

FISHES COLLECTED BY THE UNITED STATES BUREAU OF
FISHERIES STEAMER "ALBATROSS" DURING 1888,
BETWEEN MONTEVIDEO, URUGUAY, AND TOME, CHILE,
ON THE VOYAGE THROUGH THE STRAITS OF
MAGELLAN.

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The United States Bureau of Fisheries steamer *Albatross* during 1887-88 passed by way of the Straits of Magellan from the Atlantic to the Pacific, collecting at various points en route. The present paper deals with those fishes collected between Montevideo, Uruguay, and Tome, Chile, the latter situated near the last dredging station included, at 38° 08' 00" south latitude. Although the collection has remained untouched for such a long period of time, there is a great deal of interesting material included, with some new species, and pains have been taken to give as full notes as possible on the many poorly known forms. A thorough revision of the species of the genus *Notothenia* is given, with the hope that it will prove more satisfactory than its predecessors.

The writer is under the greatest obligations to Dr. C. H. Gilbert for much aid given by him during the preparation of the paper. The Macrourids had been previously examined by Doctor Gilbert and the new species are accredited jointly to him and to the author.

The drawings are by Mr. W. S. Atkinson.

The following data are taken from the list of the dredging and trawling stations of the fisheries steamer *Albatross*, published by the United States Bureau of Fisheries. For further information concerning the character of the bottom and either surface or bottom temperature, that list¹ may be consulted.

¹ U. S. Fish Commission Report for 1900, pp. 387 to 562.

Dredging and trawling stations of the "Albatross," between Montevideo, Uruguay, and Tomé, Chile.

Serial No.	Date, 1888.	Position.		Depth in fathoms.
		Latitude south.	Longitude west.	
2764.....	Jan. 12	36 42 00	56 23 00	11.5
2765.....	do.....	36 43 00	56 23 00	10.5
2766.....	do.....	36 47 00	56 23 00	10.5
2767.....	Jan. 13	40 03 00	58 56 00	52
2768.....	Jan. 14	42 24 00	61 38 30	43
2769.....	Jan. 15	45 22 00	64 20 00	51.5
2770.....	Jan. 16	48 37 00	65 46 00	58
2771.....	Jan. 17	51 34 00	68 00 00	50.5
2772.....	do.....	52 16 00	68 13 00	31.5
2773.....	do.....	52 23 00	68 11 00	10

Straits of Magellan.

2774.....	Jan. 18	52 23 00	68 31 30	17
2775.....	do.....	52 22 30	69 22 00	29.5
2776.....	do.....	52 41 00	69 55 30	21
2777.....	Jan. 19	52 38 00	70 10 30	19.75
2778.....	Jan. 23	53 01 00	70 42 15	61
2779.....	do.....	53 06 00	70 40 30	77.5

Off Chile, South America.

2780.....	Feb. 2	53 01 00	73 42 30	369
2781.....	Feb. 4	51 52 00	73 41 00	348
2782.....	Feb. 6	51 12 00	74 13 30	258
2783.....	do.....	51 02 30	74 08 30	122
2784.....	Feb. 8	48 41 00	74 24 00	194
2785.....	do.....	48 09 00	74 36 00	449
2786.....	Feb. 9	46 46 00	75 16 30	57
2787.....	do.....	46 47 30	75 15 00	61
2788.....	Feb. 11	45 35 00	75 55 00	1,050
2789.....	Feb. 12	42 36 00	72 28 00	1,342
2790.....	Feb. 13	39 21 00	75 53 00	1,287
2791.....	Feb. 14	38 08 00	75 53 00	677

In working over the literature dealing with these species great difficulty was met in locating the various places in which collecting had been done. For this reason it has been thought well to include the following list of localities, giving the longitude and latitude as taken from Government charts. In a few of the cases these are approximate, but are close enough to serve the desired purposes:

Locality.	Latitude south.		Longitude west.		Locality.	Latitude south.		Longitude west.	
	°	'	°	'		°	'	°	'
Tomé.....	36	35	72	53	Laredo Bay.....	53	00	70	52
Talcahuano.....	36	45	73	5	Gregory Bay.....	52	40	70	20
Lota.....	37	5	73	7	Second Narrows.....	52	42	70	28
Chiloe Island.....	42	30	73	55	First Narrows (and Point Delgada).....	52	30	69	35
Chonos Archipelago.....	45	00	74	00	Cape Espíritu Santo.....	52	40	68	38
Taitao Peninsula.....	46	25	74	30	Cape Virgins.....	52	23	68	28
Port O'Way.....	46	50	75	18	Sarmiento Bank.....	52	30	68	10
Messier Channel.....	47	45	74	45	Port Gallegos.....	51	37	69	2
Island Harbor (in Messier Channel).....	47	45	74	45	Cape Redondo.....	50	52	69	10
Wellington Island.....	49	00	74	45	Magdalen Sound.....	54	10	71	00
Port Grappler.....	49	25	74	15	Admiralty Sound.....	54	00	70	00
Puerto Bueno.....	50	55	74	8	Brecknock Peninsula.....	54	30	71	40
Hanover Island.....	51	00	74	45	Clarence Island.....	54	7	71	40
Mayne Harbor.....	51	20(?)	74	15(?)	Brecknock Pass.....	54	42	71	57
Smyth Channel.....	52	35	73	38	Hope Harbor.....	54	8	71	5
Oter Bay (in Smyth Channel).....	52	35	73	38	Lapataia Bay.....	54	52	68	20
Port Charruca.....	53	6	73	52	Beagle Channel.....	54	55	68	00
Borja Bay.....	53	40(?)	72	3(?)	Ushuaia.....	54	52	68	00
Port Famine.....	53	40	71	00	Haberton Harbor.....	54	52	67	20
Sandy Point (Punta Arenas).....	53	10	70	55	Orange Bay.....	55	30	68	10

For convenience and also because in the case of the present collection it is the most natural method, the collection has been divided into three parts, namely: (1) Those from the east coast; (2) those from the west coast, including the Straits of Magellan and extending as far north as 46° 45' south latitude; and (3) those to the northward of this. There are but few species found on both the western and eastern coasts, although certain species of the Straits of Magellan are found to extend to both coasts. These straits are really parts of the waterways which break up the western coast line and, in the present case at least, no sharp line can be drawn separating their faunas. As a matter of convenience the west coast forms have been treated in two divisions, simply because there are none of the species treated to be found in both of them, and the principal collections to the northward were made at a considerable distance beyond the dividing line adopted.

The following species are described as new:

<i>Idiacanthus retrodorsalis.</i>	<i>Notothenia latifrons.</i>
<i>Agonopsis asperoculis.</i>	<i>Notothenia jordani.</i>
<i>Notothenia longicauda.</i>	<i>Symphurus bergi.</i>
<i>Notothenia gilberti.</i>	<i>Laemonema multiradiata.</i>

Under the joint authorship of Gilbert and Thompson the following are described:

<i>Coryphaenoides ariommuus.</i>	<i>Coelorrhynchus patagoniae.</i>
<i>Nezumia pudens.</i>	<i>Coelorrhynchus chilensis.</i>

I. THE EAST COAST.

List of species collected:

RAJIDAE.

1. *Psammobatis rudis* Günther. Stations 2768 and 2770.

ENGRAULIDAE.

2. *Lycengraulis grossidens* (Cuvier) Agassiz. Montevideo and Buenos Aires.

CLUPEIDAE.

3. *Clupea arcuata* Jenyns. Montevideo.
4. *Brevoortia tyrannus* (Latrobe). Montevideo.
5. *Ilisha flavipinnis* (Valenciennes). Buenos Aires.

CHARACIDAE.

6. *Astyanax rutilus* Jenyns. Montevideo.
7. *Accetrorhamphus hepsetus* (Cuvier). Buenos Aires.

ATHERINIDAE.

8. *Menidia bonariensis* Cuvier and Valenciennes. Buenos Aires.

SCIAENIDAE.

9. *Sciacna adusta* (Agassiz). Montevideo.

CARANGIDAE.

10. ? *Trachinotus goodei* Jordan and Evermann. Montevideo.
11. *Perona signata* (Jenyns). Montevideo.

SERRANIDAE.

12. *Dules auriga* Cuvier and Valenciennes. Stations 2764, 2765, 2766.

MULLIDAE.

13. ? *Mullus barbatus* Linnaeus. Stations 2765, 2766.

PSEUDOCROMIDAE.

14. *Pinguipes fasciatus* Jenyns. Station 2768.

TRIGLIDAE.

15. *Prionotus punctatus* (Bloch) Cuvier and Valenciennes. Stations 2765, 2766.

AGONIDAE.

16. *Agonopsis asperoculis*, new species. Station 2766.

PLEURONECTIDAE.

17. *Paralichthys brasiliensis* (Ranzani). Montevideo, Buenos Aires.
18. *Citharichthys microstomus* Gill. Stations 2764, 2765, 2766.
19. *Thysanopsctta naresii* Günther. Station 2771.
20. *Achirus jenynsi* (Günther). Buenos Aires.

SOLEIDAE.

21. *Symphurus bergi*, new species. Montevideo.

ZOARCIDAE.

22. *Platca insignis* Steindachner. Station 2764.

MERLUCCIIDAE.

23. *Merluccius gayi* Guichenot. Stations 2766, 2769, 2770, 2771.

PERCOPHIDAE.

24. *Percophis braziliensis* Quoy and Gaimard. Stations 2764, 2765, 2766.

1. PSAMMOBATIS RUDIS Günther.

Two young specimens from station 2770, in 58 fathoms. In the youngest the dorsal surface is much rougher than in the other, 20 cm. in length. In the larger specimen the series of spines on the dorsal side of the tail is beginning to show its triple character. The tip of the tail is somewhat prolonged into a slender whip.

A specimen 65 mm. long taken from an egg case with yolk sac barely evident shows the tip of the tail still more prolonged to a length equal to two-fifths of the remainder of the tail. The total length of the tail from the ventral fins to its tip is three-fifths of the total length of the specimen. The spines are barely evident, but the body is otherwise typical in its general shape. The egg capsule

is 37 mm. long and 23 mm. wide without its processes and is similar in appearance to that shown by Dollo¹ for *Raja arctowskii* (although but half as long). It is from station 2768, in 51½ fathoms off the Gulf of St. George.

2. LYCENGRAULIS GROSSIDENS (Cuvier).

Numerous specimens from Montevideo and two from Buenos Aires. Vertebrae 45. The teeth are not strikingly enlarged nor caninelike, but resemble those in Agassiz's plate of the type.

3. CLUPEA ARCUATA Jenyns.

Clupea arcuata JENYNS, Voyage *Beagle*, 1842, p. 134. Bahia Blanca.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 7, 1868, p. 442; and other authors.

Seven specimens from Montevideo (market?), the largest 110 mm. in total length. These are in most respects similar to the specimens described by Jenyns and by Günther, but do not correspond to the *Sardinella arcuata* of Evermann and Kendall,² which has, for instance, 14 dorsal rays.

There are teeth on the tongue and on the anterior part of the jaws, also along the maxillary edge behind the premaxillaries there are fine spinations or teeth; on the palatines there are traces of teeth, but none on the vomer. The following measurements and counts give the variation in five specimens:

D. 17 or 18; A. 21 to 23; scutes on ventral edge, 16 to 19 before ventrals, 10 or 11 behind; head 4 or 4½ in length to base of caudal; depth, 3 or 3½; eye, 3½ to 3½ in head; maxillary, 2 to 2½; least depth of caudal peduncle, 2 or 2½; distance dorsal to tip of snout, 1⅔ to 1⅔ in body length. A single specimen has but 15 anal rays, but no other differences are evident, so that it is regarded as the same. The ventrals are inserted under or slightly anterior to the dorsal and the spines of the scutes are strong.

It has been difficult to ascertain the genus to which this belongs, and pending a revision of the confused clupeid genera it is left in *Clupea*.

4. BREVOORTIA TYRANNUS (Latrobe).

Clupea tyrannus LATROBE, Trans. Amer. Philos. Soc., vol. 5, 1802, p. 77, pl. 1. Chesapeake Bay, U. S. A.

Clupanodon aureus AGASSIZ, (Spix) Pisces Brazil, 1828, p. 52. Brazil.

? *Alosa pectinata* JENYNS, Voy. *Beagle*, 1842, p. 135, pl. 25. Bahia Blanca.

Five specimens from Montevideo. These show a uniformly deeper caudal peduncle than do specimens of *Brevoortia tyrannus* from Woods Hole, the Gulf of Mexico, and Florida. The differences found, if corroborated by additional material, would justify division from

¹ Voyage *Belgica*, pl. 9, fig. 10.

² Proc. U. S. Nat. Mus., vol. 31, 1906, p. 74.

the species to the north, and in that case the species in Brazil would stand as *Brevoortia aureus* Agassiz.

Table of comparative measurements of *Brevoortia tyrannus*.

Locality.	Montevideo, Uruguay.			Cameron, Louisiana.				Woods Hole, Massachusetts.	Florida.
Length to end of middle caudal rays.....mm.	142	145	150	125	150	130	120	210	215
Depth ¹	0.37	0.36	0.36	0.36	0.38	0.34	0.34	0.30	0.36
Dorsal rays.....	3+16	3+16	3+16	3+15	3+16	3+18	3+17	3+18	3+16
Pectoral rays.....	0.15	0.16	0.165	0.16	0.165	0.18	0.18	0.18	0.19
Caudal peduncle depth.....	.11	.11	.11	.115	.11	.09	.09	.085	.10
Eye diameter.....	.06	.06	.06	.065	.06	.08	.08	.06	.055

¹ Measurements made in hundredths of body length.

No other differences of form or scaling were found that were as definite as those given above. The specimens from Louisiana seemed to have about 30 scales between the occiput and the dorsal insertion, as compared to 40 in those from other localities.

5. ILISHA FLAVIPINNIS (Valenciennes).

Pristigaster flavipinnis VALENCIENNES, D'Orbigny, Voy. Amer. Mèr. Poiss., pl. 10., fig. 2, 1839. Buenos Aires.

Two examples from Buenos Aires (market?) "collector Burmeister," and labeled "Hacha," apparently the local name.

6. ASTYANAX RUTILUS Jenyns.

One specimen, 120 mm. long, from Montevideo, a gravid female.

D. 11; A. 30; scales in lateral line 39; in transverse series $7\frac{1}{2}/6\frac{1}{2}$; gill rakers 9+10; head $4\frac{2}{5}$ in length without caudal; depth $2\frac{3}{5}$; eye 3; maxillary extending just beyond anterior margin of eye; a single tooth in maxillary; dorsal inserted behind ventrals, midway in body length; an indefinite vertically elongate humeral spot and a horizontal stripe of black on middle caudal rays; sides with a silvery band.

7. ACESTORRHAMPHUS HEPSETUS (Cuvier).

Two specimens, 210 and 225 mm. in total length from Buenos Aires, "collected by Burmeister." These correspond with Steindachner's description and figure.¹

D. 11; A. 29; scales 54 or 57, $1\frac{3}{10}$; head $3\frac{3}{5}$; depth $3\frac{1}{3}$ in length without caudal; eye 4; snout $3\frac{3}{4}$; interorbital space $3\frac{1}{3}$ in head.

8. MENIDIA BONARIENSIS Cuvier and Valenciennes.

Six specimens from Buenos Aires are referred to this species, as they correspond in all regards to the description given by Cuvier and Valenciennes, and to the excellent one by Steindachner.² In the

¹ Die Süßwasserfische des Südöstlichen Brasilien, 1876, p. 111.

² Ichthyologische Notizen, vol. 6, 1867, p. 31.

larger specimens, 265 mm. in total length, the area from between the ventral bases to the anus is a bright silvery color, as is the lateral stripe. Gill rakers 10+30; vertebrae 50; D. V., I., 10; A. I. 17; scales 60, in transverse between dorsal and anal insertions 15; no vomerine teeth, those on jaws in two rows.

9. SCIAENA (OPHIOSCION) ADUSTA (Agassiz).

Very numerous specimens of this species from Montevideo correspond closely to the description and figure given by Agassiz, but not to that by Jordan and Eigenmann, in their Review of the Sciaenidae.¹ The latter authors identified with this species specimens with the soft dorsal rays numbering 22 and 23, whereas Agassiz distinctly gives 28, and our specimens uniformly have D. XI, 28, without variation. This mistake is surprising when it is seen that Jenyns² and Günther³ both give this ray formula and the former presents an excellent description. Six of the largest specimens at hand give the following counts:

D. XI, 28; A. II, 7 or 8; scales in lateral line, 50-54, in transverse series between insertions of dorsal and anal 7/10; longest specimen 210 mm. in total length.

It is probable that the species of Jordan and Eigenmann is referable to *Sciaena gilli* (Steindachner).

10. ?TRACHINOTUS GOODEI Jordan and Evermann.

?*Trachinotus goodei* JORDAN and EVERMANN, Fish. North and Middle America, vol. 1, 1896, p. 943. Key West.

Five specimens from Montevideo (market?) between 16 and 19 cm. in total length. This is the first record of this species so far south, it having been previously regarded as confined to the West Indies.

Head $3\frac{1}{2}$ in body length to base of caudal; depth, $1\frac{7}{8}$; eye $3\frac{3}{4}$ in head; maxillary $2\frac{5}{8}$; about 100 pores in lateral line; depth caudal peduncle, 3 in head; D. VI, I, 19; A. II, I, 17; Gill rakers x+12.

Tip of premaxillaries at lower level of eye, snout rising in a curve having a point on posterior border of eye as center of arc, until above nostrils; remaining distance to dorsal weakly convex; maxillary reaching to a vertical line from center of eye; lobes of dorsal and anal reaching somewhat beyond middle of base of fins when laid back against them; caudal lobes equal, $2\frac{2}{3}$ in body length to base of caudal; scales minute, a patch behind eye, obscure in some specimens; lateral line but slightly arched anteriorly.

Color uniformly silvery, lobes of dorsal and anal black; those of caudal dark, as are the pectorals.

These specimens have been compared with the type of *Trachinotus goodei*, which is but 5 cm. long, and are found to differ principally in

¹ Report U. S. Commissioner of Fish and Fisheries for 1886 (1889), pp. 398 and 403.

² Voy. Beagle, p. 42.

³ Cat. Fish. Brit. Mus., vol. 11, p. 289.

characters due to age. There is also a specimen 11 cm. in total length in the Stanford University collection, which is intermediate in these respects. The fin lobes in the small specimens are shorter and the interorbital space much less convex and turgid. Counts and measurements correspond, as does the general appearance, but until specimens of equal size are compared the identification is considered provisional.

11. *PERONA SIGNATA* (Jenyns).

One specimen from Montevideo market.

12. *DULES AURIGA* Cuvier and Valenciennes.

Numerous specimens from stations 2764 and 2765, immediately to the south of the Rio de la Plata, in 10 or 11 fathoms.

13. ?*MULLUS BARBATUS* Linnaeus.

Mullus barbatus BERG, Enumeracion de Peces Marinos, p. 59.

Four specimens of a mullet from station 2766 and two from station 2765, just south of the Rio de la Plata, are referred to this species with a great deal of hesitation. The largest specimen is 82 mm. in total length, and the smallest 54 mm. Berg¹ records a specimen from the Mar de la Plata as *Mullus barbatus* Linnaeus, but this appears to be the sole preceding record. On the Atlantic coast of the United States Jordan and Gilbert have recorded *Mullus auratus*, which is not as sharply separated from the European form as is desirable. Our specimens are too small to compare with those from Europe at our disposal.

The largest shows the following characters:

Dorsal rays VII-I, 8; anal rays II, 6; pectoral 2, 14; head $3\frac{1}{4}$ in length to base of caudal; depth of body $3\frac{1}{2}$; eye $3\frac{1}{2}$ in head; maxillary extending to below anterior edge of orbit; depth of preorbital equal to eye diameter; barbels equal to head without snout, extending to center of operculum, not to its edge; teeth very minute in lower jaw, absent in upper, present on vomer in coarse, rough patch; first dorsal spine longest, equal to head without snout; longest soft dorsal ray equal to head behind center of pupil; longest anal ray equal to head behind posterior edge of pupil; color entirely faded; silvery, save for black blotch on distal edge of membrane of first spines and a horizontal pale bar below it; scales all lost, presumably 33 in lateral series, $2\frac{1}{2} + 7$ in transverse series below insertion of spinous dorsal.

The smallest specimen at hand is very nearly the same length as that figured by Fries, Ekström, and Sundeval as a young mullet² after Malm.³ The preorbital is, however, markedly different, being

¹ Enumeracion de Peces Marinos, p. 59.

² A History of Scandinavian Fishes, ed. 2, edited by Smitt, Stockholm, 1893.

³ Öfvers Vet.-Skad. Forh., 1852, p. 224, pl. 111, fig. 1.

like that of the adult rather than very low, and the snout is also like that of the adult. It is very doubtful indeed whether the specimens at hand belong to this species, but our material is too small to allow of adequate comparison.

14. PINGUIPES FASCIATUS Jenyns.

A single specimen, 120 mm. in total length, from station 2768, off the Gulf of San Matias. This is evidently the young of the species described by Jenyns, as it varies in those particulars usual to young of these groups. The eye is much larger, contained $3\frac{1}{2}$ in head, instead of 5, the interorbital space half their diameter instead of one and one-half times; the maxillary reaches under the anterior third of the eye, and the depth is not so great. The two longitudinal bands which are but faintly shown in Jenyns's figure¹ are in the present specimen the most distinct, and may be traced from the upper third and the lower margin of the orbit to the last dorsal rays and the caudal spot, respectively. The upper is narrow throughout, about two or three scale rows wide, but the lower is nearly twice the width of the upper, and ends in the widely ocellated black caudal spot on the upper caudal rays. Besides the strong longitudinal stripes there are faint transverse bars, seven or eight broad ones alternating with much narrower ones.

Dorsal rays V, 26; anal 25; scales with pores in lateral line 80; in series above lateral line 108; depth 5; head $4\frac{1}{4}$ in total; $3\frac{3}{8}$ in body without caudal; eye $3\frac{1}{2}$ in head; interorbital space 2 in eye; distance from tip of snout to end of maxillary $2\frac{3}{8}$ in head.

15. PRIONOTUS PUNCTATUS (Bloch).

One from station 2766, off Rio de la Plata, and a number from stations 2765, near the same locality. They are certainly the *Prionotus punctatus* of Cuvier and Valenciennes, by whom the apparently unidentifiable drawing of Bloch was referred to this species, and that of all subsequent authors.

16. AGONOPSIS ASPEROCULIS, new species.

Plate 2, fig. 1.

Type.—60 mm. in total length, from station 2766, just south of the La Plata River, in 10 or 11 fathoms of water; Cat. No. 76851, U.S.N.M.

Head in body length to base of caudal; breadth of head, 5; depth at nape, $7\frac{1}{3}$; eye, $3\frac{3}{8}$ in head; snout, 4; least width of interorbital space, 6; D. VI, 7; A., 8; pectoral, 13; caudal, 2-11-2; pores in lateral line, 40; branchiostegals, 6.

¹ Voyage of *Beagle*, pl. 5.

Tail slender, its least depth and width slightly less than two-thirds diameter of eye; maxillary ending under anterior edge of pupil, with a single terminal barbel less in length than diameter of pupil; lower jaw slightly shorter than upper, a series of four very minute and nearly invisible barbels along each ramus; no barbels apparent below cheeks; a series of very small ones on branchiostegals; gill membranes united, joined to isthmus, but forming a very slight fold across it; teeth in both jaws in narrow bands, a transverse series on vomer, and a short row on each palatine; a row of four or five very distinct small spines on upper surface of eyeballs; a small terminal plate on snout, its lower edge serrate; two pairs of sharp spines on tip of snout; a high and sharp ridge above eye ending posteriorly in a strong spine, beginning with a smaller one; four series of spines on dorsal surface of head, inner ones of two large spines each, separated by a deep occipital pit from uppermost series on body; outer series of lower spines continuing as second body ridge but interrupted by lateral line at angle of gill opening; ridge along suborbital region continued by broad-based spines, last of which forms fifth and uppermost of spines on edge of preopercle; interorbital space deeply concave.

Uppermost and lowermost pairs of body ridges uniting 5 scales posterior to second dorsal and anal to form a dorsal and ventral double ridge on the tail; first ridges with 27 spines as far back as their union, with 8 posterior to it; second ridges with 36; third with 35; fourth with 30 to their union and 9 beyond; latter ridges with slightly smaller spines, especially on breast, where there is a median series of 5 small ones.

First dorsal inserted opposite seventh scale of first ridge; space between dorsals equal to 5 scales of first ridge; anal 2 scales in advance of insertion of second dorsal; ventrals extending well beyond vent, $7\frac{1}{2}$ in body; pectorals reaching to below tenth scale of first ridge, caudal $1\frac{1}{2}$ in head.

Color pattern indistinct, apparently four or five transverse irregular bands on body, first below first dorsal, second across first rays of second dorsal; third across last rays of same; fourth behind junction of first and fourth pairs of ridges; pectorals distally dark, tipped narrowly with white; caudal similar, both with incomplete cross stripes of dark at base; dorsals and anal with traces of narrow dark stripes.

(*Asperoculis*, rough eye).

This is apparently the first record of *Agonopsis* from the east coast of South America, and is the second species to be described in the genus. The other species is found on the western coast of South America, and perhaps in Patagonia. The present species differs from Jenyns's description and figure of the type of *Aspidophorus*

*chiloënsis*¹ in the much more slender tail; the wider spacing of the dorsals, which are five instead of two scales apart; the presence of a series of small spines on the upper surface of the eyeball; the slightly larger eye; the very much smaller barbels on the lower jaw; and the position of the vent nearly opposite mid-length of the ventrals

17. PARALICHTHYS BRASILIENSIS (Ranzani).

Numerous specimens, the largest 25 cm. in total length, from Montevideo, and one from Buenos Aires. The latter is labeled "*tapa ciclo* or *chelo*." This name is given to *Symphurus plagusia* by Berg (Enumeración de los Peces).

This species is very close to *Paralichthys adspersus* of the western coast of South America, and as a large series of both is available, a detailed comparison has been made. The most easily noticed differences are the more advanced position of the lower eye in *P. brasiliensis*, the position of the posterior nostril of the blind side below the first dorsal ray rather than in front of it, and the brevity of the flap in the anterior nostrils. In the measurements and counts the following differences may be noticed: The scales in the lateral line average 12 more in *P. adspersus*; the head is very slightly longer, the depth slightly greater, the snout (measured from the lower eye) longer, and the gill rakers somewhat shorter. By reference to the description of *P. adspersus* (see west coast species, p. 468) the measurements given in hundredths of body lengths may be compared with the following of six specimens of *P. brasiliensis*:

Dorsal rays 68 to 75; anal 53 to 57; pores in lateral line 95 to 100; scales in transverse series $\frac{33 \text{ to } 34}{31 \text{ to } 38}$ (counting oblique series at deepest part of body); head 0.27 to 0.29; depth 0.41 to 0.46; eye 0.04 to 0.05; interorbital space 0.02; snout 0.05 to 0.06 (from lower eye); mandible 0.15 to 0.17; maxillary length 0.12 to 0.13; pectoral length on eye side 0.11 to 0.13; on blind 0.10 to 0.12; depth of caudal peduncle 0.11 to 0.125; gill rakers 4 or 5 + 15 or 16; their length 0.025; vertebrae 11 + 23 = 34.

Table of comparative measurements of *Paralichthys adspersus* and *P. brasiliensis*.

Locality.	<i>P. adspersus.</i>							
	Mazatlan.	Bay of Callao, Peru.		Tome and Lota, Chile.				
Body length.....mm..	210	205	200	97	97	90	89	79
Dorsal rays.....	72	71	72	69	72	73	70	73
Anal rays.....	57	54	55	56	57	57	56	57
Scales in lateral line.....	106	110	110	104	119	112	110	113
Scales transverse.....	36+50	.....	.....	39+50	39+50	40+47	43+52	.....
Head ²	0.32	0.31	0.30	0.30	0.30	0.29	0.30	0.30
Depth.....	.48	.46	.44	.52	.49	.47	.48	.48
Eye.....	.05	.05	.05	.06	.055	.06	.05	.06
Snout from lower eye.....	.07	.....	.....	.065	.07	.07	.065	.07
Maxillary.....	.15	.14	.14	.13	.13	.125	.13	.13

¹ Voyage *Beagle*, p. 30, 1842.

² Measurements in hundredths of lengths to base of caudal.

Table of comparative measurements of *Paralichthys adspersus* and *P. brasiliensis*—Con.

Locality.	<i>P. brasiliensis</i> .				
	Montevideo, Uruguay.				
Body length.....mm.	210	175	149	126	190
Dorsal rays.....	75	75	73	72	68
Anal rays.....	57	57	55	55	53
Scales in lateral line.....	95	96	97	95	96
Scales transverse.....	32+38	33+35	33+34	.....	.....
Head ¹	0.27	0.28	0.28	0.28	0.29
Depth.....	.43	.41	.45	.46	.42
Eye.....	.04	.05	.055	.05	.05
Snout from lower eye.....	.05	.06	.06	.06	.06
Maxillary.....	.12	.135	.13	.13	.135

¹ Measurements in hundredths of lengths to base of caudal.

18. CITHARICHTHYS MICROSTOMUS GILL.

Citharichthys microstomus GILL, Proc. Acad. Nat. Sci. Phila., 1864, p. 223. Beesley's Point, New Jersey.

Numerous specimens, not exceeding 135 mm. in total length, from stations 2764, 2765, and 2766, in 10½ to 11½ fathoms, off Punta Sur, near the Rio de la Plata. These agree with the description given by Gill of a specimen from Beesley's Point, New Jersey, United States, and the description given by Jordan and Goss.¹ In the Proceedings of the United States National Museum, volume 7, 1884, page 540, Dresel gives a table of measurements in hundredths of the body length of a specimen (Cat. No. 36081, U.S.N.M.) from Long Island, New York, with which our specimens agree very closely. Although these have not actually been compared with northern specimens, there does not seem to be much doubt of the identification. It is a new record for South America. The measurements given below in parentheses give hundredths of body length to base of caudal in six specimens.

Head 4½ (0.22 to 0.24) in length of base of caudal; depth 2½ (0.44 to 0.47); eye 3⅔ in head (0.06 to 0.065); maxillary 4 (0.055 to 0.06); mandible 2⅝ (0.08 to 0.09); length of pectoral of eyed side 3½ in body length to base of caudal (0.30), of blind side 8½; dorsal rays 75 to 79; anal 57 to 64; scales in lateral line 43 to 45, in transverse series ^{10 or 11}/_{13 or 11}; gill rakers 3 + 7; vertebrae 9 + 25 = 34.

Interorbital ridge very narrow and sharp; maxillary short, not reaching pupil; teeth of eyed side in anterior half of jaws only, in a single series in both jaws; those of blind side close-set, small; cirri on subopercle of blind side long, not very numerous; pectoral, with the upper ray filiform and much elongated on the eyed side, longer than head (but frequently broken); no spine on snout; lower eye very slightly in advance of upper; scales cycloid, seven vertical rows present on cheek on blind side, those on head on eyed side smaller

¹ A review of the Flounders and Soles (Pleuronectidae) of America and Europe, Report of the Commissioner of Fish and Fisheries for 1886, (1889) p. 277.

than those on body or on blind side of head; snout and jaws scaleless; color in alcohol light brown, scales outlined with pigment; four indistinct blotches of darker color along lateral line and many others dispersed over body; fins with irregular markings of darker brown.

19. *THYSANOPSETTA NARESI* Günther.

One specimen from station 2771, north of Cape Virgins, which was the type locality. It was taken in 55 fathoms, while the type was taken in 51. It seems that this species has not been found since the voyage of the *Challenger*, save by Lönnberg.¹ The description given by Günther is not given in much detail, but there is no doubt as to the identity of our specimen. The illustration given in the "Shore-fishes" of the *Challenger* shows the eyes dextral, whereas the text states them to be sinistral, as is true of our specimen.

Head $4\frac{1}{2}$ in body length to base of caudal; depth $2\frac{1}{2}$ in same; snout $4\frac{1}{4}$ in head; eye (upper) $3\frac{2}{3}$; maxillary $2\frac{2}{5}$; mandible $1\frac{5}{6}$; interorbital space $2\frac{3}{4}$ in upper eye; pectoral of eyed side 2 in head; depth of caudal peduncle 2 in head; dorsal rays 82; anal 59; pectoral of eyed side 9; scales in lateral line 70; in transverse series 22/25; gill rakers 10 + 25, their length two-thirds longitudinal diameter of eye.

Body oblong, median contours nearly parallel and with but slight convexity; upper border of upper eye nearly in dorsal outline of head; bony ridge of interorbital narrow and sharp, covered by a flat scaled area nearly as wide as pupil; eyes oblong, their vertical diameter two-thirds their longitudinal, the upper eye markedly in advance of the lower; jaws equal, the upper with a sharp notch at tip, into which fits a knob from the lower; subopercle of eyed side with coarse cirri; gill rakers long and delicate; teeth in jaws fine, set in four irregular rows anteriorly in both jaws, thinning out to two posteriorly on both eyed and blind sides equally.

Dorsal fin beginning opposite anterior border of upper eye, first ray somewhat thickened and a trifle longer than second; pectorals of eyed and blind side nearly equal in length; ventral of eyed side normal, that of blind side so reflected that first and last rays are superimposed, with a troughlike fin between (a fleshy lobe extending from an enlarged and modified vent obliquely backward across bases of first anal rays due to preservation?).

Scales strongly ctenoid, absent on fins, snout, jaw, and interopercle.

Color, uniform rather dark brown.

20. *ACHIRUS JENYNSI* (Günther).

Achirus lineatus D'ORBIGNY.

Five specimens from Buenos Aires, showing the following variations. The longest is 127 mm. in total length. The measurements in paren-

¹ Magalhaenische Sammelreise, 1907, p. 14.

theses are given in terms of hundredths of the body length, without caudal:

Dorsal rays 58 to 65; anal rays 38 to 45; scales in lateral line 80 (in one case 86); head $3\frac{1}{2}$ (0.31 to 0.32) in body length to base of caudal; depth $1\frac{1}{2}$ (0.64 to 0.69) in same.

The scales are rough, more so on the eyed than on the blind side; the cross lines are narrow, yet distinct and about 11 in number; there is a row of threadlike tentacles along the snout and lower side of the head, the two on the tip of the snout being longest.

21. *SYMPHURUS BERGI*, new species.

Plate 2, fig. 2.

? *Symphurus plagusia* BERG, part.

Numerous specimens from Montevideo, longest reaching a total length of 195 mm. The type is Cat. No. 76852, U.S.N.M., and is 186 mm. in total length. Paratypes are in the United States National Museum and in the Stanford University collections.

The species of *Symphurus* are poorly known and as a rule inadequately described, and much doubt exists as to their distribution. The species of the eastern coast of South America are known through the descriptions of *Symphurus tessellatus* (Quoy and Gaimard) from Rio de Janeiro, and *Symphurus brasiliensis* (Agassiz) from an unknown locality. Recently Evermann and Kendall have described *Symphurus jenyysi*. The characters given by Quoy and Gaimard and by Agassiz are those of the northern *S. plagusia* (Bloch and Schneider), Jordan and Goss. The latter regarded *S. plagusia* as identical with forms from Rio de Janeiro. The present form apparently differs from all of these.

Described from the type, 185 mm. in total length.

Head $5\frac{9}{10}$ in length to base of caudal; greatest depth of body $3\frac{1}{4}$; postocular length of head $8\frac{1}{8}$; long diameter of lower orbit 9 in head; length of caudal rays $2\frac{1}{2}$; middle dorsal rays $2\frac{4}{5}$; ventral $3\frac{1}{4}$, maxillary $4\frac{1}{4}$; dorsal rays 109; anal 91; caudal 10; scales in longitudinal series from upper angle of opercle 105; in transverse series upward and backward from near anal insertion 51; vertebrae $9 + 48 = 57$.

Distance from posterior margin of lower eye to vertical from anterior margin of upper eye contained twice in snout; cornea of eye without indications of flap; lower eye extending forward only as far as anterior third of upper eye; maxillary ending under posterior half of lower eye; lower jaw not markedly wider than upper, much shorter than snout; teeth lacking in eyed side of lower jaw; upper jaw with a series of four or five present anteriorly on the eyed side, those on blind side in a series of four or five rows; teeth on blind side of lower jaw forming a prominent oval patch; nostrils of eyed side with tubules of moderate length; anterior nostril of blind side tubu-

lar, posterior nostril without fringes, situated slightly behind angle of mouth; first gill arch attached below angle of second; gill rakers barely distinguishable; flaps of gill opening extending but slightly beyond opercular edge.

Dorsal height not great, longest rays at center of fin; caudal rays but slightly longer than longest of dorsal.

Color of type, uniform brown; vertical fins becoming darker posteriorly, margined diffusely with white. In a paratype there are somewhat indistinct dark cross bars, 12 in number on body, separated by one and one-half times their own width.

The characters distinguishing *Symphurus bergi* from *S. plagusia* are the greater number of dorsal and anal rays, the more numerous scales in both transverse and longitudinal series, the fewer caudal rays, the slightly lesser depth, the stronger teeth in jaws, and the fact that the distance between the anterior edge of the upper orbit and the posterior edge of the lower is contained twice in the length of the snout. In the fin formula *S. brasiliensis* and *S. tessellatus* correspond to *S. plagusia*, and in the former the caudal rays are distinctly said to be 12.

In comparing the specimens at hand with the description of *Symphurus jennyssi*, Evermann and Kendall¹ from the same locality, the following differences are found: The head is not 6.66 in length without caudal, but 5.9 to 6.25 (using the variation found in 15 specimens); the eye is 8 or 9 in head instead of 13; only in a single case does the number of dorsal rays fall as low as 109, none being 108; the scales in longitudinal series vary from 100 to 114, and in no case reach 120; there are, distinctly, teeth on the eyed side of the upper jaw, which is stated by Evermann and Kendall to be without teeth; the eyes are far from being "on the same line," the lower beginning below the end of the anterior third of the upper, instead of "slightly advanced;" and, finally, there are not 12 but 10 caudal rays. The differences are obviously great, although the general appearances are similar.

Table of counts and measurements in hundredths of length to base of caudal of *Symphurus bergi* and related species.

	Number of specimens.	Head.	Depth.	Postorbital length of head.	Lower orbit.	Dorsal.
<i>S. bergi</i>	12	0.175 (.16-.19)	0.29 (.27-.31)	0.12 (.11-.13)	0.02	110 (109-112)
<i>S. plagusia</i> , Jamaica.....	4	.19	.32 (.30-.33)	.13 (.125-.13)	.023	92 (90-95)
<i>S. elongatus</i> , Panama.....	1	.19	.24	.145	.015	104
<i>S. atricauda</i> , Lower California.....	2	.21	.29	.15	.03	97
<i>S. leei</i> , Panama.....	2	.25	.26	.18	.03	98 (97-100)
<i>S. fasciolarus</i> , Pacific.....	1	.20	.30	.12	.03	95
<i>S. atrimentatus</i> , Gulf of California.....	1	.20	.30	.135	.03	94
<i>S. williamsi</i> , southern California.....	1	.21	.29	.14	.03	98

¹ Proc. U. S. Nat. Mus., vol. 31, 1906, p. 108.

Table of counts and measurements, etc.—Continued.

	Number of specimens.	Anal.	Scales in longitudinal series.	Scales in transverse series.	Caudal rays.	Length of dorsal rays.
<i>S. bergi</i>	12	94 (91-96)	108 (100-114)	50 (47-51)	10	0.55 (.05-.06)
<i>S. plagusia</i> , Jamaica.....	4	79 (77-83)	95 (93-95)	45 (44-45)	12	.065 (.06-.07)
<i>S. elongatus</i> , Panama.....	1	86	98	43	12	.06
<i>S. atricauda</i> , lower California.....	2	79	95	47	12	.07
<i>S. leei</i> , Panama.....	2	82 (81-84)	84	37	12	.09
<i>S. fasciolarus</i> , Pacific.....	1	77	95	(?)	12	(?)
<i>S. atrimentatus</i> , Gulf of California.....	1	80	95	42	12	.09
<i>S. williamsi</i> , southern California.....	1	81	110	50	12	.09

The above table will serve to distinguish the species to some extent, but some additional characters, taken from specimens in the Stanford University collections, are given below, in order to more closely define the various species:

1. **SYMPHURUS LEEI** Jordan and Bollman.

Albatross station 2804, Panama (type). Teeth on the eyed side of both jaws, in a single row anteriorly, extending more posteriorly in the lower jaw; those on the blind side of both jaws in a broad band; gill rakers well developed, 6 or 7, short, soft, and thick; a series of short transparent cilia on the lower edge of the gill opening on the blind side; a short triangular lappet of the black coat of the eye projecting from the interorbital side into the corneal space; lower jaw wide, nearly as wide as length of snout.

2. **SYMPHURUS ELONGATUS** (Günther).

Panama. Teeth as in *S. leei*; gill rakers somewhat smaller, but present; no modification of the cornea.

3. **SYMPHURUS ATRICAUDUS** (Jordan and Gilbert).

Lower California, *Albatross* station 2830. Teeth as in *S. leei*; gill rakers small; a very large flap of tissue running down to center of pupil, black with narrow white edges. No cirri on edge of gill openings.

4. **SYMPHURUS PLAGUSIA** (Bloch and Schneider) Jordan and Goss.

Jamaica. On eyed side teeth are absent in lower jaw; present in small numbers (4 or 5 anteriorly) in the upper; broad bands on the blind side; no cirri on edge of gill opening; gill rakers absent; no corneal modification.

5. **SYMPHURUS FASCIOLARIS** Gilbert.

Type.—*Albatross* station 3022-3027, Pacific. Teeth as in *S. plagusia*; no corneal modification; no cirri on edge of gill opening; gill rakers unknown.

6. **SYMPHURUS ATRIMENTATUS** Jordan and Bollman.

Albatross station 3011, Gulf of California. Teeth in both jaws on eyed side; corneal flap well developed, as in *S. atricaudus*; gill rakers distinct; no cirri on edge of gill opening.

7. SYMPHURUS WILLIAMSI Jordan and Culver.

Albatross station 2926, Southern California. Teeth in both jaws on eyed side; corneal flap well developed; gill rakers comparatively large; no cilia on opercle of blind side; lower jaw not unusually wide.

The remarkable corneal modification mentioned above is present in *S. leei*, *atricaudus*, *williamsi*, and *atrimentatus*, but not as markedly so in the first mentioned. Similar formations are present in other genera of the Pleuronectidae, Triglidæ, many of the sharks, and a great many bottom dwellers. What its significance may be is problematical, but it is apparently present or absent in closely related species and bears no obvious relation to other characteristics, even the depth inhabited. The presence of teeth on the eyed side of the lower jaw seems correlated with a greater development of the gill rakers, but this is not striking enough to warrant a generic or subgeneric division.

22. PLATEA INSIGNIS Steindachner.

A single specimen 14 cm. long from station 2764. This is a much smaller specimen than Steindachner's type, yet it corresponds closely to the description given by him.¹ The ventrals are, however, contained but thrice in the head, the gape of the mouth reaches only to the center of the eye, and the dorsal and anal fin counts are 110 and 100, respectively.

23. MERLUCCIUS GAYI Guichenot.

Numerous specimens from stations 2766, 2769, and 2771, between Rio de la Plata and Cape Virgins. This little-known species differs from the European hake, *Merluccius merluccius* (Linnaeus) in the longer pectoral, 5 in length without caudal, the more numerous gill rakers (3+12, instead of 3+7), and the weaker teeth. From *M. productus* (Ayres) of the California coast it seems to differ in the longer ventrals, which are nearly as long as the pectorals, the fewer scales, and the stronger dentition.

24. PERCOPHIS BRAZILIENSIS Quoy and Gaimard.

A number of specimens from *Albatross* stations 2764, 2765, and 2766, off Cape San Antonio, just to the south of the Rio de la Plata. The largest is 278 mm in total length, the smallest 40. There is remarkably little variation among them, even with age. They correspond well with the brief type description of Quoy and Gaimard and that of Jenyns (Voyage of the *Beagle*).

D. IX, 31 or 32; A. 40 or 41; scales in lateral line 112 to 114, in transverse series between insertions of anal and of first dorsal 9 or 10/19 to 22; number of vertical series between end of maxillary and preopercular margin 24; between preopercular and opercular margins 16; head $3\frac{2}{3}$ in length to base of caudal; depth $12\frac{2}{3}$; eye $5\frac{2}{3}$ in head;

¹ Fauna Chilensis, p. 323, pl. 20, figs. 12-12B.

maxillary $2\frac{3}{4}$; mandible 2; interorbital space 10; height of first dorsal $2\frac{1}{3}$; of second $2\frac{2}{3}$; length of pectoral $1\frac{9}{10}$ in head; of ventral $2\frac{1}{2}$.

Anterior nostril with a short posteriorly directed tube, the posterior opening large and oval; maxillary terminating under center of eye, edged with minute conical teeth; premaxillaries with five enlarged posteriorly directed canines and broad bands of minute teeth; canines frequently lost, the third on each side in all specimens at hand loosely and flexibly attached.

Dorsals varying in height, the first being from $2\frac{1}{3}$ to $2\frac{2}{4}$ in head; the second elevated anteriorly, the first ray longest, nearly equal to length of second ray of first dorsal, sixth ray being two-thirds length of first and but slightly longer than twenty-eighth; membranes of shorter rays incised nearly to base.

Jaws sparsely scaled along edges, the scales on cheeks much smaller than shown in illustration of type.¹

Color of adults in alcohol brown above and silvery below; scales above each marked by a small basal spot of darker color; a diffuse faintly dusky spot as large as eye on opercle; upper pectoral rays strongly pigmented, as is membrane of first dorsal; second dorsal with alternate light and dark on rays, forming longitudinal bars on fin. Young of 160 mm. total length with 10 or 11 transverse whitish bars, each four scales wide, extending from mid-dorsal line to lateral line. In very young, 40 mm., these are much more numerous, tending to fuse, and the fins are colorless.

II. WEST COAST, SOUTH OF $46^{\circ} 45'$ SOUTH LATITUDE, INCLUDING THE STRAITS OF MAGELLAN.

List of species other than those of the genus *Notothenia*:

MYXINIDAE.

1. *Myxine australis* Jenyns. Port Churruca, Borja Bay, and Sandy Point.

SCYLLIORHINIDAE.

2. *Catulus canescens* (Günther). Stations 2780, 2783, and 2784.

SQUALIDAE.

3. *Squalus fernandinus* Molina. Gregory Bay.
4. *Etmopterus granulosus* (Günther). Station 2781.

RAJIDAE.

5. *Raja magellanica* Steindachner. Station 2774.
6. *Psammobatis rudis* Günther. Station 2778.

GALAXIIDAE.

7. *Galaxias nukulatus* (Jenyns). Mayne Harbor.
8. *Galaxias attenuatus* (Jenyns). Port Otway.

¹ Voyage d'Uranic, p. 351, pl. 53.

HAPLOCHITONIDAE.

- 9. *Haplochiton zebra* Jenyns. Mayne Harbor, Latitude Cove, and Port Otway.
- 10. *Haplochiton taeniatus* Jenyns. Island Harbor.

SYNGNATHIDAE.

- 11. *Syngnathus blainvillianus* Eydoux and Gervais. Mayne Harbor and Port Otway.

ATHERINIDAE.

- 12. *Menidia alburnus* (Günther). Laredo Bay, Gregory Bay, and Sandy Point.

BOVICHTHYIDAE.

- 13. *Pseudaphritis gobio* (Günther). Borja Bay and Otter Bay.

NOTOTHENIIDAE.

- 14. *Harpagifer bispinis* (Forster). Sandy Point, Laredo Bay, and station 2775.
- 15. *Eleginops maclovina* (Cuvier and Valenciennes). Sandy Point. (See genus *Notothenia*.)

RUVETTIDAE.

- 16. *Thyrsites atun* (Euphrasen). Port Otway.

PLEURONECTIDAE.

- 17. *Hippoglossina macrops* Steindachner. Station 2787.

GOBIESOCIDAE.

- 18. *Gobiesox marmoratus* Jenyns. Port Otway.

GADIDAE.

- 19. *Salilota australis* (Günther). Sandy Point and Otter Bay.
- 20. *Lotella marginata* Günther. Station 2783.

MACROURIDAE.

- 21. *Coelorhynchus fasciatus* Günther. Stations 2783, and 2784. (See Section III, after No. 21.)
- 22. *Coelorhynchus patagoniae* Gilbert and Thompson, new species. Station 2784. (See Section III, after No. 22.)

1. MYXINE AUSTRALIS Jenyns.

Muaernoblenna olivacea LACÉPÈDE, Poissons, vol. 5, 1803, p. 652.
Myxine australis JENYNS, Voy. *Beagle*, 1842, p. 159.

Three specimens, from Port Churruca, Borja Bay, and Sandy Point.

The depth is contained nineteen times in the total length; there are 97 pores between the head and anus (32 to the pectoral), and 12 from the anus to the tip of the caudal; the dorsal fold is continued nearly halfway toward the head. The first two teeth of the upper series are confluent, and there are 11 in all in that series.

2. CATULUS CANESCENS (Günther).

Two specimens, from *Albatross* stations 2783 and 2784, in 122 and 194 fathoms, respectively, the first between Hanover Island and the mainland, the second between Wellington Island and the mainland. The largest is 46 cm. in total length. The teeth each have a large cusp and four smaller ones, contrasting with the tricuspid teeth of *C. stellaris*, the generic type.

Four smaller specimens are from station 2780, in the western entrance of the Straits of Magellan, in 369 fathoms.

3. SQUALUS FERNANDINUS Molina.

Three male specimens from Gregory Bay, Straits of Megellan, are but slightly different from a specimen of *Squalus sucklii* from San Diego. The former are 63 to 68 cm. in total length, the latter is a female, 69 cm. Regan, in *Sharks of the Family Squalidae*,¹ gives the main difference as the extension of the pectoral fin, when laid back, to the middle of the first dorsal in *S. fernandinus*. This difference, however, does not hold well, for our largest specimen of *S. fernandinus* agrees in this with our specimen of *S. sucklii*, although the pectoral, nevertheless, uniformly is very slightly shorter in *S. fernandinus*. This species has also very indistinct white body spots that are lacking in our adult specimen of *S. sucklii*, and a generally lighter color, with somewhat shorter caudal. In the following table the measurements are given in hundredths of the total length. The method of preservation of the specimens was apparently not the same, which should be considered:

	<i>Squalus fernandinus.</i>			<i>Squalus sucklii.</i>
Length in centimeters.....	63	67	68	69
Length of second dorsal.....	0.055	0.05	0.055	0.045
Length of pectoral.....	.14	.14	.13	.155
Length of upper caudal lobe.....	.195	.19	.185	.215

4. ETMOPTERUS GRANULOSUS (Günther).

A small specimen 11 cm. in length, from *Albatross* station 2781, in 348 fathoms. It is very much smaller than that described by Günther and shows the following differences: Distance from tip of snout to front of upper jaw equaling width of mouth; length of eye as great as distance measured obliquely from the center of the square snout to the anterior edge of the eye; spine of first dorsal two-thirds the length of that of the second; "granules" present as distinct and strong spinules, arranged in a band passing from each angle of the snout back along the upper portion of the flanks below the first dorsal, four or five series wide, another commencing in an indefinite

¹ Ann. Mag. Nat. Hist., ser. 8, vol. 2, July, 1908.

way below the second dorsal and extending along the sides of the tail; belly with smaller, blunter spinules in a band from the chin to the ventrals, widening behind; teeth tricuspid.

5. RAJA MAGELLANICA Steindachner.

One specimen from station 2774, in 17 fathoms, near the eastern entrance of the Straits of Magellan. The measurements do not exactly correspond to those given by Steindachner, but the color and spination are so similar as to leave but little doubt of the correctness of this identification. The interorbital space is one and one-fifth times the longitudinal diameter of the orbit.

6. PSAMMOBATIS RUDIS Gütther.

One young specimen from station 2778, in 61 fathoms, near the Second Narrows in the Straits of Magellan.

7. GALAXIAS MACULATUS (Jenyns).

Nine specimens from Mayne Harbor, Patagonia, the measurements of which are given under *Galaxias attenuatus*. They are all strongly colored and differ much in this respect from *G. alpinus*. Two specimens from the same locality differ in having a much longer head and maxillary, the larger having the head 0.29 and the maxillary 0.11 of body length, the smaller having the same 0.28 and 0.10, respectively. These may be contrasted with the measurements given for *G. maculatus* (under *G. attenuatus*). The pectorals and ventrals are as long as the longest of those of the other specimens, but no other striking differences may be seen. The color is in larger, less broken spots, but presents no greater variation from the others than is found within the range of the latter. Without more specimens they can not be regarded as a distinct species.

8. GALAXIAS ATTENUATUS (Jenyns).

Very numerous specimens from Port Otway, Patagonia. The variation among them is very large and certain of them are intermediate in some respects between this species and *G. maculatus*. One of the principal differences is the length of the head, which is much greater in the latter. In the following table the differences are shown by giving the number of individuals having each head length, this being measured in hundredths of total length to base of caudal:

Head length.....	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25.	0.26
<i>G. attenuatus</i>	1	9	17	5	1	1	.....	.....	.....	.....	.....
<i>G. maculatus</i>.....	.....	.....	.....	.....	.....	.....	1	5	2	0	1

The comparison of maxillary length is as follows:

Length of maxillary.....	0.04	0.05	0.055	0.06	0.065	0.07	0.075	0.08	0.085	0.09
<i>G. attenuatus</i>	3	25	8	5						
<i>G. maculatus</i>						3	0	4	0	2

The range of other measurements are here appended for comparison with other species.

Distance snout to ventrals.....	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56
<i>G. attenuatus</i>		7	16	6	5	2		
<i>G. maculatus</i>					3	1	3	1

Length of pectoral.....	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16
<i>G. attenuatus</i>	2	6	16	11	4				
<i>G. maculatus</i>					2	4	2	0	1

Length of ventrals.....	0.08	0.09	0.10	0.11	0.12	0.13
<i>G. attenuatus</i>		14	23	3		
<i>G. maculatus</i>				3	3	2

Despite the distinctness of the two species, the most sharply defining difference is that of color, for all the above measurements are found to overlap on the examination of larger series. Taking the extremes of a hundred specimens of *G. attenuatus*, the longest head lengths are found to exceed the shortest head lengths of *G. maculatus*. The latter, however, has a more regular and more clearly defined color pattern, with larger spots, so that, with the exception of a few intermediate individuals, the two may be easily distinguished. Regan¹ used the position of the ventrals to differentiate these forms. (See third table above.) It is apparent that these plainly distinct species are yet not distinctly separated by any one character. The other species of the genus have not been examined, but it is evident that caution is necessary in dealing with them, in view of the wide variation.

9. HAPLOCHITON ZEBRA Jenyns.

Numerous specimens from Mayne Harbor, Latitude Cove, and Port Otway, Patagonia.

10. HAPLOCHITON TAENIATUS Jenyns.

A single large specimen of this species from Island Harbor, Patagonia, 180 mm. in total length, presents the following differences from *Haplochiton zebra*: Depth less, $6\frac{1}{2}$ in body length to base of caudal; eye very much smaller, $6\frac{1}{2}$ in head; depth of caudal peduncle

¹ Proc. Zool. Soc. London, 1905, vol. 2, April 5, 1906.

$4\frac{1}{2}$ in head (3 to $3\frac{1}{3}$ in *H. zebra*); maxillary longer, extending to below posterior third of eye, $2\frac{1}{2}$ in head; pectorals and ventrals very short, $2\frac{1}{3}$ in head, and vertical fins low. The head is long and conical, with a sharper snout, the depth at the occiput equal to its width and less than the postorbital length of head (greater in *H. zebra*). The teeth are longer and more prominent. *Haplochiton zebra* has the physiognomy of a trout (*Salmo*), while *H. taeniatus* has much the trim look of a slender Atherinoid or Scombroid fish, which may argue a difference in habit. The silvery stripe mentioned by Jenyns is very evident, but there is little else which conclusively proves our adult to be the same as his very young form save the lesser depth. The fin counts are the same.

11. SYNGNATHUS BLAINVILLIANUS Eydoux and Gervais.

A single well-preserved example from Mayne Harbor, and another in bad condition from Port Otway, Patagonia.

Body rings 19; tail 50; dorsal rays 34; anal 3; caudal 10; pectoral 13; body with many very small dark rings surrounding minute specks of brown lighter than body color, these not on dorsal or ventral edge of body, not on head, tail, or fins.

12. MENIDIA ALBURNUS (Günther).

Numerous specimens of this little-known form from the Straits of Magellan, at Laredo Bay, Gregory Bay, and Sandy Point.

Head, $4\frac{1}{2}$ (0.21) in length to base of caudal; depth, $5\frac{1}{2}$ to $6\frac{1}{2}$ (0.15 to 0.18); eye, 5 in head (0.035 to 0.045 in body); snout, 3 in head; interorbital space, $3\frac{1}{2}$; length of pectoral, $1\frac{1}{4}$ in head; of ventral, $2\frac{1}{2}$; distance from snout to insertion of first dorsal less than half body length without caudal; distance between dorsal insertions slightly less than length of head; dorsal rays VII-I, 12 or 13; anal rays I, 16 or 17; scales in longitudinal series, 98 to 105; in transverse series between dorsal insertions, 21 or 22; gill rakers, 4 + 15.

Premaxillaries protractile, lower jaw very slightly shorter than upper; no teeth on vomer or palatines; first dorsal inserted over ventral base; second dorsal base terminating anteriorly to that of anal; scales with four or five basal radii, pectinate on their free edges; the circuli not angled at basal corners of scale; shape of scale oval. Lateral band bright, covering four series of scales.

In this species the most anterior two or three scales of the dorsal surface of the head are imbricated in the reverse direction from the usual one, and those on the posterior and central parts are imbricated over those lying laterally to them, the transitional area or "nucleus" lying directly between the eyes.

13. PSEUDAPHRITIS GOBIO (Günther).

Three specimens from Borja Bay and one from Otter Bay, the longest 360 mm. in total length. They differ greatly from the

specimen figured by Günther,¹ in having the fins much lower and the eye tentacle very small. Other smaller differences may be seen from the following data, but it is apparent that these are not specific in character.

Head, $2\frac{1}{3}$ to $2\frac{1}{2}$ in length to base of caudal; depth, $4\frac{1}{3}$ to $4\frac{1}{2}$; eye, 5 or 6 in head; maxillary, $2\frac{1}{10}$ to $2\frac{1}{3}$; snout $3\frac{1}{3}$ to $3\frac{3}{4}$; interorbital space, 14 to 16 in head; dorsal rays VII, 22 or 23; anal, 20 or 21; scales in lateral line, 64 to 66; spinous dorsal when supine barely extending beyond first ray; longest spine and longest rays subequal, about equaling length of snout in longest specimens; maxillary reaching to or slightly beyond posterior border of eye; color light, with irregular darker saddles below last spines of dorsal, below sixth, seventh, and eighth rays, and below last nine rays; fins irregularly spotted, tentacles above eyes tipped with black.

14. *HARPAGIFER BISPINIS* (Forster).

Numerous specimens of this well-known form from Sandy Point, Laredo Bay, and *Albatross* station 2775, between Cape Virgins and First Narrows of the Straits of Magellan. The coloration of the second dorsal varies widely, but all intergradations are present between fins uniformly dark and those with narrow dark bands. In the young (30 mm.) the transverse bands are almost absent. In the adults the dorsal surface of the head is occasionally thickly papillate or roughened.

15. *ELEGINOPS MACLOVINA* (Cuvier and Valenciennes).

Sandy Point, Straits of Magellan.

16. *THYRSITES ATUN* (Euphrasen).

Numerous specimens from Port Otway, Patagonia. There are sometimes 6, sometimes 7 finlets in the dorsal and anal.

17. *HIPPOGLOSSINA MACROPS* Steindachner.

One specimen 180 mm. in total length from station 2787, near Taitao Peninsula, Chile, in 61 fathoms. This corresponds remarkably well with Steindachner's description, excepting in the fact that only the last four or five rays in the dorsal and anal are divided. The original description states that 14 or 15 are thus distinguished. The scales on the blind side are etenoid as far forward as the tip of the pectoral and not only in the posterior third of the body, as stated. Steindachner states that the eyes are on the left side as they are in ours, but his plate of the species shows them on the right. The spots on the body are ocellated indistinctly.

No differences are evident between this specimen and one from Valparaiso, Chile, collected by Admiral Beardslee, even in the above

¹ Plate 9, *Challenger* Shore Fishes.

characters. No other specimens are known as far as can be ascertained.

Dorsal rays, 65; anal, 54; scales, 78 in lateral line, 26 in oblique series above lateral line at deepest part of body, 32 below; head, 0.31 of body length to base of caudal; depth, 0.39; eye (longitudinal diameter of the upper), 0.09; snout (from lower eye), 0.06; maxillary length, 0.13; pectoral length on eyed side, 0.17, on blind, 0.11; depth of caudal peduncle, 0.095; gill rakers, 4 + 11.

The presence of this species has now been recorded in Smyth Channel by Lönnberg¹ in corroboration of Günther's record.

18. *GOBIESOX MARMORATUS* Jenyns.

Three specimens from Port Otway, Patagonia.

19. *SALILOTA AUSTRALIS* (Günther).

Haloporphyrus australis GÜNTHER, Ann. Mag. Nat. Hist., vol 11, 1878, p. 19.

One specimen 20 cm. long from Sandy Point, Straits of Magellan. D. 9.56; A. 57; depth, $4\frac{1}{2}$ in total length; maxillary ending under posterior third of eye. Also six specimens from Otter Bay, Smyth Channel. These show the number of rays in the first dorsal either 10 or 11, as given by Smitt.² An unsealed circular pit is present between the ventral bases.

20. *LOTELLA MARGINATA* Günther.

Two small specimens from *Albatross* station 2783, in 122 fathoms, between Hanover Island and the mainland. Dorsal rays, 8, 60; anal, 59.

Genus *NOTOTHENIA* Richardson.

Notothenia RICHARDSON, Voyage of H. M. S. *Erebus* and *Terror*, Ichthyology, 1846, p. 5 (*type*, *N. coriiceps* Richardson).—BOULENGER, Southern Cross, 1902, p. 182.

This is one of the largest and the most characteristic of the genera inhabiting the waters near Cape Horn. The identification of the species has been very difficult because of the lack of careful descriptions and because of the application of varying conceptions of species. The genus is here limited as by Boulenger,³ and a thorough revision is undertaken of those species found in the waters of the Falkland Islands and along the coasts of the South American continent. After the revision was completed the monograph by Regan⁴ came to hand. The conclusion there reached for the majority of the species is the same that had been tentatively reached by the author from an inspection of the literature, namely, that the species

¹ Magalhaenische Sammelreise, 1907, p. 14.

² Poiss. Expéd. Scient. Terre Feu., Bih. K. Svenska Vet. Akad. Handl., vol. 24, Afd. 55, No. 5, 1898, p. 37.

³ Southern Cross, p. 182.

⁴ Scottish Antarctic Expedition.

of this genus found in the region under discussion are peculiar to it and very different from even those of South Georgia. Two species are credited by Regan, however, with a circumpolar distribution, but this view has not been accepted in this paper. (See under *N. cornucola* and *N. macrocephala*.)

The present collection is probably the largest and most abundant in individuals of any which has been made so far, and the opportunity was seized to delimit the species as carefully as possible. The results may be seen in part in the following table showing the species recognized here as compared with those considered valid by previous writers. Seven were given by Dollo, 10 by Regan, and 15 are here listed in the present paper as peculiar to the region.

Dollo, 1904. ¹	Regan, 1913. ²	Present identification.
<i>Notothenia tessellata</i>	= <i>tessellata</i>	= <i>tessellata</i> Richardson.
<i>Notothenia sima</i>	= <i>sima</i>	= <i>sima</i> Richardson.
<i>Notothenia coriiceps</i>	= <i>cornucola</i>	= <i>cornucola</i> Richardson.
<i>Notothenia cyaneobrancha</i>	= <i>brevicauda</i>	= <i>longicauda</i> , new species.
<i>Notothenia elegans</i>	= <i>elegans</i>	= <i>elegans</i> Günther.
<i>Notothenia longipes</i>	= <i>longipes</i>	= <i>longipes</i> Steindachner.
<i>Notothenia acuta</i>	= (<i>tessellata</i>)	= (<i>tessellata</i>).
<i>Notothenia macrocephala</i>	= <i>macrocephala</i>	= <i>macrocephala</i> Günther.
	<i>trigramma</i>	= <i>trigramma</i> Regan.
	<i>canina</i>	= <i>canina</i> Smitt.
	<i>ramsayi</i>	= <i>ramsayi</i> Regan.
	<i>wiltoni</i>	= (<i>longipes</i> Steindachner).
		<i>brevicauda</i> Lönnberg.
		<i>gilberti</i> , new species.
		<i>latifrons</i> , new species.
		<i>squamiceps</i> Peters.
		<i>jordani</i> , new species.

The monograph of the Nototheniiformes by Regan³ constitutes a marked advance on what was previously known concerning the genus *Notothenia*, but the identification of species without material for comparison is left very difficult, and the recognition of new species still more so. The present collection has been worked over with a view to presenting a clear definition of the species, the range of variation of each character, and the correct determination of the synonymy, including as far as possible locality records. It is to be regretted that certain species, which are not included in the present collection, still rest on descriptions which are entirely inadequate and in some cases so similarly constructed as to render the species relationship doubtful. For the literature and bibliography the paper

¹ Dollo, Voyage du S. Y. *Belgica* (1897-1899) Zoologie, Anvers, 1904, p. 79 (Summary of Literature).

² Regan, The Antarctic Fishes of the Scottish National Antarctic Expedition, Transactions of the Royal Society of Edinburgh, vol. 49, pt. 2 (No. 2), 1913, p. 264, plates.

³ Idem.

by Dollo¹ may be consulted, and also the synonymy given here for each of the species treated.

For each species a typical example has been selected and used as the type of the description to avoid confusion from the possible inclusion of more than one species under the one name. The range of variation found for as many specimens as possible is then included in parentheses after each character. No one set of characters is relied on as diagnostic. The scaling of the head is variable in some species and constant in others, but the size of the scales on the head is usually a good character. For the average of the counts and measurements of the species examined the table following the key may be consulted, but for the extremes the individual descriptions must be examined.

The South American forms may be loosely divided into two groups, typified (1) by *Notothenia macrocephala* and *N. latifrons*, and (2) by *Notothenia longipes* with the remaining species. *N. squamiceps* is most nearly allied to the first, but differs in its deep body and scaled interorbital region. The first group is characterized by the broad naked interorbital space, lateral eyes, compressed bodies, and few anal rays. They seem to be of uniform coloration and perhaps are not strictly littoral, as most of the other species seem to be. The second group has a more cottoid appearance, a slightly compressed body, narrow interorbital space, and usually a variegated color pattern. Among this group *N. gilberti* is remarkable for its very short snout, and *N. elegans* for its greatly elongated, slender body and extremely narrow interorbital.

The measurements made in this review are in hundredths of the body length to the base of the caudal fin and were computed by means of the United States Bureau of Fisheries scale for proportional measurements. The scales were counted in series along the lateral line, not in the line itself, from the angle of the opercle to the last of the muscular part of the tail, and the transverse counts were made from the anal insertion obliquely upward and forward. The count spoken of as from the occiput to the dorsal was made from the posterior line of the head to the first dorsal spine.

The specimens were each labeled with a number (such as 01-12 or 01-11, etc.) to prevent confusion while being examined. These have been left attached and the numbers are given wherever detailed measurements are presented, in order that investigators subsequently dealing with the same material may identify them. Some of the specimens are placed in the collections of Stanford University, and the types, with the remainder of the species, have been sent to the United States National Museum.

¹ Trans. Royal Soc. Edinb., vol. 49, 1913, p. 269.

KEY TO THE SPECIES OF NOTOTHENIA OF THE WATERS OF SOUTH AMERICA, INCLUDING THE FALKLANDS.

- a*¹. Snout very short, measured to the edge of the eye about 5 in head; maxillary $3\frac{1}{2}$ to 4 in head; interorbital width $4\frac{2}{3}$ to 5 in head; dorsal VI, 32; anal 30; scales 70 to 73; pectoral about $1\frac{1}{8}$ in head; caudal peduncle depth 3 to $3\frac{2}{3}$ in same; gill rakers 9+12; scales between occiput and dorsal insertion 15.
N. gilberti, 1.
- a*². Snout longer, contained 3 or 4 times in head.
- b*¹. Head scaleless above or nearly so.
- c*¹. Width of interorbital space more than three-tenths that of the head; anal base $2\frac{1}{3}$ to $2\frac{1}{2}$ in body; anal 24 or 25; scales 55 to 75; scales transverse 26; length of ventral $1\frac{2}{3}$ to $1\frac{1}{2}$ in head.
- d*¹. Scales smooth to touch; 55 to 65 in lateral series; pores in upper lateral line 37 to 46; scales covering space in front of and between ventrals.
N. macrocephala, 2.
- d*². Scales plainly ctenoid to touch; 65 to 75 in lateral series; pores in upper lateral line 50 to 60; scales lacking in front of and over half of distance between ventrals.....*N. latifrons*, 3.
- c*². Width of interorbital space less than one-fifth length of head; anal base 2 in body; anal rays more than 26; scales less than 55.
- e*¹. Width of interorbital space one-thirteenth to one-fifteenth that of head; length of head one-fourth to three-tenths of body length; depth of body $6\frac{2}{3}$ to $5\frac{2}{10}$ in its length; maxillary about 3 or $3\frac{1}{4}$ in head; dorsal VI, 33; depth of caudal peduncle slightly less than diameter of eye; velum narrow; two series of scales between dorsal fin and lateral line.....*N. elegans*, 4.
- e*². Width of interorbital space one-sixth length of head; head $3\frac{1}{2}$ to $2\frac{7}{8}$ in body; depth of body $4\frac{2}{3}$ to 5 in its length; maxillary about $2\frac{1}{2}$ to 3 in head; dorsal V or VI, 28 to 33; depth of caudal peduncle greater than diameter of eye.
- f*¹. Dorsal V, 31 to 33; scales in lateral series 49 to 54; opercle scaled above only; no embedded scales on interorbital space; base of pectoral with a distinct bar completely across it in adults.....*N. cornucola*, 5.
- f*². Dorsal VI (rarely V), 27 to 30; scales 45 to 49; opercle scaled entirely; a single embedded scale always present on anterior part of interorbital space (surface of head sometimes entirely scaled); bar on pectoral base not extending completely across it.....*N. sima*, 6.
- b*². Head distinctly scaled above.
- g*¹. Anal rays 28 to 30; dorsal V to VII, 26 to 31; scales 46 to 50; depth of caudal peduncle $3\frac{1}{3}$ in head; ventrals extending to or well beyond anus.
- h*¹. Head cylindrical, cottoidlike, somewhat depressed; width of interorbital space 6 in head; eye slightly dorsal in position and outlook; dorsal V or VI, 28 to 30; gill rakers X+9 to 12; scales on head small, much smaller than those on body, frequently nearly entirely absent; anal with oblique stripes, ventral clear. (See above.).....*N. sima*, 6.
- h*². Head compressed laterally; body very deep, its width about $1\frac{1}{2}$ in its depth; width of interorbital space $4\frac{1}{2}$ to 5 in head; eye facing laterally; dorsal VI or VII, 26 to 29; gill rakers 8+13 to 16; scales on head large, nearly as large as those on body, never absent.....*N. squamiceps*, 7.
- g*². Anal rays 30 to 34; dorsal V to VIII, 32 to 36; scales in lateral series above lateral line 55; depth of caudal peduncle contained $3\frac{1}{2}$ in head or more (except in *N. brevicauda*); ventrals ending at or before anus in adults.

- i*¹. Gill rakers long and fine, 35 to 38 on first arch; scales less than 65; interorbital space 0.05 to 0.065.
- j*¹. Scales on head small, 8 or 9 in transverse series, extending forward to nostrils; first dorsal rays about one-third length of head.....*N. ramsayi*, 8.
- j*². Scales on interorbital space large, 3 in transverse series, not extending beyond the anterior edge of eye; first dorsal high, two-thirds length of head; scales on head rough ctenoid.
N. jordani, 9.
- i*². Gill rakers short, less than 35 on first arch; scales more than 65.
 - k*¹. Dorsal V, 35 or 36; gill rakers 30 to 34; eye in a specimen 100 mm. long, 4 in head.
 - l*¹. Depth of caudal peduncle less than one-third head.
N. longicauda, 10.
 - l*². Depth of caudal peduncle more than one-half head.
N. brevicauda, 11.
 - k*². Dorsal VI to VIII, 32 to 35.
 - m*¹. Teeth of moderate size, not canines.
 - n*¹. Velum, from tip of lower jaw to its edge, two-thirds eye in adult; lower jaw longer than upper; gill rakers 20 to 25; dorsal VI or VII, 32 to 34; scales from occiput to dorsal 15 to 20; upper lateral line not reaching nearly to caudal base.....*N. tessellata*, 12.
 - n*². Width of velum (measured as above) one-half diameter of eye in adult; lower jaw equal to upper; gill rakers usually 25 to 32 on first arch; dorsal VI or VII, 34 or 36; scales from occiput to dorsal 10 to 15; upper lateral line reaching nearly to caudal base; eye in a specimen 100 mm. long, 3 in head.
 - o*¹. Scales in upper lateral line 65; three lateral lines (above characters not corroborated).....*N. trigramma*, 13.
 - o*². Scales in upper lateral line 47 to 53; two lateral lines.....*N. longipes*, 14.
 - m*². Canine teeth present; dorsal VI, 32 or 33; gill rakers 36 to 39; lateral line not reaching nearly to caudal base (known from description only).....*N. canina*, 15.

Table showing average for each species of each proportional measurement employed.

Species number ¹	1	3	4	5	6	7
Number of specimens.....	2	7	3	9	5	29
Head.....	0.285	0.30	0.30	0.27	0.30	0.30
Depth (at pectorals).....	.20	.26	.22	.155	.....	.20
Eye.....	.08	.07	.07	.08	.07	.07
Snout.....	.06	.085	.08	.065	.08	.08
Maxillary.....	.075	.095	.11	.083	.12	.11
Mandible.....	.12	.115	.13	.10	.13	.12
Interorbital width.....	.06	.10	.09	.02	.05	.05
Dorsal spines.....	VI	IV or V	V	VI	V	V or VI
Dorsal rays.....	32	30	30	33	33	30
Anal rays.....	30	24	25	31	29	29
Scales in lateral lines.....	45+6	40+12	56+10	39+7	40+6	38+10
Scales in series.....	72	61	71	49	52	47
Scales transverse.....	27	25	28	16	20	18
Pectoral length.....	0.26	0.22	0.23	0.21	0.22	0.23
Pectoral rays.....	22	17	.....	23	20	22
Ventral length.....	0.22	0.19	0.19	0.215	0.20	0.23
Caudal peduncle depth.....	.085	.10	.10	.07	.09	.09
Gill rakers.....	9+12	7+12	7+13	7+12	9+12	+11
Scales occiput to dorsal.....	15	15	14	11	13	14

¹ See text.

Table showing average for each species of each proportional measurement employed—Con.

Species number ¹	9	10	11	13	14	- 15 ²
Number of specimens.....	7	6	7	15	26	3
Head.....	0.33	0.29	0.29	0.30	0.30	0.28
Depth (at pectorals).....	.24	.18	.20	.19	.18	.17
Eye.....	.075	.08	.08	.065	.08	.07
Snout.....	.08	.075	.075	.076	.08	.065
Maxillary.....	.095	.095	.10	.12	.10	.11
Mandible.....	.12	.13	.11	.13	.12	.13
Interorbital width.....	.07	.06	.04	.045	.045	.05
Dorsal spines.....	VII	VII	V	VI or VII	VI	VI
Dorsal rays.....	28	35	35	33	34	33
Anal rays.....	29	32	33	32	33	31
Scales in lateral lines.....	35+7	45+12	49+6	47+9	50+12	64+9
Scales in series.....	47	60	72	75	74	68
Scales transverse.....	16	21	24	23	21	24
Pectoral length.....	0.23	0.23	0.19	0.23	0.19	0.25
Pectoral rays.....	22	23	24	24	26	27
Ventral length.....	0.24	0.21	0.18	0.185	0.19	0.18
Caudal peduncle depth.....	.065	.075	.075	.08	.075	.075
Gill rakers.....	8+15	12+24	11+20	8+15	10+17	15+22
Scales occiput to dorsal.....	10	11	15	17	12	.....

¹ See text.² After Smitt, measurements changed from hundredths of total length to hundredths of length without caudal.

1. NOTOTHENIA GILBERTI, new species.

Plate 2, fig. 3.

Described from the type and paratype taken at Laredo Bay, in the Straits of Magellan, both 60 mm. in total length; the type is author's number 01-52, and 76853 of the United States National Museum. Measurements of type and paratype in hundredths of body length given in parentheses.

Head (to tip of upper jaw) $3\frac{1}{2}$ in body to base of caudal (0.29 to 0.28); depth $5\frac{1}{4}$ (0.19 to 0.21); eye $3\frac{1}{2}$ in head (0.08); snout 5 (0.06); maxillary $3\frac{1}{2}$ (0.07 to 0.08); mandible about $2\frac{1}{2}$ (0.12); width of interorbital space 5 (0.06); length of pectoral $1\frac{1}{8}$ (0.24 to 0.27); of ventral $1\frac{1}{4}$ (0.22); least depth of caudal peduncle $3\frac{2}{3}$ (0.08 to 0.085); length of combined dorsal bases $1\frac{2}{3}$ in body; of anal base $1\frac{9}{10}$ or 2; D. VI 32; A. 31 (30); pectoral rays 22; scales with pores in upper lateral line 45; in lower line 6; scales in lateral series 70 (73); in transverse from origin of anal obliquely forward and upward 6+22 (26 to 28); gill rakers 9+12.

Width of head equal to its depth at the opercles, squarish in section, the sides somewhat parallel; snout extremely short, projecting but little beyond the anterior edge of the eye; profile of head descending along anterior border of eyes as far as nostrils, and then slightly forward to meet the premaxillaries; lower jaw longer than upper, mandible very long in proportion to maxillary; interopercle in large part covered; upper limb of preopercle vertical; breadth of velar flap measured from tip of lower jaw contained three times in eye; teeth small, in three rows anteriorly above and two below, a single row laterally in both jaws, rows subequal; gill rakers short.

Dorsal inserted above pectoral base; space between last dorsal ray and last of muscular part of tail equal to two-thirds of least depth of caudal peduncle; dorsal terminating above third from last anal ray; pectoral rounded at tip; ventrals reaching anus; caudal broken but apparently pointed.

Upper lateral line extending as far as does second dorsal, overlapping the lower lateral line by two or three scales.

Scales absent on snout, lips, and lower jaw, also on limbs of preopercle; present on interorbital to between eyes or slightly beyond; those on cheek very small, larger on opercle and dorsal surface of head; nowhere roughly ctenoid.

Color much faded; irregular small dark spots on dorsal surface of head and body, with two rows of indefinite blotches on either side of median line of flank, which may be remnants of cross bars; first dorsal strikingly tipped with black and narrowly margined with white; second dorsal with very oblique brown stripes; anal colorless; caudal cross-striped, ventrals and pectoral clear.

Named for Dr. C. H. Gilbert in grateful acknowledgment.

On the roof of the mouth of the paratype is a copepod parasite, filling nearly the whole of the buccal cavity and giving rise to a query as to the eating habits of the species. It was not thought best to mutilate the specimens to look at the stomach contents.

Table of proportional measurements in hundredths of body length.

Author's number.....	01—34	01—52 ¹	Scales in lateral series.....	73	70
Length to base of caudal. mm.	50	50	Scales in transverse series.....	26	28
Head length.....	0.28	0.29	Pectoral length.....	0.24	0.27
Body length.....	.19	.21	Ventral length.....	.22	.22
Diameter of eye.....	.08	.08	Caudal peduncle depth.....	.08	.085
Snout, from eye to its tip.....	.06	.065	Gillrakers on first arch.....	X+12	9+12
Maxillary length.....	.07	.08	Scales occiput to dorsal.....	14	16
Mandibular length.....	.12	.12	Pectoral rays.....	22	23
Interorbital width.....	.06	.06	Combined dorsal bases.....	0.61	0.62
Dorsal rays.....	VI+32	VI+32	Anal base.....	.50	.50
Anal rays.....	31	30	Scales in lateralline.....	45+6	45+6

¹ Type.

2. NOTOTHENIA MACROCEPHALA Günther.

Notothenia macrocephala GÜNTHER, Cat. Brit. Mus., vol. 2, 1860, p. 263. Falkland Islands.—CUNNINGHAM, Voyage of H. M. S. *Nassau*; Trans. Linn. Soc., vol. 27, 1871, p. 470. Fortune Bay, west coast of Patagonia.—PERUGIA, Ann. Mus. Genova, (2) vol. 10, 1891, p. 18. Punta Arenas.—VAILLANT, Mission Scientifique du Cap Horn (1882-1883), vol. 6, Zoologie, Paris, 1891, p. 27, pl. 3, figs. 2, 2a, 2b, 2c, 2d (plates not seen and the description insufficient). Orange Bay.—SMITT, Bih. Svenska. Akad., vol. 23, IV, No. 3, p. 9, pl. 3, figs. 23-26, 1897. Punta Arenas.—DELFIN, Catalogo de los Peces de Chile, Revista Chilena, vol. 4, 1900, p. 84.—BOULENGER, Southern Cross, 1902, p. 184 (part, those from Cape Horn, not "*N. macrocephala*" from Campbell Island).—LÖNNBERG, Hamburger Magalhaenische Sammelreise, Fische, 1907, p. 10. Smyth Channel, Punta Arenas, Cape Horn.—REGAN, Scottish Antarctic Expedition, Trans. Roy. Soc. Edinburgh, vol. 49, pt. 2 (No. 2), p. 277. Magellan Straits, Falkland Islands (New Zealand and Campbell Island?).

Notothenia hassleriana STEINDACHNER, Ichth. Beitr., No. 3, Sitzb. d. k. Akad. d. Wiss., Wien, vol. 73, Abth. 1, Juni Heft, 1875, p. 41, pl. 6. Puerto Bueno and Port Gallant in Straits of Magellan; also Fauna Chilensis, Zool. Jahrb. Suppl., vol. 4, 1898, p. 303. Punta Arenas.

?*Notothenia porteri* DELFIN, Revista Chilena, vol. 4, 1899, p. 117. Talcahuano.¹

Described from three specimens² collected at Borja Bay, two from Sandy Point, and two from Otter Bay; the largest, from the latter place, 215 mm. in total length, is used as typical.

Head $3\frac{1}{4}$ (0.29 to 0.32) of body length; depth $3\frac{2}{3}$ (0.23 to 0.29); eye $4\frac{3}{4}$ in head (0.06 to 0.08); snout $3\frac{1}{2}$ (0.08 to 0.09); length of maxillary $2\frac{3}{8}$ (0.09 to 0.115) of mandible $2\frac{7}{8}$ (0.11 to 0.12); width of interorbital space $2\frac{2}{5}$ (0.09 to 0.13); length of pectoral $1\frac{2}{5}$ (0.20 to 0.25); of ventral $1\frac{5}{8}$ (0.17 to 0.20); of combined dorsal bases $1\frac{3}{4}$ in body; of anal base $2\frac{1}{2}$; D. V (or IV), 30 (29-31); A. 24 (or 23); pectoral rays 17; scales with pores in upper lateral line 43 (38 to 46), in lower 10 (8 to 14); in lateral series 61 (58 to 64); in transverse series 8+22; gill rakers 6+11 (17 to 19).

Head massive, broad above, with rounded snout and vertical checks; profile arched most strongly before eyes on snout; interorbital nearly flat, arched slightly from side to side; maxillary ending under anterior edge of pupil (under anterior quarter of eye in young); jaws equal; width of velar flap measured from tip of lower jaw two-thirds diameter of eye; eye looking laterally, upper surface of eyeball not exposed; interopercle nearly as wide as preorbital; teeth of jaws in two loose rows anteriorly, one laterally, small, a pair behind second row at symphysis of lower jaw; gill rakers very short and thick.

Space between last spine and first dorsal ray equal to two or three interspinous spaces; spines stiffer than usual, longest of them three or four in head length; anterior portion of soft dorsal elevated, length of its rays containing that of posterior part one and two-thirds times; dorsal and anal terminating opposite each other and a trifle more than depth of caudal peduncle from last of muscular part of latter; anal similar to second dorsal but slightly lower; pectoral falcate, more so in adults than in young; ventrals reaching three-fifths to two-thirds distance to anus; caudal emarginate.

¹ As the original description of this nominal (?) species is somewhat difficult of access the following abstract is given in translation. The locality is so far north of other records as to require confirmation if it is *N. macrocephala*:

Depth at insertion of anal contained $5\frac{5}{7}$ times in total length; width at pectorals $4\frac{1}{2}$; length of head $4\frac{1}{2}$ in same; width of interorbital space $2\frac{1}{4}$ in head; top of head with many rough granulations and minute scales. Nasal tube large. Eye $2\frac{1}{4}$ in length of snout. Scales large on opercle, preopercle, and posterior edge of eye (translation?). Upper lateral line terminating opposite last ray of second dorsal; lower beginning on a line between the sixth from the last rays of the dorsal and anal. Color variable, greenish brown, darker above. Irregular blotches forming one or two irregular bands laterally, interrupted by yellowish green color. Pectoral with circular yellow spots, faint distally, a large irregular blotch on the axilla. Dorsal and anal green, obscured by a pattern of greenish yellow of different hues. Caudal similar with a clear vertical band. Rays of dorsal and pectoral only vary in number "D, IV-VI, 28-30; A. 24; P. 18-19."

² See table of measurements after *Notothenia latifrons* on page 435.

Upper lateral line terminating under fourth from last dorsal ray and two scale series before beginning of lower.

Scales present on head only on upper half or third of checks, dorsal surface of head naked, but covered by coarse papillae as far forward as anterior edge of eyes; no naked area before ventrals; scales smooth to touch because of pronounced dermal flap which covers etenoid edges of scales, more particularly in adults.

Color uniform; fins all more or less dusky, without pattern save for three or four indefinite longitudinal lines anteriorly on second dorsal, better defined in young; ventrals frequently much darker above than other fins. According to Lönnberg¹ the life colors are: "Rücken dunkel graugrün, nach dem Bauch in Gold übergehend, unter dem Kopfe weiss."

This species might well be *Notothenia magellanica* (Bloch and Schneider) were the anal rays not given as 25 for that form.

Regan² believes that *Notothenia macrocephala* is identical with species from Kerguelen, New Zealand, Auckland, and Campbell Islands. This would leave this species and *N. cornucola* the sole members of the genus which are circumpolar in distribution. His decision with regard to *N. cornucola* seems to have been based on a single "small specimen" from New Zealand. In his description of *N. macrocephala*³ the range of variation of the dorsal spines is given as III to VI, which is greater than in any other species in the present collection. In over a hundred examples of *Notothenia tessellata* the number varied only between VI and VII, while in 75 of *N. longipes* but 3 were found to vary from VI, and in 30 of *N. sima* the only numbers found were V or VI. However, judging from the form of the species, it is not as strictly littoral as some of the others, and if any of them are of wide distribution it would be this species, instead of cottoid forms like *N. sima*. If this distribution is adopted, the synonymy would include the following, as given by Regan:

Notothenia maoriensis HAAST, Trans. New Zealand Inst., vol. 5, 1873, p. 276, pl. 16, fig. New Zealand.

N. angustata HUTTON, Ann. Mag. Nat. Hist., ser. 4, vol. 16, 1875, p. 315. New Zealand.

N. antarctica PETERS, Monatsb. Akad. Berlin, 1876, p. 837. Kerguelen.

N. arguta HUTTON, Trans. New Zealand Inst., vol. 11, 1879, p. 339. New Zealand.

Without these localities, *N. macrocephala* ranges from the Falkland Islands, through the Straits of Magellan, around Cape Horn, to Fortune Bay, west coast of Patagonia and Otter Bay, in Smyth Channel, thus being present on both coasts.

¹ Magalhaensische Sammelreise.

² Scottish Antarctic Expedition, 1913, p. 277.

³ Idem.

3. NOTOTHENIA LATIFRONS, new species.

Plate 3, fig. 1.

Type and two paratypes from Sandy Point and Laredo Bay, Straits of Magellan. Type 63 mm. in total length, Cat. No. 76854, U.S.N.M.

Head $3\frac{1}{2}$ in body to end of muscular part of tail (0.30); depth $4\frac{2}{3}$ (0.22); eye, $4\frac{1}{3}$ in head (0.07 to 0.075); snout, $3\frac{2}{3}$ (0.08); maxillary $2\frac{2}{3}$ (0.11); mandible $2\frac{2}{3}$ (0.125 to 0.13); width of interorbital space $3\frac{1}{3}$ (0.09); length of pectoral $1\frac{1}{3}$ (0.22) to 0.23; of ventral $1\frac{1}{2}$ (0.19 to 0.20); least depth of caudal peduncle 3 (0.09 to 0.10); length of combined dorsal bases $1\frac{2}{3}$ in body without caudal (0.60); of anal base $2\frac{2}{3}$ (0.42 to 0.44); D. V, 30; A. 25 (24); scales with pores in upper lateral line 56 (51 to 56); in lower lateral line 10 (or 9); in lateral series 73 (67 to 73); in transverse series obliquely forward and upward from anal insertion 8+20; gill rakers 7+15 (18 to 22).

Head broad above but deeper than wide at preopercle; snout rounded, not pointed; profile arched strongly before eyes, nearly level behind; maxillary ending under anterior border of eyes; jaws nearly equal; interopercle nearly overlapped at angle of opercle; teeth in two or three rows anteriorly in both jaws, in a single row laterally; upper margin of eye covered by interorbital; eye looking laterally; gill rakers very short.

Dorsel inserted above pectoral base; interdorsal space equal to at least three interspinous spaces; distance last dorsal ray to end of muscular part of tail equal to least depth of caudal peduncle; last dorsal ray over last of anal; pectoral edge rounded; ventral not extending to anus; caudals broken in all specimens.

Upper lateral line ending under third from last dorsal ray and distant four scales from beginning of lower.

Scales etenoid, absent on head save on upper edge of opercle and cheek; present on suprascapular area; scales also absent before ventrals between their bases and gill opening, those between ventrals forming a broad band covering half of distance between them; scales between occiput and dorsal small.

Color uniform; silvery below and darker above; second dorsal dusky distally; narrowly margined with white; first dorsal somewhat darker; anal similar to second dorsal; other fins colorless or slightly dusky, but pattern, if any, completely faded.

This species differs from *Notothenia macrocephala* in the larger number of scales in the upper lateral line, the larger number in longitudinal series; longer maxillary and mandible in specimens of a size; the roughness of the scales to the touch, which are strongly etenoid and without the dermal flap which characterizes *N. macrocephala*; and in the presence of a bare space before the ventrals.

Table of proportional measurements in hundredths of the body length.

	<i>Notothenia macrocephala.</i>							<i>N. latifrons.</i>		
	01-50	01-14	01-12	01-72	01-66	01-73	01-67	01-11	01-65	01-64
Author's numbers ¹	01-50	01-14	01-12	01-72	01-66	01-73	01-67	01-11	01-65	01-64
Length to base of caudal. mm.	185	155	69	60	45	42	41	53	47	42
Body depth.....	0.28	0.29	0.26	0.26	0.24	0.23	0.23	0.22	0.225	0.22
Scales in lateral series.....	61	63	63	58	64	60	59	73	67	73
Scales in lateral lines.....	43+10	46+12	39+9	40+12	38+14	38+10	39+8	56+10	51+9	56+10
Maxillary length.....	0.115	0.105	0.095	0.10	0.09	0.095	0.09	0.11	0.11	0.11
Mandible length.....	0.12	0.115	0.11	0.11	0.11	0.115	0.115	0.125	0.13	0.13
Dorsal spines.....	V	IV	IV	IV	IV	V?	V	V	V	V
Anal rays.....	24	23	24	24	24	24	24	25	25	24

¹ Localities: Otter Bay, Smyth Channel, 01-50, 01-14; Borja Bay, Straits of Magellan, 01-12, 01-72, 01-73; Saudy Point, Straits of Magellan, 01-66, 01-67, 01-11, 01-65; Laredo Bay, Straits of Magellan, 01-64.

4. NOTOTHENIA ELEGANS Günther.

Notothenia elegans GÜNTHER, *Challenger Shore Fishes*, p. 21, pl. 11, fig. C. Off Cape Virgins, 55 fathoms.—PERUGIA, *Ann. Mus. Genova* (2), vol. 10, p. 19. 48° 1' 10" latitude south, and 63° 54' 15" longitude west.—DELFIN, *Catalogo de los Peces de Chile*, *Revista Chilena*, vol. 4, 1900, p. 87.—BOULENGER, *Southern Cross*, 1902, p. 183.—REGAN, *Scottish National Antarctic Exped.*, *Trans. Roy. Soc. Edinburgh*, vol. 49, pt. 2, No. 2, 1913, p. 274. Cape Virgins.

Described from numerous specimens taken at *Albatross* stations 2770, 2771, 2773, and 2774, extending from Cape Blanco to the entrance of Magellan Straits. The species is evidently a small one, the largest individual being 80 mm. in total length. A specimen (numbered 01-24) 75 mm. long is used as typical in the description and the extremes of measurements are inserted in hundredths of the total length.

Head $3\frac{3}{4}$ in body length (0.26 to 0.28); depth $6\frac{3}{8}$ in same (0.15 to 0.17); eye $3\frac{1}{4}$ in head (0.07 to 0.085); snout $4\frac{1}{2}$ (0.06 to 0.07); length of maxillary 3 (0.08 to 0.09); of mandible $2\frac{5}{8}$ (0.09 to 0.10); width of interorbital space 13 (0.015 to 0.025); length of pectoral $1\frac{1}{2}$ (0.20 to 0.23); of combined dorsal bases $1\frac{5}{8}$ in body; of anal base 2; D. VI, 32 (or 33); A. 30 (30 to 32); pectoral rays 23; scales with pores in upper lateral line 39 (38 to 42), in lower 5 (5 to 8); in lateral series 50 (48 to 51); scales between occiput and dorsal 14 (10 to 14); gill rakers X+11 (6 to 9+10 to 12=17 to 20).

Body elongated and slender, nearly cylindrical; width of head at opercles greater than depth by diameter of pupil; width of body at pectorals greater than depth by but little; tail compressed; head arched strongly in profile from above posterior border of eyes to tip of snout; eyes looking upward nearly as much as laterally, interorbital space very narrow; snout short, less than eye diameter; maxillary reaching to below pupil, mouth cleft but slightly oblique; volar flap, measured from tip of lower jaw, as wide as one-half diameter of eye; teeth small, in a double row in front, outer larger, a single row laterally.

First dorsal high, $2\frac{1}{4}$ in head; second dorsal nearly a third again as high anteriorly as posteriorly, as far as may be seen despite worn-

off rays; anal similar to second dorsal; last ray of latter above third from last of anal, and distant from last of muscular part of tail by more than depth of caudal peduncle; pectoral somewhat pointed; caudal rounded at tip; ventrals extending beyond anus.

Upper lateral line ending under third or fourth from last dorsal ray and slightly before or over beginning of lower.

Scales slightly ctenoid to touch; absent on head save a single line above on opercle and a few on upper edge of cheek; a narrow naked space in front of ventrals.

Body with five irregular V-shaped bands, first over pectorals, last below last rays of dorsal, extending ventrally to median line of side along which a narrow clear longitudinal space extends; six or seven large spots below this, not reaching ventral surface of body; second dorsal with indistinct markings; caudal crossed by two or three relatively broad bands; an irregular spot on caudal base; other fins clear.

Notothenia elegans Vaillant is not this species because of the fin formula, which is: D. IV, 40; A. 30.

N. elegans is only known from Cape Blanco to Cape Virgins, apparently entirely on the eastern coast.

5. NOTOTHENIA CORNUCOLA Richardson.

Notothenia cornucola RICHARDSON, Voyage *Erebus and Terror*, Fishes, 1846, p. 8, pl. 8, figs. 4 and 5; p. 18, pl. 11, figs. 3 and 4. Cape Horn, Port Louis, and Falkland Islands.—GÜNTHER, Cat. Fish. Brit. Mus., vol. 2, 1860, p. 261.—CUNNINGHAM, Voyage of H. M. S. *Nassau*, Trans. Linn. Soc., vol. 27, 1871, p. 470. Chiloe, Straits of Magellan, and west coast of Patagonia.—STEINDACHNER, Ich. Beitr., vol. 3, Sitz. d. k. Akad. Wien, vol. 72, Abth. I, Juni Heft, 1875, p. 45. Coasts of Patagonia and Chile and Straits of Magellan.—PETERS, Monatsb. Akad. Wiss. Berlin, Dec. 1876, p. 837. Punta Arenas, Straits of Magellan.—PERUGIA, Ann. Mus. Genova, (2) vol. 10, 1891, p. 19.—STEINDACHNER, Fauna Chilensis, Zool. Jahrb. Suppl. vol. 4, 1898, p. 301. Admiralty Sound, Punta Arenas.—DELFIN, Catalogo de los Peces de Chile, Revista Chilena, vol. 4, 1900, p. 85 (part only, forma *calva*).—VAILLANT, Mission Sci. Cap Horn, vol. 6, Zoologie 1, Poissons, 1907, p. 25. Orange Bay and "Mission a Terre."—REGAN, Scottish Antarctic Exped. Trans. Royal Soc. Edinburgh, vol. 49, pt. 2, No. 2, 1913, pp. 240 and 275. Falkland Islands and Magellan Straits.

Notothenia virgata RICHARDSON, Voyage *Erebus and Terror*, Fishes, 1846, p. 18, pl. 11, figs. 5 and 6. Falkland Islands.—GÜNTHER Cat. Fish. Brit. Mus., vol. 2, 1860, p. 262 (types of species).—VAILLANT, Mission Sci. Cap Horn, vol. 6, Zoologie, 1, Poissons, p. 25. Orange Bay and "Mission a Terre."

Notothenia marginata RICHARDSON, Voyage *Erebus and Terror*, Fishes, 1846, p. 18, pl. 12, figs. 1 and 2.—VAILLANT, Mission Sci. Cap Horn, vol. 6, 1907, p. 26. Orange Bay and "Mission a Terre" and Beagle Channel.

?*Notothenia modesta* STEINDACHNER, Fauna Chilensis, Zool. Jahrb., Suppl., vol. 4, 1898, p. 302, pl. 20, figs. 3, 3a. Punta Arenas, Straits of Magellan.—DELFIN, Catalogo de los peces de Chile, Revista Chilena, vol. 4, 1900, p. 86.

Notothenia coriiceps DOLLO, Voyage du S. Y. *Belgica*, Antwerp, 1904, p. 79. Lapatafa Bay in Beagle Channel.—LÖNNBERG, Wiss. Ergeb. Schwed. Südpolar Exp., vol. 5, Lief. 6, 1905, pp. 6 and 13. Ushuaia, Terre del Fuego, Falkland Islands; Hamburger Magalhaenische Sammelreise, Fische, 1907, p. 9, Smyth Channel, Punta Arenas, Ushuaia, Haberton Harbor, Falkland Islands (not *N. coriiceps* Richardson).

Described from three specimens taken at Laredo Bay (with a number of very young specimens) and five from Sandy Point, in the Straits of Magellan, the largest individual being 95 mm. in total length.

Head $3\frac{2}{3}$ in length to base of caudal (0.29 to 0.32 of body length), depth $4\frac{2}{3}$; eye 4 in head (0.07 to 0.075); snout $3\frac{1}{3}$; length of maxillary $2\frac{1}{2}$ (0.11 to 0.12); of mandible $2\frac{1}{3}$ (0.12 to 0.14); width of interorbital space $5\frac{2}{3}$ (0.045 to 0.055); length of pectoral $1\frac{1}{3}$ (0.19 to 0.23); of ventral $1\frac{2}{3}$ (0.19 to 0.21); least depth of caudal peduncle $3\frac{1}{3}$ (0.09 to 0.095); length of combined dorsal bases $1\frac{2}{3}$ in body (0.63 to 0.68); of anal fin 2; D. V (or IV), 32 (or 33); A. 29 (or 28); pectoral rays 20; scales with pores in upper lateral line 40; in lower 6; in lateral series 52 (49 to 54); in transverse series 5+15 (18 to 21); gill rakers 8+12.

Head narrow above, strongly arched, its width less than its depth at occiput; body compressed, its width one and one-third times in depth at pectoral bases; maxillary ending under center of eye; distance from eye to nearest point on line of occiput less than diameter of eye (more in *Notothenia sima*); breadth of velar fold from tip of lower jaw equal to two-thirds eye diameter; teeth above in two or three rows anteriorly, three or four below; interopercle evenly exposed throughout; jaws nearly equal; upper limb of preopercle inclined backward as it passes to angle; gill rakers short.

Dorsal inserted slightly before base of pectoral; distance from last ray to end of fleshy part of peduncle one-third least depth of latter; last dorsal ray above third from last of anal; first dorsal not as high as first rays of second dorsal, which are higher than last of same fin; anal lower but similar to second dorsal; ventrals reaching anus; caudal and pectorals rounded.

Upper lateral line ending below last dorsal ray; lower commencing immediately before its termination, very short.

Scales absent on cheeks and opercles save narrow upper parts; interorbital space completely naked, no buried scale between anterior edges of eyes; those between occiput and dorsal very small and buried; scales apparently lacking in space between ventrals and gill opening.

Color dark; two clear streaks, separated by a narrow dark streak, running obliquely back and downward from suborbital; a dark blotch above these below posterior border of eye; ventrals dark, with faint

clear edge; pectorals with bar completely across base in adults; anals dark, with clear edge; soft dorsal similar; spinous dorsal with usual large black spot on distal and posterior half; caudal with indications of cross-stripes; in young specimens anal frequently shows traces of oblique stripes.

Certain very young specimens of this species from Laredo Bay apparently show 5 spines and 34 rays in the dorsal, but are otherwise typical.

That this is *Notothenia cornucola* of Richardson and not *N. sima* is shown conclusively by the characters given for the former. These are: Dorsal rays 32; opercle not completely scaled; oblique cheek stripe distinct; bar across pectoral complete and distinct. Our specimens correspond in every detail with the description of the type.

Notothenia sima differs from this species not only in the characters shown in the key and tables of measurements, but also very greatly in physiognomy, the interorbital space being less strongly arched from side to side and the head apparently less compressed.

Regan¹ records a small specimen from New Zealand, but this is so contrary to the general distribution of the species of the genus that it is difficult to accept the record, on such meager material at least.

Steindachner's description of *Notothenia modesta* seems to fit our specimens closely enough, although he says:²

Wegen der stark comprimierten Form der Kopfes und der äusserst geringen Stirnbreite wage ich es nicht, das hier beschriebene Exemplar der Art nach mit *N. cornucola* zu vereinigen.

The range of distribution seems the greatest of the genus in so far as South American members are concerned, as it extends from the Island of Chiloe (43° latitude) on the western coast to the Falkland Islands on the eastern, being recorded many times from Cape Horn and the Straits of Magellan.

Authors' number. ¹	<i>N. cornucola.</i>					<i>N. sima.</i>						
	02-15	02-18	02-16	02-17	01-15	02-46	02-45	02-5	01-23	01-68	01-8	02-48
Length to base of caudal mm.	66	68	70	81	81	60	68	70	80	80	85	91
Eye diameter.....	0.075	0.075	0.07	0.07	0.07	0.07	0.07	0.065	0.07	0.06	0.06	0.06
Maxillary.....	.12	.12	.11	.12	.11	.10	.11	.11	.12	.11	.11	.12
Mandible.....	.14	.13	.12	.13	.12	.125	.12	.115	.13	.12	.125	.12
Dorsal rays.....	V, 32	V, 33	V, 32	V, 33	V, 32	VI, 29	VI, 29	VI, 30	VI, 30	V, 29	VI, 29	VI, 30
Scales in lateral series.....	50	49	53	52	54	47	46	46	48	50	49	49
Gill rakers.....	8+12	9+11	x+13	x+12	x+13	9+10	9+10	9+11	7+9	9+10	9+11	6+11

¹ Trans. Royal Soc. Edinb., vol. 49, 1913, p. 275.

² Fauna Chilensis, p. 302.

³ Localities: *N. cornucola*: All from Sandy Point, Straits of Magellan. *N. sima*: Laredo Bay, Straits of Magellan 02-46, 02-45, 02-48, 02-5, 01-8; Gregory Bay, Straits of Magellan, 01-23, 01-68.

6. NOTOTHENIA SIMA Richardson.

Notothenia sima RICHARDSON, Voyage *Erebus* and *Terror*, Fishes, 1846, p. 19, pl. 11, figs. 1 and 2. Falkland Islands.—STEINDACHNER, Fauna Chilensis, Zool. Jahrb. Suppl., vol. 4, 1898, p. 303. Punta Arenas, Straits of Magellan.—BOULENGER, Ann. Nat. Hist., (7) vol. 6, 1900, p. 53. Stanley Harbor, Falkland Islands; idem, Southern Cross, 1902, p. 183 (part).—LÖNNBERG, Wissensch. Erg. Schwed. Südpolar Exp., vol. 5, Lief. 6, 1905, p. 12, pl. 1, fig. 1. Falkland Islands.—?VAILLANT, Expédition Antarctique Française (1903–1905) Dec., 1906, p. 24. Booth Wandel Island, (Dorsal VI, 36).—LÖNNBERG, Magalhaenische Sammelreise, 1907, p. 9. Punta Arenas, Smyth Channel and Falkland Islands.—REGAN, Scottish Antarctic Expedition, Trans. Royal Soc. Edinb., 1913, p. 240 and 269. Magellan Straits and Falkland Islands.

Notothenia cornucola, formae *calva*, *intermedia*, and *squamifrons* SMITT, Bih. Svenska Akad., vol. 23, IV, No. 3, 1897, p. 12, pl. 1, fig. 12; pl. 2, figs. 13 and 14; pl. 11, figs. 15–17.—DELFIN, Catalogo de los Peces de Chile, Revista Chilena, vol. 4, 1900, p. 85 (after Smitt).

?*Notothenia kerlandrae* LÖNNBERG Wissensch. Ergeb. Schwed. Südpolar Exp., vol. 5, 1905, Lief. 6, p. 14, pl. 4, fig. 13. Port Williams and Port Stanley, Falklands.

Described from numerous specimens taken at Gregory and Laredo Bays, and Sandy Point in the Straits of Magellan. A specimen 105 mm. in total length from Laredo Bay taken as typical. It is the longest at hand.

Head $3\frac{2}{3}$ in body length (0.29 to 0.32); depth $4\frac{1}{2}$ (0.19 to 0.22); eye 5 in head (0.06 to 0.075); snout $3\frac{2}{3}$ (0.07 to 0.085); maxillary $2\frac{5}{8}$ (0.095 to 0.12); mandible $2\frac{1}{2}$ (0.11 to 0.13); width of interorbital space $5\frac{3}{4}$ (0.045 to 0.055); length of pectoral $1\frac{1}{3}$ (0.21 to 0.26); of ventral about $1\frac{1}{2}$ (0.22 to 0.24); depth of caudal peduncle $3\frac{1}{2}$ in head (0.08 to 0.095); length of combined dorsal bases $1\frac{2}{3}$ in body; of anal base 2; D. VI (or V), 28 (to 30); A. 28 (to 30); pectoral rays 22; scales with pores in upper lateral line 35 to 38; in lower 8 to 12; in longitudinal series 46 (45 to 50); in transverse 5+14; between insertion of dorsal and line of occiput 12 to 17; gill rakers 9+11 (18 to 20).

Head cottoid in shape, as deep as wide at opercles; widely arched, not strongly convex, from side to side; lower jaw but very slightly longer; lip usually as broad as suborbital; small teeth in a double band, outer series slightly enlarged; distance edge of velar flap from tip of lower jaw equal to two-thirds diameter of eye; upper side of eyeball exposed and pigmented; maxillary extending to below anterior fourth of eye; posterior limb of preopercle vertical; distance eye to line of occiput greater than diameter of eye in adults.

First dorsal inserted above pectoral base; interdorsal space equal to that between spines; distance from last ray to end of muscular part of tail two-thirds least depth of caudal peduncle; last dorsal ray over fourth from last of anal; longest dorsal spine 3 in head; longest ray $2\frac{1}{4}$ in head; anterior part of fin higher by a third than posterior;

longest anal ray 3 in head, fin slightly lower posteriorly; pectoral rounded; ventrals just reaching anus; caudal rounded.

Upper lateral line ending under fourth ray from last of second dorsal, and overlapping lower lateral line by four scales, sometimes not at all.

Scales ctenoid; interorbital scaled to between nostrils in some specimens, but half in others, and often covered by widely scattered scales; frequently entirely naked as far back as occiput save for a single, occasionally deeply embedded, but constantly present, scale between anterior borders of eye; whole of opercle with scales as large as those on body, preopercle, interopercle, and subopercle naked; cheeks with minute scales above on area of varying extent; scales between occiput and dorsal one-fifteenth size of those on the body; space before each ventral base naked to isthmus.

Color of majority of specimens much faded, leaving the first dorsal dark, the second dusky, and the anal with prominent oblique stripes; color of better preserved specimens variegated, especially in young; four irregular transverse bands on body margined with white, especially laterally; remainder of body spotted with dark scales; upper surface of snout covered by sharply margined spots; a dark, somewhat indefinite band extending downward and backward from preorbital and another from center of eye, with lighter center; upper half of pectoral base traversed by irregular dark lines surrounding lighter area; a dark bar across base of caudal, fading distally on rays; dorsal with indistinct dark oblique stripes, those on anal much more distinct; caudal with several well-defined crossbars.

The variation in the scaling of the head in this species is certainly remarkable, but it is evident enough that it is simply variation. All intergradations and degrees of scaling are to be seen, correlated with no other character as far as may be discovered. It is evident that Smitt was correct in calling his three "forms" members or parts of a single species, and Boulenger as plainly incorrect in referring the scaleless headed forms to *Notothenia cornucola*, as may be seen by reference to the differences between those species.

Table of measurements¹ and counts of specimens of *Notothenia sima* Richardson with scaled and scaleless heads.

Author's number.....	01-8	01-9	Anal rays.....	29	29
Scales on back of head.....	None.	Present.	Scales in lateral line.....	38+11	34+11
Length to base of caudal. mm.....	85	85	Scales in lateral series.....	49	45
Head length.....	0.32	0.32	Scales in transverse.....	17	18
Body depth.....	.21	.22	Pectoral length.....	0.23	0.22
Eye diameter.....	.06	.06	Ventral length.....	.23	.20
Snout length.....	.08	.08	Caudal peduncle depth.....	.09	.09
Maxillary length.....	.11	.11	Number of gill rakers.....	9+11	8+10
Interorbital width.....	.05	.05	Distance snout to dorsal.....	0.31	0.30
Dorsal spines..... number.....	VI	VI	Scales occiput to dorsal.....	.15	.16
Dorsal rays..... do.....	29	27	Distance snout to anus.....	.50	.49

¹ Measurements given in hundredths of body length.

Table of measurements ¹ and counts of *Notothenia sima* Richardson, from Laredo Bay, Straits of Magellan.

Author's number.....	02-49	01-90	01-71	02-41	02-46	02-45	02-5
Length to base of caudal..... mm.	43	44	44	51	60	68	70
Body depth.....	0.21	0.21	0.22	0.21	0.20	0.195	0.20
Maxillary length.....	.10	.10	.10	.10	.10	.11	.11
Interorbital width.....	.04	.04	.05	.05	.045	.045	.045
Dorsal spines.....	VI	VI	IV(?)	VI	VI	VI	VI
Gill rakers.....	X+11	8+10	X+10	8+10	9+10	9+10	9+11
Scales between dorsal and occiput.....	13	15	17	12	15	15	16

¹ Measurements in hundredths of the length to base of caudal.

7. NOTOTHENIA SQUAMICEPS Peters.

Plate 3, fig. 2.

Notothenia squamiceps PETERS Monatsber. Akad. Wiss. Berlin, Dec. 1876, p. 837. Punta Arenas (Straits of Magellan), in 1 or 2 fathoms.

Description of 10 specimens from Mayne Harbor, Patagonia, and Port Churrucá, in the Straits of Magellan; the longest specimen, 67 mm. in total length, was used as typical.

Head $3\frac{1}{2}$ (0.29 to 0.31) in total length to end of muscular part of tail; depth $3\frac{1}{3}$ (0.22 to 0.26); eye $4\frac{1}{4}$ in head (0.07 to 0.08 of body); snout $3\frac{1}{2}$ (0.075 to 0.085); length of maxillary $2\frac{1}{2}$ (0.09 to 0.10); of mandible $2\frac{2}{3}$ (0.11 to 0.125); width of interorbital space $4\frac{1}{2}$ (0.06 to 0.075); length of pectoral $1\frac{1}{2}$ in head (0.23 to 0.26); of ventral $1\frac{1}{6}$ (0.23 to 0.24); length of combined dorsal bases $1\frac{2}{3}$ in body without caudal; of anal 2; least depth of caudal peduncle $3\frac{1}{2}$ in head (0.09 to 0.10); D. VI (VI or VII), 26 (26 to 29); A. 29 (28 to 30); pectoral rays 22; scales with pores in upper lateral line 35 (31 to 38); in lower 6 (or 7); scales in longitudinal series 48 (46 to 49); in transverse from origin of anal obliquely forward and upward 4+12 (14 to 17); in series from occipital line of head to insertion of dorsal 9 (8 to 12); gill rakers 8+15 (7 or 8+13 to 16).

Head compressed, its depth at line of occiput one-third greater than its width at same point; without cottoid appearance of species allied to *Notothenia longipes*; body compressed, its width at base of pectorals nearly twice ($1\frac{2}{3}$) in its depth; interorbital space broad and somewhat arched; jaws nearly equal; upper limb of preopercle nearly vertical; interopercle in part completely overlapped; width of velar flap from tip of lower jaw equal to half diameter of eye; upper surface of eyeball but little exposed, eye looking nearly laterally; teeth in three rows anteriorly, a single one posteriorly; gill rakers not as long as pupil is wide.

Dorsal insertion above pectoral base; interdorsal space as wide as one or two spaces between spines; last dorsal ray above fourth or fifth from last of anal, and distant from end of muscular part of tail by $1\frac{1}{3}$ least depth of caudal peduncle; pectorals rounded, ventrals extending much beyond anus; caudal broken in all specimens, probably rounded.

Upper lateral line ending under third from last dorsal ray and failing to reach beginning of lower lateral line by seven or eight scales, although latter is continued by slightly pitted scales as far forward as pectorals, in same inconspicuous fashion as in other *Notothenia*.

Scales roughly ctenoid; present on head, except on snout, preopercular limbs, preorbitals, and jaws; extending as far forward as anterior border of eyes on interorbital and as far as end of maxillary on cheeks; scales on interorbital as large as those on flanks and opercle, those on cheeks and space between dorsal and occiput smaller; space between and before ventrals scaled.

Color uniform; spinous dorsal dark; soft dorsal with indistinct white stripes obliquely placed on a dark ground; anal similar, both anal and dorsal with last rays white or clear in a conspicuous way; caudal uniform, slightly dusky, as are pectorals and ventrals.

The large scales on the forehead, the somewhat compressed head, much compressed body, and clear (or white) last rays in the soft dorsal and anal clearly differentiate this species from all others.

The brief original description of the species offers but little secure ground for the determination of its relationships, and there may be room for doubt concerning the present identification. Peters' species was at all events not the same as *Notothenia sima*, to which it has been referred by recent authors, as it differs from that species in numerous details. It has one more spine than is found in *N. sima*, a greater depth, shorter head, and different coloration. The present species seems to have a different coloration than that described by Peters, and the scales extend to the anterior edge of the eye instead of to the middle. It is not at all closely comparable to *Notothenia tessellata*, to which he compared his specimens.¹

The recording of this species from Mayne Harbor extends the range of this species from Sandy Point (Punta Arenas) to Hanover Island on the western coast.

Table of measurements² and counts of *Notothenia squamiceps* Peters.

Author's number ³	01-60	01-53	02-50	01-61	01-62	01-13	01-59
Length to base of caudal.....	38	40	40	46	50	54	58
Body depth.....	0.22	0.25	0.25	0.23	0.24	0.26	0.25
Maxillary length.....	.09	.09	.095	.09	.095	.095	.10
Interorbital width.....	.06	.06	.06	.07	.075	.07	.075
Dorsal spines.....	V1	VI	VII	VII	VII	VII	VII
Gill rakers.....	X+13	X+15	7+16	8+14	7+14	X+15	X+15
Scales between occiput and dorsal.....	12	(?)	10	8	8	10	9

¹ The following is the original description of *Notothenia squamiceps* Peters:

² D. 7-28; A. 30; Lin. Lat. 51; tr. 3/13.

³ Körperhöhe zur Totallänge wie 1:4½. Der Kopf, dessen Länge die Körperhöhe kaum übertrifft, hat die Baeken der Kiemendeckel und die Interorbitalgegend bis vor die Mitte beschuppt.

⁴ Hellbraun. Brustflossen gelblich. Bauchflossen in der Mitte der Oberseite schwarz. Die Senkrechten Flossen schwarz gefleckt und gebändert, auf der vorderen Hälfte der Analflosse etwas unregelmäßige schwarz Längsbinden. auf der Schwanzflosse schwarze Querbinden.

⁵ Dieser Art stimmt durch die Beschuppung des Kopfes am meisten mit *N. tessellata* Richardson überein, bei welche aber dieselbe vorn noch über die Augen hinausragt, und welche ausserdem viel kleinere Schuppen, 66 bis 70 in der Seitenlinie und eine andere Flossenstrahl hat."

⁶ Measurements in hundredths of length to base of caudal.

⁷ Localities: Mayne Harbor, Patagonia, 01-60, 01-61, 01-62, 01-13, 01-59; Port Churruea, Straits of Magellan, 01-53, 02-50.

8. NOTOTHENIA RAMSAYI Regan.

Notothenia ramsayi REGAN, Scottish Antarctic Expedition, Trans. Roy. Soc. Edinburgh, vol. 49, pt. 2 (No. 2), 1913, pp. 239 and 267, pl. 7, fig. 1. Burdwood Bank and Isthmus Bay, Magellan Straits (56 and 14 fathoms).

"Depth of body 4 to $5\frac{1}{2}$ in the length of the fish, length of head about $3\frac{1}{2}$. Diameter of eye 4 to $4\frac{1}{2}$ in the length of the head, interorbital width $4\frac{1}{2}$ to 7. Jaws equal anteriorly; maxillary extending to below anterior one-fourth of eye; cheeks, opercles, and upper surface of head, to between the nostrils, scaly; 21 to 25 gill rakers on lower part of anterior arch. Dorsal VII (VIII), 34–36. Anal 32–34. Pectoral from less than three-fifths to two-thirds length of head; pelvis as long, extending to vent or to anal fin. Caudal rounded or subtruncate. Caudal peduncle as long as deep or deeper than long, its least depth one-fourth to two-sevenths the length of the head. Sixty to seventy-two scales in a longitudinal series, from above base of pectoral to caudal fin; 46 to 54 in upper lateral line, which almost reaches the caudal; 8 to 17 in lower lateral line. A lateral series of 5 to 7 dark blotches or vertical bars." (Regan.)

9. NOTOTHENIA JORDANI, new species.

Plate 3, fig. 3.

Described from numerous specimens taken at *Albatross* stations 2769, 2773, 2774, and 2775, respectively located as follows: Off the Gulf of St. George, off Cape Virgins, just south of Cape Virgins, and between Cape Virgins and First Narrows in the Straits of Magellan. All are badly preserved and brittle except the type from station 2773, a specimen 125 mm in total length, author's number 01–10, and Cat. No. 76855, U.S.N.M. Extremes of measurements in hundredths of body lengths of paratypes given in parentheses after the respective measurements of the type.

Head $3\frac{2}{3}$ in length to base of caudal (0.27 to 0.31); depth $4\frac{2}{3}$ (0.17 to 0.22); eye $4\frac{1}{2}$ in head (0.065 to 0.08); snout $3\frac{3}{4}$ (0.07 to 0.08); length of maxillary $2\frac{2}{3}$ (0.095 to 0.10); of mandible $2\frac{3}{4}$ (0.12 or 0.13); width of interorbital space $5\frac{1}{2}$ (0.05 to 0.065); length of pectoral $1\frac{2}{3}$ (0.21 to 0.25); of ventral $1\frac{1}{2}$ (0.19 to 0.23); of longest spine of first dorsal $1\frac{1}{2}$; least depth of caudal peduncle $3\frac{2}{3}$ (0.07 to 0.08); length of combined dorsal bases $1\frac{1}{2}$ in body; of anal $2\frac{1}{10}$; D. VII (VII or VIII), 35; A. 32 (31 to 33); pectoral rays 23; scales with pores in upper lateral line 46 (43 to 47), in lower lateral line 16 (8 to 16); in lateral series 62 (58 to 62); in transverse from anal insertion obliquely forward and upward 5 + 15; gill rakers 14 + 24 (= 35 to 38).

Width of head at preopercle nearly equal to its depth; width of body at pectorals two-thirds its depth; lower jaw slightly longer than upper; maxillary ending under anterior third of eye; interorbital space broad, flat; upper surface of eyeballs only slightly exposed;

angle of preopercle overlapping interopercle entirely at one place; breadth of velar flap measured from tip of lower jaw half diameter of eye; teeth small, in a band 4 or 5 series wide anteriorly, narrowing on either side, none enlarged, rows subequal; gill rakers fine and longer than usual, $2\frac{1}{3}$ to 3 in eye.

First dorsal inserted in advance of pectoral base, its rays long and reaching to sixth of second dorsal; latter nearly one and one-half times as high anteriorly as posteriorly, longest ray one-half to two-thirds those of first dorsal; dorsal termination above third from last anal ray, which is nearly depth of caudal peduncle from end of fleshy portion of tail; ventrals extending nearly to or slightly beyond anus; pectoral rounded.

Upper lateral line extending slightly beyond last dorsal ray, overlapping lower lateral line with eight of its scales.

Scales very roughly ctenoid, even on dorsal surface of head; present everywhere save on lips, snout, and lower jaw; extending to between anterior border of eyes on interorbital space, to end of maxillary on cheeks, not present on interopercle and limbs of preopercle; scales on dorsum of head as large as those on flanks, as are those on opercle; on cheeks and space between occiput and dorsal somewhat smaller; area before and between ventrals scaled.

Color pattern striking; four pairs of irregular dark stripes transverse to body, inclined posteriorly somewhat above lateral line, and continued on dorsal as black spots; these fading ventrally; a dark patch in center of caudal peduncle; a yellowish brown stripe as wide as pupil running from occiput in a curve to median line of body and thence to center of caudal; no color pattern observable on head; first dorsal dusky; second with indications of longitudinal stripes, and black spots continued from body stripes to half height of rays; anal appears to have dusky markings and clear margin; pectoral with diffuse blotch across upper part of base; ventrals clear.

Named for Dr. D. S. Jordan, of Stanford University.

The striking features of this species are the following: A high first dorsal; large roughly ctenoid scales on head; black spots on second dorsal; and long, fine gill rakers. It is probably most closely related to *Notothenia longipes* and *N. tessellata*, but is very distinct from either.

Our specimens differ from the description given by Regan of *Notothenia ramsayi* in the following characters: The scales do not extend as far forward as the nostrils in any of our numerous specimens and they are very large on the interorbital space, three of them forming a transverse series from eye to eye; and the lower jaw is slightly longer. From his plate the following differences may be noted, although they may possibly not hold when the species are directly compared: The preopercle overlaps the interopercle entirely

at one place in our specimens (a good character generally); the first dorsal is much higher (in adults and young); and the second dorsal has black blotches, very prominent, instead of being plain. In *N. ramsayi* Regan the scales on the interorbital space are shown very small, eight or nine in transverse series from eye to eye, and this character may especially be used to differentiate the two.

	<i>N. jordani.</i>					
Author's number ¹	01-10	01-45	01-51	01-57	01-58	01-56
Length to base of caudal.....mm.	110	111	57	53	43	42
Eye diameter.....	0.065	0.08	0.07	0.08	0.08	0.08
Width of interorbital.....	0.05	0.05	0.065	0.06	0.055	0.06
Dorsal spines.....	VII	VII	VIII	VII	VII	VII
Scales in lateral lines.....	46+16	47+8	(?)	45+13	43+?	43+11
Scales in lateral series.....	62	(?)	60	58	60	58
Pectoral length.....	0.21	0.23	0.23	0.23	0.25	0.23
Gill rakers.....	14+24	12+23	11+24	14+24	x+25	x+24

	<i>N. longipes.</i>								
Author's number ¹	02-25	02-35	02-19	02-21	02-22	02-20	02-23	02-36	
Length to base of caudal.....mm.	120	105	101	97	92	85	75	70	
Eye diameter.....	0.08	0.085	0.08	0.09	0.09	0.10	0.10	0.11	
Width of interorbital.....	0.045	0.045	0.04	0.04	0.04	0.035	0.035	0.035	
Dorsal spines.....	VI	VI	VI	VI	VI	VI	VI	VI	
Scales in lateral lines.....	51+11	53+13	53+10	(?)	52+7	51+10	53+12	50+9	
Scales in lateral series.....	74	74	69	69	70	74	70	(?)	
Pectoral length.....	0.20	0.20	0.19	0.20	0.19	0.19	(?)	0.21	
Gill rakers.....	10+18	12+20	12+20	10+18	10+19	13+19	10+19	11+18	

	<i>N. jordani.</i>						
Author's number ²	01-45	01-10	01-51	01-57	01-58	01-56	
Length to caudal base.....mm.	111	110	57	53	43	42	
Maxillary.....	0.095	0.095	0.095	0.095	0.10	0.10	
Mandible.....	0.12	0.12	0.12	0.13	0.13	0.13	
Dorsal rays.....	VII, 33	VII, 35	VIII, 35	VII, 35	VII, 35	VII, 35	
Scales in lower lateral line.....	8	16	(?)	13	(?)	11	
Scales in series.....	(?)	62	60	58	60	58	
Ventral length.....	0.20	0.19	0.195	0.21	0.23	0.23	
Gill rakers.....	12+23	14+24	11+24	14+24	x+25	x+24	
Scales between dorsal and occiput.....	12	10	12	12	11	11	

	<i>N. tessellata.</i>							
Author's number ²	02-44	01-47	01-18	01-54	02-37	02-38	02-39	
Length to caudal base.....mm.	110	97	84	53	55	50	44	
Maxillary.....	0.10	0.10	0.11	0.10	0.095	0.10	0.095	
Mandible.....	0.12	0.115	0.12	0.13	0.12	0.13	0.13	
Dorsal rays.....	VI, 32	VI, 33	VI, 32	VI, 34	VI, 32	VI, 32	VI, 33	
Scales in lower lateral line.....	8	8	9	6	8	7	7	
Scales in series.....	77	71	73	76	69	74	72	
Ventral length.....	0.18	0.18	0.21	(?)	.....	0.19	0.18	
Gill rakers.....	8+13	9+13	9+13	9+13	9+14	8+14	9+13	
Scales between dorsal and occiput.....	16	15	(?)	(?)	16	16	15	

¹ Localities as follows: *N. jordani*: Cape Virgins, 01-51, 01-10, 01-57, 01-58; between First Narrows and Cape Virgins (Magellan Straits), 01-56; off the Gulf of St. George, 01-45 (*Albatross* station 2769). *N. longipes*: All from *Albatross* station 2770, near Hilly Point and Cape Watchmap, east coast of Patagonia.

² Localities: *N. jordani*: See note to preceding tables (*N. jordani* and *longipes*). *N. tessellata*: Sandy Point, Straits of Magellan, 02-44, 01-47; Mayne Harbor, Patagonia, 01-18, 02-37, 02-38, 02-39; Port Churruca, Straits of Magellan, 01-54.

10. NOTOTHENIA LONGICAUDA, new species.

Plate 4, fig. 1.

?*Notothenia cyanobranchia* VAILLANT, Mission Sci. Cap Horn, 1907, p. 26. Orange Bay (not *N. cyanobranchia* Richardson).

Notothenia brevicauda REGAN, Scottish National Antarctic Exped. Trans. Roy. Soc. of Edinburgh, vol. 49, pt. 2 (No. 2), 1913, pp. 239 and 269. Port William and Port Stanley (Falkland Islands).

Described from seven specimens taken at *Albatross* station 2771, off Cape Redondo, Patagonia; one from Gregory Bay; and one from Island Harbor, Patagonia, the last taken as the type Cat. No. 76856, U.S.N.M. The type (78 mm. in body length) is the only specimen in a good state of preservation; the others are shrunken and brittle from strong alcohol. The longest specimen is 110 mm. in total length.

Head $3\frac{3}{5}$ (0.28 to 0.30) in length to base of caudal; depth of body $5\frac{1}{2}$ (0.19 to 0.21); eye 4 in head (0.07 to 0.08); snout $3\frac{3}{4}$ (0.07 to 0.08); length of maxillary 3 (0.09 to 0.10); of mandible $2\frac{4}{5}$ (0.10 to 0.12); width of interorbital space $6\frac{1}{5}$ (0.035 to 0.045); length of pectoral $1\frac{5}{8}$ (0.18 to 0.20); of ventral $1\frac{1}{2}$ (0.18 to 0.20); depth of caudal peduncle $3\frac{1}{5}$ (0.07 to 0.08); D. V, 36 (35); A. 33 (32 or 33); pectoral rays 24; scales with pores in upper lateral line 48 (47 to 50); in lower 5 (0 to 7); in lateral series 65 (65 to 75); in transverse series from insertion of anal obliquely forward and upward 4+18 (21 to 26); gill rakers 9+16 (30 to 34).

Width of head equal to its depth; maxillary ending under anterior third of eye; interorbital narrow; upper surface of eye exposed and colored; jaws nearly equal; teeth in four rows anteriorly in both jaws, outer row only slightly enlarged; width of velar fold measured from tip of lower jaw slightly more than half diameter of eye; least depth of preorbital $3\frac{1}{2}$ in eye.

Insertion of dorsal over pectoral base; distance from last dorsal rays to end of muscular part of tail equal to depth of caudal peduncle; last dorsal ray over next to last anal ray; height of first dorsal equal to diameter of eye; of second $2\frac{2}{3}$ in head, but slightly lower posteriorly; anal height nearly equal throughout, equal to that of first dorsal; ventrals extending to anus; pectorals rounded; caudal rounded.

Upper lateral line approaching to within three or four scales of end of muscular part of tail; lower very short, or absent, overlapped two scales by upper lateral line.

Scales present on interorbital space to between anterior border of eyes, but absent on line of occiput over occipital tube of lateral line organs, a small bare space of greater or less extent also present before it in median line; scales on cheeks and opercles as in *Notothenia longipes*, absent on snout, jaws, limbs of preopercle, and interopercle; present on subopercle.

Color very dark, without definite pattern on body; dorsal and anal very dark, latter nearly black; ventrals dusky; pectorals and caudal clear; branchiostegal membrane very dark, margin clear.

There are none of the characteristic markings of *Notothenia longipes* visible, and the anatomical characters which distinguish it from that

species are the following: Absence of scales on the occipital line and on the interopercle, fewer scales with pores in the lower lateral line, and but five spines instead of six. The eye in specimens of a size is markedly smaller in *N. longicauda*, new species.

From *N. brevicauda* Lönnberg this species differs in the much longer and more slender caudal peduncle, the higher fins, and a number of other different measurements as far as can be judged from the plate. Regan¹ ignores the great depth of the caudal peduncle in *N. brevicauda*, and identifies what is apparently the present species as that form. He, however, gives no character by which his specimens may be differentiated from *Notothenia longipes* of Steindachner save the number of dorsal spines, and it is on this character that his form is here identified as *N. longicauda* rather than *N. longipes*. Lönnberg's plate and his text emphasize the depth of the peduncle in such fashion that it is impossible to ignore it, in addition to the other apparent differences to be seen from the plate. If the plate can be trusted, the preorbital is deeper than usual, scales are lacking on the subopercle, and the interdorsal space is not wider than that between two spines. In all these characters it differs from the present species, as also from *N. longipes*. There is not the slightest tendency to vary in such a marked way in any of the numerous specimens of *Notothenia longipes* at hand or in those of the present species.

Author's number.?	<i>Notothenia longipes.</i>						
	02-23	02-36	02-20	02-22	02-21	02-19	02-35
Length to caudal base.....mm..	75	70	85	92	97	101	105
Body depth.....	0.165	0.16	0.17	0.15	0.16	0.18	0.16
Eye diameter.....	0.10	0.11	0.10	0.09	0.09	0.08	0.085
Dorsal.....	V1,34	V1,36	V1,34	V1,35	V1,36	V1,35	V1,36
Anal.....	33	34	34	33	34	34	34
Scales in lateral line.....	53+12	50+9	51+?	52+7	(?)	53+10	53+13

Author's number.?	<i>Notothenia longicauda.</i>						
	01-81	01-82	01-85	01-84	01-83	01-80	01-43
Length to caudal base.....mm..	72	73	80	82	83	100	100
Body depth.....	0.19	0.20	0.20	0.20	0.19	0.21	0.20
Eye diameter.....	0.08	0.08	0.08	0.08	0.07	0.07	0.08
Dorsal.....	V,35	V,35	V,35	V,34	V,35	V,35	V,35
Anal.....	32	32	33	33	32	33	33
Scales in lateral line.....	50+5	49+5	49+0	49+6	47+6	49+7	50+?

¹ Scottish Antarctic Expedition, p. 269.

² Localities: *N. longipes* all from *Albatross* station 2770, near Hilly Point and Cape Watchmap, on east coast of Patagonia. *N. longicauda* from *Albatross* station 2771, north of Cape Virgins.

11. *NOTOTHENIA BREVICAUDA* Lönnberg.

Notothenia brevicauda LÖNNBERG, Swedish South Polar Expedition, Wissensch. Ergeb. Schwed. Südpolar Exp., vol. 5, 1905, Lief. 6, p. 6, Ushuaia, 10 meters (not *N. brevicauda* Regan).

The very short and deep caudal peduncle of this species appears entirely distinctive; in other regards it seems to be related to *Notothenia longicauda*, new species, differing slightly in body depth and height of fins. No specimens are at hand which answer Lönnberg's description.

"D. V, 35; A. 32; Squ. 66.

"Head moderately compressed, extensively scaly all over except on snout to above nostrils and preorbital. Body rather strongly compressed. Depth of body four and four-fifth times in total length without caudal. Length of head three and one-half times in total length without caudal. Diameter of eye four times in length of head. Interorbital width about seven times in length of head. Snout a little longer than diameter of eye. Upper lateral line with 45 to 46 tubular scales, lower lateral line with only 5 to 6 tubular scales, but in front of them may be counted a great number of pitted scales, on one side 20. First dorsal basally somewhat connected with second. Longest ray of former shorter than longest ray of latter, which is equal to half the length of the head. Longest anal rays about one-third length of head. Pectoral rounded about two-thirds length of head, reaching beyond origin of anal. Ventral about five-sevenths length of head, reaching beyond origin of anal. Caudal very strongly rounded. Caudal peduncle much deeper than long, so short that anal as well as second dorsal when laid back reach beyond the same, its depth not even contained twice in length of head. Anal and ventral fins as well as gill-membrane dusky." (Lönnberg.)

12. *NOTOTHENIA TESSELLATA* Richardson.

Notothenia tessellata RICHARDSON, Voyage *Erebus* and *Terror*, Fishes, London, 1846, p. 19, pl. 12, figs. 3 and 4. Falkland Islands.—GÜNTHER, Cat. Fish Brit. Mus., vol. 2, p. 260, after Richardson.—CUNNINGHAM, Voyage of H. M. S. *Nassau*, Trans. Linn. Soc., vol. 27, 1871, p. 469. Punta Arenas and Fortune Bay (west coast of Patagonia).—STEINDACHNER, Ich. Beitr., vol. 3, Sitzb. d. k. Akad. d. Wiss. Wien., vol. 72, I Abth. Juni Heft, 1875, p. 44. Straits of Magellan, Punta Arenas, Port Gallant, Puerto Bueno, and Chile.—PERUGIA, Ann. Mus. Genova (2), vol. 10, 1891, p. 18. Brecknock Pass and Straits of Magellan.—VAILLANT, Mission Sci. Cap Horn, 1882-1883, vol. 6, Zoologie, 1891, p. 24, "Fuegie"; Smitt, Bih. Svenska Akad., vol. 23, IV, No. 3, 1897, p. 25 (part, forma *microps*). Tierra del Fuego.—DELFIN, Catalogo de los Peces de Chile, Revista Chilena, vols. 3 and 4, 1900, p. 86 (part, forma *microps*).—DOLLO, Voyage du S. Y. *Belgica*, Zoologie, Antwerp, 1904, p. 79. "Hope Harbor (Clarence Island, Magdalena Sound)."—LÖNNBERG, Wissensch. Ergeb. Schwed. Südpolar Exp., vol. 5, Lief 6, 1905, p. 6. Ushuaia, Tierra del Fuego. Hamburger Magalhaenische Sammelreise, 1907, p. 9. Smyth Channel (eight localities) Punta Arenas and Ushuaia.—REGAN, Scottish Antarctic Exped. Trans. Royal Soc. Edinburgh, vol. 47, pt. 2, No. 2, 1913, p. 268.

?*Notothenia veitchii* GÜNTHER, Ann. Nat. Hist., vol. 14 (4), 1874, p. 370. Chonos Archipelago, Chile.

Notothenia acuta STEINDACHNER, Fauna Chilensis, Zool. Jahrb. Suppl., vol. 4, 1898, p. 303. Cape Espirito Santo.—DELFIN, Catalogo de los Peces de Chile, Revista Chilena, vols. 3 and 4, 1900, p. 86 (after Steindachner).

Notothenia brevipes LÖNNBERG Wissenschaft. Ergeb. Schwed. Südpolar Exp., vol. 5, 1905, p. 15. Falkland Islands.

Description of very numerous specimens (250) from Sandy Point, Port Churruea, Gregory Bay, and Laredo Bay in the Straits of Magellan; Otter Bay in Smyth Channel; Port Grappler; and Mayne Harbor, Patagonia. Specimens of this species were taken from the stomach of a "hake" in Borja Bay in the Straits of Magellan. A mature specimen 240 mm. in total length is used as the type of the description, with the range of 20 specimens given in parentheses.

Head, $3\frac{2}{3}$ in body length to base of caudal (0.30 to 0.33); depth, 5 (0.18 to 0.20); eye, $4\frac{1}{4}$ in head (0.055 to 0.07); snout, $3\frac{1}{2}$ (0.07 to 0.09); maxillary, $2\frac{1}{2}$ (0.095 to 0.13); mandible, $2\frac{1}{10}$ (0.115 to 0.145); width of interorbital space, 6 (0.04 to 0.055); length of pectoral, $1\frac{1}{2}$ (0.22 to 0.24); of ventral, $1\frac{2}{3}$ (0.17 to 0.20); depth of caudal peduncle, $3\frac{2}{3}$ (0.07 to 0.08); length of combined dorsal bases, $1\frac{2}{3}$ in body; of anal base, 2; D. (VI or VII, 33 (32 to 34); A. (32 or) 33; pectoral rays, 24; scales with pores in upper lateral line 48, in lower 11 (41 to 49+6 to 13); scales in longitudinal series, 77 (69 to 80); in a transverse series from origin of anal obliquely forward and upward 7+22; between insertion of dorsal and line of occiput, 17 (15 to 19); gill rakers, 8+14 (21 to 24).

Head slightly depressed, with wide mouth, slightly cottoid in shape, its width a trifle greater than its depth; lips thick; interorbital space narrow, flat, or slightly concave; lower jaw longest, projecting in front of upper; velar fold measured from tip of lower jaw two-thirds of, or equal to, eye diameter; teeth in a loose double row, in front enlarged somewhat, behind small; upper surface of eyeball exposed and pigmented; upper limb of preopercle inclined backward toward angle; gill rakers short.

First dorsal inserted above pectoral base, connected slightly at base by membrane with first ray of second, from which its last spine is as far distant as the space between two spines; second dorsal terminates above third from last anal ray; depth of caudal peduncle greater than distance from last anal ray to last of muscular part of caudal peduncle; longest dorsal spine 3 in head; rays subequal, $3\frac{1}{2}$ in head; anal similar, rays 4 in head, the posterior rays somewhat longer; ventrals extending nearly to anus; pectorals rounded; caudal margin convex.

Upper lateral line ending five scales before end of muscular part of tail; lower line usually short and but slightly overlapped by the upper.

Scales on dorsal surface of head and occiput in adults frequently appearing nonimbricated, those on cheeks concealed; scales not always rough to the touch except on belly and lower side of flanks, and never roughly ctenoid as in *Notothenia longipes*; scales present

on head to between anterior border of eyes, the scaly area ending in point midway between them, not extending along upper anterior border of orbits; scales present on whole of cheeks to a point opposite least depth of preorbital; no scales on interopercle; those on space between occiput and dorsal small as are those on interorbital; snout and jaws naked as are limbs of preopercle; area before and between ventrals scaled.

Color variegated; body with five irregular bars or Y-shaped saddles much broken, a light line along median level of flank, fading into light below; head and dorsal part of body with many small spots as large as scales of greater or less distinctness; an indistinct bar running backward and downward from postero-ventral border of eye, fading distally; spinous dorsal dusky, a large black spot on last spines; soft dorsal with narrow semihorizontal stripes most oblique posteriorly; tip of each ray clear; pectorals covered proximally with small spots arranged in transverse rows, these fading on distal part of fin; ventrals sometimes slightly dusky; anal submargined with dark, with clear base and whitish margin; caudal with narrow irregular transverse bands, darker and wider nearest the tip, and with a clear or white margin.

Lönnerberg (Magalhaenische Sammelreise, p. 9), remarks:

Die Färbung dieser Art ist etwas abwechselnd, was wohl mit der Beschaffenheit des Bodens zusammenhängt. Es finden sich die folgenden Angaben hierüber auf den Etiketten: "Bauch schmutzig-weiß, Seiten Gelblich, auf den Rücken grünbraune Flecken" (Puerto Bueno); "Hellbraun mit dunkeln Flecken, Bauch goldgelb" (Smyth Channel); "Grau-wässrig mit Schwarzen Flecken" (Port Grappler).

Notothenia veitchii Günther varies greatly in scale count and anal rays ("D. VI, 32; A. 28; L. lat. ca. 88") but Boulenger is here followed, as the types of the species are presumably in the British Museum and examined by him. There is no doubt that Steindachner's specimens of *N. acuta* are the present form, as the type of that species has larger eyes and a decidedly narrow interorbital space (10 to 11 in head, according to Boulenger, not 5 as given by Steindachner for his specimens).

Some of the differences between this species and *Notothenia longicauda* are shown in the attached tables, and more are to be found in the coloration. The absence of the scales along the line of the occiput in *N. longicauda* is a striking difference.

	<i>Notothenia tessellata</i> .							
	01-54	02-42	02-43	02-40	02-41	01-18	01-47	02-44
Author's number ¹	53	67	78	78	80	84	87	110
Length of caudal base.....mm.	0.07	0.07	0.07	0.07	0.07	0.065	0.065	0.06
Eye diameter.....	0.10	0.10	0.10	0.11	0.10	0.11	0.10	0.10
Maxillary.....	VI, 34	VI, 33	VI, 33	VI, 32	VII, 33	VI, 32	VI, 33	VI, 32
Dorsal rays.....	33	32	32	32	33	32	32	33
Anal rays.....	41+6	47+6	47+6	46+7	45+8	48+9	48+8	48+8
Scales in lateral lines.....	0.24	0.24	0.23	0.24	0.22	0.23	0.22	0.23
Pectoral length.....	9+13	9+13	9+12	8+13	9+13	9+13	9+13	8+13
Gill rakers.....								

¹Localities: *N. tessellata*: Port Churrucá, Straits of Magellan, 01-54; Mayne Harbor, Patagonia, 02-42, 02-43, 02-40, 02-41, 01-18, 01-47; Sandy Point, Straits of Magellan, 02-44. *N. longicauda*: all from Albatross station 2771, north of Cape Virgins.

	<i>N. longicauda.</i>						
	01-81	01-82	01-85	01-84	01-83	01-80	01-43
Author's number ¹	72	73	80	82	83	100	100
Length of caudal base..... mm.	0.08	0.08	0.08	0.08	0.07	0.07	0.08
Eye diameter.....	0.10	0.09	0.10	0.095	0.095	0.10	0.10
Maxillary.....	V, 35	V, 35	V, 35	V, 34?	V, 35	V, 35	V, 35
Dorsal rays.....	32	32	33	33	32	33	33
Anal rays.....	59+5	49+5	49+0	49+6	47+6	49+7	50+?
Scales in lateral lines.....	0.19	0.18	(?)	0.20	0.18	0.18	0.20
Pectoral length.....	11+19	11+20	10+19	11+21	12+19	10+21	14+20
Gill rakers.....							

¹ Localities: *N. tessellata*: Port Churrucal, Straits of Magellan, 01-54; Mayne Harbor, Patagonia, 02-12, 02-43, 02-40, 02-41, 01-18, 01-47; Sandy Point, Straits of Magellan, 02-44. *N. longicauda*: All from Albatross station 2771, North of Cape Virgins.

13. NOTOTHENIA TRIGRAMMA Regan.

Notothenia trigramma REGAN, Scottish Antarctic Exped., Trans. Royal Soc. Edinburgh, vol. 49, pt. 2 (No. 2), 1913, pp. 239 and 266, pl. VI, fig. 2. Port Stanley, Falklands.

"Depth of the body 5 in the length, length of head 4. Diameter of the eye 5 in the length of the head and equal to the interorbital width. Lower jaw projecting; maxillary extending to below anterior third of eye; upper surface of head, except snout, cheeks, and opercles scaly; 15 gill rakers on lower part of anterior arch. Dorsal VI, 34. Anal 32. Pectoral longer than pelvics, two-thirds as long as head, extending to above anal. Caudal rounded. About 85 scales in a lateral longitudinal series, 65 in upper lateral line, which nearly reaches caudal, 13 in line in middle of tail, and 40 to 45 in a third lower lateral line, which is separated by 4 or 5 longitudinal series of scales from the base of the anal fin. Brownish; fins darker.

"Port Stanley, Falklands.

"Total length, 280 mm." (Regan.)

The plate shows the interorbital space to be covered with small scales.

14. NOTOTHENIA LONGIPES Steindachner.

Notothenia longipes STEINDACHNER, Ichth. Beitr., vol. 3, Sitzb. d. k. Akad. d. Wiss. Wien, vol. 72, I Abth. Juni Heft, 1875, p. 42, pl. 6, fig. rechts. Straits of Magellan and west coast of Patagonia.—GÜNTHER, *Challenger*, Shore Fishes 1880, p. 21. Messier Channel (345 fathoms), Port Famine (10 to 15 fathoms), Cape Virgins (55 fathoms).—PERUGIA, Ann. Mus. Genova (2), vol. 10, 1891, p. 17 (of separate). Brecknock Pass.—VAILLANT, Mission Sci. Cap Horn, 1882-1883, vol. 6, Zoologie, Poissons, 1888, p. 25. Orange Bay.—JORDAN, List of Fishes obtained in the harbor of Bahia, Brazil, and in adjacent waters, Proc. U. S. Nat. Mus., vol. 13, 1890, p. 335. Southern Patagonia.—STEINDACHNER, Fauna Chilensis, Zool. Jahrb. Suppl., vol. 4, 1898, p. 304. Smyth Channel, Patagonia (not *N. mizops* Günther).—BOULENGER, Southern Cross, 1902, p. 183 (part, not *N. squamifrons* Günther).—LÖNNBERG, Wissenschaft. Ergeb. Schwed. Südpolar Exped., vol. 5, Lief. 6, 1905, p. 15. Falkland Islands.—REGAN, Scottish Antarctic Exped., Trans. Royal Soc. Edinburgh, vol. 49, pt. 2 (No. 2), 1913, p. 269. Patagonia and Magellan Straits. *Notothenia tessellata* forma *megalops* SMITT, Bih. Svenska Akad., vol. 23, IV, No. 3, 1897, p. 25 (not synonymy).—DELFIN, Catalogo de los Peces de Chile, Revista Chilena, vols. 3 and 4, 1900, p. 86 (part, forma *megalops*).

?*Notothenia squamifrons* VAILLANT, Mission Sci. Cap Horn, vol. 6, Zoologie, 1. Poissons, 1891, p. 24. Orange Bay.

Notothenia wiltoni REGAN, Scottish Antarctic Exped., Trans. Royal Soc. Edinburgh, vol. 49, pt. 2 (No. 2), 1913, p. 268, pl. 7, figs. 2, 2a. Orange Bay, Straits of Magellan, Port Stanley, and Port Williams (Falklands), and on Burdwood Bank.

Description of numerous specimens (nearly 75) from *Albatross* station 2787, at Otter Bay, Smyth Channel; Sandy Point, Laredo Bay, and Port Churruca in the Straits of Magellan; Port Grappler, Patagonia; *Albatross* station 2770, near Hilly Point and Cape Watchmap, on the east coast of Patagonia, and station 2771 near Cape Virgins, in 50 fathoms. The measurements in parentheses of the extremes of variation were taken from 30 specimens. The typical specimen is 250 mm. in total length:

Head $3\frac{1}{3}$ (0.29 to 0.31) in body length; depth $5\frac{1}{4}$ (0.15 to 0.21) in same; eye 4 in head (0.07 to 0.11); snout $3\frac{1}{2}$ (0.07 to 0.08); maxillary $2\frac{2}{3}$ (0.095 to 0.12); mandible $2\frac{2}{3}$ (0.105 to 0.12); width of interorbital space 6 (0.035 to 0.05); length of pectoral $1\frac{2}{3}$ (0.18 to 0.22); of ventral $1\frac{2}{3}$ (0.17 to 0.21); depth of caudal peduncle 4 in head (0.07 to 0.08); length of combined dorsal bases $1\frac{5}{8}$ in body (0.64 to 0.67); of anal base 2 (0.47 to 0.52); D. VI (very rarely VII), 35 (34 to 36); A. 33 (31 to 34); pectoral rays 26 (24 to 26); scales with pores in upper lateral line 49 (47 to 53); in lower lateral line 7 to 17; in longitudinal series 75 (69 to 78); in transverse from origin of anal obliquely upward and forward 21 (20 to 22); between insertion of dorsal and line of occiput 12 (10 to 15); gill rakers 10+17 (22 to 32).

Head somewhat cottoid in shape, its width equal to depth at opercles; interorbital space flat, its width always less than vertical diameter of orbit; eyeball exposed and colored above; width of lip and maxillary nearly equal to width of suborbital; velar flap from tip of lower jaw less than half eye; jaws nearly equal; maxillary extending to below anterior fourth of eye; teeth small, anteriorly in a band 4 or 5 series wide above; 3 or 4 series below, outer row enlarged slightly, but a single series present laterally in either jaw.

First dorsal inserted slightly before pectoral base; distance between last ray and first of second dorsal twice that between two spines; depth of caudal peduncle slightly less than distance from last dorsal ray to last of muscular portion of peduncle; distance between last anal ray and caudal fin three-fourths depth of peduncle; longest dorsal spine $2\frac{3}{4}$ in head (in adult), flexible at tip; dorsal rays subequal throughout, $2\frac{1}{2}$ in head; anal similar, length of rays equal to snout; pectoral rounded; ventrals reaching to or nearly to anus; caudal rounded.

Upper lateral line extending nearly to caudal fin, lower usually much overlapped by upper.

Scales not ctenoid on head; strongly so on flanks; interorbital region densely and completely sealed from line of occiput to anterior margin of eyes and tip of premaxillary process; opercle and subopercle with large scales; cheeks to end of maxillary (not in advance) covered entirely with small scales; a row posteriorly on interopercle; limbs of opercle, snout, and jaw naked; scales between dorsal and line of occiput continuous with those on head, only slightly smaller than those on body; area before and between ventrals sealed.

Color usually dark; five broad irregular dark crossbands on body, first above pectorals and opercle, second below second to sixth dorsal rays, third broken above at lateral line to form two, last below last dorsal rays; crossbands continued on to dorsal base to form five blotches; first dorsal distally black; caudal submargined with black; dorsals, anal and caudal, all narrowly edged with white, but otherwise dusky or occasionally black; dorsal frequently with faded, narrow oblique stripes evident in addition to other pattern; a diffuse bar on pectoral base, not sharply defined; on fully colored specimens cheeks with two broad dark stripes, somewhat ill defined, one from lower edge of eye running backward and slightly downward until it fades at angle of preopercle; another from center of eye back to black diffuse spot on upper part of opercle, as large as pupil; ventrals and branchiostegal membranes sometimes strongly pigmented, in none black; majority of specimens faded, nearly without coloration.

Notothenia longipes differs from *N. tessellata* as follows: Teeth anteriorly in 4 or 5 series (not 2); velar flap much narrower; coloration entirely different; scales larger between occipital line and first dorsal. It is difficult to understand Smitt's confusion of this species with *N. tessellata*.

It is probable that Vaillant's *N. squamifrons*¹ is simply a large specimen of *N. longipes*, the more so as his identification of it with that form was frankly provisional.

The species recently named *N. wiltoni* by Regan² is apparently described and figured from an adult specimen of *N. longipes*. Steindachner's specimens were typical of smaller sizes. Our largest specimen, 210 mm. in body length, 235 in total, corresponds in every detail to those published of *N. wiltoni* (and is nearly the same size) save for a very slightly broader interorbital space and the insertion of the first dorsal over instead of slightly in advance of the opercular flap as shown in Regan's plate. The smaller individuals below 180 mm. in length, differ from this specimen in the same details upon which Regan relies to differentiate his *N. longipes* from *N. wiltoni* and correspond in every respect to the description of the type by Steindachner.

¹ Mission Sci. Cap Horn, vol. 6, 1889, p. 89.

² Trans. Royal Soc. Edinb., vol. 49, 1913, p. 268.

Every available specimen (75) was carefully measured and the changes with age ascertained. The following tables give these, especially for those characters supposed to distinguish *N. wiltoni*.

Length to base of caudal.	Width of interorbital in head.	Same given in hundredths of body length.
75 to 100 mm.....	10 to 7½ times.....	0.04 to 0.03
100 to 130 mm.....	8½ to 6½ times.....	.045 to .035
130 to 160 mm.....	7½ to 6 times.....	.05 to .04
160 to 190 mm.....	6½ to 6 times.....	.05 to .045
190 to 210 mm.....	6½ to 5½ times.....	.055 to .045

One specimen 197 mm. long had an interorbital space slightly narrower than 0.045.

Length to base of caudal.	Orbit contained in head.	Orbit given in hundredths of body length.
75 to 80 mm.....	3 times.....	0.10
80 to 95 mm.....	3 to 3½ times.....	0.10 to .09
95 to 110 mm.....	3½ to 3¼ times.....	.09 to .08
110 to 125 mm.....	3½ to 4½ times.....	.085 to .07
125 to 185 mm.....	3½ to 4½ times.....	.08 to .07
185 to 210 mm.....	4½ to 4½ times.....	.07 to .065

Length to base of caudal.	Length of maxillary contained in head.	Length of maxillary given in hundredths of body length.
75 to 100 mm.....	3¼ to 3 times.....	0.09 to 0.10
100 to 125 mm.....	3½ to 3 times.....	.09 to .10
125 to 150 mm.....	3½ to 2½ times.....	.095 to .11
150 to 175 mm.....	3½ to 2½ times.....	.095 to .11
175 to 210 mm.....	3 to 2½ times.....	.10 to .12

Among 75 specimens counted for fin rays but 1 had five spines and but 2 seven in the first dorsal. The last spine is frequently very short and flexible.

In forms less than 140 mm. in total length the lower jaw appears slightly longest, but above that length the upper and lower appear more nearly equal, due probably to the heavier skin of the lips, etc.

Author's number. ¹	<i>Notothenia tessellata</i> .						
	01-5	01-4	02-40	01-6	01-19	01-47	01-54
Length to base of caudal.....mm..	185	170	78	145	135	97	53
Body depth.....	0.19	0.20	0.20	0.20	0.20	0.18	0.20
Eye.....	.06	.07	.07	.065	.06	.065	.07
Maxillary.....	.12	.13	.11	.12	.12	.10	.10
Mandible.....	.14	.135	.13	.11	.13	.115	.13
Width of interorbital.....	.04	.05	.05	.05	.04	.04	.055
Dorsal rays.....	VII, 32	VI, 33	VI, 32	VII, 32	VI, 33	VI, 33	VI, 34
Scales in lateral lines.....	46+8	48+7	46+7	49+8	45+10	48+8	41+6
Pectoral length.....	0.21	0.24	0.24	0.22	0.23	0.22	0.24
Gillrakers.....	9+15	7+16	8+13	8+15	9+14	9+13	9+13
Scales between occiput and dorsal.....	16	16	17	16	17	15	.....

¹Localities: *N. longipes*, Port Churrucua, Straits of Magellan, 02-27; Sandy Point, Straits of Magellan, 01-3, 01-35; *Albatross* station 2770, near Hilly Point, and Cape Watchmap, east coast of Patagonia, 01-55, 02-19, 02-20, 02-23. *N. tessellata*, Port Grappler, 01-5, 01-4; Sandy Point, Straits of Magellan, 01-6, 01-47; Laredo Bay, Straits of Magellan, 01-19; Mayne Harbor, Patagonia, 02-40; Port Churrucua, Straits of Magellan, 01-54.

Author's number. ¹	<i>N. longipes.</i>						
	02-27	01-3	01-35	01-55	02-19	02-20	02-23
Length base of caudal.....mm..	185	170	150	125	101	85	75
Body depth.....	0.20	0.19	0.20	0.17	0.18	0.17	0.165
Eye.....	.08	.07	.075	.075	.08	.10	.10
Maxillary.....	.12	.10	.11	.10	.09	.10	.095
Mandible.....	.125	.11	.12	.11	.115	.12	.12
Width of interorbital.....	.05	.05	.05	.04	.04	.035	.035
Dorsal rays.....	VI, 34	VII, 35	VI, 35	VI, 35	VI, 35	VI, 34	VI, 34
Scales in lateral lines.....	51+10	53+13	52+14	52+8	53+10	51+10	53+12
Pectoral length.....	0.18	0.21	0.19	0.22	0.19	0.19	(?)
Gill rakers.....	8+17	9+16	9+15	11+19	12+20	13+19	10+19
Scales between occiput and dorsal.....	14	12	15	12	13	12	11

¹Localities: *N. longipes*, Port Churruea, Straits of Magellan, 02-27; Sandy Point, Straits of Magellan, 01-3, 01-35; *Albatross* station 2770, near Hilly Point, and Cape Watchmap, east coast of Patagonia, 01-55, 02-19, 02-20, 02-23. *N. tessellata*, Port Grappler, 01-5, 01-4; Sandy Point, Straits of Magellan, 01-6, 01-47; Laredo Bay, Straits of Magellan, 01-19; Mayne Harbor, Patagonia, 02-40; Port Churruea, Straits of Magellan, 01-54.

No difference could be seen in the average extension of the maxillary farther under the eye with age, but it varied much more in older specimens and was greatest among the very young, with large eyes. The highly variable depth varies between 0.15 and 0.20 of the body length of specimens 70 and 150 mm.; those above 150 mm. vary between 0.18 and 0.22, thus including that given for *N. wiltoni* Regan.

15. NOTOTHENIA CANINA Smitt.

Notothenia tessellata, forma *canina* SMITT, Bih. Svenska Akad., vol. 23, IV, No. 3, 1897, p. 25, pl. 1, figs. 10, 11; pl. 2, figs. 20-22. Port Gallegos, Patagonia. *Notothenia canina* BOULENGER, Southern Cross, 1902, p. 183 (after Smitt).

The following characters are taken from Smitt's ¹ paper on *Notothenia*, as the species has not been seen by any other author. These are changed from measurements in hundredths of total length to those in hundredths of body length, so as to compare with measurements of the other species. The large number of scales in the upper lateral line would appear diagnostic save for the fact that Smitt gives a variation of 25 scales in 15 specimens of *N. longipes*, whereas the greatest variation among 30 of our specimens of *N. longipes* is only 9 scales. The occasional extraordinary range of variation in his work casts some suspicion on his identifications.

Head in hundredths of length to base of caudal 0.27 to 0.29; eyes 0.06 to 0.075; snout 0.06 to 0.07; width of interorbital space 0.05; length of maxillary 0.097 to 0.12; of mandible 0.13; length of anal base 0.45 to 0.48; height of first dorsal 0.10; of second 0.115; of anal 0.10 to 0.11; of pectorals 0.22 to 0.255; of ventrals 0.17 to 0.19; depth of body 0.15 to 0.17; of caudal peduncle 0.075; D. VI, 32 or 33; A, 30 or 31; pectoral rays 26 to 28; scales with pores in upper lateral line 62 to 64; in lower 7 to 12; in lateral series 68 to 71;

¹ Southern Cross, 1902.

in transverse series (how counted?) 4 or 5/18 or 19; gill rakers $\frac{15-16}{22 \text{ or } 23}$ (=37 to 39).

Teeth in two loose rows, outer enlarged and distinctly canine-like; maxillary ending under center of eye; scales present on cheek and opercle (also interorbital?); caudal rounded; dorsal ending over fifth ray from last of anal; second dorsal with oblique dark stripes; caudal transversely barred; a black spot on first dorsal; lower lateral line short, not overlapped by upper.

III. WEST COAST, NORTH OF 46° 45' SOUTH LATITUDE.

List of species collected:

SCYLLIORHINIDAE.

1. *Catulus chilensis* (Guichenot). Tome, Chile.

CLUPEIDAE.

2. *Sardinella fucgensis* Jenyns. Lota, Chile.
3. *Ethmidium coerulea* (Cuvier and Valenciennes). Lota.

ENGRAULIDAE.

4. *Engraulus ringens* Jenyns. Lota.

STOMIATIDAE.

5. *Stomias atriventer* Garman. Station 2791.

IDIACANTHIDAE.

6. *Idiacanthus retrodorsalis*, new species. Station 2791.

ATHERINIDAE.

7. *Atherinopsis microlepidoda* (Jenyns). Tome and Lota, Chile.
8. *Menidia maulianum* (Steindachner). Tome and Lota.
9. *Menidia regia* (Humboldt and Valenciennes). Tome and Lota.

CARANGIDAE.

10. *Trachurus picturatus* (Bowditch). Locality?

SCIAENIDAE.

11. *Sciaena gilberti* Abbott. Lota, Chile.

SCORPAENIDAE.

12. *Sebastes chitensis* Steindachner. Lota.

LATILIDAE.

13. *Prolatilus jugularis* (Cuvier and Valenciennes). Lota.

NOTOTHENIIDAE.

14. *Eleginops maclovina* Cuvier and Valenciennes. Lota and Tome, Chile.

BATRACHOIDIDAE.

15. *Porichthys porosus* (Cuvier and Valenciennes). Tome.

PLEURONECTIDAE.

16. *Paralichthys adpersus* (Steindachner). Tome and Lota.

BLENNIIDAE.

17. *Calliclinus geniguttatus* Cuvier and Valenciennes. Tome.

OPHIDIIDAE.

18. *Genypterus blacodes* (Bloch and Schneider). Tome.

GADIDAE.

19. *Laemonema multiradiatum*, new species. Station 2791.

MACROURIDAE.

20. *Coryphaenoides arionomus* Gilbert and Thompson, new species. Station 2791.

21. *Nezumia pudens* Gilbert and Thompson, new species. Station 2791.

(*Coelorhynchus fasciatus* Günther. Stations 2783 and 2784.)¹

22. *Coelorhynchus chilensis* Gilbert and Thompson, new species. Station 2791.

(*Coelorhynchus patagoniae* Gilbert and Thompson, new species. Station 2784.)²

1. CATULUS CHILENSIS (Guichenot).

A single example from Tome, Chile. There are eight or nine broad dark saddles across the dorsal surface, one between the eyes, the next lying above the pectorals and running obliquely forwards above the gills, the third just behind the pectorals, the fourth below the first dorsal, the fifth over the anal insertion, the sixth on and below the second dorsal, and four much smaller ones present posteriorly on the tail. On these, as in the interspaces and on the fins, are many small leopard spots.

The distinctness of the nasal valves places this species in *Catulus*, as separated by Gill from *Scylliorhinus*, which has them confluent, although the value of this character is open to question.

2. SARDINELLA FUEGENSIS Jenyns.

Sardinella fuegensis JENYNS, Voy. *Beagle*. 1842, p. 134.

A number of specimens from Lota, Chile, the longest 120 mm. in total length. Specimens of the same size as that described by Smitt² correspond to his measurements and figure. The following additional notes may be added to Günther's remarks:³

Dorsal rays 18 or 19; anal 16 to 18; pectoral 16; depth 4 to $4\frac{1}{2}$ in body of young (80 mm. in total length), and $3\frac{1}{2}$ in largest (120 mm.); head $3\frac{2}{5}$ to $4\frac{1}{4}$; eye 4 to $4\frac{1}{3}$ in head; maxillary $2\frac{1}{2}$ to $2\frac{3}{4}$; interorbital width $4\frac{1}{5}$ to 5; scales in lateral series 44 to 46, in transverse 14 to 16; vertebrae 45; least depth of caudal peduncle, 3 in head.

There are no teeth discernible in the jaws, the tongue is smooth; the ventral insertion is but slightly behind that of the dorsal, which

¹ See p. 419.

² Bih. Svenska Akad., vol. 24, IV, No. 5, 11, p. 59, pl. 5, fig. 41.

³ Cat. Fish. Brit. Mus., p. 413.

is nearer the base of the caudal than the snout; the scales are rounded and not striated; the maxillary does not reach quite to the center of the eye. The peritoneum is black. There are weak serratures along the whole ventral edge from the head to the anus, 19 to 20 of them before the ventrals, 12 or 13 behind. The gill rakers are 65 to 70 in number on the lower limb of the first gill arch and equal in length the diameter of the eye.

This species has been recorded from Port Gallegos, near the eastern entrance of the Straits of Magellan, by Smitt.¹

The genus to which this species belongs is difficult to ascertain, and it is placed provisionally only in *Sardinella*.

ETHMIDIUM, new genus (Clupeidae).

Clupea notacanthoides Steindachner, from the west coast of South America (Peru), was referred by Abbott² to the genus *Potamalosa* of Ogilby. In this, however, he was undoubtedly in error, as it is a distinct genus, to which the name *Ethmidium* may be given, and which has the following characters: A row of scutes with long lateral processes along the ventral edge of the body; another row of scutes along the dorsal edge of the body between the dorsal and the occiput, without the long lateral processes of the ventral row; anal short, composed of about 15 to 17 rays; gill rakers very long and very numerous, as in *Brevoortia*; vertebrae 45 to 50; ventral fins inserted behind the first dorsal ray, which is midway between the snout and the base of the caudal; no teeth; branchiostegals 9 or 10; scales more or less pectinate or fluted; maxillaries broad; a deep narrow notch between the premaxillaries; mandibular articulation behind the vertical from the eye; cheeks deeper than long; peritoneum black.

Type of genus.—*Ethmidium notacanthoides* (Steindachner).

This genus is perhaps closely allied to *Brevoortia*, it resembling that genus in shape of body and of head, character of gill rakers, articulation of mandible behind the eye, and the notch in the premaxillaries. It differs in the absence of the double dorsal row of fringed scales so characteristic of *Brevoortia*, and in the presence of a row of scutes in their place. Of the two species included in the new genus, *E. coerulea* is without the marked pectination of the body scales and has fewer gill rakers. It seems to be the nearest of the two species to the herrings, while the fluted scales and very numerous gill rakers of *Ethmidium notacanthoides* ally it unmistakably with *Brevoortia*. The two species can not be generically separated, however.

Of the recent genera, the "double-armored" herrings, *Potamalosa* and *Hyperlophus*, differ very markedly from *Brevoortia* and *Ethmi-*

¹ Bih. Svensk. Akad., vol. 23, 1897, p. —.

² Proc. Phila. Acad. Sciences, 1899, p. 333.

dium. They are in fact not allied to the latter genus in any respect save in the presence of the dorsal row of scutes and are of very different appearance, probably because of entirely different habits, to which their structure is related. It may be that the dorsal row of scutes is an independent development in each case, in any event it appears to be so in the American species as distinguished from the Australian. The following table will serve to distinguish these genera from each other, although in thus comparing them it is not intended to attach any special significance to the fact that they are "double armored" as distinguished from those forms with but a ventral row of scutes:

- a¹. Gill rakers very numerous (80 to 150), and long (3 or 4 in head) on lower limb of first arch; a narrow notch between premaxillaries; maxillary broad, its width $1\frac{1}{2}$ to $1\frac{3}{4}$ in eye diameter; articulation of mandible behind eye; no teeth; branchiostegals 7 to 10; scales pectinate; head large, compressed, opercular bones deep; eye small and high; ventral inserted under dorsal.
- b¹. A line of scutes between occiput and dorsal; dorsal insertion midway between snout and caudal base; scales in lateral series 50; no angle in lower limb of first gill arch..... *Ethmidium (notacanthoides)*.
- b². No line of dorsal scutes, a double row of pectinate scales in their place; dorsal inserted nearer caudal; scales 60 to 80; lower limb of gill arch not angulated..... *Brevoortia (tyrannus)*.
- a². Gill rakers short (7 or 8 in head), and few in number (about 10+25); no notch in premaxillary; eye large, not placed high in the head; articulation of mandible under center of eye; head small, not much compressed or deep; ventral inserted before dorsal.
- c¹. Maxillary narrow, its width $4\frac{1}{2}$ in eye; branchiostegals 8; teeth in jaws, tongue, etc.; scales not pectinate..... *Potamalosa (novae-hollandiae)*.
- c². Maxillary broad, its width $2\frac{3}{4}$ to $2\frac{1}{2}$ in eye; branchiostegals 4; no teeth; scales pectinate..... *Hyperlophus (spratellides)*.

There have also been three genera of fossil "double-armored" clupeids described. Cope¹ described the genus *Diplomystus*, distinguished by a series of scutes between the occiput and dorsal, from the Green River Eocene of Wyoming, including forms with very short anal and few vertebrae with the typical species with long anal and many vertebrae. Ogilby² described the recent genera *Hyperlophus* and *Potamalosa*³ for fresh water herrings of Australia. Jordan⁴ described two more fossil genera of these forms from Brazil, *Ellimma*⁵ and *Knightsia*. *Diplomystus* is sharply distinguished by its long anal, *Ellimma* by its few vertebrae and prominent ventral region, and *Knightsia* apparently by the few vertebrae (36). The last-named form may be related to *Potamalosa*, but the identification of such a fossil genus with a recent one is not advisable when differences are to be found.

¹ Bull. U. S. Geol. Surv. Terr., vol. 3, 1877, p. 800.

² Rec. Austr. Mus., vol. 2, 1892, p. 26.

³ Proc. Linnæan Soc. N. S. W., vol. 21, 1897, p. 504.

⁴ Annals of the Carnegie Museum, vol. 7, No. 1, 1910, p. 23.

⁵ Originally *Ellipes*, preoccupied by *Ellipes* of Scudder (Psyche, 1902, p. 308), later renamed *Ellimma* by Doctor Jordan.

Table of measurements ¹ and counts of *Ethmidium notacanthoides* and *coerulea*.

	<i>E. notacanthoides</i> .					<i>E. coerulea</i> .					
Length to caudal base . . . mm.	163	172	175	181	184	101	82	103	120	129	123
Head	0.33	0.32	0.33	0.33	0.34	0.31	0.30	0.295	0.29	0.29	0.28
Depth . . . . .	.33	.34	.33	.33	.33	.35	.35	.35	.35	.35	.35
Eye . . . . .	.065	.07	.07	.075	.07	.075	.08	.08	.06	.06	.07
Maxillary . . . . .	.15	.15	.15	.155	.15	.15	.14	.14	.13	.14	.14
Scales, lateral	50	52	50	51	50	49	49	49	51	50	50
Depth of caudal peduncle . . . . .	.09	.095	.09	.10	.095	.11	.11	.105	.11	.11	.11
Dorsal rays	20	19	20	19	20	21	22	20	21	21	21
Anal rays	15	16	16	16	17	17	17	17	14½	16	14½
Eye to angle of preopercle . . . . .	.14	.14	.145	.15	.16	.13	.13	.13	.125	.12	.12
Gill rakers on lower limb	131	115	135	132	140	73	78	83	82	85	84
Dorsal scutes	24	25	25	25	26	26	27	25	24	26	21½
Ventral scutes	19+17	20+17	20+16	20+16	20+17	20+16	20+16	20+16	20+17	20+17	17+15
Branchiostegals	9	9	9	9	9	9	9	9	9	10	10
Locality	Bay of Callao, Peru.					Lota, Chile.					

¹ Given in hundredths of body length to base of caudal.

3. ETHMIDIUM COERULEA (Cuvier and Valenciennes).

Alausa coerulea CUVIER and VALENCIENNES, vol. 20, p. 432. Valparaiso, Chile (not *Mcletta coerulea* Girard, nor *Clupea coerulea* Mitchel).

Clupea notacanthus GÜNTHER, Cat. Fish. Brit. Mus., vol. 7, p. 443. Valparaiso, Chile.

Numerous specimens from Lota, Chile, the longest 15 cm. in total length. They are evidently *Alausa coerulea* of Cuvier and Valenciennes and correspond in all details with Günther's *Clupea notacanthus*. It has not been recognized as this species by any recent authors.

Depth $2\frac{3}{4}$ in length of body to base of caudal; head length $3\frac{3}{8}$; latter exceeded by body depth slightly more than an eye diameter, which is contained $4\frac{1}{2}$ in head, and is but slightly longer than snout; maxillary ending slightly behind posterior edge of eye, and contained twice in head; no teeth in jaws, on vomer, palatine, or tongue, save slight serrations on edge of maxillary; lower opercular edge at its junction with subopercle if projected would meet first dorsal ray; jaws equal, premaxillaries deeply and narrowly notched; gill rakers 55+73 to 85, slightly longer than snout; vertebrae 50; D. 20 or 21 (counting first short rays); A. 15 to 17; scales in lateral series 49 to 52; in transverse 18 to 20; dorsal scutes 24 to 28; ventral scutes 20+16; branchiostegals 9 or 10.

Dorsal inserted very slightly nearer tip of snout than caudal; ventrals under its anterior third; pectorals reaching two-thirds distance to ventral bases; base of anal three-fourths length of that of dorsal, which is $1\frac{2}{3}$ to $1\frac{3}{8}$ in head.

A line of scutes along upper edge of body before dorsal, ventral edge from isthmus to anus with scutes, spines strongest between ventrals and anus, but slightly evident anteriorly, their number comparatively constant; scales showing but slight traces of pectination; edge not very irregular.

Color in alcohol silvery, underlaid by deep blue above, without sharp division from lower part of body; a row of dark-blue spots nearly as large as pupil extending from upper angle of gill cover to center of caudal peduncle, or above anal, 10 or 12 in well-preserved examples, first ones much darker and more striking; if second row present in life, not evident as preserved.

As compared with specimens of *E. notacanthoides* (Steindachner) recorded by Abbott¹ from the Bay of Callao, Peru, the following differences are evident, although the two species without doubt are closely allied: Caudal peduncle deeper ($3\frac{1}{2}$ in head in *E. notacanthoides*); depth exceeds length of head by much more, due to shorter head and greater depth (head equal to depth in *E. notacanthoides*); position of lower edge of opercle (at its junction with subopercle) is more vertical, the line of edge pointing to posterior half of dorsal in *E. notacanthoides*; the scales are much less plainly pectinate, the gill rakers are but half as numerous, and the second row of spots on the side is lacking. Although Abbott's examples are much larger than our specimens of *Clupea notacanthus*, it is not probable that any of these are age differences.

Clupea notacanthoides Steindachner is very probably *Alausa maculata* Cuvier and Valenciennes, if one may judge from Abbott's specimens, and *Clupea (Alosa) maculata* of Steindachner may well be the present species, judging from Steindachner's description.²

4. ENGRAULIS RINGENS Jenyns.

Numerous specimens from Lota, Chile, the longest 160 mm. in total length.

Compared with *Engraulis mordax* Girard from the California coast, with which it has been at times identified, the head proves decidedly shorter, the snout a trifle shorter, and the maxillary a good deal so, extending beyond the carina of the preopercle in *E. mordax*, whereas it barely reaches it in *E. ringens*. As compared with *E. japonicus* (Schlegel), the latter has a much lesser depth and shorter head. In the following table the measurements are given in hundredths of the body length to the caudal base. The first number in each case is the average, those in parentheses give the range of variation.

	Number of specimens.	Head.	Depth.	Snout.	Maxillary.
<i>E. ringens</i>	12	0.29 (0.27-0.30)	0.19 (0.18-0.20)	0.05 (0.045-0.05)	0.19 (0.18-0.20)
<i>E. mordax</i>	11	.33 (.32-.34)	.195 (.18-.21)	.06 (.055-.06)	.23 (.23-.24)
<i>E. japonicus</i>	4	.26 (.26-.27)	.15 (.14-.16)	.05 (.05-.055)	.18 (.17-.20)

¹ Proc. Acad. Nat. Sci. Phila., 1899, p. 333.

² Fauna Chilensis, p. 330.

Dorsal rays 14 or 15; anal rays 19 to 21; scales in lateral series 38 to 40; distance from snout to dorsal insertion slightly more than half length to base of caudal; minute teeth in both jaws; dorsal surface of body dark, sharply separated from silvery flanks and ventral surfaces.

5. *STOMIAS ATRIVENTER* Garman.

Two specimens, one 155, the other 85 mm. in total length from *Albatross* station 2791, in 677 fathoms, 38° 08' S., and 75° 53' W. off Lota, Chile. Both of these are badly preserved, especially the larger. The following features may be made out with reasonable certainty:

Total length.....	155 mm.	85 mm.
Depth in length.....	12 times.	14 times.
Head in length.....	9 times.	9 times.
Dorsal rays.....	16?	16
Anal rays.....	20	19
Ventral rays.....	5	5
Luminous organs between pectoral and ventral.....	46	45
Between ventrals and anal.....	13?	12
Between first anal ray and caudal.....	16?	16
Along branchiostegal membrane.....	18	18
Along gular region.....	15?	11

6. *IDIACANTHUS RETRODORSALIS*, new species.

Plate 4, fig. 2.

A single specimen, Cat. No. 76857, U.S.N.M., from *Albatross* station 2791, off Lota, Chile, in 677 fathoms. It has lost a part of the tail, and its total length can not be stated, but it is 125 mm. from the snout to the anus. There are left 20 vertebrae beyond the anus. Günther gives 30 in *Idiacanthus ferox*.

Head $4\frac{1}{2}$ in distance from snout to ventral fins, 7 in distance to anus; depth 23 in latter and half that of the head; snout 4 in head and $2\frac{1}{10}$ in postorbital part of same; eye $1\frac{3}{4}$ in snout, 4 in postorbital part of head; barbel one and one-half times length of head; dorsal rays more than 44; anal rays more than 27, there being 22 rays of dorsal in front of anal insertion; ventral rays 6; no pectoral; teeth in upper jaw slightly shorter than those in lower, arranged in four groups, each increasing in size posteriorly; numbers in groups as follows: 3, 4, 3, 4, last teeth of second and third group longest, those in upper jaw totalling 14; teeth in lower jaw in six groups, each increasing in length posteriorly save in the last, which is composed of several small subequal teeth; these groups have the following numbers of teeth: 6, 5, 3, and 4, totalling 18 in all; tongue apparently toothless (crushed condition of lower jaw may have resulted in loss of tongue teeth, but this is not probable); a pair of teeth on either side of vomerine region just behind ends of premaxillaries; two on each lateral roof of mouth directly under each eye.

Dorsal fin inserted behind ventral base, a distance equal to half length of head; ventral bases slightly nearer posterior end of head than anus, length including filamentous ray tips about three-quarters head length; both dorsal and anal rays inserted between pairs of short stout spines as usual.

Luminescent organs in two rows on each side of body in a ventral and lateral series; in either series these number 28 between isthmus and ventral fin bases, and 20 between ventrals and anus; they are both continued along each side of anal fin to where body is broken off; hyoid region with 12 or 13 organs; one on each branchiostegal ray base, apparently 16 in number; a larger organ behind eye above middle of upper jaw; a great many luminescent organs of very small size scattered thickly over head and in transverse rows on body.

From the four known species of this genus, as enumerated by Brauer,¹ this species seems to be differentiated by the origin of the dorsal behind the ventrals, by the number of luminescent organs and the position of the ventrals midway between head and anus. Although the barbel is shorter than in *Idiacanthus ferox* Günther, the present species is evidently nearly related to that form. If the absence of teeth on the tongue is of importance, it is the only species lacking them in the genus.

* 7. *ATHERINOPSIS MICROLEPIDOTA* (Jenyns)

Atherina microlepidota JENYNS, Voy. *Beagle*, Fish, vol. 4, 1842, p. 68, pl. 16, fig. 1. Valparaiso (not of Kner, Girard, or Günther).

Atherinopsis regius STEINDACHNER, Denk. Akad. Wiss. Wien, vol. 72, 1902, p. 39. Rio Tambo, Peru.—EIGENMANN, Princeton Patagonian Exped., vol. 2, pt. 2, 1909, p. 282, no specimens.

Tome and Lota, Chile, numerous specimens, the largest 365 mm. in total length.

This species has recently been referred to *Menidia regia* (Humboldt and Valenciennes) by Eigenmann², Steindachner, and Smitt, but in the absence of positive evidence to the contrary the disposition of the name *regia* is that made first, namely, by Günther,³ where the species *Atherina laticlavia* Cuvier and Valenciennes is considered its synonym.

The two species *Menidia laticlavia* (Cuvier and Valenciennes) and *Atherinopsis microlepidota* (Jenyns) are very different, (1) the premaxillaries in the latter being nonprotractile, (2) body slender in form, with (3) dull lateral stripe, (4) scales with basal radii, and (5) the base of the anal does not extend as far posteriorly as that of the second dorsal. A careful examination of the synonymy shows that there has been a confusion of the two names, and that the specimens of Kner, Girard, and Günther were ones with protractile premaxil-

¹ Deutschen Tiefsee Expedition, p. 59.

³ Cat. Fish. Brit. Mus., vol. 3, p. 402.

² Princeton Patagonian Exped., vol. 2, 1909, p. 282.

larities. Thus Girard¹ had in mind as the type of his genus *Basilichthys* what was in reality a *Menidia*. This does not, however, change the type, it remaining the species *Atherina microlepidota* Jenyns according to a recent opinion of the International Commission on Zoological Nomenclature.²

The type of *Basilichthys (microlepidotus)* was compared with that of *Atherinopsis*, and found to differ somewhat but not generically. The direction of imbrication of the scales on the head is reversed in the former and the vertebrae are more numerous.

In the following notes the figures in parentheses represent the respective measurements of 15 specimens given in hundredths of body length to base of caudal:

Head $4\frac{1}{2}$ to 5 in length to base of caudal (0.20 to 0.24); depth of body 6 (0.17 to 0.21); eye $5\frac{1}{2}$ in head (0.03 to 0.04); snout 3 (0.07 to 0.075); pectoral $1\frac{1}{2}$ (0.13 to 0.14); interorbital width 3 (0.07 to 0.08); space between dorsal insertions $1\frac{3}{4}$ to 2 in head (0.11 to 0.14); length of gill rakers half diameter of eye; dorsal rays V. (or VI), I, 10 or 11; anal rays I, 14 to 16; scales in lateral series 99 to 100; in transverse series between insertions of dorsal and anal fins 24; gill rakers 6 + 24 (to 27).

Jaws equal; premaxillaries nonprotractile, their skin continuous with that of dorsal surface of head; vomerine teeth present anteriorly in a small patch.

First dorsal small, inserted midway in the total length; interdorsal space very small; dorsal and anal high anteriorly, emarginate; anal terminating before last rays of dorsal; ventrals midway between pectoral and anal bases.

Scales small, cycloid, subquadrangular; circuli well defined and close set, 5 or 6 basal radii present; no apical radii, those in anterior portion of body about as long as wide, those posterior longer than wide. The direction of imbrication on the dorsal surface of the head reversed in direction.

Lateral band covers five scale rows, equaling in width the eye, and is without the brightness of that on other Atherinoids, being a dull tarnished silvery.

It may be noted that this extends the range of this species at least as far south as Conception. The *Basilichthys microlepidota* of Everman and Kendall³ from Argentina is not this species, having scales larger, 70 to 76 in lateral series. There is no ground as yet for considering the species common to both coasts, or as being found in the Straits of Magellan.

¹ U. S. Naval and Astron. Exped., 1895, p. 238, pl. 30, figs. 8, 9.

² Smithsonian Institution, Publication 1938, July, 1910, Opinion 14, in the case of the genus *Etheostoma* vs. *Catonotus* and *Diplasion*.

³ Proc. U. S. Nat. Mus., vol. 31, p. 97.

8. MENIDIA MAULIANA (Steindachner).

Numerous specimens, the longest 145 mm. to tip of caudal rays, from Tome and Lota, Chile, corresponding in all details to the description given by Steindachner. The narrow lateral stripe and greater depth distinguish it at once from other species. The gill rakers are few, 3 + 13 or 14, thus having about half as many as are present in *Menidia regia*.

9. MENIDIA REGIA (Humboldt and Valenciennes).

Atherina regia HUMBOLDT and VALENCIENNES, Rec. Obs. Zool. Anat. Comp., 1835, vol. 2, p. 187, Peru.

Atherina latilavina CUVIER and VALENCIENNES.

Basilichthys microlepidota of AUTHORS (not of Jenyns).

Very numerous specimens, the largest 290 mm. in total length, from Lota and Tome, Chile. The extremes of measurements in hundredths of body lengths of 12 specimens are given in parentheses.

Head $4\frac{3}{8}$ (0.22 to 0.24) in body length, $5\frac{1}{2}$ in total; depth $5\frac{3}{8}$ (0.17 to 0.20) in body, $6\frac{3}{8}$ in total; eye $4\frac{1}{2}$ to $5\frac{1}{2}$ in head (0.04 to 0.06); snout 3 (0.07 to .08); width of lateral body band $4\frac{1}{2}$ in body depth (0.04 to 0.05); interorbital breadth $3\frac{1}{2}$ in head (0.06); distance between dorsal insertions equal to depth of body (0.17 to 0.19); dorsal rays VI to VIII, I, 10 or 11; anal rays, I, 16 to 18 (usually I, 17); scales in lateral line 83 to 90, in transverse series between insertions of first dorsal and of anal 16 or 17; gill rakers 8 + 25.

Maxillary extending to within half a pupil diameter of vertical from anterior orbital edge; premaxillaries protractile; jaws of equal strength and length; teeth in jaws in two rows, none on palatines or tongue, occasional teeth on vomer; gill rakers two-thirds of eye diameter in length; first dorsal set midway in total length; base of anal extending slightly farther posteriorly than that of dorsal.

Scales imbricated in normal fashion on dorsal surface of head; anterior bodyscales nearly oval, without basal radii, circuli widely set; posterior body scales nearly quadrangular, with four or five basal radii; circuli close set and distinct; vertical fins scaleless; cheeks scaled, four rows below eye, eight or nine between eye and posterior opercular edge.

Lateral silvery band broad, extending over two and a half rows of scales.

This species has been referred to *Atherina regia* Humboldt by Günther, whose example is here followed, as there is nothing in the original descriptions which differentiates the two species *latilavina* and *regia*.

The types and paratypes of the species described from Peru by Abbott¹ and placed in the Stanford University collections, namely, "*Basilichtys regillus*," "*B. octavius*," and "*B. jordani*," have been carefully compared with our specimens, and the only basis for any of these species seems to be the longer head of *Menidia regillus*. This may be shown by the following comparison of head lengths measured in hundredths of the body length, the number of specimens having each measurement being placed in that column:

Length of head.....	0. 21	0. 22	0. 23	0. 24	0. 25	0. 26
<i>Menidea laticlavata</i>	1	5	6	1	0	0
<i>Menidea regillus</i>	0	0	0	4	2	1
<i>Menidea octavius</i>	0	0	1	0	0	0
<i>Menidea jordani</i>	0	0	0	1	1	0

The differences given for *M. jordani* by Abbott were the greater development of the lower jaw and the presence of the vomerine teeth. The former difference is included in the variation of our series, and in many of our specimens there is a single vomerine tooth, in others none, and in some of them a small patch.

Those supposed to exist in the case of *B. octavius* Abbott were the number of dorsal spines, the space between the dorsal insertions and the lesser depth. The following tables show the counts and measurements of the types and paratypes as compared with our specimens. Under each count or measurement is ranged the number of specimens showing that count or measurement, as above. The latter are in hundredths of body length:

Number of dorsal spines.....	VI	VII	VIII
<i>Menidia laticlavata</i>	3	9	1
<i>Menidia regillus</i>	2	3	0
<i>Menidia octavius</i>	0	0	1
<i>Menidia jordani</i>	1	1	0

Distance between dorsal insertions.....	0. 17	0. 18	0. 19	0. 20
<i>Menidia laticlavata</i>	4	6	3	0
<i>Menidia regillus</i>	1	3	0	0
<i>Menidia octavius</i>	0	0	0	1
<i>Menidia jordani</i>	0	1	1	0

Depth of body.....	0. 16	0. 17	0. 18	0. 19	0. 20
<i>Menidia laticlavata</i>	2	2	3	4	1
<i>Menidia regillus</i>	1	3	1	0	0
<i>Menidia jordani</i>	1	1	0	0	0
<i>Menidia octavius</i>	0	1	0	0	0

10. TRACHURUS PICTURATUS (Bowditch).

Two large specimens, the longest 52 cm. in total length, from an unknown locality. No differences were apparent between these and smaller specimens from the Californian coast, but none were at hand

¹ Proc. Acad. Nat. Sci. Philadelphia, 1899, pt. 2, 1900, pp. 338-341.

from the Atlantic or Mediterranean. No actual comparison has yet been made between specimens from the two oceans.

Dorsal rays VIII-I, 32; Anal II-I, 26; shields 95 (52+43, counting before and behind beginning of straight posterior portion of series).

11. *SCIAENA GILBERTI* Abbott.

Several specimens from Lota, Chile, the largest 155 mm. in total length. Compared with the type of the species which is in the Stanford collections and found identical. The membranes of the spinous dorsal in the specimens at hand are dusky. This species may be distinguished at once by the terminal mouth, and the fact that the head and depth are nearly equal. In *S. deliciosa* the snout overhangs the mouth, the lower jaw is much shorter than the upper, and the head is longer than the body depth.

12. *SEBASTODES CHILENSIS* Steindachner.

Sebastes chilensis STEINDACHNER, Fauna Chilensis, Zool. Jahrb. Suppl., vol. 4, 1898, Heft 2, p. 295. Talcahuano.

Sebastes jennynsi ABBOTT, Proc. Acad. Nat. Sci., Philadelphia, 1899, p. 476. Valparaiso.

A single large example 35 cm. in total length from Lota, Chile. It has been compared with the type of *S. jennynsi* Abbott, which is in the Stanford University collections, and seems to be the same. The coloration is identical save for its faded condition. The anal spines are shorter, due to the greater age, and the second is contained $2\frac{5}{8}$ in head instead of $2\frac{2}{5}$; the pectorals reach but slightly beyond the anus and are $1\frac{1}{2}$ in head; and the dorsal fins are lower. There are seven anal rays instead of six. The description given by Steindachner offers no tangible differences from the specimens at hand, save the absence of the clear spots on the flank. These are entirely faded on one side of the type of *S. jennynsi* and are very indistinct on the present specimen, so much so that unless they were particularly looked for they would escape attention.

13. *PROLATILUS JUGULARIS* (Cuvier and Valenciennes).

Three specimens, longest 30 cm. in total length, from Lota, Chile.

Dorsal rays IV, 28; anal II, 21; scales in lateral line 75, in transverse series between insertions of vertical fins 10/20; gill rakers 3+10; no posterior canine in either jaw; head $3\frac{1}{4}$ in length to base of caudal; depth $4\frac{1}{2}$; eye 5 in head; maxillary 3; transverse bands of color very indistinct; scales on snout very minute, absent only on fins and jaws.

14. *ELEGINOPS MACLOVINA* Cuvier and Valenciennes.

Numerous specimens from Lota and Tome, Chile; Laredo Bay and Sandy Point in the Straits of Magellan; and Port Otway, Patagonia. Very little variation is evident save in the extent of the ventrals and the distance which the spines reach backward on the second dorsal.

This species is well figured and well known, having been obtained by almost all collectors in that region.

15. *PORICHTHYS POROSUS* (Cuvier and Valenciennes).

Specimens from Tome, Chile. The absence of the phosphorescent organs differentiates this species from the others of the genus, and might be regarded as indicating a generic difference.

16. *PARALICHTHYS ADSPERSUS* (Steindachner).

Numerous small specimens of this species from Tome and Lota, Chile, the longest 120 mm. in total length, can not be separated from specimens from Mexico which are in the Stanford University collections. Series of measurements of 12 specimens in hundredths of body length, and careful counts, failed to show any differences, the averages in each case being identical and the range of variation (which was small) more or less coinciding. The specimens fitted the accounts given by Steindacher in the original description very closely, as also the description given by Jordan and Evermann.¹ The measurements given below are expressed in hundredths of the body length to the base of the caudal.

Dorsal rays 70 to 74; anal rays 56 and 57; pores in lateral line 100 to 120, scales in transverse series $\frac{39}{48}$ to $\frac{43}{52}$ (counting an oblique series

at deepest part of body); head 0.29 to 0.31; depth 0.47 to 0.52; eye 0.05 or 0.06; interorbital space 0.02; snout 0.07; mandible 0.15 or 0.16; maxillary length 0.13, pectoral length on eyed side 0.14, on blind 0.10 to 0.115; depth of caudal peduncle 0.10 to 0.11; gill rakers 7 or 8 + 16 to 19; gill raker length 0.03.

17. *CALICLINUS GENIGUTTATUS* Cuvier and Valenciennes.

A single specimen, 20 cm. long, from Tome, Chile, is referred to this species, although it differs markedly from the description given by Steindachner² in having 56 pores in the lateral line instead of 44. The coloration is much obscured by the preservation.

Dorsal rays XXIV, 12; anal II, 21; head $3\frac{1}{2}$ in body; length without caudal, $3\frac{5}{8}$ in total; depth $3\frac{1}{3}$ in body, 4 in total; snout $3\frac{1}{3}$ in head, eye 6, interorbital space 8; scales in lateral line with pores 56; teeth all coarsely conical, those on vomer in a nearly triangular-shaped patch, slightly emarginate on the posterior edge; nasal, supra-orbital, and nuchal tentacles present, second named split into 12 or 14 threads or cirri; five indistinct cross stripes of black are present, most plainly on the dorsal bases; belly and pectoral base with many small dense brown specks, these absent on the head.

¹ Fishes North and Middle America.

² Fauna Chilensis, Zoologische Jahrbücher Suppl., vol. 4, Heft 2, 1898, p. 312.

The genera of the group to which this belongs are in need of revision, it being evident that this species differs considerably from the typical species of *Clinus*, and the forms at present listed under this genus in Australia and South Africa are very divergent also among themselves, but no specimens are at hand for comparison.

18. *GENYPTERUS BLACODES* (Bloch and Schneider).

A specimen from Tome, Chile, 47 cm. long. This is assuredly the "*Ophidium blacodes* (Forst.)" of Tschudi,¹ which was figured by the same author as "*O. maculatum*."² The evidence for its identity with *Genypterus blacodes* Bloch and Schneider, from New Zealand, is questionable. Hutton's description of the latter species³ is possibly not that of the present form, although it was of a much larger specimen (3½ feet), because of these measurements: Head 7 in length, and depth 10 in same. However, Hector, in the same paper⁴ gives a figure which is like our own specimens in measurements and other characters. The *Genypterus chilensis* recorded by Abbott from Chile⁵ is in the Stanford University collections and is plainly the same as *G. blacodes*, although darker in color. There is no reason for regarding *Genypterus chilensis* (Guichenot) as distinct from *G. blacodes* (Bloch and Schneider), as far as can be seen.

Our specimen shows the following characters: Head $4\frac{1}{2}$ in total length; depth 7; maxillary $2\frac{1}{2}$ in head; eye 7; snout $5\frac{1}{2}$; interorbital breadth $5\frac{1}{2}$; ventrals $2\frac{2}{3}$; pectorals $2\frac{1}{10}$; D. about 120; A. about 127; caudal rays 7; pectoral rays 25. Vertical fins dark; pectorals dark, narrowly edged with white.

19. *LAEMONEMA MULTIRADIATUM*, new species.

Plate 4, fig. 3.

A single specimen from *Albatross* station 2791, 38° 08' S. and 75° 53' W. off Lota, Chile, in 677 fathoms; total length 147 mm. It is Cat. No. 76858, U. S. N. M.

Head $4\frac{1}{2}$ in length; depth at pectorals $6\frac{1}{2}$ ($2\frac{2}{3}$ in head); width of head $1\frac{2}{3}$ in its length; maxillary 2 in head; eye $4\frac{1}{3}$; interorbital space $2\frac{1}{2}$; snout 3; mandible $1\frac{2}{3}$; distance tip of snout to ventral bases $1\frac{1}{3}$; ventral bases to anus $2\frac{1}{2}$; anus to anal insertion $5\frac{1}{2}$; snout to dorsal insertion one and one-tenth times head length; length second ray of first dorsal one and one-tenth times head length; of ventral filament nine-tenths head length; D. 5-74; A. 71; pectoral 21; ventrals with 2 long and 3 (?) rudimentary rays; scales more than 118; gill rakers $x + 17$; branchiostegals 7; body cavity length measured from snout less than a third of total length.

¹ Fauna Peruana, 1845, p. 29.

² Idem, pl. 5.

³ Fishes of New Zealand, 1872, p. 48.

⁴ Idem, p. 116, pl. 8, fig. 77.

⁵ Proc. Acad. Nat. Sci. Philadelphia, 1899, p. 475.

Head skeleton cavernous, broad, interorbital space one and two-thirds times eye diameter; snout longer than eye, not overhanging mouth; postorbital part of head half its whole length; maxillary ending under posterior fourth of eye; lower jaw but slightly, if any, shorter than upper; barbel represented by a very minute papilla at symphysis of lower jaw, not visible without lens; teeth minute, in narrow bands, about four series wide anteriorly in both jaws, but narrowing rapidly in lower jaw; a very small circular patch of fine teeth on vomer; gill rakers nearly as long as diameter of eye.

Greatest depth of body at dorsal insertion, which is above point of opercle and slightly before pectoral bases; caudal peduncle depth a third of eye diameter; body profiles nearly straight from tail to deepest part at dorsal insertion; anus twice as far from ventral bases as from first anal ray; second ray of first dorsal greatly elongated, reaching nineteenth ray of second dorsal; ventrals inserted under posterior limb of opercle and midway between anus and posterior end of maxillary; second ventral ray reaching eighth of anal, with two or three rudimentary inner rays; first ray broken, apparently not as long; pectoral rays broken, probably equal to length of postorbital part of head; caudal rays broken; contours of dorsal and anal not evident, probably low midway of their length.

Scales all lost, but traces showing over whole body save gular region; lateral line not evident.

Coloration lacking or faded, peritoneum and lining of mouth black.

This species forms one extreme of the genus, with its next relative, probably *Laemonema latifrons* Holt and Byrne,¹ from the southwest coast of Ireland. From this it differs in the greater number of fin rays, longer filaments of dorsal and anal, wider interorbital, longer maxillary, and in other ways. It is probable that all species of *Laemonema* have several rays in the ventrals instead of two, or the "bifid" ray of authors generally. The presence of these small rays has been corroborated by the writer in the present form, *L. melanurum* and *L. barbatulum*. The barbel is nearly invisible, even more rudimentary than in *L. latifrons*.

The long delicate filaments of the dorsal and ventral rays, broken when the specimens were received, have since worked loose in handling the bottles and have been lost, hence are not evident in the type. They are shown in the accompanying plate.

The following are the measurements of the type in hundredths of the total length and in tenths of the head, 145 and 32 mm., respectively:

¹ Ann. Mag. Nat. Hist., ser. 8, No. 1, 1908, p. 87.

	Hun- dredths of total.	Tenths of head.		Hun- dredths of total.	Tenths of head.
Total length.....	1.00	.....	Ventral filament.....	0.20	0.9
Head length.....	.22	1.00	Body width.....	.13	.6
Eye.....	.05	.25	Body depth.....	.16	.8
Snout.....	.07	.3	Distance snout to ventrals.....	.19	.9
Interorbital.....	.09	.4	Distance ventrals to anus.....	.09	.4
Maxillary.....	.12	.5	Anus to anal insertion.....	.04	.2
Dorsal filament.....	.24	1.1			

Family MACROURIDAE.¹

20. CORYPHAENOIDES ARIOMMUS Gilbert and Thompson.

Plate 5, fig. 1.

Type and nine paratypes from *Albatross* station 2791, in 677 fathoms, off Lota, Chile, at 38° 08' S., 75° 53' W. The type is Cat. No. 76859, U.S.N.M., a specimen 250 mm. in total length.

Head, $4\frac{2}{3}$ in total length, and $1\frac{5}{8}$ in length to anus; depth 6 in total, 2 in length to anus; orbit $3\frac{1}{4}$ in head; interorbital width 4; snout $3\frac{1}{2}$; maxillary $3\frac{1}{2}$; mandible $2\frac{3}{4}$; barbel 5 in eye; distance between ventral bases and anus $2\frac{1}{2}$ in head; D. II, 8-84; A. 77; P. 21; V. 9; branchiostegals 6.

Snout short, with strong suborbital ridge extending as far back as posterior border of eye, its crest at narrowest part twice as far from mouth as from orbit; snout with a median spinous point and two similar prenarial prominences, the latter equally distant from orbital rim and apex of snout; a median rostral ridge extends to middle of interorbital space; width of snout at prenarial prominences one and one-fifth times least interorbital width; distance tip of snout to premaxillaries slightly over half diameter of eye and equal to distance between apical and prenarial prominences; teeth above in a wide band of seven or eight series, equal in size, a narrower band below of about three series; barbel short, its length one-fourth diameter of eye; anterior edge of preopercle abruptly bent backward at angle, forming a conspicuous rounded lobe; maxillary terminating slightly before center of eye, distance between posterior ends of maxillaries two-thirds width of head at same level; mandibular articulation just anterior to posterior margin of orbit, provided with a sharp spur; gill membranes attached to isthmus, without free fold; first gill slit very short, four and one-half times in diameter of orbit.

Dorsal inserted just behind pectoral base, its second spine serrated; interdorsal space equal to interorbital space; ventrals inserted under first spine of dorsal and just behind pectorals; filament of first ray reaching two-thirds distance to the insertion of anal, which is somewhat farther from ventral bases than is the isthmus; anus situated immediately before anal fin.

¹ By Dr. C. H. Gilbert, of Stanford University, and W. F. Thompson.

Scales lost everywhere save over interdorsal space, there showing from 9 to 11 nearly parallel rows of spinules which are raised but slightly from plane of scale surface, and rarely project over posterior edge; lower surface of head and mandibular rami scaled; no pit or naked area between ventrals; lateral line not evident because of loss of scales.

Color uniformly dusky except at edges of mouth, the posterior edges of gill membranes, the peritoneum, and linings of gill cavities, which are all black.

The relatives of this form include *C. rudis* (Günther),¹ but the scales are different and the barbel much shorter. Its proportions differentiate it from *C. capito*, *anguliceps*, and *latinasutus* of Garman.

Table of measurements of type and paratypes in hundredths of length to anus.

	Type.		Paratypes.			
Total length.....mm..	250	340	295	260	235	
Length to anus.....mm..	90	130	102	90	92	
Head.....	0.65	0.61	0.65	0.65	0.65	
Depth.....	.48	.46	.45	.41	.46	
Snout.....	.19	.18	.20	.20	.21	
Eye.....	.20	.16	.18	.20	.20	
Maxillary.....	.19	.19	.20	.18	.20	
Mandible.....	.24	.24	.25	.24	.26	
Interorbital space.....	.16	.15	.17	.17	.18	
Distance premaxillaries to tip of snout.....	.11	.10	.12	.13	.13	
Dorsal rays.....	II, 8-84	II, 8-85+	II, 8-102	II, 8-87	II, 8-	
Pectoral.....	21	21	21	21	21	
Ventral.....	9	9	9	9	9	

21. *NEZUMIA PUDENS* Gilbert and Thompson.

Plate 5, fig. 2.

Two specimens from *Albatross* station 2791, in 677 fathoms, off Lota, Chile, 38° 08' S., 75° 53' W. The type is 175 mm. in total length, Cat. No. 76860, U.S.N.M.

Head 5 in total length, and $1\frac{2}{3}$ in length to anus; depth 7 in total, $1\frac{4}{5}$ in length to anus; orbit $3\frac{1}{5}$ in head; interorbital width $4\frac{1}{3}$; snout $3\frac{1}{2}$; maxillary 3; mandible $2\frac{1}{2}$; barbel 4 ($1\frac{1}{3}$ in eye); distance from base of ventral to anus $1\frac{2}{3}$ in eye; from anus to origin of anal $1\frac{1}{8}$ in eye; D. II, 10-117; A. 112; P. 23 (or 22); V. 11; branchiostegals 7; scales between lateral line and middle rays of first dorsal 8, gill rakers x + 8.

Eye circular, large, equaling length of short snout; anterior profile of snout nearly vertical, the distance from tip of snout to premaxillaries equal to interorbital width and $1\frac{1}{5}$ in distance from tip of snout to anterior border of orbit; width of suborbital space $1\frac{4}{5}$ in eye diameter; snout with usual median and prenarial prominences, each with a small rosette of spinules; the lateral prominences are midway between orbits and tip of snout, the distance between them greater than interorbital width and equal to eye; suborbital ridge low, ending

¹ Deep Sea Fishes, p. 131.

behind pupil; mouth small, the maxillary ending under anterior fifth of orbit; vertical edge of preopercle slightly emarginate, not overlapping much of interopercle; oblique height of cheeks equaling the diameter of eye; teeth small, in rather wide bands in both jaws, the outer series in the upper jaw slightly enlarged; barbel nearly as long as diameter of eye; branchiostegal membranes forming a free fold across the isthmus; length of first gill slit equal to half diameter of eye.

Measurements of type and paratype of Nezumia pudens, in hundredths of length to anus.

	Type.	Para- type.		Type.	Para- type.
Total length.....mm..	170	165	Interorbital space.....	0.17	0.18
Length to anus.....mm..	43	45	Premaxillaries to tip of snout.....	.18	.18
Head.....	0.78	0.75	Ventrals ¹ to isthmus.....	.34	.32
Depth.....	.55	.55	Ventrals ² to anus.....	.14	.15
Eye.....	.25	.25	Anus to anal fin.....	.20	.22
Snout.....	.22	.25	Snout to dorsal fin.....	.88	.88
Maxillary.....	.24	.28	Length second dorsal spine.....		.56
Mandible.....	.33	.33			

¹ Anterior edge of base.

² Posterior edge of base.

Ventrals inserted under margin of opercle, but slightly anterior to pectoral bases; first dorsal inserted three series of scales behind pectorals; interdorsal space equal to diameter of eye; anal inserted under last ray of first dorsal (under tip of last ray in paratype); second dorsal spine coarsely serrated (with about 11 spinules, as long as head without eye in the paratype; tip broken, so as to prevent measurement in the type); filament of outer ventral ray reaching second anal ray; anus nearer base of ventrals than origin of anal; scales thickly beset with short spinules, 30 or more in number, projecting nearly at right angle to the surface of the scale; the spines arranged in parallel rows, as many as 12 rows to a scale; but those on head have the rows more or less diverging; the upper surfaces of the snout and mandibular rami scaled; no special naked area about vent.

Color of alcoholic specimen dark brown, nearly black on abdomen and lower side of head, lining of the mouth and the peritoneum also black.

COELORHYNCHUS FASCIATUS Günther.

Numerous specimens from *Albatross* station 2783, between Hanover Island and the mainland, and station 2784, between Wellington Island and the mainland, the former in 122 fathoms, the latter in 194. The largest is 24 cm. long. In most of the specimens the anal has more than 62 rays, in one 95.

22. COELORHYNCHUS CHILENSIS Gilbert and Thompson.

Plate 6, fig. 1.

Type and very numerous paratypes from *Albatross* station 2791, in 677 fathoms, off Lota, Chile, 38° 08' S., 75° 53' W. Type, a specimen 305 mm. in total length. Cat. No. 76861, U.S.N.M.

Head $3\frac{3}{5}$ in total length, $1\frac{1}{2}$ in length to anus; depth $6\frac{1}{2}$ and $2\frac{3}{5}$ in same; orbit $3\frac{1}{5}$ in head; snout $2\frac{2}{3}$; interorbital width $4\frac{1}{2}$; maxillary $3\frac{1}{2}$; mandible $2\frac{5}{6}$; distance premaxillary to tip of snout 3; maxillary to lower edge of orbit 6; barbel $3\frac{3}{5}$ in eye; D. II, 8-96; A. 99; P. 19; V. 7; branchiostegals 6.

Snout produced, its length slightly greater than the diameter of the large orbit, which is one and two-fifths times as long as wide; a strong lateral ridge running from the very acute snout nearly to the produced angle of opercle, which overlaps the interopercle completely and is as far from orbit as length of snout; the lateral ridge is double-crested from below center of eye backward; a central row of spinous plates on upper surface of snout, forming crest and extending to above anterior margin of orbit without forming a prominent ridge; a supraorbital ridge follows around the orbit in front and is continued by a low row of scales on lower orbital edge, and also by a low ridge in front of nares; posteriorly it is continued by a strong spinous ridge running parallel to suborbital ridge and reaching upper angle of gill opening; a pair of ridges on occiput, beginning above center of eye, separated by a distance equaling three-fifths interorbital space, and extending backward to nape with very slight divergence; a strongly spinous plate midway between terminations of occipital and of supraorbital ridges, situated, however, on body rather than head; no ridges, scales, or spines present below suborbital ridges, save a sharp spur on mandible at articulation; maxillary ending under center of eye; preopercle strongly produced backward, overlapping interopercle; opercle ending in a stiff spine; teeth in small cardiform bands, somewhat larger above and in more series, about four or five above and three below anteriorly, very slightly if at all enlarged externally; first gill slit as long as one-third orbital diameter.

Dorsal inserted just behind pectoral base, its second spine smooth; interdorsal space equal to vertical diameter of eye; ventrals inserted below dorsal insertion, their filamentous first rays reaching front of anal; origin of anal behind first dorsal a distance equaling base of first dorsal; base of ventrals midway between origin of anal and the isthmus; anus immediately before first anal ray.

Scales present everywhere except on lower surface of head; those on body (between insertion of lateral line and dorsal) with four to six divergent rows of spinules, the central rows highest and the spinules longest posteriorly, latter nearly vertical in position, and making body very rough; scales on flanks lacking, so that character can not be given; no naked space between ventrals; 5 series of scales between lateral line and middle of dorsal, 19 between anal insertion and first dorsal.

Color of all specimens faded, save for black peritoneum and branchiostegal membranes; fins dusky.

This species is close to *Coelorhynchus commutabilis* Smith and Radcliffe, from the Philippines,¹ differing in size of eye, character of spine of first dorsal, barbel, and length of snout. From *Coelorhynchus canus* Garman, it differs in the position of the pectorals, insertion of dorsal, anal and ventral fins, length of maxillary, and in character of scales.

Table of measurements in hundredths of body length to anus of *Coelorhynchus chilensis* Gilbert and Thompson.

	Type.	Paratypes.					
Total length..... millimeters.....	305	225	240	190	215	240	
Length to anus.....do.....	120	98	100	95	85	100	
Snout.....	0.26	0.25	0.25	0.26	0.27	0.25	
Interorbital space.....	.16	.17	.15	.16	.15	.15	
Orbit.....	.22	.23	.24	.23	.23	.22	
Head.....	.68	.68	.71	.69	.70	.68	
Maxillary.....	.20	.18	.21	.19	.18	.19	
Mandible.....	.25	.24	.24	.22	.23	.23	
Tip of snout to premaxillaries.....	.22	.24	.23	.25	.24	.23	
Isthmus to anus.....	.43	.42	.45	.42	.41	.43	
Snout to dorsal.....	.73	.73	.75	.75	.79	.74	
Interdorsal space.....	.17	.16	.18	.21	.16	.15	
Distance between terminations of supra- and suborbital ridges.....	.20	.20	.21	.20	.20	.20	
Dorsal rays.....	II, 8-96	{II, 9 (over 70)}	II, 8	II, 8	{II, 8 (over 81)}	II, 9-83	
Ventral rays.....	7	7	7	7	7	7	

COELORHYNCHUS PATAGONIAE Gilbert and Thompson.

Plate 6, fig. 2.

Type, a small specimen, 125 mm. in total length, from *Albatross* station 2784, between Wellington Island and the mainland on the west coast of Patagonia, in 194 fathoms. It is Cat. No. 76862, U.S.N.M.

Head $4\frac{1}{2}$ in total; $1\frac{1}{2}$ in length to anus; depth $6\frac{1}{2}$ in total, $2\frac{2}{3}$ in length to anus; orbit $2\frac{1}{2}$ in head; interorbital width $4\frac{2}{3}$; snout $3\frac{1}{2}$; maxillary $3\frac{2}{3}$; mandible $3\frac{1}{3}$; distance premaxillary to tip of snout 3; D. II, 9-63; A. 71; P. 17; V. 7; branchiostegals 6.

Snout not much produced, equal to two-thirds orbital diameter and—the distance from tip of snout to premaxillaries; a strong suborbital ridge from tip of snout to produced sharp angle of preopercle, which covers the interopercle; suborbital ridge double backward from below nares; a broad low median dorsal ridge on snout ending above anterior edges of orbits; supraocular ridge but little evident, represented by a row of slightly enlarged plates; a pair of ridges from interorbital space diverging somewhat at occiput until their terminations are a third farther apart than the beginning; a low ridge runs from upper border of eye along upper margin of opercle, with a larger ridge between it and occipital ridges; lower surface of head and jaws naked and unarmed save for the spur on mandible at articulation.

¹ Proc. U. S. Nat. Mus., vol. 43, p. 128.

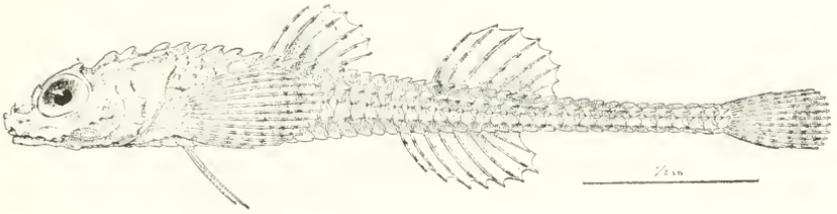
Dorsal and ventral fins inserted just behind pectoral base, second dorsal spine smooth, the ventral filament reaching seventh or eighth anal ray; anal inserted as far behind ventral bases as isthmus is forward of same, anus just before anal insertion.

Scales between lateral line and middle of dorsal 3 in a transverse series, between anal insertion and first dorsal 15; four to six divergent rows of spinules on each scale, those of flanks equal in size, those on scales between occiput and dorsal with a much higher median row, the last spinules projecting well beyond border of scale.

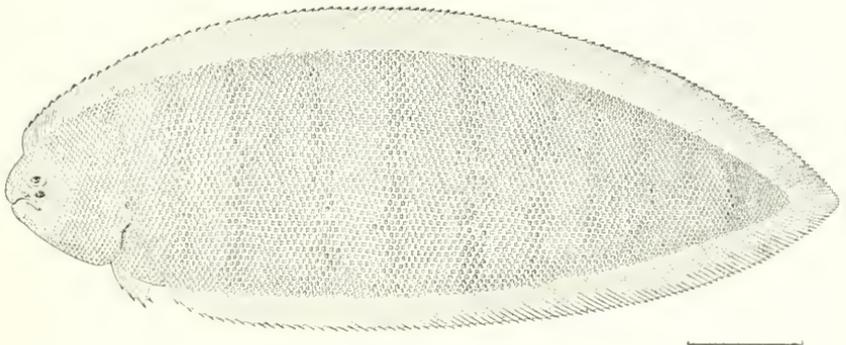
Color all faded save for dark lining of mouth, gill cavity, and body cavity.

The smaller number of scales above the lateral line and in a transverse series, the difference in the ridges of the head, the shorter snout, and other slight differences in proportions separate this species from *Coelorhynchus chilensis*. No barbel is evident, but this may be due to accident. The following measurements are in hundredths of the length anterior to anus:

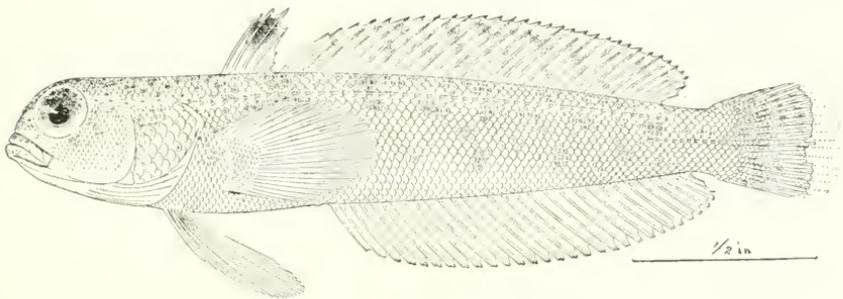
Total length 125 mm.; length to anus 42 mm.; of snout 0.22; width of interorbital space 0.15; diameter of orbit 0.29; length of head 0.72; of maxillary 0.20; of mandible 0.24; distance tip of snout to premaxillaries 0.24; isthmus to anus 0.45; snout to dorsal 0.78; interdorsal space 0.18; distance between terminations of supra- and suborbital ridges 0.29; dorsal rays II, 9-63; ventral rays 7.



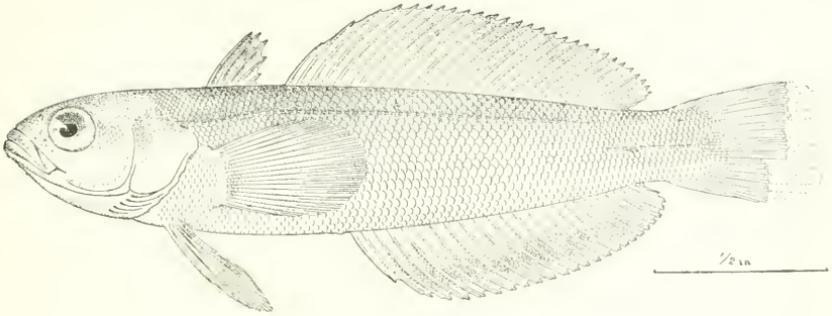
1. AGONOPSIS ASPEROCULIS. (PAGE 409.)



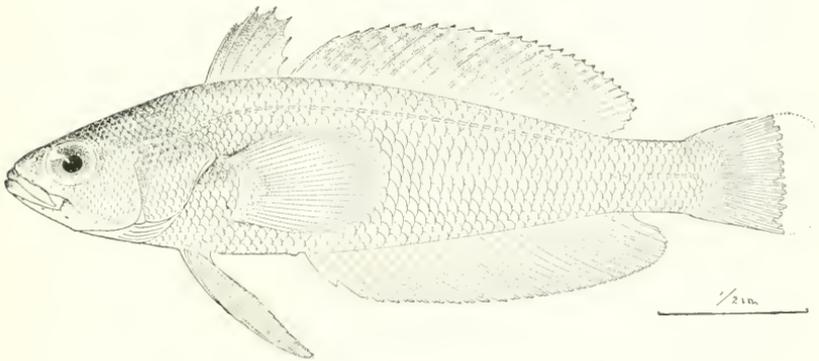
2. SYMPHURUS BERGI. (PAGE 414.)



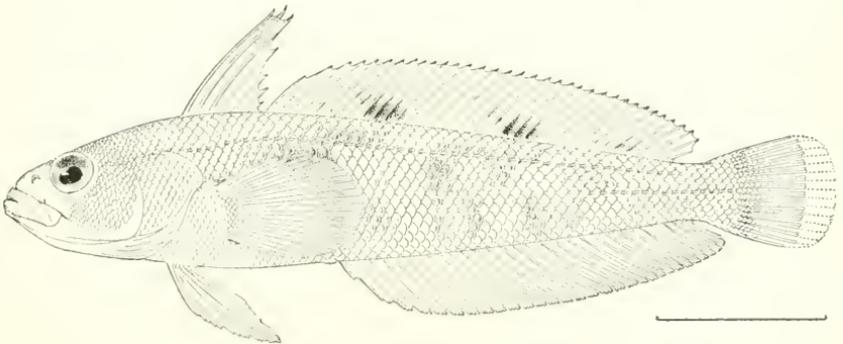
3. NOTOTHENIA GILBERTI. (PAGE 430.)



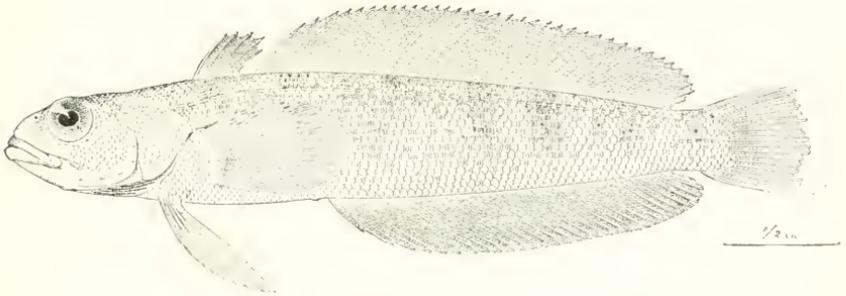
1. NOTOTHENIA LATIFRONS. (PAGE 434.)



2. NOTOTHENIA SQUAMICEPS. (PAGE 441.)



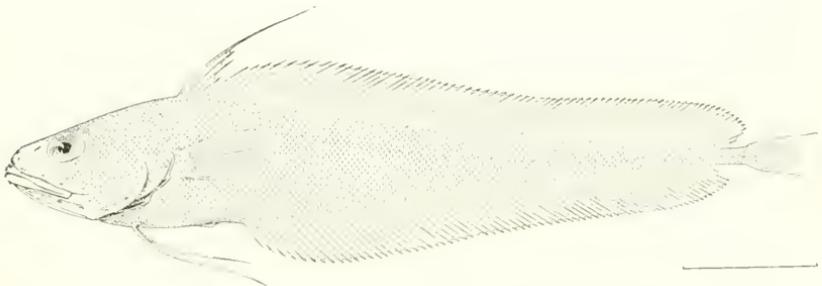
3. NOTOTHENIA JORDANI. (PAGE 443.)



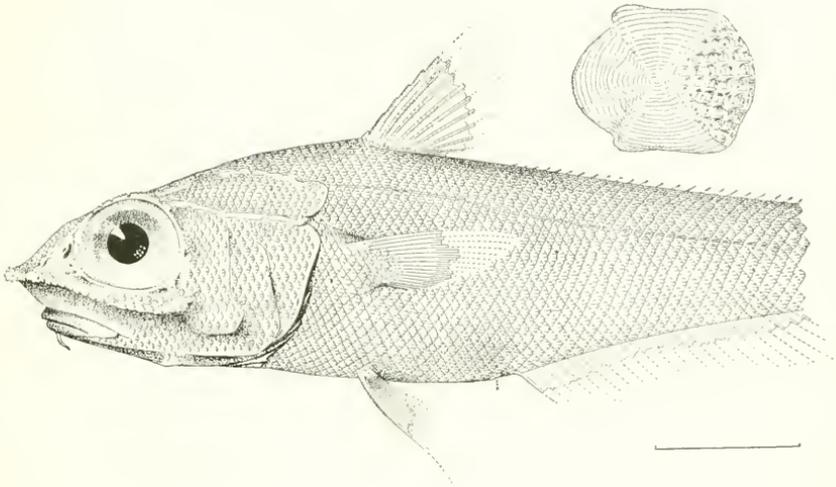
1. *NOTOTHENIA LONGICAUDA*. (PAGE 445.)



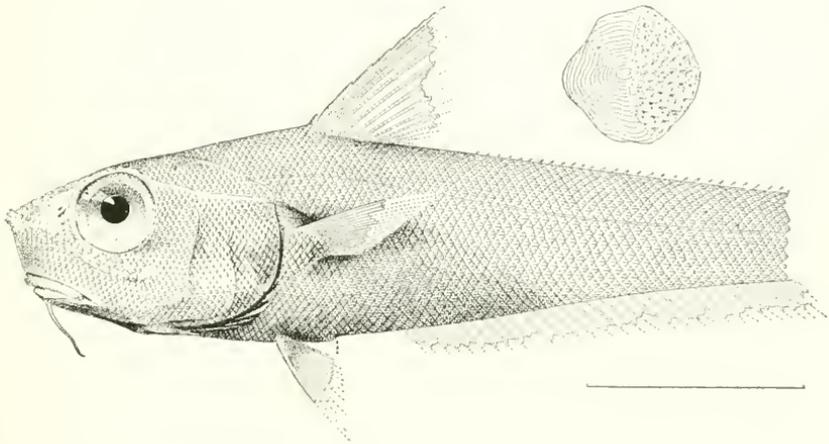
2. *IDIACANTHUS RETRODORSALIS*. (PAGE 462.)



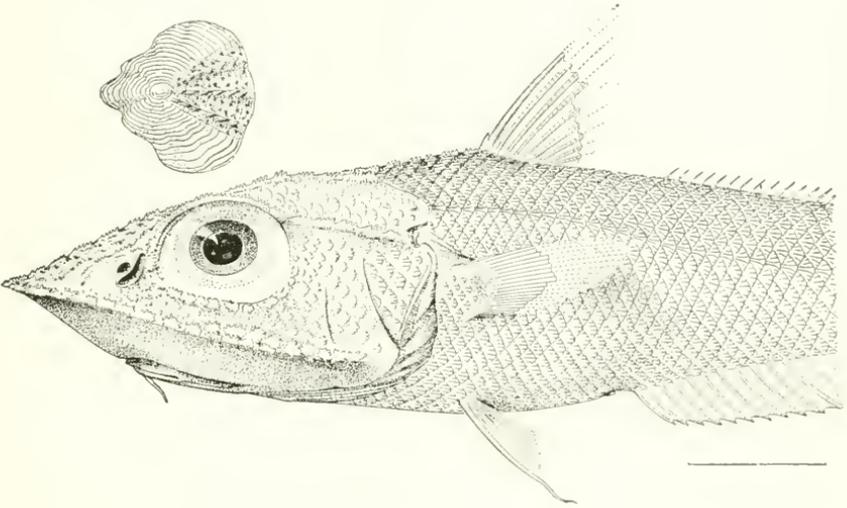
3. *LAEMONEMA MULTIRADIATA*. (PAGE 469.)



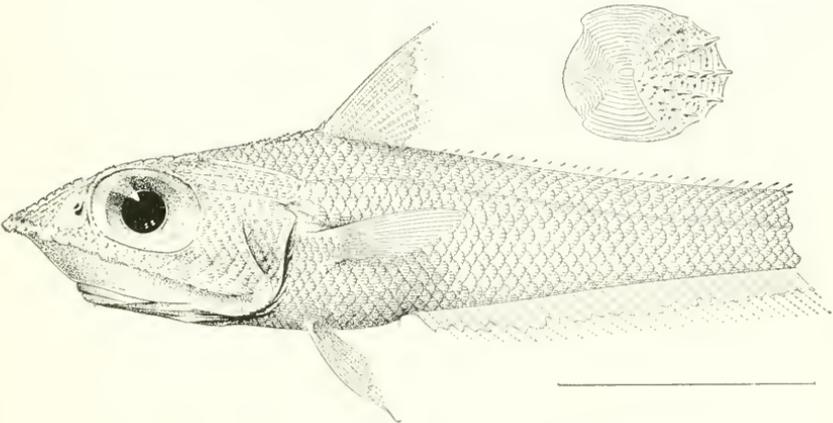
1. CORYPHAENOIDES ARIOMMUS. (PAGE 471.)



2. NEZUMIA PUDENS. (PAGE 472.)



1. COELORHYNCHUS CHILENSIS. (PAGE 473.)



2. COELORHYNCHUS PATAGONIAE. (PAGE 475.)

