

FISHES OF THE EASTERN PART OF THE
INDO-AUSTRALIAN ARCHIPELAGO
WITH REMARKS ON ITS ZOOGEOGRAPHY

BY

D^R. L. F. DE BEAUFORT,
EERBEEK.

(With Plate II and 8 figures in the text).

PRAEDA ITINERIS
a L. F. de Beaufort in Archipelago indico facti
annis 1909—1910.

X.

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Archipelago with remarks on its zoogeography

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The collection of fishes, brought together during my voyage in the eastern part of the Indo-Australian Archipelago in 1909—1910, consists of about 1700 specimens belonging to nearly 270 species, of which 9 were apparently new to science. 7 of these I have described previously, viz.: *Rhombatractus catherinae* in: Zool. Anz. XXXVI. p. 250, while the following gobies have been described in: Zool. Anz. XXXIX. p. 136: *Gobius (Cryptocentrus) stigmatophorus*, *Gobius (Rhinogobius) scapulopunctatus*, *Schismatogobius bruynisi*, *Sicyopus multisquamatus*, *Sicyopterus brevis*, *Sicyopterus longifilis*.

Doryrhamphus brevidorsalis and *Gobius oyensi* are described here for the first time.

By far the greater part of the fishes were collected by my wife and myself, but valuable additions were presented to me by Dr. P. Th. Justesen, at that time military surgeon at Buton, Messrs. M. J. van Baarda and G. A. Maan, missionaries at Halmahera, and Mr. L. de Bruyne, "posthouder" at Sorong, New Guinea. I hereby express my thanks to these gentlemen.

In working out these collections I had not only the advantage of being able to consult Prof. Max Weber's manuscript on the fishes of the Siboga Expedition, but this able ichthyologist helped me most kindly, with many useful suggestions out of his rich experience, through which not a little was added to my ichthyological knowledge and I became better trained to collaborate to the work "Fishes of the Indo-Australian Archipelago", in which Prof. Weber and I are now engaged.

I am glad to have an opportunity of thanking my esteemed master for his help and friendship, which makes the prospect of our working together in coming years a pleasant one.

I will begin this paper with a systematic list of the species collected, and discuss in the sequel the fishfauna of the islands visited and its bearing upon the zoogeography of that part of the Indo-Australian Archipelago.

In the systematic part the literature is only quoted so far, as to leave no doubt which species is meant. Only in critical cases the literature is given more fully.

I. Systematic part.

ELASMOBRANCHII

SELACHII

Chiloscyllium Müller & Henle.

1. *Chiloscyllium freycineti* (Q. G.)
Scyllium freycineti Quoy et Gaimard, Voy. Uranie, Poiss. p. 192.
Scyllium malaisianum Lesson, Voy. Coquille, Zool. II p. 94.
3 spec. 210—470 mm, from Saonek, Dec. 1909, January 1910.

This species is only known from the specimens described by the above named authors from Waigeu. Bleeker recorded *Ch. malayanum* from Batjan and Java, but Günther (Cat. Brit. Mus. VIII p. 412 and 413) proved that Bleeker's specimens were *Ch. indicum* (Gm. L.) and *punctatum* M. H. As has already been stated by Günther (l. c. p. 411), *Ch. freycineti* is closely allied to *Ch. ocellatum* (Gm. L.) and *Ch. trispeculare* Rich. from Australia, differing from these species by the absence of a black, white-edged ocellus above the pectoral. In my specimens there are two dark brown spots, much darker than those on the body, above that fin, but they are not edged with white. These spots are not shown in the figure given by Lesson, which is otherwise correct, except in the outlines and position of the gill-slits. In my specimens the fourth and fifth slits are close together as in the other members of the genus. The second slit is wider than the first one, which is much wider than the orbit. According to Richardson's figure of *Ch. trispeculare* the upper border of the dorsal fin is more concave in *Ch. freycineti*, forming a very acute angle with the hindborder, specially in the larger specimen, as is also described by Quoy & Gaimard and figured by Lesson. The lip of the lower jaw is not continuous in the middle, as is also the case in the Australian species.

TELEOSTOMI

Clupeidae

Stolephorus Lac.

1. *Stolephorus indicus* (v. Hass.).
Engraulis indicus van Hasselt, Algem. Konst- en Letterbode 1823. p. 329.
Stolephorus indicus Bleeker, Atl. Ichth. VI p. 32.
Ambon, fishmarket, 3 spec. 96—69 mm, December 7. 1909.
3 spec. 70—64 mm, February, 1910.
2. *Stolephorus heterolobus* Rüpp.
Stolephorus heterolobus Rüppell, Neue Wirbelt. Fische p. 79.
Stolephorus heterolobus Bleeker, Atl. Ichth. VI. p. 126.
4 spec. 60—64 mm, from the fishmarket at Buton, Dec. 3. 1909.
3. *Stolephorus zollingeri* (Blkr.).
Engraulis zollingeri Bleeker, Journ. Ind. Arch. II. p. 73.
Stolephorus zollingeri Bleeker, Atl. Ichth. VI. p. 127.
2 spec. 58 and 70 mm, from the fishmarket at Buton, Dec. 3. 1909.

Clupea L.

1. *Clupea (Harengula) atricauda* Gthr.
Harengula melanurus Bleeker, Nat. Tijds. Ned. Ind. V p. 245 (nec C. V.).
Clupea atricauda Günther, Cat. Brit. Mus. VII p. 426.
Clupea (Harengula) atricauda Bleeker, Atl. Ichth. VI p. 106.
9 spec. 139—155 mm, from Kairatu, W. Ceram. March 1, 1910.
2. *Clupea (Harengula) moluccensis* (Blkr.).
Harengula moluccensis Bleeker, Nat. Tijdschr. Ned. Indië IV p. 609.
Clupea (Harengula) moluccensis Bleeker, Atl. Ichth. VI p. 107.
Clupea (Harengula) kunzei Bleeker, Atl. Ichth. VI p. 107.
3 spec. 130—135 mm, Saonek, December 1909.
7 spec. 52—132 mm, Ambon, January 1910.
2 spec. 120 mm, Kairatu, W. Ceram, March 1, 1910.
3. *Clupea (Harengula) schrammi* (Blkr.).
Alosa schrammi Bleeker, Verh. Bat. Gen. XXII. Bijdr. Ichth. Bali p. 11.
Clupea (Harengula) schrammi Bleeker, Atl. Ichth. VI p. 109.
2 spec. circa 74 mm and 140 mm, from the fishmarket at Ambon. December 7, 1909 and February 1910.
4. *Clupea (Amblygaster) sirm* Rüpp.
Clupea sirm Rüppell, Neue Wirbelth. Fische p. 77.
Sardinella leiogastroides Bleeker, Nat. Tijdschr. Ned. Indië VII p. 255.
Clupea (Amblygaster) leiogastroides Bleeker, Atl. Ichth. VI p. 102.
Clupea sirm Günther, Fische der Südsee, Heft VIII p. 383.
7 spec. circa 50—150 mm, Buton, fishmarket, December 3, 1909.

Siluridae

Paraplotosus Blkr.

Elongate, tail tapering, head depressed, mouth transverse, rounded in front. Lips thick, with papillae and vermiculated folds. Upper lip very prominent, perforated at its underside near the mouth opening by the anterior nostrils, which look downward and are surmounted anteriorly by a very prominent caniculated lip. Posterior nostril a slit between eye and upper lip, in front of which a nasal barbel. A supramaxillary barbel near the end of the upper lip, a mandibular barbel below the corner of the mouth, two mental barbels between the mandibular barbels. Eye not covered by skin. A short dorsal, beginning behind the origin of pectorals, with few rays and a strong spine. A long second dorsal, united with the caudal, and beginning before origin of ventrals. It is many-rayed as well as the long anal fin, which is also united with the caudal. Ventrals with 12—13 rays. Pectorals with a spine and 12—13 rays. Maxillary teeth conical, with rounded tips and arranged in two rhombic patches with rounded lateral edges. Inframaxillary ones in two approximated semi-crescentic patches, the anterior row strong and conical, the posterior ones molars. Vomerine teeth molar, on a crescentic patch, the hindmost the stronger. First branchial arch with a finely crenulated membrane along the innerside of the horizontal branch, which bears 22 gillrakers. The second and third branchial arches with a series of long cartilaginous processes, covering the base of the gill-laminae on the sides facing each other. Gillmembranes confluent in the middle,

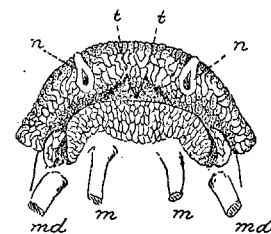


Fig. 1. View of the mouth and lips of *Paraplotosus albilabris* (C.V.) from below.

n nostril.
t teeth.
md mandibular barbel.
m mental barbel.

only the anterior portion of their confluent part connected with the isthmus. Branchiostegals 9–11. A very conspicuous dendritic organ between anus and anal.

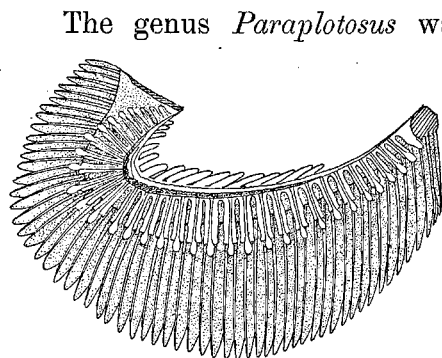


Fig. 2. Inner view of second branchial arch of *Paraplotosus albilabris* (C.V.).

The genus *Paraplotosus* was proposed by Bleeker for *Plotosus albilabris* C.V. with the following words: „Cette espèce est remarquable par la position des narines dans la lèvre supérieure même au milieu des papilles labiales, par la disposition des dents intermaxillaires, par son profil très convexe et par la grandeur des yeux. L'ensemble de ces caractères pourrait bien conduire à y voir un genre distinct, qu'on pourrait nommer *Paraplotosus*”. (Atl. Ichth. II p. 100).

Bleeker never gave a diagnosis of the genus and continued in his later papers to call the species *Plotosus albilabris*, as was done by most other authors.

Günther however (Cat. Brit. Mus. V p. 26) included this species in his genus *Copidoglanis*, although he says in the diagnosis of the genus: “nostrils as in *Plotosus*”. He did so evidently on account of the presence of a membrane along the first branchial arch. By the peculiar position of the anterior nostrils and by the presence of a dendritic organ behind the vent *Paraplotosus* is distinguished from the known species of *Copidoglanis*. By the last named character it approaches *Plotosus* and *Cnidoglanis*. It differs however from both genera by the position of the anterior nostrils; from *Plotosus* by the presence of cartilaginous processes on the second and third branchial arch and from *Cnidoglanis* by the gillmembranes being free from the isthmus. Moreover it differs from *Plotosus*, with which genus it is most related, by the situation of the second dorsal fin, which originates before the origin of the ventrals and not behind it as in *Plotosus*.

1. *Paraplotosus albilabris* (C.V.).

Plotosus albilabris Cuvier & Valenciennes, Hist. Nat. Poiss. XV p. 427.

Plotosus albilabris Bleeker, Atl. Ichth. II p. 99.

Copidoglanis albilabris Günther, Cat. Brit. Mus. V p. 26.

One specimen, 340 mm, from Sorong. New Guinea. Jan. 1910. (L. de Bruyne leg.)

Plotosus Lacépède.

1. *Plotosus anguillaris* (Bl.).

Platystacus anguillaris Bloch, Ausländ. Fische VIII p. 61.

Plotosus arab Bleeker, Atl. Ichth. II p. 98.

Plotosus anguillaris Günther, Cat. Brit. Mus. V p. 24.

2 spec. 82 and 87 mm, Saonek. December 1909.

1 spec. 84 mm, Sorong, New Guinea, L. de Bruyne leg.

5 spec. 65–70 mm, Buton, Dr. Justesen leg.

Anguillidae.

Genus *Anguilla* Cuvier.

1. *Anguilla celebesensis* Kp.

Anguilla celebesensis Kaup, Cat. Apodal Fish, p. 42.

Anguilla celebesensis Max Weber, Siboga-Exp. Fische, p. 39.

1 spec. 170 mm. Upper course of the river Tuba, W. Ceram. February 27. 1910 (fresh water).

2. *Anguilla mauritiana* Benn.

Anguilla mauritiana Bennet, Proc. Comm. Zool. Soc. London 1831 p. 128.

Anguilla mauritiana Max Weber, Siboga-Exp. Fische, p. 37.

One specimen, 810 mm, from a river near Kajeli, Buru (fresh water). Dec. 9. 1909.

3. *Anguilla* spec. juv.

1 spec. 69 mm, River Waiu waigé, Waigeu, December 25. 1909.

5 spec. 45—60 mm, River Waihä, Waigeu (fresh water).

Muraenichthys Bleeker.1. *Muraenichthys schultzei* Blkr.*Muraenichthys schultzei* Bleeker, Nat. Tijdschr. Ned. Ind. XIII p. 366. Atl. Ichth. IV p. 33.*Muraenichthys schultzei* Günther, Cat. Brit. Mus. VIII p. 52.*Muraenichthys schultzei* Day, Fishes of India 4°, p. 663.

One specimen, 75 mm, from coralreef at Ambon. February 1910.

Leiuranus Bleeker.1. *Leiuranus semicinctus* (Lay & Benn.).*Ophisurus semicinctus* Lay & Bennett, Zool. Voy. Blossom. p. 66.*Leiuranus colubrinus* Bleeker, Atl. Ichth. IV p. 43 (S. Syn.).*Liuranus semicinctus* Günther, Cat. Brit. Mus. VIII p. 54.*Leiuranus semicinctus* Jordan & Snyder, Proc. U. S. Nat. Mus. XXIII p. 866.*Liuranus semicinctus* Günther, Fische der Südsee. Heft IX p. 396.

One spec., 470 mm, from Saonek, December 1909.

There are only 21 bands in my specimens, while normally this species has 25—35 bands on body and tail. The 2 first bands on the head are irregularly connected along the sides of the head, the fourth and fifth band do not encircle the body as is the case with all the following bands, none of which are interrupted along the ventral side, as is commonly the case in this species.

I don't think that these differences are of any importance. It is known that the number of bands decreases with age (vide Bleeker l. c.).

Aphthalmichthys Kaup.1. *Aphthalmichthys javanicus* Kp.*Aphthalmichthys javanicus* Kaup, Arch. Naturg. XXII, I p. 68.*Aphthalmichthys javanicus* Bleeker, Atl. Ichth. IV p. 16.*Moringua javanica* Günther, Cat. Brit. Mus. VIII p. 92. Fische der Südsee, Heft IX p. 405.

One specimen, 270 mm, from the reef at Saonek, Jan. 21, 1910.

2. *Aphthalmichthys abbreviatus* Blkr.*Aphthalmichthys abbreviatus* Bleeker, Ned. Tijdschr. Dierk. I p. 163. Atl. Ichth. IV p. 17.*Moringua abbreviata* Günther, Cat. Brit. Mus. VIII p. 92. Fische der Südsee, Heft IX p. 406.*Aphthalmichthys abbreviatus* Jordan & Snyder, Proc. U. S. Nat. Mus. XXIII p. 877.

Two specimens, 250 and 300 mm, from the reef at Saonek, Dec. 1909 and Jan. 1910.

One Specimen, 195 mm, from Ambon, March 1910.

The last named specimen has a shorter head, a little more than $\frac{1}{10}$ of the total length. As it is a young specimen, I don't doubt that it belongs to *A. abbreviatus* and not to *A. macrocephalus*, where the head is $\frac{1}{9}$ of the total length, as Günther says l. c. „Die Länge des Kopfes is 12—13 mal, in jungen etwa $10\frac{1}{2}$ mal in der Totallänge enthalten.”

Sphagebranchus Bloch, Schneider.1. *Sphagebranchus mindora* (Jord. & Rich.).*Caecula mindora* Jordan & Richardson, Bull. Bur. Fish. XXVII p. 239.

One specimen, 380 mm, Waigeu, river Waihä, fresh water above rapids, Decemb. 20. 1909.

This species is related to *Sphagebranchus macrodon* Blkr, from which it differs in having a longer snout, a smaller eye and a larger extent of the cleft of the mouth.

Muraenidae.

Gymnothorax Bloch.

1. *Gymnothorax brummeri* (Blkr.).

Muraena Brummeri Bleeker, Nat. Tijdschr. Ned. Ind. XVII p. 137.

Strophidon Brummeri Bleeker, Atl. Ichth. IV p. 109.

Strophidon polyodon Bleeker, Atl. Ichth. IV p. 109.

Muraena brummeri Günther, Fische der Südsee Heft IX p. 420.

One specimen, circa 550 mm long, from Ambon, February 1910.

My specimen quite agrees with Bleeker's description of *Strophidon polyodon*, but I think Günther is right in uniting this species with *S. brummeri*. I don't think there is reason to adopt the genus *Strophidon* as given by Bleeker, the only difference with *Gymnothorax* being the greater length of body and tail compared to height of body and length of head.

2. *Gymnothorax richardsonii* (Blkr.).

Muraena Richardsonii Bleeker, Nat. Tijdschr. Ned. Ind. III p. 296.

Gymnothorax Richardsonii Bleeker, Atl. Ichth. IV p. 100.

Gymnothorax ceramensis Bleeker, Atl. Ichth. IV p. 101.

Muraena Richardsonii Günther, Fische der Südsee, Heft IX p. 414.

Three specimens, 100—350 mm, Saonek, reef, Dec. 1909.

3. *Gymnothorax polyuranodon* (Blkr.).

Muraena polyuranodon Bleeker, Nat. Tijdschr. Ned. Ind. V p. 248.

Gymnothorax polyuranodon Bleeker, Atl. Ichth. IV p. 89.

Muraena polyuranodon Günther, Cat. Brit. Mus. VIII p. 114, Fische der Südsee, Heft IX p. 421.

One specimen, 330 mm, Batu merah, Ambon (brackish), February 1910.

4. *Gymnothorax monochrous* (Blkr.)?

Muraena monochrous Bleeker, Nat. Tijdschr. Ned. Ind. X p. 384.

Gymnothorax monochrous Bleeker, Atl. Ichth. IV p. 106.

A young specimen of circa 100 mm length, from coralreefs at Ambon, may possibly belong to the above named species.

5. *Gymnothorax?* spec. juv.

4 very small specimens from the reef at Saonek, Decemb. 1909.

Echidna Forster.

1. *Echidna nebulosa* (Ahl.).

Muraena nebulosa J. N. Ahl, De Mur. et Ophichth. p. 5.

Echidna variegata Bleeker, Atl. Ichth. IV p. 80.

Muraena nebulosa Günther, Fische der Südsee, Heft IX p. 423.

1 spec. 430 mm, Saonek.

2. *Echidna delicatula* (Kp.).

Poecilophis delicatulus Kaup, Arch. Naturg. XXII, I. p. 67.

Echidna delicatula Bleeker, Atl. Ichth. IV p. 78.

Muraena amblyodon Günther, Cat. Brit. Mus. VIII p. 132. pro parte.

Echidna delicatula Jordan & Seale, Bull. Bur. Fish. XXV p. 204.

2 spec. 350 and 450 mm, from Saonek, December 1909.

3. *Echidna* spec. juv.

Two small specimens 65 and 67 mm, from the reef at Saonek. Possibly they are young *E. polyzona* Rich.

Anarchias Jordan & Seale¹⁾.1. *Anarchias allardicei* Jord. & Seale¹⁾.

Anarchias allardicei Jordan & Seale, Bull. Bur. Fish. XXV p. 204.

Anarchias knighti Jordan & Seale, Bull. Bur. Fish. XXV p. 205.

Muraena allardicei Günther, Fische der Südsee, Heft IX p. 421.

2 specimens, 77—138 mm, from Ambon, agree in all respects with *A. allardicei* except the length of the snout, which is like that of *A. knighti*. These two species however have been, according to me rightly, united by Günther.

Myctophidae.*Saurida* Cuvier & Valenciennes.1. *Saurida tumbil* (Bl.).

Salmo tumbil Bloch, Ausländ. Fische, IX p. 112.

Saurida tumbil Bleeker, Atl. Ichth. VI p. 155.

One specimen, 104 mm, from the fishmarket at Ambon, Dec. 7. 1909.

Synodus Gronovius.1. *Synodus variegatus* (Lac.).

Salmo variegatus Lacépède, Hist. Nat. Poissons, V p. 157.

Synodus synodus Bleeker, Atl. Ichth. VI p. 154 (nec L.).

One specimen, 142 mm, from the reef at Saonek, December 1909.

Centriscidae.*Aeoliscus* Jordan & Starks.1. *Aeoliscus strigatus* (Gthr.).

Amphisile strigata Günther, Cat. Brit. Mus. III p. 528.

Aeoliscus strigatus Max Weber, Siboga-Exp. Fische, p. 98.

18 specimens, 75—97 mm, Beo, Majalibit-bay, Waigeu, January 1910.

3 specimens, 14—23 mm, Buton, Dr. Justesen leg.

Fistularidae.*Fistularia* Linné.1. *Fistularia depressa* Gthr.

Fistularia depressa Günther, Challenger Report, Shore Fishes, p. 69.

1 spec. 320 mm, Ambon, fishmarket, December 7. 1909.

1 spec. 480 mm, Saonek, January 10. 1910.

¹⁾ The genus, as well as the two species cited here are described by Jordan & Seale under the heading: "*Anarchias* Jordan & Starks, new genus." As there is no reference to any work of Jordan & Starks, where descriptions of this genus and species occur, I think it correct to mention Jordan & Seale and not Jordan & Starks as the authors.

Aulostomidae.**Aulostomus Lac.**1. *Aulostomus valentini* (Blkr.).*Polypterichthys valentini* Bleeker, Nat. Tijdschr. Ned. Indië, IV p. 608.*Aulostoma chinense* Günther, Cat. Brit. Mus. III p. 538 (nec L.).

2 specimens, 160 and 250 mm, Ambon, February 1910.

Both specimens show lighter cross bars, running at regular intervals on the body. It is worth mentioning that these bars are continued on the elongated snout, which fact may be regarded as one evidence more against the lately advocated theory, that cross bars are correlated with the segmentation of the body.

Syngnathidae.**Syngnathus Artedi.**1. *Syngnathus brevirostris* Rüpp.*Syngnathus brevirostris* Rüppell, Neue Wirbelthiere, Fische, p. 144.*Syngnathus andersonii* Bleeker, Nat. Tijdschr. Ned. Ind. XV p. 465.*Syngnathus tetrophthalmus* Bleeker, Nat. Tijdschr. Ned. Ind. XV p. 467.*Syngnathus brevirostris* Günther, Cat. Brit. Mus. VIII p. 167.*Syngnathus tetrophthalmus* Günther, Cat. Brit. Mus. VIII p. 169.*Syngnathus brevirostris* Klunzinger, Synopsis Fische Roth. Meer. p. 562.*Syngnathus brevirostris* Max Weber, Siboga-Exp. Fische, p. 106.

2 specimens, 24—26 mm, from the reef at Saonek, December 1909 and January 1910.

Both specimens show distinct filaments on the head as well as on the body. I find these too in much older specimens from the Malay Archipelago.

2. *Syngnathus spicifer* Rüpp.*Syngnathus spicifer* Rüppell, Neue Wirbelthiere, Fische, p. 143.*Syngnathus spicifer* Günther, Cat. Brit. Mus. VIII p. 172.*Syngnathus spicifer* Klunzinger, Synopsis Fische Roth. Meeres, p. 650.

One specimen 91 mm, from river Rabiai, Waigeu, December 31. 1909 (fresh water).

One specimen 63 mm, from Kairatu, West-Ceram, February 17. 1910.

3. *Syngnathus haematopterus* Blkr.*Syngnathus haematopterus* Bleeker, Verh. Bat. Gen. XXV p. 20.*Syngnathus haematopterus* Günther, Fische d. Südsee, Heft IX p. 431.

8 spec., 50—57 mm, Saonek, reef. December 1909, January 1910.

Doryrhamphus Kp.1. *Doryrhamphus brachyurus* (Blkr.).*Syngnathus brachyurus* Bleeker, Verh. Bat. Gen. XXV p. 16.*Doryichthys brachyurus* Günther, Cat. Brit. Mus. VIII p. 184. Fische der Südsee, Heft IX p. 433.

2 specimens, 108 and 126 mm, from a freshwater brook near Kajeli, Buru, December 9. 1909.

5 specimens, 74—183 mm, from Kairatu, West-Ceram, February 16. (brackish).

2. *Doryrhamphus mento* (Blkr.).*Syngnathus mento* Bleeker, Act. Soc. Indo-Neerl. I p. 75.

One specimen, 62 mm long, river at Kajeli, Buru, Dec. 9. 1909 (fresh water).

3. *Doryrhamphus caudatus* (Pet.)

Microphis caudatus Peters, Monatsber. Akad. Wiss. Berlin, 1868, p. 276.

Doryichthys caudatus Günther, Fische der Südsee, Heft IX p. 432.

2 spec. 60—67 mm, river Waiha, Waigeu, December 20. 1909, fresh water.

2 spec. 140 mm long, upper course of the river Tuba, West Ceram, Febr. 27. 1910.

9 spec. 110—115 mm long, from a brook near Kairatu, W. Ceram, Febr. 20. 1910.

A small specimen, 44 mm, from Kajeli, Buru (fresh water), probably belongs to this species too.

4. *Doryrhamphus brevidorsalis* n. sp.

D. 24. P. 17. Cingulum 16 + 28. Body higher than broad, its height almost 20 times in the total length. Head $6\frac{2}{3}$ in total length, almost 3 in length of head and trunk. Tail slightly longer than trunk and head together. Upper profile of snout concave. Snout about equal to postorbital part of head and twice as long as eye, with a median ridge, ending before the eyes. Orbital ridges continued on the postorbital part of the head, but not continuous with the dorsal edges of the body. A median slightly scalloped ridge begins behind the eyes and is continued to the second body-ring. Operculum with a strong median ridge and radiating striae. Edges of the body very slightly serrated between the rings, those of the tail almost smooth. The dorsal edges of the body are not continuous with those of the tail and end on the 5th caudal ring. The dorsal edges of the tail begin on the last body-ring. The lateral line bends downward and passes in the ventral edges of the tail. The median ventral ridge of the body is not very prominent. The dorsal fin begins on the last body-ring and ends on the beginning of the sixth tail-ring. Colour light brown. A dark band runs from the snout through the eye and the operculum and is continued on the body, where it becomes indistinct. A light ocellus with dark border on each caudal ring along its ventral margin.

One specimen, 42 mm long, from a stream near Kajeli, Buru, December 9. 1909 (fresh water).

This species seems to be allied to *D. caudatus* (Pet.), from which it differs in the shorter dorsal fin, which has a smaller number of rays.

Coelonotus Peters.

1. *Coelonotus leiaspis* (Bleeker).

Syngnathus leiaspis Bleeker, Verh. Bat. Gen. XXV p. 20.

Hemithylacus leiaspis Kaup, Cath. Lophobr. Fish. Brit. Mus. p. 61.

Coelonotus leiaspis Günther, Cat. Brit. Mus. VIII p. 188.

Syngnathus leiaspis Duméril, Hist. Nat. Poiss. II p. 572.

Hemithylacus leiaspis Duméril, l. c. p. 599.

Coelonotus leiaspis Jordan & Richardson, Bull. Bur. Fisheries, XXVII p. 246.

One ♀, 94 mm long, from a river at Kajeli, Buru, Dec. 9. 1909 (fresh water).

One ♂, 159 mm long, from the river Rabiai, Waigeu, Dec. 31. 1909 (fresh water).

This species was described as *Syngnathus leiaspis* by Bleeker after two female specimens from Java. Kaup, who was able to examine males of this species, also from Java, founded the genus *Hemithylacus* for this species, on account of the abdominal egg-pouch and other characteristics. Günther united this genus with Peter's genus *Coelonotus*, based on a species of which males were unknown, but agreeing in its generic characters in every respect with *Hemithylacus*.

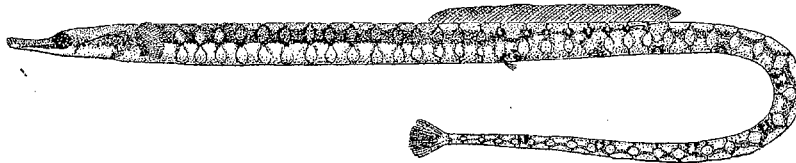


Fig. 8. *Coelonotus leiaspis* (Blkr.)

Coelonotus leiaspis was hitherto only known from Java, the Philippines and Madagascar. By previous authors the coloration of this species is described as uniform, which is not in accordance with my well-preserved specimens, as may be seen in the accompanying figure. In the Waigeu-specimen the upper sides of the body and tail are brown, the under side yellowish. A dark brown stripe running from the hinder margin of the eye along the sides of the trunk. The anal ring, and the 2nd, 4th, 5th, 7th, 10th, 13th, 15th, 18th, 22nd and 26th tailring are speckled with brown on the ventral side, giving to the rings a tortoiseshell-like appearance. In the Buru-specimen the markings on the tail-rings are not visible, and the brown pigment of the sides of trunk and tail is concentrated along the margins of the rings and the intersutural plates. These last, being round and almost white, form a row of brown-edged ocelli.

Gasterotokeus Heckel.

1. *Gasterotokeus biaculeatus* (Bl.).

Syngnathus biaculeatus Bloch, Ausl. Fische IV p. 10.

Gasterotokeus biaculeatus Günther, Cat. Brit. Mus. VIII p. 194. Fische der Südsee, Heft IX p. 434.

4 spec., 160—200 mm, fishmarket at Ambon, December 7. 1909.

1 spec., 146 mm, fishmarket at Macassar, March 11. 1910.

Hippocampus Rafinesque.

1. *Hippocampus kuda* Blkr.

Hippocampus kuda Bleeker, Nat. Tijdschr. Ned. Ind. III p. 82.

Hippocampus guttulatus Günther, Cat. Brit. Mus. VIII p. 202 (partim).

Hippocampus kuda Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV p. 15.

Hippocampus guttulatus Günther, Fische der Südsee, Heft IX p. 435 (S. Syn.).

One specimen, 165 mm, from Ambon, February 1910.

Scomberesocidae.

Hemirhamphus Cuv.

1. *Hemirhamphus far* (Forsk.).

Esox far Forskål, Descript. Anim. p. 67.

Hemirhamphus far Bleeker, Atl. Ichth. VI p. 54.

Hemirhamphus far Günther, Fische d. Südsee II p. 357.

One specimen, 240 mm, obtained at the fishmarket of Ambon. Dec. 7, 1909.

2. *Hemirhamphus quoyi* C. V.

Hemirhamphus quoyi Cuvier & Valenciennes, Hist. Nat. Poiss. XIX p. 35.

Hemirhamphus quoyi Bleeker, Atl. Ichth. VI p. 57.

10 specimens, 154—203 mm. Beo, Majalibit-bay, Waigeu. January 1910.

3. *Hemirhamphus (Zenarchopterus) buffonis* C. V.

Hemirhamphus Buffonis Cuvier & Valenciennes, Hist. Nat. Poiss. XIX p. 48.

Zenarchopterus Buffoni Bleeker, Atl. Ichth. VI p. 62.

One specimen, 83 mm (beak damaged), Saonek, Dec. 19. 1909.

One specimen, 126 mm long, Bajon, Majalibit-bay, Waigeu (salt water).

4. *Hemirhamphus (Zenarchopterus) dispar* C. V.

Hemirhamphus dispar Cuvier & Valenciennes, Hist. Nat. Poiss. XIX p. 58.

Zenarchopterus dispar Bleeker, Atl. Ichth. VI p. 63.

Zenarchopterus dispar Günther, Fische der Südsee, II p. 358.

One ♂, 140 mm long, Saonek, December 19. 1909.
 3 ♂♂, 150—170 mm, Mirdika-river, Ambon, February 14. 1910.

Atherinidae.

Atherina Artedi.

1. *Atherina forskåli* Rüpp.

Atherina Forskåli Rüppell, Neue Wirbelth. p. 132.
Atherina lacunosa Bleeker, Nat. Tijdschr. Ned. Indie, V p. 504.
Atherina Forskåli Günther, Cat. Brit. Mus. III p. 397.
Atherina Forskåli Day, Fishes of India, 4° p. 345.
Atherina lacunosa Günther, Fische der Südsee, p. 213 (p. p.).
Atherina Forskåli Klunzinger, Fische des Roten Meeres, p. 130.

3 spec. 82—86 mm, Ambon, fishmarket, December 7, 1909.

My specimens agree with the descriptions of *A. forskåli*. The silvery band along the sides however, is, as mentioned under *A. pinguis*, slightly narrower than it ought to be, not quite reaching the middle of the fourth row of scales.

2. *Atherina pinguis* Lac.

Atherina pinguis Lacépède, Hist. Nat. Poissons, V p. 372.
Atherina pectoralis Cuvier & Valenciennes, Hist. Nat. Poissons, X p. 447.
Atherina pinguis Bleeker, Act. Soc. Sc. Ind. Neerl. VIII p. 85.
Atherina pinguis Günther, Cat. Brit. Mus. III p. 339.
Atherina lacunosa Günther, Fische der Südsee, II p. 213 (partim).
Atherina pinguis Day, Fishes of India, 4° p. 344.
Atherina pinguis Klunzinger, Fische d. Roten Meeres, p. 130.
Atherina pinguis Sauvage, Hist. de Madagascar, Poissons, p. 409.
Atherina pinguis Max Weber, Siboga-Exp. Fische, p. 135.

1 spec. 83 mm, from Saonek. December 1909.

I am not quite sure that my specimen really belongs to the above-named species, the most important discrepance being the broad silvery band along the sides, which covers the upper half of the fourth lateral row of scales, is in fact, broader than the band in my specimens which I refer to *A. forskåli*. In other respects it agrees with the descriptions of *A. pinguis*, notably in the presence of a dusky blotch at the end of the pectoral.

Note. Ogilby's recent investigations on these species (Mem. Queensl. Mus. I. 1912, p. 36) came too late in my hands to use them in the determination of my specimens.

3. *Atherina temminckii* Blkr.

Atherina Temminckii Bleeker, Nat. Tijdschr. Ned. Ind. V p. 506.

One specimen, 76 mm, from Kairatu, W. Ceram, Febr. 28, 1910.

My specimen shows two longitudinal rows of black spots under the lateral line, as in *A. endrachtensis* and in some of my specimens of *A. duodecimalis*. In all other respects it agrees with Bleeker's description.

4. *Atherina duodecimalis* C.V.

Atherina duodecimalis Cuvier & Valenciennes, Hist. Nat. Poissons, X p. 458.
Atherina duodecimalis Bleeker, Nat. Tijdschr. Ned. Ind. II p. 485.
Atherina duodecimalis Sauvage, Hist. Madagascar. Poissons, p. 406.

3 spec. 67—105 mm, Majalibit-bay, Waigeu, Jan. 1910.

The two longitudinal rows of scales beneath the silvery band have more or less distinct

black dots, a feature not in accordance with the descriptions of the above-named authors, and giving to my specimens the appearance of *A. endrachtensis*. Last-named species, as shown by my specimen from the same locality and of the same length as the two smaller *A. duodecimalis* from my collection, differs by its longer pectoral, which is almost as long as the head, as well as by the much wider interorbital space, which is greater than the diameter of the eye, whereas it is less than the eye in *A. duodecimalis*. Another difference between these two species, mentioned by Sauvage l. c., is, that in *A. duodecimalis* the first dorsal is at an equal distance from the base of the caudal and from the hindmargin of the eye, while in *A. endrachtensis* it is nearer to the caudal.

5. *Atherina endrachtensis* Q.G.

Atherina endrachtensis Quoy & Gaimard, Voyage Uranie et Physicienne, Zoologie, p. 334.

Atherina endrachtensis Cuvier & Valenciennes, Hist. Nat. Poissons, X p. 456.

Atherina bimanensis Bleeker, Journ. Ind. Archipel, II p. 638.

Atherina endrachtensis Sauvage, Hist. Madagascar. Poissons, p. 406.

Atherina endrachtensis Max Weber, Siboga-Exp. Fische, p. 136.

1 spec. 63 mm, Majalibit-bay, Waigeu, Jan. 1910.

1 spec. 113 mm, from Kairatu, West Ceram, February 28. 1910.

I have but little doubt that the species shortly described by Bleeker as *A. bimanensis*, belongs to *A. endrachtensis*.

I have made some remarks on this species under *A. duodecimalis*.

5. *Atherina* spec. juv.

One specimen, 24 mm, from Kairatu, W. Ceram, February 16. 1910.

Melanotaeniidae.

***Rhombatractus* Gill.**

1. *Rhombatractus catherinae* de Bft. (Plate II, fig. 1).

Rhombatractus catherinae de Beaufort, Zool. Anz. XXXVI p. 250.

D. I. 4 (rarely 3 or 5). I. 11—13 (generally 12). A. I. 19—23 (generally 20).

P. 13—14. V. I. 5. L. l. 32—35 (generally 34). L. t. 12 (11½).

Strongly compressed. Dorsal profile almost straight from first dorsal to point of snout, sloping more rapidly in large than in small specimens; horizontal from first to second dorsal and sloping down from here to the tail. Ventral profile very convex. Height in specimens of 100 mm and longer $2\frac{3}{4}$ —3, in smaller specimens 3— $3\frac{1}{2}$ times in the total length, and $2\frac{1}{2}$ — $2\frac{3}{4}$ and $2\frac{1}{2}$ — $3\frac{1}{4}$ times in the length without caudal. Length of head 4— $4\frac{1}{2}$ times in the total, $3\frac{1}{2}$ — $3\frac{3}{4}$ in the length without caudal. Head moderately pointed. Diameter of eye 3— $3\frac{1}{2}$ times in the length of the head and $1\frac{1}{2}$ times in the flat or even slightly convex interorbital space. Snout rather short, $2\frac{2}{3}$ to almost 3 times in length of head. Gape of mouth oblique, more horizontal in the first $\frac{1}{3}$ of its length. Upper jaw covered by praeorbital when the mouth is closed. The intermaxillary does not reach below the frontmargin of the eye. It is swollen and covered on its whole surface with several rows of conical small teeth. The mandibles are also swollen in front and have similar teeth, which decrease in number posteriorly. A narrow band of teeth on the vomer. No teeth on the palatines. Teeth on the pterygoids present. Tongue edentulous. Scales cycloid, partly with feeble indentations; dorsally they reach to the eyes; on the cheeks in 3 longitudinal rows, reaching under the eyes. Pectorals longer than head without snout. Base of ventrals below that of pectorals in large specimens, in smaller specimens more backward. The ventrals reach to the second or third anal ray. The first spine of the first dorsal is about opposite to that of the anal and equal

to that of the second dorsal, both being about $\frac{1}{3}$ of the length of the head. In small specimens it is comparatively longer. There are about 16 rows of scales between the vertex and first dorsal spine. The anal spine is curved backward and is equal to the diameter of the eye. Dorsal and anal fin of about the same height. Caudal incised, less so and with the lobes more rounded in large specimens. Peduncle of tail scarcely longer than high in large specimens.

Colour in spirits brown or yellowish brown on the back, ventrally whitish. A broad black lateral band runs from the hinder border of the eye over the base of the pectoral to the caudal, at least as broad as one scale. For colours in fresh state see fig. 1, on Plate II.

All specimens were captured in fresh water, in most cases in the uppercourse of the rivers and brooks, where the ground is rocky and the water clear. They live in shoals.

15 spec. 59—119 mm, river Rabiai, Waigeu. Dec. 31. 1909.

10 spec. 18—90 mm, brook Wai Semi, Waigeu. Jan. 1910.

226 spec. 12—89 mm, brook Wai Menil, Waigeu. Jan. 1910.

1 spec. 96 mm, — river Bajon, Waigeu. Jan. 1910.

I have named this species after my wife, who accompanied me on my travels and had a great share in the collecting of zoological specimens.

Mugilidae.

Mugil L.

1. *Mugil rossi* Blkr.

Mugil rossi Bleeker, Nat. Tijdschr. Ned. Ind. VII p. 45. id. XVI p. 276.

Mugil rossi Max Weber, Siboga-Exp. Fische, p. 138.

1 spec. 69 mm, Saonek, January 1910.

1 spec. 92 mm, Sorong, New Guinea, January 1910, L. de Bruyne leg.

2 spec. 51—61 mm, Ambon, Batu merah, March 1910.

I range my specimens under *M. rossi* on account of the position of the dorsal, the origin of which is situated nearer to the base of the caudal than to the tip of the snout.

I am somewhat in doubt about the validity of this species, which may be a variety of *M. waigiensis*, as has been suggested by Günther.

2. *Mugil sundanensis* Blkr.

Mugil sundanensis Bleeker, Nat. Tijdschr. Ned. Indië, IV p. 265.

Mugil brachysoma Bleeker, Nat. Tijdschr. Ned. Indië, IX p. 399.

Mugil sundanensis Bleeker, Nat. Tijdschr. Ned. Indië, XVI p. 276. Ac. Soc. Sc. Indo-Neerl. VIII p. 45.

One specimen, 235 mm, from mouth of river at Buton, isle of Buton, Dec. 3, 1909 (brackish).

3. *Mugil subviridis* C. V.

Mugil subviridis Cuvier & Valenciennes, Hist. Nat. Poiss. XI p. 115.

Mugil subviridis Day, Fishes of India, 4° p. 353.

One specimen, 215 mm, Kajeli, Buru, Dec. 9, 1909 (fresh water).

4. *Mugil bleekeri* Gthr?

Mugil bleekeri Günther, Cat. Brit. Mus. III p. 445.

Mugil borbonicus Bleeker, Nat. Tijdschr. Ned. Indië, XVI p. 279, idem XVIII p. 375.

7 spec. 57—110 mm, Saonek, December 1909 and January 1910.

1 spec. 98 mm, Buli, Halmahera, collected by Mission. Maan.

7 spec. 69—80 mm, Batu Merah, Ambon, March 1910.

The following East-Indian *Mugil*-species: *M. seheli* Forsk. (= *axillaris* Blkr.), *bleekeri*

Gthr., *suppositus* Gthr. (= *borbonicus* Cant.) and *caeruleomaculatus* (Lac.) Blkr. have the following points in common: The membrana palpebralis does not attain or scarcely attains the iris. The maxillary is entirely or almost hidden by the praeorbital. There is an elongated pointed scale in the axil and a black spot at the upperside of the base of the pectoral. The second dorsal and anal fin are opposite to each other. The number of scales in the lateral line is not far from 40, being 40—45 in *M. seheli* and 38, 38—39, and 40 in the three other species.

The chief differences between these species are recorded in the following table:

	<i>M. seheli</i>	<i>M. suppositus</i>	<i>M. bleekeri</i>	<i>M. caeruleomaculatus</i>
Upperlip	thick (thin?)	thin	thin	thick
Position of first D.	as far from snout as from base of caudal	as far from snout as from base of caudal	nearer to base of tail than to snout	as far from snout as from base of caudal
Anal	III 9—10	III 8	III 9—10	III 9—10
Pectoral	shorter than head	shorter than head	shorter than head	longer than head
Lin. lat.	40—45	40	38—39	38

According to this table *M. caeruleomaculatus* may be easily distinguished by its long pectoral. The differences between the remaining three are not so salient. *M. suppositus* is chiefly characterised by its small number of soft anal rays. Although the number of these rays is fairly constant in *Mugil*, I think Günther went too far in creating a new species, known moreover from a single specimen only, upon this characteristic, while it agrees in all other points with *M. seheli*. Last named species differs from *M. bleekeri* only in having 1—6 scales more in the lateral line and in the fact that the first dorsal is as far from the snout as from the base of the caudal. Considering the great number of common points I don't think that the two named differences are sufficient to separate them, and I think it very probable that, when more material will be available, *M. seheli*, *M. suppositus* and *M. bleekeri* may be united. For the moment, having no material at my disposal, I will keep them apart.

My specimens agree in all respects with *M. bleekeri*, but for the lips, which are thick and even slightly papillated in the specimens caught at Saonek in December. Max Weber (Siboga-Exp. Fische p. 139) has mentioned thick lips in his specimens of *M. bleekeri*. I cannot lay much stress on this fact, as f. i. Bleeker states of *M. axillaris* (= *M. seheli*) that the lips are thick, while Günther (Südseefische) calls them thin, as is also done by Klunzinger (Fische des Rothen Meeres).

Jordan and Seale (Bull. Bur. Fish. XXV p. 217) unite *M. axillaris* and *caeruleomaculatus*, I think wrongly, as the pectoral is stated to be longer than the head in last-named species by Cuvier & Valenciennes, Bleeker and Günther.

5. *Mugil ceramensis* Blkr.

Mugil ceramensis Bleeker, Nat. Tijdschr. Ned. Indië, III p. 699. id. XVI p. 277. Act. Soc. Sc. Indo-Neerl., VIII p. 48.

5 specimens, 177—247 mm, Kajeli, Buru, Dec. 9. 1909 (fresh water).

6. *Mugil borneensis* Blkr.

Mugil borneensis Bleeker, Nat. Tijdschr. Ned. Indië, II p. 201, id. XVI p. 278.

One specimen, 235 mm, Kajeli, Buru, Dec. 9. 1909 (fresh water).

7. *Mugil crenilabis* Forsk.

Mugil crenilabis Forskål, Descr. Aminal. p. 73.

? *Mugil macrocheilos* Bleeker, Nat. Tijdschr. Ned. Indië, VII p. 43.

Mugil crenilabis Günther, Fische der Südsee, p. 219.

Mugil crenilabis Klunzinger, Fische Roth. Meer. 4^o. p. 131, 132.

1 spec. 100 mm long, from Saonek, December 1909.

As part of the scales had fallen off, I could not ascertain the exact number of them in the l.l., but in other respects the fish so closely agrees with the descriptions of Günther and Klunzinger, that I have no doubt about the correctness of my determination. I am not sure that Günther is right in uniting *M. macrocheilos* Blkr. with *crenilabis*, as Bleeker states that the head is smaller, the fringe on the upper jaw uniserial etc.

8. *Mugil* spec. juv. (*borneensis* Blkr.?)

3 young specimens, 37—43 mm, from Kairatu, W. Ceram, possibly belong to *Mugil borneensis* Blkr. I find however some differences in the length of the head and in the place of the anal fin, which may be due to their juvenile age.

A specimen of 35 mm from the reef at Saonek, December 1909, probably also belongs to this species.

9. *Mugil*? spec. juv.

A larva of 11 mm from the reef at Saonek, January 1910, possibly belongs to this genus.

Polynemidae.

Polynemus L.

1. *Polynemus zophomus* Jordan & Mc Greg.

Polynemus zophomus Jordan & Mc Gregor, Proc. U. S. Nat. Mus. XXX p. 814.

Polydactylus zophomus Jordan & Seale, Bull. Bur. Fish. XXVI p. 11.

Polynemus zophomus Max Weber, Siboga-Exp. Fische, p. 142.

One specimen, 195 mm, from the fishmarket at Ambon, Dec. 7. 1909.

Sphyraenidae.

Sphyraena Artedi.

1. *Sphyraena commersonii* C.V.

Sphyraena commersonii Cuvier & Valenciennes, Hist. Nat. Poiss. III p. 352.

Sphyraena commersonii Bleeker, Verh. Bat. Gen. XXVI p. 15.

Sphyraena commersonii Günther, Cat. Brit. Mus. II p. 338.

Sphyraena commersonii Day, Fishes of India, 4^o. p. 343.

One specimen, 110 mm long, from Saonek, December 18. 1909.

One specimen, 87 mm, from Buton (Dr. Justesen leg.).

I am not quite sure of the determination of last-named specimen, as the maxillary does by far not reach below the front border of the eye; this may however be due to the youth of the specimen.

A *Sphyraena* of 44 mm, from the reef at Saonek, may possibly belong to this species, but it has the markings of *Sphyraena jello* C.V. However, I can't count more than about 80—90 scales in the l.l.

Ophiocephalidae.

Ophiocephalus Bloch.

1. *Ophiocephalus striatus* Bl.

Ophiocephalus striatus Bloch, Ausländ. Fische VIII p. 141.

Ophiocephalus striatus Bleeker, Verh. Akad. Amsterdam XIX p. 42.

Many young specimens, 15—47 mm, from Telaga Tihu, Ambon, March 1910.

Holocentridae.**Holocentrum** Artedi.

1. *Holocentrum tiereoides* Blkr.
Holocentrum tiereoides Bleeker, Nat. Tijdschr. Ned. Ind. V p. 334. Ned. Tijdschr. Dierk. IV p. 228.
 3 specimens, 136—152 mm, Ambon, March 1910.
2. *Holocentrum rubrum* (Forsk.).
Sciaena rubra Forskål, Descript. Animal. p. 48.
Holocentrum rubrum Bleeker, Ned. Tijdschr. Dierk. IV p. 224.
 1 spec. 102 mm, Saonek.
 1 spec. 143 mm, Ambon, February 1910.
3. *Holocentrum sammara* (Forsk.).
Sciaena sammara Forskål, Descript. Animal. p. 48.
Holocentrum sammara Bleeker, Ned. Tijdschr. Dierk. IV p. 213.
 One specimen, 109 mm, from Saonek.

Myripristis Cuv.

1. *Myripristis adustus* Blkr.
Myripristis adustus Bleeker, Nat. Tijdschr. Ned. Indië IV p. 108. Ned. Tijdschr. Dierk. IV p. 193.
 1 specimen from Buton, December 3. 1909.

It is with some hesitation that I range my specimen under this name, as it lacks the black markings characteristic of this species. It has however the axil and the hindborder of the operculum black. There are no teeth on the chin, as stated to be the case in *M. macrolepis*, with which species *M. adustus* is closely related (cf. Max Weber, Siboga-Exp. Fische p. 187).

Centrarchidae.**Kuhlia** Gill.

1. *Kuhlia marginata* (C. V.).
Dules marginatus Cuvier & Valenciennes, Hist. Nat. Poiss. III p. 116.
Moronopsis ciliatus Bleeker, Atl. Ichth. VII p. 120.
Kuhlia marginata Boulenger, Cat. Brit. Mus. sec. ed. vol. I p. 38.
 1 spec. 190 mm, Kajeli, Buru, Dec. 9. 1909. (fresh water).
 2 spec. 150 and 170 mm, stream at Batjan, Dec. 11. 1909.
 1 spec. 108 mm, Buli, Halmahera (Mission. Maan leg.).
 1 spec. 82 mm, river Lam-lam, Fofak Bay, North Waigeu, January 5. 1910.
 8 spec. 83—210 mm, river Eme, W. Ceram, February 20 and 24. 1910.
 2 spec. 70—79 mm, upper course of river Tuba, West Ceram, February 27. 1910.
2. *Kuhlia rupestris* (Lac.).
Centropomus rupestris Lacépède, Hist. Nat. Poiss. IV p. 252 and 273.
Moronopsis rupestris Bleeker, Atl. Ichth. VII p. 121.
Kuhlia rupestris Boulenger, Cat. Brit. Mus. 2nd ed. vol. I p. 36.
 2 spec. 270 and 290 mm, from a river near Kajeli, Buru, December 9. 1909 (fresh water).

Kyphosidae.**Kyphosus** Lac.

1. *Kyphosus cinerascens* (Forsk.).
Sciaena cinerascens Forskål, Descript. Anim. p. 53.
Pimelepterus tahmel Günther, Cat. Brit. Mus. I p. 499.
Pimelepterus cinerascens Bleeker, Atl. Ichth. IX p. 15.
Kyphosus cinerascens Jordan & Thomson, Proc. U. S. Nat. Mus. XLI p. 596.
 One specimen, 390 mm, from Sanana, Sula islands, Dec. 10. 1909.

Toxotidae.**Toxotes** Cuvier.

1. *Toxotes jaculator* Pall.
Toxotes jaculator Pallas, Phil. Transact. LVI p. 186.
Toxotes jaculator Bleeker, Atl. Ichth. IX p. 4.
 3 specimens, 193—137 mm, Majalibit-bay, Waigeu.

Serranidae.**Centrogenys** Richardson.

1. *Centrogenys waigiensis* (Q. G.).
Scorpaena waigiensis Quoy & Gaimard. Zool. Voy. Uranie et Physicienne, p. 324.
Centrogenys waigiensis Bleeker, Atl. Ichth. VII p. 68.
 A specimen of 73 mm, from the fishmarket at Macassar, March 11. 1911.

Epinephelus Bloch.

1. *Epinephelus pachycentrum* (C.V.).
Serranus pachycentron Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 295.
Epinephelus pachycentrum Boulenger, Cat. Brit. Mus. 2nd ed. I p. 178.
 One specimen, 47 mm, from the reef at Saonek, December 1909.
 One specimen, 56 mm, from Ambon, February 1910.
2. *Epinephelus fasciatus* (Forsk.).
Perca fasciata Forskål, Descr. Animal. p. 40.
Epinephelus fasciatus Bleeker, Atl. Ichth. VII p. 66.
Epinephelus fasciatus Boulenger, Cat. Brit. Mus. 2nd ed. I p. 238.
 One specimen, 175 mm, from the fishmarket at Ambon, March 1910.
3. *Epinephelus summana* (Forsk.).
Perca summana Forskål, Descript. Animal, p. 42.
Epinephelus summana Boulenger, Cat. Brit. Mus. 2nd ed. I p. 248.
 6 spec. 25—155 mm, from the reef at Saonek.

Paracanthistius Bleeker.

1. *Paracanthistius maculatus* (Bl.).
Bodianus maculatus Bloch, Ausländ. Fische, IV p. 48.
Paracanthistius leopardinus Bleeker, Atl. Ichth. VII p. 25.
Paracanthistius maculatus Bleeker, Atl. Ichth. VII p. 26.
Plectroponta maculatum Boulenger, Cat. Brit. Mus. 2nd ed. Vol. I p. 160.
 2 specimens, 220 and 260 mm, belonging to the variety *maculatus*, from the fishmarket at Macassar, March 12. 1910.

Anyperodon Günther.

1. *Anyperodon leucogrammicus* (C.V.).

Serranus leucogrammicus Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 259.

Anyperodon leucogrammicus Bleeker, Atl. Ichth. VII p. 28.

Anhyperodon leucogrammicus Boulenger, Cat. Brit. Mus. 2nd ed. I p. 270.

One specimen, 280 mm, from the fishmarket at Ambon, Febr. 12. 1910.

Plesiops Cuvier.

1. *Plesiops nigricans* (Rüpp.).

Pharopteryx nigricans Rüppell, Atlas Reise Afrika, p. 15.

Plesiops nigricans Rüppell, Neue Wirbelth. p. 5.

Plesiops coeruleolineatus Rüppell, Neue Wirbelth. p. 5.

Plesiops corallicola Bleeker, Nat. Tijdschr. Ned. Ind. IV p. 280.

Pharopteryx nigricans Jordan & Seale, Bull. Bureau Fish. XXV p. 260.

Plesiops nigricans Max Weber, Siboga-Exp. Fische, p. 212.

9 spec. 14—138 mm, reef at Saonek, Dec. 1909, Jan. 1910.

2. *Plesiops melas* Blkr.

Plesiops melas Bleeker, Verh. Bat. Gen. XXII p. 9.

Pharopteryx melas Jordan & Seale, Bull. Bur. Fish. XXV p. 261.

Plesiops melas Max Weber, Siboga-Exp. Fische, p. 213.

4 spec. 52—67 mm, from the reef at Saonek.

3. *Plesiops?* spec. juv.

I refer a small fish of 19 mm length with some doubt to this genus, as the membrane between the dorsal spines is only slightly incised.

Grammistes Artedi.

1. *Grammistes sexlineatus* (Thunb.).

Perca sexlineata Thunberg, Vetensk. Ac. Handl. Stockh. XIII p. 142.

Grammistes orientalis Bleeker, Atl. Ichth. VII p. 70.

Grammistes sexlineatus Boulenger, Cat. Brit. Mus. 2nd ed. I p. 346.

One specimen, 39 mm, from the reef at Saonek, December 27. 1909.

Priacanthus Cuvier.

1. *Priacanthus hamrur* (Forsk.)

Sciaena hamrur Forskål, Descr. Animal. p. 45.

Priacanthus hamrur Bleeker, Atl. Ichth. VII p. 13.

Priacanthus hamrur Boulenger, Cat. Brit. Mus. 2nd ed. I p. 355.

Three specimens, 200—210 mm, Ambon, February 1910.

Ambassis C.V.

1. *Ambassis urotaenia* Blkr.

Ambassis urotaenia Bleeker, Nat. Tijdschr. Ned. Ind. III p. 257. Atl. Ichth. VIII p. 135.

Ambassis urotaenia Day, Fishes of India 4^o. p. 55.

Priopis lungi Jordan & Seale, Bull. Bur. Fish. XXVI p. 18.

Ambassis urotaenia Evermann & Seale, Bull. Bur. Fish. XXVI p. 75.

Ambassis lungi Evermann & Seale, Bull. Bur. Fish. XXVI p. 75.

- 1 spec. 72 mm, mouth of the river Rabiai, Waigeu, Dec. 31. 1909 (brackish).
 6 spec. 80—96 mm, from Ambon, partly from the river Batu merah, February and March 1910.
 2 spec. 70 and 88 mm, from the mouth of the river Riuapa, W. Ceram, February 16. 1910.

My specimens agree better with the description of Day than with that of Bleeker, having only one row of scales on the cheeks. In a specimen of Bleeker's collection too I find only one row, in stead of 2 as mentioned by Bleeker. I am of opinion that this difference is not sufficient to separate the forms with one row as *A. lungi*, as has been done by Jordan and Seale, as I am not aware that there is another noteworthy difference. It is true that these authors as well as Seale and Evermann also mention a broken lateral line as a characteristic of *A. lungi*. This does not hold good however, as on one of my specimens from Ambon and on another from Ceram the lateral line is continuous on one side, whereas it is interrupted at the other side.

2. *Ambassis buruensis* Blkr.

Ambassis buruensis, Bleeker, Nat. Tijdschr. Ned. Ind. XI p. 396.

Ambassis buruensis, Bleeker, Nat. Verh. Holl. Mpij d. Wetensch. 3^{de} Verz., Deel II, n° 2, p. 98. Atl. Ichth. VIII p. 137.

Priopis buruensis, Jordan & Seale, Bull. Bureau Fisheries XXVI, 1906, p. 18.

Ambon, river Mirdika 19 spec. 75—63 mm, Febr. 14. 1910.

Ambon, river Batu Merah 6 spec. 78—66 mm. Febr. March, 1910.

Ambon, sea 1 spec. 75 mm.

Buru, Kajeli, 1 spec. 62 mm, Dec. 9. 1909.

My specimens agree with Bleeker's description, but the orbital is serrated below, slightly in some specimens, very conspicuously in others. As I can not find other differences and as the serrations are almost obsolete in some individuals, I do not hesitate to bring my specimens to the above-named species.

29 young specimens 25—44 mm, from the river Mirdika, Ambon, probably belong to this species too.

3. *Ambassis commersoni* C. V.

Ambassis commersonii Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 176.

Ambassis commersonii Bleeker, Atl. Ichth. VIII p. 136.

Ambassis commersonii Day, Fishes of India, 4° p. 52.

One specimen, 170 mm, Kajeli, Buru, Dec. 9. 1909 (fresh water).

In every respect my specimen agrees with the description given by Bleeker, but for the number of scales in a row between the vertex and the first dorsal, which is about 16 or 17 in my specimen, and not about 13 as Bleeker states. By this higher number of scales my specimen agrees with *Ambassis batjanensis* Blkr., which species is said to have only 2 scales above the lateral line but otherwise seems to be very closely allied to *A. commersoni*, as has already been remarked by Day l. c.

4. *Ambassis dussumieri* C. V.

Ambassis dussumieri Cuvier & Valenciennes, 1828. II p. 181.

Priopis argyrozona (K. & v. H.), Cuvier & Valenciennes, 1830. VI p. 378.

Chanda dussumieri Cantor, 1850. Cat. Mal. Fishes, p. 988.

Ambassis gymnocephalus Bleeker (nec Lacép.), Natuurk. Verh. Holl. Mpij d. Wetensch. 3^{de} Verz. II. n° 2 p. 99. Atl. Ichth. VIII p. 138.

Ambassis gymnocephalus Day (nec Lacép.) Fishes of India, 4° p. 54.

Njanjef Waigeu, 25 Dec. 1910. 1 spec. 55 mm.

Majalibit-bay, Waigeu, Jan. 1910. 9 spec. 55—45 mm.

Bleeker considered *Lutjanus gymnocephalus* of Lacépède to be the above-named species

saying l. c.: "On reconnaît aisément l'espèce dans la figure du *Lutjan gymocéphale* de Lacépède". Day followed Bleeker's consideration in his "Fishes of India". However, when we consult the figure given by Lacépède (III pl. 23, fig. 3), we see a fish with an unbroken lateral line and with a much longer dorsal fin than that of *A. dussumieri*. Moreover, Lacépède states in the text (IV p. 181): "Huit rayons aiguillonnés et treize rayons articulés à la nageoire du dos". It is clear that this fish never can be *A. dussumieri*. Cuvier & Valenciennes II p. 131, suppose Lacépède's fish to be identical with *A. commersonii*, because Lacépède founded his species on a drawing made by Commerson, the discoverer of *A. commersonii*. They suppose that a mistake in the number of rays of the dorsal fin was made in the drawing. Günther, (Cat. Fishes I p. 223) also placed *Lutjanus gymnocephalus* among the synonyms of *A. commersonii*, without acknowledging however its priority. I think it best to put *Lutjanus gymnocephalus* in the list of doubtful species of Ambassis. In this list Günther also places *Priopis argyrozona* (K. & v. H.) C. V., a fish described by Cuvier and Valenciennes after a drawing of Kuhl and van Hasselt, who named the species. Bleeker, who later on got possession of this drawing, states that it represents his *A. gymnocephalus*.

Apogon Lacépède.

1. *Apogon orbicularis* C. V.
Apogon orbicularis Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 155.
Amia orbicularis Bleeker, Atl. Ichth. VII p. 79.
 2 spec. 87 and 100 mm, from the Majalibit-bay, Waigeu, Jan. 1910.
 1 spec. probably from Ambon, 70 mm.
2. *Apogon novemfasciatus* C. V.
Apogon novemfasciatus Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 154.
Apogon novemfasciatus Max Weber, Siboga Exp. Fische p. 224.
 11 spec. 44—70 mm, from the reef at Saonek, Dec. 27. 1909.
3. *Apogon ceramensis* Blkr.
Apogon ceramensis Bleeker, Nat. Tijdschr. Ned. Indië, III p. 258.
Apogon ceramensis Bleeker, Atl. Ichth. VII p. 91.
 5 spec. 80—90 mm, mouth of Batu mera, Ambon, Dec. 8. 1909.
 5 spec. 71—80 mm, Majalibit-bay, Waigeu, January 1911.
4. *Apogon aureus* (Lacép.).
Centropomus aureus Lacépède, Hist. Nat. Poiss. IV p. 253, 273.
Apogon aureus Bleeker, Atl. Ichth. VII p. 92.
 12 spec. 14—85 mm, Saonek, December 1909.
5. *Apogon sangiensis* Blkr.
Apogon sangiensis Bleeker, Bijdr. Ichth. Sangi, Nat. T. Ned. Ind. XIII p. 375.
Apogon sangiensis Günther, Fische d. Südsee, I p. 20.
Apogon sangiensis Day, Fishes of India, 4^o. p. 64, Plate XVII fig. 3.
Amia sangiensis Bleeker, Atl. Ichth. VII p. 95.
 Beo, Majalibit-bay, Waigeu, January 1910, 92 spec. 70—44 mm.

In the original description of this fish, Bleeker says that his single specimen was in a rather bad state of preservation and that the pearl-blue ocelli on the anal fin seem to be present on the second dorsal and caudal too (Bleeker says: dorsal and anal, but this is surely a misprint for dorsal and caudal). This is the case in a good number of my specimens, in others the ocelli are less distinct.

All my specimens have the front part of the first dorsal black, which is not mentioned by Bleeker, who states: "dorsali spinosa fusco-arenata". Day says: "Upper half of first dorsal black", while Günther's specimens of Yap are in accordance with mine: "Der vordere Rand der ersten Rückenflosse schwarz".

Day says that there is "a minute black spot on the back, close behind the base of the last dorsal ray". All my specimens show this spot clearly and besides they have a similar spot in front of the first dorsal and between the two dorsal fins.

In other respects my specimens agree with Bleeker's diagnosis. The pectorals and ventrals only seem to be slightly shorter.

6. *Apogon savayensis* Gthr.

Apogon savayensis Günther, Pr. Zool. Soc. 1871, p. 656, Fische der Südsee, I p. 21.

Amia savayensis Steindachner, Sitzb. Akad. Wien, CXV p. 1379.

Amia savayensis Jordan & Seale, Bull. Bur. Fish. XXV p. 239.

Saonek, 12 specimens, 85—14 mm.

Bleeker identified this species with his *A. bandanensis*, probably on account of Day's *A. savayensis*, which seems to me not to be identical with Günther's species of the same name. Klunzinger went still farther and united *A. moluccensis*, *hoevenii* and *monochrous* with the two named above.

7. *Apogon margaritophorus* Blkr.

Apogon margaritophorus Bleeker, Nat. Tijdschr. Ned. Indië, VII p. 363.

Amia margaritophora Bleeker, Atl. Ichth. VII p. 91.

One specimen, 45 mm, from the fishmarket at Macassar, March 11. 1910.

8. *Apogon amboinensis* Blkr.

Apogon amboinensis Bleeker, Vierde bijdr. ichth. Amboina, Nat. Tijdschr. Ned. Indië, V p. 329.

Amia amboinensis Bleeker, Atl. Ichth. VII p. 90.

River Waiu waigé, Waigau, in fresh water but still under influence of the tide, 2 spec. 76—69 mm. 25 Dec. 1909.

My specimens have besides the markings, peculiar to this species, two black spots on the praeoperculum, not mentioned by Bleeker. On the figure in the Atlas Ichth., where erroneously the first dorsal has 7 spines, a reddish band is drawn on the praeoperculum, not mentioned in the text.

9. *Apogon melas* Blkr.

Apogon melas Bleeker, Contr. ichth. Sumbawa, Journ. Ind. Arch. I p. 635.

Amia melas Bleeker, Atl. Ichth. VII p. 94.

Waigau, Majalibit-bay, Jan. 1910, 5 spec. 101—115 mm.

Bleeker does not mention in his description of this fish an oblique black stripe, running from the hindmargin of the eye to the intramarginal crest of the praeoperculum, although it is visible in the figure of the fish on Plate 348, fig. 1 of the Atl. Ichth. It is clearly visible in all my specimens.

10. *Apogon polystigma* (Blkr.).

Apogonichthys polystigma Bleeker, Nat. Tijdschr. Ned. Ind. VI p. 484.

Amia polystigma Bleeker, Atl. Ichth. VII p. 101.

1 spec. 31 mm, Ambon, February 1910.

11. *Apogon* spec. juv.

7 spec., about 10 mm long, from brackish water at Kairatu, W. Ceram, February 16. 1910.
D. VI. I 9. A. II 9?

The body being pigmented is brown, the tail and head are colourless. First dorsal dark brown, a black spot at base of caudal. I am not able to range these young fishes under any of the known species.

Cheilodipterus Lacépède.

1. *Cheilodipterus lineatus* (Forsk.).

Perca lineata Forskål, Descript. Animal. p. 42.

Cheilodipterus lineatus Klunzinger, Fische Roth. Meer. 4° p. 23.

2 spec., 60 and 63 mm, from Buton, collected by Dr. Justesen.

The two specimens are characterized by the maxillary not reaching to below the hindborder of the eye, by having well developed canini in the jaws and in being rather slender, the height of the caudal peduncle being $\frac{1}{2}$ of its length. The specimens are coloured as *C. quinquelineatus*, having a black spot at the base of the tail and 5 well defined longitudinal bands; but between these bands there are smaller and lighter ones, so that there are about 8 bands on each side. It is possible that *C. quinquelineatus*, with which species my specimens agree otherwise, is only a variety of *C. lineatus*. Klunzinger says about this question: „Diese Form (*C. quinquelineatus*) würde ich, wenn nicht Bleeker 54—110'' als Grösse angäbe, für die Jugend von *Ch. lineatus* halten, mit nog weniger entwickelten Zähnen." Hitherto *Ch. lineatus* has not been recorded from the indo-australian archipelago.

2. *Cheilodipterus singapurensis* Blkr.

Cheilodipterus singapurensis Bleeker, Natuurk. Tijdschr. Ned. Indië, XX p. 452.

Paramia singapurensis Bleeker, Nat. Verh. Mpij v. Wetensch. 3^{de} Verz. II p. 78. Atl. Ichth. VII p. 106.

21 spec., 165—65 mm, Beo, Majalibit-bay, Waigeu, January 1910.

My specimens only differ from Bleeker's description in the coloration. They are all dark brown, with four still deeper brown longitudinal stripes, the first running from the beginning of the lateral line to the caudal fin, where it is continued on the upper margin of the fin. The second runs from the snout through the eye to the middle of the base of the caudal fin, where it ends in a black patch, not always distinct. The third begins also at the snout, runs over the dorsal part of the maxilla, through the base of the pectoral fin to the lower margin of the caudal fin, where it may faintly be traced on the lower rays. The fourth is rather indistinct, and runs from the corner of the mouth to the anal fin. In the half of my specimens there is a silvery white patch on the opercle, between the second and the third longitudinal stripe. First dorsal, basal half of second dorsal, caudal and ventrals dark.

Lutjanus Bloch.

1. *Lutjanus ehrenbergi* (Pet.).

Mesoprion Ehrenbergi Peters, Monatsber. Akad. Berlin 1869, p. 704.

Lutjanus oligolepis Bleeker, Atl. Ichth. VIII p. 48.

Mesoprion Ehrenbergi Klunzinger, Fische Roth. Meeres. 4° p. 13.

One specimen 62 mm, from Batu merah, Ambon, March 1910.

2. *Lutjanus biguttatus* (C. V.).

Serranus biguttatus Cuvier & Valenciennes, Hist. Nat. Poiss. VI p. 507.

Lutjanus Bleekeri Günther, Cat. Brit. Mus. I p. 208.

Lutjanus biguttatus Bleeker, Atl. Ichth. VIII p. 54.

Lutjanus biguttatus Day, Fishes of India. 4° p. 34.

12 spec. 80—120 mm, from the Majalibit-bay, Waigeu, January 1910.

2 spec. 162—165 mm, Ambon, Batu merah, February 1910.

3. *Lutjanus kasmira* (Forsk.).*Sciaena kasmira* Forskål, Descr. Anim. p. 46.*Lutjanus bengalensis* Bleeker, Atl. Ichth. VIII p. 55.*Lutjanus quinquelineatus* Bleeker, Atl. Ichth. VIII p. 56.*Lutjanus kasmira* Max Weber, Siboga-Exp. Fische, p. 248.

1 spec., 191 mm, from the fishmarket at Buton, December 3. 1909.

2 spec., 158—170 mm, Ambon, February—March 1910.

4. *Lutjanus gibbus* (Forsk.).*Sciaena gibba* Forskål, Descript. Animal. p. 46.*Lutjanus butonensis* Bleeker, Atl. Ichth. VIII p. 59.

1 spec., 74 mm. from the fishmarket at Ambon, December 7. 1909.

5. *Lutjanus fulviflamma* (Forsk.).*Sciaena fulviflamma* Forskål, Descript. Animalium, p. 45.*Lutjanus fulviflamma* Bleeker, Atl. Ichth. VIII p. 65.

2 spec., 218 and 235 mm, from Sanana, Sula Islands, December 10. 1909.

6. *Lutjanus marginatus* (C. V.).*DiaCOPE marginata* Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 425.*Lutjanus flavipes* Bleeker, Atl. Ichth. VIII p. 68.*Lutjanus marginatus* Bleeker, Atl. Ichth. VIII p. 69.*Lutjanus marginatus* Max Weber, Siboga-Exp. Fische, p. 252.

1 spec., 270 mm, from Sanana, Sula Islands, December 10. 1909.

1 spec., 190 mm, from Ambon, February 1910.

7. *Lutjanus monostigma* (C. V.).*Mesoprion monostigma* Cuvier & Valenciennes, Hist. Nat. Poiss. II. p. 446.*Lutjanus lioglossis* Bleeker, Atl. Ichth. VIII p. 70.

A specimen, long 173 mm, from Saonek and another young one of 48 mm, from the reef at the same island.

A specimen from Batu merah, Ambon, 76 mm long, may belong to this species. It shows however a dark band, running from the snout through the eye to the blotch under the soft dorsal, and continued from there to the caudal. Parallel to and below this band runs another one, beginning under the eye. Another band runs from the hindborder of the eye to the beginning of the soft dorsal, above which runs a band from the upperborder of the eye to the middle of the spinous dorsal. The space between the two lower bands is margaritaceous, as well as a ring round the blotch under the soft dorsal. Upperborder of dorsal blackish.

The specimen is not very well preserved and the exact number of scales on the praeoperculum could not be ascertained, but in general shape etc. it closely resembles *L. monostigma*. I suppose that it is a variety of this species, as another specimen from Ambon, long 45 mm, shows a band through the eye, continued on the operculum, but has the body without bands as in *L. monostigma*.

8. *Lutjanus rivulatus* (C. V.).*DiaCOPE rivulata* Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 414.*Lutjanus rivulatus* Bleeker, Atl. Ichth. VIII p. 73.

1 spec., 88 mm, from the fishmarket at Macassar, March 11. 1910.

9. *Lutjanus argentimaculatus* (Forsk.).*Sciaena argentimaculata* Forskål, Descript. Animal. p. 47.*Lutjanus argentimaculatus* Bleeker, Atl. Ichth. VIII p. 74.

3 spec., 31—142 mm, Batu merah, Ambon, February 1910.

1 spec., 102 mm, Buli, Halmahera, fresh water (Mission. Maan leg.).

Two young specimens of 25 mm, from the river Mirdika, Ambon, Dec. 7. 1909, and a still younger one, 20 mm long, from the mouth of the Riuapa river, Kairatu, Ceram, probably belong to this species. They are characterised by a long slender spine at the angle of the praeoperculum, which is longer in the smaller specimen than in the two other ones.

Lutjanus spec. juv.

1 spec., 28 mm, from the reef at Saonek, January 1910.

Therapon Cuvier.

1. *Therapon jarbua* (Forsk.).

Sciaena jarbua Forskål, Descript. Animal. p. 50.

Therapon servus Günther, Cat. Brit. Mus. I p. 278.

Therapon (Datnia) jarbua Bleeker, Atl. Ichth. VII p. 112.

Therapon jarbua Day, Fishes of India 4°. p. 69.

Therapon jarbua Klunzinger, Fische Roth. Meer. 4°. p. 26.

3 spec., 140—185 mm, Kairatu, W. Ceram, March 1. 1910.

1 spec., 70 mm, Batu merah, Ambon, March 1910.

2. *Therapon puta* C. V.

Therapon puta Cuvier & Valenciennes, Hist. Nat. Poiss. III p. 131.

Therapon vittatus Günther, Cat. Brit. Mus. I p. 280 (*vittatus* H. B.?).

Therapon (Datnia) puta Bleeker, Atl. Ichth. VII p. 112.

Therapon puta Day, Fishes of India 4°. p. 68.

Therapon puta Klunzinger, Fische Roth. Meeres 4°. p. 26.

15 spec., 93—112 mm, Majalibit-bay, Waigeu, January 1910.

3. *Therapon argenteus* (C. V.).

Datnia argentea Cuvier & Valenciennes, Hist. Nat. Poiss. III p. 139.

Therapon argenteus Günther, Cat. Brit. Mus. III p. 283.

Therapon (Datnia) argenteus Bleeker, Atl. Ichth. VII p. 114.

Datnia argentea Day, Fishes of India 4°. p. 71.

1 spec., 235 mm, from Kairatu, W. Ceram, March 1. 1910.

4. *Therapon rosenbergii* (Blkr.).

Datnia Rosenbergii Bleeker, Nat. Tijdschr. Ned. Indië XXII p. 237.

Therapon (Datnia) Rosenbergii Bleeker, Atl. Ichth. VII p. 116.

1 spec., 215 mm, river Batu Merah, Ambon, December 7. 1909, fresh water.

1 spec., 180 mm, river at Batjan, December 11. 1909, fresh water.

Both specimens are better in accordance with the description of *Th. rosenbergii* than of *Th. cancellatus*. The first mentioned specimen has, however, much stronger spines on the angle of the praeoperculum than the other smaller specimen and agrees in this respect with *Th. cancellatus*. The differences between these two species are very slight and I have little doubt that, at the hand of more material than I dispose of at present, both species could be united.

The carnosity of the upperlip is much more marked in my specimens than in the figure of Bleeker in the Atlas Ichthyologique. It gives the snout a pig-like appearance, quite different from that of other species of the genus.

Pseudochromididae.**Opisthognathus Cuv.**1. *Opisthognathus (Gnathypops)* spec.

1 spec., 29 mm, from the reef at Saonek, December 1909.

It is impossible to determine the species, as the scales are still invisible, except on the tail.

Pseudochromis Rüppell.1. *Pseudochromis fuscus* Müll. Trosch.

Pseudochromis fuscus Müller & Troschel, Horae ichthyol. III p. 23.

Pseudochromis xanthochir Bleeker, Nat. Tijdschr. Ned. Indië VIII p. 443. Verh. Akad. Amsterdam, XV, Pseudochromidoïdes, p. 17.

Pseudochromis fuscus Bleeker, Verh. Akad. Amsterdam XV, Pseudochromidoïdes, p. 16.

3 spec., 65—36 mm, Ambon, February 1910.

The smaller specimen misses the dark band at the caudal and at the base of the pectorals and should therefore be what Bleeker calls: *P. xanthochir*. As this is the only difference between both species, I think that one may look at *P. xanthochir* as a synonym of *P. fuscus*.

2. *Pseudochromis melanotaenia* Blkr.

Pseudochromis melanotaenia Bleeker, Ned. Tijdschr. Dierk. 1, p. 273. Verh. Kon. Akad. Amsterdam, XV, Pseudochromidoïdes, p. 20.

1 spec., 34 mm, from Ambon, February 1910.

The coloration of my specimen does not quite agree with that of Bleeker's 2 specimens, (one from Timor and the other from Ambon). The black stripe on the dorsal is continuous with that of the caudal and is prolonged in front on the head, so that the whole system of coloration may be described as follows: Head and body yellowish, minutely spotted with brown, more densely on some of the scales on the side, so as to form brown patches. A dark brown almost black band beginning at the snout covers the intraorbital space and runs backward along the dorsal fin, leaving only its upperpart hyalin, continued on the dorsal side of the tail and the upper margin of the caudal fin, where it descends to the lower margin in the form of a semicircle, which touches the nearly straight hinder margin of the caudal fin. The band, running forward along the lower margin of the caudal fin, ends at the hinder margin of the anal.

Pseudogramma Bleeker.1. *Pseudogramma polyacanthus* (Blkr.).

Pseudochromis polyacanthus Bleeker, Nat. Tijdschr. Ned. Indië X p. 375.

Pseudochromis polyacanthus Bleeker, Verh. Kon. Akad. v. Wetensch. XV p. 25.

3 spec., 28 and 43 mm long, from Ambon, January and February 1910, in corals.

Sillaginidae.**Sillago Cuvier.**1. *Sillago sihama* (Forsk.).

Atherina sihama Forskål, Descript. Animal. p. 70.

Sillago sihama Bleeker, Verh. Akad. Amsterdam XIV, Sciénoid. et Sillag. p. 67.

6 spec., 79—133 mm, Ambon, Batu merah, February and March 1910.

2. *Sillago macrolepis* Blkr.

Sillago macrolepis Bleeker, Nat. Tijdschr. Ned. Indië XVIII p. 166. Verh. Akad. Amsterdam, XIV p. 72.

1 spec., 90 mm, Saonek, January 1910.

2 spec., 93 and 112 mm, Ambon, February 1910.

Gerridae.**Equula Cuvier.**1. *Equula edentula* (Bl.).

Scomber edentulus Bloch, Ausländ. Fische IX p. 108.

Equula ensifera Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 66.

Equula ensifera Bleeker, Verh. Bat. Gen. XXIV Makreel. p. 80.

Equula edentula Günther, Cat. Brit. Mus. II p. 498.

2 spec., 112 and 125 mm, from mouth of river at Buton, December 3. 1909 (brackish).

2. *Equula splendens* Cuv.

Equula splendens Cuvier, Règne Animal II p. 212.

Equula gomorah Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 80.

Equula gomorah Bleeker, Verh. Bat. Gen. XXIV. Makreel. p. 82.

Equula splendens Günther, Cat. Brit. Mus. II p. 501.

6 spec., 70—80 mm, from the fishmarket at Macassar, March 11. 1910.

3. *Equula daura* Cuv.

Equula daura Cuvier, Règne Animal II p. 212.

Equula dacer Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 83.

Equula dacer Bleeker, Verh. Bat. Gen. XXIV. Makreel. p. 81.

Equula daura Günther, Cat. Brit. Mus. II p. 502.

Many specimens, 43—110 mm, from Amboina, February 1910.

1 spec., about 60 mm, from Buton (Dr. Justesen leg.).

4. *Equula oblonga* C. V.

Equula oblonga Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 85.

Equula oblonga Bleeker, Verh. Bat. Gen. XXIV. Makreel. p. 84.

Equula oblonga Günther, Cat. Brit. Mus. II p. 502.

1 spec., 74 mm, from the fishmarket at Macassar, March 11. 1910.

Gazza Rüppell.1. *Gazza argentaria* (Forster).

Zeus argentarius Forster, Descr. Anim. p. 288.

Gazza argentaria Max Weber, Siboga-Exp. Fische, p. 270.

13 spec., 50—95 mm, from the Majalibit-bay, Waigeu. January 1910.

1 spec., 100 mm, from Ambon, February 1910.

Gerres Cuvier.1. *Gerres filamentosus* C. V.

Gerres filamentosus Cuvier & Valenciennes, Hist. Nat. Poiss. VI p. 482.

Diapterus filamentosus Bleeker, Atl. Ichth. VIII p. 124.

1 spec., 115 mm, from Bajon, Waigeu, January 9. 1910.

2. *Gerres macracanthus* Blkr.*Gerres macracanthus* Bleeker, Nat. Tijdschr. Ned. Indië, VI p. 195.*Diapterus macracanthus* Bleeker, Atl. Ichth. VIII p. 125.

2 spec., from Ambon, Batu merah, March 1910.

Bleeker never got this species from the Moluccos and thought that it was restricted to the western part of the Indo-Australian Archipelago. My specimens however prove the reverse. Both show the transversal bands mentioned by Bleeker very clearly and accord in every other respect with Bleeker's description.

3. *Gerres macrosoma* Blkr.*Gerres macrosoma* Bleeker, Nat. Tijdschr. Ned. Indië, VI p. 56.*Diapterus macrosoma* Bleeker, Atl. Ichth. VIII p. 126.

3 spec., 10—95 mm, Saonek, December 18. 1909.

4. *Gerres oyena* (Forsk.).*Latrus oyena* Forskål, Descr. Anim. p. 35.*Diapterus oyena* Bleeker, Atl. Ichth. VIII p. 129.

2 spec., about 100 mm, Majalibit-bay, Waigeu, January 1910.

Pristipomatidae.*Emmelichthys* Richardson.1. *Emmelichthys leucogrammicus* (Blkr.).*Dipterygonotus leucogrammicus* Bleeker, Journ. Ind. Arch. III 1849 p. 71. — Atl. Ichth. VIII p. 42.

2 spec., 67 and 70 mm, from the fishmarket at Buton, December 3. 1909.

Pentapus C.V.1. *Pentapus nemurus* (Blkr.).*Heterognathodon nemurus* Bleeker, Nat. Tijdschr. Ned. Indië, III p. 754.*Heterognathodon nemurus* Günther, Cat. Brit. Mus. I p. 365.*Pentapus nemurus* Bleeker, Atl. Ichth. VIII p. 103.

1 spec., 168 mm, from Saonek, January 21. 1910.

In life this specimen was bright lilac, lighter below; the upper part of the head bright yellow. From the yellow of the head two longitudinal bands extend to the tail, both are margined with brown. The upper one, which is the narrower, runs above the lateral line just below the base of the dorsal fin, and does not extend farther than the tail. The lower one runs in a straight line from head to base of caudal, which is also yellow in the middle.

Plectorhynchus Lacépède.1. *Plectorhynchus chaetodonoides* Lac.*Plectorhynchus chaetodonoides* Lacépède, Hist. Nat. Poiss. III p. 135.*Diagramma chaetodonoides* Günther, Cat. Brit. Mus. I p. 326.*Plectorhynchus chaetodonoides* Bleeker, Atl. Ichth. VIII p. 17.

2 spec., 82 and 345 mm, from Ambon, February 1910.

2. *Plectorhynchus goldmanni* Blkr.*Diagramma Goldmanni* Bleeker, Nat. Tijdschr. Ned. Indië IV p. 602.*Plectorhynchus Goldmani* Bleeker, Atl. Ichth. VIII p. 21.

1 spec., 460 mm, from Sanana, Sula Islands, December 10. 1909.

3. *Plectorhynchus orientalis* (Bl.).*Anthias orientalis* Bloch, Ausländ. Fische VII p. 10.*Plectorhynchus orientalis* Bleeker, Atl. Ichth. VIII p. 22.

1 spec., 142 mm, from Ambon, February 1910.

Scolopsis Cuvier.

1. *Scolopsis ciliatus* (Lac.).*Holocentrus ciliatus* Lacépède, Hist. Nat. Poiss. IV p. 333.*Scolopsis ciliatus* Bleeker, Atl. Ichth. VIII p. 6.

1 spec., 77 mm long, from the fishmarket at Macassar, March 11. 1910.

2. *Scolopsis temporalis* C. V.*Scolopsis temporalis* Cuvier & Valenciennes, Hist. Nat. Poiss. V p. 341.*Scolopsis temporalis* Günther, Cat. Brit. Mus. I p. 360.*Scolopsis temporalis* Bleeker, Atl. Ichth. VIII p. 12.

1 spec., about 240 mm, from Ambon, February 1910.

My specimen differs from Günther's description in the following points: there are only 5 scales above the lateral line, the snout is somewhat longer than the diameter of the eye, which is equal to the height of the praeorbital. The characteristic markings of this species as well as the peculiar scaleless supraorbital space leave no doubt that my specimen belongs to the above-named species. It seems to be rare, as Bleeker never saw a specimen from the Indo-Australian Archipelago.

3. *Scolopsis elongatus* M. Web.*Scolopsis elongatus* Max Weber, Siboga-Exp. Fische, p. 281.

3 spec., 80—114 mm, from Saonek.

Synagris Günther.

1. *Synagris ruber* (C. V.).*Dentex ruber* Cuvier & Valenciennes, Hist. Nat. Poiss. VI p. 247.*Dentex ruber* Lesson, Voyage Coquille p. 187. Pl. XXXI fig. 2.*Synagris ruber* Bleeker, Atl. Ichth. VIII p. 84.

1 spec., 90 mm, from the fishmarket at Macassar, March 11. 1910.

My specimen has the praeorbital formed as on the figure of Lesson, the free border of the praeoperculum is smaller than the scaled part and the two last dorsal spines are shorter than the preceding ones. The combination of these characters makes it probable that my specimen belongs to the same species as those that were examined by Cuvier & Valenciennes and Lesson and called *Dentex ruber*. Bleeker did not see this species. Future research will have to make out, if it is different from *Synagris taeniopterus* (C. V.).

Caesio Comm.

1. *Caesio maculatus* C. V.*Caesio maculatus* Cuvier & Valenciennes, Hist. Nat. Poiss. VI p. 439.*Caesio maculatus* Günther, Cat. Brit. Mus. I p. 391.*Caesio maculatus* Bleeker, Atl. Ichth. VIII p. 38.*Caesio maculatus* Max Weber, Siboga-Exp. Fische, p. 285.

1 spec., 105 mm, Majalibit-bay, Waigeu, January 1910.

1 spec., 141 mm, Ambon, February 1910.

2. *Caesio* spec.

A small, badly preserved specimen of 55 mm, from Buton, belongs to the above-named species or to the allied *C. caerulaureus* Lac.

Gymnocaesio Bleeker.

1. *Gymnocaesio gymnopterus* (Blkr.).

Caesio gymnopterus Bleeker, Nat. Tijdschr. Ned. Indië X p. 372.

Gymnocaesio gymnopterus Bleeker, Atl. Ichth. VIII p. 34.

1 spec., 114 mm, from the fishmarket at Ambon, December 7. 1909.

Lethrinus Cuvier.

1. *Lethrinus moensi* Blkr.

Lethrinus Moensi Bleeker, Nat. Tijdschr. Ned. Indië IX p. 435.

Lethrinus moensi Günther, Fische der Südsee I p. 64.

Lethrinus Moensi Bleeker, Atl. Ichth. VIII p. 115.

2 spec., 218 and 250 mm, Sanana, Sula-Islands, December 9. 1909.

2. *Lethrinus opercularis* (C. V.) Blkr.

? *Lethrinus opercularis* Cuvier & Valenciennes, Hist. Nat. Poiss. II p. 289.

Lethrinus opercularis Bleeker, Atl. Ichth. VIII p. 119.

1 spec., 115 mm, from Saonek.

1 spec., 92 mm, fishmarket at Macassar, March 11. 1910.

Mullidae.

Upeneus (Cuvier) Blkr.

1. *Upeneus sulphureus* C. V.

Upeneus sulphureus Cuvier & Valenciennes, Hist. Nat. Poiss. III p. 450.

Upeneus sulphureus Bleeker, Verh. Akad. Amsterdam 1874, Révis. Mulloïdes, p. 4.

1 spec., 146 mm, Kairatu, W. Ceram, February 28. 1910.

2. *Upeneus vittatus* (Forsk.).

Mullus vittatus Forskål, Descript. Anim. p. 31.

Upeneus vittatus Bleeker, Verh. Akad. Amst. 1874. Rév. Mulloïdes, p. 6.

9 spec., 87—100 mm, Kairatu, W. Ceram, February 28. 1910.

1 spec., 57 mm, Ambon, February 1910 (bad condition).

1 spec., 81 mm. Buton, Dr. Justesen leg.

3. *Upeneus sundaicus* (Blkr.).

Upeneoides sundaicus Bleeker, Act. Soc. Scient. Ind. Neerl. Achtste bijdr. vischf. Ambon, p. 47.

Upeneus sundaicus Bleeker, Verh. Akad. Amst. 1874. Révis. Mulloïdes, p. 10.

1 spec., 110 mm, fishmarket at Makassar, March 11. 1910.

My specimen has the lower lobe as well as the upper lobe of the caudal fin banded. In all other respects it agrees with the description given by Bleeker.

4. *Upeneus tragula* Rich.*Upeneus tragula* Richardson, Rep. Ichth. China, Rep. 15th Meeting Brit. Assoc. p. 220.*Upeneus tragula* Bleeker, Verh. Akad. Amst. 1874. Révis. Mulloides, p. 11.

1 spec., 135 mm, probably from Sorong, N. Guinea.

Mulloides Bleeker.

1. *Mulloides samoensis* Gthr.*Mulloides samoensis* Günther, Fische der Südsee, p. 57.*Mulloides samoensis* Jordan & Evermann, Bull. Fish. Comm. XXIII p. 253.*Mulloides samoensis* Max Weber, Siboga-Exp. Fische, p. 294.

1 spec., 185 mm, from the fishmarket at Ambon, December 7. 1909.

Parupeneus Bleeker.

1. *Parupeneus indicus* (Shaw).*Mullus indicus* Shaw, Gen. Zool. IV, 2 p. 614.*Upeneus indicus* Günther, Cat. Brit. Mus. I p. 406, Fische der Südsee, p. 57.*Upeneus malabaricus* Günther, Cat. Brit. Mus. I p. 407. — Fische der Südsee, p. 58.*Parupeneus indicus* Bleeker, Verh. Akad. Amst. 1874. Révis. Mulloides, p. 28.*Pseudupeneus indicus* Snyder, Proc. U. S. Nat. Mus. XXXII p. 93.

One specimen, about 250 mm, from Ambon, February 1910, has the eye situated in the hinderpart of the head as in *P. malabaricus* (Günther), but has the short barbels of *P. indicus*.

Chaetodontidae.

Scatophagus Cuvier.

1. *Scatophagus argus* (Bl.).*Chaetodon argus* Bloch, Ausländ. Fische III p. 86.*Ephippus argus* Bleeker, Verh. Akad. Amsterdam XVII p. 26. Atl. Ichth. IX p. 21.

1 spec., 63 mm, river Batu merah, Ambon, December 6. 1909.

3 spec., 17—19 mm, Kairatu, West Ceram, brackish water.

The last-named specimens are still in larval condition, having remains of the *Tholichthys* stadium.

Chaetodon L.

1. *Chaetodon auriga* Forsk.*Chaetodon auriga* Forskål, Descript. Animal. p. 60.*Tetragonoptrus auriga* Bleeker, Atl. Ichth. IX p. 47.

1 spec., 119 mm, Sorong, New Guinea, January 1910 (L. de Bruyne leg.).

2. *Chaetodon kleinii* Bl.*Chaetodon Kleinii* Bloch, Ausländ. Fische IV p. 7.*Tetragonoptrus Kleinii* Bleeker, Atl. Ichth. IX p. 45.

2 spec., 50—65 mm, from the fishmarket at Ambon, December 7. 1909.

3. *Chaetodon vagabundus* L.*Chaetodon vagabundus* Linné, Syst. Nat. ed. 10a p. 276.*Tetragonoptrus vagabundus* Bleeker, Atl. Ichth. IX p. 48.

3 spec., 111—126 mm, Sorong, New Guinea, January 1910 (L. de Bruyne leg.).

Parachaetodon Bleeker.

1. *Parachaetodon ocellatus* (C. V.).*Platax ocellatus* Cuvier & Valenciennes, Hist. Nat. Poiss. VII p. 229.*Parachaetodon ocellatus* Bleeker, Atl. Ichth. IX p. 24.

1 spec., 57 mm, from the fishmarket at Ambon, March 11. 1910.

Chelmon Cuvier & Valenciennes.

1. *Chelmon rostratus* (L.).*Chaetodon rostratus* Linné, Mus. Ad. Fried. I p. 61.*Chelmo rostratus* Bleeker, Atl. Ichth. IX p. 22.

2 spec., 125 mm, Sorong, New Guinea, January 1910. L. de Bruyne leg.

Heniochus Cuvier & Valenciennes.

1. *Heniochus acuminatus* (L.).*Chaetodon acuminatus* Linné, Syst. Nat. ed. X p. 272.*Heniochus acuminatus* Bleeker, Atl. Ichth. IX p. 29.

2 spec., 125 mm, Sorong, New Guinea, January 1910. L. de Bruyne leg.

Holacanthus Lacépède.

1. *Holacanthus semicirculatus* C. V.*Holacanthus semicirculatus* Cuvier & Valenciennes, Hist. Nat. Poiss. VII p. 143.*Acanthochaetodon semicirculatus* Bleeker, Nat. Verh. Ak. Amsterdam, XVII p. 146. Atl. Ichth. IX p. 69.

1 spec., 19 mm, Saonek, reef.

My very young specimen has besides the medial stripe between the eyes, only two more stripes on the head and two on the body, in accordance with Bleeker's description of the juveniles of this species. The soft part of the dorsal and anal has a white margin, and the caudal is quite white, without stripes or bands.

Acanthuridae.

Acanthurus Bl. Schn.

1. *Acanthurus blochii* C. V.*Acanthurus blochii* Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 209.*Acanthurus blochii* Günther, Fische der Südsee I p. 109.

1 spec., 52 mm, Batu merah, Ambon, March 1910.

An *Acronurus*, from the same locality, possibly belongs to this species.

Naseus Commerson.

1. *Naseus* spec. juv. (*Keris*-stadium).*Keris amboinensis* Bleeker, Nat. Tijdschr. Ned. Indië III p. 272.*Keris amboinensis* Günther, Cat. Brit. Mus. III p. 356.

2 spec., 60—75 mm, Ambon, fishmarket, December 7. 1909.

8 spec., 38—61 mm, Ambon, February 1910.

I am not sure if the young *Naseus* mentioned above are identical with Bleeker's *Keris amboinensis*. The smaller ones, being of the same length as those described by Bleeker (44 and 52 mm), fully agree in measurements, but the larger ones are less high, a difference very possibly due to age. There is some diversity in the colouring of the soft dorsal fin. In some individuals: „dorsali radiosa et anali fuscis vitta longitudinali media grisea” in others the fin has a light colour with two or three parallel darker bands. One specimen has a dark submarginal and a clear white marginal band along the dorsal and anal fin, as well as a bright white marginal band along the caudal.

2. *Naseus* spec. juv. (*Keris*-stadium).

1 spec., 54 mm, Ambon, February 1910.

D. VI. 27. A. II. 27.

This specimen may be at once distinguished from the different *Keris*, hitherto described, by its elongate form, the height being contained $3\frac{3}{5}$ times in the total length, or 3 times in the length without caudal. The head is as long as high, $\frac{1}{4}$ of the total length (the caudal included). The eye is placed far backwards, much nearer to the hinder margin of the operculum than to the tip of the snout. Its diameter is $\frac{2}{5}$ of the length of the head. Colour yellowish brown, the dorsal, anal and ventral fins dark. The caudal has a broad, curved white band at its base, in the form of a 3, followed by some smaller black and white bars, which are not very distinct.

Zanclus Lacépède.

1. *Zanclus cornutus* (L.).

Chaetodon cornutus Linné, Syst. Nat. ed. X p. 243.

Zanclus cornutus Bleeker, Atl. Ichth. IX p. 77.

1 spec., 74 mm, Ambon, February 1910.

Amphacanthidae.

Amphacanthus Bl. Sch.

1. *Amphacanthus javus* (L.).

Teuthis javus Linné, Syst. Nat. ed. XII p. 507.

Amphacanthus javus Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 118.

Amphacanthus javus Bleeker, Verh. Bat. Gen. XXIII p. 9.

Teuthis javus Günther, Cat. Brit. Mus. III p. 315.

2 spec., 152 and 158 mm, Beo, Majalibit-bay, Waigeu, January 1910.

2. *Amphacanthus vermiculatus* C. V.

Amphacanthus vermiculatus Cuvier & Valenciennes, Hist. Nat. Poiss. X p. 126.

Amphacanthus vermiculatus Bleeker, Verh. Bat. Gen. XXIII p. 11.

Teuthis vermiculata Günther, Cat. Brit. Mus. III p. 317.

1 spec., 270 mm, Buli, Halmahera, December 15. 1909.

1 spec., 130 mm, Batu merah, Ambon, February 1910.

3. *Amphacanthus striolatus* (Gthr.).

Teuthis striolata Günther, Cat. Brit. Mus. III p. 319.

Teuthis striolata Günther, Fische der Südsee, p. 89.

Two specimens, 117 and 157 mm, from Saonek, probably belong to this species, although they differ slightly in colour with Günther's description. My specimens are of a deep chocolate-brown, indistinctly vermiculated with whitish. Region between pectorals and ventrals white,

as if these parts were covered with chalk. Cheeks, operculum and under surface of head also tinged with white. Tail chocolate-brown in the basal half, yellowish, with indistinct bars in the outer half. Anal and soft dorsal yellow, the rays brown, spotted with darker brown. Pectorals yellow, brown at their base. Ventrals brown, with the same „chalked” appearance as the surrounding parts of the body.

Pomacentridae.

Pomacentrus Lacépède.

1. *Pomacentrus melanochir* Blkr.

Pomacentrus melanochir Bleeker, Versl. Kon. Akad. Amsterd 2^{de} R. X p. 384. Natuurk. Verh. Holl. Mpij. 3^{de} Verz. Deel II, n^o. 6, p. 49.

3 spec., 69—54 mm, from the fishmarket at Ambon, December 7. 1909.

2. *Pomacentrus moluccensis* Blkr.

Pomacentrus moluccensis Bleeker, Nat. Tijdschr. Ned. Indië IV p. 118.

Pomacentrus moluccensis Günther, Cat. Brit. Mus. IV p. 30.

Pomacentrus moluccensis Bleeker, Verh. Holl. Mpij. 3^{de} Verz. Deel II, n^o. 6, p. 56.

13 spec., 19—55 mm, Ambon, February and March 1910.

3. *Pomacentrus amboinensis* Blkr.

Pomacentrus amboinensis Bleeker, Versl. Kon. Akad. Amsterdam, 2^{de} Reeks II p. 334. Natuurk. Verh. Holl. Mpij. 3^{de} Verz. Deel II n^o. 6, p. 58.

I got one specimen, 90 mm long, on the fishmarket at Ambon, December 7. 1909.

4. *Pomacentrus trilineatus* C. V.

Pomacentrus trilineatus Cuvier & Valenciennes, Hist. Nat. Poiss. V p. 428.

Pomacentrus trilineatus Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 61 (S. Syn.).

7 spec., 110—125 mm, Ambon, mouth of the Batu merah river, 8 Dec. 1909. February 1910.

1 spec., 57 mm, Ambon, February 1910.

1 spec., 69 mm, Majalibit-bay, Waigeu, January 1910.

1 spec., 90 mm, Buli, Halmahera (Maan leg.).

A young specimen, 34 mm long, from Ambon, that has partly lost his scales, probably belongs to this species.

5. *Pomacentrus fasciatus* C. V.

Pomacentrus fasciatus Cuvier & Valenciennes, Hist. Nat. Poiss. V p. 426.

Dischistodus fasciatus Bleeker, Nat. Verh. Holl. Mpij. 3^{de} Verz. Deel II n^o. 6, p. 86.

2 spec., 118 and 127 mm long, from Saonek.

Cheiloprion Max Weber.

1. *Cheiloprion labiatus* (Day).

Pomacentrus labiatus Day, Fishes of India 4^o. p. 384.

Cheiloprion labiatus Max Weber, Siboga-Exp. Fische, p. 342.

1 spec., 48 mm long, from Ambon, February 1910.

Abudefduf Forskål.

1. *Abudefduf saxatilis saxatilis* (L.).

Chaetodon saxatilis Linné, Syst. Nat. ed. X p. 276.

Glyphidodon coelestinus Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 101.

Glyphisodon saxatilis Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV p. 608.

1 spec., 170 mm, Sorong, New Guinea. L. de Bruyne leg.

20 young specimens, 23—35 mm, Saonek, January 21. 1910.

2. *Abudefduf saxatilis coelestinus* (C. V.).

Glyphisodon coelestinus Cuvier & Valenciennes, Hist. Nat. Poiss. V p. 464.

Glyphidodon coelestinus var. *b* Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 101.

1 spec., 23 mm, Saonek. January 21. 1910.

3. *Abudefduf plagiometopon* Blkr.

Glyphisodon plagiometopon Bleeker, Nat. Tijdschr. Ned. Indië III p. 67.

Glyphidodon plagiometopon Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 103.

1 spec., 150 mm, from Saonek, January 1910.

As I found some differences between my specimen and those of Bleeker according to his description, I compared it with the type in the Leyden Museum. This examination proved that it certainly belongs to the above-named species, but that the scales on the praeoperculum are not so strictly biserial as in the type. In my specimen some of the vertical rows in the hinder portion consist of 3 scales. The inferior pharyngeal bone does not show the peculiar shape described by Bleeker, but is more or less triangular, with the hinder margin concave. I don't know if much value has to be attached to the characteristics of the pharyngeal bones. It seems that Bleeker is the only ichthyologist who makes use of them as specific characters. At all events I don't think I am justified in making a new species only on this difference with the typical specimens. The colour of my specimen is much darker than in those of Bleeker, but the light stripes and dots on the scales of the back and along the sides are clearly visible.

The tail is rounded in my specimen and not emarginate as described by Bleeker. The two typical specimens in the Leyden Museum however have also the tail more or less rounded.

4. *Abudefduf melas* (C. V.).

Glyphisodon melas Cuvier & Valenciennes, Hist. Nat. Poiss. V p. 472.

Paraglyphidodon melas Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 123.

1 spec., 149 mm long, from Saonek, January 1910.

5. *Abudefduf brownriggii* (Benn.).

Chaetodon brownriggii Bennett, Fishes of Ceylon, p. 8.

Glyphidontops antjerius Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 134.

Glyphidontops zonatus Bleeker, ibid. p. 138.

Glyphidontops unimaculatus Bleeker, ibid. p. 140.

Glyphidontops brownriggii Günther, Fische der Südsee p. 232 (S. Syn.).

I got 16 specimens of different ages on the reef at Saonek. December 1909, which clearly show how the colour variations, on which several species have been built, are fused.

My 3 smallest specimens, 19—32 mm long, show two narrow bright blue stripes between the eyes, meeting in front at a sharp angle and continued backwards to the black ocellus on the dorsal. A second smaller ocellus at the axil of the dorsal (*A. antjerius*).

Nine specimens, 51—68 mm long, belong to *A. unimaculatus*, but one of them, long 58 mm, shows clearly the supra-ocular stripes, meeting in front, of *A. antjerius*, while another, 65 mm long, shows a light cross-bar on the body as in *A. zonatus*. Of this last named form I have two specimens, 75 and 85 mm long, while the two remaining ones belong to the form described by Günther l. c. sub 2 and figured Plate 127 fig. A.

The different colour varieties don't live separately on the reef, the above-mentioned *unimaculatus* with a crossbar was found together with two typical *unimaculatus* in a very small rock pool.

6. *Abudefduf* spec. juv.

2 spec., 20 and 28 mm long, from Ambon, February 1910.

Tetradrachmum Cantor.

1. *Tetradrachmum reticulatum* (Rich.).

Heliases reticulatus Richardson, Rep. 15th meet. Brit. Ass. p. 254.

Tetradrachmum reticulatum Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 145.

4 spec., from Ambon, 44—93 mm, December 1909 and February 1910.

2. *Tetradrachmum aruanum* (L.).

Chaetodon aruanus Linné, Systema Naturae X p. 275.

Tetradrachmum arcuatum Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 147.

27 spec., 22—66 mm, from Ambon, among corals. February 1910.

3. *Tetradrachmum melanurus* (Blkr.).

Dascyllus melanurus Bleeker, Nat. Tijdschr. Ned. Indië, VI p. 109.

Tetradrachmum melanurus Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 150.

17 spec., 15—40 mm, from Ambon, among corals. February 1910.

Chromis Cuvier.

1. *Chromis caeruleus* (C. V.).

Heliases caeruleus Cuvier & Valenciennes, Hist. Nat. Poiss. V p. 497.

Heliases lepisurus Cuvier & Valenciennes, op. cit. V 498.

Heliases frenatus Cuvier & Valenciennes, op. cit. p. 498.

Heliastes lepidurus Günther, Fische der Südsee, p. 238.

Chromis lepidurus Bleeker, Verh. Holl. Mpij. 3^{de} Verz. II n^o. 6, p. 164.

Heliastes lepidurus Day, Fishes of India 4^o. p. 389.

Chromis caeruleus Jordan and Seale, Bull. Bureau Fisheries XXV p. 290.

54 spec., 56—26 mm, from Ambon, among corals. February 1910.

The identity of *Chr. caeruleus*, *lepisurus* and *frenatus* is discussed by Bleeker l. c.: "Tous mes individus (of *Chromis lepisurus*) ont 12 épines dorsales, ce qui fait douter que les *Heliases frenatus* et *coeruleus*, dont il est dit qu'ils en auraient 13, soient de la même espèce". Jordan and Seale l. c. however declare the three species doubtless identical and continue: "The type of *caeruleus* is said to have 13 dorsal spines, while *Chromis lepisurus* has 12. No other difference appears in the description". The authors don't make any further mention of this difference in the number of dorsal rays, although it seems to me an important point in the discussion, as we know that the number of dorsal spines is very constant among the Pomacentridae. Vaillant wrote in response to a request of the above-named American authors to re-examine the original types, that he agrees with their view and thinks the three species to be the same, but he too does not mention the number of dorsal rays in his letter, published by Jordan and Seale l. c. Therefore it is important that among my 54 specimens there was one exactly like the others except for the fact of having 13 dorsal spines instead of 12, as is the case in the 53 remaining specimens. I think that we may safely draw the conclusion that occasionally individuals with 13 spines occur and it seems even that the number is still more variable, as Day l. c. states that there are 11—12 spines in this species.

Labridae.

Cheilinus Lacépède.

1. *Cheilinus chlorurus* (Bl.).

Sparus chlorurus Bloch, Ausländische Fische V p. 24.

- Cheilinus chlorurus* Bleeker, Atl. Ichth. I p. 65.
Cheilinus chlorurus Günther, Cat. Brit. Mus. IV p. 128.
Cheilinus chlorurus Day, Fishes of India 4^o. p. 393.

1 spec., 86 mm, from Saonek.

2. *Cheilinus ceramensis* Blkr.

Cheilinus ceramensis Bleeker, Nat. Tijdschr. Ned. Indië III p. 290. Atl. Ichth. I p. 69.

4 spec., 188—60 mm, Ambon, February 1910.

Cheilio Lacépède.

1. *Cheilio inermis* (Forsk.).

Labrus inermis Forskål, Descript. Animalia p. 34.

Cheilio inermis Bleeker, Atl. Ichth. I p. 82.

1 spec., 234 mm, Saonek, January 1910.

Julis C. V.

1. *Julis dorsalis* Q. G.

Julis dorsalis Quoy & Gaimard, Zool. Voy. Astrolabe III p. 713.

Julis dorsalis Bleeker, Atl. Ichth. I p. 94.

1 spec., 133 mm, from Saonek.

PlatyGLOSSUS Klein.

1. *PlatyGLOSSUS notopsis* (C. V.).

Julis notopsis Cuvier & Valenciennes, Hist. Nat. Poiss. XIII p. 485.

PlatyGLOSSUS notopsis Bleeker, Atl. Ichth. I p. 111.

PlatyGLOSSUS notopsis Günther, Fische der Südsee, Heft VIII p. 258.

A young specimen, 18 mm, from the reef at Saonek, December 1909.

2. *PlatyGLOSSUS schwarzi* (Blkr.).

Julis (Halichoeres) Schwarzi Bleeker, Verh. Bat. Gen. XXIII p. 7.

Halichoeres Schwarzi Bleeker, Atl. Ichth. I p. 117.

PlatyGLOSSUS Schwarzi Günther, Cat. Brit. Mus. IV p. 149.

PlatyGLOSSUS (Halichoeres) Doleschalli Steindachner, Ichth. Mitth. VI, Verh. Zool. bot. Gesellsch. XIII p. 1190.

3 spec., 93—85 mm, Saonek, January 1910.

3. *PlatyGLOSSUS bicolor* (Bl. Sch.).

Labrus bicolor Bloch, Schneider, Syst. Ichth. p. 267.

Halichoeres bicolor Bleeker, Atl. Ichth. I p. 118.

PlatyGLOSSUS bicolor Günther, Cat. Brit. Mus. IV p. 145.

8 spec., 95—112 mm, Majalibit-bay, Waigeu, January 1910.

My specimens are a little higher and have the head slightly longer than those of Bleeker, while there is a black triangular spot at the base of the pectoral. The colour-pattern agrees with the description and figure given by Bleeker and as I don't find other differences, I have no doubt that my specimens belong to the above-named species.

This species was hitherto only known from the Western part of the Archipelago.

4. *PlatyGLOSSUS binotopsis* (Blkr.).*Julis (Halichoeres) binotopsis* Bleeker, Verh. Bat. Gen. XXIII p. 7.*Halichoeres binotopsis* Bleeker, Atl. Ichth. I p. 120.*PlatyGLOSSUS binotopsis* Günther, Cat. Brit. Mus. IV p. 153.

2 spec., 62 and 49 mm, Saonek, reef. December 1909.

Besides these two I obtained at Saonek a very small fish, 22 mm long, which is uniformly green excepting a dark stripe behind the eye, a spot at the base of caudal and two spots on the dorsal, of the same size and in the same position as those in *P. binotopsis*, of which species I suppose this specimen to be the young. It is however possible that it belongs to the related *P. leparensis* Blkr.

5. *PlatyGLOSSUS kawarin* (Blkr.).*Julis (Halichoeres) kawarin* Bleeker, Nat. Tijdschr. Ned. Indië III p. 172.*Halichoeres kawarin* Bleeker, Atl. Ichth. I p. 121.*PlatyGLOSSUS kawarin* Günther, Cat. Brit. Mus. IV p. 152. Fische der Südsee II p. 266.*PlatyGLOSSUS kawarin* Day, Fishes of India 4°. p. 400.

1 spec., 84 mm, Saonek, January 1910.

The lines on the head follow another course than those figured by Bleeker and Günther, but I don't think that this is of any importance, as the two figures mentioned differ inter se too and moreover Günther says: „In seinen (Garett's, the collector) Notizen weist er ausdrücklich auf die grosse Variabilität der Körperfärbung hin". This rare species is known from the Andamans, Celebes, Timor, the Society- and Kingmill Isles.

6. *PlatyGLOSSUS hyrtli* (Blkr.).*Julis (Halichoeres) Hyrtli* Bleeker, Act. Soc. Reg. Scient. Ind. Neerl. I p. 60.*Halichoeres Hyrtli* Bleeker, Atl. Ichth. I p. 121.*PlatyGLOSSUS hyrtlii* Günther, Cat. Brit. Mus. IV p. 149.

7 spec., 99—82 mm, Majalibit-bay, Waigeu, January 1910.

7. *PlatyGLOSSUS chloropterus* (Bl.).? *Labrus chloropterus* Bloch, Ausländ. Fische V p. 149.*PlatyGLOSSUS chloropterus* Günther, Cat. Brit. Mus. IV p. 144.*Halichoeres chloropterus* Bleeker, Atl. Ichth. I p. 125.

A single specimen, 139 mm, from Saonek, agreeing with Bleeker's „var. macula media dorso latissima nigra usque infra lineam lateralem descendente".

8. *PlatyGLOSSUS scapularis* (Benn.).*Julis scapularis* Bennett, Proc. Zool. Soc. 1831, p. 167.*Julis caeruleovittatus* Rüppell, Neue Wirbelth. Fische, p. 14.*Güntheria caeruleovittata* Bleeker, Atl. Ichth. I p. 137.*PlatyGLOSSUS scapularis* Günther, Cat. Brit. Mus. IV p. 146.

1 spec., 144 mm, Saonek.

1 spec., 75 mm, Ambon, fishmarket. December 1909.

9. *PlatyGLOSSUS* spec. juv.

19 spec., 15—35 mm, Saonek, reef. December 27. 1909.

Diproctacanthus Bleeker.1. *Diproctacanthus xanthurus* (Blkr.).*Labroides xanthurus* Bleeker, Act. Soc. Reg. Scient. Ind. Neerl. I p. 52.*Diproctacanthus xanthurus* Bleeker, Atl. Ichth. I p. 156.

1 spec., 36 mm, from Ambon, February 1910.

This beautiful little species was hitherto only known from the two type-specimens from Menado. My specimen quite agrees with Bleeker's description. The snout only is a little longer than the eye, and there are only 35 scales in the lateral line, whereas Bleeker states: circa 40.

Stethojulis Günther.

1. *Stethojulis interrupta* (Blkr.).

Julis (Halichoeres) interrupta Bleeker, Nat. Tijdschr. Ned. Ind. II p. 252.

Stethojulis interrupta Bleeker, Atl. Ichth. I p. 132.

1 spec., 92 mm, from the fishmarket at Ambon, December 7. 1909.

Carangidae.

Chorinemus C. V.

1. *Chorinemus lysan* (Forsk.).

Scomber lysan Forskål, Descr. Anim. p. 54.

Chorinemus commersonianus Bleeker, Verh. Bat. Gen. XXIV Makreel. p. 44.

Chorinemus lysan Günther, Cat. Brit. Mus. II p. 471.

3 spec., 120—130 mm, from Beo, Majalibit-bay, Waigeu, January 1910.

Caranx Lacépède.

1. *Caranx affinis* Rüpp.

Caranx affinis Rüppell, Neue Wirbelth. p. 49.

Selar Hasseltii Bleeker, Verh. Bat. Gen. XXIV Makreel. p. 53.

Caranx hasseltii Günther, Cat. Brit. Mus. II p. 234.

Caranx (Selar) affinis Klunzinger, Fische Roth. Meer. 4°. p. 97.

2 spec., 130 mm, Majalibit-bay, Waigeu, January 1910.

2. *Caranx macrophthalmus* Rüpp.

Caranx macrophthalmus Rüppell, Atl. Fische, p. 97.

Caranx crumenophthalmus Günther, Cat. Brit. Mus. II p. 429 (partim).

Caranx (Selar) macrophthalmus Klunzinger, Fische Roth. Meer. 4°. p. 97.

6 spec., 143—190 mm, Saonek, December 1909, January 1910.

2 spec., 163 mm, from Ambon, Batu merah, March 1910.

3. *Caranx boops* C. V.

Caranx boops Cuvier & Valenciennes, Hist. Nat. Poiss. IX p. 46.

Selar boops Bleeker, Verh. Bat. Gen. XXIV Makreelacht. p. 51.

Caranx boops Günther, Cat. Brit. Mus. II p. 431.

1 spec., 70 mm, Buton, December 3. 1909.

6 spec., 99—200 mm, Saonek, December 1909.

4. *Caranx melampygus* C. V.

Caranx melampygus Cuvier & Valenciennes, Hist. Nat. Poiss. IX p. 116.

Caranx melampygus Bleeker, Nat. Tijdschr. Ned. Indië VI p. 58.

Caranx melampygus Günther, Cat. Brit. Mus. II p. 446.

Caranx melampygus Klunzinger, Fische Roth. Meeres 4°. p. 99.

Caranx melampygus Day, Fishes of India 4°. p. 214.

Caranx melampygus Günther, Fische der Südsee I p. 133.

1 spec., 188 mm, from Ambon, February 1910.

5. *Caranx carangus* (Bl.).

Scomber carangus Bloch, Auslând. Fische VII p. 69.

Caranx ekala Bleeker, Verh. Bat. Gen. XXIV Makreel. p. 59.

Caranx carangus Günther, Cat. Brit. Mus. II p. 448.

1 spec., 180 mm, from Buton, December 3. 1909.

6. *Caranx hippos* (L.).

Caranx hippos Linné, Syst. Naturae Ed. XII p. 494.

Caranx hippos Günther, Cat. Brit. Mus. II p. 449.

Caranx hippos Day, Fishes of India 4°. p. 216.

4 spec., 63—76 mm, Ambon, December 1909 and February 1910.

1 spec., 125 mm, Majalibit-bay, Waigeu, January 1910.

3 spec., 107—111 mm, from Kairatu, W. Ceram, March 1. 1910.

1 spec., about 65 mm, fishmarket at Macassar, March 11. 1910.

7. *Caranx* (*Carangoides*) spec.

One specimen, from Batu merah, Ambon, March 1910, too badly conserved to make out the species.

Scyris C. V.

1. *Scyris ciliaris* (Bl.).

Zeus ciliaris Bloch, Auslând. Fische VI p. 29.

Carangoides blepharis Bleeker, Verh. Bat. Gen. XXIV Makreel. p. 67.

Caranx ciliaris Günther, Cat. Brit. Mus. II p. 454.

Scyris ciliaris Klunzinger, Fische Roth. Meeres 4°. p. 101.

1 spec., 138 mm, fishmarket at Ambon, December 1909.

2. *Scyris gallus* (L.).

Zeus gallus Linné, Systema Naturae Ed. X p. 267.

Carangoides galeichthys Bleeker, Verh. Bat. Gen. XXIV. Makreel. p. 68.

Caranx gallus Günther, Cat. Brit. Mus. II p. 455.

Scyris gallus Klunzinger, Fische Roth. Meeres 4°. p. 101.

1 spec., 210 mm, fishmarket at Ambon, December 1909.

Scombridae.

Scomber L.

1. *Scomber australasicus* C. V.

Scomber australasicus Cuvier & Valenciennes, Hist. Nat. Poiss. VIII p. 49.

Scomber australasicus Günther, Cat. Brit. Mus. II p. 359.

2 specimens, 98—132 mm, from Buton. Dr. Justesen leg.

The description of this species by Cuvier & Valenciennes and Günther is too scanty to give certainty to the identification of my specimens. I am not aware that a better description has been given later on, although this species has been recorded several times. Bleeker seems never to have seen this species, although it has been recorded by Günther from Ambon and by A. B. Meyer from North Celebes.

This species seems to be allied to *S. moluccensis* Blkr. My specimens however differ from lastnamed by the fact that the maxillary is shorter, its hindborder not reaching farther backwards than to below the anterior part of the eye. In consequence the number of teeth in the jaws is less, and moreover those of the upper jaw are conspicuously stronger than those of the lower jaw, whereas the reverse is the case in *S. moluccensis* according to Bleeker.

There is a slight discrepancy between the formulae of the dorsal fin given by the authors cited above and those of my specimens, as I find only 9 spines in the first dorsal of both. The greater specimen has 5, the smaller 6 dorsal finlets.

Trichiuridae.

Trichiurus L.

1. *Trichiurus haumela* (Forsk.).

Clupea haumela Forskål, Descript. Animal. p. 72.

Trichiurus haumela Günther, Cat. Brit. Mus. II p. 348.

Trichiurus haumela Klunzinger, Fische Roth. Meer. 4°. p. 120, 121.

1 spec., 295 mm, from Kairatu, West Ceram.

Pleuronectidae.

Pseudorhombus Blkr.

1. *Pseudorhombus polyspilus* (Blkr.).

Rhombus polyspilus Bleeker, Nat. Tijdschr. Ned. Indië IV p. 503.

Pseudorhombus polyspilus Bleeker, Atl. Ichth. VI p. 7.

1 spec., 139 mm, mouth of river near Buton, island Buton, brackish water. December 3, 1909.

Platophrys Swainson.

1. *Platophrys pantherinus* (Rüpp.).

Rhombus pantherinus Rüppell, Atl. Reise Nördl. Afrika, Fische p. 121.

Platophrys pantherinus Bleeker, Atl. Ichth. VI p. 11.

1 spec., 147 mm, Saonek, January 1910.

7 spec., 44—250 mm, Ambon, February 1910.

Achirus Lacépède.

1. *Achirus poropterus* Blkr.

Achirus poropterus Bleeker, Nat. Tijdschr. Ned. Indië I p. 410.

Achirus poropterus Bleeker, Atl. Ichth. VI p. 24.

Kairatu, West-Ceram, brackish water. 11 specimens 68—19 mm.

My specimens agree with Bleeker's descriptions in all points excepting the two following:

1) The scales on the blind side are only slightly ctenoid, in contrast to those of the other side, which are strongly so. 2) The chin is provided with very conspicuous cirri, some of them almost attaining the length of the eye, and the snout is villose on the blind side and has a tubular nasal aperture.

Cynoglossus Ham. Buch.

1. *Cynoglossus bilineatus* (Lac.).

Achirus bilineatus Lacépède, Hist. Nat. Poiss. V p. 659, 663.

Cynoglossus quadrilineatus Bleeker, Atl. Ichth. VI p. 32.

Cynoglossus bilineatus Max Weber, Siboga-Exp. Fische p. 443.

2 spec., 186 and 261 mm, from the fishmarket at Macassar, March 1910.

Gobiidae.

Eleotris (Gron.) Cuvier.1. *Eleotris gyrinoides* Blkr.*Eleotris gyrinoides* Bleeker, Nat. Tijdschr. Ned. Indië IV p. 272.*Eleotris gyrinoides* Bleeker, Versl. Akad. Amsterdam (2) XI p. 20.*Eleotris gyrinoides* Günther, Fische der Südsee I p. 188.*Eleotris gyrinoides* Max Weber, Nova Guinea V p. 254.

1 spec., 320 mm, from a stream near Kajeli, Buru, December 9. 1909 (fresh water).

1 spec., 310 mm, river Waisa, Waigeu, January 18. 1910 (fresh water).

3 spec., 69—166 mm, from river Eme and a brook near Honitetu, W. Ceram, February 1910 (fresh water).

2. *Eleotris (Oxyeleotris) aruensis* Max Web.*Eleotris (Oxyeleotris) aruensis* Max Weber, Abh. Senckenb. Naturf. Ges. XXXIV p. 32.

2 spec., 52—85 mm, Beo, Majalibit-bay, Waigeu, January 1910 (brackish).

3 spec., 69—78 mm, Wai Menil, Waigeu, January 5. 1910 (fresh water).

3. *Eleotris (Ophiocara) porocephalus* C. V.*Eleotris porocephalus* Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 237.*Ophiocara porocephalus* Bleeker, Versl. Akad. Amsterdam (2) XI p. 30.

2 spec., 226—266 mm long, from a stream near Kajeli, Buru, December 9. 1909 (fresh water).

The longer of the two specimens showed, when fresh, two greenish yellow transverse bands below and behind the second dorsal. These bands are mentioned by Bleeker in the young only.

4. *Eleotris (Ophiocara) aporos* Blkr.*Eleotris aporos* Bleeker, Nat. Tijdschr. Ned. Indië VI p. 59.*Eleotris aporos* Kner, Novara-Reise, Fische p. 183.*Ophiocara aporos* Bleeker, Versl. Akad. Amsterdam (2) XI p. 33.*Eleotris aporus* Max Weber, Nova Guinea V, 1908 p. 252.

8 spec., 266—24 mm, Lake of Galela, Halmahera, December 13. 1909 (fresh water). nom. indig.: „Lèbo”.

According to the missionary van Baarda, who procured the 6 largest specimens of the 8 mentioned above, this is the only fish known to inhabit the lake. The same is said by Kükenthal.

The specimens collected by last-named are recorded by Steindachner (Abh. Senckenb. Naturf. Gesell. XXV p. 431) as *E. macrolepidota* (Bl.) Gthr., which is not surprising, as Günther considers *E. aporos* Blkr. to be a synonym of this species.

5. *Eleotris (Ophiocara) hoedti* Blkr. [Plate II].*Eleotris Hoedti* Bleeker, Nat. Tijdschr. Ned. Indië VI p. 496.*Ophiocara Hoedti* Bleeker, Versl. Akad. Amsterdam (2) XI p. 35.*Eleotris Hoedti* Max Weber, Nova Guinea V, 1908 p. 253.

2 spec., 215—250 mm, River near Kajeli, Buru, December 9. 1909 (fresh water).

1 spec., 125 mm, river Waiha, Waigeu, December 20. 1909 (fresh water).

2 spec., 205—220 mm, brook at Mumes, Waigeu, December 29—30. 1909 (fresh water).

4 spec., 66—136 mm, river Waisa, Waigeu, January 18. 1910 (fresh water).

2 spec., 106—120 mm, Ambon, February 1910.

The figures 6 and 7 on Plate II represent two male specimens, caught together in the river near Kajeli, Buru. They clearly show the variety of coloration in this species. Most specimens are much duller than those figured here and miss the purple spots on the body

which makes me suppose that my Buru-specimens are in nuptial dress. Although both are males, there is a marked difference in the colouring of the vertical fins, the caudal being spotted in the larger specimen, which has moreover an orange-red anal, freckled with yellow, and a black soft dorsal with yellow markings, while on the other hand the caudal of the smaller specimen is unspotted, the anal is blackish, with yellowish rays and two red bars, with a yellow one between them, at the base of the fin. While red is wanting in the second dorsal of the larger specimen, there is a row of bright red spots between the bases of the rays of that fin in the smaller specimen.

6. *Eleotris (Culius) fuscus* (Bl. Schn.).

Poecilia fusca Bloch, Schneider, Syst. Ichth. p. 453.

Culius fuscus Bleeker, Versl. Akad. Amsterdam (2) XI p. 40.

- 29 spec., 26—86 mm, river Waihä, Waigeu, fresh water above rapids, December 20. 1909.
- 3 spec., 81—95 mm, brook at Mumes, Waigeu, fresh water, December 29. 30. 1909.
- 8 spec., 37—84 mm, river Rabiai, Waigeu, fresh water, December 31. 1909.
- 2 spec., 77—105 mm, small branch of river Bajon, Waigeu, fresh water, January 9. 1910.
- 7 spec., 53—87 mm, river Waisa, Waigeu, fresh water, January 18. 1910.
- 2 spec., 100—124 mm, Ambon, February 1910.
- 1 spec., 57 mm, river Batu merah, Ambon, March 1910.

7. *Eleotris (Culius) melanosoma* Blkr.

Eleotris melanosoma Bleeker, Nat. Tijdschr. Ned. Indië III p. 705.

Culius melanosoma Bleeker, Versl. Akad. Amsterdam (2) XI p. 43.

- 1 spec., 45 mm, from river Waihä, Waigeu, fresh water above rapids. December 20. 1909.

A young specimen, 23 mm long, from the river Waiu waigé, Waigeu, possibly belongs to this species.

8. *Eleotris (Belobbranchus) belobbrancha* C. V.

Eleotris belobbrancha Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 243.

Belobbranchus Quoyi Bleeker, Versl. Akad. Amsterdam (2) XI p. 53.

- 1 spec., 77 mm, River Riuapa, West Ceram, February 22. 1910 (fresh water).
- 3 spec., 38—50 mm, upper course of the river Tuba, West Ceram, February 27. 1910 (fresh water).

This species seems to be confined to the Malay Archipelago. Recently (Ann. Mag. Nat. Hist. (8) I p. 153) it has been recorded from New Guinea by Tate Regan.

9. *Eleotris (Butis) butis* (Ham. Buch.).

Cheilodipterus butis Hamilton Buchanan, Fish. Gang. p. 57.

Butis butis Bleeker, Versl. Akad. Amsterdam (2) XI p. 62.

- 1 spec., 102 mm, river Waiu waigé, Waigeu, fresh water but under tidal influence. December 24. 1900.

My specimen has only squamulae at the base of a few scales of the trunk, which points to *E. amboinensis*. The dentition however is typical of *butis*, as described by Bleeker l. c.

10. *Eleotris (Butis) amboinensis* Blkr.

Eleotris amboinensis Bleeker, Nat. Tijdschr. Ned. Indië V p. 343.

Butis amboinensis Bleeker, Versl. Akad. Amsterdam (2) XI p. 66.

Eleotris amboinensis Max Weber, Nova Guinea V p. 253.

- 2 spec., 45—47 mm, Kajeli, Buru, December 4. 1909 (fresh water).
- 6 spec., 22—84 mm, Kairatu, West Ceram, February 16. 1910 (brackish water).

Rhiacichthys Boulenger.

1. *Rhiacichthys aspro* (C. V.).*Platyptera aspro* Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 321.*Platyptera aspro* Bleeker, Nat. Tijdschr. Ned. Indië IX p. 310.

1 spec., 157 mm long, from a streamlet running into the river Eme, West Ceram.

Gobius L.

1. *Gobius echinocephalus* Rüpp.*Gobius echinocephalus* Rüppell, Atl. Reise nach Afrika, Fische p. 136.*Gobius amiciensis* Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 135.*Gobius xanthosoma* Bleeker, Nat. Tijdschr. Ned. Indië III p. 703.*Gobius melanosoma* Bleeker, ibid.*Gobius echinocephalus* Max Weber, Siboga-Exp. Fische p. 457.

15 spec., 19—35 mm, Ambon, between corals. February 1910.

2. *Gobius variabilis* Steind.*Gobius variabilis* Steindachner, Abh. Senckenb. Naturf. Gesellsch. XXV p. 430.*Gobius variabilis* Max Weber, Siboga-Exp. Fische p. 458.

8 spec., 28—47 mm, from the reef at Saonek, December 1909.

3 spec., 69—72 mm, Batu merah, Ambon, March 1910.

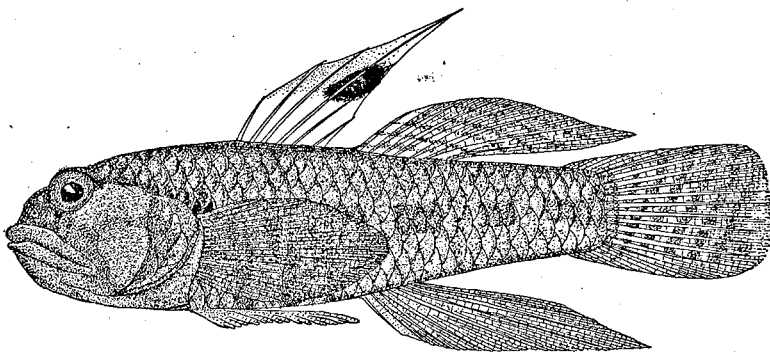
3. *Gobius javanicus* Blkr.*Gobius javanicus* Bleeker, Nat. Tijdschr. Ned. Indië XI p. 88.

2 spec., 46—55 mm, Upper course of river Tuba, West Ceram: February 27. 1910 (fresh water).

My specimens closely agree with the description given by Bleeker. I find however one ray less in the second dorsal, while the body is longitudinally banded with brown. Two bands running parallel to each other along the middle of the sides are darker than the other ones. These bands are united at distances by dark blotches, formed by the dark margins of two or three consecutive scales of the longitudinal row, between which the bands run.

4. *Gobius oyensi* n. sp.D. VI. I. 6. A. I. 6. P. 17. L. I. 26. 1. tr. 7 (between anal and 2nd dorsal).

Moderately compressed. Profile slightly sloping down from the beginning of the first dorsal, where the body has its greatest height, to the eyes and from those running downwards to the snout, the tip of which is much below the level of the lower border of the eye. Height 4 in length without caudal. Head about $3\frac{1}{3}$ in length without caudal, its width $1\frac{3}{5}$ in its length, which is more than its height. Eyes more than 4 times in length of head, about equal to snout and about 2 times in the postorbital part of head. They are placed high up in the head, looking upwards and sideways and only about $\frac{1}{2}$ of their diameter apart. Posterior nostril tubular, just in front of eye; anterior nostril below and a little in front of posterior nostril and provided with a valve. Gape very oblique, reaching to below hindborder of eye; lips thick and swollen; jaws subequal. Swollen muciferous

Fig. 4. *Gobius oyensi* n. sp.

canals form parallel rows on the chin, between the two mandibles. These muciferous canals are also visible on the snout, above the posterior nostril and faintly on the swollen cheeks. Gillmembranes united with and separated from each other by the isthmus. The head is destitute of scales, excepting some large scales on the operculum in about 2 rows, and the upper part of the head behind the eyes, which is covered with scales and conspicuously separated from the naked cheeks by a deep furrow, running on each side from the hindborder of the eye to the upperborder of the operculum. There are about 8 rows of scales in front of the dorsal. These scales, as also those on the opercle and those of the abdomen, are cycloid, the rest is ctenoid, all are of about the same size. 4th ray of first dorsal much longer than the others and much longer than length of head. Second dorsal higher behind than in front, its longest ray not much shorter than head. Anal pointed, the middle rays being the longest and about equal to longest ray of first dorsal. Caudal truncated, its length a little more than head without snout. Pectorals acutely rounded, about as long as the head and a little longer than ventrals. 4—5 strong, curved canini on each side in the fore part of the upper jaw, forming one continuous band of teeth in the front of the mouth. Behind those and along the sides of the upper jaw small teeth, without canini or caninoids, behind the canini in several rows. Teeth in the mandible small and pointed, forming a broad band at the symphysis, but only a stripe (of one row?) along the sides. On both sides of the mandible laterally 2 canini, which are not so strong as those of the upper jaw. Tongue not notched. Colour yellowish brown, with fine brown blotches along the sides and indications of an alternating row above those. Three brown transversal bands on the belly, hidden by the ventral-disk; the hindermost running through the anus. Two scales behind the operculum dark brown as well as a stripe running from the eye to the middle of the upper lip. Second dorsal and caudal banded with brown, first dorsal with an indication of a black band through its upper part and a black spot between the third, fourth, and fifth ray.

1 spec., 26 mm, from the river near Kajeli, Buru, December 9. 1909.

1 spec., 65 mm, from the upper course of the river Tubah, W. Ceram, February 27. 1910.

The diagnosis given above is based on the larger specimen of the two, as the peculiarities of the dentition were not to be made out in the smaller specimen, which moreover only shows vestiges of the colour pattern. I have examined another specimen, of 35 mm length, from the island of Babber, taken in the Jer (river) Toilela, near Tepa, at 500 M. of the mouth by Mr. F. A. H. Weckherlin de Marez Oyens, to whom I dedicate this species. This specimen, which is mentioned as *Gobius* spec. by Max Weber and myself¹⁾ in our list of fishes from Babber, is similar to the type in every respect, but misses the bands on the belly.

This species is characterised by the long maxillaries and the small number of rays in the dorsal and anal fin.

5. *Gobius* (*Gnatholepis*) *knighti* (Jord. & Everm.).

Gnatholepis knighti Jordan & Evermann, Bull. U. S. Fish. Comm. XXII p. 204.

Gnatholepis knighti Jordan & Evermann, Bull. U. S. Fish. Comm. XXIII p. 487.

Gnatholepis knighti Jordan & Seale, Bull. Bur. Fish. XXV p. 395.

3 spec., 21—28 mm, from the reef at Saonek, December 1909.

This species is allied to *G. cauerensis* (= *ophthalmotaenia*) Blkr. and *G. capistratus* Peters. It differs from the former by having no free silk-like rays in the pectoral, at least this is the case in my specimens. Nothing is said about this point in the description of this fish, but Jordan & Evermann mention under the characteristics of the genus *Gnatholepis*: „pectoral with silky rays”. In the accompanying plate however, the pectoral rays are represented as united. The tongue is notched, as has already been observed by Jordan and Seale.

¹⁾ Max Weber & L. F. de Beaufort, Over de Zoetwatervisschen van Timor en Babber, Verslag Akad. Amsterdam. 1912. p. 133.

6. *Gobius ornatus* Rüpp.

Gobius ornatus Rüppell, Atl. Reise Afrika p. 135.

Gobius interstictus Richardson, Voy. Erebus & Terror, Fishes p. 3.

Gobius periophthalmoides Bleeker, Nat. Tijdschr. Ned. Ind. I p. 249.

Gobius ornatus Günther, Cat. Brit. Mus. III p. 21. Fische der Südsee p. 172.

Gobius ornatus Day, Fishes of India 4°. p. 294.

27 spec., 22—77 mm, Saonek, reef, December 1909.

1 spec., 68 mm, Sorong, New Guinea, January 1910.

4 spec., 48—57 mm, Batu merah, Ambon, March 1910.

One of the specimens of Ambon has 7 rays instead of 6 in the first dorsal.

7. *Gobius semidoliatus* C. V.

Gobius semidoliatus Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 67.

Gobius semidoliatus Klunzinger, Synopsis Fische Roth. Meer. p. 475.

Gobius semifasciatus Kner, Sitzb. Akad. Wien LVIII p. 326.

Gobius semidoliatus Day, Fishes of India 4°. p. 295.

Zonogobius semidoliatus Jordan & Seale, Bull. Bur. Fisher. XXV p. 397.

Gobius semidoliatus Max Weber, Siboga-Exp. Fische p. 462.

One specimen, 23 mm long, from the reef at Saonek, December 1909.

8. *Gobius ophthalmicus* M. Web.

Gobius ophthalmicus Max Weber, Notes Leyden Mus. XXXI p. 150. Siboga-Exp. Fische, p. 463.

12 spec., 12—38 mm, reef at Saonek, December 1909.

My specimens quite agree with those described by Prof. Weber. In my largest specimen however I find a strong curved canine tooth in the lower jaw.

9. *Gobius melanocephalus* Blkr.

Gobius melanocephalus Bleeker, Verh. Bat. Gen. XXII p. 33.

Gobius personatus Bleeker, t. c. p. 34.

Gobius grammepomus Bleeker, t. c. p. 34.

Gobius grammepomus Bleeker, Nat. Tijdschr. Ned. Indië IX p. 200.

Gobius litturatus Steindachner, Sitzb. Akad. Wien XLII p. 289.

Gobius grammepomus Günther, Cat. Brit. Mus. III p. 64, p. 554.

Gobius personatus Day, Fishes of India 4°. p. 292.

Gobius melanocephalus Vinciguerra, Ann. Mus. Civ. Genova (2) IX p. 173.

Gobius melanocephalus Max Weber, Siboga-Exp. Fische, p. 465.

1 spec., 118 mm, upper course of river Rabiai, Waigau, fresh water, December 31. 1909.

1 spec., 105 mm, upper course of river Riuapa, West Ceram, fresh water, February 22. 1910.

1 spec., 109 mm, upper course of river Tuba, West Ceram, fresh water, February 21. 1910.

There are not only scales on the operculum, in the manner described by Max Weber l. c., but there are several longitudinal rows of scales on the cheeks too. In one of my specimens these rows are very clearly visible and 6 in number, leaving the ventral part of the cheeks naked. Bleeker and the later authors doubtlessly overlooked these scales.

Prof. Max Weber pointed out to me a marked sexual difference in this species. The head of the male is much darker, more or less leaden grey above and below, as also the pectorals and the ventrals. In the female on the contrary, there exists a black spot on the hinder half of the first dorsal, which is wanting in the male.

10. *Gobius puntang* Blkr.

Gobius puntang Bleeker, Nat. Tijdschr. Ned. Indië II p. 486.

Gobius puntangoides Bleeker, Nat. Tijdschr. Ned. Indië V p. 242.

Gobius puntangoides Günther, Cat. Brit. Mus. III p. 19.

Gobius puntangoides Günther, Fische der Südsee III p. 171.

Exyrias puntangoides Jordan & Seale, Bull. Bur. Fish. XXV p. 405.

9 spec., 104—144 mm, Majalibit-bay, Waigeu, January 1910 (strongly brackish).

2 spec., 125—165 mm, Ambon, Batu-merah, February 1910.

11. *Gobius (Glossogobius) giuris* Ham. Buch.

Gobius giuris Hamilton Buchanan, Fishes Ganges p. 51.

Gobius giuris Max Weber, Siboga-Exp. Fische p. 468.

1 spec., 288 mm, from a stream near Kajeli, Buru, December 9. 1909.

12. *Gobius (Glossogobius) celebius* C. V.

Gobius celebius Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 56.

Gobius celebius Max Weber, Siboga-Exp. Fische p. 468.

1 spec., 140 mm, Buli, Halmahera (Mission. Maan. leg.).

13. *Gobius reticularis* Max Web.

Gobius reticularis Max Weber, Abh. Senckenb. Naturf. Ges. XXXIV p. 38.

1 spec., 14 mm, river Rabiai, Waigeu, December 31. 1909.

21 spec., 16—22 mm, river Waihä, Waigeu, December 20. 1910 (fresh water, above rapids).

1 spec., 15 mm, (bad condition) upper course of river Tuba, W. Ceram, February 27. 1910 (fresh water).

14. *Gobius rouxi* M. Web.

Gobius rouxi Max Weber, Abh. Senckenb. Naturf. Ges. XXXIV p. 40.

1 spec., 16 mm long, from the mouth of the river Riuapa, Kairatu, W. Ceram, February 16. 1910 (brackish water).

15. *Gobius (Rhinogobius) scapulopunctatus* de Bft.

Gobius (Rhinogobius) scapulopunctatus de Beaufort, Zool. Anz. XXXIX, p. 137.

D. VI. 8(9). A. 8. l.l. ± 27 . l.tr. 8.

Body compressed, with the head slightly depressed, the height of the head being slightly less than its breadth. The height of the body is $\frac{1}{5}$ of the total length ($\frac{1}{4}$ of the length

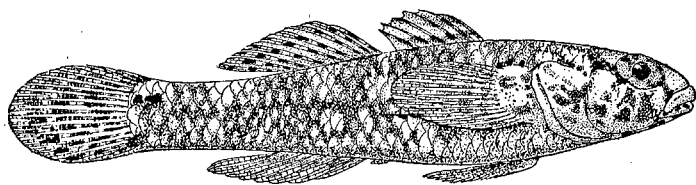


Fig. 5. *Gobius (Rhinogobius) scapulopunctatus* de Bft.

without caudal). The length of the head is $\frac{1}{4}$ of the total length ($\frac{3}{10}$ of the length without caudal). The dorsal profile gently slopes from the first dorsal to the eye, from here it bends rather abruptly down to the snout. The eyes are very close together, prominent above the dorsal profile and situated in the first half of the

head. Their diameter is $2\frac{1}{2}$ —3 times the length of the head. The snout is rather obtuse and shorter than the eye. Anterior nostrils tubular. Sides of head and opercles naked. Crown of head and neck covered by rather large scales, partly imbedded in the skin and not easily visible. A pore between the eyes and behind each eye as well as on the hinder margin of the praeoperculum. Rictus somewhat oblique. Jaws almost equal. Maxilla reaching under the front border of the eye. Lips thick. Tongue truncated, with rounded edges and the frontmargin slightly curved inwards. Outer row of teeth in both jaws enlarged, lancet-like. Scales ctenoid, those on the fore part of the body slightly smaller than the rest. First dorsal lower than the body in the female, in the male the middle rays are prolonged and exceed the height of the body. Second dorsal beginning above the vent, lower than the body. Anal beginning behind the second dorsal, lower than the body and with the hindmost rays the longest.

Pectorals as long as the head, none of the rays free and silk-like. Ventrals short, not reaching the vent, the rays prolonged beyond the membrane, giving the border of the fin a festooned appearance. Caudal rounded, $\frac{1}{5}$ of the total length.

Colour in spirits whitish, with 5 saddle-like brown bands on the back. The first on the neck, the second under the first dorsal, the third and fourth under the second dorsal and the fifth on the tail. Ventrally they reach to the middle of the body, where they are partly confluent with a longitudinal row of somewhat darker brown blotches. A dark brown elongate patch under the eye and an indistinct stripe running forward from the eye to the mouth. Brown patches on the sides and on the under surface of the head. Three or four small black spots above the origin of the pectoral. A black spot on the dorsal side and in the middle of tail at base of caudal. The male has some scattered black spots along the sides of the body and along the back, similar to those above the pectoral. Two indistinct black bands on first dorsal. Rays of second dorsal and anal with black spots, forming dark bands on the fins. Pectorals, ventrals and anal dusky, darker in the male.

3 spec. (2 ♂♂, one ♂) 20—24 mm, from the reef at Saonek. December 1909.

This species is allied to *Ctenogobius hadropterus* Jord. & Snyder from Japan, from which it differs by having a shorter snout, a larger eye (age differences?) and by having the second dorsal placed more in advance, besides other small differences. It may easily be distinguished by the three or four black spots above the pectoral.

16. *Gobius (Cryptocentrus) stigmatophorus* de Bfrt.

Gobius (Cryptocentrus) stigmatophorus de Beaufort, Zool. Anz. XXXIX p. 136.

D. VI. 12 (13). A. 13 (14). P. 16. I.l. ± 80 , I.tr. ± 20 .

Body elongate, laterally compressed. Its height is contained 6 times in the total length, 5 times in the length without caudal. The length of the head is contained 4 times in the total length, more than 3 times in the length without C. The height of the head is a little more than the half of its length. The eyes are very close together, situated in the first half of the head and their diameter is contained $3\frac{2}{3}$ times in the length of the latter. The obtuse snout is shorter than the eye. The rictus is oblique. The maxilla reaches not quite as far back as a vertical from the centre of eye. There are 8 canini on each side in the upper jaw and 5 or 6 on each side in the lower jaw. The outer ones of those in the mandible are stronger than the others and curved backwards. The scales are ctenoid, especially so on the sides of the body and on the tail, where they are larger than on the fore part of the body. The head is naked, the scales beginning just in front of the dorsal fin. The 3rd ray of the 1st dorsal is the longest and about $\frac{4}{5}$ of the height of the body. The second dorsal is close to the first one. Its length is not quite twice that of the first dorsal and a little more than that of the anal. Its height is less than that of the first dorsal. The pectorals are rather pointed, their length is equal to the distance from the posterior margin of the operculum to the middle of the eye; none of the rays free. The ventrals are slightly shorter than the pectorals and do not reach the vent. The caudal is obtusely pointed and $\frac{1}{5}$ of the total length. Colour in spirits greyish brown, with about 14 vertical narrow light bands on the body. Cheeks and operculum spotted with light blue ocelli, surrounded by deeper blue. Most of the scales of the body have a blue vertical stripe. Besides these light spots and stripes there are black spots on the sides of the head and on the sides of the body. Some larger spots behind the eye and above the hinder margin of the operculum, where they are confluent and form a conspicuous dark patch. A black band crosses the basal portion of the first dorsal, 3 rows of black spots on the second dorsal. Anal with a submarginal dusky band and a dark spot at the base between each ray. Caudal crossed by about 5 dark bands, formed by spots between the rays. Pectorals dusky at base, ventrals pigmented with dusky.

One specimen, 31 mm long, from the reef of Saonek, December 1909.

This species is closely allied to *Gobius arabicus* L., which has a similar pattern of coloration. When we compare the measurements given by Steindachner (Denkschr. Akad. Wien,

LXXI, p. 147) for a juvenile *G. arabicus* with those of *G. stigmatophorus*, we find that in the latter the head is longer and the eye larger. In its mode of coloration this species has some resemblance with *Cryptocentrus octofasciatus* Tate Regan.

Callogobius Bleeker.

1. *Callogobius hasseltii* (Blkr.).

Eleotris Hasseltii Bleeker, Nat. Tijdschr. Ned. Indië I p. 253.

Eleotris Hasseltii Bleeker, Nat. Tijdschr. Ned. Indië XI p. 412.

Callogobius hasseltii Max Weber, Siboga-Exp. Fische p. 480.

4 spec., 19—51 mm, from the reef at Saonek, December 1909.

Gobiodon Bleeker.

1. *Gobiodon quinquestrigatus* (C. V.).

Gobius quinquestrigatus Cuvier & Valenciennes, Hist. Nat. Poiss. XII p. 134.

Gobiodon quinquestrigatus Bleeker, Archiv. Neerl. X p. 117.

3 spec., 26—38 mm, Ambon, among corals, February 1910.

2. *Gobiodon hypselopterus* Blkr.

Gobiodon hypselopterus Bleeker, Archiv. Neerl. X p. 120.

1 spec., 42 mm, from the coral-reefs at Ambon, February 1910.

Schismatogobius de Bft.

(Zool. Anz. XXXIX p. 139).

Body elongate, naked. Teeth fixed, long, needle-like, curved backwards at the end, widely set in several rows in both jaws. Maxilla produced far behind the eye. Vertical fins well developed, first dorsal with six spines. Ventrals united, forming a well developed disk.

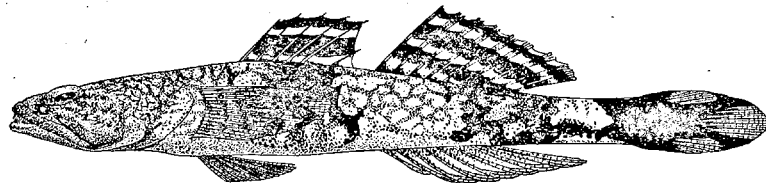


Fig. 6. *Schismatogobius bruynisi* de Bft.

Gobiosoma longipinne Steind. from the Gulf of California may possibly find a place in this genus, besides the type *Sch. bruynisi*, described below.

Jordan & Evermann (Fishes of N. America) placed Steindachner's species in the genus *Evermannia*, making (p. 2256) however the remark, that it may be the type of a distinct genus. It agrees with *Sch. bruynisi*, in the fact of having a naked body combined with a produced maxilla, these features being the chief characteristics of the new genus. It differs however in having a much longer second dorsal and anal, with 16—17 rays, while my species has only 9 rays in those fins. The teeth of *G. longipinne* are described by Steindachner as follows: „die beiden Kiefer... tragen seitlich zwei, vorn 3 Reihen kleiner spitzer Zähne". According to this description the teeth seem to be much smaller than in *Sch. bruynisi* and probably they are not curved backwards, as Steindachner does not mention anything of that kind.

1. *Schismatogobius bruynisi* de Bft. (Plate II fig. 2).

Schismatogobius bruynisi de Beaufort, Zool. Anz. XXXIX p. 139.

D. VI. 9. A. 9.

Body naked, elongate, compressed, head depressed, the neck and the crown of the head flattened, giving to the latter a snake-like appearance. The height of the body is contained more than 7 times in the total length, 6 times, in the length without caudal. Profile sloping gradually from the first dorsal to the point of the snout. The latter is pointed, slightly

shorter than the eye. Eyes situated much nearer to the end of the snout than to the hinder margin of the operculum, close together. Their longest diameter is contained 4 times in the length of the head. The latter is contained a little more than 4 times in the total length, $3\frac{1}{2}$ times in the length without caudal. Rictus oblique. Praemaxilla protractile. Maxilla very long, extended backwards far behind the eye, longer than the postorbital part of the head. Lips moderately thick. Teeth fixed, long, needle-like, curved backwards at tip, widely set, in the upper jaw in three rows in front. In the lower jaw the teeth in the back-row are strongly inclined backwards. The tooth-row in the upper jaw much longer than that of the lower jaw, the latter row extending half way the length of the rictus. Isthmus very broad. The first dorsal is lower than the body. The distance between the fifth and sixth ray is much more than that between the other ones. The second dorsal is in front as high as the body, and diminishes in height backwards. The anal begins scarcely behind the second dorsal and is less high than the body. The pectorals are pointed, as long as the head without snout. The ventrals are united and are shorter than the pectorals. Their length is slightly more than that of the postorbital part of the head. Caudal rather pointed, equalling the ventrals in length.

Colour yellow, reticulated all over with brown. Under the first and the second dorsal these reticulations are broader, deep black and partly confluent, forming two transversal irregular dark bands on the body. Distal end of tail black, as well as the caudal fin, which has three yellow spots, one terminal and the two others dorsally and ventrally. The black of the tail is united by a fine longitudinal black band with the black under the second dorsal. The two dorsal fins are deep black, the first one crossed by two, the second by three longitudinal yellow bands. Anal yellow, blackish along its base. Pectorals with an irregular black band. Ventrals with a subterminal black bar.

One specimen, 39 mm, from the river Eme, Honitetu, West Ceram (fresh water), February 24. 1910.

Named in honour of Lt. J. Bruynis, commanding officer of the military post at Honitetu, who helped us in every possible way.

Microsicydium Bleeker.

1. *Microsicydium gymnauchen* (Blkr.).

Sicydium gymnauchen Bleeker, Act. Soc. Sc. Ind. neerl. III p. 11.

• *Microsicydium gymnauchen* Bleeker, Versl. Akad. Amsterdam, 2^{de} reeks IX p. 15.

Microsicydium gymnauchen Max Weber, Abh. Senckenb. Naturf. Gesellsch. Bd. XXXIV p. 46.

1 spec., 39 mm, river Eme, West Ceram, February 20. 1910 (fresh water).

This specimen is longer than either the 300 specimens examined by Bleeker or those mentioned by Max Weber. I cannot find the canines in the mandible, described by the latter author. The colouring of my specimen is somewhat different to those of Bleeker. There are no traces of transversal bands, but there exists a black longitudinal line, running from the upper lip backwards under the eye, over the base of the pectoral fin and along the sides to the caudal fin, on the base of which the line ends in a dark spot.

Stiphodon Max Weber.

1. *Stiphodon elegans* (Steind.) (Plate II fig. 4 & 5).

Sicydium elegans Steindachner, Sitzungsber. Akad. Wien p. 152.

Sicydium elegans Ogilvie Grant, Pr. Zool. Soc. 1884 p. 162.

Stiphodon semoni Max Weber, Semon. Forschungr. V p. 270.

Microsicydium elegans Jordan & Seale, Bull. Bur. Fish. XXV p. 411.

Stiphodon Semoni Max Weber, Nova-Guinea V p. 264.

1 spec., 19 mm, Batjan, December 11. 1909.

37 spec., 29—43 mm, river Eme, West-Ceram (fresh water), February 1910.

1 spec., 34 mm, river Riuapa, West-Ceram (fresh water), February 22. 1910.

14 spec., 25—30 mm, river Tuba, West-Ceram (fresh water), February 27. 1910.

Max Weber established the genus *Stiphodon* for a small gobioid from Ambon, allied to *Sicydium* in its dentition, but differing by having a free ventral disk, not adherent to the belly as in the latter genus. Previously however Steindachner had described the same fish as *Sicydium elegans*. It is incomprehensible why Steindachner ranged this fish — without any remark — in the genus *Sicydium*, as he states in his diagnosis: „Ventrals frei”. In his revision of the genus *Sicydium* Ogilvie Grant placed *S. elegans* among the other members of the genus. As his description is a copy of that of Steindachner, I suppose that he did not see specimens. Jordan and Seale, who neither saw specimens, mention the species under the name of *Microsicydium elegans*, saying of the genus *Microsicydium* of Bleeker that “it may be provisionally distinguished from *Sicyopterus* by the large scales”. Bleeker however has given a complete diagnosis of *Microsicydium* (Verh. en Med. Kon. Akad. Amsterdam 2^{de} reeks IX p. 15), which genus has nothing to do with the species under discussion. The scales are not large as supposed by Jordan and Seale, but the small number of scales in the linea lateralis is due to the fact that the first part of the body is naked.

Max Weber has already drawn attention to the remarkable sexual dimorphism in this species. While the females are longitudinally banded, the males are of a dark brown or blackish colour in spirits, lighter on the belly. In life however there is a splendid, shining blue line along the side, which disappears almost immediately after death. Some of my larger female specimens are strongly shaded with carmin along the sides (Plate II fig. 5). Two other much smaller specimens are bright carmin all over, the vertical fins included. Along the back there are traces of a brown band. The head is blue (with exception of the occiput) (Plate II fig. 4). I can't find any differences — besides the colour — between these specimens and the other ones. A bluish black head with a light brown occiput may be seen in several other male specimens so that it seems to me not improbable that these are specimens of the same species in nuptial dress. It is not easy to make out the sex of the two small specimens without destroying them. The genital papilla seems to be only slightly different in the two sexes of this species, being truncated and slightly emarginated or bicorned in the female and obtusely pointed in the male. If this holds good, one of the two specimens in nuptial dress would be a female, the other one, which has the rays of the first dorsal elongated, a male. If this were true, the sexes would be much more alike in the nuptial dress than they are in the ordinary dress. At all events the females have a tendency to become carmin in the fraying period, as is shown by one of the above-mentioned females with carmin shades on the sides, which had the ovarium filled by almost ripe eggs. Max Weber described a male specimen (with elongated first dorsal) with two yellowish cross bars, one in front and the other behind the second dorsal, the body being brown in spirits. Great range of variation, not only in colour but also in the pattern, seems to be a characteristic of this species.

Stiphodon elegans is known from the Society-islands (Steindachner), New Guinea, Ambon, (Max Weber) Batjan and Ceram. Moreover there are specimens in the museum at Amsterdam from Java and Nias. It seems to have a wide distribution but being rather rare at the same time. I have compared one of the typical *Stiphodon semoni* Max Weber with Steindachner's description of *Sicydium elegans* and I cannot find any difference.

I found this species at Ceram and Batjan in clear mountain streams.

Gen. *Sicyopus* Gill.

When Bleeker described (Nat. Tijds. Ned. Ind. XII p. 296) *Sicydium zosterophorum* and *balinense*, he remarked that it was only with hesitation that he brought these two species under the genus *Sicydium*, as they had no labial teeth, and as the teeth in the upper jaw were not bristle-like but formed in the same way as in the mandible. In a footnote on p. 262

of the Proc. Acad. Philadelphia 1863, Gill created for these species (apparently without having seen them), the genus *Sicyopus*. We can scarcely say that he gave a diagnosis of the genus, as may be seen from the above-quoted footnote, which runs as follows: "The *Sicydiinae* are represented by four genera *Sicydium* (old world), *Sicyopterus* (new world), *Sicyopus* (without labial teeth, &c., and embracing *Sicydium zosterophorum* Blkr., and *S. balinease* Blkr.), and *Sicyogaster* Gill." In his „Esquisse d'un système naturel des gobioides", (Arch. Neerl. IX), Bleeker adopted the genus, but did not place it among the *Sicydiini* but among the *Latrunculini*. The short diagnosis given there was enlarged in the „Révision des Sicydiini et Latrunculini de l'Insulinde" (Versl. Akad. Amsterdam, 2^{de} reeks IX). Bleeker removed the genus from the *Sicydiini* because he restricted the *Sicydiini* to forms with labial teeth. Besides the two species of Bleeker, three specimens in all, it seems that no specimen of the genus was ever found. Among my material, collected in the mountain streams of West Ceram, are two well-preserved specimens of *S. zosterophorum*, besides a new species, with a considerable greater number of scales (about 55) in the lateral line. As Bleeker mentions in the diagnosis of the genus: "Squamae... 32 circ. in serie longitudinali", it will be necessary to change the diagnosis in this respect.

This new diagnosis may run as follows: Body elongate, habitus *Sicydium*-like. Head naked, body scaled, with ctenoid scales, 32—55 in the l.l. No labial teeth. Teeth in both jaws in a single row, pointed and more or less apart. Lips thick, cleft of the mouth horizontal. Isthmus broad. Ventrals round, formed as in *Sicydium* but free from the belly. D. VI. 10—11. A. 10—11.

The genus has certain affinities with *Stiphodon*, specially in the shape of the ventrals, but it differs from this genus by the absence of labial teeth.

1. *Sicyopus zosterophorum* Blkr. (Plate II fig. 3).

Sicydium zosterophorum Bleeker, Nat. Tijdschr. Ned. Indië XII p. 296.

Sicyopus zosterophorum Bleeker, Versl. Akad. Amsterdam 2^{de} reeks, IX p. 287.

2 spec., 38—45 mm, river Eme, West-Ceram, February 20. 1910 (fresh water).

The two specimens mentioned above quite agree with the description of the single specimen hitherto known and described by Bleeker. The colour of the hind part of the body is brick-red in life, as well as the second dorsal, the anal and the upper margin of the first dorsal. The smaller of the two specimens has a large blue spot on the first dorsal, between the two last rays.

2. *Sicyopus multisquamatus* de Bft.

Sicyopus multisquamatus de Beaufort, Zool. Anz. XXXIX p. 142.

D. VI. 11. A. 10. l.l. about 55, l.tr. about 14.

Body elongate, rather more depressed than compressed. The height of the body is contained a little more than 8 times in the total length, almost 7 times in the length without caudal. Head flattened above, the upper profile horizontal from the first dorsal to the eye, then sloping to the point of the snout. The length of the head is contained $4\frac{1}{2}$ times in the total length, almost $3\frac{3}{4}$ times in the length without caudal. The diameter of the eye is equal to the length of the snout and $\frac{1}{4}$ of the length of the head. The interorbital space is rather more than $1\frac{1}{2}$ times the diameter of the eye. The cleft of the mouth is low

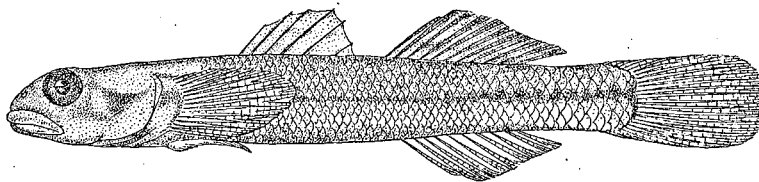


Fig. 7. *Sicyopus multisquamatus* de Bft.

and horizontal, as in *Sicyopterus*. The entire upper lip and the sides of the lower lip are thick and swollen. The maxilla reaches a vertical through the middle of the eye. A single row of about 20 strong yellow-tipped teeth in the upper jaw. These teeth stand wide apart; they are pointed and strongly curved inwards. A similar row of teeth in the mandible, but here

the teeth are much smaller and not curved. Isthmus broad. The first dorsal is short and much lower than the second one, from which it is widely separated. The first rays of the second dorsal are as high as the body in front, but the last rays are much shorter.

The anal is not so high as the second dorsal, the first rays are the longest. The caudal is truncated, its length is a little more than $\frac{1}{6}$ of the total length. The rounded pectorals are shorter than the head. The ventrals are shaped as in *Sicyopterus*, but only the centre of the disk is adnated to the belly. Its length is almost equal to half the length of the head. Scales on neck and belly cycloid and small, on the hinderpart of the sides and on the tail large and strongly ctenoid. Head naked; the scales reach to the sides of the occiput, but they are here almost hidden in the skin and scarcely perceptible. Colour in spirits yellowish. A triangular blackish spot on the operculum. A dark band along the sides. Rays of the dorsal fins dark. Anal colourless.

1 spec., 58 mm, from a brook in the mountains near Honitetu, W. Ceram. February 19. 1910.

This species is easily distinguished from the other species of the genus by the great number of scales in the l.l. and l.tr.

Sicyopterus Gill.

1. *Sicyopterus longifilis* de Bft.

Sicyopterus longifilis de Beaufort, Zool. Anz. XXXIX p. 140.

D. VI. 11. A. 11. P. 19. l.l. about 66, l.tr. 17.

The height of the body is contained 6 times in the total length, 5 times in the length without caudal. The length of the head is contained $4\frac{3}{5}$ —5 times in the total length, $3\frac{3}{4}$ —4 times in the length without caudal. The eye is nearly situated in the middle of the length of the head. Its diameter is $\frac{1}{5}$ — $\frac{1}{6}$ of the length of the head. The eyes are 2 times their

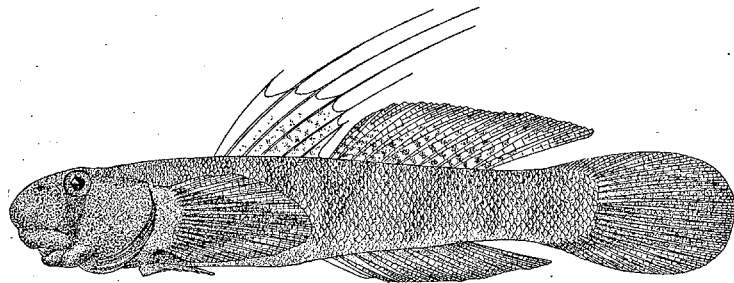


Fig. 8. *Sicyopterus longifilis* de Bft.

diameter apart. The rounded snout is 2 times as long as the eye. The maxilla reaches under the front border of the eye. Upperlip without median cleft. Teeth in the upper jaw tricuspid. There are 8 strong teeth on each side in the lower jaw, besides two canines in front. The head is naked, except the occiput. Scales of occiput, neck and belly cycloid, the rest ctenoid. There are about 25 scales in front of the first dorsal. These scales

and those along the shoulder and on the belly are smaller than those on the sides of the body and on the tail. The two dorsals are very close together. The 2nd, 3rd, 4th and 5th ray of the first dorsal are filamentous and excessively long, being rather more than half the length of the body without caudal. The second dorsal is higher than the body and pointed behind. The anal is like the dorsal, but much lower, its height being less than that of the body. Caudal rounded, longer than head. Pectorals pointed, as long as the head. The diameter of the ventral disk is the half of the length of the pectoral.

Colour in spirits brownish, whitish on the belly and at the underside of the head, the chin however being blackish. 7 or 8 indistinct dark transverse bands on the back. A black stripe running from the eye to the corner of the mouth. First dorsal whitish, with an indistinct dusky spot between the third and fifth ray. The hinderpart of the first dorsal and the whole of the second dorsal variegated with dusky dots. Caudal blackish, its upper and under margin broadly edged with white. Pectorals blackish, with a broad clear white margin, narrowing towards the tip. Ventrals white.

3 spec., 49—97 mm, upper course of river Tuba, W. Ceram, February 27. 1910.

This species differs from all other Indo-australian *Sicyopterus* by the enormous development of its dorsal fins. It seems to be closely allied to *S. pugnans* O. Grant from Savaii, from which it differs in being less elongate, in having tricuspid instead of bicuspid teeth in the upper jaw and in having a greater number of scales in the linea lateralis and transversalis. According to the figure there is also a difference in the place of the eye, which is represented as being nearer to the tip of the snout than to the hind margin of the operculum.

1. *Sicyopterus brevis* de Bft.

Sicyopterus brevis de Beaufort, Zool. Anz. XXXIX p. 141.

D. VI. 11—12. A. 12. l.l. about 62, l.tr. about 16.

The height of the body is contained $5\frac{1}{2}$ times in the total length, $4\frac{3}{5}$ times in the length without caudal. The length of the head is contained $4\frac{1}{2}$ times in the total length, $3\frac{3}{4}$ in the length without caudal. The eye is situated in the middle of the length of the head. The diameter of the eye is $\frac{1}{4}$ of the length of the head. The eyes are $1\frac{1}{2}$ times their diameter apart. Upperlip without median cleft. No papillae on the gum beneath the upper lip. Teeth in the upper jaw tricuspid. The first and the two last mandibular teeth caninoid, the middle ones minute. The maxilla does not reach quite so far as a vertical through the middle of the eye. Head naked, except the occiput. The cycloid scales on the occiput and neck and on the belly are smaller than the ctenoid ones along the sides of the body and on the tail. The length of the third and longest ray of the first dorsal is equal to the height of the body. Second dorsal and anal much shorter than the height of the body. The pectoral is shorter than the head. The longitudinal diameter of the ventral disk is more than the half of the length of the head. Colour in spirits yellowish. A dark longitudinal band along the sides of the body, and another interrupted zig-zag-shaped one, which is less distinct, at each side along the back. An indistinct dusky spot between the third and fourth ray of the first dorsal. Second dorsal obliquely striped with blackish, anal white with a dark subterminal band. Caudal with an indistinct median stripe (a continuation of the band along the sides of the body) and with traces of a horse-shoe-shaped submarginal band. A dark stripe runs from the eye to the corner of the mouth.

2 spec., 44 and 45 mm, upper course of river Tuba, W. Ceram, February 27. 1911.

This species is distinguished by its short body. It seems to be allied to *S. taeniurus* Gthr., but differs in having smaller scales, in having a shorter pectoral etc.

Periophthalmus Bl. Schn.

1. *Periophthalmus koelreuteri* (Pall.).

Gobius koelreuteri Pallas, Spicil. VIII p. 8.

Periophthalmus koelreuteri Günther, Cat. Brit. Mus. III p. 97.

16 spec., 42—103 mm, Saonek, December 18. 1909.

1 spec., 50 mm, Sorong, N. Guinea, January 1910 (L. de Bruyn leg.).

13 spec., 63—82 mm, Kairatu, W. Ceram, February 16. 1910.

11 spec., 42—72 mm, Ambon.

Taenioides Lac.

1. *Taenioides* spec.

2 spec., 20—34 mm long, Kairatu, W. Ceram, brackish water, February 16. 1910.

These two small specimens seem to be allied to *Taenioides urolepis* Blkr., they have however no trace of scales.

Scorpaenidae.**Sebastes C. V.**

1. *Sebastes (Sebastopsis) guamensis* (Q. G.).
Scorpaena guamensis Quoy et Gaimard, Voyage Uranie, Zool. p. 325.
Scorpaena guamensis Günther, Fische der Südsee, p. 74.
Sebastopsis polylepis Bleeker, Verh. Kon. Akad. Amsterdam XVI p. 21.
Sebastopsis guamensis Jordan & Seale, Bull. Bur. Fish. XXV p. 374.
 2 spec., 88 and 20 mm, from the reef at Saonek, December 1909 and January 1910.

Scorpaena Artedi.

1. *Scorpaena novae-guineae* C. V.?
Scorpaena Novae-Guineae Cuvier & Valenciennes, Hist. Nat. Poiss. IV p. 320.
Scorpaenopsis Novae-Guineae Bleeker, Verh. Akad. Amsterdam XVI p. 35.
 2 juvenile specimens, 23 and 33 mm long, from Saonek, probably belong to this species.

Gymnapistus Swainson.

1. *Gymnapistus niger* (C. V.).
Apistus niger Cuvier & Valenciennes, Hist. Nat. Poiss. IV p. 415.
Gymnapistus niger Bleeker, Verh. Kon. Akad. Amsterdam XVI p. 86.
 One young specimen of 18 mm, from Kairatu, W. Ceram. February 16. 1910.

Platycephalidae.**Platycephalus Bl. Schn.**

1. *Platycephalus bobossok* Blkr.
Platycephalus bobossok Bleeker, Nat. Tijdschr. Ned. Indië IV p. 461.
Platycephalus bobossok Bleeker, Verh. Kon. Akad. XIX, Platycephalus, p. 23.
 1 spec., 73 mm, from the fishmarket at Macassar, March 11. 1910.

Triglidae.**Parapercis Bleeker.**

1. *Parapercis cylindrica* (Bl.).
Sciaena cylindrica Bloch, Ausländ. Fische VI p. 42.
Percis cylindrica Günther, Cat. Brit. Mus. II p. 239.
 3 spec., 83—102 mm, Saonek, December 1909.

Blenniidae.**Salarias Cuvier.**

1. *Salarias amboinensis* Blkr.
Salarias amboinensis Bleeker, Act. Soc. Scient. Ind. II p. 67.
 2 spec., 57—110 mm, Saonek, December 1909.
 1 spec., 103 mm, Ambon, February 1910.

2. *Salarias sumatranus* Blkr.*Salarias sumatranus* Bleeker, Nat. Tijdschr. Ned. Indië I p. 256.*Salarias sumatranus* Max Weber, Siboga-Exp. Fische p. 531.

1 spec., 100 mm, from the reef at Saonek, December 1909.

3. *Salarias striatamaculatus* Kner & Steind.*Salarias striatamaculatus* Kner & Steindachner, Sitz. ber. Akad. Wien. LIV p. 368.*Salarias striatamaculatus* Bleeker, Versl. Akad. Amsterdam 2^{de} Reeks, XII p. 6.*Salarias striatamaculatus* Max Weber, Siboga-Exp. Fische p. 531.

1 spec., 99 mm, from Sorong, New Guinea. L. de Bruyne leg. January 1910.

My specimen differs from that mentioned by Max Weber, with which I was able to compare it, in the fact of having a crest on the head (probably characteristic of the male) and in having the dorsal and anal broadly margined with brownblack.

4. *Salarias interruptus* Blkr.*Salarias interruptus* Bleeker, Nat. Tijdschr. Ned. Indië XIII p. 68.

4 spec., from the reef at Saonek, December 1909.

5. *Salarias lineatus* C. V.*Salarias lineatus* Cuvier & Valenciennes, Hist. Nat. Poiss. XI p. 314.*Salarias lineatus* Bleeker, Verh. Bat. Gen. XXIII p. 18.*Salarias lineatus* Day, Fishes of India 4^o. p. 332.

5 specimens, 46—88 mm, from the reef at Saonek, December 1909.

6. *Salarias rivulatus* Rüpp.*Salarias rivulatus* Rüppell, Atl. Reise Nordl. Afrika p. 114.*Salarias quadricornis* Cuvier & Valenciennes, Hist. Nat. Poiss. XI p. 329.

15 spec., 24—69 mm, from the reef at Saonek, December 1909.

7. *Salarias bilitonensis* Blkr.*Salarias bilitonensis* Bleeker, Nat. Tijdschr. Ned. Indië XV p. 231.

2 spec., 44—63 mm, from the reef at Saonek, December 1909.

8. *Salarias* spec.

2 spec., 34 and 38 mm, from the reef at Saonek, December 1909.

I am not able to range these two young specimens under one of the known species. They show some affinity to *S. periophthalmus*, but lack canini, have simple nasal tentacles, while some of the dorsal and caudal rays are produced.

I think it safer not to describe these half-grown specimens as a new species, in order not to create still more confusion in the species of the genus *Salarias*. Prof. Weber and I will have to work out the Indo-australian species of the genus *Salarias* for our „Fishes of the Indo-australian Archipelago” therefore I will postpone further research to the future.

Petrosirtes Rüppell.

1. *Petrosirtes grammistes* (C. V.)*Blennechis grammistes* Cuvier & Valenciennes, Hist. Nat. Poiss. XI p. 284.*Petrosirtes anema* Bleeker, Nat. Tijdschr. Ned. Indië III p. 273.*Petrosirtes anema* Günther, Cat. Fishes Brit. Mus. III p. 236.*Petrosirtes grammistes* Günther, Südseefische, p. 197.

18 spec., 32—55 mm long, river Batu merah, Ambon, March 1910.

25 spec., 21—74 mm long, river Mirdika, Ambon, December 1909, February 1910.

2 spec., 21—47 mm long, Kairatu, W. Ceram, February 16. 1910, brackish.

All the larger specimens and a good deal of the smaller ones differ from the descriptions of the authors cited above in the following points: Presence of small suborbital tentacles, 8 interorbital tentacles, four of which are situated in a row in front, the four others placed more backwards in the corners of a square. A pair of small tentacles in front of the dorsal fin on the vertex, and half a dozen on each side along the outer edge of the praeoperculum. Two small barbels on the chin. The middle ray of the ventral fin mostly produced, sometimes very much so. The head dark violet, without traces of the lower of the three longitudinal dark bands. This band is diffuse on the body, of a violet colour, sometimes almost absent. It reappears however on the tail. The light interspace between the bands yellow. Dorsal fin with its outermargin greyish, separated from the broad black band along the base of the fin by a white interspace, obliterated in front between the 2nd to the 6th spine, but reappearing between the first and second spine, where the outermargin of the fin is deep black. A subterminal black band along the anal fin, and a dusky one along its base.

I suppose that the fishes with the peculiarities described above are the males and the other ones the females. I dissected two specimens of each variety which proved to be of the expected sex in these four cases.

The females agree with the descriptions given by Bleeker and Günther, but some of them have a diamond-shaped black marking on the undersurface of the head.

Batrachidae.

Batrachus Bl. Schn.

1. *Batrachus grunniens* (L.)

Cottus grunniens, var. *B.* Linné, Mus. Ad. Fried. II p. 65.

Batrachus grunniens Günther, Cat. Brit. Mus. III p. 168.

Batrachus Gangene Day, Fishes of India 4° p. 270.

1 spec., 200 mm, from the fishmarket at Macassar, March 12. 1910.

2. *Batrachus diemensis* (Lesueur).

Batrachoides diemensis Lesueur, Journ. Acad. Nat. Sc. Philadelphia, III p. 402.

Batrachus diemensis Richardson, Voyage Erebus & Terror, Fishes p. 17.

Batrachus diemensis Günther, Cat. Brit. Mus. III p. 170.

4 spec., 78—108 mm, Beo, Majalibit-bay, Waigeu, January 1910.

Antennariidae.

Antennarius Commerson.

1. *Antennarius* spec. juv.

One specimen from Ambon, long 22 mm, February 1910.

Triacanthus Cuvier.

1. *Triacanthus blochi* Blkr.

Triacanthus blochi Bleeker, Nat. Tijdschr. Ned. Indië, III p. 81. Atl. Ichh. V p. 89.

Triacanthus blochi Tate Regan, Proc. Zool. Soc. 1903 p. 182.

2 spec., 95 and 89 mm, Macassar, fishmarket, March 11. 1910.

Balistes L.

1. *Balistes viridescens* Bl. Schn.
Balistes viridescens Bloch, Schneider, Syst. Ichth. p. 477.
Balistes (Pseudobalistes) viridescens Bleeker, Atl. Ichth. V p. 112.
2 spec., 65 and 130 mm, from Ambon, February 1910.
2. *Balistes undulatus* Mungo Park.
Balistes undulatus Mungo Park, Trans. Linn. Soc. III p. 37.
Balistapus lineatus Bleeker, Atl. Ichth. V p. 118.
Balistes undulatus Günther, Cat. Brit. Mus. VIII p. 226.
1 spec., 155 mm, from Saonek, January 15. 1910.
3. *Balistes aculeatus* L.
Balistes aculeatus Linné, Syst. Nat. Ed. X p. 328.
Balistapus aculeatus Bleeker, Atl. Ichth. V p. 102.
1 spec., 139 mm, from Saonek.
4. *Balistes verrucosus* L.
Balistes verrucosus Linné, Syst. Nat. Ed. X p. 328.
Balistapus verrucosus Bleeker, Atl. Ichth. V p. 120.
1 spec., 152 mm, from Saonek.
2 spec., 94 and 118 mm, from Ambon.

Monacanthus Cuvier.

1. *Monacanthus tomentosus* (L.).
Balistes tomentosus Linné, Syst. Nat. Ed. X p. 328.
Monacanthus hajam Bleeker, Atl. Ichth. V p. 126.
Monacanthus tomentosus Bleeker, Atl. Ichth. V p. 127.
Monacanthus tomentosus Günther, Cat. Brit. Mus. VIII p. 238.
2 spec., 52 and 82 mm, from the fishmarket at Ambon.
24 spec., 70—106 mm, from the Majalibit-bay, Waigeu, January 1910.
1 spec., 65 mm, from Sorong, New Guinea, January 1910 (L. de Bruyne leg.).
2. *Monacanthus chinensis* (Bl.).
Balistes chinensis Bloch, Ausl. Fische II p. 29.
Monacanthus chinensis Bleeker, Atl. Ichth. V p. 125.
1 spec., 122 mm, from Sorong, New Guinea, January 1910 (L. de Bruyne leg.).
1 spec., 71 mm, from the fishmarket at Macassar, March 11. 1910.

Ostracion L.

1. *Ostracion cornutus* L.
Ostracion cornutus Linné, Syst. Nat. Ed. X p. 331.
Ostracion arcus Bleeker, Atl. Ichth. V p. 35.
Ostracion cornutus, Günther, Cat. Brit. Mus. VIII p. 265.
1 spec., 155 mm, Ambon, February 1910.
1 spec., 61 mm, Macassar, fishmarket, March 1910.

Tetraodontidae.

Tetraodon L.

1. *Tetraodon hispidus* L.*Tetraodon hispidus* Linné, Syst. Nat. Ed. X p. 333.*Crayracion implutis* Bleeker, Atl. Ichth. V p. 71.*Tetraodon hispidus* Günther, Cat. Brit. Mus. VIII p. 297.*Tetraodon hispidus* Day, Fishes of India 4° p. 706.*Tetraodon hispidus* Günther, Fische der Südsee, Bd. III p. 467.

1 spec., 145 mm, Saonek.

1 spec., 173 mm, Majalibit-bay, Waigeu, January 1910.

3 spec., 32—165 mm, Ambon.

Both specimens have a black anal ring. This is not in accordance with Bleeker's statement „ano annulo nigro nullo”. Günther however (Fische d. Südsee) mentions this ring in some of his varieties.

2. *Tetraodon immaculatus* Bl. Schn.*Tetrodon immaculatus* Bloch, Schneider, Syst. Ichth. p. 507.*Crayracion immaculatus* Bleeker, Atl. Ichth. V p. 75.*Crayracion manillensis* Bleeker, Atl. Ichth. V p. 69.*Tetrodon immaculatus* Günther, Cat. Brit. Mus. VIII p. 291.

6 spec., 150—95 mm, Majalibit-bay, Waigeu, January 1910.

1 spec., 90 mm, Sorong, New Guinea (L. de Bruyne leg. January 1910).

All my specimens are of the striped variety (*manillensis*), which is considered to be the juvenile dress of *T. immaculatus*.

3. *Tetraodon erythrotaenia* Blkr.*Tetraodon erythrotaenia* Bleeker, Nat. Tijdschr. Ned. Indië V p. 174.*Crayracion erythrotaenia* Bleeker, Atl. Ichth. V p. 68.*Tetrodon erythrotaenia* Max Weber, Abh. Senckenb. Naturf. Gesellsch. XXXIV p. 48.

10 spec., 52—74 mm, from the river Mirdika, Ambon, February 1910.

4. *Tetraodon patoca* Ham. Buch.*Tetrodon patoca* Hamilton Buchanan, Fish. Ganges, p. 7.*Leiodon patoca* Bleeker, Atl. Ichth. V p. 76.*Tetrodon patoca* Günther, Cat. Brit. Mus. VIII p. 288.

1 spec., 55 mm, River Waiu waigé, Waigeu, freshwater under influence of tide, Dec. 25. 1910.

2 spec., 200—68 mm, Majalibit-bay near Beo, Waigeu, January 1910.

5 spec., 62—14 mm, Kairatu, West Ceram, brackish water, February 16. 1910.

4 spec., Ambon, February 1910.

3 spec., Batu merah, Ambon, March 1910.

II. General part.

The chief importance of the collection, described above, lies in the fact that it contains a number of freshwater-fishes from different islands in the eastern part of the Indo-Australian archipelago, viz. from Buru, Ceram, Batjan, Halmahera, Ambon and Waigeu.

The fishes collected at Batjan, during the few hours of our visit, belong to only three species:

- Kuhlia marginata* (C. V.)
- Therapon rosenbergii* Blkr.
- Stiphodon elegans* (Steind.)

They were caught in a mountain-stream, which flows into the bay of Batjan. Only the first one of these three has been previously recorded from this island by Bleeker, who gave two lists of freshwater-fishes from Batjan ¹⁾. The two others are not mentioned either by Max Weber in his table of the distribution of the freshwater-fishes of the Indo-Australian archipelago ²⁾ or by Steindachner in the record of the fishes collected by Kükenthal on that island ³⁾.

Max Weber ⁴⁾ has given a list of the freshwater-fishes of Ambon. Among the fishes which I collected there in freshwater and estuaries, the following do not occur in that list:

1. *Hemirhamphus dispar* C. V.
2. *Mugil rossi* Blkr.
3. *Platophrys pantherinus* (Rüpp.)
4. *Lutjanus biguttatus* (C. V.)
5. *Lutjanus ehrenbergi* (Pet.)
6. *Lutjanus argentimaculatus* (Forsk.)
7. *Apogon ceramensis* Blkr.
8. *Therapon rosenbergii* Blkr.
9. *Sillago sihama* (Forsk.)
10. *Caranx macrophthalmus* Rüpp.
11. *Acanthurus blochii* C. V.
12. *Gobius puntang* Blkr.
13. *Gobius variabilis* Steind.
14. *Petroscirtes grammistes* (C. V.).
15. *Tetraodon hispidus* L.

I have in my collection the following species from Halmahera, presented to me by the missionary G. A. Maan and obtained in a stream near Buli:

1. *Mugil bleekeri* Gthr.?
2. *Lutjanus argentimaculatus* (Forsk.)
3. *Gobius celebius* C. V.

None of them are either recorded in the list of Max Weber or by Steindachner from Kükenthal's collection.

From the lake Galela I got by the kind assistance of the missionary van Baarda the only species of fish, which is said to inhabit it:

- Eleotris aporos* Blkr.

Not much is known of the fish-fauna of Buru. Quoy & Gaimard ⁵⁾ mentioned some marine species from Buru as well as Cuvier & Valenciennes in the „Histoire naturelle des

1) Bleeker, Nat. Tijdschr. Ned. Indië VII, 1854, p. 359—378 and IX, 1855, p. 191—202.

2) Max Weber, Zoolog. Ergeb. einer Reise nach O. Indien. III, 1894, p. 447.

3) Steindachner, Abhandl. Senckenb. Naturf. Gesellsch. XXV, 1901, p. 413.

4) Max Weber, Zool. Ergeb. III, p. 440 and in Semon, Zool. Forschungsreisen in Australien und dem Malay. Archipel 1895, p. 260.

5) Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. Poissons. 1824. — Voyage de l'Astrolabe. Zool. III, 1834, p. 674.

Poissons". Bleeker ¹⁾ has published several papers on the fishes of Buru, but it is not specially stated if specimens were caught in freshwater; generally nothing is said about the habitat, in other cases there is only stated that they came from the sea and estuaries near Kajeli. Lastly Forbes ²⁾ mentions a species of eel as the only fish inhabiting the lake Wokolo in the interior of the island. This is about all that is known about the fish-fauna of this island. The fishes which I collected in a stream near Kajeli not far from its mouth, will add but little to our knowledge. In the following list of the fishes obtained there, those with an * have not yet been recorded from Buru.

1. *Anguilla mauritiana* Benn.
- *2. *Coelonotus leiaspis* (Blkr.)
- *3. *Doryrhamphus mento* (Blkr.)
4. *Doryrhamphus brachyurus* (Blkr.)
- *5. *Doryrhamphus brevidorsalis* de Bft.
- *6. *Doryrhamphus caudatus* (Peters).
- *7. *Mugil borneensis* Blkr.
- *8. *Mugil ceramensis* Blkr.
- *9. *Mugil subviridis* C. V.
10. *Kuhlia marginata* (C. V.).
11. *Kuhlia rupestris* (Lac.)
12. *Ambassis buroensis* Blkr.
- *13. *Ambassis commersoni* C. V.
- *14. *Eleotris gyrinoides* Blkr.
- *15. *Eleotris porocephalus* C. V.
16. *Eleotris hoedti* Blkr.
17. *Eleotris amboinensis* Blkr.
18. *Gobius giuris* H. B.
- *19. *Gobius oyensi* de Bft.

Little is also known with certainty about the freshwater-fishfauna of Ceram. Although Bleeker ³⁾ has given many contributions to our knowledge of the fishfauna of that island, only the 7 following ones are specially recorded as freshwater fishes. They were collected by von Rosenberg in the river Ruwata, which flows in the Elpaputih-bay, at the south coast of the island.

1. *Mugil heterocheilos* Blkr.
2. *Agonostoma oxyrhynchum* C. V.
3. *Gymnothorax polyuranodon* (Blkr.)
4. *Lutjanus fuscescens* (C. V.)
5. *Kuhlia marginata* (C. V.)
6. *Therapon rosenbergii* Blkr.
7. *Eleotris porocephalus* C. V.

The fishes, which I collected at Ceram, are all from one river-system, viz. the Riuapa, which flows near Kairatu into the southern part of the Piru-bay. It comes from the mountains near Honitetu, where I visited its uppercourse, which has the character of a rapid mountain-torrent, rushing down on a rocky bed. Here it receives several brooks, which run in deep ravines and unite in the torrent Ème, which again flows in the Riuapa. Another of its tributaries, the river Tuba, mixes its water with that of the Riuapa lower down. I also had an opportunity of fishing in the Tuba in that part of its course, where it leaves the mountain.

1) Bleeker, Nat. Tijdschr. Ned. Ind. XI. 1856, p. 383—414. ibid. XIII. 1857, p. 55—82. ibid. XXII. 1861, p. 109—114. Ned. Tijdsch. Dierk. II. 1865, p. 141—151.

2) Forbes., Wanderungen eines Naturforschers im Malay. Archipel. II. 1886. p. 115.

3) Bleeker, Nat. Tijdschr. Ned. Ind. III. 1852, p. 229—309, p. 689—714. ibid. V. 1853, p. 233—248. ibid. XI. 1856, p. 486—487. ibid. XII. 1856—1857, p. 508. ibid. XXII. 1861, p. 228—238. Ned. Tijdschr. Dierk. I. 1863, p. 252—261. ibid. II. 1865, p. 182—193.

In the accompanying table the distribution of the fishes collected in the Riuapa and its tributaries is shown. Certainly the list of fishes is very far from being complete, especially of those of the lower part of the river, where I only collected during an hour or so near its mouth and in a clear, gently flowing brook in the lowland, the Krikua, a left tributary of the Riuapa.

Out of this table may be seen that the *Gobiidae* ascend the rivers farthest and especially those with a well-developed ventral disk, as the different species of *Sicyopterus* and *Sicyopus* as well as *Stiphodon elegans*, *Microsicydium gymnauchen* and *Rhiacichthys aspro*, which are all probably able to resist the rapid current by attaching themselves to the stones in the bed of the river.

SPECIES	Riuapa (mouth)	Krikua	Tuba	Riuapa (uppercourse)	Èmé
* <i>Anguilla celebesensis</i> Kp.	—	—	+	—	—
<i>Atherina</i> spec.	+	—	—	—	—
<i>Mugil</i> spec.	+	—	—	—	—
* <i>Achirus poropterus</i> Blkr.	+	—	—	—	—
<i>Syngnathus spicifer</i> Rüpp.	+	—	—	—	—
* <i>Doryrhamphus brachyurus</i> (Blkr.)	+	—	—	—	—
* <i>Doryrhamphus caudatus</i> (Pet.)	—	+	+	—	—
<i>Kuhlia marginata</i> (C. V.)	—	—	+	—	+
* <i>Therapon argenteus</i> (C. V.)	+	—	—	—	—
<i>Therapon jarbua</i> (Forsk.)	+	—	—	—	—
<i>Scatophagus argus</i> Blkr.	+	—	—	—	—
<i>Lutjanus argentimaculatus</i> (Forsk.) . . .	+	—	—	—	—
<i>Apogon</i> spec.	+	—	—	—	—
<i>Ambassis urotaenia</i> Blkr.	+	—	—	—	—
<i>Caranx hippos</i> L.	+	—	—	—	—
* <i>Gobius melanocephalus</i> Blkr.	—	—	+	+	—
* <i>Gobius reticularis</i> M. Web.	—	—	+	—	—
* <i>Gobius javanicus</i> Blkr.	—	—	+	—	—
* <i>Gobius rouxi</i> M. W.	+	—	—	—	—
* <i>Gobius oyensi</i> de Bft.	—	—	+	—	—
* <i>Rhiacichthys aspro</i> (C. V.)	—	—	—	—	+
* <i>Eleotris gyrinoides</i> Blkr.	—	—	—	—	+
* <i>Eleotris amboinensis</i> Blkr.	+	—	—	—	—
<i>Eleotris belobrancha</i> C. V.	—	—	+	—	—
* <i>Sicyopterus longifilis</i> de Bft.	—	—	+	—	—
* <i>Sicyopterus brevis</i> de Bft.	—	—	+	—	—
* <i>Sicyopus multisquamatus</i> de Bft. . . .	—	—	—	—	+
* <i>Sicyopus zosterophorum</i> (Blkr.)	—	—	—	—	+
* <i>Microsicydium gymnauchen</i> (Blkr.) . . .	—	—	—	—	+
* <i>Stiphodon elegans</i> (Steind.)	—	+ ¹⁾	+	+	+
* <i>Schismatogobius bruynisi</i> de Bft. . . .	—	—	—	—	+
<i>Taenioides</i> spec.	+	—	—	—	—
<i>Periophthalmus koelreuteri</i> Pall. . . .	+	—	—	—	—
* <i>Petroscirtes grammistes</i> (C. V.)	+	—	—	—	—
<i>Gymnapistus niger</i> C. V.	+	—	—	—	—
<i>Tetraodon patoca</i> H. B.	+	—	—	—	—

Kuhlia marginata however was also met with in the highest parts of the rivers, where it was actually seen to leap through the rapids from one pool to the other.

In these wild streams eels and sea-needles were not found, but *Anguilla celebesensis* Kp. and *Doryrhamphus caudatus* (Peters) ascend as far as where the rapids begin, as may be demonstrated by their capture in the river Tuba.

Freshwater-fishes from Waigeu were not known with certainty before I visited the island. In fact all that was known of the ichthyological fauna of this island were the species reported by Lesson²⁾ from the voyage of „La Coquille” and by Quoy & Gaimard

1) Only seen, not captured.

2) Lesson, Voyage autour du monde sur La Coquille, Zoologie 1830.

from that of „L'Uranie” et „la Physicienne”, as well as some species mentioned by Cuvier & Valenciennes and by Bleeker ¹⁾, who published the list of fishes collected by Bernstein on that island. Lastly the Siboga-expedition visited Waigeu, and some fishes of that locality are mentioned in Max Weber's report on the fishes of that expedition.

None of them however are from freshwater. All of the fishes mentioned by Lesson were captured „dans la baie d'Offach”. Those described by Quoy & Gaimard are only stated to be caught at Waigeu, without indication whether they came from the sea, estuaries or freshwater and the same can be said of those collected by Bernstein. It is however probable that the following species came from freshwater or at least estuaries:

1. *Eleotris fusca* Bl. (= *Eleotris niger* Q. G.)
2. *Eleotris hoedti* Blkr.

Anguilla marmorata of Quoy & Gaimard ought perhaps to be mentioned here too, but it is very doubtful if the species described by these authors from Waigeu really is an *Anguilla* (cf. Max Weber. Zool. Jahrb. Suppl. I. 1912, p. 580).

The rivers and brooks which I have explored in Waigeu are the following:

- 1°. River Waiu waigé, which flows into the bay Tip waigé. The place where I collected was not far from its mouth, where the river flows through a rather swampy forest, in which here and there isolated rocks arise. The species collected are:
 1. *Anguilla* spec. juv.
 2. *Apogon amboinensis* Blkr.
 3. *Eleotris* (*Butis*) *butis* H. B.
 4. *Eleotris* (*Culius*) spec. juv.
- 2°. River Waihä, at the south coast of the island. For the greater part it finds its way to sea through the limestone-rocks, which here come down to the coast. Its course is thus short and steep. All the species were collected above the rapids.
 1. *Sphagebranchus mindora* Jord. & Rich.
 2. *Anguilla* spec. juv.
 3. *Gobius reticularis* M. Web.
 4. *Eleotris hoedti* Blkr.
 5. *Eleotris fusca* Bl. Schn.
 6. *Eleotris melanosoma* Blkr.
- 3°. River Waisa, also at the south coast and of about the same condition as the foregoing.
 1. *Eleotris gyrinoides* Blkr.
 2. *Eleotris hoedti* Blkr.
 3. *Eleotris fusca* Bl. Schn.
- 4°. A rapidly flowing brook, forming several small waterfalls, near Mumes, south coast of Waigeu.
 1. *Eleotris hoedti* Blkr.
 2. *Eleotris fusca* Bl. Schn.

The following rivers all flow into the Majalibit-bay, which almost divides Waigeu in two parts and only communicates by a rather narrow passage with the open sea. Notwithstanding the circumstances which make one assume that the water of this bay, which has quite the aspect of a lake, is more or less fresh, this is not the case and its water is strongly brackish. I collected several fishes in the end of the bay, near the island Beo, which all prove the brackish character of their habitat, as may be seen from the following list:

1. *Atherina duodecimalis* C. V.
2. *Atherina endrachtensis* Q. G.
3. *Hemirhamphus quoyi* C. V.
4. *Hemirhamphus buffonis* C. V.
5. *Aeoliscus strigatus* (Gthr.)
6. *Apogon melas* Blkr.

1) Bleeker, Versl. Akad. Amsterdam (2) II. 1868, p. 295—301, *ibid.* p. 331—335.

7. *Apogon sangiensis* Blkr.
8. *Apogon ceramensis* Blkr.
9. *Apogon orbicularis* Blkr.
10. *Cheilodipterus singapurensis* Blkr.
11. *Ambassis dussumieri* C. V.
12. *Lutjanus biguttatus* (C. V.)
13. *Caesio maculatus* C. V.
14. *Therapon puta* C. V.
15. *Gerres oyena* (Forsk.)
16. *Gazza argentaria* (Forst.)
17. *Amphacanthus javus* L.
18. *PlatyGLOSSUS hyrtli* (Blkr.)
19. *PlatyGLOSSUS bicolor* (Bl. Schn.)
20. *Pomacentrus trilineatus* C. V.
21. *Caranx hippos* L.
22. *Caranx affinis* Rüpp.
23. *Chorinemus lysan* (Forsk.)
24. *Gobius puntang* Blkr.
25. *Eleotris aruensis* M. Web.
26. *Batrachus diemensis* Lesueur
27. *Monacanthus tomentosus* (L.)
28. *Tetraodon patoca* H. B.
29. *Tetraodon hispidus* L.
30. *Tetraodon immaculatus* Bl. Schn.

The following rivers, which flow into the Majalibit-bay, were explored.

5°. River Rabiai, flowing on a gravel-bed in a narrow canon-like valley.

1. *Syngnathus spicifer* Rüpp.
2. *Coelonotus leiaspis* (Blkr.)
3. *Rhombatractus catherinae* de Bft.
4. *Ambassis urotaenia* Blkr. (mouth of river).
5. *Gobius reticularis* M. Weber.
6. *Gobius melanocephalus* Blkr.
7. *Eleotris fusca* Bl. Schn.

6°. River Bajon (gravel-bed.)

1. *Rhombatractus catherinae* de Bft.
2. *Gerres filamentosus* C. V. (near mouth).
3. *Eleotris fusca* Bl. Schn.

7°. Wai-semi, a side river of the Kaiawat (gravel-bed, flowing through rather level forest).

1. *Rhombatractus catherinae* de Bft.

8°. Wai-menil (uppercourse torrent-like, undercourse on gravel-bed).

1. *Rhombatractus catherinae* de Bft. (upper and undercourse).
2. *Eleotris aruensis* M. Web. (undercourse).

The only locality from the north coast, where I collected, was:

9°. river Lam-lam, a clear brook in level forest, which flows into the Fofak-bay.

1. *Kuhlia marginata* (C. V.)

In the table on page 158 I have given a list of all the fishes now known to inhabit the freshwater of the islands which I visited and those in the neighbourhood, in fact including the principal islands between the Greater Sunda-islands and New Guinea, only excepting Celebes. I have excluded this island from my list, as new contributions to the freshwater fish-fauna of this island will shortly be published by Prof. Max Weber.

As a base for this table I have used that given by Weber (l. c. antea), but I have only recorded here those species, which are known from freshwater and excluded from the list those which are found in brackish water and the sea only, or have accidentally been found

in freshwater. The list is further brought up to date by entering the fishes recorded by Kükenthal (l. c. antea) from Batjan, Halmahera, by Max Weber¹⁾ from the Aru- and Kei-islands, by Miss Popta²⁾ from Lombok and Sumbawa and by Max Weber and myself³⁾ from Timor and Babber, as well as those recorded in this paper from the islands mentioned above.

SPECIES	Bali	Lombok	Sumbawa	Flores	Sumba	Rotti	Timor	Euru	Ceram	Ambon	Obi major	Batjan	Halmahera	Babber	Kei	Aru	Waigeu	Misol	Remarks on the distribution of the genera
<i>Barbus maculatus</i> C. V.	+	+																	Asia, Europe, Africa, fresh water.
<i>Rasbora argyrotaenia</i> Blkr.	+	+																	Asia, Africa, fresh water.
<i>Rasbora elberti</i> Popta		+	+																
<i>Clarias batrachus</i> (Bl.)	+	+	+																Asia, Africa, fresh water.
<i>Copidoglanis brevidorsalis</i> (Gthr.)																+			New Guinea, Australia.
<i>Copidoglanis ater</i> (Perugia)																	+		
<i>Anguilla mauritiana</i> Benn.	+	+		+			+	+	+	+		+	+	+			+	+	Katadrom!
<i>Anguilla celebesensis</i> Kp.							+	+	+	+						+			
<i>Anguilla australis</i> Rich.	+	+					+	+	+	+						+			
<i>Gymnothorax polyuranodon</i> (Blkr.)								+	+	+									Chiefly marine.
<i>Sphagebranchus mindora</i> Jord. & Rich.																	+		Chiefly marine.
<i>Aplocheilichthys javanicus</i> Blkr.		+																	Asia, Africa, fresh and brackish water.
<i>Aplocheilichthys celebensis</i> M. Web.							+												Chiefly marine.
<i>Syngnathus spicifer</i> Rüpp.									+								+		Chiefly marine.
<i>Syngnathus retzii</i> Blkr.					+														
<i>Doryrhamphus brachyurus</i> (Blkr.)		+						+	+										Chiefly marine.
<i>Doryrhamphus mento</i> (Blkr.)								+	+										
<i>Doryrhamphus caudatus</i> (Peters)		+		+			+	+	+									+	
<i>Doryrhamphus brevidorsalis</i> de Bft.								+	+										
<i>Coelionotus leiaspis</i> (Blkr.)								+										+	Philippines, Madagascar.
<i>Pseudomugil novae guineae</i> M. Web.																	+		New Guinea, Australia, fresh water.
<i>Pseudomugil gertrudae</i> M. Web.																	+		New Guinea, Australia, fresh water.
<i>Rhombattractus patoti</i> M. Web.																	+		New Guinea, Australia, fresh water.
<i>Rhombattractus senckenbergianus</i> M. Web.																	+		
<i>Rhombattractus catherinae</i> de Bft.																		+	
<i>Mugil sundanensis</i> Blkr.	+						+												Fresh water and coasts of all the temperate and tropical regions.
<i>Mugil subviridis</i> C. V.		+						+											
<i>Mugil borneensis</i> Blkr.								+	+	+									
<i>Mugil ceramensis</i> Blkr.								+	+	+									
<i>Mugil troschelii</i> Blkr.				+				+	+	+									
<i>Mugil oligolepis</i> Blkr.				+															
<i>Mugil heterocheilus</i> Blkr.									+	+		+							
<i>Mugil labiosus</i> C. V.							+												
<i>Agonostoma oxyrhynchum</i> C. V.								+				+							West India, Central America, New Zealand, Australia, Mauritius, Comora islands. Fresh water.
<i>Aeschrichthys goldiei</i> Macleay							+												New Guinea, New Caledonia, fresh water.
<i>Ophiocephalus striatus</i> Bl.	+	+	+	+						+		+	+						Asia, Africa, fresh and brackish water.
<i>Anabas scandens</i> (Dald.)	+	+	+	+	+	+	+			+		+	+						South Asia, fresh and brackish water.
<i>Kuhlia rupestris</i> (Lac.)					+		+	+		+		+							East Africa, islands of India and Pacific, North Australia, fresh and brackish water.
<i>Kuhlia marginata</i> (C. V.)	+				+		+	+	+	+		+	+			+	+	+	South Asia, N. Australia, Polynesia, New Zealand, fresh water and coast.
<i>Kuhlia taeniura</i> (C. V.)							+	+	+										Chiefly marine.
<i>Toxotes jaculator</i> C. V.			+				+	+	+									+	
<i>Lutjanus argentimaculatus</i> (Forsk.)	+						+		+	+		+	+				+		Chiefly marine.
<i>Lutjanus fuscus</i> (C. V.)							+		+	+		+	+						
<i>Lutjanus lemniscatus</i> (C. V.)									+	+		+	+						
<i>Lutjanus marginatus</i> (C. V.)									+	+		+	+						
<i>Epinephelus pantherinus</i> Blkr.							+			+		+							Chiefly marine.
<i>Epinephelus corallicola</i> (C. V.)										+		+							
<i>Epinephelus crapao</i> C. V.							+			+		+							
<i>Ambassis urotaenia</i> Blkr.								+	+	+		+						+	Indian region, N. Australia, fresh and brackish water and sea.
<i>Ambassis nalu</i> C. V.				+								+				+			
<i>Ambassis commersonii</i> C. V.					+			+	+	+		+							
<i>Ambassis interrupta</i> Blkr.								+	+	+		+							
<i>Ambassis buroensis</i> Blkr.	+						+	+	+	+		+							
<i>Ambassis dussumieri</i> C. V.	+						+	+	+	+		+							

1) Max Weber, Abhandl. Senckenberg. Naturf. Gesellsch. XXXIV. 1911, p. 1.

2) Popta, Notes Leyden Museum XXXIV. Note III 1911, p. 9-16. — Verhandl. d. 83. Versamml. Deutsche Naturf. u. Aerzte 1911. II. 1. Hälfte, p. 418. — In Dr. J. Elbert: »Die Sunda-Expedition». II. p. 315.

3) Max Weber & L. F. de Beaufort; Versl. Akad. Amsterdam 1912, p. 133.

SPECIES	Bali	Lombok	Sumbawa	Flores	Sumba	Rotti	Timor	Buru	Ceram	Ambon	Obi major	Batjan	Halmahera	Babber	Kei	Aru	Waigen	Misol	Remarks on the distribution of the genera
<i>Ambassis batjanensis</i> Blkr.	+		+			+	+	+		+		+	+						Chiefly marine. <i>Apogon beauforti</i> and allied species only known from fresh water of New Guinea.
<i>Apogon hyalosoma</i> Blkr.			+							+									Chiefly marine.
<i>Apogon beauforti</i> M. Web.																	+		Chiefly marine.
<i>Therapon cancellatus</i> C. V. (+ <i>rosenbergi</i> Blkr.)							+		+	+		+							Chiefly marine.
<i>Sparus datnia</i> (H. B.)		+																	Chiefly marine.
<i>Scatophagus argus</i> C. V.	+	+					+	+	+	+		+				+			Chiefly marine.
<i>Scatophagus multifasciatus</i> Rich.																+			Chiefly marine.
<i>Equula splendens</i> Cuv.	+		+					+	+	+									Chiefly marine.
<i>Gobius baliuroides</i> Blkr.	+							+	+	+									The genus <i>Gobius</i> , taken in a larger sense, as is done here, is almost cosmopolite. Species of the genus occur in the sea, brackish as well as in fresh water.
<i>Gobius celebius</i> C. V.				+	+		+	+	+	+			+			+	+		
<i>Gobius giurus</i> H. B.								+	+	+			+						
<i>Gobius chrysosoma</i> Blkr.									+	+									
<i>Gobius grammepomus</i> Blkr.	+			+			+	+	+	+		+	+						
<i>Gobius puntangoides</i> Blkr.								+	+	+						+			
<i>Gobius melanocephalus</i> Blkr.							+		+								+		
<i>Gobius spectabilis</i> Gthr.					+														
<i>Gobius javanicus</i> Blkr.		+		+				+	+	+							+		
<i>Gobius tambujon</i> Blkr.	+																+		
<i>Gobius römeri</i> Blkr.											+						+		
<i>Gobius hoeveni</i> Blkr.																	+		
<i>Gobius cavifrons</i> M. Web.													(+)				+		
<i>Gobius mertonii</i> M. Web.																	+		
<i>Gobius reticularis</i> M. Web.																	+		
<i>Gobius roulei</i> M. Web.																	+		
<i>Gobius leptochilus</i> Blkr.																	+		
<i>Gobius oyensi</i> de Bft.								+	+					+					
<i>Gobius zurstrasseni</i> Popta.		+	+																
<i>Schismatogobius bruynisi</i> de Bft.									+										With certainty only known from Ceram.
<i>Sicyopus balinense</i> Blkr.	+																		Indo-Australian Archipelago.
<i>Sicyopus zosterophorum</i> Blkr.	+																		
<i>Sicyopus multisquamatus</i> de Bft.																			
<i>Microsicydium gymnauchen</i> (Blkr.)																	+		Indo-Australian Archipelago, fresh and brackish water.
<i>Stiphodon elegans</i> (Steind.)										+	+		+						Indo-Australian Archipelago and West Pacific islands, fresh water.
<i>Sicyopterus cynocephalus</i> Blkr.		+	+	+			+					+		+	+				Asia to Pacific islands, fresh and occasionally brackish water.
<i>Sicyopterus macrostetholepis</i> Blkr.	+									+									
<i>Sicyopterus micrurus</i> Blkr.															+				
<i>Sicyopterus wichmanni</i> M. Web.				+			+												
<i>Sicyopterus brevis</i> de Bft.										+									
<i>Sicyopterus longifilis</i> de Bft.																			
<i>Eleotris aporus</i> Blkr.		+			+					+		+	+						Circumtropical and subtropical. Sea, brackish and fresh water.
<i>Eleotris hoedti</i> Blkr.						+	+	+	+	+		+	+			+	+		
<i>Eleotris porocephalus</i> C. V.	+						+	+	+	+		+	+			+	+		
<i>Eleotris gyrinoides</i> Blkr.		+					+	+	+	+		+	+			+	+		
<i>Eleotris urophthalmoides</i> Blkr.		+																	
<i>Eleotris gymnopus</i> Blkr.	+																		
<i>Eleotris melanosoma</i> Blkr.				+			+	+	+			+					+		
<i>Eleotris melanostigma</i> Blkr.	+																+		
<i>Eleotris fusca</i> Bl. Schn.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Eleotris butis</i> H. B.	+	+						+	+	+		+					+		
<i>Eleotris belobrancha</i> C. V.	+						+	+	+			+		+			+		
<i>Eleotris aruensis</i> M. Web.																	+	+	
<i>Eleotris mertonii</i> M. Web.																	+	+	
<i>Eleotris mogurnda</i> Rich.																	+	+	
<i>Eleotris macrocephalus</i> Blkr.								+		+							+	+	
<i>Bostrychus sinensis</i> Lac.																+			Asia, New Guinea. Sea, brackish and fresh water.
<i>Bostrychus aruensis</i> M. Web.																	+		Indo-Australian Archipelago, Solomons islands, fresh water.
<i>Rhiacichthys aspro</i> (C. V.)									+	+									Chiefly marine.
<i>Tetraodon erythrotaenia</i> Blkr.										+							+	+	
<i>Tetraodon patoca</i> H. B.	+	+	+					+	+	+							+	+	

An examination of this list will lead us to the same result as to which previous authors came, and which is best expressed as follows: 1° The freshwater-fishfauna of the islands between the Greater Sunda-islands and New Guinea is chiefly constituted of marine fishes, which took possession of the available freshwater as invaders from the sea. 2° True fresh water fish-families are lacking, but some indian forms (*Anabas scandens* (Dald.), *Ophiocephalus striatus* Bl., *Aplocheilus javanicus* Blkr.) have been able to extend their range more or less

eastward. 3° Some islands in the neighbourhood of New Guinea have an Australian element in their freshwater-fishfauna (*Rhombatractus*, *Pseudomugil*, both members of the *Melanotaeniidae* and *Copidoglanis*). I will now proceed to a closer examination of these 3 elements in the fishfauna of these islands and begin with the 3rd. Max Weber¹⁾ has pointed out the significance of the occurrence of *Melanotaeniidae* in New Guinea. The members of this family, probably derived from marine *Atherinidae*, are true freshwater fishes, and their occurrence in Australia as well as on New Guinea is a confirmation of the opinion, that New Guinea and Australia have been connected by a landbridge. The reason why Max Weber thought it probable that this connection existed in the Pliocene, whereas it disappeared in the Pleistocene, may be found for in the paper quoted. In this paper the author expressed the probability that the Aru- and Kei-islands as well as Waigeu — in view of what was known of their fauna — would yield *Melanotaeniidae*. The confirmation of this prophecy was brought shortly afterwards by Weber himself for the Aru-islands²⁾ and by myself for Waigeu³⁾, but in the case of the Kei-islands the result turned out to be otherwise. The collections made by Dr. H. Merton and Dr. J. Roux in the Aru- and Kei-islands gave Weber⁴⁾ the opportunity of showing the marked difference in the fishfauna of these islands. In the case of the Aru-islands a strictly Papuan fauna, not only on account of the *Melanotaeniidae* but also on that of the *Siluridae* (*Copidoglanis*) and even perceivable in the *Gobiidae* was shown to exist, whereas the scanty brooks and rivers on the Kei-islands are only inhabited by marine invaders of a more western (Indian) character.

This marked difference between the fauna of the Aru- and Kei-islands is also apparent in other groups of animals. Hartert⁵⁾ expressed it in reference to the birds of these islands. Roux⁶⁾ and Barbour⁷⁾ pointed out the occurrence of an Indian element in the reptilian fauna of the Kei-islands, which is wanting in that of the Aru-islands. At a meeting of the „Nederlandsch Natuur- en geneeskundig Congres” in 1911 I⁸⁾ read a paper on the zoogeography of the eastern part of the Indo-Australian Archipelago, in which I gave the following table on the distribution of the birds, migrants, sea-birds etc. being excluded:

	ENDEMIC SPECIES	SPECIES ALSO FOUND IN NEW GUINEA.	SPECIES WITH AFFINITIES TO THE ORIENTAL REGION	SPECIES OF WIDE DISTRIBUTION
Waigeu . .	14%	66.6%	1.1%	18.3%
Batanta . .	9%	63%	0%	28%
Salawatti .	0%	84%	0%	16%
Misol. . . .	2%	83%	2%	13%
Aru-Islands	7%	78%	2%	13%
Kei-Islands	30%	14%	32.5%	23.5%
Ceram . . .	56.4%	17.4%	24%	2.2%
Halmahera	54%	20%	23%	3%

This table shows the difference between the birdfauna of the Aru- and Kei-islands very clearly. My figures agree rather well with those derived from the table given by von Berlepsch⁹⁾, who expresses the constitution of the birdfauna of the Aru-islands as follows: 112

1) Max Weber, Nova Guinea V, Livraison II. 1908, p. 201.

2) Max Weber, Zool. Anz. XXXII. 1907, p. 401.

3) De Beaufort, Zool. Anz. XXXVI. 1910, p. 249.

4) Max Weber, Abhandl. Senckenberg. Naturf. Gesellsch. XXXIV. 1911, p. 1.

5) On the birds of the Key and South-east Islands, Novit. Zoologicae VIII. 1901, p. 1.

6) Jean Roux, Reptilien und Amphibien der Aru- und Kei-Inseln. Senckenb. Naturf. Gesellsch. XXXIII. 1910, p. 211.

7) Thomas Barbour. A contribution to the zoogeography of the east Indian islands. Mem. Mus. Comp. Zool. Harvard Coll. XLIV. n° 1. 1912.

8) De Beaufort, Handelingen XIII^{de} Nederl. Natuur- en Geneesk. Congres. 1911, p. 242.

9) Von Berlepsch. Abh. Senckenb. Naturf. Gesellsch. XXXIV. 1911, p. 55.

species (66 %) occur also on New Guinea, 21 (12 %) are represented there by local races, 38 species (22 %), 11 of which are endemic, do not occur on New Guinea. This would give on my table in the two first columns for the Aru-islands 6,4 % in stead of 7% and 77,1 % in stead of 78 %.

The difference between my results and those of von Berlepsch are mainly due to different conceptions of the value of some subspecies. As I pointed out in my paper quoted above, there is a great difference between the birdfauna of the 5 first islands in the table and the 3 following. The 5 first have a fauna of a mainly papuan character, the percentage of the species they have in common with New Guinea being 66.6, 63, 84, 83 and 78, whereas western affinities are scarce or absent (1.1 %, 0 %, 0 %, 2 %, 2 %). Endemic species of Salawatti are unknown, and this island certainly remained longest connected with New Guinea. The occurrence here of a species of *Zaglossus* (*Proechidna*), while the genus is otherwise restricted to New Guinea, is of some significance in this respect. Although so very close to Salawatti, Batanta has a birdfauna 9 % of which are endemic. None of these, however, are strictly endemic, but they are also found on Waigeu and nowhere else. This shows the close connection between Batanta and Waigeu, which islands have surely only been separated in recent times, long after the separation between them and Salawatti, which then probably still formed a part of New Guinea. The deep Pitt strait (strait Saguwin) between Batanta and Salawatti is of much older date than the shallow Dampier strait, scattered with reef, between Batanta and Waigeu. This is not expressed here for the first time, but has already been stated by Guillemard ¹⁾, and with the same arguments taken from the birdfauna of these islands.

The number of endemic species of the birdfauna of Misol is only 2 %, 83 % of the species being also found on New Guinea. This shows that Misol too is nothing else but a part of that great island, separated in recent times. The papuan character of the birdfauna has already been stated by Rothschild and Hartert ²⁾. It is noteworthy that the reptilian fauna does not show such a strong affinity to that of New Guinea. Barbour ³⁾ has laid stress upon this fact, and pointed out that several oriental forms have been recorded from this island.

The distribution of the birds, shown in our table, made me conclude that a line, running from north to south westward of Waigeu and Misol, deflected here in south eastern direction and leaving Ceram to the west of it, and then running between the Kei- and Aru-islands to Australia, would show the probable northwestern outline of the australian continent in tertiary times. This line coincides with that of 200 M. depth on the chart, and an upheaval of 200 M. of the sea-bottom would produce the old conditions, Waigeu, Batanta, Salawatti, Misol and the Aru-islands forming part of the mainland, which would be separated by sea from Halmahera, Ceram and the Kei-Islands. We have seen that the occurrence of *Melanotaeniidae* in the Aru-islands and Waigeu confirms this opinion. The freshwater of Salawatti, Batanta and Misol has not yet been explored, but I think it probable, that *Melanotaeniidae* will be found there.

We will now shortly consider the element of the fishfauna mentioned sub 2 above. This is formed by species belonging to true freshwater fish-families: *Barbus maculatus*, *Rasbora argyrotaenia* and *elberti* as members of the *Cyprinidae*, *Ophiocephalus* (*Ophiocephalidae*), *Anabas scandens* (*Anabantidae*) and *Clarias* (*Siluridae*), although lastnamed genus belongs to a family, some of the members of which occur also in the sea. The species of *Clarias* however are restricted to freshwater, or at most descend rivers to their mouth. *Aplocheilichthys javanicus* and *celebius* may be mentioned here too. Although not restricted to freshwater, they form here the most eastern outskirts (Timor) of the family *Cyprinodontidae* and constitute an oriental element in the fauna of the islands where they occur.

There is *communis opinio* among zoogeographers as well as geologists that the Greater Sunda-islands formed part of the asiatic continent in tertiary times. The distribution of the

1) Guillemard, The Cruise of the Marchesa, vol. II. 1886, p. 270.

2) Rothschild and Hartert, Novitates zoologicae VIII. n° 1. 1901, p. 56.

3) Barbour, op. c. p. 40 and 41.

Cyprinidae and many other freshwater-fishfamilies have contributed to establish this opinion. Since Max Weber¹⁾ stated the occurrence of *Cyprinidae* on Lombok and showed that their distribution can no longer be maintained as an argument which the believers in the „line of Wallace” can bring forward, out of an ichthyological point of view the possibility may be considered that this tertiary asiatic continent was prolonged eastward in a peninsula, which later on broke into several islands.

The occurrence of *Rasbora elberti* and *Clarias batrachus* on Sumbawa, as mentioned by Popta, through which the boundary of the *Cyprinidae* and of this asiatic genus of *Siluridae* is even more shoven to the east, may lead us to suppose that this asiatic peninsula even reached so far as lastnamed island. However it is not my intention to consider this problem here at length.

Anabas scandens and *Ophiocephalus striatus* are the only indian freshwater-fishes which extended their range east of the supposed tertiary asiatic continent. The probable reason why these, and these only of the many others which yet inhabit the rivers and lakes of the Greater Sunda-islands, were able to penetrate so far eastward, will be mentioned lower down.

After exclusion of the australian element (*Copidoglanis*, *Rhombatractus*, *Pseudomugil*) and of the indian element (*Barbus*, *Rasbora*, *Clarias*, *Ophiocephalus*, *Anabas*, *Aplocheilus*) of our list, their remains a quantity of species which form the group mentioned sub 1 on page 159 and which largely contributes to the freshwater-fauna of the islands now under consideration. In fact on many of them no others than these marine invaders are known to inhabit the freshwater. In the table I have noted the distribution of each genus. It will be seen that many of them are formed by species of genera which are chiefly marine, e. g. *Epinephelus*, *Gymnothorax*, *Tetraodon*, and the occurrence of some species of these genera in freshwater may only be accidental and perhaps they had better been left out of the list, as many other species which have been found in estuaries and in the undercourse of rivers could claim equal right to be recorded here (e. g. *Hemirhamphus*, several *Carangidae*, *Gymnapistus niger*, some *Pleuronectidae* etc.). They prove what has already been stated by Max Weber, that the invasion of marine species into the freshwater is still going on. On the other hand, the rest of the species mentioned in the list belong to genera, the members of which are chiefly to be found in freshwater and some of the species seem to have completely adopted themselves to this element e. g. species of *Kuhlia*, *Eleotris*, *Gobius*, while other genera seem to be completely restricted to freshwater as *Agonostoma*, *Aeschrichthys*, *Toxotes*, *Sicyopterus*, *Sicyopus*, *Stiphodon*, *Rhiacichthys*, or at most descend the rivers to the estuaries.

They all participate in the freshwater-fauna of these islands as well as of those to the west and east of them, some of the genera having a wide range. Many of the species are found here as well as to the west and east, inhabiting the rivers of Sumatra or even the asiatic continent as well as the brooks of many of the West Pacific islands. They form what might be called the neutral shade of the freshwater-fishfauna of the islands of the Indopacific, obsolete on the Greater Sunda-islands by the strong asiatic colouring of the fishfauna here, slightly altered on New Guinea and neighbouring islands by an australian tint and coming into fullest development even in the Molucco islands, where they have not to compete with „true” freshwater-fishes.

Among the genera which occur here there are a few, which could be called endemic, as they are restricted to this part of the world. These genera are: *Aeschrichthys*, *Sicyopus*, *Stiphodon*, *Microsicydium* and *Rhiacichthys*, possibly also *Schismatogobius*. Now it is noteworthy that the species of all these genera are particularly found in mountain streams. In the table given of the distribution of the fishes in the river Riuapa of Ceram (see page 155), it may be seen that species of *Sicyopus*, *Stiphodon*, *Microsicydium*, *Rhiacichthys* are chiefly or exclusively found in the higher parts of the streams. By their rounded ventral disk *Sicyopus*, *Microsicydium* and *Stiphodon* (as well as *Sicyopterus*) seem to be well suited to live at the

1) Max Weber, Siboga-Exp. Introduction 1902, p. 16. — Der Indo-australische Archipel und die Geschichte seiner Tierwelt. Fischer. Jena. 1902, p. 26.

bottom of rapidly flowing torrents and *Rhiacichthys* may even said to be especially adapted to such a mode of life. I must add, however, that *Microsicydium* has also been recorded from brackish water. As just these genera, which show a special predilection to torrents, are the only ones which seem to have originated here (with the exception of *Aeschrichthys goldici*, which has only twice been recorded, once from New Guinea and once from Timor, and which cannot be said to be specially adapted for the life in mountain streams, although the Timor-specimens came from an altitude of about 700 m), one may be allowed to make the supposition that in times when the invasion into the freshwater of these islands began or in other words when these islands were formed themselves, the fishes found circumstances which favoured the adaption to torrent-life.

This means that these islands must have been small or at least narrow and mountainous and that they rose steeply out of the sea.

No lowland of great extent was present, and the rainwater falling on these islands was carried along rapidly flowing brooks to the sea and did not find conditions favourable to assemble in lakes, marshes or ponds of any importance.

In these brooks the above-named genera developed out of marine *Gobiidae*. Only later on, when the streams had deposited the materials, carried from the mountains into lowland and a gently flowing undercourse was formed with ponds and marshes, a new invasion of marine forms took place; but this invasion was too recent to produce new forms. Thus may be explained why the lakes, ponds and undercourses of the rivers in the Molucco-islands do not possess any special fish-genera or even species (whereas such forms, derived from marine invaders are present as well on the Greater Sunda-islands as on New Guinea e. g. *Lycotrichia*, *Danio*, the *Melanotaeniidae* etc.), while at the other hand such „endemic” forms are now found in the uppercourse of the rivers.

Narrow landbridges connecting Celebes with the Molucco's and New Guinea as well as with the Lesser Sunda-islands have been postulated to explain the fauna of this island by the Sarasin¹⁾, and van Kampen²⁾, led by the distribution of the Amphibia, has pointed out that these landconnections must have been poor in freshwater. In this respect he draws the attention to the distribution of *Anabas scandens* and *Ophiocephalus striatus* as well as of *Symbranchus bengalensis* and *Monopterus albus*. All these species are able to stand drying up of their habitat or to live in mud, generally spoken they can manage to remain alive where not much water is available. This explains why they only among the many freshwater-fishes of the Great Sunda-islands, were able to penetrate eastward. This postulation of scantity of freshwater is quite in accordance with that to which I came above. I should only be inclined to add that the landbridges, which formed temporary connections between Java, Celebes, the Molucco's and New Guinea were not only narrow, but also steep, in other words, that the islands, which by their successive and various connection with each other formed these bridges, were not for instance low coral-islands, risen slightly above the sea level, but on the contrary were high and rising abruptly out of the sea.

1) P. & F. Sarasin, Ueber die geologische Geschichte der Insel Celebes auf Grund der Thierverbreitung. Wiesbaden. 1901.

2) P. N. van Kampen, Nova Guinea IX. Livraison I. 1911, p. 46 and 47.

EXPLANATION OF PLATE II.

- Fig. 1. *Rhombatractus catherinae* de Bfrt. nat. size. River Rabiai, Waigeu.
Fig. 2. *Schismatogobius bruynisi* de Bfrt. $\times 1\frac{1}{2}$. River Eme. Ceram.
Fig. 3. *Sicyopus zosterophorum* (Blkr.) $\times 1\frac{1}{2}$. River Eme. Ceram.
Fig. 4. *Stiphodon elegans* (Steind.) $\sigma \times 1\frac{1}{2}$. River Eme. Ceram.
Fig. 5. *Stiphodon elegans* (Steind.) $\varphi \times 1\frac{1}{2}$. River Eme. Ceram.
Fig. 6, 7. *Eleotris hoedti* Blkr., σ , nat. size. River at Kajeli, Buru.

