, p. 672, pl. 172, fig. 4; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 362, figs. 175, 180, 182, 183.

*Gymnothorax pictus* Bleeker, Atlas Ichth., 4, 1864, 87, pl. 170, figs. 3-4, pl. 172, fig. 3, pl. 173, fig. 1, pl. 189, fig. 3; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 103, pl. 19; Herre, Phil. Journ. Sci., 23, 1923, p. 208, fig. 12.

*Gymnothorax polyophthalmus* Bleeker, Atlas Ichth., 4, 1864, p. 96, pl. 174, fig. 3.

*Gymnothorax pictus, litus, and polyophthalmus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), pp. 198, 199.

As in many other morays the bodily proportions vary considerably with age, but except in the very young the teeth are distinctive, while the species may always be recognized from its color and markings. The vomerine teeth are in two short rows, the forward end more or less forked; on the intermaxillary plate is a single central tooth (rarely 2), not fang-like, and no larger than the 10 to 14 teeth in the outside row. The maxillary teeth are in one row except in the very young.

In life the adult color is usually bluish gray or yellowish, flecked and speckled with innumerable small to minute purplish gray or brown specks, the fins like the body. In the very young the ground color is yellow, with 3 irregular rows of circular purplish or dark olive spots about as large as the eye; these soon develop a yellow center. As the fish grows larger the spots become irregular and the yellow center gets larger till the spots are broken up and the adult pattern develops. Many adult specimens retain more or less of the first color pattern and always have 3 rows of dark spots, or the spots become confluent and form ring-like figures. The color in alcohol is little different.

Two fine typical specimens, 700 and 755 mm. in length, were taken at Cocos Island. At Atuona, Hiva Oa Island, Marquesas, a very dark specimen, largely purplish black, its ground color mostly showing as whitish or yellow lines, was taken; its length is 300 mm. Two excellent young specimens, each 275 mm. long, were caught at Makatea Island, Tuamotu Archipelago. A specimen, only 46 mm. long, was collected at Maraa, Tahiti, and 6 beautiful specimens, 250 to 475 mm. in length, were obtained on the reefs about Nukulau Island, Fiji. Another specimen, 380 mm. long, and a very handsome representative of the youthful stage often described as *G. polyophthalmus*, 160 mm. long, were captured at Malo Island, New Hebrides.

This handsome and easily recognized moray occurs from the east coast of Africa to the islands off the coast of Mexico and north to the Riu Kiu Islands.

#### ***Gymnothorax richardsoni* (Bleeker).**

*Muraena richardsoni* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 296—Wahai, Ceram.

*Gymnothorax richardsoni* Bleeker, Atlas Ichth., 4, 1864, p. 100, pl. 186, fig. 2; Herre, Phil. Journ. Sci., 23, 1923, p. 226, pl. 11, fig. 4.

*Gymnothorax scoliodon* Bleeker, Atlas Ichth., 4, 1864, p. 101, pl. 184, fig. 2.

*Gymnothorax ceramensis* Bleeker, Atlas Ichth., 4, 1864, p. 101, pl. 177, fig. 3.

Depth 12 to 21.1, head 5.75 to 8 times in the length. The tail approximately equals the head and trunk together. The eye is moderately large, 8 to 11.6 times in the head and 1.5 to 2 in the snout. The vomerine teeth are in one row in large old specimens, but in the young they are partially or usually completely biserial.

The color is light grayish in life, everywhere with irregular dendritic, anastomosing purplish to brown marblings which may form more or less definite transverse bands, particularly on the tail. The belly and throat are paler, the markings much reduced or forming only spots and irregular marks. There is no dark patch at the angle of the mouth or around the gill openings.

This handsome eel is very common and in many localities swarms in vast numbers about the coral sand beaches. It is of small or moderate size, perhaps always less than a meter in length.

One specimen, 165 mm. long, was taken at Maraa, Tahiti; also 14 specimens from the tide pools of the Nukulau reefs, Fiji. They vary in length from 75 to 195 mm. The largest specimen, a gravid female, was taken from the stomach of a large lutianus.

### *Gymnothorax undulatus* (Lacépède).

*Muraenophis undulata* Lacépède, Hist. Nat. Poiss., 11, 1803, pp. 125, 129, pl. 1, fig. 2.

*Gymnothorax undulatus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 98, pl. 16; Herre, Phil. Journ. Sci., 23, 1923, p. 220, pl. 9, fig. 1.

*Muraena undulata* Günther, Fische der Südsee, 3, 1909-10, p. 413, pls. 164, 165; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 376, fig. 186.

*Muraena cancellata* Richardson, Zool., Voy. Erebus and Terror, Fishes, 1844-48, p. 87, pl. 46, figs. 1-5.

*Gymnothorax isingleenoides* Bleeker, Atlas Ichth., 4, 1864, p. 91, pl. 179, fig. 1, pl. 180, fig. 1.

*Gymnothorax bullatus* Bleeker, Atlas Ichth., 4, 1864, p. 91, pl. 171, fig. 2, pl. 187, fig. 3.

*Gymnothorax cancellatus* Bleeker, Atlas Ichth., 4, 1864, p. 93, pl. 176, fig. 3, pl. 177, fig. 2, pl. 183, fig. 1.

*Gymnothorax agassizi* Bleeker, Atlas Ichth., 4, 1864, p. 95, pl. 185, fig. 2.

*Muraena fimbriata* Day, Fishes India, 1878-88, p. 670, pl. 172, fig. 1.

The depth varies greatly, old specimens being more than twice the depth of the young. The head is 6.5 to 7.5 times in the length.

The eye is 8.5 to 8.75, the snout 4 to 5.6, the gape 2 to 2.2 times in the head.

My specimens are yellowish or bluish gray, densely covered with fine lines and spots of blackish, brown, or purplish brown, so the general effect is of a purplish brown or blackish network above, with the under side similar but paler on a whitish ground. The dorsal and anal usually have a more or less evident white border.

Five specimens, from 80 to 172 mm. long, were taken on a reef near Suva, Viti Levu Island, and 2, 208 and 260 mm. long, at Nukulau Island; at Nukulau also one, 55 mm. long, which undoubtedly is this species, was obtained. Its companion, 28 mm. long, cannot be determined. In the New Hebrides, 12 specimens, 98 to 188 mm. long, were collected in coral tide pools at Bushman Bay, Malekula Island; 3 specimens, 98 to 172 mm. in length, at Malo Island; and 4, 42 to 120 mm. long, at Wala Island. At Tenibuli, Ysabel Island, Solomon Islands, a large specimen of a sea-snake, *Laticauda* sp., contained a specimen of this eel, 315 mm. long, the posterior third with the skin removed by digestion. This specimen was pale gray, with spots and dashes of black more or less arranged in transverse bands. I place here an eel, 127 mm. long, from a tide pool at South Seymour Island, Galapagos. It is dark brown in color, with 3 rows of ocellated spots, black-margined with white centers, on the body and similar spots on belly and dorsal. The fins are black.

### *Uropterygius concolor* Rüppell.

*Uropterygius concolor* Rüppell, Neue Wirbelt., Fische, 1835, p. 83, pl. 20, fig. 4—Massaua, Red Sea; Jordan and Seale, Proc. U. S. Nat. Mus., 28, 1905, p. 772; Herre, Phil. Journ. Sci., 23, 1923, p. 231; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 60, synonymy in part.

*Gymnomuraena concolor* Günther, Fische der Südsee, 3, 1909-10, p. 426; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 395.

Depth 18 to 33; head 7.1 to 10.3 times in length. The eye is twice in the heavy blunt snout. The cleft of the mouth is 3 in the head, and reaches far beyond the eye. The body is robust, smooth, finless, with thick leathery skin, compressed posteriorly, with a very small caudal at the tip of the tail. The dorsal and anal are merely vestigial, the dorsal origin twice the eye-diameter before the tip of the tail.

The color is uniform dark chocolate brown.

On the reefs at Tahiti 6 young specimens, from 90 to 110 mm. in length, were collected. I also refer here a specimen, only 37 mm. long, taken at Malo Island, New Hebrides.

**Uropterygius marmoratus** (Lacépède).

*Gymnomuraena marmorata* Lacépède, Hist. Nat. Poiss., 11, 1803, pp. 132, 133—  
New Britain; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916,  
p. 397, figs. 193, 194.

*Uropterygius marmoratus* Jordan and Evermann, Bull. U. S. Fish Comm.,  
23, 1903 (1905), p. 111, fig. 33; Herre, Phil. Journ. Sci., 23, 1923, p. 232.

*Gymnomuraena pantherina* Bleeker, Atlas Ichth., 4, 1864, p. 113, pl. 175, fig. 3.

*Gymnomuraena xanthopterus* Bleeker, Atlas Ichth., 4, 1864, p. 114, pl. 164, fig. 4.

*Gymnomuraena micropterus* Bleeker, Atlas Ichth., 4, 1864, p. 115, pl. 164, fig. 2.

Depth 14 to over 20, the head 8.1 to nearly 11 times in the length. The eye is 10 to 17, the snout 6 or 7 times, the mouth 2.7 to 3 times in the head. The head is very deep and heavy, the rounded snout more than twice the small eye which is a little nearer to the tip of the snout than to the angle of the mouth. The anterior nostrils are in conspicuous tubes, the posterior ones with a rim or short tube according to age. The teeth are in 3 rows in adult specimens, the outer row of very small, pointed, fixed teeth, the inner rows of much larger, long, depressible canines. The 2 outer rows of maxillary teeth are continued around the intermaxillary plate and enclose several larger depressible canines. The vomer has a short row of 7 or 8 tiny teeth in young specimens, but some large specimens have more numerous vomerine teeth in 2 rows anteriorly. The dorsal and anal are both entirely absent.

A specimen, 620 mm. long, collected at Malo Island, New Hebrides, has the depth 19.6, the head 10.33 times in the length. The eye is 17, the snout 6.66, the gape 3 times in the head. Vomerine teeth in one row. The tail is a little shorter than the head and trunk together, 1.175 times in the head and trunk.

The color in alcohol is pale yellowish, everywhere marbled and spotted with more or less anastomosing, dendritic purplish dark or blackish markings which are very numerous and coarser dorsally, finer and less numerous below.

The specimen noted above is near *U. macrocephalus*, having the head and trunk longer than the tail, but the eye, length of head, and coloration are those of *U. marmoratus*. This specimen, which is near the maximum size for the species, closely resembles the figure of Bleeker's *G. pantherina*.

## Family BELONIDAE

**Tylosurus melanotus** (Bleeker).

*Belone melanotus* Bleeker, Nat. Tijds. Ned. Ind., 1, 1850, p. 94—Batavia.

*Mastacembelus melanotus* Bleeker, Atlas Ichth., 6, 1866-72, p. 47.

*Mastacembelus choram* Bleeker, Atlas Ichth., 6, 1866-72, pl. 256, fig. 2.

*Tylosurus melanotus* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 127, fig. 47.

Dorsal II, 22; anal II, 19; pectoral I, 13 or 14. There are 340 to 360 scales in a median lateral series, 295 predorsal scales, and 20 rows of scales across the preopercle. The lateral line has about 260 scales, with 22 or more scales above it in a transverse series to the origin of the dorsal. There is a small patch of scales on the opercle. The breadth of the elongate, compressed body is 1.2 times in the depth, which is 12.7 to 13.5 times in the length. The broad head is flattened above and on the sides, 3.08 to 3.15 times in the length. The eye is 9.5 times in the head, 2.4 times in the postorbital region, 1.6 times in the interorbital space, 5.5 or 5.6 times in the beak. The dorsal begins in advance of the anal, which is beneath the first dorsal ray. The lateral line forms an elevated blackish keel on the caudal peduncle to the end of the caudal. The tongue is smooth. The canines are all perpendicular.

Two specimens were collected in Papeete, Tahiti, each 790 mm. in length. While they lack the granular teeth of the tongue, and differ from typical *melanotus* in several other respects, I cannot place them elsewhere and do not feel justified in calling them new.

### Family HEMIRAMPHIDAE

#### *Hemiramphus dussumieri* Cuvier and Valenciennes.

*Hemiramphus erythrorinchus* var. LeSueur, Journ. Acad. Nat. Sci. Phila., 2, 1821, p. 138—near Timor, Mauritius.

*Hemiramphus dussumieri* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 33, pl. 520.

*Hemiramphus dussumieri* Bleeker, Atlas Ichth., 6, 1866-72, p. 56, pl. 253, fig. 3; Günther, Fische der Südsee, 3, 1909-10, p. 354; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 251; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 155.

*Hemiramphus erythrorinchus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 77.

Dorsal II, 12 to 14; anal II, 12. There are 54 scales in the lateral line in my specimens and 37 or 38 predorsal scales. The depth is 8.7 to 10, the head 4.2 to 4.3, the head including the long lower beak 2.14 times, the deeply forked caudal 4 to 4.5 times in the length. The eye is 3.35 to 3.6, the broad, triangular snout 2.9 to 3, the interorbital 3.6 to 3.85 times in the head. The snout is wider than long. The pectoral is 1.5 to 1.9 times in the head. The lower caudal

lobe is much the longer. The scales are very loosely attached and many have fallen off.

The color in alcohol is yellowish, each scale of the dorsal region with a dark brown or blackish spot, and a conspicuous black stripe from the pectoral axil to the middle of the caudal base. There is a black stripe along the middle of the back, and on each side of it a black line. The opercle is black within, this showing as a blackish patch at the surface. The fins are all pale. In life the lateral band is bright silver, with a black marginal line above.

Here described from 12 specimens, 86 to 126 mm. long, from the reef at Nukulau Island, Fiji. A specimen, 116 mm. long, was caught in the Mbureta River, Ovalau Island, Fiji. A specimen, 94 mm. long, was taken at Tulagi, Solomon Islands.

### **Hemiramphus far** (Forskål).

*Esox far* Forskål, Descr. Anim., 1775, p. 67—Lohaja, Red Sea.

*Hemiramphus far* Rüppell, Neue Wirbelt., Fische, 1835, p. 74; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 252; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 77; Day, Fishes India, 1878-88, p. 516, pl. 120, fig. 3; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 156, fig. 55.

Dorsal II, 11 or 12; anal I, 9 to 11; there are 50 to 52 scales in the lateral line, and 32 to 34 from the dorsal to the head. The depth is 3.8, the head 4.3 times in the length. The eye is 4.3, the interorbital 3, and the snout 2.8 times in the head. The lower jaw has the tip broken in my specimen, but the head with the lower jaw included is 2.3 to 2.4 times in the length. The triangular upper jaw is broader than long. The body is compressed but stout and bulky, its breadth contained 1.35 times in its depth. The origin of the anal is below the fifth dorsal ray. The caudal is deeply forked, the lower lobe the larger.

In life the color is dark sea-green above, the sides silvery and almost translucent, with 4 to 9 large black spots along the side, and a conspicuous silver band from the shoulder to the middle of the caudal base. In alcohol the color is yellowish, the back dark, each scale with a large blackish brown spot and a blackish line along the middle of the back. A broad blackish silvery band extends from the angle of the opercle to the middle of the caudal base, bordered above by a blue black stripe, best developed anteriorly. Partly above and partly upon the lateral band is a row of large black blotches, 5 in my specimen. The beak and upper jaw are black. The dorsal is blackish, the caudal dusky, the other fins pale.

One specimen, 305 mm. long, was taken at Suva, Viti Levu Island, Fiji, and one, 280 mm. long, at Tenibuli, Ysabel Island, Solomon Islands.

### **Hyporhamphus unifasciatus** (Ranzani).

*Hemirhamphus unifasciatus* Ranzani, *Novi Comment. Ac. Sci. Inst. Bonon.*, 5, 1842, p. 326—Brazil.

*Hyporhamphus unifasciatus* Jordan and Evermann, *Fishes N. and Mid. Amer.*, 1, 1896, p. 720, pl. 96, fig. 311; Meek and Hildebrand, *Marine Fishes Panama*, *Field Mus. Nat. Hist., Zool. Ser.*, 15, 1923, p. 237, pl. 16, fig. 1.

Dorsal 13 to 16; anal 15 to 17; scales 52 to 59. The body is elongate, compressed, the depth 6.3 to 9.8, the head 4.5 to 5 times in the length. Young specimens are very slender, adults comparatively bulky. The mandible is much longer proportionately in the young, 3.5 to 5.75 in the length. The eye is 3.6 to 4.3, the snout 2.5 to 3 times in the head. The lower lobe of the forked caudal is much the larger.

The color in life is bright silvery, the dorsal and caudal dusky, the back green with dusky scale margins and 3 lines down the middle, the top of the head and mandible blackish, the beak with a red tip. In alcohol the back is brownish yellow, with black scale margins, the sides paler to white; a broad silver band extends from shoulder to caudal base, widest posteriorly, margined above by a dark line. The sides of the head are bright silver. The lines on the back and fins are as in life.

This widely distributed half-beak is very abundant on sandy beaches in the Galapagos Islands; at Turtle Bay, Albemarle Island, large schools were seen and it was very plentiful at Charles and South Seymour Islands. We have 22 specimens, 123 to 190 mm. in length, from Charles Island. The largest specimen, taken January 15, 1929, was a female ready to spawn; its extreme length, including beak and caudal fin, was 273 mm. At South Seymour Island we collected 23 specimens, 47 to 85 mm. in length, and 10 specimens, 130 to 167 mm. long. While fishing by electric light at Tagus Cove, Albemarle Island, 100 tiny, slender specimens, from 20 to 32 mm. in length, were captured. Only the very largest of these were typically colored. The rest were more or less blackish to lead-colored, with a silvery sheen over all.

### **Zenarchopterus dispar** (Cuvier and Valenciennes).

*Hemirhamphus dispar* Cuvier and Valenciennes, *Hist. Nat. Poiss.*, 19, 1846, p. 58, pl. 524—Madagascar, Java; Day, *Fishes India*, 1878-88, p. 517, pl. 119, fig. 5.

- Zenarchopterus dispar* Bleeker, Atlas Ichth., 6, 1866-72, p. 63, pl. 253, fig. 4;  
 Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 252;  
 Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 169, fig. 58;  
 Mohr, Zool. Jahrb., 52, 1926, p. 254, fig. 16.

Dorsal III, 8; anal II, 8. There are 41 to 43 scales in the lateral line and 36 to 38 scales from the dorsal to the tip of the snout. The depth is 6.25 to 7.15, the head 3.7 to 4 times in the length, measured from the tip of the upper jaw to the caudal base. Including the lower jaw, the head is 1.5 to 1.6 times in the length from the tip of the snout to the caudal base, or 2 to 2.2 times in the extreme length. The eye is 4.15 to 4.3, the snout about 2.75, the interorbital 3.4 to 3.5 times in the head. The dorsal is uniform in females, but males have the fourth ray elongated and thickened or the fourth and fifth elongated (really the first and second divided rays). In males the sixth anal ray (fourth divided ray) is greatly lengthened and widened, twice or thrice as long as the preceding one. The seventh ray is as long as or longer than the sixth and is also very wide but not as much so as the sixth. When depressed these rays may extend to the middle of the caudal or beyond. The caudal is obtusely rounded.

The color in alcohol is dark brown or olive brown above, the sides paler, brownish gray to white beneath, with a narrow black stripe from the upper angle of the pectoral to the middle of the caudal base, widest beneath the dorsal. The fins are more or less dusky to brownish gray. The beak is black, the iris silvery, the pupil white.

Described from the following: 21 males, 68 to 116 mm. in length, from the Mbureta River, Ovalau Island, Fiji, and 12 females, from 70 to 91 mm. long, the females much slenderer than the males. One male specimen, 79 mm. long, was obtained from a small river flowing into Suva Harbor, Viti Levu Island, Fiji. A male specimen, 121 mm. long, was also collected from a small creek at Auki, Malaita Island, in the Solomons.

### ***Zenarchopterus kampeni* M. Weber.**

- Hemiramphus (Zenarchopterus) Kampeni* M. Weber, Nova Guinea, 9, 1913, p. 554.  
*Zenarchopterus kampeni* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 167; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 78.  
*Zenarchopterus kampenii* Mohr, Zool. Jahrb. Jena, 52, 1926, p. 248, figs. 13-14;  
 Duncker and Mohr, Mittheil. Zool. Mus. Hamburg, 42, 1926, p. 127.

Dorsal I, 9 or 10; anal I, 9; pectoral I, 8. There are 47 to 50 scales in the lateral line from the anterior end under the throat back to the caudal base, and 5 scales above the line to the dorsal

origin. There are 38 scales in a longitudinal series from the angle of the gill opening to the caudal base. There are 28 scales from the dorsal origin to the interorbital, 3 or sometimes 4 of them, lying above the middle of the pectoral, greatly enlarged. The body is elongate, compressed, broad, the width about 1.5 times in the depth. Depth 6.85 to 7.66, the head 3.5 to 3.75, the caudal 4.66 to 5, the pectoral 5.25 to 5.75 times in the length from the tip of the upper jaw to the caudal base. The eye is 3.7 to 4, the snout 2.65 to 3, the least depth of the caudal peduncle 3.25 to 4 times in the head. The beak is elongate, slender, the head with the lower jaw 2 to 2.1 times in the total from its extremity to the caudal base. The head proper, without the beak, is 2.6 to 2.75 times in the trunk; the triangular part of the upper jaw is about as long as broad, and covered with scales above; the basal half of the long beak is corrugated on each side, as if scaled; the minute teeth are in bands of 5 rows in each jaw. The fourth dorsal ray is thickened and elongate, the fifth ray sometimes elongate. The anal origin is beneath the third dorsal ray. In males the sixth anal ray is greatly enlarged in length and thickness, sometimes extending to the middle of the caudal. The seventh ray is much less enlarged than the sixth. Sometimes the fifth ray is also enlarged, but the sixth and seventh are always much larger than the rest. The caudal is somewhat obliquely truncate, the lower part the longer, the margin erose.

The color in alcohol is olive brown above, each scale with a dark margin, the sides brown or dusky brown, the under side yellowish, the throat white. A silvery lateral stripe extends from the angle of the opercle to the caudal base, often only evident on the posterior half where it is much broader than forward, bordered above by a black stripe nearly as wide as the silver stripe. The sides of the head and basal portion of the elongate beak are bright silver. There is a dusky blotch on the caudal base. The dorsal and caudal are more or less specked with dusky, the other fins colorless.

Described from 10 specimens, 65 to 96 mm. in length, collected at Hathorn Sound, New Georgia Island, Solomon Islands.

Hitherto this half-beak has been known only from the Sepik River, New Guinea.

#### Family EXOCOETIDAE

##### *Exocoetus volitans* Linnaeus.

*Exocoetus volitans* Linnaeus, Syst. Nat., ed. 10, 1758, p. 316—high seas of Europe and America; Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903),

p. 435; Weber and Beaufort, *Fishes Indo-Austr. Arch.*, 4, 1922, p. 177, fig. 62; Fowler, *Fishes Oceania, Mem. Bishop Mus.*, 10, 1928, p. 80, fig. 16.

*Exocoetus evolans* Bloch, *Ichthyologie*, 12, 1797, p. 9, pl. 398; Bleeker, *Atlas Ichth.*, 6, 1866-72, p. 69.

Dorsal I or II, 12 to 14; anal I or II, 11 to 14; there are 40 to 42 scales in the lateral line, plus 5 more on the caudal base, 6 above and 2 below the line. The body is compressed, with the front of the head bluntly conical. The depth is 5.2, the head 3.9, the caudal 3, and the pectoral 1.3 times in the length. The eye is 3.6, the snout 4.7, the interorbital 3.5, the least depth of the caudal peduncle 3.75, and the ventral 2 times in the head. The caudal is deeply forked, the lower lobe much the longer. The origin of the ventrals is much nearer to the tip of the snout than to the caudal base. The pectoral extends to the caudal base.

The color in alcohol is brown to brownish blue above, silvery on the sides and white beneath. The pectoral is bluish dusky or brown with a broad white posterior and lower margin and often with a white upper margin. The other fins are pale.

A fine example, 167 mm. long, flew aboard the *Illyria* between the Galapagos and the Marquesas Islands, in Long. 112° W., Lat. 5° 6' S. An excellent specimen, 168 mm. long, came aboard northeast of Raratonga; another, 147 mm. long, when the *Illyria* was about one hundred miles west of Raratonga; and about one hundred and fifty miles west of Viti Levu Island, Fiji, a specimen, 140 mm. long, flew upon the deck.

### *Cypselurus altipennis* (Cuvier and Valenciennes).

*Exocoetus altipennis* Cuvier and Valenciennes, *Hist. Nat. Poiss.*, 19, 1846, p. 109, pl. 560—seas of India, Cape of Good Hope.

*Exocoetus altipinnis* Bleeker, *Atlas Ichth.*, 6, 1866-72, pl. 247, fig. 1; Day, *Fishes India*, 1878-88, p. 807.

*Cypselurus altipennis* Weber and Beaufort, *Fishes Indo-Austr. Arch.*, 4, 1922, p. 186.

*Cypselurus altipennis* Fowler, *Fishes Oceania, Mem. Bishop Mus.*, 10, 1928, p. 82.

*Exocoetus katopron* Bleeker, *Atlas Ichth.*, 6, 1866-72, p. 72; Jordan and Seale, *Fishes Samoa, Bull. Bur. Fish.*, 25, 1905 (1906), p. 211, fig. 16.

Dorsal I, 12; anal I, 8; there are 46 scales in the lateral line, plus 3 more on the caudal base, 8 above and 3 below the line. There are 30 predorsal scales. The body is flattened along the sides, not constricted below, its breadth nearly equal to the depth, which is 6.8 times in the length. The head is 4, the pectoral 1.45, the caudal 3.3 times in the length. The pectoral reaches almost to the caudal

base, and the ventrals equal the head. The eye is 3, the blunt snout 3.8, the interorbital 3.2, the least depth of the caudal peduncle 3.75 times in the head. The lower lobe of the deeply forked caudal is much the longer.

The color in alcohol is bluish black above, becoming brownish on the side and white lower down and beneath. The pectoral is blackish above, with a central oblique broad clear band centrally, the outer third black with a marginal white edge. The caudal is blackish, the dorsal pale, the anal white. The ventral is whitish, with the two median rays brownish gray.

A specimen, 165 mm. long, was caught with the aid of a submarine light at Bushman Bay, Malekula Island, New Hebrides.

### *Cypselurus rondeletii* (Cuvier and Valenciennes).

*Exocoetus rondeletii* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 84, pl. 562—Naples, Sicily, Canaries.

*Cypselurus rondeletii* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 81.

Dorsal I, 10; anal I, 10; there are 40 to 43 scales in a longitudinal series to the caudal base and 3 more on the latter, 5 scales above the line to the dorsal origin. Both the first and second pectoral rays are undivided. The undivided first and second pectoral rays distinguish this species at once from all other flying fishes.

In alcohol the dorsal region is dusky, the sides and under side bright silver, the pectorals and ventral black.

Four specimens, 22 to 25 mm. in length, were caught by the aid of electric light in Suva Harbor, Viti Levu Island, Fiji.

### *Cypselurus spilopterus* (Cuvier and Valenciennes).

*Exocoetus spilopterus* Cuvier and Valenciennes, Hist. Nat. Poiss., 19, 1846, p. 113—Oualan, Caroline Islands; Bleeker, Atlas Ichth., 6, 1866-72, p. 74, pl. 250, fig. 2.

*Cypselurus spilopterus* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 187.

*Cypselurus spilopterus* Fowler, Mem. Bishop Mus., 10, 1928, p. 83.

*Exocoetus poecilopterus* (not of Cuvier and Valenciennes) Day, Fishes India, 1878-88, p. 518, pl. 120, fig. 4.

Dorsal 12; anal 10. There are 52 scales in the lateral line, 8 above and 3 below it. There are 31 predorsal scales. Depth 5.47, head 4.1, caudal about 2.75, ventral 3.15, and pectoral 1.44 times in the length. The large eye is 3.1, the interorbital 2.7 times in the head, the snout nearly equal to the eye. The minute simple teeth are in few rows. The anal origin is opposite the sixth dorsal

ray. The pectoral reaches to the tip of the depressed dorsal, and the elongate ventral extends nearly as far. The caudal is deeply forked, the lower lobe very large.

In alcohol the color is dark purplish brown above, the lower half silvery white. The pectorals are bluish dusky above, the lower third and posterior margin whitish or colorless, the rays glistening silvery, a white or colorless transverse band extending from the lower margin upward about halfway in the middle of the fin, and with flattened elliptical black spots sparingly and irregularly disposed in transverse bands on the posterior half, the anterior rows not descending more than two-thirds across. The caudal is dull bluish brown, the dorsal darkened slightly, the anal white.

Here described from a specimen, 230 mm. long, caught at sea between Makatea and Tahiti.

#### Family BREGMACEROTIDAE

##### *Bregmaceros atripinnis* (Tickell).

*Asthenurus atripinnis* Tickell, Journ. Asiat. Soc. Bengal, 34, 1865, p. 32, pl. 1—India.

*Bregmaceros atripinnis* Day, Proc. Zool. Soc. Lond., 1869, p. 522; Day, Fishes India, 1878-88, p. 418, pl. 91, fig. 1.

Dorsal I-20, XV, 22; anal 22, X, 26.

The color in alcohol is brown, with black dots on top of the head and along the dorsal region, most numerous posteriorly on the caudal peduncle; a row of black dots also along the upper part of the abdomen; the fins are all brown. Day states that the very young have no black on the fins. This species differs markedly from *B. maclellandi* in having an air bladder.

While fishing by electric light in Suva Harbor, Viti Levu Island, Fiji, a specimen, 16 mm. long, was captured which I refer here rather than to *B. maclellandi*.

##### *Bregmaceros maclellandi* Thompson.

*Bregmaceros Maclellandi* Thompson, Charlesworth Mag. Nat. Hist., 4, 1840, p. 184, fig.—brackish water of Gangetic Delta; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 368; Day, Fishes India, 1878, p. 418; Weber, Siboga Exp., Fische, 1913, p. 174.

Dorsal I-16, X, 15; anal 22, X, 20. The first dorsal ray is on top of the head and a little longer than the head. The median dorsal and anal rays are very short. There is no air bladder.

The color in alcohol is uniform olive brown.

A young specimen, 14 mm. long, was taken while we were fishing by electric light in Suva Harbor.

### Family BOTHIDAE

#### *Platophrys constellatus* Jordan.

*Platophrys constellatus* Jordan in Jordan and Goss, Report U. S. Fish Comm., 14, 1886 (1889), p. 266—James Island, Galapagos Archipelago; Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2663; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 422.

A young specimen, 66 mm. long, was collected at Tagus Cove, Albemarle Island, Galapagos.

#### *Platophrys mancus* (Broussonet).

*Pleuronectes mancus* Broussonet, Ichthy., 1782, pls. 3, 4—Ulitea.

*Platophrys mancus* Smith and Swain, Proc. U. S. Nat. Mus., 5, 1882, p. 142; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 412; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 331.

*Rhomboidichthys mancus* Günther, Fische der Südsee, 3, 1909–10, p. 342.

Dorsal 98 to 100; anal 78 to 80; scales in lateral line 90 to 95. The depth is 1.94, the head 3.44 times in the length. The eye is 6.4, the snout 3.85, the interorbital 2.65, the caudal 1.5 times in the head. The dorsal and ventral profiles are evenly convex, except for the concave snout and notch above the mouth. The posterior border of the lower eye is in advance of the anterior border of the upper eye. The mouth is curved, very oblique, the maxillary extending beneath the anterior margin of the eye. There is a stout sharp horn or spine on the snout, growing from the upper end of the maxillary. The dorsal origin is on the blind side of the snout. The left pectoral is very elongate, with thread-like rays, some of them equal to the depth of the body. The right pectoral is about twice in the head.

The color in alcohol is light brown, with many large pale ocelli bordered by much darker brown, and numerous small dark brown spots interspersed between the ocelli. There are 2 very large blackish blotches on the lateral line, and a row of 4 black blotches about as large as the eye near the dorsal outline and a similar one near the ventral profile. The dorsal, anal, and caudal are blackish brown, the left pectoral black. The under side is thickly strewn with small brown spots.

Here described from a specimen, 310 mm. long, collected at Takaroa, Tuamotu Islands.

**Platophrys pantherinus** (Rüppell).

*Rhombus pantherinus* Rüppell, Atlas Reise Nord. Africa, Fische, 1828, p. 121, pl. 3, fig. 1—Red Sea.

*Rhomboidichthys pantherinus* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 436.

*Platophrys pantherinus* Bleeker, Atlas Ichth., 6, 1866-72, p. 11, pl. 233, fig. 3; Day, Fishes India, 1878-88, p. 425, pl. 92, figs. 3 and 4; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 512; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 332; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 91.

*Passer marchionessarum* Valenciennes, Voy. Venus, Poiss., p. 344, 1855, pl. 9, 1846.

Dorsal 85 to 92; anal 65 to 70; there are 85 scales in the lateral line, plus 5 more on the caudal base. The depth of the elongate and much flattened body is 1.7 to 1.9, the head 3.4 to 3.8 times in the length. The eye is 3.85 to 4.7, the least depth of the caudal peduncle about 2.55, the caudal about 1.25 to 1.66 times in the head. The pectoral varies greatly, in females being small, about 1.5 times in the head; in males the upper rays become enormously elongated, extending beyond the caudal fin, about 1.16 times in the total length. The eyes are one-half to nearly a whole diameter apart, the lower eye half a diameter in advance of the upper one. There is a bony rim before and above the lower eye, and often one below the upper eye, which may have a small spine in front of it. In males each eye has a barbel on its posterior part.

The color in alcohol is brown to purplish brown above, with a row of 3 large circular dark brown spots along the lateral line, a dozen or more similar dark spots about half as large scattered about, and very many small flecks and spots of dark brown arranged in open circles over the intervening spaces. The fins are marked by dark brown spots. The under side is uniformly pale yellowish.

Here described from 3 specimens, 30, 110, and 170 mm. in length, the last a male, taken on a reef near Suva, Viti Levu Island, Fiji.

## Family CYNOGLOSSIDAE

**Paraplagusia bilineata** (Bloch).

*Pleuronectes bilineatus* Bloch, Ichthyologie, 6, 1788, p. 21, pl. 188—China Sea and East Indies.

*Plagusia bilineata* Klunzinger, Verh. Zool. Bot. Gesell. Wien, 21, 1871, p. 573.

*Paraplagusia bilineata* Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 183, figs. 50 and 51.

*Plagusia marmorata* Bleeker, Atlas Ichth., 6, 1866-72, p. 28, pl. 246, fig. 5; Günther, Fische der Südsee, 3, 1909-10, p. 348.

Dorsal 98 (96 to 118); anal 88 (75 to 90); there are about 90 tubulated scales in the central lateral line, plus about 15 on the caudal. Depth 3.9 (3.6–3.9), head 4.15 (3.9–4.3), caudal 8.16 times in the length. The eyes are very small, 8.3 (10 or more) times in the head. The body is lanceolate, the eyes on the left side, the front margin of the lower eye below the middle of the upper eye. The eyes are about half the diameter of an eye apart. The strongly hooked mouth extends below the hind part of the lower eye, the lips, especially the lower one, with a row of long fringed tentacles. There are 2 lateral lines on the colored side, 18 scales apart.

The color in alcohol is dark gray, spotted and freckled with large and small irregular whitish blotches and spots. The right side is pinkish white. Some alcoholic specimens are plain brown.

Here described from a specimen, 49 mm. long, collected at Bushman Bay, Malekula Island, New Hebrides.

This species has been called *marmorata* by most authors, but Klunzinger discovered that Bloch's specimen was really *bilineatus*.

#### Family HOLOCENTRIDAE

##### *Holocentrus ruber* (Forskål).

*Sciaena rubra* Forskål, Descr. Anim., 1775, p. 48.

*Holocentrus ruber* Rüppell, Atlas, Fische, 1828, p. 83, pl. 22, fig. 1; Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 248.

*Holocentrum rubrum* Bleeker, Atlas Ichth., 9, 1878, pl. 357, fig. 4; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 244.

*Holocentrus praslin* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 225, fig. 26.

Dorsal XI, 12 to 13; anal IV, 8 to 10; there are 33 scales in the lateral line, plus 5 more on the caudal base, 3 above and 7 below it. The depth is 2.6 to 2.8, the head 2.9 to 3 times in the length. The eye is 2.4 to 2.7, the snout 5, and the least depth of the caudal peduncle 3.75 times in the head. The lower jaw is slightly included, and the maxillary extends to the middle of the eye. The spine on the preopercle is about twice in the eye. The upper opercular spine is larger than the lower. The third to fifth dorsal spines are longest, 1.9 to 2 times, the third anal spine 1.4 times in the head.

The color of a specimen in alcohol, 86 mm. long, from Wala Island, New Hebrides, the *H. praslin* of authors, is dark reddish brown with 6 blackish horizontal bands along the sides and 1 or 2 indistinct bands on the lower part of the side, the nape and interorbital black also. The spinous dorsal has a broad black sub-

marginal band as shown in Jordan's excellent figure. The membrane between the second and third anal spines is black and the upper and lower caudal margins are black, the outer ventral ray brownish black, all the fins otherwise white or colorless. Another specimen, 29 mm. long, from the same locality, is banded longitudinally with alternate blackish brown and pearly white stripes.

### **Holocentrus cornutus** Bleeker.

*Holocentrus cornutum* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 240—Ceram; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 45; Bleeker, Atlas Ichth., 9, 1878, pl. 359, fig. 5; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 241, fig. 68.

*Holocentrus cornutus* Evermann and Seale, Bull. Bur. Fish., 26, 1906, p. 60.

Dorsal XI-I, 11 or 12; anal IV, 9; there are 35 or 36 scales in the lateral line, 3 above and 7 below it. The head and depth are equal, 2.85 to 2.9 times, the caudal 4.16 to 4.25, the pectoral 4.3 to 4.4, the third anal spine 3.6 to 3.9 times in the length. The prominent eye is 2.6 to 2.9, the pointed snout 4.35 to 4.5, the inter-orbital 4.6 to 4.8 times in the head. The least depth of the caudal peduncle equals the preopercular spine, 3.6 to 3.7 times in the head. The jaws are equal, the opercular bones strongly denticulated, the opercle with 2 flat spines, the upper one longer and stouter than the other.

The color in alcohol is yellowish, with silvery whitish longitudinal stripes, the interspaces above the level of the eye dark violet brown longitudinal bands. At the caudal base is a black spot as large as the pupil. Each dorsal spine has a white stripe behind it, the rest of the membrane chocolate brown with a sub-marginal brown stripe, the tips of the spines colorless. A black basal blotch is present below the soft dorsal and there are traces of one at the base of the anal rays. The membrane between the third and fourth anal spines is brownish black on the outer half; the upper and lower caudal margins are dusky. The remaining fins are yellowish.

Three specimens, 101 to 106 mm. long, were collected at Tenibuli, Ysabel Island, Solomons.

### **Holocentrus suborbitalis** Gill.

*Holocentrus suborbitale* Gill, Proc. Acad. Nat. Sci. Phila., 1863, p. 86—Cape San Lucas.

Dorsal XI-I, 13; anal IV, 8; there are 36 scales in the lateral line, 3 above and 8 or 9 below it. The body is oblong, the depth 2.45, the head nearly 3 times in the length. The large eye is 2.6

times in the head, nearly twice the short, steep snout, which is contained 4.8 times. The interorbital is much narrower than the eye, 3.6 times in the head. The mouth is rather small, nearly horizontal, the posterior end of the maxillary beneath the pupil. The pointed pectoral is a third, the caudal a fifth shorter than the head.

The color in alcohol is steel gray, sprinkled with dark brown circular dots, several on each scale. There is a bright silver stripe beginning on the snout and curving along the orbital margin beneath and behind the eye, ending opposite the middle of the pupil. There is a narrow silver streak on the posterior edge of the preopercle and extending upon the preopercular spine. The opercle and cheeks are more or less coppery. Where the scales overlap, longitudinal dusky lines are formed, these plainest on the upper half. There is a dusky spot on the upper part of the eye. The spinous dorsal has a basal series of rounded white spots, then a broad violet gray band, a marginal series of vertically elongated white spots, and a fine blackish marginal line. The soft dorsal is more or less dusky, the other fins all pale.

Two specimens were collected at Cocos Island, 85 and 88 mm. in length.

### *Holocentrus violaceus* Bleeker.

*Holocentrum violaceum* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 335—Amboina; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 43; Kner, Sitzungsber. Akad. Wiss. Wien, 57, 1868, p. 296; Bleeker, Atlas Ichth., 9, 1878, pl. 355, fig. 2; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 246.

*Holocentrus violaceus* Jordan and Seale, Bull. Bur. Fish. 25, 1905 (1906), p. 223.

Dorsal XI-I, 13; anal IV, 9; there are 36 scales in the lateral line, 3 above and 6 below it. Depth 2.5, head 2.75 times in the length. The prominent eye is 3, the snout 3.36, the interorbital 5.6, the preopercular spine 4.2, the least depth of the caudal peduncle 4.2, the forked caudal 1.6, the pectoral 1.4, the third anal spine 1.7 times in the head. There are 2 flat opercular spines, the lower one the smaller.

In life the general color was reddish dusky with a vertical violet bar on each scale, these bars forming longitudinal stripes, with a violet silver luster over all; at the upper end of the opercular margin was a black bar with a small pearl white spot above it; on the back of the caudal peduncle was a pink spot. The color in alcohol is yellowish brown with a dark reddish brown vertical bar on each

scale, these bars forming longitudinal stripes. Each scale on the side of the head has a reddish brown spot. There is a black bar on the opercle at its upper posterior margin and a small black spot at the pectoral axil. The dorsal is reddish dusky, with pale submarginal markings, the other fins pale.

Described from a specimen, 116 mm. long, taken at Hathorn Sound, New Georgia Island, Solomon Islands. Four specimens were taken at Tenibuli, Ysabel Island, Solomon Islands, 99 to 120 mm. in length; scales in the lateral line 34 or 35. In color they exactly resemble Bleeker's figure cited above. In alcohol the ground color is violet brown, darker above and paler below, each scale with a white or bluish or violet vertical bar. There is a bright silver spot in the axil of the soft dorsal on top of the caudal peduncle, and a black bar at the upper angle of the opercle. The spinous dorsal is nearly colorless to dull violaceous, the margin darker with a submarginal whitish streak. Another specimen, 122 mm. long, from Tenibuli, Ysabel Island, is very dark violaceous brown all over, with no trace of paler or whitish vertical bars when removed from alcohol; they show faintly while immersed in fluid. The black opercular bar is present and the axillary spot on top of the caudal peduncle is very faint.

### *Holocentrus opercularis* Cuvier and Valenciennes.

*Holocentrum operculare* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 501—New Ireland; Günther, Fische der Südsee, 1, 1873-75, p. 100, pl. 66, fig. A; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 232.

*Holocentrus opercularis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 227; Kendall and Radcliffe, Mem. Mus. Comp. Zool., 35, 1912, p. 95; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 105.

Dorsal X-I, 12; anal IV, 9; there are 39 scales in the lateral line, 3 above and 7 below it. The depth is 3, the head 2.66, the caudal 4.33, and the third anal spine 4 times in the length; the eye and snout are equal, 2.8 times, the interorbital 4.33 times in the head; the chin is strongly projecting.

The color in alcohol is pale reddish above, the sides gradually lighter, the under parts yellowish white, with a bright silvery luster over all. The spinous dorsal is black, with the spines white-tipped and a conspicuous sub-basal white band, below which is a row of brown spots. The soft dorsal has a dark line on its upper margin and there is a dark stripe between the third and fourth anal spines. The fins are otherwise yellowish white. There is a blackish spot on the upper margin of the eye; the iris is golden.

Here described from a typical specimen, 104 mm. long, collected on the reef at Maraa, Tahiti.

### **Holocentrus tiereoides** Bleeker.

*Holocentrus tiereoides* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 334; Bleeker, Atlas Ichth., 9, 1878, pl. 358, fig. 1; Weber and Beaufort, Fishes Indo-Austr., 5, 1929, p. 249.

*Holocentrus tiereoides* Bryan and Herre, Occ. Papers Bishop Mus., 2, 1902 (1903), p. 128; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 20; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 265; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 100.

Dorsal XI-I, 13 or 14; anal IV, 9; there are 39 or 40 scales in the lateral line, plus 2 or 3 more on the caudal base, 3 above and 7 below it. The body is oblong, with steeply inclined and nearly straight anterior profile, pointed snout, the jaws even or the lower slightly projecting. The depth is 2.4 to 2.6, the head 2.7 to 2.85, the third anal spine 4, the caudal 3.6 to 3.8 times in the length. The eye is 3 to 3.25, the snout 3.7 to 3.85, the interorbital 4.6 to 5 times in the head. The rays of the soft dorsal and anal are elongate and pointed anteriorly, the caudal deeply forked. The strong preopercular spine is 0.7 to 0.9 of the eye.

The color in alcohol is dark purplish brown, paler beneath, and becoming very pale yellowish on the caudal peduncle. There is a dark longitudinal band on each row of scales, posteriorly more or less orange between the soft dorsal and anal. The fins are all very pale yellowish, without markings.

Here described from 2 specimens from the reef at Maraa, Tahiti, 106 and 147 mm. in length. A specimen, 89 mm. long, was taken at Malo Island, New Hebrides.

### **Holocentrus rubellio** Seale.

*Holocentrus rubellio* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 22, fig. 5—Tahiti.

Dorsal XI-I, 14; anal IV, 9; there are 40 scales in the lateral line, 4 above and 7 below it. The depth is 2.6, the head 2.9 times in the length. The eye is 3 times in the head. The short, pointed snout is 0.8 of the eye.

The color in life was bright pink, the vertical fins and caudal like the body. In alcohol the sides are somewhat dusky, with 9 pale yellow longitudinal bands, whitish yellow below, and behind a line from the origin of the second dorsal to the origin of the anal. The fins are all yellowish white. Neither when fresh nor preserved is there a white or silvery spot on top of the caudal peduncle behind

the dorsal, as there is in *Holocentrus caudimaculatus* Rüppell, with which Fowler has placed this species.

One specimen, 133 mm. long, was collected at the island of Moorea.

### *Holocentrus laevis* Günther.

*Holocentrum laeve* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 47—Louisade Archipelago, Guadalcanar, Solomon Islands, Amboina; Fische der Südsee, 1, 1873-75, p. 101, pl. 65, fig. B.

*Holocentrus laevis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 226; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 101, fig. 20.

*Holocentrum goldiei* Macleay, Proc. Linn. Soc. N. S. Wales, 7, 1882, p. 352.

*Holocentrum novae-britanniae* De Vis, Proc. Linn. Soc. N. S. Wales, 8, 1884, p. 447.

*Flammeo achromopterus* Fowler, Proc. Acad. Nat. Sci. Phila., 1904, p. 236, fig. 6.

Dorsal X-I, 11; anal IV, 7; there are 39 to 41 scales in the lateral line, plus 2 on the caudal base, 3 above and 7 below it. The body is elongate, slender, the chin projecting a little, the depth 3.2 to 3.4 times, the head 3 times, the third anal spine 4.4 to 4.8 times in the length. The eye is 2.85 to 2.9, the snout 3.67 to 4, and the interorbital 4 times in the head. The deeply forked caudal is three-fourths of the length of the head.

The color in alcohol is brilliant grayish silver, with a roseate flush dorsally, and opalescent and pearly reflections everywhere. The scales on the cheeks are marked with indistinct dark spots. The fins are all very pale yellowish, the caudal with its upper and lower margins darkened, as are also the tips of the dorsal spines and the anterior margin of the soft dorsal. The iris is very pale golden with a roseate flush.

Here described from 2 specimens from the reef at Maraa, Tahiti, their lengths 120 and 144 mm. Eight fine specimens were taken at Tenibuli, Ysabel Island, Solomon Islands, their lengths from 120 to 148 mm.

### *Holocentrus unipunctatus* Günther.

*Holocentrum unipunctatum* Günther, Fische der Südsee, 1, 1873-75, p. 95, pl. 65, fig. A—Solomon Islands, Tonga; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 98.

Dorsal XI-I, 12; anal IV, 9; there are 41 to 43 scales in the lateral line, plus 1 or 2 more on the caudal base, 4 above and 8 or 9 below it; predorsal scales 6. The depth equals the head, 2.8 times

in the length. The eye is 2.8, the snout 3.3, the interorbital 5.5, the maxillary 2.44, the least depth of the caudal peduncle 4.12 times in the head. The third and fifth dorsal spines are longest, 2.44 times in the head. The third anal spine is very large, 1.57 times in the head or 4.38 times in the length. The deeply forked caudal, the pectoral, and the ventral are of equal length, 3.83 times in the total length. The maxillary hardly extends back below the middle of the eye. The preorbital has 2 coarse teeth anteriorly, followed by several smaller ones and another coarse one. The suborbital and postorbital are finely serrate. The nasal bone ends in a flat bifurcate spine. The opercle has 2 flat spines, the upper one the larger.

The color in alcohol is golden to whitish yellow, with a longitudinal stripe of brownish or golden along the middle of each row of scales. The fins are all whitish, with a dark brown spot on the basal part of the membrane between the first and second dorsal spines. A specimen, 104 mm. long, taken at Auki, Malaita Island, in the Solomons, was uniform bright red in life with a pale spot in the axil of the soft dorsal and a small dark spot at the base of the membrane between the first and second dorsal spines. In alcohol the color is dark violaceous brown dorsally, paler on the sides, becoming yellowish above the anal and on the caudal peduncle, the fins all pale yellowish. The characteristic small dark brown spot is present at the base of the membrane between the first and second dorsal spines.

This specimen has the dorsal XI-I, 14; anal IV, 10; lateral line with 43 scales plus 2 more on the caudal base, 5 above and 9 below it. Depth 2.5, head 2.6, third anal spine 4.33, caudal 3.85, the pectoral 4 times in the length. The eye and snout are equal, 3.4 times in the head. The interorbital is 7, maxillary 2.63, preopercular spine 3.95, least depth of the caudal peduncle 3.95 times in the head. The third and fourth dorsal spines are longest, 2.2 times in the head.

A specimen, 100 mm. long, from Tenibuli, Ysabel Island, Solomons, has a dusky violet spot on the base of the membrane behind the soft dorsal and the proportions vary a little from those already given. In life the general color was red with a violet bar on each scale. In alcohol the color is reddish yellow with alternate reddish dusky and pale stripes above and yellow and paler longitudinal stripes below the lateral line. Each scale below the lateral line has a violet blue vertical bar or large spot. The scales on the sides of the head are similarly colored.

Two specimens were collected at Auki, Malaita Island, 92 and 94 mm. in length, and a specimen, 95 mm., at Hathorn Sound, New Georgia Island, Solomon Islands.

**Holocentrus sammara** (Forskål).

*Sciaena sammara* Forskål, Descr. Anim., 1775, p. xii, 48—Djedda, Red Sea.

*Holocentrus samara* Rüppell, Atlas, Fische Rothen Meers, 1828, p. 85, pl. 22, fig. 3.

*Flammeo sammara* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 155, fig. 56.

*Holocentrum tahiticum* Kner, Sitzungsber. Akad. Wiss. Wien, 29, 1864, p. 482—Tahiti; Kner, Reise Novara, Fische, 1, 1865-67, p. 9, pl. 1, fig. 2.

Dorsal XI, 12; anal IV, 8; there are 40 to 44 scales in the lateral line, and 4 more on the caudal, 4 above and 6 below the lateral line. The depth is 3.1 to 3.4, the head 2.8 times in the length. The eye is 2.8 to 3 times, the snout 3.4 to 3.5 times in the head.

This handsome and very distinct species varies considerably in the intensity of its coloration. In life it may be deep blood red or deep red with the scales margined with black, or black margined with some shade of red, the spots on the scales forming maroon or blackish longitudinal stripes, a silvery luster over all, often with purplish, golden, or greenish metallic reflections also. A large black spot is always present on the first two or three dorsal spines; in life this spot may be blood red or deep red margined with black, or black margined with some shade of red. The soft dorsal and anal may vary from clear red to golden, with a maroon stripe on the anterior rays. The caudal is colored the same, with a maroon or lighter red stripe on each lobe.

Three specimens were collected at Maraa, Tahiti, their lengths 122 to 180 mm.; 4 specimens at Moorea Island were 120 to 142 mm. in length; and 3 specimens from Bora Bora were from 128 to 173 mm. long. In the Solomon Islands 5 specimens, 96 to 110 mm. in length, were taken at Ugi Island. These specimens were much more heavily colored than those collected in the Society Islands. In alcohol the dorsal region is bluish brown or dark steel bluish above, becoming reddish brown or yellowish on the sides, each row of scales below the lateral line with a longitudinal reddish brown stripe along its middle. The preopercle has dark brown spots and the opercle is dark reddish brown except along its posterior margin. The membrane between the third and fourth anal spines and first anal ray is dark reddish brown. There is a narrow stripe of the same color along the margin of the soft dorsal, and a

broad band of like color along the upper and lower margins of the caudal. There is a large black or blackish brown spot on the soft dorsal between the first and third spines, the rest of the fin largely dark violaceous. There is a silvery luster over all, especially on the dorsal region. A specimen, 29 mm. long, from Tulagi also seems to belong here.

### **Holocentrus lacteo-guttatus** Cuvier and Valenciennes.

*Holocentrum lacteoguttatum* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 214—Indian Ocean.

*Holocentrus guttatus* Fowler, Fishes of Oceania, Mem. Bishop Mus., 10, 1928, p. 100, fig. 19.

*Holocentrum punctatissimum* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 215.

*Holocentrus punctatissimus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 162; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 24.

*Holocentrum stercus muscarum* Cuvier and Valenciennes, 7, 1931, p. 378.

*Holocentrum diploxiphus* Günther, Proc. Zool. Soc. Lond., 1871, p. 660, pl. 60.

Dorsal XI-1, 14; anal IV, 10; there are 43 scales in the lateral line plus 3 on the caudal base, 5 above and 7 below the line. The depth is 2.9, the head 2.8, the caudal 3.7, the pectoral 4 times in the length. The eye is 2.5, the snout 4.4, the interorbital 3.5, the least depth of the caudal peduncle 1.58, the preopercular spine 2.2 times in the head. The second anal spine equals the caudal.

The color in alcohol is pale brownish white with violet reflections over all and alternate longitudinal darker and paler stripes, the latter more or less pale golden to silvery, the region along the base of the dorsal somewhat darker. The spinous dorsal has a row of brown spots along its middle, exactly as shown in Günther's figure of young *H. diploxiphus*. The fins otherwise are all pale. The smaller specimen also has coarse reddish brown specks scattered over the sides and under parts.

Here described from 2 specimens, 56 and 85 mm. long, taken at Tenibuli, Ysabel Island, Solomons.

### **Holocentrus caudimaculatus** Rüppell.

*Holocentrus caudimaculatus* Rüppell, Neue Wirbelt., Fische, 1835, p. 97—Red Sea (on *H. spinifer* Rüppell, 1828); Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 223; Fowler, Mem. Bishop Mus., 10, 1928, p. 98.

*Holocentrum caudimaculatum* Günther, Fische der Südsee, 1, 1873-75, p. 95; Bleeker, Atlas Ichth., 9, 1878, pl. 356, fig. 3; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 247.

*Holocentrus spinifer* (not of Forskål) Rüppell, Atlas, Fische, 1828, p. 86, pl. 23, fig. 1.

*Holocentrus borvici* Jordan and Snyder, Proc. U. S. Nat. Mus., 29, 1906, p. 353, fig. 1.

Dorsal XI, 14 or 15; anal IV, 9 or 10. There are 43 or 44 scales in the lateral line and sometimes one or two additional ones on the caudal base, 3 above and 7 below the line. The body is elongate, oblong, the anterior dorsal profile forming a steep straight line from the nape to the tip of the sharp snout, the lower jaw projecting noticeably. The depth is 2.6 to 2.44, the head 2.6 to 2.7, the third anal spine 4.7 to 5, the caudal 4 times in the length. The eye is 3.7 to 3.9, the snout 3.25 to 3.5, the interorbital 7.1 to 7.4 times in the head.

The color in alcohol is grayish yellowish, the anterior upper half more or less purplish red, each row of scales with a longitudinal paler band, everywhere more or less silver lustrous; a purplish or silvery white spot on top of the caudal peduncle in the axil of the soft dorsal. The fins are all uniformly pale yellowish, without spots or bands. There is a dark spot at the upper end of the posterior margin of the preopercle and another at the base of the upper opercular spine.

Here described from 4 specimens, 138 to 174 mm. in length, collected at Maraa, Tahiti. In the living fish the spot on the caudal peduncle is brilliant and conspicuous.

A specimen, 119 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### **Holocentrus spinifer** (Forskål).

*Sciaena spinifera* Forskål, Descr. Anim., 1775, pp. xii, 49—Djedda, Red Sea.

*Holocentrum spiniferum* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 374.

*Holocentrus spinifer* Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), p. 161, pl. 8.

*Holocentrum leo* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 152—Bora Bora; Quoy and Gaimard, Voy. Astrolabe, Zool., 3, 1834, p. 678, pl. 14, fig. 3.

Dorsal XI or XII-I, 13 or 14; anal IV, 9, or rarely 10. There are 42 to 45 scales in the lateral line, 4 above and 9 or 10 below it. The depth is 2.4, the head 2.6 times in the length. The eye is 3.6 to 3.8, the snout 3.4 to 3.6, the interorbital varies from 7 to 8.5 in head, 1.9 to 2.2 in eye, the maxillary 2.5 times in the head. The third dorsal spine is longest, about twice in the head. The third

anal spine is twice in the head. The depth of the caudal peduncle is 4 times in the head, 1.67 times in its own length. The caudal is 1.5 times in the head. The pectoral is a trifle longer than the caudal, the long-pointed ventrals equal to the caudal.

The color in alcohol is dusky grayish brown above and anteriorly, fading to yellowish white behind a line from the posterior end of the spinous dorsal to the tip of the ventrals. There is a dark spot behind the eye and another one behind that, and a brick red area on top of the head behind the interorbital. There is a series of longitudinal bands, dark above the lateral line, reddish or golden below it, along the center of each row of scales. The spinous dorsal is yellow, the other fins all whitish. There is a dusky blotch in the axil of the soft dorsal of large specimens.

Eight specimens, 96 to 158 mm. in length, were collected at Bora Bora. One specimen had 12 dorsal spines, the others 11. Six very fine specimens, 104 to 176 mm. in length, were taken at Tenibuli, Ysabel Island, Solomon Islands.

### **Holocentrus binotatus** Quoy and Gaimard.

*Holocentrum binotatum* Quoy and Gaimard, Voy. Astrolabe, Zool., 3, 1834, p. 679, pl. 14, fig. 4; Bleeker, Atlas Ichth., 9, 1878, pl. 360, fig. 2.

*Holocentrus binotatus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 224; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 98.

Dorsal XI-1, 12; anal IV, 9. Fowler gives the anal with 3 spines, but there are 4, the first one minute. There are 46 scales in the lateral line plus 3 more on the caudal base in one specimen, 48 plus 2 in the other. There are 4 scales above and 8 below the lateral line and 8 predorsal scales. The depth is 3.15 to 3.3, the head 2.8, the third anal spine about 3.7, the caudal 4.3 to 4.4, the pectoral 4.3 to 4.6 times in the length. The eye is 2.7 to 2.8, the snout 4 to 4.14, the interorbital 4.66 to 4.8, the least depth of the caudal peduncle 4.2 to 4.3 times in the head. The preopercular spine is short, less than half the eye, 6.25 to 7.25 times in the head. The fourth dorsal spine is longest, 5.12 times in the head.

The color in alcohol is pale yellowish with 7 or 8 longitudinal dark brownish reddish stripes, the fins all pale yellowish. Between the first and second, and second and third dorsal spines are 2 dark brownish spots or blotches, which may be small and basal, or may cover a large part of the membrane.

Two specimens, 79 and 82 mm. in length, were taken at Tenibuli, Ysabel Island, Solomon Islands.

**Holocentrus diadema** Lacépède.

*Holocentrus diadema* Lacépède, Hist. Nat. Poiss., 9, 1799, pp. 235, 290, 292, "les manuscrits de Commerson," (pl. 97, fig. 3, 1833, fine colored figure); Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), part 1, p. 159, pl. 10; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 102, pl. 7, A.

*Holocentrum diadema* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 213; Lesson, Voy. Coquille, 2, 1830, p. 220, pl. 25, fig. 2; Bleeker, Atlas Ichth., 9, 1878, pl. 356, fig. 1; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 238.

Dorsal XI, 12 or 13; anal IV, 9. There are 47 or 48 scales in the lateral line, 3 above and 7 below it. The depth is 2.95 times, the head 3 times in the length. The large eye is 2.5 to 2.7 times, the snout 4 times in the head. The spine at the preopercular angle is large, extending beyond the gill opening. The anterior dorsal spines are strong and sharp, the fourth and fifth longest, 1.75 times in the head. The third anal spine is very large, 1.33 times in the head. The soft dorsal and anal rays are longest anteriorly, 1.5 or 1.6 times in the head. The rather small caudal is deeply forked, about 1.25 times in the head. The pectoral is 1.4 times in the head.

In life the color is rose red or dark red, the dorsal region darkest, with 9 or 10 longitudinal white lines; the spinous dorsal is dark blood red or brownish black, with a narrow white stripe near the base ending at the fifth or sixth spine, and another white stripe above the middle from the sixth or seventh to the eleventh spine, all the spines tipped with white. The membrane between the third and fourth anal spines is very dark purplish or reddish black. The fins otherwise are roseate to deep red. In alcohol the color is yellowish or reddish brown, with more or less silvery luster, with 9 longitudinal pale or white lines. The spinous dorsal is dull black, with white lines as in life. The other fins are all pale yellow to colorless, with the membrane between the third and fourth anal spines blackish in color.

Here described from 3 specimens from Maraa, Tahiti, 63 to 99 mm. in length, and 3 specimens, 79 to 85 mm. in length, from Moorea. A typical specimen, 91 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

An aberrant specimen, 56 mm. long, from Takaroa, Tuamotu Archipelago, is placed here. The head equals the depth, 3.2 times in the length. The eye is 2.85 times in the head. There are 50 scales in the lateral line. The color in alcohol is purplish brown above, whitish below, a brilliant silver luster over all. The spinous

dorsal is black with white markings exactly as figured by Bleeker for his *Holocentrum cornutum* (Atlas Ichth., 9, 1878, pl. 359, fig. 5).

### **Holocentrus microstomus** Günther.

*Holocentrus microstoma* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 34—Amboina; Günther, Fische der Südsee, 1, 1873-75, p. 98, pl. 64, fig. B.

*Holocentrus microstomus* Fowler, Proc. Acad. Nat. Sci. Phila., 1901, p. 325; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 24; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 226; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 103.

*Holocentrus thorntonensis* Fowler, Proc. Acad. Nat. Sci. Phila., 1904, p. 231, fig. 4.

Dorsal XI-I, 12 or 13; anal IV, 9. There are 47 or 48 scales in the lateral line, plus 1 or 2 on the caudal base, 4 above and 8 or 9 below the lateral line. The depth is 3, the head 2.85, the caudal about 4, and the third anal spine 3.25 times in the length. The eye is very large, flush with the dorsal profile, about 3 times in the head. The short sharp snout is nearly 4 times in the head, the interorbital 4.1 times. The body is compressed, elongate, the least depth of the slender caudal peduncle nearly twice in its length or 4 times in the head. The mouth is small, the lips even or the lower jaw slightly projecting. The third anal spine is very large, reaching nearly to the middle of the caudal, seven-eighths of the head. The pectoral is slender, 1.5 times in the head. The caudal is deeply forked, about 1.75 times in the head.

The color in alcohol is silvery white on the lower two-thirds, the dorsal region pale reddish, a metallic luster over all, the sides sparingly sprinkled with dark brown dots. There is a conspicuous longitudinal whitish band along each row of scales. There is a white longitudinal band along the upper part of the spinous dorsal, above it a blackish bar or row of blackish blotches, most marked anteriorly. The rest of the fin is dusky reddish, with a blackish bar beneath the posterior two-thirds of the white band.

Here described from 4 young specimens, 50 to 56 mm. in length, from Makatea Island, Tuamotu Archipelago. A specimen, 92 mm. long, from Bora Bora has the depth 3.12, the head 2.85, the caudal about 4, and the third anal spine 3.3 times in the length. The eye is 2.8, the snout 3.85, the interorbital 4.5 times in the head. The sides are striped alternately with reddish brown and whitish brown bands, which become narrower behind. The spinous dorsal is pale with a submarginal blackish band, broad on the first two membranes, then much narrower. The other fins are all very pale brownish,

nearly colorless. Four specimens, 75 to 115 mm. long, were taken at Malo Island, New Hebrides. One of these, with dark longitudinal stripes, is a duplicate of Günther's figure cited above.

**Holotrachys lima** (Cuvier and Valenciennes).

*Myripristis lima* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 493—Mauritius.

*Myripristis (Holotrachys) lima* Günther, Fische der Südsee, 1, 1873-75, p. 93, pl. 63, fig. A; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 252.

*Holotrachys lima* Seale, Occ. Papers Bishop Mus., 1, 1902, pp. 18, 20, 21; Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), p. 147, pl. 4; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 222, fig. 25.

Dorsal XII, 15; anal IV, 11. There are 40 scales in the lateral line, 4 above and 11 below it. The oblong body is not much compressed anteriorly, the head thick, the anterior profile in a bold curve from the dorsal origin to the tip of the snout. The depth is 2.35, the head 2.66, the caudal 4 times in the length. The eye is 3.3, the snout and interorbital equal, 5 times in the head. The bony, notched snout overhangs the lip. The snout, orbital, suborbital, and opercular bones all with denticulate or spiny edges. All the scales very rough with strong spines.

The color in alcohol is pale reddish to yellowish, the fins all very pale yellowish.

Here described from a specimen, 80 mm. long, collected at Maraa, Tahiti.

**Myripristis adustus** Bleeker.

*Myripristis adustus* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 108—Amboina; Atlas Ichth., 9, 1878, pl. 356, fig. 2; Macleay, Proc. Linn. Soc. N. S. Wales, 7, 1882, p. 352; Herre, Occ. Papers Bishop Mus., 2, 1903, p. 128; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 26; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 220; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 106.

*Myripristis murdjan* var. *adusta* Günther, Fische der Südsee, 1, 1873-75, p. 92, pl. 62.

Dorsal XI-I, 14; anal IV, I, 13. There are 27 or 28 scales in the lateral line, 2 above and 6 below it. The depth is about 2.3, the head 2.75 to 2.85, the forked caudal 3.1 to 3.2, the pectoral 4.15 to 4.25 times in the length. The very large eye is 2.4 to 2.5, the blunt snout 4.9 to 5.1, the interorbital 3.9 to 4 times in the head.

The color in life is violet or bluish gray, becoming violaceous yellow below, the scales on the upper third broadly margined with

violet brown, the top of the head bluish or violet. A blackish red spot is on the tip of the opercle and another at the pectoral axil, the spinous dorsal is blood red with a broad violet black margin. The soft dorsal, anal, and caudal are each yellow with a reddish base and a broad black patch posteriorly and marginally. The color in alcohol is yellow, the upper third dusky violet with scales broadly margined with blackish brown. The spinous dorsal is broadly margined with chocolate brown, the rest of the fin dusky violet. The soft dorsal, anal, and caudal are conspicuously tipped or margined with black, the fins otherwise yellow. There is a large black opercular spot.

Two specimens, 124 and 146 mm. long, were obtained at Tenibuli, Ysabel Island, New Hebrides.

### *Myripristis intermedius* Günther.

*Myripristis murdjan* var. *intermedia* Günther, Fische der Südsee, 1, 1873-75, p. 92—Samoa.

*Myripristis intermedius* Jordan and Snyder, Proc. U. S. Nat. Mus., 29, 1906, p. 353; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 220; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 107.

This species is very similar to *M. murdjan*, from which it differs chiefly in having the tips of the soft dorsal and anal, and usually those of the caudal also, more or less blackened or dusky. Specimens in alcohol have each scale marked by a vertical dusky bar on its posterior margin; the dorsal region is also darker than in *M. murdjan*. The black opercular band and pectoral axillary spot are very dark, large, and conspicuous. There is a brown or dusky stripe along the anterior margin of the soft dorsal and anal and the upper and lower margins of the caudal.

From the Marquesas group a specimen, 129 mm. long, was collected at Atuona, Hiva Oa Island, and 6 specimens, 52 to 61 mm. long, from Nuka Hiva Island. In the Society Islands the following were collected: Maraa, Tahiti, 4 very perfect specimens, 110 to 155 mm. in length; 2 at Moorea Island, 122 and 205 mm. in length; and 2 at Bora Bora, 117 and 150 mm. in length. Three specimens were taken at Tenibuli, Ysabel Island, Solomon Islands, their lengths 87 to 99 mm.

### *Myripristis murdjan* (Forskål).

*Sciaena murdjan* Forskål, Descr. Anim., 1775, p. 48—Red Sea.

*Myripristis murdjan* Rüppell, Atlas Reise Nord. Afrika, Fische, 1828, p. 86, pl. 23, fig. 2; Günther, Fische der Südsee, 2, 1873-75, p. 92, pl. 61, not

*intermedia* and *adusta*; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 152, pl. 5.

Dorsal X-I, 14; anal IV, 12 or 13. There are 28 to 30 scales in the lateral line, 4 above and 7 below it. The body is strongly compressed, the dorsal region thickened anteriorly, the depth 2.25 times, the broad head 3 times in the length. The very large, circular eye is 2.3 times, the blunt snout 5.5 times in the head. The lower jaw projects slightly. The mouth is strongly oblique, the posterior margin of the maxillary not extending to the hind margin of the eye.

In life the color is a beautiful clear red, the scales paler centrally, with a black bar on the posterior margin of the opercle as far as the pectoral, the anterior rays of the soft dorsal and anal and the caudal margins white. The fins are deep red, but the dorsal spines may be pink or the upper half of the spinous dorsal may be orange. The axil of the pectoral is blackish blood red. In alcohol the color is yellow with a silvery luster, the scales of the dorsal region with dusky margins, and a black mark on the upper margin of the eye; a dark brown or blackish bar on the hind margin of the opercle and a black spot in the pectoral axil. The fins are all pale yellowish. Sometimes the red fades but little, the red color of life largely persisting.

Specimens of this common fish were obtained as follows: 2 from Cocos Island, 125 and 210 mm. long; 1 from Takaroa Island, Tuamotu Archipelago, 168 mm. long; 1 from Moorea Island, 198 mm. long; 1 from Bora Bora, 89 mm. long; and 1 from Suva, Fiji Islands, 135 mm. long. A specimen, 146 mm. long, was taken at Bushman Bay, Malekula Island, New Hebrides, one, 134 mm. long, at Malo Island, and one, 69 mm. long, at Vila, Efate Island, in the same group. In the Solomon Islands 12 specimens, 80 to 130 mm. in length, were collected at Tenibuli, Ysabel Island.

***Myripristis undecimalis* Herre. Fig. 2.**

*Myripristis undecimalis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 393.

Dorsal XI-I, 14; anal IV, 12; scales 3-28-6, predorsal 7. Depth 2.2, head 2.9 in length. Eye 2.23, snout 4.67, maxillary 1.78, fourth dorsal spine 1.68, third and fourth anal spines 2.6, pectoral 1.25, ventral 1.4 in head. Interorbital 1.66, width of expanded end of maxillary 2.2, snout 2 in eye. Body compressed, thickened in anterior third, dorsal and ventral profiles nearly equally convex. Head and snout boldly convex. Eye prominent. Interorbital has

4 strong ridges, 2 median and 1 on each side. Mouth oblique, lower jaw barely projecting. An external cluster of 6 short, conical teeth at each anterior angle of the symphysis. One or 2 similar teeth at each anterior angle of upper jaw. Maxillary reaches to posterior fourth of eye. A few very small teeth on lower side of posterior extremity of maxillary. Bones of head all finely serrate, opercular spine not much enlarged. Dorsal spines slender, not very strong. Anterior rays of soft dorsal 2.5 times posterior

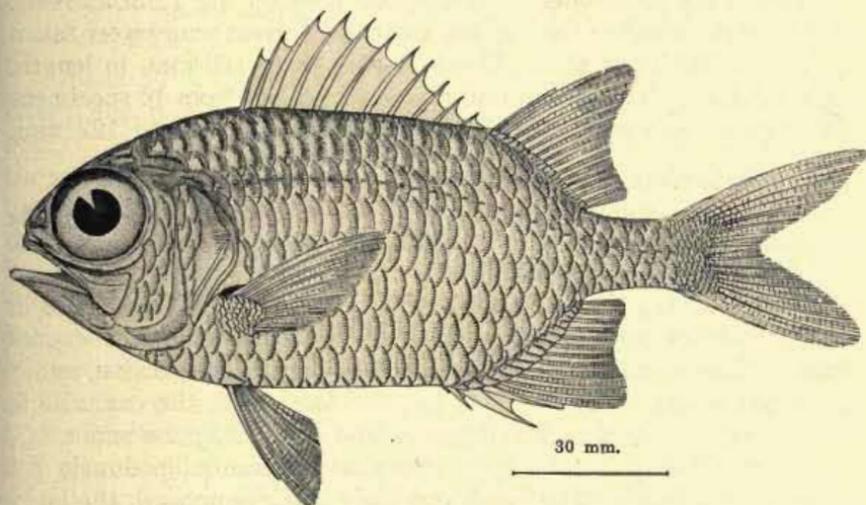


FIG. 2. *Myripristis undecimalis* Herre, type, Takaraoa, Tuamotu Islands.

ones, slightly longer than fourth dorsal spine. Third anal spine about twice as stout as fourth. First anal rays as long as longest dorsal rays. Caudal peduncle slender. Caudal deeply forked, longer than the head.

One specimen collected at Takaraoa, Tuamotu Islands.

### *Myripristis microphthalmus* Bleeker.

*Myripristis microphthalmus* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 261—Amboina; Atlas Ichth., 9, 1878, pl. 358, fig. 2; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 220; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 107.

Dorsal X-I, 14; anal IV, 12. There are 28 scales in the lateral line, and 3 more on the caudal base, 3 scales above and 6 below the lateral line, and 8 predorsal scales. The depth is 2.15 to 2.25, the head 2.85 to 3 times in the length. The eye is very large, 2.3 times

in the head. The very short, blunt and steeply curved snout is 2.35 times in the eye, 5.5 to 5.6 times in the head.

In life the color is deep red or blood red, each scale on the upper half with dark edges, and a silvery sheen over all. The fins are all bright red, the caudal peduncle and caudal paler. There is a very dark blood red or deep red crossbar on the posterior edge of the opercle, beginning above the gill opening and extending to the axil of the pectoral.

This is the commonest of the holocentrids on the Tahitian reefs, and is much prized as food by the natives. A great many were taken at Maraa, Tahiti; of these, 12 specimens, 48 to 160 mm. in length, were retained. The description above was taken from 10 specimens collected at Moorea. Their lengths varied from 94 to 122 mm.

#### *Myripristis violaceus* Bleeker.

*Myripristis violaceus* Bleeker, Nat. Tijds. Ned. Ind., 2, 1851, p. 234—Banda Neira; Atlas Ichth., 9, 1878, pl. 357, fig. 5; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 106.

Dorsal X-I, 14; anal III, 13. There are 28 tubulated scales in the lateral line and 4 more scales without tubules on the caudal base. There are 4 scales above and 6 below the lateral line, and 8 predorsal scales. The depth is 2.3, the head 2.85, the caudal 3.5, the pectoral 4 times in the length. The eye is 2.3, the snout 4.7, the interorbital 3.75, the least depth of the caudal peduncle 3.4 times in the head. The head and body are compressed, the body especially so posteriorly, the anterior third thick and heavy. The eye is very large, circular, and high. The broad, convex snout is blunt and short. The mouth is large, strongly oblique, the chin slightly projecting, the maxillary extending beneath the posterior part of the eye. The edges of the preorbital, suborbital, preopercle, interopercle, opercle, subopercle, and suprascapula are finely to moderately serrate. The deeply forked caudal is nearly all covered with minute scales, the basal ones very little larger than the others.

In life the color is beautiful dark reddish violet, the posterior margin of each scale with a broad dark violet vertical bar, with a silver luster over all. On the membranous flap behind the upper part of the opercle is a very dark red bar. A blackish violet spot is concealed in the pectoral axil. The fins are all dusky red, the pectorals, soft dorsal, and anal paler than the others. In alcohol the color is violaceous brown, each scale with a broad violet gray vertical bar. There is a black bar on the hind margin of the opercle above the pectoral, and a violaceous black blotch in the pectoral

axil. The fins are all yellowish gray with violaceous dusky shadings, the caudal is darkest, the soft dorsal, the anal, and the pectorals are whitish.

Here described from a specimen, 131 mm. long, taken at Hog Harbor, Espiritu Santo Island, New Hebrides.

### *Myripristis leiognathos* Valenciennes.

*Myripristis leiognathos* Valenciennes, Voy. Venus, Zool., Ichth., 1855, p. 316, 1846, pl. 4, fig. 1—New Ireland; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 21 (after Valenciennes); Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 109 (after Valenciennes).

Dorsal XI-I, 13; anal IV, 14. There are 36 tubulated scales in the lateral line, plus 2 more on the caudal base, 3 above and 7 below the line. There are 8 predorsal scales. The depth is 2.5, the head 3, the caudal 3.26, the pectoral 3.7 times in the length. The very large circular eye is 2.16, the snout 4.875, the interorbital 3.54, the least depth of the caudal peduncle 3.42, the maxillary 1.86 times in the head. The head is thick and heavy, the interorbital broad and ridged, the snout blunt. The maxillary extends to a vertical from the posterior margin of the eye and has 3 or 4 small teeth on its lower margin on one side, 2 on the other side of the head. On either side of the curved notch in the upper jaw is a tooth or 2, and 1 or 2 small teeth on each side of the symphysis. The teeth in the jaws are very small, the tongue smooth. The second, third, and fourth dorsal spines are subequal, longer than the others, 1.95 times in the head. The third and fourth anal spines are of equal length, 3.4 times in the head. The ventral spine equals the eye. The caudal is deeply forked.

In alcohol the color is yellowish, darker and somewhat reddish above, with a paler or golden longitudinal stripe along the middle of each row of scales. There is a narrow dark brown opercular bar and small brown axillary spot on the pectoral base. The fins are all pale yellowish or reddish.

Here described from a specimen, 116 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands, the first one taken since the voyage of the Venus.

### *Myripristis occidentalis* Gill.

*Myripristis occidentalis* Gill, Proc. Acad. Nat. Sci. Phila., 1863, p. 87—Cape San Lucas.

Dorsal X-I, 13; anal IV, 12. There are 36 scales in the lateral line, 3 above and 6 below it. The body is elliptical, thick anteriorly

and above, compressed posteriorly, the dorsal and ventral profiles nearly equal. The mouth is oblique, the lower jaw included. The maxillary extends to a point beneath the posterior margin of the eye. The head is 3 times, the depth 2.5 times in the length. The eye is 2.5 times in the head, twice as long as the short, blunt snout.

The color is cardinal red in life, darker on the snout and top of the head back to the origin of the dorsal, paler beneath and posteriorly, with a silvery sheen over all. There are longitudinal dusky lines on the sides but they are not very distinct. The fins are bright red. The color in alcohol is dark red or brownish red above, paler to pale silvery red on the belly or whitish on the breast, and with faint dusky longitudinal lines along the sides between the rows of scales where they overlap. There is a large black spot on the upper part of the eye. The fins are colorless, or the soft dorsal, anal, and caudal are pale yellowish.

Eleven specimens were obtained at Cocos, from 83 to 112 mm. in length.

**Myripristis mooreanus** Herre. Fig. 3.

*Myripristis mooreanus* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 10 (name only).

*Myripristis mooreanus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 394.

Dorsal X-I, 14; anal IV, 13 or 14; scales 4-38-6, predorsal 8. Depth 2.4 to 2.5, head 2.94 to 3 in length. Eye 2, snout 5 to 5.3, interorbital 3.6, maxillary 1.75, third dorsal spine 2 in head. Interorbital 1.6 to 1.75, third and fourth anal spines 1.5 to 1.67 in eye. Body compressed, rather thick forward, dorsal and ventral profiles moderately convex. Head short and thick, upper profile descending steeply from dorsal origin. Eye large, prominent, high up. Snout broad, blunt, boldly convex, very short. Interorbital broad, with 2 ridges, nearly flat. Mouth very oblique, lips equal. Maxillary reaches about to rear of eye. Lower edge of maxillary smooth or with a few tiny serrations near posterior angle. Margins of head bones finely to minutely serrate, opercle with a moderately strong spine. Dorsal spines weak, slender, the third longest. Dorsal rays barely higher than longest spine. Third anal spine much stouter than fourth. Anal rays higher than those of dorsal. Caudal deeply forked, about equal to head. Pectoral slender, nearly equal to head without snout.

Six specimens collected at Moorea Island, Society Islands.

**Myripristis pralinius** Cuvier and Valenciennes.

*Myripristis pralinius* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 170—New Ireland; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 20; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 222; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 253, fig. 69.

*Myripristis pralinius* Sauvage, Madagascar, Poiss., 1891, p. 17, pl. 2, fig. 2.

*Myripristis pralinius* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 108.

*Myripristis seychellensis* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 172; Sauvage, Madagascar, Poiss., 1891, p. 12, pl. 2, fig. 1, and pl. 3, fig. 2.

Dorsal X-I, 15 or 16; anal IV, 14 or 15. There are 38 to 41 scales in the lateral line, 3 above and 7 below it. The depth is

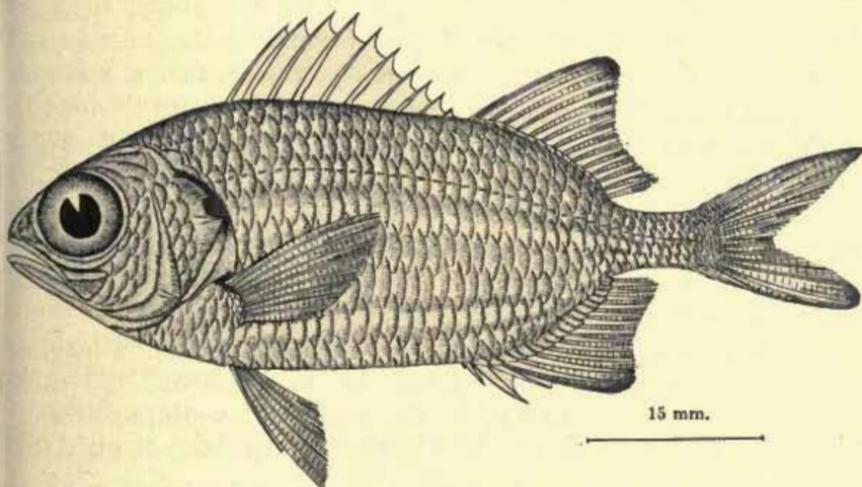


FIG. 3. *Myripristis mooreanus* Herre, Moorea Island, Society Islands.

2.33 to 2.5, the head 3 or 3.1 times in the length. The very large eye is 2.25 to 2.4, the snout 5, the interorbital 3.75 to 4 times in the head. The deeply forked caudal is a little longer than the head. The body is oblong, compressed, thickened anteriorly, the dorsal and ventral profiles evenly curved. The eye is flush with the upper profile, the snout very short and blunt. The mouth is large, oblique, the posterior angle of the maxillary extending beyond the pupil.

In life the color is glowing crimson, with a darker red or blackish red bar on the posterior margin of the opercle from its upper angle to the pectoral axil. The fins are all very bright red, the ventral, anal, and soft dorsal edged with white. In alcohol the color is

grayish red to brownish red, paler below, with reddish golden longitudinal bands above and broad silvery bands below the lateral line, corresponding to the rows of scales. A broad blackish cross-band extends from the upper angle of the opercle to the pectoral axil. The iris is golden red, with a blackish spot on its upper part. The fins are all pale yellowish.

Here described from 8 specimens, 51 to 140 mm. long, from the reef at Maraa, Tahiti, where it was very abundant. Perhaps more than a hundred specimens were collected and given to the natives, by whom it is highly prized as food. This is a very beautiful fish in life.

#### Family SYNGNATHIDAE

##### *Choeroichthys sculptus* (Günther).

*Doryichthys sculptus* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 185—Fiji.

Trunk rings 19; caudal rings 23; dorsal 30.

This species is quite variable in color and markings. Four specimens from Suva Harbor, Viti Levu Island, Fiji, 36 to 58 mm. in length, were pale cream color, with a large circular brown spot on each shield of the trunk and tail rings, on the dorsal, lateral, and ventral surfaces. There are similar but smaller spots on the opercles, snout, cheeks, top, and under side of the head.

Six specimens, also from Suva Harbor, 35 to 56 mm. in length, were dark brown, the lateral shields of the trunk and tail each with a pair of pearl-colored spots; the caudal with a white posterior margin. These were all caught while we were fishing at night by electric light.

A specimen, 38 mm. long, from Nukulau Island, Fiji, was uniform dark brown, without markings.

Five specimens from the tide pools of Malekula Island, opposite Wala Island, New Hebrides, were variously marked. Some had a white spot on each lateral shield. Others had large dark brown spots on the under side of the head and trunk, and along the lower part of the side. All had paired whitish spots along the upper side of the trunk and tail. Their lengths were from 44 to 45 mm.

##### *Coelonotus argulus* (Peters).

*Syngnathus argus* Peters, Bericht Verh. Akad. Berlin, 1852, p. 685 (not of Richardson).

*Coelonotus argulus* Peters, Bericht Verh. Akad. Berlin, 1855, p. 465; Reise nach Mossambique, Zool., 4, 1868, p. 106, pl. 20, fig. 4; Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 189.

*Coelonotus argus* Duncker, Rev. Syngnathidae I, Mitt. Naturh. Mus. Hamburg, 32, 1915, p. 56; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 57.

*Coelonotus biocellatus* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 188.

Dorsal 45 to 48 in my specimens (42 to 53 according to Duncker); anal 4; pectoral 16 or 17; caudal 9; trunk rings 16, caudal rings 38 or 39. The body is rather plump and rounded in my specimens, said to be much compressed in adult females. The depth is 24 to 24.3 times, the head 9.2 to 9.5 times in the length. The eye is 6.1 to 6.5 times in the head, about 2.5 times in the snout. There are 3 feebly developed longitudinal ridges on the snout, which is 2.44 times in the head and is very little shorter than the postorbital part of the head. There is a very poorly developed keel along the middle of the opercle, which extends across only the anterior third or is almost absent, breaking up into a number of weak radiating lines. The shields are transversely striated. The cristae are typical of the genus, inconspicuous and feebly developed. The tail is more than twice the length of the trunk, and 1.55 to 1.6 times the head and trunk together. The long dorsal extends over 3 or 4 trunk and 8 or 9 caudal rings. The caudal fin is 1.8 times in the head.

The color in alcohol is brown, dark above and pale beneath. There are two rows of black ocelli with pale margins on each side of the trunk, passing gradually into a single row on the tail, but usually not extending beyond the dorsal fin.

Hitherto known only from Comoro and Madagascar off the coast of Africa, and Flores in the East Indies.

Four fine specimens, 92 to 105 mm. in length, were taken from a small stream near Atuona, Hiva Oa Island, Marquesas. They correspond exactly to the excellent description and figure given by Peters in his treatment of the river fishes of Mozambique.

### *Microphis brachyurus* (Bleeker).

*Syngnathus brachyurus* Bleeker, Verh. Bat. Gen., 25, 1853, Trosk. Viss., p. 16—Batavia.

*Microphis brachyurus* Bleeker, Act. Soc. Sci. Indo-Neerl., 8, 1860, 8th Bijdr. Viss. Sumatra, p. 72; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1906, p. 214, fig. 20; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 264; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 44, fig. 21; Duncker and Mohr, Mitt. Zool. Mus. Hamburg, 41, 1925, p. 13.

*Doryrhamphinarum brachyurum* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 111, fig. 22.

There are 21 trunk rings, 23 or 24 caudal rings in my specimens and 38 or 39 dorsal rays. The head is 4.5 to almost 5 times in the length. The depth varies with age, sex, and condition. In specimens from 95 to 154 mm. long it ranges from 22.5 to nearly 26 times in the length. The snout is 1.56 to 1.8 times, the eye 8.33 to 11.33 times in the head. The operculum has a complete longitudinal keel with several ridges radiating from it on the lower side. The transversely striated shields have longitudinal serrated keels, each terminating in a spine. The inferior cristae of the trunk and tail are discontinuous. The median lateral trunk cristae and the inferior cristae of the tail are continuous.

The color in alcohol is brownish gray to brown, with an obscure dark band along the side from the snout to the tail.

Six specimens, 81 to 153 mm. in length, were taken in a freshwater stream on Moorea Island.

### ***Ichthyocampus kampeni* M. Weber.**

*Ichthyocampus kampeni* M. Weber, Siboga Exp., Fische, 1913, p. 114; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 93, fig. 38.

Dorsal 20; anal 3; pectoral 13; caudal 10; trunk rings 16, caudal rings 29; subdorsal rings 1+4. The stout body is heptagonal, with prominent abdominal ridge, the tail four-sided. The greatest depth is 20.7 times in the length, the breadth more than 0.8 the depth. The trunk is contained 2.7 times in the tail, which is 58.6 per cent of the total. The head is 8.9 times in the length. The short thick snout is 2.95 times in the head. The eye equals the caudal, 4.33 times in the head. The superior and inferior cristae of the trunk are continuous with the corresponding ones on the tail. The medial lateral cristae are straight, ending at the third caudal ring. The edges of the finely corrugated shields are prominent, smooth anteriorly, but higher posteriorly and ending in a sharp tooth. The posterior margin of the eye is nearly at the middle of the head. There is a trace of a median keel between the eyes above the snout base. There is a small keel on the anterior third of the operculum, from which radiate many fine lines. The operculum, occiput, and under side of head are everywhere dotted with minute pits. There are no cutaneous appendages.

The color in alcohol is uniform brown, with about 10 transverse white lines across the back, each with a dark brown spot before or on both sides of it; opercles black, the snout gray.

Here described from a male specimen, 58 mm. long, collected at Ovalau Island, by the aid of electric light.

**Corythoichthys conspicillatus** (Jenyns).

*Syngnathus conspicillatus* Jenyns, Zool. Voy. Beagle, Fishes, 1842, p. 147, pl. 27, fig. 4—Tahiti; Garman, Bull. Mus. Comp. Zool., 39, 1903, p. 239, pl. 5, fig. 2; Günther, Fische der Südsee, 9, 1910, p. 430, pl. 167, fig. B.

*Corythoichthys conspicillatus* Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 264; Fowler, Mem. Bishop Mus., 10, 1928, p. 114.

Dorsal 28; anal 3; pectoral 16. There are 16 trunk and 34 caudal rings. The depth is 30, the head 8.57 times in the length. The eye is 4.4, the snout 2.5 times in the head. The robust body is about as wide as deep, the median lateral keel not continuous with the lower caudal keel. The opercle has a complete longitudinal keel. The shields are vertically striated.

The color in alcohol is very pale yellowish brown, with 13 pairs of blackish crossbands over the back and down the sides. There is a black patch on top of the head and a black stripe from the middle of the eye back to the nape. A black line begins before the eye and runs along the under side of the head beneath the eye to the throat. Between the posterior ends of this line and its fellow is a median black spot on the throat. A short distance behind it is a larger black spot, from which a short black bar runs backward.

Here described from a specimen, 60 mm. long, collected in Papeete Harbor, Tahiti, as we were fishing by electric light. Another specimen, 89 mm. long, caught in the same way at Vila, Efaté Island, New Hebrides, has the black line and blotches on the head and throat better developed. From the lower part of the opercle a black line runs back to the third ring. The ventral surface of the first three rings has a pair of blackish blotches on each. The snout is thinly sprinkled with black dots.

**Corythoichthys corrugatus** (Weber).

*Syngnathus corrugatus* Weber, Siboga Exp., Fische, 1913, p. 112.

*Corythoichthys corrugatus* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 73, fig. 32.

Dorsal 30 to 32; pectoral 15. There are 15 trunk rings and 42 in the tail. The dorsal is on 1 trunk and 7 caudal rings. The trunk is 7-sided, the 2 ventral plates uniting in a prominent ridge, the dorsal with a single concave plate. The 4-sided tail is elongate and slender. The entire surface of trunk and tail is finely corrugated and reticulated and the edges of the shields are prominent and minutely serrate or corrugated. The greatest depth is 21.33 times, the head 10 to 10.3 times in the length. The head is 2.75 times in the trunk. The tail is 1.56 to 1.6 times in the total length

and 2.28 to 2.4 times as long as the trunk. The short, blunt, tubulate snout is 2.5 to 2.8 times in the head, much shorter than the postorbital part of the head, its dorsal surface concave. The eyes are very prominent, 5 to 5.16 times in the head, the interorbital region steeply descending. The postorbital region is 1.85 times in the head. On each side of the upper surface of the snout is a microscopically serrate ridge, bearing several isolated spines, and before each nostril is a ridge with 4 serrations or spines. Weber and Beaufort say "median line of snout with a series of isolated spines . . . continued . . . on the interorbital space," but my specimens are as stated above. The eye margin is denticulated and from the middle of the dorsal portion a curved minutely serrate ridge runs to the end of the head. From the posterior portion of the interorbital a median crest, divided into three parts by shallow notches, runs back and disappears on the first trunk ring. The opercle is crossed by a minutely corrugate longitudinal keel, from which radiate many lines, the whole surface of the opercle minutely reticulate. The superior cristae of the trunk are continued to the end of the dorsal but are not continuous with the superior caudal cristae, which deflect downward and extend forward to the front margin of the last trunk ring. The inferior cristae of the body and tail are continuous. The median lateral trunk cristae end at the front margin of the first tail ring. The dorsal base is not elevated. The pectorals and caudal are very small, the latter 35.5 times in the length, or 3.4 times in the head.

The color in alcohol is dusky brown anteriorly, the tail with alternating rings of whitish and brown; the lower lateral trunk plates and the ventral plates each have one or two white dots. The head is brown with two pairs of white lines on the under side of the snout and two more pairs below the eye. From the eye a broad silvery white band passes backward and downward to the under side of the head, and a thin line of white runs from the middle of the opercular ridge to the throat. On the ventral side of the first trunk ring is a faint white V-shaped mark. A broad silvery white band extends along the upper side of the snout to the eyes, where it divides, a branch extending along the upper margin of each eye.

Weber and Beaufort's figure shows white spots on the lower plates of the trunk and the broad white band from the eye, but they are not mentioned in the description.

Described here from two specimens, each 64 mm. long, collected at Bushman Bay, Malekula Island, New Hebrides. A third specimen, 53 mm. long, agrees in every essential. This rare little pipe

fish has been known hitherto only from the type, collected by Dr. Weber at the Karakelang Islands.

***Corythoichthys fasciatus* (Gray).**

*Syngnathus fasciatus* Gray, Illustr. Indian Zool., 1, 1830-32, pl. 89, figs. 2 and 2a, not of Risso.

*Syngnathus flavofasciatus* Rüppell, Neue Wirbelt., Fische, 1835, p. 144; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 113.

*Corythoichthys fasciatus* Kaup, Cat. Lophobr. Fish, 1856, p. 25; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 70, fig. 31.

Dorsal 30; anal 3; pectoral 17; caudal 8; trunk rings 16; tail rings 33; subdorsal rings 7, all caudal. The head is 6.38 times in the length. The straight snout is half the length of the head, and 1.5 times the postorbital portion of the head. The eye is 6 times in the head, the caudal 3.6 times. The tail is a trifle more than 0.6 of the total length. The superior cristae of the trunk and tail are discontinuous, that of the trunk being carried back over to the sixth ring of the tail, almost to the end of the dorsal, and that of the tail being deflected downward at the posterior end of the dorsal and ending on the middle of the last trunk ring. The inferior cristae of the trunk and tail are continuous. The lateral shields of the trunk have a median longitudinal keel and are very minutely transversely striated. The dorsal and lateral plates of the tail are not keeled. There is a high, arched keel from just behind the eyes to the posterior part of the first trunk ring. There is a very small keel over the eye. All the shields are smooth. There is a complete longitudinal keel on the operculum, without radiating ridges, but the operculum is microscopically striate. The dorsal is entirely upon the tail.

The color in alcohol is yellowish white, everywhere minutely punctulate with brown specks. There is a black circular spot on the superior cristae at the corner of each plate, also a black line through the eye and one below it continued back upon the operculum, and brownish black streaks and marks along the sides on at least every other shield. There is a black circular spot at the lower corner of each shield opposite the one above and a few black dots on the head and snout. There is a pair of black spots on the throat and a median black spot on the ventral surface of the first three trunk segments. The eye is silvery, the pupil black. The caudal is pink.

Here described from a specimen, 60 mm. long, including the caudal fin, or 57.5 mm. standard length, caught in Suva Harbor, Viti Levu Island, with the aid of electric light.

**Micrognathus brevirostris** (Rüppell).

*Syngnathus brevirostris* Rüppell, Neue Wirbelt., Fische, 1835, p. 144—Massaua, Red Sea.

*Micrognathus brevirostris* Duncker, Mitth. Naturh. Mus. Hamburg, 32, 1915, p. 75; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 75.

Dorsal 20; anal 3; there are 17 (15 to 17) rings in the trunk, 30 (28 to 32) in the tail. The head is 9.5 times in the length, the eye 5 times in the head. The very short concave snout equals the post-orbital part of the head and the operculum has a short, poorly developed basal keel from which radiate lines. The tail is nearly twice as long as the trunk.

The color in alcohol is black, with 10 pearl white crossbands on the back and sides. Each trunk shield has a pearl white dot on the posterior part of its ventral margin. On the dorsal surface and the under side of the head, white dots are sprinkled sparsely.

One specimen, 43 mm. long, was collected in Suva Harbor, Fiji, at night with the aid of electric light.

A male with his brood pouch filled with embryos nearly ready to hatch was taken at Tulagi Harbor, Solomon Islands, its length 40 mm. The depth is 20, the head 8, the head and trunk together 2.5, the caudal portion 1.66 times in the length. The eye is 5 times, the snout 2.77, the postorbital part of the head 2.38 times in the head. The color is brown, mottled with white, with a white crossbar across the back at every fourth or fifth ring. On the opercle is a whitish ocellus with a pearly white marginal ring and with some black dots scattered over its surface.

**Micrognathus suvensis** Herre. Fig. 4.

*Micrognathus suvensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 396.

Dorsal 28; anal 3; pectoral 18; trunk rings 15; caudal rings 39 to 40. Dorsal on 6 caudal rings. Depth 43.68 to 44.5, head 8.8 to 9.5 in length. Eye 6.5 to 7.75, snout 1.9 to 2, caudal 2.3 in head. Trunk 2.36 to 2.57, head and trunk 1.7 to 1.76 in tail. Trunk more or less heptagonal. Tail four-sided. Body everywhere with smooth edges. Shields all very minutely transversely striate. Snout stout and straight, with a sharp median crest. Operculum with a well-developed median keel that extends entirely across and has many radiating lines above and below. No cutaneous appendages. Dorsal begins on second caudal ring. Superior and inferior cristae of trunk and tail discontinuous. Lateral median ridge of trunk continuous with inferior crista of tail.

Color in alcohol whitish, darkened by punctulations of minute dots, snout dusky, caudal fin blackish.

Two specimens collected in Suva Harbor, Viti Levu Island, Fiji Islands.

#### Family AULOSTOMIDAE

#### *Aulostomus valentini* (Bleeker).

*Polypterichthys valentini* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 608—Ternate.

*Aulostomus valentini* Jordan and Starks, Proc. U. S. Nat. Mus., 26, 1903, p. 64; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 114, fig. 34.

*Aulostoma valentini* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 10, fig. 3.

*Aulostoma chinense* Günther, Fische der Südsee, 2, 1876-81, p. 223, pl. 123, figs. B and C.

Dorsal VIII to XII-24 to 27; anal IV, 22 to 25. The depth of the elongate, compressed body is 11 to 13, the head 3 to 3.2 times in

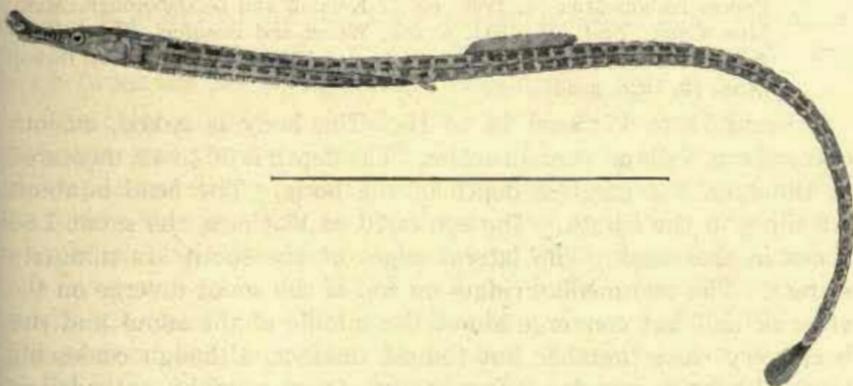


FIG. 4. *Micrognathus susensis* Herre, Suva Harbor, Viti Levu Island, Fiji Islands.

the length. The compressed, much elongated and tubiform snout is 1.4 to 1.5 times in the head. The circular eye is 8.6 to 10 times in the snout and 12 to 14 times in the head. The lower jaw curves upward and projects strongly, the prominent chin bearing a fleshy barbel beneath. The mouth is strongly oblique. The first dorsal is of slender isolated spines. The soft dorsal and anal are very far back, and opposite each other. The caudal peduncle is small, slender, its depth 4 times in its length. The small pectoral is 1.5 or 2 times the eye. The small caudal is 5 times in the head.

In life the color is highly variable. It may be light brown with roseate longitudinal stripes, or lemon yellow, or dark brown with yellow fins with black spots and bars, or there may be other color combinations. Usually the body between the soft dorsal and anal and the caudal peduncle is spotted with white, yellow, or black, or the spots may form crossbars. Sometimes most of the body is crossbarred. There is a black spot or bar on the maxillary. In alcohol the color is dull brown or dusky brown; the black spots persist but the other markings usually disappear.

At Takaroa, Tuamotu Archipelago, 2 specimens, 550 and 610 mm. in length, were taken. This species is very common around the docks at Papeete, Tahiti, where 5 specimens, from 130 to 160 mm. in length, were taken.

#### Family FISTULARIIDAE

##### *Fistularia petimba* Lacépède.

*Fistularia petimba* Lacépède, Hist. Nat. Poiss., 10, 1803, p. 89—New Britain; Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 437; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 17; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 263; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 14, fig. 4; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 117.

Dorsal 14 to 17; anal 14 to 16. The body is naked, smooth everywhere, without median scales. The depth is 36 to 41, measured at the eyes, the greatest depth of the body. The head is about 2.5 times in the length. The eye is 10 to 13 times, the snout 1.35 times in the head. The lateral edges of the snout are minutely serrate. The two median ridges on top of the snout diverge on the anterior half but converge about the middle of the snout and run back very close together but remain distinct, although coalescing along the inner margins. The center of the caudal is extended as a very long filament.

The color in alcohol is pale to dark brown above, pale brownish to yellowish beneath. The caudal filament is black. The fins are colorless or very pale.

Here described from 10 young specimens, 125 to 158 mm. in length, collected at Papeete, Tahiti, where these fish were numerous in the quiet waters inside the dock. Large specimens were seen at Tahiti and many other localities, but none were secured up to the time of leaving Fiji. At Tulagi, Solomon Islands, 5 specimens were secured, ranging in length from 76 to 130 mm.

## Family ATHERINIDAE

*Atherina endrachtensis* Quoy and Gaimard.

*Atherina endrachtensis* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1824, p. 334—China Sea and Australia—"terre d'Endracht"; Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 456.

*Atherina endrachtensis* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 270.

Dorsal V-II, 9; anal II, 12. There are 36 scales in a longitudinal series to the caudal base and 6 in a transverse series. The depth is 4.5, the head nearly 3.5, the caudal 4.4, the pectoral 5 times in the length. The eye is 2.35, the snout 3.8, the interorbital 2.7, the least depth of the caudal peduncle 3.8 times in the head. The compressed body is broad and heavy anteriorly, the snout broad and blunt, the interorbital flat, the very large circular eyes rising above the interorbital level. The mouth is small, oblique, the maxillary extending beneath the front part of the eye. The origin of the first dorsal is opposite the thirteenth scale, midway between the hind border of the eye and the caudal base. A vertical from it is nearer to the anal than to the ventral origin. The anus is 3 scales in advance of a vertical from the first dorsal origin and lies between the posterior parts of the ventrals.

The color in alcohol is yellowish, the scales on the upper part margined with dark brown. There is a black band from the axil of the pectoral to the caudal base, bordering a silvery band beneath it. Below this is a row of black dots, one on each scale. There is a median black line along the back from the occiput to the caudal. The snout, top and sides of the head are dusky or black with dark specks and there is a black spot on the upper margin of the eye. The pectoral base is marked by a black transverse line, and the caudal is somewhat dusky, the other fins largely colorless.

Described from a specimen, 66 mm. long, taken with the aid of electric light while anchored in Turtle Bay, Espiritu Santo Island, New Hebrides. I also refer here 12 immature specimens, 17 to 29 mm. in length, collected at the same time.

*Atherina forskali* Rüppell.

*Atherina forskalii* Rüppell, Neue Wirbelt., Fische, 1835, p. 132, pl. 33, fig. 1—Red Sea; Day, Fishes India, 1878-88, p. 345, pl. 71, fig. 4; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 119.

*Atherina forskalii* Jordan and Hubbs, Ann. Carnegie Mus., 11, 1917, p. 462, pl. 46; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 274.

Dorsal V-II, 8; anal II, 11 to 13; there are 42 to 45 scales in a longitudinal, 6 in a transverse series. In a specimen, 38 mm. long, the depth is about 5.85, the head 4.2 times in the length. The eye is 2.5, the snout 3.75, the interorbital 2.7 times in the head. The pectoral is 6.3 times in the length. The origin of the first dorsal is opposite the fifteenth or sixteenth scale, nearer to the caudal than to the tip of the snout, about midway between the hind border of the pupil and the caudal base. The origin of the second dorsal is opposite the twenty-fifth scale (twenty-fourth to twenty-sixth in a series of specimens). The anus is opposite the twelfth to fourteenth scale and 2 scales before a vertical from the origin of the first dorsal (sometimes 3 scales before).

The color in alcohol is yellowish, the scales above the lateral band margined by lines of dusky dots and a black band along the middle of the back. The sides are silvery, with a broad glistening silver band along the middle containing a more or less distinct narrow black band from the upper angle of the pectoral to the middle of the caudal base. The sides of the head are bright silver.

Twenty specimens were taken by the aid of electric light in Suva Harbor, Viti Levu Island, Fiji, their lengths from 20 to 38 mm. In the same manner 64 fine and much more typical specimens, 52 to 110 mm. in length, were taken in the harbor of Vila, Efaté Island, New Hebrides, and 105 specimens, 15 to 77 mm. long, in Tulagi Harbor, Solomon Islands. A specimen, 110 mm. long, has the depth 4.6 times, the head 3.66 times in the length; the eye is 2.6 times in the head and equals the interorbital.

***Atherina ovalaua* Herre. Fig. 5.**

*Atherina ovalaua* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 401.

Dorsal VII-II, 8; anal II, 8 or 9; pectoral I, 14; scales 40 to 42, transverse series 7, predorsal 14 to 16, between dorsals 7 or 8; gill-rakers 22 to 25 on lower arch. Depth 5.9 to 6.2 in length. Eye 2.75 to 3, length of caudal peduncle 1.6, pectoral 1.5 to 1.6, ventral 2.1 to 2.3 in head. Width 1.17 to 1.26 in depth. Depth of caudal peduncle 2.37 in its length. Body subcylindrical. Head bluntly pointed, flattened above. Snout convex. Eye large, prominent, distinctly shorter than postorbital part of head. Snout equal to interorbital, shorter than eye. Maxillary reaches front of eye. Teeth minute. Dorsal origin midway between caudal base and front of eye, occasionally farther forward, opposite sixteenth scale. Origin of second dorsal opposite twenty-fifth or twenty-sixth scale.

Sixty-one specimens collected at Ovalau Island and in Suva Harbor, Fiji Islands.

**Hepsetia pinguis** (Lacépède).

*Atherina pinguis* Lacépède, Hist. Nat. Poiss., 10, 1803, pp. 117, 124, pl. 5, fig. 1, on Commerson MS.; Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 399; Ogilby, Mem. Queensland Mus., 1, 1912, p. 38, pl. 12, fig. 1; Jordan and Hubbs, Studies in Ichthyology, Atherinidae, Stanford Univ. Pub., 1919, p. 32; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 120.

Dorsal VI-I, 10; anal I, 14 or 15; there are 43 to 45 scales in a longitudinal series, plus 3 or 4 more on the caudal base, 8 in a transverse series, and 20 or 21 before the first dorsal. The compressed body is rather stout anteriorly, with broad blunt head. The anus is between the tips of the ventrals and some distance before a vertical from the dorsal origin which is nearer to the caudal base than to the tip of the snout. The depth is 4.1 to 4.6, the head

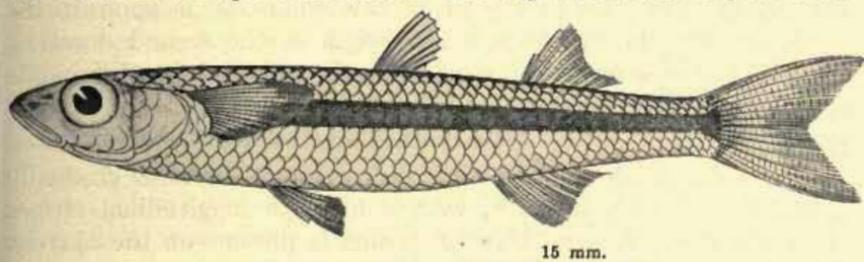


FIG. 5. *Atherina ovalaua* Herre, Ovalau Island, Fiji Islands

3.33 to 3.6, the caudal 3.9 to 4.1, and the pectoral about 4.33 times in the length. The large eye is 2.5 to 2.7, the snout 3.6 to 3.8, the interorbital 2.7 to 2.9, the least depth of the caudal peduncle 3.6 to 3.8 times in the head. The mouth is large, oblique, the posterior end of the maxillary beneath the anterior or the middle part of the eye. The caudal is deeply forked.

The color in alcohol is whitish, each scale on the dorsal surface more or less dusky brown with minute blackish dots, a blackish line along the middle of the back, and a broad silver or lead-colored band from the pectoral base to the middle of the caudal base. The pectoral has a blackish blotch near its tip and the caudal is dusky or black on its posterior lobes. The snout is blackish, there is a black streak along the upper margin of the opercle, and there is a blue black spot on the upper margin of the eye.

Here described from 34 specimens, 66 to 78 mm. in length, collected at Ovalau Island, Fiji, with the aid of electric light.

## Family MUGILIDAE

**Mugil dussumieri** Cuvier and Valenciennes.

*Mugil dussumieri* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 147—Bombay, Coromandel; Day, Fishes India, 1878-88, p. 352, pl. 74, fig. 4; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 235; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 122.

Dorsal IV-I, 8 or 9; anal III, 9. There are 28 or 29 scales in a longitudinal series plus 3 or 4 more on the caudal base and 10 or 11 in a transverse series; predorsal scales 18 to 20. The depth is 3.25 to 4.25, the head 3.8 to 4 times in the length. The eye has a well-developed adipose lid covering the posterior third or more of the eye, 4.25 to 4.6 in the head. The snout is equal to or less than the eye, the flat wide interorbital about twice the eye. The mandible has a single knob at its tip and the maxillary is visible when the mouth is closed. The origin of the first dorsal is slightly nearer to the caudal base than to the tip of the snout and is opposite the ninth or tenth lateral scale. The origin of the second dorsal is opposite the nineteenth or twentieth scale and opposite the middle of the anal. The pectoral is shorter than the head, reaching the seventh or eighth lateral scale, with a small axillary scale or none.

The color in alcohol is bluish dusky above, the sides gradually paling to yellowish beneath, with 6 blackish longitudinal stripes along the side. A large blackish blotch is present on the opercle. All the fins except the pectoral are dusky.

From a small river flowing into Suva Harbor, Viti Levu Islands, Fiji, were collected 2 specimens, each 105 mm. in length.

**Mugil engeli** Bleeker.

*Mugil engeli* Bleeker, Nat. Tijds. Ned. Ind., 16, 1858-59, p. 277—Batavia, Java; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 238; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 122.

Dorsal IV-I, 8; anal III, 9. There are 32 or 33 scales in a longitudinal, 11 in a transverse series, and 18 or 20 before the dorsal. The depth is 3.7 to 4, the head 3.4 to 3.5 times in the length. The eye is 3.8 to 4, the snout 3.6 to 3.9, the interorbital 2.3 to 2.5, the least depth of the caudal peduncle 2.4 to 2.6 times in the head. The body is compressed, the snout broad and blunt. The mouth is broad with slightly included lower jaw, the symphyseal knob double, the maxillary hidden when the mouth is closed. The adipose eyelid is well developed. The origin of the first dorsal is midway between the tip of the snout and the caudal base, or nearer

the latter, and is opposite the tenth or eleventh lateral scale. The origin of the second dorsal is a third or half behind the anal, and opposite the twentieth or twenty-first scale. The pectoral extends to the eighth or ninth scale, 1.1 to 1.2 times in the head, with a large, pointed axillary scale. The deeply forked caudal equals the head.

The color in alcohol is dark olive above, the sides silvery, becoming white beneath. The ventrals are white, the other fins more or less dusky, the caudal with a paler crossband near the posterior end.

Nine specimens, 120 to 154 mm. in length, were collected from the Papenoo River, Tahiti.

### **Mugil kandavensis** Günther.

*Mugil kandavensis* Günther, *Fische der Südsee*, 2, 1876-81, p. 215—Kandavu, Fiji.

Dorsal IV-I, 8; anal III, 9; there are 32 or 33 scales in a longitudinal series, plus 3 or 4 more on the caudal base, 12 in a transverse series, and 16 or 17 predorsal. The depth is 3.7 to 3.8, the head 3.35 to 3.44, the pectoral 4 to 4.7 times in the length. The eye is 3.6 to 3.76, the snout 3.25 to 3.5, the interorbital 2.3 to 2.4, the least depth of the caudal peduncle 2.5 to 2.6 times in the head. The forked caudal equals the head. The lips are thin, the snout short, blunt, and broad. The maxillary is not concealed by the preorbital when the mouth is closed. The symphyseal knob is broad and prominent. The origin of the spinous dorsal is midway between the caudal base and the middle or hind part of the eye, opposite the hind margin of the tenth scale. The origin of the second dorsal is opposite the twentieth or twenty-first scale. The second dorsal and caudal have only a few basal scales. The adipose eyelid is poorly developed.

The color in alcohol is dusky brown above, paler on the sides and whitish below, each row of scales with a darker longitudinal band, the opercle dark.

Forty specimens, 28 to 63 mm. in length, were taken at Nukulau Island, Fiji, where large schools of these fish were seen swimming on the extensive tidal flats.

### **Mugil longimanus** Günther.

*Mugil longimanus* Günther, *Cat. Fishes Brit. Mus.*, 3, 1861, p. 428—East Indies; Macleay, *Proc. Linn. Soc. N. S. Wales*, 9, 1884, p. 41; McCulloch, *Rec. Austr. Mus.*, 13, 1921, p. 130; Weber and Beaufort, *Fishes Indo-Austr. Arch.*, 4, 1922, p. 239; Fowler, *Fishes Oceania, Mem. Bishop Mus.*, 10, 1928, p. 123.

Dorsal IV-I, 8 or 9; anal III, 9. There are 34 or 35 scales in a longitudinal series, plus 3 or 4 more on the caudal base, 12 in a transverse series, and 18 or 19 predorsal scales. The depth is 3.4 to 3.6, the head 3.66 to 3.7 times in the length. The eye is 4.3 to 4.6, the snout 3.4 to 3.9, the interorbital 2.4, and the least depth of the caudal peduncle 2 to 2.2 times in the head. The adipose eyelid is well developed, covering most of the eye except the pupil. The snout is blunt, convex, the upper lip moderately thick. The maxillary is entirely concealed when the mouth is closed. The symphyseal knob is double. The origin of the first dorsal is midway between the tip of the snout and the caudal base, or a little nearer to the snout, and is opposite the twelfth or thirteenth lateral scale. The origin of the second dorsal is opposite the twenty-first to twenty-second lateral scale and behind the anal origin. The pectoral is only a little shorter than the head, extending to a perpendicular from the dorsal origin or beyond, or at least to the twelfth scale. There is a long, pointed axillary scale, which goes 2.6 times in the length of the pectoral. The caudal is rather deeply emarginate, with pointed tips, a little longer than the head.

The color in alcohol is olive brown above, becoming pale yellowish under the head, above the anal and on the lower part of the caudal peduncle, the belly and middle of the sides dull purplish. The opercle is blackish. The dorsals and caudal are blackish, the other fins yellowish.

Here described from 5 specimens, 104 to 171 mm. in length, collected at Bushman Bay, Malekula Island, New Hebrides.

#### **Mugil thoburni** Jordan and Starks.

*Mugil thoburni* Jordan and Starks in Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 812—Galapagos.

Dorsal IV-I, 7; anal III, 9; there are 42 scales in a longitudinal, 15 in a transverse series, and 24 predorsal scales. The depth is 3.5, the head 3.8 times in the length. The adipose eyelid is large, the eye 4.5 times in the head, shorter than the broad snout, which is 3.75 times.

The color in alcohol is dirty bluish gray above, merging into yellowish white on the belly, the sides and under parts silvery. Faint longitudinal bluish stripes follow the rows of scales on the sides. All the fins are dusky except the ventrals, which are whitish. There is a blackish crossbar on the pectoral base.

A common fish in the Galapagos; 18 specimens, 77 to 106 mm. long, were obtained at Post Office Bay, Charles Island; 52 specimens

at Narborough Island, from 51 to 87 mm. in length; and 4 at South Seymour Island, from 110 to 122 mm. long.

Young mullets in the *Querimana* stage are very common throughout the Galapagos Archipelago. They are very similar in appearance to "*Querimana harengus*," which has been shown by Bean (New York State Mus., Bull. 60, Zool., 8, 1903, p. 366) and by Jacot (Trans. Amer. Micr. Soc., 39, 1920, pp. 199-229) to be the young of *Mugil curema*. Since this species was not collected in the islands and *Mugil thoburni* is very common there, it is likely that these young belong to the latter species.

### *Liza oligolepis* (Bleeker).

*Mugil oligolepis* Bleeker, Nat. Tijds. Ned. Ind., 19, 1859, p. 437—Sumbawa; Day, Fishes India, 1878-88, p. 358, pl. 76, fig. 2; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 245.

Dorsal IV-I, 8 or 9; anal III, 9. There are about 26 scales in a longitudinal and 10 or 11 in a transverse series. There are 15 or 16 predorsal scales. The depth is 3.6 times in the length, a trifle less than the head, which is 3.5 times in the length. The eye is a trifle more than 3 times in the head and 1.64 times the short blunt snout. There is no trace of an adipose eyelid. The slightly convex interorbital is wider than the eye. The maxillary is visible when the mouth is closed. There is a double knob at the tip of the mandible. The upper lip is very thin. The origin of the first dorsal is opposite the ninth scale of a lateral series. The origin of the second dorsal is behind the anterior half of the anal and opposite the seventeenth or eighteenth scale. The pectorals are a little shorter than the head, and without an axillary scale. The caudal is slightly emarginate.

The color in alcohol is brownish olive dorsally, and bright silver on the sides below the level of the upper margin of the eye, and on the belly.

A specimen, 30 mm. long, was caught in Suva Harbor, Viti Levu Island, Fiji, while we were fishing by electric light.

### *Liza vaigiensis* (Quoy and Gaimard).

*Mugil vaigiensis* Quoy and Gaimard, Voy. Uranie, Zoologie, 2, 1824, p. 337, pl. 59, fig. 2—Waigiu; Duncker and Mohr, Mitt. Zool. Mus. Hamburg, 42, 1926, p. 131, figs. 4 and 5; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 244.

*Mugil vaigiensis* Day, Fishes India, 1878-88, p. 359; Günther, Fische der Südsee, 2, 1876-81, p. 216, pl. 121, fig. B.

*Liza vaigiensis* Seale, Occ. Papers Bishop Mus., 6, 1906, p. 15.

*Liza raigiensis* Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 257.

Dorsal IV-I, 7 or 8; anal III, 8. There are 26 to 28 scales in a longitudinal, 9 or 10 in a transverse series, and 15 or 16 predorsal. The depth equals the head, which is 3 to 3.33 times in the length. The eye is longer than the snout in my specimens, 4.5 times in the head, and nearly twice in the interorbital. The origin of the first dorsal is opposite the ninth scale in a lateral series, and slightly nearer to the caudal base than to the tip of the snout. The origin of the second dorsal is opposite the eighteenth scale, and opposite the middle of the anal. The pectoral is much shorter than the head.

In alcohol the color is bluish brown or dusky above, paler on the sides to bluish gray beneath, the sides with about 6 faint longitudinal darker rows. The upper half of the pectoral is black, the first dorsal black, the second dorsal dusky, the other fins all pale or whitish. Other specimens have the back leaden or brownish dusky, the sides silvery to silvery white, the longitudinal stripes and fins as already given.

Here described from 10 specimens, 30 to 43 mm. long, collected at Maraa, Tahiti, and 52 specimens from the reef between Suva and Nukulau Island, Fiji, from 21 to 50 mm. in length. We also obtained 6 specimens, 23 to 33 mm. in length, from Suva Harbor, Viti Levu Island, Fiji.

This mullet is very common in the young stages along the strand, coming in to very shallow water with the flood tide. It is the handsomest of the mullets and young specimens make very attractive aquarium exhibits. It is recognized at all stages by the black pectorals and the 8 anal rays.

Four specimens, 42 to 48 mm. long, were taken at Auki, Malaita Island, Solomons.

#### *Liza melinoptera* (Cuvier and Valenciennes).

*Mugil melinopterus* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 146, pl. 313; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 246.

*Liza melinoptera* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 217.

Dorsal IV-I, 8; anal III, 9. There are 29 scales in a longitudinal, 10 or 11 in a transverse series, and 18 predorsal scales. The depth is 3.65, the head 3.75, the caudal 3.55, the pectoral 4.9 times in the length. The eye is 4.25, the snout 3.25, the interorbital 2.2, and the pectoral 1.3 times in the head. The maxillary

is visible when the mouth is closed. The knob at the tip of the mandible is single. The origin of the first dorsal is opposite the ninth lateral scale. The origin of the second dorsal is opposite the middle of the anal and the eighteenth or nineteenth lateral scale. An adipose eyelid is wanting.

The color in alcohol is brownish dusky above, browner on the sides and yellowish beneath, the fins all dusky except the ventrals.

Here described from a specimen, 255 mm. long, from Suva, Viti Levu Island, Fiji. Also placed here are 22 specimens, 8 to 10 mm., from Papeete Harbor, Tahiti, where these fish were swimming in schools about the ship. The specimens were bright silver in life, with black pectorals and honey yellow caudal. In alcohol they are silver color, but the fins have faded.

### *Liza borneensis* (Bleeker).

*Mugil borneensis* Bleeker, Nat. Tijds. Ned. Ind., 2, 1851, p. 201; Günther, Cat. Fishes Brit. Mus., 3, 1859-61, p. 448; Kner, Fische, Novara Exp., 1865, p. 228; Day, Fishes India, 1878-88, p. 357, pl. 76, fig. 1; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 249.

*Liza borneensis* Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 258.

Dorsal IV-I, 8; anal III, 9. There are 32 scales in a longitudinal series, plus 2 or 3 more on the caudal base, 10 or 11 in a transverse series, and 19 predorsal scales. The depth is 3.85, the head 3.15 times in the length. The eye is 3.3 times, the snout 4.1, the interorbital 2.6 times in the head. The eye is 1.6 times in the interorbital and lacks an adipose lid. The preorbital is denticulate, the maxillary visible. The stout first dorsal spine is longer than the postorbital part of the head, equal to the longest dorsal and anal rays, 1.75 times in the head. The origin of the first dorsal is opposite the eleventh lateral scale, the second dorsal opposite the twentieth. The origin of the second dorsal is much behind that of the anal. The forked caudal is very little shorter than the head. The pectoral is 1.2 times in the head, the axillary scale very short. Axillary scales are well developed at the first dorsal base and ventrals. The least depth of the caudal peduncle about equals its length, 2.75 times in the head.

The color in alcohol is silvery, olivaceous on the back. The fin spines and rays are speckled with dusky, the membranes colorless.

This description is from a specimen 52 mm. long. I refer here 3 small specimens, 30 to 52 mm. in length, taken at Makatea Island, Tuamotu Archipelago.

**Liza troscheli** (Bleeker).

*Mugil troscheli* Bleeker, Nat. Tijds. Ned. Ind., 16, 1858-59, p. 277—Java; Günther, Cat. Fishes Brit. Mus., 3, 1859-61, p. 448.

*Mugil troscheli* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 248.

*Liza troscheli* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 217, excluding synonymy.

Dorsal IV-I, 8 or 9; anal III, 9. There are 31 to 33 scales in a longitudinal series, plus 3 or 4 more on the caudal base, 10 in a transverse series, and 18 to 20 predorsal scales. In a specimen, 65 mm. long, the depth is 3.8, the head 3.4, the caudal 3.25, the pectoral 4 times in the length. The eye is 3.8, the snout 4, the interorbital and the least depth of the caudal peduncle each 2.5 times in the head. The symphysial knob is double, the maxillary exposed when the mouth is closed. The origin of the anal is before that of the second dorsal. The origin of the first dorsal is opposite the eleventh scale, that of the second dorsal opposite the twenty-first scale. The anal and soft dorsal are both covered with small scales. The deeply emarginate caudal is covered with small scales basally and along most of the upper and lower margins.

The color in alcohol is bluish to brownish gray on the back, the sides paler and becoming white or yellowish beneath, with a silvery luster on the sides of the head and body, the fins all pale. Larger specimens have the fins all dusky except the ventrals, and also have a dark longitudinal streak on each row of lateral scales.

Sixty specimens, 24 to 65 mm. in length, were taken on the reef at Maraa, Tahiti. A number of them vary from the above in having the origin of the second dorsal opposite that of the anal, but agree in other respects. Fourteen specimens, 18 to 35 mm. in length, were taken in Suva Harbor, Viti Levu Island, Fiji. Fifteen fine typical specimens, 103 to 150 mm. in length, were collected from a fresh-water stream flowing into Bushman Bay, Malekula Island, New Hebrides. On the shallow sandy tidal flats of Bushman Bay 9 young specimens, 30 to 44 mm. in length, were also taken, and one, 28 mm. long, at Wala Island.

**Liza seheli** (Forskål).

*Mugil seheli* Forskål, Descr. Anim., 1775, p. 73—Red Sea; Klunzinger, Abh. Zool. Bot. Gesell. Wien, 20, 1870, p. 827; Day, Fishes India, 1878-88, p. 355; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 252.

*Mugil axillaris* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 131; Bleeker, Nat. Tijds. Ned. Ind., 16, 1858-59, p. 280; Günther, Fische der Südsee, 2, 1876-81, p. 216, pl. 120, fig. B.

Dorsal IV-I, 8; anal III, 9. There are 38 to 40 scales in a longitudinal, 14 or 15 in a transverse series, and 21 or 22 predorsal scales. The depth is 3.7, the head 3 to 3.2 times, the caudal 3.5 to 4 times in the length. The eye is without an adipose eyelid, 3.5 to 3.7 times in the head, equal to the snout, and less than the interorbital, which is 2.5 times in the head. The upper lip is more or less fleshy, smooth, the mandible with a large double symphyseal knob, the maxillary hidden when the mouth is closed. The origin of the first dorsal is opposite the thirteenth or fourteenth scale, that of the second dorsal opposite the twenty-fourth scale, that of the anal opposite the twenty-third scale. The pectoral extends approximately to the origin of the first dorsal, 1.4 to 1.6 times in the head.

The color in alcohol is steely brownish or steel gray above, the sides paler, becoming white underneath, with a silvery sheen over all. There is a dusky spot on the pectoral axil. The pectoral is yellowish, but dusky on the inner side.

Thirty-two specimens were collected at Nuka Hiva Island, Marquesas; not typical, owing to their small size, 26 to 52 mm. long. Two large specimens, 265 and 270 mm. long, were bought at the market in Papeete, Tahiti, and 25 specimens, 25 to 32 mm. in length, were caught on the reef at Maraa, Tahiti. One specimen, 56 mm. long, was caught in a fresh-water creek flowing into Suva Harbor, Viti Levu Island, Fiji.

#### *Chaenomugil chaptali* (Eydoux and Souleyet).

*Mugil chaptalii* Eydoux and Souleyet, Voy. Bonite, Zool., 1, 1841, p. 171, pl. 4, fig. 1—Hawaii.

*Chaenomugil chaptali* Jenkins, Bull. U. S. Fish Comm., 22, 1903, p. 438; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 140, fig. 49.

*Neomyxus chaptalii* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 127.

*Myxus* (*Neomyxus*) *scilateri* Steindachner, Ichth. Beiträge, 7, Sitzungsber. Akad. Wiss. Wien, 77, 1878, p. 384.

Dorsal IV-I, 9; anal III, 10. There are 43 or 44 scales in a longitudinal, 13 or 14 in a transverse series, and 26 or 27 from the first dorsal to the tip of the snout. The depth is 3.7 to 3.75, the head 3.4 to 3.5 times in the length. The eye is 3.7 times, the snout 3.2 times, the interorbital 2.5 to 2.7 times in the head. The pectoral is 1.2 or 1.25 times in the head. The emarginate caudal is a little shorter than the head. The upper lip is very thick, the lower part of the lip thickly fringed with very small, weak, pectinate teeth.

The narrow lower jaw is included, the maxillary entirely hidden when the mouth is closed. The origin of the first dorsal is opposite the fourteenth, of the second dorsal opposite the twenty-eighth, and of the anal opposite the twenty-fourth scale.

The color in alcohol is bluish olive or steely above, becoming paler on the sides and white beneath, with a bright silvery luster over all. All the fins except the pale or yellowish ventrals are more or less dusky.

Here described from nine specimens, 32 to 56 mm. long, collected at Nuka Hiva Island, Marquesas. A specimen, 28 mm. long, was caught at Maraa, Tahiti.

#### Family SPHYRAENIDAE

##### *Sphyraena idiasstes* Heller and Snodgrass.

*Sphyraena idiasstes* Heller and Snodgrass, Proc. Wash. Acad. Sci., 5, 1903, p. 190, pl. 2—Seymour Island, Galapagos.

Three young specimens, 36 to 42 mm. long, of this rare barracuda, were secured at Eden Island, Galapagos. They are marked by 6 or 7 large dark brown crossbars or circular spots. There is a median black line on each side of the posterior half, widening behind to a broad silvery band. The eyes and opercles are bright silver.

##### *Sphyraena barracuda* (Walbaum).

*Esox barracuda* Walbaum, Artedi Piscium, 3, 1792, p. 94, after Catesby.

*Sphyraena barracuda* Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2841; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 128.

*Sphyraena picuda* Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 224.

Dorsal VI-I, 9; anal I, 9. There are 82 scales in the lateral line to the caudal base, plus 5 more on the latter, 10 above and 9 below the line. The depth is 7.4, the head 3 times in the length. The eye is 5.75, the snout 2, the interorbital 5.35, the least depth of the caudal peduncle 5 times in the head. The body and head are elongate, fusiform, the lower jaw projecting, the mouth very large.

The color in alcohol is gray, the back and sides mottled with irregular blackish blotches, a large black blotch on the opercle. In larger specimens these dark patches and marks disappear and the color is silvery. The second dorsal, anal, and caudal are blackish marginally. The first dorsal is dusky, the other fins yellowish.

Here described from a young specimen from Nukulau Island, Fiji, 111 mm. long. Another from the same locality is only 41 mm. long.

This savage and voracious fish attains a great size, reaching a length of at least 1,800 mm. One caught with rod and reel by General Leonard Wood off Cape San Agustin, Mindanao, weighed 106 pounds. These gigantic specimens live in the tide rips off long spits and inter-island channels.

A specimen, only 27 mm. long, was caught at Tenibuli, Ysabel Island, Solomons. Scales 86 to the caudal base, and several more on the latter. In October, 1933, at Tinian, Marianas Islands, I caught one 5 feet 2 inches long, weighing 25 kilograms.

### *Sphyræna jello* Cuvier and Valenciennes.

*Sphyræna jello* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 259—Vizagapatam, on *Jellow*, Russell, Fishes of Coromandel, 2, 1803, p. 59, pl. 174—Vizagapatam.

Dorsal V-II, 8; anal II, 8. There are 119 to 122 scales in the lateral line, plus 10 or 11 on the caudal. The depth is 7.3 to 7.6, the head 3.15 to 3.2 times in the length. The large eye is 5 to 5.4 times in the head, 2.38 times in the snout. The interorbital is slightly more than the eye, 4.56 to nearly 4.7 times in the head. The snout is a trifle more than twice in the head. The angle of the preoperculum is broadly rounded. The length of the pectoral is 2.7 to 2.8 times in the head. The origin of the first dorsal is above the tip of the pectoral and behind the origin of the ventral. The tips of the broadly forked caudal are broken.

The fins are more or less dusky or blackish, the ventral yellow. Behind the pectoral there is a large blackish brown spot. The pectoral is yellow on its basal half, the rest colorless, its inner side largely blackish.

A specimen, 365 mm. long, was purchased at Suva. While the *Illyria* was lying at anchor one night about nine o'clock in Suva Harbor, a specimen, 410 mm. long, jumped aboard. The water was perfectly calm, and to land upon the deck the barracuda had to leap at least twelve feet from the surface in order to clear the rail.

## Family POLYNEMIDAE

### *Polynemus plebeius* Broussonet.

*Polynemus plebeius* Broussonet, Ichthyologia, 1782, p. 23, pl. 8 (pages and plates not numbered)—Pacific Ocean, near Otaheite, near Tanna Island.

*Polynemus plebejus* Günther, Fische der Südsee, 1, 1873-75, p. 103, pl. 77, fig. A; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 202.

*Polydactylus plebeius* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 219; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 130.

Dorsal VIII-I, 13; anal II, 11. There are 62 scales in the lateral line to the caudal base, plus about 15 more on the latter, 8 above and 12 below the line; pectoral filaments 5. The depth is 3.5, the head 3.3, the caudal 2.37, the pectoral 4.6, and the pectoral filaments 2.64 times in the length. The eye is 3.85, the snout 4.66, the interorbital 4, and the least depth of the caudal peduncle 2.15 times in the head. The body is elongate, the conical snout prominent, the mouth inferior and extending far beyond the eye, the caudal very deeply forked, with elongate, pointed lobes. The pectoral rays are all simple.

The color in alcohol is somewhat dusky above, the rest yellowish, with dark lines running lengthwise between the rows of scales, the fins more or less dusky, and a large blackish spot on the opercle. The longitudinal lines are plainest above, disappearing on the belly.

Here described from a fine specimen, 185 mm. long, taken at Wala Island, New Hebrides. Three specimens, 56, 65, and 80 mm. long, were collected at Bushman Bay, Malekula Island, New Hebrides. The smallest of these has the pectorals and ventrals black, but the free pectoral filaments are yellowish. The dorsals and caudal are also dusky with minute black specks.

Broussonet described this fish under the name *plebeius*, and not *plebejus* as often given. The *plebejus* appears on a title page listing the species, but the description is under the other form of the word.

### **Polynemus indicus** Shaw.

*Polynemus indicus* Shaw, Gen. Zool., 5, 1804, p. 155—Indian Seas; Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 326; Day, Fishes India, 1878-88, p. 179; Weber and Beaufort, Fishes Indo-Austr. Arch., 4, 1922, p. 205.

*Polydactylus indicus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 131.

Dorsal VIII-I, 13; anal II or III, 11. There are 65 scales in the lateral line, plus 5 or 6 on the caudal base, 8 scales between the dorsal origin and the lateral line, and 12 from the latter to the anal origin. The depth of the elongate body is 3.3 to 3.7, the head 3.25 to 3.5 times in the length. The eye is 4.2 to 4.4 in the head, covered by a large adipose lid, a little shorter than the interorbital space. The bluntly conical snout is a little less than the eye. The large inferior mouth extends far behind the eye. The teeth are very small, in narrow bands in the jaws, those on the palatines in a broad band anteriorly which is much narrowed posteriorly, the vomer with a small rounded patch. The first dorsal and anal spines are very small or minute. The second dorsal and anal are deeply concave

posteriorly. The caudal is deeply forked with long pointed lobes, much longer than the head. There are 5 free pectoral filaments, the first and second longest, equal to or longer than the head, extending beyond the tip of the ventrals. The distance between the ventral and anal origins is equal to or a little more or less than the head length.

The color in alcohol is light brown, becoming yellowish beneath, with blackish longitudinal lines along the sides, along the upper and lower margins of the rows of scales. There is a large dusky spot on the opercle. The fins are all dusky or basally yellowish and the remainder dusky, the ventrals mostly pale.

Here described from 2 specimens obtained at the market in Papeete, Tahiti, where this fish was abundant in February. They are 192 and 204 mm. in length.

### ***Polynemus sexfilis* Cuvier and Valenciennes.**

*Polynemus sexfilis* Cuvier and Valenciennes, 7, 1831, p. 515—Mauritius; Day, Fishes India, 1878-88, p. 178, pl. 43, fig. 1.

*Polydactylus sexfilis* Seale, Occ. Papers Bishop Mus., 1, 1900 (1901), p. 67; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 144; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 131.

Dorsal VII-I, 12 or 13; anal III, 11 or 12; 62 to 66 scales in the lateral line and 15 to 19 more on the caudal base; 8 scales above and 12 or 13 below the lateral line. The depth is 3.1 to 3.2 times, the head 3.25 to 3.35 times in the length. The eye is 4 to 4.6 times in the head, with a large adipose eyelid. The second dorsal spine is longest, equal to the longest pectoral and anal rays, about 1.35 times in the head. The second dorsal and anal are highest anteriorly, with concave posterior border, the second dorsal about 1.2 times in the head. There are 6 pectoral filaments, 2.85 to 3 times in the length. The depth of the long, much compressed caudal peduncle is 1.9 to 2 times in the head. The body is deep, much compressed, with a conical snout which projects practically its whole length beyond the large inferior mouth.

The color in life is silvery, the fins dusky. In alcohol the color is silvery white, with 18 longitudinal blackish lines, dusky above, the under side white. The spinous dorsal is tipped with black, the other fins are all more or less dusky.

This good food fish is plentiful at Atuona, Hiva Oa Island, Marquesas, where we caught many with a seine. Eleven specimens, 110 to 168 mm. in length, were kept. The species likewise occurred

in abundance at Nuka Hiva Island, where 2 specimens, 280 and 290 mm. long, were obtained.

#### Family SCOMBRIDAE

##### ***Pneumatophorus peruanus* Jordan and Hubbs.**

*Pneumatophorus peruanus* Jordan and Hubbs, footnote and key in Mem. Carnegie Mus., 10, 1925, p. 211.

Several schools of this fish were seen in the Galapagos Islands, particularly in the channel between Albemarle and Narborough Islands and in Tagus Cove, Albemarle Island. About 35 large specimens were caught one night with the aid of electric light. Most of them were taken with dip nets, a few with hook and line. They were placed in the refrigerator but the steward threw them overboard very early next morning before any could be preserved. These fish were 400 mm. or more in length.

This is a very handsome fish, brilliant steel merging into greenish blue above and blue black on top of the head, the sides silvery iridescent with small dusky blotches.

##### ***Rastrelliger brachysoma* (Bleeker).**

*Scomber brachysoma* Bleeker, Nat. Tijds. Ned. Ind., 1, 1850, p. 356—Batavia, Java; Jordan and Dickerson, Proc. U. S. Nat. Mus., 34, 1908, p. 609, fig. 3—Suva, Fiji; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 132.

Dorsal IX-I, 11-VI; anal I, 11-V. There are 144 scales in the lateral line to the caudal base, plus 10 on the fin. Jordan and Dickerson give 130, Fowler 120 scales, so that the number is evidently subject to considerable variation. The scales are arranged in curved and somewhat irregular lines, those on the sides and belly being much larger than those above the lateral line. The depth is 3.2 in the length. Measured to the end of the opercular flap the head is 3 times, measured to the upper angle of the gill opening 3.44 times, in the length. The eye is 3.5 times in the head. The adipose lid is very conspicuous, covering the anterior fourth and posterior half of the eye and extending far forward and backward from the eye. The mouth is very large, the jaws even, the maxillary mostly concealed under the preorbital and extending backward nearly to a point beneath the rear margin of the eye. The short, broad pectoral is twice in the head. The least depth of the caudal peduncle is 7.8 times in the head. There are 2 small keels on each side of the caudal peduncle. The caudal is a little shorter than the head, its lobes widely extended, the lower one the longer, the distance between the tips of the lobes 2.6 times in the length.

The color in alcohol is dark bluish on the back, brownish on the sides, becoming yellowish white below. The dorsal, caudal, and pectoral are lightly margined with black. The ventral and anal are yellowish.

One specimen, 262 mm. long, was obtained at Suva, Viti Levu Island, Fiji.

### ***Scomberomorus maculatus* (Mitchill).**

*Scomber maculatus* Mitchill, Trans. Lit. and Phil. Soc. N. Y., 1, 1815, p. 426—New York.

*Scomberomorus maculatus* Jordan and Gilbert, Bull. U. S. Fish Comm., 2, 1882, p. 106; Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 874, pl. 134, fig. 368; Meek and Hildebrand, Field Mus. Nat. Hist. Zool. Ser., 15, 1923, p. 324.

*Scomberomorus sierra* Jordan and Starks, Proc. Calif. Acad. Sci., (2), 5, 1895, p. 428; Snodgrass and Heller, Proc. Wash. Acad. Sci., 5, 1905, p. 361.

Dorsal XVII or XVIII—16 to 18—VIII or IX; anal II, 15 to 17—VIII or IX. The body is elongate, slender and compressed, the dorsal and ventral outlines about alike, the back low, the long, low head sharply pointed; the head 2.5 to 3 times in the length. The eye is 4.5 to 5.5 times in the head.

Several specimens of this very handsome fish were caught by trolling in or near Tagus Cove, Albemarle Island, Galapagos, but were too large to preserve. In life the sides are sprinkled with numerous golden spots which contrast beautifully with the shining silvery sides. The dorsal region is bluish green.

## Family THUNNIDAE

### ***Katsuwonus pelamis* (Linnaeus).**

*Scomber pelamis* Linnaeus, Syst. Nat., ed. 10, 1758, p. 297.

*Thynnus pelamys* Cuvier and Valenciennes, Hist. Nat. Poiss., 8, 1831, p. 113, pl. 214; Schlegel, Fauna Japonica, Pisces, 1847, p. 96, pl. 49.

*Gymnosarda pelamis* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 868.

*Euthynnus pelamis* Tanaka, Fishes Japan, 1-10, 1912, p. 140, pls. 37, 39, 40; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 133.

*Katsuwonus pelamis* Kishinouye, Journ. Coll. Agric., Tokyo, 8, 1923, p. 453, figs. 5, 14, 19, 25, 53, 57.

Many schools of the oceanic bonito were seen in the Galapagos Islands and on the voyage from that group to the Marquesas, as well as elsewhere during the cruise of the *Illyria*. Some specimens were caught in the channel off Tagus Cove, Albemarle Island, in

the Galapagos, but none were kept. When the *Illyria* lay to off Raratonga it was interesting to watch the islanders in their small canoes out in the tremendous swell. Forty or more boats were out catching bonito in a sea so heavy that we were unable to make a landing.

The oceanic bonito is recognized at sight by having 4 longitudinal dark bands on the side, below the lateral line. It occurs in great abundance along the coast of North Borneo and in the Philippines. In Mindanao, Panay (Antique Province), and along the coast of Batangas Province, Luzon, great numbers are caught at times in fish corrals. In Borneo waters and around the north end of the Philippines Japanese fishermen from Formosa catch many with hook and line.

### **Thunnus thynnus** (Linnaeus).

*Scomber thynnus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 297—pelagic.

*Thunnus thynnus* Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 362; Günther, Fische der Südsee, 1, 1873-76, p. 150; Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 870; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 361; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 133.

One or two specimens of tuna were taken in the channel between Albemarle and Narborough Islands, Galapagos, near Tagus Cove, but were not kept because of their size. This giant mackerel is found in all warm seas and at times is abundant in Philippine waters.

### **Neothunnus macropterus** (Schlegel).

*Thynnus macropterus* Schlegel, Fauna Japonica, Pisces, 1847, p. 98, pl. 51.

*Germo macropterus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 228.

*Neothunnus macropterus* Kishinouye, Journ. Coll. Agric., Tokyo, 8, 1923, p. 446, figs. 13, 19, 23, 45, 51; Jordan and Evermann, Occ. Papers Calif. Acad. Sci., 12, 1926, p. 20, pl. 3, fig. 3, and pl. 5; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 134.

*Germo germo* Jordan and Evermann (not of Lacépède), Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 174.

*Neothunnus itosibi* Jordan and Evermann, Occ. Papers Calif. Acad. Sci., 12, 1926, p. 22, pl. 6.

Several specimens of this large and handsome albacore were hooked off Tagus Cove, Albemarle Island, Galapagos, and one was caught but was too large to preserve.

I have examined many hundreds of this fine fish, alive, just taken from the water, and after preservation in ice, in the Philippines,

and have also examined vast numbers of them in Japan. I agree with the late Dr. Kishinouye that there is no difference between those with the anterior dorsal and anal lobes of ordinary height and those in which the lobes, particularly the anal, extend to the caudal base or beyond. In a lot of several hundred caught in a fish corral at one time, or among twenty tons caught with hook and line at one time, there would be every gradation in the length of the dorsal and anal lobes. Sometimes the anal, more rarely the dorsal, lobe would be elongated and the other remain comparatively short. My observations have been made upon specimens ranging in weight from 30 to 40 pounds up to those weighing nearly 400 pounds, their lengths varying from two-thirds of a meter to nearly three meters.

This albacore ranges over almost the whole Pacific north of the equator in the tropical and warm temperate regions. It is abundant from the Galapagos to the coast of California, about the Hawaiian Islands, and everywhere from the north coast of New Guinea, the Moluccas, Celebes, and Borneo, northward to the Bonin Islands and Japan. It is rare north of 35° N. Lat.

The bright yellow dorsal and anal finlets, together with the long pectoral which extends past the origin of the second dorsal, readily distinguish this albacore from other large mackerel-like fishes related to it.

### *Sarda chiliensis* (Cuvier and Valenciennes).

*Pelamys chiliensis* Cuvier and Valenciennes, Hist. Nat. Poiss., 8, 1831, p. 163—Valparaiso, Chile.

*Sarda chilensis* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 872; Meek and Hildebrand, Marine Fishes Panama, 1, 1923, p. 318; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 134.

Dorsal XVIII-I, 12 or 13-VIII; anal II, 11-VI or VII. The body is wholly covered with scales with a distinct corselet in the pectoral region. The vomer is toothless, the jaws and palatines with rather strong, conical teeth of about equal size, curved inward.

The color is dark steel-blue above, paler to silvery below. On the back and sides are about 5 blackish lines or stripes running obliquely upward and backward. The anal and ventrals are pale, the other fins more or less blackish.

Two or three specimens of the skipjack or California bonito were taken while trolling near Tagus Cove, Albemarle Island, Galapagos. None were kept, because of their size and the difficulty of preservation.

## Family GEMPYLIDAE

**Ruvettus pretiosus** Cocco.

*Ruvettus pretiosus* Cocco, Giorn. Sci. Sicilia, 42, 1829, p. 21—Messina; Lowe, Fishes Madeira, 1843-60, p. 121; Goode and Bean, Oceanic Ichthyology, 1895, p. 196, pl. 57, fig. 210; Waite, Mem. Austr. Mus., 3, 1899, p. 539.

Dorsal XIV or XV-III, 15-II; anal III, 14-II. There are 98 scales in a longitudinal series plus 5 more on the caudal base, and 26 to 29 in a transverse series from the origin of the second dorsal to the anal origin. The compressed, elongate body is highest over the pectoral base, the anterior profile boldly convex, the lower jaw strongly projecting. The depth is 4.9 to 5.25, the head 3.45 to 3.5, the caudal 4.2 to 4.4 times in the length. The head is large, with long, steeply descending snout. The very large circular eye is 4.3 to 4.7, the snout 2.8 to 2.85, the interorbital 3.8 to 3.9, the least depth of the caudal peduncle 5.5 to 5.8, the pectoral 1.85 to 2 times in the head. The mouth is large, with the maxillary extending to the posterior margin of the eye and with conspicuous, backward pointing teeth, those of the lower jaw largest. There are teeth also on the vomer and palatines. There are many bony plates in the skin, each ending in one or more spines so that the surface is very rough and the fish difficult to handle. At the base of each spine is a pore. The abdomen is keeled posteriorly.

The color in alcohol is clear dark brown, the fins black or blackish.

Described from 2 specimens from Tahiti, 613 and 702 mm. long.

The whole fish is very oily, so that even in handling alcoholic specimens one's fingers fairly drip with oil. The flesh is very savory and highly prized, but the oil it contains acts as a very rapid and powerful purgative.

This deep-sea fish has a very wide distribution in the Atlantic and Pacific oceans, and is well known to the natives throughout Polynesia and Micronesia. It is taken with hook and line at depths of 100 to 400 fathoms. The Castor-Oil Fish is caught only in the dark of the moon, when the sea is calm, a kilometer or more from shore, far out beyond the reefs. At Tahiti it commonly occurs from 1 to 2 meters in length, and there are trustworthy accounts of the capture of specimens 3 meters in length at other islands. To land successfully these great fish with only a frail canoe to work from, requires great skill.

Dr. E. W. Gudger has written two interesting papers on the peculiar hooks used in taking the ruvettus (Wooden Hooks Used

for Catching Sharks and Ruvettus in the South Seas, Anthro. Pap., Amer. Mus. Nat. Hist., 28, part 3, pp. 199-348, 92 figs.; The Distribution of Ruvettus, the Oil Fish, throughout the South Seas, Amer. Nat., 62, 1928, pp. 467-477).

Dr. Max Weber has described *Ruvettus tydemani* from Binongka Island, East Indies, and Jordan has called specimens from Honolulu *Ruvettus pacificus*, changing this later to *R. tydemani*, but I do not believe these specimens differ in essentials from *R. pretiosus*.

### Family XIPHIIDAE

#### *Xiphias gladius* Linnaeus.

*Xiphias gladius* Linnaeus, Syst. Nat., ed. 10, 1758, p. 248—Europe; Bloch, Ichthyologie, 3, 1786, p. 23, pl. 76; Cuvier and Valenciennes, Hist. Nat. Poiss., 8, 1831, p. 255, pls. 225, 226, and 231; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 168, fig. 61.

A photograph of a specimen more than two meters in length was seen at Suva, Fiji. The fish was caught off the coast of Viti Levu, not far from Suva.

The swordfish occurs throughout the tropical Pacific, as well as in all warm seas of both hemispheres. It is occasionally caught with hook and line or harpooned, from the Bay of Panama and the Galapagos to the Philippines.

The flat, elongated, powerful sword and absence of ventrals distinguish this fish from its relatives, the spearfish and the sailfish.

### Family CORYPHAENIDAE

#### *Coryphaena hippurus* Linnaeus.

*Coryphaena hippurus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 261—open sea; Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 952, pl. 149, fig. 402.

Two young specimens, 46 and 50 mm. in length, were captured at Tagus Cove, by the aid of electric light. Dorsal 56; anal 26. Numerous adults were seen in the Gulf of Panama, at Cocos Island, all through the Galapagos Archipelago, and in fact throughout our entire Pacific voyage, but none were captured.

This far-ranging, swiftly moving, and very handsome fish is found in all warm seas, and is often seen leaping in the air when feeding. Its colors of green and gold, with iridescent sheen, are exceedingly beautiful in life.

## Family CARANGIDAE

**Scomberoides tol** (Cuvier and Valenciennes).

*Tol Parah* Russell, Fishes Coromandel, 1803, p. 29, pl. 138.

*Chorinemus tol* Cuvier and Valenciennes, Hist. Nat. Poiss., 8, 1831, p. 385;

Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 473.

*Chorinemus moadetta* Day, Fishes India, 1878, p. 230, pl. 51B, fig. 1—in part.

Dorsal VII-I, 20; anal II-I, 19. Depth 3.5 to 3.6, head 3.5 to 3.65, caudal 4.5 to 5.3 times in the length. The eye is 3.33 to 3.66, the snout 3 to 3.15 times in the head. The maxillary extends beneath the anterior portion of the eye. The needle-like scales lie close together and are very small.

The color in alcohol is silvery, with 2 or 3 rows of dark spots on the sides. The dorsal is more or less blackish, the soft dorsal with a black margin.

Described from 3 young specimens, 31 to 40 mm. in length, taken by electric light at Tulagi Harbor, Solomon Islands.

**Scomberoides toloo-parah** (Rüppell).

*Lichia toloo-parah* Rüppell, Atlas, Fische, 1828, p. 91—Massaua, Red Sea.

*Scomberoides toloo-parah* Jordan and Evermann, Bull. U. S. Fish Comm.,

23, part 1, 1903 (1905), p. 180; Kendall and Goldsborough, Mem. Mus.

Comp. Zool., 26, 1911, p. 267; Fowler, Fishes Oceania, Mem. Bishop

Mus., 10, 1928, p. 140.

Dorsal I-VII-II, 19; anal II-I, 18. The depth of the fusiform, compressed body is 3.4 to 3.75, the head 3.6 to 4 times in the length. The eye is 3.6 times in the head, the snout little if any longer than the eye. The deeply forked caudal is a trifle shorter than the head. The mouth is large, with prominent lower jaw, the maxillary extending to the posterior edge of the pupil. The least depth of the caudal peduncle equals or is slightly less than the eye.

The color in alcohol is dark bluish dusky above, the sides below the lateral line pinkish white. There is a dark spot on the opercle and the upper part of the dorsal lobe is black.

Described here from 2 young specimens, 54 and 66 mm. long, from Bushman Bay, Malekula Island, New Hebrides.

**Megalaspis cordyla** (Linnaeus).

*Scomber cordyla* Linnaeus, Syst. Nat., ed. 10, 1758, p. 298.

*Megalaspis cordyla* Jordan and Evermann, Proc. U. S. Nat. Mus., 25, 1902, p.

336; Seno, Rep. Fish. Formosa, 1910, pl. 7, fig. 1; Wakiya, Ann. Carnegie

Mus., 15, 1924, p. 147, pl. 15, fig. 1; Oshima, Phil. Journ. Sci., 26, 1925, p. 364.

*Caranz rotleri* Günther, Fische der Südsee, 2, 1876-81, p. 130.

Dorsal VIII-I, 10-IX; anal II-I, 8-VIII. There are 50 scutes in the lateral line. The depth of the elongate, fusiform body is equal to the head, 3.8 times in the length. The eye is 4.6, the snout 3.28, the interorbital 4.2, the least depth of the caudal peduncle 9 times in the head. An adipose eyelid covers all the eye but the central part of the pupil. The maxillary extends below the middle of the eye. The minute teeth are in a very narrow band on the upper jaw, a single series on the lower jaw, and are also on the vomer, palatines, and tongue. Greatly developed scutes are present on the entire straight portion of the lateral line and are very strong on the tail. The caudal peduncle is nearly twice as broad as deep. The elongate, falcate pectoral exceeds the head and is 3.6 times in the length, the deeply forked caudal about 5 times.

The color in alcohol is bluish to brownish above, very pale yellowish below. There is a circular black spot on the opercle. The anterior margin of the spinous dorsal, top of the soft dorsal lobe, and the posterior margin of the caudal are black or blackish.

Here described from a specimen, 180 mm. long, collected at Bushman Bay, Malekula Island, New Hebrides.

This swift, far-ranging fish reaches a large size. I have often observed them a meter or more in length, in the Philippines.

#### **Decapterus lajang** Bleeker.

*Decapterus lajang* Bleeker, Vif. Bijdr. Ichth. Ternate, Nat. Tijds. Ned. Ind., 8, 1855, p. 302; Wakiya, Ann. Carnegie Mus., 15, 1924, p. 155.

Dorsal VIII-I, 35-I; anal II-I, 29-I. There are 110 scales in the lateral line, with 28 scutes on the posterior part. The depth of the elongate, moderately compressed body is 4.9 times, the head 3.7 times, the pectoral 5.7 times in the length. The eye is 4 times in the head, 1.3 times in the snout, which is 3 times in the head. The interorbital is 0.9 of the eye, 4.4 in the head. The maxillary extends to the anterior border of the eye, its posterior end concave, its length 3 times in that of the head. The teeth in the jaws are very fine, in a single row, those of the lower jaw much more evident than those above. The vomerine teeth are in a T-shaped band. The palatines are toothed, the tongue with a median longitudinal band. The lateral line is scarcely arched, becoming straight beneath the fifteenth dorsal ray, the curved part longer than the straight portion. The pectoral equals the head without the snout. The caudal is widely but not very deeply forked, 6 times in the length.

The color in alcohol is grayish blue above, white below, with a silver luster over all. The caudal is light dusky, the other fins

pale to whitish. There is a well-defined black opercular spot. In life the dorsal region was blue green or greenish blue, white below, the lower half shining silver; no stripes or longitudinal bands.

Here described from a specimen, 148 mm. long, captured in a school of *Trachurops macrophthalmus*, taken at Nuka Hiva Island, Marquesas.

**Decapterus sanctae-helenae** (Cuvier and Valenciennes).

*Caranx sanctae-helenae* Cuvier and Valenciennes, Hist. Nat. Poiss., 9, 1833, p. 37; Günther, Fische der Südsee, 2, 1876-81, p. 130.

*Decapterus sanctae-helenae* Steindachner, Denk. Akad. Wiss. Wien, 70, 1901, p. 495; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 143.

*Caranx pinnulatus* Eydoux and Souleyet, Voy. Bonite, Zool., 1, 1841, p. 165, pl. 3, fig. 2.

*Decapterus pinnulatus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 186, pl. 30.

*Caranx muroadsi* Temminck and Schlegel, 1847, p. 108, pl. 58, fig. 1.

*Decapterus muroadsi* Wakiya, Ann. Carnegie Mus., 15, 1924, 152, pl. 16, fig. 1.

Dorsal VIII-I, 33-I; anal II-I, 27-I. There are 26 or 27 scutes in the lateral line. The depth is 5.14, the head 4.2 times in the length. The snout is 3, the eye 4 times in the head. The interorbital equals the eye. The least depth of the caudal peduncle is 6.4, the second dorsal spine 1.9, the pectoral 1.7 times in the head. The elongate, fusiform body is plump, the head pointed, the large adipose lid covering most of the eye. The forked caudal is broken in my specimen.

In alcohol the color is blackish steel-blue above, the sides and under parts light brown. Traces are visible of a reddish brown band extending from above the pectoral base to the caudal base. There is a black spot on the upper part of the opercular margin and another in the axil of the pectoral.

Here described from a specimen, 270 mm. long, purchased in the market, Papeete, Tahiti.

**Trachurops macrophthalmus** (Rüppell).

*Caranx macrophthalmus* Rüppell, Atlas, Fische, 1828, p. 97, pl. 25, fig. 4.

*Selar macrophthalmus* Wakiya, Ann. Carnegie Mus., 15, 1924, p. 160, pl. 18, fig. 3.

Dorsal VIII-I, 26; anal II-I, 22; scutes 35. The depth is 3.6 times, the head 3.1 to 3.3 times, the pectoral 3.8 to 4 times in the length. The eye is 3.2 times in the head, equal to the snout, and 1.37 times greater than the interorbital space, which is 4.5 to 4.7

times in the head. The body is elongate, moderately compressed, the back little elevated, the dorsal and ventral profiles very much alike. The large eye is covered by a very large adipose eyelid which extends both before and behind the eye. The mouth is large, oblique, with the lower jaw projecting, the posterior end of the maxillary extending beneath the front margin of the pupil.

The color in alcohol is brown or purplish brown above, pale to whitish below, with a silvery luster over all. The dorsals are dusky, the caudal yellowish to brownish. The other fins are pale to whitish.

At Nuka Hiva Island, Marquesas, several thousand specimens were taken with a large seine. Six were retained, their lengths from 145 to 195 mm. This species was abundant in market at Papeete, Tahiti, in February; 4 specimens were bought, 159 to 174 mm. long. Two specimens from Suva, Fiji, are 210 and 240 mm. long. In them the depth is 3.1, the head 3.1, the pectoral 3.37 to 3.5 times in the length. The eye is 3 times in the head, equal to the snout and 1.5 times the interorbital. Dorsal VIII-I, 26; anal II-I, 20 to 22.

#### *Caranx ignobilis* (Forskål).

*Scomber ignobilis* Forskål, Descr. Anim., 1775, p. 55—Red Sea.

*Caranx ignobilis* Klunzinger, Sitzungsber. Akad. Wiss. Wien, 80, part 1, 1879, p. 377; Fische des Rothen Meeres, 1884, p. 100; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 188, fig. 72, not synonymy; Wakiya, Ann. Carnegie Mus., 15, 1924, p. 193, pl. 27, fig. 3.

*Caranx hippoides* Jenkins, Bull. U. S. Fish Comm., 22, 1903, p. 443, fig. 15.

Dorsal VIII-I, 21; anal II-I, 17; scutes 30-32. The depth is 2.3, the head 2.8 to 3 times in the length. The eye is 4 to 4.5 times, the snout 2.9 to 3 times, the interorbital 4 to 4.4 times in the head. The strongly compressed, oblong body is elevated, the profile from the origin of the spinous dorsal to the tip of the snout boldly and steeply arched. The lateral line is moderately curved, the arched part 1.25 times in the straight portion. The height of the soft dorsal lobe equals half its base. The breast is naked below, except for a small patch of minute scales before the ventrals. The pectoral is long, falcate, extending to the base of the seventh anal ray, 2.8 times in the length. The widely forked caudal about equals the head.

The color in alcohol is bluish to brownish gray above, white below, with a silvery luster over all. The dorsals are dusky or brownish, the other fins all pale, or the dorsals, anal, and caudal more or less dusky. There is a blackish spot in the pectoral axil.

Eleven specimens, 52 to 172 mm. long, were collected at Atuona, Hiva Oa Island, Marquesas, and one specimen, 121 mm. long, at Moorea, one of the Society Islands.

Some of the specimens from Atuona are very close to *C. jarra*, as defined by Wakiya. Four specimens, 60 to 126 mm. in length, were taken at Bushman Bay, Malekula Island, New Hebrides.

### *Caranx melampygus* Cuvier and Valenciennes.

*Caranx melampygus* Cuvier and Valenciennes, Hist. Nat. Poiss., 9, 1833, p. 116—Waigiu, Rawak, Buru, Vanicolo, Isle de France; Jordan and Jordan, Fishes Hawaii, Mem. Carnegie Mus., 10, 1922, p. 39; Jordan, E. K., Proc. U. S. Nat. Mus., 66, 1925, p. 15.

*Caranx forsteri* Jordan and Evermann (not of Cuvier and Valenciennes), Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 191.

Dorsal VIII-I, 23; anal II-I, 19; scutes 37 or 38. The depth is 2.5, the head 3 times in the length. The eye is 3.8 times in the head, a little less than the interorbital, and 1.28 times in the snout, which is a trifle less than 3 times in the head. The body is oblong, with a regularly curved anterior profile. The curved part of the lateral line is 1.4 times in the straight portion, which begins beneath the fifth dorsal ray. The breast is completely scaled. The dorsal spines are short and weak, 2.2 to 2.3 times in the head. The soft dorsal lobe is 1.9 times in the head, 2.35 times in the base of the fin. The long, falcate pectoral and deeply forked caudal equal the head.

The color in alcohol is olive above, paler below, the soft dorsal and anal lobes blackish, the caudal dusky with a whitish posterior marginal line, the pectorals yellowish. There is no opercular spot.

This species and *C. stellatus* are very closely related.

Here described from 3 specimens, 77 to 83 mm. in length, collected at Bora Bora Island. I also place here a specimen, 85 mm. long, from Moorea, and 2 specimens, 63 and 65 mm. long, from Nukulau Island, Fiji.

At Nuka Hiva Island, Marquesas, I saw several gigantic carangids, probably of this species, which were caught by native fishermen trolling in their canoes outside the harbor. Two of the fish were each about 1,300 mm. in length, exclusive of the caudal. They were thick and bulky and must have weighed almost 35 kilograms apiece. The smallest fishes of this lot were nearly a meter in length.

### *Caranx sansun* (Forskål).

*Scomber sansun* Forskål, Descr. Anim., 1775, p. 56—Red Sea.

*Caranx sansun* Wakiya, Ann. Carnegie Mus., 15, 1924, p. 197, pl. 28, figs. 1 and 2.

Dorsal VIII-I, 22; anal II-I, 18. There are 30 scutes in the lateral line, plus 4 more on the caudal base. The depth is 2.75 times, the head nearly 3.5 times in the length. The eye is 5 times, the snout 2.9 times in the head. The long, falcate pectoral is about 2.6 times in the length and is 1.3 times the head. The arc of the lateral line is nearly 1.3 times in the straight part. There is an opercular spot. The breast is naked on the under surface only, with a small patch of minute scales before the ventrals.

The color in alcohol is brownish silver below the lateral line, darker above, the predorsal region, nape, and snout more or less leaden in hue. The dorsals are gray to yellowish gray, edged with blackish. The caudal is yellowish, the upper lobe darker than the lower, edged posteriorly with blackish. The anal is pale yellowish, with dusky markings basally. The pectorals are dusky gray with a blackish axillary spot. The ventrals are yellow.

A specimen, 295 mm. long, was taken at Nuka Hiva Island, Marquesas Group, and 2, 115 and 136 mm. in length, were collected in the Papenoo River, Tahiti, near its mouth.

#### *Caranx sexfasciatus* Quoy and Gaimard.

*Caranx sexfasciatus* Quoy and Gaimard, Voy. Uranie, Zool., 1825, p. 358, pl. 65, fig. 4—Iles de Papous; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 231; Wakiya, Ann. Carnegie Mus., 15, 1924, p. 184, pl. 25, figs. 3 and 4.

Dorsal VIII-I, 21; anal II-I, 18; scutes 30-31. The depth is 2.5 to 2.6 times, the head 3.3 times in the length. The oblong body is much compressed, the anterior dorsal profile regularly and evenly arched from the origin of the soft dorsal to the tip of the snout. The eye is prominent, 3.3 to 3.5 times in the head, equal to the snout and approximately equal to the interorbital. The maxillary extends to the posterior margin of the pupil or a little farther. The curved portion of the lateral line is 1.5 to 1.6 times in the straight portion, which begins beneath the fifth dorsal ray. The pectoral and caudal are slightly shorter than the head. The lobe of the soft dorsal is low, 1.8 times in the head. The breast is entirely scaly.

The color in life is bluish gray above, white on the lower half, with a bright silvery sheen over all and 5 to 7 broad, darker vertical crossbands as wide as or wider than the eye. The first one crosses the eye, the second is before the first dorsal and descends to the opercle. These two bands are often very indistinct or disappear. There is a small black spot above the gill opening. The anal and pectorals

are pale yellowish gray to colorless. The dorsals are dusky, the caudal yellowish gray basally, edged posteriorly with black. Often the dorsal is rather clear, the soft dorsal tipped posteriorly with black.

Of this common and widespread fish 11 specimens were obtained from a fresh-water creek at Atuona, Hiva Oa Island, Marquesas, their lengths varying from 58 to 86 mm. From the Papenoo River, Tahiti, 6 specimens, 73 to 132 mm. long, were collected, and at Maraa, Tahiti, 2 specimens, 65 and 71 mm. long, were taken on the coral reef. A specimen, 55 mm. long, was caught in a small river near Suva, Viti Levu Island, Fiji, and in the Rewa River on the same island, 25 miles from the sea, was taken another of the same length. Both specimens from Fiji showed 7 crossbands. At Bushman Bay, Malekula Island, New Hebrides, a specimen, 69 mm. long, was taken from a fresh-water creek. Three specimens, from 83 to 92 mm. in length, were seined from a fresh-water creek at Auki, Malaita Island, in the Solomon Islands.

#### *Caranx stellatus* Eydoux and Souleyet.

*Caranx stellatus* Eydoux and Souleyet, Voy. Bonite, Poiss., 1841, p. 167, pl. 3, fig. 2—Hawaiian Islands; Jordan, E. K., Proc. U. S. Nat. Mus., 66, 1925, p. 15.

*Caranx melampygus* Günther, Fische der Südsee, 2, 1876, p. 133, pl. 86; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 192.

Dorsal VIII-I, 22 or 23; anal II-I, 19 or 20; scutes 37 or 38. The depth is 2.6 to 2.7, the head 3.3 times in the length. The eye is 5.25 times in the head, nearly 1.5 times in the interorbital, and nearly twice (1.95) in the snout, which is 2.7 times in the head. The falcate pectoral is 2.6 to 2.7 times in the length. The body is much compressed, the nape elevated, the anterior profile descending in a bold and nearly straight line to the snout tip. The lower jaw is slightly projecting. The eye has a well-developed adipose lid posteriorly. The dorsal spines are short and weak, the longest 2.4 to 3.3 times in the head. The pectoral is very long, reaching to above the seventh anal ray. The deeply forked caudal equals the head, the lower lobe the longer. The breast is scaly. There is no opercular spot. The lateral line is moderately curved, the curved part 1.3 times in the straight part which begins below the fifth dorsal ray.

In life this is a beautiful fish, perhaps the handsomest of the carangids. The dorsal region and vertical fins are blue, glowing as if incandescent, while spots of dark blue on the upper part of the sides gleam like jewels. The rest of the fish is brilliant silver. The

pectorals are yellow. In alcohol the color is whitish to grayish silvery, with a narrow black band below the base of the dorsal. The upper part of the sides usually has some small dark or blackish spots. The vertical fins are blackish, with the first ray and tips black. The pectorals are gray to yellowish, the caudal dusky, especially posteriorly.

Here described from 2 specimens from Papeete, Tahiti, 255 and 260 mm. in length. I also place here 4 young specimens, 78 to 99 mm. long, collected at Nuka Hiva Island, Marquesas group. Three specimens, 192 to 250 mm. in length, were taken at Tenibuli, Ysabel Island, and one, 284 mm. long, at Hathorn Sound, New Georgia Island, in the Solomons.

### *Trachinotus bailloni* (Lacépède).

*Casesiomorus baillonii* Lacépède, Hist. Nat. Poiss., 5, 1801, pp. 121, 122, pl. 3, fig. 1, on Commerson MS.

*Trachinotus baillonii* Cuvier and Valenciennes, Hist. Nat. Poiss., 8, 1831, p. 431; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 271, pl. 2, fig. 1.

*Trachynotus baillonii* Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 484; Fische der Südsee, 2, 1876-81, p. 139.

Dorsal VI-I, 23 or 24; anal II-I, 22 or 23. There are 92 tubulated scales in the lateral line, and about 10 more on the caudal base. The depth is 2.3, the head 3.8, the caudal 1.8 times in the length. The eye is 3.4 to 3.7, the snout 3.7 to 3.9, the least depth of the caudal peduncle about 2.9, the pectoral about 1.4 times in the head. The body is elongate-ovate, strongly compressed, the caudal very deeply forked, the lobes with very elongate tips. The anterior dorsal and anal rays are greatly elongate, the former extending to the end of the fin, the anal lobe often reaching to the caudal base. The maxillary extends beneath the anterior part of the pupil.

The color in alcohol is blackish or dusky bluish above, the sides yellowish or silvery white, with 5 circular black spots in a row on the lateral line, the 2 or 3 middle ones largest and darkest, the others inconspicuous or often wanting.

Two fine specimens, 210 and 214 mm. long, were taken at Bushman Bay, Malekula Island, New Hebrides.

## Family NEMATISTIIDAE

### *Nematistius pectoralis* Gill.

*Nematistius pectoralis* Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 259—Cape San Lucas; Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896,

p. 895, pl. 138, fig. 377; Meek and Hildebrand, *Fishes of Panama*, Field Mus. Nat. Hist., Zool. Ser., 5, 1923, p. 330.

This fine and very striking looking fish took the hook freely at Tagus Cove, Albemarle Island, Galapagos. A number of large specimens were taken, but none were retained. It may be known at once by the dorsal spines, all but the first one being greatly elongated and filiform.

#### Family LEIOGNATHIDAE

##### *Leiognathus fasciatus* (Lacépède).

*Clupea fasciata* Lacépède, *Hist. Nat. Poiss.*, 11, 1803, pp. 191 and 240—Isle de France, after Commerson.

*Equula fasciata* Day, *Fishes India*, 1878-88, p. 243, pl. 51C, fig. 2.

*Leiognathus fasciatus* Jordan and Seale, *Fishes Samoa*, Bull. Bur. Fish., 25, 1905 (1906), p. 273; Fowler, *Fishes Oceania*, Mem. Bishop Mus., 10, 1928, p. 153.

Dorsal VIII, 16 or 17; anal III, 14. There are 50 scales in the lateral line, plus 3 or 4 more on the caudal base, 9 above and about 20 below. The very deciduous scales have nearly all fallen in my specimens. The depth is 2.5, the head 3.3 to 3.4 times in the length. The eye is 3.4 to 3.66, the snout 2.85, the least depth of the caudal peduncle 4.4 to 4.8, the pectoral 1.66 times in the head. The caudal equals the head. The body is much compressed, elongate ellipsoid, the dorsal and ventral profiles about equally curved, the caudal peduncle very slender, the caudal fin forked. The second dorsal spine is elongated, from two-thirds of the head in smaller specimens to more than the head in larger specimens. The second anal spine is stout and long, about three-fourths of the head. Day remarks that the lateral line ceases before the base of the caudal fin, but that is only true where the very loosely attached scales have been rubbed off.

The color in alcohol is pale brownish, with irregular and more or less vertical darker brown markings on the upper half of the body and a large blackish spot on the opercle. The spinous dorsal is blackish marginally, the fins otherwise pale.

Described from 6 specimens, 55 to 79 mm. long, from Bushman Bay, Malekula Island, New Hebrides. I also refer here 9 specimens from the same locality, 37 to 63 mm. in length. They have 55 or 56 tubulated scales in the lateral line to the caudal base.

##### *Leiognathus dussumieri* (Cuvier and Valenciennes).

*Equulus dussumieri* Cuvier and Valenciennes, *Hist. Nat. Poiss.*, 10, 1835, p. 56, pl. 283—Coromandel coast; Cuvier, *Regne Anim.*, Poiss., Disciples

ed., 1836, pl. 62, fig. 1; Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 500; Day, Fishes India, 1878-88, p. 239, pl. 52, fig. 2.

Dorsal VIII, 16; anal III, 14. There are 58 or 59 scales of the lateral line with tubules, plus 3 more on the caudal base. The depth is 2 to 2.1, the head 3 times in the length. The second dorsal spine is stout, 2.3 to 2.4 times in the depth, and the third spine is slender and nearly as long. The longest anal spine is a little less than the second dorsal spine; the lower margin of the preopercle is serrated.

There is a dusky band from the shoulder to the caudal, broad in the middle of the body. There is a number of irregular vertical dusky streaks and blotches below the dorsal and nape extending to the middle of the body. There is no black blotch on the spinous dorsal, but there is a blackish line at the dorsal base and a black spot under the pectoral axil.

Three specimens, 40 to 42 mm. in length, were taken from the Mbureta River, Ovalau Island, Fiji.

#### Family APOGONIDAE

##### *Apogon atradorsatus* Heller and Snodgrass.

*Apogon atradorsatus* Heller and Snodgrass, Proc. Wash. Acad. Sci., 5, 1903, p. 192, pl. 3—Charles Island, Galapagos.

Dorsal VI-I, 9; anal II, 8. There are 25 scales in the lateral line, 3 above and 11 below it. The depth is 3.2, the head 2.64 times in the length. The large eye is 3.1 times, the snout 4.4, the interorbital 4.2 times in the head. The narrow, pointed pectoral is 1.5 times, the emarginate caudal 1.4 times in the head.

The color in alcohol is reddish brown, becoming dusky above and much paler on the throat and belly, profusely dotted with minute red brown specks. The first dorsal is dusky, the dorsal and anal rays black on the outer half or all but the basal portion, the caudal black. The other fins are pale. The opercle and the region immediately behind its lower part have a pearly or silvery luster. The sides of the head and body may have a purplish sheen. Specimens may bleach till the body is yellowish, with a silvery sheen, and the fins are all pale, but the ends of the soft dorsal rays and tip of the caudal always remain black. In life the color is bright red, paler on the throat and breast, the outer part of the second dorsal, anal, and caudal black.

From Cocos Island we have 4 specimens, 57 to 74 mm. in length. From the Galapagos Islands we have the following: Albemarle

Island, Tagus Cove, 3 specimens, 70 to 72 mm. long; Turtle Bay, 2 specimens, 68 and 75 mm. long; Charles Island, Post Office Bay, 1 specimen, 56 mm. long, and 2 young, each only 15 mm. long. Only the specimens from Cocos and Tagus Cove are in good condition.

**Apogon orbicularis** Kuhl and Van Hasselt.

*Apogon orbicularis* Kuhl and Van Hasselt in Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 155—Java; Günther, Fische der Südsee, 1, 1873-75, p. 22, pl. 20, fig. D; Day, Fishes India, 1878-88, p. 65, pl. 17, fig. 7.

*Amia orbicularis* Bleeker, Atlas Ichth., 7, 1873-76, p. 79, and 8, 1876-77, pl. 339, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 154; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 31.

*Apogon nigromaculatus* Hombron and Jacquinot, Voy. Astrolabe, 3, 1853, p. 32, pl. 1, fig. 2.

Dorsal VI-I, 9; anal II, 8. There are 24 scales in the lateral line plus 3 more on the caudal base, 2 above and 5 below the line and 6 predorsal scales. The depth of the compressed, sub-orbulate body is 1.8, the head 2.6, the caudal 2.5 times in the length. The eye is 3, the snout 3.75, the interorbital 3.33, the first dorsal spine 1.3, the pectoral 1.4, the least depth of the caudal peduncle 1.8 times in the head. The maxillary extends beneath the middle of the eye, 2.14 times in the head. The mouth is large, oblique, the jaws about equal, or more often the lower jaw is projecting.

The color in life is brown, with a conspicuous blackish brown stripe extending obliquely downward from the origin of the first two dorsal spines and forming a belt which may cross the belly before the vent or may be broken beneath. About the head are numerous small dark brown spots and on the posterior and lower part of the body are many large blackish brown spots. The fins are all pale brown, the ventrals with a broad blackish terminal stripe which appears to be an extension of the black body girdle when the fins are expanded. The color in alcohol is but little changed except that the general body color is darker and the fins are darker. The membrane of the spinous dorsal is sprinkled with small dark brown spots.

Described here from 3 specimens, 45 to 78 mm. long, taken at Auki, Malaita Island, and 1 specimen, 79 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

This strikingly marked but really inconspicuous cardinal fish swarms around the docks and piers of the Indo-Pacific realm from the Solomon Islands westward through the East Indies. It is particularly abundant where the piers built of coral afford it excellent hiding places. Large schools of this fish lie motionless for hours

beside landing places or pier-heads where they can get food in abundance without being exposed to the sweep of the tide.

### *Apogon rhodopterus* Bleeker.

*Apogon rhodopterus* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 62—Singapore.

*Amia rhodopterus* Bleeker, Atlas Ichth., 7, 1873-76, p. 81, pl. 312, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 155.

*Amia rhodoptera* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 34.

*Amia koilomatodon* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 240, fig. 34.

Dorsal VI-I, 9; anal II, 8. There are 23 scales in the lateral line plus 4 more on the caudal base, 2 above and 6 below the line. The preopercle has 2 or 3 rows of scales. The depth is 2.3 to 2.5, the head 2.4 to 2.6, the caudal 2.95 to 3.1, the pectoral 3.85 to 4 times in the length. The eye is 3.5 to 4 times in the head, the snout 3.5, the interorbital 3.85 to 4.1, the maxillary 2.15 to 2.2, the least depth of the caudal peduncle 2.2 to 2.3, the second dorsal spine 1.75, the second anal spine 2.2 to 2.3 times in the head. The dorsal rays are much higher than the dorsal spines, 1.37 times, the anal rays 1.48 times in the head. The mouth is large, the lips even or the chin slightly projecting, the maxillary extending beneath the middle or posterior edge of the pupil. The preopercle is strongly denticulate. The preorbital margin is dentate to spinescent.

The color in alcohol is brown above, becoming paler or sometimes whitish beneath, each scale with a vertical brown marginal bar. From the dorsal origin and base of the anterior spines a brownish black bar descends to behind the pectoral and a second brownish black bar extends from the base of the last 3 dorsal rays to the base of the posterior anal rays. Often these bars, especially the posterior one, are broken at the lateral line or at the mid-axis of the body. At the middle of the caudal base is a small, circular black spot. From the lower margin of the eye a black line or stripe extends to the posterior angle of the preopercle. There is a large blackish blotch on the opercle. The spinous dorsal is mottled with blackish brown, the other fins all colorless except the caudal which is margined above and below with blackish. The first dorsal rays may be margined with blackish, and the tips of the anal rays may be dusky.

This large and heavy-bodied species is here described from 3 specimens, 89 to 106 mm. long, taken at Tenibuli, Ysabel Island, Solomons. In the same archipelago 6 specimens, 82 to 107 mm. in length, were collected at Auki, Malaita Island, and 3 at Hathorn Sound, New Georgia Island, their lengths 88 to 111 mm.

**Apogon bandanensis** Bleeker.

*Apogon bandanensis* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 95—Banda; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 317.

*Amia bandanensis* Bleeker, Atlas Ichth., 7, 1873-76, p. 82; 8, 1876-77, pl. 345, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 155; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 40.

*Apogon savayensis* Günther, Proc. Zool. Soc. Lond., 1871, p. 656; Fische der Südsee, 1, 1873-75, p. 21, pl. 19, fig. B; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 277.

*Amia savayensis* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 239, fig. 33.

Dorsal VII-I, 9; anal II, 8. There are 23 or 24 scales in the lateral line plus 1 to 3 more on the caudal base, 2 above and 5 below it. The depth is 2.5 to 2.6, the head 2.33 to 2.55, the caudal 2.9, the narrow pectoral 3.6 to 3.7 times in the length. The large eye is 2.15 to 2.55, the snout 4.5 to 5, the interorbital 3.4 to 3.8, and the least depth of the caudal peduncle 2.1 to 2.25 times in the head.

The color in alcohol is brown above, the sides pale yellowish brown, the belly silvery brown, the opercles and lower part of the head with beautiful violet reflections. There is a blackish brown saddle on the caudal peduncle and a dark brown band (occasionally absent) from the eye diagonally backward to the lower angle of the preopercle. The dorsals and caudal are dusky, the anal and ventrals violet or violaceous brown, the pectoral nearly colorless.

Here described from 5 specimens, 28 to 63 mm. in length, from Maraa, Tahiti, and 1, 67 mm. long, from Bora Bora. At Nukulau Island, Fiji, this handsome little cardinal fish is abundant. I collected there 40 specimens, 20 to 35 mm. long. Three specimens, 42 to 55 mm. long, were obtained at Vila, Efaté Island, New Hebrides.

Our specimens are typical of the *A. savayensis* of Günther.

Three specimens taken at Malo Island, New Hebrides, 50 to 57 mm. in length, lack the brown transverse band on the caudal peduncle, and the diagonal stripe on the preopercle is very faint. Six specimens, 43 to 63 mm. long, taken at Ugi Island, Solomons, are richly colored with bronze, silvery, and violet reflections. I also place here 3 young specimens, 36 to 39 mm. long, lacking some of the characteristic markings, but closer to *A. bandanensis* than anything else. They are from a reef at Tenibuli, Ysabel Island, Solomon Islands.

**Apogon apogonides** (Bleeker).

*Cheilodipterus apogonides* Bleeker, Act. Soc. Sci. Indo-Neerl., 1, 1856, p. 37—Manado, Celebes.

*Amia apogonides* Bleeker, Atlas Ichth., 7, 1873-76, p. 97; 8, 1876-77, pl. 341, fig. 2.

*Apogon apogonides* Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 324.

Dorsal VII-I, 9; anal II, 8. There are 25 scales in the lateral line, plus 3 more on the caudal base, 2 above and 7 below it. The depth is 3, the head 2.75, the caudal 3.4 times in the length. The snout is 3.8, the eye 3, the interorbital 4.2 times in the head. The third and fourth dorsal spines are 2.1 times in the head, shorter than the longest dorsal rays, which are 1.6 times in the head. The anal equals the soft dorsal. The narrow pectoral is 1.5, the least depth of the caudal peduncle 2.33 times in the head. The caudal is forked, the lobes pointed. The mouth is large, the maxillary reaching beyond a vertical from the rear margin of the pupil. The first dorsal spine is minute, the second half as long as the third and fourth, which are equal.

The color in alcohol is pale brownish yellow, sprinkled with minute brown dots, the head and body below the lateral line with violet and pearly reflections. There is a dusky band from the tip of the snout to the eye. There is a black blotch at the tip of the spinous dorsal, between the third and fourth, and fourth and fifth spines. The posterior margin of the caudal is blackish, the fins otherwise all whitish.

This species has unquestionably been confused with *A. moluccensis* Cuvier and Valenciennes, and perhaps with *A. fusca* Quoy and Gaimard.

Two specimens of this rare little fish were collected on the reef at Maraa, Tahiti, their lengths 38 and 58 mm. The measurements are from the larger specimen.

#### *Apogon hartzfeldi* Bleeker.

*Apogon Hartzfeldii* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 254—Amboina.

*Apogon hartzfeldi* Martens, Preuss. Exp. Ost-Asien, 1, 1876, p. 386; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 311.

*Amia hartzfeldi* Bleeker, Atlas Ichth., 7, 1873-76, p. 86; 8, 1876-77, pl. 347, fig. 2.

*Amia hartzfeldii* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 44.

Dorsal VII-I, 9; anal II, 8. There are 25 scales in the lateral line plus 3 more on the caudal base, 2 above and 6 below the line. My specimen has but 1 row of scales on the preopercle, not 2 as given by authors. The depth is 3.1, the head 2.5, the slightly

emarginate caudal 3.4, the pectoral 4.4 times in the length. The eye is 3, the snout 4.16, the interorbital 4.5, the maxillary 3.5, the least depth of the caudal peduncle 2.5 times in the head. The maxillary extends beneath the hind margin of the pupil. The rear margin of the preopercle is minutely and evenly serrate.

The color in alcohol is pale yellowish brown, the head blackish brown with purplish bronze reflections, the sides and belly with silvery luster. A bluish white line extends from the nape to the dorsal origin and another extends from the posterior margin of the head along the back to the top of the caudal peduncle. At the middle of the caudal base is a circular black spot as large as or larger than the pupil. On the median line of the snout is a black line, and a black line from it above the eye to the hind margin of the top of the head. The fins are largely nearly colorless, the soft dorsal and anal each with a vague blackish basal band which extends to the tip of the posterior ray. On the caudal are 4 cross rows of blackish brown spots.

Here described from a specimen, 62 mm. long, from Tenibuli, Ysabel Island, Solomons. Another specimen, 65 mm. long, from Auki, Malaita Island, agrees in all essentials, the dusky bars on the dorsal and anal rays being better developed and the caudal having 5 or 6 crossbars of dark spots.

#### **Apogon angustata** (Smith and Radcliffe).

*Amia angustata* Smith and Radcliffe, Proc. U. S. Nat. Mus., 41, 1911, p. 253, fig. 1—Malanipa Island, Philippine Islands; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 51.

Dorsal VII-I, 9; anal II, 8. There are 25 scales in the lateral line, plus 3 more on the caudal base, 2 above and 6 below the lateral line, and 4 predorsal scales. The depth is 3, the head 2.72 times in the length. The large eye is 2.9 times in the head. The short, broadly rounded snout is 0.7 of the eye, 4.14 times in the head. The interorbital is 0.6 of the eye, 4.8 times in the head. The mouth is large, oblique, the jaws equal, the maxillary extending to a vertical midway between the hind margin of the pupil and the posterior border of the eye. The third dorsal spine is longer and much stouter than the rest, twice in the head. The soft dorsal is 1.5 times, the anal 1.6 times in the head. The notched caudal is 1.3 times, the pectoral 1.6 times in the head.

The color in alcohol is brownish gray, nearly whitish, with three dark brown stripes along the sides and one from between the eyes and along the back at the dorsal base to behind the last dorsal ray. The median lateral band extends from the eye to the caudal base,

where it ends in a circular black spot nearly as large as the pupil. The fins are all whitish, the soft dorsal and anal each with a blackish margin and a blackish longitudinal band a little above the base. The posterior margin of the caudal is blackish.

Two specimens, 64 and 79 mm. long, were collected at Nuka Hiva Island, Marquesas Islands. This rare species has hitherto been known only from the Philippines and off the north coast of Borneo, from specimens collected by the *Albatross* and myself.

### *Apogon novemfasciatus* Cuvier and Valenciennes.

*Apogon novemfasciatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 154—Timor and Guam.

*Amia novemfasciata* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 242, fig. 36; Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 254; Smith and Radcliffe, Proc. U. S. Nat. Mus., 41, 1911, p. 251, pl. 23; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 156.

*Apogon fasciatus* Günther, Fische der Südsee, 1, 1873-75, p. 19, pl. 20, fig. B; Bleeker, Atlas Ichth., 7, 1873-76, p. 87; 8, 1876-77, pl. 326, fig. 4.

Dorsal VII-I, 9; anal II, 8. There are 25 scales in the lateral line, plus 3 or 4 more on the caudal base, 3 above and 6 below the line. The depth is 2.9 to 3, the head 2.45 to 2.55, the caudal 3.25 to 3.7 times in the length. The large eye impinges upon the upper profile, 2.7 to 3 times, the snout 3.7 to 4.25, the interorbital 5 to 5.4, the least depth of the caudal peduncle 2.1 times in the head. The mouth is large, oblique, the posterior angle of the maxillary beneath the posterior part of the pupil. The rather stout third dorsal spine is 2.5 times in the head. The second dorsal, anal, and pectoral are all equal, 1.75 to 1.8 times in the head.

The color in alcohol is very pale reddish brown or yellowish, with 3 dark reddish bands from the snout to the caudal and one along the middle of the back. The middle band on the side runs to the extremity of the caudal. The bands on either side of it converge toward the central band on the caudal but do not touch it. There is a conspicuous spot on the pectoral base. There is a broad dark brown basal band on the second dorsal, continued to the tip of the last rays, and a similar but fainter band on the anal. The spinous dorsal is more or less dusky, the other fins are all white to colorless.

This species is very common on the reefs of Fiji. Fifty-four specimens, 18 to 64 mm. long, were collected at Nukulau Island; 8 specimens, 21 to 50 mm. in length, at Suva, Viti Levu Island; and 4, from 12 to 31 mm. in length, at Ovalau Island. At Malo Island,

New Hebrides, a specimen, 64 mm. long, was added to the collection. A specimen, 57 mm. long, was obtained at Tenibuli, Ysabel Island, in the Solomon group. Three more specimens, 24 to 30 mm. long, probably belong here.

**Apogon aroubiensis** Hombron and Jacquinot.

*Apogon aroubiensis* Hombron and Jacquinot, D'Urville's Voy. Pôle Sud, Poiss., 1853, p. 31, pl. 1, fig. 1—Aroub, Malaysia.

*Amia aroubensis* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 33; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 241, fig. 35; Smith and Radcliffe, Proc. U. S. Nat. Mus., 41, 1911, p. 250, pl. 22; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 157.

*Apogon fasciatus* (not White) Günther, Fische der Südsee, 1, 1873-75, p. 19, pl. 20, fig. A (part).

Dorsal VII-I, 9; anal II, 8. There are 24 scales in the lateral line and 4 or 5 on the caudal base, 3 above and 6 below it. The depth is 3, the head 3.8, the caudal 4.2 times in the length. The eye is 2.5, the snout two-thirds as long, 3.75, the interorbital 4.5, the least depth of the caudal peduncle 2.14 times in the head. The maxillary extends to a vertical from the posterior third of the eye. The very slightly forked caudal is 1.5 times in the head and is a little longer than the pectoral.

The color in alcohol is whitish with a deep brown median stripe on the back from the snout to the soft dorsal, 3 broad stripes along the side, and a fifth narrow and less distinct stripe from the throat to the anal. The second and fourth stripes bend at the caudal base toward the third stripe but do not unite with it. There is a thin dusky line along the middle of the caudal, a continuation of the third lateral stripe. The fins are all white, with a black bar near the base of both the soft dorsal and anal.

Here described from 2 specimens, 22 and 42 mm. long, from Maraa, Tahiti, and 1, 42 mm. long, collected at Bora Bora.

**Apogon robusta** (Smith and Radcliffe).

*Amia robusta* Smith and Radcliffe, Proc. U. S. Nat. Mus., 41, 1911, p. 254, pl. 24 and fig. 2—Jolo, Philippine Islands.

Dorsal VII-I, 9; anal II, 8. There are 24 scales in the lateral line to the caudal base, plus 3 more on the latter, 3 above and 6 below the line. The body is thick and robust anteriorly, much compressed posteriorly, the depth 2.8, the head 2.7, the caudal 3.5, the pectoral 4 times in the head. The large, circular eye is 3, the snout 3.75, the interorbital 4.5, the least depth of the caudal peduncle 2.25 times in the head. The thickness of the body behind the opercle

is 1.88 times in the depth. The mouth is large, oblique, the maxillary extending beneath the posterior margin of the pupil.

The color in alcohol is yellowish white with 4 lateral blackish longitudinal stripes and 1 along the middle of the back. The median dorsal stripe begins between the eyes, divides at the dorsal origin and continues on each side at the base of the dorsal, unites behind the dorsal and continues to the caudal base. The first lateral stripe starts on the tip of the snout, where it joins its fellow of the opposite side in a V, and runs back above the eye and on the upper half of the lateral line scales for about half its length, then continues straight on to the upper part of the caudal base where it bends down slightly. A short narrow dark stripe runs across the upper margin of the eye and back to the origin of the lateral line. The second lateral stripe runs around the tip of the snout across the eye and back to the caudal base, very broad above the pectoral, then narrows until near the caudal where it enlarges into a deep black elongate blotch. The third stripe extends from the middle of the maxillary along the lower margin of the eye over and above the pectoral base to the base of the caudal, where it curves upward slightly. The fourth band is paler, and runs from the end of the maxillary to the posterior part of the anal base. The anterior half of the spinous dorsal is dusky. There is a rather faint dusky bar along the base of both the soft dorsal and anal, extending to the tip of the posterior rays. Otherwise all the fins are whitish.

Here described from 3 specimens, 28 to 49 mm. in length, taken at Wala Island, New Hebrides. They agree in every essential with Smith and Radcliffe's description and figures.

#### *Apogon frenatus* Valenciennes.

*Apogon frenatus* Valenciennes, Nouv. Ann. Mus. Hist. Nat., Paris, 1, 1832, p. 57, pl. 4, fig. 4—New Guinea, Guam; Günther, Fische der Südsee, 1, 1873-75, p. 19, pl. 19, fig. A; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 295—synonymy in part.

*Amia frenata* Bleeker, Atlas Ichth., 7, 1873-76, p. 89, pl. 342, fig. 2; Fowler and Ball, Bull. Bishop Mus., 26, 1925, p. 13.

Dorsal VII-I, 8 or 9; anal II, 8. There are 24 scales in the lateral line plus 4 more on the caudal base, 2 above and 6 below it. The depth is 2.8 to 3, the head 2.5 to 2.66, the caudal 3.25 to 3.7, the pectoral 4 times in the head. The eye is 3.33, the snout 3 to 3.33, the interorbital 4.1 to 4.6 times in the head. The fourth dorsal spine is highest, 1.8 to 2 times in the head. The second dorsal is higher than the first, the anterior rays longest, 1.55 to 1.75, the anal

1.8 times in the head. The caudal peduncle is wide, its least depth 2.35 to 2.45 times in the head. The caudal is moderately forked, its upper lobe pointed.

The color in alcohol is yellowish brown, each scale on the upper half with a dark brown margin, becoming light yellowish and more or less silvery below. There is a dark brown band from the snout to the caudal, ending in a large rounded blackish brown spot or crossbar on the caudal base. The membrane between the anterior dorsal spines is blackish brown. The soft dorsal and anal each have a black or dark brown crossbar near the base, the bar often extended out to the tip of the posterior rays. The upper and lower margins of the caudal are dark brown. The membrane between the outer ventral rays is also dark brown.

Two specimens, 88 and 90 mm. long, were taken on the reef at Maraa, Tahiti, and 4 at Moorea Island, from 67 to 88 mm. in length. A specimen, 69 mm. in length, was collected at Vila, Efaté Island, and 3 specimens, 80 to 82 mm., at Malo Island, New Hebrides. In the Solomon Islands a specimen, 81 mm. long, was collected at Auki, Malaita Island, and 11 specimens, 50 to 86 mm. long, at Tenibuli, Ysabel Island.

#### **Apogon exostigma** (Jordan and Seale).

*Amia exostigma* Jordan and Seale (Jordan and Starks by typographical error), Bull. Bur. Fish., 25, 1905 (1906), p. 238, fig. 31—Apia, Samoa; Kendall and Radcliffe, Mem. Mus. Comp. Zool., 35, 1912, p. 101; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 278.

Dorsal VII-I, 9; anal II, 9. There are 24 or 25 scales in the lateral line plus 3 to 5 more tubules on the caudal fin, 2 above and 6 below the lateral line. The depth is 2.85, the head 2.55 to 2.6, the caudal 3.33 to 3.4, the pectoral 4 to 4.2 times in the length. The eye is 3 to 3.2, the snout 3.25 to 3.5, the interorbital 4.6 to 4.7 times in the head. The oblong body is slender, compressed, the head large, the snout blunt, the mouth large with the maxillary extending to a vertical below the middle of the pupil.

The color in life is pale olive or brownish white with a slight roseate flush. A black stripe runs from the tip of the snout to and behind the eye and along the middle of the side, very broad behind the eye but narrowing posteriorly and disappearing before reaching the caudal base. Above its posterior end is a circular black spot as large as the pupil. The opercle is silvery, sprinkled with dark punctulations. The fins are pale reddish to clear. The anterior and upper part of the spinous dorsal is black or dusky and there

is a black line on the margins of the upper and lower caudal lobes. Near the base of both the soft dorsal and anal is a dusky crossband.

In alcohol the color is very pale brownish, with each scale outlined or margined with brown, the nape violaceous brown. There is a blackish lateral band from the snout to the caudal peduncle as in life, with a conspicuous black circular spot on the caudal base above the lateral line. Below the black band is a silvery white stripe from the eye to above the pectoral base. The cheeks, throat, and breast have a violet sheen. The first dorsal is black anteriorly, the caudal margined above and below with blackish.

On the reef at Maraa, Tahiti, were collected 12 typical specimens, 52 to 86 mm. in length. I have compared them with typical *A. frenatus* and find them distinct. At Ovalau Island, Fiji, 1 specimen, 25 mm. long, was obtained. In the Solomon Islands 4 specimens, 55 to 82 mm. in length, were taken at Auki, Malaita Island, and 4 specimens, 60 to 86 mm., at Tenibuli, Ysabel Island.

#### *Apogon compressus* (Smith and Radcliffe).

*Amia compressa* Smith and Radcliffe, Proc. U. S. Nat. Mus., 41, 1911, p. 246, pls. 20 and 21—Bisucay Island, Cuyo Islands, Philippines, 45 localities in Philippines, Borneo, and Moluccas; Fowler, Mem. Bishop Mus., 10, 1928, p. 157; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 75.

*Amia fasciata compressa* McCullough, Endeavour Reports, 3, part 3, 1915, p. 118.

Dorsal VI-I, 9; anal II, 9. There are 24 or 25 scales in the lateral line plus 4 more on the caudal base, 2 above and 6 below the line; 2 rows of scales on the preopercle. The depth is 2.55 to 2.6, the head 2.55 to 2.75, the forked caudal 2.5 to 3.4, the pectoral 3.5 to 4 times in the length. The large eye is 2.4 to 2.6, the snout is 5, the interorbital 3.5 to 3.6, the maxillary 3.5 to 3.6, the least depth of the caudal peduncle 1.8 to 1.9 times in the head. The lower jaw projects slightly, the maxillary extending to a vertical from the middle or posterior margin of the pupil. The preopercular margin is finely serrate.

In alcohol the ground color is pale silvery or pearly white or yellowish with 6 blackish brown longitudinal bands, the interspaces appearing as brilliant pearly or opalescent stripes. The fourth dark band, extending from the snout tip across the eye to the middle of the caudal base, breaks into 2 short bars at the caudal base above and below its terminus, or less often several of the longitudinal dark stripes break into small spots at the caudal base.

The spinous dorsal is blackish brown anteriorly or almost the entire fin may be blackish. The soft dorsal and anal are pale brownish or may be clear, both with a dark brown basal bar which extends back to the tip of the posterior ray. Often the anterior margin of the soft dorsal is blackish. The pectoral is pale. The upper and lower caudal margins are blackish brown, the rest of the caudal and the ventrals colorless or tinged with blackish.

Described from 10 specimens, 54 to 69 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

#### **Apogon amboinensis** Bleeker.

*Apogon amboinensis* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 329—Amboina; Playfair and Günther, Fishes Zanzibar, 1866, p. 19; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 340.

*Amia amboinensis* Bleeker, Atlas Ichth., 7, 1873-76, p. 90; 8, 1876-77, pl. 346, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 81.

Dorsal VI or VII-I, 9; anal II, 8. There are 22 or 23 scales in the lateral line plus 2 to 4 more on the caudal base, 2 above and 6 or 7 below the line, and 2 rows on the preopercle. The depth is 2.4 to 2.9, the head 2.3 to 2.5, the caudal 3, the pectoral 3.84 to 4.1 times in the length. The eye is 3 to 3.4, the snout and interorbital each 4 to 4.1, the maxillary 2.15 to 2.2, the least depth of the caudal peduncle 2.8 to 3 times in the head. The body is compressed, the profile steeply descending in a nearly straight line from the dorsal origin, the lips even or the lower jaw very slightly included, the maxillary extending beneath the posterior part of the pupil.

The color in alcohol is brown above, pale yellowish below, the under side of the head and throat whitish, with silvery and opalescent reflections on the sides of the head and lower half of the trunk, the lower half of the body and head covered with dark reddish brown dots and specks. A black, white-margined band extends from the tip of the snout across the eye to the caudal peduncle. At its end on the caudal base is an ocellated black spot with a wide yellowish margin. A second blackish line extends from the interorbital region to the upper part of the caudal peduncle. Another runs from the middle of the interorbital to the dorsal origin, then along the dorsal base to the soft dorsal axil. A fourth black line begins above the anal spines and runs back to the caudal peduncle and along its ventral edge to the caudal base. Some specimens show a dark brown bar from the lower edge of the eye to the posterior angle of the opercle. The anterior margin of the spinous dorsal is

black or blackish, the fins otherwise colorless, or the soft dorsal may have a longitudinal black line near its base.

Thirteen specimens of this handsome little cardinal fish were taken from a fresh-water stream on Kulambangra Island, in the Solomons, their lengths 29 to 54 mm. Thirteen specimens, 47 to 56 mm. in length, were collected at Tenibuli, Ysabel Island, Solomons.

I have seen no specimens with the upper longitudinal lateral stripe following the lateral line downward to join the median stripe, as shown in Bleeker's figure. Most of the specimens have 7 dorsal spines, exactly as shown in Bleeker's figure.

### **Apogon melas** Bleeker.

*Apogon melas* Bleeker, Journ. Ind. Arch., 2, 1848, p. 635—Bima, Sumbawa; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 309.

*Amia melas* Bleeker, Atlas Ichth., 7, 1873-76, p. 94; 8, 1876-77, pl. 348, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 88.

Dorsal VII-I, 9; anal II, 8. There are 24 scales in the lateral line plus 3 more on the caudal base, 2 above and 6 below the line. The single specimen has but 1 row of scales on the preopercle. The depth is 2.55, the head 2.4, the caudal 2.8, the pectoral 4 times in the length. The snout equals the interorbital, 3.5 times, the eye 3.1, the maxillary 2.33, the least depth of the caudal peduncle 2.25, the third dorsal spine 2 times in the head. The maxillary scarcely extends to a vertical from the middle of the eye. The posterior margin of the preopercle is minutely serrate. The caudal is but slightly emarginate.

The color in alcohol is dark brown, the head blackish, with bronze and purplish metallic reflections on the sides of the head and belly. The fins are all dusky to blackish, with a large black spot or ocellus on the basal portion of the soft dorsal and anal. A narrow black stripe extends from the lower margin of the eye to the angle of the preopercle.

Here described from a specimen, 68 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

### **Apogon leptacanthus** Bleeker.

*Apogon leptacanthus* Bleeker, Nat. Tijds. Ned. Ind., 12, 1856, p. 204—Ternate; Macleay, Proc. Linn. Soc. N. S. Wales, 1882, p. 235; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 344.

*Amia leptacanthus* Bleeker, Atlas Ichth., 7, 1873-76, p. 97; 8, 1876-77, pl. 349, fig. 3.

Dorsal VI-I, 9; anal II, 9. There are 24 or 25 scales in the lateral line plus 2 on the caudal base, 2 above and 6 below the

line. There are 2 rows of scales on the preopercle. The depth is 2.2 to 2.25, the head 2.6 to 2.65, the caudal 3 to 3.1, the pectoral 3.3 to 3.4 times in the length. The eye is 2.5 to 2.6, the snout 4.16 to 4.3, the interorbital 3.4 to 3.55, the least depth of the caudal peduncle 2 to 2.16, the maxillary 2 to 2.16 times in the head. The mouth is oblique with prominent lower jaw, the maxillary reaching to a vertical from the anterior edge or center of the pupil. The lower edge of the preopercle is serrated, the hind margin scarcely so. The preorbital, orbital margin, and preopercular ridge are all smooth. The second dorsal spine is produced into a long thread which may extend to the caudal base when depressed. The caudal is emarginate.

The color in alcohol is pale yellowish to brownish, the sides of the head and anterior half of the trunk with small darker-colored melanophores, with a pearly luster over the anterior half. The fins are all colorless or the spinous dorsal is blackish.

Described from 4 specimens, 29 to 34 mm. long, taken at Tenibuli, Ysabel Island, Solomon Islands.

#### *Apogon sangiensis* Bleeker.

*Apogon sangiensis* Bleeker, Nat. Tijds. Ned. Ind., 13, 1857, p. 375—Sangir Islands; Day, Fishes India, 1878-88, p. 64, pl. 17, fig. 4; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 343.

*Amia sangiensis* Bleeker, Atlas Ichth., 7, 1873-76, p. 95, pl. 319, fig. 4; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 104.

Dorsal VI-I, 9; anal II, 8. There are 23 scales in a longitudinal series plus 2 more on the caudal base, 2 above and 6 or 7 below the line, with 2 rows of scales on the preopercle. The depth is 2.4 to 2.6, the head 2.4 to 2.5, the caudal 3.1 to 3.4, the pectoral 4 times in the length. The eye is 3 to 3.3, the snout 3.5 to 4, the maxillary 2.1 to 2.5, the least depth of the caudal peduncle 2.4 to 2.5 times in the head. The maxillary extends to beneath the middle of the eye. The preopercular margin is finely serrate.

The color in alcohol is light brown above, pale yellowish to whitish on the sides and below, with a silvery luster on the sides of the head and below the pectoral. A black or blackish brown band extends from the tip of the snout across the eye to the rear edge of the opercle. At the middle of the caudal base is a black ocellated spot scarcely as large as the pupil, with a broad pale or whitish margin. A black stripe runs around the tip of the snout through the eye to the posterior margin of the operculum. The first dorsal spine is black and the upper part of the membrane

between the second and third dorsal spines is black. The soft dorsal and anal each have a black stripe a little above the base, the fins otherwise are colorless.

Described from 7 specimens, 41 to 59 mm. in length, taken at Auki, Malaita Island, and 54 specimens, 30 to 52 mm. long, from Tenibuli, Ysabel Island, Solomon Islands; 2 additional specimens, each 50 mm. long, have the soft dorsal, anal, and caudal crossbanded by alternate rows of black dots or spots and rounded milk-white spots.

#### *Apogon hyalosoma* Bleeker.

*Apogon hyalosoma* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 63—Sumatra, on *Apogon thermalis* Bleeker (not of Cuvier and Valenciennes), Nat. en Geneesk. Arch. Ned. Ind., 2, 1845, p. 526; Day, Fishes India, 1878-88, p. 64, pl. 17, fig. 5; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 341.

*Amia hyalosoma* Bleeker, Atlas Ichth., 7, 1873-76, p. 96, pl. 309, fig. 1; Macleay, Cat. Austr. Fishes, 1, 1881, p. 45; Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 254; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 105.

Dorsal VI-I, 9; anal II, 8. There are 21 to 24 scales in the lateral line plus 4 more on the caudal base, 3 above and 7 below the line, and 2 rows of scales on the preopercle. The depth is 2.3 to 2.5, the head 2.25 to 2.35, the caudal 2.4 to 3.1, the pectoral 3.5 to 3.85 times in the length. The eye is 3.2 to 4, the interorbital 4.7 to 5, the maxillary 2.2, the least depth of the caudal peduncle 2.4 to 2.5 times in the head. The snout is less than the eye in the young but equals or exceeds it in the adult. The mouth is oblique with projecting chin, the maxillary extending beneath the posterior third of the eye. The preopercular margin is entire. The dorsal spines are slender and weak.

The color in alcohol is pale brown or yellowish, the sides of the head and body with iridescent pearly luster, and a large rounded blackish brown spot at the middle of the caudal base. The second dorsal spine or the membrane between the second and third dorsal spines is blackish, the other fins all colorless in my specimens or the caudal faintly brown. Some specimens have the upper lip brown or dusky with a whitish line above. My material is all young and does not show the color markings seen in specimens from 100 to 170 mm. long.

Here described from 57 specimens, 34 to 57 mm. long, taken at Tenibuli, Ysabel Island, Solomon Islands. A specimen, 65 mm. long, was obtained at Auki, Malaita Island, Solomon Islands.

**Apogon multilineatus** Bleeker.

*Apogon multilineatus* Bleeker, Ned. Tijds. Dierk., 2, 1865, p. 188—Ceram; Weber, Siboga Exp., Fische, 1913, p. 223.

*Amia multilineata* Bleeker, Atlas Ichth., 7, 1873-76, p. 83; Radcliffe, Proc. U. S. Nat. Mus., 41, 1911, p. 259, pl. 25; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 48.

*Amia multitaeniata* Bleeker, Atlas Ichth., 7, 1873-76, pl. 319, fig. 1.

Dorsal VII-I, 9; anal II, 8. There are 24 scales in the lateral line, plus 4 more on the caudal base, 2 above and 6 below the line, and 2 rows on the preopercle. The depth is 2.9, the head 2.7, the caudal 2.9, the pectoral 4 times in the length. The eye is 2.55, the snout 4.5, the interorbital 5.6, the maxillary 2, the least depth of the caudal peduncle 2 times in the head. The mouth is oblique, the jaws even, the maxillary extending beneath the rear margin of the pupil, the caudal forked. The hind margin of the preopercle is finely serrate.

In alcohol the color is pale brownish yellow with 12 longitudinal bands and lines on the body. From the lower part of the eye to the rear margin of the opercle is a broad blackish brown band margined above and below by a pearly white stripe. Above this a similar stripe extends from the middle of the eye to the hind margin of the preopercle, with a narrow faint white line above it. The upper and median white lines cross the eye, the upper one extending to the snout tip. The spinous dorsal is faintly brownish dusky, the other fins all whitish. There is a faint basal reddish brown stripe on the soft dorsal and on the anal which runs to the tip of the last ray.

Two specimens, 34 and 49 mm. long, were taken at Auki, Malaita Island, Solomon Islands. The description is taken from the larger specimen. The smaller one agrees in color.

**Pristiapogon snyderi** (Jordan and Evermann).

*Apogon snyderi* Jordan and Evermann, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 180—Hawaii.

*Amia snyderi* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 214, pl. 36 and fig. 85.

Dorsal VIII-I, 9; anal II, 8. There are 25 scales in the lateral line, 2 above and 5 below it. The depth is 3 to 3.1 times, the head 2.7 times in the length. The large prominent eye is equal to the snout, 3.7 times in the head.

In life the color is coppery red, or pale with reddish metallic sheen, with a faint dusky longitudinal band and 2 longitudinal

silvery lines on the side. There is a black spot on the caudal base above the lateral line. The first dorsal is dusky, the soft dorsal, caudal, and anal pale red, dusky basally. In alcohol the color is yellowish brown, with a darker band from the tip of the snout through the eye back to the middle of the caudal base. There is a blackish crossbar on the base of the caudal fin, with a black spot above the lateral line. The anterior part of the spinous dorsal is black or dark brown, the soft dorsal and anal are pale, each with a black crossband near the base.

A specimen, 82 mm. long, was caught in a fresh-water creek near Atuona, Hiva Oa Island, Marquesas.

**Mionorus pacificus** Herre. Fig. 6.

*Mionorus pacificus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 403.

Dorsal VI-I, 9; anal II, 8; pectoral 11; scales 2-24; gill-rakers 7 or 8. Depth 3, head 2.7 to 2.9, caudal 3.5 to 3.6 in length. Eye

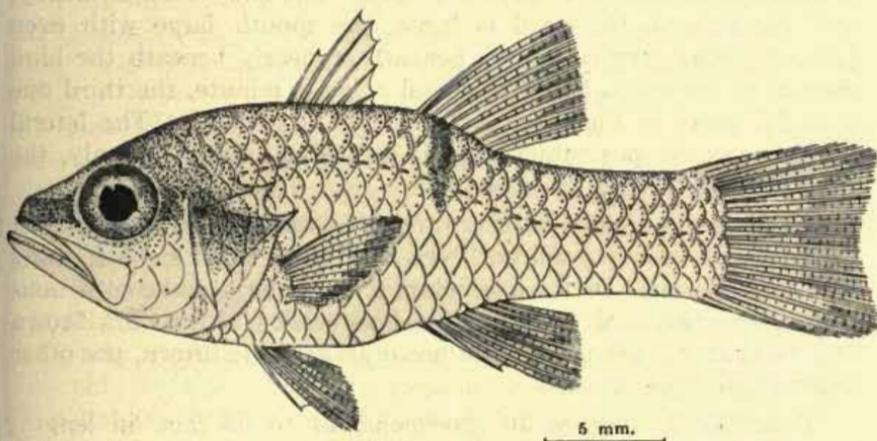


FIG. 6. *Mionorus pacificus* Herre, Tagus Cove, Albemarle Island, Galapagos Islands.

is 2.7, snout 4, pectoral 2, ventral 2 in head. Snout 1.5 to 1.66 in eye. Head and body compressed. Head bluntly pointed. Lower jaw prominent. Eyes large, a little more than interorbital. Mouth oblique. Maxillary reaches beyond pupil but not to rear of eye. Teeth in narrow bands. Caudal truncate, narrow. Ventrals do not reach anal fin. Scales very deciduous.

Color in life is red with silvery luster. Scales on upper third, margined with dusky. Dusky band from tip of snout through eye to above pectoral. A vertical dark bar from anterior third of

soft dorsal to below lateral line. Fins unmarked. In alcohol, the red changes to yellowish.

Four specimens, collected at Tagus Cove, Albemarle Island, Galapagos Islands.

**Apogonichthys auritus** (Cuvier and Valenciennes).

*Apogon auritus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 443—Isle de France; Day, Fishes India, 1878-88, p. 63, pl. 17, fig. 2; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 325.

*Apogonichthys auritus* Steindachner, Sitzungsber. Akad. Wiss. Wien, 1, 1883 (1884), p. 1066; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 163; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 6.

Dorsal VII-I, 8; anal II, 8. There are 22 scales to the caudal base plus 3 more on the latter, 1 or 2 above and 6 below the line. The depth is 2.7, the head 2.4 to 2.5, the caudal 3.25, the pectoral 3.5 to 3.9 times in the length. The eye is 3.4 to 4, the snout is 4 to 5, the interorbital 5.33 to nearly 7, the least depth of the caudal peduncle 2.45 to 2.66 times in the head. The body is stout, heavy, and compressed, the head is large, the mouth large with even jaws, the maxillary extending beneath or nearly beneath the hind margin of the eye. The first dorsal spine is minute, the third one 2 to 2.3 times in the head. The caudal is rounded. The lateral line has conspicuous tubules to the eighth or ninth scale only, the rest of the scales with obscure pores.

The color in alcohol is brown, mottled with darker brown, most of the scales with a small but very dark spot, these spots forming longitudinal rows. On the operculum is a very large and conspicuous white-margined, dark brown or blackish ocellus with a dark brown longitudinal line above it. The pectorals are pale brown, the other fins all dark brown.

Described here from 10 specimens, 14 to 39 mm. in length, from the reef at Nukulau Island, Fiji.

**Apogonichthys perdix** Bleeker.

*Apogonichthys perdix* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 321; Atlas Ichth., 8, 1876-77, pl. 322, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 163.

*Amia perdix* Bleeker, Atlas Ichth., 7, 1873-76, p. 100.

*Apogon perdix* Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 328.

Dorsal VII-I, 9; anal II, 8. There are 19 scales in the lateral line plus 2 more on the caudal base, 2 above and 6 below it. The depth is 2.66 times, the head 2.2 times in the length. The eye is

2.75, the snout 4, the least depth of the caudal peduncle 3 times in the head. The interorbital equals the snout. The mouth is large, oblique, the lower jaw slightly projecting, the maxillary extending to a vertical from the middle of the pupil.

The color in alcohol is yellowish brown, sprinkled with dark brown or dusky dots, the top of the head dusky, and a dark brown crossbar on the caudal peduncle. There is a dark brown bar from the eye diagonally down across the preoperculum. The caudal is dotted with dark brown.

Here described from a specimen, 24 mm. long, collected on the reef at Maraa, Tahiti.

### *Archamia zosterophora* (Bleeker).

*Apogon zosterophorus* Bleeker, Act. Soc. Sci. Indo-Neerl., 1, 1856, Besch. Vischfauna Manado, p. 56—Manado, Celebes; Macleay, Proc. Linn. Soc. N. S. Wales, 7, 1882, p. 235; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 346.

*Amia zosterophora* Bleeker, Atlas Ichth., 7, 1873-76, p. 103, pl. 313, fig. 2.

*Archamia zosterophora* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 164, fig. 40; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 117.

Dorsal VI-I, 9; anal II, 15. There are 22 or 23 scales in the lateral line plus 3 more on the caudal base, 2 above and 6 below the line, and 2 rows on the preopercle. The depth is 2.4 to 2.6, the head 2.3 to 2.5, the forked caudal 3 to 3.1, the pectoral 3.6 to 4 times in the head. The eye is 2.9 to 3.1, the snout 4.5 to 4.8, the interorbital 4 to 4.5, the maxillary 2, the least depth of the caudal peduncle 2.6 to 2.7 times in the head. The mouth is oblique with slightly projecting lower jaw, the maxillary extending beneath the middle of the eye. The lower margin of the preopercle is serrate. The anterior anal rays are much longer than the posterior ones.

The color in alcohol is yellowish, with pearly reflections on the sides of the head and body. A broad dark brown belt, either uniform or made up of distinct dots and spots, crosses the body downward and a little forward from the soft dorsal base to the middle of the anal base and post-ventral region. An interocular blackish brown stripe runs around the tip of the snout. At the caudal base is a small black circular spot. The second dorsal and caudal may be sprinkled with fine brown dots, the other fins are all yellowish or colorless.

Here described from 20 specimens, 34 to 51 mm. in length, from Tenibuli, Ysabel Island, Solomon Islands.

**Rhabdamia cypselurus** Weber.

*Rhabdamia cypselurus* Weber, Notes Leyden Mus., 31, 1909, p. 167—Ceram; Weber, Siboga Exp., Fische, 1913, p. 242, fig. 60; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 358, fig. 86.

*Amia cypselura* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 107.

Dorsal VI-I, 9; anal II, 9 or 10. Scales(?). According to Fowler there are 22 or 23 scales in the lateral line plus 2 or 3 more on the caudal base; gill-rakers 22. The depth is 3.5, the head 2.45 to 2.5, the caudal 3.2, the pectoral 4.7 times in the length. The eye is 3.25, the interorbital 4.6, the least depth of the caudal peduncle 3.5 times in the head. The lower jaw projects, the mouth is oblique, the maxillary extending beneath the pupil. The cycloid scales are very deciduous, none of my specimens having more than two or three scattered scales. The caudal is deeply forked, with pointed lobes. The margin of the preopercle is smooth. The opercles are covered with small scales.

In alcohol the color is yellowish or whitish, with beautiful silver and violet-blue iridescence on the sides of the head, pectoral base and breast. A blackish stripe runs from the tip of the snout across the eye to the tip of the opercle. The upper and lower caudal lobes each have a submarginal longitudinal blackish stripe, the other fins are very pale to colorless.

Thirty-two specimens, 26 to 33 mm. in length, were taken at Tenibuli, Ysabel Island, in the Solomon Islands, with the aid of electric light.

**Cheilodipterus macrodon** (Lacépède).

*Centropomus macrodon* Lacépède, Hist. Nat. Poiss., 7, 1802, p. 263—Mauritius, Réunion.

*Paramia macrodon* Bleeker, Atlas Ichth., 7, 1873-76, p. 105; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1925 (1926), p. 252.

*Chilodipterus macrodon* Klunzinger, Fische des Rothen Meeres, 1, 1884, p. 23.

*Cheilodipterus macrodon* Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 363.

*Cheilodipterus octovittatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 163.

*Paramia octolineata* Bleeker, Atlas Ichth., 7, 1873-76, pl. 305, fig. 2.

Dorsal VI-I, 9; anal II, 8. There are 25 scales in the lateral line, plus 3 more on the caudal base, 2 above and 7 below it. The depth is 3.35 to 3.5, the head 2.6 to 2.7, the caudal 3 to 3.6, the pectoral 4 to 4.6 times in the length. The eye is very large, its upper margin flush with the dorsal profile, 3.4 to 3.8 times in

the head. The snout approximately equals the eye, 3.4 to 3.65 times in the head. The interorbital is 5.8 to 5.9 times in the head. The mouth is oblique, the jaws even, the maxillary extending to a vertical from the rear margin of the pupil. The least height of the caudal peduncle is 2.6 times in the head. The caudal is forked.

The color in alcohol is yellowish with eight dark brown longitudinal stripes which disappear on the caudal peduncle. The top of the head and opercle are dark violaceous brown. There is a median dark brown stripe from the interorbital to the dorsal, then along its base. At the base of the caudal is a dark brown band encircling it, and a blackish stripe along the upper and lower caudal margins. The rest of the caudal is pale violaceous brown with a blackish tip. The anterior half of the first dorsal is black, the anterior margin of the soft dorsal and anal and the posterior half of the ventrals also blackish. The pectoral is very pale yellowish with a violet brown crossbar on its base.

Here described from 2 specimens, 110 and 138 mm. long, taken at Moorea, and a fine specimen, 150 mm. long, collected at Bora Bora. Twenty-three specimens, 50 to 133 mm. long, were taken at Tenibuli, Ysabel Island, Solomon Islands. In the smaller specimens there is a dark brown circular spot at the caudal base, which gradually enlarges with age until it becomes a dark brown bar or band.

### *Cheilodipterus quinquelineatus* Cuvier and Valenciennes.

*Cheilodipterus quinquelineatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 167—Society Islands; Lesson, Voy. Coquille, Zool., 2, 1830, p. 237; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 165; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 361.

*Chilodipterus quinquelineatus* Günther, Fische der Südsee, 1, 1873-75, p. 23; Day, Fishes India, 1878-88, p. 66.

*Paramia quinquelineata* Bleeker, Atlas Ichth., 7, 1873-76, p. 105; 8, 1876-77, pl. 326, fig. 2; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 33; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 252; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 279.

Dorsal VI-I, 9; anal II, 8. There are 25 or 26 scales in the lateral line, 2 above and 7 below it. The depth is 3.4 times, the head 2.68 times in the length. The eye and snout are equal, 3.17 times, the interorbital 5.9 times, the least depth of the caudal peduncle 2.7, the caudal 1.46 times in the head. The mouth is large, oblique, the maxillary extending to beneath the posterior margin of the pupil. In the anterior part of the upper jaw are

2 pairs of very small canines, and in the middle of the lower jaw is a row of 3 small canines on each side.

In life the color is pale olive brown with 5 longitudinal black stripes and a conspicuous lemon yellow ocellus with a black central spot at the caudal base. In alcohol the color is duller or darker brown or yellowish, the stripes much as in life, but the yellow area about the black spot at the caudal base fades to the ground color.

This handsome little apogonid is very abundant about the coral reefs of the western Pacific.

Here described from 2 specimens, 29 and 51 mm. in length, from Maraa, Tahiti. In the Solomon Islands 17 specimens, 31 to 65 mm. in length, were secured at Auki, Malaita Island, and 6, from 37 to 72 mm. long, at Tenibuli, Ysabel Island.

### Family AMBASSIDAE

#### *Ambassis commersoni* Cuvier and Valenciennes.

*Ambassis commersonii* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 176, pl. 25—Bourbon, Pondicherry, Mahé, Java; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 223; Day, Fishes India, 1878-88, p. 52, pl. 15, fig. 3; Boulenger, Cat. Fresh Water Fishes Africa, 3, 1913, p. 112, fig. 85.

*Ambassis commersoni* Bleeker, Atlas Ichth., 8, 1876-77, p. 136, pl. 352, fig. 1; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 406.

*Ambassis safgha* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 153.

Dorsal VII-I, 9; anal III, 9 or 10. There are 28 scales in the lateral line, plus 4 on the caudal, 4 above and 8 below the line. There are 16 to 18 predorsal scales. The depth equals the length of the head, 2.6 to 2.7 times, the deeply forked caudal 2.4 to 2.9, the pectoral 3.65 to 3.95 times in the length. The third dorsal spine equals the pectoral. The snout equals the interorbital, 4.3 to 4.5 times, the eye 3 times, the maxillary 2.45 to 2.5, the least depth of the caudal peduncle 2.5 to 2.8 times in the head. The mouth is strongly oblique with projecting chin, the maxillary extending beneath the front margin of the pupil. The lower margin of the preopercle is serrate, with an enlarged flat spine at the angle. The lateral line is continuous. There is a patch of teeth on the tongue.

In life the fish is largely colorless, nearly translucent below and posteriorly, with a median longitudinal blackish line on the posterior half, the sides of the head bright silver. In alcohol the color is yellowish with silvery luster, the scales on the upper portion margined by dusky or brown dots, with a silvery band from the upper angle of the opercle to the middle of the caudal base. A black line

is often visible along the middle of the silver band, especially on the posterior third. There is a blackish line below the dorsal and anal, which may be continued along the caudal peduncle. The sides of the head are silvery. The membrane between the second and third spines is blackish, and the caudal is more or less dusky, the fins otherwise colorless.

Seven specimens, 54 to 78 mm. in length, were taken at Auki, Malaita Island, Solomon Islands, from a fresh-water creek.

### *Ambassis miops* Günther.

*Ambassis miops* Günther, Proc. Zool. Soc. Lond., 1871, p. 655—Raratonga; Sundara Raj, Records Indian Mus., 12, 1916, p. 279; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 166; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 408.

*Ambassis myops* Day, Fishes India, 1878-88, p. 784.

Dorsal VII-I, 9; anal III, 10. There are 29 scales in the lateral line, plus 4 more on the caudal with tubules, 3 above and 8 below the line; predorsal scales about 14. The depth is 2.9, the head 2.8, the caudal 2.8, the pectoral 3.5 times in the length. The eye is 2.85, the snout 3.6, the interorbital 4, the maxillary 2.25, the second dorsal spine 1.4, the least depth of the caudal peduncle 2.45 times in the head. The anterior profile descends in a nearly straight line from the dorsal to the snout tip. The mouth is very oblique, the maxillary extending beneath the front margin of the eye, with an obliquely truncate posterior end. There is a patch of teeth on the tongue. The margin of the preorbital has 6 or 7 short spines. The preopercular ridge has a spine at the posterior angle with a few small serrations preceding it. The lower margin of the preopercle and lower part of its posterior margin are serrate, the margin of the interopercle smooth. The dorsals and anal have a basal scaly sheath. The lateral line is complete. The caudal is deeply forked.

The color in alcohol is silver gray to brownish yellow with a silver sheen on the lower half of the head and trunk. There is a median longitudinal lateral silvery stripe from the head to the caudal, with a black line in it showing on the posterior third. The membrane between the second and third dorsal spines is blackish, and there is a blackish longitudinal stripe on each caudal lobe or the lobes are tipped with blackish, the fins otherwise pale to colorless, or the dorsal and anal slightly specked with dusky.

Here described from 30 specimens, from 20 to 50 mm. in length, seined from a fresh-water stream on Kulambangra Island, Solomon Islands.

**Ambassis vaivasensis** Jordan and Seale.

*Ambassis vaivasensis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 254, fig. 47—Vaivase River, Apia, Samoa; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 166.

Dorsal VII-I, 9; anal III, 9 or 10. There are 28 scales in the lateral line, plus 3 more on the caudal base, 3 above and 6 below it. The depth is nearly 3 times, the head 2.7 times in the length. The eye is 3.16, the interorbital 3.8, the snout 4.3 times in the head. The body is strongly compressed, the mouth very oblique with projecting lower jaw. The second dorsal spine is strong, its length 1.4 times in the head. The depth of the caudal peduncle is 2.7 times in the head. The caudal is deeply forked with long pointed lobes, a little longer than the head. The pectoral is about 1.33 times in the head.

The color in alcohol is yellowish to brownish white, the dorsal region more or less thickly strewn with minute dark brown dots, with a black line along the middle of the side from the gill opening to the caudal base. The membrane between the second and third dorsal spines is blackish. In life the color is pale gray or silver, with a silver stripe from the gill opening to the caudal base, the lower half of the body translucent.

This little ambassid, previously known positively only from Samoa, is very common in the streams of Fiji, where it was collected as follows: 28 specimens from a river flowing into Suva Harbor, 146 specimens from another river flowing into the same harbor, and 10 specimens from the Rewa River, about 30 miles from the sea, Viti Levu Island; also 26 specimens from the Mbureta River, Ovalau Island. These vary in length from 22 to 54 mm.

**Priopis buruensis** (Bleeker).

*Ambassis buruensis* Bleeker, Nat. Tijds. Ned. Ind., 11, 1856, p. 396—Kajeli, Buru; Bleeker, Atlas Ichth., 8, 1876-77, p. 137, pl. 353, fig. 5; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 417.

*Ambassis buroensis* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 157.

*Priopis buruensis* Jordan and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 18; Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 255.

Dorsal VII-I, 9; anal III, 9. There are 12 tubulated scales in the upper part of the lateral line, 10 in the lower section, and 5 on the caudal, 3 above and 8 below the line. There are 12 to 14 predorsal scales, and 2 rows on the preopercle. The depth is 2.2 to 2.3, the head 2.5, the pectoral 2.75 to 2.9 times in the length. The deeply

forked caudal equals the depth. The eye is 2.8 to 2.9, the snout is 4.85 to 5, the interorbital 4.3 to 4.4, the least depth of the caudal peduncle 2.4 to 2.5 times in the head. The mouth is very oblique, the chin prominent, the maxillary extending beneath the front margin of the eye. There is a patch of teeth on the tongue. The preorbital margin is strongly serrate. The ridge above the eye is smooth, ending posteriorly in one small spine. The lower margin of the preopercle and interopercle is serrate, with a larger triangular spine at the preopercular angle, the posterior margins smooth. The second dorsal spine equals the head in length. The dorsals and anal have a basal scaly sheath, one or two scales wide. The caudal is covered with small scales basally.

The color in life is pale silvery white, the abdomen more or less translucent, the dorsal dusky between the second and third spines. In alcohol the color is brownish yellow, with a silver stripe or a silvery band with a black line from the eye to the middle of the caudal base, and a dusky line at the dorsal and anal base continuing along the edges of the caudal peduncle to the caudal. The sides of the head and abdomen have a silvery sheen. The membrane between the second and third dorsal spines is dusky, the fins pale except for dusky specks on the dorsals, anal, and caudal, or the caudal may be blackish.

Described from 2 specimens, 52 and 58 mm. long, from a fresh-water stream at Bushman Bay, Malekula Island, New Hebrides, and 2 specimens, 50 and 55 mm. long, from a fresh-water creek at Auki, Malaita Island, Solomon Islands.

#### Family KUHLIIDAE

##### *Kuhlia rupestris* (Lacépède).

*Centropomus rupestris* Lacépède, Hist. Nat. Poiss., 7, 1802, pp. 236, 263—Réunion, on Commerson MS.

*Dules rupestris* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 119; 7, 1831, p. 477; Sauvage, Hist. Madagascar, Poiss., 1891, p. 150, pl. 41B, fig. 3; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 166.

*Kuhlia rupestris* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 36; Regan, Proc. Zool. Soc. Lond., 1913, p. 375; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 205, pl. 1, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 167; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 270.

*Moronopsis rupestris* Bleeker, Atlas Ichth., 7, 1873-76, p. 121; 8, 1876-77, pl. 339, fig. 2.

Dorsal X, 11; anal III, 10. There are 41 to 43 scales in the lateral line to the caudal base plus 5 more on the latter, 5 above and 8 below the line. There are 17 or 18 gill-rakers on the lower limb of the first gill arch. The body is oblong, compressed, its depth 2.6 to 2.9 times, the head 2.6 to 3.1 times in the length. The eye is 3.5 to 4.5, the snout 3.2 to 3.6, the interorbital 3 to 3.5 times in the head. The maxillary extends to beneath the middle or posterior part of the eye. The fifth dorsal spine is highest, 1.9 to 2.4 times in the head. The caudal is slightly emarginate, with blunt or rounded lobes, 3.25 times in the length.

The color is dark bluish silvery above, the sides brighter silvery, most of the scales with a blackish spot basally, and rounded black spots at the base of the anal. Each lobe of the caudal has a wide black diagonal band and the upper part of the soft dorsal is blackish. In alcohol the color is yellowish white to yellowish brown, the predorsal region and top of the head black, the ground color obscured above the lateral line by dusky shading. Most of the scales have a black or dark brown spot or bar basally, with a more or less silvery gloss over all. The anal usually has a row of rounded black spots basally. The spinous dorsal is darkened. On the anterior half of the soft dorsal is a marginal black band and a similar diagonal band is on each lobe of the caudal.

From the Rewa River, Viti Levu Island, Fiji, a specimen, about 250 mm. long, was obtained, and from a creek flowing into Suva Harbor on the same island 2 small specimens were taken, their lengths 20 and 42 mm. This species was abundant in a small stream about 3 miles from the coast at Bushman Bay, Malekula Island, New Hebrides, where many specimens, from 63 to 250 mm. in length, were taken. Four specimens were taken from a fresh-water creek at Auki, Malaita Island, Solomon Islands, their lengths 111 to 177 mm.

#### ***Kuhlia marginata* (Cuvier and Valenciennes).**

*Dules marginatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 87, pl. 52; 7, 1831, p. 356—Java.

*Kuhlia marginata* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 38; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 255; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 203, pl. 1, fig. 3.

*Dules maculatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 357.

*Dules malo* (not of Cuvier and Valenciennes) Hombron and Jacquinot in Voy. Pôle Sud, Poiss., 1853, p. 41, pl. 3, fig. 4.

*Moronopsis ciliatus* Bleeker, Atlas Ichth., 7, 1876, p. 120, pl. 316, fig. 1; 8, 1877, pl. 324, fig. 2.

Dorsal X, 10 or 11; anal III, 11. There are 40 to 44 scales in the lateral line, 5 above and 8 below it. There are 16 to 18 gill-rakers on the lower part of the first gill arch. The depth is 2.8 to 3, the head 3.2 to 3.5 times in the length. The eye is 3 to 3.4, the snout 3.3 to 3.8, the interorbital 2.9 to 3.4 times in the head. The caudal fin is deeply forked.

The color in life is silver gray, darker above, merging into white on the belly, and usually with blackish spots scattered irregularly along the side, mostly above the lateral line. In alcohol the color is silvery blackish above, yellowish white on the lower half, or silvery gray, with spots on the side and caudal as in life. The soft dorsal, anal, and caudal are each narrowly edged with white and have a blackish submarginal band; there is a blackish spot in the pectoral axil.

Several hundred specimens were taken in the Papenoo River, Tahiti, and 10 specimens, 84 to 110 mm. in length, were kept. This fish occurs in large schools in the lower reaches of the river near the sea, and in similar localities throughout Polynesia. Ten specimens, from 20 to 112 mm. in length, were taken from a small fresh-water creek on Moorea Island, where it likewise occurred in abundance. Eighteen specimens, from 38 to 110 mm. in length, were caught in a creek flowing into Bushman Bay, Malekula Island, New Hebrides. Fourteen specimens, 78 to 123 mm. in length, were taken from a fresh-water stream at Auki, Malaita Island, in the Solomon Islands.

***Kuhlia bilunulata* Herre. Fig. 7.**

*Kuhlia bilunulata* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 404.

Dorsal X, 11; anal III, 10 or 11; scales 48 + 5 or 6, 5 above and 10 below, 10 to 12 predorsal; gill-rakers 22 on lower limb of first arch. Depth 2.6, head 2.9 in length. Eye 2.33 to 2.6, snout 3.2 to 3.4, interorbital 3 to 3.25, width of head 1.75, fifth dorsal spine 1.6, tenth dorsal spine 2.4 to 2.6, third anal spine 2.4 to 2.6, depth of caudal peduncle 2.7, pectoral 1.5 to 1.6, ventral 1.7 in head. Body compressed, depth greatest at dorsal origin. Anterior profile descends in a steep, straight line from front of dorsal. Ventral profile a broad, regular curve. Head longer than deep. Eye high up. Interorbital broad and flat. Snout broad and short. Mouth strongly oblique. Maxillary reaches front of eye. Preopercle smooth behind, lower edge minutely serrulate. Opercle entire, with two flat, stout spines, lower one stronger. Fifth dorsal spine longest.

Tenth dorsal spine much longer than ninth. First dorsal ray longest. Caudal deeply forked. Ventrals pointed.

Color in alcohol is dusky above, yellowish below. Caudal white with a broad, black, basal crescent and a black, subcrescentic marginal band, extreme tip of fin white. Spinous dorsal dark. Soft dorsal with a submarginal black bar. Anal dusky at base, margin white. Other fins pale.

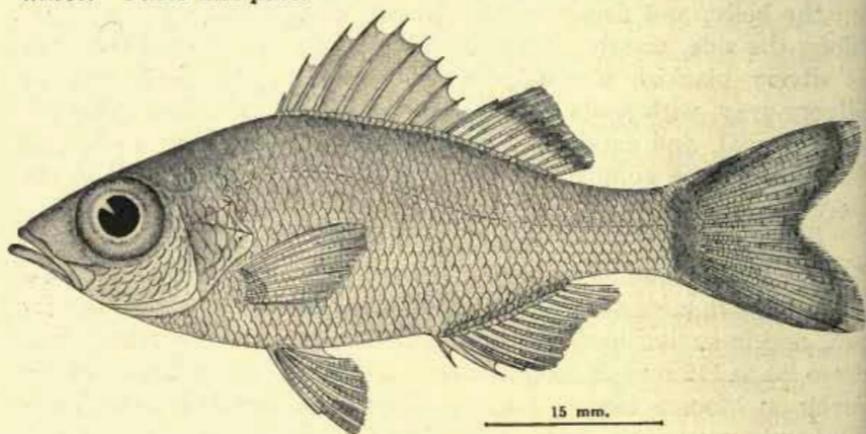


FIG. 7. *Kuhlia bilunulata* Herre, river flowing into Suva Harbor, Viti Levu Island, Fiji Islands.

Eighteen specimens collected in a small river flowing into Suva Harbor, Viti Levu Island, Fiji Islands.

#### *Kuhlia taeniura* (Cuvier and Valenciennes).

*Dules taeniurus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 85.

*Kuhlia taeniura* Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 200, pl. 1, fig. 1.

*Perca argentea* Bennett, Fishes Ceylon, 1834, p. 22, pl. 22.

*Dules argenteus* Günther, Fische der Südsee, 1, 1873, p. 25, pl. 19, fig. C.

*Moronopsis taeniurus* Bleeker, Atlas Ichth., 7, 1876, p. 119, pl. 345, fig. 5.

Dorsal X, 10 or 11; anal III, 11; scales in the lateral line 54, 6 between the lateral line and the dorsal origin, and 11 between it and the anal origin. The depth is 3 to 3.2 times, the head 3.6 to 3.8 times in the length. The eye is 3.2 times, the snout 3.5 to 4 times in the head. The caudal fin is deeply forked, the lobes equally produced. The fifth dorsal spine is highest, 1.5 times in the head, nearly equal to the pectoral. The last dorsal spine is 2.25 times in the head, equal to the ventral spine and a little higher than the third anal spine.

This species is common on the reef at Maraa, Tahiti, where 10 specimens, from 23 to 50 mm. in length, were collected. In life the entire region above the lateral line is dark steel color with a silvery sheen over all. The top of the head and nape are mottled. These specimens all showed a black line at the base of the dorsal and another one from the side of the nape to the base of the caudal. With age these bands disappear and the dorsal surface darkens to uniform dark blue-gray or steel-gray. The soft dorsal is broadly margined with blackish. The caudal fin has 5 black bands, a pair on each lobe, converging posteriorly, and the fifth one along the middle rays. The black bands on the tail distinguish this species at once from all related species.

At Cocos Island, 4 specimens, 58 to 91 mm. in length, were obtained.

#### Family SERRANIDAE

#### *Plectropomus oligacanthus* Bleeker.

*Plectropoma oligacanthus* Bleeker, Nat. Tijds. Ned. Ind., 7, 1854, p. 422—

Batavia, Java; Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 162.

*Paracanthistius oligacanthus* Bleeker, Atlas Ichth., 7, 1873-76, p. 27.

*Acanthistius oligacanthus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 279, fig. 2.

*Plectropomus oligacanthus* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 201, fig. 7.

Dorsal VII, II, 9; anal III, I, 7. There are 88 tubulated scales in the lateral line plus 14 more on the caudal, 18 scales above and 36 below the line. Minute scales extend far out on the fins. The depth is 3.5, the head 2.9, the caudal 4.3 times in the length. The eye is 6.5, the snout 3.25, the maxillary 2.1, the interorbital 4.4, the least depth of the caudal peduncle 2.6 times in the head. The pectoral equals the least depth of the caudal peduncle. The dorsal and ventral profiles are evenly and regularly curved and alike from snout tip to caudal peduncle, the body rather heavy, with thick caudal peduncle and broad emarginate caudal. The lower jaw is projecting, the maxillary extending beneath the posterior part of the eye. There is a pair of stout canines at the front of each jaw and 3 canines on each side of the lower jaw. The posterior nostril is much enlarged. The central opercular spine is closer to the lower spine than to the upper one.

The color in life is extraordinarily beautiful, a rich glowing cherry red with longitudinal deep blue lines on the head and breast, pectoral base, and anterior dorsal region, and also on the soft dorsal and anal. Above the pectoral are parallel vertical blue lines which

continue back to between the soft dorsal and anal. The rest of the body and the caudal are sprinkled with circular blue spots. In alcohol the color is dark brownish red, the blue lines and spots largely altered to dark brown or bluish dusky.

This and a related species abound about the coral reefs of the Sulu Sea and are gamy fish that delight both the angler and the epicure, while their beauty is a joy to every nature lover.

Described from a specimen, 276 mm. long, caught with hook and line at Hathorn Sound, New Georgia Island, Solomon Islands.

### *Cephalopholis argus* Bloch and Schneider.

*Cephalopholis argus* Bloch and Schneider, Syst. Ichth., 1801, p. 301, pl. 61; Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), p. 221, fig. 88; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 174.

*Epinephelus argus* Bleeker, Atlas Ichth., 7, 1876, p. 43, pl. 342, fig. 3; Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 189.

*Serranus guttatus* Günther, Fische der Südsee, 1, 1873-75, p. 5, pl. 4.

*Serranus myriaster* Rüppell, Atlas, Fische, 1828, p. 107, pl. 27, fig. 1; Lesson, Voy. Coquille, Zool., 2, 1830, p. 234, pl. 37; Quoy and Gaimard, Voy. Astrolabe, Zool., 3, Poiss., 1833, p. 653, pl. 3, fig. 1.

Dorsal IX, 15 to 16; anal III, 9. There are 95 to 110 scales in a longitudinal series, 50 to 55 in the lateral line, 9 or 10 above and 32 to 38 below the lateral line. The depth is 2.8, the head 2.5 times in the length. The snout is 3.5, the eye 6.5, the pectoral 1.67 times in the head. The rounded caudal is a little shorter than the pectoral. The lower jaw projects strongly, the maxillary extends far beyond the eye, the width of its distal extremity nearly equal to the diameter of the eye.

The color is purplish brown, deep chocolate brown, or blackish anteriorly, a little paler behind, sometimes with faintly defined crossbands toward the tail. The head, body, and fins are covered with small, circular, pale blue, whitish, or dark blue spots ringed with black. The spinous dorsal is edged with orange or whitish anteriorly. The soft dorsal, anal, pectoral, and caudal are edged with a whitish line.

From Takaroa, Tuamotu Archipelago, 3 specimens were collected, 64, 200, and 225 mm. in length, and one, 160 mm. long, from Tahiti. At Hog Harbor, Espiritu Santo Island, New Hebrides, a fine specimen, 270 mm. long, was caught with hook and line, and one at Wala Island, 173 mm. long. In life the last specimen was dark brown, sprinkled all over with very deep blue spots, the fins blackish, the soft dorsal, anal, and caudal each with a narrow whitish-blue margin.

**Cephalopholis cyanostigma** (Kuhl and Van Hasselt).

*Serranus cyanostigma* Kuhl and Van Hasselt in Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 359—Java.

*Epinephelus cyanostigma* Bleeker, Atlas Ichth., 7, 1873-76, p. 42, pl. 320, fig. 3 (fig. mislabeled *E. argus*); Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 181.

*Cephalopholis cyanostigma* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 223.

Dorsal IX, 16; anal III, 8. There are 85 to 95 scales in the lateral line to the caudal base, plus 14 or 15 more on the latter and about 50 tubulated scales to the caudal base plus 6 or 7 more on the latter. There are 21 or 22 scales above and 27 to 35 below the lateral line. The depth is 3, the head 2.6, the caudal 4.25, the pectoral 3.9 times in the length. The eye is 5.4, the snout 4.2, the interorbital 6.9, the maxillary 2.1 times in the head. The mouth is large, with projecting lower jaw, the maxillary extending much beyond the posterior margin of the eye. The small teeth are in bands, those of the mandible forming 3 rows along the sides. The middle opercular spine is nearer to the lower than to the upper spine, the upper one extending furthest back.

The color in alcohol is dark brown with grayish blue spots sparsely scattered over the whole head and body and upon the fins. Close examination shows that these spots are margined with blackish and were ocelli before fading. Across the body are 6 wide cross-bands, more or less reticulated.

A specimen, 98 mm. long, was collected at Tenibuli, Ysabel Island, Solomon Islands.

**Cephalopholis kendalli** Evermann and Seale.

*Cephalopholis kendalli* Evermann and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 76, fig. 11—Bacon, Sorsogon Prov., Luzon, Philippine Islands.

Dorsal IX, 16; anal III, 8. There are 48 tubulated scales in the lateral line and 5 more on the caudal, 20 scales above the line and 20 below it to the base of the second anal spine. There are about 86 rows of scales above the lateral line to the caudal base and 74 to 76 transverse series below the line. The body is moderately compressed with a large head, the lower jaw strongly projecting. The depth is 2.75 to 2.85, the head 2.5, the rounded caudal 3.75, the pectoral 4.15 times in the length. The small eye is 7.25, the snout 3.8, the interorbital 6.66, the maxillary 2, the least depth of the caudal peduncle 2.8 times in the head. The middle opercular spine is largest, much nearer to the lower than to the upper one. There

are 5 rows of needle-like depressible teeth in the front of the upper jaw, the inner ones longest; on the sides a band of small teeth with an outer row of larger fixed teeth. In the lower jaw there is a band of 5 or 6 rows of depressible pointed teeth anteriorly, and 3 rows posteriorly, the inner row much larger than the rest.

The color in alcohol is dark brown or reddish brown, with 6 or 7 indistinct darker crossbands and large dark brown spots with darker brown or blue centers scattered over the head, breast, belly, pectoral base, and all fins except the marginal half of the spinous dorsal, which is paler to whitish. The outer half of the pectoral is yellow and unspotted, but the inner side is all spotted. Otherwise the fins are brown like the body.

Described from 3 specimens from Tenibuli, Ysabel Island, Solomon Islands, 146 to 200 mm. in length.

### **Cephalopholis pachycentron** (Cuvier and Valenciennes).

*Serranus pachycentron* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 295—East Indies.

*Epinephelus pachycentrum* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 178.

*Cephalopholis pachycentron* Evermann and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 76; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 220, fig. 9.

*Petrometopon pachycentron* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 173.

*Epinephelus microprion* Bleeker, Atlas Ichth., 7, 1873-76, p. 39, pl. 280, fig. 1.

*Epinephelus boelang* Bleeker (not of Cuvier and Valenciennes), Atlas Ichth., 7, 1873-76, p. 40; 8, 1876-77, pl. 346, fig. 5.

Dorsal IX, 15 or 16; anal III, 8. There are 80 to 85 scales in the lateral line plus 12 more on the caudal base, and 48 scales with tubules plus 5 more on the caudal base. There are about 20 scales from the lateral line to the dorsal origin and about 25 to the anal origin. The depth is 2.6 to 2.75, the head 2.4 to 2.5, the rounded caudal 4 to 4.4, the pectoral 3.35 to 3.7 times in the length. The eye is small, 5.5 to more than 6 times, the snout 3.8 to 4.2, the interorbital 6 to 6.8, the maxillary 2, the least depth of the caudal peduncle 2.8 times in the head. The mouth is large with projecting chin, the maxillary extending far beyond the eye. The middle opercular spine is much nearer to the lower than to the upper spine. There is a pair (sometimes doubled) of canines at the front of the upper jaw, with about 5 rows of needle-like teeth, depressible, the front teeth of the inner row longest, passing into a narrow

band of very small fixed teeth with an outer row of larger fixed teeth. In the lower jaw there is a pair of canines at the symphysis, with a band of 5 to 7 rows of needle-like depressible teeth anteriorly, passing into a band of 3 rows of similar teeth posteriorly, the inner teeth longest.

The color in alcohol varies from pale to dark brown, with 6 to 8 more or less well-defined darker vertical crossbands, most conspicuous posteriorly. The entire head is covered with blue, brown-margined spots. The fins are all brown to blackish brown, the upper margin of the dorsal spines paler. Sometimes the caudal is margined by a yellowish line.

Described above from 13 specimens, 70 to 134 mm. in length, collected at Tenibuli, Ysabel Island, Solomon Islands.

Another specimen, 166 mm. long, from the same locality, is blackish brown with traces of the vertical bars showing, but without spots on the head. The pectorals are blackish brown, the other fins black. I place with the last another, 75 mm. long, which is plain, blackish brown, with the margin of the spinous dorsal paler and the posterior margin of the caudal pale yellowish.

### **Cephalopholis miniatus** (Forskål).

*Perca miniata* Forskål, Descr. Anim., 1775, p. 41—Red Sea.

*Serranus miniatus* Rüppell, Atlas, Fische, 1828, p. 10, pl. 26, fig. 3; Günther, Fische der Südsee, 1, 1873-75, p. 5, pl. 5; Day, Fishes India, 1878-88, p. 24, pl. 6, fig. 2.

*Epinephelus miniatus* Bleeker, Atlas Ichth., 7, 1873-76, p. 41; Boulenger, Cat. Fishes Brit. Mus., ed. 2., 1, 1895, p. 191.

*Cephalopholis miniatus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 35; Fowler, Mem. Bishop Mus., 10, 1928, p. 175; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 210, fig. 8.

*Epinephelus cyanostigmatoides* Bleeker, Atlas Ichth., 7, 1873-76, pl. 283, fig. 3.

Dorsal IX, 15 or 16; anal III, 9. There are 50 to 56 tubulated scales in the lateral line, 14 to 16 above and 28 to 34 below. The depth is 2.9, the head 2.5 times in the length. The eye is 5.5 times, the snout 4.5 times in the head. The rounded caudal is 1.7 times in the head.

In alcohol the color is orange red, the body covered with dark-margined blue spots which extend upon the dorsal, anal, and caudal fins, but are absent on the pectorals and ventrals.

Three specimens, collected at Maraa, Tahiti, seem to be the young of this species. They are 22 to 24 mm. long. When taken

they were spotted with blue, but their color and markings have largely faded, leaving them brown.

**Cephalopholis leopardus (Lacépède).**

*Labrus leopardus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 165, 260, pl. 18, fig. 1—Great Equatorial Ocean, on Commerson.

*Serranus leopardus* Günther, Fische der Südsee, 1, 1873-75, p. 4, pl. 3, fig. B; Day, Fishes India, 1878, p. 25, pl. 6, fig. 4.

*Epinephelus leopardus* Bleeker, Atlas Ichth., 7, 1873-76, p. 44, pl. 288, fig. 2; Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 195.

*Cephalopholis leopardus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1925 (1926), p. 258; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 285; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 176; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 217.

Dorsal IX, 14; anal III, 9. There are 45 to 52 tubulated scales in the lateral line, 75 to 80 scales in the lateral line, plus 12 to 15 on the caudal base, 12 to 15 above and 25 to 28 below the line. The depth is 2.6 to 2.75, the head 2.5 to 2.75, the rounded caudal 5 times in the length. The eye is 5 to 6.5, the snout 3.9 to 4.5, the maxillary 2 to 2.25 times in the head. The interorbital equals the eye. The mouth is large, the lower jaw projecting, the maxillary extending beyond the eye. The teeth are in bands, in 3 or 4 rows on the sides of the lower jaw, becoming 2 rows posteriorly, the inner row long and depressible. There are narrow bands of fine teeth on the vomer and palatines. The posterior preopercular margin is minutely serrate. The median opercular spine is closer to the lower than to the upper spine. The long opercular flap is pointed.

The color in life is olive above becoming dusky along the dorsal base and anteriorly, the lower half paler with circular scarlet to orange red spots sprinkled over the head below the eye, the sides, anal, and caudal; most conspicuous on the head, breast, and abdomen. One or 2 conspicuous black spots with white margins on the top of the caudal peduncle. The caudal fin is conspicuously barred by 2 convergent dusky bands. There is a large dusky blotch on the opercle and behind it on the opercular flap is a deep black spot. The soft dorsal and anal both have a red submarginal band. In alcohol the color is pale brown to dark brown, the red spots largely disappearing or else becoming darker than the ground color. The ocellated saddle spots on the top of the caudal peduncle are prominent, as are the oblique bands on the caudal. The dusky and black spots on the opercle are very plain.

Two specimens, 105 and 109 mm. in length, were taken at Ugi Island, and one, 108 mm. long, at Auki, Malaita Island, Solomon

Islands. A specimen, 90 mm. long, from Tenibuli, Ysabel Island, Solomons, is pale brown with 6 double, reticulated, dark brown, vertical crossbands; in other respects it is typical of the species.

### **Cephalopholis urodelus** (Bloch and Schneider).

*Percam urodelam* (Forster) Bloch and Schneider, Syst. Ichth., 1801, p. 333—St. Christina, Waitaho.

*Serranus urodelus* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 306; Günther, Fische der Südsee, 1, 1873-75, p. 3, pl. 3, fig. A.

*Epinephelus urodelus* Bleeker, Atlas Ichth., 7, 1873-76, p. 41; 8, 1876-77, pl. 321, fig. 2; Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 192.

*Cephalopholis urodelus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 258; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 175; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 214.

Dorsal IX, 14 or 15; anal III, 9. There are about 55 tubulated scales in the lateral line to the caudal base plus 5 or 6 more on the latter, and 90 to 92 scales in longitudinal series to the caudal base, plus 10 or 15 more on the latter. There are 14 to 16 scales above and 26 to 30 below the lateral line. The depth is 2.8 to 3.1, the head 2.5 to 2.7, the caudal 4.1 times in the length. The eye is 4.5 to 5.5, the snout 3.8 to 4, the interorbital 6, the least depth of the caudal peduncle 2.85 to 2.9 times in the head.

The color in life is brilliant deep red, with 2 broad white crossbands on the caudal, converging behind and cutting off the corners. The caudal is otherwise dark red or blackish red; the dorsals and anal often have white marginal bands. The soft dorsal and anal may be red or blackish red. The pectorals are usually dusky basally, the outer part orange, or it may be all clear red. In alcohol the color is usually blackish brown, more or less spotted with whitish on the breast and pectoral base, the white bands on the caudal very conspicuous, the dark red of the dorsals and anal usually becoming blackish.

Many specimens were taken by hook and line, by traps, and by dynamite in the New Hebrides, the Solomon Islands, and on the coast of Waigiu and Celebes, but only a few were kept. Four specimens, 116 to 124 mm. long, are in the collection from Hog Harbor, Espiritu Santo Island, New Hebrides.

### **Cephalopholis rogae** (Forskål).

*Perca rogae* Forskål, Descr. Anim., 1775, p. 38—Red Sea.

*Serranus rogae* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 349; Rüppell, Atlas, Fische, 1828, p. 105, pl. 26, fig. 1.

*Epinephelus rogae* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 185.  
*Cephalopholis rogae* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930,  
 p. 233.

Dorsal IX, 17; anal III, 10. There are about 50 tubulated scales in the lateral line plus 5 more on the caudal base, 28 above it to the dorsal origin and 30 below it to the anal origin. There are 90 transverse rows of scales above the lateral line from the upper angle of the gill opening to the caudal base. The depth is 2.25, the head 2.85, the caudal 4.35, the pectoral 4.5 times in the length. The eye is 7.6, the snout 3.25, the interorbital 6.3, the maxillary 1.85, the least depth of the caudal peduncle 2.25 times in the head. The head is very deep, the mouth very oblique with projecting lower jaw, the maxillary extending beneath the posterior part of the eye. The inner teeth are depressible, with a pair of canines at the front in each jaw. The teeth of the mandible are in 3 rows, narrowing to one row of large depressible teeth at the back. The hind margin of the preopercle is minutely serrate. Small accessory scales are at the base of many scales on the upper half of the head and trunk. The basal part of the fins is covered with very small scales which may extend over a large part of each fin. The broad caudal is truncate.

The color in alcohol is uniformly deep blackish brown, the fins all black. The inside of the mouth and gill opening are more or less orange. The spinous dorsal has a marginal paler band, probably violet in life.

Described from a specimen, 305 mm. long, collected at Tenibuli, Ysabel Island, Solomons. A rare fish, reserved in the old days for royalty.

### ***Epinephelus labriformis* (Jenyns).**

*Serranus labriformis* Jenyns, Zool. Voy. Beagle, Fishes, 1840, p. 8, pl. 3—Galapagos Islands.

*Epinephelus labriformis* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 1155.

Dorsal XI, 15; anal III, 8. There are 90 to 100 scales in a longitudinal series, 55 tubulated scales in the lateral line, 9 above and 40 below it. The depth is 3 times, the head 2.5 times in the length. The eye is 6 times in the head and two-thirds of the pointed snout, which is 3.86 times in the head. The convex caudal is twice in the head. The lower jaw is strongly projecting. The maxillary extends nearly to the hind margin of the eye.

The color in life is reddish brown, paler below, with rather small rounded nearly white spots on the sides, pectoral base, and under

parts, and small rounded pale spots above and on fins. In alcohol the color is dark brown with rounded pale or white spots and blotches, which are most distinct on lower half of head and lower half of body. There is a conspicuous black spot behind the dorsal on top of the caudal peduncle.

This fish is common around the rocky coasts of Cocos Island and the Galapagos Islands, and is easily caught with hook and line. Two specimens, each 286 mm. long, were caught at Cocos Island. At Eden Island, Galapagos, a specimen, 275 mm. long, and one, 305 mm. long, were obtained.

### *Epinephelus australis* (Castelnau).

*Serranus australis* Castelnau, Intercol. Exhib. Essays Vict. Dep. (Res. Fish. Australia), 2, 1875, p. 7—Cape York, Darnley Island.

*Epinephelus australis* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 215, pl. 6—New Britain.

Dorsal XI, 15; anal III, 8. There are 2 rows of teeth in the mandible.

The color is dark purplish brown, thickly strewn with small whitish dots or tiny spots, most numerous and distinct below the lateral line. The spots were white when the specimen was collected. The pectoral is olive, the other fins all black or brownish black.

A small specimen, 35 mm. long, obtained from a tide pool at Nuka Hiva Island, Marquesas, is referred here. It is near *E. albonotulatus* Boulenger, but the second dorsal spine is not longer than those following and the maxillary is naked, although it extends to the posterior margin of the eye.

### *Epinephelus coeruleo-punctatus* (Bloch).

*Holocentrus coeruleo-punctatus* Bloch, Ichthyologie, 7, 1797, p. 74, pl. 242, fig. 2.

*Serranus coeruleopunctatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 366; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 183; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 277, figs. 18 and 19.

*Epinephelus coeruleo-punctatus* Bleeker, Atlas Ichth., 7, 1873-76, p. 62.

*Epinephelus albo guttatus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 284, fig. 1.

*Serranus hoevenii* Bleeker, Verh. Bat. Gen., 22, 1849, p. 36; Playfair and Günther, Fishes Zanzibar, 1866, p. 9, pl. 2, fig. 3.

*Epinephelus hoevenii* Bleeker, Atlas Ichth., 7, 1873-76, p. 63, pl. 282, fig. 1, pl. 286, fig. 3, pl. 290, fig. 4.

Dorsal XI, 15; anal III, 8. There are 52 to 55 tubulated scales in the lateral line plus 3 or 4 more on the caudal base, 16 to 20 above and about 24 below the line. There are 95 to 100 rows of scales in

lateral series plus 12 to 15 more on the caudal base. The basal portion of each fin is covered with minute, closely crowded scales. The depth is 3.25, the head 2.3, the caudal 4.7, the pectoral 3.7 times in the length. The eye is 4.85, the snout 3.8, the interorbital 7.3, the maxillary 2.35, the least depth of the caudal peduncle 3.8 times in the head. The mouth is large, the lower jaw projecting, the maxillary extending beneath the posterior part of the eye. The teeth are in villiform bands, in 9 or 10 rows anteriorly, narrowing at the posterior end to a single row.

The color in alcohol is brown or dark purplish brown, with many small rounded whitish spots which may unite to form wavy and more or less longitudinal short stripes or bars, and with a few very large whitish rounded blotches scattered over the sides. The fins are covered with small white spots like those on the body, the soft dorsal and anal each with a narrow whitish marginal line. The maxillary groove is blackish brown.

The young are dark purplish brown, with large, widely spaced and conspicuous white spots on the trunk and head, the black fins with smaller white spots. Two young specimens, 39 and 47 mm. long, were taken at Wala Island, New Hebrides.

Described from a specimen, 178 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

### ***Epinephelus ongus* (Bloch).**

*Holocentrus ongus* Bloch, *Ichthyologie*, 7, 1797, p. 52, pl. 234.

*Serranus ongus* Peters, *Monatsb. Akad. Wiss. Ber.*, 1865, p. 102.

*Epinephelus ongus* Bleeker, *Atlas Ichth.*, 7, 1873-76, p. 64.

*Serranus bataviensis* Bleeker, *Verh. Bat. Gen.*, 22, 1849, p. 38.

*Epinephelus bataviensis* Bleeker, *Atlas Ichth.*, 7, 1873-76, pl. 282, fig. 2.

Dorsal XI, 15; anal III, 8. There are about 65 tubulated scales in the lateral line, plus 5 more on the caudal base, 17 above and 30 below it, and 98 scales in a longitudinal series from the upper angle of the gill opening to the caudal base and 10 more on the latter. The depth is 3, the head 2.68 times in the length. The eye is 5.3, the snout is 4, the interorbital 6.75 times in the head. The broadly rounded caudal equals the pectoral, 1.6 times in the head. The mouth is large, with small canines, the teeth in bands, those on the sides of the lower jaw in 3 rows. The maxillary extends below the posterior margin of the eye.

The color in alcohol is yellowish white, densely spotted with dark brown, the spots rounded, hexagonal, or coalescing and forming

elongate streaks along the middle of the sides and on the caudal peduncle, the ground color appearing merely as an irregular network. The fins are dark brown edged with yellowish, and are covered with yellowish circular spots and elongate streaks; the pectoral, however, is only spotted basally, externally. Within, the spots cover all but the marginal portion.

Here described from a specimen, 164 mm. long, caught with hook and line in the surf at Papenoo, Tahiti. It is almost exactly like Bleeker's excellent figure published under the name of *E. bataviensis*.

Boulenger placed this under *E. summana* (Forskål), an arrangement followed by Fowler. However, in view of the marked differences between *ongus* and typical *E. summana*, I must keep them separate, at least for the present. Bloch gave the type locality as Japan and the name of the fish as "ican ongus." "Ikan" is the Malay word for fish, and is not a Japanese word, while the fish is unknown in Japan. Undoubtedly Bloch's specimen came from somewhere in Malaysia, probably Java.

A fine specimen, 263 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### ***Epinephelus malabaricus* (Bloch and Schneider).**

*Holocentrus malabaricus* Bloch and Schneider, Syst. Ichth., 1801, p. 319, pl. 63—Tranquebar.

*Serranus malabaricus* Day, Fishes India, 1878-88, p. 19, pl. 4, fig. 2; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 10, 1930, p. 289.

*Epinephelus malabaricus* Sauvage, Hist. Madagascar, Poiss., 1891, p. 67; Jordan and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 19.

*Holocentrus pantherinus* Lacépède, Hist. Nat. Poiss., 3, 1802, pl. 27, fig. 3; 4, 1802, pp. 389 and 392.

*Epinephelus pantherinus* Bleeker, Atlas Ichth., 7, 1873-76, p. 51.

*Epinephelus crapao* Bleeker, Atlas Ichth., 7, 1873-76, pl. 286, fig. 1.

(For further synonymy see Fowler and Bean, cited above.)

Dorsal XI, 15; anal III, 8. There are 60 tubulated scales in the lateral line to the caudal base, with about 15 more extending far out on the caudal. There are 18 scales from the lateral line to the dorsal origin, 32 to the anal origin. The scales at the bases of the fins are small to minute. The depth is 3.47, the head 2.6, the caudal 4.3, the pectoral 5.6 times in the length. The eye is 5.6, the snout 4, the interorbital 9, the maxillary 2.35, the least depth of the caudal peduncle 3.7 times in the head.

The color in alcohol is dark brown, a little paler below, the body and fins with reddish brown circular spots which largely dis-

appear on the anterior half of the trunk. My specimen is like Bleeker's figure cited above.

Described from a specimen, 191 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

### *Epinephelus merra* Bloch.

*Epinephelus merra* Bloch, *Ichthyologie*, 7, 1797, p. 17, pl. 329—Japan Sea; Bleeker, *Atlas Ichth.*, 7, 1873-76, p. 55, pl. 301, fig. 2; Boulenger, *Cat. Fishes Brit. Mus.*, ed. 2, 1, 1895, p. 241.

*Serranus merra* Fowler, *Fishes Oceania*, Mem. Bishop Mus., 10, 1928, p. 181. *Serranus hexagonatus* Cuvier and Valenciennes, *Hist. Nat. Poiss.*, 2, 1828, p. 330; Richardson, *Voy. Sulphur, Zool.*, 1844, p. 82, pl. 38, fig. 1; Günther, *Fische der Südsee*, 1, 1873-75, p. 7, pl. 7, figs. A and B; Day, *Fishes India*, 1878-88, p. 14, pl. 2, fig. 3.

*Epinephelus stellans* Bleeker, *Atlas Ichth.*, 7, 1873-76, p. 54; 8, 1876-77, pl. 332, fig. 4.

Dorsal XI, 15 to 17; anal III, 8. There are 55 to 70 scales in the lateral line, 10 to 13 above and 32 to 44 below it. There are 95 to 120 scales in a longitudinal series. The depth is 3 to 3.5, the head 2.6 to 3 times in the length. The eye is 4.5 to 5.2 times in the head, equal to or a little less than the snout. The lower jaw projects strongly. The mouth is large, the posterior angle of the maxillary extending beyond the eye. The teeth are in broad bands, in 3 or 4 rows in the lower jaw, the canines rather small. There are 14 to 17 gill-rakers on the lower arch.

In life the entire body is covered with more or less hexagonal clear brown, dark brown, or purplish brown spots, separated by a network of whitish or very pale yellowish or brownish lines, the spots smaller on the head, dorsals, anal, caudal, and ventrals. The pectoral is cream or whitish, thickly set with smaller and more circular spots. In alcohol the color changes but little, merely becoming duller.

At Tahiti were collected 2 specimens, 135 and 158 mm. in length, and 5 at Bora Bora, 76 to 220 mm. long. Nine specimens of this widespread species were kept, out of the many found in the tide pools of the reefs near Suva, Viti Levu Island. They varied in length from 66 to 136 mm. in length. This is the commonest serranid of the coral reefs in shallow water, every tide pool containing a number. Where the reef dries off at low tide they do not escape with the retreating water but retire beneath boulders or in holes ramifying through the coral. At Vila, Efaté Island, New Hebrides, a specimen, 118 mm. long, was caught. In Hathorn Sound, New Georgia Island, Solomon Islands, a large specimen, nearly a meter long, was caught with hook and line. This specimen, weighing

about 12 kilograms, was eaten. At Ugi Island, Solomons, a specimen, 102 mm. long, was collected.

### ***Mycteroperca olfax* (Jenyns).**

*Serranus olfax* Jenyns, Zool., Voy. Beagle, Fishes, p. 9, pl. 4, 1840—Galapagos Islands.

*Mycteroperca olfax* Jordan and Evermann, Fishes N. and Mid. Amer., 1, 1896, p. 1183; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 368.

Dorsal XI, 17; anal III, 11. There are 110 to 120 scales in a longitudinal series, about 75 tubulated scales in the lateral line, 20 above and 50 below it. The depth is about 3.1 times, the very large head 2.7 in the length. The eye is 6 times, the snout 3.3 times, the depth of the broad caudal peduncle 2.9 times in the head. The narrow pectoral is 1.8 times, the broad, truncate caudal 1.4 times in the head. The mouth is large, the chin projecting, the maxillary extending back beneath the anterior edge of the pupil. The dorsal and anal are low, the fourth spine longest, 2.8 times in the head. The nostrils are very close together, the posterior one more than twice the diameter of the anterior.

The color in life is dark olive brown, spotted with paler and purplish brown, becoming gray brown underneath. The fins are all dusky. In alcohol the color is dark brown above, becoming blackish brown on top of the head and before the dorsal, the under parts pale brown. The fins are blackish, the soft dorsal, anal, pectorals, and caudal each with a fine white marginal line.

Here described from a specimen, 280 mm. long, collected at Tagus Cove, Albemarle Island, Galapagos Islands.

This species is very abundant about Albemarle and Narborough Islands. Large numbers were caught by trolling and still-fishing at Tagus Cove, Albemarle, and off Narborough. Mr. Briggs, the second mate, caught several hundred pounds in less than an hour, by still-fishing. Specimens up to a meter in length were caught by trolling. The largest caught weighed about 25 pounds.

### ***Paralabrax albomaculatus* (Jenyns).**

*Serranus albomaculatus* Jenyns, Zool., Voy. Beagle, Fishes, p. 3, pl. 2, 1840—Galapagos Islands.

*Paralabrax albomaculatus* Jordan and Bollman, Proc. U. S. Nat. Mus., 1889, p. 181; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 370.

Dorsal X, 14 to 15; anal III, 7. There are 85 to 100 scales in a longitudinal series, 65 to 70 tubulated scales in the lateral line, 14 to 18 above and 31 or 32 below it. The depth is 3.5 times, the

head 2.85 times in the length. The eye is 5.3 times, the snout a trifle less than 3 times in the head. The interorbital is a little wider than the eye. The chin is strongly projecting, the large mouth is nearly horizontal, the broad maxillary extending beneath the posterior third of the eye. The third dorsal spine is longest, twice in the head, the seventh, eighth, and ninth spines very short and the fin therefore deeply notched, the rayed portion only moderately high. The broad, rounded pectoral is 1.7 times, the slightly lunate caudal 1.5 times in the head.

In life the color is dark olive brown on the upper half, the lower half pale brown, with 2 rows of large silvery white spots on each side, the lower row below the lateral line and much more noticeable than the upper one. The opercle, maxillary, subopercle, and lower jaw are suffused with golden. The pectoral, dorsal, and most of the caudal are deep yellow. The spinous dorsal has a black margin. In alcohol the dorsal half is blackish brown, with 2 rows of large pale spots, the head and lower half pale reddish brown. The spinous dorsal and pectoral are yellow. The soft dorsal and anal are dusky. The caudal is dusky with a large whitish lunate marginal band posteriorly. The ventrals are dark purplish brown.

Here described from a specimen, 284 mm. long, caught with hook and line at Tagus Cove, Albemarle Island, Galapagos Islands. A young specimen, 36 mm. long, also from Tagus Cove, is placed here. There is a silvery spot on the opercle, and 3 large pale silvery white spots covering most of the ventral half of the body. The color otherwise is pale brown. The spinous dorsal is dusky, the ventrals dusky bluish, the other fins pale.

**Paranthias furcifer** (Cuvier and Valenciennes).

*Serranus furcifer* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, p. 264, 1828—Brazil.

*Paranthias furcifer* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 273.

*Serranus colonus* Valenciennes, Voy. Venus, Zool., 1846, p. 300, pl. 2, fig. 1—Galapagos Islands.

Dorsal IX, 18 to 20; anal III, 9 or 10. There are about 80 scales with tubules in the lateral line, 5 or 6 more on the caudal, and 122 rows of scales in a longitudinal series from the angle of the gill opening to the caudal base. The depth is 3 or a little less, the head 3.33 times in the length. The eye slightly exceeds the snout and is 4 to 4.16 times in the head. The interorbital is a little broader than the eye. The profile is boldly convex, the lower jaw projecting slightly. The oblique mouth exposes a pair of canines near the tip

of each jaw. The maxillary extends beneath the posterior third of the eye. The pectoral equals the head. The caudal is deeply lunate, with pointed, elongate tips, a third longer than the head. The dorsal is low, the first spine very short, the longest spine 3 times in the head, the third anal spine a trifle shorter than the longest dorsal spine. The narrow pointed ventrals are a little less than 1.5 times in the head.

The color in life is a richly glowing deep cherry red, with a few deep blue or blue green spots in a longitudinal row between the lateral line and the soft dorsal. There is a similar spot on the pectoral base. These spots are most evident on the young and tend to disappear with age. The breast is lined alternately with paler and darker red. The outer margin of the ventrals is blue. The color in alcohol is deep dusky brown above, paler posteriorly, becoming white on the throat and breast, the sides with faint longitudinal streaks. The dorsal is blackish brown, the caudal dusky, paler posteriorly with a white marginal line posteriorly or the upper and lower margins whitish. The anal is pale or light brown, reddish basally, with a marginal brown line. The pectoral is brown or blackish brown, the ventrals pale, suffused with dusky.

This beautiful and graceful fish is very abundant in the deep, rocky recesses of Tagus Cove, Albemarle Island, Galapagos Islands, and about the rocky cliffs of Cocos Island.

Seventeen specimens, from 90 to 184 mm. long, were collected at Cocos. Several hundred were obtained at Tagus Cove by the explosion of a small piece of dynamite, but only 9 specimens, 80 to 195 mm. in length, were kept.

### *Anthias mooreanus* Herre.

*Anthias moorensis* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 10 (name only).

*Anthias mooreanus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 405.

Dorsal X, 16; anal III, 6; scales 6-54-15, 4 between middle dorsal spines and lateral line. Depth 3, head 3.66, pectoral 3.66 in length. Eye 3.6, snout 4.4, interorbital 3.4, fourth dorsal spine 2.5, height of soft dorsal 2.16, third anal spine 2.88, height of anal 2.16, depth of caudal peduncle 2.16 in head. Body compressed, somewhat ellipsoid, dorsal and ventral profiles moderately and almost equally convex. Head small, pointed. Mouth oblique. Mandible slightly projecting. Maxillary extends beneath pupil, expanded portion two-thirds as wide as eye. A pair of outwardly curved canines at middle and a

pair of straight ones a little farther back in upper jaw, all visible when mouth is closed. A single row of coarse teeth in upper jaw. A pair of hooked canines at middle of lower jaw. One row of fine teeth in lower jaw. A patch of teeth on vomer, apparently none on palatines. Tongue smooth. Posterior edge of preopercle serrated, teeth enlarged at angle. Interopercle not serrated. Opercle with 2 spines, the upper one much larger. Three or 4 small serrations on lower part of opercle and a few very small ones on subopercle. Entire trunk and head, except lips, covered with scales. Dorsals and anal have a low scaly sheath. Dorsal origin slightly behind gill opening. First dorsal spine less than half the second, the fourth the longest, the last six subequal. No dorsal notch. Soft dorsal pointed behind. Third anal spine longest. Caudal lunate, longer than head, lower lobe elongate, filiform, 1.5 times the head. Ventrals pointed.

Color in life red, with 2 longitudinal bands, one extending back from behind eye, the other from behind pectoral.

One specimen, collected at Moorea Island, Society Islands.

### **Grammistes sexlineatus** (Thunberg).

*Perca sexlineata* Thunberg, Kon. Vet. Akad. Handl. Stockh., 13, 1792, p. 142, pl. 5—Abhor Slagtet.

*Grammistes sexlineatus* Klunzinger, Fische des Rothen Meeres, 1, 1884, p. 10; Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 346; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 260, pl. 38, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 187.

*Grammistes orientalis* Day, Fishes India, 1878-88, p. 28, pl. 9, fig. 1; Bleeker, Atlas Ichth., 7, 1873-76, p. 70; 8, 1876-77, pl. 337, fig. 5.

Dorsal VI or VII, 13 or 14; anal II, 8. There are 65 to 70 scales in the lateral line, 10 or 11 above and 25 to 30 below. The depth is 2.5 to 2.6, the head 2.66 to 2.9 times in the length. The eye and snout are about equal, or in small specimens the eye may be noticeably larger, 3.5 to 4 times in the head. The lower jaw projects and has a more or less developed dermal appendage on the chin. The mouth is large, the maxillary extending below the hind margin of the eye or beyond. The opercle has 3 strong and nearly equidistant spines.

The color is dark brown, chocolate, or blackish brown, with 3 to 7, more commonly 4, broad white longitudinal stripes, and a white line from the tip of the snout to the dorsal. In the young the first dorsal spine is white, the rest of the spinous dorsal blackish brown, the other fins all pale.

Two young specimens, each 28 mm. long, were collected at Nukulau Island, Fiji. A specimen of the same length was also taken at Wala Island, New Hebrides.

### Family PLESIOPIDAE

#### *Plesiops melas* Bleeker.

- Plesiops melas* Bleeker, Verh. Bat. Gen., 22, 1848, Bijdr. Ichth. Bali, p. 9—Bali; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 378, fig. 91.  
*Pharopteryx melas* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 261, pl. 38, fig. 3.

Dorsal XI, 8; anal III, 9. There are 15 to 17 scales in the upper part of the lateral line, and 8 to 12 more in the lower section, plus 2 more on the caudal base. There are 2 above and 9 below the lateral line, but in those with 10 or 12 tubulated scales in the lower section plus 3 in the caudal base the lower section extends forward beyond the anal origin and there are but 5 scales between it and the anal origin. The depth is 3 to 3.4, the head 2.5 to 2.75, the caudal 3.3 to 3.5, the ventrals about 2.3 times in the length. The eye is 3.9 to 4.4, the least depth of the caudal peduncle 2.55 to 2.7 times in the head. There are 6 or 7 rows of scales on the preopercle. The fins are as in *P. nigricans*.

In life the color is black or blackish, the spinous dorsal with a brick red or scarlet margin. In alcohol the color is chocolate brown or black, the dorsal margined with white. Behind the eye 2 broad black stripes run back to the rear margin of the opercle and a third narrower stripe runs down and back from the lower margin of the eye, along the upper part of the maxillary and a short distance beyond it.

Two specimens, 33 and 49 mm. long, were taken at Wala Island, and 26, from 12 to 60 mm. long, at Malo Island, New Hebrides.

#### *Plesiops nigricans* (Rüppell).

- Pharopteryx nigricans* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 15, pl. 4, fig. 2—Mohila, Red Sea; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 260.  
*Plesiops nigricans* Rüppell, Neue Wirbelt., Fische, 1835, p. 5; Bleeker, Atlas Ichth., 9, 1878, pl. 390, fig. 3; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 375.  
*Plesiops caeruleolineatus* Rüppell, Neue Wirbelt., Fische, 1835, p. 5.  
*Plesiops corallicola* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 280; Günther, Fische der Südsee, 1, 1873-75, p. 87, pl. 58, fig. B.

Dorsal XII, 6 or 7; anal III, 7 or 8. There are 18 or 19 scales in the upper section of the lateral line, and 10 to 12 in the lower section,

plus 3 more on the caudal base, 3 above and 6 below the line. The depth is 3 to 3.4, the head 2.6 to 3, the caudal 3 to 3.33, the ventrals 3 times in the length. The eye is 3.8 to 4.35, the snout 4.7 to 5, the least depth of the caudal peduncle 2 to 2.1 times in the head.

The robust, oblong body is compressed, the back not elevated, the maxillary extending beyond the eye, the dorsal origin above the opercle. There are 4 or 5 oblique rows of scales on the preopercle. The first dorsal spine is short, the other spines increasing slightly in length posteriorly, but much shorter than the dorsal rays. The dorsal and anal rays are much elongated posteriorly, extending well upon the caudal when depressed. The caudal is rounded, but there is one large specimen in which it is emarginate with the upper and lower tips pointed. The greatly elongated ventrals are inserted before the pectorals and extend to the anal.

In life the color is black or very dark brown, with blue spots on the head and frequently on each scale of the body, a large black ocellus on the opercle, margined with red or orange, a black spot behind the upper part of the eye, a short black bar behind the lower part of the eye, and a black stripe running from the lower margin of the eye down and back above the maxillary. The fins are all black, the spinous dorsal with a broad dull blue margin, the soft dorsal, anal, and caudal with a blue or white marginal line, and the pectoral with its posterior margin red. In alcohol the color is olive brown to blackish brown, often with several darker crossbars, the ocellus and dark spots and bars on the head as in life, but the blue spots usually disappear. The red of the pectoral and the blue of the other fins changes to white.

The following specimens were obtained in the New Hebrides: one, 67 mm. long, at Vila, Efaté Island, 7, from 33 to 100 mm. long, at Wala Island, and 2, 62 and 95 mm. long, at Malo Island. A specimen, 33 mm. long, taken at Malo, is brown with a pale blue spot on every scale and 4 or 5 transverse rows of blue spots on the caudal; the large dark brown opercular ocellus is margined with pale blue.

On lava-strewn shores the species of *Plesiops* occur in large numbers. At low tide they remain concealed under the boulders covering the beach, and apparently are able to get along with an exceedingly limited supply of water, as long as they have wet sand in which to burrow.

A single specimen, 65 mm. long, was obtained at Tenibuli, Ysabel Island, Solomon Islands.

## Family PSEUDOCROMIDAE

Genus *Nesiotes* De Vis.

*Nesiotes* De Vis, Proc. Linn. Soc. N. S. Wales, 8, 1883-84, p. 453.

Gills  $3\frac{1}{2}$ , no slit behind the last one; the large gill membranes narrowly united, free from the isthmus. The large lower pharyngeals are not ankylosed, but separate, with bluntly conical teeth. The palatines bear a row of stout serrate teeth. The vomer has a patch of teeth. There are 4 anterior canines in the lower and 6 in the upper jaw; no posterior canines. Each jaw has a single row of conical teeth, close-set but not fused basally. Pseudobranchiae are present. The nostrils are double on each side, the posterior conspicuous. The dorsal is continuous, with 3 stiff spines, 10 articulated spines and 15 rays; the anal with 3 spines and 13 rays; the soft dorsal and anal similar and with scaly basal sheaths. The ventral has 1 spine and 5 rays. It is inserted below the pectoral. There are no axillary scales on the bases of the pectoral or pelvic fins. The rounded caudal is covered with scales for half its length. The lateral line is interrupted, the upper part parallel with the dorsal outline to below the middle of the soft dorsal. It is resumed along the median line of the caudal peduncle. The body is oblong, compressed, the dorsal profile rather high, the head longer than deep, the snout rather blunt, the preopercle with small, the opercle with large scales. The premaxillary is protractile. The lower jaw projects slightly. The lips are not thickened as in the Labridae, which group this fish strongly resembles. The margins of the membranous bones of the head are smooth. The scales are ctenoid for the most part—those on the head, on the predorsal region above the lateral line, and on the breast cycloid. Branchiostegals 5.

*Nesiotes purpurascens* De Vis. Fig. 8.

*Nesiotes purpurascens* De Vis, Proc. Linn. Soc. N. S. Wales, 8, 1883-84, p. 453  
—South Seas; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928,  
p. 189, copied from De Vis.

Dorsal III, X, 15; anal III, 13. There are 25 tubulated scales in the upper part of the lateral line on one side, 29 on the other side of my specimen. The lower division begins several scales behind the end of the upper section and has 5 tubulated scales, plus 2 more on the caudal base. There are 39 scales in a median longitudinal series from the angle of the opercle to the caudal base. There are 5 scales above the line to the dorsal origin and 14 below to the anal origin. The anterior profile of the compressed body descends in a steep

unbroken line from the dorsal origin to the tip of the snout. The greatest depth is at the dorsal origin and equals the head, 2.9 times in the length. The circular eye is 4, the snout 3.73, the interorbital 5.6 times in the head. The mouth is oblique with projecting chin, the maxillary extending to beneath the middle of the pupil. The teeth are as already given in the generic diagnosis. There are 4 rows of small overlapping scales on the preopercle, and 4 or 5 large scales on the opercle, plus 3 more smaller ones on the upper part, none of them imbricate. The first dorsal spine is very short, the second one about 3 times as long, the third one 4 times the first and equal to the snout, the tenth spine 3 times in the head. The

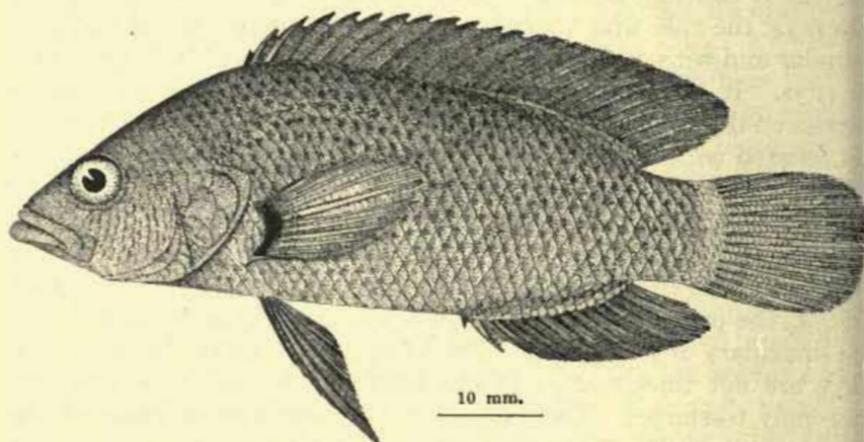


FIG. 8. *Nesiotes purpurascens* De Vis, Vila, Efaté Island, New Hebrides.

dorsal rays are higher posteriorly, twice in the head. The anal spines are stout, the third a little higher than the second, 3.2 times in the head. The posterior anal rays equal those of the dorsal, both fins pointed posteriorly and extending upon the caudal when depressed. The pectoral equals the caudal, 3.8 times in the length. The least depth of the wide, flattened caudal peduncle is a little more than twice in the head. The ventrals extend to the origin of the anal, 3.25 times in the length.

The color in alcohol is brown, the head paler beneath, each scale with a dark purplish brown basal bar or spot, these spots forming longitudinal and vertical rows. The dorsals, anal, and ventrals are blackish brown, the caudal pale brown. The pectoral is pale with a black vertical bar at the base of the rays.

Here described from a specimen, No. 17340, Field Museum of Natural History, 65 mm. long, collected in the harbor of Vila, Efaté Island, New Hebrides. The only other specimen ever observed was the one described by De Vis. He gave its length as  $2\frac{1}{2}$  inches, or 64 mm., but this included the caudal fin.

The fish described and figured by McCulloch (Biological Results of the Fishing Experiments carried on by the F. I. S. *Endeavour*, 5, part 4, p. 188, pl. 49) as *Pseudochromis* (*Pseudochromis*) *purpurascens* is certainly not the same species as the one described by De Vis under the name *Nesiotos purpurascens*. It has been renamed *Pseudochromis mccullochi* by Dr. George S. Myers (Copeia, 1932, No. 1, p. 30).

### ***Pseudochromis tapeinosoma* Bleeker.**

*Pseudochromis tapeinosoma* Bleeker, *Derde Bijdr. Ichthy. Amboina, Nat. Tijds. Ned. Ind.*, 4, 1853, p. 115; Bleeker, *Pseudochromidoidea*, *Acad. Roy. Neerl. Sci.*, 15, 1875, p. 23, pl. 1, fig. 1.

Dorsal II, 21; anal II, 13; the lateral line is interrupted, 25 scales in the upper part, 8 in the lower. The depth of the elongate, compressed body is 3.9, the head 3.5 times in the length. The head is pointed, the dorsal and ventral profiles alike, moderately convex. The eye is large, prominent, high up, even with the profile, 3.5 times in the head. The snout is short, 1.3 times in the eye, 4.7 times in the head. The interorbital is 2.38 times in the eye. The posterior end of the maxillary extends below the anterior third of the eye. The lateral line curves up to 1 scale below the dorsal, running back almost to the posterior extremity of the fin. The lower portion begins on the third scale below the last scale of the upper part and continues to the caudal base, with 1 tubule on the base of the fin. The vertical fins are low. The short, rounded pectoral very slightly exceeds the rounded caudal, 1.5 times in the head. The pointed ventrals are about 6 times in the length or 1.7 times in the head.

The color in alcohol is uniform dark olive brown, the vertical fins and the caudal black, the pectorals and the ventrals brownish gray.

This rare fish was originally described from 2 small specimens, 38 and 45 mm. long, from Amboina. Later Bleeker had 5 more from Sumatra, Buru, Ceram, and Goram, all in the Dutch East Indies. One from the reef at Suva is 39 mm. long and agrees in all essentials with Bleeker's description.

**Pseudogramma polyacanthus** Bleeker.

*Pseudogramma polyacanthus* Bleeker, Verh. Akad. Amsterdam, 15, 1875, p. 25

—Ternate; Bleeker, Atlas Ichth., 9, 1878, pl. 389, fig. 1; Herre, Occ. Papers Bishop Mus., 1903, p. 139.

*Pseudochromis polyacanthus* Bleeker, Nat. Tijds. Ned. Ind., 10, 1856, p. 375—

Ternate; Günther, Fische der Südsee, 2, 1876-81, p. 159, pl. 98, fig. A; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 189.

Dorsal VII, 18 to 21; anal III, 16 or 18. There are 30 to 33 tubulated scales in the upper, 22 in the lower division of the lateral line, plus 2 more on the caudal base. In a specimen 65 mm. long, the depth is 3.3, the head 2.7 times in the length. The eye and snout are equal 2.7 times in the head. The least depth of the caudal peduncle is 3.4, the caudal 2.18, the pectoral 1.6 times in the head. The body is compressed, the upper profile arched, the lower jaw projecting. The eyes are high, close together, dorsolateral in position. The mouth is large, moderately oblique, the maxillary extending beyond the eye.

The color in alcohol is brown with irregular dark brown stripes on the sides of the head and numerous dark brown vertical spots on the sides of the body. The dorsals, anal, and caudal are black, the anal with a white marginal line. The pectorals and ventrals are brown.

Three specimens, 29 to 65 mm. in length, were taken at Maraa, Tahiti. Another, about the size of the largest Tahitian specimen, was collected on a reef near Suva, Fiji.

## Family PRIACANTHIDAE

**Priacanthus cruentatus** (Lacépède).

*Labrus cruentatus* Lacépède, Hist. Nat. Poiss., 3, 1800, p. 522, from a copy of a plate made by Plumier at Martinique.

*Priacanthus cruentatus* Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 352; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 229, fig. 94.

Dorsal X, 12 or 13; anal III, 14. There are 100 to 115 scales in a longitudinal series, 11 above and 51 to 53 below the lateral line. There are about 76 tubulated scales in the lateral line. The oblong, deep, compressed body has the dorsal and ventral outlines much alike, the depth 2.6 to 2.7 times, the head 3 to 3.2 times in the length. The eye is large, 2.25 to 2.5 times, the blunt snout 3.4 to 4 times in the head. The lower jaw projects strongly, the oblique mouth is large, the maxillary extending to beneath the pupil. The dorsal and anal spines are low, the rays higher. The small pectoral is 1.9 times in the head. The caudal is slightly shorter than the head.

In life the whole fish is rose red or brilliant glowing red, with a silvery luster over all. Sometimes when removed from the water it is mottled with white and bright red, or is blotched or vertically barred by darker red, but I believe these variations are changes due to fright and to color changes consequent upon death. In alcohol the color becomes plain whitish or yellowish, somewhat dusky above and paler below, with silvery sheen.

The members of this group live in holes and eddies about bold rocky shores and are much prized as food.

Two specimens were collected at Cocos Island, each 199 mm. in length. At Maraa, Tahiti, 2 specimens, 68 to 71 mm. in length, were taken. They were sprinkled with numerous black specks above the lateral line. At Papeete, Tahiti, 5 specimens, 68 to 76 mm. long, were secured. At Bora Bora 2 more, 147 and 182 mm. in length, were taken.

#### **Priacanthus hamrur** (Forskål).

*Sciaena hamrur* Forskål, Descr. Anim., 1775, pp. xi, 45—Red Sea.

*Priacanthus hamrur* Bleeker, Atlas Ichth., 7, 1876, p. 13, pl. 353, fig. 3; Boulenger, Cat. Fishes Brit. Mus., ed. 2, 1, 1895, p. 355.

Dorsal X, 13; anal III, 13 or 14. There are 68 to 80 scales in the lateral line. The body is deep, strongly compressed, the upper profile slightly elevated, the ventral outline strongly curved, the depth 2.7, the head 3.2, the caudal 3, the ventral 3.4 times in the length. The eye is very large, high up, 2.16 times in the head. The snout is 0.7 of the eye. The interorbital is 4, the pectoral 1.7 times in the head. The mouth is nearly vertical, with very prominent chin, the maxillary prominent, its posterior angle not extending to a vertical from the pupil, its greatest breadth half the eye. The dorsal spines increase in length to the last, which is 2.3 times in the head. The ventral is nearly as long as the head, reaching the anal. The third anal spine is 2.75 times in the head. The caudal is lunate, the lobes produced, especially the upper one.

In life the color is red or coppery red, becoming paler beneath, with a silvery luster. The pectoral is yellow, the other fins more or less yellowish, their margins or sometimes most of the fin black or blackish. In alcohol the color is gray or reddish gray, the lower half silvery, the yellowish fins blackish marginally.

A fine specimen, 210 mm. long, was collected at Takaroa, Tuamotu Archipelago.

## Family PEMPHERIDAE

**Pempheris dispar** Herre. Fig. 9.

*Pempheris dispar* Herre, Jour. Pan-Pacific Res. Inst., 6, 1931, p. 6 (name only).

*Pempheris dispar* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 407.

Dorsal V or VI, 7 or 8; anal III, 22 or 23; scales 6-59 or 60+7-15 or 16, predorsal 29 or 30. Depth 2.65 to 2.75, head 2.75 to 2.8, caudal 3.3 to 3.45, pectoral 3.66 to 3.8, length anal base 3.1 to 3.25 in length. Eye 2.375 to 2.6, snout 3.8 to 4.1, interorbital 3.5 to 4,

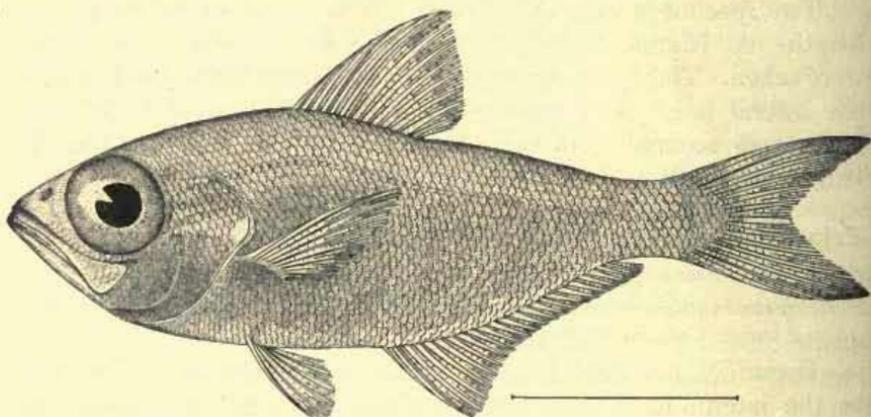


FIG. 9. *Pempheris dispar* Herre, Tenibuli, Ysabel Island, Solomon Islands.

depth of caudal peduncle 3.5 to 4 in head. Mouth oblique. Chin prominent. Maxillary reaches beyond middle of eye. Lateral line nearly straight. Preopercle not serrated.

Eighteen specimens, collected at Tenibuli, Ysabel Island, Solomon Islands.

## Family LUTIANIDAE

**Lutianus jordani** (Gilbert).

*Neomaenis jordani* Gilbert, Fishes of Panama, Proc. Calif. Acad. Sci., 1897, and in Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1251—Panama.

*Lutianus jordani* Gilbert and Starks, Mem. Calif. Acad. Sci., 4, 1904, p. 102.

Dorsal X, 14; anal III, 8; there are 48 scales in the lateral line, 6 between it and the dorsal origin and 13 from it to the anal origin. The head is 2.7 times, the depth 3 times in the length. The eye is 3.75 times, the snout 3.2 times in the head. The maxillary extends

beneath the anterior edge of the pupil. The teeth on the vomer form a diamond-shaped patch. The long, pointed pectoral is a sixth shorter than the head. The caudal is 1.3 times in the head.

The color in alcohol is a warm reddish brown or purplish brown, the top of the head and the anterior dorsal region darker. The fins are darker, except the pectoral, which is paler than the general body color.

Two specimens, each 224 mm. in length, were caught with hook and line at Cocos Island.

### *Lutianus kasmira* (Forskål).

*Sciaena kasmira* Forskål, Descr. Anim., 1775, pp. xi, 46—Arabia.

*Lutianus kasmira* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 261.

*Holocentrus bengalensis* Bloch, Ichtyologie, 7, 1797, p. 82, pl. 246, fig. 2.

*Lutjanus bengalensis* Bleeker, Atlas Ichth., 8, 1876-77, p. 55, pl. 333, fig. 4.

*Diacope octolineata* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 418.

Dorsal X, 14 or 15; anal III, 8 or 9. There are 80 to 85 scales in a longitudinal series above and 68 to 70 below the lateral line, 8 or 9 above, and 11 or 12 below the lateral line. The depth of the oblong, compressed body is 2.9, the head 2.6 times in the length. The eye is nearly 4.4 times, the snout 2.85 times in the head. The long, pointed pectoral is 1.1 to 1.2 times, the deeply emarginate caudal 1.3 times in the head.

The color in life is light golden cream to golden yellow, with four longitudinal blue stripes, each stripe margined with deep violet, all the colors very brilliant. The fins are yellow to golden, the dorsal margined with violet. In alcohol the color above is brown, becoming whitish beneath, the stripes pale blue with brown margins. The fins are dusky yellowish to whitish, the dorsal margined with blackish.

Four specimens, 121 to 145 mm. in length, were collected at Nuka Hiva Island, Marquesas.

In the Solomon Islands specimens from Tenibuli, Ysabel Island, show some differences; 13, ranging in length from 33 to 131 mm., vary in color from silvery to clear brown, with 4 or 5 stripes as in those already described. They also show a dusky blotch on the lateral line, as in Bleeker's figure of *Lutjanus quinquelineatus*. A specimen, 78 mm. long, from Auki, Malaita Island, is pale yellowish with 6 longitudinal brown lines on the body, the 3 upper ones somewhat oblique, the others horizontal, with a black blotch on the

upper half of the caudal peduncle at the caudal base, with a broad pale or whitish ring about it.

**Lutjanus oligolepis** Bleeker.

*Lutjanus oligolepis* Bleeker, Versl. Akad. Amsterdam, 7, 1873, p. 43—Sumatra; Bleeker, Atlas Ichth., 8, 1876-77, p. 48, pl. 333, fig. 5.

Dorsal X, 13; anal III, 8. There are 48 tubulated scales in the lateral line, plus 7 more on the caudal base and caudal, and 46 rows of scales in a longitudinal series to the caudal base, both above and below the lateral line. The depth is 2.8, the head 2.5, the caudal and pectoral each 3.25 times in the length. The large, rounded eye is 3.7, the snout 3, the interorbital 4.85, the maxillary 2.35, the least depth of the caudal peduncle 2.9 times in the head. The body is compressed, the profile descending in a nearly straight line from the nape to the snout. There are 2 small canines in the front of the upper jaw, and a patch of teeth on the tongue. The maxillary extends beneath the front margin of the pupil. There are 5 rows of scales on the preopercle, 6 on the opercle. The suborbital is naked and the naked interorbital area extends posteriorly along the middle to the nape. The posterior margin of the preopercle is minutely serrate on the upper portion above the shallow emargination, spiny-toothed on the angle below. The first dorsal spine is twice in the second, the third to fifth spines longest, 2.65 times in the head. The last spine is 4.3 times, the penultimate spine 5 times in the head. The second anal spine is 4.35 times in the head, much less than the third, which is 3.6 times. The anal rays are higher than the soft dorsal, the first anal ray 2.35 times in the head. The caudal is somewhat emarginate.

The color in life was dark violet reddish above, paler to roseate pearly beneath, each row of scales on the lower third of the body with a longitudinal golden line, and a large black spot beneath the anterior dorsal rays and the last 2 dorsal spines. The dorsal was dusky red basally, paler above, the caudal red basally, the fins otherwise all golden. In alcohol the color is olive on the snout, the body reddish dusky above, the sides of the head and trunk reddish to reddish silvery, becoming nearly white beneath, with faint golden or whitish longitudinal lines on each row of scales, and a large black spot on the lateral line below the 3 anterior dorsal rays and 2 last dorsal spines. The dorsal is soiled or dusky gray, the caudal and pectoral are yellowish, the other fins whitish.

Described from a specimen, 156 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

**Lutianus biguttatus** (Cuvier and Valenciennes).

*Serranus biguttatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 6, 1830, p. 507—Trincomalee.

*Lutianus biguttatus* Day, Fishes India, 1878, p. 34, pl. 10, fig. 6.

*Lutjanus biguttatus* Bleeker, Atlas Ichth., 8, 1876-77, p. 54, pl. 338, fig. 5.

Dorsal XI, 11; anal III, 8. There are 46 scales in the lateral line plus 8 more on the caudal, 5 above and 13 below the line. The form is elongate, the dorsal and ventral profiles nearly horizontal, the depth 3.6, the head 2.7, the caudal 4.15, the pectoral 4 times in the length. The eye is 3.6, the snout 3.17, the interorbital 4.5, the least depth of the caudal peduncle 3.6 times in the head. The mouth is oblique, the lower jaw slightly projecting, the maxillary extending beneath the first third of the eye. The posterior margin of the preopercle is finely serrate and has a very slight indentation opposite the very feebly developed opercular knob. The opercle has 2 small flat spines. The teeth in the upper jaw are in a fine band with an outer row of much larger, widely spaced teeth and a few large canines at the front. The outer row in the lower jaw is of large teeth becoming much larger posteriorly, with a narrow band of minute teeth behind in the front of the mandible. The scales above the lateral line are in oblique rows, those below it in horizontal rows.

The color in alcohol is dusky above, pale yellowish below, with a black band from the eye to the middle of the caudal base and another black band from the chin along the lower side to above the anal, where it disappears. The interorbital and top of the snout are bluish black. There is a black spot at the upper angle of the pectoral base. The spinous dorsal is dusky, the other fins all yellowish. My specimen shows no trace of the 2 silvery or pearly white spots on the back below the dorsal that are typical of the species.

Here described from a specimen, 145 mm. long, from Hathorn Sound, New Georgia Island, Solomon Islands.

**Lutianus semicinctus** Quoy and Gaimard.

*Lutjanus semicinctus* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1824, p. 303—

Rawak, Waigi; Bleeker, Atlas Ichth., 8, 1876-77, p. 63, pl. 341, fig. 3;

Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 198.

*Mesoprius semicinctus* Günther, Fische der Südsee, 1, 1873-75, p. 15, pl. 17.

*Lutianus semicinctus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 43.

Dorsal X, 12; anal III, 8. There are 47 tubulated scales in the lateral line, plus 7 more on the caudal base, 8 above and 15 below the line. The depth of the elongate, compressed body is

2.98, the head 2.6, the emarginate caudal 3.6, the pectoral 3.3 times in the length. The eye is 5, the snout 2.67, the interorbital 4.44, the least depth of the caudal peduncle 2.9, the fifth dorsal spine 2.75, the second anal spine 3.47 times in the head. The conical snout is as broad as long. The mouth is large, the maxillary extending beneath the eye. There are 6 canines in front of the upper jaw and 16 large teeth along the front and sides of the lower jaw, with bands of teeth in the jaws and narrow bands of fine teeth on the palatines and vomer.

In life this is a very handsome snapper, the color above greenish gold, paler with rosy shading on the lower half, with 7 dark violet brown bands across the back, narrowing rapidly and disappearing about the level of the pectoral. At the base of the caudal is a large dark brown blotch, its length equal to the snout. The top of the snout and nape is deep violet brown. The fins are all pink to yellow. In alcohol the color is whitish, greenish dusky dorsally, with 7 blackish crossbands and a large blackish blotch on the caudal base, the top of the head violet brown and the fins all yellowish.

Described from a specimen, 209 mm. long, taken at Malo Island, New Hebrides. In the Solomon Islands 2 fine specimens were obtained at Tenibuli, Ysabel Island, their lengths 164 and 224 mm., and 3 specimens, 98 to 148 mm. long, at Ugi Island.

### **Lutianus bohar** (Forskål).

*Sciaena bohar* Forskål, *Descr. Anim.*, 1775, pp. xi, 46—Arabia.

*Mesoprion bohar* Günther, *Fische der Südsee*, 1, 1873-75, p. 13, pl. 15.

*Lutjanus bohar* Bleeker, *Atlas Ichth.*, 8, 1876-77, p. 64, pl. 348, fig. 4; Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 198.

*Lutianus bohar* Jordan and Seale, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 262.

Dorsal X or XI, 13 or 14; anal III, 8. There are 48 tubulated scales in the lateral line plus 12 more on the caudal, 9 above and 18 below the line. There are 58 scale rows in a longitudinal series above the line plus 7 more on the caudal base. The depth is 2.4 to 2.6, the head 2.5, the caudal about 3.2 times in the length, the pectoral scarcely shorter than the caudal. The eye is 3.7 to 4.2, the snout 3 to 3.15, the interorbital 3.8 to 4, the maxillary 2.25 to 2.3, the least depth of the caudal peduncle 2.9 to 3 times in the head.

The color in life is dark red, the back dusky, each scale along the side with a pale center, so that longitudinal lines of alternate light and dark are visible, those above the lateral line very oblique, the rest horizontal. Below the soft dorsal are 2 rather small pale silvery spots. The caudal is margined above and below with black-

ish red, the anal and ventrals are likewise banded submarginally with the same. The spinous dorsal is reddish black. In alcohol the color is pale reddish on the sides and below, the dorsal region a little darker, with longitudinal dusky lines below and oblique lines above the lateral line. The head is bluish olive above. The silvery spots below the soft dorsal are usually prominent, but in one specimen they are absent. The spinous dorsal and anterior dorsal rays are largely blackish. The caudal is margined above and below with a white line and a broad submarginal blackish stripe. The anterior margin of the anal is a white line with a submarginal black bar. The outer ventral ray is white, the middle of the fin blackish to violet at the inner side.

Two specimens, 97 and 104 mm. in length, of this handsome and unmistakable snapper were taken at Tenibuli, Ysabel Island, Solomon Islands.

#### **Lutianus fulviflamma** (Forskål).

*Sciaena fulviflamma* Forskål, Descr. Anim., 1775, pp. xi, 45—Arabia.

*Lutjanus fulviflamma* Bleeker, Atlas Ichth., 8, 1876-77, p. 65, pl. 344, fig. 3;

Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 199.

*Lutianus fulviflamma* Day, Fishes India, 1878-88, p. 41, pl. 12, figs. 5 and 6.

Dorsal X, 13; anal III, 8. There are 46 to 48 scales in a longitudinal series, with 4 to 10 more on the caudal base, 44 or 45 tubulated scales in the lateral line with 3 to 6 more on the caudal base, 7 scales above and 14 below the line. The depth is 2.8 to 3, the head 2.6, the caudal 3.6 times in the length. The eye is 3.3 to nearly 4, the snout 4 times in the head. The maxillary extends to beneath the middle of the eye. The tongue has a patch of teeth. The caudal is emarginate.

The color in alcohol is silvery, brownish above, with a large black blotch on the lateral line below the last dorsal spines and the anterior dorsal rays.

A specimen, 40 mm. long, was collected at Nukulau Island, Fiji. Another, 31 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands. On the latter the spinous dorsal membrane between the first and third spines is dusky. A specimen collected in the New Hebrides was packed and shipped to Field Museum without being measured.

#### **Lutianus lineatus** (Quoy and Gaimard).

*Diacope lineata* Quoy and Gaimard, Voy. Uranie, Zool., 1824, p. 309—Rawak, Waigi.

*Mesoprion lineatus* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 193.

*Lutjanus lineatus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 304, fig. 4; 8, 1876-77, p. 69; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 200.

*Lutianus lineatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 264.

Dorsal X, 13; anal III, 8 or 9. There are 65 to 70 scales above and 55 to 60 below the lateral line, and about 48 to 50 in the lateral line, 8 above to the dorsal origin and 15 or 16 below to the anal origin.

In life this noble fish is very beautiful. Each scale has a dark golden or brownish golden spot, the spots forming longitudinal rows, with a rich metallic golden luster over all. The dorsals and caudal are dusky above, shading into violet brown and golden violet basally. The other fins all golden with a roseate flush.

A number of large specimens, each 450 to 600 mm. long, and weighing 3 to 4 kilograms apiece or more, were taken at Tenibuli, Ysabel Island, Solomon Islands. Most of them were eaten, and the rest were injected with preservative in the hope that they could be preserved; unfortunately all spoiled.

#### *Lutianus marginatus* (Cuvier and Valenciennes).

*Diacope marginata* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 425—Pondicherry, Oualan.

*Mesoprion marginatus* Günther, Fische der Südsee, 1, 1873-75, p. 13, pl. 14.

*Lutjanus marginatus* Bleeker, Atlas Ichth., 8, 1876-77, p. 69, pl. 349, fig. 2.

*Lutianus marginatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 263.

Dorsal X, 13; anal III, 8 (in some specimens 7). There are 48 scales in the lateral line, plus 2 on the caudal base. The depth is 2.7, the head 2.6 times in the length. The eye is 4.1 times in the head, 1.55 times in the snout, which is 2.64 times in the head. The second anal spine and third dorsal spine are the strongest and longest, each a trifle less in length than the snout. The pectoral is nearly as long as the head.

The color is red in life, yellowish below, the dorsal fin scarlet with a marginal blackish stripe which becomes wide on the soft dorsal. The caudal is very dark red with white edging on its posterior margin. The anal and ventrals are golden. In alcohol the color may be a pale gray brown, the dorsal spines black-tipped, the soft dorsal with a wide blackish marginal band edged by a white line. The caudal is dusky with a white line on the posterior margin. The pectoral and ventral are pale whitish. The anal is whitish, with its posterior half faintly dusky.

Here described from a specimen, 190 mm. long, collected near Suva, Viti Levu Island, Fiji. Other specimens are reddish bronze above, becoming paler to silvery white below, the fins as already given.

This is the commonest lutianid in the South Seas. Specimens were obtained as follows: in the Marquesas, 6 at Atuona, Hiva Oa Island, 110 to 146 mm. in length, and 2 at Nuka Hiva Island, 110 to 118 mm. long. At Makatea Island 2 tiny specimens, each 22 mm. long, were taken. This species was abundant on the reef at Tahiti. Ten specimens were kept, ranging from 44 to 150 mm. in length. At Moorea 2 specimens, 129 and 184 mm. long, were obtained; at Bora Bora 4 specimens, 148 to 176 mm. in length; at Suva, Fiji, 1 specimen, 189 mm. long; at Nukulau Island, Fiji, 8 specimens, 34 to 73 mm. long; and at Ovalau Island, Fiji, 1 specimen, 28 mm. long. At Wala Island, New Hebrides, a specimen, 160 mm. long, was taken, and a very fine one, 315 mm. long, at Hog Harbor, Espiritu Santo Island.

From the reef at Maraa, Tahiti, 4 specimens, 44 to 78 mm. in length, were collected, which seemed near to *L. flavipes*, agreeing with that species in color, but different in scales. Dorsal X, 14; anal III, 8; scales in lateral line 48; above it to dorsal 8, below it 15 scales; 60 scales in longitudinal series above the lateral line, 46 in series below it; 11 predorsal scales and 6 rows on the cheek; a slight preopercular notch. The tongue is smooth. There is a black spot on the opercle. The caudal is pale, with a pale crossband, somewhat lunate in shape.

A specimen, 135 mm. long, from a fresh-water creek on Kulambangra Island, Solomon Islands, has a well-developed notch in the rear margin of the preopercle; the soft dorsal has a blue marginal line.

### *Lutianus gibbus* (Forskål).

*Sciaena gibba* Forskål, Descr. Anim., 1775, pp. xi, 46—Arabia.

*Mesoprion gibbus* Günther, Fische der Südsee, 1, 1873-75, p. 12, pl. 12 and pl. 13, fig. A.

*Lutianus gibbus* Day, Fishes India, 1878, p. 43, pl. 13, figs. 2 and 3; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 201; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 286.

*Lutjanus gibbus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 201.

*Holocentrus bouillon* Lacépède, Hist. Nat. Poiss., 7, 1802, pp. 340, 390.

*Lutjanus butonensis* Bleeker, Atlas Ichth., 8, 1876-77, p. 59, pl. 315, fig. 3.

Dorsal X, 14; anal III, 8. There are about 50 tubulated scales in the lateral line to the caudal base plus 5 or 6 more on the latter, 8 or 9 scales above and 17 or 18 below the line. The depth equals

the head, 2.5 times, the caudal 3.4 to 3.5, the pectoral 3 to 3.1 times in the length. The eye is 3.6 to 4, the snout 2.7 to 2.8, the interorbital 4.6 to 4.9, the maxillary 2.5 to 2.6, the least depth of the caudal peduncle 3.1 to 3.3 times in the head. The width of the preorbital to the upper lip equals the eye. The jaws are equal, the mouth oblique, the maxillary extending beneath the front margin or the anterior portion of the eye. The posterior edge of the preopercle is very deeply indented to receive the large, stout opercular knob. Below the groove the preopercle is coarsely serrate, above it the teeth are very fine. The scales above the lateral line are in oblique rows, and below the line are in wavy oblique lines.

In life the color is red or roseate, or may be dusky greenish dorsally and rose red or crimson elsewhere, the fins roseate to dark violet, the dorsal and anal rays and caudal yellow-margined. In alcohol the color may be greenish dusky or olive above, the sides rosy red. The red usually fades to whitish beneath, each scale with a pale center, so that alternate dusky and light lines run obliquely up and back on the sides. The dorsal and anal are pale with a broad dusky margin having a narrow whitish edge on the soft dorsal and anal. The caudal is brownish to dusky, with a white or greenish posterior margin. The pectoral is yellowish, the ventral yellowish with a dusky tip. Other specimens have the dorsal and anal blackish with a white or pale edge posteriorly, the caudal black with a yellow edge posteriorly. Some specimens have the upper half of the body blackish, the lower half reddish brown.

This red snapper is abundant on coral reefs everywhere in the East Indies and Melanesia and is a fine food fish.

Described from 10 specimens, 100 to 151 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

### **Lutianus monostigma** (Cuvier and Valenciennes).

*Mesoprion monostigma* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 446—Seychelles; Günther, Fische der Südsee, 1, 1873-75, p. 14, pl. 16.

*Lutianus monostigma* Seale, Occ. Papers Bishop Mus., 1, 1900, p. 74; 4, 1906, p. 40; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 264; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 287.

*Lutjanus lioglossus* Bleeker, Atlas Ichth., 8, 1877, p. 70, pl. 344, fig. 4.

Dorsal X, 13; anal III, 8. There are about 50 scales in the lateral line. The depth is 2.9 to 3 times, the head 2.6 to 2.7 times in the length. The eye is 4 to 4.5 times, the long, pointed snout 2.7 times in the head. The dorsal is low, the third or fourth spine

longest, 3.35 times in the head. The emarginate caudal is 3.2 to 3.4 times, the long, pointed pectoral 3.8 times in the length. The tongue is smooth.

In life the color is deep red or sometimes dark green, the back shaded with bronze or olive. On the lateral line below the posterior dorsal spines and anterior dorsal rays is a small elliptical black spot. In alcohol the red usually disappears, and the color is pale whitish brown, each scale above and on the sides with a dusky vertical bar at the base. The fins are all colorless. The lateral spot remains as in life.

Here described from a specimen, 216 mm. long, from Takaroa, Tuamotu Islands, and 2 specimens, 160 and 193 mm. long, from Bora Bora. At Maraa, Tahiti, a fine specimen, 190 mm. long, was collected, and another, 300 mm. long, at Suva, Viti Levu Island, Fiji. At Wala Island, New Hebrides, specimens, 80 mm. long and 26 mm. long, were secured. At Atuona, Hiva Oa Island, was obtained a juvenile specimen, 22 mm. long, and at Nuka Hiva Island, also in the Marquesas, 4 specimens, from 24 to 31 mm. in length. These young fish were brilliantly silver, or in one case glistening purplish bronze in color.

#### **Lutianus rivulatus** (Cuvier and Valenciennes).

*Diacope rivulata* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 414, pl. 38—Coromandel, Java, Red Sea, Malabar.

*Lutianus rivulatus* Day, Fishes India, 1878, p. 37, pl. 11, fig. 4; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 262.

*Lutjanus rivulatus* Bleeker, Atlas Ichth., 8, 1876-77, p. 73, pl. 347, fig. 3.

Dorsal X, 15; anal III, 8. There are 54 to 56 rows of scales above, about 50 below the lateral line, 8 to the dorsal origin and 16 to the anal origin. The depth is 2.2, the head 2.3, the caudal 3.25, the pectoral 2.6 times in the length. The small eye is twice in the snout, 5 times in the head. The snout is 2.5, the interorbital 4.15, the least depth of the caudal peduncle 3.2 times in the head. The maxillary equals the snout. The mouth is large, oblique, the maxillary extending to beneath the pupil. The posterior margin of the preopercle is very finely serrate, with a shallow notch opposite the very poorly developed opercular knob.

The color in alcohol is olive gray, each scale on the upper half with a blue or whitish circular spot at its center, each scale on the lower half of the body with a violet brown vertical bar at its base, the head with many wavy and more or less longitudinal violet brown lines. On the lateral line below the soft dorsal is a silvery

white spot. The pectoral, anal, and ventrals are violaceous dusky, the other fins dull or greenish gray.

Described from 2 specimens from Tenibuli, Ysabel Island, Solomon Islands. In life this is a fish of great beauty, with its rose red and violaceous color, pearly blue scale spots, and beautiful blue lines on the head.

It is a highly prized food fish and reaches a large size. Specimens weighing from 25 to 40 pounds occur in the East Indian markets.

**Lutianus argentimaculatus** (Forskål).

*Sciaena argenti-maculata* Forskål, Descr. Anim., 1775, pp. xi, 11, 47—Arabia.

Dorsal X, 14; anal III, 8. There are 47 or 48 scales in longitudinal series above the lateral line, 44 below; from lateral line to origin of dorsal, 7 scales, from lateral line to origin of anal, 13; predorsal scales 13. The depth is 2.7, the head 2.67 times in the length. The eye is 4.2 times in the head, 1.7 in the snout. The interorbital is slightly broader than the eye. The snout is 2.9 times in the head. The pectoral is 1.3 times, the caudal 1.4 times in the head. The depth of the caudal peduncle equals its own length. There is a patch of teeth on the tongue. The ventrals are dusky at the tip, and the soft dorsal and anal each have a large blackish basal blotch.

This species attains a large size, and is very widely distributed. In the East Indies it enters rivers and large lakes communicating with the sea, often going long distances from the ocean. It remains in fresh water until sexually mature, returning to the sea to spawn. It reaches a length of nearly a meter, and a weight of from 15 to 25 pounds.

One specimen, 260 mm. in length, was obtained at Suva, Viti Levu Island, Fiji.

**Lutianus chrysaenia** Bleeker.

*Lutjanus chrysaenia* Bleeker, Versl. Akad. Amsterdam, 14, 1862, p. 106—

Batjan; Bleeker, Atlas Ichth., 7, 1873-76, pl. 302, fig. 4; 8, 1876-77, p. 50.

*Mesoprion chrysaenia* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 192.

*Lutianus chrysaenia* Day, Fishes India, 1878-88, p. 36, pl. 11, fig. 3.

Dorsal X, 15; anal III, 9. There are 48 to 50 scales in the lateral line, plus 10 more on the caudal base and caudal, 11 above to the dorsal origin and 19 below to the anal origin. There are about 70 scale rows above and 62 below the lateral line. There are 7 or 8 rows of scales on the preopercle. The body is compressed, the dorsal region elevated, the profile from the nape to the tip of the snout descending steeply in a straight line. The head equals the

depth, 2.4 to 2.5 times in the length. The emarginate caudal equals the subfalcate pectoral, 3.35 to 4 times in the length. The interorbital equals the eye, 4.55 to 4.6, the preorbital 4.85 to 5.4, the snout 2.7 to 2.95, the maxillary 2.3 to 2.4 times in the head. The least depth of the caudal peduncle equals the snout; the interorbital, snout, preorbital, and suborbital are naked. In the upper jaw is a pair of canines a little way back from the tip, visible when the mouth is closed. The other teeth above are in 1 row, stout and acutely pointed. The teeth in the lower jaw are coarse, in 1 row, with 1 or 2 canines on each side posteriorly. The vomerine teeth are very fine, in a somewhat diamond-shaped patch with the lateral and posterior angles elongated. The tongue has an elongate median patch of fine teeth. The scales are in slightly oblique rows above the lateral line, horizontal rows below it. The posterior margin of the preopercle is smooth, with a shallow indentation above the angle. There is no interopercular knob. The third, or third and fourth, dorsal spines are longest, equal to the least depth of the caudal peduncle. The third anal spine is 10 to 11 times in the length.

The color in alcohol is very dark violaceous brown above, paling into warm reddish brown below, with 6 broad black longitudinal stripes, the 2 upper ones following the curve of the back anteriorly, the others horizontal. The fourth runs from the tip of the snout across the eye to the upper part of the caudal base. The sixth runs from the gill opening below the pectoral to the anal axil. There is a large black spot on the upper part of the pectoral base and the pectoral axil is black. The top of the snout is deep violaceous brown. The basal two-thirds of the caudal is light brown, the fins otherwise colorless.

The above description is of 2 specimens, 151 and 186 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

Two more, each 160 mm. long, agree in all respects except color, in this corresponding with the descriptions and the figures cited. The ground color is golden yellow, the dorsal third violaceous gray, with 6 dark brown longitudinal bands, the fourth band much paler than the rest and only readily visible posteriorly. A seventh band along the body from the gill opening below the pectoral to the anal axil has almost disappeared. There is a large black spot at the angle of the pectoral and behind it in the axil. The fins are all golden or colorless, the caudal most brightly colored. The snout is violaceous.

**Lutianus malabaricus** (Bloch and Schneider).

*Sparus malabaricus* Bloch and Schneider, 1801, p. 278—Coromandel.

*Mesoprion malabaricus* Cuvier and Valenciennes, Hist. Nat. Poiss., 2, 1828, p. 480.

*Lutianus malabaricus* Day, Fishes India, 1878, p. 31, pl. 9, fig. 4.

*Lutjanus malabaricus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 293, fig. 1; 8, 1876-77, p. 61.

*Mesoprion dodecacanthus* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 104.

*Lutjanus dodecacanthus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 302, fig. 2.

Dorsal XI, 13; anal III, 8. There are 52 tubulated scales in the lateral line plus 7 on the caudal, 11 above to the dorsal origin and 16 below to the anal origin. There are 54 scale rows below and 64 above the lateral line in longitudinal series. The depth equals the head, 2.5 times in the length. The caudal is 3.5, the pectoral 3.25 times in the length. The eye is 4.25, the snout 2.8, the interorbital 6.25, the maxillary 2.5, the least depth of the caudal peduncle 3.25 times in the head. The distance from the eye to the mouth equals the eye, the width of the preorbital proper 1.25 times in the eye. The mouth is large with projecting lower jaw, the maxillary barely extending to a vertical from the front margin of the eye. The preopercular margin is coarsely toothed at the angle. Above this is a very shallow notch and the remaining margin above is minutely serrate. There is a small opercular knob opposite the indentation of the preopercle. The scales above the lateral line are in oblique rows, less oblique to the level of the opercular flap, below this in horizontal rows.

The color in alcohol is silvery, becoming silvery white below, a little dusky before the dorsal, with a dusky line along the center of each row of scales above the lateral line. At the axil of the soft dorsal on top of the caudal peduncle is a large white spot and behind it a larger blackish saddle-like spot, as in Day's and Bleeker's figures. The fins are all yellowish to white.

Described from a specimen, 134 mm. long, taken at Tenibuli, Ysabel Island, Solomon Islands.

**Lutianus russelli** (Bleeker).

*Mesoprion russelli* Bleeker, Verh. Bat. Gen., 22, 1849, p. 41—no locality.

*Lutjanus russelli* Bleeker, Atlas Ichth., 7, 1873-76, pl. 300, fig. 2; 8, 1876-77, p. 71.

*Genyoroge notata* (not of Cuvier and Valenciennes) Cantor, Cat. Malay. Fishes, 1849, p. 12 (*Diacope notata* Cuvier and Valenciennes is something else); Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 181.

Dorsal X, 14; anal III, 8. There are 50 tubulated scales in the lateral line plus 2 more on the caudal base, 8 above and 15 below the line. There are 54 transverse rows of scales above the lateral line and 48 below it. On the opercle are 6 rows of scales. The depth is 2.8, the caudal 3.45, the head 2.55, the pectoral 3.55 times in the length. The eye is 4, the snout 3.25, the interorbital 5.75, the preorbital 7, the least depth of the caudal peduncle 3 times in the head. There is a slight emargination in the posterior margin of the preopercle, the angle below it serrate. Above the lateral line the scale rows are oblique, below it horizontal. There is a patch of teeth on the tongue.

The color in alcohol is olive brown above, the top of the head darker, the rest of the body silvery to white beneath, with a rosy wash over the sides. Below the anterior half of the soft dorsal on the lateral line is a large blackish spot. The upper part of the eye is blackish. The dorsal is brownish gray to dusky with a blackish marginal line on the spinous portion. The caudal is largely blackish as in Bleeker's figure, the posterior margin paler. The pectorals are whitish, the other fins yellow. There are a brown spot and line on the pectoral base.

Described from a specimen, 107 mm. long, from a fresh-water creek on Kulambangra Island, Solomon Islands.

### **Macolor macolor** (Lesson).

*Diacope macolor* Lesson, Mem. Paris Soc. Hist. Nat., 4, 1828, p. 409—Dorey Harbor, New Guinea; Lesson, Voy. Coquille, 2, 1830, p. 230, pl. 22, fig. 3.

*Genyoge macolor* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 176.

*Lutjanus macolor* Bleeker, Atlas Ichth., 8, 1876-77, p. 75, pl. 343, fig. 3.

*Macolor typus* Bleeker, Act. Soc. Sci. Indo-Neerl., 8, 1860, p. 25.

*Lutjanus niger* Weber, Siboga Exp., Fische, 1913, p. 253, pl. 12, figs. 1 and 20.

Dorsal X, 14; anal III, 11. There are 15 scales in the lateral line plus 8 on the caudal base, 10 above and 19 below the line. Above the lateral line are 58 transverse rows of scales and 53 below the line, from the opercle to the caudal base. Bleeker gives "70 circ." above, and 65 below the line, but his figures agree with various specimens examined by me. Predorsal scales are 20, gill-rakers 27, plus 63 on the lower limb. The depth is 2.3, the head 2.6, the caudal 3.3, the pectoral 2.7 times in the length. The eye is 3.9, the snout 3.1, the interorbital 2.9, the maxillary 2.3, the least depth of the caudal peduncle 2.7 times in the head. The long, slender gill-rakers equal the eye and extend forward into the mouth, curling about the tongue much as in *Ulua*, a genus of Carangidae. The body is oblong, com-

pressed, the anterior profile convex, the nape compressed into a sharp ridge, the interorbital very broad and convex, the snout very steep. The jaws are even, the maxillary extending beneath the middle of the eye. The posterior margin of the preopercle has a very deep notch into which the long, curved spine of the opercle is closely appressed. Below this notch the preopercular margin is toothed, above it finely serrate. There is a high basal scaly sheath on the dorsal and anal. On the caudal, the scales extend far out, up to 0.8 of the caudal length. The first dorsal spine is short, not much more than half the eye, the fourth spine longest, 2.55 times in the head, the dorsal spines then curving downward, the dorsal rays much higher. The soft dorsal and anal fins are elongate and pointed posteriorly, the fourth and fifth rays from the last longest and reaching the caudal base when depressed, 1.85 times in the head. The broad caudal is emarginate. The pectoral extends back almost to a vertical above the middle of the anal.

The color in alcohol varies from violet brown to blackish brown above, the lower half nearly white to pale violet, with a black band from beneath the pectoral to the lower side of the caudal peduncle. Between the lateral line and the dorsal are 2 rows of large white or violet spots, 3 in the upper row along the dorsal base and 2 in the lower row. The caudal is tipped with whitish and the anal is usually whitish on the posterior margin, the fins otherwise black.

This handsome fish is common in the East Indies, and especially so in the Philippines. It reaches a length of half a meter. Various authors have stated that *macolor* is the young of *niger*. Having examined large numbers of fresh specimens of various sizes up to those nearly half a meter long, I am not convinced that *macolor* is merely the young stage of a completely black lutianid.

It is curious that no writer seems to have noticed the remarkable gill-rakers of this fish, which alone are sufficient to mark its generic distinction.

Described from a specimen, 233 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

#### ***Evoplites viridis* (Valenciennes).**

*DiaCOPE viridis* Valenciennes, Voy. Venus, 1855, p. 303, 1846, pl. 1, fig. 2 (poor fig.)—Galapagos Islands.

*Evoplites viridis* Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1246.

Dorsal X, 14; anal III, 8. There are 54 scales in the lateral line, 9 above and 17 below it. The depth is 2.85 times, the head

2.6 times in the length. The prominent eye is 3.5, the snout 2.9 times in the head. The interorbital is a sixth less than the eye. The pectoral and caudal are equal, 1.25 times in the head. The fourth dorsal spine is strongest and highest, 4 times in the head.

The color in alcohol is reddish to golden brown, paler to whitish below, the top of the head deep brown. There are 5 longitudinal stripes on each side, narrower than the interspaces. In life they are brilliant sky blue, each with marginal lines of dark blue. In the preservative they are bluish, bordered by dark brown. The first stripe is from the occiput to the eighth or ninth dorsal spine. The second runs from the upper margin of the eye to the middle of the soft dorsal base. The third extends from behind the middle of the eye to the top of the caudal peduncle, the fourth from the middle of the upper jaw to the middle of the base of the caudal, and the fifth from over the end of the maxillary to beyond the last anal ray. The dorsal is margined with deep reddish brown. The eye has a golden bronze sheen.

Three specimens, 166 to 191 mm. in length, were obtained at Cocos Island.

#### *Xenocys jessiae* Jordan and Bollman.

*Xenocys jessiae* Jordan and Bollman, Proc. U. S. Nat. Mus., 1889, p. 160—Charles Island, Galapagos; Jordan, Proc. Calif. Acad. Sci., 1896, p. 220, pl. 24; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1285.

Dorsal X-I, 13; anal III, 10. There are 52 scales in the lateral line, and 10 more on the caudal base and caudal, 8 above and 15 below the lateral line. The elliptical, compressed body has the back but little elevated, the depth 3.7 to 3.8 times, the head 3.2 to 3.3 times in the length. The lower jaw is moderately prominent, the oblique mouth rather large, the broad maxillary extending to a point below the middle of the pupil. The eye is large, its diagonal width downward and backward greatest, its horizontal diameter 3 to 3.33 times in the head. The snout and the interorbital are equal to or slightly less than the eye. The narrow preorbital covers the edge of the maxillary for its whole length. The teeth are very small, those on the vomer in a  $\Lambda$ -shaped patch. The dorsal fins are entirely separate, the third and fourth spines twice in the head. The second dorsal and anal are low, the third anal spine longest, nearly 4 times in the head. The soft dorsal, anal, basal part of caudal, and ventrals are closely covered with small scales. The length of the deeply forked caudal is nearly 0.9 of the head. The long,

pointed pectoral is 1.33 times in the head. There is a well-developed ventral axillary scale.

The color in alcohol is grayish black to brownish gray above, silvery below, with 6 or 7 dusky parallel longitudinal stripes on the back and sides, some extending across the opercles and cheeks. The upper stripes are as broad as the interspaces, the lower ones narrower. All the fins, except the ventrals, are dusky.

Here described from 14 specimens collected at Eden Island. They range from 83.5 to 115 mm., but the species reaches a length of 300 mm. One specimen, 164 mm. long, was caught at Tagus Cove, Albemarle Island.

This species abounds on the bold rocky coasts of the Galapagos Islands, but is not known elsewhere.

#### ***Xenichthys agassizii* Steindachner.**

*Xenichthys agassizii* Steindachner, Ichth. Beiträge, III, Sitzungsber. Akad. Wiss. Wien, 72, 1875, p. 6—Galapagos Islands; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1287.

Dorsal XI-I, 17 or 18; anal III, 17. There are 58 to 60 scales in the lateral line and several more on the caudal base, 10 above and 13 below the lateral line. The compressed, elongate body is rather thick above anteriorly, the dorsal profile elevated, the depth equal to the length of the conical head, which is broad above, 3 to 3.1 times in the depth. The large eye is 2.9 to 3 times in the head, the broad snout 3.5 to 4.1 times, the wide interorbital equal to or greater than the snout. The lower jaw is strongly projecting, the mouth oblique, the maxillary extending beneath the anterior margin of the eye. The dorsal and anal fins are low, covered with small scales, as is also the caudal base. The depth of the caudal peduncle is 3 to 3.1 times, the forked caudal 1.2 to 1.3 times in the head. The falcate pectoral fin extends to the origin of the anal, its length 0.9 to 0.95 of the head.

The color is steel blue or dull gray above, paler to whitish below and more or less silvery over all. A young specimen, 65 mm. long, had 2 longitudinal blackish stripes and a black spot at the base of the pectoral.

Here described from 15 specimens, 108 to 144 mm. long, from Narborough Island, and 10 specimens, ranging from 28 to 141 mm. in length, from Eden Island.

This species is known only from the Galapagos Islands.

**Xenichthys xanti** Gill.

*Xenichthys xanti* Gill, Proc. Acad. Nat. Sci. Phila., 1863, p. 82—Cape San Lucas (young); Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1287.

*Xenichthys xenops* Jordan and Gilbert, Bull. U. S. Fish Comm., 1881, p. 325—Panama (adult).

Dorsal XI-I, 18; anal III, 17. There are 56 scales in the lateral line, 10 above and 14 below. The depth of the elliptical, rather deep and compressed body is 3.5 times in the length. The head is little compressed, thick above, 2.9 times in the length. The eye is very large, 2.5 times in the head, nearly 1.4 times the snout. The flat interorbital space equals the snout, 3.5 times in the head. The soft dorsal and anal are low and long, with well-developed scaly sheaths. The soft dorsal, anal, pectorals, ventrals, and basal half of the caudal are largely covered with scales. The length of the caudal is two-thirds that of the head. The pectoral falls far short of reaching the anus, 1.75 times in the head.

The color in alcohol is silvery, brownish on top of the head and back, white on the belly, the fins all pale. There is a dusky spot on the upper margin of the eye.

Here described from a specimen 60 mm. long. At Post Office Bay, Charles Island, 145 young specimens, 20 to 60 mm. in length, were caught.

**Caesio caerulaureus** Lacépède.

*Caesio caerulaureus* Lacépède, Hist. Nat. Poiss., 5, 1801, pp. 112, 113—Moluccas; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 392; Kner, Reise Novara, Fische, 1865, p. 65; Bleeker, Atlas Ichth., 8, 1876-77, p. 39, pl. 347, fig. 4; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 266; Herre, Fishery Resources Phil. Is., 1927, pl. 26, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 204.

Dorsal X, 15; anal III, 12. There are 58 to 72 scales in the lateral line (the number varying with age and also in individuals of the same size) plus 5 to 7 more on the caudal base, 7 to 9 above and 14 to 17 below the line. The depth is equal to the length of the head, 3.45 times in the length. The deeply forked caudal is 3.1 to 3.4, the pectoral 3.4 to 3.8 times in the length. The eye is 3.6 to 4, the snout 3.66 to 4.25, the interorbital 2.9 to 3.5 times in the head. The least depth of the slender caudal peduncle is 3.5 to 3.6 times in the head. The body is fusiform, plump, the head pointed, the dorsal and ventral profiles evenly and regularly arched in a low curve, both alike. The eye and snout may be equal or either may be a trifle more than the other. The interorbital equals or is a

little less than the eye. The adipose eyelid is broader behind than in front. The maxillary extends beneath the anterior margin of the eye or slightly beyond it. The dorsal spines are weak and slender.

The color in life is deep blue above, paler blue on the sides, becoming rosy on the lower parts, with a broad golden band above the lateral line extending from the shoulder to the middle of the caudal base. The caudal is reddish with a broad submarginal violet black band in the upper and lower lobes. The dorsal is olivaceous with a marginal line of red and a pale or whitish submarginal stripe. The anal and ventral are blue, the pectoral roseate or yellowish with a large blackish spot in the axil. In alcohol the color varies from blue to blackish above, the sides and under parts violet, violaceous brown, or whitish. The golden lateral stripe disappears, but is evident as a paler band margined by dark lines. The dorsal is smoky or blackish, with a black marginal line. The caudal is yellowish or whitish with a broad blackish longitudinal band in each lobe. The other fins are whitish or yellowish.

Described from 24 specimens, 72 to 156 mm. long, taken at Tenibuli, Ysabel Island, Solomon Islands.

This beautiful caesio is abundant about all reefs in the East Indies where the water is clear and the currents moderate.

### **Caesio chrysozona** Kuhl and Van Hasselt.

*Caesio chrysozona* Kuhl and Van Hasselt in Cuvier and Valenciennes, Hist. Nat. Poiss., 6, 1830, p. 440—East Indies; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 392; Day, Fishes India, 1878, p. 95, pl. 24, fig. 5; Bleeker, Atlas Ichth., 7, 1873-76, pl. 307, fig. 2; 8, 1876-77, p. 39.

Dorsal X, 15; anal III, 12. There are 68 scales in the lateral line plus 7 more on the caudal base, 7 above and 13 below the line. The depth is 4.64, the head 3.1, the caudal 3.8, the pectoral 4.64 times in the length. The eye is 3.33, the snout 4.1, the interorbital 3.8, the least depth of the caudal peduncle 3.8 times in the head. The body is elongate, fusiform, the back a trifle more elevated than the arch of the ventral curvature, the breadth 1.4 times in the depth. The maxillary extends just beyond a vertical from the front margin of the eye. The caudal is forked.

The color in alcohol is violet blue above, the lower half whitish to white, with a pale band from the hind margin of the preopercle below the lateral line to the middle of the caudal base. The caudal is colorless, the tips of its lobes blackish brown. The dorsal is gray, the anal and ventrals yellow, the pectoral colorless.

Described from a specimen, 65 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

**Caesio erythrogaster** Kuhl and Van Hasselt.

*Caesio erythrogaster* Kuhl and Van Hasselt, in Cuvier and Valenciennes, Hist. Nat. Poiss, 6, 1830, p. 442, fig. 166; Bleeker, Atlas Ichth., 7, 1873-76, pl. 34, fig. 3; 8, 1876-77, p. 36.

*Odonecles erythrogaster* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 265.

*Caesio cuning* Day, Fishes India, 1878-88, p. 95.

Dorsal X, 14; anal III, 11. There are 50 to 52 scales in the lateral line plus 3 to 5 more on the caudal base, 7 above and 13 below the line. The depth is 2.5 to 2.6, the head 3.2 to 3.35, the forked caudal 2.7 to 2.9, the pectoral 2.8 to 3 times in the length. The eye is 3.75 to 4, the snout 4, the interorbital 3.1 to 3.3, the least depth of the caudal peduncle 3.1 to 4 times in the head. The body is oblong, compressed, somewhat pointed both anteriorly and posteriorly, the dorsal and ventral profiles nearly equally curved. The maxillary extends beneath the anterior portion of the eye. The angle of the preopercle is toothed, the margin above it very minutely serrate. The dorsal spines are slender and weak, the basal half of the dorsal and anal scaly.

The color in alcohol is a very beautiful violet blue on the upper half, the top of the head often blackish violet, shading off to violet brown or silvery or yellowish white on the lower third, the anal and caudal more or less yellow. The dorsal is violaceous with a blackish marginal line. The pectoral is yellow or colorless, with a large blackish axillary spot.

Described from 18 specimens, 65 to 190 mm. in length, from Tenibuli, Ysabel Island, Solomon Islands.

Family POMADASIDAE

**Anisotremus surinamensis** (Bloch).

*Lutianus surinamensis* Bloch, Ichtyologie, 8, 1797, p. 1, pl. 253—Surinam.

*Anisotremus surinamensis* Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1318, pl. 208, fig. 537; Meek and Hildebrand, Fishes Panama, Field Mus. Nat. Hist., Zool. Ser., 15, 1925, p. 566, pl. 58.

Dorsal XII, 16; anal III, 9. There are 52 scales in the lateral line, 7 above and 14 below it.

The color in alcohol is gray, paler below, the dorsal region and sides with a purplish brown spot at the base of each scale, the spots forming rows.

Only 1 specimen, 97 mm. long, was collected at Eden Island, in the Galapagos.

### **Orthopristis forbesi** Jordan and Starks.

*Orthopristis forbesi* Jordan and Starks, in Gilbert, Proc. U. S. Nat. Mus., 1896 (1897), p. 443—Albemarle Island, Galapagos; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1896, p. 1336; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 377.

Dorsal XII or XIII, 14 to 15; anal III, 11 or 12. In my specimens there are 67 or 68 scales in the lateral line to the caudal base, not 80 to 85 as given by Jordan and Starks and Jordan and Evermann; 9 scales above and 20 below the lateral line. The body is elongate, slender, with arched upper profile, the depth 2.9 to 3 times, the head 3.3 times in the length. From the nape to the tip of the snout forms a nearly straight line. The snout is 3.3, the eye 5.3 times in the head. The posterior margin of the preopercle is finely serrate. The vertical fins are low. The lunate caudal is 1.1 in the head. The pectoral is 1.3 in the head.

The color in alcohol is dark brown above, becoming pale brown on the under side, with purplish and metallic bluish and violet reflections. The fins are all dusky except the pectoral, which is pale.

Two fine specimens from Tagus Cove, Albemarle Island, 280 and 285 mm. long, and 2, each 205 mm. long, from Narborough Island, in the Galapagos group.

### **Plectorhynchus celebicus** Bleeker.

*Plectorhynchus celebicus* Bleeker, Ned. Tijds. Dierk., 4, p. 285—Macassar, Celebes; Bleeker, Atlas Ichth., 8, 1876-77, p. 18, pl. 329, fig. 3.

*Diagramma celebicum* Macleay, Proc. Linn. Soc. N. S. Wales, 7, 1882, p. 238.

Dorsal XIII, 20; anal III, 7. There are about 60 tubulated scales in the lateral line, plus 12 more on the caudal, 12 scales to the dorsal origin above the line and 17 scales below it to the anal origin. There are 78 rows of scales in transverse series above the line and 68 below the line. The high, oblong body is much compressed at the head and the posterior half. The depth is 2.65, the head 3.14, the emarginate caudal 3.85, the pectoral 5 times in the length. The eye is 4.25, the snout 2.3, the interorbital 3.3, the maxillary 2.7, the preorbital to the end of the maxillary 4, the least depth of the caudal peduncle 2.7 times in the head. The anterior profile descends in a bold regular curve from the dorsal origin to the tip of the snout. The mouth is rather small, inferior, the lips fleshy, the maxillary extending just beyond a vertical from the front margin of the eye. The hind

margin of the preopercle is vertical, minutely serrate. The stout dorsal spines are heteracanthous, the third one longest, 2.6 times, the last one 5 times in the head. The soft dorsal base is nearly 3 times the height of the longest rays. The second anal spine is very stout, equal to the third dorsal spine.

The color in alcohol is bluish gray, becoming very pale yellowish beneath, with 9 longitudinal golden bands on the body, the fifth to the eighth extending on the caudal. There are 6 golden stripes on the sides of the head, the 3 upper ones beginning at the eye and continuous with stripes on the body, the fourth beginning on the snout and ending at the opercular rear margin, the fifth beginning at the tip of the snout, the sixth behind the maxillary, the 2 last ending on the pectoral base. The dorsals and caudal are violaceous brown to violaceous gray, the other fins yellowish violaceous.

Described from a specimen, 321 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

### *Scolopsis margaritifer* Cuvier and Valenciennes.

*Scolopsis margaritifer* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 337—Waigiü; Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 355; Bleeker, Atlas Ichth., 7, 1873-76, pl. 317, fig. 2; 8, 1876-77, p. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 208.

Dorsal X, 9; anal III, 7. There are 35 scales in the lateral line plus 4 more on the caudal base, 4 above and 10 below the line and 4 rows of scales on the preopercle. The predorsal scales extend a trifle beyond the front of the eye. The depth is 2.66, the head 2.89, the pectoral 3 times in the length. The forked caudal equals the head, the upper lobe the longer. The large full eye is 2.47, the snout equal to the broad interorbital, 3.2, the least depth of the caudal peduncle 2.84 times in the head. The preorbital has a long stout spine and several teeth beneath the eye. The concave margin of the preopercle has short stout teeth, each with a more or less developed basal hook.

The color in alcohol is dusky above, the sides greenish silver, each scale with a pearly vertical stripe or spot basally. There are 2 pearl-colored stripes from the eye to the snout. The dorsal is violaceous dusky, the other fins white or neutral in hue.

Described from a specimen, 136 mm. long, from Hathorn Sound, New Georgia Island, Solomon Islands.

### *Scolopsis leucotaenia* (Bleeker).

*Scolopsides leucotaenia* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 451—Banka or Lepar Island.

*Scolopsis leucotaenia* Bleeker, Ned. Tijds. Dierk., 4, 1873, p. 351; Day, Fishes India, 1878, p. 88, pl. 23, fig. 4; Bleeker, Atlas Ichth., 7, 1873-76, pl. 294, fig. 4; 8, 1876-77, p. 4.

Dorsal X, 9; anal III, 7. There are 37 scales in the lateral line, plus 2 on the caudal base, 4 above and 9 below the line. The depth is equal to the head, 3 times in the length. The forked caudal equals the pectoral, 3.6 times in the length. The eye is 2.6, the snout 3.2, the interorbital 3.6, the least depth of the caudal peduncle 3 times in the head. The body is compressed, the interorbital broad, the snout convex and pointed, the maxillary extending beneath the front margin of the eye. There is a single backward-pointing spine beneath the eye. The posterior margin of the preopercle is serrate, the teeth at the angle not enlarged. The opercle has a single small flat spine. The large eye is very high up, impinging upon the upper profile. There are 4 rows of scales on the preopercle.

The color in alcohol is silvery white, the scales dorsally with slightly darker margins. A black stripe extends from the tip of the snout across the eye back to the middle of the caudal base where it ends in a spot. Another band curves back over the eye and to the top of the caudal peduncle. The fins are all colorless, the dorsal with a blackish spot between the first and fourth spines.

Described from a specimen, 54 mm. long, from Hathorn Sound, New Georgia Island, Solomon Islands. Eight more specimens from the same locality in the Solomon Islands, 98 to 147 mm. in length, offer considerable variation. Two smaller specimens are like the one described above, but all the rest are much darker, the whole body above the level of the pectoral being more or less dusky or the scales dark-margined. The dorsal is more or less dusky, with a white marginal line; the deeply forked caudal is nearly colorless to dusky, the other fins colorless or yellowish. A specimen, 98 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### *Scolopsis ciliatus* (Lacépède).

*Holocentrus ciliatus* Lacépède, Hist. Nat. Poiss., 7, 1802, pp. 343, 390.

*Scolopsis ciliatus* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 355; Day, Fishes India, 1878, p. 89, pl. 23, fig. 5; Bleeker, Atlas Ichth., 8, 1876-77, p. 6.

*Scolopsides ciliatus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 316, fig. 2.

*Scolopsides lycogenis* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 346, pl. 127.

Dorsal X, 8; anal III, 6. There are 42 or 43 scales in the lateral line plus 2 or 3 on the caudal base, 4 above and 10 or 11 below

the line. The depth is 3, the head 3.4 to 3.65, the caudal 3.3 to 3.4, the pectoral 3.8 to 3.9 times in the length. The eye is 2.65 to 2.9, the snout 2.75 to 3, the interorbital 2.85 to 2.9, the least depth of the caudal peduncle 2.4 to 2.7 times in the length of the head. The body is oblong, compressed, the anterior profile of the head regularly and evenly convex, the interorbital broad, the caudal forked. The supramaxillary is armed with a prominent serrated ridge. There are 2 large spines on the suborbital, one pointed forward and less conspicuous than the other, which points backward. The posterior extremity of the maxillary extends beneath the front margin of the eye. The posterior margin of the preopercle is serrate, the teeth at the angle largest. The opercle has a single flat spine.

The color in alcohol varies from light purplish brown along the back to silvery white on the sides and below, or the whole body may be uniform brown. A pearly white stripe extends along the back just below the dorsal fin. My specimens also show a median longitudinal pearl white band along the side from the angle of the opercle to the middle of the caudal base, as in Cuvier and Valenciennes' figure of *Scolopsides lycogenis*. The fins are all plain.

Described from 4 specimens, 85 to 125 mm. in length, from Tenibuli, Ysabel Island, Solomon Islands.

### *Scolopsis bilineatus* (Bloch).

*Anthias bilineatus* Bloch, *Ichthyologie*, 10, 1797, p. 1, pl. 325, fig. 1—Japan.

*Scolopsis bilineatus* Günther, *Cat. Fishes Brit. Mus.*, 1, 1859, p. 357; Day, *Fishes India*, 1878-88, p. 85, pl. 22, fig. 3; Bleeker, *Atlas Ichth.*, 7, 1876-77, p. 7, pl. 323, fig. 2 and pl. 342, fig. 1; Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 209.

Dorsal X, 9; anal III, 7. There are 45 scales in the lateral line plus 3 more on the caudal base, 5 above and 10 below it. The depth is 2.66, the head 3.27 times in the length. The forked caudal equals the head. The eye is large, 2.8 times, the convex snout 3.1 to 3.2, the least depth of the caudal peduncle 2.5 times in the head. The pointed pectoral is a little less than the head. The mouth is small, the jaws even, the maxillary scarcely extending as far as the front margin of the eye. There is a backward-pointing spine beneath the middle of the eye, and above it a small antrorse spine may be present on one or both sides, or absent.

The color in alcohol is pale olivaceous to whitish, darker above, with 2 parallel blackish lines, one from the middle of the eye, the other from below the eye, curving upward to the anterior part of

the soft dorsal. There is a white stripe on the upper part of the eye which is continued as a pearly or whitish band curving up toward the middle of the spinous dorsal. The upper part of the spinous dorsal and anterior half of the anal are black, the fins otherwise pale to nearly white. In life this is a very handsome fish and is a beautiful addition to the aquarium and an ornament on the coral reefs. The 2 parallel black lines enclose a pearly band.

A specimen, 115 mm. long, was taken at Malo Island, New Hebrides.

#### Family THERAPONIDAE

##### **Therapon argenteus** (Cuvier and Valenciennes).

*Datnia argentea* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 139, pl. 54—Java.

Dorsal XII, 10; anal III, 8. There are 52 scales in the lateral line, 58 in a longitudinal series above and 48 below the lateral line. From the lateral line to the dorsal origin are 11 scales, to the anal origin 18 scales. This species is notable for its long, pointed snout and steep profile descending from the origin of the dorsal.

The color is uniform dark silver greenish. The spinous dorsal is dusky with a black margin. The anal is black, the outer part of its posterior rays white. The pectoral and caudal are whitish. The ventral is black, the inner ray white.

One specimen, 90 mm. long, was seined in a fresh-water stream flowing into Suva Harbor, Viti Levu Island, Fiji.

##### **Therapon cancellatus** (Cuvier and Valenciennes).

*Datnia cancellata* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 144—Java; Bleeker, Nat. Tijds. Ned. Ind., 8, 1855, p. 438.

*Therapon cancellatus* Bleeker, Ned. Tijds. Dierk., 4, 1873, p. 385.

Dorsal XII, 10; anal III, 8. There are 50 scales in the lateral line, plus 6 on the caudal base, 10 above and 18 below the line. The depth is 2.6 to 2.7 times, the head 2.75 to 2.8 times, the caudal 3.5 to 3.6, the pectoral 4.4 to 4.5 times in the length. The eye is 3.85 to 4.2, the snout 2.5 to 2.6, the least depth of the caudal peduncle 2.7 to 2.9 times in the head. The interorbital equals the eye. The compressed body is very high at the dorsal origin, where it forms a sharp ridge, the anterior profile descending in a long, steep, straight line to the tip of the elongate, naked snout. The mouth is inferior, rather small. In young specimens the maxillary barely extends to a vertical from the front margin of the eye, but in larger specimens it falls short of it. A few villiform teeth are on the vomer

in the young, but disappear in larger specimens. The posterior margin of the preopercle is serrate to spinate in the young but the serrations are shallower and blunter in older specimens. The operculum has 2 spines, the lower one more than twice as long as the upper. The second anal spine is very stout and long, 1.8 to 1.85 times in the depth, 1.7 to 1.8 times in the head, and a little more than the largest and longest dorsal spine, which is the fourth or fifth. The caudal is emarginate. The filiform tips of the ventrals reach the base of the first anal spine.

The color in alcohol is light brown above, passing into pale yellowish beneath, each scale with a pale center, and with longitudinal dark brown stripes, the first from the upper margin of the eye to the top of the caudal peduncle and upper end of the caudal base, the second from the opercular angle to the middle of the caudal, and the third from the pectoral axil to the anal axil. Over the back are 3 or 4 wide indistinct dusky crossbands. There is a dark brown bar on the opercular membrane. The dorsal is colorless, with a blackish margin on the spinous portion. A large blackish blotch covers the basal two-thirds of the anal rays and the middle of the ventrals is blackish. The other fins are colorless or slightly tinged with darker.

Described from 4 specimens taken from a fresh-water creek at Auki, Malaita Island, Solomon Islands, their lengths 92 to 152 mm.

### ***Therapon jarbua* (Forskål).**

*Sciaena jarbua* Forskål, Descr. Anim., 1775, pp. xii, 50—Djedda, Suez, Red Sea.

*Therapon jarbua* Klunzinger, Verh. Zool. Bot. Gesell. Wien, 20, 1870, p. 729; Bleeker, Atlas Ichth., 7, 1873-76, p. 112; Day, Fishes India, 1878-88, p. 69, pl. 18, fig. 4; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 289; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 211.

*Therapon servus* Bleeker, Atlas Ichth., 7, 1873-76, pl. 312, fig. 2.

Dorsal X-I, 11; anal III, 8. There are 82 scales in the lateral line plus 6 more on the caudal base, 14 above and 22 below the line. The depth is 3.14, the head 3, the caudal 3.36, the pectoral 5.1 times in the length. The eye is 4.5, the snout equal to the interorbital, 3.39, the least depth of the caudal peduncle 2.77 times in the head. The body is elongate, compressed, but rather thick anteriorly, the interorbital broad and flat, the mouth moderate with the lower jaw slightly included, the maxillary extending beneath the pupil. The hind margin of the preopercle is nearly vertical, serrated, as is also

the lower margin. The upper opercular spine is very small and inconspicuous but the lower one is large and flat, its length more than an eye-diameter. There is a large, flat, serrated bone above the pectoral axilla and one above the angle of the gill opening. The caudal is deeply forked.

The color in alcohol is silvery, with 3 curved longitudinal blackish bands. The first extends from the dorsal origin to the base of the soft dorsal. The second curves down from the nape to the lateral line, then up to the base of the last dorsal rays, unites with the first band, and continues along the top of the caudal peduncle. The third band runs from the top of the head to the lower opercular spine, then curves downward slightly and rises posteriorly to the middle of the caudal peduncle and is continued to the tip of the caudal fin. The snout is black. The upper part of both dorsals is black. There is a milk white stripe along the base of the spinous dorsal. The caudal has a broad diagonal black band at the base of each lobe and the lobes are tipped with black. The pectoral has a black axillary spot and the inside of the fin is more or less dusky. The anal is also somewhat dusky on the lower half.

Described from a specimen, 185 mm. long, taken at Suva, Viti Levu Island, Fiji. A young specimen, 15 mm. long, was taken at Nukulau Island, Fiji, and one, 49 mm. long, at Bushman Bay, Malekula Island, New Hebrides.

#### Family LETHRINIDAE

##### *Lethrinus miniatus* (Forster).

*Sparus miniatus* (Forster MS.) Bloch and Schneider, Syst. Ichth., 1801, p. 281—Pacific Ocean.

*Lethrinus miniatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 6, 1830, p. 315; Bleeker, Atlas Ichth., 8, 1876-77, p. 121, pl. 309, fig. 3; Steindachner, Sitzungsber. Akad. Wiss. Wien, 115, 1906, Abt. 1, p. 1385; Seale and Bean, Proc. U. S. Nat. Mus., 33, 1907, p. 244; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 402, pl. 1, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 216.

*Lethrinella miniata* Fowler, Journ. Acad. Nat. Sci. Phila., 1904, p. 529.

*Lethrinus rostratus* Cuvier and Valenciennes, Hist. Nat. Poiss., 6, 1830, p. 296; Day, Fishes India, 1878-88, p. 134, pl. 33, fig. 1; Bleeker, Atlas Ichth., 8, 1876, pl. 309, fig. 3.

*Lethrinus longirostris* Playfair and Günther, Fishes of Zanzibar, 1866, p. 44, pl. 7, fig. 2.

Dorsal X, 9; anal III, 8. There are 48 scales in the lateral line, plus 4 or 5 more on the caudal base, 6 above to the dorsal origin

and 16 between the lateral line and the anal origin. The depth is 2.8 to 3.2, the head 2.4 to 2.6 times in the length. The characteristic, elongate, pointed snout is 1.6 to 2 times in the head, the eye 4.5 to 6.8 times in the head and 2 to 4 times in the snout. The interorbital is 4.1 to 4.8, the depth of the compressed caudal peduncle 3.9 to 4.2 times in the head. The lateral teeth are compressed and pointed, only the last ones in the upper jaw at all blunt. The jaws and snout are peculiarly compressed and elongate.

The color in alcohol is yellowish, the sides with dusky blotches, the nape, snout, and cheeks violaceous with dusky blotches. The pectoral is yellow, the ventrals blackish, the other fins colored like the body.

A fine specimen, 335 mm. long, was purchased in the market at Papeete, Tahiti.

### *Lethrinus variegatus* Ehrenberg.

*Lethrinus variegatus* Ehrenberg in Cuvier and Valenciennes, Hist. Nat. Poiss., 6, 1830, p. 287—Massaua; Bleeker, Atlas Ichth., 7, 1876, pl. 317, fig. 1; 8, 1877, p. 117, pl. 328, fig. 3, pl. 330, fig. 2; Macleay, Proc. Linn. Soc. N. S. Wales, 7, 1882, p. 247; Evermann and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 86; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 409, pl. 3, fig. 1.

*Lethrinus latifrons* Rüppell, Neue Wirbelt., Fische, 1835, p. 118, pl. 28, fig. 4.

Dorsal X, 9; anal III, 8. There are 47 scales in the lateral line plus one on the caudal base, 5 above and 15 below it, and 7 predorsal scales. The dorsal and ventral profiles of the compressed, elongate body are equally curved from snout to caudal, the depth 3.3, the head 2.9 times in the length. The eye is 4.66 times, the snout 1.75, the interorbital 3.6 times in the head. These measurements are from a specimen of unusual size. Those of ordinary size have the depth 3.6 to 4, the head 2.7 to 2.9 times in the length. The eye 3 to 3.4 (rarely 4), the snout 2.4 to 2.7 times in the head.

The color in alcohol is yellowish brown, the lower part much paler, the back and upper sides crossed by transverse blackish brown bands or blotches. The interorbital is violaceous dusky, the snout and sides of the head violet brownish. Smaller specimens have a longitudinal blackish band from the eye to the upper part of the caudal, with a narrow yellowish stripe above it along the anterior half. These longitudinal bands disappear with age. The dorsal, anal, and caudal are transversely barred with blackish brown spots, or the spots disappear, leaving the fins brownish or clear.

A specimen, 328 mm. long, was purchased at Papeete, Tahiti.

**Lethrinus harak** (Forskål).

*Sciaena harak* Forskål, Descr. Anim., 1775, p. 52—Red Sea.

*Lethrinus harak* Rüppell, Neue Wirbelt., Fische, 1835, p. 116, pl. 29, fig. 3;

Day, Fishes India, 1878-88, p. 137, pl. 33, fig. 3; Bleeker, Atlas Ichth., 8, 1877, p. 119, pl. 327, fig. 3; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 413, pl. 3, fig. 2.

*Lethrinus bonhamensis* Günther, Fische der Südsee, 1, 1873-75, p. 65, pl. 47.

Dorsal X, 9; anal III, 8. There are 45 scales in the lateral line to the caudal base, plus 2 or 3 more on the latter, 6 above and 10 below the lateral line. The upper and lower profiles of the oblong, compressed body are about equally arched from the snout tip to the dorsal and anal axils, the depth 2.6 to 3, the head 2.8 to 3.2, the caudal 3.4 to 3.7, and the pectoral 3 to 3.3 times in the length. The eye is 3.2 to 4, the rather elongate, pointed snout 2 to 2.5 times, the interorbital 3.5 to 4.1 times, the least depth of the caudal peduncle 2.9 to 3 times in the head. The maxillary extends to beneath the anterior nostril and equals the greatest width of the preorbital, 2.3 to 2.5 times in the head. The canines at the tip of each jaw are of medium size, with a band of villiform teeth behind them. The lateral teeth are conical, bluntly pointed anteriorly, becoming medium-sized to large molars posteriorly, each with a lengthwise groove in its crown.

The color in alcohol is yellowish to brownish olive above, becoming whitish below, with a large blackish blotch between the lateral line and the posterior part of the pectoral. The snout and top of the head are deep violet brown. The fins are all pale.

Three specimens, 193 to 220 mm. in length, were taken at Malo Island, and another, 188 mm. long, at Bushman Bay, Malekula Island, New Hebrides. Three specimens, 210 to 230 mm. long, were collected at Tenibuli, Ysabel Island, Solomon Islands.

**Lethrinus haematopterus** Schlegel.

*Lethrinus haematopterus* Schlegel, Fauna Jap., Pisces, 1842, p. 74, pl. 38;

Bleeker, Atlas Ichth., 8, 1876-77, p. 112, pl. 331, fig. 4; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 416, pl. 3, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 216.

Dorsal X, 9; anal III, 8. There are 47 scales in the lateral line, 5 above and 14 below it. The body is deep, compressed, with the dorsal outline more strongly arched than the ventral, the depth 2.4 or 2.5, the head 2.8 or 2.9, the pectoral 2.9 to 3, the caudal 3.4 to 3.6 times in the length. The eye is 3.3 to 3.6, the snout 1.9 to 2, the interorbital 3.4 to 3.8, the preorbital 2.2 to 2.4, the least depth

of the caudal peduncle 2.8 to 3 times in the head. The length of the soft anal base is less than the height of the anal rays. The third, fourth, and fifth dorsal spines are highest, the last one 3.3 to 3.6 times in the head. The anal spines are progressively higher, the last 3 to 3.6 times in the head. The maxillary extends beneath the posterior nostril. The mouth is horizontal, the lower jaw slightly included. The anterior lateral teeth are conical, becoming molars posteriorly with a distinct longitudinal groove on the crown.

The color in alcohol is yellowish brown to gray, the dorsal region darker, paler beneath, many of the scales with a blackish spot basally. The fins are pale reddish to gray, the pectoral with its superior margin dusky.

A fine specimen, 265 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### **Lethrinus hypselopterus** Bleeker.

*Lethrinus hypselopterus* Bleeker, Ned. Tijds. Dierk., 4, 1873, p. 326; Bleeker, Atlas Ichth., 8, 1876-77, p. 144, pl. 330, fig. 3; Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 419, pl. 4, fig. 1.

Dorsal X, 9; anal III, 8. There are 46 scales in the lateral line to the caudal base, 5 above and 15 below it. The body is oblong, compressed, the upper profile more arched than the lower, its depth 2.4, the head 2.7 to 2.8, the pectoral 3 to 3.2, the caudal 3.2 to 3.4 times in the length. The eye is 3.8 to 4, the snout 1.8, the maxillary 2.5, the preorbital 2.1, the interorbital 3.6, the least depth of the caudal peduncle 2.5 to 2.6 times in the head. The length of the soft anal base is more than the height of the longest rays. The head is as deep as long, its upper profile before the eyes concave. The maxillary does not reach a perpendicular from the posterior nostril. The lips are thick and fleshy. In the front of each jaw are four slightly curved and rather stout canines, the outer ones longer than the inner ones. The anterior lateral teeth are conical, the posterior ones large molars, each with a distinct longitudinal groove along the middle of its crown. The fourth to sixth dorsal spines are the highest, the last one 3.2 to 3.5 times in the head. The third anal spine is longest, 3 to 3.1 times in the head.

The color in alcohol is yellowish brown to yellowish gray, with a violet brown edge to each scale, the naked portion of the head deep violet or violaceous brown. The spinous dorsal and anal are yellowish basally, becoming blackish outwardly. The rays of the dorsal, anal, and caudal are blackish violet, the membranous por-

tions yellowish to gray. The ventral spine and rays are washed with violet on the outer half. The pectoral is white or gray.

A specimen, 228 mm. long, was collected at Tenibuli, Ysabel Island, Solomon Islands.

**Lethrinus leutjanus** (Lacépède).

*Bodianus leutjanus* Lacépède, Hist. Nat. Poiss., 4, 1802, pp. 281, 293; Bleeker, Atlas Ichth., 8, 1876-77, p. 120, pl. 354, fig. 5.

Dorsal X, 9; anal III, 8. There are 47 scales in the lateral line and 2 more on the caudal base, 6 above and 16 below the lateral line in transverse series; 8 predorsal scales. The depth is 2.5, the head 3 times in the length. The snout is long, 1.9 times, the eye 4.25 times in the head. The interorbital is wider than the eye, 3.8 times in the head. The length of the pectoral equals the head, that of the caudal is 0.9 of the head. The least depth of the caudal peduncle is 2.8 times in the head. The third and fourth dorsal spines are longest, 3 times in the head, the third anal spine very slightly shorter. The fifth dorsal ray is longest, twice in the head. The fourth anal ray is longest, 2.75 times in the head.

One specimen, 216 mm. long, was obtained at Suva, Viti Levu Island, Fiji.

**Gnathodentex oculo-maculatus** Herre. Fig. 10.

*Gnathodentex oculo-maculatus* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 7 (name only).

*Gnathodentex oculo-maculatus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 407.

Dorsal X, 9; anal III, 8; scales 6 to 7-69 to 74+5 or 6-15 to 17, predorsal 12 to 14, 5 rows on preopercle. Depth 2.8 to 2.9, head 2.9 to 3, caudal 2.9 to 3.3, pectoral 3.6 to 3.9, ventral 4.45 to 4.55 in length. Eye 2.5 to 2.9, snout 2.6 to 3.1, interorbital 3 to 3.2, depth of caudal peduncle 3 to 3.33, maxillary 4, first dorsal spine 4.9 to 5.5, fourth dorsal spine 2.85 to 3, third anal spine 2.9 to 3.15 in head. Body elongate-oblong, compressed. Head pointed. Upper profile more arched than ventral outline. Eye very large and prominent, touching dorsal profile. Head a little concave behind eye, a little angulate at interorbital. Snout convex, pointed. Mouth small. Maxillary does not reach eye. A pair of small anterior canines in lower jaw. A coarsely toothed ridge on upper maxillary. Preopercular margin smooth. Dorsal spines heteracanthous.

Four specimens collected at Tenibuli, Ysabel Island, Solomon Islands.

**Pentapus caninus** (Cuvier and Valenciennes).

*Scolopsides caninus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 354—Dorey Harbor, New Guinea.

*Heterognathodon caninus* Günther, Fische der Südsee, 1, 1873-76, p. 32.

*Pentapus caninus* Bleeker, Atlas Ichth., 8, 1876-77, p. 103; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 218.

*Pentapus xanthopleura* Kner, Zool. Reise Novara, Fische, 1865, p. 61; Bleeker, Atlas Ichth., 7, 1873-76, pl. 310, fig. 3.

Dorsal X, 8 or 9; anal III, 7. There are 45 scales in the lateral line, 3 above and 8 or 9 below it. The depth is 3.1 to 3.2, the head 3.3 to 3.4, the caudal 3 to 3.33, the pectoral 4.6 to 4.75 times in the length. The eye is 3.3 to 3.85, the snout 2.6 to 2.85, the inter-orbital 3 to 3.3, the least depth of the caudal peduncle 2.35 to

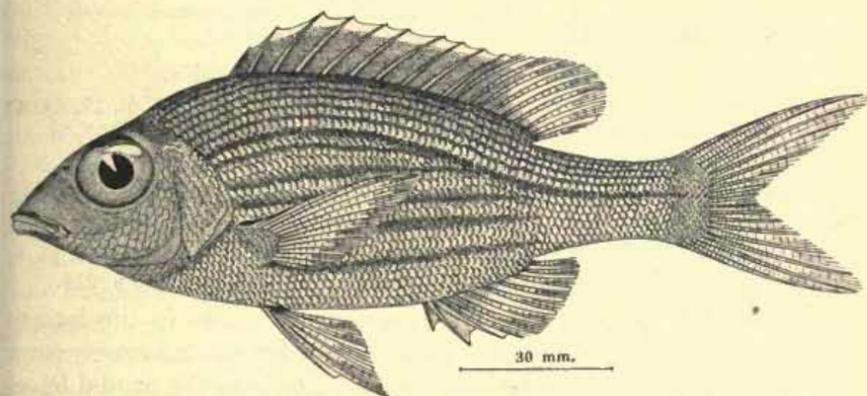


FIG. 10. *Gnathodentex oculo-maculatus* Herre, Tenibuli, Ysabel Island, Solomon Islands.

2.75 times in the head. The fourth dorsal spine is longest, 2.15 to 2.25 times in the head. The body is oblong, compressed, the head pointed, the eye large and high up. On either side of the symphysis of the mandible is a large, curved, backward-pointing canine. The posterior margin of the preopercle is smooth. There are 5 well-developed rows of scales on the cheek, plus another row on the preopercular flange. The caudal is deeply emarginate with pointed but not produced lobes.

The color in alcohol is brownish gray above, the belly whitish, each scale on the upper three-fourths margined with dark brown, these marginal lines forming conspicuous diagonal dark lines running downward and backward along each row of scales. Above the pectoral base begins a bright silvery band which runs back to the middle of the caudal peduncle and which is very wide along the middle of

its course. Above the eye begins a pearly or silvery line which runs back just below the dorsal to the origin of the dorsal rays. A blue band on the snout crosses from eye to eye, continues on across the eye as a pearly line and extends in a curve from the eye to the margin of the opercle in front of the pectoral base. Another bright pearl-colored line runs from the upper posterior margin of the eye to the beginning of the lateral line and then just beneath the lateral line to the middle of the trunk. On the pectoral base is a dark brown bar. The fins are all colorless.

Described from 4 specimens, 130 to 175 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

#### Family SPARIDAE

##### *Sparus berda* Forskål.

*Sparus berda* Forskål, Descr. Anim., 1775, pp. xi, 32—Arabia.

*Chrysophrys berda* Rüppell, Neue Wirbelt., Fische, 1840, p. 120, pl. 27, fig. 4;

Day, Fishes India, 1878-88, p. 140, pl. 34, fig. 2, pl. 35, fig. 2.

*Sparus hasta* Bleeker, Atlas Ichth., 8, 1876-77, p. 108, pl. 345, fig. 3.

*Sparus calamara* Russell, Fishes Coromandel, 1, 1803, p. 63, pl. 92; Evermann and Seale, Bull. Bur. Fish., 26, 1907, p. 86.

*Sparus berda* Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 430, pl. 6, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 218.

Dorsal XI, 11; anal III, 8. There are 44 scales in the lateral line, 4 above and 10 below the line. There are 40 transverse rows of scales in a longitudinal series from the opercle to the caudal base, counted above the lateral line, and also 40 rows counted below the lateral line. The compressed body is very deep, the back much elevated, the depth 2.1 times in the length. The head is 2.85, the pectoral 2.45 times in the length. The eye is 4.8, the snout 2.3, the maxillary 2.2, the preorbital width 3.2, the interorbital 3.2, the least depth of the caudal peduncle 2.65 times in the head. The large head is as deep as long. The maxillary extends beneath the pupil. The lips are wide, thick, and fleshy, the jaws stout, with 6 incisors in front both above and below. The roof of the mouth is covered with teeth arranged in 4 somewhat irregular rows, the anterior teeth smaller and more or less granular, the posterior teeth large molars with rounded crowns. The lower jaw has within the outer row 3 rows of irregular teeth on each side, granular anteriorly, and molariform posteriorly, the rear teeth of the inner row much the largest. The head is scaled above the eyes and on the sides, the preopercle with 6 rows.

In life the color was greenish with a metallic bronze luster, the fins paler, except the spinous dorsal, which is dusky. Behind the upper angle of the opercle was a blackish spot. In alcohol the color is very dark greenish gray, most of the scales with a darker basal spot or streak, a dusky spot at the pectoral axil, the spinous dorsal blackish green, the other fins dusky gray to greenish gray. The naked top of the snout is violet brown.

Described from a specimen, 343 mm. long, caught in a fresh-water creek on Kulambangra Island, Solomon Islands.

### **Calamus brachysomus** (Lockington).

*Sparus brachysomus* Lockington, Proc. U. S. Nat. Mus., 1880, p. 284—Magdalena Bay, Lower California.

*Calamus brachysomus* Evermann and Jenkins, Proc. U. S. Nat. Mus., 1891, p. 153; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1353; Meek and Hildebrand, Field Mus. Nat. Hist., Zool. Ser., 15, 1925, part 2, p. 574.

Dorsal XII, 12; anal III, 10. There are 47 + 3 scales in the lateral line and 43 to 46 in a series below it; 7 scales above and 12 below the line; 5 or 6 rows on cheeks. The back of the deep and compressed body is much elevated, the profile strongly convex at the nape. The head is 3 to 3.35, the depth 2 to 2.15 times in the length. The caudal equals the head. The eye is 3 to 4, the snout 2 to 3, the maxillary 2.3 to 3 times in the head. The small mouth is nearly horizontal, the lower jaw included. Each jaw has a patch of conical teeth anteriorly, the outer ones enlarged, and 2 or 3 rows of molars along the sides, the inner teeth broadest.

The color in alcohol is greenish silvery, the snout black, as is the margin of the preopercle and opercle, each scale with a pale or golden spot, the spots forming longitudinal rows. There is a dark spot at the upper part of the pectoral base.

A specimen, 270 mm. long, was taken at Academy Bay, Indefatigable Island, Galapagos.

### **Monotaxis grandoculis** (Forskål).

*Sciaena grandoculis* Forskål, Descr. Anim., 1775, pp. xii, 53—Djedda, Red Sea.

*Sphaerodon grandoculis* Rüppell, Neue Wirbelt., Fische, 1835, p. 113, pl. 28, fig. 2; Günther, Fische der Südsee, 1, 1873-75, p. 67.

*Monotaxis grandoculis* Bleeker, Atlas Ichth., 7, 1875, pl. 299, fig. 1 (young as *Sphaerodon heterodon*; 8, 1877, p. 105; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 243, fig. 101 (young, after Bleeker); Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905

(1906), p. 271 (young); Herre and Montalban, *Phil. Journ. Sci.*, **33**, 1927, p. 425, pl. 5, fig. 2 (young) and fig. 3 (adult); Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, **10**, 1928, p. 219.

*Lethrinus latidens* Cuvier and Valenciennes, *Hist. Nat. Poiss.*, **6**, 1830, p. 316.

*Spherodon latidens* Kner, *Reise Novara, Fische*, 1865, p. 83, pl. 4, fig. 1.

*Monotaxis indica* Bennett, *Life of Raffles, Fishes*, 1830, p. 683.

*Sphaerodon heterodon* Günther, *Cat. Fishes Brit. Mus.*, **1**, 1859, p. 465; Bleeker, *Atlas Ichth.*, **7**, 1875-76, pl. 299, fig. 1 (young).

Dorsal X, 10; anal III, 9. There are 45 to 47 scales in the lateral line, plus 3 to 5 more on the caudal base, 6 above and 15 below it. The depth is 2.3 to 2.5, the head 2.8 to 3.1 times in the length. The upper profile is elevated and is swollen and bulging before the upper part of the eye. The very large, circular eye is 2.5 to 2.9, the very steeply inclined snout 2.2 to 2.6, the interorbital 2.6 to 2.8 times in the head. The upper jaw has 6 canines in front, the lower jaw 4, with a single series of broad molars laterally in each jaw. The snout, preorbital, and suborbital are much larger and broader proportionately in the adult than in young specimens and the eyes are more conspicuous.

In life, adults are uniform dusky violaceous, becoming dusky above, the throat and belly paler, often with more or less silver sheen on the sides and belly. There may be yellow above the pectoral. The dorsal, anal, and caudal are the same color as or darker than the body. In alcohol the color is pale whitish, yellowish, or brownish violet, paler beneath, the sides with longitudinal streaks posteriorly. The interorbital is dark violet brown. The dorsal, anal, and caudal membranes are dark violet brown to nearly colorless. The ventrals and pectoral are colorless to violaceous. The pectoral may have a violet or blackish bar on its base and a spot of the same color in its axil.

Here described from 2 specimens, 285 and 290 mm. long, purchased in the market at Papeete, Tahiti.

In most collections only the young are represented and most published figures are of the immature. The young are much paler in color, greenish or grayish with a silvery luster, with 2 white transverse bands, one from the first 3 dorsal spines, the other from the last 2 spines.

This toothsome food fish is abundant in the Solomon Islands. At Tenibuli, Ysabel Island, 7 specimens, from 68 to 195 mm. in length, were taken.

A specimen, 85 mm. long, from Hathorn Sound, New Georgia Island, is so different as almost to merit a varietal name. A dark

purplish brown submarginal band extends along the upper and lower lobes of the very deeply forked caudal. The upper half of the trunk and the dorsal are dark purplish brown, crossed by 2 silvery pale brown bands.

### Family KYPHOSIDAE

#### *Doydixodon freminvillei* Valenciennes.

*Doydixodon freminvillei* Valenciennes, Voy. Venus, 5, p. 323, 1855, pl. 5, 1846—Galapagos Islands; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1382.

Dorsal XII, 15; anal III, 15. There are 51 to 55 scales in the lateral line, 12 above and 14 below it. The body is thick and heavy, the depth, in a specimen 65 mm. long, 2.5 times, the head 3.4 times in the length. The anterior profile is boldly convex, the snout nearly vertical. The eye is 3.33 times, the snout nearly 3 times in the head.

The color in alcohol is dark purplish brown above, paler below posteriorly, and white under the head and on the belly. The dorsal is blackish brown, the anal dusky, the caudal a little paler. The pectoral is pale brown with a greenish pale crossbar near the base.

From Tagus Cove, Albemarle Island, 1 specimen, 120 mm. long, was taken. From a tide pool on Narborough Island 9 specimens, 72 to 128 mm. long, were taken. At Eden Island a specimen, 65 mm. long, was captured. Two specimens were collected at South Seymour Island, 21 and 22 mm. in length.

#### *Kyphosus cinerascens* (Forskål).

*Sciaena cinerascens* Forskål, Descr. Anim., 1775, pp. xii, 53—Red Sea.

*Pimelepterus cinerascens* Day, Fishes India, 1878-88, p. 143, pl. 35, fig. 3; Bleeker, Atlas Ichth., 9, 1878, p. 15, pl. 364, fig. 4.

*Kyphosus cinerascens* Herre and Montalban, Phil. Journ. Sci., 33, 1927, p. 436, pl. 7, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 221.

*Pimelepterus indicus* Kuhl and Van Hasselt in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 270.

*Pimelepterus altipinnis* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 270.

*Pimelepterus dussumieri* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 273.

*Pimelepterus tahmel* Rüppell, Neue Wirbelt., Fische, 1835, p. 35, pl. 10, fig. 4.

Dorsal XI, 12; anal III, 11. There are 53 scales in the lateral line plus 7 or 8 more on the caudal base, 10 above to the dorsal origin and 18 below the lateral line to the anal origin. The body

is elongate-ovate, moderately compressed, the depth 2.2 to 2.3, the head 3.4 to 3.7 times in the length. The eye is 3.2 to 3.5, the blunt, rounded snout 2.7 to 2.8 times in the head. There is a convex hump in front of the eyes, the interorbital 2.4 to 2.6 times in the head. The dorsal spines increase in height to the sixth or seventh, which is about 2.5 times in the head and much lower than the anterior dorsal rays, the second ray 1.8 times in the head. The base of the soft dorsal is 1.5 times in the base of the spinous dorsal. The anal rays are equal to or higher than the dorsal rays. The least depth of the caudal peduncle is twice in the head. The caudal is deeply emarginate, with pointed lobes, 2.85 times in the total length.

In life this fish is very different from its appearance after death. It is silvery gray with bright golden longitudinal bands on the sides, the fins dusky. In alcohol the color is silvery gray to blackish, the scales with silvery or pale centers which form longitudinal bands alternating with dark bands between the scale rows.

A fine specimen was obtained at Moorea, its length 280 mm. Flocks of this herbivorous fish play about reefs washed by strong currents, coming up to shallow water to feed. Four specimens, 134 to 172 mm. in length, were taken at Tenibuli, Ysabel Island, Solomon Islands.

### ***Kyphosus waigiensis* (Quoy and Gaimard).**

*Pimelepterus waigiensis* Quoy and Gaimard, Voy. Uranie, Zool., 1825, p. 386, pl. 62, fig. 4—Îles des Papous.

Dorsal XI, 14; anal III, 14. There are 58 tubulated scales in the lateral line and 7 or 8 more on the caudal base.

The color in alcohol is silver gray, with alternate longitudinal lines of gray and brown, most conspicuous below the lateral line, and large whitish spots scattered over the lower parts. There is a bright silver stripe from the tip of the snout backward below the eye. The free dorsal and anal rays are dusky.

One young specimen, 45 mm. long, was obtained on the reef at Ovalau Island, Fiji.

## Family GERRIDAE

### ***Gerres filamentosus* Cuvier.**

*Gerres filamentosus* Cuvier, Regne Anim., ed. 2, 2, 1829, p. 188, on *Zeus wodawahah* Russell, Fishes Coromandel, 1, 1803, p. 52, fig. 67—Vizigapatam; Day, Fishes India, 1878-88, p. 98, pl. 25, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 226.

*Diapterus filamentosus* Bleeker, Atlas Ichth., 8, 1876-77, p. 124, pl. 362, fig. 3.

Dorsal IX, 10; anal III, 7. There are 47 scales in the lateral line, plus 3 more on the caudal base, 6 above and 9 below it. The depth is 2.33, the head 3.1, the pectoral 2.66 times in the length. The eye is 3.3 times, the snout 3, the least depth of the caudal peduncle 2.57 times in the head. The deeply forked caudal equals the head. The second dorsal spine is very elongate, often extending to the caudal but in my specimen reaching the posterior part of the soft dorsal and 2.1 times in the length. The mouth is very protractile, the posterior end of the maxillary beneath the front margin of the eye. The second anal spine is stronger than the third, which is of the same length, about 2.4 times in the head.

The color in alcohol is yellowish with silvery luster, the upper half of the body with longitudinal rows of short horizontal bluish bars, a blackish spot on the opercle, and a short black line near the base of each dorsal spine and ray, the dorsal with a dusky or black margin. The other fins are all whitish to colorless.

A specimen, 112 mm. long, was caught at Bushman Bay, Malekula Island, New Hebrides.

#### ***Gerres kapas* Bleeker.**

*Gerres kapas* Bleeker, Nat. Tijds. Ned. Ind., 2, 1851, p. 482—Batavia, Java; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 225.

*Diapterus kapas* Bleeker, Atlas Ichth., 8, 1876-77, p. 127, pl. 391, fig. 3.

*Xystaema kapas* Jordan and Dickerson, Proc. U. S. Nat. Mus., 34, 1908, p. 610.

Dorsal IX, 10; anal III, 7. There are 39 scales in the lateral line to the caudal base, and 3 or 4 more on the latter. Above the lateral line are 5, below it 9 scales. There are 18 or 19 predorsal scales. The depth is 2.6 to 2.7 times, the head 3.2 to 3.3 times in the length. The third dorsal spine is 1.4 to 1.5 times in the head. The third anal spine is longer than the second, 2.5 to 2.8 times in the head. The pectoral is 3.3 times in the length.

The color in alcohol is pale olive brown above, the lower half yellowish white. There is a blackish spot at the top of the second and third spines and a black line along the dorsal margin, the entire membrane of the fin sprinkled with minute dusky dots. The other fins are all pale. There is a large dusky spot covering most of the opercle.

Three specimens, 132 to 136 mm. in length, were collected on a reef near Suva, Viti Levu Island, Fiji.

#### ***Gerres macracanthus* Bleeker.**

*Gerres macracanthus* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 195.

Bleeker's specimens, which were from 88 to 166 mm. in length, were regarded by Günther as the adult of *Gerres punctatus* Cuvier and Valenciennes. Fowler places *Gerres macracanthus* under *Gerres filamentosus* Cuvier, as the young of that species. Considering the size of some of Bleeker's specimens and the view taken by Günther, the arrangement made by Fowler (*Fishes of Oceania*, p. 226) can hardly be accepted. *G. macracanthus* agrees with *G. filamentosus* in having an elongate second dorsal spine, but differs in having a much slenderer form and by being marked by dark vertical bands, well shown in Bleeker's figure.

One specimen, 31 mm. long, was collected from a reef near Suva, Viti Levu Island, Fiji.

#### **Gerres macrosoma** Bleeker.

*Gerres macrosoma* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 56—Sindangole, Halmahera; Fowler, *Fishes Oceania*, Mem. Bishop Mus., 10, 1928, p. 224.

*Diapterus macrosoma* Bleeker, Atlas Ichth., 8, 1876-77, p. 126, pl. 362, fig. 5.

Dorsal IX, 10; anal III, 7. There are 38 to 40 scales in the lateral line, plus 3 more on the caudal base, 4 scales above and 9 below the line. The depth is 2.6, the head 3 times in the length, the forked caudal equal to the head. The interorbital equals the least depth of the caudal peduncle, 3 times in the head. The body is elongate ovoid, strongly compressed, deepest at the origin of the spinous dorsal.

The color in alcohol is very pale whitish, the upper half cross-barred and spotted with olive brown, the lower half more or less silvery. The tip of the spinous dorsal is black and the whole margin more or less dusky. There is a large blackish spot on the opercle.

Six specimens, 43 to 62 mm. in length, from Suva, Viti Levu Island, and one, 60 mm. long, from Nukulau Island, Fiji.

#### **Eucinostomus californiensis** (Gill).

*Diapterus californiensis* Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 245—Cape San Lucas, Lower California.

*Eucinostomus californiensis* Jordan, Proc. Calif. Acad. Sci., 1895, p. 469; Jordan and Evermann, *Fishes N. and Mid. Amer.*, 2, 1898, p. 1369; Meek and Hildebrand, *Fishes Panama*, Field Mus. Nat. Hist., Zool. Ser., 15, 1925, p. 584, pl. 62, fig. 1.

Dorsal IX, 10; anal III, 7. There are 46 to 48 scales in the lateral line, plus 2 more on the caudal base. The depth is 2.8, the head 3.2 times in the length. The eye is 3, the snout 2.67 times in the head. The dorsal outline forms a regular curve from the upper lip to the caudal peduncle. The flat interorbital equals the eye. The second

interhaemal spine is a hollow cone, entered by the air bladder, which comes to a point posteriorly. Anteriorly the air bladder has two small appendages which extend forward to the cranium.

The color in alcohol is bright silver, the dorsal with a very narrow blackish margin. Otherwise the fins are pale. Viewed from above the back is pale brownish yellow with irregular darker blotches, a metallic luster over all.

Twenty specimens, 77 to 128 mm. in length, were taken at Eden Island, Galapagos. The description was taken from a specimen, 128 mm. long.

#### Family MULLIDAE

##### *Upeneus tragula* Richardson.

*Upeneus tragula* Richardson, Ichth. China, Rep. Brit. Assoc. Adv. Sci., 1845, p. 220—Canton; Bleeker, Verh. Akad. Amsterdam, 15, 1875, Revis. Mull., p. 11; Atlas Ichth., 9, 1878, pl. 392, fig. 2.

*Upeneoides tragula* Günther, Cat. Fishes Brit. Mus., 1, 1859, p. 398; Day, Fishes India, 1878, p. 121, pl. 30, fig. 4; Herre and Montalban, Phil. Journ. Sci., 36, 1928, p. 99, pl. 2, fig. 1.

Dorsal VIII-I, 8; anal I, 6; there are 31 scales in the lateral line, plus ? on the caudal base, 3 above and 7 below it. The depth is 4 to 4.5, the head 3.2 to 3.7, the deeply forked caudal 3 to 3.5 times in the length. The eye is 4 to 4.9, the snout 2.3 to 2.4, the interorbital 3.4 to 3.8, the least depth of the caudal peduncle 2.3 to 2.7 times in the head. The maxillary extends beneath the anterior margin of the pupil. The entire head, including preorbital, maxillary, and chin, is covered with scales. The first dorsal spine is minute, the second spine highest, 1.4 to 1.6 times in the head. The soft dorsal and anal are equal in height, 1.6 to 1.9 times in the head.

The color in life is gray, spotted with brownish above, each scale on the lower half with a conspicuous brown spot, and a brown band from the tip of the snout through the eye to the caudal base. The upper half of the dorsal is black, sprinkled with yellow, rounded spots, the lower half with faint dusky bands. The soft dorsal has 2 or 3 faint dusky bands and the caudal is obliquely barred with dusky bands. The anal, pectorals, and ventrals are crossbarred by rows of red spots. In alcohol the color is brownish above, yellowish below, with a dusky band from the snout across the eye to the caudal base. The fins are much as in life, the red spots, however, becoming dark.

Described from Philippine specimens. Two young but unmistakable specimens, 29 and 35 mm. in length, were collected by electric light lure, at Tulagi, Solomon Islands.

**Upeneus sulphureus** Cuvier and Valenciennes.

*Upeneus sulphureus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 450—Antjer, Straits of Sunda; Bleeker, Atlas Ichth., 9, 1878, pl. 393, fig. 4.

*Upeneoides sulphureus* Day, Fishes India, 1878-88, p. 120, pl. 30, fig. 3; Jordan and Richardson, Bull. Bur. Fish., 27, 1908, p. 260; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 293; Herre and Montalban, Phil. Journ. Sci., 36, 1928, p. 103, pl. 3, fig. 1.

*Upeneoides belaque* Fowler, Proc. Acad. Nat. Sci. Phila., 70, 1918, p. 40, fig. 16.

Dorsal VIII-I, 8; anal I, 6. There are 36 scales in the lateral line, plus 4 more on the caudal base, 3 above and 7 below the line. The depth is 3.2 to 3.5, the head 3.1 to 3.5, the caudal 3.2 to 3.4, the pectoral 3.8 to 4.2 times in the length. The eye is 3.6 to 4, the snout 2.3 to 2.7, the least depth of the caudal peduncle 2.5 to 2.8 times in the head. There are 8 or 9+20 or 21 long, slender gill-rakers on the first arch. The compressed body is rather deep, the snout long, convex, the caudal deeply forked. The mouth is nearly horizontal, the lower jaw shorter than the upper, the maxillary extending below the anterior part of the eye. The teeth are in villiform bands on the jaws, vomer, and palatines. The preorbital is partly naked, the rest of the head scaled. The barbels reach almost to the hind margin of the opercle.

The color in alcohol is dusky gray above, pale yellowish below, with traces of 2 yellow stripes on the body, one from the eye to the caudal base, the other from the pectoral axil to the caudal peduncle. The top of the spinous dorsal is deep black, the margin of the soft dorsal is black, and the caudal has a dusky, white-edged posterior margin. There is a large black blotch on the opercle.

Two specimens, 154 and 159 mm. in length, were collected at Bushman Bay, Malekula Island, New Hebrides. Also referred here are 7 young specimens, 58 to 73 mm. in length, from the same locality. There is no trace of the yellow lateral stripes. Above the lateral line are 2 vague parallel longitudinal dusky bands, the lower one better defined and made up of spots. The tip of the spinous dorsal is black and there are traces of 2 black longitudinal bands, one basal and one about the middle of the fin. The soft dorsal is edged with blackish and has a dusky longitudinal band across the middle.

**Upeneus vittatus** (Forskål).

*Mullus vittatus* Forskål, Descr. Anim., 1775, p. 31—Djedda, Red Sea; Lacépède, Hist. Nat. Poiss., 3, 1798, pp. 382, 401, pl. 14, fig. 1.

*Upeneoides vittatus* Day, Fishes India, 1878, p. 120, pl. 30, fig. 2; Bleeker, Atlas Ichth., 9, 1878, pl. 392, fig. 3; Herre and Montalban, Phil. Journ. Sci., 36, 1928, p. 105, pl. 4, fig. 1.

Dorsal VII-I, 8; anal I, 6. There are 35 scales in the lateral line, 3 above and 7 below it. The depth is 3.7 to 3.9 times, the head 3.3 to 3.5 times in the length. The nearly flat interorbital is a little wider than the eye, which is 3.7 to 4 times in the head. The dorsal profile is boldly convex from the dorsal origin to the tip of the very steep snout, which is about 2.5 times in the head. The barbels extend to a vertical from the angle of the smooth preopercle. The first dorsal spine is minute, the third one highest, 1.3 times in the head. The second dorsal and anal are equal in height, twice in the head. The pectoral is 1.3 to 1.5 times in the head, longer than the ventral. The deeply forked caudal is very slightly shorter than the head.

In life the color is rosaceous yellow to whitish yellow, with 4 or 5 bright yellow or dark yellow longitudinal bands on the sides. The spinous dorsal has a black tip, with 1 or 2 longitudinal bands below. The second dorsal has 3 dusky bands, or its tip is black with 2 dusky bands. The upper lobe of the caudal has 4 or 5 oblique black bands, the lower lobe 3 or 4, the posterior one widest. The other fins are all the same color as the body. In alcohol the color is grayish to yellowish, the yellow longitudinal bands more or less evident, the sides with a roseate flush, a silvery sheen over all. The fins are colored as in life, or are faded but the original markings are still visible. The caudal markings are little changed, the posterior bar on the lower lobe widest and blackest.

This fish was very abundant at Atuona, Hiva Oa Island, Marquesas. Here 20 specimens, 73 to 102 mm. in length, were collected.

### *Parupeneus*<sup>1</sup> *barberinus* (Lacépède).

*Mullus barberinus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 79, 108, pl. 1, fig. 3—near the Moluccas.

*Upeneus barberinus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 462; Günther, Fische der Südsee, 1, 1873-75, p. 57, pl. 42; Herre and Montalban, Phil. Journ. Sci., 36, 1928, p. 109, pl. 3, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 230.

*Parupeneus barberinus* Bleeker, Atlas Ichth., 9, 1878, pl. 393, fig. 1.

*Pseudupeneus barberinus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 49; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 276; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 293.

<sup>1</sup>*Parupeneus* must be used instead of *Upeneus*. See Weber and Beaufort, Fishes Indo-Austr. Arch., 6, 1931, pp. 379-380.

Dorsal VIII-1, 9; anal I, 6. There are 28 scales in the lateral line and 3 more on the caudal base, 3 above and 6 below the line. The depth is 3 to 3.5, the head 2.7 to 3 times in the length. The eye is entirely in the posterior half of the head, 5 to 6.5, the long, pointed snout 1.6 to 1.8 times in the head. The barbels barely reach the posterior edge of the preopercle. The opercle has but one spine. The caudal is shorter than the head, 3.25 to 3.5 times in the length.

The color in life is usually pinkish white, the top of the head brown, with a black band from the tip of the snout through the eye to below the soft dorsal, and a large circular black spot on the caudal base. Above the black band is a broad golden stripe. The dorsals are bluish or pink, the other fins all pink or red. In alcohol the color is whitish, darker dorsally, with a broad black band from the tip of the snout to below the soft dorsal. On the base of the caudal is a large circular black spot. The first dorsal is dusky, the second dorsal less so, the other fins yellowish.

Described from a young specimen, 52 mm. long, collected on the reef at Maraa, Tahiti. A fine specimen, 229 mm. long, was taken at Hathorn Sound, New Georgia Island, Solomon Islands.

#### **Parupeneus bifasciatus (Lacépède).**

*Mullus bifasciatus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 78, 105, pl. 2, fig. 2.

*Upeneus bifasciatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 468; Günther, Fische der Südsee, 1, 1873-75, p. 59, pl. 44, fig. A; Herre and Montalban, Phil. Journ. Sci., 36, 1928, pl. 6, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 227.

*Pseudupeneus bifasciatus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 258, fig. 107; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 274; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 293.

*Mullus trifasciatus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 79, 105, pl. 3, fig. 1.

*Upeneus trifasciatus* Seale, Occ. Papers Bishop Mus., 1, 1901, p. 72.

Dorsal VIII, 9; anal I, 6. There are 27 scales in the lateral line plus 3 more on the caudal base, 2 above and 6 below the lateral line. The depth and head are equal, 3.2 times in the length. The eye is 4.25, the snout 1.8, the least depth of the caudal peduncle 2.4 times in the head. The barbels extend slightly beyond the posterior edge of the preopercle. The first gill arch has 8+27 gill-rakers. The third dorsal spine is highest, 1.6 times in the head. The moderately forked caudal approximately equals the head.

In life the color is white flushed with pink, with 3 wide blackish crossbands extending to or below the lateral line, the first below the first dorsal and nape, the second below the second dorsal, and the

third on the caudal peduncle. The anal is banded longitudinally with yellow and bluish. The soft dorsal has similar lines on its outer half. The pectoral is rosy with a red crossbar at its base. The color in alcohol is very pale yellowish, with a broad dusky band from the nape and anterior part of the first dorsal to and behind the pectoral, another from the second dorsal to below the lateral line, and a third on the caudal peduncle. The snout and ocular region are dusky bluish. Before and below the second crossband the side is suffused with pink. The pectoral has a dusky bar at its base, the fin whitish yellow. The soft dorsal and anal are bluish

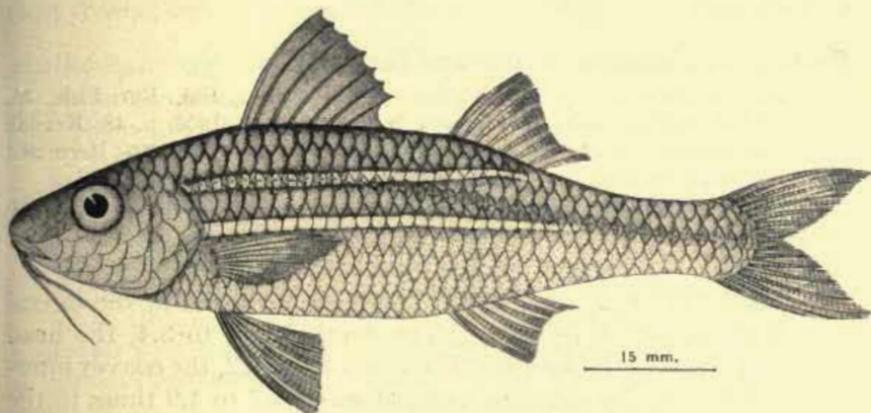


FIG. 11. *Parupeneus bilineatus* (Cuvier and Valenciennes), Nuka Hiva Island, Marquesas Islands.

gray, with several marginal yellowish and dark crossbars. The caudal is dusky.

Here described from a specimen, 136 mm. long, collected on the reef at Maraa, Tahiti, and one, 215 mm. long, taken at Moorea Island.

***Parupeneus bilineatus* (Cuvier and Valenciennes). Fig. 11.**

*Upeneus bilineatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 394—Amboina; Fowler, Bull. Bishop Mus., 38, 1927, p. 17, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 233, fig. 47.

Dorsal VIII-I, 8; anal II, 6. There are 36 scales in the lateral line and 4 more on the caudal base. In a specimen, 82 mm. long, the depth equals the head, 3.6 times in the length. The eye is 3.5 times, the snout 2.87 times in the head.

The color is silvery, darker above, whitish below, the caudal bright yellow, especially basally. On the sides are 2 pearl white longi-

tudinal bands, the upper one from the upper margin of the eye diagonally back and upward to below the soft dorsal. The lower one runs from the middle of the preopercle behind the eye to the lateral line beyond the soft dorsal. The dorsals are slightly dusky with fine black dots. The anal is yellow, like the caudal. The ventrals are yellow. The muzzle, top of head, and barbels are yellow. There is a blackish bar on the upper part of the eye and upper margins. The pectoral is yellowish.

We were fortunate enough to secure 3 specimens of this very rare and beautiful little fish at Nuka Hiva Island, Marquesas, all about 80 mm. long.

### **Parupeneus moana** (Jordan and Seale).

*Pseudupeneus moana* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1906, p. 274; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 48; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 293; Herre and Montalban, Phil. Journ. Sci., 36, 1928, p. 124, pl. 4, fig. 2.

*Upeneus trifasciatus* Günther, Fische der Südsee, 1, 1873-75, p. 59, pl. 44, fig. B.

*Parupeneus multifasciatus* Bleeker, Atlas Ichth., 9, 1878, pl. 394, fig. 4.

Dorsal VIII-I, 8; anal I, 6. There are 28 scales in the lateral line, 2 above and 6 below it. The depth is 3.2 to 3.4, the head 2.9 to 3.1 times in the length. The eye is 4.8 to 6.2, the convex interorbital 3.4 to 4, the elongate, pointed snout 1.7 to 1.9 times in the head. The gill-rakers are 7 to 9+27 to 29. The long barbels extend to the base of the ventrals, 3.6 to 4 times in the length. The deeply forked caudal is 3.5 to 3.9 times in the length.

In life the color is pinkish red, the scales above darker and edged with yellow. There are 4 darker crossbands, the last on the caudal peduncle and separated from the third by a wide yellow saddle-like blotch. There is a black blotch behind the eye. The basal half of the second dorsal is black, with violet and yellow stripes across the upper half. The anal is alternately barred with violet and yellow. The ventral is deep red. The pectoral is golden orange. The caudal is golden or brownish. In alcohol the color is usually dull purplish above, paler or yellowish below, with 3 well-marked broad blackish transverse bands from the dorsals to below the lateral line, and a broad black saddle on the caudal peduncle. Between it and the third band is a wide yellow band encircling the body. Some specimens show a blackish band from the nape downward. The spinous dorsal is more or less dusky. The basal half and posterior ray of the soft dorsal are black, the upper half yellowish with traces of longi-

tudinal bands. The yellowish anal has 3 crossbands on the outer part. The upper and lower edges of the yellowish caudal are blackish. The pectoral is pale yellow. The ventrals are violaceous dusky.

Described from 3 specimens, 138 to 170 mm. long, from Maraa, Tahiti. We also collected 2 specimens at Moorea, 150 and 152 mm. in length, 2 at Bora Bora, 83 and 163 mm. long, and 1 at Wala Island, New Hebrides, its length 131 mm. I place here 20 immature specimens, 20 to 30 mm. in length, taken by dip net while fishing with a submarine electric lamp in Turtle Bay, Espiritu Santo Island, New Hebrides. Two excellent specimens were taken at Tenibuli, Ysabel Island, Solomon Islands, their lengths 143 and 169 mm.

### *Mulloidichthys*<sup>1</sup> *auriflamma* (Forskål).

*Mullus auriflamma* Forskål, Descr. Anim., 1775, p. 30—Djedda, Red Sea.

*Upeneus auriflamma* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 461.

*Mulloides auriflamma* Klunzinger, Verh. Zool. Bot. Gesell. Wien, 20, 1870, p. 742; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 250, fig. 103; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 276; Herre and Montalban, Phil. Journ. Sci., 36, 1928, p. 130, pl. 2, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 233, pl. 21A.

*Mullus flavolineatus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 80, 108.

*Upeneus flavolineatus* Rüppell, Neue Wirbelt., Fische, 1835, p. 101, pl. 26, fig. 1.

*Mulloides flavolineatus* Day, Fishes India, 1878-88, p. 122, pl. 30, fig. 6; Bleeker, Atlas Ichth., 9, 1878, pl. 394, fig. 3.

*Upeneus zeylonicus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 459.

Dorsal VII-I, 8; anal I, 7. There are 36 or 37 scales in the lateral line, plus 3 more on the caudal base, 3 above and 7 below the lateral line. The depth of the slender body is 3.5 to 3.8, the head 3.2 to 3.3 times in the length. The eye is 3.7 to 3.9, the snout 2 to 2.2, the interorbital 3.1 to 3.4 times in the head. There are 8+23 or 24 gill-rakers on the first gill arch. The first dorsal spine is 1.4 to 1.5 times in the head. The soft dorsal and anal are equal in height, 1.9 to 2.3 times in the head. The least depth of the caudal peduncle is 2.8 to 3.2 times in the head. The deeply forked caudal nearly equals the head.

In life the color is yellow above, paler yellow below, with a bright lemon yellow band extending from the tip of the snout to the eye

<sup>1</sup> *Mulloidichthys* replaces *Mulloides*. See Whitley, Studies in Ichthyology, No. 3, Rec. Austr. Mus., 17, 1929, p. 122; also Weber and Beaufort, Fishes Indo-Austr. Arch., 6, 1931, p. 373; also Fowler, Fishes of the Philippines, Bull. 100, U. S. Nat. Mus., 12, 1933, p. 261.

and on to the caudal base, and some lemon yellow spots on the cheeks. The dorsals and caudal are lemon yellow, the other fins pink or colorless. In alcohol the color is uniformly pale grayish yellow, or more or less greenish golden above the lateral line and yellowish gray below the lateral line, with a golden longitudinal band from behind the eye to the caudal base. On the caudal peduncle it is above the lateral line. Below this golden stripe, but not forming its lower margin, is a white line, starting at the angle of the opercle and curving slightly downward. On the caudal peduncle it is parallel to and very close to the lateral line. The opercle is blackish. The vertical fins are greenish golden suffused with dusky, or all with a golden base, the first dorsal black and the soft dorsal and anal dusky. The ventral is more or less dusky, the pectoral clear.

Three specimens, 104 to 125 mm. in length, were collected at Bora Bora.

#### *Mulloidichthys samoensis* (Günther).

*Mulloides samoensis* Günther, *Fische der Südsee*, 1, 1873-75, p. 57, pl. 43, fig. B—Apia, Samoa; Waite, *Mem. Austr. Mus.*, 1897, p. 184, pl. 8, fig. 2a; Seale, *Occ. Papers Bishop Mus.*, 1, 1900 (1901), p. 71; Waite, *Rec. Austr. Mus.*, 5, 1903, p. 3; Jordan and Evermann, *Bull. U. S. Fish Comm.*, 23, part 1, 1903 (1905), p. 253, fig. 105; Jordan and Seale, *Fishes Samoa*, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 276; Kendall and Goldsborough, *Mem. Mus. Comp. Zool.*, 26, 1911, p. 294; Herre and Montalban, *Phil. Journ. Sci.*, 36, 1928, p. 132, pl. 3, fig. 4; Fowler (syn. in part), *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 234.

Dorsal VIII-I, 9; anal I, 7. There are 35 scales on the lateral line, plus 3 more on the caudal base, 3 above and 6 below. The depth is 4.1 to 4.6 times, the head 3.1 to 3.3 times in the length. The eye is 3.7 to 4.5, the snout 1.9 to 2.1, the interorbital 3.1 to 3.6 times in the head. The first gill arch has 7 or 8 + 18 to 20 short, rather stout gill-rakers. The barbels extend to the posterior margin of the preopercle. The pectoral and ventral are equal, 1.4 to 1.7 times in the head. The deeply forked caudal is equal to or shorter than the head.

The living fish is drab above, merging through gray to white beneath. A bright yellow stripe runs from the eye to the caudal base. Above it is a narrower parallel one and below it are 2 or 3 more. The cheek and snout each have 2 or 3 yellow longitudinal lines. The spinous dorsal is pale orange, the soft dorsal and caudal yellow. There is a red crossbar on the pectoral base. The pectoral, anal, and ventrals are pinkish to colorless. In alcohol the color is yellowish white, becoming bluish gray or even dusky above,

with little or no trace of the yellow stripes on the sides. A blackish spot is often present on the lateral line below the spinous dorsal. The fins are all colored like the body.

This goatfish is abundant in the Society Islands, large schools of the young and half-grown swimming about in the shallow waters of the lagoons. Twenty-six specimens, 79 to 114 mm. in length, were secured at Maraa, Tahiti, and 22, from 72 to 104 mm. long, at Bora Bora. A fine specimen, 180 mm. long, was taken at Malo Island, New Hebrides. Two specimens, 88 and 94 mm. in length, were collected at Tenibuli, Ysabel Island, Solomon Islands.

#### Family SCIAENIDAE

##### *Umbrina galapagorum* Steindachner.

*Umbrina galapagorum* Steindachner, Ichth. Beiträge, 7, 1878, p. 20—James Island, Galapagos; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1468.

Dorsal XI, 27 or 28; anal II, 6. There are 48 or 49 scales with tubules in the lateral line, 7 above and 9 below it. The body is elongate, the dorsal profile elevated, the anterior profile steep and convex, the depth 3.35 to 3.45 times in the length. The head is large, its length a trifle less than the depth, the blunt, projecting snout 3 to 3.33 times in the head. The eye is 1.33 to 1.45 times in the snout, 4.4 times in the head. The interorbital is a little more than an eye's diameter in breadth. The mouth is small and horizontal, the maxillary extending to a point beneath the pupil. The second anal spine is 2.5 times in the head. The depth of the caudal peduncle is 2.9 times in the head. The lunate caudal is 1.1 times in the head. The pectoral is 1.5 to 1.67 times in the head.

The color in alcohol is white with a silvery sheen, the back darker with a brownish cast. Above the lateral line darker oblique lines run up and back, becoming horizontal on the caudal peduncle. Below the lateral line are faint, dark, more or less horizontal lines, all lines above and below lateral line more or less wavy. Fins pale.

Here described from 5 specimens, 120 to 141 mm. in length, 2 from Eden Island and 3 from Post Office Bay, Charles Island.

This rare fish has hitherto been known only from the specimens collected by Steindachner.

#### Family BRANCHIOSTEGIDAE

##### *Caulolatilus princeps* (Jenyns).

*Latilus princeps* Jenyns, Zool., Voy. Beagle, Fishes, 1842, p. 52, pl. 11—Chatham Island, Galapagos.

*Caulolatilus princeps* Jordan and Evermann, *Fishes N. and Mid. Amer.*, 3, 1898, p. 2276.

Dorsal IX, 24; anal II, 23. There are 117 scales in the lateral line and 7 more on the caudal base; 16 above and 40 below the lateral line. An elongate, slender fish, the head and nape thickened; the depth 4, the head 3.8 times in the length. The large eye is high up, 5 times in the head, 1.6 times in the broad interorbital. The anterior profile forms a long regularly convex curve to before the eye, the snout nearly perpendicular and 2.75 times in the head. The mouth is nearly horizontal, the maxillary extending beyond the anterior margin of the eye. The lower lobe of the lunate caudal is longest, the caudal and pectoral about equal, 1.2 times in the head.

The color in alcohol is olive brown, darker above and paler below, with reddish tinges on the head. The dorsals and anal are darker, the caudal like the body. The pectoral is purplish brown on the upper two-thirds of the inner side, the lower part yellowish white.

Three fine specimens, 293 to 400 mm. long, were caught with hook and line at Tagus Cove, Albemarle Island, Galapagos.

#### Family MONODACTYLIDAE

##### *Monodactylus argenteus* (Linnaeus).

*Chaetodon argenteus* Linnaeus, *Syst. Nat.*, ed. 10, 1758, p. 272—Indies.

*Psettus argenteus* Richardson, *Zool., Voy. Erebus and Terror, Fishes*, 1844-48, p. 57, pl. 35, figs. 1-3; Day, *Fishes India*, 1878-88, p. 235, pl. 51B, fig. 5.

*Monodactylus argenteus* Jordan and Seale, *Fishes Samoa, Bull. Bur. Fish.*, 25, 1905 (1906), p. 237, fig. 30; Fowler, *Fishes Oceania, Mem. Bishop Mus.*, 10, 1928, p. 240.

Dorsal VII-I, 28; anal III, 29. There are 78 scales in a lateral series, plus 14 more on the caudal base, 19 above and 45 below the lateral line. The very deep body is greatly compressed, its depth from dorsal base to ventral base 1.2 times in the length, according to other authors 1.4 to 1.5. The small head is 2.9 times in the length, 3.1 to 3.2 in larger specimens. The eye is 2.66, the snout 4.36, the interorbital 3 times in the head.

The color in alcohol is silvery brown, with a black ocular band from the nape through the eye to the lower margin of the preopercle, and a similar curved band from the first dorsal spine behind the eye to the ventral region, stopping just above the ventrals. The dorsal lobe is blackish and the anterior anal margin is bordered by a black band. The vertical curved bands usually disappear with age.

Described from a young specimen, 69 mm. long, collected at Bushman Bay, Malekula Island, New Hebrides, in a small fresh-water river.

Family SCATOPHAGIDAE

*Scatophagus argus* (Linnaeus).

*Chaetodon argus* Linnaeus, ed. 12, 1, 1766, p. 464; Boddaert, Over den gevlakten klipvisch, 1770; Bloch, Ichthyologie, 6, 1788, p. 63, pl. 204, fig. 1.

*Scatophagus argus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 136; Day, Fishes India, 1878-88, p. 114, pl. 29, fig. 3; Seale and Bean, Proc. U. S. Nat. Mus., 33, 1907, p. 246, fig. 8; Weber, Siboga Exp., Fische, 1913, p. 302, pl. 10, figs. 1-5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 8, pl. 2, fig. 2, and pl. 12, fig. 2; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 35, fig. 1.

*Ephippus argus* Bleeker, Atlas Ichth., 9, 1878, p. 21, pl. 363, fig. 2.

*Chaetodon pairatalis* Buchanan Hamilton, Fishes Ganges, 1822, pp. 122, 372, pl. 14, fig. 41.

*Scatophagus ornatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 143, pl. 180.

*Chaetodon atromaculatus* Bennett, Fishes Ceylon, 1834, p. 18, pl. 18 (very fine figure).

Dorsal XI, 16 to 18; anal IV, 14 or 15. There are 90 to 128 scales in the lateral line, 28 to 34 above and 55 to 82 below it. The body is strongly compressed and somewhat quadrangular, the back strongly elevated. The depth is 1.5 to 1.7 times, the head 2.9 to 3.3 times, the least depth of the caudal peduncle 6.1 to 7.3 times in the length. The eye is 3.3 to 4.3 times, the bluntly rounded snout 2.7 to 3.2 times, the pectoral 1.7 to 2.2 times in the head. The mouth is small and horizontal. The first dorsal spine is recumbent and points forward. The fifth dorsal spine is 1.2 to 1.6 times in the head. The fan-shaped caudal equals the head. The ventral spine is 1.5 to 1.9 times in the head. The dorsal, anal, and ventral spines are all strong and sharp the latter particularly being very stout. When taken up the fish spreads its fins so that it is able to inflict severe wounds. It is much dreaded by fishermen.

Very young specimens are ornately colored in life, the ground color olive brown, with 5 or more black transverse bands. The head and anterior part of the body are marked with 2 or 3 crossbands of yellow, orange, or red, with 3 spots of the same color along the back. In life, older specimens are violet brown to dark brown, becoming paler on the belly, with a beautiful purplish gloss over all. On the sides are scattered blackish rounded spots, most numerous along the back and varying in number, size, and hue. Sometimes the spots are greenish.

In alcohol the ground color varies from purplish to dark yellowish brown, paler below and with rounded blackish spots on each side. The pectoral is yellowish, the vertical fins, the caudal, and the ventral are dark brown.

This fish is common in both fresh and salt water, ascending rivers for long distances and entering lakes many miles from the sea. As yet I have been unable to determine whether it breeds in fresh water or not, although very young specimens are found in lakes.

Having kept large numbers of specimens, from those in the larval or *Tholichthys* stage to large adults, under continuous observation for over seven years, and examined thousands of specimens, I am unable to recognize more than one species, in spite of the very considerable variability exhibited.

A large number was taken from a fresh-water stream flowing into Bushman Bay, Malekula Island, New Hebrides; 8 specimens were kept, ranging from 92 to 120 mm. in length.

#### Family CHAETODONTIDAE

##### *Forcipiger longirostris* (Broussonet).

- Chaetodon longirostris* Broussonet, Descr. Ichth., 1, 1782, p. 23, pl. 7—Pacific Ocean; Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 89, pl. 175.  
*Chelmon longirostris* Cuvier, Regne Anim., ed. 1, 2, 1817, p. 334, pl. 175.  
*Chelmo longirostris* Günther, Fische der Südsee, 1, 1873, p. 48.  
*Prognathodus longirostris* Bleeker, Atlas Ichth., 9, 1878, p. 23, pl. 366, fig. 5.  
*Forcipiger flavissimus* Jordan and McGregor, Rep. U. S. Fish Comm., 24, 1898, p. 279.  
*Forcipiger longirostris* Fowler, Proc. Acad. Nat. Sci. Phila., 1900, p. 512; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 363, pl. 46; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 336; Ahl, Chaetodontidae, p. 8, in Archiv Naturg., 89, 1923, Abt. A, Heft 5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 16, pl. 3, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 259, pl. 28B.

Dorsal XII, 23; anal III, 17 or 18. There are 57 to 60 scales in a longitudinal series, 14 above and 28 below the lateral line. The body is very deep and compressed, the head small and low with very concave profile. The depth is 2.3 times, the head 2.1 to 2.2 times, the least depth of the caudal peduncle 6 to 6.4 times in the length. The snout is very nearly horizontal, 1.7 times in the head. The jaws are equal and produced into a long and nearly tubular beak. The circular eye is 5.4 to 6 times in the head, a little more than the interorbital.

This curious-looking but beautifully colored fish is brilliant yellow in life, the color deepening and shaded with orange posteriorly. A large black triangular patch covers the nape and upper half of the head, the head and breast below this livid white. The caudal is grayish, the other fins yellow. In the posterior angle of the anal is a circular black spot. The soft dorsal and anal have a narrow black margin. In alcohol the brilliance of life fades to whitish yellow and blackish brown.

A specimen, 122 mm. long, was collected at Takaroa Island, Tuamotu Archipelago, and a fine one, 118 mm. long, at Moorea Island.

### *Chaetodon nigrirostris* (Gill).

*Sarathrodus nigrirostris* Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 243—Cape San Lucas.

*Chaetodon nigrirostris* Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, p. 365; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1673.

Dorsal XII, 24; anal III, 19. There are 47 scales in the lateral line. The body is very deep and strongly compressed, the depth 1.48 times in the length. The head is deeper than long, 2.76 times in the length, the profile from the first dorsal to the eyes very steep, the snout concave, a trifle shorter than the large prominent circular eye, which is 2.5 times in the head. The interorbital is three-fourths of the eye. The rows of scales run obliquely upward and backward above the middle of the side, and are nearly horizontal below the level of the upper end of the gill opening. The dorsal spines are wide and strong, the fourth one longest, 1.3 times in the head. The second anal spine is much stouter and longer than the others, and is two-thirds the length of the head. The pectoral equals the head. The caudal equals the fourth dorsal spine in length. The ventrals reach the origin of the anal, and are a trifle more than two-thirds the head.

The color in alcohol is pale silvery, more or less reddish along the base of the dorsal and anal. A wedge-shaped blackish bar extends from the origin of the dorsal nearly to the eye, and a broad blackish bar extends from the base of the fifth dorsal spine backward and downward across the dorsal base and caudal peduncle. The anterior part of the snout is shiny brownish black and there is a chocolate brown blotch above and on each eye. The edge of the gill opening is black, and there is a short black bar across the pectoral base. The ventrals are dusky, the other fins reddish pale except as noted above.

One specimen of this very rare little chaetodont was secured at Cocos Island. It is 83 mm. long.

**Chaetodon strigangulus Solander.**

*Chaetodon strigangulus* Solander, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 42, pl. 172; Lay and Bennett, Zool. Beechey's Voy., Fishes, 1839, p. 60, pl. 17, fig. 2; Günther, Fische der Südsee, 1, 1873-75, p. 35, pl. 26, fig. A; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 24, pl. 4, fig. 1.

*Megaprotodon strigangulus* Bleeker, Atlas Ichth., 9, 1878, p. 54, pl. 375, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 256.

*Chaetodon trifascialis* Quoy and Gaimard, Zool., Voy. Uranie, 2, 1824, p. 379, pl. 62, fig. 5.

*Chaetodon triangularis* Rüppell, Atlas, Fische Rothen Meers, 1828, p. 42, pl. 9, fig. 3.

*Chaetodon bifascialis* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 48.

*Chaetodon leachii* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 49.

*Megaprotodon trifascialis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 336.

Dorsal XIV, 15 or 16; anal IV, 15. There are 23 to 25 scales in the lateral line, 9 above and 14 below it. The depth of the oblong-oval body is 2 to 2.2, the head 3.1 to 3.4, the caudal 3.4 times in the length. The eye is equal to the pointed snout, 2.8 times, the interorbital 3 to 3.1 times in the head. The scales on the sides are large, arranged in diagonal series, those on the head and fins small to minute.

In alcohol the color is yellowish brown above, yellowish below with about 20 (22 in my specimen) narrow blackish obtusely angled cross stripes on each side, their angles directed forward and centered on a line drawn from the eye to the middle of the caudal peduncle. A black ocular band with white margins descends from the nape to the throat. The soft dorsal and anal each have a submarginal black stripe. The caudal is black with a wide yellow submarginal band bounded by a narrow black stripe posteriorly, the posterior margin colorless.

A specimen, 67 mm. long, was taken at Bora Bora.

**Chaetodon triangulum Kuhl and Van Hasselt.**

*Chaetodon triangulum* Kuhl and Van Hasselt, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 44—Batavia, Java; Ahl, Chaetodontidae, p. 174, in Archiv Naturg., 89, 1923, Abt. A, Heft 5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 26, pl. 5, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 136.

*Tetragonoptrus triangulum* Bleeker, Atlas Ichth., 9, 1878, p. 53, pl. 374, fig. 1.

*Gonochaetodon baronessa* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 257.

Dorsal XI, 24; anal III, 21 to 23. There are 30 to 32 scales in the lateral line, 9 to 11 above and 15 to 19 below it. The strongly compressed and nearly circular body is very deep. The depth is 1.3 to 1.4, the head 3 to 3.4, the least depth of the caudal peduncle 8.1 to 8.9 times in the length of the body. The eye is 2.7 to 3.2, the snout 2.9 to 3.1, the interorbital 3.2 to 3.8 times in the head. The pectoral is about equal to the head, the slightly convex caudal a little shorter.

The sides have alternate light and dark cross stripes, angularly bent, the angle directed forward, the stripes much narrower posteriorly. In life the lighter stripes are bright lemon yellow, the darker ones deep violet brown on the head, lilac to blackish brown posteriorly and on the dorsal and anal. The dorsal spines are reddish marginally. The soft dorsal is margined with blackish, with a lilac submarginal band. The anal is blackish brown, fading into reddish outwardly, with a lemon yellow margin. The caudal is blackish brown, with a submarginal posterior band of yellow and a gray edge. The pectoral and ventral are bright lemon yellow. The caudal has a crossband of lilac which extends upon the anal. In alcohol the lemon yellow becomes whitish to very pale yellowish and the darker stripes become very pale lilac to blackish.

This is probably the commonest butterfly fish on the coral reefs of the Indo-Pacific seas. Its great depth and constant color pattern easily distinguish it.

A specimen, 85 mm. long, was taken at Hog Harbor, Espiritu Santo Island, New Hebrides. Thirteen specimens, from 68 to 97 mm. long, were collected at Tenibuli, Ysabel Island, Solomon Islands.

### *Chaetodon auriga* Forskål.

*Chaetodon auriga* Forskål, Descr. Anim., 1775, p. 60—Djedda, Red Sea; Day, Fishes India, 1878-88, p. 106, pl. 27, fig. 3, var. *setifer*; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 29, pl. 7, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 252; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1929, p. 116.

*Chaetodon setifer* Bloch, Ichthyologie, 12, 1797, p. 99, pl. 425, fig. 1; Lesson, Voy. Coquille, Zool., 2, 1830, p. 175, pl. 29, fig. 2, 1826; Günther, Fische der Südsee, 1, 1873-75, p. 36, pl. 26, fig. B; Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), p. 364, pl. 47; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 306; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 252, pl. 26A.

*Tetragonopterus auriga* Bleeker, Atlas Ichth., 9, 1878, p. 47, pl. 373, fig. 4.

*Chaetodon sebanus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 74.

Dorsal XIII, 23 to 25; anal III, 20 or 21. There are 28 scales from the gill opening to the caudal base, about 34 in the lateral line, 8 above and 15 to 17 below it. The depth of the very much elevated and compressed body is 1.6 to 1.7 times, the head 2.7 to 3 times, the least depth of the caudal peduncle 8.6 to 9.1 times in the length. The eye is 3.5 to 3.9 times, the pointed snout 2.3 to 2.6 times in the head. The anterior profile of the head forms a deep concave curve. The interorbital is about equal to the eye. The scales on the sides are very large and arranged in very oblique and regular rows. The fifth and sixth dorsal rays are produced into a thread, often greatly elongated and extending much beyond the caudal.

The color in life is soft violaceous pearl or violaceous gray. The soft dorsal, anal, caudal peduncle, and caudal are orange yellow. From the dorsal spines 5 violet or violet gray stripes run downward toward the head. At right angles to these are from 9 to 12 similar stripes running diagonally toward the anal. A wide, white-margined black band descends from the nape through the eye to the throat, where it meets its fellow. Above the eye the ocular band narrows and in old specimens often disappears. The soft dorsal is edged with black and has a large circular black spot near its upper posterior angle. The anal has a marginal yellow band and a submarginal black line. The caudal has a pale violet band on its posterior margin, with 2 submarginal black lines. In alcohol the color is yellowish brown, the sides with 5 deep brown stripes running diagonally from the dorsal spines toward the head, and from 9 to 12 blackish or deep brown lines at right angles to them from the fifth stripe diagonally toward the anal. The black ocular band, the large black spot on the soft dorsal, and the black lines on the fins are little changed.

A very fine specimen, 140 mm. long, was collected at Moorea, and another, 139 mm. long, at Bora Bora. These specimens belong to the subspecies or variety *setifer*, which I follow Ahl in uniting with *auriga*.

### **Chaetodon vagabundus** Linnaeus.

*Chaetodon vagabundus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 465—Indies: Bloch, Ichthyologie, 7, 1788, p. 64, pl. 204, fig. 2; Day, Fishes India, 1878-88, p. 105, pl. 27, fig. 1; Ahl, Chaetodontidae, p. 153, in Archiv Naturg., 89, 1923, Abt. A, Heft 5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 32, pl. 5, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 253.

*Tetragonopterus vagabundus* Bleeker, Atlas Ichth., 9, 1878, p. 48, pl. 378, fig. 1.

Dorsal XIII, 22 to 26; anal III, 19 to 21. There are 30 to 35 scales in a longitudinal series, 6 above and 16 below the lateral line. The body is strongly compressed and much elevated, the depth 1.5 to 1.7 times, the head 3 to 3.4 times in the length. The eye is 2.8 to 3.1 times, the snout 2.6 to 2.8 times, and the interorbital 3.2 to 3.7 times in the head. The scales on the body are very large, becoming very small on the soft dorsal and anal and caudal. The pectoral equals the head.

In life the ground color varies from straw yellow to gray, the soft dorsal and anal bright orange, the caudal golden or orange. From the base of the spinous dorsal 6 black or purplish brown lines run downward and forward. At right angles to these 12 similar lines run obliquely toward the anal. A black ocular band nearly as wide as the eye extends from the nape to the throat. A black line beginning on the base of the spinous dorsal expands on the soft dorsal to a broad band continuing across the caudal peduncle to the middle of the anal base. Both dorsals are edged with black. On the caudal are 2 black crossbands, the anterior one crescent-shaped. The anal has a submarginal black line. In alcohol the color is purplish gray above, the breast whitish, or it varies from yellowish brown to dull brown, the dark lines and bands of life deep brown or black.

The following specimens were taken in the Society Islands: one, 88 mm. long, at Maraa, Tahiti; one, 99 mm. long, at Moorea; and one, 104 mm., at Bora Bora. A specimen, 24 mm. long, from a reef near Suva, Fiji, has a black circular spot with a white semi-circle before it on the dorsal rays; otherwise it is colored much like the adult. Two specimens, 76 and 80 mm. long, were secured at Tenibuli, Ysabel Island, Solomon Islands.

### ***Chaetodon rafflesi* Bennett.**

*Chaetodon rafflesi* Bennett, Life of Raffles, 1830, p. 689—Sumatra; Günther, Fische der Südsee, 1, 1873-75, p. 44, pl. 35, fig. 2; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 36, pl. 6, fig. 2; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 125.

*Tetragonopterus rafflesi* Bleeker, Atlas Ichth., 9, 1878, p. 49, pl. 376, fig. 4.

Dorsal XIII (rarely XIV), 22 or 23; anal III, 19 or 20. There are 29 or 30 scales in a longitudinal series, 7 above and 14 below the lateral line, which ends 4 to 6 scales before the dorsal axil. The greatly compressed body is much elevated, the profile from the dorsal origin to the interorbital very steep, the snout pointed. The depth is 1.6 to 1.7, the head 2.9 to 3.1 times in the length. The eye is 3 to 4, the snout 2.4 to 2.8, the interorbital 3.5 to 3.9 times in the

head. The scales are large on the sides, becoming much smaller on the head, vertical fins, and caudal.

The color in life is lemon yellow, the body diagonally checkered by two series of lines on the scale margins, these lines pinkish brown above, reddish pink below, the region above the pectoral to the spinous dorsal darkened by an obscure dusky patch. The bright lemon yellow head is crossed by a black ocular band from before the dorsal to the lower edge of the interopercle. The soft dorsal and caudal each have a wide submarginal band of black, represented on the anal by a thin black line. Separated from the black band on the soft dorsal by a yellow band on its inner side is a broad reddish area. In alcohol the color varies from yellowish to yellowish brown, with an obscure blackish area above the pectoral, which becomes well marked in some specimens. The crisscross streaks on the sides are gray. The ocular, soft dorsal, and caudal bands of black are prominent, that on the soft dorsal margined on both sides by yellow. The pectorals, ventrals, caudal, and anal are all yellowish or gray, the anal with a black submarginal line.

In the Solomon Islands a specimen, 50 mm. long, was taken at Ugi Island, and 4, from 87 to 103 mm. long, at Tenibuli, Ysabel Island.

#### *Chaetodon octofasciatus* Bloch.

*Chaetodon octofasciatus* Bloch, *Ichthyologie*, 6, 1788, p. 85, pl. 215, fig. 1—East Indies; Cuvier and Valenciennes, *Hist. Nat. Poiss.*, 7, 1831, p. 14; Ahl, *Chaetodontidae*, p. 84, in *Archiv Naturg.*, 89, 1923, Abt. A, Heft 5; Herre and Montalban, *Phil. Journ. Sci.*, 34, 1927, p. 39; Fowler and Bean, *Bull. 100, U. S. Nat. Mus.*, 8, 1929, p. 93.

*Tetragonopterus octofasciatus* Bleeker, *Atlas Ichth.*, 9, 1878, p. 38, pl. 376, fig. 3.

Dorsal XI, 18 to 20; anal III, 16 or 17. There are 45 to 48 scales in a longitudinal series, 12 above and 21 below the lateral line. The very deep body is greatly compressed, the depth 1.3 to 1.5, the head 3.2 to 3.4 times in the length. The eye is 2.5 to 3, the snout 2.8 to 3.1, the interorbital 2.7 to 3 times in the head. The scales are all small, those on the head and fins very small to minute, those on the sides in nearly vertical series.

The color in life is lemon yellow, the breast and belly paler, with 8 black or blackish brown crossbands on the sides, the spaces between the second and third, fourth and fifth, sixth and seventh more than the other spaces, so that the stripes are more or less in pairs. The soft dorsal and anal each have a submarginal blackish brown band, edged on each side with white. Young specimens have a blackish

blotch on the side between the fourth and fifth bands. In alcohol the general color is brownish yellow, the lower parts yellow, the crossbands but little changed.

A specimen, 69 mm. long, was collected at Tenibuli, Ysabel Island, Solomon Islands. Many others were seen but could not be taken.

### **Chaetodon ornatissimus Solander.**

*Chaetodon ornatissimus* Solander, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 17—Tahiti; Lesson, Voy. Coquille, Zool., 2, 1830, p. 179, pl. 30, fig. 1; Günther, Fische der Südsee, 1, 1873-75, p. 38, pl. 30, fig. B; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 373, pl. 53; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 42, pl. 9, fig. 1.

*Tetragonopterus ornatissimus* Bleeker, Atlas Ichth., 9, 1878, p. 32, pl. 375, fig. 2.

Dorsal XII, 25 or 26; anal III, 21. There are 51 scales in the lateral line, 10 or 11 above and 21 to 23 below it. The depth of the very compressed body is 1.5 times in the length. The head is deeper than long, 3.1 to 3.5 times in the length, its upper profile a steep, nearly straight line from the dorsal origin to the snout tip. The eye is 3.4 to 3.5 times, the bluntly rounded snout 2.7 times in the head.

In life the body is grayish to nearly white, with 6 broad dark orange bands running diagonally upward and backward. The head, breast, and belly are golden, crossed by 4 or 5 vertical black bands, the two anterior ones broad. The first one crosses the snout to the chin, the other goes from the top of the head through the eye to the breast. A narrow black band behind the eye continues up and along near the dorsal margin and down to the last dorsal ray. Before the pectoral base are 3 short diagonal orange bars. The pectorals, ventrals, and scaleless portion of the dorsals, anal, and caudal are all orange or golden, the caudal with 2 black crossbands. The anal has a submarginal black band, the soft dorsal and anal each with a black edge. In alcohol the ground color becomes yellowish brown or brownish gray, the color marks much as in life, but duller. This handsome species is recognized at once by the 6 diagonal orange crossbars.

Two very fine specimens, one 145 and one 158 mm. in length, were collected at Nuka Hiva Island, Marquesas.

### **Chaetodon ulietensis Cuvier and Valenciennes.**

*Chaetodon ulietensis* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 39—Ulietea; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905

(1906), p. 340; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 307; Ahl, Chaetodontidae, p. 171, in Archiv Naturg., 89, 1923, Abt. A, Heft 5.

*Chaetodon falcula* (not of Bloch) Günther, Fische der Südsee, 1, 1873, p. 39, pl. 27, fig. C; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 255.

Dorsal XII, 23; anal III, 20. There are 31 scales in a lateral series, 7 above and 15 below the lateral line. The depth is 1.6, the head 2.9 times in the length. The eye is 3.8, the long, pointed snout 2.2, the preorbital 3.2 times in the head. The interorbital equals the eye.

The color in alcohol is yellowish gray or brownish cream, with 16 nearly vertical blackish violet lines on each side of the trunk. The blackish violet ocular band is as wide as the eye. A very broad blackish violet vertical band extends from the anterior half of the spinous dorsal to behind the pectoral base. A similar vertical band descends from the posterior part of the spinous dorsal and anterior part of the dorsal rays to or almost to the anal. A blackish violet blotch crosses the caudal peduncle. The fins are like the body in color, the anal with 2 submarginal blackish lines, the dorsal with a blackish edge, the caudal with a black, curved crossband and a whitish edge.

At Takaroa a specimen, 98 mm. long, was taken; at Maraa, Tahiti, 5 fine specimens, from 105 to 133 mm. in length; and at Bora Bora 3 more, from 54 to 124 mm. long, were added to the collection.

### *Chaetodon fasciatus* Forskål.

*Chaetodon fasciatus* Forskål, Descr. Anim., 1775, pp. xii, 59, No. 80; Ahl, Chaetodontidae, p. 117, in Archiv Naturg., 89, 1923, Abt. A, Heft 5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 52, pl. 9, fig. 2.

*Tetragonopterus fasciatus* Bleeker, Atlas Ichth., 9, 1878, p. 41, pl. 374, fig. 2.

*Chaetodon lunula* Günther, Fische der Südsee, 1, 1873, p. 42, pl. 33; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 366, pl. 54 and fig. 160.

*Chaetodon flavus* Rüppell, Atlas, Fische, 1828, p. 40, pl. 9, fig. 1.

*Chaetodon biocellatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 48 (young).

Dorsal XII, 23 to 25; anal III, 18 or 19. There are 34 to 38 scales in a longitudinal series, 9 above and 16 below the lateral line. The depth of the greatly elevated body is 1.5 to 1.7 times, the head 2.8 to 3 times in the length. The eye is 3 to 3.6 times, the snout 2.5 to 2.7 times in the head.

In life the color is yellow with reddish orange lines running obliquely upward and backward on the sides. There is a broad black

vertical ocular band, behind which is a wide white crossband. A broad black band with wide white borders ascends diagonally backward from above the pectoral to the middle of the spinous dorsal base, narrowing rapidly as it rises, then runs back along the dorsal base to the caudal peduncle, widening as it descends and becoming a broad bar on the caudal peduncle. Before the first dorsal and along the base of the first 3 or 4 spines is a wide black blotch, usually lobate, broadly margined with white. The dorsal and anal have a marginal black band, inside which is a white band. The caudal has a pale yellowish marginal band and a broad black submarginal band. In alcohol the colors are similar but faded and browner. In the young there is a large black ocellus with wide white margin on the dorsal rays.

From the Marquesas Archipelago were obtained 3 specimens, respectively 19, 130, and 142 mm. in length, at Atuona, Hiva Oa Island, and 3 specimens, 21, 27, and 117 mm. long, from Nuka Hiva Island. At Tahiti were collected 3 adults, from 92 to 132 mm. in length, and a juvenile specimen, 20 mm. long; at Bora Bora 4 specimens were taken, 78 to 128 mm. long. Two juvenile specimens, 20 and 23 mm. in length, were collected at Wala Island, New Hebrides; another specimen, 68 mm. long, taken at the same time, had only partially assumed the adult coloration. A specimen, 122 mm. long, was secured at Tenibuli, Ysabel Island, and one, 68 mm. long, at Hathorn Sound, New Georgia Island, Solomon Islands.

### **Chaetodon unimaculatus** Bloch.

*Chaetodon unimaculatus* Bloch, *Ichthyologie*, 6, 1788, p. 54, pl. 201, fig. 1—East Indies; Jordan and Evermann, *Bull. U. S. Fish Comm.*, 23, part 1, 1903 (1905), p. 368, pl. 50 and fig. 161; Jordan and Seale, *Fishes Samoa*, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 342; Herre and Montalban, *Phil. Journ. Sci.*, 34, 1927, p. 61, pl. 11, fig. 1; Fowler, *Mem. Bishop Mus.*, 10, 1928, p. 251, pl. 35B.

*Tetragonopterus unimaculatus* Bleeker, *Atlas Ichth.*, 9, 1878, p. 45, pl. 375, fig. 5.

*Chaetodon sphenospilus* Jenkins, *Bull. U. S. Fish Comm.*, 19, 1899 (1901), p. 395, fig. 8.

Dorsal XIII, 22 or 23; anal III, 19 or 20. There are 40 scales in the lateral line, 10 above and 19 below it. The depth of the compressed suborbiculate body is 1.5 to 1.6 times, the head 3.1 to 3.4 times in the length. The eye is 3 to 3.7 times, the bluntly rounded snout 2.4 to 2.8 times, the interorbital 2.8 to 3.1 times in the head. The scales are large anteriorly, smaller posteriorly and toward the

fins, in nearly horizontal series. The pectoral equals or nearly equals the head. The caudal is much shorter.

The color in life is lemon yellow or bright pale yellow, paler ventrally and becoming bluish gray on the anal. Below the posterior dorsal spines on the lateral line is a large circular black spot more or less than twice the eye. Sometimes a wedge-shaped band descends from it to the middle of the side. A black ocular band about as wide as the eye runs from the nape to the breast. A narrower black band extends submarginally across the soft dorsal and anal and the intervening part of the caudal peduncle, the soft dorsal and anal with a marginal bluish line. In alcohol the color is paler, the back becoming dark brown, the head and the basal regions of the dorsal and anal fins largely reddish or purplish reddish. The blue marginal line of the dorsal and anal becomes white.

There are 2 excellent specimens, 95 and 110 mm. in length, from the coral reef at Maraa, Tahiti, and another, 61 mm. long, from Vila, Efaté Island, New Hebrides. A fine specimen, 110 mm. long, was taken at Wala Island, and one, 57 mm. long, at Malo Island, New Hebrides.

### *Chaetodon trifasciatus* Mungo Park.

*Chaetodon trifasciatus* Mungo Park, Trans. Linn. Soc. Lond., 3, 1797, p. 34—Sumatra; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 372, pl. 52; Ahl, Chaetodontidae, p. 56, in Archiv Naturg., 89, 1923, Abt. A, Heft 5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 63, pl. 13, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 245, pl. 23B.

*Chaetodon trifasciatus* var. *arabica* Steindachner, Denks. Akad. Wiss. Wien, 71, 1902, p. 138, pl. 2, fig. 3.

*Tetragonopterus trifasciatus* Bleeker, Atlas Ichth., 9, 1878, p. 35, pl. 377, fig. 1.

*Chaetodon vittatus* Bloch and Schneider, Syst. Ichth., 1801, p. 227; Lay and Bennett, Fishes, in Zool. Beechey's Voy., 1839, p. 61, pl. 17, fig. 3; Day, Fishes India, 1878-88, p. 107, pl. 27, fig. 5.

*Chaetodon tau nigrum* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 38.

*Chaetodon austriacus* Rüppell, Neue Wirbelt., Fische, 1835, p. 30, pl. 9, fig. 2.

Dorsal XIII, 21 to 23; anal III, 18 to 20. There are 32 to 38 scales in the lateral line, 6 or 7 above and 14 or 15 below it. The depth of the compressed and rather elongate body is 1.6 to 1.8 times, the head 3.1 to 3.5 times in the length. The eye is 2.8 to 3.2 times, the interorbital 2.6 to 3.2 times in the head. The snout is approximately equal to the eye.

The color in life is yellow to orange or creamy, with a longitudinal stripe of violet blue, deep violet or dark purple on each row of scales.

The caudal peduncle and region above the anal may be pale blue. A black ocular band extends from the nape to the throat, with a bright golden band behind it, and a narrow vertical black streak down the posterior margin of the preopercle. The soft dorsal, anal, and caudal each have a black transverse bar, bordered by golden. The soft dorsal has 1 or 2, and the anal 1 black marginal line. In alcohol the color is much duller and paler.

This very beautiful little chaetodont is abundant on the reefs about Tahiti, where 5 specimens, 56 to 99 mm. in length, were collected. One specimen, 98 mm. long, was obtained at Moorea, and 7, from 51 to 85 mm. in length, at Bora Bora. It was observed at Takaroa, Tuamotu Islands, but none were taken. In the New Hebrides 2 specimens, 85 and 87 mm. long, were taken at Wala Island; 2 specimens, 87 and 96 mm. long, at Hog Harbor, Espiritu Santo Island; 2 specimens, 85 and 86 mm. long, at Vila, Efaté Island; and 1 specimen, 91 mm. long, at Malo Island. One specimen, 69 mm. long, was secured at Tenibuli, Ysabel Island, and 2 specimens, 53 and 56 mm. long, at Ugi Island, in the Solomon Islands.

#### **Chaetodon bennetti** Cuvier and Valenciennes.

*Chaetodon bennetti* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 84—Sumatra; Günther, Fische der Südsee, 1, 1873-75, p. 37, pl. 29, fig. A; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 65, pl. 8, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 244; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 73.

*Tetragonoprus bennetti* Bleeker, Atlas Ichth., 9, 1878, p. 34, pl. 376, fig. 2.

*Chaetodon vinctus* Bennett, Zool. Beechey's Voy., Fishes, 1839, p. 62, pl. 17, fig. 1 (very bad figure).

Dorsal XIV, 17; anal III, 16. There are 46 scales in a longitudinal series, 12 above and 18 below the lateral line. Other authors give the following: dorsal XIII or XIV, 17 to 19; anal III, 15 to 17; scales 40 to 46; transverse series 9 or 10 and 17 to 20. The body is elevated, its depth 1.5 times, the head 3.5 times in the length. The eye is 3.3, the snout 2.7, the interorbital 2.8, the least depth of the caudal peduncle 2.5 times in the length of the head. The scales on the sides are of moderate size, becoming small to minute on the head and fins.

In alcohol the color is brownish yellow, with a large white-margined black ocellus on the lateral line below the last dorsal spines. The ocular band is violet black, margined with white. From the origin of the lateral line a pearly stripe descends before the pectoral and curves back to the anal origin. A similar stripe starts a little

behind it, and descends back of the pectoral to above the anterior part of the anal. The soft dorsal, anal, and caudal are marginally blackish, the fins otherwise yellowish.

This very attractive butterfly fish is one of the most easily recognized and handsomest of the whole beautiful group.

A fine specimen, 129 mm. long, was taken at Hathorn Sound, New Georgia Island, Solomon Islands.

### **Chaetodon citrinellus** Broussonet.

*Chaetodon citrinellus* Broussonet in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 27; Günther, Fische der Südsee, 1, 1874, p. 47, pl. 35, fig. B (poor figure); Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 344; Ahl, Chaetodontidae, p. 104, in Archiv Naturg., 89, 1923, Abt. A, Heft 5; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 68, pl. 14, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 247.

*Tetragonopterus miliaris* (not of Quoy and Gaimard) Bleeker, Atlas Ichth., 9, 1878, p. 39, pl. 377, fig. 3.

Dorsal XIV, 22; anal III, 17. There are 40 to 42 scales in a longitudinal series, 10 above and 16 below the lateral line. The body is strongly compressed with the back much elevated, the depth 1.7 to 1.9 times, the head 2.9 to 3.2 times in the length. The eye is 2.5 to 2.7 times, the snout 2.7 to 3.3 times, the interorbital 3.3 to 3.5 times in the head. The lateral scales are of medium size, those of the head and fins very small. The pectoral equals the head.

The color in life is pale yellowish or greenish white, often rose above the lateral line, becoming white ventrally with a violet or blue spot on each scale. The blackish ocular band is narrower than the eye, extends from the nape to the throat, and is edged above the eye with gray or pale blue. The anal has a black marginal band, with a submarginal bright yellow band. In alcohol the color is creamy yellow, with a roseate flush above and posteriorly, each scale with a blue or lilac brown spot, the ocular band sometimes edged with whitish. The dorsals are narrowly edged with white, with a fine, submarginal blackish line. The anal has a wide blackish marginal band beneath, the caudal and pectorals are yellowish or colorless, the ventrals yellow or a little dusky.

A handsome specimen was collected at Tahiti, its length 90 mm.; one, 78 mm. long, at Moorea; 2 at Bora Bora, each 75 mm. long; and one at Nukulau Island, Fiji, 46 mm. long.

### **Heniochus monoceros** Cuvier and Valenciennes.

*Heniochus monoceros* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 100—Mauritius; Günther, Fische der Südsee, 1, 1874, p. 49, pl. 38;

Kendall and Radcliffe, Mem. Mus. Comp. Zool., 35, 1912, p. 143; Fowler, Mem. Bishop Mus., 10, 1928, p. 258.

Dorsal XII, 26; anal III, 19. There are 57 scales in the lateral line, 9 above and 24 below it. The depth is 1.4 times, the head 2.8 times in the length. The head is much deeper than long, with a large horn projecting forward from the middle of the nape. In front of each eye is a large outward curved horn. The large circular eye is 3.33 times, the pointed snout 2.3 times in the head. The pectoral is 0.9 of the length of the head. The very broad ventrals reach to the origin of the anal, 1.15 times in the head. The truncate caudal is 1.33 times in the head. The fourth dorsal spine is very broad and much elongated. The thread-like tip has been broken off in my specimen. The soft dorsal and anal are high, so that the greatly compressed body is nearly square.

The color in life is brilliant golden, banded with silvery white and black, the ventrals and anal margin black. In alcohol the golden color disappears and the whole fish is white or whitish, with black crossbands. A black band extends from over the eyes to below the chin, and a black patch extends forward from the origin of the dorsal nearly to the horn on the nape. A wide black band goes from the base of the fifth and sixth dorsal spines to the belly, where it reaches from the origin of the deep black ventrals to the origin of the anal. The anal is margined with black. There is a black bar on the pectoral base. A vague but broad dusky bar extends diagonally backward and downward from below the last dorsal spines to the posterior part of the anal rays.

A fine specimen, 170 mm. long, was collected at Takaroa, Tuamotu Archipelago.

### *Heniochus permutatus* Bennett.

*Heniochus permutatus* Bennett, in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 99; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 346; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 80, pl. 22, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 258.

*Heniochus chrysostomus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 99; Valenciennes, Poiss., in Cuvier, Regne Anim., Disciples ed., 8, 1836, pl. 40, fig. 2; Lay and Bennett, Fishes, Voy. Blossom, 1839, p. 62, pl. 18, fig. 1; Günther, Fische der Südsee, 1, 1873-75, p. 49, pl. 39, fig. A; Ahl, Chaetodontidae, p. 30, in Archiv Naturg., 89, 1923, Abt. A, Heft 5.

*Taurichthys chrysostomus* Bleeker, Atlas Ichth., 9, 1878, p. 29, pl. 366, fig. 4.

*Heniochus drepanoides* Thiollière in Montrouzier, Fauna Woodlark Is., 1857, p. 166.

Dorsal XII, 22; anal III, 18. There are 50 scales in the lateral line, 11 above and 25 below it. The depth is 1.45, the head 3.1, the pectoral 2.66 times in the length. The caudal is a little less than the head. The eye is 2.6, the interorbital 3.46, the snout 2.9 times in the head. The fourth dorsal spine is elongated, with a filamentous tip and a wide membrane behind. The dorsal profile is very steep, the snout concave. There is a short sharp bifid spine over each eye.

The color in alcohol is yellowish white, with 3 transverse, somewhat curved, black bands descending diagonally backward. The first is from the top of the head to the belly, including the eye and ventrals. The second is from the fourth to sixth dorsal spines to and including most of the anal rays. The third extends from the 5 posterior dorsal spines, covers the base of the dorsal rays, and extends to or across the caudal base.

Here described from a specimen, 120 mm. long, collected on the reef at Maraa, Tahiti, and 2 specimens, 118 and 122 mm. in length, from Bora Bora. Numerous specimens were seen in the Tuamotu and Society Islands. A specimen, 75 mm. long, was taken at Malo Island, New Hebrides.

#### **Holacanthus sexstriatus** Kuhl and Van Hasselt.

*Holacanthus sexstriatus* Kuhl and Van Hasselt in Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 145—Java; Bleeker, Atlas Ichth., 9, 1878, p. 66, pl. 372, fig. 1.

Dorsal XIII, 20; anal III, 18. There are 50 scales in a lateral series, 9 above and 30 below the lateral line. The depth of the oval, compressed body is 1.7 to 1.8 times, the head 2.1 to 2.2, the least depth of the caudal peduncle 6.7 to 7.5 times in the length. The eye is 4 to 4.7, the snout 2.3 to 2.4, the interorbital 2.9 to 3.2, the maxillary 3 to 3.5 times in the head. The preopercular spine is twice in the head. The dorsal spines increase in length to the last, which is 2.2 in the head.

In life the color is yellowish brown, each scale with a large dark blue center. The head is dark blue with a broad pearl white band from the nape to the base of the opercular spine. On the body are 6 dark blue vertical bands. The dorsal spines and the preopercular spine are blue. The dorsals, anal, and caudal are yellowish brown with a blue margin, a submarginal band of blue black, and many circular bluish white spots scattered over the fins. In alcohol the ground color is yellowish, the head, breast, fins, and vertical bands violet black. The pearl white band on the head is

dull white. The blue centers of the scales are blackish. The fins are marked much as in life.

Numbers of specimens were seen in the Solomon Islands, but only one specimen, 300 mm. long, was secured at Tenibuli, Ysabel Island, and it was taken by Field Museum to be used in making a cast.

#### **Holacanthus passer Valenciennes.**

*Holacanthus passer* Valenciennes, Voy. Venus, pl. 6, 1846, p. 327, 1855—Galapagos Islands.

Dorsal XIII, 19 and XIV, 17; anal III, 17. The depth is 1.56 to 1.75 times, the head 3.5 to 3.6 times in the length. The eye is 4.4 to 5 times, the preopercular spine 3 to 3.3 times in the head. There are 46 to 48 rows of scales in a longitudinal series. The ascending limb of the preopercle is coarsely serrate, with a spine in front of the large one at the angle and another on the subopercle. The preorbital has 3 or 4 short spines. The middle rays of the soft dorsal and anal are elongate and attenuate, and extend almost to the posterior end of the caudal.

The color is purplish black, each scale on the posterior half of the body with a pale greenish yellow vertical bar. A vertical purplish or bluish white bar descends from the base of the sixth and seventh dorsal spines to behind the pectoral, becoming narrower below. On the nape before the dorsal fin is a circular deep blue spot, sprinkled with bluish pearl spots. The pectorals, ventrals, caudal, and dorsal back to the fourth or fifth spine are brilliant yellow or orange. The soft dorsal and anal are more or less yellow, barred with irregular purplish bands. The anal and dorsal, except 4 or 5 anterior spines, have a marginal band of pearly blue. The caudal has a marginal dark line. This very handsome and showy species varies in both form and color with advancing age.

Two specimens, 180 and 236 mm. in length, were taken in Tagus Cove, Albemarle Island, Galapagos Islands.

#### **Holacanthus flavissimus Cuvier and Valenciennes.**

*Holacanthus flavissimus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 197—Uleá; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 65; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 348; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 261.

*Holacanthus cyanotis* Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 517; Günther, Fische der Südsee, 1, 1873-75, p. 52, pl. 40, fig. B.

*Holacanthus monophthalmus* Kner, Sitzungsber. Akad. Wiss. Wien, 56, 1867, p. 714.

*Holacanthus ocularis* Peters, Monatsb. Akad. Wiss. Ber., 1868, p. 147.

Dorsal XIV, 16; anal III, 15 or 16. There are 45 or 46 scales in a longitudinal series, 7 above the lateral line and 22 below it. The depth is 1.6, the head 3.8 times in the length. The eye is 2.85, the snout 2.5, the interorbital 3.1 times in the head. The preopercular spine equals the eye.

The color in life is clear brilliant deep yellow, with a deep blue bar on the posterior margin of the opercle, a deep blue ring around the eye, and a blue line on the edge of the soft dorsal, anal, and caudal. The preopercular spine is blue, there is a dark blue transverse bar on the chin, and a blue spot beneath the chin above the isthmus. In alcohol the colors are similar but paler.

Three very beautiful little specimens, 64 to 76 mm. in length, were collected at Maraa, Tahiti, and one, 73 mm. long, was taken at Bora Bora. Numerous others were seen at various places, but not secured.

#### **Holacanthus vroliki** Bleeker.

*Holacanthus vroliki* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 339—Amboina; Bleeker, Atlas Ichth., 9, 1878, p. 63, pl. 371, fig. 1; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 92, pl. 22, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 164.

Dorsal XIV, 15 to 17; anal III, 15 to 17. There are 35 to 38 scales in the lateral line with tubules, 7 above and 20 to 23 below it, and 40 in a longitudinal series plus 2 more on the caudal base. The depth is 1.7 to 2 times, the head 3.2 to 3.4 times in the length. The eye is 2.6 to 3.3, the snout 3.4 to 4, the interorbital 3.1 to 3.5, the least depth of the caudal peduncle 2 to 2.2 times in the head.

In life the anterior two-thirds is a soft light brown, passing gradually into deep violet black or brownish black on the posterior third, soft dorsal, anal, and caudal. On each scale is a vertical pale or whitish streak or bar. In alcohol the colors are paler, otherwise but little changed, with a large black mark on the hind margin of the opercle.

Two specimens, 67 and 76 mm. long, were taken at Tenibuli, Ysabel Island, Solomon Islands.

#### **Holacanthus nicobariensis** (Bloch and Schneider).

*Chaetodon nicobariensis* Bloch and Schneider, Syst. Ichth., 1801, p. 219, pl. 50—Nicobars.

*Holacanthus nicobariensis* Günther, Fische der Südsee, 1, 1873-75, p. 54, pl. 41, fig. B; Day, Fishes India, 1878-88, p. 112, pl. 28, fig. 6; Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 98.

*Acanthochaetodon nicobariensis* Bleeker, Atlas Ichth., 9, 1878, p. 69, pl. 365, fig. 1.

Dorsal XIII or XIV, 19 to 21; anal III, 19 or 20. There are 85 to 88 scales in the lateral line, 13 or 14 above and 36 to 40 below it. The head and body are much compressed, the depth 1.8, the head 2.8 to 3 times in the length. The eye is 2.7 to 3.2, the snout 3.1 to 3.2, the interorbital 3.5 to 3.9, and the least depth of the caudal peduncle 2.7 to 2.9 times in the head.

In alcohol the color is deep blackish blue, with alternately broad and narrow curved white lines on the sides, the posterior one forming a complete ring before the caudal peduncle. These lines extend upon the dorsal, anal, and caudal fins where they divide and form a more or less well-developed network. The posterior half of the caudal is white. On the side of the head are 3 broad and often several narrow vertical white lines. A broad white line crosses the interorbital from eye to eye.

This species is distinguished at once from *H. semicirculatus* by the complete circle or ellipse on the posterior part of the trunk, by the absence of a vertical median white line running down the snout, and by the presence of an interorbital crossband.

A specimen, 26 mm. in length, was taken at Wala Island, New Hebrides.

### *Holacanthus semicirculatus* Cuvier and Valenciennes.

*Holacanthus semicirculatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 143, pl. 183—Timor, Waigiu, Port Praslin, New Ireland; Lesson, Voy. Coquille, Zool., Poiss., 2, 1830 (1831), p. 173, pl. 30, fig. 3;<sup>1</sup> Herre and Montalban, Phil. Journ. Sci., 34, 1927, p. 100, pl. 19, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 185, fig. 9.

*Holacanthus striatus* Rüppell, Neue Wirbelt., Fische, 1835, p. 32, pl. 10, fig. 2.  
*Acanthochaetodon semicirculatus* Bleeker, Atlas Ichth., 9, 1878, p. 69, pl. 370, fig. 5.

*Holacanthus nicobariensis* var. *semicirculatus* Day, Fishes India, 1878-88, p. 112, pl. 28, fig. 6.

Dorsal XIII, 22; anal III, 20. There are 75 scales in a longitudinal series, 14 above and 45 below the lateral line. The deep, ovoid body is strongly compressed, its depth 1.5 to 1.7, the head 2.8 to 3.2 times in the length. The eye is 2.45 to 2.8, the snout 2.6 to 3, the interorbital 3.8 times in the head. The convex caudal is 3.33, the pectoral 4 times in the length. The ventral is equal to the head, its outer filamentous ray extending upon the anal.

<sup>1</sup> Since Lesson cites Cuvier and Valenciennes it is self-evident that his account was published later, in spite of the discrepancy in the dates on the title pages of the two works.

The color in life is the darkest indigo, the ventrals and dorsal and anal margins clear deep blue, with 18 irregular curved or vertical crossbars and lines, 5 of them white and much broader than the others, the rest narrow to linear and white or bluish white. There is a median white line from the nape to the tip of the snout. The outer part of the caudal is colorless or white. In very young specimens only the 5 wide crossbars are present, the narrow lines appearing gradually with age. In alcohol the color is blackish brown to bluish black, the white lines as in life.

Two specimens, 13 and 25 mm. in length, were collected at Wala Island, New Hebrides.

### Family ZANCLIDAE

#### *Zanclus canescens* (Linnaeus).

*Chaetodon canescens* Linnaeus, Syst. Nat., ed. 10, 1, 1758, p. 272.

*Zanclus canescens* Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 493; Bleeker, Atlas Ichth., 9, 1878, p. 366, pl. 4, fig. 3; Weber, Siboga Exp., Fische, 1913, p. 325; Herre, Phil. Journ. Sci., 34, 1927, p. 472, pl. 8.

*Zanclus montrouzieri* Thiolliere in Montrouzier, Fauna Woodlark, 1856, p. 168.

Dorsal VII, 38 to 41; anal III, 32 to 35. The strongly compressed body is very deep, short, the back greatly elevated, the breast and belly equally extended and semicircular, the depth equal or nearly equal to the length. The head is not drawn out into a long tubulated snout, is deeper than long, 2.4 to 2.6 times in the length. The eye is high up, 2.85 to 3 times in the head and 1.7 to 2 times in the short, deep, concave snout, which is 1.66 to 1.8 times in the head. The convex interorbital equals or nearly equals the eye, and lacks horns or humps over the eye. The preorbital has a strong, sharp, backward curved spine above the angle of the mouth, with 2 or 3 small pointed teeth before the base of the spine. The first and second dorsal spines are very short and stout. The third is prolonged into a thread and may be twice the total length of the fish. The pectoral and caudal are equal, about a tenth shorter than the head. The first ventral ray equals or is a little longer than the head.

The color in alcohol is brownish yellow. A black band extends from the predorsal region over the eye and before the pectoral to the ventral fin and belly. A narrower black band descends from the top of the anterior dorsal rays to the lower margin of the anal. The third dorsal spine and ventrals are black, the free tips of most of the dorsal rays and the rear third of the anal rays whitish or

yellowish. The caudal is black with a whitish lunate margin. There is no trace of the characteristic blue or pearly stripes and lines of *Z. cornutus*.

A fine specimen, 54 mm. long, was obtained at Tahiti.

### *Zanclus cornutus* (Linnaeus).

*Chaetodon cornutus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 273; Bloch, Ichthyologie, 6, 1788, p. 52, pl. 200, fig. 2.

*Zanclus cornutus* Cuvier and Valenciennes, Hist. Nat. Poiss., 7, 1831, p. 102, pl. 177; Day, Fishes India, 1878-88, p. 111, pl. 28, fig. 4; Günther, Fische der Südsee, 2, 1876-81, p. 42, pl. 92; Bleeker, Atlas Ichth., 9, 1878, p. 77, pl. 366, figs. 1 and 2; Herre, Phil. Journ. Sci., 34, 1927, p. 473, pls. 9 and 10.

*Zanclus canescens* (not of Linnaeus) Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 382, pl. 57; Fowler (excluding synonymy), Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 263, pl. 29B.

Dorsal VII, 39 to 41; anal III, 31 to 33. The short, compressed body is much elevated, its depth 1.1 to 1.3 times, the head 2.25 to 2.5 times in the length. The very concave, long, tubulate, pointed snout is 3.1 to 3.5 times in the length, 1.35 to 1.45 times in the head. The eye is high up, 4 to 5 times in the head. The interorbital is concave, about equal to the eye, with a hump or a pointed, outwardly curved horn above each eye. The first and second dorsal spines are very short, stout, and sharp. The third spine is long to exceedingly elongate, with a thread-like tip, sometimes 1.5 times the length of the head and body together. The other spines and dorsal rays are successively shorter, the posterior rays very short. The anal rays are high anteriorly, the posterior half of the fin very short. The rather broad caudal is truncate or slightly lunate, 1.2 to nearly 1.5 times in the head. The pectoral is shorter than the caudal, 1.4 to 1.5 times in the head.

This gorgeously colored little fish is usually bright canary yellow in life, but may be white or pearly white; a broad black or dark brown crossband extends from the supraorbital horns to the first and second dorsal spines, down to breast, ventrals, and behind anus, its anterior margin bordered by a blue or pearl white stripe. Two or three blue lines cross it vertically. Another black or dark brown band extends from the tip of the anterior dorsal rays downward to the lower margin of the anal, widest below, with a vertical blue line across its posterior part. A broad black or dark brown band covers most of the caudal, behind it a crescent-shaped blue or white stripe and a wide yellow margin. A black or dark brown band extends from the interorbital to the tip of the snout. From it a line loops

downward on the side of the snout, enclosing a roughly triangular area, margined below by a pearly white or bluish line. The lower jaw is black or dark brown. The pectorals are yellow, the ventrals black or dark brown. The soft dorsal and anal are edged with black. In alcohol the yellow usually fades to white or pale brownish yellow, and the blue lines turn to white. The dark crossbands usually turn paler also.

This striking-looking little fish was abundant and conspicuous around the docks at every port in the South Seas, but very few specimens were secured, as neither traps, nets, nor dynamite could ordinarily be used at such places. They were observed at Takaroa, Papeete, Bora Bora, and Suva. One specimen, 104 mm. long, was secured on the reef at Maraa, Tahiti, and two, 60 and 75 mm. long, were taken at Vila, Efaté Island, New Hebrides.

#### Family ACANTHURIDAE

##### *Acanthurus triostegus* (Linnaeus).

*Chaetodon triostegus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 463—Indies.

*Acanthurus triostegus* Bloch and Schneider, Syst. Ichth., 1801, p. 215; Day, Fishes India, 1878, p. 204, pl. 48, fig. 2; Herre, Phil. Journ. Sci., 34, 1927, p. 407, pl. 1, fig. 1.

*Hepatus sandvicensis* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 394, fig. 172.

I am unable to separate *sandvicensis* from *triostegus*, since intergrading forms occur. Large schools of the young of this species frequent the shallow pools of the coral reefs. With age they retire to much deeper water.

The characteristic vertical bands are present in the larval stage with vertical keeled striae, before scales are formed. Specimens 25 mm. long are still in this condition but emerge from it and become scaled before they attain a length of 30 mm. None of my specimens show a continuation of the second vertical band below the pectoral.

From Cocos Island there are 6 specimens, 20 to 35 mm. in length. Six specimens, 25 to 29 mm. long, were collected at Atuona, Hiva Oa Island, and two, 30 and 38 mm. long, at Nuka Hiva Island, in the Marquesas. At Makatea, one of the Tuamotu Archipelago, this species swarmed in the pools on the reef. Thirty-two specimens, 25 to 32 mm. long, were taken there. Four were collected at Tahiti, their lengths from 23 to 40 mm. In the Fiji Islands the following were collected: 2 at Ovalau, 34 mm. long; 1 at Nukulau, 48 mm.

long; 1 at Suva, 46 mm. long. In the New Hebrides 3 specimens, 22 to 24 mm. in length, were taken at Wala Island.

### *Acanthurus gahm* (Forskål).

*Chaetodon gahm* Forskål, Descr. Anim., 1775, p. 64—Red Sea.

*Acanthurus gahm* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 219; Günther, Fische der Südsee, 1, 1873-75, p. 113, pl. 74; Herre, Phil. Journ. Sci., 34, 1927, p. 411, pl. 12, fig. 2.

*Chaetodon nigricans* Linnaeus, Syst. Nat., ed. 10, 1758, p. 274(?).

*Hepatus nigricans* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 351; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 272.

Dorsal IX, 25; anal III, 23 to 24. The body is oblong, much compressed, with a very convex upper profile, the snout becoming vertical or even overhanging the mouth. The depth is 2, the head 3.5 to 3.7, the caudal 1.9 to 2.1 times in the length. The eye is 3.7 to 4.6, the snout 1.25 to 1.4, the interorbital 2.25 to 2.75, the least depth of the caudal peduncle 2.4 to 2.5, the caudal spine 4 to 4.3 times in the head. The very short first dorsal spine is entirely and the second spine almost entirely concealed in the thick skin. The small, inferior mouth opens obliquely downward, with 9 teeth on each side above and 10 teeth on each side in the lower jaw.

In life the color is variable, but usually dusky brown, with a dull blue spot on the nape and a broad white band on the caudal base, a conspicuous black longitudinal bar behind the eye, and a very narrow and greatly elongate, pointed black stripe extending forward from the black caudal spine halfway to the tip of the pectoral fin. The dorsal and anal are brownish orange, with a dark blue basal band, the anal edged with bright blue. The caudal is slaty blue, with a deep blue stripe above and below and a wide bluish white posterior margin. The pectoral has a broad yellow crossbar, the posterior margin colorless. The ventral is streaked with reddish. In alcohol the color is very dark brown. The black shoulder bar and long pointed stripe before the caudal spine are as in life and enable one to recognize the species at once. The fins are much as in life but darker, the blue usually turning to black.

At Bora Bora 2 specimens were collected, 122 and 146 mm. in length, and at Malo Island, New Hebrides, one, 146 mm. long. A large specimen obtained at Tenibuli, Ysabel Island, in the Solomons, was accidentally dropped overboard.

### *Acanthurus aliala* Lesson.

*Acanthurus aliala* Lesson, Voy. Coquille, Zool., 2, 1830, p. 150—Oualan, Caroline Islands; Herre, Phil. Journ. Sci., 34, 1927, p. 416, pl. 2, fig. 2.

*Acanthurus glaucopareius* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 139; Günther, Fische der Südsee, 1, 1873, p. 114, pl. 71, fig. A; Fowler, Mem. Bishop Mus., 10, 1928, p. 272.<sup>1</sup>

Dorsal IX, 28 to 29; anal III, 25 or 26. The depth is 1.7, the head 3.4 to 3.6 times in the length. The eye is 2.75 to 2.9, the concave snout 1.25 to 1.35 times in the head. The bulging inter-orbital equals the eye. The mouth is very small, projecting downward, with 5 broad short teeth on each side of the upper jaw, their margins denticulate. The pectoral exceeds the head. The ventrals are 1.3 to 1.5, the least depth of the caudal peduncle 2.35 to 2.5 times in the head. The short, wide caudal is nearly truncate or slightly concave, about 3.25 times in the length.

In life the yellow basal band on the dorsal and anal is very bright and conspicuous. The pale, nearly white caudal has a yellow crescent and behind it is a broad, darker crescent merging into the blue margin. There is a large violet pearl spot beneath the eye and extending anteriorly. There is a broad pearly blue band almost encircling the mouth, but it is not continuous on the upper lip. The dorsal, anal, and ventrals are all edged with pale blue. In alcohol the color is purplish to brownish black, the spot beneath the eye and the bands on the dorsal, anal, and about the mouth yellowish or whitish. The caudal is yellowish with a wide blackish band on the posterior margin.

Two specimens, respectively 173 and 192 mm. in length, were obtained at Cocos. This species is very abundant at this lovely island, large schools swimming about in deep water a few yards off shore and feeding upon the algae covering the rocks. In the Marquesas 3 specimens, 139 to 180 mm. long, were collected at Atuona, Hiva Oa Island, and 3 specimens, 126 to 131 mm. long, at Nuka Hiva. A fine specimen, 145 mm. long, was obtained at Takaroa, one, 130 mm. long, at Tahiti, and one, 133 mm. long, at Moorea.

### *Acanthurus lineatus* (Linnaeus).

*Chaetodon lineatus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 274.

*Acanthurus lineatus* Bloch and Schneider, Syst. Ichth., 1801, p. 214, pl. 49; Günther, Fische der Südsee, 1, 1873-75, p. 111, pl. 70; Herre, Phil. Journ. Sci., 34, 1927, p. 420, pl. 14, fig. 1.

<sup>1</sup> Fowler uses the name *Hepatus glaucopareius*, giving for the specific name an apparently fictitious reference, "*Harpurus glaucopareius* (Forster) Schneider, Systema Ichth., Bloch, p. 212, 1801; (type loc., Tahiti)." Schneider copies Forster's description, using the name *Harpurus*, but nowhere does he use the name *glaucopareius*. On the contrary he gives Forster's description as a note under *Harpurus nigricans*. Apparently the first person to use the name *glaucopareius* was Seba, a pre-Linnaean author, in 1734, as explained by Cuvier and Valenciennes.

*Acanthurus vittatus* Bennett, Fishes Ceylon, 1828, p. 2, pl. 2.

*Hepatus lineatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 351; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 269, excluding part of synonymy.

Dorsal IX, 26 or 27; anal III, 25 to 27. The depth is 2 or 2.1, the head 3.7 to 3.9, the caudal 2.3 to 2.4 times in the length. The eye is 4 to 4.5 times in the head, 3 times in the snout. The long, steep snout is 1.3 to 1.4, the interorbital 2.8 to 2.9 times, the least depth of the caudal peduncle twice in the head. The body is compressed, elongate ovoid, the anterior dorsal profile boldly convex, the nape compressed. The mouth is very low with 6 broad lobate teeth on each side of the upper jaw. The pectoral and ventral are each a little longer than the head. The caudal is deeply lunate. The elongate caudal spine is 1.9 to 2 times in the head.

The color in life is golden or vivid yellow, the belly blue or blue gray, with 8 to 10 deep blue, brown-margined stripes running from the eye and cheek to the caudal base and to the back and out upon the dorsal. Two similar bands curve forward from the eye on the snout and around on the cheek to the pectoral base. There are 2 or 3 similar vertical stripes at the caudal base. The anal is orange basally, the rest of the fin pale blue or olive or dark brown in others, with a marginal line of blue. The caudal is dark brown basally, then a lunate blue line, the outer part olive or brownish. The ventrals are orange, the anterior margin deep blue. The pectoral is brown basally, the rest of it yellow or pale, usually with a blue cross line. In alcohol the blue usually fades to dark brown or blackish. There is considerable variation in this vividly colored surgeon fish, no two specimens being exactly alike. Specimens 35 mm. long and less show the characteristic markings of this species.

"*Acanthurus striatus*" Quoy and Gaimard, is a *Ctenochaetus* and specimens 60 mm. long show none of the characters of *Acanthurus lineatus*. Fowler is therefore unjustified in his assumption that *A. striatus* Quoy and Gaimard is a synonym of *A. lineatus*.

Two very fine specimens, 161 and 170 mm. in length, were taken at Bora Bora and 2, 176 and 195 mm. in length, at Malo Island, New Hebrides. A specimen, 178 mm. long, was collected at Bushman Bay, and another, 158 mm. long, at Tenibuli, Ysabel Island, New Hebrides.

#### *Acanthurus matoides* Cuvier and Valenciennes.

*Acanthurus matoides* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 204—Oualan, Caroline Islands; Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 330; Herre, Phil. Journ. Sci., 34, 1927, p. 430, pl. 16, fig. 3.

*Hepatus matoides* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 387; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 352; Evermann and Seale, Proc. U. S. Nat. Mus., 31, 1906, p. 509; Fowler and Bean, Proc. U. S. Nat. Mus., 62, 1922, p. 57.

*Acanthurus annularis* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 209.

*Teuthis annularis* Fowler, Proc. Acad. Nat. Sci. Phila., 1900, p. 513.

*Acanthurus blochi* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 209; Günther, Fische der Südsee, 1, 1873-75, p. 109, pl. 69, fig. B.

*Teuthis guntheri* Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 477, fig. 29.

*Hepatus guntheri* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 388, fig. 168.

Dorsal IX, 25 or 26; anal III, 24 or 25. The depth is 1.7 to 2, the head 3.45 to 3.75 times in the length. The anterior profile is boldly convex from the dorsal to the tip of the snout. The eye is 3.5 to 3.8 or in very large specimens 4.5 to 5.6 times in the head, the snout 1.5 to 1.25 times in the head. There are 9 teeth on each side in the upper jaw, with long, pointed, crenulate or denticulate tips. The first dorsal spine is very short and concealed, the last one 1.4 to 1.5 times in the head. The pectoral is a little shorter than the head. The lunate caudal has its upper lobe pointed and somewhat elongate, 2.7 to 2.9 times in the length. The short, stout caudal spine is equal to the eye, or in the young may be twice the eye.

In life the color is uniform brown or purplish brown, darker above and paler below, with a narrow black band on the base of the dorsal and anal fins, with a blue band above it. The dorsal and anal are both orange with 4 or 5 longitudinal blue or lavender stripes. The pectoral is yellow or has a yellow posterior margin. There is a yellow area about the eye. The caudal spine is whitish in a black area. The caudal is brown or bluish, with a poorly defined paler crossbar on its base. The color in alcohol is brown to blackish brown, with a more or less distinct, broad, paler or whitish band on the caudal base. The bands on the dorsal and anal disappear.

In the harbor at Papeete, Tahiti, a specimen, 30 mm. long, was obtained, and a larval one in the *Acronurus* stage, 25 mm. long. At Tenibuli, Ysabel Island, Solomons, 3 excellent specimens, from 180 to 230 mm. in length, were collected.

At nearly every tropical Pacific harbor where we anchored a school of this surgeon fish would take up its quarters beneath our ship, and around the docks they could be seen near the bottom, at depths ranging from 15 to 30 feet. Many of very large size were

noticeable in the harbor at Rabaul, New Britain. Under the conditions I was not able to take them.

A study of living specimens kept under continuous observation for seven years, and of large numbers on the reefs by the use of a water telescope, and an examination of thousands of fresh specimens, have shown that there is no specific distinction between those with large and small eyes, banded and plain vertical fins, and convex and nearly straight anterior dorsal profile.

### *Acanthurus flavoguttatus* Kittlitz.

*Acanthurus flavoguttatus* Kittlitz, Mus. Senckenb., 1, 1834, p. 195, pl. 13, fig. 5—Caroline Islands; Günther, Fische der Südsee, 1, 1873-75, p. 112, copied; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1829, p. 217, copied.

*Acanthurus kittlitzii* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 222.

Dorsal IX, 23; anal III, 22 or 23. The depth is 2, the head 3.3 to 3.5, the caudal 2.65 to 2.8, the pectoral 3 to 3.25 times in the length. The snout is 1.45, the eye 3.25 to 3.5, the interorbital 2.9 to 3.2, the least depth of the caudal peduncle 2.63 to 2.7 times in the head. The ovoid body is compressed, the anterior profile with a bend at the interorbital, the snout very steep and nearly straight. The mouth is very low down, with 6 teeth on each side in the upper jaw, their round-pointed tips crenulate. In the lower jaw there are 6 teeth on each side, their blunt tips likewise crenulate. In both jaws the outermost tooth on each side is much smaller than the rest. The first dorsal spine is very short but not concealed, the ninth spine 1.8 times in the head. The soft dorsal and anal are angulate posteriorly, the longest dorsal rays 1.7 times in the head. The third anal spine is 2.25 times, the longest anal ray twice in the head. The slender, elongate, caudal spine equals the eye. The caudal is lunate, with pointed lobes, the upper tip longer than the lower. The first ventral ray is elongate, thread-like, equal to the head, and extending to the base of the third anal ray.

In life this is a very handsome surgeon fish, dark reddish brown in color, with numerous conspicuous golden spots on the sides of the head and breast, 4 blue longitudinal lines on the soft dorsal, a conspicuous black axillary spot on the soft dorsal and anal, and a blue line on the posterior caudal margin, the caudal spine in a black sheath. In alcohol the color is blackish brown, the dorsal and anal black, the pectorals and caudals blackish, the latter with

a bluish white posterior marginal line, the ventrals black. All the golden spots have disappeared, as have also the lines on the soft dorsal.

Here described from 2 specimens, 93 and 101 mm. in length, from Vila, Efaté Island, New Hebrides.

**Acanthurus elongatus** (Lacépède).

*Chaetodon elongatus* Lacépède, Hist. Nat. Poiss., 8, 1802, pp. 94 and 117; 7, 1802, pl. 5, fig. 2—the Great Ocean.

*Hepatus elongatus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 389; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 352; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 267; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 213.

*Acanthurus elongatus* Jordan and Jordan, Mem. Carnegie Mus., 10, 1922, p. 65.

*Acanthurus nigroris* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 206; Herre, Phil. Journ. Sci., 34, 1927, p. 428, pl. 4, fig. 1.

Dorsal IX, 24 or 25; anal III, 23 or 24. The depth is 2 to 2.25, the head 3.2 to 3.6, the caudal 2.7 times in the length. The eye is 3.9 to 4.5, the snout 1.4, the interorbital 3, the least depth of the caudal peduncle 2.3 to 2.4 times in the head. The body is much compressed, the anterior dorsal profile convex, the snout very steep. The small mouth is low down, with 6 broad teeth on each side of the upper jaw, their rounded tips finely crenulate. The first dorsal spine is short, not hidden, the last spine about 1.7 times in the head. The pectoral and ventrals are about equal to the head. The caudal is deeply lunate, the upper lobe the longer, with an elongate thread-like tip. The caudal spine is 2.7 to 2.8 in the head, its point very long.

The color in alcohol is uniformly brown or blackish brown, the lips black, the sides of the head and breast sometimes with metallic bronze luster. The dorsals and anal are darker than the body, with a black spot in the dorsal and anal axils. The brown caudal has a white or whitish line along its posterior margin. The pectoral is pale yellowish to very pale brown. The ventrals are brown, margined with blackish brown. The caudal spine sheath is black.

A juvenile specimen, 45 mm. long, was taken on the reef at Makatea, Tuamotu Archipelago, and a specimen, 83 mm. long, at Vila, Efaté Island, New Hebrides.

**Ctenochaetus striatus** (Quoy and Gaimard).

*Acanthurus striatus* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1824, p. 373; Atlas, 1824, pl. 63, fig. 3—Guam.

*Ctenochaetus striatus* Herre, Phil. Journ. Sci., 34, 1927, p. 437, pl. 13, fig. 2.

Large schools of this very beautiful fish were about the edge of the reef at Makatea, in the Tuamotu Archipelago, and great numbers came up on the reef with the incoming tide.

The color in life was a deep reddish violet, with the breast a deep blue but varying from indigo to violet. The body was marked by 10 or 11 longitudinal stripes of pale red to orange. The vertical fins were deep violet or very dark blue, the dorsal with numerous fine longitudinal lines of paler blue. The tips of the caudal were crimson or deep red.

*Ctenochaetus striatus* has been confused with *Ctenochaetus strigosus* (Bennett), under the false assumption that it is merely the young of the latter. An examination of hundreds of living specimens of both species, as well as thousands of *C. strigosus* varying in length from 35 to 160 mm., has shown that they are altogether different. At no stage of its development does *C. strigosus* have the characteristic markings, coloration, or proportions of *C. striatus*.

Seventy-five specimens were preserved, varying from 42 to 60 mm. in length, but most of them about 50 mm. long. A single specimen, 52.5 mm. long, was taken at Moorea.

#### *Ctenochaetus strigosus* (Bennett).

*Acanthurus strigosus* Bennett, Zool. Journ., 4, 1828, p. 41—Hawaii; Günther, Fische der Südsee, 1, 1873-75, p. 116, pl. 79, fig. B.

*Ctenochaetus strigosus* Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 480; Herre, Phil. Journ. Sci., 34, 1927, p. 438, pl. 15, figs. 2 and 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 274.

*Acanthurus clenodon* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 241, pl. 289.

*Ctenochaetus striatus* (not of Quoy and Gaimard) Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 398; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 355.

Dorsal VIII, 24 to 28; anal III, 24 to 26. The depth of the ovoid, compressed body is 1.8 to 2, the head 3.3 to 3.6 times in the length. The anterior dorsal profile is boldly convex. The eye is 3.3 to 3.4, the snout 1.33 to 1.5 times in the head. There are 17 to 19 teeth on each side of the upper jaw, 20 or 21 on each side in the lower jaw. The very short first dorsal spine is embedded in the skin, the second spine short and barely visible, the other spines increasing to the last, which is 1.7 times in the head. The deeply lunate caudal is 2.25 to 2.7, rarely 2, times in the length, the pointed lobes nearly equal or the upper one elongate. The pectoral equals or exceeds and the pointed ventral

equals or is shorter than the head. The elongate, knife-like, pointed caudal spine is 2.75 to 3 times in the head.

The color in life is reddish brown to deep chocolate brown, with many wavy, more or less irregular longitudinal blue lines along the sides. Small circular brownish red or golden spots are sprinkled over the sides of the head, nape, and throat. On the dorsal and anal are 2 to 4 longitudinal blue lines. The eyes are brilliant sapphire. This fish is able to change its color greatly. In alcohol the color varies from pale to blackish brown, the dorsal, anal, and caudal darker than the body, with a black spot at the posterior axil of the soft dorsal and anal. The blue longitudinal lines largely disappear or become whitish, as do the golden spots on the head. The ventrals are blackish, the caudal spine in a blackish sheath.

This species is very abundant about coral reefs throughout Polynesia and the East Indies, and is the commonest of the surgeon fishes (Acanthuridae). One was collected at Papeete and 6 at Maraa, Tahiti, from 104 to 175 mm. in length, 8 at Moorea, 49 to 148 mm. in length, and 9 at Bora Bora, 75 to 148 mm. in length. In the New Hebrides a specimen, 97 mm. long, was taken at Vila, Efaté Island, and 5 specimens, 120 to 152 mm. long, at Malo Island. Two specimens, 100 and 108 mm. long, were obtained at Tenibuli, Ysabel Island, Solomon Islands.

### ***Zebrasoma flavescens* (Bennett).**

*Acanthurus flavescens* E. T. Bennett, Zool. Journ., 4, 1828, p. 41; Günther, Fische der Südsee, 1, 1873-75, p. 116, pl. 76.

*Zebrasoma flavescens* Herre, Fishes of Marcus Island, Occ. Papers Bishop Mus., 2, 1903, p. 234; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 397, pl. 5; Herre, Phil. Journ. Sci., 34, 1927, p. 441; Fowler, Mem. Bishop Mus., 10, 1928, p. 274, pl. 32A.

Dorsal V, 24 or 25; anal III, 19 to 21. The body is very deep and strongly compressed, the depth 1.4 to 1.75, the pointed head 2.8 to 3 times in the length; the eye is 3.66 to 4 times, the long, very concave snout 1.25 to 1.4 times in the head. The mouth is very low down, the jaws produced, usually equal, with 8 or 9 lobate teeth on each side of both jaws. The first dorsal spine is very short, usually concealed, the last one equal to or longer than the snout. The anterior part of the soft dorsal is much the highest, the second to fifth rays longest, the posterior rays very low. The first anal spine is very short, concealed. The caudal is a little shorter than the head, its posterior margin truncate or slightly convex. The stout caudal spine is 4 to 5 times in the head. Before the caudal

spine is a patch of hooked bristles which may be little developed or may be very large, with long coarse bristles.

The color in life is dark or purplish brown to blackish, the patch of bristles before the caudal spine black, or paler than the body, or the tips of the bristles may be pale blue. The sides of the head and breast are covered with fine, pale blue dots. About the pectoral and behind a perpendicular from the dorsal origin they pass into irregular wavy fine blue lines. The pectoral is yellowish or pale blue. The other fins are chocolate or purplish brown or blackish. The caudal spine has a conspicuous white sheath. Sometimes there is a pale blue bar from the gill opening to the patch of bristles on the side. In alcohol the blue dots and lines often change to whitish or may disappear and the pectoral fades, but otherwise there is little change.

At Tahiti a specimen, 122 mm. long, was collected, also 2 at Bora Bora, 100 and 126 mm. in length. Many others were seen, especially about docks where they could not be taken. A specimen, 76 mm. long, was obtained at Malo Island, and 2 specimens, 68 and 76 mm. in length, at Vila, Efaté Island, in the New Hebrides. A specimen, 78 mm. long, was secured at Hathorn Sound, New Georgia Island, Solomon Islands.

### ***Zebrasoma veliferum* (Bloch).**

*Acanthurus velifer* Bloch, *Ichthyologie*, 12, 1797, p. 106, pl. 427, fig. 1, collection of M. John; Rüppell, *Atlas, Fische, Rothen Meers*, 1828, p. 58, pl. 15, fig. 2.

*Zebrasoma veliferum* Jordan and Evermann, *Bull. U. S. Fish Comm.*, 23, part 1, 1903 (1905), p. 396, fig. 173; Jordan and Seale, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 356; Herre, *Phil. Journ. Sci.*, 34, 1927, p. 442, pl. 11; Fowler and Bean, *Bull. 100, U. S. Nat. Mus.*, 8, 1929, p. 255.

*Acanthurus hypselopterus* Steindachner, *Denks. Akad. Wiss. Wien*, 70, 1900, p. 494, pl. 4, fig. 1.

Dorsal IV, 28 to 32; anal III, 24 or 25. The irregularly ovoid body is strongly compressed, the depth 1.9 to 2 times, the head 3.2 to 3.6, the caudal 3 to 3.3, the pectoral 3.25 to 3.8 times in the length. The eye is 4 to 4.1 times in the head and 2.5 to 2.75 times in the snout, which is 1.45 to 1.6 times in the head. The interorbital is a third wider than the eye. The least depth of the caudal peduncle is 3.4 to 3.6 times in the head. The stout, razor-edged and sharp-pointed caudal spine is nearly equal to the eye. The first dorsal spine is concealed and is very short, the others successively longer, the last more than the head, 2.66 to 2.9 times in the length. The anterior dorsal rays are very high, 1.9 to 2.25 in the length. The first

anal spine is short and concealed, the last 1.4 to 1.75 in the head. The seventh to tenth anal rays are longest, equal to or more than the head.

In life this is a very strikingly colored and handsome fish. The body is dark brown, the sides of the snout and throat very pale to whitish, mottled with small golden spots. Six broad, golden yellow bands cross the sides, the first descending from the predorsal region diagonally to the base of the ventrals. The second begins on the dorsal fin and descends obliquely behind the pectoral base to the base of the anal spines. The remaining bands are evenly spaced, the last one extending from the base of the last three dorsal rays to the corresponding anal rays. Each of the interspaces between the yellow bands is marked by several black lines or stripes extending from the dorsal to the anal. The dorsal and anal are very dark brown or in some specimens violet, crossed by numerous blue or violet lines or rows of spots running from the base diagonally upward and forward. The pectoral and caudal are colored like the body, the ventrals purplish black. In alcohol the color is very dark brown to blackish, the golden crossbars faded to whitish or reddish brown, the golden spots on the cheeks and chin darkened or disappearing largely, the blue or violet cross lines on the dorsal and anal fading till the fins are nearly uniform black.

A specimen, 210 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### *Naso brevirostris* (Cuvier and Valenciennes).

*Naseus brevirostris* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 277, pl. 291—Moluccas, Mauritius, New Guinea; Günther, Fische der Südsee, 1, 1873-75, p. 121, pl. 79, fig. A, and text fig. 5; Day, Fishes India, 1878-88, p. 209, pl. 38, fig. 4.

*Acanthurus brevirostris* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 410, fig. 176.

*Naso brevirostris* Herre, Phil. Journ. Sci., 34, 1927, p. 450, pl. 5, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 277; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 268, fig. 17.

Dorsal VI, 27 to 29; anal II, 28 to 30; pyloric caeca 3 + 2; vertebrae 9 + 13. The depth of the compressed body is 2.4 to 2.8, the head 3.6 to 4.3 (usually 4) times in the length. The eye is 3.9 to 4.3 times, the upper lip below the horn 4.5 to 5.2 times, the elongate snout 1.6 times in the head. The teeth are very small, about 24 on each side of the upper jaw. The forehead is produced into a stout, cylindrical, tapering horn which extends beyond the mouth, its length from the front margin of the eye a little more or

less than that of the head, its axis passing through the center of the eye. On each side of the caudal peduncle are 2 bony plates, each bearing a thin, high, keen-edged spine, often curved forward; the caudal equals the head.

The color in life is usually olive brown, paler below, the sides thickly barred by transverse rows of blue dots and lines which break into dots below, the sides of the head with similar spots or with more or less longitudinal stripes. The vertical lines are usually best developed posteriorly, but may cover the entire side. Sometimes the markings are few in number or may be altogether absent. The membranous margin of the opercle is yellow. The dorsal, anal, and pectorals are uniform brown, or the dorsal may have faint longitudinal lines. Sometimes both the dorsal and anal have a basal band of blue. The caudal is yellowish or green with a yellow crossband posteriorly, a green or black marginal band, and a fine white edging. In alcohol the blue markings change to dark brown and the fins become uniform brown.

Two fine specimens were taken at Takaroa, Tuamotu Archipelago, their lengths 278 and 290 mm.

This species is easily distinguished by the very short and nearly vertical snout between the horn and the upper lip.

### *Naso lituratus* (Forster).

*Harpurus lituratus* Forster, Descr. Anim., ed. Lichtenst., 1844, p. 218.

*Acanthurus lituratus* Bloch and Schneider, Syst. Ichth., 1801, p. 216, on MS. of Forster; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 358.

*Naseus lituratus* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 282; Günther, Fische der Südsee, 1, 1873-75, p. 124, pl. 82.

*Callicanthus lituratus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 404, pl. 60 and fig. 177.

*Naso lituratus* Herre, Phil. Journ. Sci., 34, 1927, p. 464, pl. 16, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 276; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 278.

*Aspisurus elegans* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 61, pl. 16, fig. 2.

Dorsal VI, 29 to 31; anal II, 30 or 31; pyloric caeca 8. The depth of the compressed body is 2 to 2.2 times, the head 3.4 to 3.5, the lunate caudal 3.25 to 4 times in the length. The eye is 4 to 4.5, the snout 1.33, the pectoral 1.4 to 1.5 times in the head. There are 14 to 16 small teeth on each side in the upper jaw, their smooth tips rounded. The first dorsal spine is 2 to 2.3 times, the first anal spine 3.25 to 3.5 times in the head. The least depth of the caudal peduncle is 5.2 to 5.6 times in the head. On each side

of the caudal peduncle are 2 horny plates, each with a wide, thin, high-keeled spine, the posterior one on the base of the caudal fin. These caudal spines vary much with age, becoming strongly curved forward and sharp pointed. In the very young the spines are not developed, and the basal plates are little evident. Sometimes an adult specimen lacks one or two spines, on either or both sides.

In life the color is dark olive to dusky brown, the breast and belly more or less golden or yellowish, with a broad yellow or golden band above and behind the eyes and over the interorbital region, and a stripe of the same color curving downward and forward from the lower anterior margin of the eye to the angle of the mouth, thence often looping back to the hind margin of the preopercle. The lips are red. The caudal plates and spines are golden, or orange red set in a golden patch. The spinous dorsal is black, the soft dorsal blackish with a white or bluish white marginal band and a basal stripe of lilac blue. The anal is blackish basally, the outer half yellowish or pale, with a lilac margin. The caudal has a white band on the hind margin and a broader greenish yellow submarginal band. The color in alcohol is usually nearly uniform dark brown to dusky, the golden bands and patches disappearing or sometimes becoming whitish. Two specimens, 85 and 91 mm. long, were taken at Vila, Efaté Island, New Hebrides.

### **Xesurus laticlavus** (Valenciennes).

*Prionurus laticlavus* Valenciennes, Voy. Venus, p. 337, 1855, pl. 7, fig. 2, 1846—Galapagos Islands.

*Xesurus laticlavus* Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1695; Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 404.

*Xesurus clarionis* Gilbert and Starks, Proc. U. S. Nat. Mus., 1896, p. 445, pl. 51—Clarion Island.

Dorsal VIII or VII, 27 or 26; anal III or IV, 22 or 23. The form of the body and head is subject to variation, particularly in the depth and in the shape of the snout, which may be deeply concave in some, much less so in others.

Seven specimens, from 56 to 86 mm. long, were collected at Eden Island, Galapagos.

### Family TEUTHIDAE

### **Teuthis rostrata** (Cuvier and Valenciennes).

*Amphacanthus rostratus* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 158—Massaua, Red Sea; Klunzinger, Verh. Zool. Bot. Gesell. Wien, 21, 1871, p. 503.

*Teuthis rostrata* Playfair, Fishes Zanzibar, 1866, p. 50, pl. 10, fig. 2; Günther, Fische der Südsee, 1, 1873-76, p. 89, pl. 60; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 161, pl. 1, fig. 3.

*Siganus rostratus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 67; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 283; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 310.

Dorsal XIII, 10; anal VII, 9. The depth is 2.6 to 2.8, the head 3.8 to 4.3, the deeply forked caudal 3.4 to 3.75, the pectoral 5 to 5.5 times in the length. The eye is 2.9 to 3.25, the snout 2.5 to 2.65, the interorbital 2.8 to 3, the least depth of the caudal peduncle 4.3 to 5.2 times in the head. The upper profile of the snout is very slightly arched, the head slightly concave above the eyes, the dorsal and ventral profiles otherwise evenly and about equally arched, the body elongate and compressed. The maxillary extends slightly behind a vertical from the posterior nostril. There are 14 or 15 bifid teeth on each side of both jaws, the outer lobe of each tooth large, pointed, and microscopically serrate, the pointed inner lobe very small. The middle dorsal spines are highest, the last one shortest and 4.8 to 5.33 times in the head. The second and third anal spines are highest, the others decreasing to the last, which is 3.8 to 4.75 times in the head.

In life the color was dark blue with golden longitudinal lines on the lower half and golden spots on the dorsal region and on the head. In alcohol the color is bluish or violaceous brown, the sides with pale rounded spots or these entirely disappearing. The spinous dorsal and anal and caudal are violaceous brown, often with darker cloudings. The soft dorsal and anal have violet brown rays, the membranes colorless. The pectoral is yellow.

Described from 4 specimens, 152 to 185 mm. in length, collected at Tenibuli, Ysabel Island, Solomon Islands.

### ***Teuthis hexagonata* (Bleeker).**

*Amphacanthus hexagonatus* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 518—Cocos, Keeling Islands; Weber, Siboga Exp., Fische, 1913, p. 328.

*Teuthis hexagonata* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 320; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 162, pl. 2, fig. 1.

*Siganus punctatus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 360; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 281; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 312.

Dorsal XIII, 10; anal VII, 9. The depth of the oblong, compressed body is 2 to 2.2, the head 3.4 to 4, the forked caudal 2.8 to 3.25, the very broad pectoral 4.4 to 4.9 times in the length. The eye is 3.1 to 3.6, the snout 2 to 2.1, the interorbital 2.9 to 3.2, the

preorbital width 3.7 to 4.3, the least depth of the caudal peduncle 3.1 to 3.6 times in the head. The dorsal and ventral profiles are evenly and strongly convex, or the upper profile may be steeper and more boldly curved than the lower. The interorbital is strongly convex. The maxillary extends to a vertical from the posterior nostril. The middle dorsal spines are highest, the last one 2 to 2.5 times in the head. The anal spines are very strong, increasing in length to the last, which is 1.6 to 2 times in the head.

The color in life varies from lilac to dusky blue, with a pearly blue luster over all, the entire body including the eyes and lips covered with rounded to hexagonal golden spots which extend upon the caudal, where they are darker. At the upper end of the hind margin of the opercle is a large coral red spot. The dorsal is covered with reddish brown spots, the spinous part with a colorless margin. The anal is dusky, the membrane blue, the margin of the rays spotted like the dorsal. The pectoral is yellowish. The ground color in alcohol varies from bluish gray to brown or blackish brown, the head, trunk, and caudal thickly covered with pale yellowish, brown, or dark brown rounded to hexagonal spots, the ground color forming a network between them. Sometimes the belly and anal region are covered with intricately convoluted, and vermiculate lines. On the shoulder is a large, often irregular, blackish blotch. The vertical fins and ventrals are violet brown to blackish brown, or the soft dorsal and anal may be spotted with darker. The pectoral is yellowish or yellowish brown.

This is one of the handsomest and largest of the siganids. That it is identical with *Amphacanthus punctatus* Bloch and Schneider is doubtful. Forster's notes apply to more than one species. The figure cited from my paper on the Philippine siganids is incorrect, the artist having omitted the shoulder spot.

A specimen, 206 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### **Teuthis oramin** (Bloch and Schneider).

*Amphacanthus guttatus* var. *oramin* Bloch and Schneider, Syst. Ichth., 1801, p. 207, pl. 48—Tranquebar.

*Teuthis oramin* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 318; Day, Fishes India, 1878-88, p. 168, pl. 40, fig. 6; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 165, pl. 5, fig. 1.

*Siganus oramin* Jordan and Seale, Proc. U. S. Nat. Mus., 38, 1905, p. 789; Jordan and Richardson, Bull. Bur. Fish., 27, 1908, p. 271; Barnard, Ann. South African Mus., 21, 1927, p. 785, pl. 31, fig. 4; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 307.

*Teuthis margaritifera* Day, Fishes India, 1878, p. 167, pl. 40, fig. 5.

*Amphacanthus albopunctatus* Schlegel, Fauna Japonica, Pisces, 1842, p. 128.

*Teuthis albopunctata* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 318.

*Siganus albopunctatus* Seale, Phil. Journ. Sci., Sec. D, 5, 1910, p. 284.

Dorsal XIII, 10; anal VII, 9. The depth is 2.4 to 2.7, the head 3.8 to 4.1, the caudal 3.5 to 3.75 times in the length. The eye is 2.75 to 3.4, the snout 2.4 to 2.5, the maxillary 3.1 to 3.5, the least depth of the caudal peduncle 3.9 to 4.4 times in the head. The interorbital is scarcely equal to the eye. The dorsal and ventral outlines are evenly and nearly equally arched from snout to caudal peduncle. The third to seventh dorsal spines are highest, the second to fourth anal spines highest. The caudal is more or less emarginate, often appearing deeply forked when relaxed but not when expanded.

The color in life is olive green, darker above and paler on the sides, passing into greenish yellow and becoming pale yellow beneath, with a dark spot on the shoulder. The entire body is sprinkled with small pearly white spots smaller than the interspaces, largest and more or less elongate along the middle and lower part of the sides, and passing into circular dots on the nape and caudal peduncle. The yellowish caudal is crossbarred with brown. The dorsal and anal are yellowish, spotted with brown on the rays. Other specimens are pale gray or drab, sometimes with a shade of yellowish. Sometimes the spots are bluish white. In alcohol the color varies from violaceous dusky to violaceous brown or plain brown, or the lower half may be paler or silvery, the whole body sprinkled with bluish or pearly white spots as in life, with a large irregular dark brown shoulder blotch and a blackish spot on the upper edge of the eye. The fins are spotted with brownish as in life, or the spots may disappear.

I have made careful comparison of many specimens collected in Japan, the Philippine Islands, and other localities and can find no characters on which to separate specimens with differences in the emargination of the caudal or those with white spots differing slightly in size. Specimens from Borneo and the Philippines cannot be separated from Japanese specimens except by the locality tag. Sometimes specimens have a few blackish brown, rounded or irregular spots thinly scattered over the sides, but agree in all other respects.

A specimen, 180 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

**Teuthis puella** (Schlegel).

*Amphacanthus puellus* Schlegel, Bijdr. Dierk., 1, 1852, p. 39, fig. 2—East Indies.

*Teuthis puella* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 323; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 169, pl. 4, fig. 2.

*Siganus puellus* Fowler, Mem. Bishop Mus., 10, 1928, p. 284; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 325.

*Siganus zoniceps* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 69, fig. 18.

Dorsal XIII, 10; anal VII, 9. The depth is 2.3 to 2.5, the head 3.5 to 3.8, the caudal 2.9 to 3.25, the pectoral 4.5 to 5 times in the length. The eye is 3 to 3.4, the snout 2 to 2.1, the maxillary 3.4 to 4, the interorbital 3.1 to 3.5, the least depth of the caudal peduncle 3.75 to 4 times in the head. The body is much compressed. The upper part of the opercle and preopercle are scaled, and the interorbital is scaled nearly to the middle of the eye, the head otherwise naked. The middle dorsal spines are highest, the fifth spine 2.1 in the head. The caudal fin is deeply lunate, its upper lobe slightly the longer.

The color above in life is golden to golden greenish, the sides orange or yellow, the under parts clear yellow, with blue or pearly bluish transverse lines above the pectoral (usually 6 in number), and numerous lines and broken stripes running lengthwise along the sides, passing into reticulated lines on the under parts. From the dorsal origin a dark brown band descends diagonally downward and forward across the eye to behind the chin, the portion above the eye having black or blue spots in it. The ventrals are colorless, the other fins all golden. Often pale blue spots are scattered over the sides of the head and anterior portion of the body. The color in alcohol is brown to brownish violet, with a broad dark brown band passing obliquely downward from the dorsal origin over the eye to the lower jaw, with some darker spots in the upper part of this band and a few more spots behind it on the preopercle. On the anterior part of the trunk above the pectoral are 6 dark brown vermiculated transverse lines and over the remaining portion of the side are a number of longitudinal lines of like color, which may be wavy or broken, especially dorsally and below; however, these lines usually disappear in alcohol, and often the diagonal band on the head vanishes, too, so that specimens are then often very difficult to determine. The fins are yellowish to yellowish brown.

Two specimens, 144 and 202 mm. long, were taken at Tenibuli, Ysabel Island, Solomon Islands.

**Teuthis doliata** (Cuvier).

*Siganus doliatus* Cuvier, Regne Anim., Guerin Icon. Poiss., 4, 1830, pl. 36, fig. 1—Buru; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 284; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 324.

*Amphacanthus doliatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 132; Cuvier, Regne Anim., Disciples ed., Poiss., Atlas, 8, 1836, pl. 71, fig. 1.

*Teuthis doliata* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 323; Günther, Fische der Südsee, 1, 1873-76, p. 90; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 173, pl. 2, fig. 3.

Dorsal XIII, 10; anal VII, 9. The depth is 2.1, the head 3.6, the emarginate caudal 3.33, the pectoral 4.15 times in the length. The eye is 2.9, the snout 2.2, the interorbital 3.3, the preorbital 4.3, the least depth of the caudal peduncle 3 times in the head. The dorsal and ventral profiles are nearly alike, evenly arched. There are 14 brown tridentate teeth on each side in both jaws, the central cusp of each tooth large, the lateral ones very small. The middle dorsal spines are highest, the last one twice in the head. The anal spines increase to the last, which is 1.7 times in the head.

The color in alcohol is dark brown above, shading to very pale brown and cream on the sides of the head and breast, and to pale buff farther back. On the sides are more than 20 vertical bluish lines, usually looped above and below, the anterior and posterior ones bent below and running back longitudinally below the middle of the side and along the lower half of the caudal peduncle. Some of the lines on the posterior half are often reticulated. On the dorsal region the lines fade to dark brown. The top of the head and snout are crossed by transverse bluish lines. On the sides of the head are oblique bluish lines, usually reticulated. The fins are all brownish.

Four specimens, 110 to 138 mm. long, were taken at Tenibuli, Ysabel Island, in the Solomon Islands. I refer here also two young specimens, 34 and 37 mm. long, collected at Auki, Malaita Island, Solomons. On them the blue lines begin at the upper margin and extend downward to the abdominal region, without loops or bending.

**Teuthis lineata** (Cuvier and Valenciennes).

*Amphacanthus lineatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 130, pl. 286; Whitley, Rec. Austr. Mus., 16, 1928, p. 231.

*Teuthis lineata* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 322; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 176, compiled.

*Siganus lineatus* Jordan and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 35; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 283; Fowler and Bean, Bull. U. S. Nat. Mus., 8, 1929, p. 319.

The depth is 2 to 2.2, the head 3.35 to 3.5 times in the length. The emarginate caudal is 3.2 to 3.5, the pectoral 4.45 to 4.6 times in the length. The large eye is 3.4 to 3.45, the snout 2, the least depth of the caudal peduncle 3.35 to 3.5 times in the head. The interorbital equals the eye. There are about 11 rows of scales on the cheek, measured across the widest part of the preopercle. The eighth dorsal spine is longest, 2.15 to 2.2 times in the head. The last anal spine is longest, 1.85 to 1.9 times in the head.

The color in alcohol is brown, becoming dusky on top of the head and along the back just below the dorsal, the sides with 10 or 11 very dark brown longitudinal lines which sometimes fork and again run together. Above the level of the eye they form a network of coarse mesh, the lines no longer individually distinct. Sometimes the lines on the side form loops. Above the anal the longitudinal lines break up into dots and dashes. On the sides of the head are several lines and bars running obliquely downward and forward. Below the last 3 or 4 dorsal rays is a large, blackish, circular spot. The anal rays, posterior half of the caudal peduncle, and the caudal are covered with rows of small, circular, dark brown spots. The pectoral is pale, the other fins violaceous brown.

Here described from 2 fine specimens, 215 and 218 mm. in length, from Tenibuli, Ysabel Island, Solomon Islands.

### ***Teuthis striolata* Günther.**

*Teuthis striolata* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 319; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 177, pl. 5, fig. 2.

*Siganus striolatus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 69.

*Amphacanthus striolatus* Weber, Siboga Exp., Fische, 1913, p. 329.

*Siganus marmoratus* Jordan and Seale, Bull. Bur. Fish., 26, 1907, p. 35.

The depth is 2.5 to 3, the head 3.75 to 4 times in the length. The eye is 2.6 to 2.9 times in the head, the snout a trifle longer. The depth of the head equals its length. The caudal is a little shorter than the head, the pectoral less than the caudal, 1.25 to 1.4 times in the head.

The color in life is dark greenish above, paler on the sides and whitish below, everywhere covered with bright bluish vermiculated lines which are more or less vertical below the soft dorsal and on the caudal peduncle. The caudal is partially barred with yellowish and dusky. The dorsal and anal are yellowish. The color in alcohol is dark brown, covered with irregular sinuous pale bluish lines, which often run together. There is a dark crossband on the caudal peduncle with a clear crossband on each side of it, and similar crossbands on

the caudal. The dorsal and anal are crossbarred by alternate rows of light and dark brown spots, or may become entirely clear. The pectoral is brownish yellow, the ventral clouded with darker.

This description is from 10 young specimens collected on the reef at Maraa, Tahiti, their lengths from 40 to 46 mm. At Nukululu Island, Fiji, were also obtained 16 specimens, 33 to 38 mm. in length. Two fine specimens, 155 and 167 mm. in length, were taken near Suva, Viti Levu Island, Fiji.

### *Teuthis vermiculatus* (Cuvier and Valenciennes).

*Amphacanthus vermiculatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 10, 1835, p. 126—New Guinea, Java, Mauritius.

*Teuthis vermiculatus* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 317; Day, Fishes India, 1878-88, p. 166, pl. 40, fig. 1; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 178, pl. 3, fig. 1.

*Siganus vermiculatus* Evermann and Seale, Bull. Bur. Fish., 26, 1907 (1908), p. 98; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 279.

Dorsal XIII, 10; anal VII, 9. The depth is 1.9 to 2, the head 3.3 to 3.7, the caudal 3.5 to 4 times in the length. The eye is 2.5 to 3.4, the snout 2 to 2.5, the interorbital 2.8 to 3.2 times in the head. The last dorsal spine is longest, 1.7 to 1.8 times, the last anal spine 1.4 to 1.5 times in the head. The pectoral fin is much longer than the ventral, 1.2 to 1.3 times in the head.

In alcohol the color is brown, paler to nearly white on the belly, everywhere covered with vermiculated bluish white lines, those behind the pectorals longitudinal, but irregular or transverse above the pectoral and on the head. The caudal is spotted with violet brown, the dorsal and anal brown with darker spots basally. The pectoral is yellowish.

A specimen, 170 mm. long, was taken at Bora Bora.

### *Lo vulpinus* (Schlegel and Müller).

*Amphacanthus vulpinus* Schlegel and Müller, Verh. Nat. Gesch. Ned., Leiden, 2, 1844, p. 12; Schlegel, Bijdr. Dierk., 1, 1852, p. 38, fig. 1.

*Lo vulpinus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 71, fig. 19; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 361, fig. 67; Herre and Montalban, Phil. Journ. Sci., 35, 1928, p. 182, pl. 6.

*Siganus vulpinus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 285; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 8, 1929, p. 332.

Dorsal XIII, 10; anal VII, 9. The depth is 2.2 to 2.4, the head 3.1 to 3.3, the caudal 3.6 to 4.4, the pectoral 3.9 to 4.4 times in the head. The eye is 3.5 to 3.9, the snout 1.8 to 1.9, the interorbital 3.3 to 3.7, the preorbital 2.3 to 2.9, the maxillary 4.6 to 5.2,

the least depth of the caudal peduncle 3.9 to 4.1 times in the head. The oblong, compressed body is elongate, with the dorsal and ventral outlines nearly parallel on the anterior two-thirds, the head produced anteriorly into a slender, laterally flattened, tubulate snout. There is a conspicuous protuberance on the interorbital at the angle of the eye. All the fins are naked except the caudal, which has minute scales extending half its length. The last dorsal spine is 1.8 to 2 times in the head, the last anal spine 1.7 to 1.9 times.

In life the upper part of the body, the dorsals, anal, and caudal are brilliant orange, the remaining part of the trunk clear yellow. A black or blackish brown band extends from the dorsal origin diagonally downward and forward, including the snout, eyes, and tip of the lower jaw, but leaving a paler median strip from the nape to the tip of the upper lip. Behind this dark band is a wide diagonal pearly white band thickly sprinkled with reddish or dark red dots, which covers the rest of the head below and behind the eye and touches the front end of the breast. From the gill opening a black area extends to the pectoral base and over the breast to the ventrals. The first ray of the pectoral and both ventral spines are black or blackish brown. The remaining portion of the pectoral and ventrals is yellow to nearly colorless. In alcohol the color is much duller, the orange especially darkening, so that different specimens may be whitish, yellowish, mottled brown, to umber or blackish brown, the posterior third usually paler. The black areas on the head and breast change but little but the pearly white area between often turns brownish. The fins vary from pale yellowish white to brown. The living fish is of very great brilliance and beauty.

A specimen, 161 mm. long, was obtained at Tenibuli, Ysabel Island, Solomon Islands.

#### Family SCORPAENIDAE

##### *Scorpaenodes xyris* (Jordan and Gilbert).

*Sebastopsis xyris* Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, p. 369—Cape San Lucas, Lower California; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1835.

Dorsal XIII, 10; anal III, 5. There are 40 scales in the lateral line. The depth is 2.4 to 2.8, the head 2.4 to 2.5 times in the length. The eye is large, high up, its upper margin above the profile, 3.4 to 3.6 times, the blunt rounded snout 3.78 times in the head. There are 3 spines on the preopercle, the upper one largest. There is a strong spine above the pectoral base, and one strong and one very

small spine at the origin of the lateral line, 3 strong spines on the supraorbital ridge and a pair behind the interorbital. The maxillary extends beneath the posterior fourth of the eye. The second anal spine is greatly enlarged, 1.6 times in the head, extending beyond the tip of the third spine. The large pectoral extends to above the anal origin.

The color in alcohol is reddish brown, with 4 or 5 darker cross-bands or blotches, most distinct on the posterior half and extending upward upon the dorsal. There is a circular dark brown spot on the lower part of the opercle and a large brown blotch from the eye downward and backward across the cheek. The pectoral, caudal, and anal are spotted with violet or reddish brown.

Eight specimens, from 14 to 15 mm. long, were caught by the aid of electric light at Tagus Cove, Albemarle Island; 8 more specimens, 55 to 68 mm. long, were taken from a tide pool at the same locality. One specimen, 32 mm. long, was collected at South Seymour Island, Galapagos.

#### *Scorpaenodes guamensis* (Quoy and Gaimard).

- Scorpaena guamensis* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1824, p. 326—Guam; Günther, Fische der Südsee, 1, 1873-75, p. 74, pl. 56, fig. B.  
*Sebastopsis guamensis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 374; McCulloch, Rec. Austr. Mus., 9, 1913, p. 388.  
*Sebastodes guamensis* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 289.

Dorsal XIII, 8 or 9; anal III, 5. There are 22 to 26 tubulated scales in the lateral line, plus 1 more on the caudal base; 40 to 42 scales in a longitudinal series to the caudal base, plus 3 more on the latter. The depth is 2.7 to 3, the head 2.3 to 2.6, the caudal 3.6 to 4, the pectoral 3.3 to 3.7 times in the length. The eye is 3.3 to 3.5, the snout 3.35 to 4, the least depth of the caudal peduncle 3.5 to 4, the second anal spine 2 to 2.5 times in the head.

The color in alcohol is marbled paler and darker brown, with vertical bands of dark and light alternating on the posterior half. There is a dark band on the caudal peduncle between 2 light bands. The dorsal and anal fins are marked like the body, the caudal nearly colorless.

This species is easily separated from *S. scabra* by its much shorter second anal spine.

Described here from 12 specimens, 12 to 66 mm. in length, from Wala Island, New Hebrides. Two specimens, 16 and 18 mm. long,

were taken at Maraa, Tahiti. Five specimens, 25 to 67 mm. in length, were collected at Malo Island, New Hebrides.

**Scorpaenodes scabra** (Ramsay and Ogilby).

*Sebastes scaber* Ramsay and Ogilby, Proc. Linn. Soc. N. S. Wales, 10, 1885, p. 577—Shark Reef, Australia.

*Sebastes scabra* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 374, fig. 71; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 314.

*Scorpaenodes scabra* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 290.

Dorsal XIII, 8; anal III, 5. There are 22 tubulated scales in the lateral line, plus 1 or 2 on the caudal base, 6 above and 11 below it. From the gill opening to the caudal base there are 32 rows of scales in a straight line, plus 3 more on the caudal base. Counting just above the lateral line there are 40 scales to the caudal base. The depth is 2.7, the head 2.4 times in the length. The eye equals the snout, 3.7 times, the interorbital 5.6, the caudal 1.4 times in the head. The pectoral is a little longer than the head. The second anal spine is very long and strong, 1.55 times in the head. There are 3 strong spines over the eye, a postocular spine and 2 on each side of the nape. The suborbital stay has 5 spines, the lower edge of the preorbital 2 spines, the posterior edge of the opercle 2, another above the pectoral base, and 3 on the suprascapula.

The color in alcohol is reddish brown with 4 irregular, oblique, dark brown crossbands, a dark brown crossband on the caudal peduncle, and a large black spot on the opercle; all the fins are barred with brown and white or pale spots and irregular brown blotches.

Here described from 2 specimens, 68 and 84 mm. long, from the reef at Maraa, Tahiti. Ten specimens, 28 to 68 mm. long, from Ovalau Island, Fiji, are reddish brown, transversely barred with 4 dark brown alternating with 3 very pale bands, very distinct posteriorly; 6 specimens, 12 to 24 mm. in length, were taken at Nukulau Island, Fiji. Three specimens, from Malo Island, New Hebrides, measured 57 to 60 mm. in length.

**Sebastapistes badio-rufus** Herre. Fig. 12.

*Sebastapistes badio-rufus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 409.

Dorsal XI-I, 8; anal III, 6; scales 4-22-9, 36 in longitudinal row above lateral line. Depth 2.3, head 2.1 in length. Eye 3.3, interorbital 6 in head. Interorbital 1.8 in eye. Body compressed. No flaps or dermal appendages. Mouth large. Maxillary reaches rear

part of pupil. Two spines on preorbital, one directed downward, the other forward. No orbital spines. Two small spines behind upper part of eye. Two pairs of nuchal spines. No nasal spines or tentacles. Five spines on posterior edge of preopercle. Three spines on hind margin of opercle. Two small spines above opercle. Suborbital stay has a spine below eye and one at its rear end.

Color in life brownish red, in alcohol pale reddish brown.

One specimen collected at Takaroa, Tuamotu Archipelago.

**Sebastapistes bynoensis** (Richardson).

*Scorpaenodes bynoensis* Richardson, Voy. Erebus and Terror, Ichth., 1844, p. 22, pl. 14, figs. 3-5.

*Scorpaena bynoensis* Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 113.

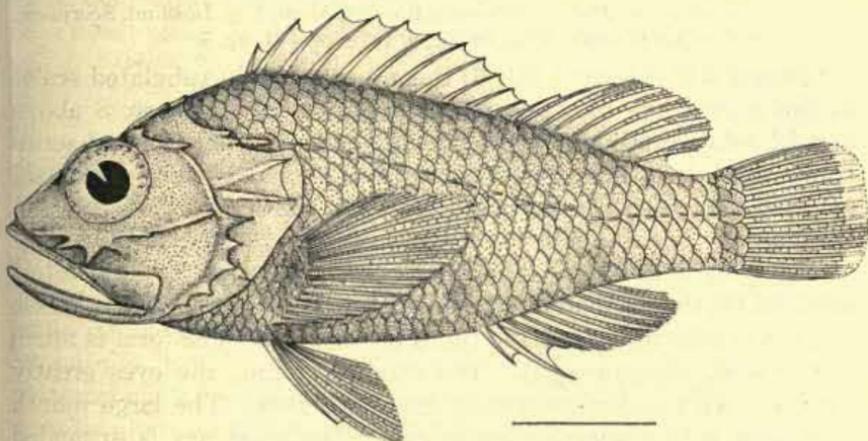


FIG. 12. *Sebastapistes badio-rufus* Herre, type, Takaroa Island, Tuamotu Islands.

*Sebastapistes bynoensis* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 289.

*Scorpaena tristis* Klunzinger, Verh. Zool. Bot. Gesell. Wien, 20, 1870, p. 802; Günther, Fische der Südsee, 1, 1873-75, p. 77, text fig.

*Sebastapistes tristis* Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 315.

Dorsal XI-I, 10; anal III, 15. There are 20 tubulated scales in the lateral line, 6 above and 12 below it, and 38 to 40 rows of scales from the angle of the opercle to the caudal base. In a specimen 42 mm. long the depth is 2.7, the head 2.33, the caudal 3, and the pectoral 2.8 times in the length. The eye is 3.33, the snout 3.6, the interorbital 6.2, and the least depth of the caudal peduncle 3.83 times in the head.

The color in alcohol is mottled and blotched with whitish, brown, and purplish brown, the fins variegated with black, whitish, and brown.

This species is very abundant in Fiji, where 100 specimens, 16 to 34 mm. in length, were obtained at Nukulau Island, and 6 specimens, 16 to 34 mm. in length, from a reef near Suva, Viti Levu Island. A specimen, 26 mm. long, was also collected on the reef at Maraa, Tahiti.

***Pterois antennata* (Bloch).**

*Scorpaena antennata* Bloch, Ichtyologie, 6, 1788, p. 16, pl. 185—Amboina.

*Pterois antennata* Cuvier and Valenciennes, Hist. Nat. Poiss., 4, 1829, p. 361; Günther, Cat. Fishes Brit. Mus., 2, 1860, p. 124; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 315; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 292.

*Pseudomonopterus (Pterois) antennata* Bleeker, Mem. Esp. Insulind. Scorpaen., 1876, p. 48; Bleeker, Atlas Ichth., 9, 1878, pl. 413, fig. 5.

Dorsal XII, 11; anal III, 6; there are about 30 tubulated scales in the lateral line plus 1 or 2 more on the caudal base, 8 above and 12 below the line. There are 58 scales in a longitudinal series above the lateral line, plus 3 more on the caudal base. Predorsal scales 6. The depth is 2.55, the head 2.4, the caudal 2.65 times in the length. The elongate filamentous pectoral rays equal the length of the head and body. The eye is 3.6, the snout 3.9, the interorbital 5.66, the maxillary 2.45, the least depth of the caudal peduncle 3.8, the orbital tentacle 2.125 times in the head. The form is much compressed, elongate oval. The snout is blunt, the eyes greatly elevated, with a deep concavity between them. The large mouth is oblique with projecting lower jaw. The maxillary is expanded posteriorly, its greatest width 1.8 times in the eye and 6.5 times in the head. The second to tenth dorsal spines are much elongated, the eighth spine longest, 1.75 times in the total length, the eleventh and twelfth spines much shorter than the second to ninth. The elongate ventral extends to the posterior half of the anal base, the third ray 2.2 times in the length of the head and body together. The dorsal and anal rays extend nearly to the middle of the caudal length when depressed. The pectoral membrane is well developed on the upper half of the fin, reaching to the middle of the soft dorsal when depressed, but on the lower half of the pectoral the membrane is little developed; the thread-like tips of the pectoral extend beyond the caudal. The nape is scaled. There is a conspicuous nasal filament and one at the preorbital margin above the maxillary and one on the lower margin of the preopercle.

In alcohol the ground color is yellowish white with about 14 dark brown crossbands between the eyes and the caudal, the anterior ones all broad, those on the posterior half alternating broad and narrow, with some, still narrower, partial bands between. The dorsal spines are broadly barred with dusky brown and white. The soft dorsal, anal, and caudal are barred by alternate rows of dark brown and white spots. The membrane of the pectoral is dark brown, spotted with black. The ventral rays are white, the membrane chocolate brown. The orbital tentacle is barred by broad black spots alternating with white lines.

Described from a specimen, 82 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

### *Pterois radiata* Cuvier and Valenciennes.

*Pterois radiata* Cuvier and Valenciennes, Hist. Nat. Poiss., 4, 1829, p. 369—Tahiti; Günther, Fische der Südsee, 1, 1873-75, p. 81, pl. 56, fig. A; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 379; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 315; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 293.

*Pterois cincta* Rüppell, Neue Wirbelt., Fische, 1835, p. 108, pl. 26, fig. 3.

*Pterois (Pseudomonopterus) villata* Sauvage, Nouv. Arch. Mus. Hist. Nat. Paris, (2), 1, 1878, p. 135, pl. 1, fig. 10.

Dorsal XI-I, 11; anal III, 6. There are 48 scales in the lateral line, plus 2 on the caudal base, 8 scales above and 14 below it. The depth equals the head, 2.75 times in the length. The eye is 3.8 times in the head, the snout a trifle longer than the eye, the interorbital 4.75 times in the head. The dorsal spines are elongate, needle-like, the eighth and ninth longest, about twice in the total length. The pectoral rays are all elongate, thread-like, the upper ones excessively elongate and equal to the total length of the head and body. The caudal is short, about 1.25 times in the head.

The color in alcohol is brown, crossed by about 8 white transverse lines, which divide the ground color into bands. Two broad white longitudinal lines on the caudal peduncle unite anteriorly. The snout, chin, breast, and under side of the caudal peduncle are cream-colored. The caudal, anal, and soft dorsal are brown spotted. The pectoral is black.

In life this bizarre fish is as brilliantly beautiful as it is dangerous. It knows the power of its stinging spines and deadly venom and struts about defiant of all other aquatic life.

Here described from a specimen, 154 mm. long, collected on the reef at Maraa, Tahiti.

## Family TRIGLIDAE

**Prionotus miles** Jenyns.

*Prionotus miles* Jenyns, Zool., Voy. Beagle, Fishes, 1842, p. 29, pl. 6—  
Chatham Island, Galapagos.

Dorsal X, 12; anal II, 9. There are 72 scales in the lateral line and 4 more on the caudal base. The depth of the elongate body is 4.25 times in the length, the trunk well-rounded anteriorly but the dorsal profile descending rapidly to the slender caudal peduncle, the depth of which equals the diameter of the eye. The head is large, 2.6 times in the length, mostly smooth, with a large, broad, bilobate snout half as long as the head. The mouth is large, the lower jaw included, the maxillary reaching as far as beneath the anterior end of the preorbital hump. The eye is 5.67 times in the head, with a prominent, smooth, preorbital ridge or hump and two much lower, slightly roughened suborbital ridges. The concave interorbital is about 0.9 as wide as the eye. There are several short, broad teeth on each lobe of the snout. The spinous dorsal is rather low, the second and third spines longest, about 2.4 times in the head. The soft dorsal is lower, the anal much lower than the first dorsal. The very large pectoral extends to the base of the fourth anal ray, nearly 1.25 times in the length. The long, pointed ventral is 0.7 of the head, and is a little longer than the slightly emarginate caudal.

The color in alcohol is pale brown above, whitish to white below and on the belly. The first dorsal is largely blackish, the second dorsal and caudal lightly barred with dusky. The anal and ventrals are white. The very conspicuous pectorals are black, with a white margin.

One fine specimen, 265 mm. long, was taken at Post Office Bay, Charles Island, Galapagos.

## Family CARACANTHIDAE

**Caracanthus maculatus** (Gray).

*Micropus maculatus* Gray, Zool. Misc., 1831, p. 20—Hao Island, Tuamotus.  
*Caracanthus maculatus* Fowler, Proc. Acad. Nat. Sci. Phila., 1900, p. 515, pl. 20, fig. 5; Jordan and Evermann, Bull. U. S. Fish Comm., 1903 (1905), part 1, p. 453, fig. 198.

Dorsal VIII, 12; anal II, 12; ventral I, 2. The depth is 1.67, the head 2.18 in the length. The eye is 4.4 times, the caudal 2, and the pectoral 1.75 times in head. The very deep, compressed body has the anterior dorsal and ventral profiles broadly arcuate,

the snout steep, the body covered with small, fleshy, pointed papillae, those on the head and nape shorter and rigid. The preorbital terminates in a large backward and downward pointing spine, depressible in a groove. The preopercle is margined with five broad, curved teeth, and there is a strong spine on the lower margin of the interopercle.

The color in alcohol is brown to reddish brown, somewhat dusky above, strewn everywhere except beneath with small black spots. The sides are sprinkled with numerous blackish or brownish spots. The dorsal is more or less divided, in some specimens being merely notched about halfway down.

This fish creeps into tiny crevices deep within coral masses and hides where one would not believe a fish of its bulk could be concealed.

Six specimens of this strange-looking, feeble swimmer were obtained from coral heads at Takaroa. They varied in length from 23 to 35 mm.

#### Family POMACENTRIDAE

##### *Amphiprion frenatus* Brevoort.

*Amphiprion frenatus* Brevoort, Notes on Some Figures of Jap. Fish, 1856, p. 263, pl. 6, fig. 4—Lew Chew; Day, Fishes India, 1878-88, p. 378, pl. 80, fig. 2; Jordan and Snyder, Proc. U. S. Nat. Mus., 22, 1900, p. 752; Montalban, Pomacentr. Philippine Islands, 1927, p. 12, pl. 2, fig. 1.

*Prochilus polylepsis* Bleeker, Atlas Ichth., 9, 1878, pl. 401, fig. 6.

Dorsal IX or X, 17 to 19; anal II, 14 to 16. There are 31 to 38 scales with tubules in the lateral line, 9 above and 17 to 21 below it, and 47 to 49 scales in a longitudinal series from the gill opening to the caudal base. The depth is 1.7 to 1.9, the head 3 times in the length. The eye is 4, the snout 2.8, the interorbital about 3 times in the head.

In life the color is an intensely glowing very dark cherry red, passing into orange or a lighter bright red on the head, breast, and fins, with a broad pearl white, indigo or black-margined crossband from the nape down behind the eye to the lower margin of the opercle. Specimens kept in an aquarium and specimens taken from the water have the sides black or reddish black, otherwise as above. In alcohol the color is brownish black above, yellowish to orange below and posteriorly, the fins yellowish to colorless on their outer part. A pearly white, black-edged band, which may become dark brown, descends from just before the dorsal down over the opercle behind the eye to the lower edge of the subopercle.

A specimen, 50 mm. long, was taken from a large sea-anemone on a reef near Suva, Viti Levu Island, Fiji.

***Dascyllus aruanus* (Linnaeus).**

*Chaetodon aruanus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 464—Indies; Bloch, Ichthyologie, 6, 1788, p. 45, pl. 198, fig. 2.

*Dascyllus aruanus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 434; Günther, Fische der Südsee, 2, 1876–81, p. 235, pl. 124, fig. B; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 290; Montalban, Pomacentr. Philippine Islands, 1927, p. 21.

*Chaetodon araneus* Bennett, Fishes Ceylon, 1834, p. 17, pl. 17.

*Tetradrachmum arcuatum* Bleeker, Atlas Ichth., 9, 1878, pl. 409, fig. 6.

*Tetradrachmum aruanum* Day, Fishes India, 1878–88, p. 381, pl. 80, fig. 6.

Dorsal XII, 11 to 13; anal II, 11 or 12. There are 25 or 26 scales in a longitudinal series, 15 to 18 tubulated scales in the lateral line, 3 or 4 above and 10 below it. The depth of the ovate, compressed body is 1.6 to 1.8 times, the head 2.75 to 3.2 times in the length. The eye is 2.5 to 3 times, the snout 3 to 3.66 times in the head.

In life the color is silvery or pearly white, with 3 black crossbands, the first from the dorsal origin over the eye to the chin and throat, usually leaving the interorbital white. The second, from the fifth to the eighth (or sixth to ninth) dorsal spines, is slightly curved and extends through the pectoral base and behind it to and including the ventrals. The third runs vertically from the soft dorsal to the anal rays. The color in alcohol is little changed, the white becoming more or less darkened.

We collected 54 specimens, 10 to 42 mm. long, from the reef at Maraa, and one, 27 mm. long, at Bora Bora. This conspicuous little pomacentrid is exceedingly abundant on coral reefs of Polynesia and the East Indies.

***Dascyllus trimaculatus* (Rüppell).**

*Pomacentrus trimaculatus* Rüppell, Fische, Rothen Meers, 1828, p. 39, pl. 8, fig. 3—Massaua, Red Sea.

*Dascyllus trimaculatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 441; Montalban, Pomacentr. Philippine Islands, 1927, p. 23, pl. 5, fig. 2.

*Tetradrachmum trimaculatum* Bleeker, Atlas Ichth., 9, 1878, pl. 409, fig. 6.

Dorsal XII, 13 to 16; anal II, 13 or 14. There are 26 scales in a longitudinal series, 18 to 20 tubulated scales in the lateral line, 4 above and 11 below it. The depth is 1.5 to 1.7 times, the head 3.1 to 3.3 times in the length. The eye is 2.5 to 3 times, the snout 3.1 to 3.5 times in the head. The interorbital equals the eye

The color in life is very dark purplish to dusky purplish, each scale edged with darker, the breast and belly with brassy luster. There is a circular pearl white spot on the top of the head, and one on each side of the body on the lateral line beneath the eighth dorsal spine. The soft dorsal and anal are purplish black, the spinous dorsal, caudal, and ventral deep purplish with dusky shades. The pectorals and the anterior margin of the ventral are yellowish or golden. The white spots may be very faint or absent. In alcohol the color is blackish, with the white spots as in life, or the color may fade to violaceous gray, most of the scales with a brown margin, the caudal, lower posterior region, and breast palest. The fins may be dusky, or all except the spinous dorsal and ventrals lose most of their color. The pectoral may have a black spot at the upper angle of its base.

From Atuona, Hiva Oa Island, Marquesas, there are 12 specimens, from 68 to 85 mm. in length. At Moorea Island 2 specimens, 63 and 65 mm., were taken. They are uniform blackish brown, the head and breast brown, each scale on the side and breast with a paler center. The white spots have disappeared. A fine specimen, 114 mm. long, from Takaroa, Tuamotu Archipelago, lacks the white spot on the top of the head. The color is deep violet brown, the fins black, except the outer part of the soft dorsal which is colorless.

This species is one of those seen in many places but rarely obtained. Like some others it has the habit of hiding deep in coral masses and is usually driven farther in by the explosion of dynamite.

### **Chromis caeruleus** (Cuvier and Valenciennes).

*Heliases caeruleus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 497—Uleá, New Guinea.

*Chromis caeruleus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 290, pl. 44, fig. 1; Montalban, Pomacentr. Philippine Islands, 1927, p. 34, pl. 8, fig. 2.

*Heliases lepisurus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 498—New Guinea.

*Chromis lepisurus* Bleeker, Atlas Ichth., 9, 1878, pl. 403, fig. 7.

*Heliastes lepidurus* Günther, Fische der Südsee, 2, 1876-81, p. 238, pl. 128, figs. C and D; Day, Fishes India, 1878, p. 389, pl. 82, fig. 1.

*Heliases frenatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 498—Guam.

Dorsal XII, 9 or 10; anal II, 9 to 11. There are 25 scales in a longitudinal series. There are 14 to 16 tubulated scales in the lateral line, 2 above and 9 below it. The depth is 2 to 2.3 times, the head 3 to 3.25 times in the length. The eye is 2.8 to 3.2 times,

the snout 3.25 to 3.5 times in the head. The mouth is large, very oblique, the maxillary extending below the anterior margin of the eye or a little beyond.

In life the color is green or greenish, becoming silvery on the belly. On each scale of the head and sides is a blue spot, lacking below. Very often there is a blue line from the eye to the tip of the snout. The spinous dorsal has a marginal blackish line and the upper margin of the pectoral is also blackish. There is a blackish spot on the pectoral base and in its axil. Otherwise, the fins are all clear gray or colorless, except the caudal which is greenish basally, with a green band along each lobe. In alcohol the color becomes violet blue, with a silvery sheen over all, the lower part pale. Most of the scales show a pale bluish spot. A short bluish line is usually present in front of the orbit. The upper and lower margins of the caudal are brownish, the other fins changing but little. The young are bright green in life, the belly whitish.

These fish fairly swarm in shallow lagoons or where intricately branching coral is very near the surface, outnumbering by far any other brightly colored fish of the reef. They do not go about singly, but in schools containing scores or even hundreds of individuals. Several schools may dwell in a single mat of branching coral, or a large school live in a single loose head of staghorn coral. They flit about, darting in and out among the coral branchlets, fleeing deep within and totally disappearing from sight at a sign of danger. After thus taking refuge they can be obtained only by breaking up coral heads or entanglements over canvas, a bucket, deck, or other place where they cannot escape or be lost.

There were obtained at Tahiti 98 specimens, 8 to 86 mm. in length, and 12 at Bora Bora, measuring from 26 to 67 mm. in length. In the Solomons 10 specimens, 31 to 59 mm. in length, were taken at Ugi Island, and 8, from 31 to 45 mm. long, at Tenibuli, Ysabel Island. A specimen from Auki, Malaita Island, 31 mm. long, has a blue spot on each scale on the side of the head and dorsal region.

### ***Chromis dimidiatus* (Klunzinger).**

*Heliasites dimidiatus* Klunzinger, Fische des Rothen Meeres, 2, 1871, p. 529—

Red Sea; Günther, Fische der Südsee, 2, 1876-81, p. 237, pl. 125, fig. E.

*Chromis dimidiatus* Fowler and Ball, Bull. Bishop Mus., 26, 1925, p. 20;

Montalban, Pomacentr. Philippine Islands, 1927, p. 33, pl. 7, fig. 2;

Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 45; Fowler,

Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 308.

*Chromis iomelas* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 292—Pago Pago, Samoa.

Dorsal XII, 12; anal II, 12. There are 17 scales in the lateral line, 3 above and 9 below it, and 25 or 26 scales in a longitudinal series plus one more on the caudal base. The depth is 2, the head 3.25, the caudal 2 in the length. The eye is 2.33, the snout 4, the broad, evenly arched interorbital 2.75 times in the head. The preorbital is very narrow, its width to the angle of the mouth less than one-third of the eye.

In life the head, body, and fins are deep brownish black as far back as a vertical line drawn from the tip of the first dorsal ray to the base of the last anal ray and on to the anal margin. All behind this line is abruptly whitish or white. The pectoral is a little paler than the body and has a deep black bar on its base. In alcohol the anterior portion is deep brownish black, the posterior part yellowish white. There is a deep black spot on the pectoral base, with a pale or white line behind it.

Here described from 3 specimens, 40 to 49 mm. long, collected at Moorea. Two specimens, 35 to 47 mm. long, were taken at Hog Harbor, Espiritu Santo Island, New Hebrides. The larger one is intermediate between *dimidiatus* and *iomelas*.

Var. *iomelas* Jordan and Seale.

Dorsal XII, 11; anal II, 12. There are 15 tubulated scales in the lateral line, 3 above and 9 below it, and 23 to 25 scales from the opercle to the caudal base. The depth of the compressed, ovate body is 1.9, the head 3.3 times in the length. The anterior profile is boldly convex above, the ventral profile almost the same, the head thickest at and above the eyes. The eye equals the interorbital, about 2.5 times, the snout 4.1 times in the head. The pectoral is about three times in the length. The caudal really equals the pectoral but the tips of its lobes are prolonged into fine threads so that including them it is equal to the depth. The depth of the caudal peduncle is 6.2 times in the length, twice or nearly so in the head.

The color in alcohol is as follows: The head and anterior half of the trunk are dark brown, paler on the throat and breast. All posterior to a vertical from the fifth dorsal spine is yellowish white. The five anterior dorsal spines are black, the rest of the dorsal, the anal and caudal yellowish white. There is a large black spot on the pectoral base, with a whitish curved line behind it. The pectoral is dusky. The ventrals are black. In life the anterior portion is brownish black, the posterior half is pale lavender, and there is a large, black, white-margined ocellus on the pectoral base.

Here described from 2 specimens, both 41 mm. long, collected at Moorea.

Specimens of *Chromis dimidiatus* collected at the same time were very markedly different while still living. The American sailors assisting, as well as the native fishermen and divers, all noted and commented upon the difference.

### **Chromis ternatensis** (Bleeker).

*Heliastes ternatensis* Bleeker, Nat. Tijds. Ned. Ind., 10, 1856, p. 377—Ternate.

*Chromis ternatensis* Bleeker, Nat. Verh. Holl. Maats. Wet., 2, 1877, p. 161; Bleeker, Atlas Ichth., 9, 1878, pl. 403, fig. 4; Montalban, Pomacentr. Philippine Islands, 1927, p. 32; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 308, fig. 52; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 31.

Dorsal XII, 10 or 11; anal II, 10 or 11. There are 15 to 17 tubulated scales in the upper section and 9 pores in the horizontal section of the lateral line, plus 2 more on the caudal base. There are 3 scales above, 10 below the lateral line. The depth is 1.85 to 2, the head 3.2 to 3.4 times in the length. The eye is 2.7 to 2.9, the snout 3.3 to 3.5 times in the head. The strongly arched interorbital equals the eye. The deeply forked caudal is 2.7 to 2.8 times in the length, longer than the pectoral, which slightly exceeds the head. The deep, much compressed body is ovoid, the upper and lower profiles alike, bluntly convex anteriorly, the whole form short and compact.

The color in alcohol is blackish brown above, paler on the sides, and silvery below. The dorsal is blackish and a conspicuous blackish bar extends along the upper and lower margins of the caudal. The anal and pectorals are very pale brown.

Here described from 2 specimens, 57 and 61 mm. in length, from Hog Harbor, Espiritu Santo Island, New Hebrides. Another, 55 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands.

### **Acanthochromis polyacanthus** (Bleeker).

*Dascyllus polyacanthus* Bleeker, Nat. Tijds. Ned. Ind., 9, 1855, p. 503—Batjan; Weber, Siboga Exp., Fische, 1913, p. 357.

*Acanthochromis polyacanthus* Bleeker, Atlas Ichth., 9, 1878, pl. 410, fig. 7; Montalban, Pomacentr. Philippine Islands, 1927, p. 27, pl. 6, fig. 2; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 27.

Dorsal XVII, 14 or 15; anal II, 15 or 16. There are 21 (19 to 23) scales with tubules in the upper part of the lateral line, 5 above and 13 or 14 below it. There are 15 scales with pores in the lower section of the lateral line, plus 3 or 4 more on the caudal base, and

31 scales in a longitudinal series from the angle of the opercle to the caudal base. The depth of the oblong, compressed body is 1.8 to 1.9, the head 3.2 to 3.5, the deeply forked caudal 2.4 times in the length. The eye is 2.6 to 3, the snout 3.3 to 3.4, the interorbital 2.5 to 2.7, the least depth of the caudal peduncle 2 times in the head. The pectoral and the ventral both equal the head, the elongate thread-like tip of the latter extending beyond the origin of the anal. The lobes of the caudal and the middle rays of the soft dorsal and anal are elongate and pointed.

The color in alcohol is largely deep reddish brown to blackish brown, the breast a little paler, the head, trunk, and fins irregularly sprinkled with black spots.

Two fine specimens, 81 and 84 mm. in length, were collected at Vila, Efaté Island, New Hebrides. This species is abundant in the Solomon Islands; 1 specimen, 90 mm. long, was taken at Auki, Malaita Island, and 10, from 59 to 85 mm. in length, at Tenibuli, Ysabel Island.

#### **Cheiloprion labiatus (Day).**

*Pomacentrus labiatus* Day, Fishes India, 1878, p. 384, pl. 81, fig. 2—Andaman and Nicobar Islands.

*Cheiloprion labiatus* Weber, Siboga Exp., Fische, 1913, p. 342, fig. 73; Mont-alban, Pomacentr. Philippine Islands, 1927, p. 36, pl. 9, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 64.

Dorsal XIII, 12 or 13; anal II, 12 or 13. There are 25 or 26 scales in a longitudinal series to the caudal base, 17 or 18 tubulated scales in the upper part of the lateral line, 4 above to the dorsal origin and 9 or 10 below the line, and 8 or 9 scales with pores in the lower section of the lateral line. The body is rather thick, heavy, ovate, the dorsal and ventral outlines about equally arched. The depth is 1.8 to 2, the head 2.6 to 2.8, the forked caudal 3.33, the ventrals 4.25 times in the length. The eye is 3 to 3.3 times, the snout 3.1 to 3.4, the convex interorbital 2.6 to 3, the least depth of the caudal peduncle 2.2 to 2.5 times in the head. The pectoral equals or is slightly less than the caudal. The lips are very broad, thick, and completely reversed around the mouth, showing the radiating papillae which cover the lips with distinct furrows, and exposing the teeth. The scales extend to the nostrils but the orbital ring is naked. The caudal is scaled for three-fourths or more of its length.

The color in alcohol is very dark or blackish brown, the breast paler. The fins are the color of the body or darker, the lips pale.

Two specimens, 55 and 58 mm. long, were taken at Malo Island, New Hebrides, and one, 55 mm. long, was secured at Ugi Island, Solomon Islands.

### **Nexilarius concolor** (Gill).

*Euschistodus concolor* Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 145—Panama.

*Nexilarius concolor* Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1559; Meek and Hildebrand, Fishes Panama, Field Mus. Nat. Hist., Zool. Ser., 15, 1925, p. 704.

Dorsal XIII, 13; anal II, 9. There are 20 scales in the lateral line, 3 above and 10 below it, and 28 scales in a longitudinal series to the caudal base, the lateral line ending below the dorsal base. The body is deep, compressed, but thick anteriorly, the upper profile forming a high arch descending very steeply from the dorsal origin to the interorbital. The depth is 1.77 times, the head 3.3 times in the length. The blunt snout is 3.1 times, the eye 3.75 times in the head. The broad interorbital is 1.6 times the eye. The posterior margin of the preopercle is smooth. The mouth is small and horizontal, the maxillary not reaching the anterior margin of the eye. The soft dorsal and anal are much higher than the spinous dorsal, the soft dorsal 1.22 times in the head, the anal a trifle lower. The caudal peduncle is very broad and strongly compressed, its depth 1.6 times in the head. The caudal is lunate with rounded lobes, the upper one longer, and is a little more than the head. The broad pectoral equals the caudal. The pointed ventrals equal the head.

The color in alcohol is uniform dark brown with 4 broad and rather indistinct blackish brown crossbars, wider than the interspaces. Behind the pectoral is a large greenish yellow patch. There is a black axillary spot on the pectoral. The tips of the soft dorsal and anal are greenish black, the ventrals lead-color.

Described from a specimen, 142 mm. long, collected at South Seymour Island, Galapagos.

### **Pomacentrus arcifrons** Heller and Snodgrass.

*Pomacentrus arcifrons* Heller and Snodgrass, Proc. Wash. Acad. Sci., 5, 1903, p. 202, pl. 7—Barrington Island, Galapagos.

Dorsal XII, 15; anal II, 13. There are 25 scales in a longitudinal series, 20 tubulated scales in the lateral line, which ends a little before the posterior end of the soft dorsal; 5 scales above, 10 below the lateral line. The body is oblong, deep, the head large and thick, deeper than long. The depth is 2 to 2.2 times, the head nearly 3 times in the length. The eye is 3.5 times, the snout 3.1

in the head. The interorbital space is a fourth wider than the eye. The pectoral is a little shorter, the caudal a trifle longer than the head. The profile from the front of the dorsal to the tip of the snout is regularly and boldly arched, the snout very steep.

The color in alcohol is brown to blackish brown, the caudal peduncle and basal half of the caudal yellow or orange yellow, the posterior half of the caudal becoming colorless. The lips are white, orange in life. All the fins, except the caudal, are blackish.

Twenty-one specimens were collected at Cocos Island, varying in length from 51 mm. to 92 mm. In the Galapagos Islands specimens were obtained as follows: 2 at Narborough Island, 73 and 76 mm. long; 31 at South Seymour Island, 33 to 95 mm. in length.

### **Pomacentrus beebei** (Nichols).

*Eupomacentrus beebei* Nichols, Zoologica, 5, 1924, p. 63—Eden Island, Galapagos; Beebe, Galapagos, 1924, p. 132, pl. 3, fig. c.

Dorsal XII, 15; anal II, 14. There are 28 scales in a longitudinal series to the caudal base. The depth is 1.75, the head 2.5 times in the length. The eye is 2.5 times, the snout 3 times in the head.

A single specimen, 18 mm. long, of this beautiful little fish was obtained at Eden Island, Galapagos. In life it was very brilliant blue, with a jewel-like luster, the dorsal region all scarlet. In alcohol the scarlet has faded to whitish, the blue to dusky with only traces of the original color left. There is a blue-margined black ocellus on the posterior part of the spinous dorsal and anterior rays of the soft dorsal and a blue spot in the axil of the soft dorsal.

### **Pomacentrus leucurus** Gilbert.

*Pomacentrus leucurus* Gilbert, Proc. U. S. Nat. Mus., 1891, p. 554—Socorro Island.

Dorsal XII, 15; anal II, 13. There are 20 scales in the lateral line, and 25 to 27 rows of scales in a longitudinal series. The depth is 2 to 2.3 times, the head 3.4 to 3.9 times in the length. The eye is 3.5 to 3.75 times in the head, a third broader than the interorbital but only slightly exceeding the blunt snout. The dorsal and ventral profiles are alike, uniformly convex. The mouth is terminal, slightly oblique, the maxillary hardly extending to the anterior margin of the eye. The pectoral equals the head. The caudal equals or slightly exceeds the head.

The color in life is deep brown to reddish brown, the caudal peduncle, under side of the head, and abdomen paler. There is a blue black spot at the upper posterior margin of the opercle. The

dorsal and anal are uniform with the body basally, their margin and posterior half of the rays black. The caudal is black. The pectoral is brown basally, but the greater part is black, with a white posterior border and orange tip. The ventrals are black or chocolate brown. The color in alcohol is brown to blackish, paler below and on the caudal peduncle. There is a black bar on the upper posterior margin of the opercle and on the upper lip. The dorsal and anal are dark brown, the posterior half of the rays black. The caudal is dark brown or black, the ventrals black or very dark. The pectoral is black with a brown spot on the base and a pale or white posterior margin and a conspicuous white or orange white spot at the tip. This fish is distinguished at once from all other species by the white and orange tip of the pectoral. There is a pearly blue spot on each scale above the lateral line, and similar spots on the sides and top of the head. On the soft dorsal is a large ocellus with a blue black center and pearly blue spots forming a ring about it. The soft dorsal and top of the caudal peduncle are sprinkled with pearly blue spots.

Our Galapagos collections include the following: Tagus Cove, Albemarle Island, 9 specimens, length 91 to 110 mm.; Eden Island, 5 specimens, length 46 to 113 mm.; Narborough Island, 3 specimens, 48 to 59 mm. in length.

### ***Pomacentrus albofasciatus* Schlegel and Müller.**

- Pomacentrus albofasciatus* Schlegel and Müller, Overz. Amphi. Verh. Nat. Ges. Ned., 1839, p. 21; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 282; Montalban, Pomacentr. Philippine Islands, 1927, p. 40, pl. 9, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 314.  
*Eupomacentrus albofasciatus* Bleeker, Atlas Ichth., 9, 1878, pl. 403, fig. 6.

Dorsal XII, 15 or 16; anal II, 12 or 13. There are 19 scales with tubules in the lateral line above, and 8 scales with pores in the lower section to the caudal base, 3 above and 9 below the line. The depth is 1.85 to 2, the head 2.9, the caudal 2.8, the pectoral 3.5 times in the length. The eye and snout are equal, 3.4 times, the interorbital 3, and the least depth of the caudal peduncle 2.08 times in the head.

The color in alcohol is very dark brown, with a broad whitish brown band across the body from the last 5 dorsal spines to the preanal region and anterior part of the anal fin, a black spot at the base of the last dorsal rays, and a black spot on the upper half of the pectoral base. The anal and ventrals are black, the pectoral and caudal brownish black, the latter with a pale hind margin.

Here described from 3 specimens, 44 to 70 mm. in length, collected at Vila, Efaté Island, New Hebrides.

**Pomacentrus eclipticus** Jordan and Seale.

*Pomacentrus eclipticus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 282, fig. 50—Apia.

Dorsal XII, 14 or 15; anal II, 11 or 12; scales in lateral line 19, 3 above and 9 below; scales in lateral series from gill opening to caudal base, 25, with several more on the caudal. The depth of the compressed, elevated body is 2, the head 3 times in the length. The dorsal profile is boldly convex, the eye rather large, 3 in the head. The interorbital equals or nearly equals the eye.

The color in life is black or blackish brown, the posterior half paler than the anterior portion. There is a large black spot on the upper part of the pectoral base. There is a deep black spot in the axil of the soft dorsal, with a white or golden spot or bar before it. The fins are all the color of the body or darker, or the soft dorsal, pectoral, and posterior half of the caudal are paler to nearly colorless. The iris is golden brown. Sometimes there is a bluish stripe below the eye to the tip of the snout. In alcohol the color is dark or blackish brown, paler on the breast and posterior third of the body. The color of the fins is not much different from that in life. The pupil is white.

Eighteen specimens, 48 to 66 mm. in length, were collected on the coral reef near the entrance to Suva Harbor, Viti Levu Island, Fiji.

**Pomacentrus lividus** (Forster).

*Chaetodon lividus* (Forster MS.) Bloch and Schneider, 1801, p. 235—Pacific Ocean.

*Pomacentrus lividus* Günther, Fische der Südsee, 2, 1876-81, p. 228, pl. 124, fig. F; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 283; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 295; Montalban, Pomacentr. Philippine Islands, 1927, p. 39; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 116; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 313.

*Eupomacentrus lividus* Bleeker, Atlas Ichth., 9, 1878, pl. 403, fig. 5.

*Pomacentrus punctatus* Quoy and Gaimard, Voy. Uranie, Zool., 1824, p. 395, pl. 64, fig. 1.

Dorsal XII, 15 or 16; anal II, 12 to 14. There are 25 scales in a longitudinal series, 16 to 18 in the lateral line, 3 above and 10 below it. The depth is about 2, the head 2.8 to 3 times in the length. The eye is 3.8, the interorbital 3.2, the snout 2.5 times in the head. The suborbital is very broad, more than the eye-diameter.

The head is scaled to the nostrils only, from there to the tip of the snout naked.

The color in life is blackish violet to black, with a blue dot on each lateral scale, the dorsals, anal, and ventrals colored like the body, the pectoral and caudal paler to yellowish. In alcohol the color is blackish brown, the sides of the head and breast bluish gray. Each scale on the sides has a whitish circular dot. The dorsals, anal, and ventrals are blackish, the pectoral brownish violet, the caudal dusky gray. A large blackish blotch is often present at the base of the posterior rays and in the axil of the soft dorsal, sometimes with a white spot before and partly surrounding it. In the young this spot may be a black ocellus margined with bluish white. A black axillary spot is usually present on the pectoral.

A specimen, 102 mm. long, was collected at Maraa, Tahiti, and 2 were taken at Bora Bora, 69 and 89 mm. in length. In the harbor of Vila, Efaté Island, New Hebrides, 10 specimens were obtained, 52 to 105 mm. in length; at Malo Island, New Hebrides, 27 specimens, 27 to 102 mm. in length; and at Wala Island, New Hebrides, 28 specimens, from 28 to 68 mm. in length. Two additional specimens taken at Wala have a well-defined ocellus at the base of the posterior dorsal rays; they are 34 and 37 mm. in length. In the Solomon Islands specimens were collected as follows: 4 at Ugi Island, 65 to 77 mm. long; 6 at Tenibuli, Ysabel Island, 90 to 116 mm. long; and one specimen, 85 mm. long, at Kulambangra Island.

### ***Pomacentrus nigricans* (Lacépède).**

*Holocentrus nigricans* Lacépède, Hist. Nat. Poiss., 4, 1803, pp. 332, 367.

*Pomacentrus nigricans* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 281.

Dorsal XII, 17; anal II, 13. There are 19 tubulated scales in the lateral line, 3 above and 10 below it, and 26 scales in a longitudinal series from the gill opening to the caudal base. In a specimen 115 mm. long, the depth is 1.8, the head 3.1 times in the length. The eye is 3.7 times, the snout 3 times in the head. The interorbital equals the snout; the least depth of the short caudal peduncle is 6 times in the length. The forked caudal equals the head, its lobes broadly rounded. The last dorsal spine is highest, 1.94 times in the head. The broadly rounded pectoral is 1.25 times in the head; the head is scaled to the tip of the snout.

The color in life is black or blackish, with purplish shades more or less evident. The vertical fins and caudal are blackish, paler

posteriorly, the axils of the dorsal and anal black. The pectoral is olive to yellowish, with a black spot on the upper part of its base. There is a pale or bluish streak below the eye. In alcohol the color is black or blackish brown to olive, often paler on the lower half of the body. There is a large black spot in the soft dorsal axil and one on the pectoral base. The fins vary from brown or black to olive. There is a grayish or bluish streak below the eye.

This is the commonest pomacentrid of the coral reefs of Polynesia. In the Marquesas group 2 were collected at Nuka Hiva Island, 75 and 78 mm. in length; one specimen, 48 mm. long, was obtained at Makatea Island, Tuamotu Archipelago. In the Society Islands 28 examples, 33 to 115 mm. long, were taken at Maraa, Tahiti; 3 at Moorea, 80 to 96 mm. in length; and 22 at Bora Bora, from 66 to 103 mm. long. At Malo Island, New Hebrides, 12 specimens, 52 to 91 mm. in length, were collected. Two specimens, 54 and 59 mm. in length, from Vila, Efaté Island, New Hebrides, are pale brown, much lighter in color than any others seen. Three specimens, 37 to 76 mm. long, were collected at Ugi Island, Solomons.

#### *Pomacentrus pavo* (Bloch).

*Chaetodon pavo* Bloch, *Ichthyologie*, 6, 1788, p. 44, pl. 198, fig. 1.

*Pomacentrus pavo* Lacépède, *Hist. Nat. Poiss.*, 4, 1803, p. 508; Günther, *Fische der Südsee*, 2, 1876-81, p. 227, pl. 124, fig. E; Bleeker, *Atlas Ichth.*, 9, 1878, pl. 408, fig. 9; Jordan and Seale, *Fishes Samoa*, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 279, pl. 40, fig. 1; Montalban, *Pomacentr.*, *Philippine Islands*, 1927, p. 43, pl. 10, fig. 2; Fowler, *Bull. U. S. Nat. Mus.*, 7, 1928, p. 68; Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 310.

Dorsal XIII, 13 or 14; anal II, 13 to 15. There are 26 scales in a longitudinal series, 3 above and 9 below the lateral line, which has 16 to 18 tubulated scales. The depth is 2.5 to 2.75, the head 3.25 to 3.5 times in the length. The eye is 2.7 to 3.15 times in the head, longer than the snout, which is 3.8 to 4 times.

The color in life is an extraordinarily brilliant and beautiful deep sapphire blue, less often sky blue or violet, passing into bright lemon beneath and on the ventral, anal, caudal peduncle and caudal fin. The upper margin of the dorsal is blackish or dusky blue, the basal two-thirds of the dorsal rays yellow. The pectoral is yellow, with a black spot on its base, and a small black spot at the angle of the opercle. Sometimes the dorsals and anal are blue like the body. In alcohol the color is some shade of blue, each scale with a darker or brownish vertical bar, the under parts and caudal peduncle yellow or pale, the head spotted and streaked with blue. There is a black

spot at the upper end of the pectoral base and a smaller one at the angle of the opercle. The caudal is yellow to yellowish gray, the vertical fins blue or pale brownish, the pectoral colorless to yellowish. Usually there is a blue line across the lower part of the eye to the snout tip, sometimes one across the upper part of the eye, and one or two parallel lines beneath the eye. Some specimens have the head marked by many conspicuous blue spots.

A fine specimen, 54 mm. long, was taken at Nuka Hiva Island in the Marquesas, and a specimen, 40 mm. long, from Takaroa Island, Tuamotu Archipelago. In the Solomon Islands 2 handsome specimens, 35 and 50 mm. in length, were taken at Auki, Malaita Island, and two, 37 and 48 mm. long, at Tenibuli, Ysabel Island; another specimen, 34 mm. long, was collected at Hathorn Sound, New Georgia Island.

At Maraa, Tahiti, this species was abundant and very brilliantly colored, although the specimens did not agree very well with typical material, and were very shy and hard to get. Sixteen specimens, 25 to 62 mm. in length, were collected. Another aberrant alcoholic specimen from Maraa, Tahiti, 30 mm. long, had the body brown with a blue dot on each scale, the caudal yellowish, the dorsal and anal largely blackish, except the produced soft dorsal rays, with a blue-edged ocellus at the axil of the soft dorsal; no black spot on the opercle or at the pectoral axil; conspicuous blue spots on the side of the head; the ventral dusky, the pectoral colorless. At Bora Bora a specimen, 46 mm. in length, was taken.

### ***Pomacentrus caeruleus* Quoy and Gaimard.**

*Pomacentrus caeruleus* Quoy and Gaimard, Voy. Uranie, Zool., 1824, p. 397, pl. 64, fig. 2—Mauritius; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 70.

Dorsal XIII, 13; anal II, 14. There are 17 tubulated scales in the lateral line, 3 above and 9 below it, and 8 scales with pores in the lower section, plus 1 more on the caudal base. There are 26 scales in a longitudinal series. The depth is 2.5 to 2.75, the head 3.3 to 3.4, the caudal 2.7 to 3 times in the length. The eye is 3, the snout 4, the interorbital 3, the least depth of the caudal peduncle 2 times in the head. The pectoral and ventral are both equal or nearly equal to the head.

The color in alcohol is bluish brown, becoming bluish white below, with a small blackish spot at origin of the lateral line and a smaller one at the upper end of the pectoral base. The dorsals, anal, and caudal are bluish gray, the pectorals and ventrals paler.

A specimen, 31 mm. long, was taken at Hathorn Sound, New Georgia Island, Solomon Islands.

**Pomacentrus violascens** (Bleeker).

*Pristotis violascens* Bleeker, Journ. Ind. Arch., 2, 1848, p. 637—Sumbawa.

*Pomacentrus violascens* Bleeker, Nat. Tijds. Ned. Ind., 12, 1856, p. 222;

Atlas Ichth., 9, 1878, pl. 408, fig. 6; Montalban, Pomacentr. Philippine Islands, 1927, p. 44; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 71.

Dorsal XIII, 10 or 11; anal II, 10 or 11. There are 26 scales in a longitudinal series to the caudal base, 18 tubulated scales in the upper part of the lateral line, 9 or 10 with pores in the lower part plus 1 or 2 on the caudal base. The depth is 2.2 to 2.4, the head 3.2 to 3.35 times in the length. The eye is 2.85 to 3, the snout 3.4 to 3.6 times in the head. The interorbital is slightly wider than the length of the snout. The emarginate caudal is 3 times in the length, slightly longer than the head, as is also the ventral, its elongate filiform tip extending upon the anal. The pectoral is slightly shorter than the head. The head and body are everywhere covered with scales, thus differing from *P. taeniurus*, which has the vertical limb of the preopercle naked.

The color in alcohol is violaceous brown, the under side of the head and breast paler. The margin of the spinous dorsal is blackish violet. The ventrals are blackish, the anal largely violaceous dusky, paler basally. The caudal peduncle is yellowish posteriorly. The posterior half of the caudal is light violaceous dusky, with a dark brown line on the upper and lower edges of the caudal. The soft dorsal is largely pale, its outer posterior part violaceous brown. The pectoral is brownish with a small blackish axillary spot.

There are in the collection 2 specimens, 50 and 57 mm. in length, from Hog Harbor, Espiritu Santo Island, New Hebrides.

**Pomacentrus bankieri** (Richardson).

*Glyphisodon bankieri* Richardson, Ichth. China, Report Brit. Ass. Adv. Sci., 1846, p. 253—Hong Kong, China Seas.

*Glyphidodon bankieri* Günther, Cat. Fishes Brit. Mus., 4, 1868, p. 54.

*Parapomacentrus bankieri* Bleeker, Atlas Ichth., 9, 1878, pl. 408, fig. 8.

*Pomacentrus bankieri* Montalban, Pomacentr. Philippine Islands, 1927, p. 45.

*Abudefduf bankieri* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 181.

Dorsal XIII, 11 or 12; anal II, 11; there are 14 to 16 tubulated scales in the lateral line, 3 above and 8 below it, and 25 scales in a longitudinal series, plus 1 more on the caudal base. The body is somewhat elongate, oblong, its depth 2.4 to 2.6, the head 3.4 to

3.5 times in the length. The eye is 3.1 to 3.3, the snout 4 to 4.3, the interorbital 3 to 3.2, the least depth of the caudal peduncle 1.7 to 1.8 times in the head. The dorsal and anal rays are elongate and filamentous, as are also the ventrals. The deeply forked caudal has both lobes more or less filamentous, the upper one much elongated.

The color in alcohol is dark brown, merging into yellowish on the caudal peduncle and above the anal. On the head, along the back, and on the caudal peduncle are small bluish spots, very obscure. On the rest of the body each scale is marked by a pale vertical streak. At the origin of the lateral line is a circular black spot as large as the pupil, and another at the axil of the pectoral. The dorsal is blackish to the second ray, the rest yellowish. The anal and caudal are yellowish, barred by numerous rows of small brown spots.

At Tenibuli, Ysabel Island, Solomon Islands, 7 specimens, from 36 to 46 mm. in length, were obtained.

This graceful little pomacentrid much resembles *Abudefduf metallicus*.

#### **Pomacentrus tropicus** Seale.

*Pomacentrus tropicus* Seale, Phil. Journ. Sci., Sect. A, 4, 1909, p. 517, pl. 12, fig. 1—Sitankai, Sulu Archipelago; Montalban, Pomacentr. Philippine Islands, 1927, p. 49, pl. 4, fig. 2.

Dorsal XIII, 14; anal II, 14. There are 24 scales in a longitudinal series to the caudal base and 1 large scale on the latter, 17 or 18 scales with tubules in the upper part of the lateral line, 3 above and 9 below it, and 7 scales with pores in the lower section of the lateral line. The depth is 2 to 2.2, the head 3.1 to 3.3 times in the length. The eye is 2.8 to 3, the snout 3.6, the least depth of the caudal peduncle 2 times in the head. The interorbital equals the eye. The truncate to slightly emarginate caudal equals or slightly exceeds the head. The pectorals are slightly less than the head. The ventrals are 4 times in the length, their filiform tips reaching the base of the first anal spine.

The color in life is clear vivid yellow to orange yellow, the region from the spinous dorsal to the tip of the snout dusky. In front of the eye are 2 short pearly white bars, and numerous pearly white spots on the side of the head below the level of the pupil. A pearly white line begins on the side midway between the pectoral base and the anal and curves down and back to the middle of the anal or beyond. There is a small black spot in front of the origin of the lateral line and a very small one at the upper angle of the pectoral

base. In alcohol the color is brownish to dusky above, the rest pale yellowish. The lines and spots are much as in life.

A fine specimen, 60 mm. long, closely resembling Montalban's excellent colored plate, was collected at Hog Harbor, Espiritu Santo Island, New Hebrides.

### ***Pomacentrus moluccensis* Bleeker.**

*Pomacentrus moluccensis* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 118—Amboina and Ternate; Bleeker, Atlas Ichth., 9, 1878, pl. 402, fig. 3; Nat. Verh. Holl. Maats. Wet., 1877, p. 56; Montalban, Pomacentr. Philippine Islands, 1927, p. 50.

Dorsal XIII, 14; anal II, 13. There are 24 or 25 scales in a longitudinal series plus 1 or 2 more on the caudal base, 18 tubulated scales in the lateral line and 3 above, 10 below the line. The depth of the ovate body is 1.8 to 2, the head 3 times in the length, the caudal equal to the head. The eye is 3 to 3.3, the interorbital 3, the snout 3.25 to 3.5, the least depth of the caudal peduncle twice in the head. The lobes of the emarginate caudal are rounded, the upper one larger than the lower. The orbital ring and posterior margin of the preopercle are naked. The suborbital is serrated, the anterior tooth enlarged and followed by a notch.

The color in alcohol is yellowish brown to dusky yellow, the upper anterior region darkest, paler below, the scales on the lower half with a pale vertical streak. There is a small black opercular spot at the origin of the lateral line and another at the upper end of the pectoral base. One specimen shows traces of a whitish longitudinal line on the anal.

Two specimens, 44 and 52 mm. in length, were taken at Tenibuli, Ysabel Island, Solomon Islands.

### ***Pomacentrus dorsalis* Gill.**

*Pomacentrus dorsalis* Gill, Proc. Acad. Nat. Sci. Phila., 1859, p. 147—Shimoda, Japan; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 29; Snyder, Proc. U. S. Nat. Mus., 42, 1912, p. 504; Montalban, Pomacentr. Philippine Islands, 1927, p. 55.

*Pomacentrus emarginatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 422; Lesson, Voy. Coquille, Zool., 1830, p. 189; Atlas, Poiss., 1826, pl. 28, fig. 1.

*Pomacentrus trilineatus* Bleeker, Atlas Ichth., 9, 1878, pl. 406, fig. 2.

*Pomacentrus delurus* Jordan and Seale, Proc. U. S. Nat. Mus., 28, 1905, p. 783, fig. 6.

Dorsal XIII, 14 or 15; anal II, 14 or 15. There are 24 or 25 scales in a longitudinal series, plus 1 or 2 more on the caudal

base; 17 or 18 tubulated scales in the lateral line, 3 or 4 above it and 9 or 10 below. The depth is 2, the head 2.8 to 3.1, the emarginate caudal 3.1 to 3.2 times in the length. The eye is 2.6 to 3.4, the snout 3.4 to 3.66, the interorbital 3.3 to 4, the least depth of the caudal peduncle 2.1 to 2.3 times in the head. The orbital ring and vertical margin of the preopercle are naked, as is also a narrow region at the tip of the snout. The dorsal spines increase in length to the last.

The color in alcohol is yellowish brown to greenish dusky, with obscure light spots on the scales. At the origin of the lateral line is a black spot, and another at the pectoral base. In front of the eye is a short bluish streak and another longer one below the eye. The caudal is yellow, abruptly marked from the body color. The dorsal is colored like the body, the anal and ventrals blackish. A large black ocellus with a bluish white margin is on the soft dorsal from the fifth to the eleventh ray, inclusive.

At Ugi Island, Solomon Islands, a specimen, 51 mm. long, was secured, and two, 48 and 58 mm. long, at Tenibuli, Ysabel Island, in the same group.

### ***Pomacentrus tripunctatus* Cuvier and Valenciennes.**

*Pomacentrus tripunctatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 421—Vanicolo; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 33; Evermann and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 89; Montalban, Pomacentr. Philippine Islands, 1927, p. 56.

*Pomacentrus trilineatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 428; Bleeker, Atlas Ichth., 9, 1878, pl. 406, fig. 6.

*Pomacentrus dimidiatus* Bleeker, Atlas Ichth., 9, 1878, pl. 406, fig. 8.

Dorsal XIII, 14; anal II, 14. There are 16 tubulated scales in the lateral line in my specimens (15 to 19 in others), 3 scales above and 9 or 10 below it, and 25 or 26 scales from the upper angle of the opercle to the caudal base. The depth is 1.9 to 2.1, the head 2.9 to 3.2, the caudal 3 times in the length. The eye is 3.66 to 4, the snout 2.85 to 2.95, the interorbital 3.3 to 3.5, the least depth of the caudal peduncle 2.9 times in the head. The head is scaled to the nostrils. The tip of the snout, the suborbital, and the posterior margin of the preopercle are naked. The caudal is emarginate, the upper lobe the longer.

The color in alcohol is dark brown above, yellowish brown on the sides, each scale below the lateral line with a bluish white spot, these spots forming longitudinal lines. There are bluish spots on the sides of the head, a blue line from the lip to the eye, and a blue

line from the tip of the snout over each eye to the dorsal origin. There is a blue black opercular spot before the lateral line origin, a dark brown spot at the upper angle of the pectoral base, and a dark blue spot on top of the caudal peduncle in the axil of the soft dorsal. The dorsal is dark brown, the anal brown with a blue longitudinal stripe, the ventral brown, the pectoral and caudal pale.

Described from 2 specimens, 71 and 74 mm. in length, from Auki, Malaita Island, Solomon Islands. Eight specimens, 43 to 83 mm. in length, were taken at Tenibuli, Ysabel Island, Solomons. Most of them were much paler than the specimens described above, and had more blue spots and lines on the top and sides of the head.

A specimen, 48 mm. long, from Hathorn Sound, New Georgia Island, Solomons, is pale yellowish all over except the top of the head and the back above the lateral line, which are brown. The top of the head and region about the eye are marked with blue lines. The sides of the head have large pale blue spots. Six additional specimens from Hathorn Sound, 18 to 43 mm. in length, are typically marked.

### ***Pomacentrus littoralis* Kuhl and Van Hasselt.**

*Pomacentrus littoralis* Kuhl and Van Hasselt, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 425—Java; Bleeker, Atlas Ichth., 9, 1878, pl. 404, fig. 8; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 76.

Dorsal XIII, 15; anal II, 15. There are 18 tubulated scales in the upper, and 8 scales with dots in the lower section of the lateral line, 3 above and 9 below the line. The depth of the ovate, much compressed body is 1.8 to 1.9, the head 3.1 to 3.3, the caudal 3.2 to 3.5 times in the length. The eye is 2.8 to 3 in the head. The snout equals the interorbital, 3.2 times, the least depth of the caudal peduncle twice in the head. The pectoral equals the emarginate caudal. The color in alcohol is uniform blackish brown, in some specimens the breast and posterior part of the caudal peduncle a little paler, the upper half of the body with a purplish brown gloss. The fins are all blackish or black except the caudal, which is sometimes dull brown. There is a circular black spot, smaller than the pupil, on the opercle before the beginning of the lateral line.

A specimen, 53 mm. long, was taken at Malo Island, and 3 specimens, 52 to 61 mm., at Vila, Efaté Island, New Hebrides.

### ***Pomacentrus amboinensis* Bleeker.**

*Pomacentrus amboinensis* Bleeker, Versl. Akad. Amsterdam, 2, 1868, p. 334—Amboina; Bleeker, Atlas Ichth., 9, 1878, pl. 406, fig. 7; Steindachner,

Abhandl. Senckenb. Gesell., 25, 1900, p. 440; Montalban, Pomacentr. Philippine Islands, 1927, p. 58; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 86.

Dorsal XIII, 14 or 15; anal II, 14 or 15. There are 24 to 26 scales in a longitudinal series, and 1 or 2 on the caudal base, 17 to 19 tubulated scales in the lateral line, 4 above and 10 below it. The cheek has 3 rows of scales. The suborbital is naked. The upper and lower profiles of the ovate body are nearly equally arched, the depth 2.1, the head 3.1 to 3.3, the caudal 3 to 3.1 times in the length. The eye is 2.9 to 3.15, the snout 3.2 to 3.5, the interorbital 3.1 to 3.3, the least depth of the caudal peduncle 2 in the head. The caudal is deeply emarginate, the upper lobe longer. The pectoral equals or is almost as long as the head. The first ventral ray is produced and extends to the anal.

In life the color is clear yellow, with pearl white spots on the head and breast, a pearl white line before the eye and one beneath the eye on the suborbital. A black spot covers the anus. There is a black spot on the opercle before the origin of the lateral line and another at the pectoral origin. The fins are all colored like the body, the anal with 2 pearl white longitudinal lines. In alcohol the color is yellow or yellowish, the spinous dorsal and back forward to the tip of the snout blackish or dark brown. The pearl white spots and lines fade or largely disappear. There is a black opercular spot and another at the pectoral origin. Midway between them a yellow or whitish longitudinal stripe runs back along the middle of the side.

Three fine specimens, 40 to 79 mm. long, were collected at Hathorn Sound, New Georgia Island; 2 specimens, 45 and 62 mm. long, at Tenibuli, Ysabel Island, Solomon Islands; and 2 specimens, 44 and 49 mm. in length, at Vila, Efaté Island, New Hebrides.

#### **Pomacentrus simsiang** Bleeker.

*Pomacentrus simsiang* Bleeker, Nat. Tijds. Ned. Ind., 11, 1856, p. 90—Java; Montalban, Pomacentr. Philippine Islands, 1927, p. 59.

*Pomacentrus trilineatus* Bleeker, Atlas Ichth., 9, 1878, pl. 406, figs. 1, 3, 4, and 5.

*Pomacentrus burroughi* Fowler, Proc. Acad. Nat. Sci. Phila., 70, 1918, p. 44, fig. 17.

Dorsal XIII, 13; anal II, 13 (dorsal and anal with 13 to 15 rays in Philippine material). There are 17 or 18 tubulated scales in the lateral line, 3 above and 9 below it, and 25 or 26 scales from the angle of the opercle to the caudal base. The depth is 2 to 2.2, the head

2.9 to 3.2, the caudal 3.25 to 3.4 times in the length. The eye is 2.9 to 3.1, the snout 3.2 to 3.85, the interorbital 3.2 to 3.5, the least depth of the caudal peduncle 2 to 2.15 times in the head. The tip of the snout before the nostrils, the suborbital, and the posterior margin of the preopercle are naked.

In alcohol the color is brownish above and anteriorly, passing gradually into yellow posteriorly, each scale below the lateral line with a light center. There is a faint dark opercular spot before the origin of the lateral line and a very small dark spot at the upper angle of the pectoral base. The top of the head and spinous dorsal are violet brown, the other fins pale or yellow.

Described from 5 specimens, 41 to 49 mm. in length, taken at Ugi Island, Solomon Islands. A specimen, 61 mm. long, from Tenibuli, Ysabel Island, in the Solomons, had a brownish white center on each scale below the lateral line, a prominent dark brown spot at the pectoral axil, and a small black ocellus on the eighth and ninth dorsal rays.

### ***Pomacentrus notophthalmus* Bleeker.**

*Pomacentrus notophthalmus* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 137—Ternate; Montalban, Pomacentr. Philippine Islands, 1927, p. 62; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 107; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 312.

*Dischistodus notophthalmus* Bleeker, Atlas Ichth., 9, 1878, pl. 401, fig. 4, and pl. 402, fig. 4.

*Pomacentrus suluensis* Seale, Phil. Journ. Sci., Sect. A, 4, 1909, p. 519.

Dorsal XIII, 13 or 14; anal II, 13 or 14. There are 26 scales in a longitudinal series to the caudal base, 17 scales with tubules in the lateral line and 7 with pores in the lower section plus 1 or 2 more on the caudal base, 4 scales above and 10 below the lateral line. The depth of the ovate body is 2, the head 3.1 to 3.2, the emarginate caudal and the pectoral, each a little longer than the head, 2.7 to 2.8 times in the length. The eye is 3.5 to 3.6, the snout 2.6 to 2.7, the interorbital 3 to 3.25, the least depth of the caudal peduncle 1.8 to 1.9 times in the head.

A juvenile specimen, 28 mm. long, was collected at Malo Island, New Hebrides. In alcohol the color of the young is brownish with a pearl white band from the third, fourth, and fifth dorsal spines to the ventral surface, and another band of the same color from the soft dorsal rays to the lower margin of the anal rays. The upper half of the head and the nape are darker brown. There is a circular, black opercular spot before the lateral line origin, and a very large

and conspicuous white-margined black ocellus on the posterior part of the spinous dorsal and adjacent part of the back.

Three adult specimens of this handsome species were taken at Tenibuli, Ysabel Island, 82, 83, and 85 mm. long, and one, 86 mm. long, was obtained at Hathorn Sound, New Georgia Island, Solomon Islands. In life the last-named specimen was violet brown on the dorsal region and dorsal fin except the last two spines. The region about the pectoral and on back to the caudal base, and the lower part of the head and the breast were bright yellow, with large golden spots on the sides of the head. Around the anus was a bright blue ring and a large bluish black spot covered the anal region and extended back over the anterior part of the anal fin. At the origin of the lateral line was a black opercular spot. In alcohol the head above the eyes, the dorsal region, and the spinous dorsal except the last spine or two is brownish black, the rest of the body more or less pale yellowish, with a large blackish brown area covering the anal region and the anal spines. There is a black opercular spot before the lateral line. The sides and top of the head are marked by large bluish white spots and 2 bluish white lines on the snout, the lower one running back under the eye. The fins, except as noted above, are pale.

***Pomacentrus cranei* Herre. Fig. 13.**

*Pomacentrus cranei* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 8 (name only).

*Pomacentrus cranei* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 409.

Dorsal XIII, 14 or 15; anal II, 14 or 15; scales 3-25-9, 15 tubulated scales plus 4 with pores in upper section and 7 to 9 with pores in lower section of lateral line. Snout scaled to nostrils, naked at tip. Depth 1.9, head 3.1 to 3.2 in length. Eye 3.3 to 3.5, snout 3, depth of caudal peduncle 2 to 2.1, last dorsal spine 1.5 to 1.66 in head. Body deep, ovate, compressed, dorsal and ventral outlines nearly alike. Caudal and pectoral slightly shorter than head. Interorbital sometimes equals eye, sometimes snout. Mouth small. Jaws equal. Maxillary does not quite reach eye. Dorsal spines increase in length to the last. Dorsal and anal rays much higher than the spines, the fins angulate behind. Ventrals elongate, filiform tips reach second anal spine.

Five specimens, collected at Tenibuli, Ysabel Island, and at Hathorn Sound, New Georgia Island, Solomon Islands.

**Pomacentrus melanopterus** Bleeker.

*Pomacentrus melanopterus* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 562—Amboina; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 24; Bleeker, Atlas Ichth., 9, 1878, pl. 402, fig. 6; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 80.

*Pomacentrus alexanderae* Evermann and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 90, fig. 17.

Dorsal XIII, 11 or 12; anal II, 13 or 14. There are 16 or 17 tubulated scales in the lateral line, 4 above and 9 or 10 below, 24 or 25 scales in a longitudinal series plus 1 or 2 more on the caudal base. The depth is 1.9 to 2, the head 3.1 to 3.3, the caudal

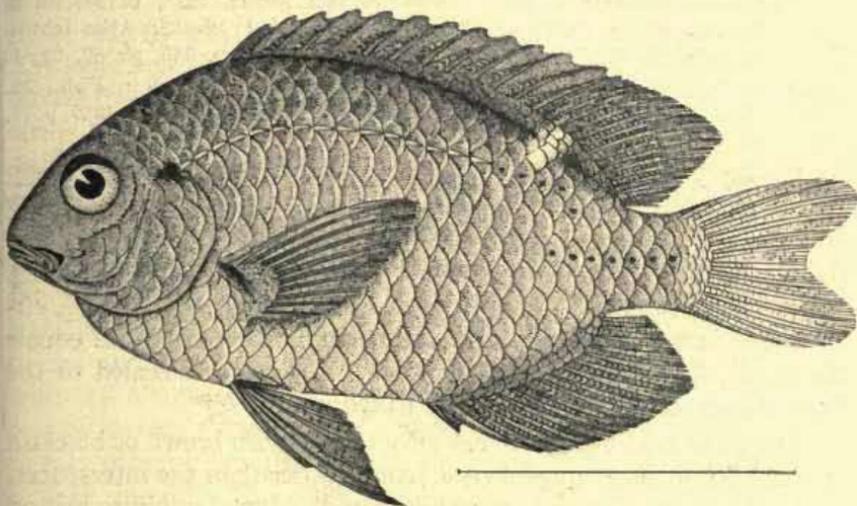


FIG. 13. *Pomacentrus cranei* Herre, Solomon Islands.

3.2 times in the length. The pectoral equals the caudal. The eye is 2.6 to 3.1, the snout 3.8, the interorbital 2.8 to 3, the least depth of the caudal peduncle 1.9 to 2 times in the head. The mouth is small, the maxillary extending below the front margin of the eye. The scales on top of the head extend to the nostrils. The suborbital is naked. There are 3 rows of scales on the cheeks. The edge of the suborbital is toothed, the first serration enlarged, with a notch separating it from the rest.

The color in alcohol is blackish brown, the sides of the head, breast, and caudal peduncle paler. The fins are all blackish but the caudal, which is pale brown. There is a black opercular spot before the origin of the lateral line and a large black spot on the pectoral base.

One example, 57 mm. long, was taken at Tenibuli, Ysabel Island, Solomon Islands. At Hathorn Sound, New Georgia Island, Solomon Islands, 2 specimens, 44 and 63 mm. in length, were obtained, which I refer here with some doubt. In both the caudal is whitish. The smaller specimen has a pale blue vertical streak on each scale below the lateral line, a pale blue spot on each scale on the side of the head, and a blue spot on each scale around and on the anal base. There are likewise traces of blue spots on the scales about the nape.

***Abudefduf sordidus* (Forskål).**

*Chaetodon sordidus* Forskål, Descr. Anim., 1775, p. 62—Djidda.

*Glyphisodon sordidus* Rüppell, Fische Rothen Meers, 1828, p. 34, pl. 8, fig. 1; Günther, Fische der Südsee, 2, 1876, p. 231; Bleeker, Atlas Ichth., 9, 1878, pl. 410, fig. 5; Day, Fishes India, 1878, p. 385, pl. 83, fig. 1.

*Abudefduf sordidus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 284; Montalban, Pomacentr. Philippine Islands, 1827, p. 77, pl. 15, fig. 2.

Dorsal XIII, 13 to 15; anal II, 12 to 15. There are 21 or 22 tubulated scales in the lateral line, 5 above and 14 below it, and 26 scales in a longitudinal series from the angle of the opercle to the caudal base. The depth of the much compressed body is 1.8 to 1.9 times, the head 2.6 to 3 times in the length. The large, circular eye is 2.7 to 2.8 times in the head. The interorbital equals the snout, 3 to 3.4 times in the head. The head is scaled to the front margin of the eye, the snout naked.

The color in alcohol is silvery gray to yellowish brown or blackish brown, with 6 blackish transverse bands, wider than the interspaces, across the body. The first descends from the dorsal origin to behind the pectoral. The second starts from a black spot which includes the third, fourth, and fifth dorsal spines. The third and fourth are below the spinous dorsal also. The fifth descends from the anterior dorsal rays. On top of the caudal peduncle, in the axil of the soft dorsal, is a conspicuous black spot from which the sixth band descends. On the pectoral base is a small black spot. The tips of the anterior dorsal rays are black, the anal and ventral tips dusky. The dark crossbands tend to disappear in alcohol.

From the Marquesas 6 specimens, 17 to 37 mm. long, were collected at Atuona, Hiva Oa Island, and 3 specimens, 22 to 34 mm. in length, at Nuka Hiva Island. Four were collected at Makatea Island, Tuamotu Archipelago, 31 to 32 mm. in length. Three specimens, 34 to 43 mm. in length, were taken at Wala Island, New Hebrides.

**Abudefduf bengalensis** (Bloch).

*Chaetodon bengalensis* Bloch, *Ichthyologie*, 5, 1787, p. 82, pl. 213, fig. 2—Bengal.

*Glyphisodon bengalensis* Day, *Fishes India*, 1878, p. 387, pl. 83, fig. 3; Bleeker, *Atlas Ichth.*, 9, 1878, pl. 407, fig. 4.

*Abudefduf bengalensis* Montalban, *Pomacentr. Philippine Islands*, 1927, p. 80, pl. 16, fig. 2; Fowler and Bean, *Bull. 100, U. S. Nat. Mus.*, 7, 1928, p. 128.

Dorsal XIII, 12 to 14; anal II, 12 to 13. There are 20 to 22 scales with tubules in the lateral line, 5 above and 12 below it, 25 scales in a longitudinal series and 2 more on the caudal base. The body is much compressed, the back elevated, the depth 1.6 to 1.8, the head 2.8 to 3 times in the length. The eye is 3.3 to 3.6, the snout 2.9 to 3.3, the interorbital 2.9 to 3.2 times in the head. The head is scaled to the nostrils. The snout before the nostrils, the orbital ring, and the preopercular edges are naked. The scaly sheath of the dorsal is low. The caudal is forked.

The color in alcohol is dull greenish or whitish, to olive brown, with 7 vertical blackish brown stripes, narrower than the interspaces, and a large blackish brown blotch on the caudal base. The first crossbar is from the nape to the postocular region, the second from the dorsal origin to behind the pectoral base, the next three from the base of the spinous dorsal, the sixth from the dorsal rays to the anal rays, the last on the caudal peduncle, usually fusing with the blotch on the caudal base. Each scale on the lower half or two-thirds of the body is marked by a short longitudinal white streak, forming parallel lines on the sides. The spinous dorsal has a black margin. There is a blackish brown spot at the upper angle of the pectoral base.

Four specimens, 87 to 114 mm. in length, were taken at Tenibuli, Ysabel Island, Solomon Islands.

**Abudefduf saxatilis** (Linnaeus).

*Chaetodon saxatilis* Linnaeus, *Syst. Nat.*, ed. 10, 1758, p. 276.

*Abudefduf saxatilis* Jordan and Seale, *Fishes Samoa*, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 285; Montalban, *Pomacentr. Philippine Islands*, 1927, p. 81, pl. 17, fig. 2; Fowler, *Bull. 100, U. S. Nat. Mus.*, 7, 1928, p. 124; Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 315.

This species may be distinguished from other banded pomacentrids by the presence of 5 black crossbands as wide as the interspaces, the first from the dorsal origin to the pectoral axil, the second between the fifth to seventh dorsal spines and the belly, the third from the tenth to the twelfth spines downward to above the anal

spines, the fourth between the base of the soft dorsal and the rear third of the anal rays, and the fifth on the middle of the caudal peduncle. There are no longitudinal black stripes on the caudal. The scales on top of the head extend to the nostrils only, the rest of the snout being naked.

Of this widespread species one specimen, 51 mm. long, was collected at Eden Island, and 18 specimens, 41 to 74 mm. in length, were obtained from a tide pool on Narborough Island, Galapagos. Two specimens from Nuka Hiva Island, Marquesas, are respectively 36 and 38 mm. in length. Four specimens, 19 to 41 mm. long, were taken at Ovalau Island, Fiji. Six specimens, 23 to 32 mm. in length, were taken at Wala Island, New Hebrides. One specimen, 98 mm. long, was collected at Tulagi, Solomon Islands. These specimens agree with material from the western Pacific, and are different from *A. marginatus*, *A. abdominalis*, and apparently unlike *A. troscheli*. I have been unable to examine authentic specimens of the last-named species, but our specimens do not agree with its description.

***Abudefduf coelestinus* (Cuvier and Valenciennes).**

*Glyphisodon coelestinus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 464, pl. 135—Indian Ocean, Isle de France, Malabar, Uliétéa, Society Islands; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 38; Günther, Fische der Südsee, 2, 1876-77, p. 229, pl. 126, fig. B.

*Glyphidodon caelestinus* Day, Fishes India, 1878-88, p. 386, pl. 83, fig. 2.

*Abudefduf coelestinus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 52; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 285, pl. 41, fig. 1; Montalban, Pomacentr. Philippine Islands, p. 83, 1927, pl. 8, fig. 1.

*Abudefduf sezfasciatus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 316.

Dorsal XIII, 11 or 12; anal II, 12 or 13. There are 20 to 21 scales in the lateral line, 5 above and 12 below it, and 28 scales in a longitudinal series to the caudal base. The depth is 1.8 to 2, the head 2 times in the length. The eye is 3.1 to 3.8, the snout 3.1 to 3.6, the interorbital 2.7 to 3.3 times in the head. The preorbital is very narrow, less than half an eye's diameter in width between the eye and mouth. There are 8 or 9+17 gill-rakers on the first arch.

In life the color is sky-blue above, the under parts yellowish white, with 5 black crossbands as follows: the first from the nape to the pectoral base, the second from the bases of the fourth to sixth dorsal spines to behind the ventral, the third from the ninth to the eleventh dorsal spines to above the anal origin, the fourth from the middle of the dorsal rays to the middle of the anal rays, and the fifth on the caudal peduncle. The caudal has a broad black

or dusky band along or near its upper and lower margins. The spinous dorsal has a black margin. The dorsal and anal rays are yellowish except where marked by the crossband. In alcohol the color becomes brownish violet, the head dusky, the vertical bars and caudal stripes blackish. The pectoral has a large black spot in its axil and a black bar on its base.

At Tahiti 2 specimens, 15 and 24 mm. in length, were collected, and at Moorea 4, from 49 to 108 mm. in length. At Nukulau Island, Fiji, were obtained 24 more, their lengths 15 to 40 mm. A specimen 79 mm. long was taken at Tenibuli, Ysabel Island, Solomon Islands.

Lacépède has applied the name *Labrus serfasciatus* (Hist. Nat. Poiss., 6, 1802, p. 137, pl. 7, fig. 2; 3, 1802, pp. 430 and 477, pl. 19, fig. 2, 5-vol. ed.), to a pomacentrid which might be *A. coelestinus*. However, all the characters he gives are common to several fishes of the group, and the only distinctive character he gives, 6 crossbands, does not apply to this species at all. The presence of the blackish bands on each caudal lobe is one not easily overlooked but Lacépède does not mention it.

#### *Abudefduf curacao* (Bloch).

*Chaetodon curacao* Bloch, Ichtyologie, 5, 1787, p. 106, pl. 212, fig. 1.

*Abudefduf curacao* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 53; Montalban, Pomacentr. Philippine Islands, 1927, p. 85, pl. 17, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 138; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 318, fig. 55.

*Glyphisodon curacao* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 352.

*Glyphisodon trifasciatus* Bleeker, Atlas Ichth., 9, 1878, pl. 410, fig. 3.

*Glyphisodon smaragdinus* Brevoort, Perry Exp. Japan, 1856, p. 264, pl. 6, fig. 3.

Dorsal XIII, 11 to 13; anal II, 12 to 14. There are 25 scales in a row from the gill opening to the caudal base, 16 or 17 tubulated scales in the lateral line, 3 above and 10 below it. The depth of the greatly compressed, broadly ovoid body is 1.66, the head 3 to 3.4 times in the length. The eye is 2.5 to 3, the snout 3 to 3.7, the broad interorbital 2.4 to 2.75 times in the head. The caudal equals the head and the pectoral is a little longer. The outer ventral ray is elongate and often filamentous, when it reaches the anterior anal rays and exceeds the pectoral.

In life the color is light yellow passing into bluish white beneath, with three crossbands of bluish black which disappear below, the dark areas formed by a bluish black spot on each scale within them.

The spinous dorsal has a violet black marginal band and the anal has a broad violaceous margin anteriorly. The caudal is bluish along the upper and lower margins. In alcohol the color is deep brown above, pale brown below, with 3 indistinct crossbars formed by black spots in the skin beneath the transparent scales. The spinous dorsal margin, anterior two-thirds of the anal, and the upper and lower caudal edges are dark brown or blackish.

A specimen, 59 mm. long, was taken on a reef at Ovalau Island, Fiji. Forty-eight specimens, 41 to 77 mm. in length, were collected at Tenibuli, Ysabel Island, Solomon Islands, and one at Ugi Island, its length 61 mm.

#### **Abudefduf dicki** (Liénard).

*Glyphisodon dickii* Liénard, Dix. Rapp. Soc. Hist. Nat. Mauritius, 1839, p. 35—Mauritius; Bleeker, Atlas Ichth., 9, 1878, pl. 309, fig. 7.

*Glyphidodon dickii* Günther, Fische der Südsee, 2, 1876-81, p. 232, pl. 125, fig. 2.

*Abudefduf dicki* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 285, pl. 41, fig. 2; Montalban, Pomacentr. Philippine Islands, 1927, p. 91; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 147; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 319.

*Glyphidodon unifasciatus* Kner and Steindachner, Sitzungsber. Akad. Wiss. Wien, 54, 1867, p. 375, pl. 2, fig. 3.

Dorsal XII, 17; anal II, 14. There are 28 scales in a longitudinal series, 21 with tubules in the lateral line and 3 above and 11 below it. The body is much compressed, the back elevated, the anterior dorsal and ventral profiles much alike, the depth 1.88, the head 3.3 times in the length. The eye is 3.33, the interorbital 2.6 times in the head, the snout a trifle longer than the eye. The depth of the caudal peduncle is a trifle more than 1.75 times in the head. The caudal is deeply forked, with rounded lobes, longer than the head, and slightly exceeding the elongate, pointed ventrals. The pectoral is a little shorter than the head. The middle rays of the dorsal and anal are elongate and pointed.

The color in alcohol is yellowish, each scale with a dark violet brown margin, with a wide black crossband from the anterior part of the soft dorsal to the base of the posterior anal rays. Behind this band the color is pale yellowish. The dorsal and anal are yellowish basally, otherwise blackish. The pectoral is yellowish, the ventrals dusky.

Here described from a fine specimen, 65 mm. long, from Bora Bora. Two specimens, 76 and 80 mm. in length, were taken at Tenibuli, Ysabel Island, Solomon Islands.

**Abudefduf leucozona** (Bleeker).

*Glyphisodon leucozona* Bleeker, Nat. Tijds. Ned. Ind., 19, 1859, p. 338; Bleeker, Atlas Ichth., 9, 1878, pl. 407, fig. 2.

*Abudefduf leucozona* Weber, Siboga Exp., Fische, 1913, p. 349; Montalban, Pomacentr. Philippine Islands, 1927, p. 92, pl. 18, fig. 2.

Dorsal XII, 15; anal II, 12. There are 20 tubulated scales in the lateral line, 4 scales above and 10 below it, and 25 scales in a longitudinal series from the gill opening to the caudal base. The depth of the ovate body is 1.9, the head 2.8, the depth of the caudal peduncle 6 times in the length. The circular eye equals the pointed snout, 3.3 times in the head. The dorsal and ventral profiles are both convex, nearly alike, the profile from the dorsal to the snout tip uniform and boldly convex.

In alcohol the color is yellowish brown, with a white crossbar about 3 scales wide from the base of the fifth, sixth, and seventh dorsal spines to the belly before the anal. Each scale on the upper two-thirds of the body has a white or pale spot, these spots forming longitudinal rows. At the base of the posterior dorsal spines and anterior rays and the adjacent part of the back above the lateral line is a large black ocellus with a pearly white margin. Behind the dorsal rays, on top of the caudal peduncle, is a black spot, and on the upper part of the pectoral base is another one.

At Nuka Hiva Island, Marquesas, a specimen was obtained. In the Fiji group a specimen, 32 mm. long, was collected near Suva, Viti Levu Island, and 3 specimens, 32 to 50 mm. long, were taken at Ovalau Island. Two specimens, 17 and 20 mm. in length, were taken at Wala Island, New Hebrides.

**Abudefduf lacrymatus** (Quoy and Gaimard).

*Glyphisodon lacrymatus* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1824, p. 388, pl. 62, fig. 7—Guam; Günther, Fische der Südsee, 2, 1876-81, p. 232, pl. 125, fig. D; Bleeker, Atlas Ichth., 9, 1878, pl. 404, fig. 6.

*Abudefduf lacrymatus* Montalban, Pomacentr. Philippine Islands, 1927, p. 93, pl. 7, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 151.

Dorsal XII or XIII, 15 to 17; anal II, 12 or 13. There are 18 or 19 tubulated scales in the lateral line, 3 above and 10 below it, and 25 scales in a longitudinal series with 1 or 2 more on the caudal base. The depth is 1.8 to 1.9, the head 2.9 to 3.1 times in the length. The eye is 3 to 3.3, the snout 3.2 to 3.4, the interorbital 3 times in the head. The head and body are completely scaled, the vertical fins with a rather high basal sheath. The forked caudal is about equal to the head.

The color in life is dark brown with sapphire spots on the sides above the level of the eye, and extending upon the dorsal. The body behind the dorsal and anal, and the caudal fin are clear yellow. The spinous dorsal has a broad, black margin. The pectoral has a black basal bar. In alcohol the color is brown, the caudal peduncle and caudal fin yellow to whitish, with small bluish or white spots on the upper part of the body.

Four specimens of this easily recognized and very handsome little fish were taken at Ugi Island, their lengths 53 to 56 mm., and 2, from 62 to 65 mm. long, at Tenibuli, Ysabel Island, Solomon Islands.

**Abudefduf melas** (Kuhl and Van Hasselt).

*Glyphisodon melas* Kuhl and Van Hasselt, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 353—Java.

*Paraglyphidodon melas* Bleeker, Atlas Ichth., 9, 1878, pl. 404, fig. 4.

*Chrysiptera melas* Jordan and Snyder, Proc. U. S. Nat. Mus., 24, 1902, p. 605; Montalban, Pomacentr. Philippine Islands, 1927, p. 95, pl. 19, fig. 2.

*Abudefduf melas* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 161.

Dorsal XIII, 13 or 14; anal II, 12 or 13. There are 26 scales in a longitudinal series, 16 or 17 tubulated scales in the lateral line, 4 above and 11 below it. The depth is 1.8 to 2, the head 3.1 to 3.5 times in the length. The eye is 3.25 to 4.25, the snout 2.8 to 3, the interorbital 2.4 to 2.8 times in the length of the head. The body is oblong, with both dorsal and ventral anterior profiles strongly and regularly convex, the interorbital high-arched. The dorsal spines are short and stout, the soft dorsal rounded and much higher. The anal is longer than the soft dorsal and equally high. The caudal peduncle is deep, its least depth 1.8 times in the head. The broad, short pectoral is a trifle shorter than the head, the slightly emarginate caudal a little shorter yet.

In life this species is readily recognized by its deep rich blackish violet color, the soft dorsal and anal a paler deep violet. In alcohol the color is uniformly blackish or brownish black, the fins all black except the pectoral, which is paler.

We collected 2 very fine specimens, 170 and 175 mm. in length, at Atuona, Hiva Oa Island, Marquesas, and 1 specimen, 45 mm. long, on a coral reef near Suva, Viti Levu Island, Fiji. Eight specimens were taken at Tenibuli, Ysabel Island, Solomon Islands, from 71 to 126 mm. in length.

**Abudefduf metallicus** Jordan and Seale.

*Abudefduf metallicus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 289, fig. 51—Apia, Samoa.

Dorsal XIII, 10; anal II, 11. There are 14 to 16 tubulated scales in the lateral line and 10 to 12 with pores in the lower section plus 1 on the caudal base, 2 or 3 above and 8 below it. There are 25 or 26 scales in a longitudinal series from the angle of the opercle to the caudal base, plus 1 or 2 more on the latter. The depth is 2.36 to 2.42, the head 3 to 3.25, the caudal 2.8 to 3 times in the length. The eye is 3.25 to 3.3, the snout 3.7 to 3.9, the interorbital 3.12 to 3.25, the least depth of the caudal peduncle 2 to 2.3 times in the head. The elongate-oblong body is thickened anteriorly, the dorsal profile descending steeply from the nape to the snout tip. The mouth is small, oblique, the maxillary extending beneath the anterior margin of the eye to beneath the anterior third of the eye. The tip of the snout, below the nostrils, is naked. The rest of the head, including the suborbital, is scaled. The caudal is forked, its outer lobes prolonged into filaments. The rays of the soft dorsal and anal are much elongated, the soft dorsal equal to the caudal, the anal a little less than the head. The ventral is also elongate, reaching to the anal spines.

The color in life is blue black or blackish indigo, with no markings except that the pectoral base may be darker than the adjacent parts. The color in alcohol is blue black above, the sides usually paler or blackish brown below the lateral line and posteriorly, each scale with a paler blue or brown margin, the fins all blue black except the pectoral, which varies from blue black to whitish with a black bar across its base, and the inner part of the caudal, which is pale to colorless.

Seventeen specimens, 18 to 51 mm. in length, of this very handsome and graceful little pomacentrid were secured in a deep pool between rapids in a fresh-water stream at Auki, Malaita Island, Solomon Islands. Two specimens, 31 and 33 mm. long, were also taken from a stream on Kulambangra Island, Solomon Islands. They differ in having the posterior part of the soft dorsal and anal pale like the inner part of the caudal, and one of them has the pectorals colorless. Seventeen specimens, 34 to 55 mm. in length, taken at Ugi Island, Solomon Islands, seem to belong here, but are paler in color, most of the scales with a light center and a dark brown or blackish bar basally. There is a black spot at the lateral line origin. The black bar at the pectoral base has a pale spot above and a whitish bar behind it. Otherwise the specimens are like those from Malaita. A specimen, 35 mm. long, from Tenibuli, Ysabel Island, is like the specimens from Ugi.

**Abudefduf uniocellatus** (Quoy and Gaimard).

*Glyphisodon uniocellatus* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1824, p. 393, pl. 64, fig. 4—Coupang; Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 481.

*Glyphidodon uniocellatus* Günther, Fische der Südsee, 2, 1876-81, p. 234, pl. 128, fig. A.

*Abudefduf uniocellatus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 54; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 288, pl. 43, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 323.

*Chrysiptera uniocellata* Montalban, Pomacentr. Philippine Islands, 1927, p. 99.

Dorsal XIII, 11 to 13; anal II, 11 to 13. There are 16 tubulated scales in the lateral line, 3 above and 10 below it, and 25 in a longitudinal series to the caudal base. The depth is 2.8 to 2.9, the head 3.1 to 3.2 times in the length. The eye is 2.8 to 2.9, the snout 3.4 to 4.5, the interorbital 3.4 to 4.2 times in the length. The very small mouth is nearly horizontal, the jaws equal.

The color in alcohol is blue or bluish or brownish, the belly pale reddish or yellowish, the scales below the lateral line with 1 (rarely 2) rather large circular blackish blue or pale or yellowish dot on each scale. There is a blackish stripe on the middle of the nape and forehead. There is a black stripe from the tip of the snout through the eye to the origin of the lateral line and 1 or 2 black dots beyond it above the origin of the lateral line. There is a black line across the preorbital to the eye. There is a large circular black spot on the base of the 3 last dorsal rays, and a black spot at the pectoral axil. The dorsal is brown or bluish, the anal yellow to blue. The caudal is blue or brown basally, the posterior half whitish or gray. In life this is one of the most beautiful of the blue damsel fishes. It is vivid deep blue, the breast and belly orange yellow, each scale on the sides with 1 or 2 golden or pale yellow dots, and a violet black stripe from the snout through the eye and to the lateral line. There is a large blue black spot on the base of the last dorsal rays.

At Tahiti 2 poor specimens, 18 and 28 mm. long, were collected, and at Suva, Viti Levu Island, Fiji, one, 38 mm. long. A fine specimen, 45 mm. long, was taken at Wala Island, New Hebrides. Two specimens were secured at Ugi Island, 47 and 48 mm. in length, and an atypical specimen, 40 mm. long, at Hathorn Sound, Solomons.

**Abudefduf taupou** Jordan and Seale.

*Abudefduf taupou* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 288, pl. 53, fig. 3—Apia, Samoa; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 54.

Dorsal XIII, 11; anal II, 11. There are 17 tubulated scales in the lateral line, 3 above and 9 below it, and 26 scales in a longitudinal series to the caudal base. The depth is 2.5, the head 3.4 times in the length. The eye is 2.65, the snout 3.8, the interorbital 3.1 times, the least depth of the caudal peduncle twice in the head. The emarginate caudal is a little shorter than the head, the pectoral a little shorter yet. The first ventral ray is prolonged into a filament which extends nearly to the anal and is longer than the head.

In life this is a fish of vivid and extraordinary beauty. It is clear, deep blue, the under parts golden. The dorsal is brilliant orange red, the posterior rays blue, with a blue black spot in the axil. The anal is similar but paler in color, and lacks the axillary spot. The caudal is very pale bluish tinged with orange, the pectoral pale blue, the ventrals golden. There is an interocular blue black stripe around the tip of the snout. In alcohol the color is blue, the golden and orange red turning to whitish, with a black spot in the axil of the soft dorsal and a black stripe on the upper lip to the eye.

Here described from a specimen, 36 mm. long, taken at Vila, Efaté Island, New Hebrides.

#### **Abudefduf brownriggi** (Bennett).

*Chaetodon brownriggii* Bennett, Fishes of Ceylon, 1828, p. 8, pl. 8—Ceylon.

*Glyphisodon brownriggii* Günther, Fische der Südsee, 2, 1876, p. 232, pl. 127, figs. B, C, E.

*Abudefduf brownriggi* Montalban, Pomacentr. Philippine Islands, 1927, p. 105.

*Glyphisodon biocellatus* Quoy and Gaimard, Voy. Uranie, Zool., 2, 1825, p. 389; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 321.

*Glyphisodon unimaculatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 358.

*Glyphidodontops unimaculatus* Bleeker, Atlas Ichth., 9, 1878, pl. 407, fig. 5.

*Glyphisodon antjerius* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 360.

*Abudefduf antjerius* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 287, pl. 42, fig. 2.

*Glyphidodontops zonatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 361; Bleeker, Atlas Ichth., 9, 1878, pl. 407, fig. 3.

*Abudefduf zonatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 286.

*Glyphidodon hemimelas* Kner, Sitzungsber. Akad. Wiss. Wien, 58, 1868, pp. 30, 351, pl. 8, fig. 25.

Dorsal XIII, 11 to 14; anal II, 11 to 13. There are 25 scales in a longitudinal series, 16 to 19 in the lateral line, 3 above and 9

below it. The depth is 2 to 2.3, the head 3 to 3.4 times in the length. The eye is 3 to 3.7, the snout 3 to 3.6 times in the head, the inter-orbital equal to or slightly less than the eye.

This beautiful little pomacentrid is subject to very considerable variation in color. With advancing age astonishing changes are often undergone. An examination of hundreds of living specimens and observation of them over a period of years, during which many passed from very youthful to mature stages, has demonstrated that the names cited above, together with many others omitted, all belong to the same species. Bennett's *C. brownriggii* was based on the young. This species falls naturally into three well-marked parallel color series, as has been pointed out by Montalban. If one merely relies upon museum specimens it is very difficult to trace the changes from one form to another. If, however, the student can keep aquarium specimens under observation for several years he will readily observe one nominal species transform into another. The young always have 2 bluish lines on the head, passing from the tip of the snout toward the dorsal, usually ending at the base of the third to the fifth dorsal spine. The very young also have 2 dark, blue-edged ocelli, a large one at the base of the last dorsal spines and a small one at the base of the last dorsal rays. The stripes and anterior ocellus usually disappear with age, and often fade in alcohol. The ground color may vary from deep blue, blackish blue, or dark olive, to yellowish brown, and a lemon yellow or white crossband may be present on each side. The posterior half of the body may be darker or the under and posterior parts and fins may shade to yellow or orange.

The Fiji collections well exemplify the variations of this species. From the reef at Nukulau Island were collected 15 specimens, 40 to 62 mm. in length, which are the *zonata* of authors, having the pale or white lateral transverse band. The studies of Weber, Montalban, and myself show this form to be merely a color variant. From a reef near Suva were obtained 9 similar specimens, 41 to 74 mm. in length. Two specimens from Ovalau Island, 22 and 23 mm. long, also belong to the variety *zonata*. Another series of 16 specimens, 18.5 to 53 mm. in length, from the same locality, are the *biocellatus* of authors. All but the two largest show an ocellus on the spinous dorsal and blue convergent lines from the tip of the snout above the eye to the dorsal origin. All have a black spot or ocellus in the axil of the soft dorsal and at the pectoral base. Another lot of 18 specimens, 17 to 47 mm. in length, also from

Nukulau, is much paler than the rest. In life each scale had a blue spot. In alcohol the ground color is pale brown, each scale with a pale center. Both ocelli are present on the dorsal fins and a black spot on the pectoral axil. The caudal is yellowish or colorless. All have the blue stripes from snout to dorsal. Seven specimens, 19 to 43 mm. long, collected from a reef near Suva, had a blue spot, or 1 or 2 blue dots on each scale. In other respects they were typically marked. In the Marquesas Islands a specimen, 27 mm. long, was obtained at Atuona, Hiva Oa Island, and at Nuka Hiva Island one, 48 mm. long, was collected. A young specimen, 16 mm. long, was taken at Maraa, Tahiti. A fine specimen, 81 mm. long, was taken at Vila, Efaté Island, New Hebrides, and 10 specimens, 14 to 29 mm. in length, at Bushman Bay, Malekula Island; also 20 specimens, 11 to 32 mm. in length, at Wala Island, in the same group. I also refer here 8 young, 13 to 15 mm. in length, taken at Hog Harbor, Espiritu Santo Island, and one, 25 mm. long, from Malo Island, all in the New Hebrides.

**Abudefduf leucopomus** (Cuvier and Valenciennes).

*Glyphisodon leucopomus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 480—Oualan, Caroline Islands.

*Abudefduf leucopomus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 283, pl. 43, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 322.

Dorsal XIII, 12; anal II, 11 or 12. There are 18 scales in the lateral line, 24 to 26 in a longitudinal series from the gill opening to the caudal base, 3 scales above and 9 below the lateral line. The depth is 2.4 to 2.6 times, the head 3.5 to 3.7 times in the length. The eye, snout, and interorbital are equal, 3.2 to 3.3 times in the head. The forked caudal is slightly longer than the head.

The color in alcohol is bluish gray, becoming grayish brown dorsally, paler on the breast and belly. A blue line above the nostril meets its fellow on top of the snout and runs back along the upper margin of the eye and on for a short distance. There are some blue dots beneath and behind the eye. There is a short blue horizontal line on the preorbital. Other blue lines and the blue dots on each lateral scale have disappeared since I first determined the specimens. The vertical fins are bluish to dusky bluish, the caudal pale interiorly, dusky bluish posteriorly. The pectoral is yellowish, its tip bluish dusky.

Here described from 3 specimens, 46 to 59 mm. long, from Makatea Island, Tuamotu Islands.

**Abudefduf glaucus** (Cuvier and Valenciennes).

*Glyphisodon glaucus* Cuvier and Valenciennes, Hist. Nat. Poiss., 5, 1830, p. 475—Guam.

*Abudefduf glaucus* Evermann and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 93; Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 264; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 169.

*Glyphidodontops modesta* Bleeker, Atlas Ichth., 9, 1878, pl. 403, fig. 9.

Dorsal XIII, 13; anal II, 13. There are 18 tubulated scales in the lateral line, 4 above and 8 below it, and 24 scales in a longitudinal series plus 2 more on the caudal base. The depth is 2.16 to 2.3, the head is 3.33 to 3.4 times in the length. The eye is 3.15 to 3.2, the snout 3.5 to 3.6 times in the head. The interorbital equals the eye. The least depth of the caudal peduncle is 1.8 to 2 times in the head. The caudal equals the head. The pectoral is a little shorter than the caudal.

The color in alcohol is brown to bluish brown above, paler brown below, paler still and more or less yellow around the base of the anal and above it. The fins are blackish or dusky, except the pectoral, which is pale, and the ventrals which are bluish to pale or nearly colorless. The caudal is more or less pale basally. The iris is slaty.

From the reef near Suva, Fiji, 7 specimens were obtained, 36 to 60 mm. in length. Nine specimens, 30 to 56 mm. in length, were taken at Wala Island, New Hebrides. They are exactly like Bleeker's figure cited above, the anal in every one showing the darker margin.

**Hemiglyphidodon plagiometopon** (Bleeker).

*Glyphisodon plagiometopon* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 67—Singapore.

*Glyphidodon plagiometopon* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 51; Bleeker, Atlas Ichth., 9, 1878, pl. 410, fig. 4.

*Hemiglyphidodon plagiometopon* Bleeker, Verh. Akad. Amsterdam, 18, 1879, p. 8; Montalban, Pomacentr. Philippine Islands, 1927, p. 75, pl. 5, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 185; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 326, fig. 57.

*Abudefduf melanopselion* Fowler, Proc. Acad. Nat. Sci. Phila., 1918, p. 59, fig. 23.

Dorsal XIII, 12 or 13; anal II, 13 to 15. There are 25 scales in a longitudinal series plus one or two more on the caudal base, 15 to 18 tubulated scales in the lateral line and 4 or 5 above it, 9 or 10 below it. The depth is 1.9 to 2, the head 2.7 to 3, the caudal 3.7 times in the length. The eye is 3.25 to 4.1, the snout 2.5 to 2.9, the interorbital 2.8 to 3.2, the least depth of the caudal peduncle 2.15 to 2.3 times in the head.

The color in alcohol is pale brown to dark purplish brown, the throat and breast paler, with a paler or bluish vertical mark on each scale, little evident on the upper third. The scales on the sides of the head and at the anal base each have a blue spot. A pale blue line extends from the snout tip to the eye and along its upper edge. A similar line curves about the lower edge of the eye. Some specimens show bluish spots on the dorsal basal scales and on the caudal base. The fins are all blackish brown, the pectoral paler than the others with a black bar along its base.

Five specimens, 70 to 130 mm. in length, were caught at Tenibuli, Ysabel Island, Solomon Islands.

#### Family LABRIDAE

##### *Bodianus eclancheri* (Valenciennes).

*Cossyphus eclancheri* Valenciennes, Voy. Venus, Zool., Poiss., p. 340, 1855, pl. 8, fig. 2, 1846—Galapagos Islands.

*Bodianus eclancheri* Snodgrass and Heller, Proc. Wash. Acad. Sci., 6, 1905, p. 392.

Dorsal XII, 9; anal III, 11. There are 32 scales in the lateral line plus 3 more on the caudal base, 6 above and 10 below it. The depth is 2.6 to 2.75 times, the head 3.1 times in the length. In large specimens the anterior profile of the head is nearly vertical, due to a large hump before and above the eye. The profile from the top of the hump to the nape is slightly concave. The snout is 2.25 to 2.5 times in the head, the eye 5.9 to 6.25 times and 2.5 to 2.67 times in the snout. The posterior dorsal and anal rays are elongate but do not extend beyond the truncate caudal. I find the preopercle scaled, not naked as given in the literature. The caudal is more or less lunate, with the upper and lower tips becoming elongate.

In life the typical color is flaming orange, merging into pale below, with 2 large black patches or 1 continuous black patch along the dorsal base and on the upper half of the body, and black on the fins. This remarkable fish varies widely in color, hardly two specimens being colored alike. One specimen was entirely black except the lips and tip of the caudal. One specimen, 280 mm. long, was an albino. In alcohol the black tends to become chocolate brown.

Several dozen specimens, from 220 to over 500 mm. long, were caught with hook and line at Tagus Cove, Albemarle Island, Galapagos. They seemed to live on the bottom, at depths ranging from 15 to 20 fathoms. Unfortunately most of them were thrown overboard

instead of being saved. Four specimens, 220 to 335 mm. in length, were preserved.

**Epibulus insidiator (Pallas).**

*Sparus insidiator* Pallas, Spicil. Zool., 8, 1770, p. 41, pl. 5, fig. 1—Java.

*Epibulus insidiator* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 110, pls. 398, 399; Bleeker, Atlas Ichth., 1, 1860, p. 74, pl. 22, fig. 3; Günther, Fische der Südsee, 2, 1881, p. 250, pl. 137.

Dorsal IX, 10; anal III, 8; 14 scales in the upper section of the lateral line, 7 in the lower, plus 1 or 2 more on the caudal base. The depth is 2.4, the head 2.7 times in the length. The eye is 6, the snout 2.7 times in the head. The soft dorsal rays reach to the caudal base or beyond. The anal rays are prolonged to the tip of the central caudal rays or beyond, longer than the head. The deeply lunate caudal has its tips elongated, 3.15 times in the length. The ventrals are likewise much extended, equal to the head, reaching well upon the anal.

This strange labrid is recognized immediately by its extraordinary jaws, which are highly protractile so that they can be extended to an amazing degree.

The color varies greatly, a deep blackish green perhaps commonest, but some are yellow. Alcoholic specimens are deep and nearly uniform black or dark olive green to brownish, the fins the same color except the pectoral, which has a broad white or pale posterior margin. The dorsal and anal show pale and dark longitudinal lines, blue or green or red in life.

At Takaroa Island, Tuamotu Archipelago, 2 specimens, 170 and 210 mm. in length, were collected. At Maraa, Tahiti, 2 more, 110 and 140 mm. in length, were taken. A specimen, 105 mm. long, was caught at Bora Bora. At Bushman Bay, Malekula Island, New Hebrides, a fine specimen, 206 mm. long, was collected. Two specimens, 120 and 132 mm. long, were taken at Tenibuli, Ysabel Island, Solomon Islands.

**Labrichthys cyanotaenia Bleeker.**

*Labrichthys cyanotaenia* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 331—Larantuka, Flores; Atlas Ichth., 1, 1862, p. 154, pl. 22, fig. 1; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 294; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 331; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 220.

*PlatyGLOSSUS ocellatus* Kner and Steindachner, Sitzungsber. Akad. Wiss. Wien, 54, 1866 (1867), p. 377, fig. 8.

*Chaerophilis castaneus* Kner and Steindachner, Sitzungsber. Akad. Wiss. Wien, 54, 1866 (1867), p. 394, text figs. a and b; same specimen as *P. ocellatus*.

Dorsal IX, 11; anal III, 10. There are 25 scales in the lateral line, plus 2 or 3 on the caudal base, 4 above and 11 below the line. The entire head, except the lips, is completely covered with scales smaller than those on the body. The depth is 3, the head 2.75, the caudal 5.5, the ventral 4.3 times in the length. The pectoral equals the caudal. The eye is 6, the snout 3, the interorbital 3.8, the maxillary nearly 5, the least depth of the caudal peduncle 1.8 times in the head. The body is oblong, much compressed, the head pointed, with thickened elongate lips made up of deep plicate folds or lamellae which radiate outwardly. When the mouth is closed the lips form a short truncate tube with a small circular opening at the tip, which remains open. Behind this tube are 3 pairs of well-hidden canines in both the upper and lower jaws, the lateral teeth fused into a wide blunt bony ridge. On each side of the upper jaw is a large posterior canine. The entire body, except the lips and snout back to the nostrils, is covered with scales, those on the head and breast smaller than those on the sides. All the fins have basal scaly sheaths, those on the dorsal highest. The lateral line is continuous. The broadly rounded caudal is twice in the head.

The remarkable lips of this handsome labrid have never been adequately noticed by any who have mentioned it. Bleeker's figure and description are both erroneous, and the only correct figure is that given by Kner and Steindachner of a young specimen. The *Thysanocheilus ornatus* of Kner, referred here by other authors, is plainly another species, as shown by his description and figure.

The color in alcohol is blue black above, the sides of the head and body brown, with a longitudinal bright blue bar on each scale, these bars forming lines running from the head to the tail. On the head the scales each have a blue spot. Above and behind the pectoral is a large pale blotch. The dorsal and anal are blue black, the basal half with a blue spot on each scale of the sheath. All the fins but the pectoral have a pale blue marginal line. The pectoral is colorless.

Described from a specimen, 99 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

### *Stethojulis axillaris* (Quoy and Gaimard).

*Julis axillaris* Quoy and Gaimard, Voy. Uranie, Zool., 1824, p. 72—Hawaiian Islands.

*Stethojulis axillaris* Bleeker, Atlas Ichth., 1, 1862, p. 136, pl. 44, fig. 7; Günther, Fische der Südsee, 2, 1876-81, p. 254, pl. 136, fig. C; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 283; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 234; Fowler, Mem. Bishop Mus., 10, 1928, p. 334.

Dorsal IX, 11; anal III, 11. There are 26 scales in the lateral line, plus 2 on the caudal base, 3 above and 8 below it. In a specimen 58 mm. long, the depth equals the head, which is 3.25 times in the length. The snout is 2.57, the eye 4.5, the interorbital 3.6, the least depth of the caudal peduncle 2.4, the caudal 1.2, the pectoral 1.38 times in the head.

The color in alcohol is olive gray to dark olive brown, becoming paler to whitish beneath, with 2, rarely 3, small circular black spots in a row on the caudal peduncle on the lateral line. Very small specimens also have a similar spot on the 2 last rays of the dorsal and anal. The lower half of the head is conspicuously paler or whitish, the line of demarcation along the under side of the eye. The fins are pale brownish to translucent.

Six specimens, 25 to 58 mm. in length, were taken on a reef near Suva, Viti Levu Island, Fiji.

#### *Stethojulis strigiventer* (Bennett).

*Julis strigiventer* Bennett, Proc. Zool. Soc. Lond., 1832, p. 184—Mauritius.

*Stethojulis strigiventer* Bleeker, Atlas Ichth., 1, 1862, p. 135, pl. 43, fig. 1; Day, Fishes India, 1878-88, p. 397, pl. 84, fig. 7; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 299; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 232; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 333.

Dorsal IX, 11; anal III, 11. There are 25 scales in the lateral line plus 2 more on the caudal base, 2 above and 8 below the lateral line. The depth is 3.65, the head 3, the caudal 5.8 times in the length. The eye is 5.25, the snout 2.87 times in the head.

The color in alcohol is dusky olive above, the sides brown, the lower part of the body with 5 dark brown longitudinal stripes alternating with very pale brown stripes. The head is dark olive brown to the level of the snout and lower margin of the eye, pale yellowish below and on the throat. There is a large dark brown spot on the opercle and a small blue black ocellus on the caudal peduncle above the lateral line at the caudal base. The caudal has 5 obscure brown crossbands. There is a small blue black ocellus at the base of the last dorsal ray, the other fins all colorless otherwise.

Here described from a specimen, 64 mm. long, from Ovalau Island, Fiji.

#### *Hemigymnus melapterus* (Bloch).

*Labrus melapterus* Bloch, Ichthyologie, 8, 1797, p. 111, pl. 285—Japan.

*Hemigymnus melapterus* Bleeker, Atlas Ichth., 1, 1862, p. 142, pl. 45, figs. 2 and 3; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906),

p. 294; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 247; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 337.

Dorsal IX, 10; anal III, 10. There are 26 scales in the lateral line, plus 3 more on the caudal base, 5 above and 10 below the line. The depth is 2.5 to 2.65, the head 2.5 to 2.75, the caudal 4 times in the length. The eye is 5.5, the snout 2.3, the least depth of the caudal peduncle 2.15 times in the head. The body is compressed, the head rather pointed, the lips turned back in a broad and very conspicuous flap.

The color in alcohol is dark violet brown from the origin of the dorsal to the anus and back to the caudal peduncle. The latter and the anterior portion are pale olive brown, becoming yellowish, spotted with purplish brown on the cheeks, under side of the head, and breast. From the dorsal origin a whitish band descends obliquely toward the pectoral, widening as it goes. There is a large blackish brown blotch behind the eye. The dorsal and anal are a little darker than the trunk, the anal with a pale marginal band. The caudal is spotted with blue, the pectorals and ventrals colorless.

Here described from a young specimen, 121 mm. long, taken at Vila, Efaté Island, New Hebrides.

#### **Halichoeres hoeveni (Bleeker).**

*Julis (Halichoeres) hoevenii* Bleeker, Nat. Tijds. Ned. Ind., 2, 1851, p. 250—Banda Neira.

*PlatyGLOSSUS hoeveni* Bleeker, Atlas Ichth., 1, 1862, p. 111, pl. 42, fig. 3; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 300.

*Halichoeres hoeveni* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 268; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 340.

Dorsal IX, 12; anal III, 12. There are 27 or 28 scales in the lateral line plus 1 or 2 more on the caudal base, 3 above and 9 below it. The depth is 3.45 to 3.6, the head 3 to 3.6, the caudal 4.6 to 4.9 times in the length. The eye is 4 to 4.7, the snout 3.33 to 3.65, the least depth of the caudal peduncle 1.85 to 2 times in the head.

The color in alcohol is light brown, darker above and paler below, with 8 to 10 darker purplish brown longitudinal bands on the body. A bluish lavender band extends from the snout to the eye. There is a darker blue black vertical bar behind the eye. There are traces of blue or lavender bands below the eye and on the cheek. There is a small black spot between the first and second dorsal spines, a large white-edged black ocellus (which is blue-margined in life) on the front of the soft dorsal, and another, a little smaller, on the caudal base above the lateral line. The dorsal is marked by 2 or 3,

the anal with 2 longitudinal bands which may be broken into diagonal or irregular spots.

Twenty-six specimens of this easily recognized species were taken at Ovalau Island, Fiji, their lengths from 21 to 49 mm. A specimen, 53 mm. long, was obtained at Tenibuli, Ysabel Island, Solomon Islands.

### **Halichoeres kallochroma** (Bleeker).

*Julis kallochroma* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 289—Priaman, Sumatra.

*PlatyGLOSSUS kallochroma* Bleeker, Atlas Ichth., 1, 1862, p. 108, pl. 42, fig. 4.

*Halichoeres kallochroma* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 261; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 339.

*PlatyGLOSSUS flos-coralis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 299, pl. 46, fig. 2.

Dorsal IX, 12; anal III, 12. There are 26 scales in the lateral line plus 2 more on the caudal base, 3 above and 9 below it. In a specimen 54 mm. long, the depth is 3.12, the head 3, the caudal 4.32, and the pectoral 5.4 times in the length. The snout is 3, the eye and interorbital each 4.5, and the least depth of the caudal peduncle 2.28 times in the head. The elongate body is much compressed, the dorsal and ventral profiles of the pointed head alike.

The color in alcohol is light purplish brown to dark brown, with 8 to 10 longitudinal bands of darker or chocolate brown. The sides of the head are paler, with a bluish dusky band from the snout to the eye and a curved band from the angle of the mouth to the pectoral base. Behind the eye the 2 longitudinal lines unite in a loop. There is a short line running back behind the chin. There are 2 longitudinal bands of purplish brown on both the dorsal and anal, the other fins very pale brownish or yellowish. There is a black spot on the pectoral base. Another specimen has the dorsal and anal both deep chocolate brown.

A specimen, 54 mm. long, was taken at Ovalau Island, and one, 44 mm. long, on a reef near Suva, Viti Levu Island, Fiji.

### **Halichoeres notopsis** (Kuhl and Van Hasselt).

*Julis notopsis* Kuhl and Van Hasselt, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 13, 1839, p. 485—Java, Guam.

*PlatyGLOSSUS notopsis* Bleeker, Atlas Ichth., 1, 1862, p. 111, pl. 41, figs. 1 and 2; Day, Fishes India, 1878-88, p. 398, pl. 84, fig. 4; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 299; Günther, Fische der Südsee, 3, 1909-10, p. 268, pl. 142, fig. A.

*Halichoeres notopsis* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 267; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 340.

Dorsal IX, 12 or 13; anal III, 12. There are 26 scales in the lateral line, including 1 on the caudal base, 4 above and 10 below the lateral line. The depth is 3, the head 3.2, the caudal 4.35 times in the length. The eye is 3.75, the snout 3, the least depth of the caudal peduncle 1.85 times in the head. The body is compressed, the dorsal and ventral profiles about evenly arched, with pointed head and snout, deep caudal peduncle, and broad, convex caudal.

The color in alcohol is brown with about 10 paler to whitish longitudinal lines, apparently blue in life, which continue without interruption across the head and trunk. Between the first and second dorsal spines is a small black ocellus and between the first and sixth dorsal rays is a very large, black, white-margined ocellus. The brown dorsal is spotted with obscure pale ocelli which were red in life, or there may be a continuous pale submarginal bar on the spinous dorsal. The anal is darker than the dorsal but similarly spotted or the ocelli fuse to form bars. The caudal is abruptly white in the young. The ventrals are dusky, the pectorals colorless.

The above description is from 4 young specimens, 43 to 48 mm. in length, collected at Wala Island, New Hebrides. Seven additional specimens from the same locality, 20 to 33 mm. in length, are like Bleeker's fig. 1. They differ from older ones in having 4 or 5 of the longitudinal bands much broader, whiter, and more conspicuous than the others, and in having 3 vertical rows of white spots posteriorly on the trunk.

#### *Halichoeres scapularis* (Bennett).

*Julis scapularis* Bennett, Proc. Comm. Zool. Soc. Lond., 1, 1831, p. 167—Mauritius.

*PlatyGLOSSUS scapularis* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 146; Day, Fishes India, 1878-88, p. 400, pl. 85, fig. 4.

*Halichoeres scapularis* Jordan and Seale, Bull. Bur. Fish., 26, 1906, p. 29; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 338; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 255.

*Halichöres caeruleo-vittatus* Rüppell, Neue Wirbelt., Fische, 1835, p. 14, pl. 4, fig. 1.

*Guntheria caeruleovittata* Bleeker, Atlas Ichth., 1, 1862, p. 137, pl. 32, fig. 2.

Dorsal IX, 11; anal III, 11. There are 27 scales in the lateral line to the caudal base, 2 above and 8 below the line. The depth is 3.25, the head 2.95, the caudal and pectoral each 4.4 times in the length. The eye is 5, the snout 2.5, the interorbital 4.65, the least depth of the caudal peduncle 2.25 times in the head. The body

is much compressed, with pointed snout. The sides of the snout are concave. The mouth is protractile, with 4 prominent canines in the upper jaw, the hind pair curved backward, and 2 much smaller canines at the tip of the lower jaw. The caudal is slightly rounded.

The color in alcohol is dusky above the lateral line, the rest of the body pale bluish white with a broad deep violet band from behind the eye to the top of the caudal base, extending anteriorly beneath the eye and ending on the cheek in a broad wedge. A broad bar of similar color extends from the eye to the snout tip. On the predorsal region and above the eyes are numerous spots and short bars of dark violet. The opercle shows traces of a bar of like color. The dorsal is silvery white with a median longitudinal band of olive. The anal is colorless with a sub-basal longitudinal stripe of silvery white. The caudal is yellow with alternate crossbands of white and olive spots.

Described from 4 specimens, 36 to 97 mm. in length, collected at Tenibuli, Ysabel Island, Solomon Islands.

#### **Halichoeres binotopsis (Bleeker).**

*Julis (Halichoeres) binotopsis* Bleeker, Verh. Bat. Gen., 22, 1849, p. 7—Boeleing, Bali.

*Halichoeres binotopsis* Bleeker, Atlas Ichth., 1, 1862, p. 120, pl. 40, fig. 4; Jordan and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 29; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 285; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 343.

*PlatyGLOSSUS binotopsis* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 153; Weber, Siboga Exp., Fische, 57, 1913, p. 372.

Dorsal IX, 11; anal III, 11. There are 27 scales in the lateral line, plus 1 or 2 on the caudal base, 4 above and 10 below the lateral line. The depth is 3.5, the head 3, the caudal 4.3, the pectoral 4.8 times in the length. The eye is 4, the snout 3, the interorbital 4.2, the least depth of the caudal peduncle 2.27 times in the head. The head and body are strongly compressed, elongate, the head pointed, the teeth prominent, with a pair of very small canines at the tip of both the upper and lower jaws.

The color in alcohol is pale brown above with 5 broad indistinct darker crossbands on the upper half, the predorsal region darkest, the body becoming nearly whitish on the lower half, with 8 longitudinal bands which are violet on the anterior half of the body but are faded posteriorly, and 2 violet bands from the dorsal origin to the nape. On top of the snout are 2 violet bands continuing with the first band on each side below the dorsal. There is a violet

band from the snout tip to the eye. From the angle of the mouth a violet band curves upward then down to the pectoral base, then loops up around the edge of the opercle, back to the eye, then up and backward to the upper angle of the opercle, almost exactly as figured by Bleeker. There is a blue black bar across the pectoral base. The dorsal and anal each have 2 longitudinal bands, badly faded now but the lower one apparently violet, the upper one red in life. The posterior part of the dorsal also has circular spots. The caudal has 2 submarginal crossbars. There is a black ocellus between the first and second dorsal spines.

Here described from a specimen, 58 mm. long, from Ovalau Island, Fiji.

### *Halichoeres centiquadrus* (Lacépède).

*Labrus centiquadrus* Lacépède, Hist. Nat. Poiss., 6, 1802, p. 148—Madagascar, Mauritius, Réunion (after Commerson).

*Hemitautoga centiquadrus* Bleeker, Atlas Ichth., 1, 1862, p. 139, pl. 32, fig. 3.

*Halichoeres centiquadrus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 300, pl. 46, fig. 3; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 253.

*Halichoeres centiquadrus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 337.

*Labrus hortulanus* Lacépède, Hist. Nat. Poiss., 6, 1802, p. 164, pl. 17, fig. 2.

*PlatyGLOSSUS hortulanus* Day, Fishes India, 1878-88, p. 399, pl. 85, fig. 3; Günther, Fische der Südsee, 3, 1909-10, p. 263.

*Sparus decussatus* Bennett, Fishes Ceylon, 1828, p. 14, pl. 14.

*Halichoeres eximius* Rüppell, Neue Wirbelt., Fische, 1835, p. 16, pl. 5, fig. 1.

Dorsal IX, 11; anal III, 11. There are 25 scales in the lateral line, plus 2 more on the caudal base, 4 above and 9 below it. The depth of the slender, much compressed body equals the length of the pointed head, 3 times in the length. The eye is 5.6 times in the head and twice in the long, pointed snout. The interorbital is a little wider than the eye. The least depth of the caudal peduncle is twice in the head. The nearly truncate caudal is equal to the pectoral, 4.4 times in the length. There are a few small scales on the upper end of the opercle.

In life this is a very beautiful fish. In alcohol the color is very pale yellowish, each scale with a brown vertical bar at the base, and 3 conspicuous yellowish white spots on the back. The first one is below the third and fourth spines and extends upon the dorsal fin. The second is at the middle of the base of the soft dorsal, the third on the caudal peduncle immediately behind the soft dorsal. Behind the first white spot is a large black spot. Above the opercle

and before the first white spot there is a circular pearly blue spot on each scale. There is a pearly blue horseshoe band on the interorbital, 1 from the snout to the eye, 2 behind the eye, 1 on the cheek below the eye, and 2 on the opercle. There is a small black spot on the upper angle of the pectoral base.

Here described from a specimen, 94 mm. long, collected at Moorea.

### **Halichoeres daedalma** Jordan and Seale.

*Halichoeres daedalma* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 301, pl. 47, fig. 2—Apia, Samoa; Jordan and Dickerson, Proc. U. S. Nat. Mus., 34, 1908, p. 614.

Dorsal IX, 11; anal III, 11. There are 27 scales in the lateral line, plus 1 on the caudal base, 3 above and 9 below it. Jordan and Seale say "scales 25," but their figure shows 27. The body is elongate-oblong, compressed, the depth equal to the head, which is nearly 3.2 times in the length. The small eye is 5.35, the snout 3.1, the interorbital 3.85 times in the head. The least depth of the caudal peduncle is twice in the head. The broad pectoral equals the very slightly rounded caudal, 1.4 times in the head, 4.4 times in the length. The first ventral ray is elongate, with a filiform tip which extends upon the anal, 1.1 times in the head. The head is naked, no scales being present on the upper part of the opercle.

The color in alcohol is blackish above, each scale on the upper half with a blue black spot, the lower half very pale yellowish with 5 blue black vertical streaks on the posterior part. A blue band runs from the upper jaw to and under the eye, dividing behind the eye, the upper branch ending on the shoulder, the other curving downward and ending before the pectoral base. Beneath it is a short straight blue bar from the chin to the posterior part of the opercle, the yellow ground color around it thus forming a broad loop. There is also a blue bar from the tip of the snout to the upper margin of the eye and beyond. There is a large blue black spot on the opercular flap. There is a small black spot between the first and second dorsal spines and a large one between the second and third dorsal rays. The dorsal is bluish with many large, often circular, white spots. The anal has a median and a marginal bluish band, with 2 rows of large circular white spots, one basal and one above the median dark band. The caudal is pale yellow, crossbarred by rows of dark spots. The pectoral and ventral are plain.

Here described from a specimen, 92 mm. long, caught with hook and line on the reef at Papenoo, Tahiti.

This species is probably identical with Bleeker's *poecila*, the present specimen being very like his figure.

**Halichoeres dispilus** (Günther).

*PlatyGLOSSUS dispilus* Günther, Proc. Zool. Soc. Lond., 1864, p. 25—Panama.

*Halichoeres dispilus* Meek and Hildebrand, Fishes Panama, Field Mus. Nat. Hist., Zool. Ser., 15, 1928, p. 721.

*Iridio dispilus* Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1597, pl. 240, fig. 602.

Dorsal IX, 11; anal III, 12. There are 27 scales in the lateral line, 4 above and 9 below it. The depth is 3.8, the head 3.7 times in the length. The eye is 5.2 times, the snout 3.5 times in the head.

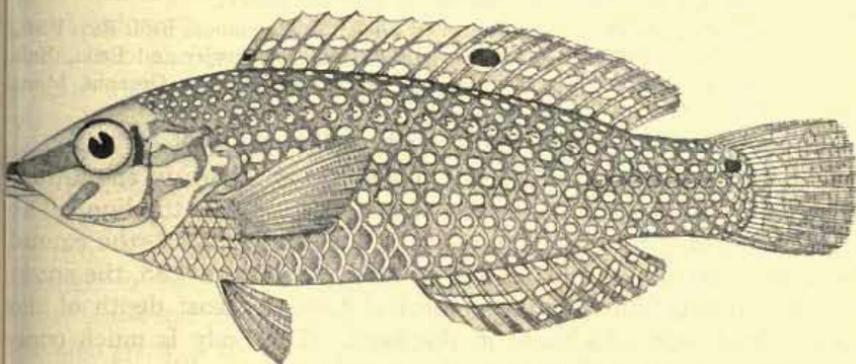


FIG. 14. *Halichoeres fijiensis* Herre, Ovalau Island, Fiji Islands.

The color in alcohol is pale yellowish brown with a darker spot on each scale, the dorsal region dark olive brown, the throat and belly yellowish white. There is a black white-margined spot as large as the eye below the fourth and fifth scales of the lateral line. At the base of the caudal is a similar spot.

We have one specimen, 103 mm. long, from Eden Island, Galapagos.

**Halichoeres fijiensis** Herre. Fig. 14.

*Halichoeres fijiensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 410.

Dorsal IX, 11 or 12; anal III, 10 or 11; scales 3-27 or 28-8, predorsal 9 or 10. Depth 3.25 to 3.3, head 3.4 to 3.5, caudal 5.25 to 5.45, pectoral 5.1, ventral 7 to 7.3 in length. Eye 3.3 to 3.5,

snout 2.7 to 2.8, interorbital 3.3 to 3.5, depth of caudal peduncle 2.3 in head. Body compressed, dorsal and ventral profiles similar, lips even. Dorsal low, rayed portion highest, 1.5 times the eye, anal a trifle lower. Caudal bluntly rounded.

Differs from *Halichoeres argus* in having large, blue black ocelli on dorsal fin and caudal peduncle. The longitudinal rows of ocelli on trunk distinguish it from *Halichoeres binotopsis* and *leparensis*.

Twelve specimens collected on the reef at Ovalau Island, Fiji.

### **Halichoeres gymnocephalus** (Bloch and Schneider).

*Labrus gymnocephalus* Bloch and Schneider, Syst. Ichth., 1801, p. 251.

*PlatyGLOSSUS gymnocephalus* Peters, Monatsb. Akad. Wiss. Ber., 1868, p. 270; Günther, Fische der Südsee, 3, 1909-10, p. 271.

*Halichoeres gymnocephalus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 303 (name only, no descr.); Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 296; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 344.

*Halichoeres modestus* Bleeker, Atlas Ichth., 1, 1862, p. 126, pl. 35, fig. 2.

Dorsal IX, 11; anal III, 11. There are 26 scales in the lateral line plus 2 on the caudal base, 4 above and 9 below the line. The head is entirely naked. The depth is 3.3, the head 3.2, the caudal 4.5, the pectoral 5.6 times in the length. The eye is 5.85, the snout 2.7, the interorbital 4.1, the preorbital 4.66, the least depth of the caudal peduncle 1.95 times in the head. The body is much compressed, elongate, rather deep, the snout elongate with wide prominent lips, the upper lip with a coarsely fimbriate margin. The anterior teeth are prominent canines, those of the upper jaw largest. There is a stout posterior canine in the upper jaw.

The color in alcohol is very pale brown to very pale yellowish to smoky brown along the back, each scale back of the pectoral base (except along the breast and belly and anal base) with 1 or 2 black dots which form longitudinal rows and extend upon the dorsal. A dark band extends from the eye to the snout and there is a short vertical bar behind the eye. The dorsal, anal, and caudal are yellow, the other fins colorless. There is a blackish brown bar across the base of the pectoral.

Described from 2 specimens, 63 and 112 mm. long, from Tenibuli, Ysabel Island, Solomon Islands. These specimens show no trace of the large dusky lateral blotch usually present on this species.

### **Halichoeres miniatus** (Kuhl and Van Hasselt).

*Julis miniatus* Kuhl and Van Hasselt, MS. in Cuvier and Valenciennes, Hist. Nat. Poiss., 13, 1839, p. 460—Java.

*Halichoeres minialus* Bleeker, Atlas Ichth., 1, 1862, p. 114, pl. 41, fig. 5; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 270.

Dorsal X or IX, 9 or 10; anal III, 10. There are 28 tubulated scales in the lateral line, plus 2 more on the caudal base, 3 above and 8 below the line. The body is slender, compressed, little elevated, the depth 3.5 to 3.66, the head 2.8 to 3 times in the length. The eye is 3.6 to 4.1, the snout 3 to 3.2, the caudal 1.6 times in the head.

In life this fish is beautiful grass green, when seen from above. The color in alcohol is very pale yellowish, with a series of 5 large dark brown blotches along the side, more or less connected in a band from the head to the caudal, and a series of 6 dark brown crossbands over the back and down the sides. There is a pearly white stripe from the angle of the mouth along the lower edge of the eye, a pearl white spot on the opercle and on the pectoral base, a pearl white band along the side of the abdomen from behind the pectoral and disappearing posteriorly above the anal, and several similar lines and spots on the trunk. There is a dark brown spot on the nape, a vertical bar of like color behind the eye, and a similar spot before the eye. The whitish fins are marked as follows: a small black spot (sometimes two) between the first and second dorsal spines, a larger black spot between the first and third rays, and nearly vertical blackish rows of spots or lines over the entire dorsal. The anal is conspicuously marked by 4 rows of small black spots (absent in one specimen). The caudal is faintly crossbarred by numerous dusky lines. This little labrid is easily recognized by its distinctively marked anal and the pearly stripe below the eye.

Here described from 9 specimens, 24 to 51 mm. long, taken at Bushman Bay, Malekula Island, New Hebrides. A specimen, 36 mm. long, was collected at Wala Island, New Hebrides.

#### *Halichoeres opercularis* (Günther).

*PlatyGLOSSUS opercularis* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 148—Fiji; Fische der Südsee, 3, 1909-10, p. 264.

*Halichoeres opercularis* Seale, Occ. Papers Bishop Mus., 1, 1900, p. 89; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 302, pl. 47, fig. 3.

Dorsal IX, 11; anal III, 11. There are 27 scales in the lateral line and 1 more on the caudal base, 4 above and 8 below the line. The depth is 3.3 times in the length, the head a trifle longer than the depth. The eye is 3.8 times, the snout 3.16, the least depth of the caudal peduncle twice in the head. The head and body are elongate, strongly compressed, the anterior profile convex with pointed snout

and even jaws, with a pair of projecting canines above and below at the tip. The very gently rounded caudal is contained about 4.7 times in the length.

The color in alcohol is pale yellowish with a large broad blackish band, which may be interrupted or broken by crossbands or spots of the ground color, and extends from the head along the side to the caudal base. Along the back is a series of blackish violet spots and short crossbands, with a row of 5 pale spots at the base of the dorsal. A bluish dusky stripe runs from the tip of the snout through the lower part of the eye to the operculum where it loops back across the pale yellow cheek to the angle of the mouth. Behind the eye is a short violet blue bar with a prolongation from its upper end back above the origin of the lateral line. There is a small blue black spot between the first and second dorsal spines and a large one between the first and third dorsal rays, the dorsal with dark bands extending from those on the back and with large dark-margined pale yellow spots. The anal is dusky with a pale median lengthwise band. The caudal is yellow with faint dark cross lines.

Here described from 2 specimens, 39 and 61 mm. in length, taken from a reef near Suva, Viti Levu Island, Fiji.

**Halichoeres purpurascens** (Bloch and Schneider).

*Labrus purpurascens* Bloch and Schneider, Syst. Ichth., 1801, p. 262.

*PlatyGLOSSUS purpurascens* Bleeker, Atlas Ichth., 1, 1862, p. 108, pl. 45, fig. 1;

Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 158.

*Halichoeres leucurus* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 260.

Dorsal IX, 12; anal III, 13. There are 27 scales in the lateral line plus 2 more on the caudal base, 4 above and 10 below the line. The depth equals the head, and is 3 times in the length. The rounded caudal is 4.5, the pectoral 5 times in the length. The eye is 5.4, the snout 2.7, the interorbital 3.85, the least depth of the caudal peduncle 2 times in the head.

The color in alcohol is purplish brown with a darker brown spot at the base of each scale, these spots forming rows longitudinally and diagonally. A pale red line on the snout extends back to the upper part of each eye and continues on back across the opercle and along the side as far as above the tip of the opercle. Beneath this is another line from the opercular margin back as far as the pectoral extends. A wider pale red stripe runs from the upper lip near the angle of the mouth back below the eye and just above the pectoral base back as far as the pectoral tip. Below this are 2 more pale red bands beginning on the lower side of the head and extending back

between the pectoral and ventral as far as the pectoral tip reaches. On the pectoral base is a black spot. The dorsal and anal are reddish brown with bluish wavy bars running diagonally downward and backward, each with a bluish white margin. The caudal is covered with a broadly rounded blackish brown patch crossbarred by bluish wavy bars and rounded spots each of which is dark-margined, the upper and lower angles of the caudal left as wide yellowish borders.

Described from a specimen, 86 mm. long, collected at Tenibuli, Ysabel Island, Solomon Islands.

### **Halichoeres trimaculatus** (Quoy and Gaimard).

*Julis trimaculata* Quoy and Gaimard, Voy. Astrolabe, Zool., 2, 1834, p. 705, pl. 20, fig. 2—Vanikoro.

*Guntheria trimaculata* Bleeker, Atlas Ichth., 1, 1862, p. 138, pl. 32, fig. 1.

*PlatyGLOSSUS trimaculatus* Günther, Fische der Südsee, 3, 1909, p. 266.

*Halichoeres trimaculatus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 56;

Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 301, pl. 47, fig. 1;

Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 300;

Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 338.

Dorsal IX, 11; anal III, 11. There are 26 or 27 scales in the lateral line, plus 2 more on the caudal base, 3 above and 8 below it. The depth is 3.25 to 3.6, the head 2.85 to 2.9, the caudal 4 times in the length. The eye is 4 to 5.4, the snout is 2.7 to 3.1, the inter-orbital 4.75 to 5 times in the head. The pectoral is a trifle shorter than the caudal.

The color in life is grass green, paler ventrally, with a large and conspicuous blue black spot on the caudal peduncle above the lateral line. Each scale on the side has a submarginal, vertical, crescent-shaped olive bar. The nape is thickly sprinkled with circular orange-red spots. The head is green, pale yellow below, with a red bar from the snout to the eye and 2 red bars behind the eye. There is a black spot at the axil of the pectoral. On the sides of the trunk are 5 or 6 wide blackish crossbands. The dorsal is green with longitudinal red lines. The other fins, except the pectoral, are similar or reddish, or the caudal may be orange. The pectoral is pale or colorless. In alcohol the green disappears and becomes pale yellowish, with several more or less evident blackish cross shades. Each scale on the side has a vertical brown to gray bar, but the lowest row or two may be represented by dots only. There is a large blackish brown crossbar on the caudal peduncle above the lateral line. There is a dark spot in the pectoral axil, traces of bars on the sides of the head, and of spots on the nape. The pupil is white, the

fins all colorless. The largest specimen shows a large circular black spot on the lateral line beneath the third and fourth dorsal spines, and behind the spot on the caudal peduncle are 2 smaller spots.

At Tahiti 1 specimen was collected, 56 mm. long. From the coral reef between Suva and Nukulau, Fiji, 30 specimens were obtained, 18.5 to 77 mm. in length, and from a reef west of Ovalau Island 17 specimens were taken, from 19 to 70 mm. in length. This beautiful little labrid is very common in the tide pools. It is an exceedingly active and hardy fish, leaping and darting with great speed when disturbed.

### *Coris aygula* Lacépède.

*Coris aygula* Lacépède, Hist. Nat. Poiss., 5, 1801, pp. 127, 128, pl. 4, fig. 1 (after Commerson); Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 201; Jordan and Snyder, Proc. U. S. Nat. Mus., 24, 1902, p. 641, fig. 9; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 58.

*Coris angulata* Lacépède, Hist. Nat. Poiss., 5, 1801, pp. 127, 131, pl. 4, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 345.

*Julis gibbifrons* Quoy and Gaimard, Voy. Astrolabe, Zool., 3, 1834, p. 707, pl. 19, fig. 3.

Dorsal IX, 12; anal III, 12; there are 60 scales in the lateral line, 8 above and 22 below it. The elongate body is strongly compressed, its depth 2.97 times, the head 2.7 times in the length. The eye is small, 9.75 times in the head, 3.5 times in the snout, which is 2.78 times in the head. There is a great hump above the eye, the high, rather sharply convex interorbital nearly 4 times in the head. The first 2 dorsal spines are elongated, with a deep notch behind separating them from the other spines, the first spine 2.9 times in the head, the dorsal rays increasing to the last, which is pointed and 2.4 times in the head. The anal likewise increases in height posteriorly and the last ray is a trifle longer than the last dorsal ray. The pectoral is very broad, 1.6 times in the head. The depth of the caudal peduncle is 1.85 times in the head. The broad caudal is irregularly divided at its posterior margin, 1.34 times in the head. The ventrals are elongate, extending to the base of the third anal ray, and slightly exceed the head. The mouth is small, with strong conical teeth and a pair of forward-projecting canines at the front of each jaw.

In alcohol the color is deep uniform blue black. In life this specimen was deep indigo, the fins like the body.

Here described from a fine specimen, 372 mm. long, caught at Papeete, Tahiti.

According to the edition of Lacépède cited above, *aygula* precedes *angulata*. I see no warrant, therefore, for changing over to *angulata*, as Fowler has done.

### *Coris pulcherrima* Günther.

*Coris pulcherrima* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 200—Amboina; Günther, Fische der Südsee, 3, 1909, p. 278.

*Julis pulcherrima* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 305, pl. 27; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 304; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 300.

*Coris formosa* (not of J. W. Bennett) Bleeker, Atlas Ichth., 1, 1862, p. 99, pl. 19, fig. 3.

Dorsal IX, 12; anal III, 12. There are 73 scales in the lateral line, plus 3 more on the caudal base, 7 above and 25 below the lateral line. The head is equal to the depth, 3.34 times in the length. The eye is 6.5, the snout 2.7 times in the head. The body is elongate, compressed, the head long and pointed. Two large canines in the front of each jaw are directed forward, the upper ones the larger. The first two dorsal spines are elongate, the first one is 1.8 times in the head. The rounded caudal equals the pectoral, 4.7 times in the length.

In life this is one of the most beautiful of fishes. The head is pale cinnamon, the body violet, darker posteriorly, the sides sprinkled with small, circular, intense blue spots, most numerous on the posterior half. The head is banded with reddish violet as follows: a median line from nape to snout; one from the upper margin of the eye toward the dorsal origin; one from the snout through the eye to the posterior margin of the opercle; one from the upper lip below the eye and curving down to the opercular margin before the pectoral base. The caudal is golden, the dorsal and anal are orange on the outer half, spotted and streaked with violet. In alcohol the body is blackish brown, sprinkled with dark blue spots. The head is dull reddish brown with darker brown bands. The orange and golden of the dorsal, anal, and caudal are changed to whitish yellow. The pectoral is whitish yellow, with a bluish black spot on the inner side of its base.

Here described from a specimen, 174 mm. long, obtained at Papeete, Tahiti.

### *Thalassoma cranei* Herre. Fig. 15.

*Thalassoma cranei* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 8, (name only).

*Thalassoma cranei* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 412.

Dorsal VIII, 13; anal III, 11; scales 4-26+1-9, head naked. Depth 3.5, head 3.3 to 3.5, caudal 4, pectoral 4.7 to 5 in length. Eye 4.9, snout 3.3 to 3.5, interorbital 3.9 to 3.95, depth of caudal peduncle 1.75 to 1.8 in head. Body oblong, compressed, anterior dorsal profile regularly arched. Thoracic scales smaller than those on sides of trunk. Scaly sheath of dorsal rather high, that of anal lower.

This is close to *Thalassoma lutescens*, but differs in proportions and in the presence of caudal and dorsal spots.

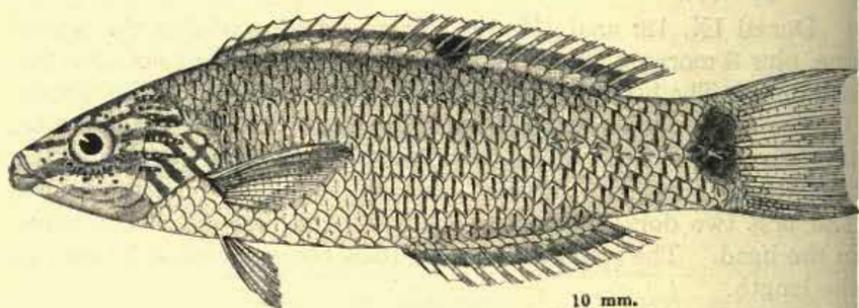


FIG. 15. *Thalassoma cranei* Herre, Solomon Islands.

Two specimens collected at Tenibuli, Ysabel Island, and Auki, Malaita Island, Solomon Islands.

#### ***Thalassoma hardwicke* (Bennett).**

*Sparus hardwicke* J. W. Bennett, Fishes Ceylon, 1828-30, p. 12, pl. 12—Ceylon.

*Thalassoma hardwicke* Fowler, Bull. Bishop Mus., 22, 1925, p. 35; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 317; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 350.

*Julis dorsalis* Quoy and Gaimard, Voy. Astrolabe, Zool., 3, 1834, p. 713, pl. 15, fig. 5; Bleeker, Atlas Ichth., 1, 1862, p. 94, pl. 34, fig. 4; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 190; Day, Fishes India, 1878-88, p. 403, pl. 85, fig. 7.

*Thalassoma dorsale* Steindachner, Sitzungsber. Akad. Wiss. Wien, 115, 1906, p. 1399; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 307.

Dorsal VIII, 13 or 14; anal II or III, 11. There are 27 or 28 scales in the lateral line, plus 1 or 2 more on the caudal base, 4 scales above and 8 below the line. The depth is 3.1 to 3.4, the head 2.8 to 3, the caudal 4 times in the length. The eye is 5.25 to 5.35,

the snout 2.7 to 2.85, the interorbital 4.1 to 4.25 times in the head. The pectoral is a trifle shorter than the caudal.

The ground color in life is green above, merging into white on the under side, with 5 blue black, backward-inclined crossbars, a blue black blotch on top of the caudal peduncle, and a red band from above the pectoral axil to the caudal base. A similar but narrower and paler red stripe parallels this, a short distance below the dorsal. From the eye radiate several (usually 5) wide red bands. There is a black spot on the upper angle of the pectoral base or a black bar on the pectoral base. The dorsal has a blue black stripe along its whole length, on the upper part of the spinous portion but below the middle of the soft dorsal. The anal is pale yellow with a black spot anteriorly. The caudal is yellowish green, with a reddish submarginal stripe above and below, or at least on the upper lobe. The pectorals and ventrals are yellowish. In alcohol the color varies from purplish dusky to brownish gray, becoming white below. Some specimens show a dusky vertical bar on each scale. The red bands on the sides and head largely disappear, but the black crossbands are much as in life. The dorsal has a black longitudinal stripe, the anal a black spot anteriorly.

This handsome labrid is very common everywhere on the coral reefs of the East Indies and Polynesia, and is very noticeable around the docks in many places. It reaches a much greater size than any museum specimens I have seen or any recorded in the literature. At Tahiti I saw numbers that were half a meter in length. In the Solomon Islands and on the coral reefs of the Celebes and Sulu Seas I have observed them equally large or even larger. This fish swims with the peculiar undulating motion characteristic of certain labrids, tilting now to one side, now to the other. It is one of the most difficult fishes to obtain by the use of dynamite. The very large specimens never come into very shallow water and at the least alarm scurry off to safety.

Described from 3 specimens collected at Tahiti, 85 to 120 mm. long, and 6 taken at Suva, Viti Levu Island, Fiji, from 50 to 85 mm. in length. A specimen, 122 mm. long, was obtained at Malo Island, New Hebrides.

### ***Thalassoma lunare* (Linnaeus).**

*Labrus lunaris* Linnaeus, Syst. Nat., ed. 10, 1758, p. 283—India.

*Julis lunaris* Rüppell, Neue Wirbelt., Fische, 1835, p. 11; Bleeker, Atlas Ichth., 1, 1862, p. 90, pl. 33, fig. 5; Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 181; Day, Fishes India, 1878, p. 403, pl. 86, fig. 1.

*Thalassoma lunare* Fowler, Journ. Acad. Nat. Sci. Phila., ser. 2, 12, 1904, p. 537, pl. 23, lower fig.; Jordan and Seale, Bull. Bur. Fish., 26, 1906 (1907), p. 30; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 321.

Dorsal VIII, 13; anal III, 11. There are 25 scales in the lateral line plus 2 more on the caudal base, 3 above and 9 below it. The depth is 3.3 to 3.5, the head 3 to 3.4, the caudal 2 to 2.5, the pectoral 4.4 times in the length. The eye is 4.75 to 5.75, the snout 3.15 to 3.25, the interorbital 4 to 4.25, the least depth of the caudal peduncle 1.7 to 2 times in the head. The body is elongate-oblong, much compressed, the caudal truncate in the young but becoming lunate with the pointed lobes much elongate.

The color in life is green, varying from pale to dark green in different individuals, but usually dark, with a short vertical red bar on each scale, and with red, curved stripes on the head, one from the snout through the eye and back to the extremity of the opercle, and another from beneath the eye to the posterior margin of the opercle. On top of the head and nape are stripes and bars of red forming a network. Under the chin are 1 or 2 broad, red stripes running to or beneath the pectoral base. The dorsal is green with a purplish red median longitudinal bar and a bluish marginal line. The anal is much like the dorsal. The caudal is bright yellow with a blackish blotch basally, the upper and lower margins blue with a submarginal stripe of red. The pectoral is blue on the upper margin with a broad, violet red stripe along the upper half, the rest green. The color in alcohol is olive brown, merging into violet or reddish on the breast and belly, each scale on the upper three-fourths with a short dusky vertical bar. The head is blue, with indigo or violet red, curved bands. The dorsal is blue green anteriorly, with a slaty blue median longitudinal band which is narrow anteriorly but wide posteriorly, and a bluish white marginal line. The anal has a deep blue longitudinal band along the basal half, the rest of the fin bluish white. The caudal is yellowish with a large, blackish violet basal blotch. The upper margin of the pectoral is bluish white; then there is a large, violet red longitudinal bar, the remainder being largely green with a broad hyaline posterior margin and a blackish violet axillary spot.

A specimen, 97 mm. long, was collected at Hathorn Sound, New Georgia Island, Solomons. This gaudily but beautifully colored fish is very common in the East Indies and is the most abundant labrid in the Philippine fish markets.

**Thalassoma lutescens** (Lay and Bennett).

*Julis lutescens* Lay and Bennett, Zool. Beechey's Voy., 1839, p. 65, pl. 19, fig. 2—Tahiti, Riu Kiu (after Solander); Brevoort, Japanese Fishes Perry Exp., 1856, p. 271, pl. 8, figs. 3 and 4.

*Thalassoma lutescens* Jordan and Snyder, Proc. U. S. Nat. Mus., 24, 1902, p. 647; Jordan and Snyder, Bull. Bur. Fish., 26, 1906 (1907), p. 214; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 326.

*Julis aneitensis* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 183.

*Thalassoma aneitense* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 304, pl. 41.

Dorsal VIII, 13; anal II, 11. There are 26 scales in the lateral line, plus 1 on the caudal base, 3 above and 9 below it. The depth is 3.45, the head 3.2 times in the length. The eye is 5.6, the snout 2.8, the interorbital 4.5, the least depth of the caudal peduncle 2.1 times in the head. Along the upper margin of the opercle is a small patch of 6 or 7 scales, the head otherwise scaleless. The broad pectoral is 1.4 times in the head, about 4.5 times in the length. The tips of the lunate caudal are prolonged and filiform, especially the upper lobe, 3.5 times in the length, central rays twice in the head.

The color in alcohol is very pale yellowish brown, with a darker brownish line running along the center of each row of scales, each scale with an obscure brownish or violaceous vertical bar. There are 2 broad, reddish yellow bands before the eye and 3 downward curved ones behind it, the lowest one forming a continuous curve from the upper lip along the lower edge of the eye and downward to the edge of the opercle before the pectoral. Another band starting on the opercle below the pectoral extends forward in a broad loop, returning to the posterior margin of the opercle near the isthmus. The bands on the head are as in Brevoort's figure cited above. The dorsal is yellow, with a black spot between the second and third spines and a broad, dusky violet longitudinal median band. The anal is yellow with a narrow basal band like that on the dorsal. The pectoral is yellow with a large, curved black blotch beginning at the upper posterior angle, the part below and behind it clear. There is a black spot on the pectoral axil. The caudal is yellow.

One specimen, 143 mm. long, collected on the reef at Maraa, Tahiti.

**Thalassoma schwanefeldi** (Bleeker).

*Julis schwanefeldi* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 288—Cauer, Sumatra.

*Julis schwanefeldi* Bleeker, Atlas Ichth., 1, 1862, p. 95, pl. 33, fig. 7.

*Thalassoma schwanefeldi* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 320.

Dorsal VIII, 13; anal III, 11. There are 25 or 26 scales in the lateral line plus 1 on the caudal base, 2 scales above and 8 below the lateral line. There are 5 predorsal scales. There are 1 to 3 scales on the upper end of the opercle. The depth is 3.6, the head 3, the truncate caudal 3.7 times in the length. The eye is 4.25, the snout 3.15, the interorbital 4.25, the least depth of the caudal peduncle 2 times in the head.

The color in life is green above, paler below, with 6 or 7 blue black crossbars on the upper half of the body, the first before the dorsal, the last on the caudal peduncle, the second, third, fourth, and fifth extending upon the dorsal. From the eye a dusky stripe extends diagonally to the lower end of the pectoral base, which also has a black spot on its upper angle. There is a black spot at the base of the membrane between the first and third dorsal spines, one at the base of the second dorsal ray, and one at the base of the ninth to eleventh dorsal rays. In alcohol the color is bluish or violaceous brown, with the transverse blue black bars and spots as given above. All the fins except the dorsal are colorless, but the pectoral may have a dusky spot at its extremity.

Described from 3 specimens, 54 to 62 mm. long, from Ugi Island, Solomon Islands.

### ***Thalassoma umbrostigma* (Rüppell).**

*Julis umbrostigma* Rüppell, Neue Wirbelt., Fische, 1835, p. 11, pl. 3, fig. 2—Red Sea.

*Julis umbrostigma* Bleeker, Atlas Ichth., 1, 1862, p. 92, pl. 34, fig. 2; Günther, Fische der Südsee, 3, 1909-10, p. 294, pl. 149, fig. B; Fuentes, Bolet. Mus. Nac. Chile, 7, 1914, p. 304, pl. 9.

*Thalassoma umbrostigma* Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 463; Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903 (1905), p. 300, fig. 129; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 352, pl. 40A.

*Julis souleyetii* Eydoux and Souleyet, Voy. Bonite, Zool., 1, 1841, p. 190, pl. 6, fig. 2.

Dorsal VIII, 13; anal III, 11; there are 28 scales in the lateral line, plus 2 more on the caudal base, 3 above and 11 below it. The depth is 3.14 to 3.5, the head 3 to 3.14 times in the length. The eye is 6.2 to 6.4, the snout 2.66 to 2.9, the interorbital 3.8 to 4.2 times in the head. There is a pair of canines in the front of both the upper and lower jaws. The eye is small, the head entirely naked. The pectoral and truncate caudal are approximately equal, 1.3 to 1.6 times in the head.

The color in alcohol is pale yellowish to purplish dusky, each scale with a dusky vertical spot, and 2 rows of large quadrangular paler spots along each side, the upper one from the opercular angle to the upper part of the caudal base, the other from behind the pectoral to the caudal base, the spots separated from each other by broad, pale vertical lines. There is a black spot between the first and third dorsal spines, the rest of the fin and the anal with a broad, purplish basal band, then a green band, and a yellowish margin. The caudal is dark green above and below, and basally, the rest yellowish. The pectoral is yellowish with a blackish axillary spot and a large black blotch on the posterior upper portion. Radiating from the eye are traces of dusky stripes and spots.

Described from 2 specimens from Papeete, Tahiti, 115 and 132 mm. long.

### ***Pseudocheilinus hexataenia* (Bleeker).**

*Cheilinus hexataenia* Bleeker, Act. Soc. Sci. Neerl., 2, 1857, p. 84—Amboina.

*Pseudocheilinus hexataenia* Bleeker, Versl. Akad. Amsterdam, 13, 1862, p. 276;

Atlas Ichth., 1, 1862, p. 73, pl. 23, fig. 2; Jordan and Seale, Bull. Bur.

Fish., 25, 1905 (1906), p. 311, pl. 44, fig. 2; Fowler, Fishes Oceania,

Mem. Bishop Mus., 10, 1928, p. 358.

*Pseudocheilinus psittaculus* Kner and Steindachner, Sitzungsber. Akad. Wiss.

Wien, 54, part 1, 1866, p. 376, fig. 7.

Dorsal IX, 11; anal III, 9. There are 17 scales in the upper part, 4 in the lower part of the lateral line, and 2 more on the caudal base; 5 predorsal scales. The depth is 2.35 to 2.6 times, the head 2.16 to 2.2 times in the length. The eye is 3.1, the sharp, pointed snout 3.55 times in the head.

In life the color is purplish green, becoming green dorsally, ventrally, and on the caudal, with 6 longitudinal, dark orange stripes and a black, white-margined ocellus on the upper part of the caudal peduncle. In alcohol the color is purplish brown, the stripes pale green, the fins all pale green basally, except the colorless pectoral. There is a black ocellus on the caudal peduncle above, and 2 whitish lines crossing the eye, one above and one below the pupil.

Here described from 2 small specimens, 13 and 16.5 mm. long, collected at Takaroa, Tuamotu Islands.

### ***Choerodon anchorago* (Bloch).**

*Sparus anchorago* Bloch, Ichtyologie, 8, 1797, p. 85, pl. 276.

*Choerops anchorago* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 95; Day,

Fishes India, 1878-88, p. 391, pl. 83, fig. 5; Weber, Siboga Exp., Fische,

1913, p. 362.

*Choirodon anchorago* Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 265.

*Choerodon anchorago* Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 193; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 327.

*Choerops macrodon* Bleeker, Atlas Ichth., 1, 1862, p. 162, pl. 47, fig. 1.

Dorsal XIII, 7; anal III, 9. There are 26 scales in the lateral line, plus 2 or 3 on the caudal base, 3 above and 8 below the line. The depth is 2.5, the head 2.7, the caudal 4.25, the pectoral 3.25 times in the length. The eye is 5.33, the snout 2, the least depth of the caudal peduncle 2.33 times in the head. The head and body are much compressed, the anterior dorsal profile strongly convex, the mouth low down, with very prominent canines.

The color in alcohol is brown on the head and on the dorsal half of the body back to the end of the soft dorsal, the rest of the body pale whitish yellow, becoming greenish on the caudal base and over the anal. Opposite the middle of the pectoral the pale color extends upward in the brown to the lateral line. The dorsal is clouded with brown or is brown with one or more longitudinal, whitish stripes, the fins otherwise all pale like the lower part of the body. There is a dark brown bar across the pectoral base. The head is thickly sprinkled with white dots.

Described from a specimen, 162 mm. long, from Tenibuli, Ysabel Island, Solomons. In life this is a very beautifully colored fish. It is one of the commonest labrids in the Philippines.

### **Cheilinus chlorourus** (Bloch).

*Sparus chlorourus* Bloch, Ichtyologie, 8, 1797, p. 21, pl. 260.

*Cheilinus chlorurus* Bleeker, Atlas Ichth., 1, 1862, p. 65, pl. 27, fig. 3; Day, Fishes India, 1878-88, p. 393, pl. 83, fig. 6; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 362; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 362.

*Chilinus chlorurus* Günther, Fische der Südsee, 2, 1876-81, p. 245, pl. 132.

*Thalliurus chlorurus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 58.

*Thalliurus chlorurus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 310.

Dorsal X, 9; anal III, 7. There are 15 scales in the upper and 7 in the lower part of the lateral line, plus 1 very large, pointed scale on the caudal base, 2 above and 6 below the caudal base. The depth is 2.35, the head 2.75, the caudal 4.34, the pectoral 4.85 times in the length. The head is 2.75, the snout 3, the eye 6, the inter-orbital 4, the least depth of the caudal peduncle 2.4 times in the head. The body is elongated, strongly compressed.

The color in alcohol is brown, each scale with 1 to 3 whitish dots, and each scale on the anterior two-thirds of the body with a much larger, dark brown, circular dot. The membrane between the dorsal spines is brown, spotted with white. The soft dorsal and pectoral are pinkish.

Here described from a specimen, 165 mm. long, collected at Moorea Island, Society Islands. A specimen, 80 mm. long, was taken at Malo Island, and one, 76 mm. long, at Vila, Efaté Island, New Hebrides. A specimen, 152 mm. long, from Tenibuli, Ysabel Island, Solomons, is much darker than those seen elsewhere and has 3 round spots in a row along the middle of the side, as in Bleeker's figure.

### *Cheilinus diagrammus* (Lacépède).

*Labrus diagrammus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 162 and 159, on Commerson MS.—the great equatorial ocean.

*Cheilinus diagrammus* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 98; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 309; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 303; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 354; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 361.

*Cheilinus radiatus* Bleeker, Atlas Ichth., 1, 1862, p. 68, pl. 26, fig. 1.

*Chilinus radiatus* Günther, Fische der Südsee, 2, 1876-81, p. 247, pl. 135, fig. A.

Dorsal IX, 10; anal III, 8. There are 15 scales in the upper portion, 7 in the lower section of the lateral line, plus 2 more on the caudal base, 2 above and 6 below the lateral line. The depth is 3, the head 2.6, the caudal 4.46 times in the length. The eye is 5.3, the snout 2.6, the least depth of the caudal peduncle nearly 2.75 times in the head.

The color in alcohol is greenish olive, with 8 (7 to 9 in other specimens) parallel, oblique, dark brown lines running downward and backward on the preopercle and opercle. The spinous dorsal is purplish dusky, the posterior rays of the soft dorsal colorless. The anal is greenish, becoming colorless posteriorly. The caudal is greenish, obscurely crossbarred with darker, the upper and lower margins blackish. The ventrals are dull purplish brown, the pectorals colorless.

The above description is of a specimen, 116 mm. long, collected at Malo Island, New Hebrides.

### *Cheilinus fasciatus* (Bloch).

*Sparus fasciatus* Bloch, Ichthyologie, 8, 1797, p. 15, pl. 257—Japan.

*Cheilinus fasciatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 92; Bleeker, Atlas Ichth., 1, 1862, p. 67, pl. 26, fig. 2; Day, Fishes India,

1878-88, p. 394, pl. 84, fig. 1; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 350; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 360.

*Chilinus fasciatus* Günther, Fische der Südsee, 2, 1876-81, p. 246, pl. 134.

*Cheilinus quinquecinctus* Rüppell, Neue Wirbelt., Fische, 1835, p. 19, pl. 6, fig. 1.

Dorsal IX, 10; anal III, 8. There are 15 scales in the upper part of the lateral line, 5 or 6 in the lower section plus 2 or 3 on the caudal base, 2 scales above and 6 below the line. The depth is 2.5 to 2.7, the head 2.5 to 2.6 times in the length. The eye is 5 to 6, the snout 2.4 to 3, the interorbital 3 to 4, the least depth of the caudal peduncle 2 times in the head. The convex caudal is a little less than the head.

The color in alcohol is pale yellow with blackish vertical cross-bands, each 3 scales wide, the interspaces appearing as 6 narrow, pale yellow stripes. Pale lines radiate from the eye. A broad, blackish band runs from the gill opening along the middle of the side to the caudal base. The caudal is crossbanded with greenish white and blackish alternately. The transverse bands of the body extend upon the dorsal and anal.

Two specimens, 68 and 122 mm. long, were taken at Tenibuli, Ysabel Island, Solomon Islands.

### ***Cheilinus oxyrhynchus* Bleeker.**

*Cheilinus oxyrhynchus* Bleeker, Versl. Akad. Amsterdam, 13, 1862, p. 300—Celebes, Amboina, Batjan; Atlas Ichth., 1, 1862, p. 73, pl. 28, fig. 2.

*Chilinus oxyrhynchus* Günther, Fische der Südsee, 2, 1877-81, p. 248.

Dorsal IX, 10; anal III, 8. There are 15 tubulated scales in the upper section of the lateral line, 7 in the lower part, plus 1 large scale on the caudal base, 2 above and 6 below the line. There are 2 rows of scales on the preopercle. The depth is 3, the head 2.44, the caudal 4.55, the pectoral 6.25 times in the length. The eye is 2 in the snout, 5.85 times in the head. The snout is 2.7, the interorbital 4.1, the maxillary 2.8, the least depth of the caudal peduncle 2.7 times in the head. The body is elongate-oblong, compressed, with a very elongate head due to the greatly produced snout and jaws, the height of the head 1.66 times in its own length.

The color in alcohol is pale yellowish with a pinkish cast, the scales on the upper half sprinkled with small red spots and margined with blackish, with a broad dusky band from the opercle to the middle of the caudal base, poorly defined except on the posterior third. The top of the head is spotted with reddish. There is a black band from the eye to the posterior margin of the opercle, forming a con-

spicuous black spot above the pectoral base and continuous with the lateral stripe on the body. There is a blue black basal spot between the first and third dorsal spines, the dorsal mottled red and dusky, the spines and rays green, the posterior half of the soft dorsal pale red. The anal has green spines and rays, the membrane red. The caudal rays are green, the membranes red, with numerous cross rows of small black spots. The pectoral is pink. The ventrals are greenish basally, the rest red.

Described from a specimen, 100 mm. long, taken at Tenibuli, Ysabel Island, Solomons.

### *Cheilinus trilobatus* Lacépède.

*Cheilinus trilobatus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 274, 284, pl. 19, fig. 3—Réunion, Mauritius, Madagascar; Bleeker, Atlas Ichth., 1, 1862, p. 66, pl. 27, fig. 2; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 322; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 59; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 310; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 360.

*Cheilinus trilobatus* Günther, Fische der Südsee, 2, 1876-81, p. 244, pl. 131.

*Cheilinus sinuosus* Quoy and Gaimard, Voy. Uranie, Poiss., 1824, p. 278.

Dorsal IX, 10 or 11; anal III, 8 or 9. There are 15 or 16 scales in the upper part of the lateral line, 7 to 9 in the lower part, plus 1 or 2 more on the caudal base; 2 scales above and 6 below the lateral line. The depth is 2.5, the head 2.65 times in the length. The eye is 5.3, the conical snout 2.75, the pectoral 2, the caudal about 1.6 times in the head.

The color in life is gray green or olive green, each scale of the trunk with a vertical dark red bar and 1 or 2 parallel dark green lines, the predorsal and pectoral region and breast sprinkled with dark red dots and lines, with several red lines downward and forward from the eye. There are 4 blackish crossbands; the first extends to the pectoral base from the dorsal origin, the second and third from the dorsal margin across the body, the fourth across the caudal peduncle. There are 4 small blackish spots in a longitudinal row along the middle of the body. The caudal is green basally, with a broad black band next, the posterior margin dark red. In alcohol the color is olive brown with 4 broad blackish crossbands and a row of 4 small black spots along the middle of the body. The red spots, lines, and scale marks have disappeared. The pectoral is nearly colorless, the dorsal and anal green except where crossed by the dark bands, the ventral green. The caudal is basally greenish, then crossed by a broad black band, the posterior margin whitish.

Here described from a young specimen, 110 mm. long, from the reef at Maraa, Tahiti. In older examples the 4 dark crossbands gradually disappear.

**Cymolutes lecluse** (Quoy and Gaimard).

*Xyrichtys lecluse* Quoy and Gaimard, Voy. Uranie, Zool., 1824, p. 284, pl. 65, fig. 1—Hawaii.

*Cymolutes lecluse* Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 465; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 327; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 364; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 364.

*Julis praelectata* Quoy and Gaimard, Voy. Astrolabe, Zool., 3, 1834, p. 712, pl. 15, fig. 4.

*Cymolutes praelectata* Bleeker, Atlas Ichth., 1, 1862, p. 146, pl. 31, fig. 1; Day, Fishes India, 1878-88, p. 409, pl. 90, fig. 1.

Dorsal IX, 12; anal III, 13. There are 58 scales in the upper part of the lateral line and 18 in the lower section to the caudal base, 8 scales above and 21 below the line. The depth is 4, the head 3.1 times in the length.

The color in alcohol is yellowish white, faintly dusky on the snout and top of the head and between the dorsal and the lateral line. There is a green stripe below the angle of the mouth. Near the upper margin of the caudal base is a small black spot. There is a dusky line between the first and second dorsal spines, the fins otherwise colorless.

These notes were made from a specimen, 39 mm. long, from a reef near Suva, Viti Levu Island, Fiji.

**Novaculichthys taeniourus** (Lacépède).

*Labrus taeniourus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 163, 259, pl. 17, fig. 1, on Commerson MS.—the great equatorial ocean.

*Novaculichthys taeniourus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 325, fig. 138; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 363.

*Novaculichthys taeniurus* Bleeker, Atlas Ichth., 1, 1862, p. 144, pl. 31, fig. 5; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 311.

*Novacula taeniurus* Günther, Fische der Südsee, 3, 1909-10, p. 284.

*Julis vanikorensis* Quoy and Gaimard, Voy. Astrolabe, Zool., 3, 1834, p. 704, pl. 20, fig. 1.

Dorsal IX, 12; anal III, 12. There are 19 scales in the upper, 5 in the lower part of the lateral line, 3 above and 9 below it. The body is elongate, very much compressed, the caudal peduncle deep, the anterior profile oblique. The depth is 3.2, the head 3 times in the length. The eye is small, high up, 5.75 times, the snout 3 times,

the sharp interorbital 5.44 times, the least depth of the caudal peduncle 2.18 times in the head. The broad caudal is very slightly rounded, 2.7 times in the head. The pectoral is very slightly shorter than the caudal. The mouth is small, not extending back as far as a perpendicular from the eye and has a pair of stout, curved canines at the tip of both the upper and lower jaws.

In alcohol the color of the body is brown, each scale with a pale brownish vertical spot and margined posteriorly by a broad dark brown band. The head is whitish, with 2 short blackish bars diagonally upward from the eye and 2 blackish bars diagonally downward from the eye across the preopercle and opercle. The membrane between the first and second dorsal spines is black, and between the second and third spines is a large black spot, the rest of the fin yellowish white crossed by diagonal wavy bars of purplish brown, these broken into spots anteriorly; the anal is dark brown with darker indistinct bars as on the dorsal, with a fine, bluish white, marginal line. The caudal has a broad yellowish white basal band, the outer half blackish with obscure vertical rows of paler spots. The pectoral is colorless, except for a large dark brown spot on its base. There is a black spot in its axil and one above it. The ventrals are black with a white posterior marginal line.

Here described from a specimen, 147 mm. long, taken on a reef near Suva, Viti Levu Island, Fiji.

#### Family SCARIDAE

#### *Scarus erythrodon* Cuvier and Valenciennes.

*Scarus erythrodon* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 189—Mauritius.

*Callyodon erythrodon* Steindachner, Sitzungsber. Akad. Wiss. Wien, 115, 1906, p. 1400; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 372.

*Scarus sumbawensis* Bleeker, Journ. Ind. Arch., 2, 1848, p. 638; Atlas Ichth., 1, 1862, p. 47, pl. 15, fig. 4.

Dorsal IX, 10; anal III, 9. There are 17 to 19 scales with tubules in the upper section and 4 to 6 in the lower section of the lateral line, plus 2 on the caudal base. There are 2 rows of scales on the cheek, the lower opercular limb naked. The depth is 2.9, the head 3 to 3.1 times in the length. The small eye is 2.6 to 2.7 times in the long, convex snout, 6.1 to 6.3 times in the head. The snout is 2.33 times in the head. The pectoral and caudal are nearly equal, 1.3 to 1.4 times in the head. The caudal is truncate or emarginate, with pointed and somewhat elongate tips.

The color in life is uniform purplish rose to dregs of wine, the fins with darker margins. The color in alcohol is uniform dark purplish brown, the throat and belly a little paler, the vertical fins pale with a blackish margin. The ventrals are colored like the body, with a wide, purplish black margin. The caudal is paler than the body, with a narrow, dark, posterior margin. The pectoral is pale with a broad, very dark brown bar across its base.

Five specimens were collected on the reef at Moorea, from 98 to 190 mm. long. Four specimens, 80 to 160 mm. long, were obtained at Bora Bora. The reef at Suva yielded 3, varying from 34 to 96 mm. in length. A fine specimen, 213 mm. long, was taken at Malo Island, and two, 173 and 186 mm. long, at Wala Island, New Hebrides. Four specimens, 118 to 218 mm. long, were secured at Tenibuli, Ysabel Island, in the Solomons. Bleeker's figure is a very good representation of these specimens as they were in life.

### *Scarus dubius* Bennett.

*Scarus dubius* Bennett, Zool. Journ., 4, 1828, p. 37—Hawaiian Islands; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), pl. 44.

*Pseudoscarus dubius* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 229; Fische der Südsee, 3, 1909-10, p. 313.

*Callyodon dubius* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 350; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 473, pro parte; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 385, pro parte.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper section of the lateral line, 5 or 6 in the lower part and 1 or 2 on the caudal base, 2 above and 6 below the line. There are 3 rows of scales on the cheek, the lowest, containing 2 scales, on the preopercular flange. The depth is 2.6 to 2.9, the head 2.9 to 3, the caudal 4.55 to 4.6, the pectoral 4 to 4.12 times in the length. The eye is 5.12 to 6.14, the snout 2.25 to 2.66, the interorbital 3 to 3.2, the least depth of the caudal peduncle 2.25 to 2.4 times in the head. The form is oblong, compressed, the dorsal and ventral profiles evenly and regularly curved and alike, the head pointed. The mouth is below the axis, the lips covering most of the teeth ordinarily, occasionally retracted. There are no canines at the angle of the jaws. The caudal is truncate when expanded.

The color in alcohol is largely purplish brown, darker anteriorly above, the belly paler to whitish. The three lowermost rows of scales on the side each have a median, white, longitudinal line, often poorly defined. The dorsal and anal are purplish to violaceous brown, the

caudal darker brown. The pectoral is light brown above, the lower part colorless. The ventrals are yellowish or colorless, sometimes with a violaceous outer margin.

Described from 7 specimens, 119 to 144 mm. in length, from Tenibuli, Ysabel Island, Solomons.

### **Scarus pectoralis** Cuvier and Valenciennes.

*Scarus pectoralis* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 269  
—Djedda, Red Sea.

*Pseudoscarus pectoralis* Günther, Cat. Fishes Brit. Mus., 4, 1862, p. 237; Fische der Südsee, 3, 1909-10, p. 324, pl. 158; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 453; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 383.

Dorsal IX, 10; anal III, 9. There are 17 or 18 scales in the upper section and 5 or 6 in the lower part of the lateral line plus 2 or 3 on the caudal base, 2 above and 6 below the line. The depth is 2.5 to 2.6, the head 2.8, the caudal 4 to 4.4, the pectoral 3.9 to 4 times in the length. The eye is 6.66 to 7.66, the snout 2.15 to 2.3, the interorbital 2.7 to 2.8, the least depth of the caudal peduncle 2.4 to 2.5 times in the head. The body is ovate oblong, and compressed, the snout low and blunt, the small eye midway of the head, the mouth low, the upper jaw with a small posterior canine. The caudal is truncate when expanded. There are 3 rows of scales on the cheek, the lowest, of 3 scales, on the preopercular flange.

The color in alcohol is dull brownish plum, or greenish dorsally with a yellowish cast on the sides, each scale with a broad vertical green bar, the under side of the head and breast faded reddish. The top of the snout and back to the dorsal are dull plum color. The lips are yellowish or faded red, the upper with a submarginal, deep green line which runs back along the lower margin of the eye. On the lower lip are 2 cross lines of green and a number of short bars and dashes behind them. The dorsal is faded red with a narrow green margin. The anal is green with a longitudinal reddish bar which covers more than half the fin. The caudal is bright green basally, the upper and lower margins plum color or purplish red, the posterior central half faded red with a streak of the same color running back below the marginal bands. The pectoral has a green band along the upper margin, then a broad, purplish red band, the rest of the fin colorless, or the whole fin may be green with a longitudinal, purplish red bar above the middle.

Described from 4 specimens, 157 to 172 mm. long, from Tenibuli, Ysabel Island, and 2 specimens, 128 and 150 mm. long, from Hathorn Sound, New Georgia, Solomon Islands.

**Scarus balinensis** Bleeker.

*Scarus balinensis* Bleeker, Verh. Bat. Gen., 22, 1849, p. 8—Bali.

*Pseudoscarus balinensis* Bleeker, Atlas Ichth., 1, 1862, p. 39, pl. 16, fig. 3.

*Callyodon balinensis* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 320; Snyder, Proc. U. S. Nat. Mus., 42, 1912, p. 509;

Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 457; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 383.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper section of the lateral line, 5 or 6 in the lower part plus 2 more on the caudal base, 2 above and 6 or 7 below the line. There are 3 rows of scales on the cheek, the lowest, of 2 scales, on the preopercular flange. The depth is 2.6 to 2.7, the head 3 to 3.1, the emarginate caudal 3.5, the pectoral 4 times in the length. The eye is 6, the snout 2.4 to 2.5, the interorbital 3, the least depth of the caudal peduncle 2.3 times in the head. The snout is convex, the profile concave before the eyes. The wide lips cover most of the teeth. Posterior canines, if present, 1 or 2 pairs above or below.

The color in alcohol is dark violaceous brown above, paler, plain brown below, the lips somewhat orange. The caudal is brown with darker upper and lower margins that were evidently blue in life. The dorsal is pale with dark cloudings and a dark edge, evidently red with blue blotches and a blue margin. The anal is faded red with a blue margin and a narrow blue basal stripe. The pectoral is pale with a bluish upper margin.

Described from 2 specimens, 185 and 205 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

**Scarus zonularis** (Jordan and Seale).

*Callyodon zonularis* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 321, fig. 60—Pago Pago, Samoa.

Dorsal IX, 10; anal III, 9. There are 16 scales in the upper part of the lateral line, 5 in the lower section plus 2 more on the caudal base, 2 above and 6 below the line. There are 3 rows of scales on the cheek, 4 scales in the lowest row covering the flange of the preopercle. The depth is 2.7 to 2.9, the head 2.6 to 2.7, the caudal 4.5 to 4, the pectoral 3.9 to 4.3 times in the length; the eye is 5.7 to 6, the snout 2.2 to 2.3, the interorbital 3 to 3.1, the least depth of the caudal peduncle 2.4 to 2.6 times in the head. The body is compressed, oblong, the convex snout somewhat swollen, the lips covering the larger part of the white or rosy teeth. There are no canines. The thick, stout, caudal peduncle is almost as deep as the length of the snout. The caudal is truncate.

The color in alcohol is yellowish to pale brown, with 4 or 5 broad, dusky brown crossbands descending obliquely forward from the back to the level of the eye, and a broad, dark brown band running back from the chin across the pectoral base to the caudal peduncle, its upper edge clean cut but its lower margin vague. Above it the ground color appears as a broad, pale stripe from beneath the eye to the caudal peduncle. A dark brown band extends to the opercular margin from the eye. The entire top of the head is pale to very dark purplish brown, or merely the snout is purplish, the rest brown. The dorsal is purplish brown, the anal and caudal paler. The pectoral is yellowish to pinkish.

Described from 5 specimens, 104 to 158 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

### *Scarus quoyi* Cuvier and Valenciennes.

*Scarus quoyi* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 273—Carteret Harbor, New Ireland.

*Pseudoscarus quoyi* Bleeker, Atlas Ichth., 1, 1862, p. 29, pl. 6, fig. 3; Günther, Fische der Südsee, 3, 1909-10, p. 319.

*Callyodon quoyi* Seale, Occ. Papers Bishop Mus., 6, 1906, p. 62; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 407; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 375.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper and 4 in the lower section of the lateral line plus 2 on the caudal base, 1 or 2 scales above and 6 below the lateral line. There are 2 rows of scales on the cheek, the preopercular flange naked. The depth is 2.6 to 2.9, the head 2.65 to 2.7, the truncate caudal 4.25 to 4.3, the pectoral 3.6 to 3.9 times in the length. The eye is 7.9 to 8, the snout 2.15 to 2.2, the interorbital 3 to 3.15, the least depth of the caudal peduncle 2.35 to 2.4 times in the head. The body is elongate-ovoid and compressed, the snout convex, only the base of the green teeth covered by the lips. There are 2 stout posterior canines on the upper jaw.

The color in life is bright green, each scale with a vertical red bar, the belly paler and about the same shade as the scale markings. On the side of the head is a large and nearly four-sided area extending from the angle of the mouth to the pectoral base and up nearly to the eye, its color lilac red, bordered by emerald green. An emerald stripe borders the lips, that on the lower lip looping broadly and almost forming a double stripe. The dorsal is green with 2 longitudinal red stripes, the anal green with a single red stripe. The pectoral is green, the lower half colorless, with an elongated, lilac red

area in the upper half. The caudal is green with a lilac stripe near the upper and lower margins. The ventrals are pale with a green margin. The teeth are green. In alcohol the red changes to yellowish, and the green is faded and dull, but otherwise the color is as given.

Described from 2 specimens, each 203 mm. long, one taken at Tenibuli, Ysabel Island, the other at Hathorn Sound, New Georgia, Solomon Islands.

### **Scarus abacurus** (Jordan and Seale).

*Callyodon abacurus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 324, pl. 33—Apia and Pago Pago, Samoa.

*Pseudoscarus abacurus* Günther, Fische der Südsee, 3, 1909-10, p. 329, pl. 162.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper, 5 in the lower section of the lateral line, plus 2 on the caudal base, 2 above and 6 below the lateral line. There are 2 rows of scales on the cheek, the flange of the preopercle naked. The depth equals the head, 2.45 times in the length. The eye is 7.15, the snout 2.2, the interorbital 3, the preorbital 3.6, the least depth of the caudal peduncle 2.8 times in the head. The very slightly concave caudal is 4.6, the broad pectoral 3.65 times in the length. The body is oblong and compressed, the snout convex and swollen. The lips are narrow, covering less than half of the jaws. There are 2 large posterior canines on the upper jaw, none on the lower. The small eye is high up.

The color in alcohol is pale yellowish brown, becoming very pale lavender on the under side of the head and breast, the top of the head and predorsal region blackish with a broad, diagonal band of blackish extending backward behind the pectoral nearly to the abdomen. The caudal peduncle is green with a large, golden spot on each scale. The lips are orange with a broad, submarginal green stripe on each, that on the upper lip running back beneath the eye. The dorsal and anal are green, with a longitudinal reddish band. The caudal is green, the upper and lower margins very dark green. The pectoral is purplish brown, the ventrals pinkish.

Described from a specimen, 213 mm. long, taken at Tenibuli, Ysabel Island, Solomon Islands.

### **Scarus dimidiatus** Bleeker.

*Scarus dimidiatus* Bleeker, Act. Soc. Sci. Indo-Neerl., 6, 1857, p. 17—Doreh, New Guinea.

*Pseudoscarus dimidiatus* Bleeker, Atlas Ichth., 1, 1862, p. 41, pl. 16, fig. 1.

*Callyodon dimidiatus* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 60; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 425; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 379.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper section, 6 in the lower part of the lateral line, plus 1 or 2 on the caudal base, 2 above and 6 or 7 below the line. There are 3 rows of scales on the cheek, the lowest row of but 2 or 3 scales on the flange of the preopercle. The depth is 2.8 to 2.95, the head equal to the depth, the truncate caudal 4.3 to 4.8, the pectoral 3.75 to 3.85 times in the length. The eye is 5.5 to 6.4, the snout 2.1 to 2.2, the interorbital 2.85 to 2.9, the least depth of the caudal peduncle 2.4 to 2.45 times in the head.

In alcohol the color of the posterior half varies from dull plum color to dull green, each scale with a wide, paler margin. On the caudal peduncle the margin is reddish. The area from the interorbital, back to the middle of the dorsal and down to the lower margin of the pectoral is very pale green or whitish greenish with a rosy cast over it, with a broad, blackish band from the eye to the posterior margin of the opercle above the pectoral axil. The upper lip is bright green, behind it a plum-colored or purplish area extending back to the middle of the interorbital. A broad, green band encircles the lower lip and extends back to the eye and vanishes beneath the black band already mentioned. The lower part of the opercle and the preopercle is pale reddish or roseate. The dorsal is green with a wide basal or sub-basal band which is pale yellowish anteriorly, dusky plum color posteriorly, and margined by reddish lines. This band was evidently red in life. The anal is bright green with a narrow, basal, yellowish or purplish stripe, also evidently red in life. The free portion of the caudal is bright green. The pectoral is green above with a median, longitudinal dark purplish stripe, the rest of the fin colorless. The ventrals are largely greenish, the inner rays colorless or pinkish. The teeth are white.

This species is readily recognized by the strongly contrasting colors on the anterior and posterior halves of the body and the band from the eye to the pectoral axil and patch on the snout. Bleeker has the posterior half figured as dark red, but I have not noticed any of that shade among the very large number examined in the fresh condition in the East Indies.

Described from 3 specimens, 164 to 185 mm. long, from Tenibuli, Ysabel Island, and 2 specimens, 143 and 150 mm. long, from Hathorn Sound, New Georgia Island, Solomon Islands.

**Scarus frenatus** Lacépède.

*Scarus frenatus* Lacépède, Hist. Nat. Poiss., 6, 1802, pp. 315, 327—the great equatorial ocean, on Commerson MS.

*Pseudoscarus frenatus* Bleeker, Atlas Ichth., 1, 1862, p. 40, pl. 16, fig. 2; Günther, Fische der Südsee, 3, 1909-10, p. 307; Fowler and Bean, Bull. 100, U. S. Nat. Mus., 7, 1928, p. 436; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 380.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper, 5 in the lower section, plus 2 more on the caudal base, 2 above and 6 below the line. There are 2 rows of scales on the cheek and a single scale on the flange of the preopercle. The depth is 2.7, the head 2.9, the caudal 4.35, the pectoral 4.2 times in the length. The eye is 5.75, the snout 2.5, the interorbital 2.88, the least depth of the caudal peduncle 2.6 times in the head. The compressed body is ovate-oblong, the dorsal profile arched and more elevated than the ventral profile, pointed both anteriorly and posteriorly. The teeth are dusky roseate. There is a posterior canine on the lower jaw, none on the upper. The lips cover most of the teeth. The caudal is slightly concave when relaxed, truncate when expanded.

The color in alcohol is muddy slate on top of the head, the anterior half of the body and the posterior region above the lateral line purplish brown, the remainder pale yellowish brown in marked contrast. A yellowish stripe extends from the upper lip along the lower margin of the eye and expands to a wide bar on the opercle. On the lower lip is a yellow bar with a purplish brown bar behind it. The dorsal is purplish dusky, becoming yellowish near the posterior extremity, with a pale yellow, submarginal, narrow stripe and a dusky margin. The caudal is dark purplish brown, the other fins all very pale purplish brown.

Described from a specimen, 152 mm. long, from Tenibuli, Ysabel Island, Solomon Islands.

**Scarus globiceps** Cuvier and Valenciennes.

*Scarus globiceps* Cuvier and Valenciennes, Hist. Nat. Poiss., 14, 1839, p. 242—Tahiti.

*Pseudoscarus globiceps* Günther, Fische der Südsee, 3, 1909, p. 311.

*Callyodon globiceps* Steindachner, Sitzungsber. Akad. Wiss. Wien, 115, 1906, p. 1400; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 386.

*Pseudoscarus spilonotus* Kner, Sitzungsber. Akad. Wiss. Wien, 58, 1867, p. 352, pl. 9, fig. 26.

*Callyodon spilonotus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 325, pl. 48, fig. 1.

Dorsal IX, 10; anal III, 9. There are 17 to 19 scales in the upper section of the lateral line, 4 to 6 in the lower section, and 2 on the

caudal base, 2 scales above the lateral line and 6 below it. The depth is equal to the head, 3 or 3.1 times in the length. The snout is 2.35, the small eye 6.8 or 6.9, the high, convex interorbital 2.75 to 2.8 times in the head. The body is oblong, the upper profile of the head convex, the long snout slightly depressed before the eyes. The emarginate caudal has the corners slightly pointed. There are 2 rows of scales on the cheeks.

The color in alcohol is dull greenish, somewhat dusky above, each scale with 2 or 3 whitish or green, circular dots. There is a purplish dusky blotch on the forehead, crossed by a whitish band from eye to eye. The cheeks are pale, the region around the mouth and chin reddish brown. There are several, longitudinal, green lines on the belly, one on each row of scales. There is a black bar on the pectoral base. The caudal is reddish to greenish, the anal yellow with a broad, marginal green band, the dorsal yellowish with a basal and marginal green band, the latter wide, or the dorsal variously banded with yellow, green, and orange red. The pectoral is green to colorless, the ventrals yellow or margined with green.

Here described from 3 specimens, 182 to 205 mm. long, from the market at Papeete, Tahiti, where this fish was plentiful. This species is easily recognized by the characteristic convex forehead, and by the distinctive scale spots.

### *Scarus troscheli* Bleeker.

*Scarus troscheli* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 498.

*Pseudoscarus troscheli* Bleeker, Versl. Akad. Amsterdam, 12, 1861, p. 232—Batavia, Java; Atlas Ichth., 1, 1862, p. 25, pl. 7, fig. 2; Günther, Fishes of Zanzibar, 1866, p. 108, pl. 14.

*Callyodon pyrhrurus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 314, fig. 55.

Dorsal IX, 10; anal III, 9. There are 18 scales in the upper, 5 in the lower section of the lateral line, and 2 more on the caudal base, 2 above and 6 below the lateral line. The depth is 3.25, the head 2.9 times in the length. The eye is 6.8 times in the head and 2.7 times in the snout. The convex interorbital is 3, the snout 2.5, the pectoral 1.33 times in the head. The caudal is slightly emarginate, with elongate tips at the corners, scarcely longer than the pectoral. There are 2 rows of scales on the cheeks, the margin of the preopercle naked. The narrow lips cover only the base of the jaws.

The color in alcohol is dull purplish olive, each scale with a dull green basal bar or elongate vertical spot, the occipital region purplish

brown, the under side of the head and breast tinged with very pale orange. The lips are dark red. The dorsal is dusky purplish with a green margin. The anal has a broad, purplish band basally, and a narrower yellowish green marginal band. The caudal is green above and below, the posterior margin pale. The pectoral is pale purplish, the ventrals greenish.

Here described from a specimen, 198 mm. long, purchased in the market at Papeete, Tahiti.

According to Fowler this is a synonym of *Callyodon sordidus* (Forskål); it is very close to *Callyodon abacurus* Jordan and Seale, which Günther recognized as distinct, but which Fowler also makes a synonym of *C. sordidus*.

#### Family ELEOTRIDAE

**Ptereleotris (Encaeura) evides** (Jordan and Hubbs). Fig. 16.

*Encaeura evides* Jordan and Hubbs, Mem. Carnegie Mus., 10, 1925, p. 303, pl. 11, fig. 2.

Dorsal VI-I, 25; anal I, 25; there are about 130 very small, embedded, cycloid scales in a longitudinal series, plus 10 or 12 more on the caudal base, and about 40 in a transverse series; ventrals I, 4. The depth is 5 to 5.25, the head 4.25, the caudal 3.4 to 3.66, the pectoral 5.66 to 5.75 times in the length. The eye and inter-orbital are equal, 3.45 to 3.7, the snout 4 to 4.1, the least depth of the caudal peduncle 2.15 to 2.2 times in the head. The elongate, compressed body is fusiform, the dorsal and ventral outlines about equally curved. The mouth is large and oblique with projecting chin, the maxillary extending beneath the front margin of the eye. The minute teeth are in 1 row in the upper jaw. In the lower jaw there are 2 rows in front, the rest in 1 row. There are no canines. The pointed tongue is noticeably slender. The vertical fins are low, the first dorsal 1.3 to 1.66 times in the head. The second dorsal and anal are highest anteriorly, the first-named 1.45 to 1.5 times, the anal twice in the head. The caudal is emarginate, with pointed lobes. The pectorals and ventrals are pointed, the latter small and 1.6 times in the head. There is a large air-bladder. The head is naked, the rest of the body covered with very small to minute, embedded scales, which extend far out on the caudal rays.

The color in alcohol is pale brown, becoming brownish white beneath, with a large, conspicuous, oval black spot, longer than the eye, half on the caudal base and half on the caudal peduncle. The dorsal and anal are dusky with minute black specks, the soft dorsal

and anal rays with blackish tips. The central part of the caudal is whitish (probably red in life) the upper and lower margins broadly dusky. The pectorals and ventrals are colorless.

This is unquestionably a pelagic or free-swimming goby, like *Ptereleotris dispersus* Herre, of the Philippines, and *Vireosa hanae* Jordan and Snyder, of Japan. The genus *Encaeura* Jordan and Hubbs is apparently too close to *Ptereleotris* to be worthy of more than subgeneric rank. *Encaeura* has 125 or 130 scales instead of 150 to 170. The presence or absence of canines may be a sexual character and is not worthy of generic rank. I therefore consider *Encaeura* to be a section of *Ptereleotris*.

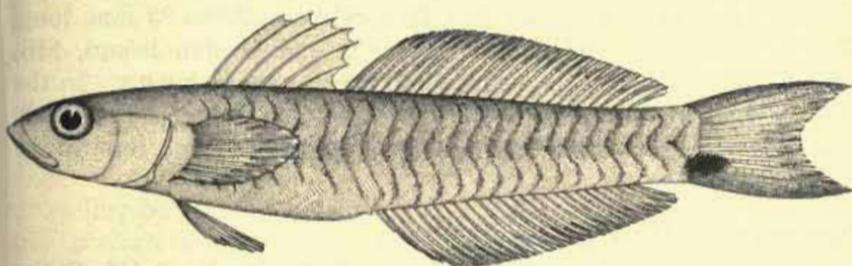


FIG. 16. *Ptereleotris (Encaeura) evides* (Jordan and Hubbs), Espiritu Santo Island, New Hebrides.

This elegant little fish, hitherto known only from 2 specimens from Wakanoura, Japan, is here described from 3 specimens, 49 to 55 mm. in length, collected at Turtle Bay, Espiritu Santo Island, New Hebrides. They were caught with a dip net, while we were fishing by electric light.

#### *Asterropteryx semipunctatus* Rüppell.

*Asterropteryx semipunctatus* Rüppell, Atlas Reise Nörd. Afrika, Fische, 1838, p. 138, pl. 34, fig. 4—Massaua, Red Sea; Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 385, pl. 36, fig. 1; Herre, Gobies of the Philippines, 1927, p. 28, pl. 1, fig. 2.

*Eleotris semipunctata* Günther, Fische der Südsee, 2, 1876, p. 187, pl. 111, fig. D.

Dorsal VI-I, 10 to 11; anal I, 8 to 10; scales in lateral series 24, in transverse 8. The head is 3.5, the depth 2.9 to 3.2 times in the length. The snout is 3.5, the eye nearly 4 times in the head. The third dorsal spine is thread-like and greatly elongated, from half to more than three-fourths the length of head and body together, extending to the caudal base when depressed, or even to its tip. There are 3 to 6 stout teeth at the angle of the preopercle.

In life the body is barred by large irregular blackish brown cross-bands or may be entirely black. Each scale is decorated by a small, circular, purplish blue spot of jewel-like brilliance. The dorsals, anal, and caudal are pale brown with fine blue dots. Sometimes the space between the pectoral and first dorsal is thickly sprinkled with small, blue dots. In alcohol there is not much change except that the colors are much duller, and the sides of the head and body are covered with rows of pearly white instead of purplish blue spots.

From the reef at Papeete, Tahiti, 2 specimens, both 20 mm. long, were collected. This brilliant little goby is very common in Fijian waters. From coral reefs near Suva, Viti Levu Island, Fiji, were obtained 36 specimens, 12 to 36 mm. in length, all of them black in life. At Nukulau Island, Fiji, 20 specimens, 20 to 33 mm. long, were added to the collection. A reef behind Ovalau Island, Fiji, gave 30 additional specimens, from 17 to 40 mm. in length. In the New Hebrides 10 specimens, 18 to 32 mm. long, were taken at Malo Island, and 2 specimens, both 14 mm. long, at Bushman Bay, Malekula Island.

#### *Hypseleotris güntheri* (Bleeker).

*Eleotris cyprinoides* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 118—Oualan (not of Cuvier and Valenciennes).

*Asterropteryx güntheri* Bleeker, Arch. Neerl. Sci. Nat. Haarlem, 10, 1875, p. 112—Oualan (after Günther).

*Eleotris guentheri* Günther, Fische der Südsee, 2, 1876-81, p. 186, pl. 113, fig. A.

*Hypseleotris guntheri* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 385, fig. 74.

Dorsal VI-I, 8; anal I, 10; scales in the lateral series 28, with 4 more on the caudal base, and 9 in a transverse series. A black lateral band extends from beneath the pectoral to the caudal, with a black spot on the caudal base. Male specimens have a black first dorsal with 2 white spots basally and a white crossbar on the upper part. The second dorsal is dusky with 3 rows of large, circular, white spots. The caudal is alternately barred with white and dusky spots. The top of the snout, interorbital, and opercle are black and there is a black bar on the pectoral base. Females have the caudal as in males, but the other fins are all dusky and unspotted.

From a small river flowing into Suva Harbor, Viti Levu Island, Fiji, 10 specimens of this handsome species, from 35 to 54 mm. in length, were collected. This graceful and active little fish lives in clear swift water. Unlike most other gobies, the members of this

genus do not lie on the bottom or attached to objects in the water, but swim about freely, resembling certain cyprinodont fishes in appearance and habits.

**Butis amboinensis** (Bleeker).

*Eleotris amboinensis* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 343—Amboina.

*Butis amboinensis* Bleeker, Act. Soc. Sci. Indo-Neerl., 8, 1860, p. 44; Herre, Gobies of Philippines, 1927, p. 46.

Dorsal VI-I, 8 or 9; anal I, 8. There are 28 to 30 scales in a longitudinal series; predorsal scales 14 to 19, usually 15 or 16. The body is low, elongate, pointed anteriorly, the depth 5.6 to 6, the head 2.8 to 3, the rounded caudal about 4 times in the length. The eye is 4.4 to 5, the snout 2.6 to 3 times in the head. The interorbital space equals or slightly exceeds the eye. The mouth is large, oblique, with strongly projecting lower jaw, the maxillary extending beneath the front margin of the eye. The orbital ridges are very low, smooth, very close to the eye margin, without scales between the eye and ridge. On the inner side of each orbital ridge is a wide naked band extending from the snout, leaving a narrow, median, scaled ridge on the interorbital, the naked band continuing on back to the upper end of the pectoral base.

The color in alcohol is blackish brown with 6 darker vertical crossbands, each scale along the side with a paler spot, these spots forming longitudinal rows. A black line runs from the snout through the eye to the opercle and a double black stripe runs from the pectoral base to the caudal. There is a black spot on the pectoral base with a pale spot above and below it. The fins are more or less blackish barred or spotted.

A specimen, 48 mm. long, was caught in a small fresh-water stream on Kulambangra Island, Solomon Islands, and one, 78 mm. long, from a creek at Auki, Malaita Island, Solomon Islands.

**Butis gymnopomus** (Bleeker).

*Eleotris gymnopomus* Bleeker, Nat. Tijds. Ned. Ind., 4, 1853, p. 274—Sumatra.

*Butis gymnopomus* Bleeker, Nat. Tijds. Ned. Ind., 12, 1856, p. 215 (name only);

Versl. Akad. Amsterdam, 11, 1877, p. 70; Herre, Gobies of Philippines, 1927, p. 51.

Dorsal VI-I, 8 or 9; anal I, 8 or 9; there are 26 to 28 scales in a longitudinal, 10 in a transverse series and 14 predorsal scales. The elongate, pointed body is cylindrical anteriorly, the sides much compressed posteriorly. The depth is 4.75 to 5, the elongate, flattened head 2.8, the caudal 3.5 to 3.8 times in the length. The

eye is about 4.9, the broad, rounded snout 2.7 to 2.8 times in the head. The interorbital equals the eye. The mouth is large, oblique, with projecting lower jaw, the maxillary extending to a perpendicular from the front margin of the eye. The teeth of the outer row in both jaws are larger and more widely spaced than the rest. The orbital and preorbital ridges are very low, smooth, and inconspicuous. The head is naked except on the nape and opercles, there being no scales between the eyes.

In life the color is blackish with a conspicuous black band from the snout across the lower part of the eye and back to the caudal base. There is a black spot on the pectoral base and a large black spot on the spinous dorsal. The anal and caudal are dusky, the latter with a white upper margin. In alcohol the color is gray to blackish, the scales on the sides with paler spots. The lateral band is conspicuous on the head but not much evident from the pectoral to the caudal. The anal is blackish with a narrow, pale margin, the caudal black with a broad, white, upper margin. There is a black spot on the spinous dorsal and one at the pectoral base.

Three specimens, 16 to 34 mm. long, were obtained in a creek on Kulambangra Island, Solomon Islands.

#### ***Bostrichthys sinensis* (Lacépède).**

*Bostrychus sinensis* Lacépède, Hist. Nat. Poiss., 5, 1801, pp. 183, 184—China; 4, 1800, pl. 6, fig. 2.

*Bostrichthys sinensis* Gill, Proc. Acad. Nat. Sci. Phila., 1860, p. 125; Day, Fishes India, 1878-88, p. 309, pl. 65, fig. 4; Herre, Gobies of Philippines, 1927, p. 43, pl. 3, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 388.

*Philypnus sinensis* Richardson, Zool. Voy. Sulphur, Ichthy., 1844-48, p. 149, pl. 56, figs. 15 and 16.

*Eleotris sinensis* Günther, Fische der Südsee, 2, 1876-77, p. 89.

*Philypnus ocellicauda* Richardson, Zool. Voy. Sulphur, Ichthy., 1844-48, p. 59.

Dorsal VI-I, 12 or 11; anal I, 8 or 9. There are 130 to 135 scales in a longitudinal row. The body is elongate, the rear half strongly compressed, the depth 5.25 to 5.7, the head 3.5 to 3.8 times in the length. The eyes are 5.1 to 5.8, the snout 3.5 to 4 times in the head. The entire body is covered with small cycloid scales, rudimentary on the snout and on top of the head, irregularly arranged on the trunk, largest on the caudal peduncle, and extending upon the caudal for half its length.

The color in alcohol is brown, mottled with fine lines of darker brown, paler to whitish beneath. A large, black, white-margined

ocellus is on the upper part of the caudal base. The dorsals and caudal are crossbarred with rows of dark brown spots. The eye spot on the tail distinguishes this eleotrid at sight.

A specimen from the stomach of a heron, *Butorides* sp., was taken on the Mbureta River, Ovalau Island, Fiji.

### *Eleotris fusca* (Bloch and Schneider).

*Poecilia fusca* Bloch and Schneider, Syst. Ichth., 1801, p. 453, after *Cobitis fusca* Forster MS.

*Eleotris fusca* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 125; Day, Fishes India, 1878, p. 313, pl. 65, fig. 7; Herre, Gobies of the Philippines, 1927, p. 30, pl. 2, fig. 1.

*Eleotris nigra* Quoy and Gaimard, Voy. Uranie et Physicienne, Zool., 1824, p. 259, pl. 60, fig. 2 (scales incorrect on figure).

*Culius fusca* Bleeker, Rev. Espèces Eleotr., Versl. Akad. Amsterdam, 11, 1870, p. 40.

Dorsal VI-I, 8 or 9; anal I, 8 or 9. There are 58 to 65 scales in a longitudinal line, 16 to 19 in a transverse series, and 48 to 50 predorsal scales. In all except very young specimens the body is thick, robust, wedge-shaped, nearly cylindrical anteriorly but strongly compressed posteriorly. The depth is from a little more than 4 to 4.7 times in the length. The large head is 2.5 to 3 times in the length, its breadth three-fourths of or equal to its own length. The small but conspicuous eyes are very high up, 6 to 6.8 times in the head, 1.8 to 2 times in the depressed interorbital space, 1.4 to 1.6 times in the short, blunt snout, which is 4 to 4.4 times in the head. The large mouth is very oblique, with a strongly projecting lower jaw. On the cheeks and snout are numerous lines of minute papillae; most of them radiate from the eyes but some form cross lines. At the lower angle of the preopercle is a sharp, downward-curved spine, more or less concealed.

In life the color is velvety blackish brown with faintly visible longitudinal blackish lines along the scale rows. The color in alcohol varies from blackish to pale brown, each scale along the sides with a dark spot, the spots forming longitudinal rows. All the fins are crossbarred with alternate rows of pale and dark spots or irregular bars, the marks usually disappearing from the ventrals.

This little eleotrid is abundant in fresh-water streams throughout Polynesia, Melanesia, and the East Indies. At Atuona, Hiva Oa Island, Marquesas, 3 specimens, 48 to 125 mm. in length, were taken from one fresh-water stream, and 40 specimens, 30 to 90 mm. in length, from another. From a small creek on Nuka Hiva

Island, Marquesas, 9 specimens, 29 to 76 mm. long, were collected. This fish is very abundant in the Papenoo River, Tahiti, where 30 specimens, 40 to 130 mm. in length, were captured. From a creek on Moorea 4 specimens, 65 to 82 mm. in length, were collected. Five specimens, 45 to 102 mm. long, were caught in spring holes and pools a couple of miles inland from the west side of Suva Harbor, Viti Levu Island, Fiji. A specimen, 33 mm. long, was taken at Hathorn Sound, New Georgia Island, Solomon Islands.

***Eleotris melanosoma* Bleeker.**

*Eleotris melanosoma* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 705—Ceram; Herre, Gobies of Philippines, 1927, p. 33; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 393.

*Culius melanosoma* Bleeker, Rev. Espèces Eleotr., Versl. Akad. Amsterdam, 11, 1875, p. 43.

Dorsal VI-I, 8 or 9; anal I, 8 or 9. There are 42 to 52 scales in a longitudinal series and 14 or 15 in a transverse series, 30 to 40 predorsal scales, and 10 or 12 in a transverse series across the caudal peduncle. The depth is 3.9 to 5 times, the head 3 to 3.2 times in the length. The eyes are very high up, equal or nearly equal to the snout, 4.8 to 5.4 times in the head and 1.5 to 1.8 times in the interorbital, which is 2.9 to 3.4 times in the head. The mouth is large, oblique, the maxillary extending to a point below the middle of the eye. The entire body except the snout, lips, chin, and subopercle is covered with scales. On the lower half of the preopercle the scales are minute or may be in part lacking. Lines of sensory papillae may be present on the cheeks and snout.

In life the color is blackish or greenish black, the fins all cross-barred by lines or rows of blackish spots. The color in alcohol is yellowish to blackish brown, the breast and belly paler, the top of the head and predorsal region darkest. Behind the pectorals the sides are marked by narrow, longitudinal, paler and darker lines caused by a pale spot on each scale. The fins are much as in life but the markings largely disappear in time.

Six specimens, 43 to 50 mm. in length, were collected from a small river flowing into Suva Harbor, Viti Levu Island, Fiji. A specimen, 80 mm. long, was taken from a creek at Auki, Malaita Island, Solomon Islands.

***Ophiocara porocephala* (Cuvier and Valenciennes).**

*Eleotris porocephala* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 178—Seychelles and New Ireland.

*Eleotris porocephalus* Day, Fishes India, 1878-88, p. 312, pl. 167, fig. 1.

*Ophiocara porocephalus* Bleeker, Rev. Espèces Eleotr., Versl. Akad. Amsterdam, 11, 1877, p. 30.

*Ophiocara porocephala* Herre, Gobies of Philippines, 1927, p. 69, pl. 5, fig. 3.

*Eleotris ophioccephalus* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 107.

*Eleotris porocephaloides* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 511.

*Eleotris cantoris* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 108.

*Ophiocara ophioccephalus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 390.

Dorsal VI-I, 8 or 9; anal I, 7 or 8. There are 35 to 40 scales in a longitudinal, 12 to 14 in a transverse series, and 22 to 26 rows of scales before the first dorsal. The depth is 4.1 to 4.8, the head 2.8 to 3 times in the length. The snout is 3.3 to 3.5, the eye 5 to 6.9, the interorbital 2.8 times in the head. On the posterior margin of the preopercle are 5 large pores, at least 3 of them conspicuous. On the groove above the opercles are at least 3 large pores, 2 above and 1 behind the eye, and 1 on the inner side of each nostril. The body is robust, wedge-shaped, the posterior half compressed. The mouth is large with a prominent lower jaw, the maxillary extending to below the middle of the eye. In the upper jaw are 8 to 10 rows of depressible, villiform teeth with a few larger ones in the inner row and 6 to 8 rows in the lower jaw with a few larger ones in the outer row. The anterior nostril has a well-developed tubule. The entire body except the tip of the snout, lips, and chin is scaled. The bluntly rounded caudal is shorter than or equal to the head, the pectoral 3.35 times in the length, about an eighth shorter than the head. The soft dorsal and anal are elongate and pointed posteriorly, extending upon the caudal.

The color in alcohol is blackish brown to yellowish brown, darkest on top of the head and on the back. Usually there are 6 or more longitudinal rows of pale or pearl-colored spots on the sides, but in large specimens they are obscure. The fins are all blackish with pale or whitish margins, those on the anal, soft dorsal, and caudal often conspicuous. The soft dorsal and caudal are often marked by cross rows of white or pale spots. Some specimens, otherwise undistinguishable, are marked by 2 broad whitish or yellowish cross-bands, with large spots of the same color on the caudal.

A fine specimen, 225 mm. long or 300 mm. with the caudal fin, was taken from a small river flowing into Suva Harbor, Viti Levu Island, Fiji. Ten specimens, 76 to 148 mm. in length, were collected in a stream flowing into Bushman Bay, Malekula Island, New Hebrides.

**Eviota afelei** Jordan and Seale.

*Eviota afelei* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 387, fig. 77—Pago Pago, Samoa.

Dorsal VI-I, 9 or 10; anal I, 8. There are 24 to 26 scales in a longitudinal series to the caudal base.

The color in life is green, with 9 blackish bars on the lower side of the body, 3 on the belly, 3 over the base of the anal, and 3 on the caudal peduncle, the 3 on the belly much wider and longer than the others. There is a blackish spot in the middle of the caudal peduncle. The color in alcohol is yellowish white, the scales margined with minute blackish brown specks, the bars on the lower side of the body as in life. There are 6 to 8 rounded dark brown spots on the sides of the head, some of which may be connected to form bands, especially from the eye to the angle of the mouth.

These tiny, greenish, dark-banded fishes dwell in the recesses of coral heads, and are found only by careful search after breaking open the coral masses.

Specimens were obtained at the following islands: 4 at Takaroa; 20 at Tahiti; 7 at Moorea; 3 at Suva, Viti Levu Island. They ranged in length from 7 to 15 mm.

**Eviota distigma** Jordan and Seale.

*Eviota distigma* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 389, fig. 79—Pago Pago, Samoa; Fowler and Silvester, Marine Papers Carnegie Mus., 1922, p. 125; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 395.

Dorsal VI-9; anal 9. There are 22 scales in a lateral series, plus 2 more on the caudal base. The depth is 4.3, the head 3.33 times in the length. The eye is 2.75 times in the head. The broad, blunt snout is short, less than the eye. The caudal is 3.5 times in the length.

The color in life is green, with blackish crossbars and 2 circular black dots on the pectoral base. In alcohol the color is yellowish white, with about 12 transverse bars on the back, 2 circular black dots on the pectoral base, 4 black spots or bars on the body under the anal and on the under side of the caudal peduncle, a black bar across the caudal base, a spot on the opercle, and 2 dusky bars radiating downward and backward from the eye.

Here described from a very small but typical specimen, only a little more than 10 mm. long, collected on the reef at Papeete, Tahiti; another specimen of the same size was taken on a reef near Suva, Viti Levu Island, Fiji.

**Eviota smaragdus** Jordan and Seale.

*Eviota smaragdus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 388, fig. 78—Pago Pago, Samoa.

Dorsal VI-I, 9; anal I, 8. There are 24 scales in a longitudinal series, plus 1 more on the caudal base. The depth is 5, the head 3.55, the rounded caudal 4 times in the length. The pectoral scarcely equals the head. The eye is very high up, 3.25 times in the head and twice the length of the snout. The least depth of the caudal peduncle is 2.25 times in the head.

The color in alcohol is yellowish with 2 circular dark brown dots on the nape, and a series of 5 blackish spots along the base of the anal and some smaller dusky spots along the dorsal base. These spots apparently represent crossbars present in life. The nuchal region is blackish. There are several faint dusky bands on the caudal, the anal is shaded with dusky, and the other fins are all colorless.

A specimen, 11 mm. long, was found in a coral head at Wala Island, New Hebrides.

**Eviota viridis** (Waite).

*Allogobius viridis* Waite, Rec. Austr. Mus., 5, 1904, p. 177, pl. 23, fig. 3—Lord Howe Island.

*Eviota viridis* Fowler and Ball, Bull. Bishop Mus., 26, 1925, p. 26; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 395.

*Eviota zonura* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 386, fig. 75; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 317.

Dorsal VI-I, 10; anal I, 8. There are 25 scales in a longitudinal series to the caudal base and 3 more on the latter, and 7 in a transverse series. The depth is 4, the head 3.4 times in the length. The eye is 3.2, the snout 5.7 times in the head. The pectoral equals the head, and the rounded caudal is a little shorter.

In life the color was green with several darker crossbars. In alcohol the color is yellowish white with a conspicuous black spot situated on the caudal base. There are 4 indistinct dusky crossbands on the posterior part of the body. The dorsal is brown, the anal black. The head and pectoral base are marked by irregular spots made up of many fine brown dots. The caudal is more or less darkened.

Three specimens, each about 15 mm. long, were taken on a reef near Suva, Viti Levu Island, Fiji.

**Valenciennesa muralis** (Quoy and Gaimard).

*Eleotris muralis* Quoy and Gaimard, MS., in Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 253, pl. 357—Tukopia (Tikopia, Santa Cruz Islands?).

Dorsal VI-I, 12; anal I, 12. There are 80 to 90 scales in a longitudinal and 25 to 30 in a transverse series. The body is elongate, fusiform, and subcylindrical, the caudal peduncle compressed, the depth 5 to 5.4 times, the head about 3.3 times in the length. The eye is 4.6 to 5.6 times in the head, 1.8 to 2 times in the snout. The second, third, and fourth dorsal spines are elongate, with thread-like tips. The dorsals are very close together, the last ray of the soft dorsal much the longest. The pectoral is as long as the head without the opercle. The caudal equals the head in length. The head, pectoral bases, and breast are naked. The rest of the body is covered with ctenoid scales, very small anteriorly, but becoming larger posteriorly.

The color in life is greenish rose above, becoming rosy pearl below. There are 3 or 4 longitudinal wavy red bands on each side of the head. On the side of the body are 2 or 3 longitudinal rose red bands, usually connected by vertical red bands. On the first dorsal are several narrow diagonal red bands, with a black blotch at the top between the third and fourth spines. The second dorsal has 2 red cross lines, and the caudal is red-spotted. There is a red line running along the base of the anal. The back of the mouth is lined with black. In alcohol the red usually disappears, and the general color becomes brownish to grayish brown. The lateral stripes are little or not at all evident and only traces of the fin markings remain.

Eight specimens, 19 to 47 mm. in length, were collected on a reef west of Ovalau Island, Fiji.

**Alepideleotris** Herre.

*Alepideleotris* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 413. Type, *Alepideleotris tigris* Herre.

Body entirely naked, compressed, head flattened. Dorsal VII-I, 11; anal I, 10. Teeth pointed, in bands; outer row enlarged, curved, fixed, some of inner rows depressible. No teeth on vomer or palatines. Tongue notched. Gill opening confined to base of pectoral. Branchiostegals 5.

**Alepideleotris tigris** Herre. Fig. 17.

*Alepideleotris tigris* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 413.

Dorsal VII-I, 11; anal I, 10; depth 4.88, head 3.5 times in length. Eye 3.9, snout 5.5, maxillary 2.75 times in head. Body compressed, head depressed, dorsal profile highest at origin of dorsal. Head large, flat above, breadth 1.7 times in length. Eyes large, very close together, margins touching. Snout blunt, with median hump, lower jaw projecting. Mouth large, terminal, maxillary extending to below posterior part of eye. Teeth of upper jaw in five rows; the outer row enlarged, curved, fixed, the others smaller, depressible. Teeth of lower jaw in 5 rows; the outer row of 6 strongly enlarged, curved, fixed teeth; the next 3 rows smaller, fixed; the inner row

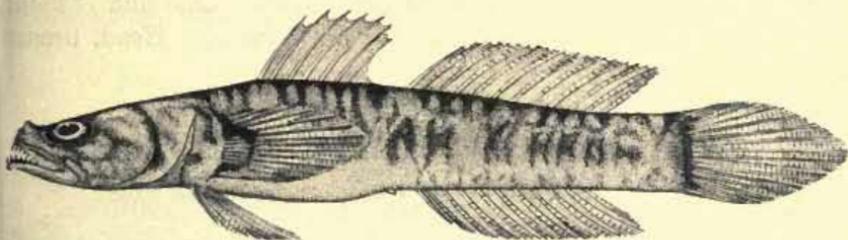


FIG. 17. *Alepideleotris tigris* Herre, type, South Seymour Island, Galapagos Islands.

of enlarged, widely spaced, depressible teeth. Dorsals well separated, longest spine 1.7 in depth. Second dorsal nearly uniform, higher than first, 1.5 in depth. Anal low, except next to last ray, which is as high as soft dorsal. Pectoral reaching end of first dorsal. Ventral origin a little in advance of pectorals, their length 0.88 of head, their pointed tips not nearly reaching anus. Anal papilla subglobose.

Color in alcohol brown, with 6 broad saddle-marks of dark brown, alternating with bands of lighter ground color; dark brown spots along the sides, each made up of 2 vertical bars; top of head with a broad transverse band of dark brown; sides of head mottled with pale and dark brown. Spots and flecks of the paler color appear in the darker brown so that the body and head have a brindled appearance. Belly and throat pale brownish. A dark brown bar at base of caudal and a dark brown spot on upper part of pectoral base. Fins all brownish.

One specimen from a tide pool, South Seymour Island, Galapagos.

## Family GOBIIDAE

**Macgregorella badia** Herre. Fig. 18.

*Macgregorella badia* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 415.

Dorsal VI-I, 10; anal I, 7; scales about 45, transverse series 18 to 20, predorsal about 20, small, obscure and difficult to make out. Head broad, depressed; body low, elongate, compressed; depth 6 to 6.3, head 3.4 to 3.7 in length; head 1.3 to 1.4 times as wide as deep. Eyes 3.3 to 3.4 in head, very close together, inner margins almost touching. Lips even, mouth small, oblique, maxillary not reaching vertical from front of eye. Scales large and ctenoid posteriorly, small to very small and cycloid forward. Head, breast

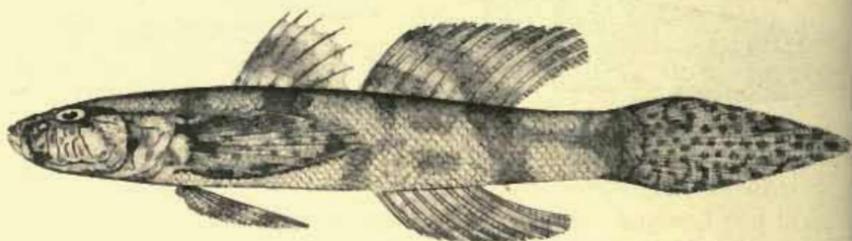


FIG. 18. *Macgregorella badia* Herre, Ovalau Island, Fiji Islands.

and pectoral base naked. First dorsal low, 1.8 in head, reaching second when depressed. Second dorsal highest posteriorly, about 1.5 times first. Caudal long and pointed, 2.25 to 2.4 in length, 1.5 times the head. Pectoral 1.3 times the head, less than 3 in length, pointed. Ventrals pointed, 4.1 to 4.2 in length.

Color in alcohol whitish, punctulated with minute brown dots and crossed by reddish brown bands, the first behind the eyes, the second between and behind the pectorals, the last at base of caudal, more or less connected on side by a faint median longitudinal band. Fins all crossbarred or mottled with alternate bands or rows of spots of black and white.

Two specimens collected on the reef, Ovalau Island, Fiji Islands.

**Macgregorella santa** Herre. Fig. 19.

*Macgregorella santa* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, pp. 8 and 14 (name only).

*Macgregorella santa* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 416.

Dorsal VI or VII-I, 10 or 9; anal I, 8; scales 45 + 3, transverse 14 to 16, predorsal 14 to 18. Depth 6.25 to 6.5, head 3.67 to 4, caudal 3 to 3.25, pectoral 4 to 4.25 in length. Caudal pointed. Eye 5.25 to 6, snout 3, interorbital 6 in head. Head somewhat flattened. Body low, compressed posteriorly. Eyes well separated. Snout blunt, broadly rounded. Mouth wide, oblique, chin prominent. Posterior end of maxillary concealed by fold of lips, reaching about halfway to vertical from front of eye. Scales cycloid, largest posteriorly, minute on breast and base of pectoral, head naked. First dorsal low, 1.55 to 1.65 in head, scarcely reaching second dorsal

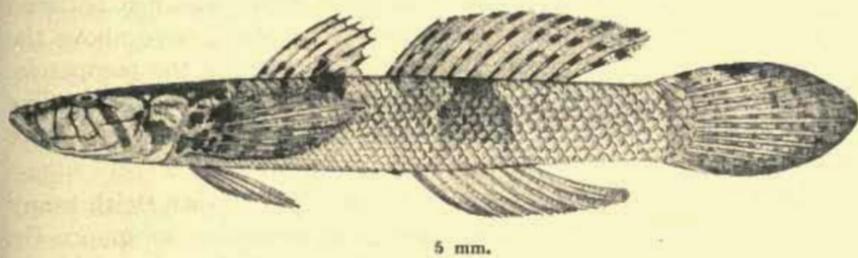


FIG. 19. *Macgregorella santa* Herre, New Hebrides and Solomon Islands.

when depressed. Second dorsal and anal highest posteriorly, 1.5 in head, reaching caudal when depressed.

Color in alcohol yellowish white with blackish brown, irregular blotches and bands forward. A crossband at second dorsal. Dorsals, caudal, and basal part of pectoral spotted. Ventrals more or less spotted. Anal whitish to dusky.

Twenty-seven specimens from the Solomon Islands and the New Hebrides.

### **Gobius ornatus** Rüppell.

*Gobius ornatus* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 135—Massaua, Red Sea; Günther, Fische der Südsee, 2, 1876-81, p. 172, pl. 111, fig. A; Day, Fishes India, 1878-88, p. 294, pl. 63, fig. 1; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 401, fig. 91; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 319; McCulloch and Ogilby, Rec. Austr. Mus., 13, 1919, p. 227, pl. 33, fig. 2; Herre, Gobies of Philippines, 1927, p. 108, pl. 7, fig. 4; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 403.

*Gobius interstinctus* Richardson, Voy. Erebus and Terror, Fishes, 1844-48, p. 3, pl. 5, figs. 3-6.

Dorsal VI-I, 10 or 11; anal I, 8 or 9. There are 26 to 28 scales in a median longitudinal, 9 in a transverse series, and 10 or 12 predorsal scales. The depth is 4.6, the head 3.4 to 3.6 times in the length. The eyes are very high up and close together, 4.2 to 4.4, the long, convex snout 3.1 times in the head. The interorbital is 2.5 times in the eye. The mouth is inferior, with thick fleshy lips fringed on the inner side. The maxillary extends beneath the anterior part of the eye or sometimes beneath the pupil. The teeth are in 4 rows in each jaw, all depressible, the outer row enlarged, the others all very small. The tongue is rounded at the tip. The entire body, including the breast and pectoral base, is covered with ctenoid scales which are slightly smaller forward, those on the nape still smaller, extending to the eyes and for a short distance between them. There are 2 interorbital pores, 3 on the groove above the opercle, and 3 large ones on the posterior margin of the preopercle. The rounded caudal is a little more or less than the head. The pectoral is always shorter than the head. The broad ventrals have a deep cup.

In alcohol the color is whitish to very pale brown, with many longitudinal rows of dusky spots and pearl white dots or spots. On the lower half of the body are 2 rows of large, dark brown or blackish spots, the lower ones often rounded, those of the upper row elongated or rectangular. All the other dark spots are small. The head is sprinkled with dusky spots. The anterior half of the first dorsal has a broad yellow or white upper margin, the fin diagonally marked by dark brown or black spots and lines, interspersed with pearly white spots. The second dorsal, anal, and caudal are barred by many rows of black or brown spots alternating with white spots.

Five specimens, 24 to 43 mm. long, were collected at Ovalau Island, and one, 27 mm. long, at Nukulau Island, Fiji. In the New Hebrides, 6 specimens, 30 to 43 mm. in length, were taken at Malo Island; 16 specimens, 12 to 31 mm., at Bushman Bay, Malekula Island; and 5 specimens, 31 to 43 mm. long, at Wala Island.

### **Bathygobius fuscus** (Rüppell).

*Gobius fuscus* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 137—Red Sea.

*Mapo fuscus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 484, fig. 212.

*Bathygobius fuscus* Jordan and Jordan, Mem. Carnegie Mus., 10, 1922, p. 78; Herre, Gobies of Philippines, 1927, p. 113, pl. 8, fig. 2.

Dorsal VI-I, 10; anal I, 8. There are 36 to 38 scales in a longitudinal and 12 in a transverse series. The depth of the wedge-shaped

body is 4.4 to 5 times, the large, broad head 3.3 to 3.4 times in the length. The broad, blunt snout equals or nearly equals the eye, which is 3.5 to 3.85 times in the head. The interorbital is half an eye's diameter or less in breadth. The broadly rounded caudal is a little shorter than the head. The upper rays of the pectoral are free and silky. The tongue is notched.

In life the color is very variable, largely depending upon the environment. The ground color may vary from grayish to very dark brownish or blackish, with irregular darker marblings and shadings. A dark or blackish spot is always present behind the eye. From 3 to 5 broad dark dorsal crossbands are usually present. The fins are spotted with brown. In alcohol the color varies from whitish or brownish gray to very dark brown, usually with 4 or 5 dark brown dorsal crossbands and 6 or 7 dark brown blotches along the side, the lateral spots united by a dark brown bar from the pectoral axil to the caudal base where it terminates in a large dusky spot. There is a large brown spot on the opercle and a small black spot behind the eye. The sides of the body are usually marked by 6 to 10 longitudinal rows of small white spots, one on each scale and most distinct on the lower half of the body. The first dorsal is dark brown or blackish with a white margin above. The second dorsal, caudal, and pectoral are more or less crossbarred by rows of brown spots. There are 2 brown bars on the pectoral base. The anal and ventrals are dusky.

Specimens were obtained in the Galapagos Islands as follows: Narborough Island, 5 specimens, 41 to 91 mm. long; South Seymour Island, 8 specimens, 31 to 59 mm. long. In the Marquesas Islands 7 were collected at Atuona, Hiva Oa Island, 30 to 65 mm. long, and at Nuka Hiva Island 33 were taken, 25 to 76 mm. in length. In the Tuamotu Archipelago 45 specimens were taken at Makatea, 25 to 74 mm. in length. Eight atypical specimens, 15 to 32 mm. long, were secured at Ovalau Island, Fiji. In the New Hebrides the following were obtained: 22, from 11 to 41 mm. long, at Bushman Bay, Malekula Island; 18, from 19 to 39 mm. long, at Wala Island; 2 specimens at Hog Harbor, Espiritu Santo Island, 22 and 29 mm. in length. Some of the specimens from Wala were remarkably pale. A specimen, 37 mm. long, was caught in a fresh-water creek on Kulambangra Island, Solomon Islands.

### ***Chlamydes cotticeps* (Steindachner).**

*Gobius cotticeps* Steindachner, Sitzungsber. Akad. Wiss. Wien, 80, 1879 (1880), p. 137, pl. 1, figs. 2, 2a—Society Islands.

Dorsal VI, 9; anal I, 7. There are 37 or 38 scales in a longitudinal, 16 or 17 in a transverse series, 24 or 25 before the first dorsal. The head is very broad, its width equal or nearly equal to its length.

The color is very dark brown, with 4, 5, or 6 transverse gray bands. The upper half of the first dorsal is clear, the basal half dusky, with a large black spot between the fifth and sixth spines. The other fins are all black, except the ventrals, which are white.

This fish, hitherto known only from Steindachner's specimens from Tahiti, seems distinct from *Chlamydes laticeps* Jenkins, of the Hawaiian Islands, which Fowler has attempted to unite with it.

Seven examples were obtained from a tide pool at Atuona, Hiva Oa Island, Marquesas; they vary in length from 40 to 55 mm.

**Gnatholepis corlettei** Herre. Fig. 20.

*Gnatholepis corlettei* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 14 (name only).

*Gnatholepis corlettei* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 418.

Dorsal VI-I, 11; anal I, 9; scales 26 + 2, transverse series 10, predorsal 11. Depth 4, head 3.4, caudal 3.4, pectoral 4 in length.

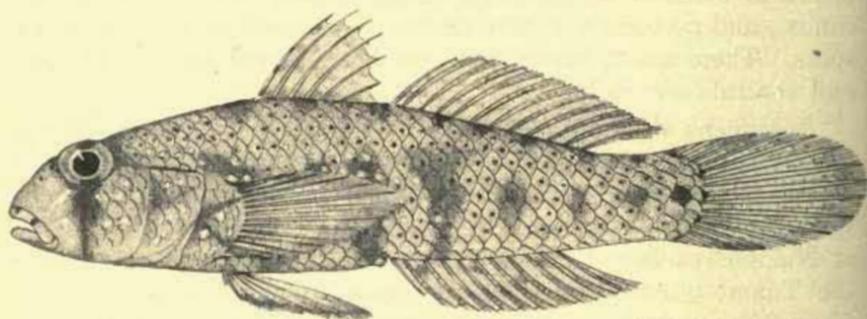


FIG. 20. *Gnatholepis corlettei* Herre, Bushman Bay, Malekula Island, New Hebrides.

Eye 3.2, snout 3.3 in head. Body compressed, heavy forward, dorsal profile arched, highest at origin of spinous dorsal. Snout arched, mouth small, maxillary barely reaching front of eye. Teeth minute, no canines. Scales ctenoid, loosely attached, 3 rows on preopercle.

Color in alcohol yellowish gray with dusky spots or crossbars on lower part of side. A vertical dark bar downward from eye. Black dots on most of the scales of upper side. Small pearly or bluish white spots on sides of head and lower part of body.

Twelve specimens collected at Bushman Bay, Malekula Island, New Hebrides.

**Gnatholepis deltooides** (Seale).

*Gobius deltooides* Seale, Occ. Papers Bishop Mus., 1, 1901, p. 125—Guam; Jordan and Seale, Proc. U. S. Nat. Mus., 28, 1905, p. 796; Herre, Gobies of the Philippines, 1927, p. 133.

Dorsal VI-I, 11; anal I, 11. There are 28 scales in a longitudinal and 10 in a transverse series, and 10 or 12 predorsal scales. The largest specimens, 46 mm. long, have the depth 4.8, the head 3.55 times in the length. The eye is 3.25, the snout about 2.9 times in the head. The eyes are very high up and close together, projecting above the dorsal profile. The interorbital is one-fifth an eye's diameter. The mouth is oblique, terminal, the jaws equal, the maxillary extending to a point beneath or just behind the anterior margin of the eye. The soft dorsal and anal are angulate posteriorly, the elongate posterior rays reaching the caudal when depressed. The least depth of the caudal peduncle is 1.3 times in the head. The rounded caudal and pectoral equal the head.

The color in alcohol is pale brown to whitish, with 6 or 7 brown crossbars over the back, alternating with brown blotches along the sides. A brownish black line begins below the eye and extends vertically downward to a large brown spot on the cheek. From this spot one line passes downward under the head, while another goes obliquely forward and downward, the two thus making the Greek letter  $\Delta$ . There is a dark brown diagonal line across the opercle and a similar line runs lengthwise of the pectoral base. There is a short black bar on the upper part of the eye. There are 3 cross rows of dark brown spots on the first dorsal and spots and streaks of brown on the second dorsal. The caudal and pectorals are crossbarred by many rows of dark spots. The anal and ventrals are dusky bluish or black.

This easily recognized species is abundant in the shallow waters of the coral reefs of Fiji. We collected 130 specimens, 15 to 46 mm. long, from Nukulau Island, and 4 from a reef near Suva, Viti Levu Island, Fiji.

**Gnatholepis gemmeus** Herre.

*Gnatholepis gemmeus* Herre, Gobies of the Philippines, 1927, p. 135, pl. 9, fig. 3.

Dorsal VI-I, 11 or 12; anal I, 11. There are 25 to 27 scales in a longitudinal, 10 in a transverse series, and 10 before the first dorsal. The depth is 4 to 4.6, the head 3.5 to 3.7, the caudal 3 to

3.75 times in the length. The eye and snout are approximately equal, 3 to 3.4 times, the least depth of the caudal peduncle 2.3 to 2.4 times in the head. The pectoral and ventral are both equal to the head. The large ctenoid scales extend to the eyes, with 4 rows on the preopercle and 3 on the opercle.

The color in alcohol is very pale yellowish, with 6 broad dusky crossbands, each scale on the upper half of the body with a black dot. On the sides of the head and body are numerous, pearly white spots. A blackish brown band extends vertically from the interorbital across the eye to the throat. A faint brown line extends longitudinally across the opercle and pectoral base. The first dorsal is crossbarred with brown and white spots, with a circular blackish brown spot on the basal part of the fourth spine and one near the base of the sixth spine. The second dorsal has 3 rows of small, dusky spots. The anal is marked by 2 rows of conspicuous circular blackish spots alternating with circular white spots. The caudal is crossbarred by several rows of dusky dots. The pectoral has a few spots and the ventral is gray, margined with blackish.

Three specimens, 25 to 30 mm. in length, were obtained at Bushman Bay, Malekula Island, New Hebrides.

This species has hitherto been known only from material collected in the Philippine Islands.

### **Gnatholepis puntangoides (Bleeker).**

*Gobius puntang* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 692, not of 2, 1851, p. 486; Day, Fishes India, 1878, p. 288, pl. 62, fig. 1.

*Gobius puntangoides* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 242; Günther, Fische der Südsee, 2, 1873-75, p. 171, pl. 108, fig. A.

*Exyrias puntangoides* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1906, p. 405.

*Gnatholepis puntangoides* Herre, Gobies of Philippines, 1927, p. 127, pl. 9, fig. 1.

Dorsal VI-I, 10; anal I, 9. There are 28 or 29 scales in a lateral series and 9 or 10 in a transverse series; predorsal scales 10 or 11. The depth of the robust, oblong body is 3.6 to 4.3, the head 3.2 to 3.75 times in the length. The eye is 3.8 to 4.5, the snout 2.7 to 3, the least depth of the caudal peduncle 1.7 to 2 times in the head. The pointed caudal is 1.5 times the head. The opercles and preopercles are covered with large scales, those on the preopercle divided by 2 longitudinal grooves into 3 conspicuous groups.

In life this is a very handsome goby, each scale along the side being marked by a blue dot. In alcohol the color varies from gray

to blackish brown, the belly paler to yellow, each lateral scale with a central, pale or white spot, these spots forming longitudinal rows. Two or 3 rows of black spots are usually present on the sides below the dorsals. The dorsals, caudal, and pectorals are cross-barred by dark spots. Occasionally specimens have 4 to 8 cross lines of black on the lower half of the body.

Two specimens, 60 and 69 mm. long, were taken from a fresh-water stream on Kulambangra Island, Solomon Islands. Each has 6 black lines crossing the body, very prominent on the belly. These specimens were golden yellow on the lower half in life, and are now much yellower than most specimens. They resemble closely speci-

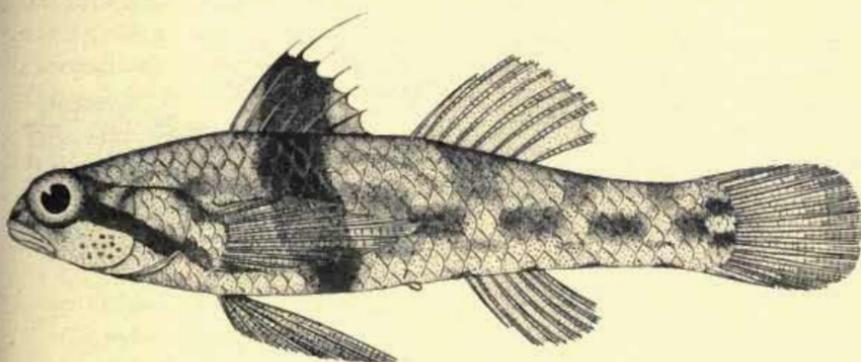


FIG. 21. *Vaimosa balteata* Herre, type, Majalibit Inlet, Waigi Island.

mens obtained by me in Albay Province, Luzon, in the Philippines. Another specimen, 70 mm. long, from Hathorn Sound, New Georgia Island, Solomon Islands, is of the ordinary type.

*Vaimosa osgoodi* Herre. Fig. 22.

*Vaimosa osgoodi* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 420.

Dorsal VI-I, 7; anal I, 5; scales 26, transverse series 9, predorsal 6, on opercle 7. Depth 3.1 to 3.2; head 2.8 to 3; first spine of first dorsal 2.15; next to last ray of second dorsal 3.1; caudal 2.5; ventrals of male 4.2 in length. Eye 2.5 to 2.6, depth of caudal peduncle 2.15 in head. Body short, thickset. Width of head 0.9 of its depth. Back convex, ventral profile nearly horizontal. Eye projects above dorsal profile. Short, steep snout is half as long as eye. Mouth terminal, lips even. Maxillary reaches nearly to posterior angle of

preopercle in males, to center of eye in females. Caudal broadly rounded. Middle and lower rays of pectoral longest. Ventrals reach to anal in male, to vent in female.

Color in alcohol brownish gray, with many black spots and bars. Scales outlined by dusky lines and dots. Three transverse rows of black spots on second dorsal and 4 on caudal. Anal and ventrals dusky, pectoral colorless.

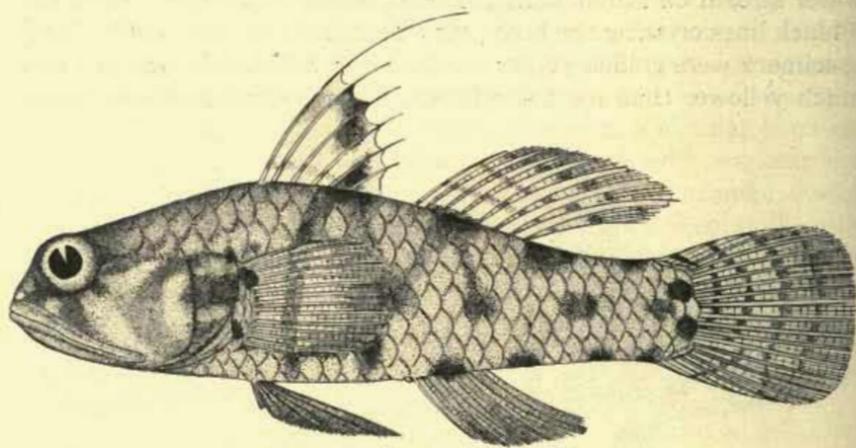


FIG. 22. *Vaimosa osgoodi* Herre, type (male) Suva Harbor, Viti Levu Island, Fiji Islands.

Two specimens collected in a small river flowing into Suva Harbor, Viti Levu Island, Fiji Islands; and 33 at Waigiui Island.

#### *Glossogobius biocellatus* (Cuvier and Valenciennes).

*Gobius biocellatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 55—Pondicherry; Day, Fishes India, 1878-88, p. 289, pl. 63, fig. 8; Weber, Siboga Exp., Fische, 1913, p. 470.

*Glossogobius biocellatus* Herre, Gobies of the Philippines, 1927, p. 156, pl. 12, fig. 3.

*Glossogobius vaisiganus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 403, fig. 93.

Dorsal VI-I, 9; anal I, 8; 28 to 30 scales in a longitudinal, 9 in a transverse series, and 14 to 17 predorsal scales. The depth is 5.2 to 6 times, the head 3 to 3.3 times in the length. The eyes are dorsolateral, close together, and from the upper margin of the iris of each eye a circular extension projects into the pupil as shown in the figures given by Weber and myself. The eye is 4.4 to 5 times in the head and 1.2 to 1.5 times in the sharp-pointed snout. The

distance from the tip of the snout to the posterior margin of the eye is less than the postorbital part of the head or very rarely may be equal to it. The lower jaw projects strongly and the mouth is large, the maxillary extending to a point below the hind margin of the eye.

The color of alcoholic specimens varies from yellowish brown to dark gray or even blackish, with 5 broad, dark brown crossbars over the back and down the sides. The pupil of the eye is white, with a black circular extension from the iris into the pupil on its upper side. The first dorsal is dark brown with a black elongate spot between the first and second spines on its upper part. Between the fifth and sixth spines is a circular black spot with a broad white band (red in life) before and above it. Just below the first spot is a broad white bar and usually 1 or 2 other white bars basally. The other fins are more or less blackish brown, with cross rows of alternate pale and dark spots.

Two specimens, 19 and 37 mm. in length, were caught in a small river flowing into Suva Harbor, Viti Levu Island, Fiji.

**Glossogobius celebius** (Cuvier and Valenciennes).

*Gobius celebius* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 74—Celebes; Weber, Siboga Exp., Fische, 1913, p. 468, fig. 94.

*Glossogobius celebius* Herre, Gobies of Philippines, 1927, p. 158, pl. 12, fig. 4.

Dorsal VI-I, 8 or 9; anal I, 7 or 8. There are 28 to 30 scales in a longitudinal, 9 or 10 in a transverse series, and 14 to 17 predorsal scales. The depth is 5.2 to 5.6 times, the head 2.7 to 3 times in the length. The eye is 5.2 to 5.5, the snout 2 to 2.9 times in the head. The distance from the tip of the snout to the rear margin of the eye is greater than the postorbital length of the head. The cheeks have about 5 parallel lines of papillae, which may also be more or less well developed elsewhere on the sides and under parts of the head.

The color in alcohol is yellowish brown with a row of large dusky spots on the sides, the one at the caudal base plainest, and with short, irregular, dusky crossbars over the back. A dark brown bar runs from the eye downward and forward. The first dorsal has a black spot on the last dorsal spine. The upper part and anterior region of the second dorsal are golden yellow. The caudal and second dorsal are crossbarred with blackish spots. The other fins are more or less dusky.

Four specimens, 26 to 44 mm. long, were seined from the Rewa River, and one, 58 mm. long, from a river flowing into Suva Harbor, Viti Levu Island, Fiji.

**Callogobius ocellatus** Herre. Fig. 23.

*Callogobius ocellatus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, p. 422.

Dorsal VI-I, 10; anal I, 9; scales about 63, transverse series 20 to 22, predorsal about 24. Depth 3.9; head 3; second dorsal spine 5.7 in length. Eye 4; second dorsal spine 1.85; longest rays of dorsal and anal 1.6; depth of caudal peduncle 2.7; caudal 1.2; pectoral 1.2; ventral 1.67 in head. Body much compressed. Head large, breadth equal to depth. Eyes very high up, prominent, their margins touching. Snout equals eye. Dorsal profile convex. Snout blunt, steep, broad. Mouth nearly horizontal. Maxillary reaches posterior margin of eye. Teeth in 3 rows in each jaw, a pair of small canines in

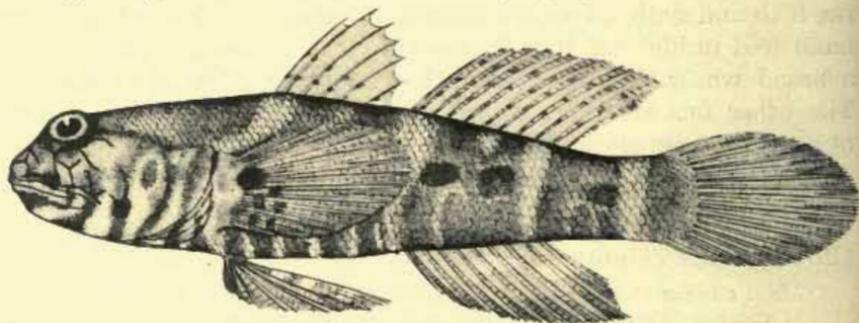


FIG. 23. *Callogobius ocellatus* Herre, type, Ovalau Island, Fiji Islands.

front, above. Ventral reaches origin of anal. Scales ctenoid behind pectoral, cycloid forward, very small forward, enlarged to the rear. Head naked. Rows of minute papillae on cheeks and snout.

Color in alcohol brown, with 4 white crossbands. Dark brown ocelli on middle of side between the white bands. Lower parts crossbarred with brown and white. Caudal grayish, other fins brown or dusky with white spots or bars.

One specimen collected at Ovalau Island, Fiji Islands.

**Callogobius sclateri** (Steindachner).

*Eleotris sclateri* Steindachner, Sitzungsber. Akad. Wiss. Wien, 80, 1879 (1880), p. 157—Society Islands.

*Gobiomorphus sclateri* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 384, fig. 73—Apia, Samoa.

*Callogobius sclateri* McCulloch and Ogilby, Rec. Austr. Mus., 13, 1919, p. 219, pl. 32, fig. 3—New Hebrides, Solomons, Fiji; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 408.

Dorsal VI-I, 10; anal I, 8. There are 31 scales in a longitudinal and 13 in a transverse series. The color is somewhat variable, with broad brown crossbands and spots, or blackish brown splotches and bars. Often there are black spots on the head and in the pectoral axil, and a black bar across the caudal peduncle. The short, heavy body, low fins, naked head, and rows of papillae on the cheeks and other parts of the head form a very characteristic combination.

This stout, heavy-bodied little fish is probably a true goby, though it is much more like an eleotrid, as originally described. The ventral fins may be separate and entirely distinct from each other, with no connection between them. More often there is a thin filmy membrane joining the inner rays of the two ventrals, but apparently there is never a well-developed frenum to form a true goby-like fin with sucking disk. Sometimes the two ventrals are united basally. Only an examination of the skeleton can settle the question as to whether this is a true goby or an eleotrid.

This species is abundant in the coral reef tide pools of Fiji. There were 28 specimens, 28 to 40 mm. long, collected on the reefs near Suva, Viti Levu Island, and 12 from a reef at Ovalau Island, 20 to 37 mm. in length. In the New Hebrides 7 specimens, 35 to 39 mm. in length, were taken at Bushman Bay, Malekula Island; 2 specimens, each 37 mm. long, at Wala Island; and one, 30 mm. long, at Malo Island.

#### **Paragobiodon echinocephalus** (Rüppell).

*Gobius echinocephalus* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 136, pl. 34, fig. 3; Günther, Fische der Südsee, 2, 1876, p. 175, pl. 108, fig. D.

*Paragobiodon echinocephalus* Bleeker, Ned. Tijds. Dierk., 4, 1873, p. 129; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 397; Herre, Gobies of Philippines, 1927, p. 172, pl. 13, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 399, in part.

*Ruppellia echinocephalus* Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 318.

Dorsal VI-I, 9; anal I, 9; pectoral rays 21; 23 or 24 scales in a longitudinal series. The depth is 3 to 4 times in the length. The deep, broad, nearly spherical head is as deep or nearly as deep as long, 3.3 to 4.8 times in the length. The eye is 3 to 3.5 times in the head. The small mouth is curved downward strongly. The jaws are equal, with heavy and often projecting chin. The entire head is naked back to the first dorsal, more or less covered with soft short prickles or papillae which may become hair-like; these papillae may be scattered thinly or may form a beard-like mat, especially on the

under side of the head. The rounded caudal equals the head without the snout. The broad pectoral equals or exceeds the caudal.

The color in life varies greatly. I have examined specimens that were black all over except the brownish red head. From this they go through brownish black, dark brown, brownish yellow, to clear yellow. The fins may be black, or may be paler than the body.

This tiny and extraordinary goby ranges from the Red Sea and Madagascar eastward to the Tuamotu Archipelago, dwelling in the crevices of coral heads and under stones along shore. At Takaroa, 17 specimens, 7.5 to 23 mm. in length, were collected, and 4, 14 to 18 mm. long, at Tahiti. At Vila, Efaté Island, New Hebrides,

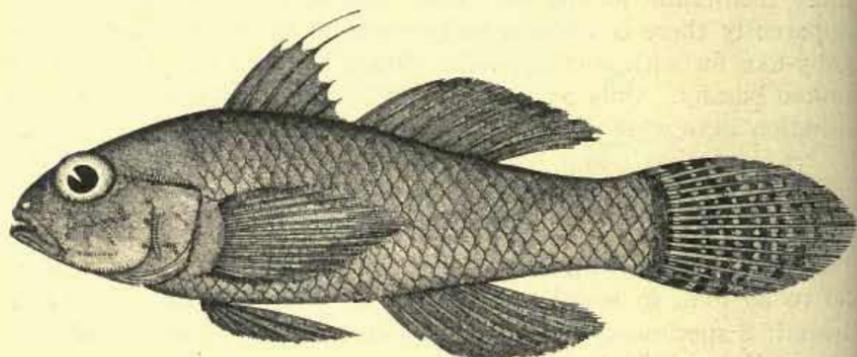


FIG. 24. *Ctenogobius aterrimus* Herre, type, Kulambangra Island, Solomon Islands.

4 specimens, 15 to 25 mm., were obtained, one, 21 mm. long, at Malo Island, and 2, 19 and 21 mm. long, at Wala Island of the same group.

***Ctenogobius aterrimus* Herre. Fig. 24.**

*Rhinogobius aterrimus* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 9 (name only).

*Ctenogobius aterrimus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 423.

Dorsal VI-I, 8; anal I, 7; scales 28, transverse series 12. Depth 3.5, head 3.2, caudal 3.1, pectoral 3.3 in length. Eye 3.5, snout 4.4, depth of caudal peduncle 2.2 in head. Anterior dorsal profile convex, snout very steep. Eyes very close together, inner margins nearly touching, projecting above top of head. Mouth oblique, chin projecting. Maxillary reaches front of eye. Head naked.

Second dorsal spine longest, with filiform tip. Rays of dorsal and anal do not reach caudal when depressed. Posterior anal ray longest.

Color in alcohol black, caudal crossbarred with paler spots.

One specimen collected in a fresh-water stream on Kulambangra Island, Solomon Islands.

**Ctenogobius baliuroides** (Bleeker).

*Gobius baliuroides* Bleeker, Verh. Bat. Gen., 22, 1849, p. 26—Sumanap, Madura.

*Rhinogobius baliuroides* Jordan and Richardson, Bull. Bur. Fish., 27, 1908, p. 276; Herre, Gobies of the Philippines, 1927, p. 188.

Dorsal VI-I, 8; anal I, 8. There are 27 scales in a longitudinal, 7 or 8 in a transverse series. The depth is 5.2 to 5.6, the head 3.7 to 3.9, the caudal 4 times in the length. The snout equals the eye, 3.5 to 3.75, the least depth of the caudal peduncle 2.5 times in the head. The eyes are very close together. The mouth is oblique, the maxillary extending beneath the anterior margin of the eye, the lower jaw projecting. In the lower jaw are 4 rows of minute teeth with a short outer row of larger teeth, ending laterally in a stout, backward-curved canine. The body is covered with ctenoid scales, the head naked, the nape largely naked, with 3 to 5 rows of tiny scales before the first dorsal.

The color in alcohol is brownish yellow to whitish, with 5 or 6 dark brown blotches along the middle of the side, the last on the caudal base. There are 5 broad crossbars over the back. A dark brown bar extends from the eye to the upper lip and continues on the under side of the lower jaw to meet its fellow from the other side. The dorsals and caudal are crossbarred by rows of blackish brown spots. The pectoral has a circular brown spot on its base and may be marked by cross rows of small spots. The anal is colorless or with a dusky margin.

Two specimens, 21 and 26 mm. in length, were collected at Hog Harbor, Espiritu Santo Island, New Hebrides.

**Ctenogobius decoratus** (Herre).

*Rhinogobius decoratus* Herre, Gobies of the Philippines, 1927, p. 181, pl. 13, fig. 3—Cabalian, Leyte.

Dorsal VI-I, 8; anal I, 8; scales in longitudinal series 26 to 28, in transverse series 8 or 9, and 6 or 8 before the first dorsal. The body is elongate, slender, subcylindrical anteriorly, but the posterior half or more is compressed. The depth is 5 to 5.5 times, the head 3.67 to 3.75 times in the length. The eyes are very high

up, dorsolateral in position, equal to the rounded protuberant snout, 3.5 to 4 times in the head. The round-pointed caudal is equal to or slightly exceeds the head. The pectoral is also round-pointed, extends back to a point above the anal origin, and equals the caudal. The ventrals are 0.9 of the head in length. The first dorsal is low, the second and third spines twice in the head. The second dorsal and anal are short, the last ray is highest, 1.6 to 1.8 times in the head.

The color in alcohol is pale whitish yellow, with 6 longitudinal brown lines extending from the head back to the tail, the bottom line broken into spots posteriorly. Along the middle of the side is a row of 5 large black spots, the last one on the base of the caudal. Running back from the shoulder is a row of conspicuous circular black dots which end on top of the caudal peduncle. Above this is another row of smaller circular black spots extending from the eye to beneath the second dorsal. Between all these lines and spots the ground color of the body shows up as large and usually circular pale or whitish spots arranged in 6 longitudinal rows. The sides of the head and snout are mottled with dusky and with circular, pale spots. The first dorsal has a black ocellus between the first and second spines, with 1 or 2 black spots on the fifth spine. The second dorsal has 3, the caudal 6 crossbars of dark brown spots. The anal has a basal row of diagonal black lines. On the base of the pectoral are 2 dark brown longitudinal lines.

This very handsome little goby has been known previously from only 3 Philippine specimens. From a coral reef near Suva, Viti Levu Island, Fiji, were collected 25 specimens, 23 to 33 mm. in length. The largest of these is an exact duplicate of the one figured in my original account. There were also obtained 8 specimens, 27 to 38 mm. in length, from a reef behind Ovalau Island, Fiji.

**Ctenogobius filamentosus** (Sauvage).

*Gobius filamentosus* Sauvage, Bull. Soc. Philomat., 7th ser., 7, 1882, p. 157—New Caledonia.

*Drombus filamentosus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 411, no specimen (after Sauvage).

Dorsal VI-I, 8; anal I, 8. There are 30 scales in a longitudinal series, plus 1 on the caudal base, and 11 in a transverse series. Sauvage gives the soft dorsal with 10, the anal with 9, evidently counting the last divided ray as 2. The depth is 3.9, the head 3, the caudal 2.8, the pectoral 3.4 times in the length. The eye is 3.4, the snout 3.4, the maxillary 2.6, the least depth of the caudal

peduncle 2.6 times in the head. The body is compressed, the snout blunt and convex, the mouth oblique, the maxillary extending beneath the anterior third of the eye. The teeth are very small, slender, in 5 rows above and below, arranged in a broad band, without canines. The tongue is a little notched. The tips of the dorsal spines are all filamentous, those of the first 3 spines greatly elongated, extending to the middle of the second dorsal base, 3 times in the total length. The dorsal and anal rays are longest posteriorly, the anal a little the highest, the longest anal ray 1.6, the longest dorsal ray 1.85 times in the head. The ventral frenum is well developed, forming a large cup at the base of the fin, the ventral margins fringed, the fin extending beyond the anus, 3.55 times in the length. The head is entirely naked, with many lines of minute papillae and pores upon the margins and surface of the opercle, preopercle, and snout. They are continued beneath the head, where they pass into very short but distinct filaments over the throat and under side of the head. The eyes are very close together, the interorbital space but a hair's breadth. The caudal is a little longer than the head, pointed, but with the tip somewhat rounded.

The color in alcohol is dark brown with 6 obscure, blackish brown, broad crossbands and another short one on the nape. The sides of the head are dark brown with a large blackish spot beneath the eye and another above the angle of the opercle. The top of the head is clouded with small dusky spots. The base of the pectoral is covered by a large blue black blotch, the fin dusky, the lower outer half yellowish. The spinous dorsal is black, the second dorsal and anal are mottled with dark brown spots. The caudal is dusky, crossbanded by numerous rows of black spots. The ventral is dusky greenish yellow.

Described from a specimen, 39 mm. long, obtained from a fresh-water stream at Auki, Malaita Island, Solomon Islands.

**Ctenogobius malekulae** Herre. Fig. 25.

*Rhinogobius malekulae* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 14 (name only).

*Ctenogobius malekulae* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 423.

Dorsal VI-I, 9; anal I, 8; scales 36+1, transverse series 14. Depth 6.65 to 6.85, head 3.4 to 3.5, pectoral 4.6, ventral 5 in length. Eye 6.5, interorbital 5.2 to 5.4, snout 3.6 to 3.75, depth of caudal peduncle 2.6 to 2.95 in head. Body elongate, little elevated, posterior part compressed. Head flattened, breadth 1.5 in its length.

Eyes small and rather far apart. Interorbital flat. Snout wide and blunt. Pectoral and ventral pointed. Scales cycloid, largest posteriorly. Head, nape, breast, and pectoral base naked. Mouth large, lower jaw projecting. Maxillary extends to below eye. Teeth in 4 rows, the outer large and widely spaced, the innermost row close-set. Tongue rounded. Posterior nostril in a tube before middle of eye.

Color in alcohol pale yellowish with a broad brown stripe along side, ending in a large spot of deep brown on caudal base. Top of head and cheeks darker.

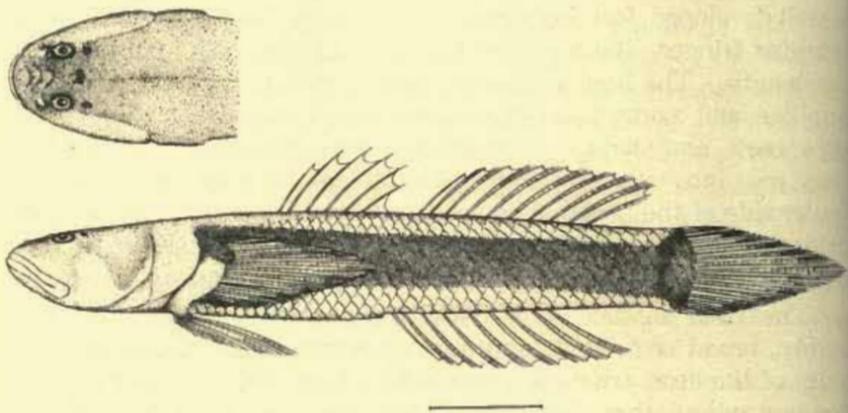


FIG. 25. *Ctenogobius malekulae* Herre, Bushman Bay, New Hebrides; showing dorsal surface of head.

Two specimens collected at Bushman Bay, Malekula Island, New Hebrides.

***Ctenogobius suluensis* (Herre).**

*Rhinogobius suluensis* Herre, Gobies of Philippines, 1927, p. 193, pl. 14, fig. 3  
—Bungau, Sulu Province.

This species is closely akin to *C. criniger*, but may be distinguished at once by the oblique bar on the opercle, silvery blackish, and inclined downward and forward, and by the 4 rectangular brown spots on the sides, enclosed between 2 longitudinal brown lines from beneath the pectoral to the caudal base, and a fifth spot on the caudal base. The tips of the first 3 dorsal spines are elongated and thread-like.

A single specimen of this rare little goby, 22 mm. long, was collected at Hathorn Sound, New Georgia Island, Solomon Islands. It is known elsewhere only from the 6 specimens collected at Bungau, one of the small islands of the Sulu Archipelago.

**Ctenogobius neophytus** (Günther).

*Gobius neophytus* Günther, Fische der Südsee, 2, 1876-81, p. 174, pl. 108, fig. E—Ponape, Huahine, Apia, Tahiti.

*Rhinogobius neophytus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 400, pl. 37, fig. 2; Herre, Gobies of Philippines, 1927, p. 195, pl. 14, fig. 4; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 411.

Dorsal VI-I, 9; anal I, 8. There are 23 or 24 scales in a longitudinal, 7 in a transverse series. There are no predorsal scales. The depth of the slender body is 4.85 times, the elongate head 3.2 times in the length. The large protuberant eyes are very high up, extending above the dorsal profile, 3 times in the head, the interorbital space linear. The long, pointed snout and broad lip are very characteristic and equal the eye in length. The mouth is oblique, the lower jaw projecting, the maxillary extending beneath or nearly beneath the front margin of the eye. Each jaw has a band of 4 rows of very small, pointed teeth, those of the outer row largest, without canines. The head is entirely naked. The rest of the body, including the breast and pectoral base but excluding the predorsal region, is covered with large, easily detached, ctenoid scales. The first dorsal spine is highest, equal to the depth. The rounded caudal is slightly shorter than the head and equals the pectoral. The ventrals equal the head and extend to the anal.

In life this fish is translucent, nearly transparent, with dark orange spots, a median longitudinal row of large, black spots, 2 blackish spots on the back at the base of each dorsal, and a black spot at the upper tip of the first dorsal. In alcohol the color is whitish, with brown spots over the head and body in more or less definite rows, with a median, longitudinal row of larger spots, with a conspicuous one at the base of the caudal fin and a dusky, transverse one on the side of the caudal peduncle. There is a black spot at the top of the first dorsal between the first and second spines. There is a brown stripe from the eye to the tip of the snout. On the pectoral base are 2 large brown spots and 2 more on the basal part of the pectoral fin. The dorsals and caudal are barred by rows of small dusky spots.

On a reef near Suva, Viti Levu Island, Fiji, 3 specimens, 18 to 31 mm. long, were collected; at Ovalau Island, Fiji, 6 specimens, from 24 to 44 mm. in length.

**Ctenogobius scapulopunctatus** (Beaufort).

*Gobius (Rhinogobius) scapulopunctatus* Beaufort, Zool. Anz., 39, 1912, p. 137—Saonek, Waigiü; Bijdr. Dierk., Amsterdam, 19, 1913, p. 140, fig. 5.

Dorsal VI-I, 8; anal I, 7; scales in median, longitudinal series 28. Depth 4.5 to 4.8, the head 3.6 times in the length. The large eyes are dorsolateral, their inner margins almost touching and projecting slightly above the profile, about 2.7 times in the head. The short, steeply convex snout is 3.7 to 3.8 times in the head. Both caudal and pectoral equal the head in length. Large, conspicuous pores are located on the head as follows: 1 between the eyes, 1 behind each eye, 3 on the supraopercular groove, and 2 on the hind margin of the preoperculum.

The color in alcohol is whitish with 4 or 5 broad, dark brown, dorsal crossbands, the first over the nape, the second under the first dorsal, the third and fourth under the second dorsal, and the fifth over the caudal peduncle. On the sides they merge more or less with a longitudinal row of dark brown blotches. There is a dark brown patch on the cheek below the eye, extending upon the opercle. There are 3 or 4 black dots above the pectoral origin, and 2 larger dark spots on the pectoral base. There is a black spot on the caudal base, or 1 on the upper part and 1 at the middle of the caudal base. The first dorsal has 2 transverse, black bands, or a large black spot basally and a row of black spots above. The second dorsal has 3 longitudinal rows, the caudal 4 to 6 transverse rows of black spots. The anal is dusky to colorless. The pectorals and ventrals are more or less dusky or brown spotted.

Here described from 20 specimens, 15 to 23 mm. in length, from the coral reef at Nukulau Island, Fiji. This little fish varies considerably, some specimens being notably thickset and plump. The depth of one specimen, 15.5 mm. long, was 3.9 times in its length. This species is easily recognized by the dots over the pectoral base and the conspicuous pores on its preopercular margin. Previously known only from 3 specimens, from 20 to 24 mm. long, from Saonek, Dutch New Guinea.

**Zonogobius semidoliatus** (Cuvier and Valenciennes).

*Gobius semidoliatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 67—Vanikolo; Günther, Fische der Südsee, 2, 1876-81, p. 174, pl. 109, fig. 41; Day, Fishes India, 1878-88, p. 295, pl. 59, fig. 6.

*Zonogobius semidoliatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 397, fig. 86; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 319; Herre, Gobies of Philippines, 1927, p. 200, pl. 30, fig. 2; Fowler, Fishes of Oceania, Mem. Bishop Mus., 10, 1928, p. 414.

Dorsal VI-I, 8 or 9; anal I, 7 or 8. There are 27 scales in a longitudinal and 9 or 10 in a transverse series. This little fish is very

thick and heavy anteriorly, the head as wide as deep, its length equal to the greatest depth of the body and 2.7 to 3 times in the total length. The eyes are high up, dorsolateral, 3 or 2.9, the snout 3.5 to 4 times in the head. The body is covered with ctenoid scales, the head, nape, breast, and pectoral base naked. The large mouth is very oblique, with strongly projecting lower jaw, the posterior maxillary angle beneath the anterior margin of the pupil.

In life the color may be dark wine red, olive or greenish, with whitish, orange or pearly dark-margined crossbands on the anterior half. The fins are paler than the body, all but the ventrals usually crossbarred with many rows of reddish or darker spots. In alcohol the color is brown or dark olive, the crossbands as in life but faded and whitish. The dorsals and anal are dusky, the other fins pale.

Large specimens present a very different appearance from the small ones ordinarily seen. This is a very handsome, boldly marked and easily recognized little goby.

Three specimens, 17 to 21 mm. in length, were collected at Tahiti. This species was found to be very abundant in the tide pools of the reefs encircling the Fiji islands. Six specimens were secured at Nukulau Island and 24 at Ovalau. Two specimens, 22 and 25 mm. long, were obtained at Malo Island, New Hebrides.

#### *Zonogobius rhizophora* (Heller and Snodgrass).

*Gobius rhizophora* Heller and Snodgrass, Proc. Wash. Acad. Sci., 5, 1903, p. 212, pl. 12—Tagus Cove, Albemarle Island.

*Zonogobius rhizophora* Heller and Snodgrass, Proc. Wash. Acad. Sci., 6, 1905, p. 416.

Dorsal VI-I, 10; anal I, 9. The scales are deciduous, and nearly all have disappeared from my specimen, which agrees in form and color with the excellent description and plate cited above.

One specimen, 18 mm. long, of this beautiful little goby was secured at South Seymour Island, Galápagos.

#### *Cingulogobius naraharæ* (Snyder). Fig. 26.

*Amblygobius naraharæ* Snyder, Proc. U. S. Nat. Mus., 35, 1909, p. 101—Naha; Snyder, Proc. U. S. Nat. Mus., 42, 1912, p. 515, pl. 68, fig. 2.

Dorsal VI-I, 11; anal I, 10; scales in longitudinal series 36 or 38, in transverse series 14; about 18 scales before the first dorsal. The compressed body is thickened anteriorly, with heavy, plump, flat-cheeked head, the dorsal outline moderately convex, the ventral one slightly so, the depth 3.35 to 3.75 times, the head 3 to 3.15 times in the length. The head is usually broader than deep, its breadth

1.4 to 1.5 times in its length. The nape is elevated, the convex snout broad and gently rounded, equal to or nearly equal to the eye. The eyes are very high up, dorsolateral, 3.8 to 4 times in the head, close together, the interorbital about 3 times in the eye. The mouth is strongly oblique, with projecting lower jaw continuous with the upper profile, the posterior angle of the maxillary beneath the anterior portion of the eye. Both jaws have an outer row of enlarged teeth, then 2 rows of minute teeth, and a fourth row of long, slender, curved, depressible teeth. The outer row in the lower jaw is composed of curved, widely spaced, depressible canines, much larger than the

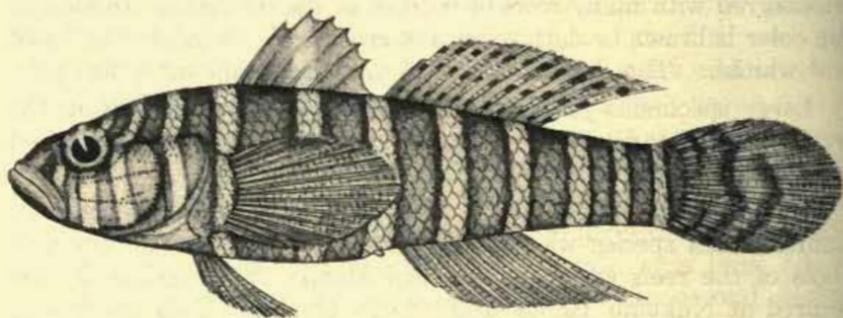


FIG. 26. *Cingulogobius naraharae* (Snyder), Nuka Hiva Island, Marquesas Islands.

outer row above, both outer rows visible when the mouth is closed. The scales extend forward to the eyes. Upon the upper part of the opercle and preopercle and on the caudal base there are small scales. The minutely papillate mucus pores of the cheek are in rows which are barely visible. The first dorsal is low, with slender spines, the first shorter than the others, which are of nearly uniform height, the last reaching the second dorsal when depressed, the longest spine 2.25 to 3.25 times in the head. The second dorsal is higher than the first, the last 2 rays longest, 1.6 to 1.7 times in the head, scarcely reaching the caudal when depressed. The anal is elongate posteriorly, 1.5 to 1.7 times in the head. The pectoral is a little shorter than the head. The ventrals are about 1.4 times in the head, not reaching the short, thick anal papilla. The depth of the caudal peduncle is 2.4 times in the head. The short caudal is damaged in all my specimens except the smallest one. In this one it is as long as the head without the upper lip.

The color in alcohol is uniform light brown, with 12 white vertical bands, the 8 posterior ones broad and completely circling the body, the 4 anterior ones more or less incomplete. The first band is before the eyes and is narrow and inconspicuous. The last band is on the caudal base. There is a narrow, white line across the interorbital. The first dorsal, anal, and ventrals are more or less blackish. The second dorsal and caudal are crossbarred with rows of dark spots. The pectoral varies from clear to dusky.

The discovery of this handsome little goby, originally described from Naha, Okinawa, Riu Kiu Islands, at the opposite side of the Pacific, is very interesting and shows how ocean currents carry the East Indian fishes north to Japan and eastward throughout Polynesia to the Marquesas, farthest removed of all the island groups.

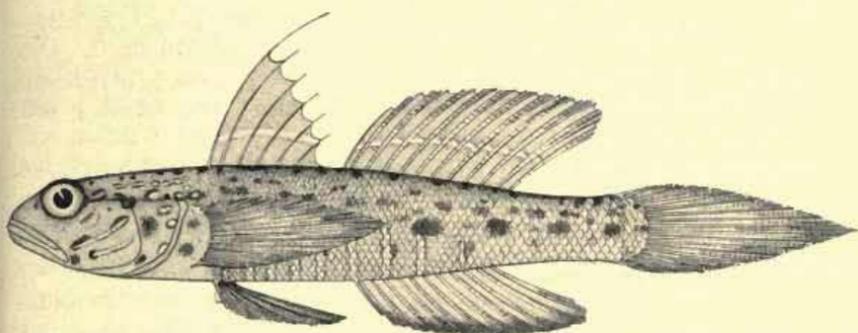


FIG. 27. *Aparrius aurocingulus* Herre, Ovalau Island, Fiji Islands.

Here described from 6 specimens, 20 to 37 mm. in length, collected at the island of Nuka Hiva, one of the Marquesas group. These have been compared with one of Snyder's cotypes.

***Aparrius aurocingulus* Herre. Fig. 27.**

*Aparrius aurocingulus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, p. 425.

Dorsal VI-I, 11; anal I, 11; scales about 56, transverse series 18 to 20. Depth 5 to 5.5, head 3.25 to 3.45, second dorsal spine 3.8 to 4, caudal 2.5 in length. Eye 3.5 to 4, ventral fin 1.3 to 1.4 in head. Body compressed; dorsal profile little elevated. Snout steep, short; chin prominent. Eyes high up, prominent, close

together; interorbital space about one-fourth of eye. Maxillary reaches center of eye. Teeth in 3 or 4 rows in each jaw, outer and inner rows enlarged, a lateral canine on each side of mandible. Tongue deeply notched. Head, nape, breast, and pectoral base naked. Scales on posterior half of body enlarged. First dorsal high, the second spine sometimes elongate and filiform; second dorsal about as high as first; anal slightly lower. Pectoral pointed, slightly longer than head. Central rays of caudal very long and easily broken.

Color in alcohol whitish, with spots, blotches, and bars of light brown and golden.

Four specimens collected in a pool on a reef west of Ovalau Island, Fiji Islands.

**Chonophorus genivittatus** (Cuvier and Valenciennes).

*Gobius genivittatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837—Tahiti; Günther, Fische der Südsee, 2, 1877, p. 170, pl. 110, fig. C.

*Awaous genivittatus* Fowler, Proc. Acad. Nat. Sci. Phila., 1900, p. 517; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 492, fig. 218 (copied from Günther).

*Chonophorus genivittatus* Herre, Gobies of the Philippines, 1927, p. 211, pl. 16, fig. 4.

Dorsal VI-I, 10 or 11; anal I, 10 or 11. There are 50 to 52 scales in a longitudinal, 14 in a transverse series, and 16 to 18 before the first dorsal. The large, blunt head is much wider than the elongate, compressed trunk. The depth is 3.5 to 4.5, the head 3.5 times in the length. The broad, blunt, very convex snout is 3 times, the small eye 4 times in the head. The dorsal spines have thread-like tips, equal to the depth. The dorsal and anal are similar in outline, greater than the depth beneath. The long, pointed caudal is 2.5 to 2.8 times in the length.

The color in life is olive or greenish brown, pale or whitish beneath, with 12 narrow, dark brown or black, more or less curved crossbars down the side, and a broad, blackish bar from the eye down and back to the lower edge of the preopercle. The dorsals and anal are pale, sometimes suffused with pinkish, with dark crossbars or rows of spots. In alcohol the color varies from nearly white to yellowish brown, with 10 to 12 dark brown or blackish crossbars on each side and a small, vertical, dark brown streak on each scale on the upper half of the body. A broad, dark brown bar runs from the eye to the lower edge of the preopercle. The dorsals are marked by irregular crossbars or rows of spots.

Six specimens, 34 to 54 mm. in length, were taken from a small fresh-water creek at Atuona, Hiva Oa Island, in the Marquesas. From the Papenoo River, Tahiti, 2 specimens, 49 and 60 mm. in length, were obtained, and 3 specimens, 50 to 58 mm. in length, from a small creek on Moorea, one of the Society Islands. A very fine specimen, 78 mm. long, was caught in a small river flowing into Suva Harbor, Viti Levu Island, Fiji.

**Chonophorus ocellaris** (Broussonet).

*Gobius ocellaris* Broussonet, Cop. Encycl. Meth., Dec. Ichthy., 1782, fig. 142—fresh waters of Tahiti; Bonnaterre, Tabl. Ichth., 1788, p. 65, pl. 36, fig. 142; Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 98; Günther, Fische der Südsee, 2, 1876-81, p. 177, pl. 108, fig. C.

*Awaous ocellaris* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 405.

*Chonophorus ocellaris* Herre, Gobies of Philippines, 1927, p. 218, pl. 17, fig. 2; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 409.

Dorsal VI-I, 10; anal I, 10. There are 55 scales in a lateral, 15 in a transverse series. There are from 16 to 20 predorsal scales. The width of the plump, wedge-shaped body equals its depth, which is 4.2 to 4.4 times, the large head 3 to 3.3 times in the length. The long, convex, steep snout is 2.3 to 2.5 times, the eye 4.8 to 5.15 times in the head. The interorbital equals or nearly equals the eye. The mouth is small, inferior, its roof hung with conspicuous papillae. The first dorsal equals the depth, the second dorsal and anal lower. The rounded caudal is shorter than the head.

The color in alcohol varies from pale to dark yellow brown, the under side pale yellowish, with numerous short, irregular dark brown or blackish blotches on the upper half. Along the middle of each side is a row of large, dark brown or black, rounded spots, the one at the base of the caudal darkest and most distinct. The sides of the head are strewn with dark brown lines, bands, or spots, 2 bands extending from the eye to the upper lip. There is a black blotch or bar on the pectoral base. The first dorsal is spotted with dark brown and has a large, black, white-margined ocellus on its posterior half. The second dorsal and caudal are crossbarred by 4 or more rows of dark brown spots.

In every stream in the Society and Fiji groups this species, so handsome in life, may be seen lying at the edges of quiet sandy pools. The ocellus on its dorsal fin is very conspicuous then, while the dorsals and anal are tinged with red. The species is very abundant in the Papenoo River, Tahiti, where 50 specimens, from 35 to 121

mm. in length, were collected. Two specimens, 45 and 50 mm. long, and a third one, 15 mm. long, were obtained from the Rewa River, Viti Levu Island, Fiji.

**Amblygobius insignis** Seale. Fig. 28.

*Amblygobius insignis* Seale, Phil. Journ. Sci., 5, Sect. D, 1910, p. 116, pl. 2, fig. 1; Herre, Gobies of the Philippines, 1927, p. 234, pl. 18, fig. 3.

Dorsal VI-I, 12; anal I, 12. There are 68 to 72 scales in a longitudinal and 28 to 30 in a transverse series. The body is subcylindrical anteriorly, compressed behind, the dorsal and ventral profiles tapering together slightly posteriorly but nearly parallel. The depth is 4.75 to 5, the head 3.5 to 3.7, the caudal 4.1 to 4.5, the

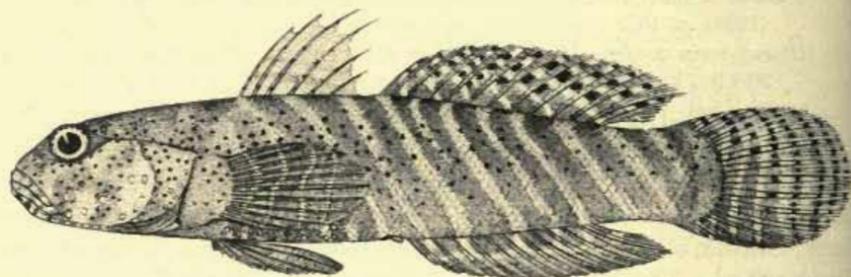


FIG. 28. *Amblygobius insignis* Seale, Hathorn Sound, New Georgia Island, Solomon Islands.

pectoral 4.35 to 5 times in the length. The eye is 4.1 to 4.8, the snout 3.25 to 3.85, the least depth of the caudal peduncle 2.15 to 2.35 times in the head. The eye is high up, extending above the profile, the interorbital space very narrow, about 4 times in the eye. The blunt, convex snout is a little more than the eye. The mouth is small, oblique, the maxillary extending beneath the anterior part of the eye. The upper teeth are in 4 rows, those of the outer row much the largest, the rest minute. The lower jaw has 3 rows of teeth, those of the outer row largest, with a posterior canine. The scales are largest posteriorly, becoming smaller and irregularly arranged anteriorly. The head and predorsal region are naked, only a few small scales extending above the pectoral as far as the hind margin of the opercle. On the nape is a very low skinny crest. The posterior rays of the dorsal and anal extend to the caudal when depressed. The caudal is rounded.

The color in alcohol is yellowish, becoming whitish beneath, with about 10 dark brown diagonal crossbands running downward and backward at an angle of about  $70^\circ$ , the anterior ones often indistinct, those below the soft dorsal broader and very distinct, the ground color appearing as pale bars between. Over the nape are 2 short, dark brown crossbands. The head, pectoral base, and upper two-thirds of the body are sprinkled with small, black or blue black, white-margined spots or ocelli, the margins usually disappearing. On the lower half of the head and on the body beneath the pectoral and below are pale blue or whitish blue ocelli. The spinous dorsal has a white crossbar with black margins near the base, the spines spotted with black dots. The brown crossbars of the trunk extend upon the soft dorsal, with rows of circular, black spots on their upper two-thirds, the intervening portion milk white. The crossbars likewise extend upon the basal half of the anal, with milk white, diagonal stripes between, the outer part of the fin dusky gray. Sometimes there is a basal row of black spots on the anal. The caudal is transversely barred with smoky gray and narrow white lines, with rows of circular, black spots on the posterior dark bars and the upper half of the anterior ones. The pectorals and ventrals are smoky blue with cross lines of small, white spots.

This uniquely barred goby has been known hitherto solely from the type obtained by Seale at Bantayan Island, and one I collected at Polillo Island, both in the Philippines. The Solomon Island specimens are better than the type. This species might well be made the type of a new genus.

Described from 16 specimens, 27 to 49 mm. in length, from Hathorn Sound, New Georgia Island, Solomon Islands.

**Amblygobius myersi** Herre. Fig. 29.

*Amblygobius myersi* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, p. 426.

Dorsal VI-I, 14; anal I, 13; scales 58 to 60, transverse series 20, predorsal 30. Depth 5.4, width 6, head 3.8, caudal 3.56 in length. Eye 3.7, snout 3.7, interorbital 4.4, depth of caudal peduncle 1.8, fifth dorsal spine 1.35, ventral 1.55 in head. Body elongate. Head bluntly rounded. Snout broadly rounded. Mouth oblique, terminal, jaws equal, maxillary reaching front of pupil. Teeth in outer row of upper jaw few, widely spaced, large, curved and fixed, those of inner row small. Lower jaw with an outer row of large teeth terminating on each side in a very large canine. The stout, curved teeth of the inner row are larger than those of the inner row above. Scales

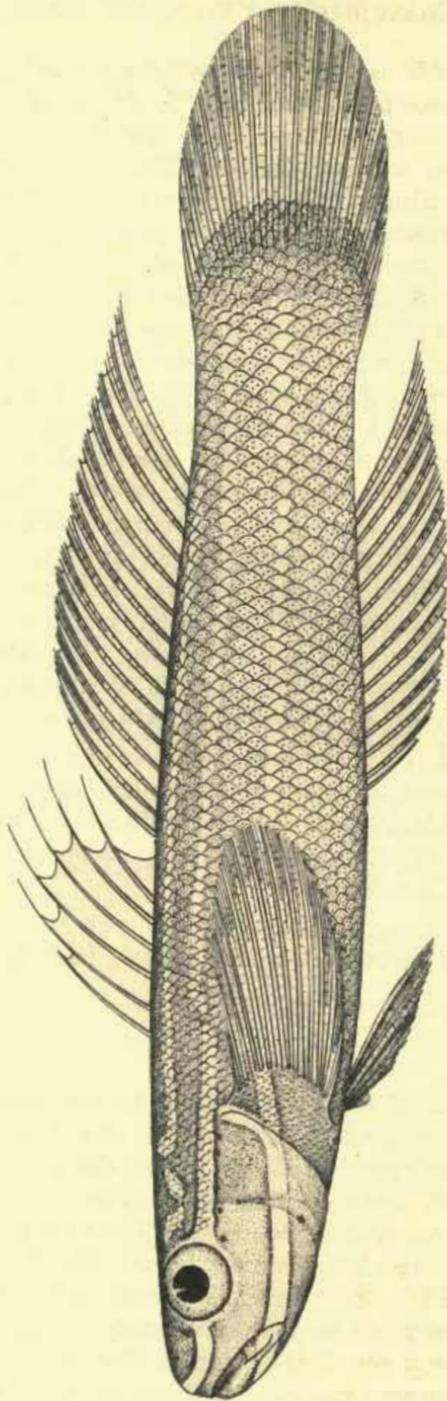


FIG. 29. *Amblygobius myersi* Herre type, Hathorn Sound, New Georgia Island, Solomon Islands.

ctenoid, much smaller on nape and breast. Predorsal scales extend to the eyes. A small patch of scales on upper part of opercle, the head otherwise naked. Caudal rounded. Pectoral equals head. Dorsal spines elongate, with filiform tips. Second dorsal and anal elevated, last or next to the last ray longest, equal to spinous dorsal, reaching caudal when depressed. The ventrals do not reach the anal.

Color in alcohol whitish yellow with white lines, some of them dark-margined, on head and body. Fins whitish or colorless.

One specimen collected at Hathorn Sound, New Georgia Island, Solomon Islands.

### *Amblygobius phalaena* (Cuvier and Valenciennes).

*Gobius phalaena* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 70—Vanicolo; Günther, Fische der Südsee, 2, 1876-81, p. 178, pl. 111, fig. C.

*Amblygobius phalaena* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 405; Herre, Gobies of Philippines, 1927, p. 235, pl. 30, fig. 3; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 412.

Dorsal VI-I, 14; anal I, 14. There are 50 to 52 scales in a longitudinal series to the caudal base and 20 in a transverse series. The depth of the oblong and compressed body is 3.8, the head 3.5, the caudal and pectoral each 3.5 to 3.8 times in the length. The eye is 3.5 to 4, the snout 3.25, the least depth of the caudal peduncle 2.15 times in the head. The predorsal region is covered with very fine scales as far as the hind margin of the eye. The upper part of the opercle is scaled but the rest of the head is naked. The third and fourth dorsal spines are elongated, sometimes longer than the head.

This deep-bodied and very handsome goby of the coral reefs is readily recognized by the presence of 2 rows of dark red, circular spots on the nape, the blue or pearly spots on the cheeks, a large dark spot at the upper angle of the opercle, 5 wide, brown crossbands on the trunk, each with narrow, blue black margins, and a large, black spot on the upper part of the caudal near its base. In alcohol the red spots on the nape and the blue spots on the cheeks may turn brown or partially disappear.

Two fine specimens, 17 and 55 mm. long, were taken at Ovalau Island, Fiji, and 6 specimens, 21 to 46 mm. in length, but in very poor condition, were collected at Nukulau Island, Fiji.

### *Cryptocentrus leucostictus* (Günther). Fig. 31.

*Gobius leucostictus* Günther, Proc. Zool. Soc. Lond., 1871, p. 664, pl. 63, fig. C; Günther, Fische der Südsee, 2, 1877, p. 176, pl. 108, fig. F.

Dorsal VI-I, 11 or 12; anal I, 10; scales about 110 in lateral, about 30 in transverse series; predorsal scales in median series varying from 0 to 10. The depth of the elongate, slender body is 6 to 6.5 times in the length, the dorsal and ventral profiles nearly parallel. The head is low, subcylindrical, its breadth equal to or nearly equal to its depth, its length 3.85 to 4.1 times in the total. The eyes are very close together, their inner margins touching, laterodorsal in position, 4.67 to 5 times in the head. The snout is equal to or less than an eye's diameter in length, blunt, very steeply inclined, the lower jaw slightly projecting. The mouth is oblique, extending below the posterior third of the eye. Teeth are in 4 rows, a pair of canines at the anterior angles of both upper and lower jaws. The

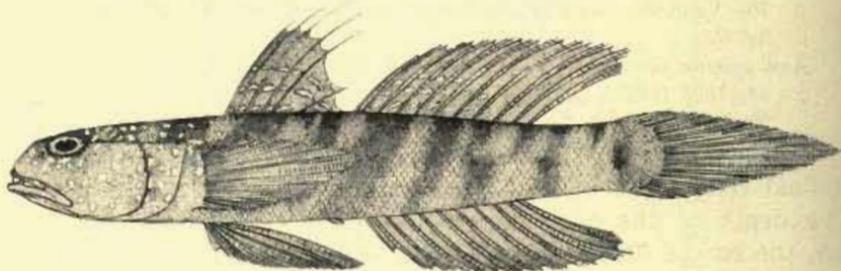


FIG. 30. *Cryptocentrus geniornatus* Herre, Waigiu Island.

head is smooth, entirely naked; breast and pectoral bases also naked. The scales are very small, closely adherent. The fourth spine of the first dorsal is longest, about 7 times in the length or 1.75 times in the head. The soft dorsal and anal equal or slightly exceed the first dorsal in height. The rather narrow pectoral is about 0.86 of the length of the head. The ventrals are short, 1.4 to 1.5 times in the head, not reaching more than halfway to the origin of the anal. The long, pointed caudal is 1.2 to 1.4 times the head.

The color in alcohol is dull gray, with 9 broad, dark brown crossbands on the back. There is a longitudinal, brown band or else a series of brown spots along the middle of each side. The sides and lower part of the head and trunk are thickly strewn with circular, white spots and dots, with 1 or 2 rows of larger, white spots along the lower part of the posterior part of the trunk. Both dorsals are barred with 3 rows each of brown and white spots. The white



10 mm.

FIG. 31. *Cryptocentrus leucostictus* (Günther), Ovalau Island, Fiji Islands.

anal is diagonally barred by 5 black bands. The caudal is white, crossed by 6 irregular brown or black bars. The pectorals are dusky, barred by rows of white spots. The ventrals are alternately banded with black and white.

Here described from 3 fine specimens, 55 to 58 mm. in length, collected on the reef at Ovalau Island, Fiji. This beautiful goby has been known hitherto only from the type, obtained at the Tonga Islands.

***Cryptocentrus voighti* (Bleeker).**

*Gobius voightii* Bleeker, Nat. Tijds. Ned. Ind., 7, 1854, p. 83—Ulukan, Sumatra; Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 72.

Dorsal VI-I, 10; anal I, 10. There are 80 scales in a lateral series. The depth is 5.25, the head 3.33 times in the length. The eye is 3.8, the snout 4.1 times in the head. The head and trunk are compressed, elongate, the snout convex, with equal jaws. The prominent eyes are very close together, their inner margins almost touching. The mouth is oblique, the posterior extremity of the maxillary beneath the middle or posterior part of the eye. The teeth in the upper jaw are in 3 rows anteriorly, those of the outer row largest, with a pair of small, stout canines anteriorly. The teeth of the lower jaw are in 4 rows anteriorly, with a large canine at the outer anterior angle on each side of the mandible. The third, fourth, and fifth spines of the first dorsal are much elongate, the fourth spine nearly equal to the head. The height of the second dorsal is 1.5 times in the head. The anal is a trifle higher than the second dorsal. The pectoral and ventral both extend as far back as the anal papilla, the length of the pectoral 0.88 of the head, the ventral a little less. The depth of the caudal peduncle is 2.75 times in the head. The caudal was damaged or destroyed in all our specimens.

The fresh specimens had large brilliant blue and red dots on the sides and top of the head, and smaller ones on the nape. On the trunk were 8 brown crossbands. On the first dorsal were 2 rows of bright red spots. The basal half of the trunk was dusky. In alcohol the color is brownish white, with 8 badly faded blackish brown crossbands, the spots on the head much faded. The first dorsal has two rows of large dusky spots, its elongate filiform tips black. The second dorsal and the basal half of the caudal are dusky. The anal is black, the ventral dusky to black. The pectoral is pale.

Five specimens, from 40 to 55 mm. in length, all in bad condition, were taken from the stomach of a young heron (*Butorides* sp.) at Ovalau, Fiji Islands.

Genus *Atuona* Herre.

*Atuona* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, p. 428. Type, *Atuona tricuspudata* Herre.

Teeth in broad pavement-like bands in both jaws, all tricuspid. Outer row in upper jaw enlarged and depressible. One or 2 pairs of canines in lower jaw behind the band of teeth. Body smooth, naked, elongate, compressed. Head blunt, rounded. Pectoral without free, silky rays. Ventrals united, slender, short.

*Atuona tricuspudata* Herre. Fig. 32.

*Atuona tricuspudata* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 429.

Dorsal VI-I, 11; anal I, 8; no scales. Depth 5.5, head 4.1 in length. Eye 5, snout 5, interorbital 5, third dorsal spine 1.7, longest

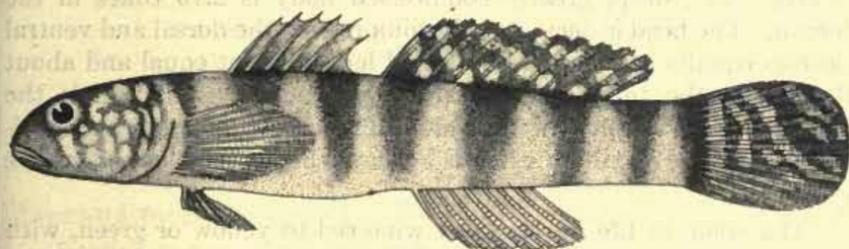


FIG. 32. *Atuona tricuspudata* Herre, Atuona, Hiva Oa Island, Marquesas Islands.

rays of second dorsal 1.5 to 1.6, depth of caudal peduncle 2.26, caudal 1.3 in head. Body smooth, naked, elongate, compressed, very slightly elevated. Head broader than trunk. Snout very bluntly rounded. Eye high up, lateral. Mouth oblique, low. Maxillary reaches below eye. Teeth tricuspid, in broad, solid bands, outer row in upper jaw larger and depressible, 1 or 2 pairs of strong, hooked canines behind last row of teeth in males, 1 pair of small canines in females. Dorsals well separated, tips of spines sometimes slightly elongated and thread-like. Posterior part of second dorsal higher than first. Pectoral a little shorter than head. Ventrals short, 1.67 in pectoral, origin behind pectoral, extending less than halfway to vent. Caudal broad and rounded.

Color in life deep dark green with 8 broad, dark crossbands. Top and sides of head black, spotted with green. Second dorsal and caudal black, with 2 or 3 rows of pale green spots. First

dorsal black, with a row of pale green spots. Anal and ventrals dusky or black, pectorals colorless. In alcohol the green becomes nearly white.

Fourteen specimens collected at Atuona, Hiva Oa Island, Marquesas Islands.

**Gobiodon quinquestrigatus** (Cuvier and Valenciennes).

*Gobius quinquestrigatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 134.

*Gobiodon quinquestrigatus* Bleeker, Arch. Neerl. Sci. Nat., 10, 1875, p. 117; Weber, Siboga Exp., Fische, 1913, p. 454; Herre, Gobies of Philippines, 1927, p. 294.

*Gobiodon ceramensis* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 88.

Dorsal VI-I, 10; anal I, 8; pectoral rays 17. The depth of the naked, short, deep, greatly compressed body is 2.75 times in the length. The head is deep, greatly compressed, the dorsal and ventral profiles equally convex, its depth and length about equal and about 3 times in the total length. The very convex snout equals the eye, 3.5 to 3.75 times in the head. The mouth is small and horizontal, and the maxillary extends beneath the forward half or middle of the eye.

The color in life varies from wine red to yellow or green, with opalescent blue or lavender vertical lines on the head as follows: the first downward from the anterior part of the eye; the second passes down behind the pupil to the throat; the third and fourth are on the cheek; the fifth lies on the base of the pectoral; usually there is a sixth, very short, line behind the angle of the pectoral. In alcohol the color is pale yellow to brown, the head usually paler. The vertical lines are pearl white or tend to disappear.

A single specimen, 18 mm. long, was collected at Malo Island, New Hebrides. In life it was grass green.

**Gobiodon rivulatus** (Rüppell).

*Gobius rivulatus* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 136; Rüppell, Neue Wirbelt., Fische, 1835, p. 138.

*Gobiodon rivulatus* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 87; Günther, Fische der Südsee, 2, 1876-77, p. 180, pl. 109, figs. F and G.

Dorsal VI (rarely VII), 11; anal I, 9. The head and body are greatly compressed, the anterior profile boldly convex. A specimen, 26 mm. long, has the depth 2.36, the head 3, the caudal 3.7, the pectoral 4.33 times in the length. The eye is 6.5 times, the snout 2.2, the least depth of the caudal peduncle 2.1 times in the head.

The snout is very steep, the eye small, the vertical fins low, the caudal rounded.

The color in alcohol is yellowish to very pale brownish, with paler, longitudinal lines on the body, more or less irregular and rivulose, the upper ones often uniting in a network. Anteriorly they send off 3 vertical stripes on the head and 1 on the pectoral base. There is a blackish dot at the upper angle of the opercle. The dorsals and anal are dusky, the other fins pale or colorless. In life the color is green, the bands dark red.

Nine typical specimens, 16 to 28 mm. in length, were collected at Vila, Efaté Island, New Hebrides.

### Genus *Papenua* Herre.

*Papenua* Herre (in combination *Papenua pugnans*), Jour. Pan-Pacific Res. Inst., 7, No. 1, 1932, p. 6 (name only).

*Papenua* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 430, fig. 33. Type, *Sicydium pugnans* Grant.

Teeth of upper jaw minute and bilobed, large canines below. Upper lip marginally crenate, inner surface smooth, no papillae or tubercles.

### *Papenua pugnans* (Grant). Fig. 33.

*Sicydium pugnans* Grant, Proc. Zool. Soc. Lond., 1884, p. 160, pl. 11, fig. 3, and pl. 12, fig. 7—Savaii.

Dorsal VI-I, 10; anal I, 10. There are 64 scales in a longitudinal series from the upper angle of the opercle to the last caudal vertebra plus 6 more on the caudal, and 18 scales in a transverse series from the origin of the second dorsal to that of the anal; about 14 scales in the median series before the first dorsal. The body is low, plump, compressed, the dorsal and ventral profiles nearly horizontal and parallel, tapering toward each other slightly on the posterior fourth, the depth 6.33 times in the length. The head is rather small, its breadth greater than its depth and 0.7 of its length, which is 4.25 times in the total length. The protuberant snout is bluntly rounded, equal to the interorbital, 2.75 times in the head. The small eyes are very high up, lateral, nearly 4.8 times in the head and 1.75 times in the snout. The mouth is low, inferior, nearly horizontal, the posterior maxillary angle scarcely reaching a perpendicular from the front margin of the eye. The upper lip is broad, with denticulate-crenate margin. The lower lip is reflexed laterally in a broad, loose flap, which is absent in the median portion. The upper teeth are in a close-set row, their long honey-colored tips conspicuous. Under

the microscope they are seen to be bilobed. On the lower lip is a row of tiny, widely spaced, simple, horizontal teeth, hidden from view by a coat of hardened slime. There is a pair of stout, hooked canines at the symphysis, behind which is a row of 7 or 8 smaller ones on each side. The tips of the second, third, fourth, and fifth dorsal spines are greatly elongated and thread-like, reaching beyond the axil of the second dorsal, the fifth spine 1.6 times the head and 2.6 times in the total length. The second dorsal is high, the rays increasing in length to the fourth, which is 1.3 times the depth of the body beneath and 1.65 times in the head. The anal is lower, increasing in length gradually to the last ray, which is 6.7

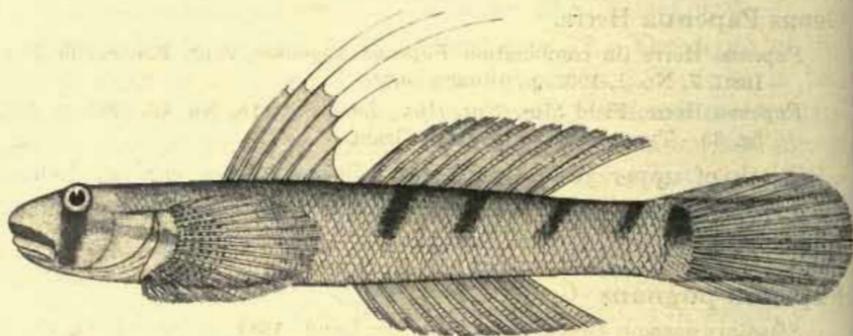


FIG. 33. *Papenua pugnans* (Grant), small stream on Moorea Island, Society Islands.

times in the length. The broad pectoral is a little longer than the head. The cup-like ventral is half as long as the pectoral, 1.8 times in the head, its width greater than its own length. The depth of the caudal peduncle is twice in the head and 1.36 times in its own length. The rounded caudal is 1.15 times the length of the head. The scales before the first dorsal are very small, becoming a little larger toward and above the pectoral base, increasing in size posteriorly, so that all scales on the posterior two-thirds of the body are of nearly uniform size. The scales on the belly and caudal base are small.

The color in alcohol is umber or very dark brown, becoming paler or whitish below and on the belly. The top of the head is very dark. There is a black band around the snout on the upper lip, running back upon the pectoral base. A conspicuous black

band passes from the upper margin of the eye to behind the angle of the mouth. Four black bars cross the trunk, beneath the soft dorsal and 2 on the caudal peduncle extend down to the middle of the side. There is a large black spot on the caudal base. There is a purplish black  $\Lambda$ -shaped mark on the under side of the head, from the symphysis backward along the sides of the throat. The dorsals, anal, and caudal are uniformly dusky. The dusky pectoral is crossbarred basally by several rows of darker spots, its lower margin whitish. The ventrals are whitish, dusted slightly with minute dark specks.

Here described from a female specimen, 47 mm. long, collected in the Papenoo River, Tahiti. Another specimen from the same locality is 22 mm. long. Six specimens, 22 to 36 mm. in length, were seined from a small stream on Moorea Island. None of them have the dorsal spines so greatly elongated as in the Papenoo River specimen described. Most of them are marked as it is, but 2 of them have no crossbars on the trunk, and lack the band from the snout to the pectoral base. All of them lack the mark on the under side of the head and have unmarked ventrals.

Hitherto this little fish has been known only from Savaii, one of the Samoan Islands.

***Stiphodon elegans* (Steindachner). Fig. 34.**

*Sicydium elegans* Steindachner, Ichth. Beiträge, VIII, in Sitzungsber. Akad. Wiss. Wien, 78, 1879, p. 152—Society Islands.

*Stiphodon elegans* Beaufort, Bijdr. Dierk., Amsterdam, 19, 1913, p. 143, pl. 2, figs. 4 and 5—Batjan and Ceram.

*Stiphodon semoni* Weber, in Semon, Zool. Forsch. Australien, 5, 1895, p. 270—Ambon.

Dorsal VI-I, 9 or 10; anal I, 9 or 10; scales in lateral series, 32 + 2 or 3 on the caudal, and 9 in a transverse series. Males may have 28 to 30 scales in longitudinal series; in females 10 to 13, usually 12 predorsal scales; males with 6 to 10 or 11 predorsal scales. The head is naked. The body is slender, elongate, low, the dorsal and ventral profiles nearly horizontal and parallel, the depth in males 6.75 to 7 times, in females 5.33 to 6.5 times in the length. The low, rather flattened head is 4.9 to 5.1 times in the length in males, 4.4 to 4.7 times in females. The nearly circular eye is high up, its upper margin rising above the profile, 3 to 4 times in the head. The rounded, somewhat protuberant snout is a little longer than the eye and approximately equals the depressed or concave inter-orbital space. The third, fourth, and fifth dorsal spines are more

or less elongate and thread-like in males, the third sometimes extending to the rear end of the second dorsal base when depressed, 2.8 to 3 times in the length. In females it is low, 1.5 to 2 times in the head and less than the height of the trunk below it. In males the posterior ray of the second dorsal and anal is longest, extending upon the caudal when depressed, varying from a little less than to a little more than the head in length. In females the anterior second dorsal rays are highest, the third ray from two-thirds to three-fourths as long as the head. The broad, rounded caudal is a little longer than the head. The nearly circular ventral is free from the

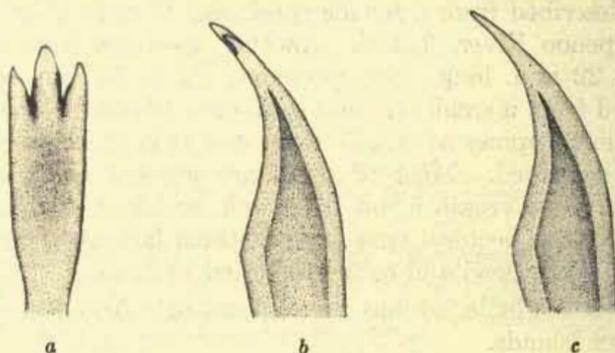


FIG. 34. Teeth of *Stiphodon elegans* (Steindachner), Marquesas Islands and Society Islands. a, Front view; b, c, Side views.

belly, 1.4 to 1.7 times in the head, and nearly or quite as broad as long. The teeth are tricuspid, as shown in the figure.

In life the males are usually, though not always, very conspicuous. The top of the head is brilliant emerald, and there is a broad longitudinal emerald band on each side of the body above the middle. When seen lying among the boulders and gravel in the clear little mountain streams where they dwell, they gleam like jewels. This brilliant green disappears almost instantly after death. Rarely, males may have the top of the head brownish red. Some males, all young, and most females are dull in color, olive green, muddy green, and dusky like the water-worn lava stones on which they lie. Now and then females may have more or less red, carmine, or, more often, a dull brick red, upon the head and trunk. Beaufort calls the head and lateral band blue, but none of the members of the Crane Expedition saw any but emerald green specimens where the males were brightly colored. In alcohol, males are dull, dusky olive, paler below and merging into blackish on top of the head and

along the back, the fins the same color. The sides may be marked by about 10 vertical dusky bars. Sometimes large specimens may have the dorsals, pectorals, and caudal crossbarred by many rows of black spots, the ground color of the second dorsal and caudal appearing as more or less circular white spots. Each ray of the anal is covered by a black line, the intervening membrane pale, the free margin white. The ventral is unspotted. Preserved females are much more brightly colored than males. The ground color is yellowish white, the dorsal region more or less dusky. There is a broad black band around the snout and backward under the eye to the pectoral base. Then beginning again behind the pectoral axil it continues to the base of the caudal, its posterior half being a series of large connected spots. Another narrower black band runs from eye to eye, then from behind the upper part of the eye runs backward to the top of the caudal peduncle. A third pair of black lines begins above the eyes, passes back below the first dorsal and is lost below the second dorsal. The first dorsal is crossed diagonally by 3 rows of black spots, the second dorsal by 3 or 4 diagonal rows of black spots. The caudal has a large black basal spot and 4 to 6 cross rows of black spots. The pectoral is crossbarred by a number of rows of much smaller spots. The anal is much flecked or spotted with dusky or black, especially along the rays, the margin white. The ventral is more or less dusky.

This interesting species is very abundant in the streamlets of the Marquesas and the Society Islands, but is very difficult to capture as it dwells amid rocks and gravel. From a brook at Atuona, Hiva Oa Island, Marquesas, were obtained 28 specimens, from 16.5 to 27 mm. long, and 32 specimens, 18 to 30 mm. long, from a small creek on Nuka Hiva Island in the same group. From a creek on Moorea, one of the Society Islands, we seined 30 fine specimens, 14.5 to 41 mm. in length. A male specimen, 25 mm. in length, was obtained from a small river flowing into Suva Harbor, Viti Levu Island, Fiji. Although males and females differ widely in coloration there is no difference in their size. I have a number of both sexes reaching a length of 41 mm.

#### Family PERIOPHTHALMIDAE

#### *Periophthalmus barbarus* (Linnaeus).

*Gobius barbarus* Linnaeus, Syst. Nat., ed. 12, 1766, p. 450.

*Periophthalmus barbarus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 393, fig. 1; Herre, Gobies of Philippines, 1927, p. 316, pl. 24, fig. 3.

- Periophthalmus papilio* Bloch and Schneider, Syst. Ichth., 1801, p. 63, pl. 14; Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 181, pl. 353.
- Periophthalmus koelreuteri* Bloch and Schneider, Syst. Ichth., 1801, p. 65; Day, Fishes India, 1878-88, p. 303, pl. 64, fig. 8; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 416.

Dorsal X to XV-I, 11; anal I, 10. There are 76 to 100 scales in a longitudinal series, and 24 to 26 in a transverse series. The depth of the elongate body is 5 to 5.9, the very large, wide head 3.3 to 3.8 times in the length. The eye is 3.1 to 3.4, the snout 2.25 to 2.35 times in the head. The large broad snout is nearly vertical and ends in a wide loose lobate flap over the lip, with 2 terminal sensory lappets hanging down over the mouth. The eyes are very close together on thick short stalks, and can be elevated or drawn in flush with the head. There is a well-developed outer eyelid. The pectoral is equal to or longer than the head, its thick muscular base a third of the length of the fin. The ventrals are never united except basally. The caudal equals the head.

In life the color and markings are highly variable. Most often the fish is gray or olive brown, spotted with blue, white, silvery, brown, or black, usually with pale spots on the head. The first dorsal has a white or yellow margin and a black or dark brown, submarginal crossband, the rest of the fin brown or dusky violet. The second dorsal has a white margin, then a wide, black, submarginal crossband, and below it a narrow white stripe. The rest of the fin is dark, speckled with white dots and spots. The caudal is marked by a number of crossbars of brown dots, its inferior rays yellowish or whitish. The pectoral is crossbarred in the same way as the caudal. The anal and ventrals are whitish or colorless. Some specimens have 8 to 10 dark or blackish brown bands over the back and diagonally forward down the sides. In alcohol the bright silver, blue, or white spots fade and the general color is browner. The spots on the caudal and pectoral become less distinct.

This extraordinary creature, so unlike a fish in its habits, is remarkable in many ways. It uses its pectoral fins as if they were arms, crawls about on mangrove roots, goes foraging amid weeds and grass or clambering about in the bushes, leaps along the surface of streams or pools instead of swimming, and takes refuge on land instead of diving to the bottom of the water. In place of swimming about it loves to lie on the bank with only its tail end in the water. Its extraordinary agility and acrobatic powers are eclipsed only by its ability to elevate its eyes and scan the horizon with one rotating orb while it stares fixedly at the observer with the other.

The mud-skipper is very abundant from Fiji to the Philippines, the Malay Peninsula, to the east coast of Africa, and on the tropical west coast of Africa.

A specimen, 54 mm. long, was taken sitting on the chimney of a crabhole, on the bank of the Mbureta River, Ovalau Island, Fiji. No attempt was made to get more. At Bushman Bay, Malekula Island, New Hebrides, were the largest mud-skipper I have ever seen. Many were from 200 to 225 mm. in length and very bulky. At this place 10 specimens, varying in length from 27 to 98 mm., were added to the collection. The largest individuals could be secured only by shooting them.

#### Family CALLIONYMIDAE

##### *Callionymus cooki* Günther. Fig. 35.

*Callionymus cooki* Günther, Proc. Zool. Soc. Lond., 1871, p. 665—Raratonga.

Dorsal IV-8; anal 7. The head is slightly more than 4 times, the caudal 3.18 times in the length. The snout is 3.12 times, the eye 3.57, and the opercular spine 2.5 times in the head. The first dorsal spine is filiform, twice in the length. The last dorsal ray is almost equal to the head, the last anal ray three-fourths as long as the head. The pectoral equals the head. The elongate ventral is 1.2 times the head.

The color in alcohol is pale brownish above and on the sides, whitish under the head and before the anal. There are 5 dark brown crossbands over the back and irregular dark brown spots along the sides. The lower half of the body, the pectoral base, and ventrals are thickly sprinkled with blue spots and dots. The first dorsal is dusky. The second dorsal is marked by several longitudinal rows of elongate, blue spots, its rays dusky. The caudal is pale, with 6 crossbars of dark brown spots and some blue spots on the lower part of the fin. The pectoral is white, crossbarred by rows of white spots. The ventral is pale brown, with some large black spots and many fine white spots. The iris is reddish bronze.

One specimen, 51 mm. long, or 67 mm. with the caudal, was obtained on the reef at Ovalau Island, Fiji.

#### Family GOBIESOCIDAE

##### *Arbacia truncata* Heller and Snodgrass.

*Arbacia truncata* Heller and Snodgrass, Proc. Wash. Acad. Sci., 5, 1903, p. 216, pl. 14—Galapagos.

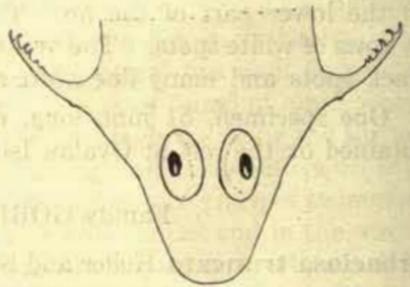
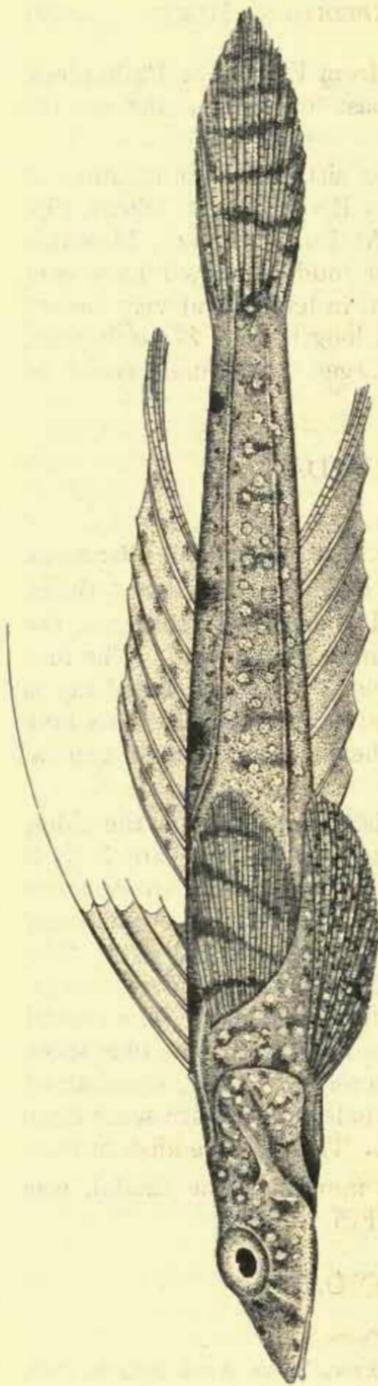


FIG. 35. *Caltionymus cooki* Günther, Ovalau Island, Fiji Islands; showing dorsal outline of head.

The head is 3.4 to 3.5 times, the depth 6.5 to 7 times in the length. The eye is 6 times in the head and twice in the snout. The broad caudal is a little more than half the length of the head.

The color in alcohol is greenish olive, spotted with blackish above, the dorsal, anal, and caudal violaceous black. Seven bluish pearly or pale brown bands radiate from the eye, the 2 lower ones running back obliquely across the cheek and opercle. Similar bands, spots, and mottlings appear on the dorsal surface of the

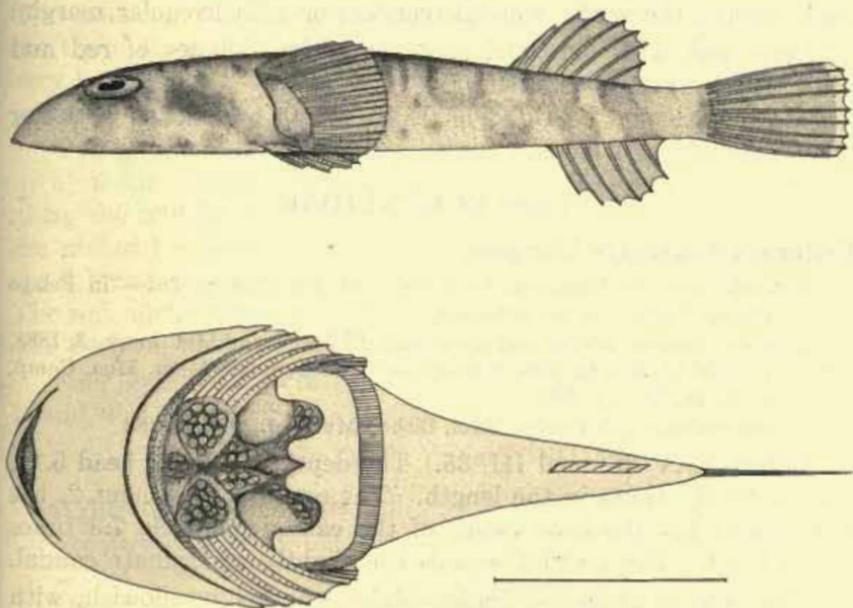


FIG. 36. *Gobiesox paradiseus* Herre, Galapagos Islands; showing ventral outline.

body. Some specimens show dark crossbars on the sides, especially on the posterior third.

This little cling-fish is very abundant in shallow tide pools on lava-strewn shores in the Galapagos. Many specimens, from 19 to 45 mm. in length, were taken at South Seymour Island, and 2 at Eden Island, 21 and 41 mm. long.

***Gobiesox paradiseus* Herre. Fig. 36.**

*Gobiesox paradiseus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 432.

Dorsal 7; anal 6. Length of head 2.5 to 2.75, breadth of head 2.4 to 2.6, ventral disk 2.6 to 3, distance from dorsal origin to end of

vertebrae 4, caudal 3.75 to 4 in length. Eye 3.25 to 3.4, interorbital 3.85 to 4.3, pectoral 2 to 2.25 in head. Eye 1.25 in snout. Head large, depressed, broader than long. Eyes large, dorsolateral. Interorbital narrower than eye. Teeth in 1 row in each jaw, anterior ones, above, larger than the lateral ones. In lower jaw are broad incisors in front, followed by 3 narrower, taller teeth, the last one much the highest, then by 6 small teeth. Ventral disk shorter than head. Pectoral broad and short, with a vertical fold of skin along the lower half of base. Dorsal inserted very far back, behind the vent. Caudal truncate or with irregular margin.

Color red, with bars and spots of various shades of red and pink. Under parts yellowish.

Three specimens collected on Eden Island and South Seymour Island, Galapagos Islands.

#### Family ECHENEIDAE

##### *Echeneis naucrates* Linnaeus.

*Echeneis naucrates* Linnaeus, Syst. Nat., ed. 10, 1758, p. 261—"in Pelago Indico," (misprint for *naucrates*).

*Echeneis naucrates* Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2269, pl. 329, fig. 796; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 330.

*Leptechenis naucrates* Fowler, Mem. Bishop Mus., 10, 1928, p. 420.

Dorsal XXV-36; anal III, 35. The depth is 9.2, the head 5.17, the caudal 6.2 times in the length. The eye is 4, the snout 2, the interorbital 1.8, the least depth of the caudal peduncle 7.3 times in the head. The pectoral equals the slightly emarginate caudal.

The color in alcohol is leaden bluish, the belly yellowish, with a dark, blackish blue band from the angle of the mouth through the eye and along the side to the middle of the caudal, the fins blackish blue. The caudal is margined above and below with white and the dorsal has a white line along its upper margin.

Here described from a specimen, 378 mm. long, caught with hook and line in Suva Harbor, Viti Levu Island, Fiji. Two very fine specimens, 565 and 635 mm. in length, were caught with hook and line at Auki, Malaita Island, Solomon Islands.

##### *Echeneis remora* Linnaeus.

*Echeneis remora* Linnaeus, Syst. Nat., ed. 10, 1758, p. 260; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 419, fig. 65.

A specimen of this widely distributed fish, 160 mm. long, was taken from a shark caught at sea, Lat. 6° 17' N., Long. 84° 14' W.

This was while we were en route from Panama to Cocos Island. Many sharks and other fishes were feeding upon or about a dead whale.

#### Family PARAPERCIDAE

##### *Parapercis cylindrica* (Bloch).

*Sciaena cylindrica* Bloch, Ichthyologie, 9, 1797, p. 37, pl. 299, fig. 1.

Dorsal V, 21; anal 18; scales in the lateral line 52. The depth is 4.8 times, the head 3.7 times, the pectoral 4.5 times in the length. The caudal equals the pectoral, and is equal to the distance from the tip of the snout to the posterior margin of the preopercle. The very long, slender, pointed ventral extends to the base of the sixth anal ray, and is 3.27 times in the length.

The color in alcohol is pale, brownish gray above, white below, with about 9 light brown crossbands. These are much wider along the middle of the side, becoming narrowed below, and often are united below to form rings across the belly. Across the back are 9 broad crossbands. There is a black blotch on the first dorsal. The soft dorsal, anal, and caudal are crossbarred with brown spots. The pectoral and ventrals are colorless or white.

Four specimens, 49 to 72 mm. in length, were collected at Ovalau Island, Fiji.

#### Family DACTYLOSCOPIDAE

##### *Dactyloscopus pectoralis* Gill.

*Dactyloscopus pectoralis* Gill, Proc. Acad. Nat. Sci. Phila., 1861, p. 267—Cape San Lucas.

Dorsal X, 22; anal II, 24; scales in lateral line about 40. The depth is 9 times, the large, thick head 4.5 times in the length. The eyes are small, dorsal in position, nearly 2 diameters apart, 12.5 times in the head. The opercular fringe has 11 or 12 free filaments.

The color in alcohol is pale, brownish yellow, with brown spots arranged to form quadrangular areas on the back, with other spots or lines below them on the upper part of the side. There is a clear white spot on top of the head, on the pectoral base, and several are on the anterior half of the dorsal region. Four divergent brown bands radiate from the eye. One or 2 white spots occur on the posterior margin of the opercle.

Here described from 2 specimens in wretched condition, one 45 mm., the other 23 mm. in length, collected at Cocos Island.

## Family BLENNIIDAE

***Emmnion bristolae* Jordan.**

*Emmnion bristolae* Jordan, Proc. U. S. Nat. Mus., 1896, p. 454, pl. 55, fig. 1—Galapagos; Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2375, from the type.

Dorsal XXV, 13; anal I, 27. There are about 56 scales in a longitudinal series, 3 above and 11 below the lateral line, which is straight and ends near the base of the last dorsal ray. The body is elongate, the head broad and the trunk broader at the pectoral base than its greatest depth, compressed beyond the pectorals. The depth is 6.6 times, the head 5.8 times in the length. The breadth of the head is 0.92 of its length. The large, circular eyes are very high up and far forward, 2.85 times in the head. The narrow interorbital is a little more than a third of the eye. The nearly vertical snout is 0.75 of the eye. The dorsal and anal are low, the dorsal beginning on the nape, the rays much higher than the spines. The caudal is a little longer than the head, subtruncate, its posterior angles rounded. The broad pectoral is one-sixth longer than the head. The head and belly are naked, the body covered with irregular scales, smallest above and forward, more or less embedded but easily detached and lost.

The color in alcohol is dark brown, the top of the head, nape and pectoral base black, the under parts pale to whitish. There are 8 short crossbands on the back, descending but little below the lateral line. The dorsal is black anteriorly, the greater part brown, the posterior portion with clear membrane, the rays blackish brown. The anal membrane is clear, the rays more or less dusky; the margin of the fin is darker. The caudal is conspicuously spotted with dark brown. The pectoral membrane is clear, the rays spotted with blackish brown. The ventrals are pale with dusky margin.

Here described from a specimen, 70 mm. long, obtained at Narborough Island, Galapagos. Only one specimen of this little blenny has hitherto been known, the type, which is about 75 mm. in length.

***Enneapterygius minutus* (Günther).**

*Trypetergius minutum* Günther, Fische der Südsee, 2, 1876-77, p. 211, pl. 118, fig. D.

*Enneapterygius minutus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 416; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 428, excluding synonymy.

Dorsal III–XI, 9; anal I, 13. There are 30 scales in a longitudinal series, plus 2 more on the caudal base and 8 scales in a transverse series. There are 12 tubulated scales in the lateral line, which stops under the middle of the second dorsal. The depth is 5.25, the head 3.75, the caudal 4.66, and the pectoral 3.5 times in the length. The eye is 2.8 times in the head. The pointed snout scarcely equals the eye but the least depth of the caudal peduncle is the same as the eye.

The color in alcohol is pale yellowish, flecked above with minute black specks. Along the middle of the side is a row of pinkish dashes, interspersed with white spots upon the lower half of the body. The pectoral and caudal are each marked by 4 blackish crossbars. The dorsals are faintly barred by rows of dark specks.

Described here from a specimen, 21 mm. long, collected at Wala Island, New Hebrides.

### **Enneapterygius pardochir** Jordan and Seale.

*Enneapterygius pardochir* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1906, p. 417, fig. 98—Apia, Samoa.

Dorsal III–XI, 9; anal 18; lateral line of 14 tubules, ending beneath the hind part of the second dorsal. There are 28 scales in a longitudinal series and 4 more on the caudal. The depth is 4.1, the head 3.5 times in the length. The eye is 3 times in the head. The pectoral equals the head. The rounded caudal is 1.5 times in the head. The pointed snout is concave and beak-like.

The color in alcohol is brown with shadings of darker spots and punctulations upon the dorsal half of the body. There are 4 brown crossbands on the pectoral and the caudal. The dorsals are also crossbarred by rows of spots.

A specimen, 24 mm. long, collected on a reef near Ovalau Island, Fiji, agrees with a paratype in the Stanford University Museum.

Fowler has lumped together under the name *Enneapterygius minutus* Günther, a number of species from Samoa. I believe they vary too much to be placed under one head without having a far larger series to examine than has been available as yet.

### **Enneapterygius punctulatus** Herre. Fig. 37.

*Enneapterygius punctulatus* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 14 (name only).

*Enneapterygius punctulatus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 432.

Dorsal III–X or XI–7; anal I, 14 or 15; scales 32+2, 13 to 15 tubulated scales in upper section of lateral line, 3 above and

16 below it, 18 scales with pores along middle of side. Depth 5.25, head 3.7, pectoral 3.5 to 3.6, caudal 4.2 in length. Eye 2.85, snout 2.85 to 3, depth of caudal peduncle 3.5, height of second dorsal 1.9, height of third dorsal 2.8 in head. Head resembles that of a *Trigla*, broad, with convex anterior profile and small, pointed snout. Posterior half of trunk compressed. Eyes large, prominent and very close together. First dorsal very low. Anal low. The pectoral

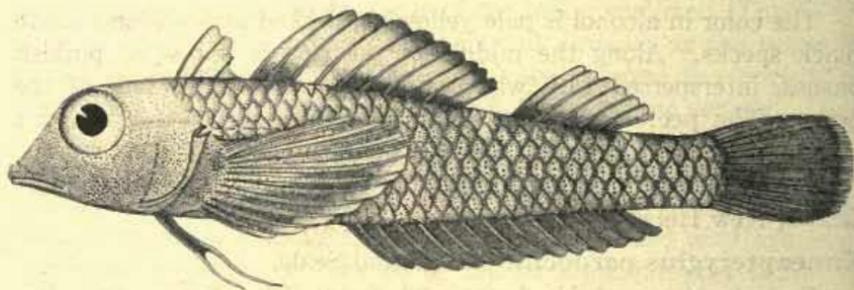


FIG. 37. *Enneapterygius punctulatus* Herre, New Hebrides.

is large, nearly reaching to the end of the second dorsal. The caudal is rounded.

Color in alcohol whitish, heavily shaded with black dots. Some bars and bands of light and dark.

Ten specimens collected at Wala Island, Espiritu Santo Island, and Malo Island, New Hebrides.

#### Genus *Tagusa* Herre.

*Tagusa* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 434.

Type, *Tagusa delicata* Herre.

Body slender, with medium-sized ctenoid scales; breast, belly and pectoral base naked. Dorsal continuous, posterior spines shortest. Vertical fins not attached to caudal. Lateral line incomplete, high up, prominent. No tentacles. Gill membranes free from isthmus. Jaws subequal. Teeth minute, uniform, simple, in bands.

#### *Tagusa delicata* Herre. Fig. 38.

*Tagusa delicata* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 435.

Dorsal XXII to XXIV, 11 to 14; anal II, 21; scales 2-38-7, 25 to 28 tubules in lateral line. Depth 4.5 to 5; head 3.5 to 4 in

length. Eye 3 to 3.7, snout 4.3 to 4.4 in head. Head and body compressed. Depth much greater than breadth. Snout convex. Interorbital about equal to snout. Mouth small, terminal, jaws about equal or chin slightly projecting. Maxillary reaches past front of eye. Vertical fins low. Anal rays about equal to dorsal rays and longest dorsal spines. Pectoral nearly as long as head. Caudal almost as long as pectoral. Ventral about two-thirds length of head.

Color in alcohol, pale yellowish with about 6 saddle-shaped dark spots; fins colorless.

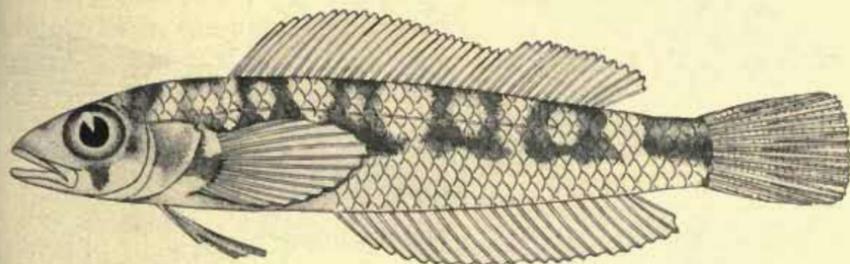


FIG. 38. *Tagus delicata* Herre, Tagus Cove, Albemarle Island, Galapagos Islands.

Ten specimens collected at Tagus Cove, Albemarle Island, Galapagos Islands.

#### Genus *Spinoblennius* Herre.

*Spinoblennius* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 435. Type, *Spinoblennius spiniger* Herre.

Naked fishes related to *Hypsoblennius*, but having a bony plate covering the top of the head, a prominent spine at the lower angle of the preopercle, and no tentacles.

#### *Spinoblennius spiniger* Herre. Fig. 39.

*Spinoblennius spiniger* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 435.

Dorsal XII, 11; anal II, 15 or 16; ventrals I, 3. Depth 3.6, head 3.5, caudal 4.16 in length. Eye 2.4, interorbital 2.5, ventrals 1.33 in head. Snout 2 in eye. Body robust anteriorly. Head large, blunt, nearly as broad as long. Snout bluntly rounded, slightly protuberant. Mouth small, inferior. Maxillary reaches

forward part of eye. Teeth subequal, no canines. Lateral line short, slightly curved, not reaching end of pectoral, 5 to 8 tubules. Isthmus broad, gill openings restricted to sides. Dorsal fin continuous, anterior spines highest. Dorsal and anal not extending on caudal peduncle. Caudal slightly rounded, slightly longer than head.

Color in alcohol, pale yellowish with 6 dark bars over back. Head dusky. Under side of pectoral black, except upper third, which is white. Other fins colorless.

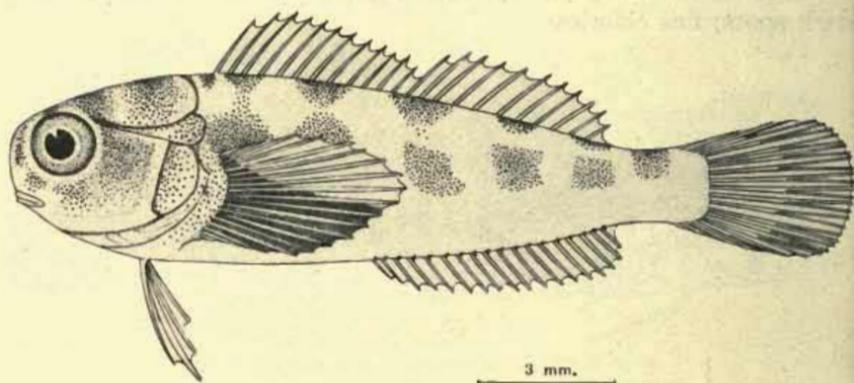


FIG. 39. *Spinoblennius spiniger* Herre, Eden Island, Galapagos Islands.

Eight specimens collected in a tide pool on Eden Island, Galapagos Islands.

**Petroscirtes kulambangrae** Herre. Fig. 40.

*Petroscirtes kulambangrae* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 9 (name only).

*Petroscirtes kulambangrae* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 436.

Dorsal XXX; anal XVIII. Depth 4.35 to 4.5, head 4.1 to 4.2, caudal 4.5 to 4.7, pectoral 6.55 to 6.6 in length. Eye 3.2 to 3.4, snout 3.3 to 3.45, interorbital 4 to 4.3, depth of caudal peduncle 2.15 to 2.3 in head. Body slender, elongate, compressed. Eyes prominent, flush with dorsal profile. Convex snout nearly vertical. Caudal rounded.

Blue in life, with 3 black lines, 1 at dorsal base, 1 from tip of snout to caudal and 1 from pectoral base to caudal.

Fifteen specimens, collected from a fresh-water creek on Kulambangra Island, Solomon Islands, and from a reef in the harbor of Manokwari, in the northwest part of Dutch New Guinea.

***Petroscirtes obliquus* Garman.**

*Petroscirtes obliquus* Garman, Bull. Mus. Comp. Zool., 39, 1903, p. 237, pl. 4, fig. 3—Suva, Fiji; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 434; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 429.

Dorsal XII or XIII, 18 or 20; anal I, 21 or 22. The depth is 5.75 to 6, the head 4.36 to 4.89, the caudal 4.2 to 6 times, the pectoral 5.75 times in the length. The eye is 3.2 to 3.6 times, the snout 3 to 3.1, the least depth of the caudal peduncle 5.75 times in the head. The elongate, slender, compressed trunk is much narrower than the head. The eyes are very high up, rising above the profile and are very close together. The snout is convex. The mouth is moderately large, the maxillary extending beneath the forward margin of the eye, or in the largest specimens beneath the pupil, the teeth

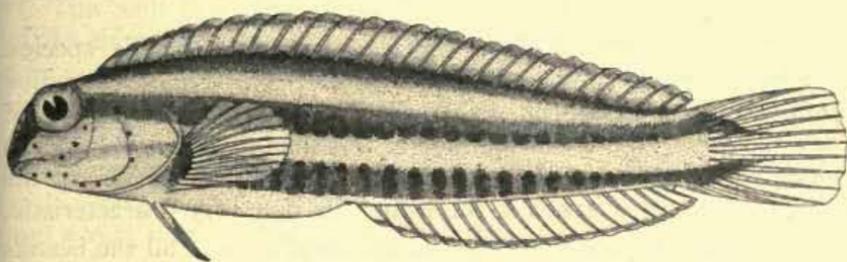


FIG. 40. *Petroscirtes kulambangrae* Herre, Solomon Islands and Dutch New Guinea.

in a single series in each jaw with a pair of stout canines behind, those of the lower jaw nearly twice as large as the upper canines. The small gill opening is above the pectoral base. The dorsal and anal are free from the caudal, which is at first subtruncate, but with age the outer rays are produced and the fin becomes forked, with greatly elongate tips. The spinous dorsal is low, the dorsal rays much higher, the anal lower than the soft dorsal.

The color in alcohol is whitish or pale yellowish to reddish brown, the sides characteristically marked with inclined or curved violet or brown bands alternating with white lines, most of them inclined forward but those on the posterior third inclined backward and not so well developed, or broken up into spots. There is a large, violet black, white-edged spot behind the eye and a smaller, brown ocellus behind this on the operculum. There are about 6 reddish violet bands on the sides and under part of the head, most of them

uniting underneath with those from the other side. There is a series of 7 or 8 double crossbars on the back, more or less broken into reddish brown spots. The dorsal fin is more or less spotted with brown. There is a large, black or blackish brown spot, often very faint, between the twenty-first and the twenty-fifth rays. Beyond this spot the whole fin may be uniformly dusky. The anal is brown, with oblique backward-pointing white bars, and a white edge. The other fins are colorless.

Twenty-six specimens of this very handsome blenny, 21 to 46 mm. in length, were obtained from the reef at Ovalau Island, Fiji.

***Petroscirtes taeniatus* (Quoy and Gaimard).**

*Aspidontus taeniatus* Quoy and Gaimard, Voy. Astrolabe, Poiss., 3, 1834, p. 719, pl. 19, fig. 4—Guam.

*Petroscirtes taeniatus* Günther, Fische der Südsee, 2, 1876-77, p. 195, pl. 114, fig. A.

Günther's figure gives a fair representation of this species. The body is dark brilliant blue with a deep black band extending from the snout to the tip of the caudal, widening posteriorly until only the upper and lower margins of the caudal fin are blue. The dorsal and anal are black, with a white margin. The shape of the snout, which projects well beyond the mouth, is very characteristic.

This beautiful blenny occurs on the coral reefs of all the islands visited from Tahiti onward, one or two being in sight at nearly all times. Their undulating, oscillating motion in swimming is very characteristic; they rarely move on an even keel, but sway from side to side as they glide swiftly ahead. Like certain other species often seen, they are very difficult to capture unless one has plenty of time, and even then are not easy to get. On many occasions a charge of dynamite was exploded in close proximity to this blenny, but not a single specimen was secured. They either scurry away to safety or are lost in the interstices of the coral.

***Petroscirtes xestus* Jordan and Seale.**

*Petroscirtes xestus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 433, fig. 110—Pago Pago, Samoa.

Dorsal 26; anal 16. The elongate, compressed body is largest anteriorly. The depth is 3.5, the head 3, the caudal 5.33 times in the length. The large eye is 2.65 times, the short, blunt snout 4.8 times in the head.

There are 6 dusky crossbars, with a blackish stripe from the eye to the base of the caudal. In life there is a silver bar below

this stripe. The dorsal has a submarginal row of black spots, one between the first and third spines and one near the middle, much larger than the others.

One specimen, 16 mm. long, was obtained on a reef near Suva, Viti Levu Island, Fiji.

### ***Runula albolinea* Nichols.**

*Runula albolinea* Nichols, Zoologica, 5, 1924, p. 64, fig. 11—Indefatigable Island, Galapagos.

Dorsal 40 or 41; anal 28 to 30. The body is elongate, slender, the dorsal and ventral profiles nearly horizontal, the depth 6.7 to 8.4 times, the head 5 to 5.5 times in the length. The eye is 3.66 times, the rounded, blunt snout 4 times in the head. The caudal is lunate, its upper and lower tips more or less elongate, equal to or 1.15 times, the pectoral 1.8 times in the head.

The color in life is clear reddish brown above and to the middle of the side, pale reddish below, the belly and under side of the head white. A pearly blue line extends from the top of the snout over the eye back to the upper part of the caudal base. From the tip of the snout a bright silver band extends back below the eye (and including its lower third) to the pectoral base. The dorsal is clear with a deep brown, marginal band, broadest on the anterior half, and a very narrow blue edge. The caudal has a central longitudinal blackish stripe and a very narrow black line on its upper and lower margins. The other fins are all colorless. In alcohol the color is more or less grayish brown, paler below to yellowish white on the belly and under side of the head. The blue line from snout to caudal becomes white, while the pearly band on the side of the head is more or less faded. The blue edging to the dorsal may remain or may fade to white.

Twelve specimens, 35 to 61 mm. in length, were caught by seining at Eden Island, Galapagos. They were abundant in the sea weeds and eel grass. When picked up they would bite savagely, sinking their fangs full length into fingers, net, or any other object. One specimen, 34 mm. long, was caught with the aid of electric light at night in Tagus Cove, Albemarle Island; the water was 20 fathoms deep, but this little blenny is evidently a surface swimmer, borne about by tidal currents. This specimen shows traces of 6 dark crossbands.

### ***Malacoctenus zonogaster* Heller and Snodgrass.**

*Malacoctenus zonogaster* Heller and Snodgrass, Proc. Wash. Acad. Sci., 5, 1903, p. 217, pl. 15—Tagus Cove, Albemarle Island, Galapagos.

Dorsal XXI or XXII, 11; anal II, 20. There are 57 to 60 scales in the lateral line. The depth is 4 to 4.2 times, the head 4 times in the length. The eye is 3 times, the snout 3.1 times in the head. The caudal is a little shorter than the head, 4.75 times, the pectoral 3.5 times in the length.

The color in alcohol is olive gray, the belly whitish, with 5 broad dark brown crossbands which nearly reach to the anal. On the opercle is a circular, blackish brown spot. The white under side of the head is crossbarred by dark brown. The under part of the trunk is irregularly blotched and barred with dark brown or blackish. The caudal is conspicuously crossbarred with dark brown and white. The pectorals, dorsals, and anal are spotted with brown and white.

This handsome blenny is abundant in tide pools on lava-strewn shores in the Galapagos. Seventy-eight specimens, 15 to 59 mm. long, were collected on South Seymour Island, one, 54 mm. long, at Eden Island, and one, 47 mm. long, at Narborough.

#### **Blennius tonganus** Jordan and Seale.

*Blennius tonganus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 420, on Günther; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 431.

*Blennius cristatus* Günther (non Linnaeus), Fische der Südsee, 2, 1877, p. 194, pl. 113, fig. E—Tonga.

Dorsal XII, 18; anal II, 16.

One specimen, 15 mm. long, was taken at Takaroa Island, Tuamotu Archipelago.

#### **Rupiscartes atlanticus** (Cuvier and Valenciennes).

*Salarias atlanticus* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 321—Madeira.

*Rupiscartes atlanticus* Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2397, pl. 339, fig. 825.

Dorsal XII, 22; anal II, 22. The body is elongate, deep, strongly compressed, the depth 3.95 times, the head 4.15 times in the length. The head is nearly as deep as long, the nearly vertical snout 2.4 times in the head. The circular eyes are very high up, 3.6 times in the head, 1.5 times in the snout, and nearly twice the interorbital width. The dorsal is very long, high, free from the caudal, as is also the slightly lower anal. The caudal and pectoral equal the head.

The color in alcohol is uniform brown, with a large, circular, dark brown or blackish spot behind each eye. The fins are all blackish or dark brown. The iris is blue or silvery.

Here described from a specimen, 95 mm. long, collected at Cocos Island. Two other specimens, 45 and 80 mm. long, were also obtained at Cocos. In the Galapagos Islands a specimen, 40 mm. long, was caught by the aid of electric light at Tagus Cove, Albatross Island. It is remarkable that tide pool fishes, such as blennies, were secured in deep water a number of times, while fishing by electric light. At Eden Island, a specimen, 45 mm. long, was obtained, and at South Seymour Island, one, 41 mm. long.

### *Salarias alboguttatus* Kner.

*Salarias alboguttatus* Kner, Sitzungsber. Akad. Wiss. Wien, 56, 1867, p. 724, pl. 4, fig. 4—Samoa.

Dorsal XII, 17; anal 19. The head equals the depth, 4.37 times in the length. The breadth of the head equals its own depth. The forehead is very short, protuberant, and rounded. The very prominent eyes are 3.2 times in the head.

The color in alcohol is brown, with about 8 darker, double cross-bars over the back and down the sides, and 7 or 8 longitudinal rows of whitish, oblong spots on the sides anteriorly and 5 rows on the posterior part of the body. The sides of the head and the pectoral base are thickly sprinkled with white spots and dots. On each side of the throat is a large, brown or violet brown spot (blue or violet in life) the ground color appearing as a white bar between. Some black dots are sprinkled over the upper anterior half of the body. There is a violet brown crossbar on the snout. The spinous dorsal is sprinkled with violet brown dots, especially basally. The dorsal rays and anal are colorless, or more often the anal has a broad, submarginal, violet band or is violaceous brown, especially marginally. The caudal is crossbarred with brown spots. The pectoral and ventrals are colorless.

This very handsome blenny is abundant on the reef at Ovalau Island, Fiji, where 60 specimens, 21 to 48 mm. in length, were obtained. There are also 5 specimens from a reef near Suva, Viti Levu Island, Fiji, 18 to 44 mm. in length.

### *Salarias belemnites* De Vis.

*Salarias belemnites* De Vis, Proc. Linn. Soc. N. S. Wales, 9, 1884, p. 695; McCulloch, Rec. Austr. Mus., 15, 1926, p. 38.

*Salarias nitidus* Günther (in part), Fische der Südsee, 2, 1876-77, p. 200, pl. 113, fig. G.

*Alticus evermanni* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 422.

Dorsal XII, 19; anal I, 21 or 22. The depth is 5.5 to 5.75, the head 4.7 to 4.95, the caudal 4.4 to 5 times in the length. The eye is 3.9 to 4.5 times, the snout 2.5 to 2.6, the least depth of the caudal peduncle 2.25 to 2.5, the pectoral 1.2 times in the head. The body is elongate, compressed, scarcely elevated. The front of the head is nearly vertical, the forehead projecting slightly, the eyes as high up and far forward as possible. The mouth is low down, very wide, the maxillary extending beyond a vertical behind the eye. On the upper part of the eye is a broad, fringed tentacle, and on the nostril a simple tentacle. Large posterior canines are present in the lower jaws of some specimens, absent in others and are probably a sex character. There is a skinny median crest on the top of the head.

The color in alcohol is brown above, due to densely strewn, minute, brown dots, becoming yellowish ventrally where the specks disappear and leave only the ground color, with 4 or 5 double crossbars of darker brown down the side and 4 or 5 short, double, dark brown bars across the back alternating with those on the side. These dorsal bars make 8 or 10 spots on the base of the dorsal fin. The body is sprinkled with elliptical or circular, pearly white spots, most conspicuous on the posterior half and rarely absent. The sides of the head, snout, and pectoral are thickly strewn with small, dark brown spots, those on the pectoral in 5 or more cross rows. On the pectoral base is a large, blackish spot. The spinous dorsal is more or less marked with blackish or with black spots between the anterior membranes. The soft dorsal is barred by dusky lines running upward and backward. The basal part of the caudal is clear, with a large blackish spot in the middle. The anal is blackish marginally.

Seven specimens, 35 to 52 mm. in length, were collected at Wala Island, and one, 45 mm. long, at Malo Island, New Hebrides. In the last the spots on the pectoral are pearl white.

#### **Salarias caudolineatus** Günther.

*Salarias caudolineatus* Günther, *Fische der Südsee*, 2, 1877-81, p. 219, pl. 116, fig. F—Tahiti; Fowler, *Fishes Oceania*, Bull. Bishop Mus., 10, 1928, p. 441.

*Alliicus caudolineatus* Jordan and Seale, *Fishes Samoa*, Bull. Bur. Fish., 25, 1905 (1906), p. 423.

There are 2 specimens, 52 and 72 mm. in length, from Ovalau Island, Fiji. The color in alcohol is brownish gray with about 6 brown double crossbars over the back and sides, 7 pairs of short bars along the dorsal base and upon the lower part of the soft dorsal,

and along the side of the trunk 5 longitudinal, blackish lines, breaking up posteriorly into dashes and dots. There are also 2 more specimens from the same locality which seem to be variants of this species. One is 27, the other 52 mm. in length. At Wala Island, New Hebrides, 10 specimens, 40 to 86 mm. in length, were collected. The largest one has the dorsal XII-I, 23; anal II, 24; depth 5.7, head 4.9, caudal 4.6 times in the length. The eye is 3.8, the snout 2.8 times in the head. The body is elongate and compressed, the head with a large, median, cutaneous crest, and the dorsal rather deeply notched. My specimens have no trace of canine teeth in the lower jaw, though Günther and Fowler both state that they are present.

The color in alcohol is grayish brown with 5 to 7 longitudinal black or very dark brown lines along the side, breaking up posteriorly into dots and dashes, and with 6 to 8 broad, double crossbars over the back and down the sides. The first dorsal is white with black or brown dots and bars or with diagonal, blackish lines running up and back. The second dorsal is marked by several rows of black or brown dots or with 5 to 8 fine wavy, longitudinal, reddish brown lines. The anal is white with a basal row of dark brown dots or is whitish, becoming dusky marginally, the pointed tips of the rays white.

Nine specimens, 16 to 50 mm. in length, were taken at Hog Harbor, Espiritu Santo Island, New Hebrides. These specimens have a pair of small canines in the lower jaw, a pair of slender orbital tentacles, a pearl white spot below and behind the eye, and pearl white spots scattered along the sides of the trunk. The colorless dorsal is flecked with horizontal or oblique rows of black dots and the caudal is crossed by numerous rows of black dots. At Malo Island a female specimen, 53 mm. long, was greatly distended with eggs, its depth 4.4 times in the length, its abdominal breadth five-sixths of the depth. One specimen, 39 mm. long, was taken at Vila, Efaté Island.

### ***Salarias edentulus* (Bloch and Schneider).**

*Blennius edentulus* Bloch and Schneider, Syst. Ichth., 1801, p. 172—Huahine Island, Society Islands.

*Salarias edentulus* Günther, Fische der Südsee, 2, 1877-81, p. 206, pl. 117, fig. A; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 437.

*Salarias quadricornis* Günther, Fische der Südsee, 2, 1877-81, p. 209, pl. 117, fig. B.

Dorsal XII-I (rarely XIII-I), 19 to 21; anal I, 20 to 22. In a female, 65 mm. long, the depth was 3.1, the head 4 times in the length.

The eye was 3.7, the snout 2.35 times in the head. In males, 75 to 78 mm. long, the head equaled the depth, 4.3 to 4.7 times in the length; the eye 3.8 to nearly 4 times, the snout 2.3 times in the head. In both sexes there is a small, simple, orbital tentacle. The dorsal is high and deeply notched. This species is sexually dimorphic, *S. edentulus* of authors being the female, and *S. quadricornis* the male. A high, median, skinny occipital crest is one of the male characters, but at Makatea Island I secured females varying from those with the typical smooth occiput to some with a moderately high crest.

Typical females are like Günther's figure of *S. edentulus* cited above. In alcohol the brown body is faintly crossbarred by darker bands, and thickly strewn by reddish brown to dark brown spots. Smaller spots of the same kind are on the dorsals, caudal, and pectorals. The anal has 2 or 3 longitudinal rows of dark brown spots, the rays with white tips. The males are much darker in color, uniform dark brown or brown with darker crossbars, or black with pale or whitish crossbars or narrow, whitish cross lines. The anal has 2 longitudinal lines or rows of bluish spots, which often disappear in preserved specimens, the rays with white tips. The spinous dorsal has longitudinal, the soft dorsal diagonal rows of pale, yellowish or whitish spots and lines, which usually disappear in alcohol.

From the Marquesas Islands were obtained 54 specimens at Atuona, Hiva Oa Island, from 26 to 78 mm. in length, and 38 specimens at Nuka Hiva Island, 13 to 84 mm. in length. At Makatea Island, Tuamotu Archipelago, this very active little blenny swarmed on the reef. Forty-six specimens, from 33 to 104 mm. long, nearly all of them very large, were secured. Females were spawning at this time, February 13, 1929. In the Fiji Archipelago 4 specimens, 30 to 58 mm. in length, were collected at Ovalau Island. In the New Hebrides, specimens were taken as follows: 25 at Wala Island, 25 to 63 mm. long; 4 at Malo Island, 40 to 51 mm. long; 72 at Hog Harbor, Espiritu Santo Island, 13 to 80 mm. in length.

#### *Salarias fasciatus* (Bloch).

*Blennius fasciatus* Bloch, Ichthyologie, 2, 1786, p. 110, pl. 162, fig. 1—East Indies.

Dorsal XII, 19 or 20; anal I, 19 or 20. The depth is 3.6 to 4 times, the head 4.1 to 4.3 times in the length. The eye is 3 to 3.4 times in the head. There is a bifid or trifid tentacle over each eye, a small bifid nasal tentacle, and a broad, fringed tentacle on each side of the nape. The anterior anal rays are more or less detached and with elongate tips.

The color in alcohol is brown, with 7 darker brown, broad cross-bars, which extend up across the dorsal and are plainest posteriorly. The region above the opercle and along the back is thickly sprinkled with black dots and dashes. Lower down these fuse to form longitudinal, blue black lines running back to the posterior third of the trunk. The pectoral and caudal are crossbarred by rows of dark spots. The anal is plain dusky, the ventrals spotted. This rather large, deep-bodied species is easily recognized by its markings.

There are 10 specimens, 34 to 76 mm. in length, from a reef near Suva, Viti Levu Island, 4 specimens, 34 to 45 mm. in length, from Nukulau Island, and 3 specimens, 41 to 60 mm. in length, from Ovalau Island, Fiji.

### ***Salarias guttatus* Cuvier and Valenciennes.**

*Salarias guttatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1835, p. 308—Vanicolo.

*Allicus guttatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 424.

Dorsal XI or XII-I, 17 or 18; anal I, 18 or 19. The depth is 4.3 to 4.4, the head 4.3 to 4.6, the pectoral 5.8 times in the length. The eye is 3, the snout 2.85 to 3, the least depth of the caudal peduncle 2.25 to 2.7 times in the head. The low, moderately elongate body is compressed posteriorly. The eyes are very prominent, placed as far forward and upward as possible, the snout concave rather than vertical. The mouth is low down, beneath the eye, and is without canines in my specimens. There is a small, very slender, simple tentacle on the upper margin of the eye and a shorter, small, simple tentacle on each side of the nape. There is no crest in my specimens. The somewhat pointed caudal equals or nearly equals the head. The dorsal is low, deeply notched, the rays higher than the spines, the last ray attached by a membrane which ends just before the caudal base.

The color in alcohol is pale brown or whitish brown, with 6 or 7 darker crossbands, and strewn with numerous dark brown spots and dots, more or less arranged in several irregular longitudinal rows, the spots below larger than those on the upper half. On the abdomen and lower side of the head are 2 rows of pearly white spots, interspersed with the dark spots, the anterior pale spots larger and circular. Similar, small, white spots are sprinkled along the side of the body. There is a dark brown spot on each side of the throat. The dorsal, anal, and caudal are more or less crossbarred with brown spots in one specimen; in others only the dorsal is spotted. The

anal has a dark margin. The pectoral base is marked by pearly white spots, the fin dotted with dark brown or clear.

Three specimens of this rare little blenny, 17, 29, and 30 mm. in length, were obtained at Bushman Bay, Malekula Island, New Hebrides.

***Salarias lineatus* Cuvier and Valenciennes.**

*Salarias lineatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 314—Java; Day, Fishes India, 1878-88, p. 332, pl. 70, fig. 8; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 426; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 326; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 442.

Dorsal XII, 23 or 24; anal II, 24. The depth is 5, the head 4.5, the caudal 5.65, the pectoral 5.2 times in the length. The eye is 3.8, the snout 2.9 times in the head. The slender, elongate body is compressed, the head broad, the broadly convex snout nearly vertical. Over the eye is a finely fringed tentacle and a smaller tentacle above the anterior nostril (absent on one side in one specimen). The dorsal fin is deeply notched behind the twelfth spine. The origin of the anal is beneath the twelfth dorsal spine, the edge of each anal membrane notched. A low crest is present in males, absent in females.

The color in alcohol is leaden, with traces of darker, longitudinal lines on the sides of the body, that in fading have left several rows of dark brown dots on the posterior end of the body. The dorsals are very pale brown with 4 to 6 slightly oblique lines of dark brown, these lines spotted with heavy dots where they cross the spines and rays. The caudal is whitish with 4 dark brown crossbars. The anal is pale brown, the margin darker. The pectorals are very pale brown.

Here described from 2 female specimens, 29 and 52 mm. long, taken at Ovalau Island, Fiji.

***Salarias margaritatus* (Kendall and Radcliffe).**

*Alticus margaritatus* Kendall and Radcliffe, Mem. Mus. Comp. Zool., 35, 1912, p. 157, pl. 7, fig. 3; pl. 8, fig. 1—Pago Pago, Samoa.

Dorsal XII-I, 19; anal 21. The depth is 4.8 to 5.2 times, the head 4.6 to 4.7 times in the length. The eye is 4 to 4.2 times in the head. There are 2 small canines in the lower jaw. The head has a crest on the nape. The orbital cirri are broad, with short fringes or lobes, the nasal cirri very small and simple.

The color in alcohol is brown, much paler below, with about 6 pairs of darker brown crossbars, the sides with pearl white dots in

irregular rows, those on the posterior half forming longitudinal series with the dots often arranged in pairs. There is a pearly or bluish white, curved line from the eye to the angle of the mouth and the opercle is thickly sprinkled with fine, white dots. The crest is pale, with numerous black dots, and a broad, black posterior margin with a fine, white edge, or the whole crest has a black encircling band. The spinous dorsal is dusky with many black dots. The soft dorsal is marked by oblique, white lines running upward and backward. The anal is dusky violet on its marginal third. The caudal is dusky or dark bluish with 1 or 2 crossbands. The pectoral is bluish gray, the ventrals bluish to white.

Sixteen specimens, from 33 to 59 mm. in length, were obtained on the reef at Ovalau Island, Fiji.

#### **Salarias marmoratus** (Bennett).

*Blennius marmoratus* Bennett, Zool. Journ., 4, 1828, p. 35—Hawaii.

*Salarias marmoratus* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 305; Günther, Fische der Südsee, 2, 1876-81, p. 204, pl. 116, fig. B; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 435.

*Alticus marmoratus* Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 498, fig. 220.

Dorsal XII or XIII, 15 or 16; anal I or II, 16 or 17. The depth is 4.8, the head 3.8 times in the length. The eye is 4.1, the snout 2.35 times in the head. The caudal is 2.8 times in the length. The orbital tentacle equals the eye.

The color in alcohol is brown, the ventral surface gray to white, with about 12 dark brown crossbands from the lateral line to the ventral surface and 6 large, dark brown spots above the lateral line and extending upon the dorsal fin. There is a blackish brown, elongate blotch on the preopercle extending downward from behind the eye and a blackish blotch above the pectoral base. The white of the belly extends upward as spots or bars between the dark vertical bars. The anterior and under part of the head is spotted and barred with pearly and bluish. The caudal and anal are dark brown, the anal rays tipped with white. The pectorals and ventrals are brown.

Here described from 3 specimens obtained at Nuka Hiva Island, Marquesas Islands. They are from 36 to 56 mm. in length.

#### **Salarias periophthalmus** Cuvier and Valenciennes.

*Salarias periophthalmus* Cuvier and Valenciennes, Hist. Nat. Poiss., 11, 1836, p. 311, pl. 328—Ticopia Island, Santa Cruz Archipelago; Day, Fishes India, 1878-88, p. 333, pl. 69, fig. 5; Günther, Fische der Südsee, 2, 1876-81,

p. 207, pl. 114, figs. D and E; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 439.

*Alticus periphthalmus* Jordan and Seale, Bull. Bur. Fish., 25, 1905 (1906), p. 422; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 325; Kendall and Radcliffe, Mem. Mus. Comp. Zool., 35, 1912, p. 155.

Dorsal XII, 21; anal I, 21. The depth is 5, the head 4.6, the caudal 4.8, the pectoral 6 times in the length. The eye is 4, the snout 3.1, the least depth of the caudal peduncle 2.27 times in the head. The very elongate body is strongly compressed, the head also compressed. The mouth is inferior, the convex anterior profile bulging opposite the eyes, which are close together and very far forward, so that the maxillary extends well behind the eye. From the upper part of the eye grows a slender tentacle an eye-diameter in length. There is a low, median crest on top of the head. The dorsal is deeply notched behind the twelfth spine. The origin of the anal is beneath the twelfth spine. The dorsal and anal are not attached to the rounded caudal.

The color in alcohol is mottled leaden and brown with 5 broad, brown crossbands, 2 rows of dark-margined spots or blue bars along the sides, and numerous scattered, smaller, blue spots. On the upper angle of the opercle is a large, circular, blue black spot, a short, blue bar below the eye and a blue spot behind the eye. The dorsal is brown, with alternate lines or bars of white and dark brown marginally. The anal is pale brown, becoming blackish brown, marginally. The caudal is reddish brown, its upper margin white, its basal portion with cross rows of white dots, and longitudinal, white lines on each membrane.

Here described from a specimen, 60 mm. long, taken at Nukulau Island, Fiji. At Wala Island, New Hebrides, 14 specimens, 22 to 59 mm. in length, were collected. I also place here 12 additional specimens, 16 to 23 mm. in length. A female specimen, 38 mm. long, from Malo Island, lacks the occipital crest, and has a fringed nasal tentacle. The dorsal and caudal are both crossbarred with black dots.

### *Salarias saliens* (Forster).

*Blennius saliens* Forster, Itin., 2, 1778, p. 343—Tanna, New Hebrides.

*Alticus saliens* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 421, fig. 111.

*Salarias saliens* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 434.

*Salarias tridactylus* Günther, Fische der Südsee, 2, 1876–81, p. 200, pl. 117, figs. C and D.

Dorsal XIII or XIV, 21 or 22; anal II, 24. The depth is 6.5 to 7.6, the head 5.5 to 5.75, the caudal 4.2 to 5 times in the length.

The eye is 3.85 to 4, the snout (measured to middle of lip) 1.85, the least depth of the caudal peduncle 2.14 times in the head. The body is elongate, slender, and compressed, the head small, with vertical or convex front profile. The eyes are very far forward, high up and close together. The mouth is wide, inferior, beneath the eye, with crenulate lips. Males have a small, median crest along the top of the head and a small, three-pointed tentacle on the upper margin of the eye, but these are lacking in females. There is a very slight notch or only a slight depression between the dorsals, which do not extend to the caudal.

The color in alcohol is bluish gray or slaty blue, with 8 to 10 poorly defined crossbands of blackish along the middle of the side, alternating with as many pairs of pale bluish, parallel cross lines. These transverse marks may extend upon the dorsal, or the dorsal may have a black, submarginal band and clear edge, the spines and rays black, and the membranes between clear. The anal varies from dusky to clear, with a submarginal, black band or row of black spots. A bluish silvery band extends along the hind margin of the eye and down to the upper lip. A similar band extends from the top of the head downward to the lower margin of the opercle. The top of the head, nape, snout, cheeks, pectoral base, and basal half of the pectoral are sprinkled with black dots. The pectoral and caudal are more or less bluish dusky.

Here described from 3 specimens, 41 to 46 mm. long, taken at Hog Harbor, Espiritu Santo Island, New Hebrides. These exceedingly active blennies occurred in great numbers, clinging to vertical rocks on the shore of an islet in Hog Harbor. They could only be approached from the sea and were so wary and agile that it was exceedingly difficult to secure any.

***Salarias walaensis* Herre. Fig. 41.**

*Salarias walaensis* Herre, Jour. Pan-Pacific Res. Inst., 6, No. 4, 1931, p. 14 (name only).

*Salarias walaensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 437.

Dorsal XII, 17; anal II, 20. Depth 4.85 to 4.95, head 4.4, caudal 5.25 to 5.35, pectoral 5.25 to 5.35 in length. Eye 3.5 to 3.66, snout 2.5 to 2.75, depth of caudal peduncle 2.3 in head. Body slender, elongate, not elevated, dorsal and ventral profiles alike. Head nearly as deep as long. Anterior profile nearly vertical. Eyes far forward, high up and close together. Mouth low down and wide. Maxillary extends to or beyond rear of eye. A pair of short,

strong canines in lower jaw. There is a simple tentacle, as long as eye, on upper part of eye. No tentacle on nostril or nape. There is no occipital crest or fringe. Dorsal not notched and not reaching caudal.

Three specimens were collected at Wala Island, New Hebrides.

***Enchelyurus ater* (Günther).**

*Petroscirtes ater* Günther, *Fische der Südsee*, 2, 1876-81, p. 199, pl. 115, fig. E—Tahiti.

*Enchelyurus ater* Jordan and Evermann, *Bull. U. S. Fish Comm.*, 23, part 1, 1903 (1905), p. 500, fig. 222; Jordan and Seale, *Fishes Samoa*, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 434; Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 443.

*Aspidontus brunneolus* Jenkins, *Bull. U. S. Fish Comm.*, 22, 1902 (1903), p. 510, fig. 50.

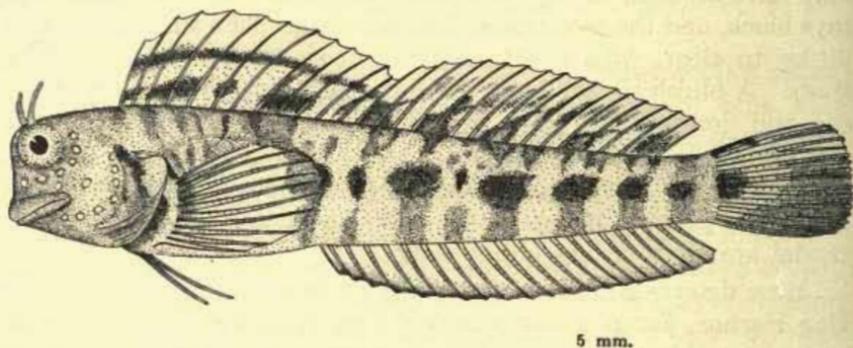


FIG. 41. *Salaria walensis* Herre, Wala Island, New Hebrides.

Dorsal 30 or 31; anal I, 18 or 19. The depth is 4 to 4.8, the head 3 to 3.45, the caudal 5 to 5.5 times in the length. The eye is 3.5, the snout 3.3 times in the head.

The color in alcohol is clear dark brown to black. The caudal and pectoral are light brown, the other fins dark brown to black.

Notes from 2 specimens, 20 and 22 mm. in length, taken on the reef at Maraa, Tahiti, and one, 26 mm. long, from Suva, Viti Levu Island, Fiji. A specimen, 27 mm. long, was taken at Vila, Efaté Island, and one, 28 mm. long, at Wala Island, in the New Hebrides. In the specimen from Vila the caudal was much longer, 3.6 times in the length, and the ventrals were also elongate, giving the fish a different aspect.

**Ophioblennius steindachneri** Jordan and Evermann.

*Blennophis (Ophioblennius) webbi* Steindachner, Ichthy. Beiträge, VIII, 1879, p. 41—Navidad near Mazatlan, and Tres Marias Islands.

*Ophioblennius steindachneri* Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2401.

Dorsal XI-I, 22; anal II, 22. The compressed head equals the depth, 4 times in the length. The eye is 2.5 times, the snout 3.3 times in the head. The dorsal origin is over the gill opening, the fin not united to the caudal; pectoral and caudal each approximately equal to head.

The color in alcohol is uniform pale brown. There is a circular, dark brown spot behind the eye and a blackish, vertical bar on the caudal base.

One specimen, 40 mm. long, was collected at Tagus Cove, Albe-marle Island, Galapagos. This rare blenny has been known hitherto only from Steindachner's specimens.

**Labrisomus xanti** Gill.

*Labrosomus xanti* Gill, Proc. Acad. Nat. Sci. Phila., 1860, p. 107—Cerro Blanco.

*Labrisomus xanti* Meek and Hildebrand, Fishes Panama, Field Mus. Nat. Hist., Zool. Ser., 15, 1928, p. 937, pl. 94, fig. 2.

Dorsal XVIII, 13; anal II, 19. There are 66 scales in the lateral line, 11 above and 14 below it. The depth is 3.5, the head 3.25 times in the length. The eye is 5.4 times, the snout 2.7 times in the head. The pectoral is 1.4 times, the caudal 1.7 times in the head.

The color in alcohol is brownish. There are 6 or 8 dark brown, vertical crossbars, broader than the interspaces. The fins are uniform brownish.

One fine specimen, 168 mm. long, was collected at Post Office Bay, Charles Island, Galapagos.

## Family BROTULIDAE

**Ogilbia ventralis** (Gill).

*Brosomphycis ventralis* Gill, Proc. Acad. Nat. Sci. Phila., 1863, p. 253—Cape San Lucas.

*Dinematichthys ventralis* Jordan, Proc. Calif. Acad. Sci., 1895, p. 502, pl. 54.

*Ogilbia ventralis* Jordan and Evermann, Fishes N. and Mid. Amer., 3, 1898, p. 2503.

Dorsal 65 to 70; anal 55 to 60; scales about 90. The depth is 6.3 times, the head 4.1 times in the length. The tiny eye is 11 times, the wide, blunt snout 5 times in the head. The mouth is

large and oblique, the chin projecting, the maxillary 1.9 in the head, extending far beyond the eye, which is midway of its length. The scales are very small and embedded in the skin. The dorsal and anal are free from the caudal. The ventrals consist of 2 slender rays.

The color in alcohol ranges from very pale brown to brown.

We have 5 specimens from South Seymour Island, Galapagos, from 26 to 50 mm. in length.

### Family CARAPIDAE

#### *Carapus homei* (Richardson).

*Oxybeles homei* Richardson, Voy. Erebus and Terror, Fishes, 1844-48, p. 74, pl. 44, figs. 7 to 19.

*Fierasfer homei* Günther, Fische der Südsee, 3, 1909-10, p. 338; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 435.

*Carapus homei* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 445.

The depth is 10.9, the head 7.4 times in the length. The eye is 3.8, the snout 5.18 times in the head. The snout is somewhat pointed. The maxillary extends but little beyond the eye, its distal extremity not enlarged, its width 3.33 times in the eye. The pectoral is 1.11 times in the head, 14.7 times in the length.

In life the fish is translucent, colorless or very pale. In alcohol the color is yellowish white, the eye silvery. A specimen, 169 mm. long, was taken from a holothurian at Moorea. From a very large cake urchin taken by diving on the reef at Maraa, Tahiti, was secured a specimen, 95 mm. long.

#### *Carapus parvipinnis* (Kaup).

*Fierasfer parvipinnis* Kaup, Cat. Apodal Fish Brit. Mus., 1856, p. 160, pl. 16, fig. 2—Carteret Harbor, New Ireland; Günther, Fische der Südsee, 3, 1909-10, p. 338; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 330.

*Jordanicus parvipinnis* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 446.

The depth is 11.94, the head 8.96 times in the length. The eye is 8, the snout 6 times in the head. The pectoral is 3.42 times in the head, 30.7 times in the length. The snout is blunt, vertical, the mouth large, extending far beyond the eye, the posterior margin of the eye midway between the tip of the snout and the posterior extremity of the maxillary. The maxillary is expanded distally, its greatest breadth more than 0.9 the diameter of the eye. The dorsal is barely visible, except near the tip of the tail, where it is higher.

In life the animal was a warm reddish brown. In alcohol the same specimen is dusky brown on the head and trunk, the anal lighter or yellowish brown. Under a lens the ground color is seen to be pale brownish yellow densely sprinkled with minute brown dots.

The above description was taken from a specimen, 215 mm. long, taken from a large holothurian at Moorea. Three more specimens were taken from the same holothurian. In life two of them were very pale and translucent, the other one pale reddish brown. An alcoholic specimen, 88 mm. long, is yellowish, heavily sprinkled with brown dots.

### **Encheliophis vermicularis J. Müller.**

*Encheliophis vermicularis* J. Müller, Abhandl. Akad. Wiss. Berlin, 1843, p. 154, pl. 4, figs. 4 and 5—Philippine Islands; Günther, Fische der Südsee, 3, 1909-10, p. 339.

*Fierasfer* sp., Semper, Zeitschr. Wiss. Zool., 1862, p. 104.

The depth is 18.5, the head 12 times in the length. The body is very elongate, the head large, its breadth equal to the greatest depth, which is just at the posterior extremity of the gill opening, the greater part of the fish very slender and tapering. The mouth is large, oblique, the maxillary 1.75 times in the head, extending far beyond the small eye, which is 7 times in the head.

The color in alcohol is yellowish white, sparsely flecked with light brown specks, most numerous on the head. The color in life is usually dark brown. According to Semper it reaches a length of about 175 mm., but I have not seen any so large.

This species, readily recognized by the absence of pectorals, is not rare in the Sulu Sea, where I have collected numerous specimens. One specimen, 85 mm. long, of this interesting little fierasfer was taken from a holothurian at Moorea Island, Society Islands.

## Family BALISTIDAE

### **Balistapus aculeatus (Linnaeus).**

*Balistapus aculeatus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 328; Lay and Bennett, in Beechey's Voy., Zool., 1839, p. 69, pl. 22, fig. 2; Bleeker, Atlas Ichth., 5, 1865, p. 120, pl. 216, fig. 3; Day, Fishes India, 1878-88, p. 690, pl. 178, fig. 3.

*Balistapus aculeatus* Fowler, Proc. Acad. Nat. Sci. Phila., 1899, p. 496; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 414, pl. 62; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 333; Herre, Phil. Journ. Sci., 25, 1904, p. 440; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 452, pl. 46A.

*Balistes ornatissimus* Lesson, Voy. Coquille, Zool., 2, 1830, p. 119; Atlas, 1826, Poiss., pl. 10, fig. 1.

Dorsal III-24 or 25; anal I, 20 or 21. There are 40 scales in a longitudinal series plus 4 more on the caudal base, and 25 in a transverse series from the base of the first dorsal spine to the anus. The body is elongate-ellipsoid, compressed, its depth 2 to 2.4, the head 2.6 to 2.85 times, the snout 3 times in the length. The eye is very high up and almost at the posterior extremity of the head, 5 to 5.6 times in the latter. There are 3 to 5 enlarged, bony plates behind the gill slits, one of them almost as large as all the rest together. The blunt, first dorsal spine is 2.7 to 2.8 times in the head. There are 2½ rows of sharp recurved spines on the caudal peduncle.

The color in alcohol varies from gray to olive or pale brown above, the throat and belly paler to white. Behind the gill opening and extending to the caudal peduncle is a large, irregular, brown or blackish spot, with a band extending from it upward and backward to the soft dorsal origin. From its lower side 5 bands extend diagonally backward, the first to the anus, the next 3 to the anal fin. Behind them are 2 pairs of pearl white bands, from the middle of the side to the anal fin. A broad, brown or bluish, interorbital band is crossed by 3 narrow brown stripes. A brown band extends from the eye to the pectoral base, bounded by 2 or 3 bluish lines. Behind the upper lip is a bluish band. A yellow or orange or pale band extends from the angle of the mouth to the pectoral base. The spinous dorsal is brown or black, the other fins all pale. In life this is a very handsome fish and may always be recognized by the 4, pearl white, diagonal bands above the anal.

This species abounds in the crevices and water-holes left when the coral reef is laid bare at low tide, but is dislodged only with great difficulty. It seeks refuge in narrow-mouthed holes and fastens itself in securely by locking its dorsal trigger and ventral spine, after which it cannot be removed except by breaking away the coral or by breaking its first dorsal. When expanded it is much larger than the opening by which it entered.

This fish occurs in great abundance on the extensive coral flats around Viti Levu Island. Of the large number caught, 9 were kept, 142 to 174 mm. in length, taken on the reefs between Suva and Nukulau Island, Fiji. A specimen, 37 mm. long, was collected at Makatea, Tuamotu Islands, and one, 35 mm. long, at Tahiti. Another, 21 mm. long, was taken at Nukulau Island, Fiji. A very

young specimen, only 21 mm. long, taken at Maraa, Tahiti, is the *Balistes (Balistapus) heteracanthus* of Bleeker (Atlas Ichth., 5, 1865, p. 117, pl. 218, fig. 1) and is in all probability the young of *B. aculeatus*. The sides are silvery and there is a dusky band between the eyes.

### **Balistapus undulatus** (Mungo Park).

*Balistes undulatus* Mungo Park, Trans. Linn. Soc., 3, 1797, p. 37—Sumatra; Day, Fishes India, 1878-88, p. 691, pl. 177, fig. 4.

*Balistapus undulatus* Fowler, Proc. Acad. Nat. Sci. Phila., 1899, p. 496; Seale, Occ. Papers Bishop Mus., 4, 1906, p. 74; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 363; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 333; Herre, Phil. Journ. Sci., 25, 1924, p. 441, pl. 1, fig. 1; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 454.

*Balistes lamouroux* Quoy and Gaimard, Voy. Uranie, Zool., 1, 1824, p. 208, pl. 47, fig. 1.

*Balistes sesquilineatus* Bennett, in Beechey's Voy., Zool., 1839, p. 69, pl. 21, fig. 3.

*Balistes (Balistapus) lineatus* Bleeker, Atlas Ichth., 5, 1865, p. 118, pl. 229, fig. 2.

*Balistapus lineatus* Fowler and Bean, Proc. U. S. Nat. Mus., 62, 1922, p. 59.

Dorsal III-24 to 26; anal I, 22 or 23. There are 37 to 42 scales in a longitudinal series and 26 to 30 in a transverse series from the base of the first dorsal spine to the anus. The depth is 1.9 to 2.2, the head 3 to 3.2 times in the length. The eye is 4.8 to 5, the interorbital 3.7 in the head. The long, blunt, slightly concave snout is 1.12 to 1.3 times in the head and is 4 times as long as the eye, which is at the upper, posterior extremity of the head. There are 2 rows of very long, stout spines on the caudal peduncle.

The color in life is quite variable but the same general pattern always prevails. The ground color may be dark or pale green, or some shade of brown, with both head and body covered with wavy, diagonal lines and stripes of some shade of red, orange, or yellow. They are crowded on the head, and those about the mouth and chin usually unite to form a broader stripe extending back below the pectoral. On the trunk they run from the dorsal toward the anal and caudal. The spines on the caudal peduncle are in a circular, black patch. The fins are largely red, orange, or yellow, varying widely in different individuals. The membrane between the first and second dorsal spines is red, orange, or golden, with a violet or dark blue spot above. In alcohol the color is brown to black, the lines and stripes darker or paler than the ground color except around the mouth and chin where they may be whitish or

pale, and often disappearing, especially posteriorly. The fins are whitish to violaceous brown, the orange or yellow colors rarely persisting.

This is the commonest balistid in general and may be seen swimming about on the reefs everywhere. Eight specimens were collected at Moorea, from 52 to 188 mm. in length, and one near Suva, Fiji, 120 mm. long; 2 at Malo Island, New Hebrides, their lengths 149 and 165 mm.; 2 at Hog Harbor, Espiritu Santo Island, New Hebrides, 135 and 165 mm. in length; and 2 at Wala Island, New Hebrides, 126 and 180 mm. long. In the Solomon Islands a specimen, 122 mm. long, was taken at Ugi Island, and 2 at Tenibuli, Ysabel Island, 115 and 141 mm. long.

### **Balistes bursa** Bloch and Schneider.

*Balistes bursa* Bloch and Schneider, Syst. Ichth., 1801, p. 476—Indian Ocean, on Rozier, Journ., 3, 1774, pl. 1; Bleeker, Atlas Ichth., 5, 1865, p. 116, pl. 223, fig. 3; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 410, fig. 180; Herre, Phil. Journ. Sci., 25, 1924, p. 433; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 450.

*Balistapus bursa* Fowler, Proc. Acad. Nat. Sci. Phila., 1900, p. 510.

*Pachynathus bursa* Jenkins, Bull. U. S. Fish Comm., 22, 1902 (1903), p. 483.

*Sufflamen bursa* Jordan and Jordan, Mem. Carnegie Mus., 10, 1922, p. 83.

Dorsal III-28; anal I, 24 to 25; about 50 scales from the gill opening to the caudal base, and 24 to 30 from the first dorsal spine to the anus. There are 25 to 27 tubes in the lateral line. The depth is twice, or nearly twice, the head about 3 times in the length. The snout is 1.1 or 1.2, the eye about 4.3 times in the head. There is a spinous tubercle on each scale on the posterior part of the body. Below the soft dorsal these become short, stout, sharp, forward-pointing spines.

The color in alcohol is uniform olive brown, the throat and breast paler or buff. A dark brown, crescent-shaped band starts below the first dorsal spine, crosses the eye and ends before the pectoral base. A second, dark brown, crescentic band begins below the middle of the first dorsal, passes behind the gill opening, and across the pectoral base. A dark blotch extends from the anus over the ventral spine.

At Moorea a small specimen, 128 mm. long, was collected.

### **Balistes vidua** Solander.

*Balistes vidua* Solander, MS., in Richardson, Zool. Voy. Sulphur, Ichth., part 3, 1845, p. 128, pl. 59, figs. 9 and 10; Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 216; Jordan and Evermann, Bull. U. S. Fish Comm.,

23, part 1, 1903 (1905), p. 410, pl. 61; Günther, *Fische der Südsee*, 3, 1910, p. 438; Herre, *Phil. Journ. Sci.*, 25, 1924, p. 426; Fowler, *Fishes Oceania*, Mem. Bishop Mus., 10, 1928, p. 449.

*Melichthys vidua* Bleeker, *Atlas Ichth.*, 5, 1865, p. 109, pl. 217, fig. 2.

Dorsal III-34; anal 30. There are 75 to 80 scales in the lateral line, about 71 in a longitudinal series from the gill opening to the base of the caudal rays, and about 40 scales from the origin of the first dorsal to the anus. The depth is 1.75 to 1.95 times, the head 3.1 to 3.4 times, the snout 4.3 or 4.4 times in the length. The circular eye is about half its diameter in advance of the first dorsal, 4.9 to 5 times in the head. The nearly vertical gill slit is beneath the first dorsal spine, which is stout and very blunt, 1.75 times in the head. Behind the gill slit are 7, enlarged, bony plates, 2 of them much larger than the rest. The short, rounded pectoral is 2.3 to 2.45 times in the head. The ventral spine is very short, blunt, immovable. The soft dorsal and anal are of moderate height, the slightly concave caudal small.

The color in alcohol is brownish black. The soft dorsal and anal are yellowish white, entirely margined with black. The caudal is yellow with a broad, white base. The pectoral is yellowish white with a black, marginal line. In life the vertical fins and caudal may be pink.

Here described from 2 specimens, 152 and 192 mm. in length, collected at Takaroa Island, Tuamotu Archipelago. At Maraa, Tahiti, was obtained a specimen, 184 mm. long, and at Moorea Island one, 175 mm. in length.

### **Balistes viridescens** Bloch and Schneider.

*Balistes viridescens* Bloch and Schneider, *Syst. Ichth.*, 1801, p. 477, on *Le Baliste verdatre* Lacépède, *Hist. Nat. Poiss.*, 1, 1798, pp. 157, 213, pl. 7, fig. 3—Mauritius; Bleeker, *Atlas Ichth.*, 5, 1865, p. 112, pl. 231, fig. 2; Day, *Fishes India*, 1878, p. 689, pl. 177, fig. 2; Weber, *Siboga Exp.*, *Fische*, 57, 1913, p. 574, pl. 10, fig. 15; Herre, *Phil. Journ. Sci.*, 25, 1924, p. 431.

Dorsal III-24 or 25; anal 25. There are 29 or 30 scales from the gill opening to the caudal base, 18 to 20 in transverse series. The depth of the elevated, compressed body is 2 to 2.1 times, the head 2.8 to 3.1 times in the length. The eye is 5 to 6.75 times in the head and 4 to 5 times in the convex snout, which is 1.33 times in the head and 3.7 to 4 times in the length. The convex snout is covered with scales up to the thick, fleshy lips and has no naked places except the fold behind the angle of the mouth. The upper lip projects beyond the lower and does not conceal the stout, pointed

teeth. Behind the gill slit are several small, bony plates. The short to very short ventral spine is more or less movable. There are 5 or 6 rows of stout, recurved spines on the caudal peduncle. The caudal is truncate to rounded.

The color in life is grayish or greenish or olive green, the snout, chin, and breast paler or yellowish, with a wide, diffuse, dusky band across the forehead and through the eyes to the pectorals. There is a broad, dusky band above the upper lip with a narrow, yellowish stripe above it, and a wide, dusky band from over the angle of the mouth to beneath the eye. The lower lip is yellow or buff, with a white line beneath it. The color in alcohol varies from uniform brown to greenish gray or even blackish, rosy to whitish beneath, or olive brown mottled with dusky, often with a dark spot on the center of each scale. Many specimens have a large, dusky blotch under the soft dorsal. The bands on the head are much as in life. The first dorsal is spotted with blackish. The soft dorsal, anal, and caudal each have a wide, dusky, submarginal band.

A fine specimen, 315 mm. long, was taken at Hathorn Sound, New Georgia Island, one of the Solomon Islands. A young specimen, 24 mm. long, taken by the aid of an electric light in Suva Harbor, Viti Levu Island, Fiji, was dusky above, the rest of the body bright silver in life. In alcohol, the back and first dorsal are black or dark brown, the lower half of the body pale yellowish brown with blackish dots thinly sprinkled over the sides.

This is the largest of the balistids, reaching a length of three-fourths of a meter at least.

#### **Melichthys radula** (Solander).

*Balistes radula* Solander, MS., in Richardson, Voy. Samarang, Fishes, 1848, p. 21, pl. 6, figs. 1-4.

*Melichthys radula* Jordan and Evermann, Bull. U. S. Fish Comm., 23, 1903, p. 417, pl. 64.

*Melichthys ringens* Bleeker, Atlas Ichth., 5, 1865, p. 108, pl. 220, fig. 2.

*Balistes niger* Günther, Fishes Zanzibar, 1866, p. 135, pl. 19, fig. 1.

Dorsal II-31; anal I, 27. There are 61 scales in a longitudinal, 39 in a transverse series. The depth is 2.33, the head 3.33 times in the length. The small eye is high up, 5.4 times in the head, 3.75 times in the long snout, which is 1.44 times in the head. The dorsal spine is twice in the head; there are 7 or 8 longitudinal rows of short spines on the sides of the posterior half of the trunk, the median ones extending upon the caudal peduncle. The caudal is lunate, its pointed lobes more or less elongate.

The color in life is black, sometimes with glints of blue. A conspicuous stripe of bright blue runs along the base of the soft dorsal and the anal. The membrane of the spinous dorsal may be violet or violaceous brown or black. There is a faint blue line on the caudal, near its posterior margin. In alcohol the color is black, with very dark brown fins, and a bluish white line at the base of the soft dorsal and anal. There is a faint, submarginal white line on the caudal.

One specimen, 215 mm. long, was collected on Cocos Island.

This balistid is very abundant around the rocky shores of Cocos. It congregates in large schools, which form long, narrow files parallel with the coast for many hundreds of yards.

### Family MONACANTHIDAE

#### *Amanes scopas* (Cuvier).

*Acanthurus scopas* Cuvier, *Regne Anim.*, 2, 1829, p. 224, on Renard, *Poiss. Moluques*, 1, 1718, pl. 40, fig. 210.

*Amanes scopas* Bleeker, *Atlas Ichth.*, 5, 1865, p. 133, pl. 228, fig. 3; Jordan and Seale, *Fishes Samoa*, *Bull. Bur. Fish.*, 25, 1905 (1906), p. 365, fig. 68; Fowler, *Fishes Oceania*, *Mem. Bishop Mus.*, 10, 1928, p. 459.

*Monacanthus scopas* Günther, *Cat. Fishes Brit. Mus.*, 8, 1870, p. 232.

*Baliste hérissé* Lacépède, *Hist. Nat. Poiss.*, 2, 1798, p. 229, pl. 9, fig. 3, fig. very bad; in a later edition with colored plates the figure is recognizable.

Dorsal I-29; anal 24. The depth is 1.75, the head 3, the snout 3.2, and the caudal a trifle more than 5 times in the length. The eye is 4 times in the head, and a little more than 3.7 times in the snout. The body is compressed, deepest at the ventral spine, which is a firm, spiny tubercle. On each side of the middle of the body, opposite the anal origin, is a cluster of 5-8 very long and strong spines, 0.75 as long as the head.

The color is uniform tan or light brown, the caudal peduncle and fin blackish. The prominent teeth are white.

A specimen, 132 mm. long, was taken at Takaroa, Tuamotu Archipelago. Another, 127 mm. long, was collected at Tenibuli, Ysabel Island, Solomon Islands.

#### *Cantherines pardalis* (Rüppell).

*Monacanthus pardalis* Rüppell, *Neue Wirbelt.*, *Fische*, 1835, p. 57, pl. 57, fig. 3—Red Sea; Günther, *Fische der Südsee*, 3, 1910, p. 498, pl. 169, fig. B; Herre, *Phil. Journ. Sci.*, 25, 1924, p. 459; Fowler, *Mem. Bishop Mus.*, 10, 1928, p. 458.

*Liomonacanthus pardalis* Bleeker, *Atlas Ichth.*, 5, 1865, p. 136, pl. 230, fig. 2.

Dorsal I-32 (34 to 36 in Philippine specimens); anal 30. The depth of the strongly compressed body is 1.8 times, the head 3.6 times in the length. The large, circular eye is 3.5 times in the head and set so high up and far back that the snout equals the head in length. The first dorsal is over the anterior half of the eye, long, slender, roughened but not barbed, a trifle shorter than the head. The skin is everywhere covered with minute scales, velvety when stroked toward the tail but like fine sandpaper when stroked toward the head; no spines on the caudal peduncle.

The color in alcohol is uniform brown, without a trace of lines or markings. In life this species is very dark brown, with a faint hexagonal, pale network over the body. On the sides of the head are indistinct, wavy lines converging toward the mouth. The soft dorsal and anal rays are pale reddish or orange, the caudal brownish yellow. The pectoral is colorless, with a blackish base.

Here described from a specimen speared at Takaroa, its length 165 mm.

Ordinarily this fish swims solely by rapid undulations of the long soft dorsal and anal, the caudal being held motionless. It is only when excited or frightened that the caudal is used for locomotion. This fish is able to change its color to a remarkable degree, so that it may match its environment. Its color changes are made with astonishing rapidity.

### *Stephanolepis melanocephalus* (Bleeker).

*Monacanthus melanocephalus* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 95—  
Lawajong, Solor; Atlas Ichth., 5, 1865, p. 127, pl. 223, fig. 1; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 365, fig. 69; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 456.

*Stephanolepis melanocephalus* Herre, Phil. Journ. Sci., 25, 1924, p. 456.

*Monacanthus nitens* Hollard, Ann. Sci. Nat., Zool., 2, 1854, p. 364, pl. 14, fig. 4.

Dorsal I-30 to 32; anal 27 to 30. The depth from the origin of the soft dorsal to that of the anal is 2.15, and the depth to the base of the ventral spine is 1.7 times in the length. The head is 3.1 times, the caudal 4.5 times in the length. The eye is 4, the snout 1.3 times in the head. The body is very much compressed, the head pointed, with strongly concave snout. The eye is directly beneath the dorsal spine, the gill slit wholly under the eye. The dorsal spine is nearly equal to the head, with about 12 downward-pointing, stout spinelets on each side. The anterior dorsal and anal rays are nearly twice as long as the posterior ones. The scales are

small to minute, each with a single, sharp spinelet, longest on the caudal peduncle. The ventral spine is well developed, free, movable, armed with strong, sharp spines.

The color in life is very deep blackish green, with a velvety blackish bar from behind the eye to the pectoral base, covering the gill opening. The lower part of the abdominal flap has a black bar, margined with a pale blue line. The top of the head and snout are black. The caudal is bright orange, with 4 or more rows of blue spots and lines near the posterior margin. The dorsal and ventral are pale or orange, marked by numerous bars of spots and lines. The color in alcohol is very dark brown above, paler ventrally, with a velvety blackish spot around the gill opening. The ventral flap has a dark brown or blackish marginal band. The caudal is alternately barred by blackish and yellowish or whitish lines on the outer part. Its basal portion is dark brown. The soft dorsal and anal are pale (light orange in life) with 6 to 8 wavy lines of dark brown which were blue in life.

A specimen, 35 mm. long, was taken in Suva Harbor, Viti Levu Island, Fiji, with the aid of electric light.

### **Stephanolepis tomentosus (Linnaeus).**

*Balistes tomentosus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 328.

*Monacanthus tomentosus* Bleeker, Atlas Ichth., 5, 1865, p. 127, pl. 220, fig. 1 (male), pl. 229, fig. 1 (female); Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 272; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 457.

*Stephanolepis tomentosus* Herre, Phil. Journ. Sci., 25, 1924, p. 453, pl. 1, fig. 4.

Dorsal I-28 or 29; anal 27. The depth is 1.75 to 2, the head 3.15 to 3.3, the long, concave, pointed snout 4, the convex caudal 4 times in the length. The eye is 2.7 to 3, the snout 1.3 to 1.45 times in the head. The stout, backward-curved dorsal spine is over the posterior part of the eye, about equal to the head. On each angle of its rear side is a row of 9, strong, downward-pointing barbs. The freely movable ventral spine is armed on each side with stout, recurved spines. The dorsal and anal are both low, their middle rays highest. The scales are minute but distinct, with 3 to 5 spinelets on the posterior margin of each, the central spinelet longest. On the caudal peduncle is a patch of more or less conspicuous, bristly spines, which may be very small or absent in females or the young.

Some specimens in alcohol are black anteriorly, the rear half grayish brown, with a black bar on the gill opening and pectoral

base, the dorsal and anal with 6 or 8 rows of blackish dots, the caudal yellowish. A specimen, 64 mm. long, colored as above, was taken on a reef near Suva, Viti Levu Island, Fiji. A specimen, 37 mm. long, from Tenibuli, Ysabel Island, Solomon Islands, is brownish gray in alcohol, mottled and blotched irregularly with dusky brown. On the side behind the gill opening is a broad, curved, whitish band extending to a point above the anus. The caudal fin has 2 broad, dark crossbands. This specimen is like the one described by me (p. 455, l.c.), having small fibrils scattered over the body, especially on the posterior half, and being without spiny bristles on the caudal peduncle.

### Family OSTRACIIDAE

#### *Ostracion cornutus* Linnaeus.

*Ostracion cornutus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 331; Schlegel, Fauna Japonica, Poiss., 1846, p. 299, pl. 131, fig. 4; Bleeker, Atlas Ichth., 5, 1865, p. 33, pl. 202, fig. 2, and pl. 204, fig. 3; Day, Fishes India, 1878-88, p. 697, pl. 176, fig. 4; Günther, Fische der Südsee, 3, 1910, p. 457, pl. 171, 10 text figs.; Herre, Phil. Journ. Sci., 25, 1924, p. 476.

*Ostracion arcus* Bleeker, Atlas Ichth., 5, 1865, p. 35, pl. 202, fig. 3, and pl. 204, fig. 4.

Dorsal 9; anal 8 or 9; pectoral 10. The depth is 2.3 to 2.8 times, the head 2.9 to 3.6 times, the caudal 1.35 to 2 times in the length. The eye is 2.1 to 2.35 times, the snout 1.1 to 1.2 times in the head. The body is irregularly rectangular, with a low, narrow, often poorly defined, median ridge along the dorsal surface. The species may be known at once by the pair of very long, sharp, forward-pointing and divergent spines projecting from the large supra-orbital ridges and the pair of similar spines projecting backward from the posterior extremities of the ventrolateral ridges. There is a blunt, median spine on each dorsolateral ridge and one between them on the median, dorsal ridge. The anal fin is far behind the dorsal. The caudal fin is long, becoming very long in large specimens. In the young the spines are very long, becoming relatively much shorter in old specimens.

In life the color above varies from yellow to green, usually pale, greenish yellow, with 2 or 3 darker crossbands. There is a blue or pearly white spot on each plate of the dorsal and lateral surfaces. The under side is clear yellow to cream. The caudal peduncle and caudal fin may be sprinkled with olive brown, white-margined ocelli. The fins are yellow to transparent. In alcohol

the color is usually brownish, the belly pale yellow, but specimens may be gray, yellow, green, or blackish brown. The blue or pearly spots may be present or absent. Otherwise the colors are much as in life.

At Takaroa, Tuamotu Islands, was collected a very fine specimen, 240 mm. long (410 mm. with the caudal fin), and at Papeete, Tahiti, one, 265 mm. long (455 mm. with the caudal).

This fantastic fish has been known from the time of the earliest explorers and is recognizable at once by its horns, which give it the name of cow fish. It is a common resident of the coral reefs and is carried by the ocean currents all over the Indo-Pacific realm.

### ***Ostracion tuberculatus* Linnaeus.**

*Ostracion tuberculatus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 331; Herre, Phil. Journ. Sci., 25, 1924, p. 474.

*Ostracion tuberculatum* Jordan and Seale, Bull. Bur. Fish., 23, 1903 (1905), p. 367.

*Ostracion argus* Rüppell, Fische, Rothen Meers, 1828, p. 4, pl. 1, fig. 1.

*Ostracion cyanurus* Rüppell, Fische, Rothen Meers, 1828, p. 4, pl. 1, fig. 2.

*Ostracion tetragonus* Bleeker, Atlas Ichth., 5, 1865, p. 39, pl. 201, fig. 2, and pl. 203, fig. 2.

*Ostracion cubicus* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 260; Day, Fishes India, 1878, p. 696, pl. 181, fig. 3.

Dorsal 10; pectoral 10; anal 10. The depth is 2.5 to 3 times, the head 3.5 to 3.9 times, the caudal 3.5 times in the length. The snout is 1.4 times, the eye 3.45 times, the broad interorbital 1.5 times in the head. The length of the gill slit equals the eye. The spineless body is roughly rectangular with 4 blunt ridges, more prominent posteriorly. The back is more or less elevated along its middle, sometimes with a poorly defined predorsal ridge. Just above the upper lip is a large hump.

In life the color is yellow or brown, the belly paler, usually with a blue, dark-edged ocellus on each dorsal and lateral plate, more rarely on the ventral plates. The head and lower parts of the body are more or less sprinkled with small, dark brown spots. The caudal is spotted or pale. The dorsal base has 3 rows of small circular dark spots on each side. In alcohol the color is brown or blackish above and on the sides, the belly pale, with the ocelli appearing as brown spots with pale centers, or as pale, silver spots. Otherwise it is much as in life.

A specimen, 153 mm. long, was taken at Takaroa, Tuamotu Archipelago, and one, 95 mm. long, at Tahiti.

## Family TETRAODONTIDAE

**Spheroides annulatus** (Jenyns).

*Tetrodon annulatus* Jenyns, Zool. Voy. Beagle, 1842, p. 153—Chatham Island, Galapagos.

*Spheroides annulatus* Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1735.

*Anchisomus geometricus* Richardson, Voy. Herald, 1854, p. 156, pl. 30—Galapagos Islands (not of Bloch and Schneider).

*Tetrodon heraldi* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 273 (after Richardson's specimen).

Dorsal 8; anal 7. A specimen, 77 mm. long, has the depth 3.7 times, the head 2.6 times in the length. The very broad, nearly flat interorbital space is 2.3 times in the head, and a little shorter than the blunt snout, which is 2.14 times in the head. The small eye is 7.5 times in the head.

The color above varies from dark brown to brownish gray, the under parts white. The sides are thickly strewn with small, circular, blackish brown spots, which extend forward on the cheeks. A pale elliptical mark extends over the back from above the pectorals to the dorsal. There are 4 oblique, pale cross stripes on the head, 1 on the snout, 1 between and 1 behind the eyes, and 1 across the nape. On the caudal peduncle are 2 oblique, backward-directed, pale cross stripes. The dorsal, caudal, and pectorals are blackish, the anal pale.

From Tagus Cove, Albemarle Island, Galapagos, we have a specimen, 196 mm. long, and another, 153 mm. long, which has had its caudal region bitten off close behind the dorsal and anal fins. The wound had healed perfectly and the fish was in excellent condition when taken, apparently none the worse for its mutilation. At Eden Island 3 specimens were secured, their lengths from 68 to 122 mm.

**Spheroides lagocephalus** (Linnaeus).

*Tetraodon lagocephalus* Linnaeus, Syst. Nat., ed. 10, 1758, p. 332—India.

*Tetrodon lagocephalus* Günther, Fische der Südsee, 3, 1909-10, p. 461.

*Spheroides lagocephalus* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 467.

Dorsal I, 11; anal I, 10. The head is 2.36 times in the length. The eye equals the snout, 2.75 times in the head. The interorbital is 3.15 times, the least depth of the caudal peduncle 10 times in the head. The highly distensible abdomen is densely covered with 4-rooted prickles. The back is also covered with very minute

prickles, the rest of the body smooth. There is a conspicuous fold of skin from the chin to the caudal peduncle, separating the belly from the sides.

The color is gray above, with a number of rather indistinct, dusky crossbars and lines, the sides brilliant silver, the belly dull gray. The iris is silvery.

Here described from a young specimen, 26 mm. long, taken while we were fishing with electric light in Suva Harbor, Viti Levu Island, Fiji. When distended it seemed like a glistening ball of silver.

#### **Tetraodon immaculatus** Bloch and Schneider.

*Tetraodon immaculatus* Bloch and Schneider, Syst. Ichth., 1801, p. 507, on *Tetraodon sans tache* Lacépède, Hist. Nat. Poiss., 2, 1798, pp. 339, 355, pl. 15, fig. 1; Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 291; Day, Fishes India, 1878-88, p. 703, pl. 183, fig. 4; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 469.

*Tetraodon immaculatus* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 370; Jordan and Richardson, Bull. Bur. Fish., 27, 1907 (1908), p. 273; Herre, Phil. Journ. Sci., 25, 1924, p. 489.

*Crayracion immaculatus* Bleeker, Atlas Ichth., 5, 1865, p. 75, pl. 211, fig. 1.

*Tetraodon manillensis* Procé, Bull. Soc. Sci. Philomat., 1822, p. 130.

*Crayracion manillensis* Bleeker, Atlas Ichth., 5, 1865, p. 69, pl. 208, fig. 2; Kendall and Goldsborough, Mem. Mus. Comp. Zool., 26, 1911, p. 335.

*Tetraodon sordidus* Rüppell, Neue Wirbelt., Fische, 1835, p. 60, pl. 16, fig. 4.

*Tetraodon scaber* Eydoux and Souleyet, Voy. Bonite, Poiss., 1841, p. 214, pl. 10, fig. 1.

*Tetraodon virgatus* Richardson, Voy. Erebus and Terror, Zool., Fishes, 1846, p. 62, pl. 39, figs. 8 and 9; Voy. Herald, Zool., Fishes, 1854, p. 163, pl. 28, figs. 6 and 8.

Dorsal I, 9; anal I, 8. The head is 2.6 to 2.7 times in the length. The eye is 3.75 to 4.75, the snout 2.1 to 2.2, the interorbital 1.7 to 2, the depth of the caudal peduncle 2.7 to nearly 3 times in the head. The caudal equals the head. The body is elongate-wedge-shaped, its breadth equal to its depth when uninflated and about equal to the broad conical head. The nostril filaments are large, conspicuous, and two-lobed. The belly is capable of great distension and when fully expanded the fish is nearly globose.

The color in alcohol is brownish to very dark brown above, paler to white beneath. Many specimens have 12 to 20 bluish or blackish parallel longitudinal lines on the back, sides, and belly, the latter usually fading. Other specimens lack the lines and have the body uniformly colored. The upper and lower margins of the caudal are always black. The pectoral and dorsal bases are very

dark, the fins pale or yellowish, as are also the ventrals. The nasal tentacles are white.

A specimen, 52 mm. long, was collected at Suva, Viti Levu Island, Fiji, with the aid of electric light.

#### **Tetraodon reticularis** Bloch and Schneider.

*Tetraodon reticularis* Bloch and Schneider, Syst. Ichth., 1801, p. 506—Malabar; Day, Fishes India, 1878-88, p. 705, pl. 180, fig. 5; Günther, Fische der Südsee, 3, 1909-10, p. 466.

*Tetraodon reticularis* Herre, Phil. Journ. Sci., 25, 1924, p. 491.

*Tetraodon testudineus* Bloch, Ichthyologie, 4, 1787, p. 122, pl. 139 (not of Linnaeus), in part.

*Crayracion testudineus* Bleeker, Atlas Ichth., 5, 1865, p. 71, pl. 212, fig. 3.

Dorsal I, 9; anal I, 8. The head is 2.3 to 2.4 times in the length. The eye is 4.2 to 5, the snout 2 to 2.3, the interorbital 1.9 to 2, the depth of the caudal peduncle 2.9 to 3.1 times in the head. The body is wedge-shaped, with a very broad, blunt head and conical snout, and is little compressed except on the caudal peduncle. The belly is highly distensible, the fish nearly globose when inflated. The nasal filaments are conspicuous and coarsely bilobed. The whole body except the lips is covered with white bristles.

The color in alcohol is dirty gray to blackish above, becoming yellowish white on the belly, with circular, white spots everywhere except on the belly, which is marked by 16 to 18, longitudinal, black stripes. Posteriorly many of them turn up at an obtuse angle and are lost in the dark color above. The pectorals and gill openings are in a black spot, with 1 or 2, encircling, white lines. The caudal is white-spotted, the other fins plain yellowish, the dusky bases of the dorsal and anal with white spots.

A specimen, 180 mm. long, was taken in the harbor at Suva, Viti Levu Island, Fiji.

### Family CANTHIGASTERIDAE

#### **Canthigaster bennetti** (Bleeker).

*Tetraodon ocellatus* Bennett, Fishes Ceylon, 1834, p. 21, pl. 21—Ceylon (not of Bloch).

*Tropidichthys bennetti* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 504.

*Tetraodon bennetti* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 301; Macleay, Proc. Linn. Soc. N. S. Wales, 8, 1883, p. 280; Günther, Fische der Südsee, 3, 1909-10, p. 471.

*Canthigaster bennetti* Evermann and Seale, Bull. Bur. Fish., 26, 1906, p. 101; Herre, Phil. Journ. Sci., 25, 1924, p. 502; Fowler, Mem. Bishop Mus., 10, 1928, p. 466.

*Canthogaster ocellatus* Bleeker, Atlas Ichth., 5, 1865, p. 80.

*Pylonotus ocellatus* Bleeker, Atlas Ichth., 5, 1865, pl. 214, fig. 5.

Dorsal I, 8; anal I, 7. The depth is 2.5, the head 2.9 times in the length. The eye is 4.8, the snout 1.5, the interorbital 3 times in the head.

A specimen, 23 mm. long, had the sides and belly very bright silver, the dorsal region umber. Over the back and sides small circular, blue spots are sparsely scattered, more numerous on the sides of the head. A large, black, blue-margined ocellus is on the dorsal base. Two or 3 blue lines pass through the eye and continue upon the snout. The fins are clear.

One specimen, 23 mm. long, was taken with electric light in Suva Harbor, Viti Levu Island, Fiji.

### *Canthigaster margaritatus* (Rüppell).

*Tetraodon margaritatus* Rüppell, Atlas, Fische, Rothen Meers, 1828, p. 66—Red Sea.

*Tetrodon margaritatus*(a) Günther, Fische der Südsee, 3, 1909-10, p. 470.

Dorsal I, 9; anal I, 8. The depth is 1.6, the head 2.48, the caudal 3 times in the length. The eye is 4.9, the snout 1.4, the interorbital 3.3, the least depth of the caudal peduncle 1.7 times in the head.

In alcohol the color is dusky above, the belly and throat pale yellowish, the entire body except the under side covered with pearly blue, black-margined ocelli. Those on the back and upper part between the head and dorsal fin and low down on the sides of the head are largest. They become very small on the caudal peduncle and minute about the eyes. There are 4 blue bands on the interorbital space crossing between the eyes, and blue lines radiating from the eye and a line below it. The spots on the top of the snout pass into lines. On the abdomen are about 18, longitudinal, pale blue lines. There is a large, black spot on the base of the dorsal. The caudal is covered with small ocelli basally, which become much larger posteriorly and pass into vertical rows or crossbars. It has a blue line along its posterior margin. The other fins are all clear.

Here described from a specimen, 62 mm. long, collected at Moorea Island, Society Islands.

### *Canthigaster solandri* (Richardson).

*Tetrodon solandri* Richardson, Voy. Sulphur, Fishes, 1844, p. 125, pl. 57, figs. 4-6—Polynesia.

*Canthigaster solandri* Seale, Occ. Papers Bishop Mus., 4, 1906, p. 79; Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 371.

Dorsal I, 8; anal I, 8 or 9. The depth is 2, the head 2.5, the caudal 3.2 times in the length. The eye is 5, the snout 1.33, the interorbital 2.8, the caudal peduncle 1.75, the caudal 1.25, the pectoral 2.33 times in the head.

In alcohol the color is brown above, the under parts pale brownish to whitish, thickly strewn everywhere except beneath with black or brown-margined pale whitish ocelli, those on the anterior part of the body and on the head often with dark centers. Three lines (blue in life) radiate forward and backward from the eye, and in young specimens there are 3 or 4 across the interorbital. There is a black spot at the base of the dorsal. The ocelli extend upon the caudal, forming vertical rows extending almost to its tip.

Here described from 2 specimens, 40 and 71 mm. long, taken at Bora Bora, Society Islands. Two others, 28 and 30 mm. long, are from Ovalau Island, Fiji.

#### Family DIODONTIDAE

##### *Diodon hystrix* Linnaeus.

*Diodon hystrix* Linnaeus, Syst. Nat., ed. 10, 1758, p. 335—India; Day, Fishes India, 1878-88, p. 708, pl. 179, fig. 4; Jordan and Evermann, Fishes N. and Mid. Amer., 2, 1898, p. 1747, pl. 266, fig. 648; Jordan and Evermann, Bull. U. S. Fish Comm., 23, part 1, 1903 (1905), p. 437, fig. 192; Herre, Phil. Journ. Sci., 25, 1924, p. 504; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 472, fig. 79.

*Diodon atinga* Bloch, Ichthyologie, 4, 1787, p. 75, pl. 125.

*Paradiodon hystrix* Bleeker, Atlas Ichth., 5, 1865, p. 56, pl. 207, fig. 2.

*Diodon punctatus* Peters, Monatsb. Akad. Wiss. Berlin, 1868, p. 276.

Dorsal I, 12 or 13; anal I, 11. The head is 2.5, the caudal 4.2 times in the length. The large eyes are 3.8 times in the head, 1.6 times in the broad, blunt snout, the latter 2.33 times in the head. The flat, broad interorbital is 1.4 times in the head. The depth of the caudal peduncle equals the eye. The thick, heavy body is very broad anteriorly, the snout very short, the mouth wide. The whole body, except the snout and sides of the tail, is covered with long, stout, and very sharp spines, those behind the pectorals largest. Those on the posterior part of the back are short and at least some of them are 3-rooted. All other spines are 2-rooted and erectile, except 2 or 3 pairs of non-erectile spines on the top of the caudal peduncle and 1 or 2 pairs on its ventral surface.

The color in life is brown above, paler on the sides, the belly white. Behind each spine or on its base, on the dorsal surface and sides of the head and body, is a rounded black or dark brown spot.

Similar spots are also present on the snout, caudal peduncle, and the dorsal, pectoral, and caudal fins. The anal is colorless. In alcohol the color changes but little. The dorsal surface largely blackens, the belly is creamy white, and the anal is yellowish.

A specimen, 200 mm. long, was taken at Maraa, Tahiti. This species occurs in all the warm seas, but apparently is nowhere abundant, in spite of its formidable defensive armor.

### **Chilomycterus affinis** Günther.

*Chilomycterus affinis* Günther, Cat. Fishes Brit. Mus., 8, 1870, p. 314; Snyder, Bull. U. S. Fish Comm., 22, 1902 (1904), p. 535; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 473.

Dorsal I, 10; anal I, 12. The head is 3.25 times in the length. The eye is 6.5, the snout 2.5 times in the head.

The color is pale olive brown, the under side white. The entire body, except the under side, is sprinkled with circular, black spots. The fins are thickly strewn with smaller, dark brown spots.

One large specimen, 275 mm. long, was picked up as it was swimming at the top of the water beside the landing place at Academy Bay, Indefatigable Island, Galapagos.

## FISHES FROM THE SEPIK RIVER, NEW GUINEA

The Sepik River is the largest stream in the northern half of New Guinea, and is the most important river in the territory formerly known as German New Guinea. On some maps it is still named the Kaiserin Augusta River.

At its mouth the Sepik is about half a mile wide, and 300 miles in the interior it is still of the same width and very deep. The basin of the Sepik is a network of streams, lakes, and swamps, as might be expected in a region with a rainfall of 100 to 400 inches annually. These waters, like the lowland streams of northern South America, are of two kinds, the ordinary streams of "white" water, and the "black" water streams with clear but very dark brown water, almost black. The latter are richest in fish life, and the native villages are usually upon the "black" streams.

Very little opportunity was afforded to collect while on the Sepik, but a number of rarities were secured and there is no question but that the whole region supports a very rich fish fauna. Fish are a staple diet with the Papuans, most of their catch being secured by means of rattan and bamboo traps.

The following localities are represented in the collections: *Illyria* anchorage, 20 miles from sea; Marienberg, 40 miles from sea; Timbukte, 120 miles from sea; Kanganaman, 175 miles from sea; Nyaurangai, about 185 miles from sea; Koragu, about 215 miles from sea; Malu, 230 miles from sea; Tsenap, 345 miles from the sea; Kabarao, about 360 miles from sea; mouth of the May River, 405 miles from sea.

On the Kerame River, a tributary of the Sepik, small collections were made at Ambot, about 25 miles from the Sepik, and at Gorogopa nearly 50 miles from the Sepik.

The thirty species collected represent but a small part of the fish fauna of the Sepik River.

#### Family PRISTIDAE

##### *Pristis perotteti* Müller and Henle.

*Pristis perotteti* Müller and Henle, *Plagiost.*, 1841, p. 108—Senegal; Günther, *Cat. Fishes Brit. Mus.*, 8, 1870, p. 436; Day, *Fishes India*, 1878, p. 729, pl. 191, fig. 1.

This sawfish seems to be common in the Sepik River and is very well known to the natives. A great many saws of various sizes were seen at Koragu, about 215 miles from the sea, and 2 were purchased, 205 and 220 mm. long.

Garman gives this species as *Pristis microdon* Latham, but the determination of Latham's figure is somewhat dubious. I therefore prefer to follow the disposition of Müller and Henle.

#### Family ANGUILLIDAE

##### *Anguilla pacifica* J. Schmidt.

*Anguilla pacifica* J. Schmidt, *Danish Eel Invest. during 25 Years*, p. 8, no date, text from Dana's *togt Omkring Jorden 1928-30*, 1932.

*Anguilla bicolor* f. *pacifica* J. Schmidt (in correspondence).

*Anguilla australis* Herre (not of Richardson), *Phil. Journ. Sci.*, 23, 1923, p. 138.

*Anguilla australis* Weber and Beaufort, *Fishes Indo-Austr. Arch.*, 3, 1916, p. 249, at least in part.

The origin of the dorsal varies slightly and may be above that of the anal fin, or over or slightly in advance of the anus. The teeth in the upper jaw form a continuous band, broad anteriorly and tapering posteriorly, uniting anteriorly with the elongate paddle-shaped or pear-shaped band of vomerine teeth which extends as far back as do the maxillary teeth. The teeth of the lower jaw are in two bands, separated at the symphysis by a groove, tapering

posteriorly. In larger specimens they are united at the extreme anterior portion.

The color in alcohol is dull dark olive brown above, paler low down on the sides and yellowish beneath. In life the tubes of the anterior nostrils are bright orange.

At Marienberg the young of this eel were observed in vast swarms ascending the river and filling every tributary brook in incredible numbers. There were 262 specimens, from 104 to 210 mm. in length, kept, and a large series sent to Dr. Johannes Schmidt at Copenhagen for determination and study. These have not yet been returned, as Dr. Schmidt needed them for further comparison with young eels from other localities.

A specimen, 625 mm. long, was collected at Ambot, Kerame River. The dorsal begins in advance of the anus, the distance between the dorsal and anal origins 4.68 times in the head. The large head is 7 times in the length. The eye is 12.7 times in the head.

### *Anguilla spengeli* Weber.

*Anguilla spengeli* Weber, Zool. Jahrb., Suppl., 15, 1912, p. 591; Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 249; Herre, Phil. Journ. Sci., 23, 1923, p. 139, pl. 1, fig. 1.

A young specimen caught in a brook at Marienberg, on the Sepik River, is referred here. The length is 135 mm., the depth 27 times, the head 7.8 times in the length. The mouth is oblique, with prominent lower jaw, the gape extending to the hind margin of the pupil. The teeth are in broad bands in the jaws, those above scarcely separated from the vomerine band, which does not extend back as far as the maxillary bands. The dorsal origin is just before the anus, the distance between the dorsal and anal origins 4.1 times in the head.

The color in alcohol is dark olive brown, pale olive below.

## Family MYRIDAE

### *Muraenichthys schultzei* Bleeker.

*Muraenichthys Schultzei* Bleeker, Nat. Tijds. Ned. Ind., 13, 1857, p. 366—Karangbollong, Java; Atlas Ichth., 4, 1864, p. 33, pl. 148, fig. 3.

*Muraenichthys schultzei* Weber and Beaufort, Fishes Indo-Austr. Arch., 3, 1916, p. 277, figs. 123 and 124; Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 41.

The depth is 24.8, the head 7.66 times in the length. The head and trunk together are 1.48 times in the length. The eye is very

small, 12 times in the head, about over the middle of the mouth, less than twice in the snout. The gape is 3 times the eye, and 4 times in the head. The origin of the dorsal and anal are opposite. The teeth are in rather broad bands on the jaws and vomer, small, granular, those on the intermaxillary in a nearly circular group.

The color in alcohol is pale yellowish, darker above with minute blackish specks over the upper half.

A specimen, 92 mm. long, was seined from a brook at Marienberg. This little eel, known from the Red Sea to Funafuti, in the South Seas, has not hitherto been recorded from fresh water so far as I am aware.

#### Family DISPARICHTHYIDAE

##### Genus *Disparichthys* Herre.

*Disparichthys* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, p. 383.  
Type, *Disparichthys fluviatilis* Herre.

Extremely elongate, cylindrical, scaleless. Tail tapering. Vent very far forward. Anal beginning at throat, far in advance of the less-developed dorsal. Jaws short and blunt. Maxillary above premaxillary and overlapping it. Teeth in a single series in both jaws. Maxillary toothless. A short row of teeth on vomer. Tongue adherent. Gill openings wide and nearly confluent. Pectorals very small. Branchiostegals few.

##### *Disparichthys fluviatilis* Herre.

*Disparichthys fluviatilis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 384, fig. 31.

Depth more than 70; head more than 28 in length; tail broken, apparently a considerable portion missing. Eye 3.33, snout 3.33 in head. A single row of teeth in each jaw, those in lower jaw small, but much larger than the minute teeth of upper jaw. Two median, fixed teeth on vomer, the hind one much larger than any other tooth in the mouth. Anal begins at the throat.

One specimen from a brook at Marienberg, Sepik River, New Guinea.

#### Family ARIIDAE

##### *Arius leptaspis* (Bleeker). Fig. 42.

*Hexanematichthys leptaspis* Bleeker, Atlas Ichth., 2, 1862, p. 27, pl. 65, fig. 2.  
*Arius leptaspis* Weber and Beaufort, Fishes Indo-Austr. Arch., 2, 1913, p. 303, fig. 128.

Branchiostegals 6; dorsal I, 6; anal 19; pectoral I, 9. The body is elongate, slender, posteriorly compressed, the head broad, de-

pressed, the upper profile in a steep, straight line from the dorsal to the tip of the snout, the proportions varying considerably with age. The depth is 4.5 to 5.1, the head 3 to 3.3, the deeply forked caudal 2.7 to 3.66 times in the length. The breadth of the head is 1.2 to 1.4 times in its own length. The eye is 7.55 to 8.8, the snout 2.5 to 2.6, the interorbital 1.75 to 1.9, the least depth of the caudal peduncle 3.85 to 4 times in the head. The head shields are granular,

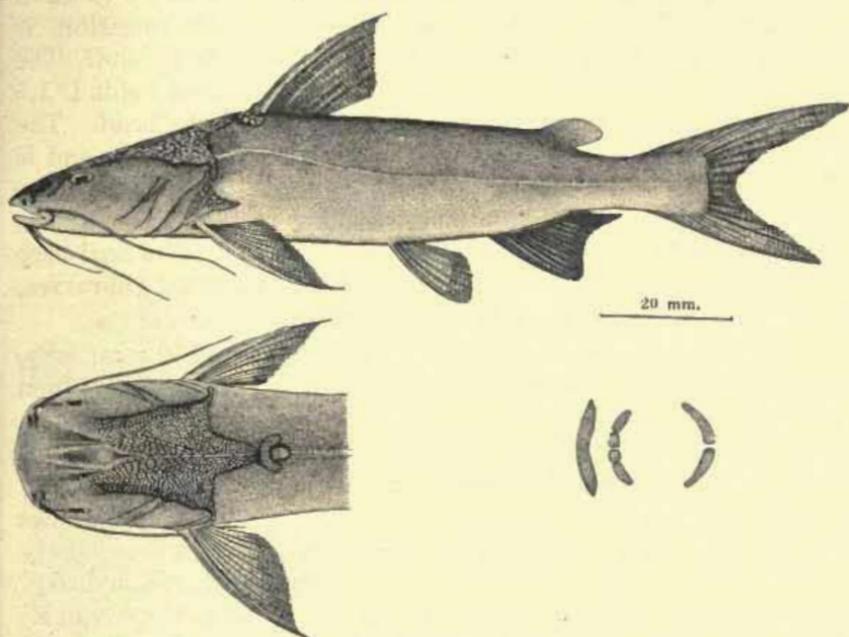


FIG. 42. *Arius leptaspis* (Bleeker), Sepik River, New Guinea; showing dorsal view of head and outline of tooth pattern.

arranged both in concentric and radiating lines. The occipital process is longer than broad, keeled in some specimens along the median line but not in very large specimens, its sides straight and converging posteriorly, scarcely reaching the narrow, semicircular, granulated basal bone before the dorsal spine. The fontanel is shortened anteriorly and especially posteriorly, and is less than one-third the length of the head. An oval fontanel is above the opercle. The humeral process is granular. The maxillary barbel extends nearly to the middle of the pectoral and is equal to the head. The mouth is very wide, the upper lip projecting so that the upper teeth are largely visible when the mouth is closed. The teeth are very small,

slender, depressible, in a continuous band in the upper jaw, its width one-tenth of its length. In the lower jaw the teeth are in 2 separate bands, slightly curved, tapering outwardly. The palatal teeth are in a curved band of somewhat ellipsoid patches, the outer patches a little longer than the inner ones, all the patches separated from each other or rarely touching each other. The distance between the dorsal and the adipose fin equals the head, or a little less. The height of the dorsal is 1.25 times, the dorsal spine 1.8 to 1.9 times in the head. The dorsal spine has a filamentous prolongation, is granulated along its front side and somewhat serrated behind. The pectoral spine is smooth to granulose before, serrated behind, 1.5 to 1.6 times, the pectoral fin 1.25 to 1.4 times in the head. The base of the adipose dorsal is 0.6 to 0.75 of the dorsal base and is contained 4 to 4.3 times in the distance from the dorsal to the adipose fin. The ventrals are long, reaching to the anal origin or upon its anterior fourth, 1.8 to 2 times in the head. The anal base is 2 to 2.2 times in the head. There are 12 or 13 flattened gill-rakers, the longest three-quarters of an eye's diameter.

In life the color is bluish dusky. A specimen, 236 mm. long, was silvery over all, the upper half with beautiful bronze and golden reflections. Another specimen, 220 mm. long, was bluish dusky above with a brassy luster, and transverse lines of more or less golden spots, the rows often broken at the lateral line. In alcohol the color is purplish to dusky brown (rarely paler) above, the sides paler or bluish with a silver luster, the under parts white or nearly so. The humeral process is shining silver. The adipose fin is dusky, the dorsal and pectorals dusky or the pectorals pale or whitish on the under side. The caudal is yellowish to brownish. The anal and ventrals vary from brownish to nearly white.

Described from the following specimens from the Sepik River, New Guinea: one, 350 mm. long, taken about 20 miles from the sea; four, 226 to 275 mm. long, from Marienberg, 40 miles from the sea; one, 212 mm. long, from Malu, 230 miles from the sea; two, 236 and 275 mm. long, from Tsenap, 345 miles from the sea; one, 240 mm. long, from Kabarao, about 360 miles from the sea. Another specimen, 196 mm. long, was obtained at Ambot, a village on the Kerame River, a tributary of the lower Sepik. Four specimens, 108 to 118 mm. in length, obtained at Koragu, a village about 215 miles from the mouth of the Sepik, also seem to belong here.

**Arius solidus** Herre. Fig. 43.

*Arius solidus* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 385.

Branchiostegals 6; dorsal I, 7; anal 18; pectoral I, 9; gill-rakers 8+14 or 15. Depth 3.85 to 4.75, head 2.96 to 3.25, caudal 2.9 to 3.2 in length. Eye 6.33 to 8.3, snout 2.7 to 3, interorbital 1.8 to 2, depth of caudal peduncle 3.8 to 4, length of median fontanel less than 2, dorsal spine 1.8 to 1.95, dorsal base 1.4 to 1.6, pectoral spine 1.5 to 1.7, anal base 1.9 to 2.2, ventral 1.9 to 2 in head. Base of adipose 1.6 to 1.8 in base of dorsal and 4 to 6 in distance from dorsal to adipose. Mouth wide. Upper lip thin. Lower lip not much thickened but with a wide, thick fold at angles of mouth. Teeth

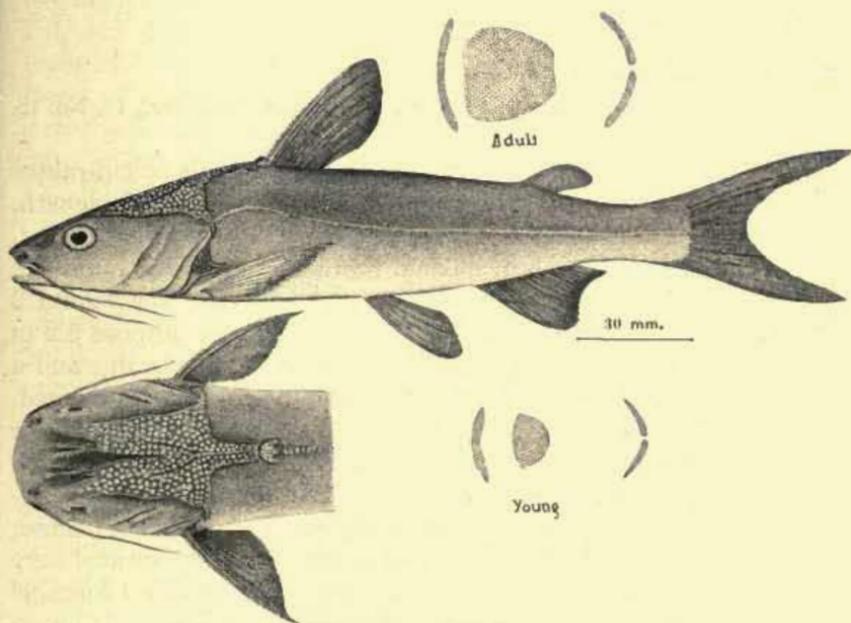


FIG. 43. *Arius solidus* Herre, Sepik River and Kerame River, New Guinea; showing dorsal view of head and outline of tooth pattern in adult and young.

not visible when mouth is closed. Upper teeth in a single, arched band, widest behind. Lower teeth in a narrow, discontinuous band, widest in front. Entire palate covered by a solid plate of finely granulate teeth. Maxillary barbel extends about to base of pectoral. Head shields granular, with radiating lines. Occipital process broad, its width three-quarters of its length, sides converging behind, rear end truncate, reaching basal bone of dorsal spine. Median fontanel very elongate, forward end almost to lip, rear end reaching nearly to nape. An oval fontanel above opercle. Humeral process tri-

angular, smooth. Dorsal spine rough-granulose in front, small barbs behind, above, nearly smooth below, with a filamentous prolongation. Pectoral spine granulose to bluntly barbed in front, strongly barbed behind, with a filamentous prolongation. Ventral reaches the base of the anal.

Color in life, rich golden bronze, with 2 rows of golden spots. In alcohol, the color is rich purplish brown above, yellowish or white below. Fins more or less dusky.

Thirty-three specimens collected at Timbunke, Kanganaman, and Nyaurangai on the Sepik River, and from Koragu on the Kerame River, New Guinea.

### *Arius kanganamanensis* Herre.

*Arius kanganamanensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, p. 387, fig. 32.

Dorsal I, 7; pectoral I, 9; anal 17; branchiostegals 5; gill-rakers 8+17. Depth 4.9, head 3.25, caudal 3.6, pectoral 1.35 in length. Eye 6.1, snout 3, interorbital 1.5, depth of caudal peduncle 3.4, width of head 1.37, length of median fontanel 1.4, dorsal spine 1.6, dorsal base 2.75, base of adipose 5.5, anal base 1.9, ventral fin 2 in head. Eye 2 in snout, 4 in interorbital. Base of adipose 5.2 in distance from dorsal to adipose. Mouth wide, with thin lips and a thickened fold at angles. Teeth not visible when mouth is closed. Upper teeth in a band, divided at middle. Lower teeth in a narrower band, also divided. Vomerine teeth in a single large patch with lateral lobes. Head shields granulose, with radiating lines. Occipital process rather narrow, its sides nearly parallel, truncate behind, nearly reaching bone at base of dorsal spine. Median fontanel very long, pointed at both ends, nearly reaching nape. An oval fontanel under the upper end of the opercle. Humeral process smooth, upper margin concave. Maxillary barbel extends upon pectoral base, equals mandibular barbel, twice snout, equal to depth. Dorsal spine granulose in front or with one or two small spines near tip, barbed behind. First dorsal ray a little longer than spine. Pectoral spine a little shorter than dorsal and more strongly barbed. Ventral does not reach origin of anal.

Color in alcohol, chocolate to blackish above, paler below, yellowish on belly. Ventrals yellowish, with dusky streaks distally, other fins all blackish.

Two specimens were collected at Kanganaman, Sepik River, New Guinea.

**Subgenus *Brustiarius* Herre.**

*Brustiarius* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 388.

Type, *Arius nox* Herre.

Distinguished by increased number of gill-rakers.

***Arius nox* Herre.**

*Arius nox* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 388.

Dorsal I, 7; anal 17 or 18; pectoral I, 8 or 9, gill-rakers 16+28 to 44. Depth 4.6 to 5.55, head 3 to 3.33, caudal 3.25 to 3.66 in length. Eye 6 to 6.9, snout 3 to 3.2, interorbital 2.12 to 2.3, depth of caudal peduncle 4 to 4.44, width of head 1.5 to 1.9, median fontanel 1.3, dorsal spine 1.7 to 1.9, pectoral spine 1.75 to 2.15, height of dorsal 1.4 to 1.6, pectoral 1.4 to 1.8, ventrals 1.7 to 2.25 in head. Body slender, elongate. Dorsal profile descending in a steep, nearly straight line from dorsal origin to tip of snout, slightly concave at and behind interorbital. Snout broadly rounded. Head narrow. Caudal deeply forked. Mouth wide. Jaws weak. Lips thin. Teeth entirely hidden when mouth is closed. Labial fold at angles of mouth little developed. Gill-rakers long and slender. Upper teeth in a continuous band, widest behind. Lower teeth in 2 bands, widest in front. Palatal teeth in 4 patches, forming an arched band. Head shields finely granulate, with radiating lines. Occipital process slender, its width a little more than half its length, its sides converging. Median fontanel very narrow, elongate, almost reaching occipital process. Humeral process small, triangular, smooth. Maxillary barbel does not usually reach the hind margin of the opercle. Mandibular barbel equals the maxillary barbel. Eye with a narrow free margin. Dorsal and pectoral spines noticeably slender, their anterior margins granulose, small blunt serrations behind, tips with filamentous prolongations. Ventrals seldom reach anal base.

Color in alcohol black, under surface and a little of lower side white. Fins black, ventrals somewhat paler.

Twelve specimens collected at Nyaurangai and Kanganaman, Sepik River, New Guinea.

***Hemipimelodus papillifer* Herre. Fig. 44.**

*Hemipimelodus papillifer* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 390.

Dorsal I, 6, 1; anal 19; pectoral I, 10; gill-rakers 9 or 10; branchiostegals 5. Depth 4.6 to 4.7, head 3.3 to 3.8, caudal 3.7 to 3.95, pectoral 4.25 to 4.4, dorsal spine 5.3 to 5.5 in length. Eye 7 to 7.6, snout 2.75, interorbital 2.2 to 2.25, depth of caudal peduncle 3.75

to 4.3, median fontanel more than 2, dorsal spine 1.45 to 1.65, height of dorsal 1.3, anal base 1.5 to 1.75, ventrals 1.95 to 2.15 in head. Base of adipose fin 3.3 to 4 in distance from dorsal to adipose, two-thirds as long as base of dorsal. Body elongate, slender, compressed behind. Head pointed in front. Anterior profile descending in a steep, straight line from dorsal origin to tip of snout. Top of head nearly smooth. Some granules on occipital process, which is keeled behind. Median fontanel does not extend to occipital process. Humeral process roughly triangular, pointed behind, no crest or

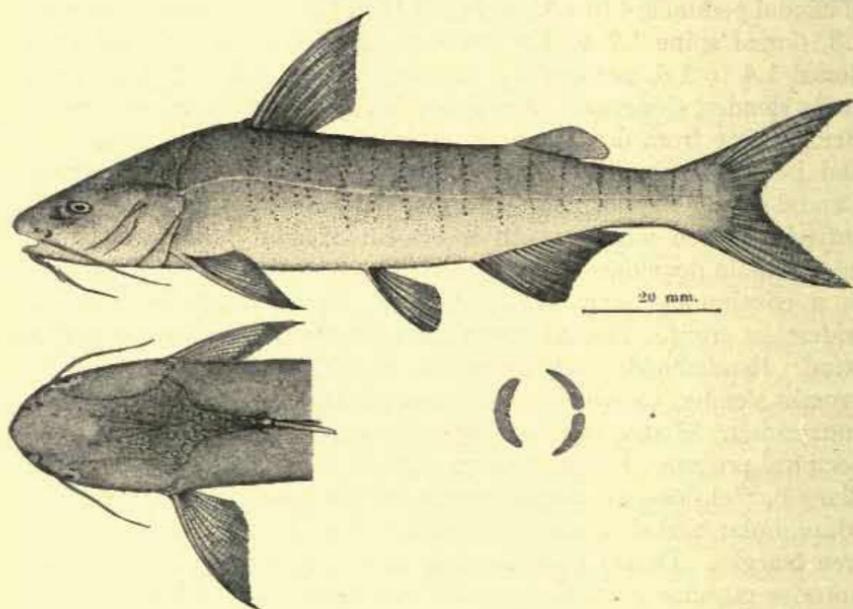


FIG. 44. *Hemipimelodus papillifer* Herre, Sepik River, New Guinea; showing dorsal view of head and outline of tooth pattern.

ridge. Eye has a narrow free margin. Posterior margin of eye midway between tip of snout and posterior angle of opercle. Mouth small. Upper lip thick, projecting, a thick fold at angles. Upper band of teeth nearly entirely exposed when mouth is closed. Maxillary barbels extend upon the pectoral base or to end of first third of fin. Other barbels shorter. Dorsal spine granulose in front, apparently smooth behind, with a filamentous tip. Pectoral spine smooth or granulose in front, serrate behind. No axillary pore at pectoral.

Color in life bluish dusky above, silvery on sides and white below. Caudal yellowish.

Three specimens collected at Timbunke and Marienberg, Sepik River, New Guinea.

Family HEMIRHAMPHIDAE

*Zenarchopterus sepikensis* Herre. Fig. 45.

*Zenarchopterus sepikensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 391.

Dorsal 13 or 14; anal II, 10; scales 57 or 58, 7 above to dorsal origin. Depth 7 to 7.3, head 3.6 to 3.8, measured from tip of upper jaw; beak 4 to 4.6 in length. Eye 4.6 to 4.9, pectoral 1.35 to 1.5, fifth dorsal ray 1.5 to 2.1 in head. Breadth 1.5 to 1.6 in depth. In males the anal base is 2.5 to 2.9 in dorsal base, 3 in females. Eye

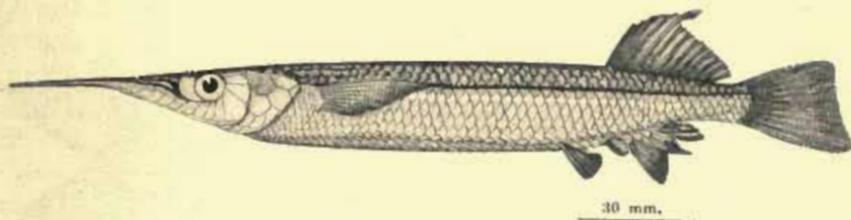


FIG. 45. *Zenarchopterus sepikensis* Herre, Sepik River and Kerame River, New Guinea.

2 to 2.25 in postorbital, 0.8 of interorbital. Breadth of preorbital 2 in eye. Body elongate, compressed. Length of upper jaw a trifle more than its basal width. Pectoral one-fourth to one-half longer than postorbital part of head. Fifth (occasionally sixth) dorsal ray thickened, elongate, often much curved. Anal origin under third dorsal ray in males, fourth in females. Fourth anal ray of males much enlarged, with spatulate, triangular distal half, fifth and sixth rays also enlarged. Posterior margin of anal concave in females. Ventrals less than one-half length of pectorals. Distance from ventral origin to base of caudal 1.7 to 1.8 in distance from ventral origin to eye. Caudal diagonally truncate, lower part longest.

Twenty-three specimens collected at Koragu and Marienberg, Sepik River, and Ambot, Kerame River, New Guinea.

Family MELANOTAENIIDAE

*Melanotaenia kabia* Herre. Fig. 46.

*Melanotaenia kabia* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 397.

Dorsal I, 3 or 4-I, 9 to 11; anal I, 17 to 20; scales 35 to 37+2, transverse series 15, predorsal 22 or 23. Depth 2.45 to 2.7, head 3.5 to 3.9, caudal 3.4 to 3.85, pectoral 4.7 to 5.1 in length. Eye 3.25 to 3.7, snout 3.25 to 3.7, interorbital 2.8 to 3, depth of caudal peduncle 2.4 to 2.6, pectoral 1.3 to 1.4, height of first dorsal 1.33 to 1.5, last ray of dorsal 2, height of anal 1.33 to 1.5 in head. First and second dorsal spines 1.5 to 1.6 in postorbital part of head. Anal spine more than 2 in postorbital part of head. Body strongly compressed. Ventral profile more convex than dorsal. Dorsal profile concave from nape to tip of snout. Pectoral pointed. Mouth has a slight downward curve, jaws nearly equal but lower barely projecting. Maxillary does not reach eye. Premaxillary overhangs

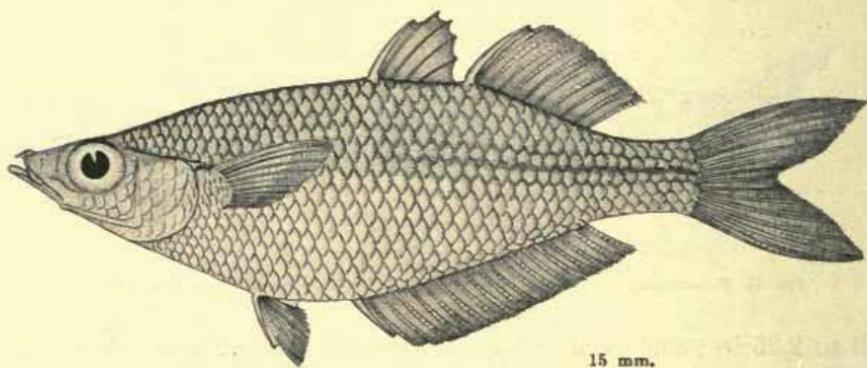


FIG. 46. *Melanotaenia kabia* Herre, Sepik River and Kerame River, New Guinea.

lower jaw at the sides so that some teeth are visible. One row of stout, conical teeth in upper jaw with a few small teeth behind it in front. Lower jaw has a band of small, slender teeth at front, becoming a single row at the sides. A small patch of minute teeth on vomer and a row on palatines. Tongue smooth. One row of scales below eye or 2 rows under rear half. Opercle covered with medium-sized scales, with a patch of smaller ones above. First and second dorsal spines stout. Length of anal base more than distance from origin of first to end of second dorsal. Origin of anal about opposite dorsal origin. Dorsal and anal rays low. Ventral pointed, elongate, reaching base of first or second anal ray. Caudal forked, lobes pointed, lower longer. Scales crenulate behind. Basal fourth of caudal covered with small scales.

Color in life dusky silvery above, lower half with vertical stripes of orange and silver or steel blue. An orange band at caudal base.

Top of snout and interorbital black. Sides of head silvery with yellow or golden. Fins dusky or with orange on the webs. Color in alcohol dusky above, with numerous dark vertical stripes. A dark line from upper angle of gill opening to caudal base. Cheeks silvery white. Ventrals yellow, other fins dusky, or all dusky.

Thirty-three specimens from Nyaurangai, Sepik River, and Koragu, Kerame River, New Guinea.

### **Melanotaenia rosacea** Herre.

*Melanotaenia rosacea* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 398.

Dorsal I, 4-I, 8 or 9; anal I, 17 to 19; pectoral 12 or 13; scales 36 to 38, transverse series 15, predorsal 23 to 25 (usually 25). Depth 3 to 3.2, head 3.3 to 3.7, caudal 3.5 to 3.75, pectoral 5 to 5.6 in length. Eye 3.1 to 3.66, snout 3.1 to 3.66, interorbital 2.9 to 3.1, depth of caudal peduncle 2.6 to 2.9, pectoral 1.4 to 1.55, dorsal and anal rays 2 in head. Body deep, strongly compressed, ventral profile more curved than dorsal. Dorsal profile concave on top of the head. Pectoral pointed. Mouth curves downward slightly, jaws equal or lower slightly projecting. Maxillary does not reach vertical from posterior nostril. Premaxillary overhangs lower jaw so that the teeth are visible. An outer row of strong, conical teeth in each jaw, with a band of much smaller teeth behind it at the front. A patch of very small teeth on vomer and a row on palatines. Tongue smooth. Two rows of scales under eye or 2 rows under rear half. Opercle covered with medium-sized scales, forward and upper rows smaller. First and second dorsal spines stout, curved, equal, or second longer, longer than postorbital part of head. Anal spine much shorter than postorbital part of head, about equal to eye. Anal base usually more than distance from origin of first dorsal to end of second, rarely equal to it. Anal origin about under that of dorsal. Dorsal and anal rays low. Caudal forked, lobes pointed. Scales conspicuously crenulate behind.

Color in alcohol dusky gray above, each scale with a dusky margin, bluish gray on sides, pinkish gray on belly. Opercle dusky or brownish. Fins more or less dusky, ventrals may be nearly colorless. A roseate golden luster conspicuous on opercles in life.

Forty-two specimens collected at Nyaurangai, Sepik River, and Koragu, Kerame River, New Guinea.

### **Rhombosoma sepikensis** Herre. Fig. 47.

*Rhombosoma sepikensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 400.

Dorsal I, 3 or 4-I, 14 or 15; anal I, 21 to 23; pectoral I, 11 to 13; scales 35 to 37, transverse series 10 to 12, predorsal 16. Depth 2.6 to 3, head 3.66 to 3.8, caudal 4.4 to 4.5 in length. Eye 3.66 to 3.8, snout 2.9 to 3.1, depth of caudal peduncle 2 to 2.13 in head. Body much compressed, ventral profile strongly convex, back little elevated in young. Profile straight from dorsal origin to interorbital, concave from there to snout. In large specimens the back is more elevated, in a high, regular arc from end of opercle to caudal peduncle. Interorbital and snout concave. Eye a little shorter than

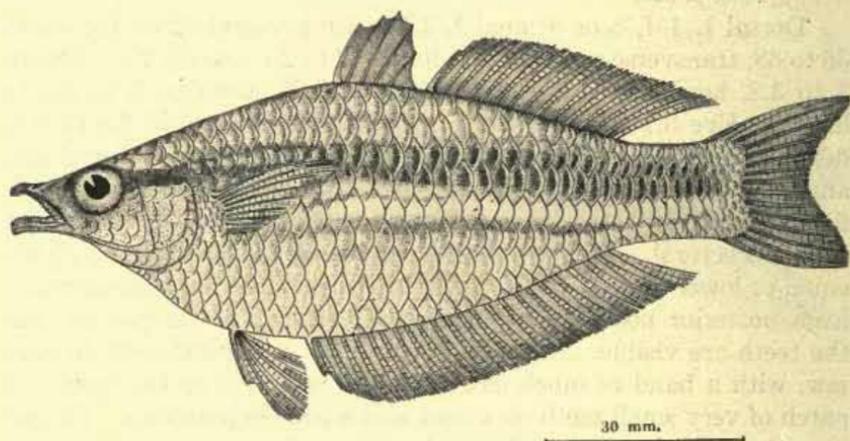


FIG. 47. *Rhombosoma sepiensis* Herre, Sepik River, New Guinea.

snout, which is twice in postorbital part of head. Jaws equal or upper projecting. Maxillary sometimes reaches eye but usually shorter. Several rows of pointed teeth in jaws, larger above, extending to the outside of the thickened lips and behind to angle of jaws. A patch of small teeth on vomer. A patch of minute teeth on base of tongue. A row of small teeth on palatines. Two rows of scales under eye. Opercle covered with medium-sized scales, 2 rows of smaller ones above. First dorsal spine stout, a trifle longer than second. Anal base equal to or slightly less than distance from origin of first to end of second dorsal. Anal origin opposite that of dorsal. Caudal emarginate, with rounded lobes.

Color in life brilliant bronze, silver and reddish metallic iridescence, with flame-colored spot on opercle. Color in alcohol dusky or dark brown above, each scale with dusky gray center and dark margin. Lower part whitish. A black stripe from tip of snout

to middle of caudal base, a white band below it, a more or less evident black stripe below this. Fins all dusky or ventrals colorless.

Fourteen specimens were collected at Marienberg, Sepik River, New Guinea.

#### Family APOGONIDAE

##### *Apogon abo* Herre. Fig. 48.

*Apogon abo* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 402.

Dorsal VI-I, 9 or 10; anal II, 9; pectoral II, 13; scales 32 or 33+7 or 8, 5 above and 12 below lateral line, predorsal 12. Depth 2.75, head 2.35, caudal 4, pectoral 5 in length. Eye 5.4, snout 4, interorbital 5.3, premaxillary 1.95, depth of caudal peduncle 2.65, spine of second dorsal 4 in head. Body thick, heavy, compressed. Head large. A decided hump behind head. Top of head concave. Eyes project above profile. Mouth large, strongly oblique, chin scarcely projecting. Maxillary reaches hind margin of eye. Teeth in a fine band above and below. Three rows of small teeth on vomer and one row on palatines. A very few minute teeth on posterior and lower edges of preopercle. Bones of head otherwise smooth. Second dorsal spine stout, twice the eye. Other spines all weak. Spine of second dorsal also weak, equal to anal spine, longer than eye. Caudal rounded, not emarginate.

Color in alcohol brownish above, paler below, with 12 or 13 narrow dark stripes running diagonally downward and forward on side. A dark stripe from eye to upper margin of opercle. A wide black band from lower margin of eye to lower edge of preopercle. Fins more or less dusky.

Seven specimens collected at Marienberg and Koragu, Sepik River, and Ambot, Kerame River, New Guinea.

#### Family AMBASSIDAE

##### *Parambassis confinis* (Weber).

*Ambassis confinis* Weber, Nova Guinea, 9, 1913, p. 577—Kaiserin Augusta River (Sepik River), New Guinea; Weber and Beaufort, Fishes Indo-Austr. Arch., 5, 1929, p. 419.

Dorsal VII-I, 10 or 11; anal III, 9 or 10; pectoral II, 14; 46 to 48 scales in the lateral line plus 4 to 6 on the caudal, 7 or 8 above the line to the dorsal origin, and 12 to the anal origin; predorsal scales 14 to 16. The depth is 2.5 to 2.75, the head 2.8 to 2.9, the caudal 2.7 to 2.95, the pectoral 4.4 to 5 times in the length. The eye is 3.2 to 3.25, the snout 4.3 to 4.5, the least depth of the caudal

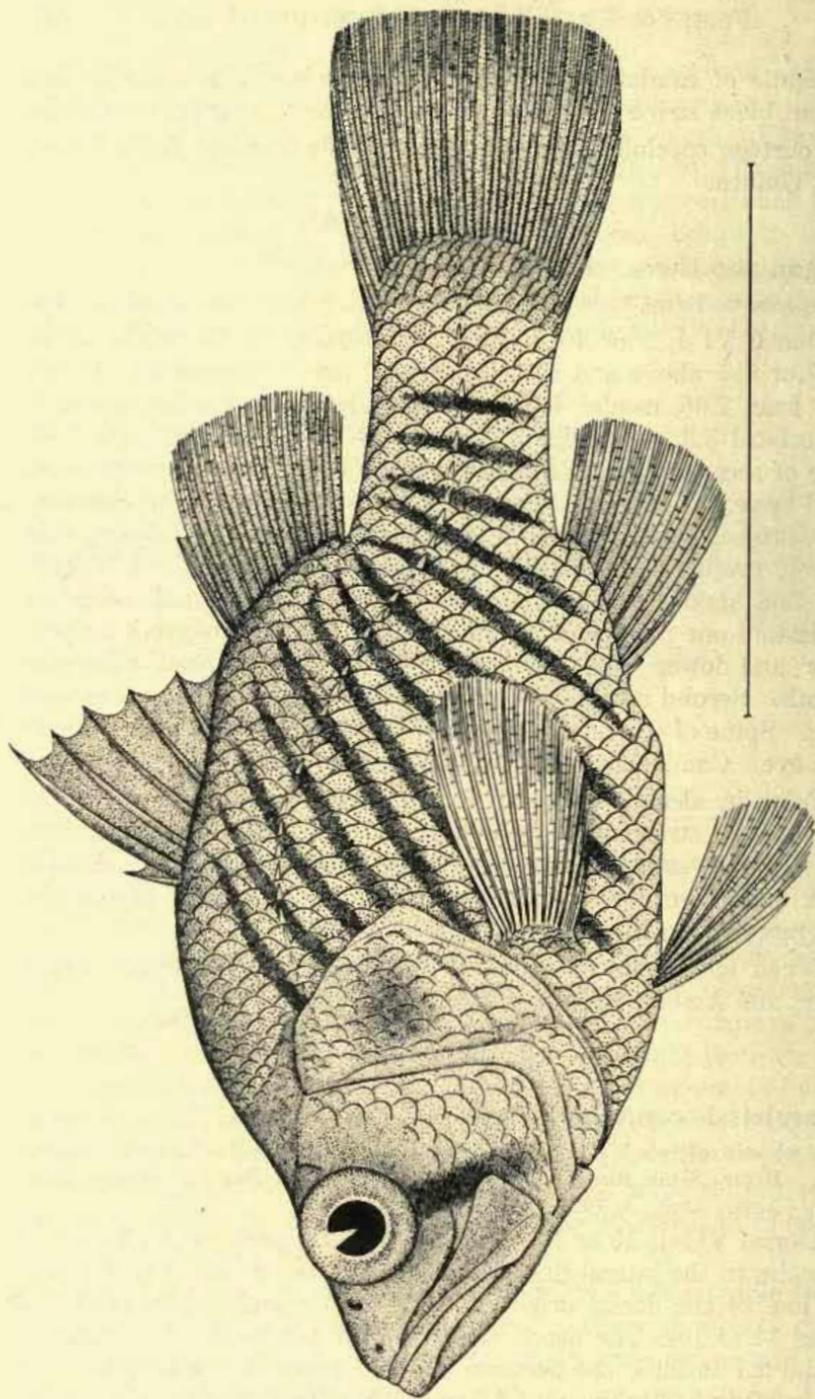


FIG. 18. *Apogon abo* Herre, Sepik River and Kerame River, New Guinea.

peduncle 2.6 times in the head. The interorbital is equal to or slightly more than the snout. The first dorsal spine is a little less than 4 times in the second spine, which is 1.15 to 1.25 times in the head. The spine of the second dorsal is a trifle shorter than the dorsal rays, 1.6 to 1.75 times in the head. The second anal spine is largest, 1.8 times in the head. The body is greatly compressed, elongate-oblong, the anterior upper profile a little concave, the region from the nape to the dorsal origin straight or convex, the greatest depth at the dorsal origin. The mouth is oblique, the lower jaw very slightly included, the jaws nearly or quite even at the tip. The maxillary extends to beneath the anterior part of the eye or to a vertical from the front margin of the pupil. The teeth are in bands of 4 or 5 rows in the front of the upper jaw, 3 or 4 rows near the tip of the lower jaw, the outer row above enlarged at the anterior angles. Sometimes the outer row in the lower jaw has some enlarged teeth. None of the teeth are hooked. The vomer has a small patch of minute teeth with a curved line of teeth extending back on each side, or the central patch may be absent and only the curved line of teeth present. The palatines have a single row of minute teeth. The orbital margin is toothed below and behind. The preorbital is serrated, with large, long teeth. The preopercular ridge has 2 strong teeth at the angle and a few small teeth on the lower edge. The lower and posterior margins of the preopercle are strongly serrate, the teeth largest at the angle, 16 or 18 teeth on the hind margin. The subopercle has a few small teeth at the angle. The preopercle has 3 rows of scales below the eye. The caudal is deeply forked, with pointed lobes. The lateral line is continuous.

The color in alcohol is yellowish, with a silvery luster over the lower two-thirds and an obscure blackish or steely band from the shoulder to the middle of the caudal base, often only evident on the caudal peduncle and sometimes disappearing altogether. The upper part of the spinous dorsal is black or blackish brown. The caudal has a broad blackish band along each lobe, the margin above and below yellowish. The fins are otherwise yellowish to colorless.

Described from 16 specimens, 27 to 67 mm. in length, collected at Koragu, Sepik River.

Previously known only from the type, 122 mm. long, from the Sepik River.

**Priopis buruensis** (Bleeker).

*Ambassis buruensis* Bleeker, Nat. Tijds. Ned. Ind., 11, 1856, p. 396.

This little ambassis, previously described from specimens collected in the New Hebrides and Solomon Islands, is very abundant in the fresh waters of New Guinea and throughout the East Indies, including the Philippines.

Ninety-two specimens, 26 to 60 mm. in length, were caught in a brook at Marienberg.

#### Family KUHLIIDAE

##### **Kuhlia marginata** (Cuvier and Valenciennes).

*Dules marginatus* Cuvier and Valenciennes, Hist. Nat. Poiss., 3, 1829, p. 116, pl. 52.

Two specimens, 100 and 105 mm. long, of this common fresh-water fish were seined from a brook at Marienberg. This species is already described from Tahiti, Moorea, the New Hebrides, and the Solomon Islands.

#### Family ELEOTRIDAE

##### **Hypseleotris güntheri** (Bleeker).

*Eleotris cyprinoides* Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 118—Oualan (not of Cuvier and Valenciennes).

*Asterropteryx güntheri* Bleeker, Arch. Neerl. Sci. Nat. Haarlem, 10, 1875, p. 112 (after Günther).

*Eleotris guentheri* Günther, Fische der Südsee, 2, 1876-81, p. 186, pl. 113, fig. A.

*Hypseleotris guntneri* Jordan and Seale, Fishes Samoa, Bull. Bur. Fish., 25, 1905 (1906), p. 385, fig. 74.

Dorsal VI-I, 9; anal I, 9 or 10. There are 28 or 29 scales in a longitudinal series, plus 1 or 2 on the caudal base, 9 in a transverse series, and 19 or 20 predorsal scales, the latter extending to the tip of the snout. The body is slender, compressed, the dorsal profile gently convex, the ventral profile nearly straight, the depth 4.66 to 4.75 times, the head 3.8 to 3.9 times in the length. The truncate caudal equals or very slightly exceeds the head. The interorbital equals the eye, which is 3.66 times, the pointed snout 4.5 to 4.7 times in the head. The least depth of the caudal peduncle is 2.2 times in the head. The fins are all rather low, the first dorsal, second dorsal, and anal of about equal height, about 6 times, the pointed ventral 5.25 times in the total length.

The color in alcohol is brown to yellowish, usually dusky above, with a more or less plainly marked black stripe from the angle of the pectoral to the caudal base and a black spot on the caudal base. Males have the first dorsal black with 2 basal circular white

spots and a diagonally transverse, white band near the top. The second dorsal is black with 1 or 2 transverse rows of large, white spots. The anal is like the second dorsal. The caudal is dusky with several transverse rows of pale spots. The pectoral is yellow or colorless, with a vertical, black bar on its base. The ventrals are more or less dusky. Other specimens may have the dorsals and anal more or less blackish to clear, with minute black specks dusted over them. The caudal is always crossbarred by pale spots and the basal bar is always present on the pectoral.

Described from 22 specimens, 31 to 46 mm. long, seined in a brook at Marienberg. We also have 36 specimens in poor condition, taken from the crop of a heron by Mr. Frank Wonder, of Field Museum, at Marienberg. Their lengths range from 24 to 38 mm.

***Eleotris macrolepis* (Bleeker). Fig. 49.**

*Culius macrolepis* Bleeker, Arch. Neerl. Sci. Nat. Haarlem, 10, 1875, p. 109—Amboina.

*Eleotris macrolepis* Weber, Nova Guinea, 5, 1908, p. 257.

Dorsal VI-I, 8; anal I, 9. There are 38 scales in a longitudinal series from the angle of the opercular opening to the caudal base, plus 2 more on the latter, and 13 scales in transverse series from the origin of the second dorsal to the origin of the anal. There are 40 predorsal scales. The depth of the thick and bulky body is 4.88 times in the length, the breadth of the head 1.1 times in the body depth. The head is 3.18, the rounded caudal 4.66, the pectoral 5.5 times in the length. The small eye is more than twice in the snout, 9.4 times in the head. The snout is 4.5 times in the head. The broad interorbital is 3 times the eye. The caudal peduncle is 2.9 times in the head. The fourth dorsal ray is a very little longer than the seventh or longest anal ray, 2.33 times in the head. The short ventrals fall far short of the anal fin, reaching only three-fifths of the distance to the anal origin, more than twice in the head and nearly 7 times in the total length. The anterior portion of the head is much depressed, the profile concave above and behind the eyes, the snout with a large central hump. The lower jaw projects strongly, the mouth very large and oblique, the maxillary extending beneath the hind portion of the eye. The entire head is scaled except the very tip of the snout, lips, and pre-orbital. The cheeks and interorbital are marked by numerous longitudinal and transverse, very low and fine cutaneous sensory ridges.

The color in alcohol is blackish brown or black, the belly a little paler brown, the fins all black or blackish brown with numerous

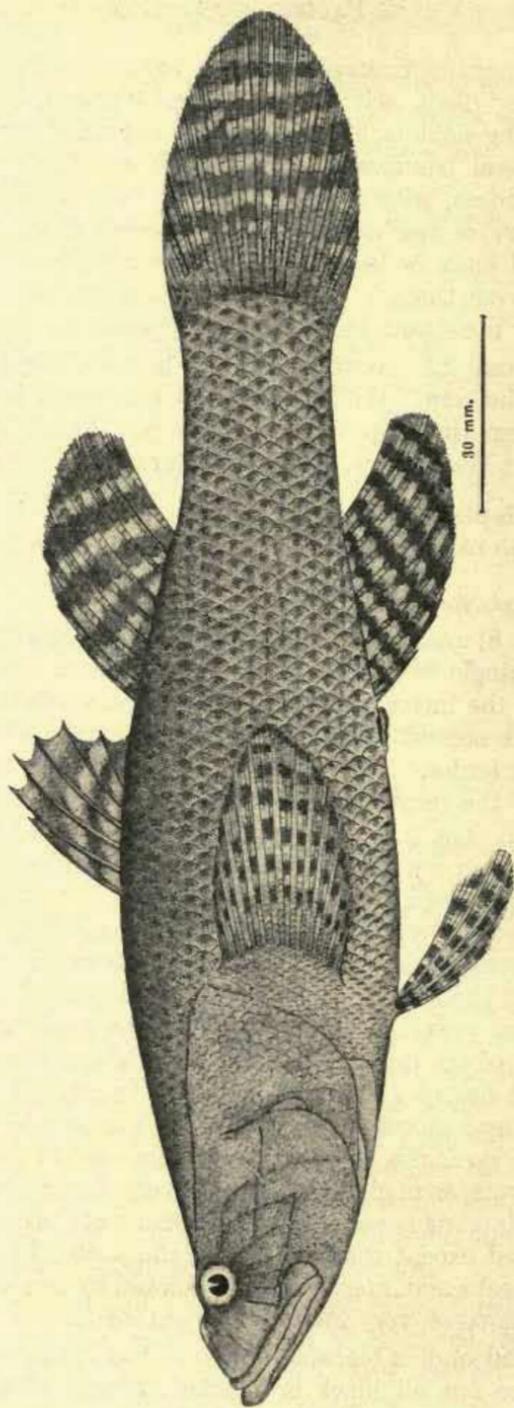


FIG. 49. *Eteorus macrolophus* (Bleeker), Sepik River and Kerame River, New Guinea.

transverse rows of paler or yellowish spots, most distinct on the ventrals, anal, and pectorals.

Described from a specimen, 210 mm. long, taken from a brook at Marienberg. Another specimen, 60 mm. long, taken at the same time, differs only in being less bulky in proportion and in its paler color, brown instead of black. A specimen, 130 mm. long, in very bad condition was obtained at Ambot, on the Kerame River.

#### **Eleotris melanosoma** Bleeker.

*Eleotris melanosoma* Bleeker, Nat. Tijds. Ned. Ind., 3, 1852, p. 705; Herre, Gobies of Philippines, 1927, p. 33.

This common eleotrid is very abundant in the rivers of the East Indies, and its range extends to the Solomon Islands and Fiji. It has already been described in treating of the fishes collected in those regions.

Six specimens, 65 to 88 mm. in length, were taken from a brook at Marienberg.

#### **Butis amboinensis** (Bleeker).

*Eleotris amboinensis* Bleeker, Nat. Tijds. Ned. Ind., 5, 1853, p. 343.

This eleotrid has been described previously from the Solomon Islands. Two more specimens, 76 and 105 mm. in length, were collected at Marienberg, from a small brook tributary to the Sepik.

#### **Mogurnda mogurnda** (Richardson).

*Eleotris mogurnda* Richardson, Voy. Erebus and Terror, Fishes, 1844-48, p. 4, pl. 2, figs. 1 and 2—Port Essington, North Australia; Günther, Cat. Fishes Brit. Mus., 3, 1861, p. 111.

*Mogurnda mogurnda* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 391.

Dorsal IX-1, 11; anal I, 12; there are 45 scales in a longitudinal, 17 in a transverse series, and 19 predorsal scales. The body is thick, robust, compressed posteriorly, the breadth of the head equal to its depth and 1.3 times in its own length. The depth of the body equals the length of the head, 3.4 times in the length, the broadly rounded caudal 4.25 times. The eye is rather small, lateral, 5.3 times in the head. The snout is wide, blunt, 3.4 times, the interorbital 2.3 times in the head. The wide mouth is oblique, with projecting lower jaw, the posterior angle of the maxillary not reaching a vertical from the front margin of the eye. The depth of the caudal peduncle is 2.1 times in the head. The vertical fins are all low, the posterior rays of the second dorsal highest. The

pectoral is 4.7, the ventral 5.16 times in the length, the ventral falling far short of reaching the anal. The head is scaled all over except the tip of the snout and the mandible. On the cheeks and opercles are rows of papillate pores, most evident below the eye and in longitudinal rows on the cheek. On the upper part of the eye are minute scales.

The color in alcohol is blackish above, the lower parts pale yellowish, with a black stripe from the angle of the opercle to the middle of the caudal base. Nine or ten wide black bands descend from the upper dark area to the longitudinal, black stripe, enclosing pale yellowish areas. There are 3 oblique, black lines or stripes from the eye to the gill opening, the upper one extending upon the pectoral base, which is marked by a large, vertical, arcuate, black blotch. All the fins are black or blackish, the dorsals, anal, and ventrals with a whitish margin. On the basal portion of the caudal are transverse rows of darker spots.

Described from a specimen, 85 mm. long, taken at Marienberg, Sepik River, New Guinea.

**Boroda malua** Herre. Fig. 50.

*Boroda malua* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 414.

Dorsal VI-I, 9; anal I, 8; scales 62 to 68, transverse series 19 to 22, predorsal about 52. Depth 4 to 5, head 2.55 to 2.7, width 4 to 5 in length. Eye 8.25 to 11; width of head 1.5; maxillary 2.5; third, fourth, and fifth dorsal rays 3.15 to 3.3; sixth to eighth dorsal rays 2.25 to 2.65; posterior rays of anal 2.5 to 2.9; pectoral 2 to 2.5; depth of caudal peduncle 2.5 to 3; caudal 1.5; ventral 2.2 to 2.4 in head. Body thick, wedge-shaped, robust, becoming exceedingly thick and bulky with age, little elevated. Head broad, low, depressed, the cheeks becoming swollen with age. Upper profile concave between nape and snout. Eyes lateral but high up, their upper rim on dorsal profile. Eyes 2.2 in interorbital, 2 to 3 in snout. Snout wide, bluntly rounded. Lower jaw projects very strongly, so that the teeth are exposed when the mouth is closed. Teeth in broad bands in both jaws, the outer row enlarged, 7 to 9 rows in upper, 6 in lower jaw. Inner row enlarged in lower jaw. No teeth on vomer, palatines or tongue. Anterior nostril tubulated, very close to upper lip. Posterior nostril very large. Mouth large, strongly oblique. Maxillary reaches or passes posterior margin of eye. Entire body except tip of snout, lips, under side of lower jaws and space between them, covered with ctenoid scales, cycloid before

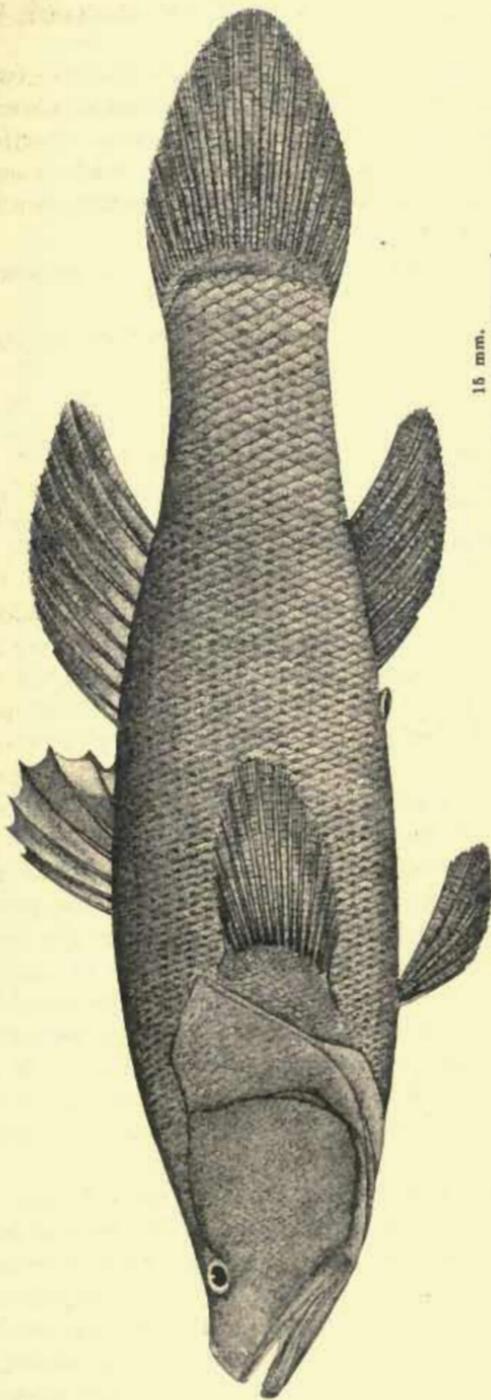


FIG. 50. *Boroda maitua* Herre, Sepik River, New Guinea.

dorsal and on head. Caudal covered one-half to two-thirds its length with small to minute scales. Pectoral base and nearly whole fin covered with small to minute scales. Vertical fins low, with no elongated spines or rays. Pectoral broad. Caudal broadly rounded. Ventrals much shorter than pectorals, reaching a little more than halfway to anal origin.

Dark brown or black on the body and fins, with some obscure markings.

Eleven specimens from Malu and Marienberg, Sepik River, New Guinea.

### **Ophiocara aporos** (Bleeker).

*Eleotris aporos* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 59.

*Ophiocara aporos* Bleeker, Versl. Akad. Amsterdam, 11, 1877, p. 33; Herre, Gobies of Philippines, 1927, p. 65, pl. 5, fig. 2, and pl. 28, fig. 3.

*Eleotris hoedti* Bleeker, Nat. Tijds. Ned. Ind., 6, 1854, p. 496.

*Ophiocara hoedti* Bleeker, Versl. Akad. Amsterdam, 11, 1877, p. 35.

Dorsal VI-I, 8 or 9; anal I, 8 to 10; there are 30 scales in a longitudinal, 10 or 11 in a transverse series. Usually there are 13 to 15 scales before the first dorsal, rarely 16 or 17. The depth is 3.6 to 4.6, the head 2.9 to 3 times in the length. The eye is 5 to 5.33, the snout 3.3 to 4 times in the head. The eye is twice to nearly three times in the interorbital. The body is wedge-shaped, strongly compressed, the anterior part of the head much depressed. The mouth is large, oblique, the lower jaw strongly projecting. Only in large specimens does the maxillary extend to or beyond the front border of the eye. The posterior edge of the preopercle has 2 pores which may be large or very large, but are usually small and obscure. The entire body except the tip of the snout, lips, and chin is covered with scales, those on the nape equal to or larger than those on the trunk. The broad, rounded pectoral is 3.6 to 4.6 times, the broadly rounded caudal about 3 times in the length. The soft dorsal and anal are usually low but sometimes rather high and elongate posteriorly, the last rays then extending to the caudal base.

In life this is a fish of great beauty, scarcely any two fishes having exactly the same color markings. The general color is dark green, pale green, or steel blue, with 2 irregular rows of large, golden, orange, or red spots, or golden and red intermingled, in longitudinal series along the sides and extending on the caudal fin as elongate dashes, the lateral spots connected by crossbars. Sometimes almost the whole body and head are orange red and

golden, with green and steel blue spots and dashes, and again the color may be almost entirely dark with a few brightly colored spots. Sometimes the sides are spotted with violet, green, or lavender. Two, dark green, stripes are always present from the lower margin of the eye to the edge of the opercle, but sometimes they are lavender or violet instead of green. A broad and rather vague stripe extends from the preopercle to the pectoral base and connects with a dusky, transverse bar. The interspaces between these stripes on the head are usually golden but may be dull. A row of golden spots (rarely 2 rows) is on the soft dorsal and sometimes the spinous dorsal is spotted with golden. The anal has a row of golden spots and a red stripe on its anterior lower margin. There is a large black spot on the caudal base. In alcohol the golden spots disappear, leaving the interspaces as broad, black bars, or there may be merely a disconnected row of large black or dusky spots between pale or whitish areas. The general color is usually blackish above, pale beneath, or may be nearly uniform brown. The golden spots on the fins become yellowish or whitish, or may disappear.

This bulky, heavy eleotrid is one of the most important food fishes of the Sepik River. At Marienberg were seined 27 specimens from a small brook, their lengths 46 to 185 mm., and 12 more from another brook, their lengths 20 to 38 mm. At Nyaurangai 2 specimens, 94 and 108 mm., were purchased, and one, 132 mm. long, at Koragu. On the Kerame River 3 specimens, 94 to 148 mm. long, were obtained at Gorogopa, and 2 at Ambot, 125 and 155 mm. long.

**Ophiocara porocephala** (Cuvier and Valenciennes).

*Eleotris porocephala* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 178.

*Ophiocara porocephala* Herre, Gobies of Philippines, 1927, p. 69, pl. 5, fig. 3.

This common eleotrid has been described previously. Five specimens, 31 to 54 mm. in length, were taken at Marienberg.

Family GOBIIDAE

KEY TO THE EAST INDIAN SPECIES OF GLOSSOGOBIUS

- A. A circular projection from upper iris into pupil of eye; 2 ocelli on first dorsal. . . . . *G. biocellatus*.
- AA. No projection from iris into pupil; no ocelli on first dorsal.
- B. Scales 14 to 17 before first dorsal; postorbital portion of head less than from tip of snout to hind margin of eye. . . . . *G. celebius*.

BB. Scales more than 20 before first dorsal; postorbital region longer than from tip of snout to hind margin of eye.

C. Predorsal scales 21 to 26; scales in longitudinal series 30 to 32. . . . . *G. giuris*.

CC. Predorsal scales 30; scales in longitudinal series 36.  
*G. koragensis*.

**Glossogobius celebius** (Cuvier and Valenciennes).

*Gobius celebius* Cuvier and Valenciennes, Hist. Nat. Poiss., 12, 1837, p. 74—Celebes; Weber, Siboga Exp., Fische, 1913, p. 468, fig. 94.

*Glossogobius celebius* Herre, Gobies of Philippines, 1927, p. 158, pl. 12, fig. 4.

Obtained at Fiji and described previously. Fourteen specimens, 66 to 96 mm. in length, were collected at Ambot, Kerame River.

**Glossogobius giuris** (Buchanan Hamilton).

*Gobius giuris* Buchanan Hamilton, Acct. Fishes Ganges, 1822, pp. 51, 366, pl. 33, fig. 15; fresh waters of Gangetic provinces.

*Glossogobius giurus* Herre, Gobies of Philippines, 1927, p. 161, pl. 27, fig. 1.

*Glossogobius giuris* Fowler, Fishes Oceania, Mem. Bishop Mus., 10, 1928, p. 402.

Dorsal VI-I, 9; anal I, 8. There are 30 to 32 scales in a longitudinal, 9 or 10 in transverse series, and 21 to 26 predorsal scales.

The body is elongate, slender, with a very large, long, wide head. The depth is 5.2 to 5.6, the head 2.8 to 3.3 times in the length. The eye is 6 to 8 times in the head, 2.5 to 3.2 times in the snout, the latter about 3 times in the head. The postorbital portion of the head is less than the distance from the tip of the snout to the rear margin of the eye. The head is naked except for 3 or 4 rows of small scales on the upper part of the opercle. On the preopercle are 4 or 5 longitudinal rows of minute papillae. The large caudal is nearly equal to the length of the head. The ventrals are very large.

The color in life is fawn or buff to yellowish, with more or less golden sheen on the sides and 5 large, blackish spots along the side, the last on the caudal base. Alternating with them are 5 short, wide crossbars over the back. The head is brownish to dusky, with 4 or 5, pale, longitudinal lines on the cheek. A brown bar extends from the lip to the eye and one from the eye diagonally across the cheek. On the pectoral base are 2, dark brown, longitudinal bars in a golden or pale spot. The dorsals and caudal are crossbarred by bands or rows of dark spots. The eye is blue. In alcohol, the color is very much paler, brownish or yellowish to whitish, the markings much as in life.

This species is very abundant throughout the East Indies, and is an important food fish wherever found. It seems to be the largest of the true gobies found in East Indian waters. Philippine specimens collected by me at Lake Buluan, Mindanao, were 265 mm. long, standard length, or 349 mm. long with the caudal fin. Specimens taken in swamps and swamp lakes are often very heavily pigmented and so melanistic as to look as though they belonged to a different species.

Five specimens, 94 to 122 mm. in length, were collected at Koragu, on the Sepik River.

### **Glossogobius koragensis** Herre.

*Glossogobius koragensis* Herre, Field Mus. Nat. Hist., Zool. Ser., 18, No. 12, 1935, p. 419.

Dorsal VI-I, 9; anal I, 8; scales 36+3 or 4, transverse series 11, predorsal 30. Depth 5 to 5.9, head 2.85 to 2.9, caudal 3.7 to 3.8, pectoral 5 to 5.25 in length. Eye 6.5 to 6.85, snout 3 to 3.13, interorbital 4.8 to 4.9, depth of caudal peduncle 3.2 to 3.25, third spine of first dorsal 2.8, third ray of second dorsal 2.4, third anal ray 2.5, ventral 1.9 in head. Body low, elongate, compressed behind. Head very long, depressed forward. Mouth large, oblique. Maxillary reaches front of eye. Lower jaw projects strongly. Head naked, sometimes a few small scales on upper part of opercle. Vertical fins low. Ventral extends a little more than halfway to anal origin.

Color in alcohol brown to yellowish brown, darker above. Soft dorsal and caudal barred with dusky spots. Pectoral and first dorsal more or less dusky. Anal and ventrals yellow or colorless.

Four specimens collected at Koragu, Sepik River, and at Ambot, Kerame River, New Guinea.

### **Chonophorus lachrymosus** (Peters).

*Gobius lachrymosus* Peters, Monatsb. Akad. Wiss. Berlin, 1868, p. 265—Quingoa River, Calumpit, Luzon, Philippine Islands.

*Chonophorus lachrymosus* Herre, Gobies of Philippines, 1927, p. 212, colored pl., frontispiece.

Dorsal VI-I, 10; anal I, 10. There are 52 to 55 scales in a longitudinal and 12 or 13 in a transverse series; predorsal scales 18 or 20. The elongate body is strongly compressed, the depth in males 4 to 4.4, in females 3.7 to 3.8 times in the length. The head is 4 to 4.2 times in the length. The large, round-pointed caudal is twice as long as the head in males, shorter in females, 1.3 to 1.4

times the length of the head. The eye is 5 to 5.8 times, the rounded snout 2.8 to 3.25 times in the head. The tips of the first dorsal spines are thread-like, much longer in males than in females, about 1.5 times the depth. The dorsal rays increase in length to the last which are a third higher than the length of the head. The anal rays are similar but a trifle lower. The pectoral is about as long as the head.

The color in alcohol is brownish to yellowish brown above, fading to whitish or whitish yellow on the belly. Eight to 10 broad, curved, dark brown bands may be present on the side, their concave side forward, or they may disappear. Beneath the eye is a large, irregular, blackish brown spot extending toward the corner of the mouth. On the upper part of the pectoral base is a vertical, blackish brown bar. The first dorsal has alternating, black and white, crossbands. The second dorsal has numerous alternating, longitudinal stripes of black and white. The anal is cerise to bluish, with a blue or white margin. The upper part of the caudal is spotted with light and dark. The pectoral is colorless, the ventrals dark bluish to colorless.

A specimen, 150 mm. long, was taken at Koragu, and 2 small specimens, 38 and 48 mm. long, at Marienberg.

This beautiful goby has hitherto been known only from Luzon and Mindanao, in the Philippines.

## INDEX

Current names in roman type, synonyms and secondary references in *italic* type, new names in **bold-faced** type.

- abacurus, Scarus, 336  
 abbreviatus, Aphthalmichthys, 39  
 abo, Apogon, 447  
 Abudehuf bengalensis, 291  
   brownriggi, 299  
   coelestinus, 292  
   curacao, 293  
   dicki, 294  
   glaucus, 302  
   lacrymatus, 295  
   leucopomus, 291  
   leucozona, 295  
   melas, 296  
   metallicus, 296  
   saxatilis, 291  
   sordidus, 290  
   taupou, 298  
   uniocellatus, 298  
 Acanthochromis polyacanthus, 272  
 Acanthurus aliala, 241  
   elongatus, 246  
   flavoguttatus, 245  
   gahm, 241  
   lineatus, 242  
   matoides, 243  
   trioctegus, 240  
 Achirophichthys kampeni, 38  
*achromopterus*, *Flammeo*, 64  
 aculeatus, Balistapus, 417  
 adustus, Myripristis, 72  
 Aequidens caeruleopunctatus, 12  
 Aetobatus narinari, 24  
 afelei, Eviota, 348  
 affinis, Chilomycterus, 433  
 agassizi, *Gymnothorax*, 46  
 agassizii, Xenichthys, 186  
 Agonostomus monticola, 12  
 albofasciatus, Pomacentrus, 276  
 albuguttatus, Salarias, 405  
 albolinea, Runula, 403  
 albomaculatus, Paralabrax, 159  
*albopunctata*, *Teuthis*, 255  
 Albula vulpes, 26  
 Alepideleotris tigris, 350  
*alexanderae*, *Pomacentrus*, 289  
 aliala, Acanthurus, 241  
 alienus, Cypselurus, 11  
 altipennis, Cypselurus, 54  
*altipinnis*, *Pimelepterus*, 205  
 Amanses scopas, 423  
 Ambassis commersoni, 140  
   miops, 141  
   vaivasensis, 142  
 Amblygobius insignis, 376  
   myersi, 377  
   phalaena, 379  
 amblyodon, Echidna, 40  
 amboinensis, Apogon, 130  
   Butis, 343, 453  
   Pomacentrus, 285  
 Amphiprion frenatus, 267  
 anchorago, Choerodon, 325  
*aneitense*, *Thalassoma*, 323  
 Anguilla mauritiana, 36  
   pacificus, 434  
   spengeli, 435  
 angulata, Coris, 318  
 angustata, Apogon, 124  
 Anisotremus surinamensis, 189  
*annularis*, *Acanthurus*, 244  
 annulatus, Spheroides, 428  
 antennata, Pterois, 264  
 Anthias mooreanus, 161  
*antjerius*, *Glyphisodon*, 299  
 Aparrius aurocingulus, 373  
 Aphthalmichthys abbreviatus, 39  
   javanicus, 40  
 apiensis, Engraulis, 33  
 Apogon abo, 447  
   amboinensis, 130  
   angustata, 124  
   apogonides, 122  
   aroubiensis, 126  
   atradorsatus, 119  
   bandanensis, 122  
   compressus, 129  
   exostigma, 128  
   frenatus, 127  
   hartzfeldi, 123  
   hyalosoma, 133  
   leptacanthus, 131  
   melas, 131  
   multilineatus, 134  
   novemfasciatus, 125  
   orbicularis, 120  
   rhodopterus, 121  
   robusta, 126  
   sangiensis, 132  
 Apogonichthys auritus, 136  
   perdix, 136  
 apogonides, Apogon, 122  
 aporos, Ophiocara, 456  
*arabicus*, *Chanos*, 27  
*araneus*, *Chaetodon*, 268  
 Arbacia truncata, 391  
 Archamia zosterophora, 137  
 arcifrons, Pomacentrus, 274  
*arcuatum*, *Tetradrachmum*, 268  
*arcus*, *Ostracion*, 426  
*argenea*, *Perca*, 146  
*argenteus*, *Butirinus*, 28

- argenteus, *Monodactylus*, 218  
     *Therapon*, 194  
 argentimaculatus, *Lutianus*, 180  
 argulus, *Coelonotus*, 80  
 argus, *Cephalopholis*, 148  
*argus*, *Ostracion*, 427  
 argus, *Scatophagus*, 219  
*Arius kanganamanensis*, 440  
     *leptaspis*, 436  
     *nox*, 441  
     *solidus*, 438  
*aroubiensis*, *Apogon*, 126  
*aruanus*, *Dascyllus*, 268  
*Asterropteryx semipunctatus*, 341  
*Astyanax ruberrimus*, 12  
*ater*, *Enchelyurus*, 414  
*aterrimus*, *Ctenogobius*, 364  
*Atherina endrachtensis*, 89  
     *forskali*, 89  
     *ovalaua*, 90  
*atinga*, *Diodon*, 432  
*atlanticus*, *Rupiscartes*, 404  
*atradorsatus*, *Apogon*, 119  
*atripinnis*, *Bregmaceros*, 56  
*atromaculatus*, *Chaetodon*, 219  
*Atuona tricuspidata*, 383  
*Aulostomus valentini*, 87  
*auriflamma*, *Mulloidichthys*, 215  
*auriga*, *Chaetodon*, 223  
*auritus*, *Apogonichthys*, 136  
*aurocingulus*, *Aparrius*, 373  
*australis*, *Anguilla*, 434  
*australis*, *Epinephelus*, 155  
*austriacus*, *Chaetodon*, 230  
*axillaris*, *Mugil*, 98  
*axillaris*, *Stethojulis*, 305  
*aygula*, *Coris*, 318  
  
*badia*, *Macgregorella*, 352  
*badio-rufus*, *Sebastapistes*, 262  
*bailloni*, *Trachinotus*, 117  
*balinensis*, *Scarus*, 334  
*Balistapus aculeatus*, 417  
     *undulatus*, 419  
*Balistes bursa*, 420  
     *vidua*, 420  
     *viridescens*, 421  
*baliuroides*, *Ctenogobius*, 365  
*bandanensis*, *Apogon*, 122  
*bankieri*, *Pomacentrus*, 281  
*barbarus*, *Periophthalmus*, 389  
*barberinus*, *Parupeneus*, 211  
*baronessa*, *Gonocheilodon*, 222  
*barracuda*, *Sphyræna*, 100  
*bataviensis*, *Epinephelus*, 156  
*Bathygobius fuscus*, 354  
*beebei*, *Pomacentrus*, 275  
*belaque*, *Upeneoides*, 210  
*belemnites*, *Salarias*, 405  
*bengalensis*, *Abudefduf*, 291  
*bengalensis*, *Lutjanus*, 171  
*bennetti*, *Canthigaster*, 430  
     *Chaetodon*, 231  
  
*berda*, *Sparus*, 202  
*bicolor*, *Anguilla*, 434  
*bifascialis*, *Chaetodon*, 222  
*bifasciatus*, *Parupeneus*, 212  
*biguttatus*, *Lutianus*, 173  
*bilineata*, *Paraplagusia*, 58  
*bilineatus*, *Parupeneus*, 213  
     *Scolopsis*, 193  
*bilunulata*, *Kuhlia*, 145  
*binotatus*, *Holocentrus*, 69  
*binotopsis*, *Halichoeres*, 310  
*biocellatus*, *Chaetodon*, 228  
     *Coelonotus*, 81  
*biocellatus*, *Glossogobius*, 360  
*birostris*, *Manta*, 25  
*Blennius tonganus*, 404  
*blochi*, *Acanthurus*, 244  
*Bodianus eclancheri*, 303  
*boelang*, *Epinephelus*, 150  
*bohar*, *Lutianus*, 174  
*bonhamensis*, *Lethrinus*, 198  
*borneensis*, *Liza*, 97  
*Boroda malua*, 454  
*borvici*, *Holocentrus*, 68  
*boschi*, *Gymnothorax*, 42  
*Bostrichthys sinensis*, 344  
*Brachyrhaphis episcopi*, 12  
*brachysoma*, *Rastrelliger*, 104  
*brachysomus*, *Calamus*, 203  
*brachyurus*, *Microphis*, 81  
*Bregmaceros atripinnis*, 56  
     *mcLellandi*, 56  
*brevirostris*, *Micrognathus*, 86  
     *Naso*, 250  
*bristolae*, *Emmion*, 396  
*brownriggi*, *Abudefduf*, 299  
*brummeri*, *Pseudechidna*, 42  
*brunneolus*, *Aspidontus*, 414  
*Brycon striatulus*, 12  
*bullatus*, *Gymnothorax*, 46  
*burroughi*, *Pomacentrus*, 286  
*bursa*, *Balistes*, 420  
*buruensis*, *Priopis*, 142, 449  
*Butis amboinensis*, 343, 453  
     *gymnopomus*, 343  
*butonensis*, *Lutjanus*, 177  
*bynoensis*, *Sebastapistes*, 263  
  
*Caecula longipinne*, 39  
*caeruleaureus*, *Caesio*, 187  
*caeruleolineatus*, *Plesiops*, 163  
*caeruleopunctatus*, *Aequidens*, 12  
*caeruleo-punctatus*, *Epinephelus*, 155  
*caeruleo-rotatus*, *Halichoeres*, 309  
*caeruleus*, *Chromis*, 269  
     *Pomacentrus*, 280  
*Caesio caeruleaureus*, 187  
     *chrysozona*, 188  
     *erythrogaster*, 189  
*calamara*, *Sparus*, 202  
*Calamus brachysomus*, 203  
*californiensis*, *Eucinostomus*, 208  
*Callionymus cooki*, 391

- Callogobius ocellatus*, 362  
*sclateri*, 362  
*cancellatus*, *Gymnothorax*, 46  
*Therapon*, 194  
*canescens*, *Zanclus*, 238  
*canescens*, *Zanclus*, 239  
*caninus*, *Pentapus*, 201  
*Cantherines pardalis*, 423  
*Canthigaster bennetti*, 430  
*margaritatus*, 431  
*solandri*, 431  
*cantoris*, *Eleotris*, 347  
*Caracanthus maculatus*, 266  
*Caranx ignobilis*, 113  
*melampyguis*, 114  
*sansun*, 114  
*sexfasciatus*, 115  
*stellatus*, 116  
*Carapus homei*, 416  
*parvipinnis*, 416  
*Carcharinus cerdale*, 22  
*galapagensis*, 22  
*melanopterus*, 23  
*platyrhynchus*, 23  
*castaneus*, *Chaerophilis*, 304  
*caudimaculatus*, *Holocentrus*, 67  
*caudolineatus*, *Salarias*, 406  
*Caulolatilus princeps*, 217  
*celebicus*, *Plectorhynchus*, 190  
*celebius*, *Glossogobius*, 361, 458  
*centiquadrus*, *Halichoeres*, 311  
*Cephalopholis argus*, 148  
*cyanostigma*, 149  
*kendalli*, 149  
*leopardus*, 152  
*miniatus*, 151  
*pachycentron*, 150  
*rogaa*, 153  
*urodelus*, 153  
*ceramensis*, *Gymnothorax*, 46  
*cerdale*, *Carcharinus*, 22  
*Chaenomugil chaptali*, 99  
*Chaetodon auriga*, 223  
*bennetti*, 231  
*citrinellus*, 232  
*fasciatus*, 228  
*nigrirostris*, 221  
*octofasciatus*, 226  
*ornatissimus*, 227  
*rafflesi*, 225  
*strigangulus*, 222  
*triangulum*, 222  
*trifasciatus*, 230  
*ulietensis*, 227  
*unimaculatus*, 229  
*vagabundus*, 224  
*chagresi*, *Thyrina*, 12  
*Chanos chanos*, 27  
*chanos*, *Chanos*, 27  
*chaptali*, *Chaenomugil*, 99  
*Cheilinus chlorourus*, 326  
*diagrammus*, 327  
*Cheilinus fasciatus*, 327  
*oxyrhynchus*, 328  
*trilobatus*, 329  
*Cheilodipterus macrodon*, 138  
*quinquelineatus*, 139  
*Cheiloprion labiatus*, 273  
*chiliensis*, *Sarda*, 107  
*Chilomycterus affinis*, 433  
*chilospilus*, *Gymnothorax*, 42  
*chinense*, *Aulostoma*, 87  
*Chirocentrus dorab*, 29  
*Chlamydes cotticeps*, 355  
*chloropterus*, *Chanos*, 27  
*chlorourus*, *Cheilinus*, 326  
*Choerodon anchorago*, 325  
*Choeroichthys sculptus*, 80  
*Chonophorus genivittatus*, 374  
*lachrymosus*, 459  
*ocellaris*, 375  
*choram*, *Mastacembelus*, 49  
*Chromis caeruleus*, 269  
*dimidiatus*, 270  
*ternatensis*, 272  
*chrysostomus*, *Heniochus*, 233  
*chrysoaenia*, *Lutianus*, 180  
*chrysozona*, *Caesio*, 188  
*Cichlasoma maculicauda*, 12  
*ciliatus*, *Moronopsis*, 144  
*ciliatus*, *Scolopsis*, 192  
*cincta*, *Pterois*, 265  
*cinerascens*, *Kyphosus*, 205  
*Cingulogobius naraharae*, 371  
*citrinellus*, *Chaetodon*, 232  
*clarionis*, *Xesurus*, 252  
*coelestinus*, *Abudefduf*, 292  
*Coelonotus argulus*, 80  
*colonus*, *Serranus*, 160  
*commersoni*, *Ambassis*, 140  
*commersoni*, *Harengula*, 30  
*compressus*, *Apogon*, 129  
*Compsura gorgonae*, 12  
*concolor*, *Nexilarius*, 274  
*Uropterygius*, 47  
*confinis*, *Parambassis*, 447  
*conspicillatus*, *Corythoichthys*, 83  
*constellatus*, *Platophrys*, 57  
*cooki*, *Callionymus*, 391  
*corallicola*, *Plesiops*, 163  
*cordyla*, *Megalaspis*, 110  
*Coris aygula*, 318  
*pulcherrima*, 319  
*corlettei*, *Gnatholepis*, 356  
*cornutus*, *Holocentrus*, 60  
*Ostracion*, 426  
*Zanclus*, 239  
*corrugatus*, *Corythoichthys*, 83  
*Coryphaena hippurus*, 109  
*Corythoichthys conspicillatus*, 83  
*corrugatus*, 83  
*fasciatus*, 85  
*cotticeps*, *Chlamydes*, 355

- cranei, Pomacentrus, 288  
 Thalassoma, 319  
*crapao*, *Epinephelus*, 157  
*cruentatus*, Priacanthus, 168  
*Cryptocentrus leucostictus*, 379  
 voighti, 382  
*Ctenochaetus striatus*, 246  
 strigosus, 247  
*ctenodon*, *Acanthurus*, 247  
*Ctenogobius aterrimus*, 364  
 baliuroides, 365  
 decoratus, 365  
 filamentosus, 366  
 malekulae, 367  
 neophytus, 369  
 scapulopunctatus, 369  
 suluensis, 368  
*cubicus*, *Ostracion*, 427  
*cuning*, *Caesio*, 189  
 curacao, *Abudefduf*, 293  
 cyanostigma, *Cephalopholis*, 149  
*cyanostigmatoides*, *Epinephelus*, 151  
 cyanoaenia, *Labrichthys*, 304  
*cyanothis*, *Holacanthus*, 235  
*cyanurus*, *Ostracion*, 427  
 cylindrica, *Parapercis*, 395  
*Cymolutes lecluse*, 330  
*cyprinella*, *Chanos*, 27  
*cyprinoides*, *Eleotris*, 342, 450  
 cyprinoides, *Megalops*, 25  
*Cypselurus alienus*, 11  
 altipennis, 54  
 rondeletii, 55  
 spilopterus, 55  
*cypselurus*, *Rhabdamia*, 138  
  
*Dactyloscopus pectoralis*, 395  
 daedalma, *Halichoeres*, 312  
*Dascyllus aruanus*, 268  
 trimaculatus, 268  
*Decapterus lajang*, 111  
 sanctae-helenae, 112  
 decoratus, *Ctenogobius*, 365  
*decussatus*, *Sparus*, 311  
 delicata, *Tagusa*, 398  
 delicatulus, *Stolephorus*, 32  
 deltoides, *Gnatholepis*, 357  
*delurus*, *Pomacentrus*, 283  
 diadema, *Holocentrus*, 70  
 diagrammus, *Cheilinus*, 327  
 dicki, *Abudefduf*, 294  
 dimidiatus, *Chromis*, 270  
*dimidiatus*, *Pomacentrus*, 284  
 dimidiatus, *Scarus*, 336  
*Diodon hystrix*, 432  
*diploxiphus*, *Holocentrum*, 67  
 dispar, *Pempheris*, 170  
 Zenarchopterus, 51  
*Disparichthys fluviatilis*, 436  
 dispilus, *Halichoeres*, 313  
 distigma, *Eviota*, 348  
*dodecacanthus*, *Lutjanus*, 182  
 doliata, *Teuthis*, 257  
  
 dorab, *Chirocentrus*, 29  
 dormitor, *Gobiomorus*, 12  
*dorsale*, *Thalassoma*, 320  
 dorsalis, *Pomacentrus*, 283  
*Doydixodon freminvillei*, 205  
*drepanoides*, *Heniochus*, 233  
 dubius, *Scarus*, 332  
 dussumieri, *Hemiramphus*, 49  
 Leiognathus, 118  
 Mugil, 92  
*dussumieri*, *Pimelepterus*, 205  
  
*Echeneis naucrates*, 394  
 remora, 394  
*Echidna amblyodon*, 40  
 nebulosa, 41  
 echinocephalus, *Paragobiodon*, 363  
 eclancheri, *Bodianus*, 303  
 eclipticus, *Pomacentrus*, 277  
 edentulus, *Salarias*, 407  
 efatensis, *Gymnothorax*, 43  
*elegans*, *Aspisurus*, 251  
*elegans*, *Stiphodon*, 387  
*Eleotris fusca*, 345  
 macrolepis, 451  
 melanosoma, 346, 453  
 elongatus, *Acanthurus*, 246  
*emarginatus*, *Pomacentrus*, 283  
 Emmnion *bristolae*, 396  
 (Encaura) *evides*, *Ptereleotris*, 340  
*Encheliophis vermicularis*, 417  
*Enchelyurus ater*, 414  
 endrachtensis, *Atherina*, 89  
 engeli, *Mugil*, 92  
*Engraulis apiensis*, 33  
 heterolobus, 34  
 tri, 35  
 zollingeri, 35  
*Enneapterygius minutus*, 396  
 pardochir, 397  
 punctulatus, 397  
*Epibulus insidiator*, 304  
*Epinephelus australis*, 155  
 caeruleo-punctatus, 155  
 labriformis, 154  
 malabaricus, 157  
 merra, 158  
 oncus, 156  
*episcopi*, *Brachyrhaphis*, 12  
 erythrodon, *Scarus*, 331  
 erythrogaster, *Caesio*, 189  
*erythrorinchus*, *Hemiramphus*, 49  
*Eucinostomus californiensis*, 208  
*evermanni*, *Alticus*, 405  
*evides*, *Ptereleotris* (Encaura), 340  
*Eviota afelei*, 348  
 distigma, 348  
 smaragdus, 349  
 viridis, 349  
*Evoplites viridis*, 184  
*eximius*, *Halichoeres*, 311  
*Exocoetus volitans*, 53  
*exostigma*, *Apogon*, 128

- falcula*, *Chaetodon*, 228  
*far*, *Hemiramphus*, 50  
*fasciatus*, *Apogon*, 126  
*fasciatus*, *Chaetodon*, 228  
     *Cheilinus*, 327  
     *Corythoichthys*, 85  
     *Leiognathus*, 118  
     *Salarias*, 408  
*favagineus*, *Gymnothorax*, 43  
*fijiensis*, *Halichoeres*, 313  
*filamentosus*, *Ctenogobius*, 366  
     *Gerres*, 206  
*fimbriata*, *Muraena*, 46  
*Fistularia* *petimba*, 88  
*flavescens*, *Zebrafoma*, 248  
*flavissimus*, *Forcipiger*, 220  
*flavissimus*, *Holacanthus*, 235  
*flavofasciatus*, *Syngnathus*, 85  
*flavoguttatus*, *Acanthurus*, 245  
*flavolineatus*, *Mullus*, 215  
*flavus*, *Chaetodon*, 228  
*flos-coralis*, *PlatyGLOSSUS*, 308  
*fluviatilis*, *Disparichthys*, 436  
*forbesi*, *Orthopristis*, 190  
*Forcipiger* *longirostris*, 220  
*formosa*, *Coris*, 319  
*forskali*, *Atherina*, 89  
*forsteri*, *Caranx*, 114  
*freminvillei*, *Doydixodon*, 205  
*frenatus*, *Amphiprion*, 267  
     *Apogon*, 127  
*frenatus*, *Heliases*, 269  
*frenatus*, *Scarus*, 338  
*fulviflamma*, *Lutianus*, 175  
*funebri*, *Gymnothorax*, 44  
*furcifer*, *Paranthias*, 160  
*fusca*, *Eleotris*, 345  
*fuscus*, *Bathygobius*, 354  
  
*gahn*, *Acanthurus*, 241  
*galapagensis*, *Carcharinus*, 22  
*galapagorum*, *Umbrina*, 217  
*Gambusia* *nicaraguensis*, 12  
*gemmeus*, *Gnatholepis*, 357  
*genivittatus*, *Chonophorus*, 374  
*geometricus*, *Anchisomus*, 428  
*germo*, *Germo*, 106  
*Gerres* *filamentosus*, 206  
     *kapas*, 207  
     *macracanthus*, 207  
     *macrosona*, 208  
*gibbifrons*, *Julis*, 318  
*gibbus*, *Lutianus*, 177  
*giuris*, *Glossogobius*, 458  
*gladius*, *Xiphias*, 109  
*glaucopareius*, *Acanthurus*, 242  
*glaucus*, *Abudefduf*, 302  
*globeiceps*, *Scarus*, 338  
*Glossogobius* *biocellatus*, 360  
     *celebius*, 361, 458  
     *giuris*, 458  
     *koragensis*, 459  
*Gnathodentex* *oculo-maculatus*, 200  
  
*Gnatholepis* *corlettei*, 356  
     *deltoides*, 357  
     *gemmeus*, 357  
     *puntangoides*, 358  
*Gobiesox* *paradiseus*, 393  
*Gobiodon* *quinquestrigatus*, 384  
     *rivulatus*, 384  
*Gobiomorus* *dormitor*, 12  
*Gobius* *ornatus*, 353  
*goldiei*, *Holocentrum*, 64  
*gorgonae*, *Compsura*, 12  
*Grammistes* *sexlineatus*, 162  
*grandoculis*, *Monotaxis*, 203  
*guamensis*, *Scorpaenodes*, 261  
*guatemalensis*, *Roebooides*, 12  
*guntheri*, *Hepatus*, 244  
*guntheri*, *Hypseleotris*, 342, 450  
*guttatus*, *Salarias*, 409  
*guttatus*, *Serranus*, 148  
*guttatus* *var. oramin*, *Amphacanthus*,  
     254  
*gymnocephalus*, *Halichoeres*, 314  
*gymnopomus*, *Butis*, 343  
*Gymnothorax* *boschi*, 42  
     *chilospilus*, 42  
     *efatensis*, 43  
     *favagineus*, 43  
     *funebri*, 44  
     *pictus*, 44  
     *richardsoni*, 45  
     *undulatus*, 46  
  
*haematopterus*, *Lethrinus*, 198  
*Halichoeres* *binotopsis*, 310  
     *centiquadrus*, 311  
     *daedalma*, 312  
     *dispilus*, 313  
     *fijiensis*, 313  
     *gymnocephalus*, 314  
     *hoeveni*, 307  
     *kallochroma*, 308  
     *miniatus*, 314  
     *notopsis*, 308  
     *opercularis*, 315  
     *purpurascens*, 316  
     *scapularis*, 309  
     *trimaculatus*, 317  
*hamrur*, *Priacanthus*, 169  
*harak*, *Lethrinus*, 198  
*hardwicke*, *Thalassoma*, 320  
*Harengula* *melanura*, 30  
     *moluccensis*, 31  
*hartzfeldi*, *Apogon*, 123  
*hasta*, *Sparus*, 202  
*Hemiglyphidodon* *plagiometopon*, 302  
*Hemigymnus* *melapterus*, 306  
*hemimelas*, *Glyphidodon*, 299  
*Hemipimelodus* *papillifer*, 441  
*Hemiramphus* *dussumieri*, 49  
     *far*, 50  
*Heniochus* *monoceros*, 232  
     *permutatus*, 233  
*Hepsetia* *pinguis*, 91

- heraldi*, *Tetrodon*, 428  
*heterodon*, *Spherodon*, 203  
*heterolobus*, *Engraulis*, 34  
*hexagonata*, *Teuthis*, 253  
*hexagonatus*, *Serranus*, 158  
*hexataenia*, *Pseudocheilinus*, 325  
*hippoides*, *Caranx*, 113  
*hippurus*, *Coryphaena*, 109  
*hoedli*, *Ophiocara*, 456  
*hoeveni*, *Halichoeres*, 307  
*hoevenii*, *Epinephelus*, 155  
*Holacanthus flavissimus*, 235  
   *nicobariensis*, 236  
   *passer*, 235  
   *semicirculatus*, 237  
   *sexstriatus*, 234  
   *vroliki*, 236  
*Holocentrus binotatus*, 69  
   *caudimaculatus*, 67  
   *cornutus*, 60  
   *diadema*, 70  
   *lacteo-guttatus*, 67  
   *laevis*, 64  
   *microstomus*, 71  
   *opercularis*, 62  
   *rubellio*, 63  
   *ruber*, 59  
   *sammara*, 66  
   *spinifer*, 68  
   *suborbitalis*, 60  
   *tiereoides*, 63  
   *unipunctatus*, 64  
   *violaceus*, 61  
*Holotrachys lima*, 72  
*homei*, *Carapus*, 416  
*hortulanus*, *Labrus*, 311  
*hyalosoma*, *Apogon*, 133  
*Hyporhamphus unifasciatus*, 51  
*Hypseleotris güntheri*, 342, 450  
*hypselopterus*, *Acanthurus*, 249  
*hypselopterus*, *Lethrinus*, 199  
*hystrix*, *Diodon*, 432  
  
*Ichthyocampus kampeni*, 82  
   *idiastes*, *Sphyraena*, 100  
   *ignobilis*, *Caranx*, 113  
   *immaculatus*, *Tetraodon*, 429  
   *indica*, *Monotaxis*, 204  
   *indicus*, *Chanos*, 28  
     *Pimelepterus*, 205  
   *indicus*, *Polynemus*, 102  
   *insidiator*, *Epibulus*, 304  
   *insignis*, *Amblygobius*, 376  
   *intermedius*, *Myripristis*, 73  
   *interstinctus*, *Gobius*, 353  
   *iomelas*, *Chromis*, 270  
   *isingleenoides*, *Gymnothorax*, 46  
   *isingleteena*, *Gymnothorax*, 44  
   *itosibi*, *Neothunnus*, 106  
  
   *japonicus*, *Stolephorus*, 33  
   *jarbua*, *Therapon*, 195  
   *javanicus*, *Aphthalmichthys*, 40  
  
   *jello*, *Sphyraena*, 101  
   *jessiae*, *Xenocys*, 185  
   *jordani*, *Lutianus*, 170  
  
   *kabia*, *Melanotaenia*, 443  
   *kallochroma*, *Halichoeres*, 308  
   *kampeni*, *Achirophichthys*, 38  
     *Ichthyocampus*, 82  
     *Zenarchopterus*, 52  
   *kandavensis*, *Mugil*, 93  
   *kanganamanensis*, *Arius*, 440  
   *kapas*, *Gerres*, 207  
   *kasmira*, *Lutianus*, 171  
   *kalopron*, *Exocoetus*, 54  
   *Katsuwonus pelamis*, 105  
   *kendalli*, *Cephalopholis*, 149  
   *killitzi*, *Acanthurus*, 245  
   *koelreuteri*, *Periophthalmus*, 390  
   *koilomatodon*, *Amia*, 121  
   *koragensis*, *Glossogobius*, 459  
   *Kuhlia bilunulata*, 145  
     *marginata*, 144, 450  
     *rupestris*, 143  
     *taeniura*, 146  
   *kulambangrae*, *Petroscirtes*, 400  
   *kunzei*, *Harengula*, 31  
   *Kyphosus cinerascens*, 205  
     *waiigiensis*, 206  
  
   *labiatus*, *Cheiloprion*, 273  
   *Labrichthys cyanotaenia*, 304  
   *labriformis*, *Epinephelus*, 154  
   *Labrisomus xanti*, 415  
   *lachrymosus*, *Chonophorus*, 459  
   *lacrymatus*, *Abudefduf*, 295  
   *lacteo-guttatus*, *Holocentrus*, 67  
   *laevis*, *Holocentrus*, 64  
   *lagocephalus*, *Spheroides*, 428  
   *lajang*, *Decapterus*, 111  
   *lamouroux*, *Balistes*, 419  
   *laticlavus*, *Xesurus*, 252  
   *latidens*, *Lethrinus*, 204  
   *latifrons*, *Lethrinus*, 197  
   *leachii*, *Chaetodon*, 222  
   *lecluse*, *Cymolutes*, 330  
   *leiognathos*, *Myripristis*, 77  
   *Leiognathus dussumieri*, 118  
     *fasciatus*, 118  
   *Leiuranus semicinctus*, 37  
   *leo*, *Holocentrum*, 68  
   *leopardus*, *Cephalopholis*, 152  
   *lepisurus*, *Chromis*, 269  
   *leptacanthus*, *Apogon*, 131  
   *leptaspis*, *Arius*, 436  
   *Lethrinus haematopterus*, 198  
     *harak*, 198  
     *hypselopterus*, 199  
     *leutjanus*, 200  
     *miniatius*, 196  
     *variegatus*, 197  
   *leucopomus*, *Abudefduf*, 301  
   *leucorus*, *Pomacentrus*, 275  
   *leucostictus*, *Cryptocentrus*, 379

- leucotaenia, *Scolopsis*, 191  
 leucozona, *Abudefduf*, 295  
 leutjanus, *Lethrinus*, 200  
 libertate, *Opisthonema*, 32  
 lima, *Holotrachys*, 72  
 lineata, *Teuthis*, 257  
 lineatus, *Acanthurus*, 242  
     *Lutianus*, 175  
     *Salarias*, 410  
*lineatus*, *Balistapus*, 419  
*lioglossus*, *Lutjanus*, 178  
 littoralis, *Pomacentrus*, 285  
 lituratus, *Naso*, 251  
*litus*, *Gymnothorax*, 45  
 lividus, *Pomacentrus*, 277  
*Liza borneensis*, 97  
     *melinoptera*, 96  
     *oligolepis*, 95  
     *seheli*, 98  
     *troscheli*, 98  
     *vaigiensis*, 95  
*Lo vulpinus*, 259  
 longimanus, *Mugil*, 93  
 longipinne, *Caecula*, 39  
 longirostris, *Forcipiger*, 220  
*longirostris*, *Lethrinus*, 196  
*lubina*, *Chanos*, 27  
 lunare, *Thalassoma*, 321  
*lunula*, *Chaetodon*, 228  
 lutescens, *Thalassoma*, 323  
*Lutianus argentimaculatus*, 180  
     *biguttatus*, 173  
     *bohar*, 174  
     *chrysoaenia*, 180  
     *fulviflamma*, 175  
     *gibbus*, 177  
     *jordani*, 170  
     *kasmira*, 171  
     *lineatus*, 175  
     *malabaricus*, 182  
     *marginatus*, 176  
     *monostigma*, 178  
     *oligolepis*, 172  
     *rivulatus*, 179  
     *russelli*, 182  
     *semicinctus*, 173  
*lycoensis*, *Scolopsis*, 192  
  
*mcelelandi*, *Bregmaceros*, 56  
*Macgregorella badia*, 352  
     *santa*, 352  
*Macolor macolor*, 183  
*macolor*, *Macolor*, 183  
*macracanthus*, *Gerres*, 207  
*macrodon*, *Cheilodipterus*, 138  
*macrodon*, *Choerops*, 326  
*macrolepis*, *Eleotris*, 451  
*macrophthalmus*, *Trachurops*, 112  
*macropterus*, *Muraenichthys*, 37  
     *Neothunnus*, 106  
*macrostoma*, *Gerres*, 208  
*maculatus*, *Caracanthus*, 266  
     *Scomberomorus*, 105  
     *maculatus*, *Dules*, 144  
     *maculicauda*, *Cichlasoma*, 12  
     *maderaspatisensis*, *Butirinus*, 28  
     *malabaricus*, *Epinephelus*, 157  
         *Lutianus*, 182  
     *Malacoctenus zonogaster*, 403  
     *malekulae*, *Ctenogobius*, 367  
     *malo*, *Dules*, 144  
     *malua*, *Boroda*, 454  
     *mancus*, *Platophrys*, 57  
     *manillensis*, *Muraena*, 36  
         *Tetrodon*, 429  
     *Manta birostris*, 25  
     *marchionessarum*, *Passer*, 58  
     *margaritatus*, *Canthigaster*, 431  
         *Salarias*, 410  
     *margaritifera*, *Scolopsis*, 191  
     *margaritifera*, *Teuthis*, 255  
     *marginata*, *Kuhlia*, 144, 450  
     *marginatus*, *Lutianus*, 176  
     *marmorata*, *Plagusia*, 58  
     *marmoratus*, *Salarias*, 411  
         *Uropterygius*, 48  
     *marmoratus*, *Siganus*, 258  
     *matoides*, *Acanthurus*, 243  
     *mauritaniana*, *Anguilla*, 36  
     *Megalaspis cordyla*, 110  
     *Megalops cyprinoides*, 25  
     *melampyggus*, *Caranx*, 114  
     *melampyggus*, *Caranx*, 116  
     *melanocephalus*, *Stephanolepis*, 424  
     *melanopterus*, *Carcharinus*, 23  
         *Pomacentrus*, 289  
     *melanosoma*, *Eleotris*, 346, 453  
     *Melanotaenia kabia*, 443  
         *rosacea*, 445  
     *melanotus*, *Tylosurus*, 48  
     *melanura*, *Harengula*, 30  
     *melapterus*, *Hemigymnus*, 306  
     *melas*, *Abudefduf*, 296  
         *Apogon*, 131  
         *Plesiops*, 163  
     *Melichthys radula*, 422  
     *melinoptera*, *Liza*, 96  
     *mento*, *Chanos*, 27  
     *merra*, *Epinephelus*, 158  
     *metallicus*, *Abudefduf*, 296  
     *metanopselion*, *Abudefduf*, 302  
     *Micrognathus brevirostris*, 86  
         *suvensis*, 86  
     *Microphis brachyurus*, 81  
     *microphthalmus*, *Myripristis*, 75  
     *microprion*, *Epinephelus*, 150  
     *micropterus*, *Gymnomuraena*, 48  
     *microstomus*, *Holocentrus*, 71  
     *miles*, *Prionotus*, 266  
     *miliaris*, *Tetragonopterus*, 232  
     *miniatus*, *Cephalopholis*, 151  
         *Halichoeres*, 314  
         *Lethrinus*, 196  
     *minutus*, *Enneapterygius*, 396  
     *Mionorus pacificus*, 135

- miops, *Ambassis*, 141  
*moadetta*, *Chorinemus*, 110  
*moana*, *Parupeneus*, 214  
*modesta*, *Glyphidodontops*, 302  
*modestus*, *Halichoeres*, 314  
*Mogurnda mogurnda*, 453  
*mogurnda*, *Mogurnda*, 453  
*Mollienisia sphenops*, 12  
*moluccensis*, *Harengula*, 31  
     *Pomacentrus*, 283  
*monoceros*, *Heniochus*, 232  
*monochrous*, *Gymnothorax*, 42  
*Monodactylus argenteus*, 218  
*monophthalmus*, *Holacanthus*, 235  
*monostigma*, *Lutianus*, 178  
*Monotaxis grandoculis*, 203  
*monticola*, *Agonostomus*, 12  
*montrouzieri*, *Zanclus*, 238  
*mooreanus*, *Anthias*, 161  
     *Myripristis*, 78  
*Mugil dussumieri*, 92  
     *engeli*, 92  
     *kandavensis*, 93  
     *longimanus*, 93  
     *thoburni*, 94  
*Mulloidichthys auriflamma*, 215  
     *samoensis*, 216  
*multifasciatus*, *Parupeneus*, 214  
*multilineatus*, *Apogon*, 134  
*Muraenichthys macropterus*, 37  
     *schultzei*, 435  
*murals*, *Valenciennes*, 350  
*murdjan*, *Myripristis*, 73  
*murdjan*, *Myripristis*, 72, 73  
*muroadsi*, *Decapterus*, 112  
*Mycteroperca olfax*, 159  
*myersi*, *Amblygobius*, 377  
*myriaster*, *Serranus*, 148  
*Myripristis adustus*, 72  
     *intermedius*, 73  
     *leionathos*, 77  
     *microphthalmus*, 75  
     *mooreanus*, 78  
     *murdjan*, 73  
     *occidentalis*, 77  
     *pralinus*, 79  
     *undecimalis*, 74  
     *violaceus*, 76  
  
*naraharae*, *Cingulogobius*, 371  
*narinari*, *Aetobatus*, 24  
*Naso brevirostris*, 250  
     *litratus*, 251  
*naucrates*, *Echeneis*, 394  
*nebulosa*, *Echidna*, 41  
*Nematistius pectoralis*, 117  
*neophytus*, *Ctenogobius*, 369  
*Neothunnus macropterus*, 106  
*Nesiotes purpurascens*, 165  
*Nexilarius concolor*, 274  
*nicaraguensis*, *Gambusia*, 12  
*nicobariensis*, *Holacanthus*, 236  
  
*nicobariensis* var. *semicirculatus*, *Holacanthus*, 237  
*niger*, *Balistes*, 422  
     *Lutjanus*, 183  
*nigra*, *Eleotris*, 345  
*nigricans*, *Chaetodon*, 241  
*nigricans*, *Plesiops*, 163  
     *Pomacentrus*, 278  
*nigrirostris*, *Chaetodon*, 221  
*nigromaculatus*, *Apogon*, 120  
*nigroris*, *Acanthurus*, 246  
*nilens*, *Monacanthus*, 424  
*nitidus*, *Salarias*, 405  
*notata*, *Genyoroge*, 182  
*notophthalmus*, *Pomacentrus*, 287  
*notopsis*, *Halichoeres*, 308  
*Novaculichthys taeniourus*, 330  
*novae-britanniae*, *Holocentrum*, 64  
*novemfasciatus*, *Apogon*, 125  
*nox*, *Arius*, 441  
*nuchalis*, *Chanos*, 27  
  
*obesus*, *Triaenodon*, 24  
*obliquus*, *Petroscirtes*, 401  
*occidentalis*, *Myripristis*, 77  
*ocellaris*, *Chonophorus*, 375  
*ocellatus*, *Callogobius*, 362  
*ocellatus*, *PlatyGLOSSUS*, 304  
     *Tetrodon*, 430  
*ocellicauda*, *Philyppnus*, 344  
*octofasciatus*, *Chaetodon*, 226  
*octolineata*, *Diacope*, 171  
     *Paramia*, 138  
*oclovittatus*, *Cheilodipterus*, 138  
*ocularis*, *Holacanthus*, 235  
*oculo-maculatus*, *Gnathodentax*, 200  
*Ogilbia ventralis*, 415  
*olfax*, *Mycteroperca*, 159  
*oligacanthus*, *Plectropomus*, 147  
*oligolepis*, *Liza*, 95  
     *Lutianus*, 172  
*ongus*, *Epinephelus*, 156  
*opercularis*, *Halichoeres*, 315  
     *Holocentrus*, 62  
*ophicephalus*, *Ophiocara*, 347  
*Ophioblennius steindachneri*, 415  
*Ophiocara aporos*, 456  
     *porocephala*, 346, 457  
*ophiocephalus*, *Eleotris*, 347  
*ophis*, *Muraena*, 41  
*Opisthonema libertate*, 32  
*oramin*, *Teuthis*, 254  
*orbicularis*, *Apogon*, 120  
*orientalis*, *Chanos*, 27  
     *Grammistes*, 162  
*ornatissimus*, *Balistes*, 418  
*ornatissimus*, *Chaetodon*, 227  
*ornatus*, *Gobius*, 353  
*ornatus*, *Scatophagus*, 219  
*Orthopristis forbesi*, 190  
*osgoodi*, *Vaimosa*, 359  
*Ostracion cornutus*, 426  
     *tuberculatus*, 427

- ovalaua, *Atherina*, 90  
 oxyrhynchus, *Cheilinus*, 328  
  
 pachycentron, *Cephalopholis*, 150  
 pacifica, *Anguilla*, 434  
 pacificus, *Mionorus*, 135  
 pairatalis, *Chaetodon*, 219  
 pala, *Chanos*, 28  
 palah, *Cyprinus (Leuciscus)*, 27  
 panamensis, *Piabucina*, 12  
 pantherina, *Gymnothorax*, 48  
 pantherinus, *Epinephelus*, 157  
 pantherinus, *Platophrys*, 58  
 Papenua pugnans, 385  
 papilio, *Periophthalmus*, 390  
 papillifer, *Hemipimelodus*, 441  
 paradiseus, *Gobiesox*, 393  
 Paragobiodon echinocephalus, 363  
 Parah, *Tol*, 110  
 Paralabrax albomaculatus, 159  
 Parambassis confinis, 447  
 Paranthias furcifer, 160  
 Parapercis cylindrica, 395  
 Paraplagusia bilineata, 58  
 pardalis, *Cantherines*, 423  
 pardochir, *Enneapterygius*, 397  
 Parupeneus barberinus, 211  
     bifasciatus, 212  
     bilineatus, 213  
     moana, 214  
 parvipinnis, *Carapus*, 416  
 passer, *Holacanthus*, 235  
 pavo, *Pomacentrus*, 279  
 pectoralis, *Dactyloscopus*, 395  
     *Nematistius*, 117  
     *Scarus*, 333  
 pelamis, *Katsuwonus*, 105  
 Pempheris dispar, 170  
 Pentapus caninus, 201  
 perdis, *Apogonichthys*, 136  
 Periophthalmus barbarus, 389  
 periophthalmus, *Salarias*, 411  
 permutatus, *Heniochus*, 233  
 perotteti, *Pristis*, 434  
 peruanus, *Pneumatophorus*, 104  
 petimba, *Fistularia*, 88  
 Petrosirtes kulambangrae, 400  
     obliquus, 401  
     taeniatus, 402  
     xestus, 402  
 phalaena, *Amblygobius*, 379  
 Piabucina panamensis, 12  
 pictus, *Gymnothorax*, 44  
 picuda, *Sphyræna*, 100  
 pinguis, *Hepsetia*, 91  
 pinnulatus, *Decapterus*, 112  
 plagiometopon, *Hemiglyphidodon*, 302  
 Platophrys constellatus, 57  
     mancus, 57  
     pantherinus, 58  
 platyrhynchus, *Carcharinus*, 23  
 plebeius, *Polynemus*, 101  
 Plectorhynchus celebicus, 190  
  
 Plectropomus oligacanthus, 147  
 Plesiops melas, 163  
     nigricans, 163  
 Pneumatophorus peruanus, 104  
 poecilopterus, *Exocoetus*, 55  
 polyacanthus, *Acanthochromis*, 272  
     *Pseudogramma*, 168  
 polylepis, *Prochilus*, 267  
 Polynemus indicus, 102  
     plebeius, 101  
     sexfilis, 103  
 polyophthalmus, *Gymnothorax*, 45  
 Pomacentrus albofasciatus, 276  
     amboinensis, 285  
     arcifrons, 274  
     bankieri, 281  
     beebei, 275  
     caeruleus, 280  
     cranei, 288  
     dorsalis, 283  
     eclipticus, 277  
     leucorus, 275  
     littoralis, 285  
     lividus, 277  
     melanopterus, 289  
     moluccensis, 283  
     nigricans, 278  
     notophthalmus, 287  
     pavo, 279  
     simsiang, 286  
     tripunctatus, 284  
     tropicus, 282  
     violascens, 281  
 porocephala, *Ophiocara*, 346, 457  
 praetextata, *Cymolutes*, 330  
 pralinus, *Myripristis*, 79  
 prasin, *Holocentrus*, 59  
 prasinus, *Myripristis*, 79  
 pretiosus, *Ruvettus*, 108  
 Priacanthus cruentatus, 168  
     hamrur, 169  
 princeps, *Caulolatilus*, 217  
 Prionotus miles, 266  
 Priopis buruensis, 142, 449  
 Pristiapogon snyderi, 134  
 Pristis perotteti, 434  
 Pseudechidna brummeri, 42  
 Pseudocheilinus hexataenia, 325  
 Pseudochromis tapeinosoma, 167  
 Pseudogramma polyacanthus, 168  
 psittaculus, *Pseudocheilinus*, 325  
 Ptereleotris (*Encaura*) evides, 340  
 Pterois antennata, 264  
     radiata, 265  
 puella, *Teuthis*, 256  
 pugnans, *Papenua*, 385  
 pulcherrima, *Coris*, 319  
 punctatissimum, *Holocentryum*, 67  
 punctatus, *Diodon*, 432  
     *Pomacentrus*, 277  
     *Siganus*, 253  
 punctulatus, *Enneapterygius*, 397

- puntangoides*, *Gnatholepis*, 358  
*purpurascens*, *Halichoeres*, 316  
   *Nesiotes*, 165  
*pyrrhurus*, *Calliodon*, 339  
  
*quadricornis*, *Salarias*, 407  
*quinquecinctus*, *Cheilinus*, 328  
*quinquelineatus*, *Cheilodipterus*, 139  
*quinquestrigatus*, *Gobiodon*, 384  
*quoyi*, *Scarus*, 335  
  
*radiata*, *Pterois*, 265  
*radiatus*, *Cheilinus*, 327  
*radula*, *Melichthys*, 422  
*rafflesi*, *Chaetodon*, 225  
*Rastrelliger brachysoma*, 104  
*remora*, *Echeneis*, 394  
*reticularis*, *Tetraodon*, 430  
*Rhabdamia cypselurus*, 138  
*rhizophora*, *Zonogobius*, 371  
*rhodopterus*, *Apogon*, 121  
*Rhombosoma sepikensis*, 445  
*richardsoni*, *Gymnothorax*, 45  
*ringens*, *Melichthys*, 422  
*rivulatus*, *Gobiodon*, 384  
   *Lutianus*, 179  
*robusta*, *Apogon*, 126  
*Roeboides guatemalensis*, 12  
*rogaa*, *Cephalopholis*, 153  
*rondeletii*, *Cypselurus*, 55  
*rosacea*, *Melanotaenia*, 445  
*rostrata*, *Teuthis*, 252  
*rostratus*, *Lethrinus*, 196  
*rotleri*, *Caranx*, 110  
*rubellio*, *Holocentrus*, 63  
*ruber*, *Holocentrus*, 59  
*ruberrimus*, *Astyanax*, 12  
*Runula albolinea*, 403  
*rupestris*, *Kuhlia*, 143  
*Rupiscartes atlanticus*, 404  
*russelli*, *Lutianus*, 182  
*Ruvettus pretiosus*, 108  
  
*safgha*, *Ambassis*, 140  
*sagenodeta*, *Gymnothorax*, 43  
*Salarias alboguttatus*, 405  
   *belemnites*, 405  
   *caudolineatus*, 406  
   *edentulus*, 407  
   *fasciatus*, 408  
   *guttatus*, 409  
   *lineatus*, 410  
   *margaritatus*, 410  
   *marmoratus*, 411  
   *periophthalmus*, 411  
   *saliens*, 412  
   *walensis*, 413  
*saliens*, *Salarias*, 412  
*salmoneus*, *Chanos*, 27  
*samalensis*, *Gymnothorax*, 43  
*sammara*, *Holocentrus*, 66  
*samoensis*, *Mulloidichthys*, 216  
*sanctae-helenae*, *Decapterus*, 112  
  
*sandvicensis*, *Hepatus*, 240  
*sangiensis*, *Apogon*, 132  
*sansun*, *Caranx*, 114  
*santa*, *Macgregorella*, 352  
*Sarda chiliensis*, 107  
*Sardinella thrissina*, 30  
*savayensis*, *Apogon*, 122  
*saxatilis*, *Abudefduf*, 291  
*scaber*, *Tetraodon*, 429  
*scabra*, *Scorpaenodes*, 262  
*scapularis*, *Halichoeres*, 309  
*scapulopunctatus*, *Ctenogobius*, 369  
*Scarus abacurus*, 336  
   *balinensis*, 334  
   *dimidiatus*, 336  
   *dubius*, 332  
   *erythrodon*, 331  
   *frenatus*, 338  
   *globiceps*, 338  
   *pectoralis*, 333  
   *quoyi*, 335  
   *troscheli*, 339  
   *zonularis*, 334  
*Scatophagus argus*, 219  
*schultzei*, *Muraenichthys*, 435  
*schwanenfeldi*, *Thalassoma*, 323  
*sclateri*, *Callogobius*, 362  
*sclateri*, *Myxus (Neomyxus)*, 99  
*scolidon*, *Gymnothorax*, 46  
*Scolopsis bilineatus*, 193  
   *ciliatus*, 192  
   *leucotaenia*, 191  
   *margaritifera*, 191  
*Scomberoides tol*, 110  
   *toloo-parah*, 110  
*Scomberomorus maculatus*, 105  
*scopas*, *Amanes*, 423  
*Scorpaenodes guamensis*, 261  
   *scabra*, 262  
   *xyris*, 260  
*sculptus*, *Choerichthys*, 80  
*sebanus*, *Chaetodon*, 223  
*Sebastapistes badio-rufus*, 262  
   *bynoensis*, 263  
*seheli*, *Liza*, 98  
*semicinctus*, *Leiuranus*, 37  
   *Lutianus*, 173  
*semicirculatus*, *Holacanthus*, 237  
*semidoliatus*, *Zonogobius*, 370  
*semipunctatus*, *Asterropteryx*, 341  
*semoni*, *Stiphodon*, 387  
*sepikensis*, *Rhombosoma*, 445  
   *Zenarchopterus*, 443  
*servus*, *Therapon*, 195  
*sesquilineatus*, *Balistes*, 419  
*setifer*, *Chaetodon*, 223  
*sexfasciatus*, *Abudefduf*, 292  
*sexfasciatus*, *Caranx*, 115  
*sexflis*, *Polynemus*, 103  
*sexlineatus*, *Grammistes*, 162  
*sexstriatus*, *Holacanthus*, 234  
*seychellensis*, *Myripristis*, 79

- sierra*, *Scomberomorus*, 105  
*simisiang*, *Pomacentrus*, 286  
*sinensis*, *Bostrichthys*, 344  
*sinuosus*, *Cheilinus*, 329  
*smaragdinus*, *Glyphisodon*, 293  
*smaragdus*, *Eviota*, 349  
*snyderi*, *Pristiapogon*, 134  
*solandri*, *Canthigaster*, 431  
*solidus*, *Arius*, 438  
*sordidus*, *Abudefduf*, 290  
*sordidus*, *Tetraodon*, 429  
*souleyetii*, *Julis*, 324  
*Sparus* *berda*, 202  
*spengeli*, *Anguilla*, 435  
*sphenops*, *Mollienia*, 12  
*sphenopilus*, *Chaetodon*, 229  
*Speroides* *annulatus*, 428  
*lagocephalus*, 428  
*Sphyræna* *barracuda*, 100  
*idiastes*, 100  
*jello*, 101  
*spilonotus*, *Pseudoscarus*, 338  
*spilopterus*, *Cypselurus*, 55  
*spinifer*, *Holocentrus*, 68  
*spiniger*, *Spinoblennius*, 399  
*Spinoblennius* *spiniger*, 399  
*steindachneri*, *Ophioblennius*, 415  
*stellans*, *Epinephelus*, 158  
*stellatus*, *Caranx*, 116  
*stellatus*, *Caranx*, 114  
*Stephanolepis* *melanocephalus*, 424  
*tomentosus*, 425  
*stercus muscarum*, *Holocentrum*, 67  
*Stethojulis* *axillaris*, 305  
*strigiventer*, 306  
*Stiphodon* *elegans*, 387  
*Stolephorus* *delicatulus*, 32  
*japonicus*, 33  
*striatulus*, *Brycon*, 12  
*striatus*, *Ctenochaetus*, 246  
*striatus*, *Ctenochaetus*, 247  
*Holacanthus*, 237  
*strigangulus*, *Chaetodon*, 222  
*strigiventer*, *Stethojulis*, 306  
*strigosus*, *Ctenochaetus*, 247  
*striolata*, *Teuthis*, 258  
*suborbitalis*, *Holocentrus*, 60  
*sulphureus*, *Upeneus*, 210  
*suluensis*, *Ctenogobius*, 368  
*suluensis*, *Pomacentrus*, 287  
*sumbawensis*, *Scarus*, 331  
*surinamensis*, *Anisotremus*, 189  
*suvensis*, *Micrognathus*, 86  
  
*taeniatus*, *Petroscirtes*, 402  
*taeniourus*, *Novaculichthys*, 330  
*taeniura*, *Kuhlia*, 146  
*Tagusa* *delicata*, 398  
*tahiticum*, *Holocentrum*, 66  
*tahmel*, *Pimelepterus*, 205  
*tapeinosoma*, *Pseudochromis*, 167  
*tau nigrum*, *Chaetodon*, 230  
*taupou*, *Abudefduf*, 298  
  
*ternatensis*, *Chromis*, 272  
*tesselatus*, *Gymnothorax*, 44  
*testudineus*, *Tetraodon*, 430  
*tetragonus*, *Ostracion*, 427  
*Tetraodon* *immaculatus*, 429  
*reticularis*, 430  
*Teuthis* *doliata*, 257  
*hexagonata*, 253  
*lineata*, 257  
*oramin*, 254  
*puella*, 256  
*rostrata*, 252  
*striolata*, 258  
*vermiculatus*, 259  
*Thalassoma* *cranei*, 319  
*hardwicke*, 320  
*lunare*, 321  
*lutescens*, 323  
*schwauenfeldi*, 323  
*umbrostygma*, 324  
*Therapon* *argenteus*, 194  
*cancellatus*, 194  
*jarbua*, 195  
*thermalis*, *Apogon*, 133  
*thoburni*, *Mugil*, 94  
*thorntonensis*, *Holocentrus*, 71  
*thrissina*, *Sardinella*, 30  
*Thunnus* *thynnus*, 106  
*thynnus*, *Thunnus*, 106  
*Thyrrina* *chagresi*, 12  
*tiereoides*, *Holocentrus*, 63  
*tigris*, *Alepidoleotris*, 350  
*tol*, *Scomberoides*, 110  
*toloo-parah*, *Scomberoides*, 110  
*tomentosus*, *Stephanolepis*, 425  
*tonganus*, *Blennius*, 404  
*Trachinotus* *bailloni*, 117  
*Trachurops* *macrophthalmus*, 112  
*tragula*, *Upeneus*, 209  
*tri*, *Engraulis*, 35  
*Triaenodon* *obesus*, 24  
*triangularis*, *Chaetodon*, 222  
*triangulum*, *Chaetodon*, 222  
*tricuspidata*, *Atuona*, 383  
*tridactylus*, *Salaria*, 412  
*trifascialis*, *Chaetodon*, 222  
*trifasciatus*, *Chaetodon*, 230  
*trifasciatus*, *Glyphisodon*, 293  
*Upeneus*, 212, 214  
*trilineatus*, *Pomacentrus*, 283, 284, 286  
*trilobatus*, *Cheilinus*, 329  
*trimaculatus*, *Dascyllus*, 268  
*Halichoeres*, 317  
*triostegus*, *Acanthurus*, 240  
*tripunctatus*, *Pomacentrus*, 284  
*tristis*, *Sebastapistes*, 263  
*tropicus*, *Pomacentrus*, 282  
*trosceli*, *Liza*, 98  
*Scarus*, 339  
*truncata*, *Arbacia*, 391  
*tuberculatus*, *Ostracion*, 427  
*tydemani*, *Ruwettus*, 109

- Tylosurus melanotus*, 48  
*typus*, *Macolor*, 183  
*ulietensis*, *Chaetodon*, 227  
*Umbrina galapagorum*, 217  
*umbrostygma*, *Thalassoma*, 324  
*undecimalis*, *Myripristis*, 74  
*undulatus*, *Balistapus*, 419  
*Gymnothorax*, 46  
*unifasciatus*, *Glyphidodon*, 294  
*unifasciatus*, *Hyporhamphus*, 51  
*unimaculatus*, *Chaetodon*, 229  
*unimaculatus*, *Glyphisodon*, 299  
*uniocellatus*, *Abudefduf*, 298  
*unipunctatus*, *Holocentrus*, 64  
*Upeneus sulphureus*, 210  
*tragula*, 209  
*vittatus*, 210  
*urodelus*, *Cephalopholis*, 153  
*Uropterygius concolor*, 47  
*marmoratus*, 48  
*vagabundus*, *Chaetodon*, 224  
*vaigiensis*, *Liza*, 95  
*Vaimosa osgoodi*, 359  
*vaisiganus*, *Glossogobius*, 360  
*vaivasensis*, *Ambassis*, 142  
*Valenciennea muralis*, 350  
*valentini*, *Aulostomus*, 87  
*vanikorensis*, *Julis*, 330  
*variegata*, *Echidna*, 41  
*variegatus*, *Lethrinus*, 197  
*veliferum*, *Zebbrasoma*, 249  
*ventralis*, *Ogilbia*, 415  
*vermicularis*, *Encheliophis*, 417  
*vermiculatus*, *Teuthis*, 259  
*vidua*, *Balistes*, 420  
*vinctus*, *Chaetodon*, 231  
*violaceus*, *Holocentrus*, 61  
*Myripristis*, 76  
*violascens*, *Pomacentrus*, 281  
*virgatus*, *Tetrodon*, 429  
*viridescens*, *Balistes*, 421  
*viridis*, *Eviota*, 349  
*Evoplites*, 184  
*vittata*, *Pterois (Pseudomonopterus)*, 265  
*vittata*, *Acanthurus*, 243  
*Chaetodon*, 230  
*vittatus*, *Upeneus*, 210  
*voighti*, *Cryptocentrus*, 382  
*volitans*, *Exocoetus*, 53  
*vroliki*, *Holacanthus*, 236  
*vulpes*, *Albula*, 26  
*vulpinus*, *Lo*, 259  
*waiigiensis*, *Kyphosus*, 206  
*walensis*, *Salarias*, 413  
*webbi*, *Blennophis (Ophioblennius)*, 415  
*xanthopleura*, *Pentapus*, 201  
*xanthopterus*, *Gymnomuraena*, 48  
*xanti*, *Labrisomus*, 415  
*Xenichthys*, 187  
*Xenichthys agassizii*, 186  
*xanti*, 187  
*Xenocys jessiae*, 185  
*zenops*, *Xenichthys*, 187  
*xestus*, *Petrosirtes*, 402  
*Xesurus laticlavus*, 252  
*Xiphias gladius*, 109  
*xyris*, *Scorpaenodes*, 260  
*Zanclus canescens*, 238  
*cornutus*, 239  
*Zebbrasoma flavescens*, 248  
*veliferum*, 249  
*Zenarchopterus dispar*, 51  
*kamperi*, 52  
*sepikensis*, 443  
*zeylonicus*, *Leuciscus*, 27  
*zeylonicus*, *Upeneus*, 215  
*zollingeri*, *Engraulis*, 35  
*zonatus*, *Abudefduf*, 299  
*zoniceps*, *Siganus*, 256  
*zonogaster*, *Malacocentrus*, 403  
*Zonogobius rhizophora*, 371  
*semidoliatus*, 370  
*zonularis*, *Scarus*, 334  
*zonura*, *Eviota*, 349  
*zosterophora*, *Archamia*, 137

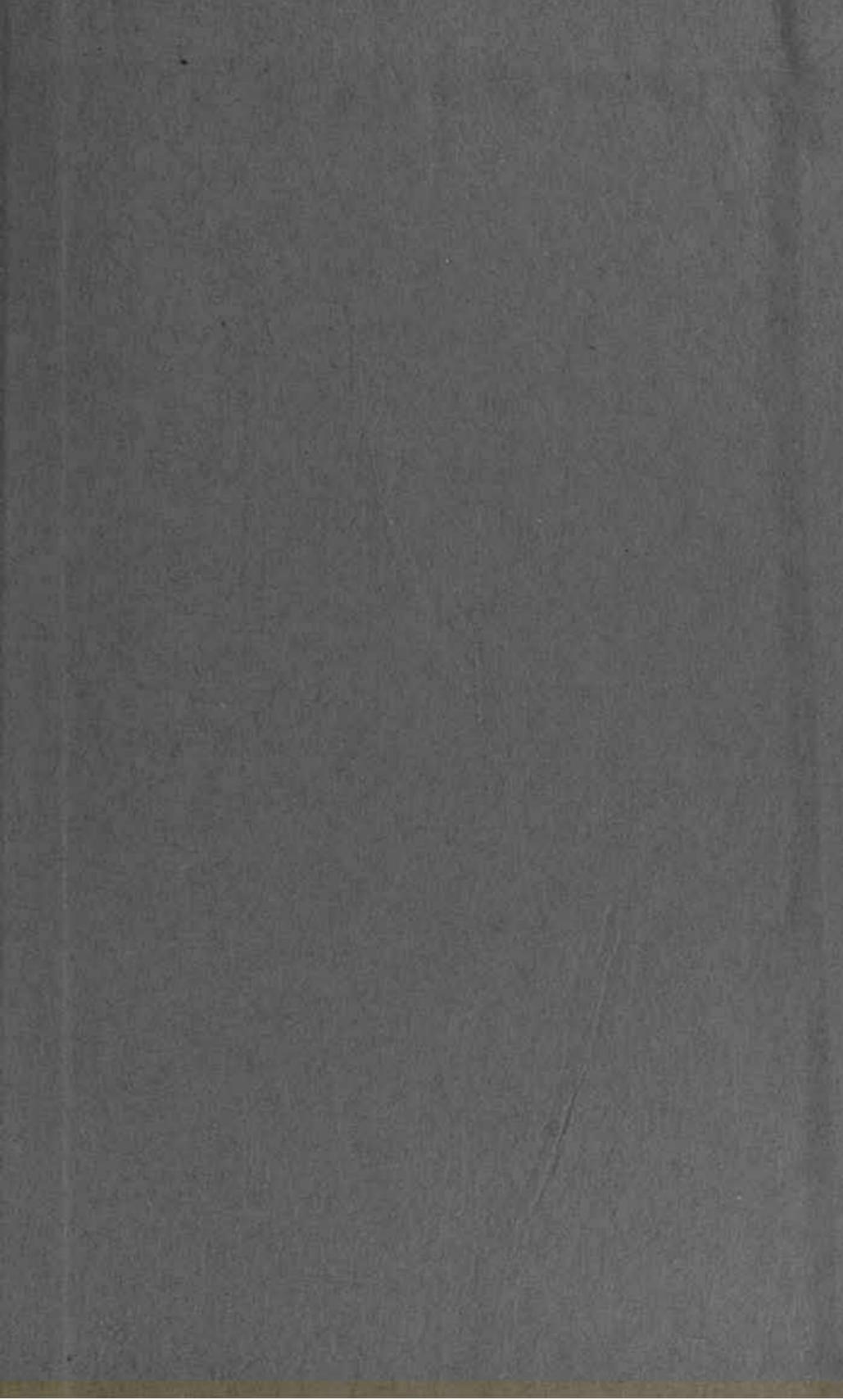
THE LIBRARY OF THE  
 APR 30 1936  
 UNIVERSITY OF ILLINOIS











UNIVERSITY OF ILLINOIS-URBANA

590.5F1 C001  
FIELDIANA, ZOOLOGYSCHGO  
21 1936



3 0112 009379501