

NOTES ON A COLLECTION OF FISHES FROM PORT  
ARTHUR, MANCHURIA, OBTAINED BY JAMES FRANCIS  
ABBOTT.

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During the summer of 1904, Dr. James Francis Abbott, now of Washington University, St. Louis, Missouri, then professor in the Japanese Naval Academy at Etájima, obtained a collection of fishes from the harbor of Port Arthur, in Manchuria. The species in this collection are enumerated in the present paper. The specimens are divided between the United States National Museum and the museum of Stanford University. The accompanying plates are the work of Mr. William S. Atkinson.

The fauna of Port Arthur is in general not very different from that of the west coast of Japan, a few distinctively Chinese species being, however, represented.

Five species in this collection seem to be new.

Family RAJIDÆ.

1. RAJA MEERDERVOORTI Bleeker.

One specimen, a mature male.

2. RAJA KENOJEI Müller and Henle.

Three specimens.

Family CLUPEIDÆ.

3. HARENGULA ZUNASI (Bleeker).

Several specimens preserved. The depth is rather variable even among specimens of the same size, running from 3 to  $3\frac{1}{2}$  in the length to base of caudal. Günther describes the depth as being equal to the length of the head. In our specimens the length of the head is contained from  $1\frac{1}{3}$  to  $1\frac{2}{3}$  in the depth, agreeing very well with the plate published by Schlegel.<sup>a</sup> Bleeker describes the type as having teeth on the palatine, but Günther later examining the same specimen

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<sup>a</sup> Fauna Japonica, pl. cvii, fig. 1.

reports the palatine teeth absent. There are, however, fine teeth on the palatine, which are scarcely visible until the mouth parts have been dried.

Family ENGRAULIDÆ.

4. COILIA NASUS Schlegel.

About 100 specimens are in the collection. These agree very well with the plate of this species published by Schlegel. Anal rays, 80 to 82; spine bearing scutes on ventral region, 42 to 43; scales, 60 to 63; scales in front of dorsal on the median line, 11 to 13; distance from tips of snout to front of dorsal,  $2\frac{2}{3}$  to 3 times; combined length of eye and snout in postorbital part of head,  $1\frac{1}{3}$ . In the last character Schlegel's plate agrees better with *C. ectenes*.

5. COILIA ECTENES Jordan and Seale.

Six specimens, among about a hundred of *C. nasus*. *Coilia ectenes* differs from *Coilia nasus* and from other species in having more anal rays. It is described as having 123 anal rays. This is probably a misprint for 113 as the figure of the type shows but 115, and the sole cotype has 106. Our Port Arthur specimens have from 96 to 106 anal rays. Günther in his description of *C. nasus*<sup>a</sup> evidently included this species with the other. *Coilia ectenes* differs further from *C. nasus* in having 48 or 49 ventral scutes; 71 to 73 scales in a lateral series; 18 to 20 scales before dorsal; the distance from tip of snout to occiput contained in distance from tip of snout to front of dorsal  $3\frac{1}{3}$  to  $3\frac{2}{3}$  times; and the combined length of eye and snout contained in postorbital part of head  $1\frac{3}{4}$  times.

Family SALANGIDÆ.

6. SALANX HYALOCRANIUS Abbott.

One specimen.

Family EXOCETIDÆ.

7. HEMIRAMPHUS SAJORI Schlegel.

One specimen.

Family MUGILIDÆ.

8. MUGIL CEPHALUS Linnæus.

(*Mugil aur* FORSKÅL).

One specimen.

Family STROMATEOIDIDÆ.

9. STROMATEOIDES CINEREUS (Bloch).

A single large specimen 28 cm. in length. Depth,  $1\frac{1}{2}$  in length to base of caudal; pectoral, 3; anterior lobe of dorsal, 4; lower caudal lobe,  $2\frac{1}{2}$ ; upper lobe,  $3\frac{1}{3}$ .

<sup>a</sup> Cat. Brit. Mus., VII, p. 405.

## Family SERRANIDÆ.

## 10. LATEOLABRAX JAPONICUS (Cuvier and Valenciennes).

Several small specimens collected, the largest 16 cm. in length. They differ from specimens from Japan in being generally darker and in having the spots on body larger and much more conspicuous. In the Japanese specimens the spots are more scattered, comparatively faint or sometimes almost wholly absent. No other differences are appreciable. A large specimen from Port Arthur, 55 cm. long, has no spots on the body but several rows of spots on the membrane of the dorsal (the small ones have 2 or 3 rows). Specimens from Japan of various sizes show this character to be variable, though the larger specimens usually have the dorsal spots more numerous.

## Family SPARIDÆ.

## 11. PAGRUS ARTHURIUS Jordan and Starks, new species.

Head  $3\frac{1}{2}$  in length to caudal base; depth  $2\frac{1}{3}$ . Eye 4 in head,  $1\frac{2}{3}$  in snout. Snout  $2\frac{1}{4}$  in head; interorbital space  $3\frac{2}{3}$ ; maxillary  $2\frac{2}{3}$ . Dorsal rays, XII, 10; anal, III, 8; scales 57.

Upper anterior profile from front of dorsal to tip of snout a moderate even curve with a scarcely distinguishable protuberance in front of eye. Lower jaw slightly included, its tip not square, but rounded to a blunt point at base of teeth. Maxillary reaching to below front of pupil. Two large canines on each side of front of upper jaw; 3 on lower, growing smaller anteriorly; behind these a couple of rows of very small conical teeth; a single molar on posterior end of lower jaw in front of which are 2 rows of similar teeth, giving place in front to the fine conical teeth behind canines; 7 teeth in the outer row, the third from the front slightly longer and sharper than the others; 4 large molars on inner row with smaller molars in front, which pass gradually into the small conical teeth; 7 molars in outer row on upper jaw growing conical anteriorly and giving place abruptly to the small conical teeth; 3 or 4 large molars on inner row posteriorly, changing abruptly at about middle of side of jaw to very small teeth. Preorbital at end of maxillary equal in width to the vertical diameter of eye. Gill rakers short and rather sharp posteriorly, the front ones blunt; the longest equal to half diameter of pupil; 9 developed on lower limb of arch.

Ten scales in an oblique series running downward and backward from front of dorsal to lateral line; 16 in a series upward and forward from front of anal. Seven rows of scales on cheek; the subopercle and interopercle closely scaled; separated from the scales on cheek by a broad naked margin on posterior part of preopercle. Top of head with fine crowded scales to opposite front of eye.

Fourth dorsal spine  $2\frac{1}{3}$  in head; tip of third broken, but apparently it was shorter than fourth, the spines nowhere abruptly shorter or longer. Soft dorsal rays shorter than the longest spines, but longer than anal rays; second anal spine as long as third and about equal to it in thickness; tip of pectoral reaching to opposite third anal spine. Ventrals not reaching to vent. Caudal rather deeply forked; when widely spread, its edge is evenly concave, the depth of the curve equal to the diameter of the eye.

Color in spirits, silvery with a few fine points scattered over it, only slightly darker above; top of head and snout brown; a little red color remains on breast, and it is probable that the species is red in life.

This species is related to *Pagrus major* (Schlegel) and *Pagrus ruber* Doderlein, having two rows of molars. It has a much smaller eye, a

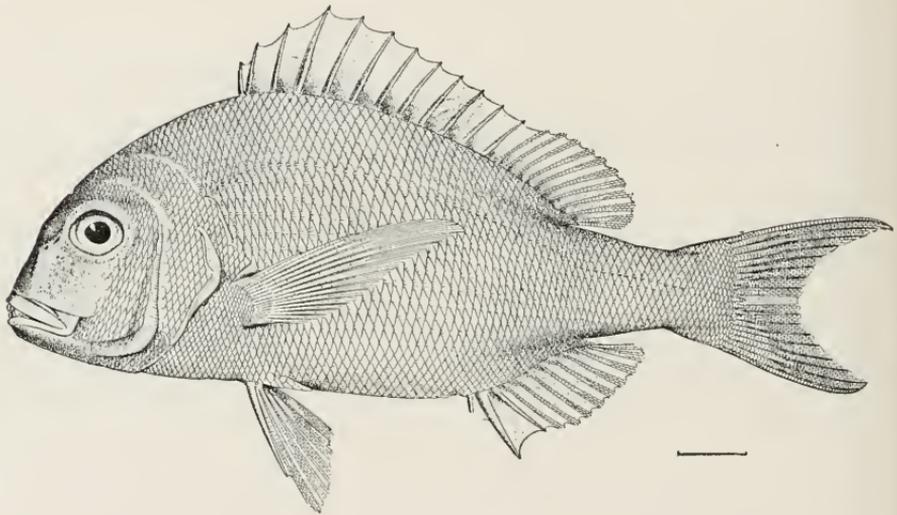


FIG. 1.—PAGRUS ARTHURIUS.

longer snout, and a wider preorbital than the latter. *Pagrus ruber* is described as having the eye contained  $2\frac{2}{3}$  times in the head; the snout 3; the width of the preorbital  $1\frac{1}{3}$  to  $1\frac{2}{5}$  in the eye. *Pagrus arthurius* differs from *Pagrus major* in having a much larger eye, a narrower preorbital, a shorter snout, the top of the head sealed to front of eye and the caudal more deeply forked.

*Type*.—One specimen 34 cm. in length, No. 9880, Stanford University.

#### Family SCLENIDÆ.

##### 12. CORVULA ARGENTATA (Houttuyn).

Several specimens collected. They are identical with Japanese specimens in all essential characters.

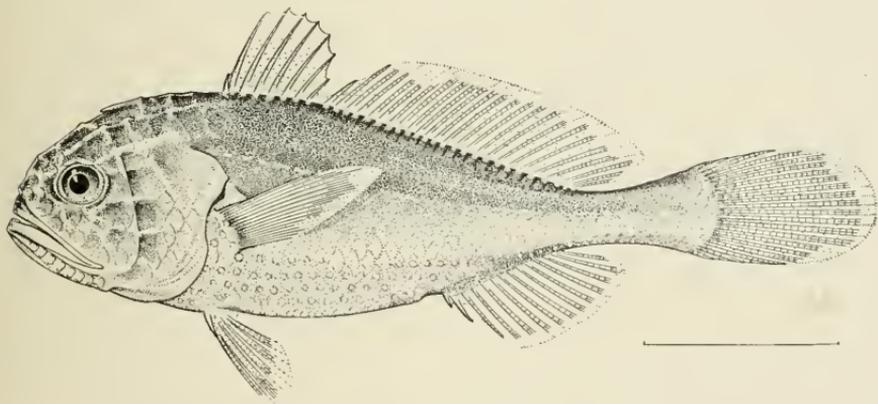
##### 13. COLLICHTHYS FRAGILIS Jordan and Seale.

About 35 specimens collected.

14. *COLLICHTHYS NIVEATUS* Jordan and Starks, new species.

Head  $3\frac{1}{2}$  in length to base of caudal; depth 3. Eye  $4\frac{1}{4}$  in head; snout  $4\frac{1}{4}$ ; maxillary  $1\frac{2}{3}$ ; interorbital space  $2\frac{2}{5}$ . Dorsal, IX, 24; anal, II, 12.

Body somewhat shorter and deeper than in *Collichthys fragilis*. Lower jaw projecting, its lip entering upper profile of head; gape very oblique, on an angle of about 45 degrees with axis of body. Teeth on mandible larger, more curved and in fewer rows than in *Collichthys fragilis*. On posterior part they are in a single row and in 2 rows in front (2 or 3 teeth at extreme tip in a third row); in the latter species they are in 2 rows posteriorly and in 3 or more rows in front. Teeth on premaxillary not noticeably different in the two species; in broader bands than on mandible; much smaller than mandibular teeth in *Collichthys niveatus*; little if any smaller in *Collich-*

FIG. 2.—*COLLICHTHYS NIVEATUS*.

*thys fragilis*. No teeth on vomer or palatines. Maxillary wide and slipping under preorbital for its full length; its posterior end reaches to the verticle from posterior edge of orbit. Anterior end of premaxillary on a level with middle of eye. Top of head, sides of head very cavernous, covered with thin naked skin leaving the sharp angles of the bones more or less projecting. A sharp bony crest at occiput ending before and behind in a short spine, the anterior spine the longer and sharper. Between the spines the crest is smooth and concave; in *Collichthys fragilis*, it is nearly always broken up into from 1 to 3 sharp bony tubercles.

Pectoral  $1\frac{2}{3}$  in head; ventral  $1\frac{3}{8}$ , reaching  $\frac{2}{3}$  of distance between its base and vent. Longest dorsal rays 2 in head, equal to those of anal, a little longer than longest spines. Caudal pointed, equal to length of head. The scales on our specimens are all absent, but from the scale pockets, which are evident on the ventral surface, the scales were much larger than in *Collichthys fragilis*. There are 10 scales in a row

between base of ventral and vent. In *Collichthys fragilis* there are 17 or 18 in this region.

Color in spirits, pinkish and yellowish, slightly dusky above, fins without color. On ventral surface there are rows of creamy white spots, each one indicating a scale. A median row of 4 forward from between ventrals to isthmus; a row of 3 each side of this from each ventral forward; 10 or 11 from each ventral back to vent; 21 from front of anal along base of anal and lower part of caudal peduncle to base of lower caudal rays. The rows extending upward on side of belly to a level with lower pectoral rays. In *Collichthys fragilis* there are 8 spots forward from between ventrals in a median line; 6 or 7 on each side of this; 17 or 18 from each ventral to side of vent; 27 or 28 from front of ventral to base of caudal. The vertical distance between the rows is decreased in a corresponding degree.

The above description is from the type, 110 mm. in length. Other specimens vary as follows: Depth 3 to  $3\frac{1}{2}$  in length. Eye  $4\frac{1}{4}$  to  $4\frac{3}{4}$  in head. Dorsal, VIII, 23 to IX, 25; anal, II, 11 or II, 12.

Besides the differences noted above, this species has a larger eye (from 5 to 6 in head in *Collichthys fragilis*) and a shorter soft dorsal (26 or 27 rays in *Collichthys fragilis*). The number of spots on the ventral surface is the most conspicuous character for separating these two species. *Collichthys lucidus* has more dorsal rays than either of these.

About thirty specimens were collected, the largest 150 mm. in length.

*Type*.—Cat. No. 55632, U.S.N.M.; cotypes No. 9884, Stanford University.

#### 15. PSEUDOSCIÆNA MITSUKURII (Jordan and Snyder).

A specimen 34 cm. in length agrees very well with the description of the type and with a specimen of about equal size from Matsushima, Japan.

For the present we place this species in *Pseudosciæna* rather than in *Pseudotolithus*. The relations of both genera to allied forms needs further study.

### Family TRIGLIDÆ.

#### 16. LEPIDOTRIGLA MICROPTERA Günther.

Five specimens taken at Port Arthur. They differ from specimens from Japan in having a wider, flatter interorbital space; the rostral processes more projecting, the distance across them greater, and armed with longer, stronger spines. The Port Arthur specimens, though differing considerably in the extreme from the Japanese specimens, grade into the latter in all of these characters, as is shown in the following table of measurements:

## Measurements in hundredths of length without caudal.

Locality.	Port Arthur.				Matsushima.	Aomori.	Hakodate.		Tokyo.		
	240	255	210	191			168	165	196	208	194
Length in millimeters.....	31	30	31	32	30	29	31	31	30	31	31
Head in hundredths of length <i>a</i> .....	21	20	20	21	22	20	21	20	21	21	22
Depth at occiput.....	8	8	8	8	8	8	7½	8	8½	8	8½
Orbit.....	8½	9	9	8½	8½	8	7½	8	8	8	8½
Interorbital width.....	6½	6	6½	7	7	6½	6	6	7	7	7
Least postorbital width.....	14	13	14	15	14	14	13	14	13	14	13
Length of snout.....	10½	9½	10½	12	10	8	8	9	8	8½	9
Width of snout at tip of mandible.....	2	2½	2½	2½	2½	2	1	1½	1	1½	1½
Projection of rostrum beyond premaxillary.....											
Length humeral spine from inner edge of shoulder girdle.....	12	11	14	13	12	13	12	13	12	13	13
Length of upper detached pectoral ray.....	18	18	18	20	18	20	18	18	21	18	21
Length of second dorsal spine.....											
Length of pectoral.....	28	28	29	31	29	29	30	29	30	30	31
Number of dorsal rays.....	1X, 17	1X, 17	VIII, 17	IX, 17	IX, 17	IX, 17	VIII, 17	VIII, 17	IX, 16	IX, 17	VIII, 17
Number of anal rays.....	17	17	17	17	16	16	16	16	16	16	17
Scales in lateral line.....	64	64	63	64	63	63	63	64	63	64	64

*a* All measurements taken from tip of rostral process without spines.

## 17. CHELIDONICHTHYS KUMU (Lesson and Garnot).

Two large specimens. We have compared these and numerous specimens from Japan with three specimens from Australia. The rostral processes are usually a little more produced, making the snout notched in front in the northern specimens and the interorbital space slightly less concave. The spots on the inner surface of the pectoral are variable in number and position. On one of the Australian specimens they are scattered over the entire fin; in another they are confined to the lower half of the fin. In our Port Arthur specimens they are scarcely evident. These differences are too slight to consider as specific differences.

## Family HEXAGRAMMIDÆ.

## 18. HEXAGRAMMOS OTAKII Jordan and Starks.

Several small specimens taken.

## Family SCORPÆNIDÆ.

## 19. SEBASTODES FUSCESCENS (Houttuyn).

Several small specimens preserved.

## 20. TRACHIDERMIS FASCIATUS Heckel.

(*Centridermichthys ansatus* RICHARDSON.)

One specimen. It agrees very well in all characters with specimens from Kiusiu in Japan.

It is probable that the Chinese and Japanese species called *ansatus* is the same as the original *fasciatus*. The latter was reported to be from the Philippines but it is not likely that any cottoid fish occurs in these tropical islands.

## Family PLATYCEPHALIDÆ.

## 21. PLATYCEPHALUS INSIDIATOR (Forskâl).

Three specimens collected which have been compared with specimens from Japan and found to be identical.

## Family GOBIIDÆ.

## RANULINA Jordan and Starks, new genus.

Body depressed, with a broad frog-like head; lower jaw projecting; teeth slender, in two rows, the outer series longer and curved outward, fringing the jaws; inner teeth turned backward; scales 40, cycloid. Cheeks, opercles, and nape scaly; lower parts of head with short divided tentacles. Dorsal rays VII-17. Anal rays 17. Caudal moderate, rounded; pectoral broad, rounded.

Allied to *Triænopogon*, but with the teeth very peculiar, unlike those of any other goby known to us.

*Type of genus.*—*Ranulina fimbriidens*.

22. RANULINA FIMBRIIDENS Jordan and Starks, new species.

Head 3 in length to base of caudal; depth  $6\frac{1}{8}$ . Eye  $10\frac{1}{2}$  in head measured obliquely across top of head from union of premaxillaries to tip of opercle; snout 3; maxillary  $1\frac{3}{5}$ ; interorbital space 5. Dorsal VII-17; anal 17; scales 40.

Head very much depressed; its depth about a third of its length; as viewed from above, its outline forms a semicircle from the posterior end of one maxillary to the posterior end of the other. Lower jaw slightly projecting; the maxillary reaching  $1\frac{1}{2}$  diameters of the eye past eye. Teeth rather long, slender and sharp, set in two rows in jaws and rather widely spaced. The teeth of inner row smaller and curved inward, the outer row set on the edge of the jaw and directed obliquely outward, sometimes nearly horizontal, and forming a conspicuous fringe around front of head. Entire lower part of head

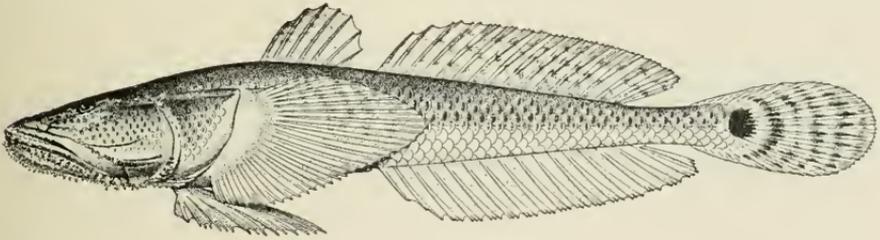


FIG. 3.—RANULINA FIMBRIIDENS.

thickly covered with fine tentacles especially numerous over a large area medially; rows of them follow the edge of mandible and upward on edge of preopercle; some of them on edge of preopercle continued backward on lower part of cheek behind maxillary; a row on each branchiostegal ray. A few short papillæ on upper part of snout. A slight ridge on supraorbital region turning abruptly outward a short distance behind eye; interorbital space shallow, concave.

Scales of moderate size, smooth and rather thin. Cheeks, opercles, and nape scaled.

Pectoral broad and rounded, reaching past front of anal, its base oblique following contour of opercle. Distance from base of last dorsal spine to first dorsal ray a little greater than width of interorbital space. Longest dorsal spines,  $3\frac{1}{2}$  in head, a little shorter than longest soft rays. Ventrals connected, broadly rounded, not adnate to belly. Anal ending slightly posterior to dorsal; caudal rounded, its length equal to that of ventral,  $1\frac{1}{2}$  in head.

Color in spirits: scales broadly outlined with dusky points on posterior margins; top of head dusky and slightly mottled; lower parts

colorless; faint dusky lines obliquely across dorsal rays; broader and fainter ones cross pectoral rays; ventrals and anal colorless. A conspicuous dark spot at base of caudal behind which are three lunate dark bands across caudal rays.

Many specimens were obtained.

*Type*.—Cat. No. 55633, U.S.N.M., is 110 mm. in length; cotypes are No. 9882, Stanford University.

23. *TRIDENTIGER BIFASCIATUS* Steindachner.

A single specimen agreeing very well with specimens from Japan.

24. *TÆNIOIDES ABBOTTI* Jordan and Starks, new species.

Head  $5\frac{1}{5}$  in length to base of caudal; depth 2 in head; maxillary  $2\frac{1}{2}$ ; interorbital space  $5\frac{1}{2}$ . Dorsal, VI, 47; anal 44.

Mouth very oblique, forming an angle of about 45 degrees. Lower jaw bluntly rounded, no bony knob at symphysis, or no barbels present. Small sharp teeth in a single row in jaws, outside of which are 2 or 3 long sharp canines on each side, which shut outside of the jaws. Eyes reduced, appearing as small inconspicuous dark dots.

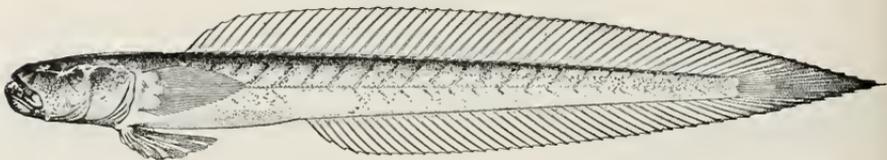


FIG. 4.—*TÆNIOIDES ABBOTTI*.

No scales apparent. Pectorals long and pointed, nine-tenths of length of head in the type, a little longer than head in the cotype; their tips reach a considerable distance past tips of ventrals. Ventrals adnate to belly at anterior third of their length; they are inserted somewhat anterior to base of pectorals and their length is contained  $1\frac{1}{4}$  times in head. Origin of dorsal at the beginning of the anterior fourth of the length of body from base of caudal to tip of snout. Dorsal not enveloped in thick skin, the spines not differentiated from soft rays. Caudal long and pointed, continuous with dorsal and anal.

Color in spirits flesh color, purplish on head, slightly dusky on back; top of head and front part of mandible dusky; fins colorless.

Two specimens taken, the largest 90 mm. in length.

*Type*.—Cat. No. 55634, U.S.N.M.; cotypes No. 9881, Stanford University.

This species differs from all others of its genus in having much longer pectorals and in having more fin rays than any other species without barbels on the mandible.

## Family PLEURONECTIDÆ.

## 25. VERASPER VARIEGATUS (Schlegel.)

Several small specimens and one adult.

## 26. PROTOPSETTA HERTZENSTEINI (Schmidt).

Two specimens obtained.

Head,  $3\frac{2}{3}$  in length to base of caudal; depth  $2\frac{1}{2}$ . Eye,  $5\frac{1}{2}$  in head; snout,  $4\frac{1}{3}$ ; maxillary  $2\frac{4}{5}$ ; interorbital space, 13. Dorsal, 73; anal, 57; scales, 78.

Lower jaw strongly projecting and with a moderately strong symphyseal knob. Teeth small and sharp, in a single series on the front of the latter. Maxillary extending to opposite end of anterior third of lower eye. Upper eye with its range nearly vertical and slightly posterior to lower eye. Interorbital space convex, its width equal to half vertical diameter of upper eye; it extends backward as a conspicuous, rough, but not sharp ridge. Gillrakers slender, 15 of them on lower limb of first arch, the longest ones equal to half the long diameter of lower eye.

Scales cycloid with etenoid scales in more or less definite areas. The latter, in addition to spinules on their posterior edges, are thickly covered over the surface with small sharp spinules, making them very rough to the touch. These are particularly rough on head, especially on ridge running back from interorbital space. An area of them along middle of side, the area becoming broader and the scales more typically etenoid posteriorly. A single row of rough scales along base of dorsal and anal, and the anterior rays of dorsal and anal each with a single row of similar scales. Tip of snout, mandible, and all but posterior part of maxillary naked. Scales of blind side everywhere cycloid.

Dorsal anteriorly turning a little toward the blind side, the first ray at extreme edge of eye. Pectorals rounded, but not bluntly, that of eyed side  $2\frac{1}{10}$  in head; its fellow  $2\frac{5}{6}$ . Caudal with the middle rays slightly the longest. A strong spine on pelvis girdle just behind base of ventral fins pointing downward and backward; anal spine moderately developed.

Color uniform brown, slightly darker toward edges of fins. Lateral line darker than surrounding body color.

Here described from a specimen 32 cm. in length.

## 27. LIMANDA YOKOHAMÆ (Günther).

Several small specimens.

## 28. KAREIUS BICOLORATUS (Basilewsky).

One small specimen.

29. *PARALICHTHYS OLIVACEUS* (Schlegel).

Two small specimens.

## Family SOLEIDÆ.

30. *ARELISCUS RHOMALEUS* Jordan and Starks, new species.

Head,  $4\frac{1}{2}$  in length to base of caudal; depth, 4. Eye, 19 in head, 7 in snout; snout,  $2\frac{3}{4}$ . Dorsal, 124; anal, 96; scales, 148 from vertically opposite upper end of gill opening; 17 anterior to this point and transverse row of pores.

Interorbital space wide, flat, and scaled; its width  $1\frac{1}{2}$  times diameter of upper eye. Upper eye from one-fourth to one-half of its diameter in advance of lower. Hook of upper jaw moderate, not nearly reaching to opposite front of eyes. Maxillary extending half a diameter of eye past posterior margin of lower eye. Nostrils as usual, the upper one between front of eyes, the lower one in a tube at edge of mouth.

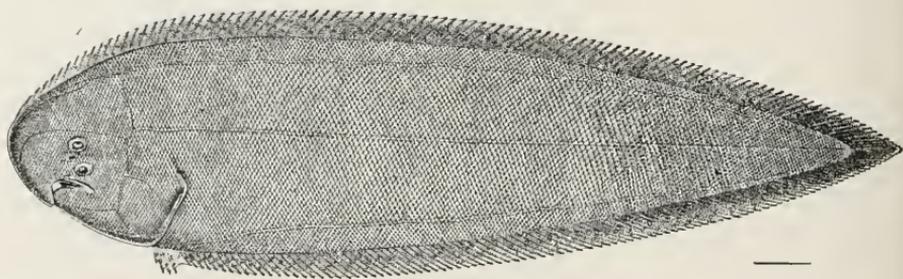


FIG. 5.—*ARELISCUS RHOMALEUS*.

Scales strongly ctenoid on eyed side of head and body, cycloid on reverse side. The three lateral lines on body and the connecting branches on head very conspicuous. At middle of body the lines are separated by 24 rows of scales counting obliquely. No lateral line on blind side of body; a light line suggests one, but no pores are present.

Body and fins uniform dark brown on eyed side, no color on fins on blind side.

This species is close to *Areliscus abbreviatus* (Gray), but the scales are finer. The latter, according to Günther, has 120 scales in a lateral series and the lateral lines are separated by 19 series of scales. *Areliscus trigrammus* (Günther) has a longer dorsal, larger eyes, and narrower interorbital space.

Here described from the type, 38 cm. in length, Cat. No. 55635, U.S.N.M. Several cotypes are numbered 9883, Stanford University.

## Family GADIDÆ.

31. *GADUS MACROCEPHALUS* Tilesius.

One specimen.