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NOTES

ON SOME

FIGURES OF JAPANESE FISH

TAKEN FROM RECENT SPECIMENS

BY THE ARTISTS OF THE U. S. JAPAN EXPEDITION:

BY JAMES CARSON BREVOORT.

1856

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NOTES

ON

SOME FIGURES OF JAPANESE FISH,

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The Expedition, owing to the possible difficulties it might have to encounter, was not accompanied by professed naturalists, which circumstance is much to be regretted. The Marine Fauna of the Pacific, which is in many respects peculiar, would have offered a wide field for investigation, and much valuable information might have been collected. The geographical distribution of fish in that ocean has not yet been studied, though the little that is known on the subject is highly interesting. Many abnormal genera, which connect widely dissimilar groups of other seas, are there met with, while some families there receive their full development.

A more intimate knowledge of the currents of the Pacific and Indian oceans will be necessary in order to account for the great range of certain fish. The Kuro-Siwo, of the Western Pacific, no doubt produces results similar to those observed in the case of the Gulf Stream in the Atlantic, by extending the range of southern, and limiting that of northern marine species. Sir John Richardson, in 1845, from zoological data of this nature only,* indicated the probability of such a current being found to exist, and his surmises have been fully verified.

The materials used for this paper consist of spirited figures of sixty kinds of fish, principally valuable from their having been taken from recently procured specimens. They were executed mostly by Messrs. Patterson and Peters, a few being the work of Messrs. Heine and Bayard Taylor, and are more or less correctly drawn; none of them, however, with any close attention to the specific characters.

From their authority, several true Salmonidæ have been added to the Japanese Fauna, with a few new species of other families. The range of several, described in the Fauna Japonica, has been extended, and some additional materials for the history of others has been gleaned from them. One of the most interesting results of their examination is the proof that viviparous fish, closely allied to the California ones, are found on the western shores of the Pacific. Some names of fish, and notes on them, were derived from a young Japanese† who returned with the Expedition. He had been engaged in the coasting trade at home, and was familiar with most of the native species. The natives of Japan, generally, are large consumers of fish, and are well acquainted with all the productions of their own seas.

It will hardly be considered necessary, in this short paper, to give a list of works consulted. Such as could be referred to, are quoted in their proper place. Pallas, in his Zoographia Rosso-

* See his report to the British Association, at the 15th meeting, page 190.

† His name as written by himself is *Irawitsch Diengkitsch.*

Asiatica, describes many fish from the North Pacific, some of which occur on the coast of Japan. The loss of the plates, which were to have accompanied his work, makes it sometimes difficult to identify his species. The only special work on the subject is the Ichthyological portion of the Fauna Japonica. This of itself is a truly magnificent work, and but few countries can boast of one equally valuable. The authors of this portion of it—Messrs. Temminck and Schlegel—worked from the notes and collections of Mr. Bürger, who besides preserved specimens, had collected many drawings by natives of recent fish.

This work, commenced in 1842, was completed in 1850, and contains descriptions of 358 species, of which 294 are figured on 143 plates. The whole is in large folio. Schlegel seems to have been the chief author of it. Sir John Richardson, in his report on the Ichthyology of the seas of China and Japan, prepared for the 15th meeting of the British Association, in 1845, has added much information to what was already known. The "Histoire des Poissons" contains much new matter on the same subject; among other things, Mr. Valenciennes having identified most of the Pallasian species of salmon found on the eastern shores of Siberia. In this great work will be found all possible information relating to authorities on Japanese Ichthyology.

Some few fish found in the seas of Japan are described in the zoological reports of recent English expeditions, as those of the Blossom and the Samarang. The indefatigable Bleecker, who has contributed much to our knowledge of the Ichthyology of the Polynesian Islands, has also published three special papers on the subject of Japanese fish, and has reviewed the whole of this portion of the Japanese Fauna.

Much, however, remains to be done before the actual number of species found on the shores of this interesting archipelago can be determined with any approach to accuracy. From the skill of its inhabitants in the capture and preparation of fish, it is probable that the fisheries of Japan will yet prove to be of the greatest value to the commercial world.

Note.—A small collection of Japanese fish was made by a physician who accompanied the Expedition, but they could not be procured for examination.

The surveying expedition to the North Pacific has recently brought home very large collections in zoology, which are noticed in a recent number of the American Journal of Science and Art. Among these collections, made by the accomplished zoologist of the Expedition Mr. William Stimpson, there are 500 species of fish; of which many are from Japan and the neighboring waters.

1. LABRAX JAPONICUS, Cuvier.

LABRAX JAPONICUS, Cuv. and Val. II, 85.
" " Bleecker, Nalezingen &c.
PERCALABRAX JAPONICUS, Faun. Jap. Pisces., Temm. & Schlegel, 2. pl. 2, fig. 1.

NOTES ON DRAWING.—From Simoda. 20½ inches.

More elongated than in the above quoted figure; the caudal more deeply forked. The colors paler, lateral line dark. First dorsal only with clouded spots; the second with a single series of longer spots between the rays.

This fish is much sought after as food by the Japanese. Langsdorff and Schlegel give its name as *Suzuki*, but Diengkitsch writes it *Suuzuki*. Dr. Cantor, in the Annals and Magazine of Nat. Hist., vol. 9, p. 277, notices this fish as found at Chusan and the river Peiho.

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2. SERRANUS TSIRIMENARA, Schlegel.

SERRANUS TSIRIMENARA, Faun. Jap. loc. cit. 7. pl. 4 a. fig. 3.

PLATE III, fig. 1. Life size?

NOTES.—From Port Lloyd, Bonin islands.—7¼ inches; D. 10 (?) A. (?) 8; C. 15; P. 15.

The colors are much brighter than in the figure of the Fauna Japonica, which was taken from a preserved specimen. The whole of the head and body bright orange red, becoming more yellowish below. The white spots, seven in number, of oblong form, four above and three below the lateral line, the six anterior ones being under the spinous dorsal. Head more dusky. A stripe of vermilion red from above tip of maxillaries to near the base of pectorals, shaded off on the edges. Under jaw edged with vermilion red; irides orange red. Margin of orbits blue. Spinous dorsal pale red, the membrane behind the points of the spines darker. Dark spots on back between bases of spines. Soft dorsal like the back, yellowish towards margin. The other fins bright yellow, ventrals and anals tipped with red.

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3. SERRANUS AKAARA, Schleg.

SERRANUS AKAARA, Faun, Jap. loc. cit. 9, pl. 3, fig. 1.

NOTES.—Hong Kong. (7¾ inches; reduced?)

The colors lighter than in the Faun. Jap., and nearly white below. Spots brownish yellow; cheeks pale yellow; dorsal dull yellow.

Aka, means scarlet; *ara*, a rock fish. Diengkitsch informs me that at Osaka it is called *Eso-owoo*, meaning shore fish; probably a generic name.

4. SERRANUS AWOARA, Schleg.

SERRANUS AWOARA, Faun. Jap., loc. cit. 9, pl. 3, fig. 2.

NOTES.—From Lew Chew. (Life size, 13½ inches; D. 11. 15.)

Pale dusky purple, darker on back, head, and spinous dorsal; soft dorsals paler; caudal, anal, and pectorals pale yellowish brown; ventrals bluish; small brownish red spots (more sparsely distributed than in the figure quoted) on whole of head and body; none on fins. The figure in the Faun. Jap. has a decided purple tinge on the sides, though in the text it is said to be yellowish brown.

Awo means purplish blue; *ara*, a rock fish.

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5. SERRANUS URODELUS, Forster.

SERRANUS URODELUS, Cuv. & Val. II. 306, and VI. 513.

PLATE VI, fig. 1. Reduced.

NOTES.—From Lew Chew.

Brilliant scarlet lake, or bright blood red over whole of body and fins; rather lighter on abdomen and cheeks. Pectorals tipped with orange yellow. Lateral line of a darker red, prolonged forwards and rising over the eye. On the caudal two clear white bars, converging and narrowing from the middle of the outer rays towards the middle of the posterior margin, without meeting. Irides paler red.

This well marked species was first noticed by J. R. Forster, at Otaheite. He named it *Perca urodela*, and his figure was found by M. Valenciennes among the drawings in the Banksian collection, with the above quoted name. In Bloch Schneider it is placed (page 333) under *Bodianus miniatus*, (*Perca miniata* of Forskäl, p. 40,) as a variety of that fish, which is a *Diacope*, according to M. Valenciennes, and is from the Red sea.

But one specimen was observed by the expedition.

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6. SERRANUS MARGINALIS, Bloch.

EPINEPHELUS MARGINALIS, Bloch, pl. 328, 1. East Indies.
HOLOCENTRUS ROSMARUS, Lacep. IV, 345, pl. 7, f. 2.
HOLOCENTRUS MARGINATUS, Lacep. IV, 342.
SERRANUS MARGINALIS, Cuv. & Val. II, 301.

PLATE III, fig. 2. Natural size.

NOTES.—From Simoda, (8⅝ inches.)

The drawing is colored bright reddish brown over the whole of body and fins; darker on back, and blackish brown on back of head. Spinous dorsal, with the membrane adjoining the

tips of the spines, dusky brown. All the fins reddish brown, like body; pectoral, ventrals, and anals, rather dusky. Breast in front of pectorals, dusky blue. Irides, yellow and red.

Strong canine teeth in both jaws; head large, profile arching uniformly, lower jaw longest. Body highest in front of dorsal. Spines eleven in number, first shortest, the others as well as soft dorsal, of nearly equal height. Caudal rounded.

In the Hist. des Poissons, as above quoted, M. Valenciennes says: "Bloch does not give the habitat of this fish, and gives it fancy colors. M. Lacépèdes' *Hol. rosmarus* was founded on a drawing by Commerson, made at the Isle de France, while his *Hol. marginatus* is from Bloch's *Ep. Marginalis*. M. Dussumier procured a specimen at Ceylon, and found it also at the Seychelles."

If the fish observed by these naturalists are all of one species, it has a wide range.

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7. THERAPON OXYRHYNCHUS, Schlegel, loc. cit. 16, pl. 6, f. 3.

NOTES.—From Simoda. D. 12. 10; A. 11. (9½ inches.)

The name *Isagi* is added to the drawing, by a native of Simoda. In the Faun. Jap. it is called *Sima isisaki*.

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8. HOLOCENTRUM SPINOSISSIMUM, Schlegel, loc. cit. 22, pl. 8, A.

NOTES.—From Lew Chew. D. 10, 14, A. 12, (7½ inches.)

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9. URANOSCOPUS ASPER, Schlegel, loc. cit. 26, pl. 9, f. 1.

NOTES.—From Simoda. D. 4. 13; A. 14. (10¾ inches.)

The formula for the fin rays should read D. 5. 13, &c. The name given to it in the Faun. Jap. is *Ten-mon-dai-o-goze*, which, it is interesting to remark, has the same signification as the scientific European name, derived no doubt from the fact of the eyes being on the back of the head, looking directly upwards. *Ten-mon-dai* means an astronomer, *goze*, resembling.

The name given to it by Diengkitsch is *Mu-shi-ma-okodi*, meaning horns behind the head.

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10. FRIGLA BURGERI, Schlegel, loc. cit. 35, pl. 14, f. 1, 2.

PLATE V, fig. 3. ⅔ size.

NOTES.—From Simoda. D. 8. 18; A. 18, &c. (Life size, 10 inches.)

The drawing is more dusky on the head than in the figure of the Faun. Jap. Upper parts of spinous dorsal dark; upper parts of caudal dark dusky.

11. PLATYCEPHALUS ISIDIATOR? Bloch.

PLAT. INSIDIATOR, Cuv. and Val. vol. IV, 227, cum al. cit.
" " Faun. Jap. Pisces, 39, pl. 15, f. 1.

NOTES.—Yedo Bay, ($7\frac{1}{2}$ inches,) with a Chinese name meaning *sandy scale.*

It seems doubtful whether the true *P. insidiator* is found in Japan. The eyes of the figure before us, as well as those of the so-called *P. insidiator* in the Faun. Jap., are much smaller than those of the true kind, besides other differences. The range, from the Red sea to Japan, seems too great for such a delicate fish. It will probably be found that Schlegel's species is a new one.

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12 and 13. SEBASTES MARMORATUS, Cuv. and Val.

S. MARMORATUS, Cuv. and Val., IV, 345.
" " Schlegel, Faun. Jap. 46, pl. 21, fig. 1.
" " Bleecker, Nalezingen &c.

PLATE IV, figs. 1 and 2.

NOTES.—Figure 1. From Simoda. Cosango, (9 inches,) reduced? D. 14. 12, A. 3. 9, P. 17. (10 free,) &c.

Figure 2. From Simoda. Kasagu, (9 inches,) reduced? D. 12. 12, A. 3. 5? P. 16. (6 free.)

The characters necessary to determine the position of these two Sebastes are not sufficiently distinct in the drawings, which are no doubt quite correct as to color. They may be different sexes of *S. marmoratus*, though the first one, in its number of fin rays, seems to agree with the *S. variabilis* of Pallas, which however has no spines over the eyes. The second one seems to correspond in its number of fin rays and colors with the *S. albofasciatus* of Lacépède, Cuv. Val. IV. 344, which is supposed by Schlegel to be only a variety of the *marmoratus.*

The colors of figure 1 are as follows: Of a general dull carmine, with broad cloud-like spaces of bluish dusky, and blotches of dusky brown on the sides and abdomen. Head of the same ground color, with smaller blotches of dusky. Lower part of opercles lighter, with dots and bars of brown. Irides red and brown. Dorsals dull brownish carmine, with numerous small spots of brown on the spinous portion; the spots on the soft portion being arranged in four series parallel to the back. Caudal brown at the base, ending with orange, the rays annulated with brown in four concentric series like spinous dorsal with tinges of orange. Pectorals light. Anal orange, brown at base; the rays annulated in three series with brown. Ventrals dull reddish.

The second figure differs considerably from the first in color, and somewhat in its form and fin rays, enough probably to constitute a different species, were it possible to compare actual specimens. The drawings no doubt represent large fish, though the notes do not give the size of life.

This last figure shows a fish of a general vermilion red color, blackish along the back of body and head. The head with irregular bars or blotches of dark dusky. Irides, red and yellow. Body marbled with indistinct blotches of dusky, the red ground color being varied with tinges of yellow. First dorsal blood red with a few spots of dusky on membrane. Second

dorsal and anal red, margined with orange. Caudal red at base, most of it being orange. Pectorals orange red, darker at base, most of the upper rays annulated with three series of brown spots. Ventrals, dull orange.

This figure resembles the one of the *marmoratus* given by Schlegel, in form.

The name on the first figure *Kasagu*, seems to signify ulcerated gills; the second one, *Cosango*, that it exceeds red coral, (in color.)

In the Fauna Japonica it is called *ara-kabu; ara* meaning, as before stated, rock fish.

Cuvier, who found a good figure of it in a Japanese work, and also in the Japanese Encyclopedia, says that M. Abel Remusat translated the text which describes it, as "*common, reaching a length of three feet, white savory flesh, sought for in the winter season;*" in all which it resembles other species of Sebastes. Its name in this Encyclopedia, (see Notices et Extraits des Manuscrits, &c., tom. XI, part 1, page 215,) as given by Remusat is *akan*, or *ako*, meaning red fish.

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14. SEBASTES INERMIS, Cuv.

SEBASTES INERMIS, Cuv. and Val. IV, 346.
" " Faun. Jap. 47, pl. 21, fig. 3, 4.

PLATE V, fig. 2. Life size.

NOTES.—From Hakodadi. ($5\frac{3}{4}$ inches.)

A young specimen, not so dark as the figure in the Faun. Jap., the blotches smaller and more distinct.

A figure was also taken of a specimen $9\frac{1}{4}$ inches long, from the same locality, and to which the same remark applies. The distinct separation of the two dorsals is a peculiar character of this species, though exaggerated in the figure, which also erroneously shows four spines in the anal.

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15. PTEROIS LUNULATA? Schlegel, loc. cit. 45, pl. 19; Bleecker Bijdrage &c., p. 3.

NOTES.—From Simoda, ($4\frac{3}{4}$ inches,) Hawogoshi.

Though in form this drawing recalls that of *P. lunulata*, the colors are different. The body is of a pale brownish blue with the bars etc., as in the above species, but more distinctly defined. The two appendages over the eye are longer and equal the diameter of the orbit. It is, perhaps, only a young specimen.

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16. APISTUS ALATUS, Cuv.

A. ALATUS, Cuv. and Val. IV, 392.
" " Faun. Jap. 49, pl. 22 a. f. 2.

NOTES.—From Simoda, ($5\frac{1}{2}$ inches.)

In the drawing the colors are dark bluish slate on back, fading to dirty yellow on the sides. Markings as in the figure of the Faun. Jap.

This specimen seems to be different from the true *A. alatus*, but a comparison of specimens can alone decide the question.

17. APISTUS RUBRIPINNIS, Schlegel.

A. RUBRIPINNIS, Faun. Jap. 49, pl. 22, fig. 2.

PLATE VI, fig. 5. Life size.

NOTES.—From Simoda. ($2\frac{1}{4}$ and $3\frac{1}{4}$ inches.)

Two drawings were taken of this species, the published one appearing to be either young or taken at the breeding season, from the brilliancy of its coloring. The markings are more distinct than in the Faun. Jap., and the abdomen of a brick red. The caudal has a broad band of white at its base; rest of fin red, with narrow bars of dark dusky. The eye is smaller than in Schlegel's figure.

The fin rays, which are noted on the figure, are D. 21, A. 8, P. 10, V. 5, C. 11, being nearly correct.

In the Faun. Jap. the fin rays are nearly the same, but require to be read A. 3. 4, V. 1. 4.

One of the drawings is marked *Iso-owoo*, as the native name. This means simply shore fish. Diengkitsch calls it *Karakame*. *Kara* is Corea.

18. PELOR JAPONICUM. Cuv.

P. JAPONICUM, Cuv. and Val. 4, 437, pl. 93.
" " Faun. Jap. 44, pl. 18, fig. 2.

PLATE V, fig. 1. Life size.

NOTES.—From Simoda. ($4\frac{1}{2}$ inches,) D. 18. 6, A. (2) 11, P. 10. 2, &c.

This is no doubt a young specimen of this fish. It is of a uniform dark dusky olive, with minute marblings of paler olive on sides and bases of fins. No large white blotches as in the figure of the Faun. Jap. Fin rays with two more spines in dorsal, a common thing in young fish.

The native name *Onio-goze*, means devil like.

19. MONOCENTRIS JAPONICUS, Houttuyn.

GASTEROSTEUS JAPONICUS, Houttuyn, Mem. Harlem. XX, pt. 2, 329.
SCIAENA JAPONICA, Thunberg, Mem. Ac. Stockholm XI, 102, pl. 3.
MONOCENTRIS CARINATA VEL CATAPHRACTA, Bl. Schn. 100, pl. 24.
LEPISACANTHUS JAPONICUS, Lacep. III, 321.
MONOCENTRIS ———, Tilesius. Mem. Ac. Münich III. 71, 1811–12, w. fig.
" JAPONICUS, Cuv. and Val. 4, 461, pl. 97.
" " Schlegel Faun. Jap. Pisces, 50, pl. 22, f. 1.
" CATAPHRACTA, Bleecker, Bijdrage, p. 5.

PLATE VI, fig. 6. Life size.

NOTES.—From Simoda. ($2\frac{1}{4}$ inches.)

Thunberg first brought home a specimen of this curious fish, whose proper place in the systems has not yet been determined by the scale of affinities. His specimen served for his own, and for

Houttuyn's descriptions. Schneider and Lacépède, as well as Gmelin, copied their descriptions from the above authors. Tilesius, who accompanied Krusenstern, describes it himself in the *Denkschiften der Münchner Acad. for* 1811–12, vol. III, p. 71, in a memoir entitled, *Abbildungen und Beschreibungen einiger Fische aus Japan*, &c.; and Messrs. Cuvier and Valenciennes describe it from his specimens also, without giving him credit for the above account of it. Tilesius seems to have given it the name of *Ericius*, according to a curious note in the Mem. de la Soc. Imp. des Nat. de Moscou; Tom XI, p. 243, where he criticises Bloch's description.

The figure herewith given is probably that of a young specimen, though it varies in the number of rows of scales, great height of body and colors, from the species as hitherto figured. Each scale on its centre is of a bright vermilion, and the fins are all of the same color. The joints of the scales form a net work of black lines. The margin of the mouth, border of suborbital and opercles are also black. The caudal forked, as in the Faun. Jap. In the Hist. des Poissons, it is said to be rounded.

Matskasa, the native name, means a pine cone or pine nut, which it indeed resembles in its external covering.

20. DIAGRAMMA CINCTUM, Schlegel.

D. CINCTUM, Schleg. Faun. Jap. 61, pl. 26. fig. 1.

NOTES.—From Simoda, (8 inches.)

From the imperfect drawing brought home by the Expedition, the following description has been made. Length, 8 inches. Height a little less than three times in total length. Head four times in the length. Eye five times in length of head. Profile sloping from the occiput in a straight line, at an angle of 45°. Lips very fleshy. First dorsal, with 12 spines, third longest, and not quite half the height of body. Caudal, slightly emarginate.

General color of body and fins leaden blue, darker on back of head and body, nearly white beneath. Stripes as in figure quoted. Irides silvery. Back sparsely dotted with oval spots of darker color, a few only below the lateral line. None over the head and shoulders. Dorsal and caudal spotted in same manner.

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21. AMPHIPRION FRENATUS, N. S.

PLATE VI, fig. 4. Life size.

NOTES.—From Lew Chew. ($4\frac{1}{4}$ inches.) D. 12, (?) A. 17, &c.

This well marked species seems to be undescribed. It has been placed under the genus Amphiprion, though from the twelve dorsal spines noted in the drawing, and the smooth opercle, it may, perhaps, be a *Pomacentrus*.

If it have seventeen anal rays as noted, probably three of them are spinous, which would bring it nearer to *Glyphisodon*.

Its height is two and a half times in the total length, outline regularly arched above and below; spinous dorsal rising slowly to the soft dorsal, without break in the outline. Anal of subequal height. Caudal with rounded lobes and slightly emarginate. Color rich dark violet

or purple, over nead and back, extending low down on the sides, and as far as end of soft dorsal. Snout, breast, abdomen, and base of tail, a bright orange red, rather paler on the fins. The soft dorsal and caudal shading off into yellow on the margin. A distinct bright ultramarine blue stripe extends from the base of the first dorsal spine obliquely forwards under the eye, and over the preopercle, narrowing as it descends, and terminating near the throat.

22. GLYPHISODON VIOLACEUS, N. S.

NOTES.—From Lew Chew. (4 inches.)

This seems to be a *Glyphisodon*, but the drawing is not distinct enough to determine its genus. Its height is $2\frac{1}{4}$ times in the length, regularly arched above and below, with subequal dorsal and rather deeply forked caudal. Fins and scales rather large. Rays cannot be counted. It is of a uniform dark dusky violet over the whole of the body and fins, darkest on the back; but without any bar or spot besides. Irides silvery.

The *G. melas* of Kuhl and Van Hasselt, (Cuv. and Val. V, 472,) comes near it as far as can be determined by the description. Their *Pomacentrus littoralis* seems also to agree with it in color, &c.

Bleecker has described many new species of *Pomacentri*, and other allied genera, from Sumatra, &c., but none of these appear to be identical with this species.

Diengkitsch calls it *Ya-ha-gi*.

23. GLYPHISODON SMARAGDINUS, N. S.

PLATE VI, fig. 3. Life size.

NOTES.—From Lew Chew, ($3\frac{1}{4}$ inches.)

This species resembles the *G. coelestinus* of Solander, (Cuv. and Val. V, 464, pl. 135,) in shape, and were it not for its decided green hue I should not hesitate to class it with that species, which appears to be common in those seas.

Its height is only twice in its length; the dorsal spines appear to be twelve in number, and longer than in *G. coelestinus*, which has thirteen. The other fins as in that species.

Color of a general verdigris green, paler beneath, and very dark on back and spinous dorsal. Three or four bars of dark green across the sides, of which three are under the dorsal, and one on the tail. Irides green also.

24. ETROPLUS FUMOSUS, N. S.

PLATE VI, fig. 1. Life size.

NOTES.—From Lew Chew. ($1\frac{3}{4}$ inches.)

This seems to be an *Etroplus* from its general form and great number of anal spines, which were not counted. Its height is twice in its length; outlines regularly arched. Dorsal and

anal with even outline and low. Ventrals pointed. Caudal slightly forked with pointed lobes.

Color over whole of body and fins, except the caudal, of a sooty blackness; a broad band of dull dusky violet under the breast, extending to the base of pectorals. Caudal pale yellow. Irides same color.

Diengkitsch recognized this fish and called it *Sumikak-owoo*. *Sumi*, soot or charcoal; *kakf*, to scrape; *owoo*, as before mentioned, means fish. *Sumikak* is the smoke black scraped from the bottom of an old kettle.

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25. LETHRINUS MINIATUS, Forster.

SPARUS MINIATUS, Bloch, Schneid. 281, (ex fig. J. R. Forster.)
LETHRINUS MINIATUS, Cuv. and Val. VI, 315.
" HÆMATOPTERUS, Schleg. Faun. Jap. 74, pl. 38.
" " ? Richardson, Zool. Sulphur. Icthyol. p. 144, pl. LXIV.

NOTES.—From Lew Chew. Size much reduced.

There seems to be no specific difference between Forster's fish, which is fully described in Bloch's Systema, (Ed. Schneider,) and the *hæmatopterus* of the Fauna Japonica. The drawing brought home by the United States Japan Expedition is identical with the one given by Schlegel.

The native name, *kutsi-butai*, means smooth forehead.

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26. DITREMA TEMMINCKII, Schlegel & Bleecker.

DITREMA ————, Schleg. Faun. Jap. 77, pl. 40, fig. 2.
" TEMMINCKII, Bleecker. Nalez. op. de Ichth. van Japan.

NOTES.—From Hakodadi. (9 inches.)

Hakodadi is in latitude 41° 49′ N., and is one of the most northerly ports of Japan.

The genus *Ditrema* was established by Schlegel upon the examination of two stuffed specimens and a native figure of a fish which offered the peculiarity of two anal orifices. Schlegel suspected that the second orifice was connected with the organs of generation. His description is here given in a condensed form. He gave the fish no specific name. After stating that it appears to belong to the *Menidae*, and comes near *Caesio*, he remarks upon the curious double anal openings, indicated also in the native drawing.

"Height two and a half times in the length; upper and lower outline arched, the upper one slightly inflected at the anterior insertion of the dorsal. Head rather small, conical, with slightly concave profile. Eyes of medium size, and vertical. Nostrils close to upper part of snout. Mouth small and narrow, somewhat protractile, with fleshy lips. A single row of small conical teeth in both jaws, set sparsely, and only on their anterior portion. Angle of the vomer projecting, but smooth, and like the palatines toothless. Angle of opercle obtuse, and like the pre-opercle smooth on the margin. Lateral line parallel to the back. Scales deciduous, smooth, of medium size, covering the opercles and forehead. Dorsal and anal with long bases and the soft rays numerous and closely crowded. Spinous dorsal much

lower than the branched portion, and increasing gradually in height from the first spine, which is half the length of the last. Anal fin with the short spines increasing in length from the first to the third, the soft rays longer than the spines, and divided into two portions, the first shorter than the last. Caudal broad at the base, and rather deeply emarginate. Pectorals and ventrals of medium size, and with no particular characters. Anal opening half way from first anal spine to the membrane attaching the ventrals to the body. Behind it a peculiar orifice, before mentioned. B. 6? D. 10, 22; A. 3, 27; P. 19; V. 1, 5; C. 19."

"When fresh, of a dirty pale bluish; lighter on sides, and white beneath. Lips pale flesh color. Pectoral of a bright light brown hue. Spinous dorsal of a brownish grey, with dirty yellow along the base, and with a rather broad blackish border. Soft dorsal and anal fins of a dirty greyish brown. Caudal blackish. Ventrals blackish green, yellowish at base of soft rays. Irides silvery white."

"This species does not exceed eight or nine inches in length. The Japanese name is Tanago. Caught in the spring in great numbers in the Bay of Nagasaki, and eaten daily at that time."

The figure by the artists of the United States Japan Expedition is identical with the one in the Fauna Japonica, though rather darker in coloring. It does not show the specific characters distinctly.

Bleecker, in a paper published in the 25th part of the Transactions of the Batavian Academy of Arts and Sciences, entitled Nalezingen op de Ichthyologie van Japan, characterizes the genus Ditrema as follows:

"Dentes maxillis minimi pluriseriati antice tantum aliquot conici majores; dentes vomerini vel palatini nulli; rostrum in tubum subhorizontalem protractile; ossa opercularia et suborbitalia edentula; pinna dorsalis unica; aperturae analis et genitalis distantes; pinna analis spinis 3, radiis numerosis subsimplicibus; membrana branchiostega radiis 6." He gives the species the name Temminckii.

He examined one specimen only, and places it between *Caesio* and *Gerres*.

Neither Schlegel nor Bleecker had suspected that this fish belonged to the interesting family of viviparous fish recently discovered on the opposite shores of the Pacific in California.

Upon showing the published figure of the Ditrema, and the figure of it by the American artist, to Diengkitsch, he immediately described its viviparous faculty, and added that it has a way of escaping from the fishermen's nets by keeping close to the sides of a rock or bank. He confirmed the name Tanango given to it in the Fauna Japonica, which is the name of a peculiar net, perhaps used for catching it. In the Notices et Extraits des Manuscrits, Tom. XI., part I., 1827, there is a notice of Japanese encyclopedias, by Mons. Abel Remusat, a highly interesting paper, in which a Japanese fount of letters is used for the first time. In the list of fish, page 216, No. 37, is one called in Chinese *Ju* or *Lian*, in Japanese *Tanako*, "a fish which swims in pairs;" and in a foot-note Mons. A. R. says: "It is asserted that this fish is viviparous, and the same in the case with the species called *Anagaiwo, Ei, Same, Heka or Fuka, and Sakataiwo.*" These five names seem to designate particular species of eels or lampreys, plaice, dog-fish, (*acanthias?*) cat-fish, (*silurus,*) and for the last, apparently, a bream, or perhaps another variety of Ditrema. This very interesting note, the authority for which is not given, induced me to compare the Ditrema with a specimen of the California viviparous fish procured by Dr. John L. Leconte in that country in 1851, and with the descriptions of the Embiotocoidae and Holconoti, by Agassiz, Gibbons and Girard, in the Am. Journal of Sc. and Arts, in the Proc. of the Acad. of Nat. Sc. of Philadelphia and of the Boston Soc. of Nat. Hist.,

when no doubt remained on my mind that species of the same family of fish were thus proved to occur on the Asiatic coast of the Pacific also. Without an examination of a specimen, it would be difficult to place the Ditrema in the above families. It will probably be found to constitute a new genus under one of them, and no doubt other species will be discovered.

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27. HENIOCHUS MACROLEPIDOTUS, Cuv. and Val.

CHAETODON ACUMINATUS, Linn. Mus. Ad. Fred., pl. 33, fig. 3.
" MACROLEPIDOTUS, Bloch. pl. 200, fig. 1.
" " Seba. Thesaurus. III, pl. 25, fig. 8.
HENIOCHUS " Cuv. and Val. VII. p. 93 and 98.
" " Faun. Jap. 82, pl. 44, fig. 1.
" " Bleecker. Verh. Bat. gen. Tom. XXIII.

PLATE VI, fig. 2. Natural size.

NOTES.—From Lew Chew.

This fish has been figured by Vlaming, Renard, Ruysch, Valentyn, &c. There appear to be several varieties of it, which may prove to be different species on actual comparison of specimens. The figure herewith given varies from the one in the Fauna Japonica, having the whole snout black, which is stated in the Hist. des Poissons to be sometimes the case. The second black band does not touch the opercle, and the third unites with the second under the spinous dorsal. According to the figure, the dorsal fin has 10.24 rays. The fourth and fifth dorsal spines are much shorter than in the Faun. Jap. It seems to belong to the variety called *acuminatus*, by Linnæus. The name in the Faun. Jap. (*Kohatatate*) signifies small flag fish, or fish with a fin like a mast, that can be raised or lowered.

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28. HOPLEGNATHUS FASCIATUS, Richardson and Schlegel.

HOPLEGNATHUS FASCIATUS, Rich. Report fifteenth meeting Brit. Assoc. p. 247.
" " Bleecker Bijdrage &c., p. 6.
POISSON PERROQUET NOIR, Krusenstern; Atlas. 52.2, (fid. Schleg.)
SCARODON FASCIATUS, Schlegel Faun. Jap. p. 89, pl. 46, fig. 1 and 2.

NOTES.—From Simoda. (21 inches.) *Kendi* on *Kandai*.

The drawing is so nearly like the figure in the Fauna Japonica that it seemed unnecessary to reproduce it.

Richardson founded this genus on a fish from Van Diemen's Land, and describes it as *Oplegnathus Conwayi* in the Proceedings of the Zool. Soc., 1840, p. 27, and in full detail as the *Hoplegnathus Conwayi* in the Transactions of the same society, vol. III, p. 145, pl. 7. In the Report of the fifteenth meeting of the British Association at Cambridge, in 1845, p. 247, he enumerates three species from China and Jupan, viz: the *H. fasciatus* and *punctatus*, of Schlegel,

and *H. maculosus*, a new species from Canton, on the authority of Reeve's and Hardwicke's drawings. In the Fauna Japonica Schlegel makes a new genus (*Scarodon*) to receive the two species from Japan, and gives to one of them the name it had previously received from Richardson, without being aware of his notices of it. He corrects it however in a note to the Index.

The exact place which this genus will occupy has not been determined by the above authors. Its interior anatomy, teeth, &c., will have to be consulted for that purpose. Bleecker, as above quoted, had two specimens, which being damaged, could not be examined in order to settle the question. He thinks this genus will stand at the head of a new family allied to the *Sciaenoids*, *Chaetodontoids* and *Scaroids*. He characterizes the family *Hoplegnathoidei* thus: "*Dentes maxillares ut in scaris. Ossa pharyngealia inferiora libera, non unita. Pinnae dorsalis, ventrales analisque spinosae.*"

Kandai means winter. In the Faun. Jap it is called *Hiza*.

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29. ZEUS JAPONICUS, Cuv. and Val.

Zeus Japonicus, Cuv. and Val. 10, p. 24.
" " Schlegel, Faun. Jap., p. 123, pl. 66 A.
Dorée ou miroir du Japon, Tilesius, Krusenst. Atlas, pl. LXI, fig. 1.

Notes.—From Simoda. (22 inches.)

The Japanese Zeus appears to resemble the European *Zeus faber* very closely. It seems to have a few basal spines less near the dorsal and anal fins than the *faber*. The drawing shows only six spines on each side of the soft dorsal, and six near the soft anal. Schlegel gives about the same number. Judging from the figures, it would seem that the profile from the dorsal to the snout is much more arched, particularly near the snout, than in the *Z. faber*, whose profile is nearly straight. The figure in the Faun. Jap. does not show the dorsals sufficiently separated, and is not colored from life. In the Hist. des Poissons its colors, given from a Japanese painting, are nearly correct.

The present drawing shows the fish of a pale dusky purple over the head, with opercles rather darker. Back and part of sides dark dusky purple, with three or four darker stripes, broken in one or two places, and extending from the shoulder to near end of anal fin. Upper stripe broad, but indistinct, following curve of back; next one more distinct, narrow, and also parallel to back; third (a fragment only,) under anterior portion of second; the last extending around upper part of the great lateral spot, like an eyebrow, and with a little extension on each end. Spinons dorsal and anal also dark, the first with a broad darker band across the rays, inclining downwards. Back of ventrals and margin of caudal also of same dark color. Sides below the spot yellowish; pectorals, soft dorsal, and anal, with base of caudal same. Irides pale yellow. The large lateral spot is nearly circular, larger than the eye, of a dusky blue, with a well-defined dusky ring around it darker than the four stripes above it. Schlegel describes another species, the *nebulosus*. He gives no native name for either of them. Diengkitsch calls it *mati-owoo*, meaning target fish, an appropriate name.

30. CLINUS POLYACTOCEPHALUS, Pallas.

BLENNIUS POLYACTOCEPHALUS, Pallas, Zoog. Ross. Asiat. III, 179.
GUNELLUS " C. and V. 11, 448.

PLATE VII, fig. 4. Reduced.

NOTES.—From Hakodadi, (12 inches,) D. 61, A. 46, P. 13, C. 13, (Gashinagi.)

From the drawing, it would be difficult to pronounce this positively a Gunellus; but Mons. Valenciennes, in the Hist. des Poissons, places it in this genus, though only from the description of Pallas, which is as follows:

"*Species anomala.*—BLENNIUS POLYACTOCEPHALUS.

"*B. pedunculis quatuor supraciliaribus uniramosis majoribus, verticis octonis simplicibus.*

"*Specimen anomali hujus piscis, inter alia curiosa e Camtschatca transmissum, siccatum, sine ulteriore adnotatione accepi, et sic descripsi:*

"DESCR. *Longitudo pedalis, forma Bl. vivipari et corpus aeque molle ac fluxum, squamulis minutis, mollibus tectum. Caput retusum, brevissimum, subtetragono-convexum, maxilla inferiore longiore, utraque plane edentula. Frons inter orbitas approximatas, majusculas, depressa, spinulis 2. cartilagineis, minutis in medio, una pone alteram; in utroque supercilio pedunculi duo cartilaginei, cathetoplatei, postico margine acutiores, uniramosi, quorum posteriores paulo majores, crassioresque. Vertex pone orbitas subexcavatus, quasi muricatus cirrhis cartilagineis erectis, in duplici serie octonis, quorum postici, iidem et exterius positi, uniramosi. Praeterea apophyses aliquot molles per operculorum discum sparsae: Opercula subtriangula, postice acuta; flabella radiis sex osseis, teretibus, arcuatis, quorum proximus sub operculo adnatus. Corpus compressum. Pinna dorsi non longe a nucha incipiens, fere ad caudam continua, radiorum* 60. *P. ani bipollicari fere intervallo ab ano, ad ipsam caudam continuata, postice in laciniam productiuscula. Candae pinna subaequalis, radiorum* 13."

The drawing seems to have less tentacles on the head; but some of these have, no doubt, been overlooked by the draughtsman. In its size, form, and number of rays, it corresponds exactly with the species noticed by Pallas. The fin rays seem to have been carefully counted, and are D. 60, A. 46, P. 13, C. 13, V.? It has distinct ventrals, though they were not noticed by Pallas.

The fish seems high for a Gunellus, and may, perhaps, belong to a new genus. The *Bl. alectorolophus* of Pallas (p. 174) is either a young of this species or one belonging to the same genus.

COLORS. Head and body olive brown, mottled or clouded in irregular darker bands on sides, with three still darker bands across middle of body, over anterior part of anal, reaching from dorsal to anal. Irides pale dull yellow. Back dark, abdomen leaden grey. Body along base of anal mottled for half its length, and tinged towards tail with brick-red. Head brownish, tinged with red, and less mottled than body. Pectorals dusky blue, tinged with brick-red around margin. Dorsal very dark dusky olive, of rather uniform tint. Anal dull leaden grey, paler along the base. Caudal brick-red, with very broad, dark, dusky, irregular bands across the middle, and margined irregularly with same.

31. GUNNELLUS DOLICHOGASTER, Pallas.

BLENNIUS DOLICHOGASTER, Pallas, Zoog. Ross. Asiat. III, 175.
GUNNELLUS " C. & V. 11, 436.

PLATE VII, fig. . Reduced.

NOTES.—From Hakodadi, (9¼ inches, D. 95, A. 42, P. 10, C. 10.

This fish is described as follows by Pallas: "BLENNIUS DOLICHOGASTER. Tab. XLII., f. 2.*

B. pinna ani corpore dimidio breviore, verrucis osseis loco ventralium, cauda pinnis coadjuncta. Circa insulas Americae vicinas, aeque ac circa Camtschatcam observatur, interdum et in lacubus maritimis. D. D. MERK.

DESCR. *Fere pedalis, crassitie digiti, compressus. Caput oblongum, compressum, rostro retuso brevissimo. Os adscendens, maxilla inferiore longiore, sursum claudenda, utraque denticulis distantibus, obtusiusculis, in apice maxillarum paulo majoribus et duplicato ordine positis. Oculi ad verticem laterales, angusto spati dirempti, margini oris proximi, iridibus aureis. Opercula branchiarum oblonga, laevia, postice subacuta; Flabella branchiostega quadriradiata, subtus cute coaduncta. Corpus longissimnm, compressum, lubricum, squamis minimis, mollibus, sparsis punctatum; lineae laterales obsoletissimae; anus pone dimidium longitudinis, sed abdomen ovariis plenum pone anum productum, longissimum inter congeneres et ventricosus. Color olivaceo fuscus, virescente flavoque nebulosus supra lineam lateralem viridi maculatus, in ventre longitudinaliter fulvus; pinnae ani et caudae fulvsecentes, pectorales flavescentes, dorsatis fusca tranversis fasciis pallescentibus, ad dorsum perpendicularibus, distantibus, quales et in p. ani. P. pectorales minimae, ovatae duodecimradiatae loco ventralium verrucae osseae e cute prominulae. P. dorsi longissima, non longe a nucha incipiens, radiis rigidis, intra cutem spinosis* 93. *cauda coaduncta; p. ani radiorum* 52. *pariter pinnae caudae continuata; radiis* 2. *primis aculeatis, reliquis inermibus. Cauda brevis, rotundata,* 20. *radiorum. In specimine: longitudo toto*† 11.″ *caudae* 6.′″ *capitis cum operculis* 1.″ ½.‴ *a summo rostro ad pin. ani* 5.″ 8.‴ *altitudo corporis ad nucham* 9.‴ *in medio alvi ultra* 1 *poll. post initium pinnae ani* 10′″."

Except in the count of fin rays the description applies very accurately to the drawing. It, however, has not the greenish spots above the lateral line alluded to by Pallas, and no distinct bars across the dorsal. General form that of a Gunellus, but high for its length, the abdominal outline sinuous. Dorsal very low, anal twice as high as dorsal. Both these fins joined to caudal, which is rounded. Ventrals represented by a recumbent spine.

The colors of the drawing are of a dull olivaceous green over head and body, rather lighter below the lateral line and underside of head, with a well marked stripe of burnt sienna along the abdomen from the head to anus. Irides yellow. Dorsal of a dusky umber brown, lighter along the base. Pectorals bright orange. Caudal dusky orange. Anal bright carmine red, with nine white bars running obliquely across it from the margin towards the tail, each bar crossing four or five rays, and widening as they approach the base; the last bars less distinct.

* The plates accompanying this great work were lost by the failure of the person entrusted with their engraving in Leipzig; six plates only, representing mammalia, accompany the work, which was printed in 1811 and published in 1831. A few plates have since been added to the illustrations.

† Pallas elsewhere states that he uses English measures.

32. CALLIONYMUS VALENCIENNEI, Schlegel, Faun. Jap., &c. 153, pl. 78, f. 3.

NOTES.—From Lew Chew, 5¾ inches, No-migutsi.

The drawing corresponds exactly to the description of the above species by Schlegel. The name given to it at Nagasaki, *Tengurikutsi*, seems to mean that it has a mouth like the net called *Tenguri*.

The name given to it on the drawing, *Nomigutsi*, means chisel mouth.

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33. JULIS POECILEPTERUS, Schlegel, Faun. Jap., &c., 169, pl. 86. bis. fig. 1.

JULIS POECILEPTERUS, Richardson, 15th meeting Brit. Assoc., 1845, p. 260.

NOTES.—From Simoda, 9⅝ inches, Bera.

Besides the description of the above fish in the Faun. Jap , Richardson gives another one in the report above quoted. Both these authors give the colors, which are much variegated, and appear to vary in different specimens.

The Japanese name *Kusabi*, or *Kfoosabi*, means that it is of a grass-green color. At Simoda it seems to be called *Bera*, from a note on the drawing.

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34. JULIS LUTESCENS, Solander.

LABRUS LUTESCENS, Sol. mss.

JULIS " E. T. Bennett, Zool. Beechey's Voy. Blossom, Fishes, p. 65. pl. 19, f. 2.

PLATE VIII, figs.3 and 4.

NOTES.—From Napha, Lew Chew, (6⅝ inches,) D. 7. 13, A. 2. 7, P. I4. Operculum smooth, teeth interlacing, long retractile mouth.

Though varying in some respects from the description of Solander, this is certainly the same fish. He observed it also at Lew Chew and Tahiti. His description as quoted by Bennett is as follows:

"*Piscis lutescens, strigis numerosis rubicundis transversalibus. Caput viridi lutescens, areis pluribus latis rubicundis. Abdomen virescens, vittis duabus luteis. Pinna dorsalis e viridi-lutescens, vittâ paulo infra medium croceâ, limite superiore coeruleo. Pinnae pectorales lutescentes, apicibus nigris. Pinnae ventrales lutescentes. Pinna ani viridi-lutescens, basi croceâ, limite coeruleo. Pinna caudae e flavo lutea, vittis marginalibus croceis. Iris argenteo virescens. Pupilla nigra.*"

The figure published by Bennett is taken from the one brought home by Solander. It does not agree with the description, particularly in wanting the numerous cross bands of red. Mr. Bennett adds, that the Zoological Society has received specimens from the Mauritius, which however will probably prove to be the *Julis annulatus*, Val., vol. 13, p. 501, pl. 388, from that Island.

The figure brought home by the U. S. Expedition is not a very good one, but is interesting as having been taken from life.

35. JULIS QUADRICOLOR, Lesson.

JULIS QUADRICOLOR, Lesson, Voy. Coquille, Poissons, pl. 35. Tahiti.
" " Hist. des Poiss., 13, p. 443.
LABRUS ERYTHROGASTER, vel FORMOSUS, Sol. Ms. Tahiti.
JULIS " Hist. des Poiss., 13, 447. Ulea.
LABRUS CYANOGASTER, Sol. Ms. Tahiti.
JULIS " Hist. des Poiss., 13, 444.
SCARUS QUINQUEVITTATUS? E. T. Bennett, Voy. Blossom, Fish., p. 66, pl. 19, fig. 3, Lew Chew.

PLATE VIII, fig. 2.

NOTES.—From Simoda, (6 inches.)

With but slight variations in color all the above synonyms seem to be referable to one species.

The colors on the drawings are as follows: Of a general uniform rich indigo-blue, with strong tinge of green on sides of head, back above lateral line, and caudal. A stripe of carmine runs from the snout through the eye, becoming bifid behind it; the upper portion short, the lower one declining and reaching to below the tip of opercle. A short stripe runs back to beneath the eye from the corner of mouth. Two spots or bars above the eye, and a bar from occiput along upper margin of opercle. All these markings are carmine. Three parallel series of scales on upper part of sides are spotted with red, and a stripe of same runs from the axilla of the pectorals back to above base of anal. Membrane at base of pectorals and caudal red also. Balance of caudal rich green. Pectorals violet-blue. Dorsal and anal of same violet-blue with a stripe of green, and a narrow edging of red. There is no yellow on the figure, though the green may, in some specimens, run into that color.

There is but little difference in form between most of the *Julidae*, and the species are distinguished by their coloring from each other; an uncertain character and one leading to much confusion. Some particular organ might be selected whose minute differences would serve to fix the species.

36. GOMPHOSUS FUSCUS, Val. Hist. des Poiss., 14, p. 25.

NOTES.—From Lew Chew, (5½ inches.)

The figure corresponds in form and coloring with the first description given in the Hist. des Poiss., with but little variation. There is no spot on the anal, and the black stripe through the eye does not reach the end of the snout.

M. Valenciennes describes other varieties with bright colors. He gives the whole Indian Ocean and Tahiti as its habitat.

37. CHEILIO HEMICHRYSOS, Val. Hist. des Poiss., 13, p. 351.

CHEILIO AURATUS, Quoy, Voy. Uranie, 274, pl. 54, fig. 2.

NOTES.—From Lew Chew, life size 9 inches.

This drawing corresponds to the description above quoted; the general color brown, white under head and breast, light brown under body, with series of distinctly marked black dots along the lateral line. The specimens seen by M. Valenciennes were from Tahiti.

38. HIPPOGLOSSUS OLIVACEUS, Schlegel, Faun. Jap., &c., 184, pl. 94.

NOTES.—From Yedo Bay, life size 8¼ inches.

The Japanese name *Makarei*, in the Faun. Jap., by which it is known at Nagasaki, is also given to it at Osaka. *Karei* is the local name given to the *Platessoidae*.

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39. SYNAPTURA OMMATURA, Rich.

SOLEA OMMATURA, Richardson, Rep. Brit. Assoc., 1845, p. 279.
SOLEA ZEBRINA, T. and S., Faun. Jap. Pisces, 185, pl. 95, f. 1.

NOTES.—From Simoda, (4¾ inches;) cow's tongue—Simushinoshta.

This drawing agrees with the above quoted figure, except that the caudal markings are orange. Richardson is no doubt right in supposing this species to be distinct from the *Solea Zebra* of Bloch. Bleecker doubts it, and classes it in his "Nalezingen op de Ichthylogie van Japan," (1853,) p. 19, under the old specific name but in his genus *Synaptura*. In his paper on Pleuronectidae, (1852,) p. 17, he observes that it seems only to be a local variety of the *Zebra*. As he however had not seen the fish, while Richardson had compared specimens of those allied species, it seems but proper to adopt the specific name of the one and the generic name of the other of these distinguished Ichthyologists.

It bears the same local name in the Faun. Jap. as that above given. *Sim*, is "to dye;" *ushinoshta*, a "cow's tongue."

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40. PLAGUSIA JAPONICA, T & S.; Faun. Jap., Pisces, 187, pl. 95, f. 2

NOTES.—From Simoda, Ushinosta, 8½ inches.

The above distinct specific name is given to it in the Fauna Japonica, until it can be shown to belong to one of the described species of *Plagusia*, which are as yet not well characterized.

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41. SALMO PERRYI, N. S.

PLATE IX, fig. 1. Reduced.

NOTES.—From Hakodadi, May and June, (33 inches,) D. 11, A. 11, P. 15, V. 8, C. 25.

After a careful comparison of this figure with all the species of salmon from the Pacific described by Pallas in his Zoographia, or by Valenciennes in the 21st volume of the Histoire des Poissons, this fish would seem not to have been described before. It resembles the *S Purpuratus* of Pallas in some points, and may be an adult specimen of it; but the Pacific salmon are not well known, and no one species has been placed on a sure basis. Pallas, Richardson and Valenciennes describe some twenty-five distinct species from the Pacific, which number will probably be reduced considerably. The surveying expedition to the North Pacific, under Commander John Rodgers, has brought home 550 species of fish, among which many Salmonidae

must occur; and these collections will probably assist in clearing up the confusion now existing in this group.

The Salmo herewith figured has been named after the able commander of the United States Japan Expedition, to whose efforts alone we owe the scanty yet interesting zoological collections and drawings, made under disadvantageous circumstances, while the squadron was in those distant seas.

In its general form and coloring it resembles the *Salmo hamatus* of Europe, and the New Brunswick salmon of North America,[1] and no doubt is the representative of that type in the Pacific, the figure having probably been taken from a female.

Head large and thick, four and a half times in total length of fish. Jaws very strong and thick, the upper one rather pointed, with stout curved maxillaries, the lower one longest when depressed, with a strong curve upwards. Teeth strong and recurved. Profile from snout to occiput nearly straight, curving thence gently into the dorsal outline, which is straight also to behind first dorsal. Abdominal outline not prominent, but gently tapering to base of caudal. Height of body in front of dorsal $\frac{5}{6}$ of length of head; at base of caudal $\frac{1}{3}$ of same. Eyes small, $\frac{1}{12}$ of head. Opercles rounded, branchial rays stout. Scales distinct and rather large, but too distinctly marked in the engraved figure. Lateral line straight. Fins large, with pointed lobes. Anterior base of dorsal slightly nearer to snout than to margin of caudal. Second dorsal large, for the fish. Pectorals and ventrals long and pointed. Anal under adipose dorsal. (Both these fins seem, in the drawing, to be too near to the base of the caudal.) Caudal with broad pointed lobes, posterior margin deeply emarginated and indented at the centre.

Proportions, from the original drawing, in hundredths of total length, measuring from snout to centre of margin of caudal:

Height of body at pectorals	18.00	Base 1st to base 2d dorsal	31.00?
Height in front of dorsal	19.00	Second dorsal long	5.00
Height at base of caudal	7.00	Snout to base ventrals	53.00
Snout to margin opercle	22.50	Ventrals long	16.00
Snout to orbits	7 50	Base ventrals to base anal	25.00?
Diameter of orbits	2.00	Anal long	14.00
Pectorals long	15.00	Snout to end scales on lat. line	95.00
Snout to first dorsal	46.00	Lobes of caudal	16.00
Anterior rays long	17.00	Emargination of open caudal	6.00

Colors: Dusky along the back of head, and becoming blue on the opercles, and dirty white beneath. Margin of lower jaw bluish dusky. Back of head, snout, opercles and maxillaries, covered with round, irregular sized blackish spots, rather closely set. Eye golden yellow. Back dusky, soon however fading into dirty purplish red on the sides, which on the under parts fades again into dirty white. The dusky back and colored sides are covered with blackish spots of irregular form, smaller than those of the head and rather more sparsely distributed. Lower part of dorsal spotted also. This and all the other fins are of a brownish black of rather uniform hue, the caudal inclining to brown. Ventrals and anal of a lighter shade, with their anterior rays lighter still.

[1] This salmon, if not identical with the *S. hamatus*, will form a new species. It has not been described or noticed by any author that has written on American Ichthyology. In October, 1856, large numbers of them, weighing from eight to fifteen pounds each, were brought to the New York market. The males invariably had straight and pointed upper, and hooked under jaws; the females, which were full of roe, had the jaws like the figure here published. It could not be confounded with the *Salmo Salar*.

42. SALMO ORIENTALIS, Pallas.

SALMO ORIENTALIS, Pallas, Zoog. Ross. Asiat. III., 367.
" " C. and Val. 21, 356.

PLATE IX, fig. 2. Reduced. (Named *Salmo masou* on the plate.)

NOTES.—From Hakodadi, May and June, (21½ inches,) Masou.

The *S. orientalis* of Pallas is a fish of large size, reaching to 60 pounds in weight, ascending large rivers only, in the months of April May and June, in great numbers. In Kamschatka it is considered the best food in the world, and it is a common saying there, "that he who has tasted the head of this fish will never wish to return to Russia."

Pallas's description, in brief, is as follows: "Resembling the *Salmo nobilis* (S. Salar. L.) in form, but broader. Head 4⅓ times in total length, conical, a little compressed. Jaws equal, and pointed, the lower one slightly recurved. Lips fleshy. Anterior lower teeth hooked. Triple series of teeth on palate,* a double row on tongue. Opercles large and rounded. Eye of medium size. Body slightly compressed, dorsal and ventral outline convex. Lateral line straight, rising towards the opercles. Scales large. Rays, B. 17; D. 12; A. 15; P. 16; V. 10. Dorsal with single rays in front. Ventrals with a thin scale at their base, nearly as long as the fins, carinate and bilamellate? (*carinata bilamellata*,) differing from any other species. Caudal large, crescent-shaped on margin. Colors dusky blue or black, abdomen white. Irides silvery. Head jaws and tongue dusky leaden blue. Opercles silvery blue. Dorsal and caudal spotted; adipose dorsal dusky. Pectorals dusky inside, bluish white outside. Anal bluish. Flesh, when fresh, red, often fulvous, becoming paler by coction."

Mons. Valenciennes, who examined dried specimens of this fish in Berlin, describes it as being "broader and thicker, in proportion to its length, (plus large et plus trapu,) than the common salmon, with jaws slightly curved, the upper one a little the longest. Outline of back and abdomen rather convex, of a silvery color, dusky blue on the back, and white beneath." He says of a drawing made in Kamtschatka by Mertens, from a female, that it was of an "ashy blue, darker on the back, sides and abdomen lighter, with a rosy-red tinge. Numerous crescent-shaped spots above the lateral line. Anterior margin of pectorals, ventrals, and anal pink." Mr. Mertens observed that the males have longer opercles than the females.

The drawing by the American draughtsman represents a fish formed as above described, with outline of back and head regularly arched. Height in front of dorsal nearly equal to length of head; at base of tail 3½ times in height of body. Head four and a quarter times in total length. (This is much larger than in the common salmon.) Head pointed, conical; upper jaw rather the longest, both armed with strong teeth. All the fins short and stout, with pointed tips and emarginated borders. Anal very small for the fish. Tail with pointed lobes, and regularly lunate. Dorsal wholly anterior to ventrals; anterior base of last ray half way between snout and edge of caudal. Adipose dorsal over front of anal, and of moderate size. Lateral line rises near the opercles. Scales rather small, but represented too large in the figure. Head dusky above, leaden blue on sides, with a few dark blotches; white beneath; tongue dusky. Irides silvery yellow. Body dark dusky, above the lateral line lighter, and tinged with purple

* The text of Pallas is, "*dentes in palato triplici series*," a vague expression, which seems to prove that he was counting the teeth on the palatines as two series, leaving one for the vomer.

on sides, and shading off rather abruptly below the lateral line into white, with tinege of red. Lateral line conspicuously placed on a narrow pale stripe from opercles to caudal. Dorsal and caudal almost black, ventrals and pectorals pale dusky. Anal dusky yellow.

The *S. Japonensis* of Pallas, (op. cit., p. 382,) from the Kurile Islands, of which he had two dried specimens, brought home by Merk, seems to resemble the *orientalis*, judging from the vague description of it by the Russian naturalist. Valenciennes (op. cit., p. 363) examined these specimens. One of them, he thinks, answers to Pallas's description, but still remarks that the species does not seem to be well founded. Had it resembled the *orientalis*, the distinguished French naturalist would have noted such a fact.

The name *Masu*, or *Masou*, seems to be a designation for salmon generally in Japan. Medhurst gives it as *Mas*. *Sake*, which also means "wine," is another name for it. The scientific names attached to those given in the Japanese encyclopedia by Mr. Remusat, in his notice of this work, are not always correctly applied, as the rough native figures seem to have been his only guide. The name of number 21, in book 49, page 8, is "*Kamasu*, in Chinese *Sotseuiu*, poisson navette,) *esox sphyraena*, murène." No doubt a salmon was represented in the accompanying figure. *Kamasu* seems to signify a "slender salmon." Kämpfer alludes to a fish under the name *Kamas*, which he calls a pike.

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43. SALMO (FARIO) LEUCOMAENIS, Pallas.

Salmo Leucomaenis, Pallas, Zoog., Ross. Asiat., III, 356.
" " Val. Hist. des Poissons, 21, 243.

PLATE X, fig. 3. Natural size.

Notes.—From Hakodadi Bay, (Lat. 41° 49′,) May and June. 8 inches.

This seems to agree with the descriptions above quoted, though it may prove to be a new species. The figure represents a fish of a uniform dusky blue, with tinge of greenish on the back, sides, and top of head, becoming silvery white on the lower parts of head and body. Large round spots of rather uniform size, and distinctly defined, are sparingly scattered over the whole of the back and sides. They are of a paler blue than the ground color, and become white below the lateral line, and are distributed in five rows, three above and two below the lateral line in irregular quicunx order. The largest are about $\frac{3}{4}$ of the diameter of the eye, or eight times in the greatest height of the body. The upper row of 6 or 7 run close to the back, beginning under the first dorsal; the second commences near the back of the head, and count nine to half way between the dorsals, where it unites with the third row. This numbers eleven spots, running parallel to the lateral line, with some confused spots on the base of caudal. The fourth row follows the under side of the lateral line and close to it, with about eight spots. The fifth is short, with five or six white spots, just distinguishable from the pale blue of the sides. Irides pale yellow, and tinges of same on opercles. The fins are all colored of a pale umber brown, the first dorsal being darkest. Ventrals quite pale.

In form it resembles a brook trout, the snout being rather blunt. The expression of Pallas, in describing its teeth, "*series in palato parallela*," may perhaps mean that it has a double row on the body of the vomer, in which case it would belong to the genus *Salar* as defined by

Valenciennes, (op. cit., p. 163,) who however, places it with *Salmo*, understanding the phrase of Pallas to refer to the teeth of the palatines only. The specimen examined at Berlin by M. Valenciennes had lost its tongue, palatines, and vomer. This question cannot, therefore, be settled from present data.

Pallas says of its habits, that "it is found in the Arctic sea as well as in the eastern ocean, in bays and estuaries, in great abundance, particularly in the spring, not ascending the streams a great distance. In the most northern waters it appears in the middle of June, when it is caught during the rest of the month. In the rivers of Kamtschatka, where it runs larger, it appears about the middle of April. It is a marine shore fish, not remaining long in fresh water, returning about the middle of May to the sea. It is one of the most palatable fish of its kind, either smoked or salted, and is brought under the name of *Somgha* from Archangel to St. Petersburgh and Moscow." This is a great range for one species of salmon. Pallas adds that it is generally a foot and a half in length; the largest of the eastern seas reaching to a yard and and a half. His specimen was almost seventeen inches long. In describing it, the principal characteristics given are as follows: "Resembling the common salmon. Snout rather obtuse. Lower jaw rather the shortest when mouth is closed, often hooked at the apex in the old Kamtschatka specimens. Large hooked teeth in the jaws, with a parallel series on the palate, and on the tongue a double row of large claw-like teeth, composed of six large ones, and a small one at the apex. Small rounded opercles. Twelve branchial rays. Body full, tapering, compressed, and with small scales. Lateral line straight, rising towards the head. Fins fleshy. Adipose dorsal small, narrow, dilaled at the end, with upper margin serrated, and placed behind the anal. Tail forked, with equal lobes. Fin rays. D, 1. 12, (rarely 11 or 12); A, 1. 10 or 11; P, 14; V, 9; C, 19. Color silvery; above and for a little distance below the lateral line bluish; back dusky, abdomen brilliant white. Orbicular white spots scattered (over body,) becoming greenish towards the back. The pectorals, ventrals, and anal, white; dorsals dusky. These colors are sometimes darker throughout. The flesh of the northern ones red; of the eastern ones white."

A comparison of the measurements given by Pallas, with the drawing, corresponds in several important parts so nearly that there can be but little doubt as to the identity of his *Leucomaenis* of Kamtschatka with the figure of the fish taken at Hakodadi.

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44. SALMO ——. Young?

PLATE X, fig. 1.

NOTES.—From Hakodadi Bay, ($6\frac{1}{2}$ inches.)

This seems to be a young salmon of uncertain species. It cannot be a brook trout, the young of which are barred as in the figure, but which remain in fresh water, and lose these distinctive markings when three or four inches long. The young salmon of the first season, known as the *Parr* on the English coast, have the same bands, and it is no doubt a salmon of the Northwest Pacific, in this state, which was figured at Hakodadi.

The figure represents a gracefully proportioned fish with rather pointed jaws, the under ones longest; head four and a half in total length. Eyes large. Dorsal rounded in outline, with

13 rays. Caudal with pointed lobes, and deeply forked. Anal in the figure seems placed too far forward. Lateral line straight. Scales rather small and rounded.

Colors. Deep indigo blue on back of head and body, shading off on under side to white. Eight strongly marked bars of same color as the back, and equally spaced, extending vertically down on sides; the first and last ones not reaching the lateral line, while the intermediate ones just pass over it. A large blue spot on the lateral line just behind the opercles. Three smaller spots below the lateral line at unequal heights, but placed vertically under the spaces between the first four bars. These bars and spots are shaded around their margins. Dorsal pale blue, with membrane between tips of first six rays darker. Pectorals, ventrals, and anal, nearly colorless. Caudal pale dusky, with dark-tipped lobes. Lateral line lighter than body.

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45. OSMERUS OLIDUS? Pallas.

SALMO, (OSMERUS) OLIDUS, Pallas, Zoog. Ross. Asiat., Vol. III, p. 391.

PLATE X, fig. 2.

NOTES.—From Hakodadi, ($6\frac{1}{4}$ inches. Ugoi.)

No species of smelt is described in the Fanna Japonica, and as the fish noticed in that work seem to have been collected around the southern shores of Japan, it is probable that it is not found so far south.

Diengkitsch pronounced Medhurst's name for the smelt, *Kisgo*, to be erroneous, and also said that *Ugoi* was not its true name. Ugoi, or Foogoi, means that it is not a carp, but he could not remember the name of the smelt.

Many Russian travellers have noticed smelt in the Pacific, and describe two species of Osmerus and one of Mallotus. (Vid. Kracheninnikow, Gmelin, and Pallas, op. cit., p. 386.) Mr. Collie appears to have met with two species of Osmerus in Awatscha bay, according to the notes on page 49 of the Zoology of Beechey's Voyage in the Blossom. Pallas seems to have supposed that the *Osmerus Eperlanus* and *Spirinchus* of Europe were also found in the Pacific, which M. Valenciennes (vol. 11, pp. 378 and 388) seems to admit, though the species can hardly have so wide a range. Pallas (op. cit.) describes an *Osmerus olidus*, as peculiar to the Pacific, which is not noticed or even quoted in the Hist. des Poissons. In the absence of more certain data, it it is assumed to be the fish herewith figured, though the species is said by Pallas rarely to exceed a length of four and a half inches. It is the first time that an *Osmerus* from the North Pacific has been figured. Specimens of this and of other species, if any exist, will no doubt be found among the collections brought home by the North Pacific Surveying Expedition.

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46. CHATOESSUS PUNCTATUS, Temm. and Schleg.

CHATOESSUS PUNCTATUS, T. and S., Faun. Jap. Pisces. 240, pl. CIX., fig. 1.

NOTES.—Yedo Bay, April, 1854, Konoshiro, (8 inches.)

The drawing corresponds exactly with the quoted figure. The name given to the Herring in Medhurst's vocabulary is the same as the one marked by a Japanese on the figure. *Siro* or *Shiro* signifies "white."

47. CLUPEA MELASTOMA, Temm. and Schleg.

CLUPEA MELASTOMA? Schneider, (Bloch.,) 427.
CLUPEA MELASTOMA, T. and S., Faun. Jap. Pisces, p. 237, pl. CVIII., fig. 1.

NOTES.—Yedo Bay, (8¾ inches,) Isagi. The drawing indicates the dark dots on the lateral line very distinctly.

Though no drawing was brought home of the fish which is described in the Fauna Japonica (p. 236, pl. 107, fig. 2) as the *Clupea Micropus*, it may not be considered improper to put on record a few remarks concerning it, which may prove interesting as regards the geographical distribution of the *Clupeoidae*.

This Clupeoid has a smooth cylindrical abdomen without serratures, and evidently does not come under the genus Clupea proper. M. Valenciennes, in a supplement to the 20th vol. of the Hist. des Poissons, describes a fish which seems to have given him some trouble to place in its proper position in the family. He however puts it between *Butyrinus* and *Elops*, and names it *Dussumiera acuta*. It was brought from the coast of Malabar and Coromandel by Dussumier, but had been observed there previously by Leschenault and Sonnerat. M. Valenciennes adds that the *Clupea Micropus*, referred to above, may perhaps be of the same species, but that if distinct it would be a second species of his new genus.

Bleecker, in his "Nalezingen op de Ichthyologie van Japan," page 48, admits the close connection of the *Micropus* with *Dussumiera*, but separates it from that genus, owing to his having detected teeth on the vomer. He makes a genus *Etrumeus* to receive it, its Japanese name being *Etrumeiwasi*. It however seems to belong to Valenciennes' genus, who distinctly describes the vomer as having rudimentary teeth on some specimens. Bleecker describes, also, two new species of *Dussumiera* in his "Bijdrage tot de Kennis der Chirocentroidei," &c., page 12, from the Moluccas.

The most curious fact, however, in the geographical distribution of this new genus is, that the same, or a closely allied one, is found on the Atlantic coast of the United States. Dekay, in the Natural History of the State of New York, (Fish, p. 262, pl. 40, fig. 128,) describes a fish as the *Alosa teres*, of which he had only seen one specimen. It is, however not rare on our shores, where it is found in the lower bay or on the coast outside, in summer, in small numbers, near the surf, and is known to the fishermen as the round herring and bass-bait. Its size and form enable it to pass through the nets. This fish is closely allied to the genus *Dussumiera*, if not in reality belonging to it. M. Valenciennes, in the Hist. des Poissons, vol. 20. page 423, describes a herring found by Lesueur near Philadelphia as Dekay's *Alosa teres*. It is certainly not Dekay's fish, though it would be difficult to say where it ought to be placed. It has, besides other differences, 19 anal rays, while the *teres* is stated by Dekay to have but 12. In most of the specimens caught here but 10 were counted, rarely more, which makes it correspond to Schlegel's *Micropus*, which had but 8 anal rays. Its formula is as follows: P. 15, V. 8, D. 19, A. 10, C. 4, 19, 4. It requires to be redescribed, but enough is known of it to place it either in *Dussumiera* or very near it. It resembles Schlegel's *Micropus* more nearly than Valenciennes' *Dussumiera*, judging from the published figures of them.

48. BELONE GIGANTEA.

BELONE GIGANTEA, T. and S. Faun. Jap., p. 245.

PLATE VII, fig. 2. Reduced.

NOTES.—*From Lew Chew.* Life size, 46 inches.

This species is not figured in the Fauna Japonica, so that the rough figure herewith published may prove interesting. Messrs. Temminck and Schlegel seem to feel confident that it is distinct from the Indian species. It is said to attain a length of twelve feet.

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49. HEMIRAMPHUS JAPONICUS. N. S.

NOTES.—*From Lew Chew.* Total length, 15 inches.

This very large Hemiramphus is not included in the Fauna Japonica, which contains but one Japanese species. In its general form and proportions it corresponds very nearly to the *H. Commersonii* of the Histoire des Poissons, (vol. 19, p. 28,) but has not its four large lateral spots, nor is it of a greenish gray color. It differs from the *H. Russeli*, (p. 32,) in having a more forked caudal, higher dorsal and anal, and in not having a red beak. Its beak is longer than that of the *H. Quoyi*, (p. 35,) but it resembles that species in having a deeply-forked caudal, and similar coloring, with the exception of the red beak. Bleecker, in his paper entitled "Bijdrage tot de kenniss der Snoekachtige Visschen, &c.," does not describe any species comin nearer to it than those above mentioned.

Its proportions, as taken from the drawing, are as follows: Tip of lower jaw to edge of opercles three times in the length from same point to centre of margin of caudal. Tip of upper jaw to edg of opercles half of last, or six times in total length. Height of head or body nine times, and rigin of dorsal to centre of caudal a little less than one-fifth of same. Origin of anal to do. one-seventh, and origin ventrals three and three-quarters in same. Lower lobe of caudal six and one-quarter times in same distance, and upper lobe nearly one-third shorter, and much narrower. Eye two and a half times in height of body. Head and beak strong and stout. Body of equal height as far as ventrals. Pectorals pointed, and equal to height of body in length. Ventrals with emarginate border, first and last rays of equal length. Dorsal with first rays nearly as long as height of body, with emarginate border, and last rays quite short. Anal commencing under middle of dorsal, and resembling it in form, but smaller. Caudal so deeply forked that it appears separated in two distinct lobes. Lower lobe longest and broadest, both pointed. The scales large, and appear to resemble those of *H. Commersonii*.

Of a general bluish color, darkest on the back, and lighter below. A tinge of green on sides and upper lobe of caudal. A narrow stripe of green on middle of sides reaching from pectoral to caudal, with a broader stripe of pale silvery blue, tinged with greenish, bordering it on each side. Lower jaw dark indigo blue towards the tip, lighter towards the head. Fins all pale-bluish, caudal dark dusky blue. The scales on the back appear to have been darker on their margins.

This fish may be found to come under one of the species already known, when specimens of it can be examined, but it appears in many respects to be a distinct species. A figure of it would have been given had it not at first been considered as the well known *H. Commersonii*.

50. SCOMBERESCOX SAIRA, N. S.

PLATE VII, fig. 1. Reduced.

NOTES.—*From Simoda.* 11¼ inches, Saira-owoo.

This curious fish is evidently a *Scomberesox*, but in some points so different from the known species of that genus that it will perhaps be found to constitute a new one when specimens can be examined. No *Scomberesox* has been hitherto described as from Japan. The *S. Forsteri* of New Zealand, (Cuv. and Val., XVIII, 481,) seems to come nearest to it, but that fish has the usual prolonged mandibles of the others.

The body is regularly fusiform in profile, and probably cultrate in section; head and jaws tapering to a point; these last acute, of even length, and not prolonged, as in other *Scomberesocidae;* nostrils large; eyes large and round; head and body covered with rather large scales. Ventrals not indicated in the figure. Dorsal with nine or ten rays, a little in advance of the anal, both low and of subequal height, with five accessory finlets above, and four below. Lateral line indistinct. Caudal small, and deeply forked, with pointed lobes.

If the length (11¼ inches) from the snout to centre of caudal margin be divided into one hundred parts, the following proportions are found:

Jaws	4.50	Snout to ventrals	48.00?
Snout to eyes	9.00	Snout to dorsal	63.00
Diameter of eyes	3.00	Base of dorsal, long	10.00
Snout to opercles	21.00	Anterior rays of dorsal	5.00
Greatest height of body (at 40.00 from snout)	11.00	Snout to anal	64.00
Height over opercles	8.00	Base of anal, long	11.00
Height at base of caudal	2.00	Anterior rays, do	4.00
Snout to pectorals	22.00	Outer caudal rays	13.00
Pectorals long	7.00		

It will thus be seen that the jaws form but $\frac{1}{6}$ of the length of the head, that the whole head is but $4\frac{2}{3}$ times in the total length, and that the eyes are rather nearer to the snout than to the opercles—in all which it varies from all others of the genus.

Colors.—Back of head and body dark greenish blue, becoming lighter on sides of head and body and white beneath, as far as the anal. Irides pale green. Pectorals dark dusky blue, dorsal and caudal dull green, finlets dusky blue, anal pale dusky.

The figure seems to have been drawn of the natural size. But one specimen of it was observed.

The local name *Saira-owoo* signifies "spear fish," which has been adopted as its specific name. A similar name, *Saiwo*, occurs in the Japanese Encylopedia.—(See Abel Remusat. *Notices et extraits des manuscrits.* Vol. XI, p. 216, No. 30.) Judging from the Japanese figure only, either Cuvier or Remusat has added to the local name "sorte de fistulaire." Owoo and Iwo both signify "fish," and are simply dialectic variations.

51. CONGER HAMO, T. and S.

CONGER HAMO, Temm. and Schleg., Fann. Jap. Pisces, p. 262, pl. 114, f. 2.

NOTES.—From Simonda, (length four feet.)

The drawing is colored over the back of head and body of a rather uniform dusky slate, with tinges of olive, lower parts nearly white. Irides silvery. Pectorals like back. Dorsal and anal darker along the margin.

In the Fauna Japonica it is said to attain a length of ten feet. The authors had received it also from the Straits of Sunda, and consider it different from the *C. Tala-Bon* of the same locality. Dr. Kaup, in his "Uebersicht der Aale," in the Archiv für Naturgeschichte, 1856, part 2, p. 74, places the *Talabon* in the genus Muraenesox of McClelland, where this species also belongs. Bleecker, in his Nalezingen op de Ichthy van Japan, p. 54, seems to suppose that the Hamo is the same as the *C. bagio* of McClelland. Under the name of *Fammo* this fish is probably the one copied in Kaempfer, plate XII, No. 4.

52. ANGUILLA MYRIASTER, N. S.

PLATE XI, fig. 2. Reduced.

NOTES.—From Hakodadi. (Length 22 inches.)

This distinctly marked species seems to be entirely new. It may be the *Congre à chapelet* of Cuvier, so named from a figure of Krusenstern's Atlas, pl. 60, fig. 7—a reference which could not be consulted.—(See note at foot of page 262 in the Fauna Japonica.)

In its general appearance and form it resembles a common eel, and probably belongs to the genus *Anguilla*. Snout to tip of caudal 22 inches. Snout to eyes $\frac{3}{4}$ inch. Eyes $\frac{5}{16}$ inch. Snout to pectorals $3\frac{1}{4}$ inches. Pectorals $1\frac{1}{4}$ inch. Snout to origin dorsal $4\frac{1}{4}$ inches. Snout to origin anal $9\frac{1}{2}$ inches? Height of body about $1\frac{1}{4}$ inch. Dorsal rising very gradually, and highest near the caudal. Anal of sub-equal height.

Colors.—Rich wood-brown over the back, shading off lighter, but in blotches, below the lateral line. Snout and head to back of eyes, and all the lower parts of the head and body of a very pale slaty-blue tinged with brown towards caudal. Irides silvery. Dorsal of a pale dusky slate, becoming more bluish towards caudal, and with a narrow margin of dark dusky along its whole length. Towards the caudal, where the dorsal is higher, this margin is broader, and shades off less abruptly. Anal of same color as the lower parts of the body, but towards the caudal it has a margin like the dorsal. The most distinctive markings of this eel, however, consist in two regular series of snow white spots or dots on each side of the back, commencing a short distance back of the eyes and running nearly to the caudal, becoming fainter as they approach it. The uppermost series consists of very small dots about the diameter of the eyes apart and set in very regular order, dropping a little, however, as they recede from the head. The second series is composed of spots of twice the size of the first, much more closely set, and apparently following the lateral line. Towards the caudal they seem to form a broken white stripe only. The engraving represents the appearance of these spots very accurately as they are given in the original drawing.

53. OPHISURUS MACRORHYNCHOS. Bleecker.

OPHISURUS SERPENS, T. and S., Faun. Jap., 264, pl. 115, fig. 1.
" " Kaup. Archiv. Naturges, 1856, 2, p. 44.
" MACRORHYNCHOS, Bleecker. Muraenoiden &c., p. 28. (1852.)

NOTES.—From Simoda, 2 figures, one 4 feet 6 inches long, the other 2 feet 2 inches. The small one named *Unagi*.

Bleecker, in his paper on the Indian *Muraenoids*, in the 25th vol. of the Transactions of the Batavian Society, separates this species from the *Serpens* of the Atlantic, with a notice of their difference.

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54. MURAENA KIDAKO? T. and S.

MURAENA KIDAKO, Temm. and Schleg., Faun. Jap., Pisces, 266, pl. 117.

PLATE XI, fig. 1. Natural size.

NOTES.—From Simoda, (17½ inches.)

This figure varies somewhat from the one given in the Fauna Japonica. It may be a young specimen of that species. The ground color of the whole body is a light brown, becoming pinkish towards the tail. The whole surface is dotted, blotched, and striped rather irregularly with darker brown. No other colors on the drawing. Irides white. Head rising to back of eyes; lower jaw rather the shortest; the gape of the mouth large, reaching back to twice the distance of the eyes from the snout. Height of body back of the head ¾ inches. Dr. Kaup, in the before quoted paper on eels, does not enumerate this species, but as it resembles the *M. Minor* of T. and S., which he places in his new genus *Poecilophis*, it may possibly belong to it also.

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55. TETRAODON BICOLOR, N. S.

NOTES.—From Simoda, (7¼ inches.)

The figure is colored light green over the back of head and body, the lower parts being pale blue. Back and sides, from the eyes to behind the dorsals, with about forty small brown spots on each side of the body, on the green ground color; pretty regularly scattered. Irides bright yellow. All the fins pale dusky black.

Form increasing rapidly in height from the obtuse snout to the pectorals, thence tapering gradually to the tail. Eyes large and oval, 1¼ inches from snout, and ½ inch in diameter. Pectorals 2¼ inches from snout, and 1¼ long. Dorsal 5 inches from snout, ¾ high. Anal 5¼ inches from snout, and much smaller than dorsal. Caudal deeply lunate, with pointed lobes, its base 6¾ inches from snout. No spines pores or lines are indicated in the drawing.

In its proportions it comes nearest to *T. Argenteus* of T. and S., but differs from all the species of the genus in color.

56. TETRAODON NIVEATUS, N. S.

NOTES.—From Simoda, (4 inches, Fooghoo.)

In form like the last, with more obtuse snout and rounded fins and caudal. Back of head and body dark sap-green to a line passing below the eyes, and above the pectorals, with many small blotches of bluish white. Lower parts white. A large dark spot behind the pectorals. Irides purple. Fins pale olive brown. Eyes $\frac{1}{2}$ inch from snout, $\frac{1}{4}$ in diameter. Pectorals 1 inch, dorsal $2\frac{3}{4}$, base of caudal $3\frac{3}{8}$ inches from snout.

The local name signifies "big belly," or "big sack." It no doubt has some more specific name to distinguish it from others of the genus.

57. TETRAODON BRUNNEUS, N. S.

NOTES.—From Simoda, ($4\frac{1}{4}$ inches.)

Forehead excavated, eyes close to profile, the dorsal outline convex, base of caudal very stout. Fins and caudal rounded. Snout to eyes $\frac{3}{4}$ inch, diameter $\frac{3}{8}$. Snout to pectorals $1\frac{1}{4}$, to dorsal $2\frac{1}{2}$, to anal $2\frac{5}{8}$, and to base of caudal $3\frac{1}{2}$ inches. No lateral line or spines on the drawing.

Upper parts and sides, to a line passing below the pectorals, of a rich bistre brown. The back very dark. Blotches and confluent spots of darker brown in two or three series from eyes and pectorals to tail, besides other paler spots between and below them, and on the sides of the head. Throat and abdomen white. Irides pale slaty blue. Fins, except caudal, of a pale brown. Caudal dark brown, with the membrane between the rays orange brown.

58. DIODON NOVEMMACULATUS, T. and S.

DIODON NOVEMMACULATUS, Temm. and Schleg., Faun. Jap. Pisces. 289, pl. 128, fig. 2.

NOTES.—From Simoda, ($7\frac{1}{2}$ inches.)

Agrees with the figure above quoted. The species is said to be quite rare in Japan.

58. MONACANTHUS CIRRHIFER, T. and S.

MONACANTHUS CIRRHIFER, Temm. and Schleg., Faun. Jap. Pisces. 290, pl. 130, fig. 1.

NOTES.—From Simoda, ($8\frac{1}{2}$ inches.)

Corresponds with the published figure, except that the bluish grey color is deeper, and the oblong spots more strongly defined.

60. OSTRACION IMMACULATUS, T. and S.

OSTRACION IMMACULATUS, Temm. and Schleg., Faun. Jap., Pisces., 296.

NOTES.—From Simoda, ($4\frac{1}{2}$ inches, Gihagi.)

From the description above quoted, there can be little doubt that the figure represents the same species. Bleecker, in his "Nalezingen, &c., p. 55," considers this a variety of the *O. Cubicus*, Bloch.

Diengkitsch observed that at Osaka it is called *cog-owoo,* which signifies rowing or paddling fish. Whoever has looked at a live box-fish in water would agree that this name was quite appropriate.

61. TRIAKIS SCYLLIUM, M. and H.

TRIAKIS SCYLLIUM, Müller and Henle; Beschreib. der Plagiostomen, p. 63, pl. 26.
WATT'S SHARK, Latham, Phillips' voy. to Botany Bay, 1789, p. 285, and plate.

PLATE XII, fig. 1. Male reduced.

NOTES.—From Simoda, (4 feet, Sa-me.)

Of this curious fish but one specimen was brought home by Mr. Bürger, which is now in the museum at Leyden, and on it Messrs. Müller and Henle founded a new sub-family, genus and species. Mr. Gerrard, in his list of *Chondropterygii* of the British Museum, 1851, p. 55, enumerates this and another species, the *T. Californica*, from a foetal specimen procured in California, but without adding any description. A dried skin of the *T. Scyllium* was brought home by a member of the United States Expedition, and is now in Philadelphia. It seems to have escaped the notice of the above naturalists, who quote the next species from Governor Phillips' voyage, that this one is also figured there, from a female, and described as Watt's shark in the same work. The figure there given resembles the one now published so nearly in form that there can be no doubt of their identity, though Phillips' seems to have annular spots, arranged in regular series.

The colors are, brownish slate above, and rather purplish below, blotched and clouded with dark brown on body and fins in an irregular manner. Throat and abdomen white. Irides yellow. The two appendages on the anterior part of the snout are longer than the others, and have a short branch on the outside of their base. Behind those, on each side, are three pair of shorter barbels. Some of these appear in another sketch to have short branches also. Eyes oval. Nostrils not indicated. Large spiracles behind and below the eyes. Branchial openings large, and above base of pectorals. Pectorals set far back, broad and heavy. Dorsals close together, and behind the ventrals, which last are large and broad. Male appendages long. Anal below and behind the second dorsal. Lobes of caudal small, with deep indentation near the end of the upper one. The figure in the voyage de la Coquille does not indicate this feature.

62. HETERODONTUS PHILLIPPI.

PORT JACKSON SHARK, Latham, Phillip's voyage, ed. 4to. 283, and plate.
HETERODONTUS PHILLIPPI, Blainville, Bull. Soc. Phil., 121, (1816.)
" PHILLIPPI, Gerrard, List of fish, &c., pt 1, p. 66.
CESTRACION PHILLIPPI, Cuvier, R. A., 3d ed., II., 391, (1829.)
" PHILLIPPI, Lesson, (1830,) Duperrey. Voy. II., pt. 1, 97 Poiss., pl. 2.
" PHILLIPPI, J. E. Gray, Ann. and Mag., Nat. Hist., I., (1838,) p. 109.

CESTRACION PHILLIPPI, Temm. and Schleg., Faun. Jap., Pisces, 304.
" " Müller and Henle, Plagiost, p. 76, 199, and plate.
" QUOYI, De Frémenville, Mag. de Zool., (1840,) and plate.
" ZEBRA, Gray, Zool. Misc., 5.
" ZEBRA, Richardson, Report, (1845,) p. 195.

PLATE XII, fig. 2. Natural size.

NOTES.—From Simoda. Life size, 8½ inches.

This remarkable form among the *Squalidæ* seems to be found from New Holland to Japan, if the *C. Zebra* is the same as the more southern species, which seems probable. Gray (Annals of Nat. Hist., 1, 109) doubts if Messrs. Müller and Henle had ever seen a specimen, when they expressly state that they had found nine specimens in various museums.

The figure here published seems correct in outline, and nothing can be added as to its proportions.

Its general color is of a pale sepia-like brown, darker on back and fins, with a pinkish tinge on lower parts of body. Irregular bands and large blotches of several shades of the same brown are distributed from the pectorals to caudal, grouped in five principal bands, with smaller ones near the back between the first three large ones. The first of these last is just back of pectorals, the second back of the first dorsal and in front of ventrals, spreading laterally near the abdomen. The snout and cheeks are shaded also with darker brown cloudings. Small pale brown dots besides the above cover the back of the head and body and about one half of the pectorals, dorsals and caudal. Ventrals, anal, and lower lobe of dorsal of a more uniform brown.

Lacépède calls it the *Squale Philip*, and in Schneider's Bloch it appears as the *Squalus Philippi*. It is figured also in Gen. Hardwicke's Illustrations, pl. 5. Mons. Bourdet de la Nièvre, in the *Annales de la Soc. Linn. de Paris, Sep.*, 1825, p. 361, alludes to the discovery of fossil teeth of a *Cestracion*. Davila, Agazziz, and Owen have also described the teeth of this remarkable genus. Gerrard, on account of a difference in the markings, seems to consider the *Zebra* as distinct from the *Philippi*; but the currents of the southwestern Pacific will account for its being found over so wide a district. Among the *Plagiostomes* the colors are subject to great variations. Latham's figure in Phillipp's voyage is very correct, while the one by Lesson is defective, the caudal being figured with its margin unbroken.

It attains a larger size than is here represented, not exceeding however three feet, according to the Fauna Japonica, where it is stated to be common in spring and autumn, and much sought after as food by the Japanese, who eat it raw or boiled. The local name given to it in the same work is *Sa-siwari*, derived, no doubt, from *Sas-ir*, to "stick in," and *war*, "to cleave," in allusion to the spines in front of the dorsals.

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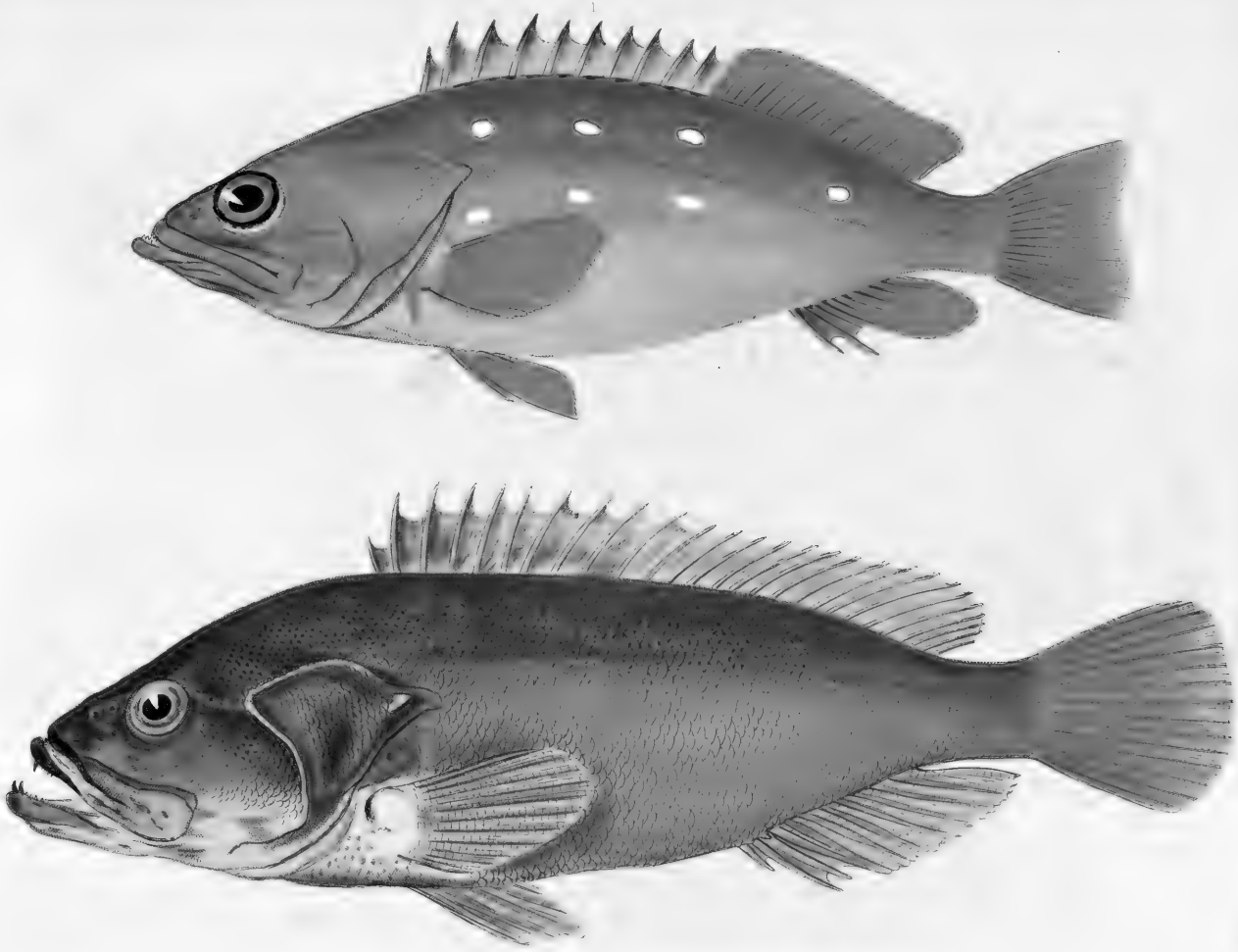
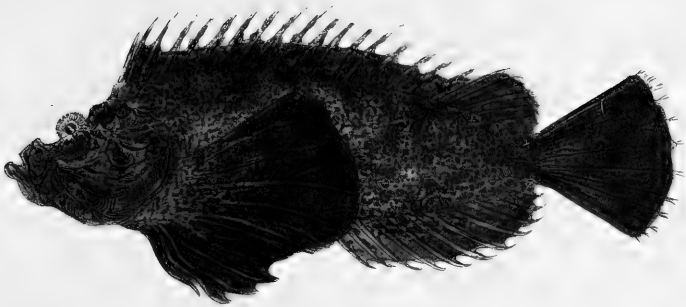
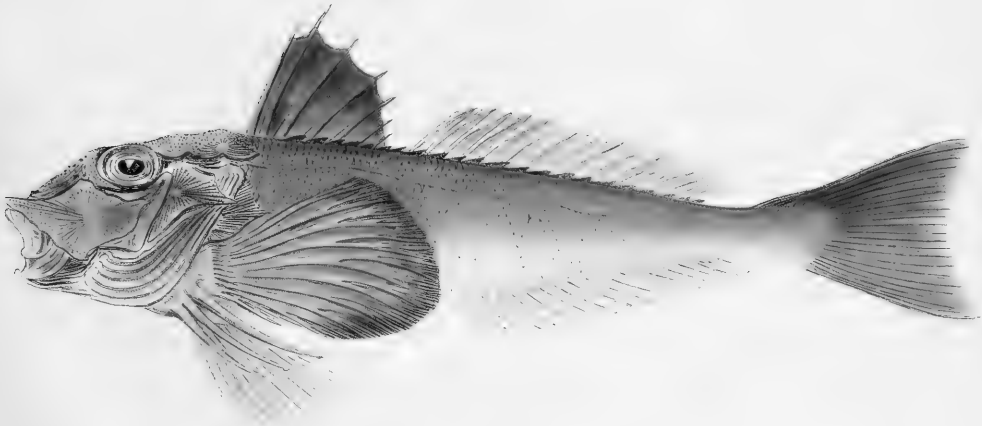
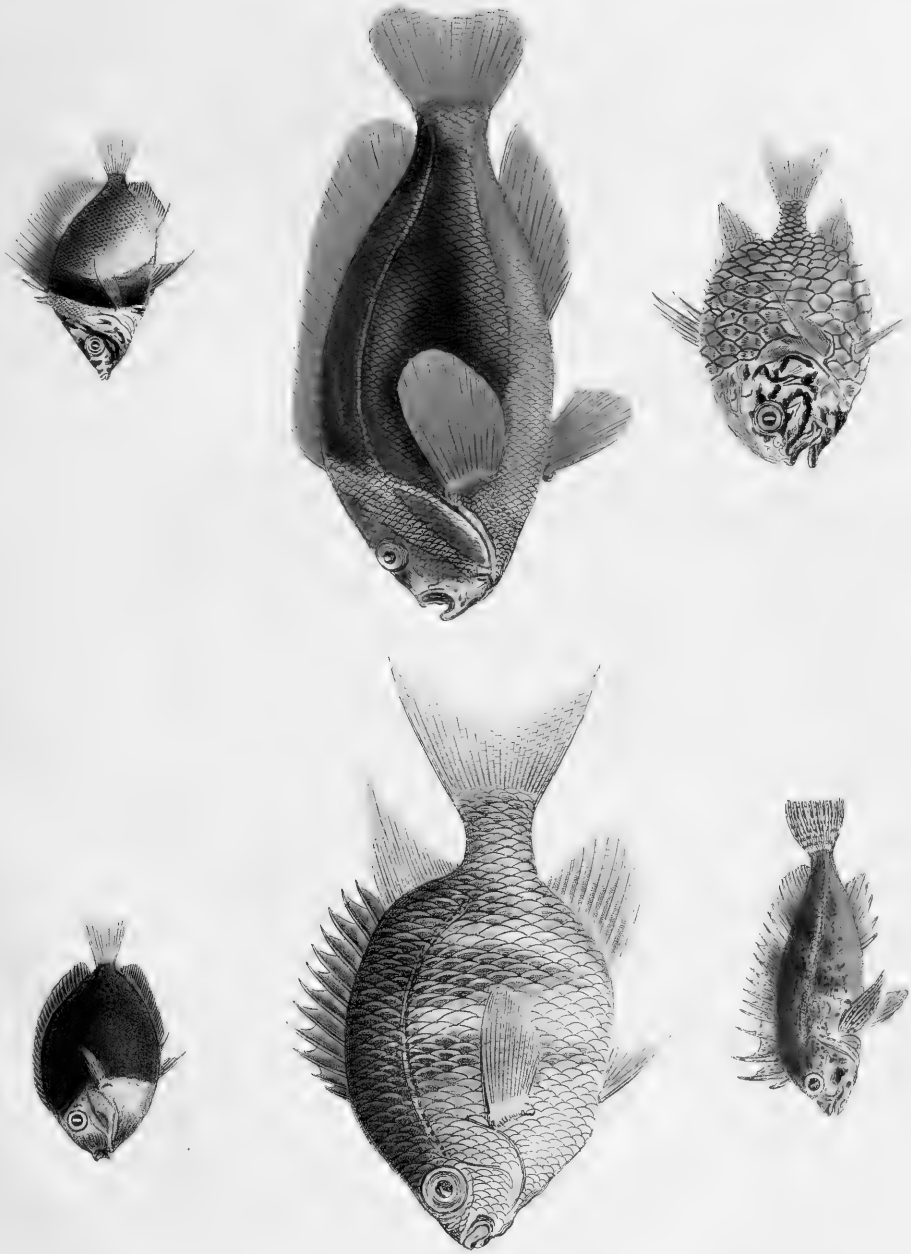


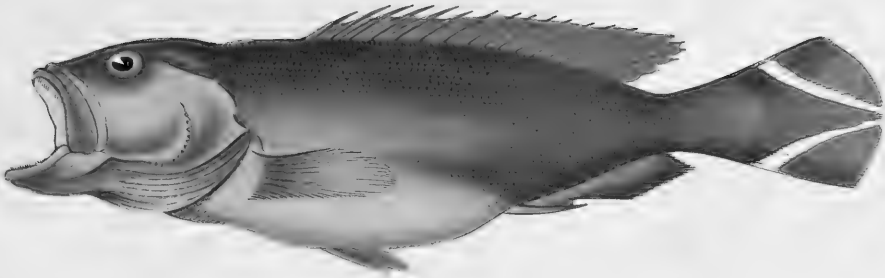
M. Wolf a. del.

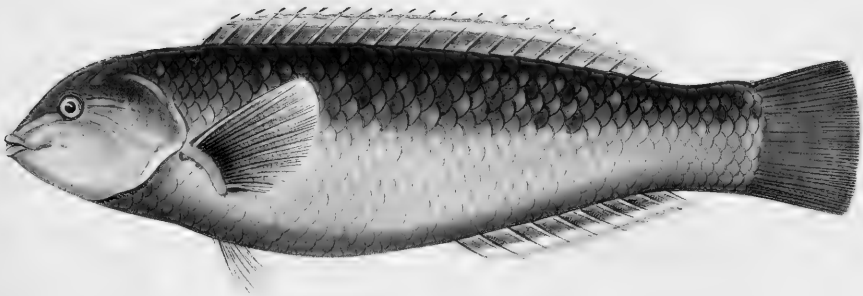
ANUS MARGINALIS

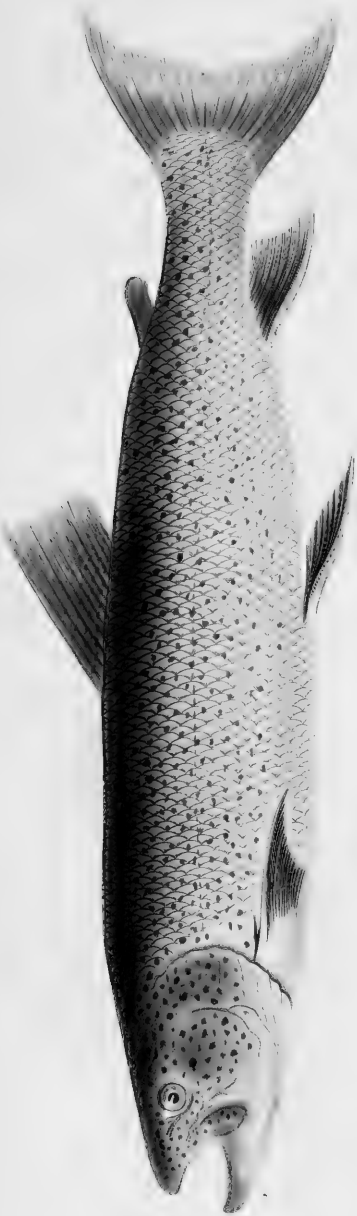


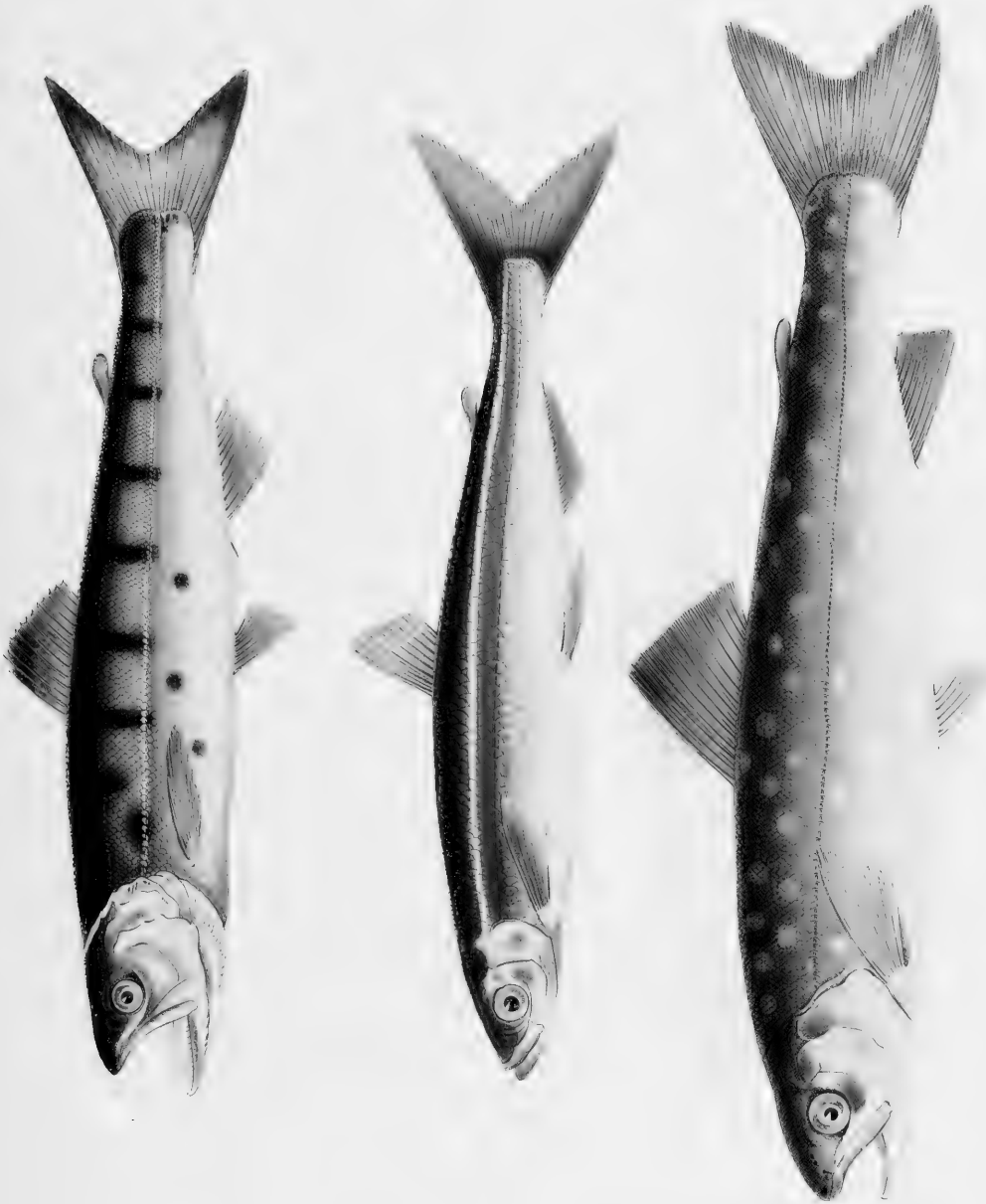












1. MURAENA [illegible] [illegible] MIGUEL.

1. TRIAKIS SCYLLIUM. (Reduced)

2. CESTRACION PHILLIPPI. (Nat. size).

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