

NOTES ON A COLLECTION OF FISHES FROM JAVA, MADE
BY OWEN BRYANT AND WILLIAM PALMER IN 1909,
WITH DESCRIPTION OF A NEW SPECIES.

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Mr. Owen Bryant, of Cohasset, Massachusetts, having invited the United States National Museum to send a representative with him to Java for the purpose of obtaining natural history specimens, Mr. William Palmer was detailed by the museum for the duty and the present paper records the ichthyological collections made by them. Nine hundred and seventy-nine specimens were secured, representing 106 genera and 182 species.

The principal publications referred to in the paper are: Dr. P. Bleeker's *Atlas Ichthyologique des Indes Orientales Néerlandaises*, published under the auspices of the *Gouvernement Colonial Néerlandais*, by Fred. Müller, Amsterdam, 1862-1877. Nine volumes, folio, of this Atlas were published, and they form the principal work of Doctor Bleeker's life, bringing together the published results of his exhaustive labors upon the fishes of the Indo-Australian Archipelago.

In making a study of the fishes of the East India Archipelago Doctor Bleeker's works are indispensable and in connection with reference thereto the volume entitled *The Fishes of the Indo-Australian Archipelago*, index of the ichthyological papers of P. Bleeker by Dr. Max Weber and Dr. L. F. de Beaufort, Leiden, 1911, is invaluable. This publication is an attractive octavo of more than 400 pages, and gives besides a short account of his life indexes of bibliography, genera, and species.

SPHYRNA ZYGÆNA (Linnæus).

One young specimen from Batavia representing the species figured under this name by Bleeker¹ and by Day.² Total length, 480 mm.; width of head, 130 mm.; lateral expansion, shortest distance from

¹ *Bijdrage tot de kennis der Plagiostomen van den Indischen Archipel.* (Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen, deel XXIV, 1852, pp. 1-92. Batavia.) p. 42, pl. 3, fig. 8.

² Day, Francis. *The Fishes of India*, vols. 1 and 2, quarto, 195 pls. London, 1876 and 1878, p. 719, pl. 186, fig. 4.

notch at side of head to front edge, 45 mm.; width of mouth, 30 mm.; center of mouth, 16 mm. in front of line joining corners. The yolk sac had been about absorbed (?), but the umbilical opening had not closed.

CARCHARIAS SORRAH¹ (Müller and Henle).

Two males and three females from Batavia. Length of males, 600 mm. and 220 mm.; length of females, 600 mm., 430 mm., and 315 mm. The smallest male and the intermediate female have the snout a little pointed and the mouth slightly different in shape. The origin of the first dorsal, also, is more nearly midway between pectorals and ventrals, and is about over the end of the pectoral fin. In the other specimens the origin of the first dorsal is over the middle of the pectoral. These two specimens may represent the true *C. sorrah* and the rest *C. javanicus*, but we find no trenchant differences. According to Bleeker's descriptions all agree more closely with *C. sorrah* than with any other species.

RHYNCHOBATUS DJIDDENSIS (Forskål).

One specimen, the total length of which is 550 mm., taken at Batavia, represents the species figured under this name by Day.² The same species was described under the name *R. lævis* by Bleeker³, and by Müller and Henle.⁴

TRYGON PASTINACOIDES Bleeker.

One small specimen from Batavia, length, 190 mm.; tail, 120 mm. Bleeker⁵ under this name and assigned to the synonymy of *T. uarnak* by Day.⁶ It is a very differently appearing fish from the one figured by Day. It is possible that this species as well as *T. uarnacoides* should be placed in the synonymy of *T. uarnak*, but as we are unable to satisfy ourselves on this point, it seems better to retain the names proposed by Bleeker.

TRYGON UARNACOIDES Bleeker.

One specimen. Length, 590 mm.; tail, 450 mm. Batavia. It was originally described by Bleeker⁷ but Day⁸ placed it in the synonymy of *T. uarnak*.

MYLIOBATIS NIEUHOFFII (Bloch and Schneider).

Two specimens from Batavia. Male: Length, 840 mm.; length of disk, 250 mm.; width, 410 mm.; tail, 630 mm. Female: Length, 550 mm.; length of disk, 160 mm.; width, 260 mm. (about); tail,

¹ See Bleeker, Plagiostomen, p. 39, and Day, Fish. India, p. 714, pl. 185, fig. 1.

² Fish. India, p. 730, pl. 192, fig. 1.

³ Plagiostomen, p. 58.

⁴ Idem, p. 111.

⁵ Idem, p. 75.

⁶ Fish. India, p. 737, pl. 195, fig. 1.

⁷ Plagiostomen, p. 72.

⁸ Fish. India, p. 737, pl. 194, fig. 1.

400 mm. The tail in the smaller of these specimens is rather longer than described by Bleeker,¹ but this character is quite variable.

MYLIOBATIS MILVUS² Müller and Henle.

One male specimen from Batavia. Length, 1,540 mm.; length of disk, 320 mm.; width about 550 mm.; tail, 1,260 mm.

ELOPS MACHNATA (Forskål).

Seven specimens from Batavia, 250 to 370 mm. long, seem to represent this species, although they do not exactly agree with the description given by Regan.³

We have examined 35 specimens of the genus *Elops*, as follows: Java, 7; Ashantee, West Africa, 3; west coast America, 5; Australia, 3; east coast America, 6; Philippine Islands, 5; Hawaii, 5; Hongkong, China, 1.

This series is entirely too limited to allow us to decide between the more closely allied forms described by Regan, but the indication is that our specimens will not entirely bear out his conclusions. We hope to be able at some time to get a sufficient series from one locality to give a clue to the amount of individual variation to expect.

Our specimens seem to indicate separate groups as follows: (1) East America, (2) West America, (3) West Africa, (4) Australia and part of Philippine specimens, (5) other Pacific and Indian Ocean specimens.

We have made counts of vertebræ as follows: East coast America, skeleton, 75½; Java, radiograph, 65½; Ashantee, West Africa, radiograph, 69½; west coast America, radiograph, 79½; Philippine Islands, radiograph, 65½; Hawaii, radiograph, 68½; Hongkong, China, radiograph, 65½.

The species represented by our specimens from Java was described by Bleeker under the name *Elops saurus*.⁴

MEGALOPS CYPRINOIDES (Broussonet).

Nine specimens, 220 to 285 mm. long. Batavia.

We have examined specimens from Australia, Samoa, and the Philippine Islands. There is a possibility that the Samoan specimens may be separable on slight grounds from the others.

We can see no reason for separating this East Indian species generically from the American tarpon. Jordan and Evermann give the backward insertion of the dorsal as the distinguishing character, but this seems to us to be of very little value. In our specimen of *M. cyprinoides* the dorsal is situated over the first one-third of the ventrals, while in *atlanticus* it is over the center or last one-third of these fins.

¹ Bleeker, *Plagiostomen*, p. 85, and Day, *Fish. India*, p. 742.

² *Idem*, p. 87.

³ *Ann. Mag. Nat. Hist.*, ser. 8, vol. 3, 1909, pp. 37-40.

⁴ *Atlas Ichth.*, vol. 6, p. 84, pl. 208, fig. 3.

In some respects these specimens seem to represent the form described by Bleeker as *Megalops kundinga*, but the differences are so slight that no certain decision can be reached without much more material for comparison.

CHIROCENTRUS DORAB (Forskål).

Five specimens, 170 to 330 mm. long. Batavia.

None of these specimens seem to represent the species described by Bleeker¹ as *C. hypselosoma* and we can see no valid differences between these specimens and others in the United States National Museum, which are labeled *C. dorab*.

CHANOS CHANOS² (Forskål).

Five specimens, 220 to 310 mm. long. Batavia.

We have examined specimens from Mazatlan, Hawaii, Samoa, and the Philippines and see no valid differences.

DUSSUMIERIA ACUTA³ (Cuvier and Valenciennes).

Two specimens, 135 and 140 mm. long. Pelaboean Ratoe. Native name given as "Bu-ro-nuk."

DUSSUMIERIA HASSELTII (Bleeker).⁴

Forty-six specimens, about 80 to 150 mm. long. Batavia.

AMBLYGASTER LEIOGASTER⁵ (Cuvier and Valenciennes).

Four specimens, 140 to 150 mm. long, from Batavia represent the species figured as *Clupea (Amblygaster) leiogaster* by Bleeker.

ALOSA KANAGURTA⁶ (Bleeker).

Plates 73-75.

Eighteen specimens, 140 to 170 mm. long. Batavia.

This species does not agree very closely with any of the established genera of Clupeidæ and may ultimately stand as the type of a new genus; but, as we are not now prepared to enter into a much-needed revision of the Herring genera, we follow Bleeker in assigning it to *Alosa*, to which it is apparently most closely allied.

The figures of the scales of various Clupeoid genera, plates 73-75, exhibit interesting differences in structure.

HARENGULA GIBBOSA (Bleeker).

Nineteen specimens, 110 to 140 mm. long. Batavia.

These fishes seem to fit about equally well the descriptions and figures of *Clupea (Harengula) gibbosa*, *atricauda*, and *moluccensis* in Bleeker.⁷ The name *gibbosa* seems to be the oldest.

We follow Bleeker in assigning these specimens to the genus or subgenus *Harengula*. *Harengula* and *Sardinella* were apparently

¹ Bleeker, Atlas, Ichth., vol. 6, p. 92, pl. 271, fig. 3.

² Idem, vol. 6, p. 81, pl. 272, fig. 4.

³ Idem, vol. 6, p. 94, pl. 271, fig. 1.

⁴ Idem, vol. 6, p. 95, pl. 271, fig. 2.

⁵ Idem, vol. 6, p. 102, pl. 272, fig. 5.

⁶ Idem, vol. 6, p. 114, pl. 265, fig. 5.

⁷ Idem, vol. 6, pp. 106-7.

both founded on fishes of the same genus unless *Sardinella* was founded on the young of *Clupea*, but the type of the former is easier to determine.

In this group Bleeker has recognized a great number of species which we are utterly unable to separate with the material at hand. Many of our specimens seem to show intermediate characters and it would be only by an examination of a much longer series that they could be separated.

HARENGULA PERFORATA (Cantor).

Plate 75, fig. 1.

Twenty-one specimens, 100 to 140 mm. long. Batavia. These specimens evidently represent the species described by Cantor as *Clupeonia perforata*, but our specimens seem to fit about equally well Bleeker's descriptions of several forms which he puts in several genera.

HARENGULA ARGYROTÆNIA (Bleeker).

Two small specimens from Batavia, 71 and 85 mm. long, apparently represent the form described by Bleeker as *Clupea (Harengula) argyrotænia*.¹ It may also be the same fish as the one described under the name *Clupea dispilonotus*.²

ILISHA INDICA (Swainson).

Plate 75, fig. 3.

Fifteen specimens from Batavia, 90 to 170 mm. long, seem to agree fairly well with the description and figure of this species as given by Bleeker.³

One additional specimen from Pelaboean Ratoe, in very bad shape, seems to be this species. Native name of this specimen given as "Bu-ro-nuk."

ILISHA ELONGATA (Bennett).

One small specimen from Batavia, 90 mm. long, in bad shape, is doubtfully referred to this species on the basis of the descriptions and figures in Bleeker.⁴

OPISTHOPTERUS TARTOOR (Cuvier and Valenciennes).

One specimen from Pelaboean Ratoe, Wynkoop Bay, 140 mm. long. Native name given as "Dow-in-a-wi."

In the discussion of the species Bleeker⁵ expresses doubt as to whether it is the same as the *tartoore* of Russell and suggests the name *O. valenciennesi* if it is different. We are inclined to agree with this conclusion, but have not sufficient material to prove the case.

¹ Atlas Ichth., vol. 6, pl. 264, fig. 5.

² Idem, vol. 6, p. 111, pl. 261, fig. 3.

³ Idem, vol. 6, p. 118, pl. 259, fig. 4.

⁴ Idem, vol. 6, pp. 119-20.

⁵ Idem, vol. 6, p. 123, pl. 263, fig. 5.

ANODONTOSTOMA CHACUNDA¹ (Hamilton-Buchanan).

Eight specimens, 110 to 150 mm. long. Batavia. One specimen in the United States National Museum, No. 56031, from Mindanao, Philippine Islands, seems to represent the variety *selangkat*, but all the others examined by us are typical *chacunda*.

ANCHOVIA INDICA (van Hasselt).²

Twenty-nine specimens, 60 to 120 mm. long. Batavia.

ANCHOVIA COMMERSONII (Lacépède).

Sixty-one specimens, 70 to 120 mm. long. Batavia. *Stolephorus commersonii* or *S. tri*, Bleeker.³ Being unable to distinguish between the two, we use the older name.

ENGRAULIS POORAWAH (Russell).

Seven specimens, 100 to 170 mm. long. Batavia.

This is the species figured under this name by Bleeker.⁴ Day called it *E. hamiltonii*.

We have not seen the figure of *poorawah* of Russell, and the name *poorwah* of Cuvier is not identifiable except he identifies it with the *poorawah* of Russell. Bleeker says that his fish is certainly the *poorawah* of Russell.

We have not located the reference to *Thrissa hamiltonii* Gray, as the only anchovy figured by him in the first volume of the illustrations of Indian Zoology under the name *hamiltonii* seems to be the type of the genus *Coilia*. The reference given by Bleeker is to volume 2, Fish plate 5, while the *Engraulis (Coilia) hamiltonii* is volume 1, Fish plate 2.

ENGRAULIS ENCRASICHOLOIDES (Bleeker).⁵

Two specimens 70 and 130 mm. long. Batavia.

ENGRAULIS MYSTAX⁶ (Bloch and Schneider).

A single specimen, 170 mm. long, was obtained at Batavia.

SAURIDA TUMBIL⁷ (Bloch).

One very poor specimen 90 mm. long. Batavia.

CYPRINUS CARPIO (Linnæus).

One small specimen, 60 mm. long. Buitenzorg.

Native name given as "Maas."

This species was figured by Bleeker⁸ as *Carpio flavipinnis*.

¹ Bleeker, Atlas Ichth., vol. 6, p. 143, pl. 261, figs. 5 and 6.

² Idem, vol. 6, p. 127, pl. 259, fig. 2.

³ Idem, vol. 6, p. 128, pl. 259, fig. 1, and pl. 262, fig. 1.

⁴ Idem, vol. 6, p. 132, pl. 259, fig. 5.

⁵ Idem, Atlas Ichth., vol. 6, p. 130, pl. 263, fig. 4.

⁶ Idem, vol. 6, p. 132, pl. 261, fig. 3.

⁷ Idem, p. 155, pl. 277, fig. 4.

⁸ Idem, vol. 3, p. 74, pl. 108, fig. 3.

CARASSIUS AURATUS (Linnæus).

One small specimen, 35 mm. long. Buitenzorg.

Collected by D. G. Fairchild.

Described by Bleeker under many subspecific names but not figured.¹

BARBODES MACULATUS² (van Hasselt).

Eight specimens, 25 to 70 mm. long. Buitenzorg.

All differ from the description in having two instead of three scales between the lateral line and the base of the ventral fins. In this they agree with the form described as *B. goniosoma*, which is probably a synonym of *B. maculatus*. The number of scales between the lateral line and the ventral fins seems to be the only salient character, and this is not constant.

One larger specimen, 110 mm. long, has the lateral line still lower, so that the lower one of the two scales between it and the ventral is quite small.

The native name of all but the largest is given as "Bern-ter," of the largest "Erer-gees."

HAMPALA MACROLEPIDOTA³ (Kuhl and van Hasselt).

One specimen, 150 mm. long. Buitenzorg.

The native name is given as "Ham-pal."

CARPETA LEIACANTHUS⁴ (Bleeker).

One small specimen, 25 mm. long. Buitenzorg.

The native name is given as "Susik-melik."

LEPIDOCEPHALICHTHYS HASSELTII⁵ (Cuvier and Valenciennes).

Four specimens, 40 to 50 mm. long. Buitenzorg.

Also one specimen collected by D. G. Fairchild at Buitenzorg.

NEMACHEILUS FASCIATUS⁶ (Kuhl and van Hasselt).

Four specimens, 55 to 65 mm. long. Buitenzorg.

HEXANEMATICTHYS SUNDAICUS⁷ (Cuvier and Valenciennes).

Seven specimens, 110 to 200 mm. long. Batavia (4) and Pelaboean Ratoe (3).

Show no trace of the whitish cross stripes shown in the figure, but otherwise seem to correspond quite closely with figure and description. The specimens from Pelaboean Ratoe show some difference in the armature and shape of the head.

Native name, Pelaboean Ratoe, "Ka-du-kang."

NETUMA THALASSINA⁸ (Rüppell).

Three specimens about 300 mm. long. Batavia.

¹ Atlas Ichth., vol. 3, p. 75.

² Idem, vol. 3, p. 104, pl. 134, fig. 1; pl. 141, fig. 1; pl. 144, fig. 6.

³ Idem, vol. 3, p. 113, pl. 139, fig. 2.

⁴ Idem, vol. 3, p. 109, pl. 137, fig. 1.

⁵ Idem, vol. 3, p. 13, pl. 103, fig. 2.

⁶ Idem, vol. 3, p. 7, pl. 103, fig. 7.

⁷ Idem, vol. 2, p. 26, pl. 62.

⁸ Idem, vol. 2, p. 28, pl. 61.

PSEUDARIUS ARIUS¹ (Hamilton-Buchanan).

Ten specimens, 60 to 180 mm. long. Batavia (2) and Pelaboean Ratoe (8).

HEMIBAGRUS NEMURUS² (Kuhl and van Hasselt).

One partly dried specimen about 250 mm. long and one specimen 110 mm. long. Larger one from Dakok, smaller from Buitenzorg.

HEMIBAGRUS PLANICEPS³ (?) (Kuhl and van Hasselt).

One specimen, 260 mm. long. Buitenzorg.

One mutilated specimen 220 mm. long taken from the stomach of a snake (identified by Thomas Barbour as *Homalopsis buccata*).

HEMIBAGRUS,⁴ species.

One small specimen, 50 mm. long. Buitenzorg (?).

GLYPTOTHORAX PLATYPOGON⁵ (Kuhl and van Hasselt).

Six specimens, 70 to 100 mm. long. Buitenzorg.

Native name "Gae-kel."

CALlichROUS BIMACULATUS⁶ (Bloch).

One specimen, 165 mm. long. Batavia.

CLARIAS TEYSMANNI⁷ (Bleeker).

One specimen, about 50 mm. long. Buitenzorg.

Four specimens, each about 20 mm. long, have been provisionally identified as the young of this species.

Native name given as "Lee-le."

CLARIAS BATRACHUS⁸ (Bloch).

Two specimens, 140 and 180 mm. long. Buitenzorg.

One fairly large head seems to be referable to this species. Native name, "Lee-le."

CLARIAS, species.

Ten young specimens, each about 20 mm. long. Buitenzorg.

Too small for specific identification at present. Native name, "Lee-le."

MONOPTERUS JAVANENSIS⁹ (Lacépède).

Twenty-five specimens, 50 to 450 mm. long. Buitenzorg, 10; Depok, 3; Tjibodas, Mount Gedei, 4,500 feet., 1; ? 11. Native name, "B'lut."

Also one specimen collected by D. G. Fairchild at Buitenzorg.

¹ Bleeker, Atlas Ichth., vol. 2, p. 36, pl. 49.

² Idem, vol. 2, p. 55, pl. 69.

³ Idem, vol. 2, p. 56, pl. 71.

⁴ Idem, vol. 2, p. 54.

⁵ Idem, vol. 2, p. 63, pl. 83, fig. 2.

⁶ Idem, vol. 2, p. 84, pl. 87, fig. 3.

⁷ Idem, vol. 2, p. 104, pl. 99, fig. 1.

⁸ Idem, vol. 2, p. 103, pl. 98, fig. 2.

⁹ Idem, vol. 4, p. 118, pl. 191, fig. 1.

ANGUILLA MAURITIANA¹ (Bennett).

One very large specimen, head and skin about 5 feet long. Buitenzorg.

ANGUILLA SIDAT² (Bleeker).

Two small specimens about 130 and 160 mm. long. Pelaboean Ratoe. Native name, "Or-ling."

MURÆNESOX TALABON³ (Cuvier).

One specimen, about 500 mm. long. Batavia.

GYMNOTHORAX PICTUS⁴ (Ahl).

One large specimen (head and skin) about 1 meter long. Batavia.

PANCHAX PANCHAX⁵ (Hamilton-Buchanan).

Twenty-two specimens, 30 to 50 mm. long. Buitenzorg.

Five small specimens about 20 mm. long have been doubtfully referred to this species, although showing some differences in proportions and color which may be due to age. Native name, "Susikmelik."

PAREXOCÆTUS MENTO⁶ (Cuvier and Valenciennes).

One specimen, 80 mm. long. Batavia.

CYPSILURUS OPISTHOPUS⁷ (Bleeker).

Two specimens, 180 to 190 mm. long. Batavia.

ZENARCHOPTERUS DISPAR⁸ (Cuvier and Valenciennes).

One poor specimen, about 140 mm. long, with most of snout broken off. Batavia.

ZENARCHOPTERUS BUFFONIS⁹ (Cuvier and Valenciennes).

Two good specimens, 160 and 180 mm. long. Batavia.

Apparently male and female.

DERMOGENYS PUSILLUS¹⁰ van Hasselt.

Sixty-two specimens, 30 to 50 mm. long, of this small fluviatile form. Buitenzorg.

The description is not sufficiently clear for us to separate this species from *D. sumatranus* in the absence of specimens of the latter. The main differences appear to be variations in depth and in length.

¹ Bleeker (*Muræna maculata*), Atlas Ichth., vol. 4, p. 9, pl. 145, fig. 2. Günther (*Anguilla mauritiana*). Cat. Fish. Brit. Mus., vol. 8, p. 25.

² Bleeker, Atlas Ichth., vol. 4, p. 10, pl. 147, fig. 3.

³ Idem, vol. 4, p. 22, pl. 152, fig. 2.

⁴ Idem, vol. 4, p. 87, pl. 170, figs. 3-4; pl. 172, fig. 3; pl. 173, fig. 1; pl. 189, fig. 3.

⁵ Idem, vol. 3, p. 141, pl. 144, fig. 3.

⁶ Idem, vol. 6, p. 77, pl. 251, fig. 6.

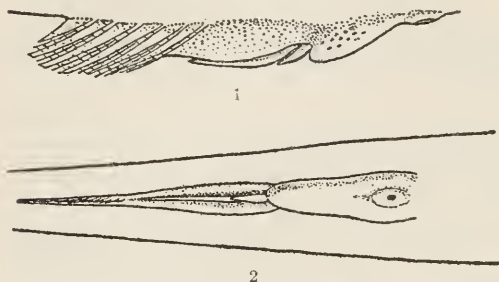
⁷ Idem, vol. 6, p. 76, pl. 248, fig. 2.

⁸ Idem, vol. 6, p. 63, pl. 253, fig. 4.

⁹ Idem, vol. 6, p. 62, pl. 254, fig. 3.

¹⁰ Idem, vol. 6, p. 64-66, pl. 253, fig. 1-2.

of head. Bleeker measured 58 specimens of *D. pusillus* and 2 of *D. sumatranus*. The remarkable development of the anal region is here shown in figs. 1 and 2.



FIGS. 1-2.—ANAL FIN OF MALE DERMOGENYS PUSILLUS.
1, VIEW OF RIGHT SIDE; 2, VENTRAL VIEW.

Native name, "Ju-ju-long."

BELONE STRONGYLURA¹ van Hasselt.

Four specimens, each about 350 mm. long. Batavia.

BELONE ANNULATA² Cuvier and Valenciennes.

One specimen, about 350 mm. long. Batavia.

The name *gigantea* Temminck and Schlegel for this species seems to be about four years later than *annulatus*.

SPHYRÆNA JELLO³ Cuvier and Valenciennes.

Seven specimens, 140 to 270 mm. long. Batavia.

SPHYRÆNA OBTUSATA⁴ Cuvier and Valenciennes.

Two small specimens, about 120 mm. long. Batavia.

ATHERINA FORSKALII⁵ Rüppell.

One specimen, 75 mm. long. Batavia.

ATHERINA DUODECIMALIS⁶ Cuvier and Valenciennes.

One small specimen, 70 mm. long. Batavia.

The small amount of material of this very difficult group renders the identification very uncertain.

MUGIL DUSSUMIERI⁷ Cuvier and Valenciennes.

One specimen, 140 mm. long. Batavia.

MUGIL PLANICEPS⁸ Cuvier and Valenciennes.

One specimen, 220 mm. long. Batavia.

AGONOSTOMUS⁹ BRYANTI Bean and Weed, new species.

Two specimens, 51 mm. long. Pelaboean Ratoe, Wynkoop's Bay, October, 1909.

¹ Bleeker (*Mastacembelus strongylurus*), Atlas Ichth., vol. 6, p. 45, pl. 257, fig. 2.

² Idem, vol. 6, p. 48, pl. 258, fig. 3.

³ Bleeker (Verh. Bat. Gen., vol. 22, 1849, p. 56, of Bijdrage tot de kennis der Percoiden van den Malaijo-Molukschen Archipel met beschrijvingen van 22 nieuwe soorten) and Day (Fish. India, p. 342).

⁴ Bleeker (Verh. Bat. Gen., 1849, p. 56) and Day (Fish. India, p. 343, pl. 71, fig. 5).

⁵ Day, Fish. India, p. 345, pl. 71, fig. 4.

⁶ Idem, p. 345.

⁷ Idem, p. 352, pl. 74, fig. 4.

⁸ Idem, p. 350.

⁹ Referred with some doubt to this genus to which it seems most closely allied.

We are informed that there are many small mountain streams flowing into the bay and it is probable that these fish were taken from one of these.

Head, $3\frac{1}{2}$; depth, 4; snout, $5\frac{1}{2}$; eye, $3\frac{3}{4}$; D. V-I, 8; A. III, 8; scales 26-29 in horizontal series, the specimens being in such condition that it is practically impossible to make an accurate count. Teeth in a villiform patch in each jaw, the outer row considerably enlarged. The teeth in the inner rows are so small that they can not be detected by the use of a dissecting needle but are plainly visible under the microscope. Looking directly down on their ends they look like minute papillæ. Papillæ of similar appearance are visible in all parts of the roof of the mouth of the cotype, being especially crowded on the head of the vomer. The teeth of the outer row are strong, conical, abruptly recurved and, perhaps, slightly flattened at the tip. In *Agonostomus monticola* the teeth in the jaws are all recurved, with

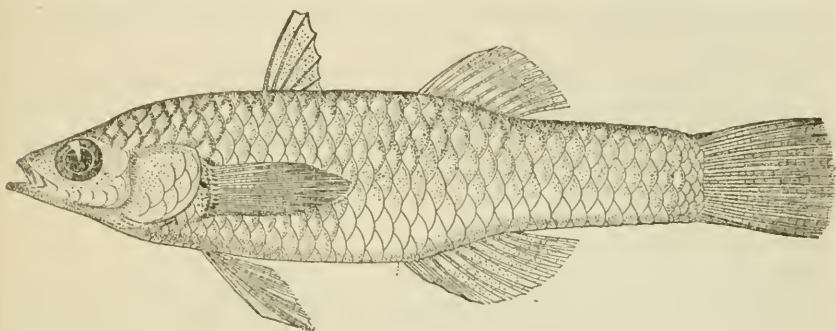


FIG. 3.—*AGONOSTOMUS BRYANTI*, NEW SPECIES.

the tip flattened, spoon-shaped, bicuspid or tricuspoid. A careful inspection will show all types in the same jaw.

Mouth very small, oblique, the lower jaw strongly projecting. The maxillary does not reach front of eye.

Caudal rounded; soft dorsal opposite anal and similar to it but with slightly shorter base.

Scales ctenoid, a single row of teeth on the edge of each. In *Agonostomus monticola* there are from three to six rows of fine teeth on the outer edge of each scale. An unidentified specimen of *Joturus* has the entire exposed surface of the scale closely covered with fairly strong teeth.

This species differs from all other species of *Agonostomus* of which we can find any description in the small number of scales. The mouth, also, is smaller and directed more upward than in others. The teeth are apparently larger than *A. monticola*.

Color in alcohol uniform pale brownish.
 The dorsal fins were apparently black in life.
Type-Specimen.—Cat. No. 72582, U.S.N.M.

RACHYCENTRON CANADUS (Linnæus).

One specimen, 170 mm. long. Batavia.

DREPANE PUNCTATA¹ (Linnæus).

Two specimens, 90 and 160 mm. long. Batavia.

The smaller specimen has four free spines before the dorsal. These are apparently articulated directly to the supraoccipital crest. Traces of them can be seen in the largest specimen.

PLATAX TEIRA² (Forskål).

Three specimens, 180 to 200 mm. long. In very poor color. Batavia.

MEGALASPIS ROTTLEI³ (Bloch).

Thirty-six specimens, 100 to 150 mm. long. Batavia, 26; Pelaboean Ratoe, 10.

Described as *Scomber rottleri* by Bloch, which some authors have identified with the *Scomber cordyla* of Linnæus. We are unable to decide in regard to the latter name, so use that of Bloch. The presence of finlets and the increased caudal armature seem to us sufficient grounds for generic separation.

CARANX FORSTERI Cuvier and Valenciennes.

Three specimens, 230 mm., 235 mm., 290 mm. Batavia.

We have examined all the specimens of this and related species in the United States National Museum and have reached the following conclusions:

Caranx latus Agassiz is a very different species, with more soft rays in dorsal and anal, with long snout, fewer scutes, and the curved and straight parts of the lateral line about equal in extent.

Caranx elacata is probably this species, also *C. marginatus* and the type of *C. rhabdotus*. The cotype of *C. rhabdotus* is quite different from the type in many characters and is probably a different species. Both are very young. Specimens from Hawaii were first identified as *C. latus* and later published as *C. forsteri*. They are apparently all *C. melampygius*.

Caranx parapistes Richardson is probably *C. forsteri*, as also *C. herberti* of Bennett.

Caranx melampygius of Day (Fishes of India) is apparently a mixture of *C. forsteri* and *C. melampygius*. He probably had both species

¹ Bleeker (*Harpochirus punctatus*), Atlas Ichth., vol. 9, p. 19, pl. 365, fig. 4.

² Idem, vol. 9, p. 73, pl. 379, fig. 2, and pl. 382, fig. 1.

³ The specimens of Carangidæ and Scombridæ in this collection were examined by Mr. J. T. Nichols of the American Museum, New York. Our identifications agree with those of Mr. Nichols except in a very few cases where a more complete series for comparison has shown some obvious differences.

at hand and confused them, a thing quite easy to do unless the length of the snout and maxillary, number of rays in dorsal and anal, and number of scutes are noted. The shape of the curved part of the lateral line is also different in the two.

CARANX DJEDABA (Forskål).

Twenty-seven specimens, 90 to 180 mm. long. Batavia.

One specimen is aberrant in head and depth, but the others appear to form a very natural group.

This is possibly different from the *Caranx djeddaba* of Rüppell,¹ which has a larger fin count in dorsal and anal. It is the *Caranx djeddaba* of Day and the *Selar kuhlii* of Bleeker.²

The *Caranx vari* of Cuvier and Valenciennes may be the same as the *C. djeddaba* of Rüppell.

CARANX KALLA Cuvier and Valenciennes.

One specimen, 95 mm. long. Batavia.

This specimen is very young and lacks the falcate pectoral which appears in young of other species at similar sizes. It seems to be, however, the *Caranx kalla* of Cuvier and Valenciennes and the *Caranx brevis* of Bleeker and of Günther. The *Caranx calla* of Günther may be a different species with a shorter head.

CARANX LEPTOLEPIS (Cuvier and Valenciennes).

One specimen, 130 mm. long. Batavia.

This fish was identified by Nichols as *C. georgianus*, but an examination of specimens of *georgianus* from Australia, the type-locality, shows that the latter are a different species with longer head, greater depth, smaller eye, longer snout, fewer gill-rakers, and fewer scutes. Also the scutes on the Australian specimens are much larger.

This specimen agrees well with the description of *C. leptolepis*, the type of which came originally from Java, except that the snout is a little shorter than there recorded. This discrepancy may be partly due to differences in method of measurement. If the snout of our specimen is measured from the front edge of the iris it is equal in length to the diameter of the iris.

CARANX IRE (Cuvier and Valenciennes).

One specimen, 130 mm. long. Batavia.

Our specimen differs somewhat from a Philippine specimen also identified as *C. ire* in head and depth, but we lack material to settle the matter. Either specimen fits the descriptions fairly well.

CARANX ATROPUS (Bloch and Schneider).

Two specimens, each 75 mm. long. Batavia.

The head is considerably longer and the ventral fins much shorter than in current descriptions. In some respects these fish seem to be

¹ Atlas Fische, p. 97.

² Makreelachtigen Fische, p. 54.

closer to Günther's description of *Caranx talamparoides* Bleeker. The latter is, however, probably more slender.

CARANX MALABARICUS (Bloch and Schneider).

Two specimens, 165 mm. and 270 mm. long. Batavia.

In spite of some discrepancies these specimens seem to conform fairly well to the published descriptions.

CARANX OBLONGUS (?) (Cuvier and Valenciennes).

One specimen, 175 mm. long. Batavia.

Our fish seems to fit the descriptions of this species fairly well except that the first anal ray is about as long as the first dorsal ray.

A specimen from New Guinea labeled *C. oblongus* is not this species and we have not yet been able to identify it.

CARANX ARMATUS (Forsk.).

Two specimens, 110 and 150 mm. long. Batavia.

This species is quite distinct from *Citula dorsalis* Gill, with which Mr. Nichols compares it.

Specimens from the Philippines labeled *C. armatus* seem to be the same species as those identified as *C. atropus* by Mr. Nichols and ourselves.

CARANX MALAM (Bleeker).

Two specimens, 170 and 180 mm. long. Batavia.

These specimens are the *Caranx nigripinnis* of Day, which seems to be certainly a synonym of *Selar malam* of Bleeker.

ALECTIS INDICUS (Bloch).

Two specimens, each about 150 mm. long.

The genus *Alectis*, proposed by Rafinesque as a substitute for *Gallus* Lacépède, was probably based on this species. Lacépède's description of *Gallus virescens* could apply either to this species or to *ciliaris*, but Cuvier and Valenciennes say that he had seen only specimens from the Indian Ocean, where this species is quite common and *ciliaris* is rather rare.

Cuvier and Valenciennes describe this species under five names: *Scyris indicus*,¹ *Scyris alexandrinus*,² *Gallichthys major*,³ *Gallichthys chevala*,⁴ and *Gallichthys ægyptiacus*.⁵ *Ciliaris* was described by these authors under three names: *Blepharis indicus*,⁶ *Blepharis sutor*,⁷ and *Blepharis major*.⁸

The description of *Scyris indicus* fits our fish with sufficient exactness and the type of that fish came from Java.

If we are correct in our translation, the very brief description of *Zeus gallus* given by Linnæus refers not to the present species but to the *ciliaris* of Bloch.

¹ Hist. des Poissons, vol. 9, p. 145.

² Idem, vol. 9, p. 152.

³ Idem, vol. 9, p. 168.

⁴ Idem, vol. 9, p. 175.

⁵ Idem, vol. 9, p. 176.

⁶ Idem, vol. 9, p. 154.

⁷ Idem, vol. 9, p. 161.

⁸ Idem, vol. 9, p. 163.

LACTARIUS LACTARIUS (Bloch and Schneider).

Thirteen specimens, 80 to 160 mm. long. Batavia, 11; Belaboean Ratoc, 2.

SCOMBEROIDES TOL (Cuvier and Valenciennes).

Twenty-one specimens, 100 to 200 mm. long. Batavia.

These fish are the same species as the one figured under the name *moadetta* by Day.

They are quite different from the Hawaiian specimens described as *sancti-petri* which have the scales lanceolate instead of linear as in the Javan specimens.

The Hawaiian specimens are undoubtedly properly identified with the *S. sancti-petri* of Cuvier and Valenciennes.

SCOMBEROIDES LYSAN (Forskål).

Ten specimens, 120 to 190 mm. long. Batavia.

These specimens are easily separable at a glance from the two more slender forms, *S. tol* and *S. sancti-petri*.

The fishes belonging to the genera *Scomberoides* and *Oligoplites* are so similar in form that on external characters they seem to constitute but a single genus. However, the American species have only 4-5 (occasionally 6) spines in the first dorsal (it is possible that all the counts of 6 have been made by including the last procumbent spine), while those of Asia and Africa have 6 or 7 spines (probably 6 by atrophy of the first). This character would not be worthy of generic rank if it were not supported by other anatomic ones. The scales in all the American forms are linear, while they are lanceolate in all the African and Asiatic ones except *S. tol*, which has them linear.

The most important character is one that was first mentioned and figured by Lütken in *Spolia Atlantica*,¹ the arrangement of the teeth in the roof of the mouth. In both there is practically a continuous band of teeth across the head of the vomer, the entire length of the palatine and on the upper arm of the pterygoid. In addition to this *Scomberoides* has a broad patch of teeth on the mesopterygoid. We quote Lütken's statement from the English edition:

For the subdivision of this genus it would be best to employ a difference hitherto unnoticed, namely, the existence or absence of teeth on the pterygoids side by side with those of the palatines and vomer, in accordance with the following scheme, the divisions of which must, however, only be estimated as sections or subgenera, and not as true genera.

A. 4-5 (6) dorsal spines; scales linear; no teeth on the pterygoids. *C. occidentalis*, *saliens*, *palometa* (*Oligoplites*, Gill).

B. 7 dorsal spines, and teeth on the pterygoids. 1. Scales linear: *C. tol* (*C. moadetta*, Klz., perhaps the young form of *C. tol*). 2. Scales short and broad: *C. lysan*, *sancti Petri*, and a new species from Singapore which greatly resembles *C. altus* of the western coast of Central America.

¹ Dansk. Vid. Selsk. Skr., vol. 12, 1850, pp. 413-613, pls. 1-5, translated in Ann. Mag. Nat. Hist., ser. 5, vol. 7, 1851, pp. 1-14, 107-123.

There is a considerable difference in number and arrangement of gill-rakers in the various species of *Oligoplites* and *Scomberoides*, but it seems to have no generic value.

The genus *Eleria* Jordan and Seale, based on the presence near the symphysis of the mandible of a pair of diverging canine teeth, is a synonym of *Scomberoides*. These teeth are matched by a similar pair in the upper jaw of specimens less than 150 mm. long. Soon after reaching this size the mandibular pair of canines disappear while those on the premaxillary persist until the fish is about 180 mm. long.

Eleria philippina, the type-species, is a synonym of *Scomberoides lysan*.

SCOMBER KANAGURTA (Russell).

Twenty-eight specimens, 110 to 200 mm. long. Batavia.

Identified by J. T. Nichols as *S. brachysoma* and *S. microlepidotus*. *Scomber brachysoma* Bleeker is an exceedingly rare fish in Java (Bleeker had only one specimen) and differs from all of these specimens in much greater depth and in the absence of all spotting on the back.

Scomber microlepidotus is apparently the young of *S. chrysozonus*, and this name is therefore not tenable.

We have examined in addition to these Java fish, one which was identified by Bleeker as *Scomber kanagurta*, two identified by Alvin Seale as *S. loo*, and eight identified by Seale as *S. microlepidotus*. The ones called *loo* are much larger and show a slightly different color pattern, but otherwise we can see no other specific differences in any grouping of the entire lot. We are entirely unable to determine the basis of Nichols's division of the specimens he examined.

We have carefully examined the paper by Dr. P. N. Van Kampen,¹ and agree with him that *Scomber kanagurta*,² *S. loo*, *S. microlepidotus*, *S. moluccensis*, *S. chrysozonus*, and *S. reani*, should all be included under the single name *S. kanagurta*, but we differ from him in including his *S. neglectus* in the list.

Another specimen (No. 56090) labeled *Scomber brachysoma* (probably identified by Alvin Seale) is evidently Van Kampen's *S. neglectus*, which we include in *S. kanagurta*, as our specimens from Batavia, Java, show all the intermediate conditions.

Mr. E. C. Starks, after an examination of the skull of each of these species and of *Scomber scombrus*, said that he saw no reason in this case for generic separation of the two. This leaves *brachysoma* alone in the genus *Rastrelliger*.

¹ Bull. Dept. Agr. Ind. Néerl., No. 8, Zool., pt. 2, 1907.

² For bibliography of *Scomber kanagurta*, especially revisions, see P. N. Van Kampen, Bull. Dept. Agr. Ind.-Néerl., No. 8 (Zool., pt. 2), 1907; Klunzinger, Verh. Zool.-Bot. Ges. Wien, vol. 21, 1871, p. 441; H. W. Fowler, Proc. Acad. Nat. Sci. Phila., vol. 56, 1904, p. 757.

GYMNOSARDA ALLETERATA (Rafinesque).

Four specimens, three about 250 mm. each, one about 300 mm. long. Batavia.

AUXIS THAZARD (Lacépède).

One specimen, 240 mm. long. Batavia.

SCOMBEROMORUS COMMERSONII (Lacépède).

Six specimens, 170 to 230 mm. long. Batavia.

SCOMBEROMORUS GUTTATUS (Bloch and Schneider).

Two specimens, 110 and 170 mm. long and three doubtful, 55, 170, and 180 mm. long. Batavia.

So far as we can identify them, there are six specimens of *S. commersonii* in the collection. The others are not this form but might with equal propriety be assigned to any one of four species: *S. kuhlii*, *S. guttatus*, *S. lineolatus*, and *S. interruptus*, all of which may ultimately be assigned the same name. We have, therefore, used the oldest name, *Scomberomorus guttatus*.

TRICHIURUS HAUMELA (Forskål).

Seven specimens, 140 to 280 mm. long. Batavia.

These specimens are labeled *Trichiurus haumela*, to which species they probably belong if, as seems rather doubtful, this and *T. japonicus* are really specifically distinct from *T. lepturus*. We do not have a sufficient series of specimens to determine this point. *T. coxi*,¹ of which we have two specimens, shows some characters which may prove of value.

We have three specimens, apparently *T. muticus*, which show the common characters of a more nearly straight lateral line and of the presence of minute scales indicating the position of the reduced ventral fins. These scales are almost invisible to the naked eye, but are readily apparent under a lens when their position has been shown by the use of a very fine dissecting needle. A coarser needle would be apt to destroy them without giving an indication of their presence. We have not been able to find these scales in other specimens examined.

The species of *Trichiurus* are so very similar in appearance and the various individuals of a single species show such great differences, especially in depth of body and in relative length of the various sections of the body, that it is probable we must look for differential characters in the internal anatomy or else greatly reduce the number of nominal species.

Trichiurus lepturus is plainly distinguished from *T. muticus* by its larger size, lack of ventral scales, more elongate (less markedly triangular) head and much stronger dentition. Also, the lateral line

¹ Ramsay and Ogilby, Proc. Linn. Soc. N. S. Wales (2), vol. 2, p. 562.

is more angled about opposite the end of the pectoral. In *T. muticus* the lateral line is nearly straight. *Trichiurus savala* may be small specimens of *T. "harmela"* or of *T. muticus* and may ultimately prove unidentifiable. *Trichiurus nitens* Garman¹ is possibly not distinct from *T. lepturus*.

STROMATEUS SINENSIS Euphrasen.

Ten specimens, 100 to 180 mm. long. Batavia.

One with an isopod (*Cymothoa stromatei* Bleeker) in the mouth.

LEIOGNATHUS BINDOIDES (?) Bleeker.

One specimen, 75 mm. long. Batavia.

LEIOGNATHUS EDENTULUS (Bloch).

Seven specimens, 80 to 100 mm. long. Batavia.

LEIOGNATHUS INSIDIATOR (Bloch).

One specimen, 75 mm. long. Batavia.

LEIOGNATHUS GERREOIDES (Bleeker).

Eight specimens, 85 to 110 mm. long. Batavia.

LEIOGNATHUS SPLENDENS (Cuvier).

Twenty-one specimens, 80 to 130 mm. long. Batavia.

Two doubtful specimens, each 75 mm. long. Binoeangen.

GAZZA MINUTA (Bloch).

Eight specimens, seven about 90 mm. long, the other about 130 mm. long. Batavia, 7; Pelaboean Ratoe, 1.

AMBASSIS NALUA² (Cuvier and Valenciennes).

One specimen 70 mm. long and one doubtful, 60 mm. long.

Best specimen from Batavia, other from Welcome Bay, Bantam.

AMIA QUADRIFASCIATA (Cuvier and Valenciennes).

One specimen, 95 mm. long. Batavia.

Shows some characteristic vertical bars below the lowest horizontal stripe, which are not shown in Bleeker's figure.³

AMIA AMBOINENSIS⁴ (Bleeker).

One specimen, 120 mm. long. Batavia.

EPINEPHELUS ONGUS⁵ (Bloch).

Two specimens, 280 and 300 mm. long. Batavia.

EPINEPHELUS VARIOLOSUS⁶ (Cuvier and Valenciennes).

One specimen, 200 mm. long. Batavia.

Two other specimens, 220 and 290 mm. long, have been doubtfully referred to this species.

¹ Mem. Mus. Comp. Zoöl., vol. 26, p. 69.

² Bleeker, Atlas Ichth., vol. 8, p. 135, pl. 354, fig. 6.

³ Idem, vol. 7, p. 88; vol. 8, pl. 335, fig. 1.

⁴ Idem, vol. 7, p. 90; vol. 8, pl. 346, fig. 1.

⁵ Idem, vol. 7, p. 64, pl. 282, fig. 2. Not pl. 342, fig. 3.

⁶ Idem, vol. 7, p. 40, pl. 300, fig. 3.

EPINEPHELUS SEXFASCIATUS¹ (Kuhl and van Hasselt).

One specimen, 220 mm. long. Batavia.

EPINEPHELUS PANTHERINUS² (Lacépède).

Four specimens, 140 to 250 mm. long. Batavia.

EPINEPHELUS GILBERTI³ (Richardson).

One specimen, 240 mm. long. Batavia.

EPINEPHELUS MERRA⁴ Bloch.

Two specimens, 170 and 260 mm. long. Batavia.

THERAPON PUTA⁵ (Cuvier and Valenciennes).

Three specimens, 120 to 130 mm. long. Batavia.

THERAPON JARBUA⁶ (Forskål).

Three specimens, 90 to 130 mm. long. Welcome Bay, Bantam, 1;
Batavia, 2.

THERAPON THERAPS⁷ Cuvier and Valenciennes.

Six specimens, 30 to 150 mm. long. Batavia.

PLECTORHYNCHUS PICTUS⁸ (Thunberg).

Two specimens, 190 to 200 mm. long. Batavia.

Adult of this species.

PLECTORHYNCHUS CHÆTODONOIDES⁹ (Lacépède).

One specimen, 300 mm. long, in adult coloration. Batavia.

SCOLOPSIS BIMACULATUS¹⁰ (Rüppell).

One specimen, 190 mm. long. Batavia.

SCOLOPSIS TÆNIOPTERUS¹¹ (Kuhl and van Hasselt).

One specimen, 230 mm. long. Batavia.

SCOLOPSIS MARGARITIFER¹² Cuvier and Valenciennes.

Three specimens, each about 190 mm. long. Batavia.

POMADASYS NAGEB¹³ (Rüppell).

One specimen, 250 mm. long. Batavia.

There is some discrepancy between the description and the figure in regard to scale count. The fish at hand has about 40 scales in a horizontal series *below* the lateral line and about 56 in and above lateral line. The description calls for about 40 scales *in* the lateral line. In the figure are shown 56 scales in and above the lateral line and about 50 below.

¹ Bleeker, Atlas Ichth., vol. 7, p. 60, pl. 281, fig. 2.

² Idem, vol. 7, p. 51, pl. 286, fig. 1.

³ Idem, vol. 7, p. 56; vol. 8, pl. 351, fig. 3.

⁴ Idem, vol. 7, p. 55, pl. 301, fig. 2.

⁵ Idem, vol. 7, p. 112; vol. 8, pl. 340, fig. 2.

⁶ Idem, vol. 7, p. 112, pl. 312, fig. 2.

⁷ Idem, vol. 7, p. 113; vol. 8, pl. 321, fig. 1.

⁸ Idem, vol. 8, p. 24, pl. 329, fig. 4; pl. 333, fig. 2.

⁹ Idem, vol. 8, p. 17, pl. 301, fig. 3; pl. 303, fig. 2.

¹⁰ Idem, vol. 7, pl. 314, fig. 1; vol. 8, p. 10.

¹¹ Idem, vol. 8, p. 10, pl. 343, fig. 5.

¹² Idem, vol. 8, p. 3, pl. 317, fig. 2.

¹³ Idem, vol. 8, p. 29, pl. 351, fig. 4.

LUTJANUS CHIRTAH¹ (Cuvier and Valenciennes).

Five young specimens, 80 to 160 mm. long. Batavia.

LUTJANUS VITTA² (Quoy and Gaimard).

One specimen, 170 mm. long. Batavia.

LUTJANUS RUSSELLI³ (Bleeker).

Two specimens, each about 180 mm. long. Batavia.

LUTJANUS FULVIFLAMMA⁴ (Forskål).

Two specimens, 250 and 300 mm. long. Batavia.

The most salient difference between these specimens and the description and figure is in the distal edge of the anal fin, which is described as being curved. Our specimens show it almost perfectly straight.

CÆSIO CÆRULAUREUS⁵ Lacépède.

One specimen, 170 mm. long. Batavia.

CÆSIO LUNARIS⁶ (Ehrenberg).

Six specimens, 130 to 220 mm. long. Batavia.

All these specimens have a narrow band or a single row of teeth on the palatine or pterygoid. This patch is so narrow that it can not be found by the use of an ordinary dissecting needle, but is detected at once by the use of an edge as a scraper in the roof of the mouth.

SPARUS DATNIA⁷ (Hamilton-Buchanan).

One specimen, 110 mm. long. Pelaboean Ratoe.

The native name is given as "Sing-rung."

GERRES MACRACANTHUS⁸ Bleeker.

Two specimens, 90 and 110 mm. long. Batavia.

OTOLITHUS ARGENTEUS⁹ Kuhl and van Hasselt.

Five specimens, 100 to 260 mm. long. Batavia.

PSEUDOSCIÆNA ANÆUS¹⁰ (Bloch).

Five specimens, 65 to 150 mm. long. Batavia.

PSEUDOSCIÆNA PLAGIOSTOMA¹¹ (Bleeker).

Two specimens, each 120 mm. long. Batavia.

UMBRINA MACROPTERA¹² Bleeker.

Two specimens, 140 and 150 mm. long. The dorsal rays are 20-24. Pelaboean Ratoe.

¹ Bleeker, Atlas Ichth., vol. 8, p. 58, pl. 301, fig. 1.

² Idem, vol. 8, p. 51, pl. 340, fig. 5.

³ Idem, vol. 8, p. 71, pl. 300, fig. 2.

⁴ Idem, vol. 8, p. 65, pl. 344, fig. 3.

⁵ Idem, vol. 8, p. 39, pl. 347, fig. 4.

⁶ Idem, vol. 8, p. 37, pl. 334, fig. 4.

⁷ Idem, vol. 8, p. 109, pl. 361, fig. 4.

⁸ Idem, vol. 8, p. 125, pl. 362, fig. 1.

⁹ Idem, vol. 9, pl. 385, fig. 5, and Day, Fishes of India, p. 197, pl. 45, fig. 3.

¹⁰ Idem, vol. 9, pl. 385, fig. 2, and Day (*Scizena anæus*), Fishes of India, p. 189, pl. 45, fig. 5.

¹¹ Idem, vol. 9, pl. 385, fig. 1.

¹² Day, Fishes of India, p. 182, and figured by Bleeker as *Scizena macroptera*, Atlas Ichth., vol. 9, pl. 384, fig. 5.

UMBRINA RUSSELLII¹ Cuvier and Valenciennes.

One specimen, 130 mm. long. Batavia.

SILLAGO SIHAMA² (Forskål).

Two specimens, 135 and 145 mm. long. Batavia.

UPENEUS VITATUS³ (Forskål).

One specimen, 90 mm. long, much discolored. Batavia.

UPENEUS SUNDAICUS⁴ (Bleeker).

One specimen, 105 mm. long. Batavia.

UPENEUS TRAGULA⁵ (Richardson).

One specimen, 240 mm. long. Batavia.

UPENEUS SULPHUREUS⁶ (Cuvier and Valenciennes).

Thirteen specimens, 65 to 120 mm. long. Batavia.

ACANTHOCHÆTODON ANNULARIS⁷ (Bloch).

One specimen, 240 mm. long. Batavia.

The preservative has turned this specimen very dark, but the color pattern is quite distinct.

SIGANUS CORALLINUS⁸ (Cuvier and Valenciennes).

Two small specimens, 65 and 80 mm. long. Batavia.

SIGANUS GUTTATUS (Bloch).

Two specimens, 210 and 230 mm. long. Batavia.

SIGANUS VIRGATUS (Cuvier and Valenciennes).

Seven specimens, 120 to 200 mm. long. Batavia.

SIGANUS JAVUS (Linnæus).

Three specimens, 150, 170, and 190 mm. long. Batavia.

TRICHOPODUS TRICHOPTERUS⁹ (Pallas).

Two specimens, 90 and 95 mm. long. Batavia.

Also one small specimen from Buitenzorg, collected by D. G. Fairchild.

CTENOPS STRIATUS¹⁰ (Bleeker).

Eighteen specimens, 15 to 60 mm. long. Buitenzorg.

OPHIOCEPHALUS MELANOPTERUS¹¹ (Bleeker).

Two specimens, 65 and 130 mm. long. Buitenzorg, 1; Pelaboean Ratoe, 1.

Native names "Gar-hus" and "Bo-kan."

¹ Day, Fishes of India, p. 183, pl. 43, fig. 4, and Bleeker (*Sciæna russellii*), Atlas Ichth., vol. 9, pl. 386, fig. 2.

² Bleeker, Atlas Ichth., vol. 9, pl. 389, fig. 4.

³ Idem, vol. 9, pl. 392, fig. 3.

⁴ Idem, vol. 9, pl. 394, fig. 2.

⁵ Idem, vol. 9, pl. 392, fig. 2.

⁶ Idem, vol. 9, pl. 393, fig. 4.

⁷ Idem, vol. 9, p. 71, pl. 370, figs. 1, 2.

⁸ Bleeker, Verh. Bat. Gen., vol. 23, 1850, Bijdrage tot de kennis der Teuthiden von den Soenda-Molukschen Archipel, p. 11.

⁹ Bleeker, Atlas Ichth., vol. 9, pl. 395, fig. 4.

¹⁰ Idem, vol. 9, pl. 396, fig. 4.

¹¹ Idem, vol. 9, pl. 398, fig. 2.

OPHIOCEPHALUS GACHNA¹ (Hamilton-Buchanan).

Sixteen specimens, 60 to 170 mm. long. Buitenzorg, 7; Goenoeng Boender, Mount Salak, 2,400 feet, 8.

Although not so figured, it is probable that in life the vertical fins of this species are all more or less cross barred with black.

Also two specimens from Buitenzorg, collected by D. G. Fairchild, are doubtfully referred to this species.

Native name "Bo-go."

POMACENTRUS ANABATOIDES² (Bleeker).

Three poorly preserved specimens, each about 110 mm. long.

POMACENTRUS, species.

Two specimens, 20 mm. long. Pelaboean Ratoe.

Too small for identification under present conditions.

HELIASTES LEPIDURUS³ (Cuvier and Valenciennes).

One poorly preserved specimen, about 90 mm. long. Batavia.

HEMITAUTOGA NOTOPHTHALMUS⁴ (Bleeker).

One small specimen, 70 mm. long. Pelaboean Ratoe.

CHEILINUS CHLORURUS⁵ (Bloch).

One specimen, 170 mm. long. Batavia.

PSEUDOSCARUS VIRIDIS⁶ (Bloch).

Five specimens, each about 180 mm. long. Batavia.

PSEUDOSCARUS RIVULATUS⁷ (Kuhl and van Hasselt).

Two specimens, 180 and 210 mm. long. Batavia.

PSEUDOSCARUS CANTORI⁸ (Bleeker).

One specimen, 180 mm. long. Batavia.

This specimen has one "angular" tooth.

It is quite possible that *Pseudoscarius viridis*, *P. rivulatus*, and *P. cantori* are all color varieties or color phases of the same species.

PLATYCEPHALUS INDICUS⁹ (Linnæus).

Two specimens, 300 and 450 mm. long. Batavia.

This species has been described under the name *Platycephalus insidiator* by many authors.

PLATYCEPHALUS SCABER¹⁰ (Linnæus).

One specimen, 190 mm. long. Batavia.

¹ Bleeker, Atlas Ichth., vol. 9, pl. 397, fig. 4.

² Idem, vol. 9, pl. 407, fig. 7.

³ Idem, vol. 9, pl. 403, fig. 7; Günther, Fische Sudsee, p. 238, pl. 128, figs. C, D; and Day, Fishes of India, p. 389, pl. 82, fig. 1.

⁴ Idem, vol. 1, p. 140, pl. 21, fig. 1.

⁵ Idem, vol. 1, p. 65, pl. 27, fig. 3.

⁶ Idem, vol. 1, p. 45, pl. 17, fig. 3.

⁷ Idem, vol. 1, p. 44, pl. 9, fig. 3.

⁸ Idem, vol. 1, p. 43, pl. 9, fig. 2.

⁹ Idem, vol. 9, pl. 418, fig. 3, 3a, and Jordan and Richardson, Proc. U. S. Nat. Mus., vol. 33, p. 641.

¹⁰ Idem, vol. 9, pl. 419, fig. 5, 5a.

BATRACHOMÆUS TRISPINOSUS (Günther).

One specimen, 160 mm. long. Batavia.

GLOSSOGOBIUS GIURUS¹ Hamilton-Buchanan.

One specimen, 170 mm. long. Batavia.

KELLOGGELLA, species.

One specimen, 27 mm. long.

Seems to represent an undescribed species of *Kelloggella*, but is in such poor condition that no valid description of it can be made. It had apparently been very extensively dried before reaching us. The teeth are as in the type of *Kelloggella cardinalis*, tricuspid, narrower and much longer in the upper than in the lower jaw. In one row above and several rows below, at least in the front of the lower jaw.

This fish may have been more slender than *K. cardinalis*; the caudal and ventral fins seem to be more pointed, and the tips of the fin rays seem to have been free.

One specimen labeled "Pelaboean Ratoe, Preanger, Oct. 1909."

SALARIAS CAUDOLINEATUS Günther.

Three specimens, each about 40 mm. long. Pelaboean Ratoe, 2; Triperwageran, Bantam, 1.

Two agree with Günther,² the other with Kendall and Goldsborough.³ We can detect no specific differences between the two forms.

SALARIAS QUADRICORNIS⁴ Cuvier and Valenciennes.

Two specimens, 40 and 55 mm. long. Pelaboean Ratoe, 1; Triperwageran, Bantam, 1.

SALARIAS NATALIS Regan.

Three specimens, 45, 48, and 55 mm. long. Pelaboean Ratoe. Regan.⁵

SALARIAS TRIDACTYLUS⁶ (Bloch and Schneider.)

Eight specimens, 40 to 85 mm. long.¹ Pelaboean Ratoe.

One very large male had the occipital crest trifold and the fins all very high. In this specimen the color had become so intense that practically all traces of markings had become obscured. Some traces of what had apparently been very small blue spots remained.

SALARIAS MARMORATUS (?)⁷ Bennett.

One small specimen, 35 mm. long. Pelaboean Ratoe.

¹ Bleeker, Blenn. Gob., p. 24, and Day, Fishes of India, p. 294, pl. 46, fig. 1.

² Fische Sudsee, p. 209, pl. 116, fig. F.

³ Mem. Mus. Comp. Zoöl., vol. 26, No. 7, p. 326.

⁴ Günther, Fische Sudsee, p. 209, pl. 117, fig. B.

⁵ Proc. Zool. Soc. London, 1909, pt. 2, p. 465, pl. 66, fig. 4.

⁶ Günther, Fische Sudsee, p. 200, pl. 117, fig. C, D.

⁷ Idem, p. 204, pl. 116, fig. B.

SALARIAS LINEATUS (?)¹ Cuvier and Valenciennes.

One small specimen, 35 mm. long. Pelaboean Ratoe.

Appears much discolored. The color pattern is almost entirely obscured but seems to agree with the descriptions. The most serious discrepancies are in the length of the head and in the depth, but these may be due to age and the method of preservation and of measurement.

POLYNEMUS TRIDACTYLUS Bleeker.

One specimen, 240 mm. long. Batavia.

POLYNEMUS TETRADACTYLUS Shaw.

Four specimens, 140 to 300 mm. long. Batavia.

POLYNEMUS HEPTADACTYLUS Cuvier and Valenciennes.

One specimen, 70 mm. long. Batavia.

POLYNEMUS MELANOCHIR² Cuvier and Valenciennes.

Two specimens, 160 and 170 mm. long. Pelaboean Ratoe.

Native name "Char-wen-e-kerning."

ECHENEIS NAUCRATES Linnæus.

Four specimens, 190 to 250 mm. long. Batavia.

PSEUDORHOMBUS MALAYANUS³ Bleeker.

Six specimens, 130 to 200 mm. long. Batavia.

PSETTODES ERUMEI⁴ (Bloch and Schneider).

Five specimens, 200 to 230 mm. long. Batavia.

All but one had one or more large isopods (*Cymothoa stromatei* Bleeker) in the mouth. Three with eyes and color on the right side.

CYNOGLOSSUS MACROLEPIDOTUS⁵ (Bleeker).

Two specimens, each about 200 mm. long. Batavia.

CYNOGLOSSUS POTOUS⁶ (Cuvier).

Four specimens, 180 to 350 mm. long. Batavia.

CYNOGLOSSUS BRACHYRHYNCHUS⁷ (Bleeker).

One specimen, 100 mm. long. Batavia.

CYNOGLOSSUS QUADRILINEATUS⁸ (Kuhl and van Hasselt).

Ten specimens, about 250 mm. long. Batavia.

PARAPLAGUSIA MARMORATA⁹ Bleeker.

One specimen, 160 mm. long. Batavia.

¹ Günther (*S. lineatus*), Cat. Fish. Brit. Mus., vol. 3, p. 254; Day, Fish. India, p. 332, pl. 70, fig. 8, and Bleeker, Gob. en Blenn., p. 18.

² Bleeker, Verh. Bat. Gen., vol. 22, 1849, Bijdraget ot de kennis der Percoiden van den Malaijo-Moluk-schen Archipel met beschrijvingen van 22 nieuwe soorten.

³ Bleeker, Atlas Ichth., vol. 6, p. 7, pl. 234, fig. 2.

⁴ Idem, vol. 6, pl. 232, fig. 2.

⁵ Idem, vol. 6, p. 34, pl. 242, fig. 2.

⁶ Idem, vol. 6, p. 33, pl. 241, fig. 4.

⁷ Idem, vol. 6, p. 37, pl. 243, fig. 4.

⁸ Idem, vol. 6, p. 32, pl. 245, fig. 3.

⁹ Idem, vol. 6, p. 28, pl. 246, fig. 3.

ÆSOPIA ZEBRA¹ (Bloch).

One specimen, 170 mm. long. Batavia.

We see no reason for considering *Solea zebrina* Temminck and Schlegel distinct from *Pleuronectes zebra* Bloch. Bloch's figure is very poor but seems to represent this species.

HIPPOCAMPUS TRIMACULATUS Leach.

Two specimens, each about 100 mm. long. Pelaboean Ratoe.

Native name, "Tang-kor."

TRIACANTHUS BREVIROSTRIS² Temminck and Schlegel.

One specimen, 165 mm. long. Batavia.

TRIACANTHUS BLOCHII³ Bleeker.

One specimen, 125 mm. long. Batavia.

This specimen shows some differences of color from Japanese specimens called *T. blochii*, but this may be due to different methods of preservation.

TRIACANTHUS NIEUHOFFII⁴ Bleeker.

One young specimen, 50 mm. long. Pelaboean Ratoe.

TETRAODON OBLONGUS⁵ Bloch.

Two specimens, 40 and 100 mm. long. Batavia, 1; Pelaboean Ratoe, 1.

TETRAODON LUNARIS⁶ Bloch and Schnelder.

Three specimens, 70, 70, and 95 mm. long. Batavia.

LEIODON PATOCA⁷ (Hamilton-Buchanan).

Ten specimens, 40 to 60 mm. long. Wynkoop's Bay, Pelaboean Ratoe.

Native name "Wun-tuk."

CRAYRACION FLUVIATILIS⁸ (Hamilton-Buchanan).

Six specimens, 80 to 100 mm. long. Welcome Bay, Bantam.

FRAGMENTS OF SHARKS, RAYS, ETC.

Trygon, perhaps *T. uarnak*; parts of head and back of two large specimens.

Dasyatis or *Rhinobatus*; jaws of large specimen.

Sphyrna, two heads with the lateral projections removed. Perhaps *S. zygaena* and *S. blochii* as the mouth appears to be of different shape in the two.

¹ Bleeker (*Brachirus zebra*), Atlas Ichth., vol. 6, p. 22, pl. 240, fig. 3.

² Idem, vol. 5, p. 91, pl. 231, fig. 3.

³ Idem, vol. 5, p. 89, pl. 217, fig. 1.

⁴ Idem, vol. 5, p. 92, adult figured pl. 217, fig. 3.

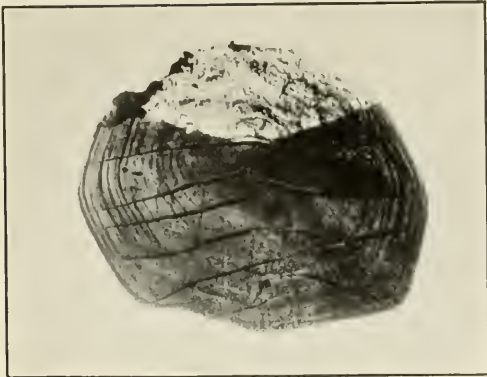
⁵ Idem, vol. 5, p. 62, pl. 207, fig. 4.

⁶ Idem, vol. 5, p. 63, pl. 205, fig. 2.

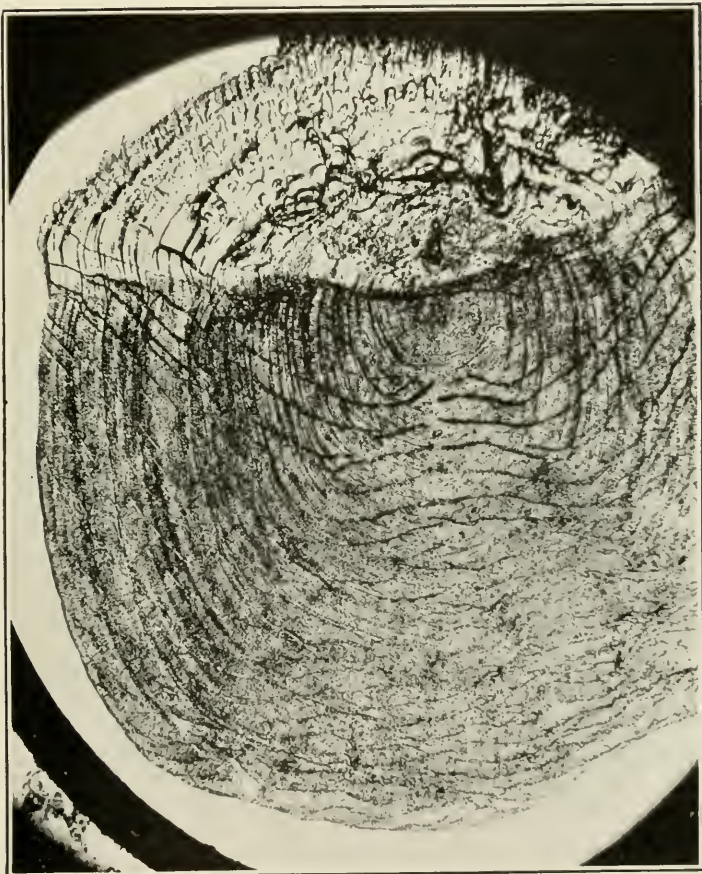
⁷ Idem, vol. 5, p. 76, pl. 210, fig. 2.

⁸ Idem, vol. 5, p. 68, pl. 210, fig. 4.





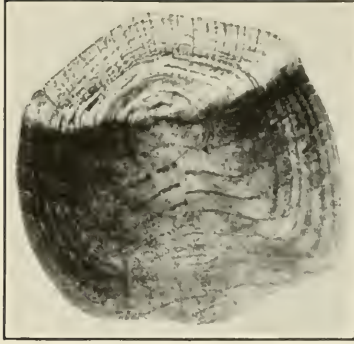
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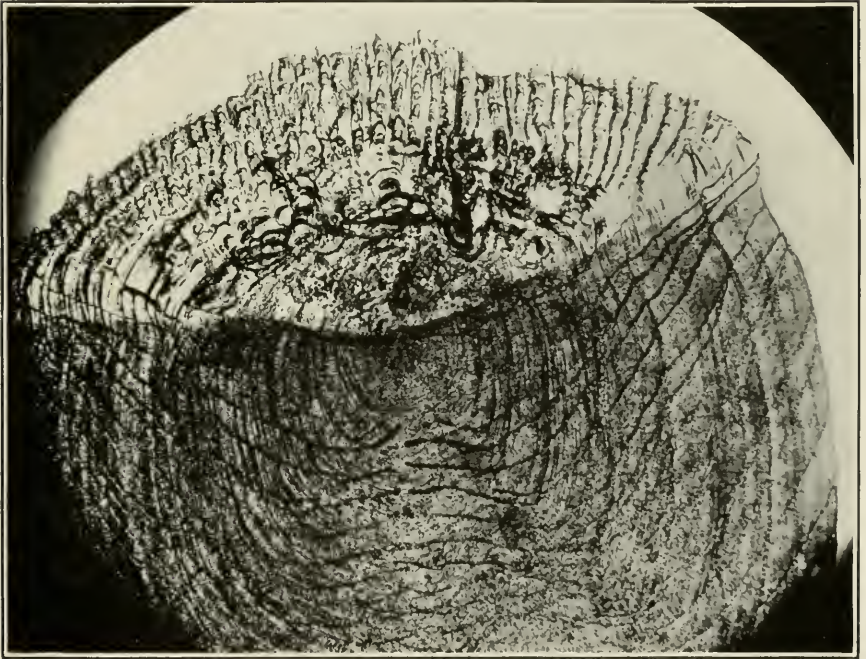
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VIEWS OF SCALES OF (1) *Alosa kanagurta* AND (2) *Alosa sapidissima*

FOR REFERENCE TO PLATE SEE PAGE 590.



1



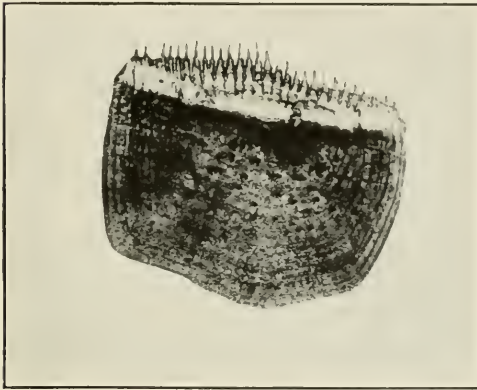
2

VIEWS OF SCALES OF (1) *POMOLOBUS PSEUDOHARENGUS* AND (2) *ALOSA SAPIDISSIMA*, FEMALE.

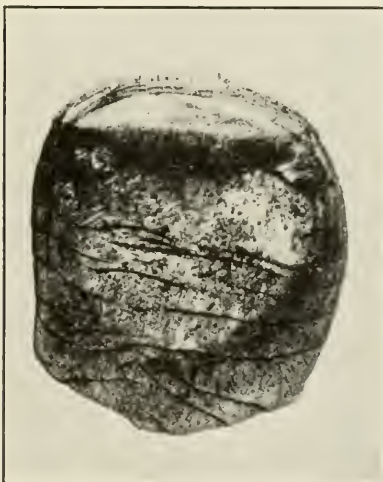
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1



2



3

VIEWS OF SCALES OF (1) *HARENGULA PERFORATA*, (2) *BREVOORTIA TYRANNUS*, AND (3) *ILISHA INDICA*.

FOR REFERENCE TO PLATE SEE PAGES 590 AND 591.

