

FLOUNDERS AND SOLES FROM JAPAN COLLECTED BY THE  
UNITED STATES BUREAU OF FISHERIES STEAMER  
"ALBATROSS" IN 1906.

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INTRODUCTION.

The present paper deals with the Heterosomata (flounders and soles) collected during the 1906 expedition of the United States Bureau of Fisheries steamer *Albatross* in Japan. Nine species are described as new, two representing genera which are apparently undescribed. A new generic name is proposed for *Engyprosopon iijimae* Jordan and Starks, and a rearrangement of several other genera has been found necessary. The flounders and soles obtained during this expedition by members detached to study the shore fishes have been reported on by Prof. J. O. Snyder.<sup>1</sup> The writer is indebted to Dr. C. H. Gilbert for opportunity to study this collection and for assistance and suggestions in the preparation of this report. He has been materially assisted by a comprehensive review of the flounders and soles of Japan, by Jordan and Starks.<sup>2</sup>

Measurements are expressed in hundredths of length from tip of snout to base of caudal, this length being expressed in millimeters. Under each species the stations at which the *Albatross* obtained the specimens are mentioned, together with the approximate locality. Following is a detailed list of these stations:

*Abbreviations and symbols.*

[\* Signifies depth as shown by chart when no sounding was made. \*\* Signifies depth and character of bottom as obtained by sounding at previous station.]

The character of bottom is expressed by the following abbreviations:

bk.....black.	G.....gravel.	R.....rock.
bl.....blue.	Glob....globigerina.	rky....rocky.
br.....brown.	gn.....green.	S.....sand.
brk....broken.	gy.....gray.	Sh....shells.
C.....clay.	hrd....hard.	sml. . .small.
Co....coral.	lav....lava.	Sp....specks.
crs....coarse.	M.....mud.	St....stones.
fne....fine.	Oz.....ooze.	vol....volcanic.
For....foraminifera.	P.....pebbles.	

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<sup>1</sup> Proc. U. S. Nat. Mus., vol. 42, 1912, pp. 438-441 and p. 517.

<sup>2</sup> Idem, vol. 31, 1906, pp. 161-246.

Stations.	Latitude N.	Longitude E.	Date (1906).	Fathoms.	Bottom character.
	° / "	° / "			
4807	41 36 12	140 36 00	July 16	44-47	Sh., crs. G.
4808	41 35 50	140 36 45	16	47	S., Sh., crs. G.
4812	38 33 00	138 40 00	18	176-200	fne. br. M.
4815	38 16 00	138 52 00	18	70	dk. gr. S.
4816	38 14 00	138 54 00	18	64	fne. gy. S.
4817	38 12 00	138 52 00	18	61	fne. gy. S.
4822	37 08 10	137 08 00	21	130	gn. M.
4826	37 25 30	137 32 00	21	114	fne. gy. S., bk. Sp.
4828	37 23 00	137 37 00	22	163	gn. M.
4832	36 14 30	135 56 30	23	76-79	dk. gy. S.
4834	36 03 30	135 54 00	23	130	gn. M.
4835	36 03 30	135 52 30	23	134	gn. M.
4838	35 56 30	135 39 15	24	144	gn. M.
4839	35 57 45	135 34 00	24	140	gn. M.
4842	36 13 00	133 27 00	26	82	fne. gn. S., Sh.
4843	36 29 20	133 01 20	26	100	gn. M., bk. S., Glob.
4844	36 34 00	132 50 20	26	116	gn. M., bk. S., Glob.
4855	36 01 30	129 42 00	30	70-89	gn. M.
8856	36 03 30	129 41 00	30	89	gn. M.
4858	36 17 00	129 40 00	31	67	gn. M., S., P.
4859	36 17 00	129 41 00	31	93	gn. M.
4868	36 32 00	139 45 00	Aug. 1	150**	gn. M., fne. gy. S.
4870	36 30 30	129 43 00	1	94**	60
4874	34 38 00	130 03 00	2	66	gn. S., brk. Sh.
4878	34 18 30	130 14 30	2	59**	
4884	32 32 00	129 30 45	8	53**	dk. gy. S., brk. Sh.
4885	32 31 30	129 30 15	8	53**	
4897	32 33 00	128 19 00	10	207	fne. gy. S., brk. Sh., For
4927	29 57 00	130 41 00	14		
4930	30 12 00	130 43 00	15	84**	brk. Sh., Co. P.
4931	30 12 00	130 43 40	15	83	brk. Sh., P., Co.
4932	30 29 30	130 45 00	15		
4946	31 29 10	130 34 30	20	39	br. S., brk. Sh., P.
4947	31 28 20	130 35 30	20	51*	
4948	31 19 00	131 23 30	21	65	S., brk. Sh., P.
4961	34 09 15	134 56 40	27	33	fne. gy. S., M.
4962	34 08 00	134 56 20	27	36*	
4963	34 06 15	134 57 50	27	40*-37	
4964	34 05 30	134 56 40	27	37	fne. gy. S., M.
4982	43 00 00	140 10 30	Sept. 19	390-428	gn. M.
4983	43 01 35	140 10 40	19	428	gn. M.
4984	43 04 20	140 12 10	19	224-248	gn. M.
4985	43 05 20	140 15 15	19	224	gn. M. (?)
4986	43 01 40	140 22 40	19	172	fne. bk. S., bk. M.
4988	43 23 10	140 21 10	20	68	S.
4989	43 23 10	140 37 00	20	92	S.
4992	45 24 00	140 49 10	22	325**	gn. M. (?)
4993	45 25 30	140 53 00	22	142	gy. M., S., G.
4994	45 27 50	140 54 00	22	190	br. M., fne. bk. S.
4997	47 38 40	141 24 30	23	318	gn. M.
4998	47 39 10	141 31 40	23	66	br. M., fne. gy. S.
4999	47 38 20	141 39 00	23	31	gy. M., gn. S.
5000	47 37 30	141 42 30	23	31**	gy. M., gn. S. (?)
5001	47 35 00	141 43 00	23	30	gn. M., gy. S.
5002	47 33 30	141 45 00	23	30**	35
5003	47 32 30	141 45 00	23	35-38	fne. gy. S., gn. M.
5004	47 31 00	141 44 30	23	38	gn. M.
5005	46 04 40	142 27 30	24	42-43	gn. M., fne. gy. S.
5006	46 04 00	142 29 00	24	42-43	gn. M., fne. gy. S.
5007	46 03 00	142 31 00	24	42	gn. M., fne. gy. S.
5008	46 07 50	142 37 20	24	40	gn. M., fne. gy. S.
5009	46 24 10	142 40 00	24	25	gn. M.
5010	46 30 30	142 43 30	24	21-32	gn. M., S.
5011	46 18 30	143 05 40	25	42	gn. M.
5012	46 17 50	143 08 30	25	42**	43
5013	46 17 00	143 09 00	25	43	(?)
5015	46 44 00	144 02 00	26	510	gn. M.
5019	46 40 15	144 00 00	26	192	br. M., bk. S., P.
5025	48 43 30	144 56 45	27	52	P.
5031	44 04 00	145 32 00	30	86	dk. S., G.
5041	42 16 30	142 04 00	Oct. 3	61-140	br. M., fne. bk. S., co. S.
5042	42 17 30	142 07 30	3	61	br. M., fne. bk. S., co. S.
5047	38 12 50	141 49 15	10	107	dk. gy. S., brk. Sh., P.
5066	35 06 05	138 40 20	15	211-293	fne. bk. S.
5067	35 05 50	138 41 15	15	293	bk. S., brk. Sh.
5071	35 03 10	138 49 50	15	57	M., S., brk. Sh.
5072	34 44 55	138 22 20	16	148-284	gy. M.
5074	34 40 45	138 16 15	16	47	gy. M.
5081	34 14 00	138 05 00	19		
5092	35 04 50	139 38 20	26	70	crs. bk. S.
5094	35 04 42	139 38 18	26	88	bk. S., brk. Sh.

## LIST OF SPECIES.

Notes are included concerning several species which were not obtained by the fisheries steamer *Albatross*. The names of these species are indicated by an asterisk in the following table.

## Family PLEURONECTIDAE.

## PSETTINAE.

1. *Chascanopssetta raptator*.\*
2. *Citharoides macrolepidotus*, new genus and species.
3. *Arnoglossus japonicus*, new species.
4. *Psettina (vijimae)*, new genus.
5. *Platophrys myriaster*.\*
6. *Engyprosonon xystrias*, new species.
7. *E. kobensis*.
8. *Laeops kitaharae*.\*
9. *L. lanceolata*.\*
10. *L. variegata*.\*
11. *Laeoptichthys fragilis*, new genus and species.

## HIPPOGLOSSINAE.

12. *Tarphops oligolepis*.
13. *Pseudorhombus cinnamomeus*.
14. *Pseudorhombus misakius*.
15. *Pseudorhombus ocellifer*.
16. *Xystrias grigorjewi*.
17. *Acanthopssetta nadeshnyi*.
18. *Hippoglossoides hamiltoni*.
19. *H. dubius*.
20. *H. propinquus*, new species.
21. *Cleisthenes pinetorum*.
22. *C. herzensteini*.
23. *Atheresthes evermanni*.

## PLEURONECTINAE.

24. *Poecilopssetta plinthus*.
25. *Pleuronichthys cornutus*.
26. *Lepidopssetta bilineata*.
27. *L. mochigarei*.
28. *Limanda aspera*.
29. *L. sakhalinensis*, new species.
30. *L. asprella*, new species.
31. *L. korigarei*, new species.
32. *L. iridorum*.
33. *L. angustirostris*.
34. *L. yokohamae*.
35. *Liopsetta obscura*.
36. *L. glacialis*.

37. *L. pinnifasciata*.
38. *Dexistes rikuzenius*.
39. *Platichthys stellatus*.
40. *Kareius bicoloratus*.
41. *Clidoderma asperrimum*.
42. *Microstomus stelleri*.
43. *M. kitaharae*.
44. *Glyptocephalus ostroumowi*.

#### Family SOLEIDAE.

##### SOLEINAE.

45. *Aseraggodes kobensis*.

##### SYNAPTURINAE.

46. *Zebrias zebrinus*.
47. *Z. zebra*.\*
48. *Z. quagga*.\*
49. *Aesopia cornuta*.\*

##### CYNOGLOSSINAE.

50. *Cynoglossus inusita*.
51. *Rhinoplagusia japonica*.
52. *Areliscus interruptus*.
53. *Symphurus hondoensis*, new species.
54. *S. orientalis*.

#### Family PLEURONECTIDAE.

##### Subfamily PSETTINAE.

##### CHASCANOPSETTA RAPTOR (Franz).

This species was described by Victor Franz<sup>1</sup> as *Trachypterophrys raptor*, new genus and species. *Trachypterophrys* is surely included in *Chascanopsetta* Alcock. *C. raptor* is related to *C. prorigera* Gilbert, from the Hawaiian Islands, differing in having fewer anal rays (77 instead of 89) and in having a longer, flatter arch in the lateral line, its length being 1.5 instead of nearly 2 in the head. *C. raptor* differs from *C. lugubris* Alcock,<sup>2</sup> the type-species, from the Bay of Bengal, in having the arch in the lateral line flat-topped (as in *C. prorigera*) instead of being angulated above the pectoral fin.

(No specimens were obtained by the *Albatross*.)

##### CITHAROIDES, new genus.

This genus is closely related to *Citharus* of Europe, resembling that genus very closely in the following characters:

Eyes and color on left side; mouth large and symmetrical, the mandible projecting; ventral bases nearly equal, the left on the pre-

<sup>1</sup> Abh. Bayer. Akad., 1910, p. 60, pl. 7, fig. 54.

<sup>2</sup> Journ. Asiatic Soc. Beng., vol. 63, 1894, p. 129, pl. 6, fig. 4.

anal ridge; origin of dorsal slightly on blind side, near anterior margin of upper orbit; dorsal and anal deflected to the blind side of the caudal peduncle, both fins high to their posterior ends; anal spine present, but weak; scales very large, weakly ctenoid; arch in lateral line long and angulated behind; upper orbit larger than the lower and anterior to it; gill-rakers slender; anus on eyed side in both genera, a character apparently peculiar to them, as in all other flounders examined the anus is on the preanal ridge or on the blind side.

*Citharoides* differs from *Citharus* in dentition, the vomer being toothless; and in the more regular jaw, the premaxillaries being much less prominent, the mandible anteriorly being flat, instead of strongly arched downward.

*Type of the genus.*—*Citharoides macrolepidotus*, new species.

CITHAROIDES MACROLEPIDOTUS, new species.

Plate 25, fig. 1.

*Type-specimen.*—Cat. No. 75670, U.S.N.M. A male 59 mm. long, from *Albatross* station 4874, in the eastern channel of the Korean Strait; depth, 66 fathoms; collected August 2, 1906.

Length of head, 0.29 of total length to base of caudal; depth, 0.37; dorsal, 66; anal, 45; 40 series of scales along the lateral line.

Head obtusely pointed, the profile only slightly elevated at a point above the anterior part of the upper eye; upper orbit, as in *Citharus linguatula*, larger and considerably anterior to the lower, the anterior margin of the lower eye only slightly anterior to the vertical of the anterior border of the upper pupil; diameter of each eye 0.08; eyes separated by an exceedingly narrow ungrooved ridge, which is not extended anteriorly nor posteriorly, its length about 0.05; nostrils as in *Citharus linguatula*, the anterior nostril with a short flap, the posterior nostril wide, its anterior wall within with a flap; snout somewhat rounded, its length 0.06; mouth large, symmetrical, and moderately oblique, the mandible projecting; length of maxillaries, 0.14, extended to below posterior margin of lower pupil; teeth symmetrically placed on jaws, those of upper jaw uniserial, with several enlarged teeth irregularly placed, those of lower jaw uniserial posteriorly, becoming biserial and finally forming a narrow band at symphysis; vomer and palatines toothless; a bony tubercle present at anterior end of arch in lateral line; 9 slender gill-rakers on lower limb of arch, their posterior edges serrate, 3 tubercles on upper limb, the longest gill-raker (the third from the angle of arch) about 0.03.

Body elliptical, the greatest width about 6 in the greatest depth; depth of caudal peduncle 0.12; caudal peduncle angulated above and below in cross section.

Scales weakly ctenoid and deciduous on the eyed side, cycloid on the blind side; snout and jaws naked; fins, except caudal at base,

also scaleless. Lateral line on both sides with a long arch, abruptly angulated, the portion behind angle steep; length of arch 0.17, eight-tenths of this length being the distance from the anterior end of arch to its angle.

Dorsal beginning at the vertical of the anterior border of upper eye, extended on the caudal peduncle, where it is deflected toward the blind side; anal similar, anal spine weak; dorsal and anal reaching their greatest height near posterior end, the third before the last dorsal ray longest, its length 0.13, the fourth before the last anal ray longest, 0.13; caudal slightly pointed or doubly truncate; pectoral of blind side well developed, with 9 rays, that of eyed side with 10 rays; ventrals as in *Citharus linguatula*; left ventral on preanal ridge, its base not extended, only slightly broader than the base of right ventral; ventral of blind side the longer, its length 0.13, length of left ventral 0.095; each ventral of 6 rays.

Color light brown in alcohol; edges of caudal peduncle, where the fins are deflected toward the blind side, with a pair of very dark brown spots (as in *Citharus linguatula*), a similar spot below the posterior end of the arch in the lateral line; slightly mottled elsewhere. Dorsal, anal, caudal, and left ventral spotted with the same color; pectorals and right ventrals colorless.

*Paratype*.—No. 22527, Stanford University Museum. A male, 57 mm. long, from the same locality as the type. Dorsal, 69; anal, 43; scales, 40; head, 0.30; depth, 0.42; diameter of upper eye, 0.09; length of interorbital ridge, 0.05; length of snout, 0.06; maxillary of eyed side, 0.15; gill-rakers, 3 + 10.

Only two specimens known.

ARNOGLOSSUS JAPONICUS, new species.

Plate 25, fig. 2.

This species has 64 scales along the lateral line, thus being intermediate between the large-scaled species and the type of *Anticitharus* with 75 scales (*Anticitharus debilis* Günther).<sup>1</sup> It differs from the only other known Japanese species, *Arnoglossus violaceus* Franz,<sup>2</sup> in the larger scales and fewer fin rays. *Arnoglossus violaceus* has dorsal, 115; anal, 92; scales, 100. *Arnoglossus tenuis* Günther, from Hongkong, China, has 48 scales in the lateral line. *A. cacatuae* Ogilby, from Queensland has 64 scales in lateral line and 55 anal rays.

*Type-specimen*.—Cat. No. 75671, U.S.N.M. A specimen 106 mm. long, from *Albatross* station 4930, Vincennes Strait, south of Kiusiu, Japan, collected on August 15, 1906, at a depth of 84 fathoms.

Length of head, 0.28 of total length to base of caudal; depth, 0.40; dorsal, 97; anal, 74; scales in 64 series along lateral line.

<sup>1</sup> Shore Fishes, *Challenger*, p. 48, pl. 22, fig. 4.

<sup>2</sup> *Abh. bayer. Akad.*, 1910, p. 61, pl. 7, fig. 56 (perhaps not an *Arnoglossus*).

Head moderate, subconic; no elevation of profile above upper eye; upper eye slightly posterior, its diameter 0.075; interorbital space narrow, naked only in its central portion, its ridge extended from the anterior margin of the lower orbit to the posterior margin of the upper orbit; nostrils in the same horizontal line, the anterior provided with a short acuminate flap; snout sharp, its length from upper orbit 0.09, its outline not parallel to anterior margin of lower orbit; mandible shorter than the upper jaw, anterior teeth of premaxillaries wholly without the mandibular symphysis; mandible and premaxillaries strongly curved, so that for their anterior third the cleft of the mouth is horizontal, for their posterior end the mouth is oblique; maxillary of eyed side 0.13, extending to below pupil of lower eye; ridges of head not sharply developed; no spines nor tubercles; teeth uniserial, developed equally on both sides of jaws, about 8 moderate canines on each side of mandible, which has no symphyseal knob; anterior end of premaxillaries produced and provided with 4 canines, the lateral teeth of upper jaw small and sharply conic, about 40 in number; vomer and palatines toothless; gill-rakers short, none on upper limb, 8 on lower limb, each curved strongly behind and provided with 3 spinules; length of longest gill-raker about 0.24 of the diameter of upper eye.

Body elliptical, compressed, the width about 7 in depth; depth of caudal peduncle 0.09. Anus on blind side.

Scales moderate, caducous, cycloid on both sides. Snout and jaws naked; pectorals and ventrals naked. Arch in lateral line rather low, its length 0.13, its height 0.05; no lateral line on blind side.

Dorsal fin originating slightly on the blind side, at the posterior end of the premaxillary spine, on a level with the lower margin of the upper orbit, its longest rays about 0.16; anal similar to dorsal; caudal subsessile, rather pointed, length 0.18; anal spine absent, pubic spine present; pectoral of eyed side slightly pointed, with 13 rays, its length 0.15; pectoral of blind side shorter and more rounded, with only 10 rays, its length 0.09; each ventral of 6 rays; base of right ventral contained not quite two times in the base of left ventral.

Color very light in alcohol, with indications of darker mottling; all the fins dark or with dark spots, except the pectorals and the ventral of blind side.

*Paratype*.—No. 22528, Stanford University Museum.

From *Albatross* station 5074, in Suruga Gulf, Japan; depth, 47 fathoms. Length, 89 mm.; dorsal, 99; anal, 79; scales, 64; head, 0.26; depth, 0.38; eye, 0.075; snout, 0.08; maxillary, 0.10; pectoral of eyed side with 11 rays, its length 0.15; pectoral of blind side with 9 rays, its length 0.08.

A small specimen from the surface, Station 5081, off the east coast of central Hondo. Length, 41 mm. without caudal; dorsal, 98;

anal, about 76; scales, 63; head, 0.26; depth, 0.39; eye, 0.07; snout, 0.07; maxillary, 0.07; dorsal with 9 spots, anal with 7, with corresponding bars at bases of dorsal and anal; body spotted elsewhere.

Only these three specimens known.

**PSETTINA**, new genus.

A new generic name is here proposed for the species described as *Engyprosopon iijimae*, because the genus *Engyprosopon*, being characterized by a wide interorbital and two rows of teeth in the jaws, certainly does not include that species. The genus is closely related to *Arnoglossus*, differing from it in having ctenoid rather than cycloid, caducous scales; and in having a smaller mouth. *Psettina* differs from *Engyprosopon*, *Platophrys*, and related genera in the narrow interorbital, alike in both sexes; and in the uniserial teeth. It resembles *Engyophrys* from the Pacific coast of Colombia, South America, differing from that genus in having teeth on both sides of the jaws and in lacking the peculiar interorbital spine. The Australian genus *Lophonectes* differs chiefly in having the anterior dorsal rays much produced. The new genus may be described as follows:

Body sinistral, ovate, and compressed; mouth small but nearly symmetrical; teeth conic, slender, in a single series on both sides of jaws, none on vomer or palatines; head without spines, alike in both sexes, the interorbital a narrow ridge; ventrals very unsymmetrical; origin of dorsal low on snout; rays of dorsal and anal moderate, the fins extended to, but free from caudal; pectorals not filamentous; anal spine absent, pubic spine sharp, triangular; scales rather large, ctenoid on the eyed side, cycloid on the blind side; gill-rakers little developed; anus partly on blind side. No lateral line on blind side.

*Type of the genus.*—*Engyprosopon iijimae* Jordan and Starks.

**PSETTINA IJIMAE** (Jordan and Starks).

*Engyprosopon iijimae* JORDAN and STARKS, Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 626, pl. 8, fig. 1. Suruga Bay.

One specimen from *Albatross* station 5074, Suruga Gulf; five specimens from *Albatross* station 4946, off the south coast of Kiusiu.

*Table of measurements in hundredths of length to base of caudal.*

<i>Albatross</i> station .....	5074	4946	4946	4946	4946	4946
Length to base of caudal, mm .....	79	97	92	91.5	72	69
Dorsal rays .....	90	89	95	92	92	87
Anal rays .....	73	68	73	73	72	68
Pores .....	46	48	52	55	54	53
Length head .....	25	25	26	25.5	27	25
Depth body .....	45	46	39	40	40	41
Diameter upper eye .....	8	8	8	8	8	8
Snout from upper orbit .....	7.5	8	8	8	7	7.5
Maxillary, eyed side .....	7	8.5	9	9	9	9.5
Pectoral, eyed side .....	15	17	14	16	16	17
Pectoral, blind side .....	10	11.5	10	10	9.5	10
Pectoral rays, eyed side .....	10	11	10	11	10	9
Pectoral rays, blind side .....	9	9	9	10	8	8
Gill-rakers .....	7	6	7	7	7	8



## PLATOPHRYS MYRIASTER (Temminck and Schlegel).

?? *Platophrys circularis* REGAN, Trans. Linn. Soc., London, vol. 12, p. 26, fig. 3.—  
V. FRANZ, Abh. bayer. Akad., 1910, p. 62, pl. 7, fig. 66.

The descriptions and figures of Regan and Franz both show clearly that they had larval forms of a *Platophrys*. Franz's identification, therefore, can not be accepted, and as his specimens agree with *P. myriaster* in the fin formula and in having minute scales, they may best be considered as the larval stage of that species.

Three larval specimens with symmetrical eyes and scaleless body; length to base of caudal 14, 18, and 22 mm. The largest has about 92 dorsal rays. Station 4927, surface, Vincennes Strait. Another specimen, with minute scales just developing, was captured at the surface, Station 4932, Vincennes Strait.

## Genus ENGYPROSOPON Günther.

Contrary to the description of *Scaeops grandisquama* and *S. kobensis*, and of the genus *Scaeops*,<sup>1</sup> the teeth are not entirely uniserial, for closer examination shows that in those species they are biserial, as in *Platophrys*, and as usual in *Engyprosopon*. The gill-rakers vary from short and few, 0 + 5 to 7 in *E. grandisquama* and *E. kobensis*, to 2 + 14 slender ones (in *E. xystriasis*), *E. hawaiiensis* and *E. xenandrus* from the Hawaiian Islands being intermediate. It is therefore impossible to separate *Scaeops* from *Engyprosopon*. *E. mogkii* (Blecker), the type-species, is figured from a female specimen.

## ENGYPROSOPON XYSTRIAS, new species.

Plate 25, fig. 3.

*Type-specimen*.—Cat. No. 75672, U.S.N.M. A female 69 mm. long from *Albatross* station 4931, Vincennes Strait, Japan, collected on August 15, 1906, at a depth of 83 fathoms.

This species differs from the two species of *Engyprosopon* previously known from Japan, *E. grandisquama* (Temminck and Schlegel) and *E. kobensis* (Jordan and Starks), in having a larger number of gill-rakers. *E. xystriasis* has 2+14, *E. grandisquama* 0+5 or 6, and *E. kobensis* 0+7. It also differs in having the anterior premaxillary teeth protruding outside the symphysis of the lower jaw. Other differences are mentioned in the description. *E. xenandrus* Gilbert, from the Hawaiian Islands, has 12 gill-rakers on the lower limb of the first arch, and has uniserial teeth in the upper jaw. *E. spilurus* (Günther), from New Guinea, may be an allied species; it has dorsal, 90; anal, 66; scales, 47. In details of form, color, and scales, this species shows a remarkably close resemblance to *E. grandisquama*.

Length of head 0.25 of total length to base of caudal; depth, 0.53; dorsal, 89; anal, 68; series of scales, 35.

<sup>1</sup> Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 627.

Head short, blunt, the profile very steep, slightly more so than in females of *E. grandisquama*; upper eye slightly posterior, its anterior border being on about the same vertical as the anterior edge of the pupil of the lower eye, diameter of upper eye 0.09; interorbital moderately wide, as usual in females of other species of this genus, interorbital width 0.06; nostrils as in *E. grandisquama*, closely approximated, the anterior with a short slender flap, the posterior very slightly tubular, slightly in advance of anterior margin of lower orbit; snout from upper orbit 0.12; maxillary of eyed side 0.10, reaching, as in *E. grandisquama*, a vertical slightly beyond the anterior margin of lower orbit; teeth strong and recurved, in a series similar on both sides of jaws, in addition to which a series of shorter, stouter teeth are developed outside of the main series; anterior end of premaxillaries with a few enlarged teeth, which are outside the mandibular symphysis when the mouth is closed, thus differing from *E. kobensis* and *E. grandisquama*, but resembling the species of *Arnoglossus*; vomer and palatines toothless; gill-rakers short and slender, 2+14 (no other species of Japanese *Psettinae* has gill-rakers on the upper limb of the arch; no other has more than 8 on the lower limb); a small tubercle present on the eyed side near tip of snout; lower margin of upper orbit and upper margin of lower orbit raised near center.

Form of body ovate, as in *E. grandisquama*; depth of caudal peduncle 0.11; width of body 6.5 in depth.

Scales ciliated or weakly ctenoid on eyed side, cycloid on blind side, large and caducous, as in *E. grandisquama*; only the tip of snout and jaws naked. Lateral line arched on eyed side, absent on blind side. \*

Origin of dorsal slightly on blind side, on a horizontal from upper margin of lower orbit; no anal spine, pubic spine sharp and triangular, as in related forms; caudal subsessile, slightly pointed, its middle rays as long as head; pectoral of eyed side with 10 rays, its length 0.23; pectoral of blind side with 8 rays, its length 0.14; ventrals each of 6 rays, the base of right ventral about 0.3 base of left ventral.

Color as in *E. grandisquama*, with a similar pair of dark spots on caudal. "Light yellow spots bordered with darker in front of interorbital area." (Dr. C. H. Gilbert's color notes.)

Only the type-specimen known.

ENGYPROSOPON KOBENSIS (Jordan and Starks).

*Scaeops kobensis* (JORDAN AND STARKS) Proc. U. S. Nat. Mus., vol. 31, 1906, p. 170, fig. 2. Kobe.

*Albatross* station 4884 and 4885, near Nagasaki;

*Albatross* station 4930, Vincennes Strait.

This species shows marked sexual differences, indicated in the table following.

	Male.	Female.
Interorbital.....	One-half wider than upper eye.....	One-half as wide as eye.
Snout.....	Steeper; 1.5 in head.....	2.3 in head.
Ocular spines.....	Present.....	Absent.

*E. kobensis* differs considerably from *E. grandisquama* in the following characters:

	<i>E. kobensis.</i>	<i>E. grandisquama.</i>
Scales.....	54 to 56, firm and strongly ctenoid; fins more scaly.	35 to 36, caducous, weakly ctenoid.
First ray of pectoral in male.	Filamentous, much longer than the second ray, twice length of head.	Not filamentous, about equal to second, only slightly longer than head.
Form.....	Broadly elliptical.....	Ovate.
Nasal spine in male..	Strongly developed, entering into profile of head.	Weakly developed, not entering into profile of head.
Ocular spines about upper orbit in males consisting of	1 main spine, sharp, on median anterior margin, and a few elevations of lower ridge.	A single dull wide spine at anterior end of lower ridge, and a few tubercles posterior to this.
Ocular spines about lower orbit in males consisting of	A sharp spine directed forward at anterior end of upper ridge, 1 to 3 smaller spines on anterior ridge.	A single tubercular spine at anterior end of upper ridge.
Color.....	Darker brown, without caudal spots, snout of male spotted.	Lighter brown, caudal with 2 dark spots, 1 on upper and 1 on lower edge of fin; snout without dark spots.

The two adult males obtained have a roughly triangular dark area, which covers most of the blind side behind the pectorals.

The fifth specimen in the table shows that young males are similar to the females in measurements. This specimen also lacks the color on the blind side.

Dr. C. H. Gilbert, while in charge of the scientific work of the Japanese cruise of the *Albatross*, made these color notes on the first specimen in the following table:

Anterior half of interorbital space, in advance of a nearly vertical ridge between the eyes, marked with numerous fine yellow spots in nearly vertical series, and between these, parallel series of slightly larger blue spots. Similar spotting on anterior portion of dorsal fin. A few orange spots on ventral of colored side, and two larger orange spots on mandibular membrane of colored side. Greater part of blind side dark blue.

Table of measurements in hundredths of length to caudal base.

<i>Albatross</i> station.....	4885	4885	4930	4930	4930	4884
	Male.	Female.	Male.	Female.	Male.	Female.
Sex.....	92	84	92.5	78	57.5	68
Length, mm.....	81	81	79	83	82	82
Dorsal rays.....	62	62	61	63	63	62
Anal rays.....	56	55	54	54	56	53
Pores.....	25	25	25	25.5	26	26
Length, head.....	52	49	51	52	47	49
Depth, body.....	7	8	8	8.5	8.5	8.5
Diameter, upper eye.....	17	11	17	11	12	11
Snout from upper eye.....	7	7.5	7	7.5	8	8
Maxillary, eyed side.....	10	4	11	4.5	4.5	4
Interorbital width.....	28	49	34	27	26	26
Pectoral, eyed side.....	12	12	14	9	11	10
Pectoral, blind side.....	10	10	10	9	9	9
Pectoral rays, eyed side.....	9	9	9	8	8	8
Pectoral rays, blind side.....	6	7	7	6	6	6
Gill-rakers.....						

## LAEOPS KITAHARAE (Smith and Pope).

*Lambdopsetta kitaharae* SMITH and POPE, Proc. U. S. Nat. Mus., vol 31, 1906, p. 496.

This species is referable to the genus *Laeops* Günther. The teeth of the jaws are in narrow bands, developed wholly on the blind side. No specimens were obtained by the *Albatross*.

## LAEOPS LANCEOLATA Franz.

*Laeops lanceolata* FRANZ, Abh. bayer. Akad., 1910, p. 62, pl. 8, fig. 60. Fukuura; Dzushi.

*L. lanceolata* seems to differ from *L. kitaharae* in having more fin rays (dorsal, 109 to 115; anal, 88 to 95, rather than dorsal, 103; anal, 76); and in the smaller scales (120 rather than 100). Eye, 2.5, instead of  $3\frac{1}{4}$ .

No specimens were obtained by the *Albatross*.

## LAEOPS VARIEGATA Franz.

*Laeops variegata* FRANZ, Abh. bayer. Akad., 1910, p. 63, pl. 8, fig. 59. Fukuura; Dzushi.

This may be a larval form. Franz states that he did not examine its dentition. Its generic identification is therefore doubtful. Its anterior dorsal rays are produced in front; dorsal, 110; anal, 90; scales, 110; eye, 6.5.

No specimens were obtained by the *Albatross*.

## LAEOPTICHTHYS, new genus.

Body elongate-ovate, strongly compressed; eyes and color sinistral; mouth small, the jaws of the blind side strongly curved, the teeth in a single even series, confined entirely to the blind side of both jaws; interorbital a narrow ridge; ventrals very unsymmetrical, the left with a very broad base; origin of dorsal in advance of upper eye; rays of dorsal and anal numerous; no anal spine; scales very small, cycloid, lateral line with a high angular arch; gill-rakers rudimentary; anus nearly on preanal ridge.

*Laeoptichthys* differs from *Laeops* Gunther<sup>1</sup> in having the teeth in a single even row, rather than in narrow bands.

*Type of the genus.*—*Laeoptichthys fragilis*, new species.

## LAEOPTICHTHYS FRAGILIS, new species.

Plate 26, fig. 4.

*Type-specimen.*—Cat. No. 75673, U.S.N.M. A specimen 68 mm. long, from *Albatross* station 5074, in Suruga Gulf, Japan; depth 47 fathoms, collected on October 16, 1906.

<sup>1</sup> *Challenger* Shore Fishes, vol. 1, 1880, p. 29.

Length of head, 0.19 of total length to base of caudal; depth, 0.31; dorsal, 109; anal, 90.

Head blunt and very short; elevation of upper profile at occiput abrupt; ventral outline of head evenly curved; the posterior angle of mandible not very prominent; diameter of upper eye, 0.05, equal in size to lower eye and slightly posterior to it; the eyes separated by a high naked ridge rising abruptly on preorbital at middle of anterior margin of lower orbit, extending backward and upward posterior to the upper orbit; nostrils closely approximated, the anterior lower than the posterior, with a short, fleshy, pointed flap, the posterior small, not tubular, and without flap; snout from upper orbit about as long as diameter of upper eye; a rectangular figure formed by the anterior margins of orbits, the outline of snout, and the premaxillaries; mouth very small and nearly vertical, the maxillaries reaching only to the vertical of the anterior margin of the lower eye; bones of eyed side nearly straight; those of blind side strongly curved; maxillary of eyed side not quite as long as snout; the region posterior to lower orbit deeply grooved; interorbital ridge very prominent; preopercular ridge prominent, curved to form a slight but regular arch, preopercle extended backward at angle, so that the posterior edge forms a semicircular arch; no spines or tubercles on head; teeth small and sharp, but little compressed antero-posteriorly, forming a single very even series confined entirely to the blind side of the jaws, not even extended to symphysis; gill-rakers rudimentary, about 6 of 7 papillae on lower limb of arch, none on upper limb.

Body very thin and very elongate-ovate, the greatest width only about 0.1 of depth. Dorsal outline more curved than ventral. Depth of caudal peduncle, 0.08. The body cavity extended only one-ninth the distance from the pectoral to the caudal base. Anus nearly on ventral ridge.

Scales cycloid, small, deciduous; 102 along the lateral line. Lateral line present on eyed side only, with a high, short, and angulated arch above pectoral; its length 0.10, its height 0.06; posterior to the arch the lateral line is straight and exactly median in position, extended on middle caudal ray. Head scaly, except on interorbital, snout and jaws; fins naked, excepting a few scattered scales on the base of dorsal, anal, and caudal.

Origin of dorsal slightly in advance of anterior margin of upper orbit, the first two rays separate, the fin high to posterior end, the highest ray, 0.13, the last ray about 0.07. Caudal subsessile, length, 0.18. Anal similar to dorsal, the posterior rays crowded; anal spine absent. Ventrals each of six rays. Pectorals very small, pointed, length of pectoral of eyed side, 0.06, blind side, 0.05.

Color in alcohol, flesh-colored. Pectorals and ventral of blind side colorless, other fins dusky.

*Paratype*.—No. 22531, Stanford University Museum.

From *Albatross* station 5072, near locality of type. Length, 72 mm. Head, 0.19; depth, 0.33; upper eye, 0.06; pectoral of eyed side, 0.06; dorsal, 104; anal, 88.

Two specimens known.

Subfamily HIPPOGLOSSINAE.

Genus TARPHOPS Jordan and Thompson.

*Tarphops* JORDAN and THOMPSON, Mem. Carnegie Mus., vol. 6, No. 4, 1914.

*Tarphops* differs from *Pseudorhombus* in the large scales.

TARPHOPS OLIGOLEPIS (Bleeker).

*Rhombus oligolepis* BLEEKER, Vifde Bijdrag, Japan, p. 8, pl. 2, fig. 2. Nagasaki.

*Pseudorhombus oligolepis* JORDAN and STARKS, Proc. U. S. Nat. Mus., 1906, p. 179.

*Albatross* station 4884, near Nagasaki entrance.

*Albatross* stations 4961, 4962, and 4963, in Kii Channel, east of Shikoku Island.

Measurements in hundredths of length to base of caudal.

<i>Albatross</i> station.....	4884	4962	4963	4961
Length to base C., mm.....	52	47	50	48
Dorsal rays.....	65	64	66	68
Anal rays.....	51	51	51	53
Pores.....	47	45	49	53
Length, head.....	27	30	28	28
Depth, body.....	45	43	45	42
Diameter, upper eye.....	9	10	10	10
Snout from upper orbit.....	7	7	7	7
Maxillary, eyed side.....	12	14	14	13
Pectoral rays, eyed side.....	9	9	10	8
Pectoral rays, blind side.....	8	7	9	8
Gill-rakers.....	7+19	6+19	6+19	6+20
Length pectoral, eyed side.....	20	21	20	20
Length pectoral, blind side.....	13	14	14	13

PSEUDORHOMBUS CINNAMOMEUS (Temminck and Schlegel).

*Rhombus cinnamomeus* TEMMINCK and SCHLEGEL, Fauna Jap., Poiss., 1846, p. 180, pl. 93. Nagasaki.

*Pseudorhombus cinnamomeus* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 174.

*Rhombus oligodon* BLEEKER, Verh. Bat. Gen., vol. 26, 1857, Nieuw. Nalez., Japan, p. 121 (Nagasaki); Natur. Tyds. Nederl., vol. 6, p. 419; Act. Soc. Ind. Ned., vol. 5, Japan, pl. 3, fig. 2.

*Pseudorhombus oligodon* JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, p. 365 (Formosa).—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 177.

This species is characterized by the ctenoid scales of the lower side, as also described by Bleeker for *P. oligodon*. The figure given by Temminck and Schlegel evidently represents the body deeper than usual in any Japanese species, and too many teeth are shown. Temminck and Schlegel's description and plate give the color and length of maxillary (reaching to below posterior border of orbit) as in *P. oligodon* and not as in *P. misakius*.

## PSEUDORHOMBUS MISAKIUS Jordan and Starks.

*Pseudorhombus misakius* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 175, fig. 4.

Three specimens from Shimizu, one from Nanao, collected by the *Albatross*.

This species differs from *P. cinnamomeus* in having cycloid scales on the blind side, in the smaller mouth, and in the coloration; from *P. dupliocellatus* in the larger scales (98 in *P. dupliocellatus*); from *P. ocellifer* in the shorter, fewer gill-rakers; and from *P. arsius* (Buchanan Hamilton), recorded from Japan by Snyder,<sup>1</sup> in "the lack of a white bordered ocellus on the lateral line, fewer dorsal rays, and a somewhat more slender body."

## PSEUDORHOMBUS OCELLIFER Regan.

*Pseudorhombus ocellifer* REGAN, Ann. Mag. Nat. Hist., 1905, p. 26. Kobe.—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 178.

*Albatross* stations 5071 and 5074, Suruga Gulf.

*Albatross* stations 4884 and 4885, west coast of Kiusiu.

*Measurements in hundredths of length to base of caudal.*

<i>Albatross</i> station .....	5074	5071	4885	4885	4885	4884
Length in mm.....	64	143	81.5	74	72	95
Dorsal rays.....	73	71	72	72	72	76
Anal rays.....	54	55	53	55	54	55
Pores.....	77	74	72	74	73	73
Length, head.....	32	32	31	32	30	29
Depth, body.....	47	44	44	47	43	46
Diameter, upper eye.....	8	7	8	8.5	8	7.5
Snout from upper eye.....	7	8	7	8.5	8	7
Maxillary, eyed side.....	15	15	15	16	16	13
Pectoral, eyed side.....	.....	18	19	19	18	18
Pectoral, blind side.....	13	14	12	13	13	12
Pectoral rays, eyed side.....	10	11	10	10	9	11
Pectoral rays, blind side.....	8	9	9	8	9	10
Gill-rakers.....	5+16	6+17	5+16	6+17	5+17	5+17

## Genus XYSTRIAS Jordan and Starks.

*Xystrias* JORDAN and STARKS, Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 623.

In the key to genera by Jordan and Starks,<sup>2</sup> the genera *Xystrias* and *Verasper* are separated from *Acanthopsetta* by having the "anal spine weak or obsolete." It is well developed in all three genera.

## XYSTRIAS GRIGORJEWI (Herzenstein).

*Hippoglossus grigorjewi* HERZENSTEIN, Bull. Acad. Sci. Imp. Petersb., 1890, p. 134. Hakodate.

*Verasper otakii* JORDAN and SNYDER, Proc. U. S. Nat. Mus., 1900, p. 378. Tokyo.

*Xystrias grigorjewi* JORDAN and STARKS, Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 623.

<sup>1</sup> Proc. U. S. Nat. Mus., vol. 42, 1912, p. 439.

<sup>2</sup> Idem., vol. 31, 1906, p. 164.

*Albatross* stations 4807 and 4808, Tsugaru Strait, between Hokkaido and Hondo.

*Albatross* stations 4815, 4816, and 4817, near Sado Island, Sea of Japan.

*Albatross* station 4832, near Tsuruga, Sea of Japan.

*Albatross* station 4856, off east coast of Korea, Sea of Japan.

*Albatross* station 5069, Suruga Gulf.

*Measurements in hundredths of length to caudal base.*

<i>Albatross</i> station .....	5069	4856	4832	4817	4817	4816	4808	4808
Length to base caudal, mm. . . . .	230	175	157	163	98	161	172	170
Dorsal rays .....	88	87	90	85	85	90	92	91
Anal rays .....	67	68	70	68	67	68	73	68
Pores in lateral line .....	90	86	86	84	86	89	88	90
Length, head .....	26	27	26	27	27	26	26	27
Depth, body .....	37	38	37	36	37	36	37	37
Diameter, upper eye .....	6	7	7	7	7	7	7	7
Snout from upper orbit .....	6	6	6	6	6	6	6	6
Maxillary, eyed side .....	10	11	9	10	10	9.5	10	10
Pectoral, eyed side .....	13	13	12	12	12	13	13	13
Pectoral, blind side .....	10	10	10	10	10	10	9	9.5
Pectoral rays, eyed side .....	10	10	10	10	11	10	11	10
Pectoral rays, blind side .....	10	10	10	9	10	11	10	10
Gill-rakers .....	5+19	5+18	5+17	3+15	4+16	6+17	6+17	5+14

Genus *ACANTHOPSETTA* Schmidt.

*Acanthopsetta* SCHMIDT, Faune Mer. Och., 1903, p. 19.

*Acanthopsetta* is allied to *Verasper* and *Xystrias*, but differs from them and resembles *Hippoglossoides* in having a single series of teeth in both jaws, even to the symphysis; and in the longer lower arch in the lateral line. This genus is characterized by the scaly snout and eye ball.

*ACANTHOPSETTA NADESHNYI* Schmidt.

*Acanthopsetta nadeshnyi* SCHMIDT, Faune Mer. Ochotsk, 1903, p. 19; name only; Pisc. Mar. Orient., 1904, p. 237, pl. 5, fig. 1.—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 187.

Numerous specimens were obtained at the following localities:

*Albatross* stations 4982, 4983, 4984, and 4985, west coast of Hokkaido (Yezo).

*Albatross* stations 4997, 4998, 4999, 5000, 5001, 5002, and 5003, Gulf of Tartary.

*Albatross* station 5010, Aniwa Bay, Sakhalin Island.

*Albatross* station 5015, off East coast of Sakhalin Island.

*Albatross* station 5031, Yezo Strait.

This species is here recorded for the first time since the types were taken.

The depth at which the specimens were obtained varies from 21 to 510 fathoms.

Description of an adult female, 304 mm. long:



Length of head, 0.28 of total length to base of caudal; depth, 0.48; dorsal, 74; anal, 57; pores, 83.

Head moderate, subconic, dorsal and ventral outlines of head nearly straight; upper eye slightly posterior to lower, diameter 0.07; interorbital narrow; the ridge high, its anterior end parallel to anterior margin of lower orbit, its posterior end nearly parallel to posterior margin of upper orbit; anterior nostril tubular, its edges somewhat puckered; snout pointed, its length 0.05, its profile at right angles to border of premaxillary; lower jaw slightly projecting, symphyseal knob developed; both jaws nearly straight, maxillaries of equal length, extending to below pupil, 0.10; teeth small, sharp, recurved, somewhat irregularly uniserial, none enlarged; gill-rakers 8 + 12, rather thick and fleshy, length of longest 0.03.

Body dextral; dorsal and ventral outlines both strongly and equally curved; depth of caudal peduncle 0.11, its length from posterior end of anal base 0.09.

Scales ctenoid everywhere, including all the fins, the eye-ball, the entire snout, excluding a small naked area about nostrils. Lateral line with a long, rather low arch, its height 0.05, its length 0.19, about eight rows of scales between its uppermost part and the horizontal.

Origin of dorsal over pupil, its highest rays near middle of body, their length 0.14; anal quite similar, its longest rays 0.13; caudal rounded, its length 0.23; anal spine strong; pectoral of eyed side 0.14, pointed; pectoral of blind side similar, but shorter, 0.10; right pectoral of 10 rays, left of 9 rays; ventrals symmetrical, the right 0.08, the left 0.09.

Color uniform dark brown on eyed side.

*Measurements in hundredths of length to base of caudal.*

<i>Albatross station</i> .....	5015	4997	4997	4997	4984	4983
Length to base caudal, mm.....	304	283	241	184	246	212
Dorsal rays .....	74	67	68	72	76	71
Anal rays .....	57	57	56	57	61	55
Pectoral rays, eyed side .....	10	10	9	11	9	.....
Pectoral rays, blind side .....	9	9	9	10	9	10
Ventral rays, eyed side .....	5	5	5	6	6	6
Ventral rays, blind side .....	6	6	6	6	6	6
Pores .....	83	74	75	74	75	74
Length, head .....	28	27	29	27	28	28
Depth, body .....	48	47	47	45	43	44
Diameter, upper eye .....	7	7	7	7	8	7
Snout from upper orbit .....	5	5	6.5	6	6.5	6
Maxillary, eyed side .....	10	9	10	9	10	9
Pectoral, eyed side .....	14	14	15	12	15	15
Pectoral, blind side .....	10	11	10	9	11	10
Ventral, eyed side .....	8	8.5	9	8	9	9
Ventral, blind side .....	9	9	9	9	9	9
Gill-rakers .....	8+12	7+10	8+11	.....	6+11	7+10

In young specimens the eye-ball, the pectoral, and the ventral of the eyed side are nearly naked; the other fins and the snout are more weakly scaled than in the adult.

## Genus HIPPOGLOSSOIDES Gottsche.

*Cynopsetta* SCHMIDT, Faune Mer. Ochotsk, 1903, p. 19; no description.Key to the species of *Hippoglossoides*.

- a<sup>1</sup>. Dorsal, about 70 to 80; anal, about 50 to 60; gill-rakers, x+ 10 to 12.  
 b<sup>1</sup>. Depth of body, 2 $\frac{3}{8}$ ; scales cycloid on blind side.....*robustus*.  
 b<sup>2</sup>. Depth, 2.3 to 2.6; scales ctenoid on both sides of the adult.  
 c<sup>1</sup>. Scales moderately rough; pectoral shorter than half the head, that of blind side naked in young and adult.....*propinquus*.  
 c<sup>2</sup>. Scales everywhere very rough; pectoral longer than half the head; pectoral of blind side with ctenoid scales in adult.....*hamiltoni*.  
 a<sup>2</sup>. Dorsal, about 80 to 90; anal, about 60 to 70.  
 d<sup>1</sup>. Dorsal, 86 to 92; gill-rakers, x+ 10 or 11.....*platessoides*.  
 d<sup>2</sup>. Dorsal, 79 to 89; gill-rakers, x+ 12 to 19.  
 e<sup>1</sup>. Gill-rakers, x+ 12 to 16; canines more strongly developed; maxillary more strongly curved and irregular.....*dubius*.  
 e<sup>2</sup>. Gill-rakers, x+ 16 to 19; canines weaker; jaws more regular....*elassodon*.

## HIPPOGLOSSOIDES HAMILTONI Jordan and Gilbert.

*Hippoglossoides hamiltoni* JORDAN and GILBERT, Rept. Fur Seal Invest., vol. 3, 1899, p. 489, pl. 84.

## Measurements in hundredths of length to caudal base.

			Types.	
<i>Albatross Station</i> .....	5011	5009	<i>hamiltoni</i>	<i>robustus</i>
Length to caudal base, mm .....	237	225	133	275 (with C.)
Dorsal rays .....	71	81	72	77
Anal rays .....	56	61	56	62
Pores .....	91	89	91	92
Gill-rakers .....	3-11	3-12	2, 3-11, 12	2, 3-11, 12
Length, head .....	28	28	27.7	31
Depth, body .....	41	40	41	47
Diameter, upper eye .....	6	6	8	4.5
Snout from upper orbit .....	5.5	5.5	5.5	.....
Maxillary, eyed side .....	11	11	12.5	11.2
Maxillary, blind side .....	12	12	14	.....
Pectoral, eyed side .....	15.7	14.4	21	12.5
Pectoral, blind side .....	15.3	13.2	15	.....
Ventral, eyed side .....	10	9.5	10.8	9.2
Length, caudal .....	21	21	24.7	.....
Height, dorsal .....	14	13	17	11.3
Height, anal .....	14	13	17	11

These specimens differ from the smaller type in having a shorter pectoral, and in having the pectoral of the blind side covered with ctenoid scales, it being naked in the type. The measurements of the type of *H. robustus* Gill and Townsend,<sup>1</sup> made by Dr. C. H. Gilbert, shows it to have a deeper body and shorter fin rays. Jordan and Evermann describe the scales of the blind side as cycloid. In *H. hamiltoni* they are strongly ctenoid, even in the young.

## HIPPOGLOSSOIDES DUBIUS (Schmidt).

*Cynopsetta dubia* SCHMIDT, Faune Mar. Ochotsk, 1903, p. 19.—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 188.*Hippoglossoides dubius* SCHMIDT, Pisc. Mar. Orient., 1904, p. 227, pl. 6, fig. 1.*Hippoglossoides katakurae* SNYDER, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 546; vol. 42, 1912, p. 438, pl. 58, fig. 1.<sup>1</sup>Proc. Biol. Soc. Wash., vol. 11, 1897.

Many specimens were obtained at the following localities:

*Albatross* stations 4822 and 4828, off west coast of Hondo, Sea of Japan.

*Albatross* stations 4834, 4835, 4838, 4839, off west coast of Hondo.

*Albatross* station 4843, near Oki Group, Sea of Japan.

*Albatross* stations 4855, 4856, 4858, 4859, off east coast of Korea.

*Albatross* stations 4986, 4989, and 4994, off coast of Hokkaido (Yezo).

*Albatross* stations 4997, 4998, 5000, 5002, and 5004, Gulf of Tartary.

*Albatross* stations 5006, 5007, 5008, 5010, Aniwa Bay, Sakhalin Island.

*Albatross* station 5042, south coast of Hokkaido (Yezo).

Description of a female 332 mm. long to base of caudal, from *Albatross* station 5011.

Head, 0.293 of this length; depth, 0.38; dorsal, 85; anal, 64; pores in the lateral line, 92.

Outline of the head uneven, the dorsal outline sharply angulated at both ends of the mandible; eyes about equal, their anterior borders on about the same vertical; diameter of upper eye 0.05; interorbital moderate and with a fairly straight ridge, extending from the anterior border of the preorbital to the posterior edge of the preopercle; interorbital with about three rows of ctenoid scales; anterior nostril in a tube, the posterior with the margin slightly elevated; length of snout from upper orbit, 0.05; snout with a strong curve above, naked except on anterior margin of orbits; maxillary strongly curved, extending past middle of eye, that of the blind side the longer, its length 0.147, that of the eyed side 0.125; premaxillary unusually broad and produced forward, more so than in any other species of the genus; preorbital broad, covering the maxillary, in some specimens nearly covering premaxillary; teeth uniserial, acute, conic, directed backward, about four premaxillary canines on each side of the jaw, irregularly arranged; behind the canines the teeth are smaller, and are better developed on the blind than on the eyed side; several canines on mandibular symphysis, decreasing in size posteriorly, similarly enlarged on both sides; gill-rakers slender, 3+13 on the eyed side, 3+16 on blind side, the longest 0.03; lower pharyngeals narrow, entirely separated, with one main and one smaller inner row of sharp conical teeth.

Body elliptical, dorsal and ventral outlines similar; depth of caudal peduncle 0.10; length of caudal peduncle (from posterior end of anal), 0.09. Vertebrae 13-29 in one specimen, 13-32 in five specimens, including the hypural plate.

Scales of both sides ctenoid, rougher posteriorly than anteriorly. Lateral line of both sides with a high curve, its length 0.19, its height 0.025.

Dorsal beginning near anterior vertical of orbit, gradually rising for more than half its length; height of longest ray 0.10, the fin rapidly and evenly decreasing in height posterior to the highest ray; anal rising to middle, about equal in height to dorsal; anal spine not strongly projecting; caudal truncate; pectorals rounded, that of the eyed side 0.105, of 10 rays, that of the blind side 0.076, with 10 rays; ventrals symmetrical, each 0.09 and with 6 rays.

Color uniform dark brown, including all fins on eyed side, the ventral somewhat lighter; dorsal and anal with a light margin; fins and body on blind side white.

The curve in the lateral line is variable, with all intermediate forms from a nearly straight line to a high curve with 7 rows of scales between its highest point and the horizontal. The dorsal fin rays in *H. katakurae* are given by Snyder as 80 or 90, the anal rays as 69, agreeing with this species. The vertebrae are 42 to 45 in specimens of this species counted; 41 in the type of *H. katakurae*. *H. katakurae* can not, therefore, be retained as a distinct species.

In the young, especially under 150 mm., the form is much more slender, the depth about 0.33; the dorsal profile is straighter; the mouth is more oblique; the upper orbit is larger; the canines are less developed; the maxillaries are more nearly equal, and the scales are smoother.

The body is apparently always dextral.

These specimens, especially the larger, differ from the original description in having the interorbital scaled, and in usually having weakly ctenoid, rather than cycloid scales on the anterior part of the body, the spines easily breaking off. The blind side usually has ctenoid scales.

This species seems nearest *H. classodon*, from Alaska and Kamchatka, but differs from that species in the more irregular, highly curved upper jaw; in the greater development of the canines; in having fewer gill-rakers ( $x + 16$  to 19 in *H. classodon*), and usually in the higher curve in the lateral line. Evidently too large a range in fin rays and gill-rakers have been recorded for *H. classodon*, probably from a confusion with other species. In four specimens of this species in the United States National Museum and in five specimens in the Stanford collection (from Puget Sound and Kamchatka), the gill-rakers are 3 or 4 + 16 to 19.

Table of fin rays and gill-rakers.

<i>Albatross station</i> .....	4997	5003	4998	4994	4989	5000	4994	5007	4986
Length without caudal, mm .....	371	332	302	272	308	260	257	425	271
Dorsal rays .....	82	85	83	82	79	83	82	84	88
Anal rays .....	64	64	64	64	64	64	67	65	68
Gill-rakers, eyed side .....	3-12	3-13	3-14	2-11	3-16	3-14	2-15	2-14	3-13
Gill-rakers, blind side .....	3-14	3-16	3-14	2-12	3-16	3-14	2-13	2-16	3-14

Table of fin rays and gill-rakers—Continued.

<i>Albatross station</i> .....	5006	5010	5008	5042	4838	5002	4856	4858	4838
Length without caudal, mm .....	212	217	217	231	173	203	190	188	190
Dorsal rays .....	85	83	82	81	85	87	82	89	83
Anal rays .....	65	64	64	63	62	67	63	69	65
Gill-rakers, eyed side .....	3-13	3-15	3-13	3-12	3-14	3-14	3-15	3-14	3-15
Gill-rakers, blind side .....	4-15	4-13	3-12	2-13	3-16	3-15	3-15	2-15	3-14

<i>Albatross station</i> .....	5004	4856	5858	5011	4834	4834	4834	5003
Length without caudal, mm .....	85	173	159	152	125	118	131	132
Dorsal rays .....	86	84	80	83	87	85	86	85
Anal rays .....	65	62	60	65	63	63	69	65
Gill-rakers, eyed side .....	2-13	3-13	2-13	2-14	2-15	2-14	2-15	3-14
Gill-rakers, blind side .....	2-12	3-14	3-13	3-14	2-17	3-14	2-14	2-14

Table of measurements in hundredths of length to caudal base.

<i>Albatross station</i> .....	5003	4998	4994	4994	5000	5007	5042	5010	5006	5002
Pores .....	92	94	90	89	90	89	89	94	88	86
Length to base caudal, mm .....	332	302	273	257	260	241	231	217	212	203
Length, head .....	29.3	31	29	27.5	29	30	29	30	28	27
Depth, body .....	38	38	41.5	34	39	39	38	39	38	37
Diameter, upper eye .....	5	5.5	6	6	6	6	6	6	6	6
Snout from upper orbit .....	5	6	6	5	5	5	5	6	5	5
Maxillary, eyed side .....	12.5	12	11.5	11	12	11	10	10	11	12
Maxillary, blind side .....	14.7	15	14	12	13	13	13	13	13	14
Pectoral, eyed side .....	10.5	12	13	13	13	12	13	13	13	12
Height, dorsal .....	10.2	11	11	11	11.5	10.5	10	12	11	12
Height, anal .....	10.3	11	11	10	11	10	11	12	11	10
Length, caudal .....	18.6	19	21	20	21	19	20	20	19	19
Length, ventral .....	8.7	9	10	10	10.5	9	10	10	9	9

## HIPPOGLOSSOIDES PROPINQUUS, new species.

Plate 26, fig. 5,

As the key indicates, this species is probably most closely related to *H. robustus* and to *H. hamiltoni*, having fewer gill-rakers and fewer fin rays than in *H. classodon* or *H. dubius*. *H. propinquus* differs from the type of *H. robustus* in the much slenderer body; in having both sides with most of the scales ctenoid, and in the prominent nasal tubes. According to Jordan and Evermann's description of the type of *H. robustus*, it has the depth  $2\frac{1}{2}$  in length without caudal (0.47 as measured on the same specimen by Gilbert); "no ctenoid scales on the blind side"; "no exerted nasal tubes." *H. propinquus* differs from *H. hamiltoni* in the shorter pectoral, less than half as long as head, and in the more weakly ctenoid scales. The pectoral of the blind side is covered with ctenoid scales in the adult of *H. hamiltoni*, but always naked in this species. The differences are more apparent in the young. Specimens of the same size when compared with the type of *H. hamiltoni* differ strikingly in the much shorter fin rays, especially the pectoral, and in the more weakly ctenoid scales, those of the blind side nearly smooth instead of strongly ctenoid. The eye is also smaller, 4.25 instead of 3.5 in head.

*Type-specimen*.—Cat. No. 75667, U.S.N.M. A female 327 mm. long without caudal, 383 mm., with caudal. *Albatross station* 5005, Aniwa Bay, Sakhalin Island.

Head, 0.29 of total length to caudal base; depth, 0.429; dorsal, 75; anal, 57; pores in the lateral line about 90.

Dorsal outline of head uneven, slightly elevated above the eyes; the anterodorsal margin of the orbit, the upper end of the premaxillary spine, the mandibular angle, and the angular projecting into the profile; eyes about equal, their anterior borders on about the same vertical; diameter of upper eye 0.055; interorbital 0.015, nearly flat, but with the ridge more prominent in some of the paratypes, at the narrowest point with three rows of scales, some of which are ctenoid; interorbital narrower in some paratypes with fewer rougher scales; anterior nostril with a rather short, fleshy tube, the posterior nostril horizontal, with the edges expanded to form a thin-walled tube, shorter than the anterior tube, its dorsal edge the higher; length of snout from anterior margin of upper orbit 0.052, naked except on the anterior borders of the orbits, where the scales are more strongly ctenoid in young paratypes; maxillary strongly curved, but less so than in *H. dubius*, the premaxillary less produced forward; length of maxillary, eyed side 0.113, blind side 0.128; preorbital not covering premaxillary before lower orbit; teeth uniserial, acute, conic, somewhat irregular, enlarged anteriorly in both jaws to form canines, which are less strongly developed than in *H. dubius*; teeth better developed on the blind side; gill-rakers moderately slender, smooth, 1+13 on the eyed side, 2+11 on the blind side, the longest about 0.03, about half the diameter of eye.

Body rather ovate than elliptical; dorsal and anal outlines similar, the ventral a little more strongly curved. Depth of caudal peduncle 0.094, a little more than one-third length of head; length of caudal peduncle about the same. Vertebrae 45 (13+32) in 1 specimen counted, including the hypural plate.

Scales ctenoid, but not very rough, both anteriorly and posteriorly on the eyed side, weakly ctenoid on back and sides of blind side; the belly and the head except the cheeks have ctenoid scales on the eyed side, but cycloid and somewhat imbedded scales on the blind side; fins of eyed side more or less covered with ctenoid scales, naked on the blind side; mandibles, lips, and the maxillaries nearly or entirely naked; smaller paratypes have the blind side nearly smooth, but the interorbital region, margin of orbits, maxillaries, and the sides of the head on the eyed side are rougher.

Dorsal increasing in length for more than half its length, the longest ray about 3.5 in head, the anal similar; anal spine not strongly projecting; pectoral somewhat pointed, a little longer than height of dorsal, of 11 rays; pectoral of blind side shorter and more rounded, with the same number of rays. Ventrals symmetrical in position, each of 6 rays, that of eyed side a little the shorter, but not constantly so.

Color uniform dark brown, slightly mottled in the very young; fins of eyed side dark, the vertical fins tipped with lighter; blind side white including all the fins, the vertical fins darker distally.

The young specimens are very readily separable from the young of *H. dubius*, with which they were taken, not only by the fewer fin rays, but also by the deeper body (ovate instead of elongate-elliptical), by the less oblique mouth, and by the firmer flesh.

Table of fin rays and gill-rakers in all the specimens, including the type and the following paratypes: One from station 5008; four from station 5009; three from station 5011; three from station 5012; one from station 5013; all in Aniwa Bay, Sakhalin Island, dredged at from 40 to 43 fathoms.

<i>Albatross station</i> .....	5005	5011	5013	5011	5012	5009	5009
Length without caudal, mm .....	327	306	164	150	142	95	87
Dorsal rays .....	75	75	72	72	76	71	76
Anal rays .....	57	57	56	55	57	57	59
Gill-rakers, eyed side .....	1-13	1-10	2-12	3-10	2-12	3-13	3-13
Gill-rakers, blind side .....	2-11	3-11	2-12	2-11	2-12	2-12	3-13

<i>Albatross station</i> .....	5009	5008	5012	5012	5009	5011
Length without caudal, mm .....	88	82	86	81	77	71
Dorsal rays .....	72	71	76	75	79	71
Anal rays .....	55	56	59	58	62	54
Gill-rakers, eyed side .....	2-10	3-12	2-12	3-11	3-12	2-13
Gill-rakers, blind side .....	1-11	3-12	2-12	3-11	3-12	3-11

All rudimentary gill-rakers counted.

*Measurements in hundredths of length to base of caudal.*

<i>Albatross station</i> .....	5005	5011	5013	5011	5012
Pores .....	90	93	86	91	89
Length without caudal, mm .....	327	306	164	150	143
Length, head .....	29	23.7	27	27.2	27
Depth, body .....	42.9	42.5	38	39.7	35.2
Depth, caudal peduncle .....	9.4	9.2	10	9.3	9
Diameter, upper eye .....	5.5	6	6	5.7	5.6
Interorbital width .....	1.5	1.3	1.2	1	1
Snout from upper orbit .....	5.2	5.5	4	4.6	4
Maxillary, eyed side .....	11.3	11.4	10.8	10.3	10.3
Maxillary, blind side .....	12.8	12.6	12.2	11.2	11.6
Pectoral, eyed side .....	12.3	12.1	12	13.4	10.8
Pectoral, blind side .....	9.6	9.7	9.7	10.4	11.6
Height, dorsal .....	11.7	11.7	11.5	12.8	11.8
Height, anal .....	11.7	11.7	12.2	12.8	11.8
Length, caudal .....	17	19.7	20	20	.....
Length, ventral eyed side .....	10.5	10.2	8.8	9.7	8.5
Length, ventral blind side .....	11.1	10	10	10.7	9

*Paratypes*.—No. 22529 Stanford University Museum.

CLEISTHENES Jordan and Starks.

*Cleisthenes* JORDAN and STARKS, Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 622.

*Protopsetta* SCHMIDT, Pisc. Mar. Orient., 1904, p. 230.

*Cleisthenes* includes *Protopsetta*, each having been compared only to *Hippoglossoides*.

*Protopsetta* was described as allied to *Hippoglossoides*, differing in the insertion of the upper eye, which is placed on the upper outline

of the head, as in *Atheresthes* and *Reinhardtius*. The dorsal begins over the posterior part of the eye, and the teeth are rather small and close together. The paratypes of *Cleisthenes pinetorum* show these same characters, differing from *Hippoglossoides* in the same manner.

*Cleisthenes* was described as closely allied to *Hippoglossoides*, differing in having cycloid scales everywhere in the young, and an increased number of gill-rakers. The adult has a single series of ctenoid scales along the anterior base of dorsal and anal, a few on the snout, on ridge behind the interorbital space, and on opercle. The dorsal begins on the orbital rim slightly on blind side. Eyes and color on right side. *Protopsetta herzensteini* differs from *Hippoglossoides* in the same manner. The two species are, in fact, very closely related.

CLEISTHENES PINETORUM Jordan and Starks.

*Cleisthenes pinetorum* JORDAN and STARKS, Bull. U. S. Fish Comm., 22, 1902 (1904), p. 622, with plate. Matsushima Bay.

A single specimen from *Albatross* station 5074, off Matsushima Bay, near the type-locality.

Dorsal, 76; anal, 57; pores, 76; gill-rakers, 8+24; length, 171 mm.; head, thirty-hundredths of total length to base of caudal; depth of body, 39; diameter of upper eye, 7; length of snout from upper orbit, 6; length of maxillary of eyed side, 10; of blind side, 10.5; pectoral of eyed side, 15; height of dorsal, 14; height of anal, 13; length of caudal, 23; length of ventral of eyed side, 9.

This species differs from *C. herzensteini* (Schmidt) chiefly in having the scales of the body and head more strongly ctenoid or spinous, and in having a larger number of gill-rakers. The variation of both species as regards the gill-rakers is wide, as the following tables show.

Paratypes of *C. pinetorum*.

Gill-rakers.....	20	21	22	23	24	25	26	27
Specimens.....	1	3	3	2	4	3	....	1

1 specimen of *C. pinetorum* from *Albatross* station 5047..... 24

*C. herzensteini* collected by the "Albatross."

Gill-rakers.....	16	17	18	19	20	21	22	23
Specimens.....	1	3	6	8	6	1	....	1

Type of *C. herzensteini*..... 16  
 2 specimens of *C. herzensteini* from Port Arthur..... 15, 18

Summary.

Gill-rakers.....	15	16	17	18	19	20	21	22	23	24	25	26	27
<i>C. pinetorum</i> .....	....	....	....	....	....	1	3	3	2	4	3	....	1
<i>C. herzensteini</i> .....	1	2	3	7	8	6	1	....	1	....	....	....	....



CLEISTHENES HERZENSTEINI (Schmidt).

*Hippoglossoides herzensteini* SCHMIDT, *Pisc. Mar. Orient.*, 1904, p. 229.

*Protopsetta herzensteini* JORDAN and STARKS, *Proc. U. S. Nat. Mus.*, vol. 31, 1906, p. 194.

*Albatross* stations 4834 and 4838, off west coast of Hondo, Sea of Japan.

*Albatross* stations 4842, 4843, and 4844, Oki group, Sea of Japan.

*Albatross* stations 4856, 4859, and 4870, off coast of Korea, Sea of Japan.

*Albatross* stations 4999, 5000, and 5002, Gulf of Tartary, west of Sakhalin Island.

*Albatross* station 5010, Aniwa Bay, Sakhalin Island.

*Albatross* stations 5041 and 5042, off south coast of Hokkaido (Yezo).

Dr. C. H. Gilbert noted the fin rays of five specimens from *Albatross* station 5042, which were not among those preserved.

Dorsal.....	67	71	70	71	70
Anal.....	54	51	56	52	56

Measurements in hundredths of length to base of caudal.

<i>Albatross</i> station .....	4999	5041	5041	4870	4844	4820	4843	4870
Dorsal rays.....	75	72	71	70	70	77	73	71
Anal rays.....	57	53	56	51	54	58	56	54
Pores.....	79	77	77	80	75	84	75	76
Gill-rakers.....	9+21	7+20	8+17	8+18	8+19	8+19	8+19	7+17
Length, mm.....	277	217	193	176	171	172	170	157
Length, head.....	29	28	30	28	30	28	28	30
Depth, body.....	41	38	44	39	39	40	38	41
Diameter, upper eye.....	6.5	6	6	6.5	7	7	7	7
Snout from upper eye.....	6.5	6	6	6	7	6	6.5	6
Maxillary, eyed side.....	9	9	10	10	10	9.5	9	9.5
Maxillary, blind side.....	10	10	10.5	10.5	11	10.5	10	11
Pectoral, eyed side.....	15	15	13	13	13	12.5	14	14
Height, dorsal.....	13	14	13	13	13	12	14	13.5
Height, anal.....	13.5	14	13	13	13	12.5	14	13.5
Length, caudal.....	20	20	21	22	22	21.5	22	22
Length, ventral.....	10	9	9	9	9	9	9	9

ATHERESTHES EVERMANNI Jordan and Starks.

*Atheresthes evermanni* JORDAN and STARKS, *Bull. U. S. Fish Comm.*, vol. 22, 1902 (1904), p. 630, pl. 5, fig. 1. Matsushima Bay.

*Albatross* station 5019, east coast of Sakhalin Island, Okhotsk Sea.

*Albatross* station 5031, Yezo Strait, near Hokkaido (Yezo).

*Albatross* station 5042, south coast of Hokkaido.

*Albatross* stations 5047 and 5048, off Matsushima Bay.

Hitherto known only from the type collected by the *Albatross* at Matsushima Bay in 1900.

Young specimens are somewhat spotted.

The specimens collected by the *Albatross* in 1906 differ from the type description in the following characters: Fewer fin rays (dorsal 98 to 111; anal 78 to 89, instead of dorsal 114; anal 94); fewer pores

in all specimens but 1 (89 to 109, instead of 109), this difference being due to the greater development of the pores in the larger specimens, in which small pores are occasionally placed between the larger ones. The teeth are in two rows in both jaws; the outer row of the lower jaw small, even, and close to the main row, so as easily to escape notice. The anterior half of the premaxillaries with a single row of sagittate canines; the posterior half with two rows of much smaller teeth.

Vertebrae  $12 + 41 = 53$  in *A. evermanni*;  $12 + 37 = 49$  in *A. stomias* of the Alaskan fauna.

*Measurements in hundredths of length to base of caudal.*

<i>Albatross station</i> .....	5031	5019	5042	5042	5042	5042	5042	5042	5042	5047	5047
Dorsal rays.....	107	101	111	108	104	107	104	111	98	101	105
Anal rays.....	83	80	89	86	83	86	80	89	83	78	84
Pores.....	104	109	94	89	98	99	86	92	92	93	90
Gill-rakers.....	2+10	3+10	2+10	3+10	3+10	2+10	2+10	2+10	3+10	3+10	3+10
Length, mm.....	380	320	176	158	158	158	139	133	133	113	117
Length, head.....	28	27	27.5	26	26	26.5	29	27	28	27	29
Depth, body.....	37	34	35	34	31	31	38	34	35	36	34
Diameter, upper eye.....	6	6	7	6	6	6.5	8	7	7.5	7.5	8
Snout from upper eye.....	6.5	6	6	6	6	6	7	6.5	6.5	6	7
Maxillary, eyed side.....	16	16	15	14	14	14	15	14.5	15	14	16
Maxillary, blind side.....	17	17	16	14.5	14.5	15	17	16	16.5	16	17
Pectoral, eyed side.....	13	13	12	11	11	11	12	12	12	12	15
Pectoral, blind side.....	9	9	8.5	.....	7.5	8	8.5	9	9	.....	9
Height, dorsal.....	11	12	13	12	.....	12	12	12	12	12	13
Height, anal.....	11	12	12.5	.....	.....	12	11	11	12	11	12
Length, caudal.....	15	15	17	16	.....	15	17	17	17	17	18
Length, ventral, eyed side.....	7	7	6.5	.....	6	6	6	7	7	7	8.5

Subfamily PLEURONECTINÆ.

Genus POECILOPSETTA Günther.

*Poecilopsetta* GÜNTHER, Shore Fishes, *Challenger*, p. 48.

POECILOPSETTA PLINTHUS (Jordan and Starks).

*Alaeops plinthus* JORDAN and STARKS, Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 623, pl. 5, fig. 2. Suruga Bay; Owari Bay.

*Albatross station* 4946, near Kagoshima, Kiusiu.

*Albatross stations* 5071 and 5074, Suruga Gulf.

The scales in this species are ctenoid with blunt, rounded spines, as in *Poecilopsetta hawaiiensis* Gilbert.

Lateral line absent on blind side in both species.

The scales in *P. hawaiiensis* are smaller; the pores in the lateral line 84 to 97. As this is the only important difference between the two species, their relationship would probably be better expressed by placing them in the same genus.

Measurements in hundredths of length to base of caudal.

Albatross station.....	5071	5071	5071	5074	5074	5074	4946
Dorsal rays.....	60	61	61	61	62	.....	59
Anal rays.....	52	49	51	45	52	52	49
Pores.....	60	61	62	66	67	.....	64
Gill-rakers.....	6+10	6+10	5+9	5+9	x+10	x+10	5+9
Length, mm.....	94	87	77	75	69	67	71
Length, head.....	22	24	24	23	24	24	23
Depth, body.....	44	46	43	42	41	42	38
Diameter, upper eye.....	7	7	7	7	7	8	7
Snout from upper eye.....	5.5	5	6	5	.....	.....	.....
Maxillary, eyed side.....	7	7	7	7	7	8	7
Pectoral, eyed side.....	12	12	12	11.5	12	13	12
Ventral, eyed side.....	9	9	10	10	11	11	10
Length, caudal.....	27	28	27	28	28	29	28
Height, dorsal.....	11	12	11	11	11	12	12
Height, anal.....	11	11	11	11	11	12	12

PLEURONICHTHYS CORNUTUS (Temminck and Schlegel).

*Platessa cornuta* TEMMINCK and SCHLEGEL, Fauna Japonica, Poiss., 1846, p. 179, pl. 90, fig. 1. Nagasaki.

*Pleuronichthys cornutus* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 201.

Albatross stations 4878 and 4885, Eastern Sea.

Albatross station 4946, near Kagoshima, south coast of Kiusiu.

One specimen from Tsuruga, collected by the *Albatross* on July 24, 1906.

In 30 specimens, including several in the collections of Stanford University, 15 have 5 gill-rakers on the lower limb of the arch, 13 have 6, and 1 has 7, another has 2+7 on the blind side, 2+9 on the eyed side; the rudimentary gill-rakers are counted.

One specimen, 112 mm. long, from Swatow, China, reported on by Rutter,<sup>1</sup> collected by Miss A. M. Fielde, and in the collections of Stanford University, shows several points of difference when compared with Japanese specimens. The gill-rakers are more numerous, longer, and slenderer, 3 on the upper limb on both sides, 8 on the lower limb of the blind side, 7 on the lower limb of the eyed side, the total number 10 or 11 instead of 7 or 8 as usual in Japanese specimens. The spines of the head are developed more strongly. The height of the spine at the posterior end of the interorbital, measured from the lower surface of the interorbital bone, is 2 in upper eye (3.5 or rarely 2.7 in Japanese specimens). The spine at the anterior end of the interorbital is of the same length as the posterior spine when measured from the upper ridge of the interorbital. Four dorsal rays are extended on the blind side of the head, reaching to opposite the upper margin of the premaxillary. In Japanese specimens only 3 rays are on the blind side of the head, and they do not extend to the upper margin of the premaxillary.

The specimen collected by A. M. Fielde at Swatow, China, may finally prove distinct from *P. cornutus*, but the material at hand does not justify its description at present as a new species.

<sup>1</sup> Proc. Acad. Nat. Sci., Phila., 1897, p. 88.

The anal spine is very slightly developed in the young, absent in the adult.

Three of the specimens collected by Jordan and Snyder at Aomori, Japan, show a remarkable variation of the anterior rays of the dorsal fin; they are not deflected onto the blind side as normally in *Pleuronichthys*, but are borne on a thick hook, which is extended nearly straight forward. This variation may have been produced during the translation of the eye. These specimens, and to a lesser degree other specimens from the same locality, show a more or less complete coloration of the blind side.

Measurements in hundredths of length to base of caudal. The first specimen is from Swatow, China.

<i>Albatross station</i> .....		4878	4885	4946	4946	4946	4946
Dorsal rays.....	76	70	71	74	76	70	70
Anal rays.....	55	51	51	51	51	50	50
Pectoral rays.....	9	10	9	9	8	8	9
Gill-rakers.....	3+8	3+5	3+5	3+5	3+6	3+5	x+5
Length, mm.....	112	138	97	93	92	91	82
Length, head.....	24	21	24	24	24	24	24
Depth, body.....	51	49	51	49	51	50	50
Diameter, upper eye.....	8	6.5	7	7	8	8	7.5
Snout from upper eye.....	4	4	4	4	4	4	4
Maxillary, eyed side.....	5.5	6	7	6	6	6	6
Pectoral, eyed side.....	14	13	12	11	13	13	13
Ventral, eyed side.....	10.5	9	10	10	10	10	10
Length, caudal.....	28	29	28	28	29	30	32
Height, dorsal.....	17	14	17	17	17	18	18
Height, anal.....	17	13	17	17	17	18	18

#### LEPIDOPSETTA BILINEATA (Ayres).

*Platessa bilineata* AYRES, Proc. Cal. Acad. Sci., 1855, p. 40. San Francisco, California.

*Lepidopsetta bilineata* GILL, Proc. Acad. Nat. Sci., Phila., p. 195.—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 203.

Two young specimens from Petropavlovsk, Kamchatka, collected by the *Albatross*, June 18, 1906:

Length.	Dorsal rays.	Anal rays.	Pores.	Gill-rakers.
<i>mm.</i> 104	79	59	90	3+8
88	82	61	90	4+7

#### LEPIDOPSETTA MOCHIGAREI Snyder.

*Lepidopsetta mochigarei* SNYDER, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 547; vol. 42, 1912, p. 440, pl. 58, fig. 2.

*Albatross station* 4808, Tsugaru Strait.

*Albatross station* 4993, Sea of Japan, northwest of Hokkaido (Yezo).

*Albatross stations* 4999, 5003, and 5004, Gulf of Tartary.

*Albatross stations* 5006, 5007, 5008, and 5010, Aniwa Bay, Sakhalin Island.

*Albatross* station 5031, Yezo Strait.

*Albatross* station 5067, Suruga Gulf, Hondo.

This species seems to represent *L. bilineata* in northern Japan, and differs from that species as follows:

1. Higher, sharper interorbital.
2. Usually larger eyes.
3. Upper profile of head straighter.
4. Smaller scales, pores 95 to 99 rather than 79 to 95.
5. Anterior nasal flap shorter, reaching only one-half the distance to posterior nostrils, nearly reaching posterior nostril in *L. bilineata*.
6. The mucous pores of the head are much more pronounced.
7. One or two instead of three or four series of scales on anterior border of orbits.
8. The scales are smoother, and of a different character, the roughest with 2 rows of spines, 2 in the apical row, and 5 or 6 in a row parallel with this; *L. bilineata* has a similar apical row, and about 10 to 15 in the other row;
9. Head more acute;
10. Fewer gill-rakers, 3 or 4 + 7 to 9 in *L. bilineata*.

Gill-rakers in *L. mochigarei*:

Specimens.	On eyed side.	On blind side.
5	2+5	2+5
2	2+6	2+6
3	2+5	2+6
3	2+6	2+5
1	2+6	1+7
1	2+6	1+8

A minute rudimentary gill-raker is sometimes present on the upper limb of the first arch, but is not included in the table.

The fin formula agrees with that of *L. bilineata*.

*Measurements in hundredths of length to base of caudal.*

<i>Albatross</i> station	4993	4999	4993	4808
Dorsal rays	75	77	74	72
Anal rays	59	60	59	57
Poros	96	95	98	97
Pectoral rays	10	10	10	10
Length to base caudal, mm	262	242	183	148
Length of accessory branch in the lateral line	6.5	4.5	4.5	5
Length, head	27	26	29	29
Depth, body	48	48	47	47
Diameter, upper eye	6	6	7	7
Snout from upper orbit	6	6	6	6
Maxillary, eyed side	6.5	7	8	8
Pectoral, eyed side	12	13	14	15
Pectoral, blind side	8	10	10	10
Ventral, eyed side	9	10	10	10
Height, dorsal	11	12	12	14
Height, anal	11	12	12	12

## Genus LIMANDA Gottsche

The fauna of northern Japan (including Sakhalin Island) is rich in species of this genus, 9 being known, 3 of these, from Sakhalin Island, being here described as new.

*Key to the species of Limanda found in Japan and Sakhalin Island.*

- a*<sup>1</sup>. Teeth conical, in an irregular series more or less extended on eyed side of jaws.  
*b*<sup>1</sup>. *Limanda*.—Snout not produced; no yellow streaks on blind side.  
*c*<sup>1</sup>. Interorbital moderate, horizontal, scaly.  
*d*<sup>1</sup>. Scales ctenoid, each with about 10 spines; lower jaw not projecting; ridges of head not prominent.  
*e*<sup>1</sup>. Depth, 0.44 to 0.55; teeth in an even row; upper jaw of eyed side arched.....*aspera*.  
*e*<sup>2</sup>. Depth, 0.39 to 0.46; teeth more separated and uneven; upper jaw of eyed side nearly straight.....*sakhalinensis*.  
*d*<sup>2</sup>. Scales ctenoid, each with a single spine; lower jaw projecting; ridges of head prominent.....*asprella*.  
*c*<sup>2</sup>. Interorbital narrow, sharp and naked; depth, 0.415 to 0.47.....*korigarei*.  
*b*<sup>2</sup>. *Myzopsetta* Gill.—Snout produced; yellow streaks along bases of vertical fins on blind side.  
*g*<sup>1</sup>. Scales about 70, cycloid on blind side.....*iridorum*.  
*g*<sup>2</sup>. Scales about 90, ctenoid on blind side.....*proboscidea*.  
*a*<sup>2</sup>. *Limandella*.—Teeth broad, truncate, close-set, confined chiefly to the blind side of each jaw; mouth very unsymmetrical.  
*h*<sup>1</sup>. Dorsal rays, 61 to 63; eye, 5.7 to 6.9 in head.....*schrenki*.  
*h*<sup>2</sup>. Dorsal rays, 65 to 75; eye, 4 to 5.5 in head.  
*i*<sup>1</sup>. Snout slender; interorbital narrow, naked in front.....*angustirostris*.  
*i*<sup>2</sup>. Snout blunt; interorbital wide, entirely scaled.....*yokohamae*.

## LIMANDA ASPERA (Pallas).

*Pleuronectes asper* PALLAS, Zoogr. Rosso-Asiat., vol. 3, 1811, p. 425.

*Limanda aspera* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 204.

Numerous specimens from Petropavlovsk, Kamchatka, collected on June 18–19, 1906, by the Fisheries steamer *Albatross*.

Description of a male, 132 mm. long, from Petropavlovsk, Kamchatka.

Length of head, 0.245 of total length without caudal; depth, 0.45; dorsal, 77; anal, 57; pores in the lateral line, 83.

Head thick and rounded; elevation above the eye slight; ventral outline nearly straight, the posterior end of mandible not prominent; greatest width of head, 0.09; eyes small, nearly round, equal, and on nearly the same vertical, the upper inserted high, its longitudinal diameter, 0.05; eyes separated by a moderate, flat interorbital, its entire width, 0.02; head without spines or tubercles, the ridge posterior to eyes little developed, its surface slightly rough; nostrils of the blind side nearly on ridge of snout, those of eyed side in the same horizontal line in front of interorbital; edges of all nostrils entire; both nostrils tubular, the posterior tube small with puckered

edges; snout obtuse, gently curved, its length from upper orbit, 0.04; dorsal outline of snout at right angles to upper margin of premaxillary; maxillary of eyed side reaching vertical of anterior margin of pupil; upper jaw strongly arched upward and outward anterior to the lower eye; posterior edge of maxillary broad, its greatest width, 0.025; length of maxillary of eyed side, 0.065, of blind side, 0.07; teeth blunt, in a somewhat irregular row, often truncate, some even indented; gill-rakers short and stout, 7+10, the longest, 0.013.

Body oval, rather robust, its width 0.20 of its depth; depth of caudal peduncle, 0.11; tip of mandible to anus, 0.29 (varying to 0.33); the anus partly on blind side.

Scales spinous on eyed side, cycloid on blind side (scales rough on both sides in larger specimens). Lateral line with a moderate arch in front, 6 rows of scales between its highest part and the horizontal portion, height of curve 11 in straight part, its length 3.5 in straight part (varying to 3 in larger specimens); one branch of lateral line extends sharply upward from the nape, for most of its length parallel to the bony ridge; the suborbital branch extends as a semi-circular arch to tip of maxillary, clearing the lower margin of orbit by 0.012, with 18 (to 20) pores; interorbital with 1 or 2 uneven rows of cycloid scales (often with 3 rows of ctenoid scales in larger specimens); tips of snout, lips of both sides, and the exposed portion of the opercular bones and the ridge anterior to nape on the blind side naked. Fins on eyed side with a few small scales on rays. Dorsal beginning on median line over anterior border of pupil, rising to the fortieth ray, its greatest height 0.13, distance from tip of snout to base of highest dorsal ray, 0.58; fleshy tips of rays free; anal similar, its highest ray about middle of fin; anal spine present; caudal slightly rounded, 0.20; pectorals broad and rounded, each of 11 rays, length, eyed side, 0.16, blind side, 0.11; ventral of blind side slightly anterior, length of each, 0.10, extended to second anal ray; each ventral of 6 rays.

Color brown, with irregular spots of constant position, 1 spot on lateral line at about the middle of its straight part, 5 to 8 above the lateral line below the dorsal base a distance about equal to the diameter of the eye; similar spots near anal fin, and others in various positions; about 8 vertically elongate spots on dorsal, about 7 on anal, in addition to which all the fins of the eyed side are finely spotted. The spots are less evident in larger specimens. "The lower side of the vertical fins is always yellow."<sup>1</sup>

An adult female, 289 mm. long without caudal, from Aniwa Bay, Sakhalin Island, is identical with specimens from Alaska. Dorsal, 70; anal, 54; pores, 80; gill-rakers, 6-8; length of head, 0.25;

<sup>1</sup> Note taken by Dr. C. H. Gilbert from these specimens.

greatest width of head, 0.087; diameter of upper eye, 0.04; inter-orbital width about 0.02, wide and flat, with a median row of spinous scales, anterior border of orbits and snout above nostrils with non-imbricate, spinous scales; length of snout from upper orbit, 0.04; length of maxillary, eyed side, 0.07, blind side, 0.077; scales rough on both sides; suborbital branch of lateral line with 18 pores; length of pectoral, eyed side, 0.165, blind side, 0.125; length of ventrals, 0.105; length of caudal, 0.204; height of dorsal, 0.145, of anal, 0.14. Color dark brown, with large blackish markings.

Table of measurements in hundredths of length to caudal base.

Dorsal rays.....	77	69	70	68	72	68	69	67	70	70
Anal rays.....	57	53	55	53	58	54	53	53	54	55
Pores.....	83	83	80	84	85	85	84	87	90	83
Gill-rakers.....	7+10	5+8	5+8	5+8	6+8	6+9	5+9	5+9	6+9	6+8
Length, mm.....	132	114	111	113	109	112	108	107	103	95
Length, head.....	24.5	25	25	25	25	25	25	26	25	25.5
Depth, body.....	45	48	49	47	48	44	46	48	47	47
Diameter, upper eye.....	5	6	5	5	5	5.5	5.5	6	6	6
Snout from upper eye.....	4	5	4	4	4	4	4	4.5	4	4.5
Maxillary, eyed side.....	6.5	7	7	7	7	7	6.5	7	7	7
Pectoral, eyed side.....	16	15	14	15	17	14	15	16	13	15
Ventral, eyed side.....	10	10	11	11	11	10	10	10	10	11
Length, caudal.....	20	21	22	22	23	20	23	23	22	22
Height, dorsal.....	13	14	15	14	13	15	15	15	13	15
Height, anal.....	13	14	13	13	13	13	14	15	13	15

LIMANDA SAKHALINENSIS, new species.

Plate 26, fig. 6.

This species is closely related to *L. aspera*, but differs in the following points:

1. Plain coloration.
2. Sharper, more compressed head.
3. The suborbital branch of lateral line on head with fewer pores, opening in much more pronounced tubes, the number 11 to 13 (18 to 20 in *L. aspera*).
4. Form more slender, depth 0.39 to 0.46 of total length without caudal (44 to 55 in *L. aspera*).
5. Teeth more conical, more separated, and more uneven in size.
6. Upper jaw of eyed side much less arched.

*Type-specimen*.—Cat. No. 75674, U.S.N.M., a male 155 mm. long, from *Albatross* station 5013, in Aniwa Bay, Sakhalin Island; depth, 43 fathoms.

Length of head, 0.25 of total length without caudal; depth, 0.425; dorsal, 74; anal, 58; pores in lateral line, 91.

Head sharp, slender, and compressed (more so than in *L. aspera*), the dorsal and ventral outlines similar; greatest width of head, 0.07; eyes similar to those of *L. aspera*, diameter of upper, 0.055; inter-orbital narrow and with a more pronounced ridge than in *L. aspera*, its total width 0.015; head without spines or pronounced ridges, the ridge posterior to eyes nearly obsolete, even less evident than in *L. aspera*; nostrils in short tubes, edges of posterior nostril of



blind side wavy; snout slightly curved, its upper margin indented at posterior end of premaxillary spine, its length from upper orbit 0.05, its outline not quite perpendicular to upper margin of premaxillary; maxillary not reaching vertical of anterior margin of pupil by about two-thirds diameter of pupil; jaws of each side nearly straight, the mouth being nearly symmetrical; maxillaries not so wide posteriorly as in *L. aspera*, their greatest width 0.02; length of maxillary of eyed side 0.075, of blind side 0.08; teeth conical on both sides of jaws, a few along sides of both jaws somewhat enlarged, making the series more irregular than in *L. aspera*; gill-rakers longer than in *L. aspera*, more constant in size, the anterior 4 or 5 on the lower limb not being greatly reduced, the number 5 + 10; length of longest gill-raker 0.016.

Body oval, rather angular at both extremes, its greatest width 0.18 of its depth; depth of caudal peduncle, 0.11; tip of mandible to anus, 0.33; anus partly on blind side.

Scales on eyed side provided with a single row of sharp but rather weak spines, 0 to 10 in number. Lateral line with an arch, about 7 rows of scales between its highest point and the horizontal part; height of arch 12 in straight part, length 3.8; the suborbital branch of lateral line less semicircular than in *L. aspera*, with 13 pores, clearing the margin of the lower orbit below pupil by 0.01; pores in lateral line, both on head and body, in much more pronounced tubes than in *L. aspera*; interorbital with 3 rows of spinous scales, widening posteriorly to 4 rows; snout, except for anterior margin of orbits, lips on both sides, and on the blind side the exposed portion of the opercular bones and the ridge anterior to nape, naked; fins of eyed side with a few small scales on rays.

Fins as in *L. aspera*, except that the ventral is shorter, extending only to anal spine. Height of dorsal, 0.145; of anal, 0.13; length of caudal, 0.21; of pectoral, eyed side, 0.14; blind side, 0.10; ventrals almost perfectly symmetrical, each 0.09.

Color uniform brown, without spots on fins or body.

*Paratype*.—No. 22530, Stanford University Museum. A male 128 mm. long, from *Albatross* station 5025, in 52 fathoms off the east coast of Sakhalin Island.

Length of head, 0.24 of total length without caudal; depth, 0.39; dorsal, 69; anal, 54; pores in the lateral line, 83; greatest width of head, 0.07; diameter of upper eye, 0.06; entire width of interorbital, 0.015; posterior nostril of the blind side with indented edges; length of snout from upper orbit, 0.04; maxillary of eyed side, 0.07, its greatest width, 0.02; gill-rakers 5+9, length of longest, 0.016; greatest width of body 0.20 of its depth; tip of mandible to anus, 0.30; length of arch in lateral line 3.5 in straight part, its height 14 in straight part; interorbital with a single series of ctenoid scales,

widening to 2 rows posteriorly; 11 pores in suborbital branch of lateral line; height of dorsal, 0.13; of anal, 0.13; length of caudal, 0.21; of pectoral on eyed side, 0.15; of pectoral on blind side, 0.11; of ventral on eyed side, 0.095, both ventrals similar and symmetrical; color uniform brown, unspotted on body and fins.

Another specimen, a male, 171 mm. long to base of caudal, was taken at *Albatross* station 5008, Aniwa Bay, Sakhalin Island, 40 fathoms.

Depth, 0.46; dorsal, 71; anal, 55; pores, 84; greatest width of head, 0.07; diameter of upper eye, 0.05; entire interorbital width, 0.015; maxillary of eyed side, 0.07; gill-rakers, 7 + 9; greatest width of body, 0.15 of its depth; tip of mandible to anus, 0.325; length of arch in lateral line 3.5 in straight part; its height 11.2 in straight part; interorbital at its narrowest point with 2 rows of ctenoid scales; 11 pores in suborbital branch of lateral line; height of dorsal, 0.125; of anal, 0.135; length of caudal, 0.21; of pectoral, eyed side, 0.12; blind side, 0.10; of ventrals, 0.095. Scales of blind side weakly ctenoid.

LIMANDA ASPRELLA, new species.

Plate 27, fig. 7.

*Type-specimen*.—Cat. No. 75668, U.S.N.M. A male 185 mm. long, from the fish market of Korsakov, Aniwa Bay, Sakhalin Island, collected by the *Albatross* on September 25, 1913.

This species differs from *Limanda aspera* and *L. sakhalinensis* in the much smoother scales, only a few scattered ones with a single median spine, while in the related species spines are present on most of the scales and may be as numerous as 10. It also differs in the more pronounced ridges of the head and in the projecting lower jaw. It resembles *L. aspera* and differs from *L. sakhalinensis* in the arched upper jaw of the eyed side; in having 18 pores in the suborbital branch of the lateral line; in the less compressed head; and in the deeper body.

Length of head, 0.27 of total length without caudal; depth, 0.53; dorsal, 69; anal, 55; pores in the lateral line, 82.

Head comparatively long, rather wide, its greatest width 0.09; dorsal outline gently raised above eye; ventral outline nearly straight, the posterior end of mandible not prominent; eyes equal in size and on the same vertical; diameter of upper eye, 0.05; eyes separated by a wide, raised interorbital; its entire width, 0.02; ridge not sharp, but extended forward to form a high and prominent ridge on the anterior margin of the lower eye; ridge behind upper eye sharp and prominent; nuchal tubercle strong; ridge of preopercle strong and angular; nostrils of eyed side as in *L. aspera*; the edges of the posterior nostril of the blind side sharply indented; region of snout subquadrate in outline, its length from upper orbit, 0.05; upper jaw of eyed side strongly curved anteriorly, the lower jaw projecting; the teeth of the lower jaw visible, without the snout, when the mouth is

closed; maxillary of eyed side extending to below anterior margin of pupil; its greatest width, 0.02; its length, 0.075; length of maxillary of blind side, 0.085; teeth bluntly conic, in a rather uneven series on both sides of jaws, those on the eyed side of upper jaw strong but short; gill-rakers, 6+9, those on the upper limb and the anterior 4 of the lower limb considerably reduced in size, as in *L. aspera*.

Body ovate, rather angular at anterior end, more compressed than usual, greatest width 0.16 of greatest depth; depth of caudal peduncle, 0.115; tip of mandible to anus, 0.25; anus partly on blind side.

Only a few scattered scales ctenoid, those with only a single median spine, the ctenoid scales mostly on eyed side; a few scales in a rough area in front of ventrals, on each side, with 2 spines; scales on upper pectoral ray with 1 spine; interorbital and anterior margins of orbits with a single row of cycloid scales; head with naked areas as in preceding species; arch of lateral line long and regularly semioval in form, its length 3 in straight part, its height 10.

Fins as in related forms, except that the highest dorsal rays are nearer the middle of the body; pectoral long; anal spine present; ventrals symmetrical, their tips reaching origin of anal. Height of dorsal, 0.15; of anal, 0.15; length of caudal, 0.20; of pectoral, eyed side, 0.18, blind side, 0.12; of ventrals, 0.105, both ventrals alike.

Color uniform dark brown on body and fins.

Only the type known.

**LIMANDA KORIGAREI, new species.**

Plate 27, fig. 8.

This species is related to others of the *L. aspera* group, but differs from them in the high, naked interorbital and anterior margins of orbits, the ridge oblique, the anterior end the higher; and in the longer, more elliptical arch in the lateral line. The suborbital branch of the lateral line has 14 or 15 pores, 11 to 13 in *L. sakhalinensis*, 18 to 20 in *L. aspera*.

*Type-specimen*.—Cat. No. 75669, U.S.N.M. A male 234 mm. long to base of caudal, from *Albatross* station 5008, Aniwa Bay, Sakhalin Island, depth 40 fathoms.

Length of head, 0.25 of total length without caudal; depth, 0.47; dorsal 73; anal, 59; pores in the lateral line, 90.

Head sharp and compressed, as in *L. sakhalinensis*; orbits somewhat elliptical, the upper slightly posterior; diameter of upper eye, 0.055; eyes separated by a high, narrow, naked interorbital, the entire width of which is 0.010; the ridge sharp, extending from a prominent anterior margin of lower orbit to posterior margin of upper orbit; edges of posterior nostril little expanded; snout indented above, its length from upper orbit 0.05; jaws straight, the

mouth nearly symmetrical, the maxillary of eyed side not reaching to below pupil, its greatest width 0.02, its length 0.07; length of maxillary of blind side, 0.075; teeth bluntly conic on sides of jaws, in a subequal series; gill-rakers, 7 + 10.

Body nearly oval, the ventral surface slightly more curved than the dorsal, strongly compressed, the width only 0.16 of depth; tip of mandible to anus, 0.315; anus nearly on midline.

Scales of both sides ctenoid, not very rough, as in *L. sakhalinensis*, but with finer and more numerous spines than in *L. aspera*; interorbital, anterior margin of orbits, snout, and jaws naked, excepting a few scales near tip of maxillary; suborbital branch of lateral line with 15 pores. Arch in lateral line long and low, regularly semi-elliptical in form, its length 3.2 in straight part, its height 12.

Fins short; ventrals symmetrical, reaching anal spine; height of dorsal, 0.125; of anal, 0.12; length of pectoral, eyed side, 0.136; blind side, 0.116; ventrals, 0.085.

Color uniform brown on body and fins.

Kori-garei is the Japanese name for *L. schrenki*.

*Paratype*.—No. 22532, Stanford University Museum, from Albatross station 5007, depth 42 fathoms.

Other specimens from station 5012, 42–43 fathoms; 5011, 42 fathoms; all in Aniwa Bay, Sakhalin Island.

<i>Albatross station</i> .....	5007	5011	5012
Dorsal rays .....	77	72	73
Anal rays .....	63	55	55
Pores .....	85	84	86
Gill-rakers .....	6+10	6+10	6+10
Length to base of caudal, mm .....	180	172	193
Length, head .....	23	23.7	23
Depth, body .....	42	44.7	41.5
Diameter, upper eye .....	6	6	5
Snout from upper orbit .....	7	7	4.5
Maxillary, eyed side .....	12	13	6.5
Pectoral, eyed side .....	8.5	9	8
Ventral, eyed side .....	12	11.7	11.7
Height, dorsal .....	12	11.7	11.7
Height, anal .....	12	11.7	11.7

LIMANDA IRIDORUM Jordan and Starks.

*Limanda iridorum* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 206, fig. 14. Mororan.

Two large specimens from Korsakov, Aniwa Bay, Sakhalin Island, collected by the *Albatross*, September 25, 1906.

Three small specimens, collected at Mororan, Japan, July 6, 1906, by the *Albatross*.

Length.	Dorsal rays.	Anal rays.	Pores.	Gill-rakers.
<i>mm.</i>				
287	59	46	73	5+11
277	61	45	73	5+11
96	65	47	77	5+12
93	58	42	69	5+11

The specimens from Korsakov have a broad band of yellow below dorsal base and above anal base, on the blind side.

LIMANDA ANGUSTIROSTRIS Kitahara.

*Limanda angustirostris* KITAHARA, in Jordan and Starks, Proc. U. S. Nat. Mus., 1906, p. 208, fig. 15. Aomori.

*Albatross* stations 4815, 4816, 4817, near Sado Island, Sea of Japan.

*Albatross* station 4832, off Tsuruga, Sea of Japan.

*Albatross* station 4842, Dogo Island, Oki Group, Sea of Japan.

These specimens differ from the types from Aomori, Hokkaido, in the smoother scales and in the more pronounced spots. The type description gives the color as "uniform slaty brown, without definite markings. The unpaired fins lighter; no color on the blind side." Traces of definite spots can be found on the paratypes, corresponding to those on the specimens from the Sea of Japan. The color may be described as follows:

Dorsal and anal fins with about 8 bars covering about one-third the length of a ray; below base of dorsal a series of 4 to 7 large dark-brown spots, edged with gray on their lower margins; 4 large dark spots on lateral line, 1 at its origin, 1 at posterior end of arch, 1 at base of caudal peduncle, and 1 between the last 2; these are sometimes bordered with gray, the anterior 2 on their posterior borders, the posterior 2 on their anterior borders; 1 or 2 small spots may be present above the ventrals, and 4 or 5, bordered above with gray, above the anal base; caudal with a spot on each side of the lateral line.

Measurements in hundredths of length to base of caudal.

<i>Albatross</i> station.....	4816	4842	4815	4815	4816	4816	4832	Aomori.		
								71	71	71
Dorsal rays.....	72	67	67	68	70	73	69	57	51	54
Anal rays.....	57	51	55	54	55	57	53	78	74	76
Pores.....	74	74	74	76	77	75	73	2+6	2+6	13+8
Gill-rakers.....	2+6	3+6	3+6	3+6	13+8	3+6	13+8	235	163	153
Length, mm.....	202	162	147	144	133	127	115	26	27	27
Length, head.....	24	28	27	25	26	26	26	44	43	39
Depth, body.....	42	43	38	38	40	38	41	3.7	3.6	3.7
Arch of lateral line in straight part.....	3.4	3.3	3.7	3.4	3.4	3.5	3.6	5	6	6
Diameter, upper eye.....	6	7	7	6	6.5	6	7	4	4.5	4
Snout from upper eye.....	4	4	5	4	4.5	4	4	6.5	6	6
Maxillary, upper side.....	6	.....	6	6	6	6	6	14	16	16
Pectoral, eyed side.....	14	16	15	11	13	14	15	9	10	9
Ventral, eyed side.....	9	10	9	8	9	9	9	20	22	22
Length, caudal.....	20	22	22	21	22	23	23	13	14	14
Height, dorsal.....	13	14	14	13	14	15	15	12.5	14	13.5
Height, anal.....	12.5	14	13.5	13	14	14	14	12	15	15

<sup>1</sup> Last 2 rudimentary.

The last 3 specimens of the table, from Aomori, are paratypes.

LIMANDA YOKOHAMAE (Günther).

*Pleuronectes yokohamae* GÜNTHER, Shore Fishes, *Challenger*, 1880, p. 69. Inland Sea; Yokohama.

*Limanda yokohamae* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 209.

One specimen from Saigo, Dogo Island, Oki Group, in the Sea of Japan, collected by the *Albatross*.

Dorsal, 65; anal, 53; pores, 80. Another specimen from Ebisu, Dogo Island.

This species is possibly the same as *L. schrenki* Schmidt (misspelled *L. schrencki* by Jordan and Starks). *L. herzensteini* Jordan and Snyder, is a very doubtful synonym.

#### Genus LIOPSETTA Gill.

*Liopsetta* GILL, Proc. Acad. Nat. Sci. Phila., 1864, p. 217 (*glaber*=*putnami*).

*Euchalarodus* GILL, Proc. Acad. Nat. Sci. Phila., 1864, p. 222 (*putnami*).

This genus differs from *Limanda* in the broad appressed pharyngeals, with blunt teeth, and in lacking the semicircular arch in the lateral line, although a high curve may be present. *Liopsetta* is also very close to *Pleuronectes*, but that genus has a single row of teeth on each side of the lower pharyngeals. The males of all known species have much rougher scales than the females. Difference in the character of the lower pharyngeals and of the arch in the lateral line seems to separate two natural groups, which are here described as subgenera.

#### GAREUS, new subgenus.

This subgenus includes only *Liopsetta obscura* (Herzenstein) and is characterized by the high curve in the lateral line, its height about five in straight part, and by the broad lower pharyngeals, closely appressed for half of their length, each side with two rows of large blunt teeth.

*Type of the subgenus.*—*Pleuronectes obscurus* Herzenstein.<sup>1</sup>

"Garei" is the Japanese word for flounder.

#### LIOPSETTA Gill.

This group includes *Liopsetta glacialis*, *L. putnami*, and *L. pinnifasciata*. It may be characterized by the straight lateral line, and by the massive lower pharyngeals, closely appressed for more than half their length, and nearly triangular in form, the blunt teeth of which are arranged on each side to form an inner, an outer, and an upper row, with one or more series between these.

#### LIOPSETTA OBSCURA (Herzenstein).

*Pleuronectes obscurus* HERZENSTEIN, Mélanges Biologiques, 1890, p. 127. Chelulpo; Vladivostok.

*Liopsetta obscura* JORDAN and GILBERT, Rep. Fur Seal Invest., vol. 3, 1898, p. 492.—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 217.

This species is superficially very similar to *Limanda yokohamae*, the low arch of that species closely approaching the high curve of *Liopsetta obscura*. The long, slender pharyngeals in the former species (as usual in *Limanda*) not being appressed, and with two rows of conic teeth, easily separate it from *Liopsetta obscura*.

<sup>1</sup> Mélanges Biologiques, 1890, p. 127.

Two specimens from the market at Korsakov, Aniwa Bay, Saghalin Island.

Dorsal, 60; anal, 44; pores, 79; gill-rakers, 4-7, 4-7; length, 200 mm.

Dorsal, 60; anal, 43; pores, 77; gill-rakers, 3-8, 4-7; length, 222 mm.

**LIOPSETTA GLACIALIS** Pallas.

*Liopsetta glacialis* PALLAS, Itin., vol. 3, App., p. 706.

Nine specimens from Petropavlovsk, Kamchatka, collected by the Albatross, June 18-19, 1906.

**LIOPSETTA PINNIFASCIATA** (Kner).

*Pleuronectes pinnifasciatus* KNER, in Steindachner, Über einige Pleuronectiden, etc., aus Decastris Bay, 1870, p. 422, pl. 1, fig. 1.

*Liopsetta pinnifasciata* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 217.

Two females, with cycloid, embedded scales, from the market at Korsakov, Aniwa Bay, Sakhalin Island.

Length.	Dorsal rays.	Anal rays.	Pores.	Gill-rakers.
mm.				
285	59	42	73	4+8
275	57	41	76	4+10

*L. pinnifasciata* is typical of the subgenus *Liopsetta*; it represents *L. glacialis* in the northern Japanese fauna, and is closely allied to it, differing in the deeper body, more pronounced bars on the fins, and the longer snout.

**DEXISTES RIKUZENIUS** Jordan and Starks.

*Dexistes rikuzenius* Jordan and Starks, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 212; Bull. U. S. Fish Comm., vol. 22, 1902 (1904), p. 624, pl. 6, fig. 1.

Albatross station 4842, Dogo Island, Oki group, Sea of Japan.

Albatross station 5046, off Matsushima Bay.

Albatross station 5094, entrance to Gulf of Tokyo.

*Araias arionmus* has the eye-ball scaly. It is identical with *Dexistes rikuzenius* as stated by Jordan and Thompson.

Dr. C. H. Gilbert (MS.) made the following color notes on a specimen from station 4843:

Lower side of head except snout, all of abdomen on blind side, and a tapering area extending back on caudal peduncle silvery. Anteriorly this area includes more than half the distance between the lateral line and the dorsal outline, beginning to taper rapidly at origin of second half of its length.

## Measurements in hundredths of length to base of caudal.

<i>Albatross station</i> .....			5094	5046	4842	4842	4842	4842
Dorsal rays.....	72	73	74	74	71	69	69	68
Anal rays.....	55	60	57	60	59	56	55	57
Pores.....	64	63	63	63	61	62	59	62
Gill-rakers.....	4+7	3+7	4+7	3+7	4+7	3+8	4+7	3+7
Length, mm.....	93	92	145	75	134	106	93	92
Length, head.....	25	27	23	27	24	26	26	27
Depth, body.....	39	40	41	36	34	37	38	36
Diameter, upper eye.....	8	9	8	9	7	9	8.5	9
Snout from upper eye.....	6	5.5	5	6	4.5	4.5	5	5
Maxillary, eyed side.....	7	8	7	8	7.5	8	8	8
Pectoral, eyed side.....		15	14	13	12	12	13	13
Ventral, eyed side.....	9	10	9	9	8	10	10	10
Length, caudal.....	23	24	22	22	19	22	24	24
Height, dorsal.....	13	14	11	12	11	12	13	12
Height, anal.....		14	11	12	11	12	13	12

The first specimen in the table is the paratype of *D. rikuzenius*, the second is the paratype of *A. arionmus*.

## PLATICHTHYS STELLATUS (Pallas).

*Pleuronectes stellatus* PALLAS, Zoogr. Rosso-Asiat., vol. 3, 1811, p. 416.

*Platichthys stellatus* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 218.

One specimen 177 mm. long, from the market at Korsakov, Aniwa Bay, Saghalin Island.

Dorsal, 53; anal, 47; gill-rakers, 4+8. The stellate prickles are rougher than in specimens from San Juan Island, Wash., but no rougher than in Alaskan specimens.

## KAREIUS BICOLORATUS (Brasilewsky).

*Platessa bicolorata* BRASILEWSKY, Nouv. Mém. Soc. Moscow, vol. 10, 1855, p. 260.

*Kareius bicoloratus* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 220.

Two specimens collected at Hakodate on July 8, 1906, by the Fisheries steamer *Albatross*.

Length.	Head.	Depth.	Eye.	Maxillary.	Snout.	Dorsal rays.	Anal rays.
<i>Mm.</i>							
296	3.38	2.17	6.9	3.7		66	48
170	3.4	2.28	5.75	3.9	4.9	72	52

## CLIDODERMA ASPERRIMUM (Temminck and Schlegel).

*Platessa asperimma* TEMMINCK and SCHLEGEL, Faune Jap., Poiss., 1846, p. 177.

*Clidoderma asperinum* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 221.

One specimen from *Albatross* station 4859, off east coast of Korea, Sea of Japan. Two specimens from *Albatross* station 5019, off the east coast of Sakhalin Island.



Length.	Dorsal rays.	Anal rays.	Head.	Depth.
<i>mm.</i>				
350	84	66	3.1	1.7
440	87	68	3.1	1.9
233	82	63	3.4	2.1

Three specimens from Mororan, Japan, collected by Jordan and Snyder, have the gill-rakers on the eyed side in each case 4+10; 2 specimens on the blind side have 4+10, the third 4+12. The 2 larger specimens collected by the *Albatross* have a few rudimentary gill-rakers on the anterior end of the lower arch, increasing the number on the eyed side to 4+12 or 13, on the blind side to 4 or 5+13 or 14; 1 specimen has other rudimentary gill-rakers between the developed ones on the lower arch. If these are counted, the number becomes about 4+18.

The 6 longitudinal rows of bony tubercles are less evident in the larger specimens than in the smaller, or in Jordan and Snyder's specimens from Mororan, 1 of which is figured by Jordan and Starks.

This species has a long dorsal branch to the lateral line, the pores on the eyed side opening on large papillae, those on the blind side present, but usually filled with mucus, rather difficult to see.

#### MICROSTOMUS STELLERI Schmidt.

*Microstomus stelleri* SCHMIDT, Pisc. Mar. Orient., 1904, p. 247.—JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 225.

*Albatross* stations 4807 and 4808, Tsugaru Strait, between Hondo and Hokkaido (Yezo).

*Albatross* station 5031, Yezo Strait, northeast of Hokkaido (Yezo).

*Albatross* station 5041, off south coast of Hokkaido.

Lower pharyngeals slender, as in *M. kitaharae* and in *Limanda*, with two rows of conical teeth.

The young are beautifully colored, as shown by two young specimens from *Albatross* station 4808, and one collected at Hakodate by Jordan and Snyder. A large dark spot on the lateral line just behind the pectoral and another between this and the base of caudal are ocellated with light (probably yellow in life), each of these spots surrounded by a pale area; about five large pale markings along base of dorsal, four along base of anal; dark mottlings below dorsal in broad zigzag lines bordering the pale areas; base of caudal pale, caudal darkly mottled; dorsal, anal, and pectoral of eyed side finely mottled, other fins pale; body mottled elsewhere. Only traces of these spots are found in adult specimens.

## Measurements in hundredths of length to caudal base.

Albatross station.....	5031	5041	5041	5041	5041
Dorsal rays.....	86	92	87	91	91
Anal rays.....	70	74	72	72	73
Pores.....	124	116	124	117	124
Gill-rakers.....	7+8	7+9	6+10	7+9	7+9
Length, mm.....	238	243	208	205	202
Length, head.....	23	21	20.5	22	21
Depth, body.....	39	41	39	39	40.5
Diameter, upper eye.....	6	6	6	6	6.5
Snout from upper eye.....	5	5	4.5	5	5
Maxillary, eyed side.....	7	5.5	5.5	5	5
Pectoral, eyed side.....	16	15	13	13	16
Ventral, eyed side.....	7	7	7	6.5	7
Length, caudal.....	20	20	20	20	20
Height, dorsal.....	11	10	10	9.5	10
Height, anal.....	10.5	10	9.5	9.5	10

## MICROSTOMUS KITAHARAE Jordan and Starks.

*Microstomus kitaharae* JORDAN and STARKS, Bull. U. S. Fish Comm., vol. 32, 1902 (1904), p. 625, pl. 7, fig. 2. Matsushima Bay.

Albatross stations 4816 and 4817, near Sado Island, Sea of Japan.

Albatross station 4832, off Tsuruga, Sea of Japan.

Albatross station 4842, near Dogo Island, Oki Group, Sea of Japan.

Albatross station 4856, off east coast of Korea, Sea of Japan.

Albatross station 4989, west coast of Hokkaido, Sea of Japan.

Albatross stations 5047 and 5048, off Matsushima Bay.

Albatross stations 5092 and 5094, entrance to Gulf of Tokyo.

*M. kitaharae* is readily separable from *M. stelleri*, differing as follows, the measurements expressed in hundredths of length:

	<i>M. kitaharae.</i>	<i>M. stelleri.</i>
Depth of body.....	0.27 to 0.33.....	0.39 to 0.41.
Fin rays.....	D., 84 to 99; A., 75 to 82.....	D., 86 to 91; A., 70 to 74.
Length of pectoral.....	0.10 to 0.14, more rounded.....	0.13 to 0.16, more pointed.
Caudal.....	Doubly truncate.....	Rounded.
Dorsal outline of head.....	Straight or convex.....	Concave.
Skin, especially on fin rays.....	Thin.....	Tough, leathery.
Fin rays.....	Weak.....	Strong.
Lateral line.....	Straight.....	With a low curve.
Scales.....	Imbricate.....	Poorly imbricate.
Pores.....	92 to 96; no accessory scales about pores.....	116 to 124; accessory scales about pores.
Eye-ball.....	Scaly.....	Naked.

Lower pharyngeals as in *Limanda*.

The change from the slender young with large eyes to the more robust adult with smaller eyes is especially well marked in this species.

The young have 3 or 4 irregular dark spots along the lateral line, 5 below base of dorsal and 4 or 5 above base of anal; about 9 spots on dorsal rays, about 7 on anal rays, with numerous smaller ones. These spots are not ocellated as in the young of *M. stelleri*. The spots disappear in the adult. In all specimens the caudal and the pectoral of eyed side are black toward their tips.

“In life, a series of small evenly spaced pearly-blue spots just within bases of dorsal and anal, 7 or 8 along dorsal, 5 or 6 along anal.” (Dr. C. H. Gilbert’s color notes.)

*Measurements in hundredths of total length to caudal base.*

<i>Albatross station</i> .....	5048	5048	5047	5047	5092	5092	5047	5092	4816	5094
Dorsal rays .....	94	95	95	97	99	84	95	93	89	89
Anal rays .....	79	81	80	82	82	75	78	77	76	76
Pores .....	98	97	97	98	97	98	94	95	92	95
Gill-rakers .....	6+7	5+8	5+8	5+8	5+8	5+8	5+9	5+8	6+7	5+8
Length, mm .....	223	217	190	177	174	172	170	154	154	148
Depth, body .....	32	32	31	29	31	33	30.5	30	31	27
Length, head .....	20.5	20.5	19	19	20	21	21	22	19	21
Diameter, upper eye .....	5.5	6	5.5	6	7	6.5	8	8	7	8
Snout from upper eye .....	4	4	3.5	3.5	4	4	4	4.5	4	5
Maxillary, eyed side .....	5.5	5	5.5	5.5	5.5	5.5	5.5	6	5	6
Pectoral, eyed side .....		9.5	10	9.5	14	13.5	12.5	12	12	10
Ventral, eyed side .....	5.5	6	6	6	7	7.5	7	6.5	6.5	6
Length, caudal .....	19		18.5	17	20	22	20	18	20	17
Height, dorsal .....	11	1	10	10.5	10.5	11	11	11	11	10
Height, anal .....	9.5	9	10	9.5	10.5	11	11	11	11	10

GLYPTOCEPHALUS OSTROUMOWI Pavlenko.

*Glyptocephalus ostroumowi* PAVLENKO, Kazanĭ, Trd. Obšč. jest., vol. 42, 1910, pl. 2, pp. 59-61, fig. 13 a, b.

Numerous specimens of this species were obtained at the following *Albatross* stations:

- 4807, Tsugaru Strait, between Hondo and Hokkaido (Yezo).
- 4812, near Sado Island, Sea of Japan.
- 4826 and 4828, near C. Rokko, west coast of Hondo, Sea of Japan.
- 4834 and 4839, near Tsuruga, west coast of Hondo, Sea of Japan.
- 4843 and 4844, near Dogo Island, Sea of Japan.
- 4855, 4856, 4858, 4859, and 4868, off east coast of Korea.
- 4984, 4985, 4986, 4988, and 4989, off coast of Hokkaido.
- 4992, 4993, and 4994, off northwest coast of Hokkaido.
- 4999, 5000, Gulf of Tartary.
- 5010, Aniwa Bay, Sakhalin Island.
- 5042, off south coast of Hokkaido.

Professor Snyder has examined the description of *G. ostroumowi*, and finds it identical with his *G. sasae*.<sup>1</sup>

Color uniform deep brown, darker toward tips of vertical fins and ventral of eyed side; tip of pectoral of eyed side dark; pectoral and ventral of blind side usually colorless; the body, the vertical fins, and sometimes the paired fins of the eyed side thickly punctulate. The adult does not retain the markings of the very young, which consist first of about 6 dark bars extended vertically across the body and fins, these later becoming separated into a row on dorsal and anal, a row at the base of each fin, and a row along the lateral line, finally entirely disappearing.

<sup>1</sup> Proc. U. S. Nat. Mus., vol. 40, 1911, p. 548; vol. 42, 1912, p. 440, pl. 49, fig. 1.

## Measurements in hundredths of length to base of caudal.

<i>Albatross station</i> .....	4999	5042	4988	4856	4808	4988	4843	4855	4868	4843
Dorsal rays.....	92	91	91	89	85	89	90	84	86	85
Anal rays.....	80	79	78	74	70	75	73	74	73	73
Pores in lateral line.....	108	105	105	109	100	104	107	109	100	102
Gill-rakers.....	4+8	4+7	4+9	4+8	4+9	4+8	4+8	5+9	4+10	4+9
Length without caudal, mm.....	270	208	202	191	186	178	167	157	150	145
Length, head.....	21	21	24	23	25	23	23	20	22	23
Depth, body.....	33	36	32	34	37	31	32	34	34	33
Diameter, upper eye.....	5.5	6	6.5	7	6.5	7	7.5	8	6.5	7.5
Snout, from upper orbit.....	5	4.5	5	5	5	6	5	6	4.5	5
Maxillary, eyed side.....	4	4	5	5	5	5	5	5.5	5	5
Pectoral, eyed side.....	15	12	13	14	14	13	13	13	13	16
Ventral, eyed side.....	9	8.5	8	8	9	8	8	8.5	9	9
Caudal.....	22	20	22	21	24	21	23	23	.....	23
Height, dorsal.....	12	11	13	14	13	11	13	13	12	15
Height, anal.....	12	11	12	13	12	11	12	12	12	14

## Family SOLEIDAE.

## Subfamily SOLEINAE.

## ASERAGGODES KOBENSIS (Steindachner).

*Solea (Achirus) kobensis* STEINDACHNER, Reise *Aurora*, 1896, p. 218.

*Aseraggodes kobensis* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 230.

*Albatross stations* 4946 and 4947, near Kagoshima, Kiushu.

*Albatross stations* 4961, 4963, and 4964, in Kii Channel.

*Albatross station* 5074, Suruga Gulf.

## Measurements in hundredths of length from tip of rostral hook to base of caudal.

<i>Albatross station</i> .....	4946	4946	4963	5074	5074	5074
Dorsal rays.....	72	67	69	70	70	70
Anal rays.....	49	48	48	49	53	52
Pores from opposite gill-opening.....	61	63	60	61	56	56
Length to base of caudal, mm.....	89	71	59	73	72.5	71
Length, head.....	22	22	23	20	22	21
Depth, body.....	47	45	36	43	45	46
Diameter, upper eye.....	4	4	4	4	4	4
Snout, from upper orbit.....	7	8	8	8	8	8
Maxillary, eyed side.....	8	8	8	8	8	8
Height, dorsal.....	11	10	11	10	10	11
Length, caudal.....	20	20	23	19	21	22

## Subfamily SYNAPTURINAE.

## ZEBRIAS ZEBRINUS (Temminck and Schlegel).

*Solea zebrina* TEMMINCK and SCHLEGEL, Fauna Jap., Poiss., 1846, p. 186, pl. 95, fig. 1.

*Brachirus zebra* BLEEKER, Atlas Pleur., 1870, pl. 9, fig. 3 (not *Pleuronectes zebra* Bloch, the following species).

*Zebrius zebrius* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 232, fig. 26.

Two specimens from Nanao and Shimizu, Japan, collected by the *Albatross*. Head, 5.7 and 5.3; depth, 2.5; dorsal, 66 and 69; anal, 59 and 61; caudal, 16; scales equal to pores, from opposite gill-opening, 98 and 95.

## ZEBRIAS ZEBRA (Bloch).

*Pleuronectes zebra* BLOCH, *Ausl. Fische*, vol. 3, 1790, p. 27, pl. 187.

*Synaptura zebra* DAY, *Fishes of India*.

*Synaptura quagga* RUTTER, *Proc. Acad. Nat. Sci., Phila.*, 1897, p. 90 (not *Aesopia quagga* Kaup).

This East Indian species is close to *Z. japonicus*, but differs from that species at least in not having the bars on the dorsal and anal fins between the extensions of the body bars on these fins.

A specimen from Swatow, China, recorded as *Synaptura quagga* by Rutter, collected by A. M. Fielde (No. 1553, Ichthyological Collections of Stanford University), has head 5.2 in length without caudal; eye 5 in head; dorsal, 70; anal, 58; caudal, 18; caudal not closely united to dorsal and anal; interorbital scaly; no ocular tentacles.

No specimens were obtained by the *Albatross*.

## ZEBRIAS QUAGGA (Kaup).

*Aesopia quagga* KAUP, *Wieg. Archiv für Naturg.*, 1858, p. 98.

*Synaptura quagga* GÜNTHER, *Cat. Fishes*, vol. 4, 1862, p. 485.

A specimen from Hongkong, China, collected by Capt. William Finch (No. 9799 Ichth. Coll., Stanford University), is referable to the species called *Synaptura quagga* by Günther. Kaup's description applies more closely, especially in fin rays, to this species than to the preceding species, from which it is readily separable by the naked interorbital and by the ocular tentacle on each eye. Jordan and Seale, reporting on this specimen,<sup>1</sup> wrongly refer it to *Z. zebra*, placing *Z. quagga* in the synonymy of that species. Jordan and Starks<sup>2</sup> also refer *Z. quagga* to the synonymy of *Z. zebra* Bloch.

No specimens were obtained by the *Albatross*.

## AESOPIA CORNUTA (Kaup.)

*Aesopia cornuta* KAUP, *Wieg. Archiv für Naturg.*, 1858, p. 95.

C. Rutter, reporting on the fishes of Swatow, China, collected by Miss A. M. Fielde, recorded a specimen of *Aesopia* and one of *Zebrias zebra* under the name *Synaptura quagga* (Kaup). The specimen of *Aesopia* is 95 mm. in total length; dorsal, 79; anal, 60; caudal, 13; pores about 90 from opposite gill-opening; head about 5.3; depth, about 3; eye less than 6 in head. This specimen differs from Japanese specimens of *A. cornuta* of larger size, in the smaller eye and in the form of the dorsal filament, which is bifid at tip, the posterior branch short, the anterior branch long and slender, longer than the rest of the ray, the ray with filament about as long as head.

No specimens in the *Albatross* collections.

<sup>1</sup> *Proc. Acad. Sci. Davenport, Iowa*, vol. 10, p. 17, pl. 12.

<sup>2</sup> *Proc. U. S. Nat. Mus.*, vol. 31, 1906, p. 232.

## Subfamily CYNOGLOSSINAE.

## CYNOGLOSSUS INUSITA (Jordan, Tanaka, and Snyder.)

*C. robustus* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 239 (not of Günther).

*C. inusita* JORDAN, TANAKA, and SNYDER, Journ. Coll. Sci., Imp. Univ. Tokyo, vol. 33, Art. 1, 1913, p. 335.

One specimen from station 4961, near Kobe; Dorsal, 127; anal, 97; caudal, 8, scales from opposite gill-opening, 74; head, 5; depth, 3.8.

This species has fewer dorsal rays (122 to 127) and fewer scales (69 to 74) than in Günther's description of *C. robustus*.<sup>1</sup>

## RHINOPLAGUSIA JAPONICA (Temminck and Schlegel).

*Plagusia japonica* TEMMINCK and SCHLEGEL, Fauna Jap., Poiss., p. 187, pl. 95, fig. 2.

*Usinosita japonica* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 237.

*Rhinoplagusia japonica* JORDAN, TANAKA, and SNYDER, Journ. Coll. Sci., Imp. Univ. Tokyo, vol. 33, art. 1, 1913, p. 335.

Two specimens were collected by the *Albatross* at Nanao, Japan. Head, 4.3; depth, 3.6; eye, 15 and 13.8; interorbital, 14.5 and 13.8; snout, 2.3 and 2.25; dorsal, 103 and 111; anal, 89 and 88; caudal, 7 and 6; scales from opposite gill-opening, 100 and 96.

## ARELISCUS INTERRUPTUS (Günther).-

*Cynoglossus interruptus* GÜNTHER, Shore Fishes, *Challenger*, 1880, p. 70, pl. 30, fig. B.

One specimen from *Albatross* station 4948, near Kagoshima.

Dorsal, 107; anal, 81; caudal, 14; ventral, 4; 58 pores in the lateral line.

An *Areliscus*, only 12 mm. long, from the surface, station 4897, Eastern Sea, has both eyes sinistral, and has 3 lateral lines.

## SYMPHURUS HONDOENSIS, new species.

Plate 27, fig. 9.

This species differs from the following, *S. orientalis*, in the greater number of fin rays (dorsal, 112; anal, 96; caudal, 12, instead of dorsal, 93 to 100; anal, 81 to 86; caudal, 12 to 14; in the finer scales (105 rather than 85 to 90 between the upper angle of the branchial aperture and base of caudal); in the larger eye (6.5 rather than 7 to 8 in head); in the more vertical and less rounded snout; in the greater curvature of the mouth; in the more oblong or less lanceolate form; and in the color, especially in lacking the bands.

<sup>1</sup> Ann. Mag. Nat. Hist., 1873, p. 243. Shanghai. D. 130; scales 83.

*Type-specimen*.—Cat. No. 75675, U.S.N.M., a male 120 mm. long, from *Albatross* station 5066, in Suruga Gulf, Japan, collected on October 15, 1906, at a depth of from 211 to 293 fathoms.

Length of head, from tip of rostral hook to upper angle of branchial aperture, 0.17 of total length to base of caudal; depth of body, 0.27; dorsal, 112; anal, 96; caudal, 12; ventral, 4; 105 series of scales between upper angle of branchial aperture and caudal base, 47 in a transverse series between first anal rays and the dorsal fin.

Head rather evenly rounded, the snout being nearly vertical from the tip of rostral hook to origin of dorsal; eyes small, the upper slightly in advance of the lower, its diameter 0.03; interorbital nearly obsolete, with a few scales, a few scales also on eyeball; length of snout from upper orbit to tip of rostral hook, 0.05; anterior nostril of eyed side in a slender tube, its length about half the diameter of eye, placed midway on a line joining the posterior nostril and tip of rostral hook, posterior nostril of eyed side between anterior margins of orbits, opening through a broad, rather low tube; nostrils of the blind side similar to those of eyed side, the anterior with a shorter tube, the posterior with an anterior flap; mouth strongly curved, small, the maxillaries reaching to below anterior edge of lower pupil; length, 0.04; teeth very slender and sharp, in a band of about four rows confined to the blind side of jaws.

Body elongate-elliptical, moderately compressed, its width about 5 in its depth; tip of mandible to anus, 0.22; anus on blind side; depth of caudal at base, 0.04.

Scales ctenoid on both sides. Lateral line absent, the median line slightly grooved.

Origin of dorsal on snout in advance of upper eye about three-fourths of its diameter, the first rays well separated, becoming more crowded posteriorly, so that there are only 11 rays anterior to the vertical of the upper angle of branchial aperture, while there are 24 rays in the same length of base at the end of the fin; height of dorsal nearly uniform, 0.07; anal similar, the first 2 rays thickened and joined; length of caudal, 0.09, rather pointed; ventral fin single, on the preanal ridge, deflected toward the blind side under the united gill membranes.

Color of both sides uniform brown, the snout and caudal fin pale, the dorsal and anal fins dusky, the ventral fin pale; peritoneum black, showing distinctly through body. Color of *S. orientalis*, as described by Bleeker:

Color of the body on the eyed side dusky-green, median opercular region with a diffuse band, trunk diffusely and darkly clouded and transversely subfasciate; fins dusky, ventral somewhat yellowish; iris greenish-yellow; color of blind side whitish; fins dusky on distal half.

## SYMPHURUS ORIENTALIS (Bleeker).

*Aphoristia orientalis* BLEEKER, Enum. Poiss. Connus du Japon, 1879, p. 31, pl. 2, fig. 1. Japan.

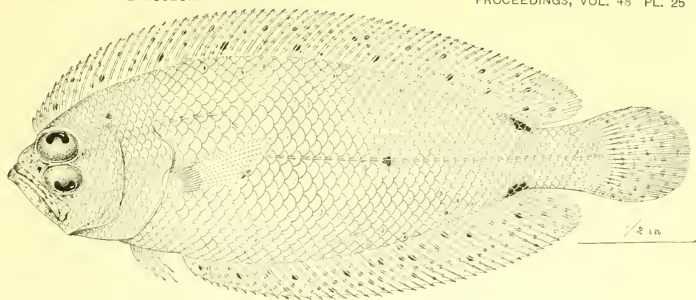
*Symphurus orientalis* JORDAN and STARKS, Proc. U. S. Nat. Mus., vol. 31, 1906, p. 243.

One specimen, 57 mm. long, from *Albatross* station 5072, in Suruga Gulf, depth 148 to 284 fathoms.

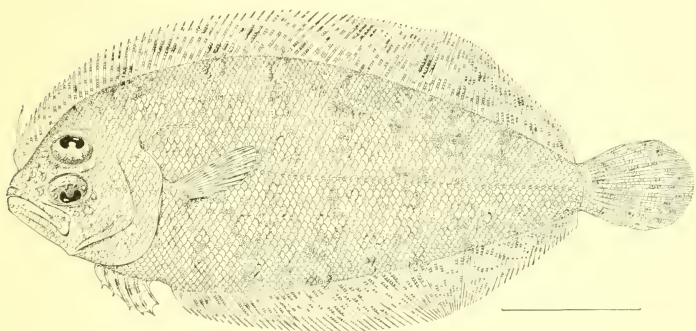
Dorsal, 93; anal, 81; caudal, 14; ventral, 4; 85 scales between upper angle of branchial aperture and caudal base, 34 in a series between first anal ray and dorsal fin; diameter of upper eye 7 in head.

This appears to be the second time this species has been recorded.

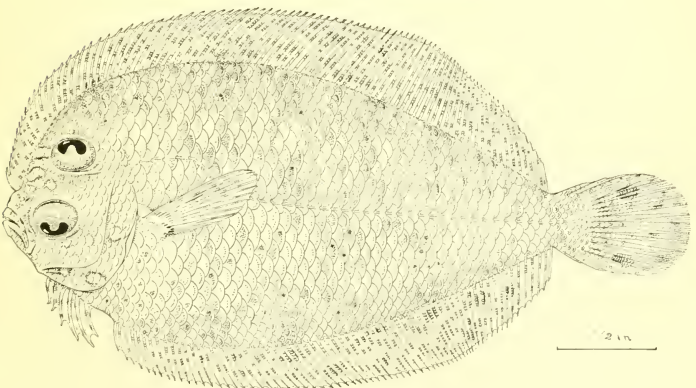




1. CITHAROIDES MACROLEPIDOTUS. (PAGE 453.)

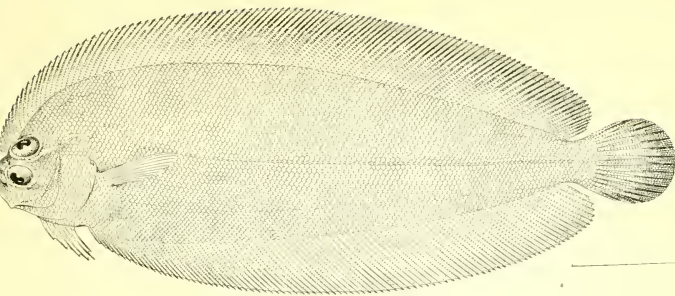


2. ARNOGLOSSUS JAPONICUS. (PAGE 454.)

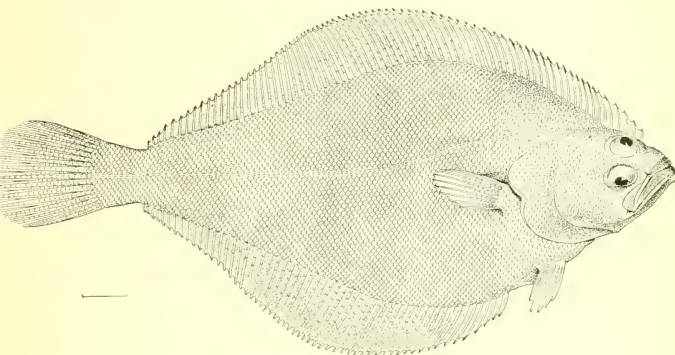


3. ENGYPROSON XYSTRIAS. (PAGE 457.)

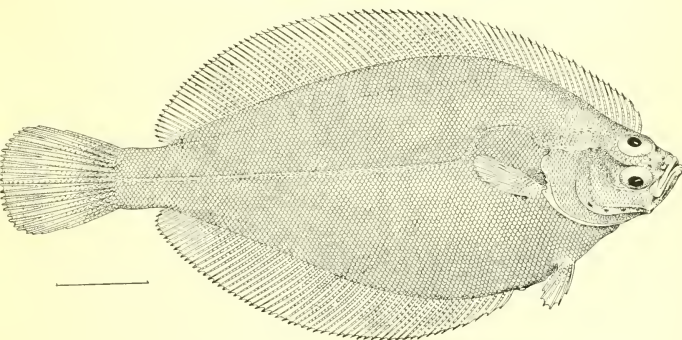




4. LAEOPTICHTHYS FRAGILIS. (PAGE 460.)

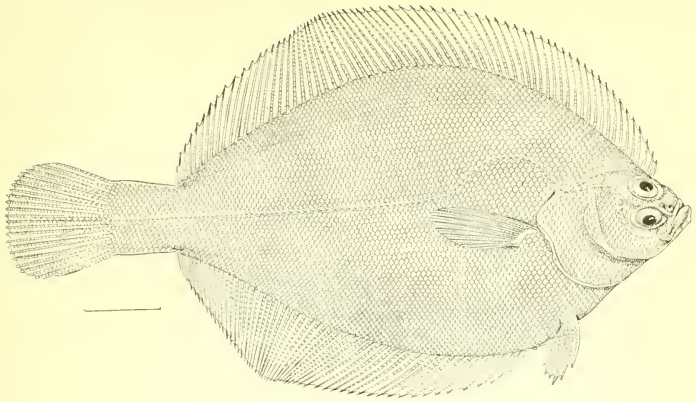


5. HIPPOGLOSSOIDES PROPINQUUS. (PAGE 469.)

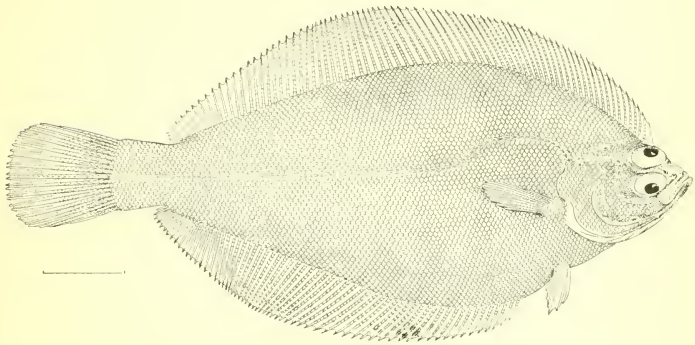


6. LIMANDA SAKHALINENSIS. (PAGE 480.)

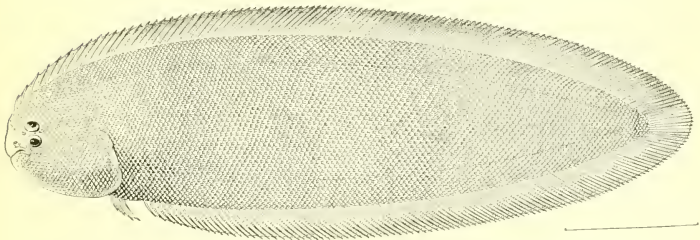




7. LIMANDA ASPRELLA. (PAGE 482.)



8. LIMANDA KORIGAREI. (PAGE 483.)



9. SYMPHURUS HONDOENSIS. (PAGE 494.)

