

THE MARINE FISHES OF PERU.

BY JAMES FRANCIS ABBOTT.

The study of the ichthyology of the west coast of South America, which was begun by Valenciennes in the early volumes of the *Histoire Naturelle*, has been carried on since in a very desultory way. The only general works that have appeared have been the fairly extensive *Fauna Chilena* of Claude Gay, published in 1848, and the, ichthyologically, very incomplete *Fauna Peruana* of Tschudi, published in 1845. The former contains descriptions of 108 species of fishes, the latter of but nineteen. Whatever work has been done since has consisted merely of isolated descriptions of single species or of small collections that have occasionally fallen into investigators' hands. Tschudi himself made extensive collections in Peru, but through a series of misfortunes they were nearly all lost. A few years before, the results of the voyage of "The Beagle" had been published, and the fishes collected by Darwin, quite a number of which had been taken from the west coast of South America, were described by Dr. Leonard Jenyns.

But by far the greater number of the species known from this region have been described by Kner and by Steindachner. The *Ichthyologische Notizen*, which were published by the latter at intervals from 1864 to 1870, and the *Ichthyologische Beiträge*, which followed from 1874 to 1882, contain numerous descriptions of species from Peru and Chile. In 1867-68 Kner published the results of his work upon the fishes in the Godeffroy Museum at Hamburg, which contained many South American examples collected by the captains of Hamburg merchant vessels. More recently Steindachner has described the collection of fishes obtained by Dr. L. Plate in his extensive exploration of Chile.¹ Many of these are from Iquique, and are here included, while others heretofore known only from Peru or northward are recorded from Chilean waters for the first time.

¹ *Fauna Chilensis*, ii, Supplement to *Zoologische Jahrbücher*, July, 1898.

And yet it is fair to state that the total number of valid species known to-day from Cape Horn to the equator does not exceed 300, and of these only 100, more or less, are found between the equator and the Tropic of Capricorn. In contrast to this we recognize over 300 species along the west coast of Mexico and Central America alone, from Panama to the Tropic of Cancer.

It is certain that the southern region is fully as rich as the northern, and the field—at least of Peru—remains practically unexplored. Very nearly all the material that has been collected has been obtained from one source—the fish-markets. The tide-pools are untouched, the deep-sea fishes almost unknown, and a multitude of forms, of little importance economically but of great interest scientifically, await the word of the investigator to introduce them to the world.

The basis of the present paper has been a collection of marine fishes made in Callao by Rear-Admiral L. A. Beardslee, U. S. N., retired, on a cruise of U. S. S. "Philadelphia," during the month of January, 1896. Though rather small, the collection contains a great deal of interesting material.

The scattered condition of the literature has hindered a study of the subject, and one of the principal purposes of the present brief paper has been to collect and modernize the synonymy of the species inhabiting this region.

We have included all the marine species known to us, inhabiting a range from Pecosmayu bay on the north to Iquique on the south, and limited in a general way by the political boundaries of Peru. The detailed synonymy has been given for all references to the west coast of South America, and the author responsible for the present generic and specific name of each form has been cited, but otherwise only enough synonymy has been included to guide the reader to other sources. The page references to Cope and Steindachner are those of the reprints containing their descriptions.

The habitats given to many species by early workers were very general, and many ranges that we have copied from their descriptions will doubtless have to be restricted. A few species have been described from "the west coast of South America," and have been admitted provisionally into the present list until future investigation shall have established their true position.

One hundred and two species, belonging to forty-two families, are here recognized as valid. Of these, fifty are confined to the Peruvian region, twenty-seven are common to both Peru and Chile, and thirteen are recorded north of the equator.

The following are here described as new:

Basilichthys octavius.

Basilichthys regillus.

Basilichthys jordani.

Pisciregia beardsleei, new gen. and sp.

Sciaena gilberti.

The writer wishes to express his indebtedness to Admiral Beardslee, through whose efforts the Callao collection was made, and the present paper made possible. He is also indebted to Mr. James Douglas Ogilby, of Sydney, N. S. W., who has contributed important information and suggestions, as well as to Dr. G. A. Boulenger, of the British Museum, who has very kindly examined types and in other ways rendered valuable assistance. Especially must he express his obligations to Dr. Charles H. Gilbert, of Leland Stanford, Jr. University, in whose laboratory the work was carried on, and to President David Starr Jordan, who has taken a personal interest in the work and who personally supervised it.

BRANCHIOSTOMIDÆ.

1. *Branchiostoma elongatum* Sundevall.

B. elongatum Sundevall, Öfvers. Vet. Akad. Förhandl., 1852, 147 ;
Steindachner, Fauna Chilensis, 334, 1898.

Steindachner records this species from Cayancha bay, Iquique.

GALEIDÆ.

2. *Galeus mento* (Cope).

Mustelus mento Cope, Proc. Amer. Phil. Soc., May 4, 1877, 31
[Pecasmayu Bay, Peru].

Mustelus edulis Perez Canto, Estudios sobre algunos Escualos de Chile, 4, 1886 ; R. A. Philippi, Ann. del Universidad de Chile, lxxi, 1887, 15.

Local name, *Tollo*.

This species, which is not represented in the present collection, is very close to *G. dorsalis*, from which it differs especially in the more anterior position of the first dorsal, the distance between the origin of that fin and the tip of the snout being about six and

two-thirds times in the total length (Philippi). The flesh is much esteemed as food by the Chilean people.

Range.—Pecasmayu bay to Juan Fernandez.

3. *Galeus dorsalis* (Gill).

Mustelus dorsalis Gill, Proc. Acad. Phila., 1864, 149 [Panama].

Galeus dorsalis Jordan and Evermann, Fishes of North and Middle America, i, 30, 1896.

Local name, *Cazon*.

The five specimens in the collection show a most remarkable color variation. Two of them have the typical silvery plumbeous ground color, paler ventrally and slightly flecked with light spots along the sides. The other three are transversely barred with about sixteen rather broad black bands, extending across the back half-way down on each side. There are five or six in front of the first dorsal, the two anterior ones bounding the interorbital space. These are not sex markings, as both sexes occur in each variety. The most careful comparison and elaborate and accurate measurements fail to reveal any other difference. The anal arises under the posterior third of the dorsal, barely extending beyond that fin.

The following measurements are in hundredths of the total length and have been computed on the U. S. Fish Commission's proportional scale:

Snout to origin of first dorsal	.29-.31
Base of first dorsal	.11-.12
Anterior margin of first dorsal.	.12
Distance between two dorsals	.20-.22
Base of second dorsal	.05-.09
Anterior margin of second dorsal	.10-.11
Second dorsal to tip of caudal	.30-.32
Distal lobe of caudal	.07-.09
Anterior edge of ventral	.07-.09
Anterior margin of pectoral	.13-.14
Tip of snout to eye	.08
Eye	.03
Eye to origin of first dorsal	.20-.22
Anal to tip of caudal	.29
Length	300-430 mm.

Range.—Gulf of California, Panama, Callao.

For comparison the following measurements were taken on a specimen of *G. dorsalis* collected by Dr. Gilbert at Panama:

Snout to first dorsal	.31
Base of first dorsal	.12
Margin of first dorsal	.13
Interdorsal	.20
Base of second dorsal	.10
Anterior margin second dorsal	.10
Second dorsal to caudal tip	.27
Caudal lobe	.065
Anal to caudal tip	.26
Anal to ventrals	.15½
Ventral, anterior margin	.08
Anal, anterior margin	.075
Pectoral to ventral	.25
Anterior margin of pectoral	.15
Snout to pectoral (second slit)	.21
Snout to eye	.085
Eye	.025

4. *Carcharhinus brachyrrhynchus* (Philippi).

Carcharias brachyrrhynchus Philippi, Tiburones de Chile, Anal.
Univ. Chile, tomo lxxi, 8, 1887 [Iquique].

SPHYRNIDÆ.

5. *Sphyrna peruana* (Philippi).

Zygaena peruana Philippi, Tiburones, etc., de Chile, Anales Univ.
de Chile, tomo lxxi, 13, 1887.

Very abundant on the coast of Peru (Philippi).

SQUATINIDÆ.

6. *Squatina armata* (Philippi).

Rhina armata Philippi, l. c., 29, lám vii, fig. 1.

Iquique.

RAJIDÆ.

7. *Psammobatis brevicaudatus* Cope.

P. brevicaudatus Cop², Proc. Amer. Phil. Soc., May 4, 1877, p. 32.

Habitat.—Pecasmayu bay, Peru.

8. *Raja chilensis* Steindachner.

Raja chilensis Steindachner, Fauna Chilensis, 332, Taf. 21, fig. 15,
1898.

Habitat.—Iquique.

NARCOBATIDÆ.

9. *Discopyge tschudii* Heckel.

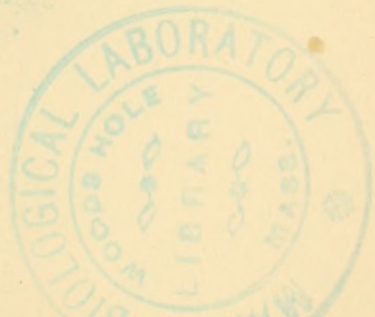
Discopyge tschudii Heckel, in Tschudi, Fauna Peruana, Fish 33, Taf. 6, 1845; Steindachner, Fauna Chilensis, ii, 332, Taf. 21, fig. 14-14b, 1898 [Calbuco, Chile].

Following is the original description:

“Genus *Discopyge* Hæckel, MSS. Caract. Gen. Discus orbicularis. Os transversum ad angulos labiis incrassatis instructum; maxilla medio lamina dentali extrorsum inflexa, denticulis minimis in quincuncim dispositis. Dentes plani rhomboidales, angulo postico acuto. Velum pone maxillam superiorem et inferiorem. Valvula nasalis truncata, in medio processu sinuato instructa, subtus frenulo cum plica circulari oris juncta. Spiracula oculis adjacentia, margine nudo. Pinnæ ventrales sub cauda in unam junctæ. Pinnæ dorsales duæ æquales. Pinnæ caudales oblique ovatæ (Heckel in lit.).

“*D. tschudii* Hæckel. Die Scheibe ist, wenn man sich die Wendung der Brustflossenränder als in ihrer Richtung fortlaufend und rückwärts verbunden denkt, vollkommen kreisrund.

“Der Mund liegt am Ende des vordern diametralen Viertheils dieser Scheibe und sein Querdurchmesser macht den dritten Theil dieses Viertheils oder die Entfernung von dem Mund bis zum Scheibenrande aus; er ist verschiebbar wie bei *Narcine* oder den *Accipenser*arten. An den Winkeln umgibt ihn ein fleischiger Lippenwulst, unter dem die kleinen obern und untern Lippenknorpel bemerkbar sind. Die in den Mundhöhlen breiteren Zahnplatten beider Kiefer wenden sich schmäler werdend nach aussen über den mittleren Mundrand um und schlagen sich gleich einer mit Zähnen gepflasterten Mittellippe zwischen den beiden eigentlichen Winkellippen zurück. Die untere Plattenumschlag ist etwas schmaler, verliert sich rückwärts spitzer; der obere ist etwas breiter, weniger umgeschlagen und abgerundet. Die Zähne auf diesen Zahnplatten stehen nicht nur dicht in verschobenen Reihen (quincunx) aneinander, sondern überdecken sich ein wenig mit ihrem hintern Rande; die innerste oder längste Reihe enthält ungefähr 12 Zähne, die nachfolgenden nehmen allmählig ab. Die einzelnen Zähne sind glatt, flach, beinahe rhomboidal und an jenen in der Mundhöhle sitzenden verlängert sich der nach hintern gewendete Winkel in eine kleine scharfe Spitze. Sowohl hinter der



untern als obern Zahnplatte schiebt sich ein dem Ansehen nach glatter Kiefersegel hervor und verschliesst beinahe die ganze Mundhöhle gleich einem zweiten Kieferpaare. Die Entfernung der beiden Nasenlöcher von einander gleicht 1, 5 der Mundbreite. Die Nasenklappe ist etwas schmaler, reicht zurückgelegt bis an den Lippenwulst und hat in der Mitte einen vorspringenden ausgebuchteten Lappen, der den Umschlag der obern Zahnplatte zwischen den oberen Lippenrudimenten genau überdeckt und verhüllt. Wird die Nasenklappe vorwärtsgeschlagen, so zeigt sich dieser vorspringende Lappen als das nach beiden Seiten etwas ausgebreitete Ende des Nasenbändchens (Frenulum), welches durch seine Basis mit der allgemeinen, den ganzen Mund umfassenden circulären Hautfalte in Verbindung steht. Die Augen sind, wie gewöhnlich, sehr klein, liegen senkrecht über dem Mund in einer zweimal so grossen Entfernung als die Nasenlöcher auseinander. Dicht hinter den Augen befinden sich die grossen glattrandigen Spritzlöcher. Weiter rückwärts bemerkt man, wie an andern *Torpedines*, zwei nahe aneinander liegende, Schleim ausführende Poren auf dem Rücken, die aber hier nur um ein Drittheil des Augenzwischenraumes hinter den Spritzlöchern liegen. Die electrischen Organe scheinen aus minder zahlreichen Säulchen zu bestehen als in den Gattungen *Torpedo* und *Narcine*; ihre Gestalt ist, wie gewöhnlich, meistens hexagon.

“ Der hintere Rand der Brustflossen überdeckt den Anfang der Bauchflossen deren *gemeinschaftlicher* hinterer Rand ein mit der Scheibe paralleles, zu beiden Seiten abgerundetes Bogensegment darstellt. Diese so merkwürdige Vereinigung beider Bauchflossen miteinander, welcher einigermaßen an die der Trichterlosen *Gobien* erinnert, geschieht mittelst einer an der untern Schwanzbasis hinter dem After befestigten Membran. Die Länge des Schwanzes vom After bis zum äusseren Flossenrande ist dem Diameter der Scheibe gleich. Zu beiden Seiten des Schwanzes laufen den ganzen Länge nach zwei horizontale, breite Keilfalten hin und enden etwas nach dem Anfange der terminalen, ruderförmigen, schief abgerundeten Schwanzflosse. Beide auf dem Schwanzrücken sitzenden Rückenflossen sind gleich gross und folgen nahe aufeinander; die erste beginnt etwas vor dem Bauchflossenrande und die zweite reicht zurückgelegt über den Anfang der Schwanzflosse, ihre Höhe übertrifft die Länge der Basis um einen Viertheil.

“*Färbung*.—Die ganze Oberseite ist dunkel röthlichbraun, auf der Mitte des Rückens dunkler als an den Scheibenrändern. Unterkörper matt weisslich.

“*Länge*, 5"—6"". Grösste Breite, 2"—10.5"".

“*Vorkommen*.—Das hier beschriebene Exemplar wurde in der Heradura einer Caleta zwischen Huacho und Chancay, gefangen.”

MYLIOBATIDÆ.

10. *Myliobatis californicus* Gill.

Holorhinus vespertilio Gill, Proc. Acad. Nat. Sci. Phila., 1862, 331;
Myliobatis californicus Jordan and Gilbert, Synopsis, 51, 1883.

Local name, *Raya*.

One specimen, from which unfortunately the tail has been cut. Breadth of disc, 470 mm.; line from eye to origin of ventrals, 200 mm.; breadth of head, 80 mm.; distance between nasal openings, 31 mm.; width of first middle tooth, 16 mm.; length, 4 mm.

Range.—Cape Mendocino, San Diego, Callao.

SILURIDÆ.

11. *Galeichthys peruanus* Lütken.

Galeichthys peruanus Lütken, Ichthyographische Bidrag, ii (Vidensk. Meded., 1874, 205) [Callao]; Steindachner, Ichthyol. Beiträge, iv, 34 (S. B. Ak. Wien, lxxii, 1875) [Callao, Altata, Panama].

Tachysurus peruanus Eigenmann and Eigenmann, Proc. Calif. Acad. Sci., 2d Series, i, 140, 1888 [Callao]; *ibid.*, Revision of South American Nematognathi, Occasional Papers, i, Cal. Acad. Sci., 51, 1890 [Callao].

Local name, *Bagre* (common for most Siluroids).

Three specimens. Head .25 of total length, depth .16. Distance from snout to origin of dorsal .31; gill rakers 5 + 9, 6 + 10, 6 + 8; D. I, 6 to 7, A. 14 to 15.

One ♀ specimen (No. 11,962, L. S., Jr., U.) appears to differ from the others, but not sufficiently to warrant separating it from the species. The head is somewhat shorter, .22 in total length; the ventrals are longer, .16 in total length. The dorsal is inserted somewhat more anteriorly (.29 to end of snout) and the outline of the humeral process is orbicular instead of being irregular, as in the other specimens.

The number of gill rakers in all three differs somewhat from the count given by Eigenmann.

Length 290–320 mm.

Range.—Callao to Tropic of Cancer.

LEPTOCEPHALIDÆ.

- 12.
- Leptocephalus multimaculatus*
- Steindachner.

L. multimaculatus Stein., Ichthyologisc. Notizen, ix, 27, 1869
[“Peru”].

- 13.
- Leptocephalus peruanus*
- Steindachner.

L. peruanus Stein., Ichthy. Notizen, ix, 28, 1869 [Peru].

OPHICHTHYIDÆ.

- 14.
- Ophichthus callaensis*
- (Günther).

Ophichthus callaensis Günther, Jour. Mus. Godeffroy, iv, 92 [Callao].

We have been unable to consult the description of this species.

- 15.
- Ophichthus pacifici*
- (Günther).

Ophichthus pacifici Günther, Cat. Fish. Brit. Mus., viii, 76, 1870
[“Chile and Peru”].

- 16.
- Ophichthus grandimaculatus*
- (Kner and Steindachner).

Ophichthus grandimaculatus Kner and Steind., Sitz. Ak. Wiss. Wien.,
1866, liv, 389, fig. 13 (Neue Fische aus Mus. Godeff., 34) [Peru].

- 17.
- Ophichthus uniserialis*
- (Cope).

Ophichthus uniserialis Cope, Proc. Amer. Phil. Soc., 1877, 31 [Pecas-
mayu bay].

MURAENIDÆ.

- 18.
- Lycodontis wieneri*
- (Sauvage).

Gymnothorax wieneri Sauvage, Bull. de la Société Philomathique de
Paris, July 7, 1883, 161 [“Chile or Peru” (sic)].

CLUPEIDÆ.

- 19.
- Clupanodon fimbriata*
- (Kner and Steindachner).

Alosa fimbriata Kner and Stein., Sitz. Ak. Wiss. Wien, 1866 (Neue
Fische aus Mus. Godeffr., 31, fig. 15 [Valparaiso]).

Clupea sagax Günther (not of Jenyns), Cat. Brit. Mus., vii, 443, 1868.

Local name, *Sardina*.

H. $3\frac{1}{2}$; D. $4\frac{1}{2}$ – $4\frac{1}{5}$. Dorsal 18 (19); anal 16 (18). 20 scutes anterior to ventrals, 15 between ventrals and anus. Maxillary $2\frac{1}{2}$ in head.

Compared with *C. cæruleus*, the rays in the dorsal are more numerous and are peculiar in that the last two and again the two preceding are pressed out side by side so as to lie in two layers covered by the enlarged scales at the base of the fin. The head is longer, the ventral scutes more numerous and the striæ on opercle much more numerous and finely divided than in *cæruleus*.

Compared with specimens of the same species from Valparaiso, no constant differences were observed, except in the head, which is slightly shorter in the latter specimens.

Four individuals, length 240–300 mm.

Range.—Chile and Peru, coastwise.

20. *Potamalosa notacanthoides* (Steindachner).

Clupea (Alosa) notacanthoides Stein., Ichthy. Notizen, ix, 20, Pl. vii, (good).

Local name, *Machete*.

This species is very closely related to *Potamalosa (Clupea) notacanthus* (Günther),² from Valparaiso, with which it may be identical. The type locality of Steindachner's species was given erroneously as Mazatlan, but the specimen doubtless came from further down the coast. The principal differences that separate the two species lie in the scales, which are striate and fimbriate in *notacanthoides*, and in the veinules of the opercle which are very prominent in that species. Dr. Boulenger very kindly examined the types of *Clupea notacanthus* for us. He says: "The scales, about 48 in lat. line, show no trace of striations and the opercle is not veined. The dorsal scutes number 23 and 27 respectively. No traces of dark spots." It is worthy of note, however, that Günther's types are all small, 4 inches, and it may be that the difference in size and age is accountable for the differences noted above. We have examined specimens of *P. notacanthoides* from Valparaiso, and find that they agree with those from Callao in every particular.

The diagnosis of the genus *Potamalosa*,³ which was created to receive the species *P. antiqua* Ogilby (*Clupea novæhollandiæ* Günther, not *Meletta novæhollandiæ* Valenciennes) will have to be somewhat modified to admit *P. notacanthoides*. The constant characters that appear to be of generic value are the position of the dorsal, which originates well in advance of the middle of the body, the number of branchiostegals and the rays of the anal.⁴

Five specimens, l. 200–240 mm.

Head 3–3½; depth 3; eye 4½–5; pectoral 1½ in head (as in Steindachner's figure, 2¾ in his description). There is considerable

² Günther, Cat. Fishes Brit. Mus., vii, 443, 1868.

³ Ogilby, Proc. Linn. Soc. N. S. Wales, xxi, 1896, 504 (1897). *Ibid.*, l. c., 1897, Pt. i, Apr. 28, p. 70.

⁴ The following synopsis will show the differences between the two species of the genus:

Gen. *Potamalosa* Ogilby. Origin of dorsal well in advance of middle of body; branchiostegals 8 or 9; anal rays 18 or less,—

(a) Dorsal scutes feeble; scales pectinate and striate; muciferous system highly developed; opercle veined *notacanthoides*.

(b) Dorsal scutes prominent; scales entire; muciferous system confined to main arteries; opercle quite smooth *antiqua*.

variation in the number of ventral scutes, which run from 19 to 21 before the ventrals and from 16 to 18 behind them. Dorsal scutes 24—27 in one specimen (misprinted 7 in Steindachner's description). Opercular veinules prominent. Color, above dark greenish brown, below silvery yellow. Dorsal dark, caudal with broad dark margin; other fins pale, six or eight round or elongate dark blotches along the side in the silvery portion. A like number more or less parallel with them in the darker upper half of body, just above the color line.

Habitat.—Coasts of Chile and Peru.

21. *Potamalosa* (?) *maculata* (Cuvier and Valenciennes).

Alausa maculata Cuv. and Val., Hist. Nat. Poiss., xx, 430 (1847) [Valparaíso]; Gay, Hist. Chile Zool., ii, 322, lám. 10, fig. 2.
Clupea maculata Günther, Cat. Brit. Mus., vii, 443, [Callao]; Steindachner, Fauna Chilensis, 330, 1898 [Iquique].

This species is very close to *Potamalosa notacanthoides* and possibly belongs to that genus, though no dorsal serrature has been described. But the type specimens in the British Museum are in such poor condition that one is not warranted in saying that a dorsal serrature is absent in the adult,⁵ and in the description of Steindachner's single specimen no mention is made of the matter. I therefore, for the present, place *maculata* with *notacanthoides* in *Potamalosa*.

Range.—Coasts of Peru and Chile.

22. *Clupanodon sagax* (Jenyns).

Clupea sagax Jenyns, Voy. Beagle, 134, 1842 [San Lorenzo isl.]; Günther, Shore Fishes, Challenger, 25, 1830 [Valparaíso]; Steindachner, Fauna Chilensis, 331, 1898 [Iquique].

23. *Clupanodon fimbriatus* (Kner and Steindachner).

Alausa fimbriata Kner and Stein., Neue Fische, Mus. Godefr., 31, fig. 15; Sitz. Ak. Wiss. Wien, 1866 [Valparaíso].

Local name, *Sardina Española*.

Two specimens. The pectoral is a little longer than in the original description, $1\frac{2}{3}$ in head. The species is readily distinguished from *C. caeruleus* by the greater number of fin rays and the numerous and more delicate striæ on sides of head. Length, 300 mm.

Range.—Coasts of Peru and Chile.

⁵ Dr. G. A. Boulenger, in lit., 6, 15, 98.

ENGRAULIDIDÆ.

24. *Stolephorus tapirulus* (Cope).

Engraulis tapirulus Cope, Proc. Amer. Phil. Soc., May 4, 1877 (separate, p. 29) [Pecasmayu bay?].

The two specimens in the collection evidently belong to this species. The brevity of Cope's description, however, seems to require a more extended one.

D. 14, A. 23-24, depth $4\frac{1}{5}$, head $3\frac{1}{2}$, eye $4-4\frac{1}{4}$ in head, 5 in snout, equal to interorbital. Body strongly compressed, outline not strongly curved. Head very acute, top flat. Mouth very oblique, giving head a triangular outline, the depth at occiput equaling length. Maxillary very long, acutely truncate, extending slightly past articulation of mandible and quadrate. Teeth very small. Gill rakers long and slender, but shorter than eye. Dorsal low, its origin nearer beginning of caudal than end of snout by twice the diameter of eye. Its longest ray about two in head. Pectoral $1\frac{3}{4}$ in head, not reaching ventrals by half diameter of eye. Ventrals short, $3\frac{1}{3}$ in head, extending slightly beyond perpendicular from origin of dorsal. Anal low, beginning slightly in advance of vertical from end of dorsal base. Scales thin, about 37 in a series from pectoral to caudal.

Color, silvery yellowish. Lateral band rather obscure, mediate. Scales above finely sprinkled with black dots. Snout and top of head peppered with dots. Occiput dark. Length 180 mm.

This species is close to *S. peruanus* Steindachner, differing in the smaller number of dorsal and anal fin rays, origin of anal, length of pectoral, position of lateral stripe and depth of head at occiput (2 in head in *S. peruanus*).

Two specimens.

Local name, *Llanamarca*.

25. *Stolephorus peruanus* (Steindachner).

Engraulis peruanus Stein., Ich. Beiträge, viii, 60, 1878 [Callao].

26. *Engraulis nasus* (Kner and Steindachner).

E. nasus Kner and Stein., Neue Fische aus Mus. Godeffr., 33, fig. 17, 1866 [Chinchas islands, Peru].

This species is certainly distinct from *E. ringens*, differing in having a larger eye, greater depth and much longer premaxillary.

27. *Engraulis ringens* Jenyns.

Engraulis ringens Jenyns, Voy. Beagle, 136, 1842 [Callao]; Steindachner, Ich. Beiträge, 62, 1879; Günther, vii, 386, 1868; Steindachner, Fauna Chilensis, 331, 1898 [Tumbes, Chile].

Local name, *Anchobeta*.

The single specimen of this species is a typical *Engraulis*, and when compared with the California specimens of *E. mordax* establishes without doubt the individuality of the two species.

They differ most markedly in coloring and in the shape of the head. The specimens of *E. mordax* examined are truly spindle-shaped, the dorsal and ventral outlines curving symmetrically from snout to tail; in *E. ringens* the dorsal outline is nearly straight, the greatest body depth is at the pectorals and the ventral outline slopes without much curve to the caudal peduncle which is slightly thicker in *ringens* ($3\frac{1}{4}$ in head to $3\frac{2}{3}$ in *mordax*). In the former species the head is deeper in proportion to its length, being $1\frac{2}{3}$ in its length at the occiput to $1\frac{3}{4}$ – $1\frac{7}{8}$ in *E. mordax*. The maxillary is contained $5\frac{1}{2}$ times in the length in *ringens*, $4\frac{1}{2}$ in *mordax*. In the former species the mandible reaches nearer to the end of the snout than in the latter, ending about half way between nostril and tip of snout. In *E. mordax* it does not quite reach nostril, thus falsely giving *E. ringens* the appearance of having a shorter snout. The distance from the end of the mandible to the tip of the snout is contained $1\frac{2}{3}$ in the eye in *ringens*, to $1\frac{1}{2}$ in *mordax*.

In *ringens* the gill cleft is much longer, beginning almost level with the back and the opercle is correspondingly produced, rounding out in a full curve instead of descending abruptly to the posterior angle as in *mordax*. The distance between the limit of the interopercle and the outer edge of the opercle at the upper angle of gill cover is contained in the head $5\frac{1}{3}$ times in *E. ringens*, 7 times in *E. mordax*.

In *ringens* the pectorals reach two-thirds of the way to the ventrals, in *mordax* they extend almost to the ventrals. In the former species the anal is somewhat more posterior, the distance from the end of the anal to the beginning of the caudal being contained twice in the head, to $2\frac{1}{2}$ times in *mordax*. The anal is somewhat shorter in the former, its base being contained 6 times in the length to $5\frac{1}{2}$ in *mordax*.

The dorsal is also shorter, its base being contained $2\frac{3}{4}$ times in

the head in the former to twice in the latter. In the former the ventrals are 3 in the head, in the latter $2\frac{1}{2}$.

The specimen in hand is dark olive green above the silvery stripe. This is narrower than in specimens of *E. mordax* examined, beginning about midway of the body, while in *mordax* the silvery part covers about three-quarters of the side.

D. 14; A. 20. Length, 112 mm.

Habitat.—Coasts of Peru and Chile.

STROMATEIDÆ.

28. *Stromateus maculatus* Cuvier and Valenciennes.

Stromateus maculatus Cuv. and Val., Hist. Nat. Pois., ix, 399, 1833 [Valparaiso]; (?) Jenyns, Zoöl. Beagle, Fishes, 74, 1839 [Chiloe]; Gay, Hist. Chile, Zoöl., ii, 248, Atl. Ichth., lám 3 bis., f. 1; Fordice, Review of Stromateidæ, Proc. Acad. Nat. Sci. Phila., 1884, 314 [Rio Grande do Sul]; Steindachner, Fauna Chilensis, 299, 1898 [Puerto Montt, Chile].

This species belongs to the more southern Chilean fauna, but Valenciennes is authority for the statement (ix, 400) that it is a common market fish at Lima from May to July, and hence may be considered to range from Peru to Patagonia (Jenyns).

EXOCOETIDÆ.

29. *Exocoetus volitans* Linnæus.

Exocoetus evolvans Linnæus, Systema Natura, Ed. xii, 521, 1766.

Exocoetus chilensis Abbott, Proc. Acad. Nat. Sci. Phila., 1860, 472 [Chile].

Halocypselus evolvans Jordan and Gilbert, Synopsis, 377, 1883 [Atlantic coast, U. S.].

Exocoetus volitans Jordan and Evermann, Fishes of N. A., 1898, Addenda, p. 2835.

Although there are no specimens of this species in the Beardslee collection, yet we have identified some taken 6° south of the equator in the East Pacific by the U. S. S. "Albatross," and it may be considered to be within the limits of Peruvian waters.

30. *Exonastes speculiger* (Cuvier and Valenciennes).

(?) *Exocoetus exiliens* Jenyns, Zoöl. Voyage Beagle, Fishes, 122, 1842 (not of Gmelin) [Coast of Peru].

Exocoetus speculiger Cuv. and Val., Hist. Nat. Pois., xix, 94, 1846 [Pacific coast, S. A.].

Exocoetus rufipinnis Cuvier and Val., Hist. Nat. Pois., xix, 99, 1846 [Payta, Peru].

Exonastes speculiger Jordan and Evermann, op. cit., Addenda, 2836, 1898.

The fish described by Jenyns as *Exocoetus exiliens* Bloch without doubt belongs to this species.

SYNGNATHIDÆ.

31. *Leptonotus blainvillianus* (Eydoux and Gervais).

Syngnathus blainvillianus Eydoux and Gervais, in Guérin, Mag. Zoöl., 1837, iv, pl. 17; Voyage Favorite, Zoöl., 79, pl. 32; Günther, Cat. Brit. Mus., viii, 162, 1868; Gay, Hist. de Chile, ii, 348, 1848; Steindachner, Fauna Chilensis, 331, 1898 [Tumbes, Chile].
Leptonotus blainvillei Kaup, Lophobranchii of Brit. Mus., 46, 1856 [Peru].

Peru, Chile (India, Auckland Islands, New Zealand, *Kaup*).

32. *Siphostoma aciculare* (Jenyns).

Syngnathus acicularis Jenyns, Fishes, Voyage Beagle, 147, pl. xxvii, fig. 3, 1842 [Valparaiso]; Steindachner, Fauna Chilensis, 331, 1898 [Iquique].

ATHERINIDÆ.

The large Atherinoids of the west coast of South America form in number a very considerable proportion of the fish fauna of that region. They are of the very finest of food fishes and with *Mugil cephalus* comprise the bulk of the market fish in Callao and Lima during the months of December and January, great quantities being consumed daily.

Until recently, nearly all fishes of the Basilichthys group have been referred to the two species, *Basilichthys* (*Atherinichthys*) *laticlavia* Cuv. and Val. and *B. microlepidotus* Jenyns, both originally from Chile. But it is evident that there must exist a great variety of forms throughout the whole region. Gay, indeed, hazarded the suggestion (*Fauna Chilena*, p. 255) that there "must be many other species [than the above two] in the seas, lakes and rivers of Chile." Two of these have recently been described by Steindachner⁶ as *Chirostoma* (*Basilichthys*) *affine* and *C. gracile*, both very closely related to the forms here described.

B. microlepidotus has been very well figured and described by Jenyns,⁷ Girard⁸ and Kner.⁹ It is characterized especially by the small, low, few-spined, first dorsal set rather close to the second dorsal.

B. laticlavia has been less fortunate. The original description¹⁰ is too brief to offer any decisive characters separating it from the closely related species and its status was not improved by the altered description of the species which Günther gives in his

⁶ Fauna Chilensis (von L. Plate gesam.), 281-339, July, 1898.

⁷ Voyage Beagle, 78, pl. xvi, 1, 2, 1841.

⁸ U. S. Astron. Exp. Southern Hem., ii, 238, pl. xxx, 6-9, 1854.

⁹ Novara Fische (ii), 222 (no plate), Wien, 1865.

¹⁰ Cuv. and Val., Hist. Poiss., x, 473, 1835.

Catalogue (Vol. iii, 402). It is likely that either the specimens described by Günther did not belong to *laticlavia*, or else that more than one species was included under that name. However, from Valenciennes' descriptions it is evident that *laticlavia* has the head shorter in proportion to the length than in any other related species of which we know, except *affine*, and the first dorsal is relatively more posterior than in any species we have examined.

Basilichthys brevianalis (Günther)¹¹ from Valparaiso has larger scales than any of the Peruvian species (67 in lateral line) and *B. alburnus* (Günther)¹² from the Strait of Magellan, much smaller scales (105 in lateral line).

Humboldt observed a Piexe-rey at Callao to which he gave the name *regia*, and which is described by Cuvier and Valenciennes,¹³ but so briefly that it is almost impossible to refer any specimen definitely to that species. The genus *Basilichthys*, as here understood, includes those Atherinoids with premaxillaries protractile and broadened posteriorly, scales small (70–100 in lateral line), and with the upper jaw developed fully as strongly as the lower.

33. *Basilichthys regillus* Abbott. New species.

Head 4, depth $5\frac{1}{2}$, eye 5 in head, $1\frac{3}{5}$ in interorbital space, snout $2\frac{7}{8}$.

D. VI–I, 10; A. I, 16. 14 rows of scales at level of ventrals, in a series from opercle to root of caudal, 11 rows on tail.

Body rather thick, rounded, low. Head rather long in proportion to depth, flat or slightly convex above. Teeth fine, in two to four rows, vomer without teeth. Mouth moderate, the jaws almost even, the upper jaw slightly projecting; gill rakers fine—7+24 (circ.). Scales sinuate, most of them with from 3 to 6 radiate striae as described by Jenyns and others. (This character of striae does not appear to be of any taxonomic importance.) Scales on top of head arranged irregularly in a sort of shield; cheeks and opercles scaled, jaws and snout naked. Origin of first dorsal nearer snout than base of caudal by one-third length of head, and inserted almost even with, or slightly in advance of vertical from tip of ventrals. Second dorsal inserted above the seventh ray of anal. Interdorsal space large, $5\frac{3}{4}$ in body length (measuring from first

¹¹ Shore Fishes, Challenger Exp., 25, 1880.

¹² Cat. Fishes British Museum, iii, 404, 1861.

¹³ x, 474 (1835).

spine of first dorsal to spine of second dorsal). Ventrals short, $2\frac{3}{4}$ to 3 in head. Pectorals $1\frac{1}{2}$ in head, minutely dotted with color. Lateral stripe obscure in outline, broad, covering $\frac{1}{2} + 2 + \frac{1}{2}$ scale rows, margined above with dark plumbeous, spreading to a large blotch on opercle, narrowing to $1\frac{1}{2}$ scale rows on caudal peduncle, and terminating in a round spot at root of caudal. Color dusky above lateral stripe, pale below, scales above the stripe margined with dark dots. Numerous narrow, dark branching lines running along middle of back from occiput to caudal.

Length 210 mm. No. 6,071 in Leland Stanford, Jr. Univ. Mus. Six cotypes, No. 6,072, vary in length from 190 mm. to 245 mm. Head $4-4\frac{1}{5}$. D. VI or VII-I, 10; A. I, 15 or 16.

Some of the specimens have the scales smooth and closely adherent, others rough and loose, a condition due probably to rough handling in the markets.

34. *Basilichthys octavius* Abbott. New species.

Very close to *B. regillus*, differing in the number of dorsal spines, insertion of first dorsal, greater interdorsal space and lesser depth.

Head $4\frac{1}{2}$, depth $6\frac{4}{5}$, eye $5\frac{1}{2}$, snout 3.

D. VIII-I, 9; A. I, 15. Body slender, depth less in proportion to length than in *regillus*. Cheeks scaled to point of maxillary, snout and preopercle smooth and bare. No teeth on vomer or palatines. 15 scale rows at ventrals, 11 on tail, 86 in longitudinal series. Gill rakers $7 + 24$.

First dorsal almost exactly midway between root of caudal and tip of snout, inserted over middle of ventrals. Interdorsal space $4\frac{4}{5}$ in body length.¹⁴ Origin of second dorsal about even with eighth anal ray. Pectoral $1\frac{2}{3}$ in head, ventrals 3. Color as in

¹⁴The difference in interdorsal space in the two species, *octavius* and *regillus*, is due to the more posterior location of the first dorsal in the former, the position of the second dorsal being practically constant, as will be seen in the following table (the numbers represent hundredths of the total length):

	<i>Octavius.</i>	<i>Regillus.</i>						
First dorsal to snout.....	44	47 $\frac{1}{2}$	46	47	47	47	47	46
Second dorsal to snout.....	62	62	61	61	61	63	61	61
Interdorsal space.....	19	15	14 $\frac{1}{2}$	15	15	15	15	15 $\frac{1}{2}$

B. regillus and other species. Lateral stripe covering $\frac{1}{2} + 2 + \frac{1}{2}$ scale rows, the silver being replaced anteriorly by dark plumbeous.

One specimen, l. 255 mm. No. 6,069 in the Leland Stanford, Jr. Univ. Mus.

35. *Basilichthys jordani* Abbott. New species.

In the presence of vomerine teeth and in the development of the lower jaw, this species approaches *Chirostoma*. But in its appearance and the smallness of its scales it is a typical *Basilichthys*.

The striking difference in appearance between fishes of the genera *Basilichthys* and *Chirostoma* seems to lie not so much in the strengthening of the mandible in the latter, as in the more noticeable weakening of the upper jaw, so that the lower jaw projects and forces the mouth into a strongly diagonal slant. In *Basilichthys* the upper jaw is as strong as the lower and slightly projecting, and the mouth is almost horizontal.

Head $4\frac{1}{4}$; depth $5\frac{1}{2}$; eye 5 in head; $1\frac{1}{2}$ in interorbital, snout $2\frac{3}{4}$. D. VI-I, 10; A. I, 16.

Body rather thick, head quadrangular. Mouth moderate, the lower jaw stronger than in other related species, even with, or very slightly projecting beyond upper. Teeth comparatively strong. Vomerine teeth prominent, in a triangular patch, scattering at the sides. Gill rakers $7 + 25$. Scales small, 14 series at ventrals, 10 on tail, 87 from opercle to root of caudal, some of them radially striate.

Pectoral $1\frac{4}{5}$, ventral 3 in head. First dorsal inserted nearer tip of snout than root of caudal by somewhat less than the diameter of the eye, its first spine vertically above tip of ventral. Interdorsal space $5\frac{1}{2}$ in body length. Second dorsal inserted above eighth anal ray. Color as in other related species. Medic-dorsal lines present but obscure. Stripe covering $\frac{1}{2} + 2 + \frac{1}{2}$ scale rows at middle of body.

Length 235 mm. No. 6,970 in Leland Stanford, Jr. Univ. Mus. A cotype, No. 6,073, in the same collection has the head 4 in length and seven spines in the first dorsal. Length 250 mm.

It gives me great pleasure to name this species for President David Starr Jordan, of Leland Stanford, Jr. University, to whose friendly interest and wealth of experience and knowledge the younger students of ichthyology in this country owe so much.

36. *Basilichthys affinis* (Steindachner).

Chirostoma affine Steindachner, Fauna Chilensis, 313, 1898 [Iquique].

This species apparently closely resembles the preceding. It appears to differ from *B. jordani* in the absence of vomerine teeth, and from *jordani*, *regillus* and *octavius* in the much shorter head and in the position of the first dorsal. Steindachner also describes (l. c. 314) a species of the same genus, *gracile*, from Juan Fernandez which is distinct from those mentioned above, though closely related.

PISCIREGIA Abbott. New genus.

Body and head pike-like. Premaxillary not protractile, its skin continuous with that of the forehead. First dorsal small, with few spines, situated posteriorly. Teeth rather strong, the outer series in each jaw enlarged. Vomer with teeth. Mouth margined entirely by premaxillary, the maxillary lying behind. Caudal peduncle thick. The genus is related to *Atherinops* and *Atherinopsis* by the non-protractile premaxillary, differing from the former in having simple teeth and from the latter in the presence of vomerine teeth, in the enlargement of the outer series of the maxillary and in the small size of the first dorsal.

37. *Pisciregia beardsleei* Abbott. New species.

Head $4\frac{1}{4}$, depth $5\frac{1}{2}$, eye $6\frac{1}{2}$ in head, 3 in interorbital, snout $2\frac{4}{5}$, preorbital $1\frac{1}{2}$ in eye.

D. IV-I, 11; A. I, 15. Scales small, 20 series at ventral, 14 on tail, 87 in longitudinal series. Head broad, flat, angular, scaled above to posterior nostril, cheeks, opercles and suborbital scaled. Preorbital, snout and jaws smooth and naked. Chin with a series of six pores on each side. Teeth rather large, incurved, in three or four series, the outer enlarged in each jaw. Vomer with half a dozen recurved teeth at apex. Gill rakers 4 + 14, short and stout, 2 in eye. Scales small, entire or sinuate, with radiate striae.

First dorsal short and low, of 4 weak spines, the height of the longest one-third of base of second dorsal, the fin inserted slightly in front of the vertical from vent. Second dorsal strong, its longest ray about equal to its base, inserted above sixth ray of anal. Anal high, its second ray equal to its base, $1\frac{2}{3}$ in head and equalling the pectoral; ventral $2\frac{1}{2}$ in head. Caudal peduncle stout, its depth $2\frac{1}{2}$ in head. Interdorsal space short, $2\frac{1}{3}$ in head. Caudal oblong, forked and but slightly spreading.

Coloration resembling the various species of *Basilichthys*. Lateral stripe broad, covering $\frac{1}{2} + 3 + \frac{1}{2}$ scale rows. Body pale below, the scales above margined with dark dots; a blotch on opercle. Lines on middle of back not evident. Dorsals and caudal dark, other fins pale, with very few, if any, dots of color.

One specimen, l. 290 mm. No. 11,961 in the Museum of Leland Stanford, Jr. University.

MUGILIDÆ.

38. *Mugil cephalus* Linnæus.

Mugil cephalus L., Syst. Natura, Ed. x, 316, 1758; Steindachner, Fauna Chilensis, 315, 1898 [Juan Fernandez].

Mugil rammelsbergii Tschudi, Fauna Peruana, Ichth., 20, 1845 [Peruvian coast]; Garman, Proc. Boston Soc. Nat. Hist., 203, 1876.

Mugil liza Gay, Hist. Chile Zool., ii, 256, lám 4b, fig. 2.

Local name, *Liza*.

After making careful comparisons between six specimens of this species from Callao and others from Italy, Texas, Florida and Mazatlan, Mexico, we are forced to corroborate the conclusion given by Jordan and Evermann (*Fishes of N. A.*, i, 811) that all belong to one and the same species.

Range.—Europe, West Atlantic, East Pacific. A valuable and abundant food fish.

Five specimens, 180 mm. to 200 mm.

One younger, 140 mm.

Following is Tschudi's original description of *M. rammelsbergii*:

“ D. IV–I, 8. A. II, 8. C. 16. V. I, 5. P. 16.

“ Verhältniss der Höhe zur Länge 1:5, des Kopfes zum Körper 1:3, 6. Grösste Breite des Kopfes gleich seiner Höhe. Auge rund, ein Viertel seines Durchmessers vom Stirnrande, zwei Drittel desselben vom Unterkieferrande, seinen Durchmesser von der Schnauzenspitze und dreimal denselben vom Vordeckelrande entfernt.

“ Das Maul ist klein, nicht ganz bis unter die Knochen gespalten, dreieckig. Die Zähne sehr zahlreich, aber fein. Nasenlöcher nahe am Canthus rostralis. Der Deckelrand ist nach oben etwas ausgeschnitten und läuft nach hinten in einen runden Fortsatz aus. Der Vordeckelrand ist einfach, ganz abgerundet.

“ Die Beschuppung des ganzen Körpers ist sehr regelmässig, auf dem Scheitel und dem Deckel etwas grösser.

“ Die erste Rückenflosse steht etwas vor der Mitte des Rückens,

der 1ste und 2te Stachel sind die längsten und gleich lang; der 4te der kürzeste, steht vom 3ten ziemlich weit ab. Ihre ganze Länge von ihr entfernt steht die 2te Rückenflosse, deren Anfang und Ende dem der Afterflosse gegenüber fällt; sie ist etwas ausgeschnitten, indem der letzte Strahl etwas höher ist als die drei vorhergehenden; der Stachel ist dünn und schwach. Schwanzflosse stark ausgeschnitten. Die beiden Stacheln der Afterflosse sind schwach; sie stimmt in Form und Länge ganz mit der zweiten Rückenflosse überein.

“ Die Bauchflosse beginnt beinahe am Ende der Brustflosse; der Stachel ist halb so long als der erste Flossenstrahl. Die Brustflosse ist hoch oben angeheftet, der oberen Hälfte des Auges gegenüber; sie überragt nur ein wenig den Anfang der Bauchflosse.

“ *Färbung*.—Auf dem Rücken grünlich gelb; silberweiss am Bauche.

“ Länge 10''–12''.

“ *Vorkommen*.—In den Monaten Mai und October sehr häufig um die Insel San Lorenzo; in der übrigen Zeit scheinen sich diese Fische mehr auf das hohe Meer zurückzuziehen.”

POLYNEMIDÆ.

39. *Polydactylus approximans* (Lay and Bennet).

Polynemus approximans Lay and Bennet, Beechey's Voyage, Zool. Fish, 57, 1849 [Mazatlan].

Polydactylus approximans Jordan and Evermann, Fishes of N. A., i, 829, 1897.

Local name, *Barbuda*.

One specimen, l. 250 mm. A common food fish of the western coast of Central America, hitherto recorded no farther south than Panama; north to Lower California (Thominot, *Bull. Soc. Phil.*, 1886).

SCOMBRIDÆ.

40. *Scomber colias* Gmelin.

Scomber colias Gmelin, Syst. Nat., p. 1329, 1788 [Sardinia]; Steindachner, Ichthy. Notizen, vii, 25, 1868 [Chile]; Dresslar and Fessler, Rev. of Scombridae, Bull. U. S. F. C., vii, 432, plate ii, 1889; T. Kitahara, Scombridae of Japan, photo-plate iv, Jour. Fisheries Bureau, vi-i of Tokyo, 1897.

Local name, *Cabinsa*, *Caballa*.

Seven specimens, l. 220–250 mm.

D. IX–12–V (one specimen, VIII–12–V); A. I–I, (I–I, 11–V).

Range.—West coast of North and South America, Japan, southern Europe. Occasional in West Atlantic.

41. *Sarda chilensis* (Cuvier and Valenciennes).

Pelamys chilensis Cuv. and Val., Hist. Nat. Pois., viii, 163, 1831 [Valparaiso]; Steindachner, Ichthy. Notizen, vii, 25, 1868 [Chile]; Kitahara, Jour. Fish. Bureau, Tokyo, vi, i, 3, pl. iv, fig. 10.

Sarda chilensis Jordan and Gilbert, Proc. U. S. N. M., iii, 27, 1880.

Local name, *Chanchilla*, *Bonito*.

Two adult specimens, one young.

Head $3\frac{1}{2}$, depth $4\frac{3}{4}$ –5. D. XVII(XVIII)–I, 13–VII(VIII). A. II, 11–VI (VII). Length 220, 400, 430 mm.

The large specimens appear to be typical, though the color markings are somewhat obscure. We are inclined to recognize the specific identity of *S. orientalis*¹⁵ as distinct from *S. chilensis*, notwithstanding the fact that Jordan and Evermann, following Dresslar and Fesler (*Bull. U. S. F. C.*, vii, 1887, 441) place both in the synonymy of *Sarda chilensis*.

In the specimens in hand the eye is 8 in head as against $9\frac{1}{2}$ in *orientalis* (same length fish), and the posterior end of the maxillary, instead of being irregular in outline and concave on its upper border as in *S. orientalis* and *S. sarda*, is regular and almost round. The single juvenile specimen shows the same peculiarities in color markings as have been noted in the young of *S. sarda*, by Steindachner (*Ichthy. Berichte*, v, 8, 1868). There are no traces of longitudinal striping, but the sides are barred two-thirds of the way from pectoral to tail with ten or eleven dusky vertical stripes. The posterior end of the maxillary is also weakly, but evidently serrate.

The discrepancies in color markings to be noticed in the published figures of both *S. sarda* and *S. chilensis* are doubtless due to the fact that the specimens drawn have been in all stages of transition between the juvenile barred type and the adult form with narrow longitudinal stripes.

ISTIOPHORIDÆ.

42. *Istiophorus audax* (Philippi).

Histiophorus audax Philippi, Sobre los Tiburones, etc., de Chile, 35, 1887.

Local name, *Pez-aguja*, described by Philippi from specimens from Iquique.

¹⁵ Temminck and Schlegel, Fauna Japonica, 52.

XIPHIIDÆ.

43. *Xiphius gladius* Linnæus.

Xiphius gladius (?), Philippi, l. c., 33, 1887.

Philippi describes specimens from Iquique and Talcahuano.

CARANGIDÆ.

44. *Trachurus picturatus* (Bowdich).

Seriola picturata Bowdich, Excursion to Madeira, 123, fig. 27, 1825.

Caranx trachurus (2me subdiv.) Cuvier and Valenciennes, iii, 17, 1833 [Valparaiso].

Trachurus cuvieri (Lowe) Lütken, Spolia Atlantica, 126, 1880 [Chile].

Caranx cuvieri Steindachner, Ich. Beiträge, ii, 16 [Talcahuano, Callao, Juan Fernandez, Galapagos].

Local name, *Furrel*.

One specimen. D. VIII-I, 32. A. II-I, 28. Length 325 mm.

Range.—San Francisco to Valparaiso, Azores, Mediterranean, New Zealand, Atlantic.

45. *Caranx peruanus* Tschudi.

Caranx peruanus Tschudi, Fauna Peruana, Ichth., 19, 1845.

The validity of this species is questionable. Following is Tschudi's original description:

“D. IX-I, 28. A. II, 28. V. I, 10. P. 20.

“Verhältniss der Höhe zur Länge 1:6, 5, des Kopfes zum Körper 1:3. Auge gross, breiter als hoch nahe am Stirnprofil, 1, 3 seines Längedurchmessers vom Unterkiefer; zweimal seiner Querdurchmesser von der Schnauzenspitze, 2, 8 mal vom Vordeckelrande.

“Nasenlöcher fast in der Mitte zwischen der Schnauzenspitze und dem vorderen Rande des Auges, letzterem doch etwas näher. Maul nicht ganz bis unter das Auge gespalten. Die Zähne in beiden Kiefern sehr klein, fein, hechelförmig. Ueber die Mitte der Zunge eine dicht besetzte Zahnleiste, die etwas weniger grossen Gaumenzähne bilden ein . Der Unterkiefer ist ziemlich vorspringend.

Die beiden Kieferäste sind einfach, der Winkel abgerundet. Der Vordeckel ist in seinem oberen Drittel stark ausgeschnitten und hat zwei dornähnliche Fortsätze, die durch eine Membran mit einander verbunden sind. Die Schuppen des Körpers sind klein. Die Seitenlinie macht den letzten Rückenflossenstrahlen gegenüber eine starke Biegung nach unten und setzt

sich fort, indem der spitzige Fortsatz jeder Schuppe, durch die sie geht, mehr comprimirt, also höher ist und die einzelnen Schuppen dichter anliegen.

“ Der nach vorn gerichtete erste Stachel der Rückenflosse ist kurz, aber stark; von den aufrechtstehenden sind der 3te und 4te die längsten. Die Rückenflosse nimmt nach hinten beträchtlich an Höhe und Stärke der Strahlen ab. Ihr Ende, so wie das der Afterflosse, wird durch eine aus 5–6 Stacheln zusammengesetzte, pinselförmige Flosse gebildet. Die Rückenflosse reicht von der Mitte der Bauchflosse bis zum Ende der Afterflosse; diese letztere beginnt der Mitte der Bauchflosse gegenüber bis zum Ende der Afterflosse; diese beginnt dem Ende des ersten Viertels der weichen Rückenflosse gegenüber; ihre beiden Stacheln sind stark, aber kurz; der hintere stark nach hinten gebogen. Die Brustflosse beginnt etwas vor der Bauchflosse und reicht bis zum ersten Rückenflossenstrahl. Die Bauchflosse reicht bis zur Hälfte der Brustflosse.

“ *Färbung.*—Der ganze Fisch ist blaugrau, am Rücken wenig dunkler und am Bauche kaum merklich heller.

“ Länge 2' 6".

“ *Vorkommen.*—Ziemlich gemein an der ganzen peruanischen Küste.”

46. *Vomer gabonensis* Guichenot.

Argyreiosus setipinnis var. A., Günther, Cat. Brit. Mus., ii, 459, 1860.
Vomer gabonensis Guichenot, Ann. Soc. Linn. Maine et Loire, 42, 1865.

This doubtful species was described as a variety by Günther from thirteen specimens, two of which were in the Haslar collection from Peru, and the rest from Brazil and the West Indies. Guichenot's specimens came from the Gaboon, W. Africa.

47. *Seriola peruana* Steindachner.

Seriola peruana Steindachner, Ich. Beiträge, xi, 13, 1881 [Callao].

CENTROLOPHIDÆ.

48. *Centrolophus peruanus* Steindachner.

Centrolophus peruanus Steindachner, Ichthy. Beiträge, i, p. 10, (Sitzb. d. Ak. Wiss. Wien, lxix, 384, 1874), [Callao]; *ibid.*, Fauna Chilensis, 299, 1898 [Iquique].

Callao to Iquique.

SERRANIDÆ.

49. *Acanthistius pictus* (Tschudi).

Plectropoma pictum Tschudi, Fauna Peruana, 5, 1844 [Peru] ; Kner, Neue Fische aus Museum Godeffroy, 2 (Sitzb. Ak. Wien. lvi, i, 1867, 710) [Iquique].

Alphestes pictus Jordan and Swain, Proc. U. S. Nat. Mus., 1884, 395.

Acanthistius pictus Boulenger, Fishes of Brit. Museum, i, 140, 1895 [Chile] ; Steindachner, Fauna Chilensis, 282, 1898 [Iquique].

A Chilean species, rare along the Peruvian coast.

50. *Mycteroperca xenarcha* Jordan.

Mycteroperca xenarcha Jordan, Proc. Acad. Phil., 1887, 387 [Galapagos islands].

Epinephelus xenarchus Boulenger, Cat. Brit. Mus., i, 266, 1895.

Galapagos island, to Payta, Peru.

51. *Paralabrax humeralis* (Cuvier and Valenciennes).

Serranus humeralis Cuv. and Val., Hist. Nat. Poiss., ii, 246, 1828 [Chile] ; Gay, Hist. Chile, Zool., ii, 149, 1847 ; Kner, Neue Fische aus Mus. Godef., 4, (Sitzb. Ak. Wiss. lviii, i, 1868) [Peru] ; Boulenger, Cat. Brit. Mus., i, 278, 1895.

Serranus semifasciatus Gay, Hist. Chile Zool., ii, 151 (plate I bis, fig. 2), 1847 [Juan Fernandez] (copied by Jordan and Eigenmann, 390, *vide infra*).

Percichthys godeffroyi Günther, Jour. Mus. Godeffr., i, H. 2, 97, 1873 [Iquique].

Paralabrax humeralis Jordan and Eigenmann, Bull. U. S. Fish Comm., viii, 389, 1890.

Local name, *Cabrilla*.

The collection contains four specimens of this species. There is evidently some variation in coloration between representatives from different localities, though there is no reason for confounding *humeralis* with the very distinct though closely allied form *P. albomaculatus* from the Galapagos Island.¹⁶

Compared with specimens from the type locality, aside from the very striking and constant difference in color markings, *albomaculatus* differs from the present species in having a considerably narrower interorbital width, narrower pectoral, smaller eye, and lunate (sometimes almost truncate) instead of forked caudal.

The specimens described by Kner (*l. c.*) from Peru, as *Serranus humeralis* (var. ?) doubtless belong to an unnamed species.

Head $2\frac{1}{2}$, depth $4\frac{1}{2}$, eye $5\frac{2}{3}$. Gill rakers 10 + 21. Lateral line (pores) 62-67. Color somewhat obscured by alcohol, very dark above; broad bands along sides. Opercle dark with lighter spots. Ventrals and middle rays of caudal dark. Soft dorsal mottled.

¹⁶ Boulenger, Cat. Brit. Mus., i, 278.

The condition of the reproductive organs indicates the time of capture (January) to have been the height of the breeding season.

Length 180–220 mm.

52. *Diplectrum conceptione* (Cuvier and Valenciennes).

Serranus conceptionis Cuv. and Val., Hist. Nat. Poiss., ii, 246, 1828

[Conception de Chile] ; Boulenger, Cat. Brit. Mus., i, 296, 1895.

Centropristis conceptionis Günther, Cat. Brit. Mus., i, 84, 1859.

Diplectrum conceptione Jordan and Eigenmann, Bull. U. S. F. C., viii, 1890 (1888), 399.

Local name, *Mojarrilla*.

Five specimens, length 180–200.

Depth $3\frac{2}{3}$ –4, head $2\frac{2}{3}$ –3, eye $4\frac{3}{4}$ in head, interorbital $\frac{2}{3}$ – $\frac{7}{8}$ in eye.

D. X, 12. A. III, 7. Lateral line (pores) 53 circ.

Body outline low. Profile almost straight from anterior edge of orbit to beginning of dorsal. Snout broad but sharp. Mouth rather large, maxillary reaching to posterior edge of pupil, its distal end about $\frac{1}{3}$ of eye in width, its dorsal edge with a longitudinal groove and ridge, somewhat imitating the accessory maxillary bone of the *Epinephelinae*. Canines weakly developed. Cheeks and opercles covered with strongly ctenoid scales. Snout, jaws and interorbital space as far as occiput, including ring about the eye, naked. Opercle with a stoutish spine. Angle of preopercle with three or four stout plectroid spines—above and below are two or three weaker and gradually shorter spines merging above into the fine denticulations of the vertical edge of preopercle. Lower edge entire. Gill rakers slender, 8+14. Lateral line concurrent with back, about 6 or 7 scale rows between it and dorsal.

Dorsal spines rather weak, the fourth and fifth the longest, subequal, 3 in head. Tenth spine about two-thirds of first ray. Origin of dorsal on the vertical with that of pectoral. Ventrals very slightly in advance of latter. Pectorals $1\frac{3}{5}$. Ventrals 2 in head. Caudal lunate, the upper lobe the longer. Anal spines rather weak, the third the longest, $4\frac{1}{3}$ in head.

Head dark reddish brown, a black blotch on opercle. Inner surface of opercle black. Side of body with seven or eight bars of rose to level of pectoral, dirty yellow below. Soft dorsal mottled. Ventrals and margin of caudal dark. A few spots on caudal.

Range.—Coasts of Chile and Peru.

53. *Pronotogrammus peruanus* (Steindachner).

Anthias (Hemianthias) peruanus Steindachner, Ichthy. Beiträge, i, 4, (Sitzb. Ak. Wiss. lxix, i, 1874) [Payta].

Pronotogrammus peruanus Jordan and Eigenmann, Review of Serranidæ, Bull. U. S. F. C., viii, 413, 1890 [Chile].

Range.—Coasts of Chile and Peru.

54. *Serranus peruanus* Lesson.

Serranus peruanus Lesson, Voyage de la Coquille, tome ii, part i, 234 1828 [Payta]; Jordan and Eigenmann, Review of Serranidæ, Bull. U. S. F. C., viii, 408, 1888.

Payta, Peru.

55. *Hemilutjanus macrophthalmos* (Tschudi).

Plectropoma macrophthalmos Tschudi, Fauna Peruana, Ichth., 6, 1845 [Callao]; Kner, Neue Fische aus Mus. Godeffroy, 3, plate I, (Sitzb. Ak. Wiss. i, lvi, 1867) [Iquique].

Hemilutjanus macrophthalmos Jordan and Eigenmann, Review of Serranidæ, Bull. Fish Comm., viii, 345, 1890.

Pomodon macrophthalmus Boulenger, Cat. Brit. Mus., i, 144, 1895; Steindachner, Fauna Chilensis, 281, 1898 [Iquique].

Range.—Coasts of Chile and Peru.

HÆMULIDÆ.

56. *Anisotremus scapularis* (Tschudi).

Pristipoma scapulare Tschudi, Fauna Peruana, 12, 1844 [Huacho].

Diagramma melanospilum Kner, Neue Fische Mus. Godef., p. 4; (Sitz. d. Ak. Wiss., lvi, 1867).

Pristipoma notatum Peters, Berl. Monatsb., 106, 1869 [Mazatlan].

Pomadasys modestus Jordan, Proc. Acad. Nat. Sci. Phila., 286, 1883.

Anisotremus scapularis Jordan and Fesler, Rep. U. S. F. C. (Rep. '89-'91), 485, 1893; Jordan and Evermann, Fishes of North and Middle Amer., ii, 1320, 1898.

There are two specimens of this well marked species in the Callao collection, length 240 mm. and 285 mm.

57. *Pomadasys bipunctatus* (Steindachner).

Pomadasys bipunctatus Steindachner, Fauna Chilensis, 286 [Iquique].

West coast of South America.

58. *Isacia conceptionis* (Cuvier and Valenciennes).

Pristipoma conceptionis Cuv. and Val., Hist. Nat. Poiss., v, 268, 1830 [Conception de Chile].

Isacia conceptionis Jordan and Fesler, Rep. U. S. F. C., '88-'91, 1893, 501 [Mexillones, Peru].

Local name, *Cabinsa*.

Two specimens, length 250 mm. and 215 mm.

This species, the type of the genus *Isacia*, is separated from Bleeker's genus *Parapristipoma* by the long anal and absence of

its scaly sheath. The value of the first character is questionable, as the species of *Parapristipoma* show a regular gradation in number of anal rays up to the number in the present species, and the character of the scaly sheath is apt to be misunderstood, as there is present in *I. conceptionis* (at least in the specimens at hand) a slight development of scales at the base of the anal, two or three scale-rows deep and at its widest part about one-ninth the length of the longest ray. On the other hand, the sheath in *Parapristipoma trilineatum*, the type of that genus, is, according to Bleeker's figure,¹⁷ about two-fifths of the length of the first ray, and composed of 7 or 8 scale rows at the widest part. The preopercular spines of *I. conceptionis* are weak and partly hidden by the skin and there appears to be no special development of them at the angle. The spines of *Parapristipoma* are rather strong, especially at the angle.

Head $3\frac{1}{4}$, D. $3\frac{2}{5}$ (4), pores in lat. line 54-56, eye $4\frac{1}{2}$, snout $2\frac{3}{4}$ ($3\frac{3}{4}$). D. XIII-14; A. III, 13 (12).

Range.—West coast of South America.

Gay gives *Cabinza* as the common name in Chile for *Mendosoma caerulea*.

59. *Orthopristis cantharinus* (Jenyns).

Pristipoma cantharinum Jenyns, Voy. Beagle, Fish, 49, 1842 [Galapagos isl.].

Hemulon modestum Tschudi, Fauna Peruana, 11, 1845 [Peru].

Orthopristis cantharinus Jordan and Fesler, Rep. U. S. F. C., 1889-91, p. 500 (1893).

Range.—Pacific coast of tropical America.

A rare species along the Peruvian coast, according to Tschudi.

SPARIDÆ.

60. *Doydixodon freminvillei* Valenciennes.

Doydixodon freminvillei Valenciennes, Voyage de la Vénus, 323, pl. 5, 1855 [Galapagos].

Doydixodon fasciatum Kner und Steindachner, Neue Fische aus Mus. Godeffroy, 3 (Sitz. Ak. Wien, liv, 358, 1866), pl. ii, fig. 2 [Iquique].

Range.—Tropical South America.

61. *Doydixodon lævifrons* (Tschudi).

Pimelepterus lævifrons Tschudi, Fauna Peruana, 18, 1845 [Huacho].

Doydixodon lævifrons Jordan and Fesler, Review of Sparidæ, Rep. U. S. F. C. ('89-'91), 532, 1893; Steindachner, Fauna Chilensis, ii, 289, 1898 [Iquique].

¹⁷ Arch. Neerl., viii, 1872.

Range.—Peruvian coast. Tschudi's original description is copied by Jordan and Fesler (*l. c.*).

SCIÆNIDÆ.

62. *Archoscion analis* (Jenyns).

Otolithus analis Jenyns, Zool. Beagle Fishes, 164, 1842 [Callao].

Local name, *Allanque*.

It is the conviction of the writer that no hard and fast lines can be drawn between the genera *Archoscion*, *Isopictus* and *Cynoscion* and that their species should come under one generic head, for which the name *Cynoscion* has priority. But in the absence of material for a comparative study of the groups, we are forced to follow precedent in placing this and the two following species under *Archoscion*.

Three examples, length 330 mm. to 350 mm. Head $3\frac{3}{5}$, depth $4\frac{7}{8}$; D. ix-i, 24 (23); A. i, 15 (14). Eye $6\frac{1}{2}$; interorbital broad, 4 in head; snout $3\frac{3}{4}$.

Body elongate, compressed, back but little elevated. Snout long, lower jaw projecting. Head long, profile straightish, very slightly convex above eyes. Maxillary extending to posterior border of pupil, $2\frac{1}{3}$ in head, its broad distal end about one-half the length of the snout in width. Preorbital narrow, $2\frac{2}{3}$ in eye. Upper anterior canines stout, conical, slightly incurved. The 5 to 7 lateral teeth of the lower jaw enlarged, scattered, about one-third the length of the upper canines. Anterior teeth of lower jaw in two rows, rather small and crowded. Preopercle with a crenulate membranaceous border. Soft flap of opercle extending to or past origin of pectoral. Opercular spines absent. Gill rakers long, slender, 7 + 9.

First dorsal spine very weak, third the longest, $2\frac{1}{4}$ in head. Interdorsal space equal to eye. Origin of second dorsal nearer to caudal than to snout. Pectoral narrow, $1\frac{3}{5}$ in head. Ventrals shorter, about 2 in head. Caudal shallowly lunate.

Scales moderate, 63 pores in lateral line, about 75 transverse rows from opercle to caudal. Lateral lines somewhat decurved under origin of soft dorsal. Head everywhere scaled, except on premaxillary.

Color, dark umber above, lighter on sides, yellowish white below. Sides below lateral line with a great number of small

orange spots arranged longitudinally. Posterior margins of scales peppered with dark dots. Upper half of pectoral dark. Ventrals pale. Axil dark.

Habitat.—Peru.

63. *Archoscion altipinnis* (Steindachner).

Ancylodon altipinnis Steindachner, Ichthy. Notizen, iii, 2, plate 1, fig. 2, 1866 ["West Coast of South America"].

Archoscion analis Jordan and Eigenmann, Rep. U. S. F. C., '86, 353, 1889 [Callao].

Although there are no specimens of this species in the Beardslee collection, yet a careful comparison of Steindachner's description and plate, with examples of *C. analis*, indicate conclusively that it is distinct from Jenyn's species. In *analis* the interdorsal space is large, as long as eye, and the two dorsals are not connected. In *altipinnis* the two fins are connected by a low membrane and are presumably close together (distance equal to pupil, Jor. and Eig.).

The eye is somewhat smaller in *analis*, being 6 in head to 5 in *altipinnis*; the snout is longer, $3\frac{1}{2}$ in head to $4\frac{1}{2}$ in *altipinnis*, and the depth in the former rather less, $4\frac{7}{8}$ in body, while Steindachner gives $4\frac{1}{3}$. The most important difference seems to lie in the lack of developed opercular spines in *analis*, while the other species has two quite strong spines.

Habitat.—Peru, perhaps extending southward.

64. *Archoscion peruanus* (Tschudi).

Otolithus peruanus Tschudi, Fauna Peruana, Ichthy., 10, 1845.

This species, which is very closely related to *C. analis*, is known only from the original description. It appears to differ from *analis* in having the second dorsal equidistant from snout and caudal and hardly separated from the first dorsal, while in *analis* the two fins are widely separated and the second is considerably nearer caudal than snout. The ventrals are longer in *peruanus*, reaching past pectorals, while in the former species the pectorals are considerably longer.

Following is Tschudi's original description:

"D. 8-22. A. 15. V. 5. P. 18.

"Verhältniss der Höhe zur Länge 1 : 4, 8, des Kopfes zum Körper 1 : 2, 5. Auge breiter als hoch, steht 1, 6 seines Querdurchmessers von der Schnauzenspitze und viermal seinen Querdurchmesser vom obern Dorn des Vordeckels, einhalbmal

seinen Längedurchmesser von der Stirnkante und 1, 5 vom Unterkieferrande. Das Maul ist bis unter die Mitte des Auges gespalten. Die erste Reihe der Oberkieferzähne ist dünn und spitzig, hinter denselben in der Mitte stehen die beiden langen, nach hinten gebogenen sehr scharfen Eckzähne, zu jeder Seite von ihnen befinden sich einige ebenfalls rückwärts gebogene schwächere Zähne. Die mittleren Zähne des Unterkiefers sind klein, spitzig, schwach und ziemlich zahlreich: die seitlichen stark, ziemlich lang, spärlich und von aussen nach innen etwas comprimirt.

“ Die Nasenlöcher stehen näher dem Auge als der Schnauzenspitze, das hintere ist grösser, schief, und schmal. Auf dem Deckelwinkel stehen membranöse Zähnchen, der Vordeckel ist einfach mit abgerundetem Winkel.

“ Die erste Rückenflosse beginnt etwas hinter den Brustflossen und reicht so weit als diese; zusammengelegt reicht der 2te Flossenstachel bis zu Ende der ganzen Flosse. Der 1ste ist ein Viertel kürzer als der 2te, vom 4ten nehmen sie schnell an Grösse ab. Die zweite Rückenflosse beginnt in der Mitte der Rückenlänge und erstreckt sich bis zum Ende der Afterflosse. In der vordern Hälfte ist sie beinahe halbmal höher, als in der hintern. Die Afterflosse beginnt hinter der Mitte der zweiten Rückenflosse und ist ziemlich hoch. Die Bauchflosse beginnt wenig weiter nach hinten als die Brustflossen und reicht weiter als diese.

“ *Färbung*.—Blaugrau, am Bauche heller, fast gelblich weiss.

“ *Länge* 1' 3".

“ *Vorkommen*.—An der ganzen peruanischen Küste.

65. *Cynoscion stoltzmanni* (Steindachner).

Otolithus stoltzmanni Steindachner, Neue u. seltene Fische, K. K. Zool. Mus. Wien., Denkschrift Ak. Wien, xli, 35, pl. ii, fig. 1, 1879 [Tumbez, Peru].

Cynoscion stoltzmanni Jordan and Gilbert, Bull. U. S. F. C., 1881, 320; Jordan and Evermann, Fishes of N. A., 1412, 1898.

Range.—Panama to Peru.

66. *Stellifer minor* (Tschudi).

Corvina minor Tschudi, Fauna Peruana, Ichth., 9, 1845.

Sciæna minor Günther, Cat. Brit. Mus., ii, 295, 1860.

Stelliferus minor Jordan and Eigenmann, Review of Sciænidae, 51, Rep. U. S. F. C., '86, 393, 1889.

Local name, *Mojarrilla*.

Seven specimens, average length 165 mm. Evidently a common species at Callao, but confined to that region.

67. *Stellifer agassizii* (Steindachner).

Corvina (*Homoprion*) *agassizii* Steindachner, Ichthy. Beiträge, ii, 26 (Sitz. d. Ak. Wiss. Wien, lxxi, 1875) [Caldera, Callao, Payta].

Corvina agassizii Cope, Proc. Amer. Phil. Soc., May, 1877, 26 [Pescamayú and Chimbote bays].

Range.—Coast of Peru.

68. *Sciæna gilberti* Abbott. New species.

In the Review of the Sciænidae, *Rep. U. S. F. C.*, 1889, p. 59, Jordan and Eigenmann place the Peruvian species *S. deliciosa* by itself under a subgenus *Callaus*. The present species is very closely related to *deliciosa*, and comes under the same subgeneric head. In contrast to other related genera and species, *S. gilberti* and *S. deliciosa* agree in having short and moderate second anal spine, moderately long and numerous gill rakers, and weak preopercular armature. They appear to be most nearly allied to the putative genus *Bola* of Hamilton, differing in not having the upper teeth greatly enlarged. Regarding the two forms as species of the genus *Sciæna*, they stand as a connecting link between those genera with long and slender gill rakers and those with gill rakers short and thick, in that respect approximating *Bairdiella* on the one hand, and *Sciænops* on the other. *S. gilberti* differs from the other Peruvian species *S. wieneri* in lacking a strongly toothed preopercle and in having a shorter maxillary, larger head and much larger eye.

Description.—Head $3\frac{1}{5}$, depth $3\frac{1}{2}$. D. IX-I, 22 (3). A. II, 9. Eye 5, interorbital $3\frac{2}{3}$, preorbital 9 in head, $1\frac{4}{5}$ in eye, maxillary $2\frac{1}{2}$. Lateral line (pores) 55.

Body elongate, elliptical, back not very elevated, profile almost straight, rather low. Snout sharp, $3\frac{3}{4}$ in head. Mouth somewhat oblique, the maxillary extending beyond pupil. Second nasal slit rather short, $3\frac{1}{2}$ in eye. Preopercular serræ weak, flexible, flattened, yet still of a bony nature. No spinous development at lower angle. Lower jaw scaled. Teeth small, in two or three rows, outer row very slightly enlarged in lower jaw, somewhat more so in upper jaw. Mucous slits present but not especially prominent. Gill rakers 8 + 15, equal to, or slightly exceeding the pupil, about $3\frac{1}{2}$ in the second anal spine.

Lateral line following the curve of the back, dipping somewhat under soft dorsal, sometimes sending up a branch at right angles, at base of caudal, which may be continued along the upper mar-

gin of the fin. Ventrals almost twice in head reaching about half-way to the vent. Pectorals moderate, about $1\frac{1}{2}$ in head.

Second anal spine about one-half length of longest ray, $2\frac{7}{8}$ in head. Caudal subtruncate, the outer rays somewhat the longer.

Scales above lateral line very oblique, those below in longitudinal series, each scale with a central streak forming narrow parallel stripes. Ground color olivaceous above, darker on head. Silvery below, tinged with rufous. Axil of pectoral dark. Lips thickly speckled with small brown spots.

Type, No. 11,918, Leland Stanford, Jr. Univ. Mus., length 240 mm.

This with *S. deliciosa* is a very important food fish on the Peruvian coast. It gives me much pleasure to name the species for my friend and instructor, Dr. Charles H. Gilbert, to whom my interest in ichthyology is wholly due.

69. *Sciæna wieneri* Sauvage.

Sciæna wieneri Sauvage, Bulletin de la Société Philomathique, July 7, 1883, 156 [Peru].

Known, we believe, only from the original description.

70. *Sciæna deliciosa* (Tschudi).

Corvina deliciosa Tschudi, Fauna Peruana, 8, 1845.

Sciæna deliciosa Jordan and Eigenmann, Review of Sciænidæ (Rep. U. S. F. C., '86), 1889, 401, 406.

Local name, *Lorna*.

One large specimen. Head 3, depth $3\frac{2}{5}$, snout $3\frac{2}{3}$, eye equal to preorbital, $6\frac{1}{3}$. D. X-I, 22. A. II, 9. Scales 55. Length 325 mm.

Compared with *S. gilberti*, *deliciosa* has a much broader interorbital, longer and blunter snout, and hence not quite so steep a profile, longer pectoral and shorter gill rakers. In *gilberti* the nostrils are nearer eye than end of snout; in *deliciosa* they are midway.

71. *Sciæna fasciata* (Tschudi).

Cheilotrema fasciatum Tschudi, Fauna Peruana, Ichth., 13, pl. 1, 1845 [Huacho to Callao].

Corvina fasciata Günther, Cat. Brit. Mus. ii, 305, 1860; Steindachner, Ichth. Notizen, vii, 21, 1868 [Chile].

Sciæna fasciata Jordan and Eigenmann, Review of Sciænidæ, Rep. U. S. F. C. '86, 403, 407, 1889.

Range.—Pacific coast of South America.

72. *Genyanemus peruanus* Steindachner.

Genyanemus peruanus Steindachner, Ichth. Beiträge, ii, 29 (Sitz. d. k. Ak. Wiss. Wien, 1875).

This species is very plentiful at Payta, rarer at Callao, where it lives on the sandy bottoms.

73. *Umbrina imberbis* Günther.

Beiträge aus dem Museum Godeffroy; Jour. des Mus. Godeffroy, H. ii, 101, 1874.

Following is the original description of this species. We believe it is not otherwise known:

“Dorsal X-I, 24. Anal II, 9, L. lat. 65.

“Der Bartfaden am Kinn ist auf ein kleines Knötchen zwischen den zwei Paaren von Mandibular-Poren reducirt. Die Höhe des Körpers ist ein Drittel der Totallänge (ohne Schwanzflosse), die Kopflänge zwei Siebentel. Die Schnautze stumpf, abgerundet, über die Mundspalte gewölbt, länger als das Auge, dessen Durchmesser $\frac{1}{6}$ der Kopflänge beträgt. Der Oberkiefer reicht bis unter die Mitte des Auges. Präoperculum schwach gezähnt. Dorsal Stacheln schwach aber nicht alle biegsam, der dritte der längste. Der zweite Analstachel ziemlich stark und etwas mehr als halb so lang als der erste Strahl. Schwanzflosse leicht ausgeschnitten. Brustflosse nicht viel kürzer als der Kopf. Einfärbig silberig; die Basis der Brustflosse schwärzlich.

“Ein Exemplar von Iquique (Chili) 13 Zoll lang.”

CIRRHITIDÆ.**74. *Cheilodactylus variegatus* Cuvier and Valenciennes.**

Cheilodactylus variegatus Cuv. and Val., Nat. Poiss., ix, 493, 1833 [Valparaiso]; Gay, Hist. Chile Zool., ii, 199, 1848.

Cheilodactylus tschudi Müller and Tröschel, Hor. Ichth., iii, 25.

Cheilodactylus cinctus Tschudi, Fauna Peruana, Ich., 15, taf. 2, 1845.

Chilodactylus variegatus Günther, Cat. Brit. Mus., ii, 81, 1862; Steindachner, Fauna Chilensis, ii, 290 [Iquique], 1898.

Local name, *Pintadilla*.

Three large specimens. One juvenile. Length 395 mm. and 97 mm.

The fin counts differ from those given by Valenciennes, but the specimens agree in color markings and in other respects with his rather general description. Direct comparison with the type may disclose other differences.

D. XVII, 28. A. III, 10. Head $3\frac{1}{2}$, depth 3, eye $5\frac{3}{4}$ in head. Lateral line 56. Pectoral $4\frac{1}{5}$ in body. Anal 6. Premaxillary spines reaching eye. The juvenile specimen is much darker than the others, almost black.

Valparaiso to Callao.

POMACENTRIDÆ.

75. *Chromis crusma* (Cuvier and Valenciennes).

Heliases crusma Cuv. and Val., Hist. Nat. Poiss., ix, 377, 1833 [Chile]; Jenyns, Zool. Beagle, 54, 1840; Gay, Hist. Chile Zool., ii, 206, lám. 4, 1848.

Heliastes crusma Günther, Fishes Brit. Mus., iv, 61, 1862; Steindachner, Fauna Chilensis, ii, 317, 1898 [Iquique].

Local name, *Congito* or *Conquito*.

Four specimens, length 260–280 mm.

76. *Eupomacentrus latifrons* (Tschudi).

Pomacentrus latifrons Tschudi, Fauna Peruana, Ich., 17, 1845 [Huacho].

Glyphidodon latifrons Steindachner, Fauna Chilensis, ii, 316, 1898 [Iquique].

Following Jordan and Evermann (*Fishes of N. A.*, ii, 1,550, 1898), we have placed this species in *Eupomacentrus* on the character of a single row of teeth in each jaw. Following is the original description:

“ D. 13–20. A. 2–14. V. 1–5. P. 20.

“ Verhältniss der Höhe zur Länge 1:2, 8, des Kopfes zum Körper 1:3, 2. Auge rund, weniger als sein Durchmesser vom vordern Stirnrande und fast zweimal denselben vom Vordeckelrande entfernt; nahe am Stirnrande, dreimal sein Durchmesser vom Unterkieferwinkel.

“ Nasenlöcher klein, kreisrund, näher dem Stirnrande als dem Auge. Maul klein, nicht bis zum Auge gespalten. In jedem Kiefer eine Reihe ziemlich gleichmässige schmalere, von vorn nach hinten etwas comprimierter und rückwärts gebogene Zähne. Der verticale Ast des Deckels ist einfach und biegt sich unter rechtem Winkel in dem Queren, welcher nach unten etwas convex ist. Der untere Dorn des Vordeckels ist stärker als der obere, zwischen beiden ist der Deckel stark nach vorn ausgeschnitten.

“ Der Kopf ist klein, die Stirn breite und schwach gewölbt, die Rückenante ziemlich schmal, Stirn, Gesicht und Deckel klein, der übrige Körper gross beschuppt. Die Flossen, besonders die

After-, Brust- und Schwanzflossen, mit kleinen Schuppen besetzt. Die Seitenlinie geht der Rückenkante sehr hoch nach oben parallel.

“ Die Rückenflosse beginnt etwas weiter vorn als die Brustflosse und reicht etwas weniger weit als die Afterflosse. Der 3te bis 6te Flossenstachel sind die längsten, der 1ste, 12te, 13te die kürzesten. Der 5te bis 8te Flossenstrahl sind die längsten. Schwanzflosse in der Mitte stark ausgeschnitten und breit. Die Afterflosse beginnt der weichen Rückenflosse gegenüber, der 2te Stachel ist doppelt so gross und stark als der 1ste, aber doch noch kürzer als der erste Flossenstrahl. Die Bauchflosse beginnt hinter der Brustflosse und reicht nach hinten gelegt bis zur Basis des ersten Afterflossenstrahls. Die Brustflosse beginnt tiefer als der untere Vordeckeldorn und reicht bis zum 10ten Rückenflossenstachel.

“ *Färbung*.—Der ganze Körper ist hellgrau, ungefleckt, aber auf dem Rücken rosafarben überlaufen und daher etwas dunkler. Der Bauch in der Mittellinie am hellsten.

“ Länge 9”.

“ *Vorkommen*.—Wir haben nur wenige Exemplare dieser Species in Huacho, nördlich von Lima, erhalten.”

LABRIDÆ.

77. *Pimelometopon canis* (Philippi).

Trochocopus canis Philippi, Sobre los Tiburones de Chile, 38, 1887, lám. vii, fig. 3.

Local name, *Peje-perro*.

The size of the scales evidently places the species under *Pimelometopon*.

Habitat.—Iquique.

78. *Pimelometopon darwinii* (Jenyns).

Cossyphus darwinii Jenyns, Voy. Beagle, Fishes, 100, pl. 20, 1842 [Galapagos].

Labrus asper Valenciennes, Voy. de la Venus, Poiss., 338, pl. 8, fig. 1, 1855.

Trochocopus darwinii Günther, Cat., iv, 100, 1862; Steindachner, Fauna Chilensis, 317, 1898 [Iquique].

Pimelometopon darwinii Gill, Proc. Acad. Nat. Sci. Phila., 1864, 59.

OPLEGNATHIDÆ.

79. *Oplegnathus insignis* (Kner).

Scaristoma insigne Kner, Neue Fische aus Mus. Godeffroy, 7 (Sitz. d. k. Ak. Wiss. Wien, i, pl. ii, 1867).

This species is known only from Kner's description and excel-

lent plate. It is closely related to *O. fasciatus* from Japan (*Scaradon fasciatus* Temminck and Schlegel, *Fauna Japonica*, 89, pl. 46, 1847), specimens of which we have examined, but we are inclined to consider the two species as distinct, although the color pattern and the dentition in *fasciatus* appear to vary with age.

Habitat.—"West coast of South America."

BALISTIDÆ.

80. *Balistes adpersus* Tschudi.

Balistes adpersus Tschudi, *Fauna Peruana*, 31, 1845 [Huacho].

Following is Tschudi's original description:

"D. 3-24. A. 1-20. P. 14.

"Verhältniss der Höhe zur Länge 1:2, 6; des Kopfes zum Körper 1:3. Auge rund, nahe am obern Stirnrande, viermal sein Durchmesser von der Schnauzenspitze, fünfmal denselben vom Unterkiefer entfernt. Maul sehr klein.

"Die vordere Rückenflosse besteht nur aus drei Stacheln; der erste ist dick und lang, auf seiner obern Fläche gezähnt, der letzte der kleinste und steht etwas abgerückt. Die zweite Rückenflosse beginnt dem After gegenüber; sie bildet ein Dreieck, dessen hinterer Schenkel der längste ist und reicht unbedeutend weiter nach hinten als die Afterflosse. Schwanzflosse fächerförmig nach hinten gewölbt, an den Enden etwas nach vorn eingeschnitten. Die Afterflosse ist wie die Rückenflosse, ihr vorderer Ansatz aber etwas weiter nach hinten gerückt. Die Bauchflosse besteht aus einem stumpfen, kurzen, mit kleinen Dörnchen besetzten Stachel. Die Brustflosse ist abgerundet, fächerförmig ausgebreitet und sitzt dem ersten Rückenflossenstachel gegenüber am untern Winkel der Kiemenspalte.

"*Färbung*.—Schwarzblau, mit weisslich blauen runden Flecken, die an Menge nach dem Bauche hin zunehmen.

"Länge 10".

"*Vorkommen*.—Das hier beschriebene Exemplar wurde in Huacho gefangen."

SCORPÆNIDÆ.

81. *Sebastodes darwini* Cramer.

(?) *Sebastes oculata* Jenyns, *Voyage of the Beagle*, Fish, 37, 1840 [Valparaiso].

Sebastodes darwini Cramer, *Proc. Cal. Acad. Sci.*, 1896, p. 240 [Mexillones, Peru]; Jordan and Evermann, *Fishes of N. A.*, ii, 1832, 1897 (copied).

Local name, *Cabrilla*.

An interesting species, originally described from Peru, close to *S. rosaceus*, but less pronounced with respect to spinous development. Not represented in the Callao collection.

Range.—Peru and Chile.

82. *Agriopus peruanus* Cuvier and Valenciennes.

Agriopus peruanus Cuv. and Val., Hist. Nat., iv, 389, 1829 [San Lorenzo islands]; Gay, Hist. Chile Zool., ii, 181, 1848; Günther, Voyage Alert, Fish, 20, 1881 [W. coast Patagonia]; Steindachner, Fauna Chilensis, 297, 1898 [Iquique].

BATRACHOIDIDÆ.

83. *Porichthys porosus* Cuvier and Valenciennes.

Porichthys porosus Cuvier and Valenciennes, Hist. Nat., xii, 506, pl. 368, 1837 [Valparaiso]; Gay, Hist. Chile Zool., ii, p. 296, 1848; Günther, Shore Fishes, Challenger, 25, 1880 [Valparaiso]; Steindachner, Fauna Chilensis, 306, 1898 [Iquique].

84. *Auchenionchus crinitus* (Jenyns).

Clinus crinitus Jenyns, Voy. Beagle, Fishes, 90, pl. 18, fig. 1 [Cochimbo]; Gay, Hist. Chile, ii, 280; Steindachner, Fauna Chilensis, 311, 1898 [Iquique].

(?) *Clinus peruvianus* Cuvier and Valenciennes, xi, 383, 1836 [no definite locality].

Auchenionchus, gen. char. Gill, Proc. Acad. Phila., 1860, 103.

GOBIIDÆ.

85. *Gobiodes peruanus* (Steindachner).

Amblyopus broussonetii Günther, Cat. Brit. Mus., iii, 136, 161 [coast of Peru].

Amblyopus peruanus Steindachner, Denk. Ak. Wien, xlii, 1880, 94 [Zur Fisch Fauna der Flüsse bei Guayaquil].

Habitat.—Peru and Ecuador, coastwise and in streams.

BLENNIIDÆ.

86. *Labrisomus philippi* (Steindachner).

Clinus philippi Steindachner, Ichth. Notizen, iii, 3 (Sitz. Ak. Wiss. Wien, liii, 210, 1866) [“West coast of South America”].

Clinus fortidentatus Cope, Proc. Amer. Phil. Soc., 26 (sep.), 1877 [Callao].

Local name, *Frambollo*.

Six specimens, length 260 mm. (circa).

Head $3\frac{1}{2}$, depth 4–5 in body. Eye $5-6\frac{1}{2}$, 2 in snout.

A very voracious fish. The throat and stomach of two of the specimens were gorged with *Stolephorus tapirulus*, fully 100 mm. long. The stomach in each was found full of mollusc shells, sea urchin spines and plates, and small crustaceans, including a good-sized crab with shell unbroken.

87. *Labrisomus microcirrhis* (Cuvier and Valenciennes).

Clinus microcirrhis Cuv. and Val., Hist. Nat. Poiss., xi, 384, 1836 [Valparaiso]; Cope, Proc. Amer. Phil. Soc., 1877, 26 [Callao].

Habitat.—West coast of South America, from Peru to Chile.

88. *Blennius tetranemus* Cope.

Blennius tetranemus Cope, Proc. Amer. Phil. Soc., 1877, 26 [Pecasmayu bay].

89. *Hypleurochilus paytensis* (Steindachner).

Blennius paytensis Steindachner, Ichthy. Beiträge, v, 171 (Sitzb. Ak. Wiss. i, lxxiv, 1876), [Payta, Peru].

90. *Scartichthys rubropunctatus* (Cuvier and Valenciennes).

Salarias rubropunctatus Cuv. and Val., Hist. Nat. Poiss., xi, 348, 1836 [Juan Fernandez]; Gay, Hist. Chile Zool., ii, 271 [Juan Fernandez]; Steindachner, Fauna Chilensis, 309, 1898 [Juan Fernandez].

Scartichthys rubropunctatus Jordan and Evermann, Fishes of North and Middle America, 2396, 1898 [Callao].

Not *Salarias rubropunctatus* Kner, Novara Fische, 198 [Valparaiso].

Range.—Coast of South America, from Panama to Chile.

91. *Scartichthys gigas* (Steindachner).

Salarias gigas Steindachner, Ichthy. Beiträge, v, 172, (Sitzb. Ak. Wiss. i, lxxiv, 1876), [Callao].

92. *Scartichthys eques* (Steindachner).

Salarias eques Steindachner, Fauna Chilensis, 307, Taf. 19, figs. 5, 5a, 1898 [Iquique].

93. *Scartichthys viridis* (Cuvier and Valenciennes).

Salarias viridis Cuv. and Val., xi, 344, 1836 [Valparaiso]; Steindachner, Fauna Chilensis, 308, Taf. 19, figs. 6, 6a, 1898 [Iquique].

Local name, *Burracho*.

94. *Ophioblennius semifasciatus* (Kner and Steindachner).

Blennophis semifasciatus Kner und Stein., Neue Fische aus Mus. Godeffr. 14, fig. 6 (Sitz. d. k. Ak. Wiss. Wien, 1866) [Iquique].

TRACHINIDÆ.

95. *Trachinus draco* Linnæus.

Trachinus draco Kner, Neue Fische aus Mus. Godeffroy 9 (Sitz. d. Ak. Wiss. Wien, 1 Ab., 1867) [Iquique].

As to the reliability of the presence of this species upon the Peruvian coast, we have only the assurance of Kner that his specimens from Iquique agreed "in allen Punkten" with European specimens. There is, of course, the possibility of a mistake in labelling.

ECHENEIDÆ.

96. *Remora remora* (Linnæus).

Echeneis remora R. A. Philippi, Peces Nuevos de Chile, Anales de la Univ. de Chile, tomo xciii, 1896, p. 376.

Philippi mentions specimens in the National Museum at Valparaiso from Panama, Guayaquil, Iquique, Quinteros and Algarroba, mentioning the fact that the Iquique specimen is somewhat darker than the others.

GOBIESOCIDÆ.

97. *Gobiesox sanguineus* (Müller and Tröschel).

Sicyases sanguineus Müller and Tröschel, Wiegmann Archive, 298, 1843; Günther, Cat. Brit. Mus., iii, 494, 1861 [Valparaiso]; Steindachner, Fauna Chilensis, ii, 315, 1893 [Juan Fernandez and Iquique].

Gobiesox brevirostris Gay, Hist. Chile Zool., ii, 335, lám 9, fig. 1.

Local name, *Peje Sapo*.

The four specimens of this large species in the Callao collection are faded in the alcohol, though the fins, head and back are unmistakably red. The belly and sides of the body are a bluish copper marbled with darker. The fin rays showed considerable variation in the four fish counting as follows:

D. 9, A. 5; D. 8, A. 5; D. 9, A. 6; D. 8, A. 6.

Length 140 mm. to 180 mm.

Range.—Coasts of Peru and Chile.

98. *Gobiesox marmoratus* Jenyns.

Gobiesox marmoratus Jenyns, Voy. Beagle, 140, pl. xxvii, fig. 1, 1842 [Chiloe]; Gay, Chile Zool., ii, p. 336, 1848; Steindachner, Fauna Chilensis, 316 [Iquique, Calbuco, Juan Fernandez].

99. *Arbacia pyrrhocinclus* (Cope).

Sicyases pyrrhocinclus Cope, Proc. Amer. Phil. Soc., 27, 1877.

Peru [Pecasmayu bay?].

100. *Arbacia petersii* (Garman).

Sicyases petersii Garman, Proc. Boston Soc. Nat. Hist., xviii, 203, 1876.

Peru.

PLEURONECTIDÆ.

101. *Paralichthys adpersus* (Steindachner).

Pseudorhombus adpersus Steindachner, Ichthy. Notizen, v, 9, pl. ii, (Sitzb. Ak. Wiss. i, lv, 1867), [Chinchas islands].

Not *Paralichthys adpersus* Jordan and Gilbert, Proc. U. S. N. Mus., 1882, 372; Jordan et al., Proc. Calif. Acad. Sci., 1895, 503, and others.

Local name, *Zingua*.

Four specimens. This species has been confused for a long time with the common *Paralichthys* of Mazatlan, from which it is wholly distinct. The Mexican species (*P. sinaloæ* Jordan and Abbott, in *Fishes of N. A.*, Addenda, 2872) has cycloid scales and fewer gill rakers (14 or 13), while in *adpersus* the scales are strongly toothed, and the gill rakers average 16 or 17.

The four specimens at hand are sinistral, glossy black on the eyed side, and show the spots and ocelli peculiar to the species.

D. 68-74. A. 54-56. Length 250 mm. to 320 mm.

Habitat.—Coast of Peru.

102. *Etropus ectenes* Jordan.

Etropus ectenes Jordan, in Jordan and Goss, Review of the Flounders. Rep. U. S. F. C., 1886, 277 (1889).

Callao, Paraca bay, Peru.



Abbott, James Francis. 1899. "The Marine Fishes of Peru." *Proceedings of the Academy of Natural Sciences of Philadelphia* 51, 324–364.

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