

ON A COLLECTION OF FISHES MADE BY MR. ALAN
OWSTON IN THE DEEP WATERS OF JAPAN

BY DAVID STARR JORDAN AND JOHN OTTERBEIN SNYDER

The writers have recently received from Mr. Alan Owston, of Yokohama, well known as a shipmaster and as a collector in natural history, a very remarkable series of fishes obtained on long lines in the depths of Sagami bay and Suruga bay, Japan. The present paper contains notes on these species, together with field notes of Mr. Owston. The specimen of *Mitsukurina owstoni* and some of the others have been sent to the United States National Museum. The rest are in the collection of Leland Stanford Junior University.

Family SCYLLIORHINIDÆ

PRISTIURUS EASTMANI Jordan and Snyder, new species

“Gobozame” (Burdock Shark)

(PLATE LX)

One specimen, a female, 345 millimeters long, from off Izu. Type No. 7740, Ichthyological collection, Leland Stanford Junior University.

The body is very slender and elongate, the head small and narrow. Head measured to first gill opening $6\frac{1}{2}$ in the total length; depth equal to half the distance between tip of snout and third gill opening, $11\frac{1}{2}$ in total length. Snout $2\frac{1}{5}$ in head, rather acutely pointed. Nostrils with pointed flaps on the edges, which meet and curve inward, making the nasal cavity tube-like with an outer anterior and an inner posterior opening; distance between outer anterior openings equal to cleft of mouth measured on upper jaw, or distance between anterior edge of eye and spiracle; distance between posterior openings equal to half the longitudinal diameter of eye. Width of mouth equal to length of snout; distance between anterior edge of mouth and tip of snout equal to distance between center of pupil and anterior gill opening, or to width of interorbital space. Teeth each with 7 acutely pointed cusps, the central of which is twice as high as the others; lateral cusps growing successively smaller toward outer edges of tooth; three central cusps

distinctly visible, the others partly covered by the gums. Upper surface of tongue and roof of mouth with minute prickles. Spiracle on a level with eye, its greatest width equal to its distance behind eye, one-half the width of the first gill opening. Length of gill area equal to distance between eye and first gill opening; second, third, and fourth gill openings about equal in width, the fifth narrowest. Skin closely covered with minute, trilobed scales, each of which has a central keel. Upper edge of tail with a keel beginning an eye's diameter behind base of second dorsal and extending posteriorly a distance somewhat greater than length of head; keel armed by two rows of enlarged, tooth-like scales, the inner edge of each scale having a sharp cusp; about three rows of scales similar to those of the body between the rows of larger ones.

First dorsal fin inserted above posterior edge of base of ventral, its distance behind tip of snout equal to $2\frac{4}{5}$ times the length of head; length of anterior edge of fin equal to length of snout. Second dorsal inserted anterior to end of base of anal. Free edges of both dorsals straight. Caudal fin with a notch on the ventral edge near end of fin. Free edge of pectoral slightly convex; when depressed the fin reaches a little over half way between origin of pectoral and ventral. Ventrals sharply pointed posteriorly. Tip of anal reaching a vertical through posterior end of base of second dorsal.

Color in spirits brownish above with indistinct clouds of a deeper shade, the more conspicuous of which are located as follows: above and a little behind base of pectoral, midway between pectoral and ventral, below bases of dorsals, on upper edge of tail and on caudal fins. Dorsals dusky, their anterior edges dark brown. Anterior edges of caudal, anal, and pectorals dark brown. Free margins of dorsals and of anal white. Pectorals dusky above, the free margins white. Tongue and inside of mouth without dusky color.

The following measurements are in hundredths of the total length (snout to tip of caudal fin): Head measured to first gill opening .15; depth .085; depth of caudal peduncle .04; width of first gill slit .017; longitudinal diameter of eye .04; length of snout .07; anterior edge of mouth to tip of snout .065; distance between nostrils .02; width of mouth .075; length of anterior edge of first dorsal .07; of second dorsal .07; length of base of first dorsal .045; of second dorsal .05; distance from insertion of ventral lobe of caudal to notch .20; from notch to end of caudal .06; width of base of pectoral .05; length of anterior edge .09; length of base of ventral .07.

Family PSEUDOTRIAKIDÆ

PSEUDOTRIAKIS ACRALES¹ Jordan and Snyder, new species

Oshizame (Dumb Shark)

(PLATE LXII)

One example, 172 centimeters long, from off Toi in Suruga bay. Type No. 12,903, Ichthyological collection, Leland Stanford Junior University.

Depth of body at origin of first dorsal about $9\frac{1}{5}$ in total length; head measured to first gill opening $5\frac{1}{2}$; snout $2\frac{1}{2}$ in head measured to first gill opening; width of interorbital space $2\frac{4}{7}$; head broad and flat, the greatest width contained $1\frac{3}{4}$ times in the length, the depth $2\frac{2}{3}$; interorbital space slightly concave; orbit narrow and long, its diameter 8 in head, the skin below eye with a deep fold; spiracle elongate, the greatest width equal to half the diameter of orbit; width of space between spiracle and first gill opening $3\frac{1}{3}$ in head; height of third gill opening equal to diameter of orbit; width of space between nostrils equal to distance between anterior edge of orbit and spiracle, $4\frac{1}{5}$ in head; distance between anterior edge of mouth and tip of snout equal to space between anterior edge of orbit and middle of spiracle, $3\frac{5}{6}$ in head; distance from angle of mouth to its anterior edge measured on upper jaw $2\frac{1}{2}$ in head.

Teeth on jaws very small, in oblique rows, the obliquity more pronounced toward posterior part of jaws; rows on upper jaw widely spaced posteriorly. Teeth of upper jaw and of tip of the lower, each with a long, sharply pointed, median cusp; a smaller cusp on the outer posterior edge, one or two similar small cusps on the inner anterior edge, and a series of sharp ridges on the outer side; posterior to tip of lower jaw the ridges are less apparent, the central cusp grows smaller, the lateral ones larger, others being added until the teeth become broad and flat with serrated edges. Skin covered with a shagreen of minute, leaf-like prickles, each with a strong, elevated midrib—some of them with a slight denticulation on each side.

Distance between origin of first dorsal fin and tip of snout equal to $4\frac{2}{3}$ times the length of space between eye and anterior gill opening; fin highest behind the middle, where its height is contained $5\frac{1}{4}$ times in the length of base.

Distance between first and second dorsals equal to $3\frac{1}{2}$ times the diameter of orbit; base of second dorsal equal to twice its height;

¹ ἀκραλής, speechless.

width of free edge of fin equal to height of fin. Insertion of anal slightly posterior to that of second dorsal, the length of its base equal to that of upper jaw, measured from angle of mouth to anterior edge; height of fin contained $2\frac{1}{2}$ times in length of base; width of free edge a little less than height of fin.

Distance between anal and origin of caudal $1\frac{1}{2}$ times diameter of eye; caudal with a deep notch on postero-ventral side, the distance between origin of fin and notch $4\frac{2}{3}$ times depth of caudal peduncle at origin of fin.

Anterior edge of base of pectoral below third gill opening; width of base of fin $3\frac{1}{3}$ in head; length 2. Origin of ventral on a vertical a little anterior to end of base of dorsal; length of anterior edge of fin $2\frac{1}{3}$ in head; free edge 4.

Color on both dorsal and ventral surfaces dark gray; fins including the first dorsal edged with blackish.

This species seems to differ considerably from the Atlantic form *P. microdon*, Capello. The writers have not seen the original description and figure of *P. microdon*, but rely on that of Günther, after Capello, and also on an account of an example from Long Island, published by Bean.¹ Comparisons of measurements given by Bean and similar ones from the species in hand follow:

P. microdon.

Snout about twice as long as distance from its tip to mouth.

Tip of snout to last gill opening 5 times in total length.

Height of head at angle of mouth 11 times in total length.

The distance of mouth from snout measured on axis of fish equals one-third width of mouth. The distance from snout to angle of mouth obliquely taken equals one-fourth the distance from snout to last gill opening.

Distance between nostrils equals 4 times the distance between eye and spiracle.

P. acrales.

About $1\frac{1}{2}$ times.

$4\frac{1}{3}$ times.

$14\frac{1}{2}$ times.

Distance from tip of snout to anterior edge of mouth $1\frac{1}{8}$ in width of mouth; from tip of snout to angle of mouth $1\frac{7}{8}$ in distance between tip of snout and last gill opening; from angle of mouth to its anterior edge measured on upper jaw, 3 times.

$2\frac{2}{3}$ times.

¹ Bean, Tarleton H. The first occurrence of *Pseudotriacis microdon*, Capello, on the coast of the United States. *Proc. U. S. Nat. Mus.*, vol. VI, 1883, p. 147.

Length of base of first dorsal $5\frac{1}{4}$ times its greatest height,
7 times its greatest height: some- $9\frac{3}{5}$ in total length.
what more than body height at
origin of fin, $8\frac{2}{7}$ in total length.

Height of second dorsal nearly $2\frac{1}{3}$ times length of orbit.
twice the length of orbit.

Distance of caudal from end $2\frac{2}{3}$.
of anal base equals one-fourth
the length of second dorsal base.

Greatest width of pectoral $1\frac{2}{3}$.
equals twice height of anal.

Family MITSUKURINIDÆ

MITSUKURINA OWSTONI Jordan

Tenguzame (Goblin-Shark)

A huge example, 353 centimeters long, forwarded without examination to the United States National Museum. This is the third example taken, the first being in the Imperial University of Tokyo, the second in the Museum of Brussels. Mr. Owston writes:

"I have several duplicates of this now, but the one I send is the longest so far obtained. This shark is taken mostly at Kozu near Odawara—on the chart $35^{\circ}.16 \times 139^{\circ}.17$ E. gives the exact spot, where it will be seen there is a bank with 52 fms. on it close to depths of 300 to 400 fms. I imagine these sharks come on to this bank to breed, as mostly females are taken, and in the spring-time only. They are caught in *naname* (7-mesh) nets, which are set at the upper edge of the bank, so catching the fish when they come up from the deep. Oil is extracted from the liver, but the flesh is used only for fertilizing purposes.

"This shark appears to be fairly well known at this particular spot only, where they call it *Tengu-zame*, Goblin or Elfin Shark. I showed a figure of it to half a dozen fish-mongers at Odawira, only four miles away, and not one of them had even seen or heard of such an animal. Kuma Aoki of Misaki knew nothing about this shark being found at Kozu, although I believe he has fished on the very ground. Kuma took a small one recently off Okinose, 10 miles south of Misaki, by shark lines, and they have been taken on the coast of Izu also by line."

Family LAMNIDÆ

ISUROPSIS GLAUCA (Müller and Henle)

Nezumizame (Rat-shark)

Nesumi, rat: "Probably meaning mouse-colored."

Suruga bay. The species is common in Japan.

Family SQUALIDÆ

LEPIDORHINUS FOLIACEUS (Günther)

Kanatsubo-zame

One specimen in good condition from off Enoura in Suruga bay.
 “*Kanatsubo* is a vulgar term for a peculiar facial expression.”

Family CHIMÆRIDÆ

CHIMÆRA PURPURASCENS Gilbert MS.

(Gilbert MS. Fishes Collected off Hawaii by the *Albatross*, 1902.)

Kachizame

One specimen 132 centimeters, No. 12,902, Leland Stanford Junior University Museum, from off Mishina, Izu in Sagami bay.

Mr. Owston observes: “The fish is called Kachizame, the exact meaning of which I have not been able to ascertain. Kachi may mean ‘a kind of gray color.’ I have a duplicate specimen. They were of a fine purplish black when fresh.”

Family PLAGYODONTIDÆ

PLAGYODUS FEROX (Lowe)

(*Alcispaurus æsculapius* Bean)

Two well-preserved examples are from Misaki. Mr. Owston mentions the preservation of several duplicates and we have seen the same species in the Imperial University of Tokyo. A comparison of the Japanese specimens with some from the west coast of North America leaves little doubt as to the identity of *P. ferox* and *P. æsculapius* (Bean) with the Japanese species.

A specimen collected at Unalaska, Alaska, by Dr. Jordan, has 41 dorsal, 15 anal, and 8 ventral rays; another obtained near Point Arenas, California, by Mr. Elijah Bishop, and presented to the University by Prof. Robert E. Swain, has 38 dorsal, 15 anal, and 9 ventral rays. The Japanese examples have 35 and 36 dorsal, 15 anal, 10 and 9 ventral rays respectively. A specimen from San Luis Obispo county, described and figured by Miss Flora Hartley,¹ has 39 dorsal (39 in description, 37 in figure), 17 anal, 9 ventral rays. All the above have the first rays of dorsal, anal, and ventral spine-like, with the anterior edge more or less roughly serrated.

¹ *Proc. Cal. Acad. Sci.*, 1895, p. 49, pl. II.

Family GONORHYNCHIDÆ

GONORHYNCHUS ABBREVIATUS Schlegel

Nezumi-Gisu (Rat-Gisu or Sillago)

(PLATE LIX)

A fine specimen from the Yokohama market.

The Japanese species seems to differ from that of the Australian seas (*Gonorhynchus gonorhynchus* = *G. gronovii* = *G. greyi* = *G. brevis*) in the constantly larger head. In the specimen here figured the head is $4\frac{2}{5}$ times in length of body to base of caudal, $4\frac{5}{6}$ times in total length. The depth is about half the length of the head. Eye $4\frac{1}{2}$ in head.

Mr. E. C. Starks has examined the shoulder girdle of this species; it has the mesocoracoid arch, as usual with Isospondylous fishes. Its place is apparently with the earliest and most generalized of these forms.

Family GEMPYLIDÆ

PROMETHICHTHYS PROMETHEUS (Cuv. and Val.)

Sumiyaki

Two specimens from off Izu; the name means "charcoal burnt." We obtained the same species in the market of Tokyo, from off Misaki.

Family LABRIDÆ

JULIS MUSUME Jordan and Snyder, new species

(PLATE LXI)

Two examples, the type No. 8384, Ichthyological collection, Leland Stanford Junior University, and the cotype in the United States National Museum, both from off Izu.

Head measured to end of opercular flap $3\frac{3}{5}$ in length to base of caudal fin; depth $3\frac{2}{3}$; depth of caudal peduncle $7\frac{1}{3}$; length of snout $3\frac{1}{4}$ in head; diameter of eye $6\frac{1}{3}$; width of interorbital space $4\frac{2}{3}$; number of scales in longitudinal series, counting from upper edge of gill opening, 69; in transverse series upward and forward from origin of anal 31; dorsal IX, 12; anal III, 12.

Two rows of teeth in each jaw, the inner of which extends backward but a short distance, the teeth small and blunt; outer teeth acutely pointed, the anterior pair of each jaw elongate, the lower pair closely apposed, fitting between the upper ones; a small posterior canine projecting outward and forward from the upper jaw.

Gill-rakers on first arch 5 + 11, short; those on middle of lower limb of arch with sharp tips.

Lateral line curving upward from the edge of the opercle, passing along near the back on the fourth or fifth row of scales below the base of dorsal, curving downward below bases of eighth and ninth articulated rays and extending along middle of caudal peduncle.

Scales gradually growing smaller from the belly toward the breast, where they are minute and imbedded near the throat; a narrow naked area extending from nape to insertion of dorsal.

Dorsal spines graduated in length from the second to the last, the second one contained $3\frac{5}{6}$ times in the head, the last $2\frac{5}{6}$ times; first spine half as long as the last; middle rays of soft dorsal $2\frac{1}{3}$ in the head. Anal spines weak, the third contained 4 times in the head; longest anal ray $2\frac{2}{5}$ in the head; base of anal extending a little farther posteriorly than that of the dorsal; the tips of the fins when depressed reaching about an equal distance posteriorly, but not reaching the base of caudal. Membranes of dorsal and anal not notched between the rays. Caudal convex, its length $1\frac{1}{2}$ in the head; scales extending outward between the rays on basal third of fin. Pectoral $1\frac{3}{5}$ in head. Ventrals pointed equal in length to pectorals.

Color in spirits white on lower half of body, the head pearly white; a broad, dark, longitudinal stripe on upper half extending from tip of snout to near tip of caudal; upper border of stripe straight, passing from tip of snout through upper margin of eye, gradually approaching base of dorsal and nearly reaching it at end of fin; ventral border of stripe passing through lower margin of eye, interrupted on opercle by a downward projection from the stripe, and again along the side of body by 12 or more breaks made by tongues from the light ventral parts projecting up into the dark stripe. Dorsal black with a white border which is narrow anteriorly, growing broader and becoming diffused with the dark base of the fin posteriorly. Dark stripe of body broadening on caudal, the lower third, the posterior and upper margins white. Pectorals, ventrals, and anal white. Inside of mouth and gill chambers white.

A colored drawing sent by Mr. Owston illustrates the color in life as follows: Snout and occiput bright vermilion, the color diffused along the back and also on the pectoral and ventral fins; anterior part of spinous dorsal, sides, and belly with lemon yellow, the color more intense at base of pectoral, between ventrals, along anterior half of base of anal, and along the lower, irregular edge of the dark, lateral stripe; middle of caudal with a dash of orange.

Family LIPARIDIDÆ

TRISMEGISTUS OWSTONI Jordan and Snyder, new genus and species

(PLATE LVIII AND FIGURE 29)

The new genus *Trismegistus* differs from *Liparis* in having the skin rough with prickles, with broad, rounded bases, like thumb-tacks. Size over-large for a Liparid.



FIG. 29.—*Trismegistus owstoni* Jordan and Snyder. (Section of the epidermis, from the under side, showing the peculiar prickles.)

The species is known from a single specimen 11 inches long. The species according to Mr. Owston is quite unknown to Japanese fishermen. It resembles *L. agassizii* Putnam, differing in the generic character of small epidermal plates or shields. Type No. 8385, Ichthyological collection, Leland Stanford Junior University, from Enoshima, Sagami bay, Japan. Length 44 cm.

Head $4\frac{2}{3}$ in length, measured to base of caudal fin; depth 4; eye 11 in length of head; snout $2\frac{1}{3}$; width of mouth $1\frac{1}{2}$; width of interorbital space $1\frac{3}{4}$; dorsal 43; anal 36; pectoral 40; caudal 10.

Interorbital space slightly convex. Anterior nostril with a low rim. Jaws covered with bands of minute, trilobed teeth; upper and lower pharyngeals with small pads of villiform teeth. Width of gill opening contained $2\frac{1}{3}$ times in the length of head, projecting about half its width below upper edge of pectoral fin; gill-rakers $1 + 7$, small and stubby; covered with horny setæ; filaments of pseudobranchiæ about one-third as long as those of the gills.

Origin of dorsal on a vertical passing through a point about twice the diameter of eye behind base of pectoral; origin of anal below eighth dorsal spine; anterior portions of both dorsal and anal covered with thick skin and gelatinous tissue; both fins united with the caudal, the dorsal extending to within an eye's diameter of the tip of the latter; anal reaching vertical through tip of caudal. Caudal slightly convex posteriorly. In *L. agassizii* the dorsal and anal do not quite reach the middle of caudal; the dorsal is partly separated from the caudal by a notch; the caudal is rounded posteriorly. Pectoral rounded, with 40 rays (34 or 35 in *Liparis agassizii*), none of the lower rays longer than those above them; lowermost rays fleshy, their tips separated as in *L. agassizii*. Pads of ventral disk soft; edge of disk very thin; longitudinal diameter contained $2\frac{1}{5}$ times in the length of head, a little less than distance between disk and anal opening.

Skin loose, the surface with very small irregular folds, on which are minute plates or shields resembling thumb-tacks in shape, the spicule pointing outward, the round flat head imbedded in the epidermis (figure 29). Lips, chin, throat, axil, and belly apparently without the plates. No barbels on head. Snout with 10 large pores in a transverse row above mouth.

Color pale gray, clouded with dark gray and black; a row of small, blackish clouds along base of dorsal; a second row of larger, black clouds below the latter; body near base of anal blackish; dorsal, anal, caudal blackish, especially along the edges; pectoral dark gray on the outer portions, blackish along edges; under or posterior side of fin darker than the outer.

Family ATELEOPIDÆ

ATELEOPUS JAPONICUS Schlegel

Three fine specimens, the one from off Izu, the others from off Kozu in Sagami bay.

"Several were taken on the Mirsukurina bank at Kozu. One was caught in Tokyo bay where it was doubtless out of its depth."

Family TRACHYPTERIDÆ

TRACHYPTERUS ISHIKAWÆ Jordan and Snyder

(Trachypterus iijimæ Jordan and Snyder; young)

(PLATE LXIII)

Two specimens about 172 centimeters long were "taken at the surface in a dying state off Mera on the west coast of Bashu, near the mouth of Tokyo bay."

Trachypterus iijimæ is probably an example of the young of this species, the type specimen of which had about 198 dorsal rays.

Head 8 in length, depth $7\frac{3}{4}$, dorsal 168, pectoral 9. Length of head somewhat greater than its depth, the latter equal to distance between tip of snout and posterior border of eye; snout $2\frac{1}{3}$ in head; eye $3\frac{1}{2}$, $3\frac{2}{3}$ in depth of body; width of interorbital space $1\frac{3}{5}$ in diameter of eye; lower jaw projecting slightly beyond the upper; process of premaxillary extending to a vertical through posterior border of eye; maxillary with a leaf-shaped flap a little longer than diameter of eye, with branched striations extending outward from its point of attachment; opercular bones with conspicuous striations. Teeth very weak; 2 or 3 small, loosely imbedded ones on vomer, a row of 4 on the premaxillary, 3 or 4 on each side of symphysis of lower jaw. Gill-rakers on first arch $5 + 11$, provided with tooth-like setæ on the inside; filaments of pseudobranchiæ equal in length to those of the gills.

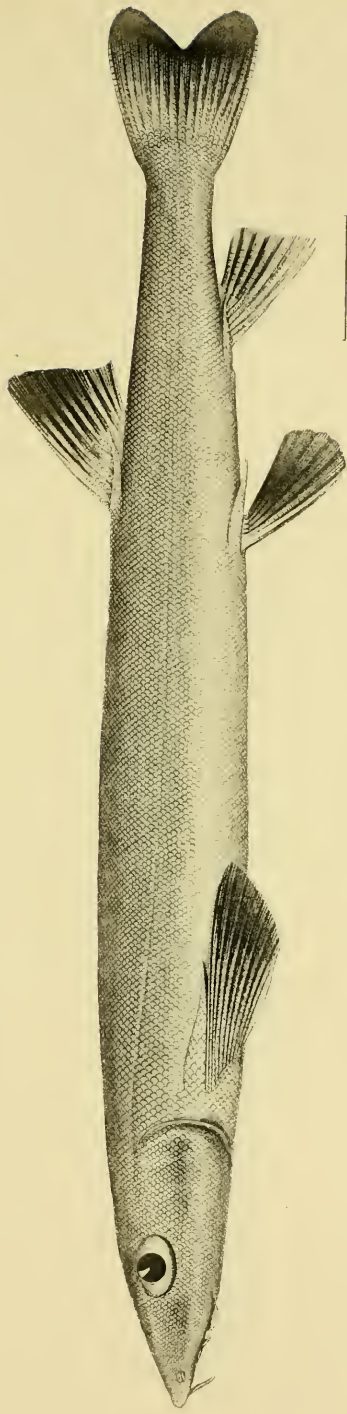
Origin of dorsal above upper edge of gill opening, the rays highest near beginning of posterior third of body, where they are about $1\frac{1}{3}$ times the diameter of orbit. Length of pectoral equal to diameter of orbit. Ventral fins absent or represented by a mere filament, the place of insertion indicated by a narrow groove below posterior edge of base of pectoral. Caudal projecting upward; filaments absent, possibly broken. Several small spines projecting downward and backward from end of caudal peduncle.

Head naked; body closely covered with minute pads or plates containing a varying amount of bony matter; those on median part of the ventral surface pointed, hard and white like enamel; along dorsal part of body enlarged plates are arranged in vertical rows parallel with the interneurals. Lateral line with large, quill-like tubes, beginning at upper edge of gill opening, gently bending downward and extending along body somewhat below the median line; armed near caudal fin with a few weak spines.

Color dusky, ventral surface and a narrow area along base of dorsal darker.



TRISMEGISTUS OWSTONI JORDAN AND SNYDER.
(Drawn by W. S. Atkinson)



GONORHYNCHUS ABBREVIATUS SCHLEGEL.

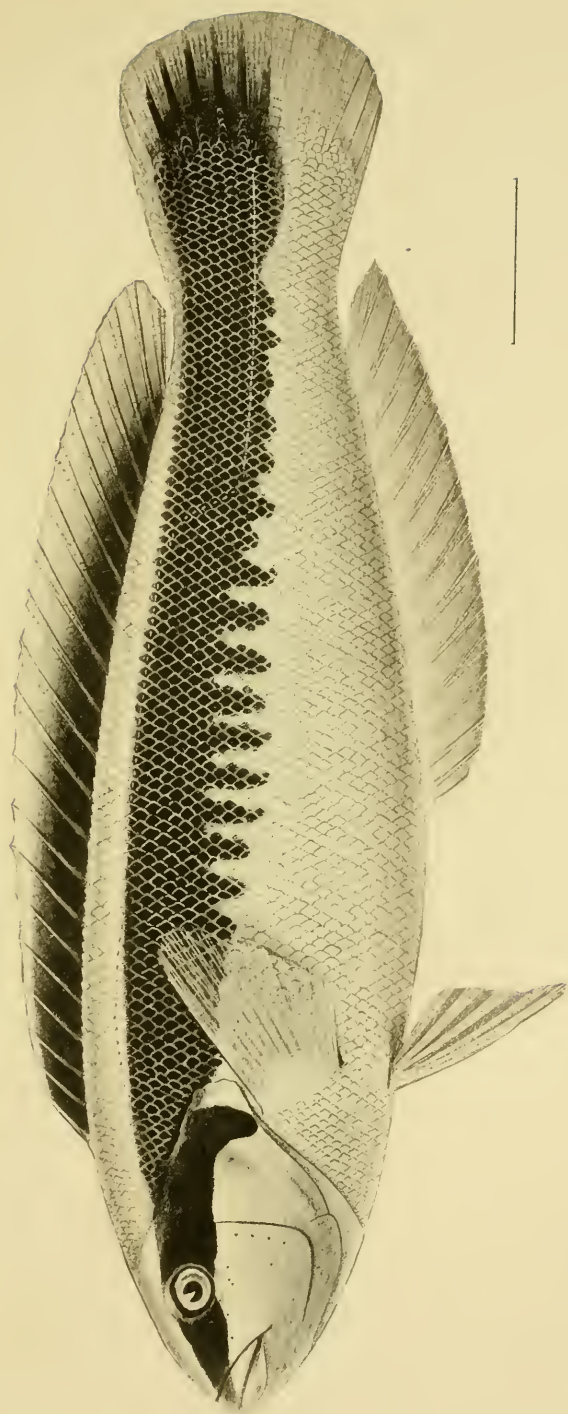
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PRISTIURUS EASTMANI JORDAN AND SNYDER.

(Drawn by W. S. Atkinson)



JULIUS MUSUME JORDAN AND SNYDER.

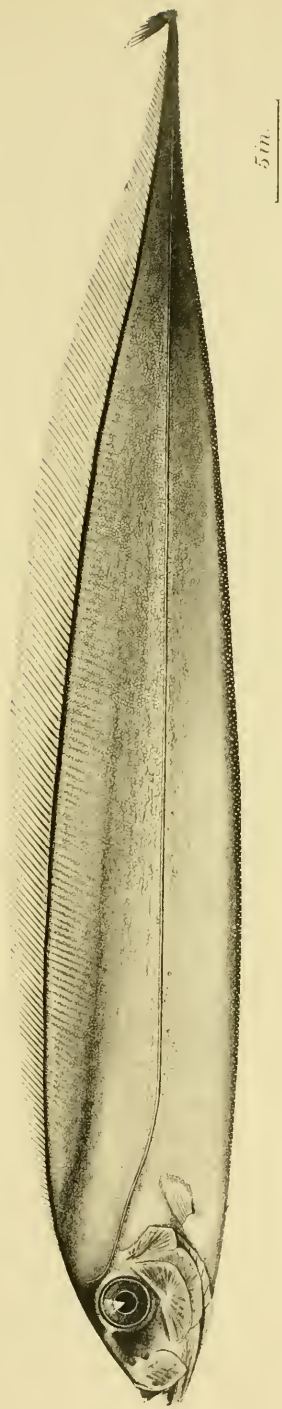
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PSEUDOTRIAKIS ACRALES JORDAN AND SNYDER.

(Drawn by W. S. Atkinson)



TRACHYPTERUS ISHIKAWÆ JORDAN AND SNYDER,
(Drawn by W. S. Atkinson)