

1. *Acipenser kikuchii*, Sagami Bay; Imperial University.
2. *Lepidopus aomori*, Aomori; type in Museum at Aomori.
3. *Tetrapturus mitsukurii*, Misaki; Matsushima; Otaru.
4. *Tetrapturus mazara*, Misaki.
5. *Bentenia aesticola*, Kashima; Imperial University.
6. *Ebirus sagamius*, Misaki; Imperial Museum.
7. *Reinhardtius matsumurae*, Misaki; no. 456, Imperial, Museum.
8. *Trachypterus ishikawae*, off Tokyo; no. 589, Imperial, Museum.
9. *Trachypterus ijimae*, off Tokyo; no. 590, Imperial Museum.

1. **Acipenser kikuchii** JORDAN and SNYDER, new species.
(Pl. XV., figs. 1, 2).

Head, $4\frac{1}{3}$ in body; depth 7; snout $2\frac{2}{3}$ in head. Dorsal plates, 11; lateral 32; ventral, 11. Dorsal rays III, 63; anal, III, 37.

Head longitudinally concave above; snout shortish, rather sharp. Plates of back large, rugose or warty, with no distinct spines; plates of side each with a spine in front; those below smooth. Dorsal and anal each followed by a large rugose plate. No bony plates on body except a few small ones between the large anterior ones of dorsal series. Skin of body soft and smooth between the plates. Opercle rugose. Cheeks with fine stellate prickles. Height of dorsal contained $2\frac{1}{3}$ times in head. Insertion of anal below posterior part of dorsal. Pectoral contained $1\frac{3}{4}$ in head. Caudal, from above, $1\frac{1}{8}$ times head.

Described from a mounted specimen 180 centimeters long, in the museum of the Imperial University, Tokyo.

Type locality, Misaki, Sagami Bay, Province of Sagami, Japan.

The type was taken in the open sea in a net in deep water. The species is named in honor of Professor DAIROKU KIKUCHI, the distinguished President of the Imperial University of Tokyo, in recognition of his interest in scientific research.

This species is distinguished from most other sturgeons by the very long dorsal fin. From *Acipenser mikadoi* HILGENDORF, the only other Japanese species known, it is separated by the characters in the following analysis.

a. Dorsal very long, of more than 60 rays; anal of about 40; dorsal plates 11; skin between series of shields nearly smooth. Sagami Bay.....*kikuchi*.

aa. Dorsal moderate, of 35 to 40 rays; anal of about 30; dorsal plates 7 or 8; skin between series of shields with small stellate plates. Rivers of Hokkaido (Ishikari River; Streams of Teshio; Mukawa).....*mikadoi*.

2. *Lepidopus aomori* JORDAN and SNYDER, new species.

Head $11 \frac{2}{3}$ in length; depth $23 \frac{1}{3}$; dorsal spines 127; eye $5 \frac{2}{3}$ in head; snout $2 \frac{2}{3}$.

Maxillary not quite reaching eye; $2 \frac{5}{6}$ in head. Teeth moderate; close set; equal, except 4 strong canines in front of upper jaw. Pectoral $2 \frac{1}{2}$ in head. No anal fin. Caudal very small, forked. Vertebrae 120. Color silvery. No ventral fins are evident on the dried skin. The dorsal spines are broken off; the above count being made from the neural spines at base of fin.

Type, a dried specimen about 8 ft. long, in good condition except for the broken dorsal fin, preserved in the Museum of Aomori. Locality, Bay of Aomori, Province of Aomori, Japan.

Local name, Tachinuwo; meaning sword-fish.

A similar dried specimen 6 ft. long from Hakodate is in the Fisheries Museum of that city.

4. **Tetrapturus mitsukurii** JORDAN and SNYDER, new species. (Pl. XVI, fig. 5).*

D. XXXVII-6.

Depth of body slightly less than height of dorsal fin. Lower jaw from front of eye $\frac{1}{4}$ more than postorbital part of head. Height of 1st dorsal equal to length of pectoral, the fin higher than in *T. mazara*. Pectorals $1\frac{2}{5}$ in head from tip of lower jaw; ventrals $1\frac{1}{12}$. Caudal lobe as long as head from tip of lower jaw.

Color steel blue with narrow whitish cross-bars on back; dorsal violet, faintly spotted.

Described from a specimen 6 ft. long without spear, examined in a fish-well at Misaki. Known to the fishermen as Makajiki or True Spear-fish.

The species is generally common in Japan, but on account of its enormous size could not be preserved by us. It was seen at Misaki, Tokyo, Yokohama, Sendai and Otaru. The specimens from Matsushima Bay showed the following characters:

D. XXXVIII-6; A. 14-7. Body slender, compressed; its depth 4 in body exclusive of head. Lower jaw from front of eye a little more than post-orbital part of head. First dorsal low, equal to depth of body. Pectoral half longer than postorbital part of head or $1\frac{1}{3}$ in head from tip of lower jaw. Ventral slightly longer than post-orbital part of head. Caudal lobe twice postorbital part of head.

Color steel blue; back above lateral line with about 15

* Reproduction of the photograph referred to below.—K.M.

whitish cross-bars, faint and diffuse. First dorsal violet, vaguely spotted with black.

These two specimens were each 8 ft. long, exclusive of spear. They were called by the fishermen Baisen or Kajiki-maguro.

A large stuffed specimen from Otaru in the Fisheries Museum at Hakodate has the spear intact. Its length from eye is a little more than $\frac{1}{2}$ greater than rest of head. Tip of lower jaw a little nearer to eye than to tip of upper jaw:

A photograph in the Imperial University taken from a specimen at Misaki shows the following characters:

Head, with snout, $2\frac{4}{5}$ in length. Postorbital part of head $2\frac{1}{3}$ in snout. Snout, from tips of lower jaw, 3 in head. Depth $8\frac{1}{4}$ in length or $3\frac{1}{8}$ in head. Dorsal $2\frac{4}{5}$ in head, the length of its longest ray a little more than depth of body. Anal 4 in head; pectoral $2\frac{1}{5}$; ventral $\frac{3}{5}$; lower lobe of caudal 2.

The species is named for Dr. KAKICHI MITSUKURI, senior Professor of Zoology in the Imperial University at Tokyo.

4. *Tetrapturus mazara* JORDAN and SNYDER, new species.

D. XL-7.

Back high, the profile rapidly rising to dorsal. Depth of body $1\frac{1}{3}$ in pectoral. Lower jaw from front of eye just equal to postorbital part of head. Spinous dorsal not abruptly falcate; its height $1\frac{3}{5}$ in length of pectoral; $1\frac{2}{5}$ in length of body without head. Pectoral $1\frac{1}{6}$ in head from tip of lower jaw. Ventral $1\frac{3}{5}$ in pectoral. Caudal lobe $\frac{1}{6}$ longer than pectoral.

Back dark blue with numerous whitish transverse bars; both dorsal fins violet, with bright blue spots.

This species is much less common than the ordinary spearfish or Kajiki. It is known to the fishermen as Mazara or as Kurokajiki (Black Spear-fish.).

Our description is taken from the single specimen seen, 10 ft. long without spear, taken off Misaki, in Sagami.

It is possible that either of these species may be identical with others described from other regions, but the evidence is against this supposition. *T. indicus* from Sumatra has never been intelligibly described. *T. herscheli* from South Africa is regarded by LÜTKEN as identical with *T. brevirostris* from India, a species which has longer ventrals. The Atlantic species, called *T. imperator*, or *T. belone*, is close to *T. mitsukurii* but differs in several regards. The rare *T. amplus* of Cuba is quite unlike either.

The two species of *Tetrapturus* found in Japan may be thus distinguished:

a. Pectoral fin moderate, $1 \frac{2}{5}$ in caudal lobe, $1 \frac{2}{5}$ in head from tip of lower jaw; dorsal lobe about equal to pectoral and about as high as body.....*mitsukurii*.

aa. Pectoral very long, scarcely shorter than caudal lobe and very little shorter than head, from tip of lower jaw; back elevated at front of dorsal; dorsal lobe shorter than pectoral and notably less than depth of body*mazara*.

5. *Bentenia æsticola* JORDAN and SNYDER, new genus and new species, (*Pteraclidæ*); (Pl. XVI., Fig. 6).

Head 4 in length; depth $3 \frac{2}{3}$; eye $3 \frac{4}{5}$ in head; snout 4; maxillary $2 \frac{2}{5}$; scales 49; D. about 55; A. about 40.

Body elliptical; closely compressed. Head with the profile before eye vertical. Mouth very oblique; the lower jaw projecting.

Maxillary broad, flat, scaly; reaching beyond middle of pupil. Teeth fine, sharp, equal; in narrow bands; those on vomer and palatines similar. Anterior nostril round; well separated from the posterior. No spines or serræ on head. Edge of preopercle membranous. All the bones of the head except lower jaw closely scaled. Preorbital moderate, sheathing the broad maxillary. Suborbital narrow. Branchiostegals 7. Gill-rakers 1+6; slender, small, far apart. Pseudobranchiæ large. Slit behind last gill moderate. Lateral line an ill defined streak. Scales hard and firm; longitudinally striate; those along dorsal and anal enlarged, papery, forming a deep sheathed groove into which the whole great fin fits and may be completely concealed. Scales on body bony, with oblique, angular, posterior edges; those on lower parts each with a vertically compressed median spine. First dorsal spine at tip of nose, very short and slender; 2nd, 3rd, and 4th progressively longer, yet slim and short; the 5th, inserted over posterior nostril; very thick and very long, greatly enlarged (broken off in the type, but certainly more than twice length of the head). Rest of dorsal made up of slender, simple, inarticulate, flexible spines; very long; the anterior longest, reaching base of caudal; the rest progressively shortened so that when laid back all end at about the same point; the tips filamentous; free from the thin, black, connecting membrane. (Whether the last few are semi-detached can not be clearly made out). Anal similar to dorsal; the 2nd spine enlarged, half longer than head; inserted just behind a vertical from eye. All the rays slender; inarticulate; technically spines. Vent directly below pupil. Pectoral long; inserted low; slightly longer than head. Ventral minute jugular, 5 in eye; the thin fragile rays almost obliterated and can not be exactly counted, probably 6; doubtless

long in young. Caudle on narrow peduncle; moderately forked; $1 \frac{1}{2}$ in head. Color plain, metallic, lustrous, silvery; fins all black.

Type, a large finely preserved alcoholic specimen about 18 in. long, in the Museum of the Imperial University. Locality, in the Kuro Shiwo or Japanese Warm Current off the coast of Kashima near Mito, Province of Hitachi. This beautiful species is allied to *Pteraclis papilio* LOWE from Madeira, also apparently a species of *Bentenia*, but it has more numerous fin rays. *Bentenia** is distinguished from *Pteraclis velifer* and *centropholis* by the anterior insertion of its vertical fins, and by the enlargement of a spine in the dorsal and a spine in the anal fin.

6. **Ebisus sagamius** JORDAN and SNYDER, new genus and new species, (*Serranidae*). (Pl. XV., figs. 3, 4).

Head $3 \frac{4}{7}$ in length; depth $3 \frac{2}{3}$; snout $3 \frac{1}{3}$ in head; maxillary 3; eye $6 \frac{1}{2}$; D. X-1, 13; A. III, 10; scales 122.

Head large; very convex in profile. Interorbital space very broad; convexly elevated. Mouth rather small; lower jaw projecting; maxillary extending nearly to middle of eye. Preorbital nearly as broad as eye. Posterior nostril round. Preopercle entire. Opercle and other parts of head without spines or serrations. Top of head with smooth skin; sides scaly. Body covered with small scales which are loosely imbricated and quite rough. Lateral line normal; not extending on caudal. Teeth strong; much larger than in *Megaperca*; brush-like, in bands; no canines. Dorsals separate, both low; dorsal spines rather weak; anal with obscure spines (probably 3); longest ray $2 \frac{2}{5}$ in head. Pectoral broad and short, unsymmetrical, of 17

* Named for the Japanese goddess BENTEN.—K. M.

rays; its length contained $1 \frac{3}{5}$ in head. Ventral inserted behind pectoral; $2 \frac{2}{3}$ in head. Caudal lunate; sub-truncate; $1 \frac{3}{4}$ in head.

Color dusky green, apparently clouded with darker.

Type, a stuffed specimen 140 centimeters long, in the Imperial Museum, Tokyo. Locality, Misaki, in Sagami. Known to fishermen as *Aburabōzu*, which means "fat-priest." It is also called *Aburainagi* or "Fat Bass." According to Kuma Aoki, an intelligent fisherman of Misaki, it is occasionally taken in the Kuro Siwo, it is not rare, and reaches a weight of 200 lbs.

The genus *Ebirus* (named for the Japanese fisher-god EBISU) is allied to *Stereolepis* and *Megaperca*, differing from both in the unarmed head, larger teeth and in the lower, weaker dorsal spines.

7. **Reinhardtius matsuuræ** JORDAN and SNYDER, new species.
(Pl. XVI, figs. 7, 8).

Head $4 \frac{1}{4}$ in length; depth $3 \frac{1}{2}$; D. 96; A. 69. Scales 117.

Body dextral. Interorbital width 3 in maxillary; a little less than longitudinal diameter of lower eye; cleft of mouth same on both sides. Lateral line single; not sharply curved anywhere; running obliquely downward to a point a little above middle of body and posterior to base of pectoral a distance equal to 2 times length of maxillary, then straight backwards to end of caudal fin, similar on blind side. Dorsal fin inserted just behind eye. Anal inserted below 26th dorsal ray. Dorsal and anal extending an equal distance posteriorly. Length of caudle peduncle $2 \frac{1}{2}$ in head. Minute scales on interradi al membranes of both dorsal and anal. Length of pectoral equal to maxillary. Color plain brown.

A stuffed specimen about $1 \frac{1}{4}$ ft. long, no. 456, Imperial

Museum, Tokyo. Locality, Misaki. This species is allied to *Reinhardtius hippoglossoides*, the Greenland Halibut, differing in the larger scales and in other characters. It is named for Mr. K. MATSUURA, Curator of fishes in the Imperial Museum at Tokyo.

8. *Trachypterus ishikawæ* JORDAN and SNYDER, new species.
(Pl. XVII., fig. 10).

Head $9 \frac{1}{2}$ in length; eye $3 \frac{1}{2}$ in head; snout $2 \frac{1}{3}$; maxillary $3 \frac{1}{3}$; D. 190.

Preorbital very wide, radiate, rugose. Body gradually tapering backward, not constricted behind vent; its depth about equal to length of head. Vent a little before middle of body, teeth 5 to 7 on each side of jaws; the middle one longest. Lateral line running low along body; its pores with spines. Ventral edge of body with tubercles throughout; larger and rougher behind; a number of hooked spines in pairs along lower part of tail; body otherwise smooth. First spines of dorsal short and slender, not separated or elevated; those near middle of fin much higher; $1 \frac{3}{4}$ in head. Pectorals 2 in head. Fin rays smooth. Color silvery throughout; no spots.

Described from a large specimen 1210 mm. long, nearly perfect but having the ventrals worn off showing only the basal bones at place of insertion, and the caudal lobe broken. The latter when entire probably measured $2 \frac{1}{2}$ to $3 \frac{1}{2}$ in head.

Type no. 589, Imperial Museum, Tokyo. Locality, off mouth of Tokyo Bay, between Misaki and Bōshu. It is named for Dr. CHIYOMATSU ISHIKAWA Curator of the Imperial Museum and Professor in the College of Agriculture in the Imperial University of Tokyo.

9. *Trachypterus ijimæ*, JORDAN and SNYDER, new species.
(Pl. XVII, fig. 9).

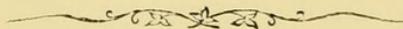
D. VI,-137.

Profile vertical; depth greatest at nape. Body abruptly constricted behind vent; not gradually tapering as in *T. ishikawæ*. Eye larger, snout much shorter than in the latter. Lower part of tail with a double row of hooked spines; 6 dorsal spines separated; filamentous, their tips reaching past caudal. Ventrals little shorter than dorsal. Color silvery; no dark spots.

Type, a young specimen about 1 ft. long; no. 590, Imperial Museum, Tokyo. Locality off the mouth of the Bay of Tokyo, between Misaki and Bōshu. This pretty species is named for Dr. ISAO IJIMA, Professor of Zoology in the Imperial University.

Leland Stanford Jr. University.

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Jordan, David Starr and Snyder, J O. 1901. "Descriptions of nine new species of fishes contained in museums of Japan." *The journal of the College of Science, Imperial University of Tokyo, Japan = Tokyo Teikoku Daigaku kiyo. Rika* 15, 301–311.

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