III.—A REVIEW OF THE SCIÆNIDÆ OF AMERICA AND EUROPE.

By David Starr Jordan and Carl H. Eigenmann.

In the present paper we have attempted to give the synonymy of the species of *Sciænidæ* found in the waters of North and South America and of Europe, together with analytical keys by which the genera and species may be distinguished. The paper is based on the collections in the museum of the University of Indiana, on a large series belonging to the National Museum, the most valuable part of this series being the collections made by Professor Gilbert at Mazatlan and Panama, and on the collections in the Museum of Comparative Zoology at Cambridge, Mass. This collection is especially rich in South American forms, and nearly all of our information regarding the South American species has been drawn from it. All the representatives of this family in the museum at Cambridge have been examined by the senior author of this paper, and for all statements regarding the South American species he is responsible.

We wish to express our special obligations to Prof. Alexander Agassiz, Director of the Museum of Comparative Zoology, and to Mr. Samuel Garman, curator of the fishes, for the free use of the material in the museum, and to Dr. Tarleton H. Bean for a loan of special desiderata from the United States National Museum. Through the aid of these two great museums we have been enabled to examine nearly all the species included in the present paper. The only species not seen by us are the following: *Cestreus obliquatus*, *Larimus stahli*, *Sciæna gilli*, *Sciæna heterolepis*, *Pachyurus francisci*, *Pachyurus schomburgki*, *Pachypops trifilis*, *Umbrina reedi*, *Lonchurus lanceolatus*, and *Eques pulcher*, ten of the 113 species recognized.

There is room for much difference of opinion as to the proper subdivision of the *Sciænidæ* into genera. There are few families in which the various types are more definitely joined together by intermediate forms than in the present one. The subdivisions must be more or less arbitrary, or else the great bulk of all the species must be thrown into two genera, *Sciæna* and *Otolithus*. Such an arrangement, however, tends to obscure the inter-relations of the species, and so we have adopted as distinct genera all the subordinate groups which we are able to restrict and define by structural characters of some importance.

It is but fair to say, however, that the arrangement adopted is not entirely satisfactory to us. The genera recognized are not equivalent in value, and no subdivision is possible in which they can be made so. The species of *Sciæninæ* with long gill-rakers (*Stelliferus*, &c.), and those with short ones (*Sciæna*, &c.) form together an almost perfect series. The characters on which the first of these groups is by us subdivided into distinct genera (dentition, armature of the preopercle, &c.) cannot apparently be used for this purpose among the *Sciænæ*, as the gradation there is more perfect and the extremes less marked. It is quite true that a character may have a generic value in one section of a family and not in another, yet such generic characters of partial application should always be looked upon with question.

The *Sciænidæ* fall naturally into two suborders, which are well distinguished from each other, and, so far as we know, not connected by intermediate forms. These are the *Otolithinæ* and the *Sciæninæ*. The extremes of the former group (*Seriphus*, *Archoscion*) have been of late usually set off as a distinct subfamily—*Isopisthinæ*. Dr. Bleeker has even removed this group, *Isopisthinæ*, from the family of *Sciænidæ* altogether. There is no warrant for this arrangement. While *Seriphus* seems quite different from the other *Otolithinæ*, *Archoscion* is intermediate between *Seriphus* and *Cestreus*, and from the latter it is scarcely to be distinguished generically, so perfect is the gradation in the series of species. At the opposite end of the series the genus *Eques* represents an aberrant form of the *Sciæninæ*, and another is represented by *Aplodinotus* and *Pogonias*. The differences existing do not apparently require the recognition of either of these groups as subfamilies, and we refer all to the *Sciæninæ*.

The *Sciæninæ* constitute an irregularly graduated series, the characters changing by small and often scarcely perceptible gradations from the forms allied to *Cestreus* on the one hand to those approaching *Eques* on the other.

We begin our series with the genus *Seriphus*, which is perhaps most nearly related to the other percoid forms, and we close it with *Eques*, which stands at the opposite extreme from *Seriphus*. In passing down the series from *Nebris* and *Odontoscion*, the most *Otolithus*-like of the *Sciæninæ*, to *Sciæna*, *Menticirrhus*, *Eques*, and the other extreme forms, we find, as has been already stated, no very sharp line of division. The middle line, if we may so speak, lies between *Bairdiella chrysoleuca* and *Sciæna sciera*, two species closely allied to each other.

Nothing could be more unnatural or more ineffective than the subdivision adopted by Cuvier, whereby the *Sciæninæ* without barbels are divided into three groups, *Corvina*, *Johnius*, and *Sciæna*, solely on the strength of the second anal spine. This is large in *Corvina*, very feeble in *Sciæna*, and intermediate in *Johnius*. Günther's arrangement, by which the species referred to *Johnius* are divided between *Corvina* and

Sciæna, is no better, as very many of the species have this spine neither large nor small, and could as well be placed in the one group as the other. Bleeker divides this group into *Pseudosciæna*, species with the mouth oblique and the jaws subequal, the lower jaw with the teeth of the inner row enlarged, and *Johnius* with the mouth horizontal and the lower jaw included, the teeth of the lower jaw being in villiform bands. This arrangement is better than the other only in theory. The characters chosen are of more value as indicating relationship, but they cannot be applied in practice, as there are intermediate gradations of all sorts. The type of *Pseudosciæna* (*Sciæna aquila*) is in fact much more nearly related to the type of *Johnius* than to most of the species associated with it in *Pseudosciæna*.

As we proceed along the series of *Sciæninæ* from *Larimus* towards *Menticirrhus*, the following changes are notable: In the *Larimus* type the pores on the snout are small and few, and there are no distinct slits or lobes on the snout above the upper jaw; in the other type the pores become large and conspicuous, 4 to 6 in number, and the thickened snout above the upper jaw has two slits on each side, bounding two dermal lobes. The mouth becomes smaller, narrower, more horizontal as we proceed towards *Menticirrhus*, the lower jaw shorter, and the bands of teeth in both jaws more and more broad, those in the lower more decidedly villiform; the pores on the chin become larger and more numerous, the number rising from 2 to 5; the lower pharyngeals become larger, and their teeth larger and less acute; the preorbital becomes wider and more gibbous, the gill-rakers shorter, fewer, and more like tubercles; the anal fin is placed farther forward, and the spines of the fins generally are less slender; the scales, as a rule, become rougher, and the rows of scales less regular in their direction. The flesh, as a rule, becomes firmer, coarser, less agreeable in flavor, and of less value as food, but this, like some of the other characters mentioned above, is subject to much variation.

It may be noted that in some *Sciænidæ* the middle rays of the caudal are more produced in young specimens. In some also the serrations on the preopercle become weaker or even obsolete with age.

The two subfamilies recognized by us may be thus distinguished:

ANALYSIS OF THE SUBFAMILIES OF SCIÆNIDÆ.

a. Vertebræ typically 14 + 10, the number in the abdominal region always greater than that of the caudal; lower jaw prominent; teeth not villiform; edge of preopercle entire; second anal spine weak and adnate to the first ray; the first spine minute and often obsolete ..... OTOLITHINÆ, I.

aa. Vertebræ typically 10 + 14, the number in the caudal region always greater than that in the abdominal; second anal spine usually well developed and usually joined to the first soft ray by a distinct membrane ..... SCIÆNINÆ, II.

*ANALYSIS OF THE GENERA OF SCIÆNIDÆ.**

Subfamily I.—OTOLITHINÆ.

(*Sciænidæ* with the vertebræ 14 or 15 + 10 or 11, the abdominal portion of the spinal column having always more vertebræ than the caudal portion, the anal fin being posterior in its insertion; body more or less elongate, the mouth large, the lower jaw projecting, the preopercle with a crenulate, membranaceous border; snout without distinct pores or slits; preorbital narrow; gill-rakers slender, moderate, or rather long; anal fin with one or two very weak spines, the second closely connected with the first soft ray; scales small, smoothish.)

a. Anal fin long, of 15 to 21 soft rays, its length more than half that of soft dorsal; dorsal fins more or less separated (soft dorsal and anal fins closely scaled).

b. Teeth small, sharp, subequal, uniserial below, in a narrow band above; no canines; anal and soft dorsal with 20 to 22 rays each, the former but little shorter than the latter; dorsal fins well separated; body compressed; scales large, ctenoid; gill-rakers long and slender; caudal fin lunate..SERIPHUS, 1.

bb. Teeth larger, very unequal, tip of upper jaw with one or two strong canines; enlarged teeth or canines on sides of lower jaw; anal fin shorter than soft dorsal, with 15 to 18 soft rays; dorsal fins more or less separated; body compressed; scales rather small, cycloid.....ARCHOSCION, 2.

aa. Anal fin moderate, or short, of 7 to 13 soft rays; its length less than half that of second dorsal; dorsal fins contiguous.

c. Canine teeth, if present, not lance-shaped, tapering from base to tip.

d. Lower jaw without canines at its tip; some of its lateral teeth sometimes enlarged; tip of upper jaw usually with canines.....CESTREUS, 3.

dd. Lower jaw with a pair of very strong canines at its tip, larger than the canines at tip of upper jaw; lateral teeth small; body very slender; anal fin small; gill-rakers short. (Contains only Asiatic species.).....OTOLITHUS.†

cc. Canine teeth lance-shaped, widened toward the tip, then abruptly pointed; canines of front of premaxillary largest; about two canines on front of lower jaw on each side; outer teeth of upper jaw enlarged, somewhat lance-shaped; outer teeth of lower jaw compressed; air-bladder with two horn-like processes; gill-rakers moderate, slender; (soft dorsal and anal fins scaly).....ANCYLODON, 4.

Subfamily II.—SCIÆNINÆ.

(*Sciænidæ* with the dorsal fins contiguous, the soft dorsal being long, much longer than the anal; vertebræ 9 to 12 + 13 to 20, typically 10 + 14, the number of vertebræ in the abdominal part of the body being always less than in the caudal part.)

* For completeness' sake we include in the following analysis, besides the American genera, *Otolithus*, *Sciænoides*, *Colliichthys*, and *Pseudotolithus*; the only well-defined genera without American representatives with which we are acquainted.

† *Otolithus* Cuvier, Règne Animal. Type, *Johnius ruber* Bloch. The characters here given are drawn from *Otolithus argenteus* (specimen from Hong-Kong, China).

a. Dorsal spines well separated, the first dorsal spine * attached to the third or fourth interneural, not more than two * of the spine-bearing interneurals being placed between the same pair of vertebræ; soft rays of dorsal fin 17 to 32 (37 to 40 in *Lonchurus*, 45 to 50 in *Sciænoides*); occipital crest not greatly elevated.

b. Lower pharyngeals separate.

c. Lower jaw without barbels.

d. Caudal fin moderately scaly, its distal portion usually more or less naked, the scales not numerous enough to give a thickened appearance to the fin.

e. Teeth well developed, permanent in both jaws.

f. Lower pharyngeals rather narrow; their teeth conic and mostly sharp; none of them molar; outer teeth of upper jaw more or less enlarged.

g. Gill-rakers comparatively long and slender; mouth more or less oblique, anal fin usually (but not always) inserted posteriorly; preorbital usually narrow, flat; edge of snout above upper jaw with the pores and slits little conspicuous or obsolete.

h. Preopercle without bony teeth or serrations, its membranaceous margin entire, crenulate or ciliate (two or three slender spinules present in *Collichthys*); teeth of lower jaw in few series.

i. Skull excessively cavernous, soft and spongy to the touch, the interorbital space very broad; eye very small; mouth large, oblique; preopercle with a broad membranaceous border, which is striated and fringed; scales small; spinous dorsal short and weak; anal spines weak; caudal fin pointed.

j. Pseudobranchiæ wanting; air-bladder with a lateral horn-like process on each side, this dividing into many branches in the skin of a peritoneal membrane; both jaws with small, unequal, canine-like teeth, those of the upper jaw in the outer, of the lower jaw in the inner series; forehead very convex; soft dorsal very long, of 27 to 50 rays; anal fin small; pectoral fin long; gill-rakers (X + 14) slender but rather short; lower jaw included; "vertebræ 14 + 10" (*Bleeker*); "vertebræ 12 + 12" (*Cuv. & Val.*). (Asiatic species.)

SCLÆNOIDES.†

* These characters (which separate the rest of the *Sciæninæ* from *Eques*) have been verified in part of the genera only, and the statement of them may need some modification when the entire group is considered. The genus *Lonchurus* especially should be examined in this regard.

† *Sciænoides* Blyth, Journ. Asiat. Sci. Beng., 29, 1861; type *Otolithus biauritus* Cantor. The characters here given are drawn from *Sciænoides pama*. This genus seems nearest to *Nebris*, but it shows several resemblances to *Lonchurus*. If it really has vertebræ 14 + 10, as stated by Bleeker, it should be placed among the *Otolithinæ*.

jj. Pseudobranchiæ small; air-bladder with a very complex structure, having many forking branches on each side, these extending in a peritoneal membrane which surrounds the viscera; no canine teeth; dorsal rays IX–I, 25 to 30; anal rays II, 8 to II, 11; the spine small; pectoral shortish; gill-rakers slender, not very long; preopercle with two or three stiff, slender spinules near its angle; top of head very convex in all directions; occipital crest high, its edge dentate; caudal fin lanceolate. (Asiatic species.) Vertebræ 11 + 18.....COLLICHTHYS.*

jjj. Pseudobranchiæ present; teeth subequal, all villiform, in narrow bands; soft dorsal long, of 30 to 35 rays; anal fin rather long; soft dorsal and anal scaly; lower jaw projecting; vertebræ 10+14; gill-rakers long and slender; air-bladder with two horns .....NEBRIS, 5.

ii. Skull firm, not excessively cavernous, interorbital space not very broad; preorbital not turgid.

k. Teeth minute, equal, chiefly uniserial or partly biserial above; snout very short; cleft of mouth very oblique or even vertical, the lower jaw projecting.....LARIMUS, 6.

kk. Teeth larger, more or less unequal, those in lower jaw mostly biserial, those of the inner series usually enlarged; cleft of mouth more or less oblique but not vertical.

l. Scales of the lateral line similar to the others, not concealed by smaller ones; anal fin inserted more or less posteriorly, its first spine usually nearer caudal than ventrals, the tip of the last ray when depressed extending beyond base of last ray of dorsal; caudal peduncle rather short; pseudobranchiæ well developed.

m. Upper jaw with a single row of teeth, some of them enlarged, forming long canines; some canines in lower jaw; lower jaw projecting .....ODONTOSCION, 7.

mm. Upper jaw with a narrow band of teeth, those of the outer row more or less enlarged; no distinct canines .....CORVULA, 8.

ll. Scales of the lateral line considerably enlarged, almost entirely concealed by smaller ones; anal fin small, inserted well forward; its first spine usually as near ventrals as

* *Collichthys* Günther=*Hemisciæna* Bleeker; type *Sciæna lucida* Günther, not of Richardson. Our specimens from Swatow, China (*Collichthys lucidus* Rich.?) agree with Bleeker's account of *Hemisciæna lucida* rather than with Günther's. This genus is certainly very close to *Sciænoides*.

caudal; caudal fin pointed, its peduncle long and slender; soft dorsal and anal scaly; scales small; pseudobranchiæ small, often obsolete on one side. (Fluviatile species.)

PLAGIOSCION, 9.

hh. Preopercle with its bony margin armed with sharp teeth or serræ.

n. Head not very broad, the interorbital space convex, scarcely spongy.

o. Preopercle with its margin simply serrate; the lower spine not enlarged; anal fin inserted well forward; caudal peduncle slender. (Species chiefly African.)

PSEUDOTOLITHUS.*

oo. Preopercle with its lowermost spine largest, directed abruptly downward. (Soft dorsal and anal fin moderately scaly.)

BAIRDIELLA, 10.

nn. Head very broad above, the interorbital space flattish, excessively cavernous, the septa reduced to thin partitions; soft dorsal and anal fin usually densely scaly, second spine of dorsal usually thickened ..... STELLIFERUS, 11.

gg. Gill-rakers comparatively short and thick, usually not longer than posterior nostril; anal fin inserted farther forward; snout above lower jaw with large pores, and with two more or less distinct slits on its edge; these sometimes obsolete; preorbital more or less broad; mouth more or less inferior ..... SCIÆNA, 12.

ff. Lower pharyngeals very broad, with coarse blunt molar teeth; teeth in both jaws subequal, in broad bands; preopercle with its bony margin coarsely serrate; lower jaw included; snout with pores and slits as in *Sciæna;* gill-rakers rather short and slender ..... RONCADOR, 13.

ee. Teeth very small, subequal, those in the lower jaw wanting or deciduous; lower pharyngeals rather broad, with paved teeth; mouth small, inferior; snout as in *Sciæna*; preopercle entire; anal fin long, with about 12 soft rays; gill-rakers shortish, rather slender ..... LEIOSTOMUS, 14.

dd. Caudal fin very densely scaly, the scales so closely set and so numerous as to hide the rays and to give a thickened appearance to the fin; mouth small, with very small, equal teeth in villiform bands; preorbital broad, more or less turgid; preopercle

* *Pseudotolithus* Bleeker, Poissons de la côte de Guinée, 1862, 59; type *Pseudotolithus typus.* The characters here given are taken from a species from Gambia.

sharply but finely serrate; gill-rakers very small, thickish; pores and slits on snout obsolete. (Fluviatile species.).....PACHYURUS, 15.

cc. Lower jaw with one or more barbels, either at the symphysis or on the rami; snout with slits and pores as in *Sciæna*; lower jaw included; preorbital broad; lower teeth in villiform bands; gill-rakers more or less short.

p. Pseudobranchiæ well developed; pectoral fin not elongate.

q. Lower jaw with slender barbels, usually several in number.

r. Barbels mostly in a tuft at the symphysis of lower jaw; mouth very small, inferior; gill-rakers minute, thickish; dorsal spines 10 or 11.

s. Preopercle sharply but finely serrate; preorbital turgid and cavernous, more or less translucent; caudal fin rhombic. (Fluviatile species.)

PACHYPOPS, 16.

ss. Preopercle without bony serræ; preorbital very broad, but less distinctly cavernous .....POLYCIRRHUS, 17.

rr. Barbels chiefly lateral, along the rami of the lower jaw, usually none at the symphysis; lower pharyngeals narrow with sharp teeth.

t. Preopercle without bony serræ; dorsal spines 14; gill-rakers short, but rather slender .....GENYONEMUS, 18.

tt. Preopercle with its bony margin armed with strong teeth; dorsal spines 10 or 11; gill-rakers short, thickish.

MICROPOGON, 19.

qq. Lower jaw with a single thickish barbel at its tip.

u. Air-bladder large; anal spines two; back more or less elevated; preopercle with its bony margin crenate or serrate; pectorals short, shorter than ventrals. (Free-swimming species.)

UMBRINA, 20.

uu. Air-bladder none; anal spine single, weak; back not elevated; preopercle with its membranaceous edge crenulate; pectoral fins long, longer than ventrals. (Bottom fishes.)

MENTICIRRHUS, 21.

pp. Pseudobranchiæ obsolete; body long and low; caudal pointed; pectoral fin elongate; preopercle without bony serratures.

v. Chin without barbels; a row of slender barbels along inner edge of mandible; soft dorsal with about 30 rays.

PARALONCHURUS, 22.

vv. Chin with two short barbels, none on sides of mandible; soft dorsal with 37 to 40 rays .....LONCHURUS, 23.

bb. Lower pharyngeals very large, completely united, covered with coarse blunt paved teeth; lower jaw included; snout with slits and pores, as in *Sciæna;* gill-rakers rather short.

w. Lower jaw with numerous barbels along the inner edge of the rami; preopercle nearly entire. (Marine species.) .....POGONIAS, 24.

ww. Lower jaw without barbels; preopercle obscurely serrate. (Fluviatile species.) .....APLODINOTUS, 25.

aa. Dorsal spines close together, the first spine attached to the first interneural, and from 5 to 12 of the spine-bearing interneurals wedged in between the high occipital crest and the neural spine of the second vertebra on the one hand, and that of the third vertebra on the other; occipital crest much elevated. Vertebræ 10 + 14.

x. Mouth small, low, included, the teeth subequal, in villiform bands; air-bladder simple; preopercle with its membranous edge serrulate; gill-rakers short; snout above premaxillary with slit and pores essentially as in *Sciæna*; anal fin small; soft dorsal very long, of 36 to 55 rays .....EQUES, 26.

Genus I.—SERIPHUS.

Seriphus Ayres, Proc. Cal. Acad. Nat. Sci., ii, 80, 1861 (*politus*).

TYPE: *Seriphus politus* Ayres.

This genus consists of a single species, abundant on the California coast.

It is one of the most aberrant genera in the family—as compared with the typical sciænoid forms, standing at the farthest possible extreme from *Eques*, *Pogonias*, and *Menticirrhus*.

ANALYSIS OF SPECIES OF SERIPHUS.

a. Body moderately elongate, compressed; profile slightly depressed over the eyes; eyes large, 4½ in head; snout projecting, 3½ in head; mouth large and narrow, the lower jaw more or less projecting in the adult; premaxillary anteriorly about on the level of the lower margin of the pupil; maxillary 2 in head, reaching to below posterior margin of eye; lower jaw with a knob at its symphysis which fits in a notch in the upper jaw; teeth all small, subequal; those of the lower jaw in a single series, except at the symphysis, where there are two or three series; those of the upper jaw in two series, the inner ones much recurved; gill-rakers long and slender, ⅔ length of eye, 7+16; lower pharyngeals narrow, linear, fragile; scales moderate, weakly ctenoid, those about the head cycloid; lateral line straight; dorsal spines weak, the highest 3 in head; soft dorsal falcate, the anterior rays much the longer; anal similar, its base

at least as long as that of the soft dorsal; interspace between dorsals 2½ in head; ventrals 2 in head; pectorals 1⅞; caudal lunate. Color bluish above, sides and belly bright silvery, finely punctate; vertical fins all pale yellow; base of pectorals blackish. Head 3½ in length; depth 4; D. VIII-I, 20; A. II, 21 or 22; scales 7-65-9 ..... POLITUS,

1. SERIPHUS POLITUS.

(THE QUEEN-FISH.)

Seriphus politus Ayres, Proc. Cal. Acad. Nat. Sci., ii, 80, 1861. Gill, Proc. Acad. Nat. Sci. Phila., 1862, 18 (name only). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (San Francisco, Monterey Bay, San Pedro, San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 48 (San Francisco southwards). Jordan & Gilbert, Syn. Fish. North Am., 582, 1882. Rosa Smith, West American Scientist, 1885, 47 (San Diego).

Habitat.—Coast of Southern California, north to San Diego.

The Queen-fish is common on the coast of Southern California. It reaches the length of about a foot, and is an excellent pan fish.

Genus II.—ARCHOSCION.

Archoscion Gill, Proc. Ac. Nat. Sci. Phila., 1862, 17 (*analis*).
Isopisthus Gill, Proc. Ac. Nat. Sci. Phila., 1862, 18 (*parvipinnis*).

TYPE: *Otolithus analis* Jenyns.

This genus as understood by us consists of two very closely related species (*Isopisthus*), and a third species (*Archoscion*) which is almost exactly intermediate between the typical *Isopisthus* and *Cestreus*.

The resemblance between *Archoscion remifer* and *A. analis* is so very close that the two cannot consistently be placed in separate genera. On the other hand, the affinities of *Archoscion analis* with certain species of *Cestreus* (as *C. bairdi*) are scarcely less definite. The separation of *Archoscion* from *Cestreus* and of the latter from *Otolithus* are justified chiefly by convenience.

ANALYSIS OF SPECIES OF ARCHOSCION.

a. Distance between dorsal fins about equal to diameter of eye; soft dorsal with 21 rays, its base about 1½ times that of anal (*Isopisthus* Gill).

b. Anal rays II, 19; depth 4 in length; pectorals rather long, the middle rays longest, 1⅓ in length of head; 75 series of scales between opercle and the tail; back not elevated; head compressed; snout not prominent, scarcely longer than the eye, which is 4½ in head; mouth large, very oblique; maxillary extending slightly beyond middle of eye, 2 in head; lower jaw strongly projecting, no pores about the chin; front of premaxillaries with two (or one) strong, recurved, movable canines; sides of upper jaw with two series of minute teeth, the outer series the larger; lower jaw with one or two series of minute teeth in front, and with a single series of larger teeth and 3 to 6 moderate canines on the sides; gill-rakers 4 + 9, those near the angle rather long and slender; dorsal and anal densely covered with small scales; base of anal, 1⅔ in head. Color in life: bluish gray above, grayish silvery below, top of snout and tip of lower jaw blackish; inside of mouth yellow, with black on lower lip within; lining of opercles black, bordered with pale orange; dorsals, caudal, and pectorals yellowish with fine black punctulations; axil

brownish, the color extending on pectorals; anal white, the anterior part and the tips of most of the rays yellowish, punctate with black; a dark blotch behind the orbit and another on upper part of opercle. D. VIII–I, 20 or 21; A. II, 19; scales in the lateral line about 55 ..... REMIFER, 2.

bb. Anal rays II, 16 or 17; depth 3⅞ in length; head 3½; pectorals shortish, the upper rays longest, 1½ in head; at least 100 series of scales from opercle to the caudal; body much compressed; upper canines very long, recurved; three canines on the sides of the lower jaw; caudal fin subtruncate; color dark plumbeous above, rest of body yellowish white; no axillary spot; an indistinct elongate dark blotch from behind the eye to middle of opercle. D. VIII–I, 21; A. II, 16 or 17; scales in the lateral line 52 to 54 ..... PARVIPINNIS, 3.

aa. Distance between dorsals about equal to diameter of pupil; soft dorsal with about 24 rays, its base about 1¾ times that of the anal (*Archoscion*).

c. Body more elongate than in the other species, with longer and sharper snout; base of anal fin 2¼ in head; eye rather smaller than in *A. remifer*, 5½ in head; snout 4½; maxillary 2⅓, reaching middle of eye; gill-rakers rather long, X + 12; upper jaw with a large canine in front; two to four small canines on each side of lower jaw; dorsal and anal scaly; pectoral long, 1½ in head; longest dorsal spine 2½; caudal fin slightly lunate. Head 3⅓ in length; depth 4⅓. D. IX–I, 24; A. I, 15; scales 64; color bluish, the sides and belly silvery; axil dark; opercle dusky within ..... ANALIS, 4.

2. ARCHOSCION REMIFER.

Isopisthus remifer Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 320 (Panama).

Habitat.—Pacific coast of tropical America, Panama.

This species is extremely close to *Archoscion parvipinnis*, differing only in the characters mentioned in our analysis. It may perhaps prove a geographical variety of the other.

3. ARCHOSCION PARVIPINNIS.

Ancylodon parvipinnis Cuv. & Val., Hist. Nat. Poiss., v, 84, 1830 (Cayenne). Günther, Cat. Fish. Brit. Mus., ii, 312, 1860 (copied).

Isopisthus parvipinnis Jordan, Proc. Acad. Nat. Sci. Phila., 1883, 289 (Cayenne, re-examination of type). Jordan, Proc. U. S. Nat. Mus., 1886, 583 (name only).

Isopisthus affinis Steindachner, Denksch. Mat. Nat. Kais. Acad. Wiss., 1879, 43, plate 2, fig. 2 (Porto Alegre).

Habitat.—Coasts of Brazil, north to Cayenne.

Only the original type of this species in the Museum of Paris has been examined by us. This seems to be identical with the species well figured by Steindachner under the name of *Isopisthus affinis*, and from Steindachner's description and figure our account has been chiefly drawn.

4. ARCHOSCION ANALIS.

Otolithus analis Jenyns, Zool. Beagle, Fishes, 164, 1842 (Peru). Günther, Cat. Fish. Brit. Mus., ii, 307, 1860 (copied).

Otolithus peruanus Tschudi, Fauna Peruana Ichthyol., 10, 1844 (Peru).

Ancylodon altipinnis Steindachner, Ichthyol. Notizen, iii, 2, plate 1, fig. 2, 1866 (West coast South America).

Habitat.—Coast of Peru.

We have examined many specimens of this species from Callao, Peru, in the museum at Cambridge. There seems no room for doubt as to the identity of the nominal species *analis*, *peruanus*, and *altipinnis*.

The species is about as near *Cestreus* as *Isopisthus*, and its existence renders the separation of *Archoscion* as a genus from the former a matter of questionable propriety.

Genus III.—CESTREUS.

Cestreus Gronow, Cat. Fish., ed. Gray, 49, 1854 (*carolinensis* = *nebulosus*).
Cynoscion Gill, Proc. Acad. Nat. Sci. Phil., 1862, 18 (*regalis*).
Apseudobranchus Gill, loc. cit. (*toeroe* = *acoupa*).
Atractoscion Gill, loc. cit. (*æquidens*).
Otolithus species; Cuvier, Günther, &c.

TYPE: *Cestreus carolinensis* Gronow = *Otolithus nebulosus* Cuvier.

This genus is closely related to the old world genus *Otolithus*, from which it differs chiefly in the absence of canine teeth in the lower jaw. Nearly all the species referable to *Cestreus* are American.

Cynoscion, notwithstanding the existence of a prior name *Cestræus*

We use the name *Cestreus* (κεστρεύς) instead of the later name (κεστραῖος), also applied to a genus of fishes (*Mugilidæ*).

The reasons for regarding the two words as different have been already given in full by Dr. Jordan in a recent review of the *Pleuronectidæ*, and need not be repeated here. (See page 297 of this Report.)

ANALYSIS OF AMERICAN SPECIES OF CESTREUS.

a. Scales not very small, the lateral line having 55 to 75 pores, the number of transverse series ranging from 55 to 75, being not much in excess of the number of pores; head compressed, not truly conical; upper jaw with distinct canines, the band of teeth in the upper jaw rather narrow, the lower teeth small and in few series in front, larger and uniserial on the sides.

b. Soft rays of the dorsal and anal more or less closely scaled; gill-rakers comparatively long and slender, 9 to 12 on the lower part of the arch, the longest at least half the diameter of the eye.[a]

c. Soft dorsal of 19 to 23 rays.

d. Caudal fin rhombic, the middle rays considerably produced.

e. Mouth large, extremely oblique, the maxillary reaching considerably beyond eye, its length 2½ in head; body robust, deeper, heavier, and with the back more elevated than in any other of our species; anterior profile depressed above the eye, so that the snout projects; snout short, not very acute, 4⅔ in head; head thicker than in other species, the interorbital space equal to length of

[a] *Cestreus obliquatus*, a species imperfectly known, belongs presumably to this group.

snout; eye 7½ in head; maxillary very broad, its tip 6 in head; canines two, short and stout; lateral teeth of lower jaw moderate; gill-rakers X + 10, rather long and slender, the longest ⅔ eye; pseudobranchiæ often obsolete on one side; dorsal spines high, the longest 2⅓ in head; soft dorsal moderately scaly, the distal half of the rays largely naked; middle rays of caudal produced; P. 1½ in head; ventrals a trifle shorter; color pale, bluish above, silvery below, axil and inside of opercle a little dusky; head 3½; depth 4. D. IX—I, 19; A. I, 9; scales about 65 .....PRÆDATORIUS, 5.

ee. Mouth moderate, not very oblique; the maxillary extending little beyond eye, its length about 2½ in head.

f. Snout short, bluntish, 4⅔ in head; mouth smaller and less oblique than in most of the species, the canines quite small; the lateral teeth of lower jaw smaller and more nearly equal than in others; lower jaw a little protruding; maxillary extending to posterior margin of eye, 2½ in head; gill-rakers 3+10, those near the angle rather long, ⅔ eye, the others rapidly shortened; eye large, 5⅔ in head; soft dorsal and anal scantily scaled, the distal half largely naked, the fins rather high, the longest soft rays 2½ in head; caudal pointed; pectorals 1½ in head, not reaching tips of ventrals; color pale, with faint darker streaks along sides of back; axil pale; opercle dusky within; head 3½; depth 4. D. X-I, 20; A. I, 8; scales 66.....ACOUPA, 6.

ff. Snout long, about 3½ in head; maxillary reaching a little beyond eye; pectoral shortish, 1⅔ in head; lower jaw very prominent; lateral line becoming straight opposite front of anal; dorsal spines weak, the longest 2½ in head; color uniform silvery, sides minutely punctulate; axil brown, ventrals yellowish; head 3½ in length; depth 4. D. VIII-I, 21 or 22; A. II, 10; scales 10-70-23. SQUAMIPINNIS, 7.

dd. Caudal fin lunate or subtruncate, the middle rays shorter than the upper ones.

g. Coloration nearly plain, bluish above, silvery below; anal rays II, 10, maxillary reaching a little beyond eye, 2½ in head; body rather elongate, the back somewhat elevated; head compressed, pointed, not conical; eye moderate, 6⅔ in head, its width a little more than interorbital space; gill-rakers long and strong, nearly as long as eye; lateral line becoming straight under soft dorsal;

soft fins all densely covered with small scales; dorsal spines stiffish, the longest 2⅔ in head; anal spines small; ventrals 2 in head; caudal fin deeply lunate; the middle rays 2½ in head; pectoral fins 1⅔ in head, reaching beyond tips of ventrals; color slaty bluish above, silvery below; body and fins everywhere with dark punctulations; tip of chin dark; fins yellowish, the upper all with dark edging; pectorals blackish on the posterior side; axil dusky; lining of opercle dark; head $3\frac{1}{10}$ in length; depth 4. D. IX-I, 23; A. II, 10; pores in lateral line 60; the series of scales 66.

OTHONOPTERUS, 8.

gg. Coloration not uniform, the back and sides with conspicuous continuous brown streaks along the rows of scales, those above lateral line running upward and backward, those below horizontal; belly silvery; fins plain; anal rays I, 8; body rather robust, compressed; head compressed; eye large, 5½ in head; mouth moderate, somewhat oblique, the maxillary 2½ in head, not quite reaching line of posterior margin of eye; snout moderately pointed, 4 in head; canines moderate; lateral teeth of lower jaw moderate in size, rather numerous; chin projecting; interorbital space rather flattened and depressed, 5½ in head; gill-rakers long and slender, the longest ⅔ eye, 4 + 13 in number; scales large; lateral line becoming straight under front of soft dorsal; soft dorsal and anal low, densely scaled; longest dorsal spine 2⅓ in head; caudal subtruncate; pectorals longer than ventrals, 1⅔ in head; anal small; head 3⅓ in length; depth 4⅓. D. X-I, 19; A. I, 8; scales 54 (pores) (52 series) .....STRIATUS, 9.

cc. Soft dorsal of 27 to 29 rays; caudal fin subtruncate, or double truncate, the middle rays but slightly produced.

h. Coloration nearly uniform silvery, somewhat darker above; snout short, scarcely longer than eye.

i. [Caudal truncate; body rather slender; eye 5 in head, the snout but little longer; maxillary reaching posterior third of eye; pectoral as long as ventral; coloration uniform silvery; head 3⅔ in length; depth 5⅓. D. X-I, 27; A. I, 11; scales 60, scales of fins undescribed.] (*Sauvage.*) .OBLIQUATUS, 10

ii. Caudal weakly double concave; body rather deep; eye very large 4 in head, as long as snout, equal to interorbital width; body more compressed than in other species; the back

somewhat elevated; snout rather short, not very acute, 4½ in head; mouth smaller than in related species; maxillary 2½ in head, reaching to below posterior margin of pupil; gill-rakers long and slender, 4 + 9, the longest half eye; lower pharyngeals very slender; dorsal fins contiguous; membrane of soft dorsal scaled to its tips; scales weakly ctenoid; lateral line much curved anteriorly, becoming straight under seventh dorsal spine; color grayish silvery, thickly punctulate above and on sides to level of pectorals, then abruptly silvery, a row of dark points marking the line of division; snout and tip of lower jaw blackish; mouth white within; lower fins white, upper dusky; head 3½ in length; depth 3⅔. D. X–I, 27 to 29; A. II, 9 or 10; scales 6–58 to 62–7.

NOTHUS, 11.

hh. Coloration brownish silvery above, with many dark-brown spots, arranged in undulating streaks; body more or less compressed; eye moderate, 5 to 7 in head; maxillary extending to below posterior margin of eye, 2⅙ in head; canines large; color brownish silvery, with iridescent reflections, and marked with many small, rather irregular dark-brown spots, some of which form undulating lines running upward and backward; upper fins dusky, lower yellowish.....REGALIS, 12.

x. Snout not very sharp, about 4½ (4 to 4⅘) in head; gill-rakers long and slender, usually 5 + 10 to 12 in number; membranes of soft dorsal and anal more or less closely scaly, the scales readily deciduous; head 3⅘; depth about 4½. D. X–I, 26 to 29; A. II, 11 to 13; scales 6–56–11.....Var. *regalis*, 12 (*a*).

xx. Snout very sharp, 3¾ to 3⅘ in length of head; gill-rakers shorter, rather slender, 4 + 8 or 9 in number; membrane of soft dorsal and anal with very few scales, these readily deciduous; head 3½ in length; depth 4⅔. D. X–I, 24 or 25; A. II, 10 or 11; scales 5–52–8.

Var. *thalassinus*, 12 (*b*).

bb. Soft rays of the dorsal and anal scaleless; gill-rakers comparatively short and thickish, usually not longer than pupil, and but 6 to 8 on lower limb of the arch.

j. Coloration not uniform, grayish and silvery, the back with distinct darker spots, lines, or reticulations; caudal fin truncate, or slightly double concave.

k. Caudal and dorsal fins immaculate.

l. Back and sides covered with dark-brown streaks and reticulations, which obscure the ground color, especially above the lateral line; lateral line in a pale streak, bordered above and below by a darker one; lower parts silvery; fins unspotted. Body comparatively deep and compressed; head somewhat conical, the snout not very sharp, 3⅗ in head; maxillary extending to below margin of pupil, 2⅗ in head; eye 7 in head; gill-rakers shortish, 3+7; ventrals 1⅓ in pectorals; pectorals about 1⅗ in length of head; highest dorsal spine about 2⅓ in head; caudal double truncate. Head 3¼ in length; depth 4⅖. D. X-I, 28; A. II, 9; scales 9-60-15. RETICULATUS, 13.

kk. Caudal and soft dorsal fins with conspicuous round black spots; back and sides covered with similar spots smaller than the pupil, larger than those on the fins; anal fin dusky. Body moderately elongate, compressed; snout rather long and acute, 3⅘ in head; eye small, 6 to 7 in head; maxillary 2⅓ in head; canines strong; gill-rakers shortish, 3 + 8; lower pharyngeals narrow, with seven or eight series of sharp teeth, those of the inner series enlarged; pectorals 1⅓ in ventrals, 2¼ in head. Head 3¼ in length; depth 4. D. X-I, 25 to 27. A. II, 10; scales 10-70 to 75-11. NEBULOSUS, 14.

jj. Coloration nearly uniform bluish gray above, silvery below; no distinct spots on body or fins.

m. Caudal fin somewhat lunate in the adult, the middle rays shortest, although more or less produced in young specimens; pectoral fin short, not reaching tips of ventrals; maxillary extending beyond pupil, 2⅓ in head; canine large, usually but one present; snout rather sharp, 4 in head; gill-rakers shortish, 4+7; pharyngeals narrow, their teeth small, cardiform, the inner ones somewhat enlarged; color, clear steel-blue above, without stripes or spots; silvery below; a narrow dusky shade along the sides below the lateral line; axil dusky; lower fins yellowish, with dusky shading; upper fins dark; second dorsal dark edged. Head 3¼ in length; depth 4⅓. D. X-I, 22 or 23; A. II, 10. Scales 12-75 (pores)-14, about 95 in a longitudinal series. PARVIPINNIS, 15.

mm. Caudal fin always double truncate or double concave, the middle rays somewhat produced.

n. Pectoral fins reaching nearly or quite to the tips of ventrals, their length more than half head.

o. Scales small (12–86–X), the number of pores in the lateral line about 70; head rather long, compressed and pointed; maxillary a little more than half head, reaching just past eye; lateral line becoming straight opposite the vent; body rather slender, compressed; eye large, 6 in head; premaxillaries in front, entirely below eye; canines small, two usually present; longest dorsal spine 2 in head; longest soft ray 2⅞; middle rays of caudal considerably produced, 1½ in head; anal spine rather small and stout; ventrals little more than 2 in head; pectorals 1⅞. Color bluish above, silvery below, upper parts and especially the middle of the sides punctate with dark points; upper fins dark, their margins dusky, lining of opercle black; inside of mouth bright yellow in life. Head 3½ in length; depth 4½. D. IX-I, 20; A. II, 8. Scales 12–66 (pores)–X; 86 rows of scales.

XANTHULUM, 16.

oo. Scales moderate (8–66–18), the pores in the lateral line about 63; head large, bluntish; the snout shorter than in *Cestreus stolzmanni*, the snout 4 to 4½ in head; eye 6¼ in head; maxillary nearly half head, reaching well past eye; body rather robust; lateral line becoming straight at a point well in advance of vent; dorsal spines slender, the longest 2½ in head; caudal double truncate, the middle rays longer than the head without snout; pectorals nearly reaching tips of ventrals, more than half length of head; second anal spine evident. Color white, somewhat bluish above. Head 3½ in length; depth 4. D. X-I, 21; A. II, 9; scales 8–63 (pores)–18; 66 series of scales .....ALBUS, 17.

nn. Pectoral fins short, reaching little past middle of ventrals, their length not more than half head; body elongate, somewhat compressed; mouth oblique; maxillary 2⅛ in head, extending to posterior margin of pupil; snout rather sharp, 4 in head; canines rather small; gill-rakers shortish, 4+7; body comparatively slender and elongate; scales rather large, all strongly ctenoid; lateral line becoming straight just before front of second dorsal; longest dorsal spines 2⅛ in head; soft dorsal slightly falcate, the first rays

about 2 in head; caudal large and broad, double truncate; ventrals 1⅔ in head. Color steel bluish above, lower parts silvery; no distinct markings. Head 3⅔ in length; depth 4⅓. D. IX-I, 21; A. II, 9; scales 10-60 (pores)-10.

STOLZMANNI, 18.

aa. Scales very small; the number of pores in the lateral line 70 to 90, and very much less than the number of transverse rows, which is from 85 to 150; teeth of upper jaw in a rather broad band, one to four of them usually more or less canine-like, the canines generally small,* and sometimes wholly disappearing with age; lateral teeth of lower jaw not much enlarged; gill-rakers usually small and short.†

p. Caudal fin lunate or subtruncate; scales not very small; head more or less distinctly conical, not flattened above; soft dorsal with 21 to 23 rays.

q. Soft dorsal and anal fins wholly scaleless.

r. Pectoral fin rather long, more than half head; flesh firm; scales of sides of head not silvery; head pointed, subconical, little compressed; profile rather steep; snout sharp, rather long, 3⅓ in head; maxillary extending beyond pupil; anteriorly on a level with the lower margin of the pupil, 2⅓ in head; canines small, becoming obsolete; pharyngeals long and slender, with four series of teeth, the inner series several times larger than the rest; gill-rakers short, 2+7; scales very small, those on head little imbedded and less silvery than in related species; caudal lunate, its middle rays less than half length of head; both anal spines evident, the second about half length of the rays; color bluish, little silvery; everywhere punctulate; young with three or four distinct dusky cross-bars; axil and fins dusky; a dusky blotch at base of pectoral, extending on whole inner face of the fin. Head 3⅓ in length, depth 4. D. X-I, 21 to 23; A. II, 9; scales 12-88-14 ..... NOBILIS, 19.

rr. Pectoral fins short, not more than half length of head; flesh rather soft; sides of head brightly silvery; head very regularly conical, pointed, tapering, scarcely compressed; snout very acute; 3⅓ in head; canines quite small, usually but one pres-

* Rather large in *Cestreus microlepidotus.*

† Not examined in *Cestreus microlepidotus,* of moderate length in *C. steindachneri.*

ent and this disappearing with age; eye small, 7½ in head; maxillary extending to behind pupil, 2⅔ in head; body slender; subfusiform, moderately compressed; gill-rakers very short, 3+6. Scales small, all cycloid, those on head imbedded and brightly silvery; highest dorsal spine 2½ in head; pectorals and ventrals about equal, 2 in head; caudal lunate. Color grayish above, with bright reflections; silvery below; lower part of tail golden; middle of sides with dark punctulations; inside of mouth deep orange-yellow; lining of opercle black; caudal fins dusky whitish, with more or less of dark edging; lower rays of caudal yellowish; fins otherwise translucent, unmarked; axil light brownish. Head 3⅓ in length; depth 4⅔. D. IX–I, 21; A. II, 10. Scales 17–90–15; about 80 distinct pores in the lateral line.

PHOXOCEPHALUS, 20.

qq. Soft dorsal fin with its lower portion covered with small, caducous scales. Body compressed; head conic, more compressed than in *Cestreus phoxocephalus;* eye moderate, 5 to 6 in head; maxillary reaching nearly to posterior margin of orbit, 2½ in head; lower jaw much projecting; upper teeth mostly biserial; canines small, both of them present; lateral teeth of lower jaw small; gill-rakers short and slender, 2 + 7; scales small, chiefly cycloid, those on sides of head bright silvery; lateral line becoming straight above front of anal; caudal fin subtruncate; pectoral fins moderate, 2 in head; caudal weakly double truncate; head 3½ in length; depth 4⅓; D. IX–I, 21 to 23; A. II, 10; scales 13–90–13, about 80 distinct pores.. LEIARCHUS, 21.

pp. Caudal fin rhombic or S-shaped, the middle rays produced, the upper lobe usually pointed; soft dorsal with 23 to 28 rays.

s. Soft dorsal entirely naked; anal with a few scales; body long and low, spindle-shaped, the head slender, subterete, and depressed above (suggesting the form of *Elacate*); profile from snout to dorsal weakly concave; snout long, rather pointed, 4 in head; mouth large, little oblique, the lower jaw strongly projecting, the maxillary 2⅔ in head; canine teeth 2, short and thick; lateral teeth close-set, of moderate size; eye small, 8½

in head; interorbital space flattish, 4⅔ in head; gill-rakers rather short, X+8, the longest about half eye; scales on head very small and silvery; caudal S-shaped, the middle rays longest; pectoral 1⅓ in head. Color plain, rather dusky, silvery below; inside of gill cavity dusky; head 3½ in length; depth 5 to 5½; D. X-I, 28; A. I, 8. Scales 80 (pores), 125 to 130 cross-series.

VIRESCENS, 22.

ss. Soft dorsal and anal fins densely scaly throughout.

t. Sides of lower jaw without canines, the teeth all comparatively small.

u. [Scales extremely small, about 150 in a longitudinal series above the lateral line, 40 in a vertical series; snout 4 in head; eye large, 4⅔; interorbital area 5½ in head; maxillary extending beyond eye; lower jaw projecting; upper jaw with 3 series of teeth; canines rather strong; lateral teeth of lower jaw not canine-like; dorsal spines slender, the longest 2½ in head; caudal fin S-shaped; pectoral slightly longer than ventral, which is slightly more than half head; lateral line becoming straight above anal; color greenish, silvery below; head 3⅔ in length; depth 4¼; D. XI-I, 23; A. II, 9; scales 155 to 160; 70 pores in the lateral line.] (*Steindachner.*)

MICROLEPIDOTUS, 23.

uu. Scales not very small, about 85 to 90 in a longitudinal series above the lateral line; body rather robust, the head small and tapering; profile of head nearly straight and rapidly descending; mouth rather small, oblique, the maxillary 2⅓ in head; chin prominent; snout short, rather pointed, 6 in head; eye large, 5½ in head; teeth all comparatively small, the bands rather broad; no distinct canines in upper jaw, the usual canine scarcely longer than the teeth around it; lateral teeth of lower jaw small; scales small, those of lateral line little enlarged; lateral line less conspicuous than in *C. virescens* or *C. bairdi*, becoming straight under front of soft dorsal; gill-rakers rather long, 4+9, the longest ⅔ eye; pectorals quite short, shorter than ventrals, 2½ in head, their tips not reaching tips of ventrals; caudal rhombic, the upper angle pointed; color

silvery, darker above; faint streaks along the rows of scales on the back; head 3⅔ in length; depth 4; D. X–I, 21 to 23; A. I, 9; scales 70 (pores); about 86 series.....STEINDACHNERI, 24.

tt. Sides of lower jaw each with 4 or 5 moderate canines (the lateral teeth being larger than in any of the other species, much as in *Isopisthus*); canines of upper jaw strong; body slender, not specially compressed; head rather slender, little compressed; the upper profile straight; the interorbital area moderate (as broad as eye) and little convex; eye large, 4⅓ in head; snout short, sharp, 4⅓ in head; mouth moderate, not very oblique, the maxillary 2¼ in head and extending to beyond pupil; preorbital very narrow, not as broad as pupil; gill-rakers slender, very short and small, X+6, the the longest half as long as pupil; dorsal spines slender, the longest 2¼ in head; soft dorsal and anal densely scaled; caudal fin rhombic; pectoral fins longer than ventrals, 1⅓ in head; scales of lateral line enlarged, somewhat covered by smaller scales; lateral line becoming straight just before anal; color plain silvery, darker above; head 3⅔; depth 4⅓; D. X–I, 25; A. I, 10; scales 70 pores; 150 series .....BAIRDI, 25.

5. CESTREUS PRÆDATORIUS.

(BOCCONE.)

Cestreus prædatorius Jordan & Gilbert, sp. nov. (Panama).

Habitat.—Pacific coast of tropical America, Panama.

This strongly marked species was obtained by Dr. Gilbert at Panama in 1883, and by us described in MS. at the time. Our specimens were destroyed by fire, and the species has remained unnoticed. The types of the present description are three specimens, the largest nearly 2 feet in length, obtained by Professor Agassiz at Panama. These are numbered 10901 and 10902 on the register of the Museum of Comparative Zoology. The species is known to the Panama fishermen as "Boccone."

6. CESTREUS ACOUPA.

Cheilodipterus acoupa Lacépède, Hist. Nat. Poiss., iii, 546, 1802 (Cayenne).
Cynoscion acoupa Jordan, Proc. U. S. Nat. Mus., 1886, 588 (name only).
Lutjanus cayennensis Lacépède, Hist. Nat. Poiss., iv, 196 and 245, 1802 (Cayenne)
Otolithus cayennensis Günther, Cat. Fish. Brit. Mus., ii, 309, 1860 (West Indies)

Otolithus rhomboidalis Cuvier, Règne Animal, ed. 2, 1829 (based on *Lutjanus cayennensis* Lacépède).

Otolithus toeroe Cuv. & Val., Hist. Nat. Poiss., v, 72, plate 103, 1830, Cayenne (same type as *L. cayennensis* Lac., Surinam, Brazil, Lake Maracaibo), *ibid.*, ix, 478 (Cayenne).

Apseudobranchus toeroe Gill, Proc. Acad. Nat. Sci. Phila., 1862, 18 (name only).

Habitat.—Surinam, Brazil.

There seems to be no reason to doubt that this is the *Otolithus toeroe* of Cuvier & Valenciennes, and this *toeroe* is based on the same typical examples as the prior names *rhomboidalis* and *cayennensis*.

As to the still earlier name *acoupa*, it seems to us that Cuvier and Valenciennes are right in referring it to a species of this group, as the caudal is rounded, the lower jaw projecting, the teeth unequal, and the second dorsal with 18 rays. As, according to the statements of these authors, the fish called "Toeroe" by the Dutch in Guiana is known as "Acoupa" by the Portuguese, this identification is highly probable. The specific name *acoupa* should then supersede *cayennensis*.

Our description of this species is taken chiefly from a specimen 14 inches long from Cachiura, Brazil (10892, M. C. Z.). Numerous other specimens are in the museum from Surinam, San Matheo, Curuça, Cachiura, and Rio Janeiro.

The statement is made by Dr. Günther that this species lacks pseudobranchiæ, and on this statement Dr. Gill has proposed for it the generic name of *Apseudobranchus*.

It is true in this as in other species of *Cestreus* that the pseudobranchiæ become smaller with age. Usually they become (in old specimens) obsolete on one side while they are perfectly evident on the other. This is the case with all the old specimens of this species which we have examined, and it is true also in several others of the larger species. The genus *Apseudobranchus* is therefore strictly synonymous with *Cestreus* and *Cynoscion*.

7. CESTREUS SQUAMIPINNIS.

Otolithus squamipinnis Günther, Fishes Central America, 387 and 429, 1869 (Panama). Steindachner, Neue und Seltene Fische k. k. Zool. Mus. Wien, 37, 1879 (Panama).

Cynoscion squamipinne Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 232 (La Union, San Salvador). Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 320 (La Union).

Habitat.—Pacific coast of tropical America.

This species is known from a few specimens taken at La Union and Panama. Specimens obtained by Prof. Alexander Agassiz at Panama are in the museum at Cambridge.

8. CESTREUS OTHONOPTERUS.

Cynoscion squamipinnis Streets, Bull. U. S. Nat. Mus., vii, 49, 1877 (off San Ygnacio River, Gulf of California) (not *Otolithus squamipinnis* Günther).

Cynoscion othonopterum Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 274 (Punta San Felipe, Mexico). Jordan & Gilbert, Bull. U. S. Fish Com., 1881. 320 (copied).

Habitat.—Gulf of California.

This species is known to us from its type, a large specimen taken in the Gulf of California. The specimen—also from the Gulf—recorded by Dr. Streets under the name *squamipinnis*, seems to belong to *C. othonopterus*. The species is closely related to *C. squamipinnis*, but we believe it to be distinct.

9. CESTREUS STRIATUS.

Guatucupa Marcgrave, Hist. Brazil, 1648.

Otolithus striatus Cuvier, Règne Animal, ed. 2, 1829 (based on *Guatucupa* of Marcgrave).

Otolithus guatucupa Cuv. & Val., Hist. Nat. Poiss., v, 75, plate 104 (Montevideo). Günther, Cat. Fish. Brit. Mus., ii, 309 (copied). Günther, Shore Fishes, 13, 1880 (mouth of the Rio de la Plata). Jenyns, Zool. Beagle, Fishes, 41, 1842 (Maldonado Bay).

Habitat.—Coasts of Brazil and Argentine Republic.

This strongly marked species much resembles the northern weakfish in coloration, but it is readily distinguished by the small number of its dorsal rays.

Our description is mainly taken from a specimen 18 inches long from Buenos Ayres (434, M. C. Z.). Other specimens are in the museum from Montevideo, Maldonado, and Buenos Ayres.

10. CESTREUS OBLIQUATUS.

Otolithus obliquatus (Valenciennes MSS.) Sauvage, Bull. Soc. Philom. Paris, iii, 209, 1879 (Martinique).

Cynoscion obliquatum Jordan, Proc. U. S. Nat. Mus., 1886, 588 (name only).

Habitat.—Martinique.

This species is unknown to us. The increased number of dorsal rays leads us to place it in the neighborhood of *Cestreus nothus*, with which species the scanty description agrees in most respects. *C. nothus* has, however, not been recorded from the West Indies.

The following is the account published by Dr. Sauvage:

"Un *Otolithe* étiqueté dans la collection du Muséum *Otolithus obliquatus* de la main de Valenciennes, n'est pas décrit dans l'Histoire des Poissons. Voisine de l'*Otolithus thalassinus*, Holbr., cette espèce en diffère par le moins grand nombre d'écailles à la ligne latérale et l'œil plus grand; la forme de la caudale la sépare de l'*Otolithus nothus*, Holbr., des mêmes parages. Voici la diagnose des deux exemplaires recueillis à la Martinique par M. Plée:

"D. X, 28; A. I, 11; L. lat. 60.

"Hauteur du corps contenue cinq fois un tiers, longueur de la tête trois fois et trois quarts dans la longueur totale du corps; museau un peu plus long que le diamètre de l'œil, qui est contenue cinq fois dans la longueur de la tête; mâchoire inférieure plus longue que la supérieure; des canines assez fortes à la mâchoire supérieure seulement; maxillaire arrivant au niveau du tiers postérieur de l'œil; angle du préopercule arrondi et un peu rejeté en arrière; dentelures du préopercule bien visibles, plus fortes à l'angle. Caudale tronquée; pectorales de même longueur que les ventrales. Ligne latérale assez incurvée vers le milieu de sa longueur. Coloration uniforme. Longueur du corps 0,200."

11. CESTREUS NOTHUS.

(BASTARD SEA TROUT.)

Otolithus nothus Holbrook, Ichthyol. S. Carolina, 134, plate 19, fig. 1, 1860 (South Carolina). Günther, Cat. Fish. Brit. Mus., ii, 308, 1860 (Jamaica).

Cynoscion nothus Goode & Bean, Proc. U. S. Nat. Mus., 1879, 131 (Pensacola). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 607 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 580, 1882. Goode, Proc. U. S. Nat. Mus., 1884, 212 (St. John's River, Fla.).

Habitat.—South Atlantic and Gulf coasts of United States.

This species is rather rare at Charleston and elsewhere along our Southern coast.

It is a very well marked species, differing in numerous respects from the others, *regalis*, *thalassinus*, *nebulosus*, found in the same waters. The specimens examined by us are from Charleston.

12. CESTREUS REGALIS.

(THE WEAK-FISH, OR SQUETEAGUE; "SEA TROUT.")

[Plate I.]

a. Var. *regalis.*

Johnius regalis Bloch & Schneider, Syst. Ichthyol., 75, 1801. Holbrook, Ichthyol. S. Carolina, 127, plate 18, fig. 1 (South Carolina).

Otolithus regalis Cuv. & Val., Hist. Nat. Poiss., v, 67 (New York, New Orleans). Richardson, Faun. Bor. Amer. Fish., 68, 1836. Storer, Report Fishes Massachusetts, 33, 1839 ("no longer found on the coast"). Storer, Hist. Fish. Mass., 122, plate 9, fig. 1 (Provincetown). Ayres, Fishes of Brookhaven, L. I., 259, 1842. De Kay, New York Fauna, Fishes, 71, plate 8, fig. 24, 1842 (New York). Storer, Syn. Fish. North Am., 118, 1846 (Massachusetts). Günther, Cat. Fish. Brit. Mus., ii, 307, 1860.

Cynoscion regale Gill, Proc. Acad. Nat. Sci. Phila., 1862, 18. Uhler & Lugger, Fishes of Maryland, 98, 1876 (Chesapeake Bay). Goode & Bean, Fishes of Essex County and Massachusetts Bay, 17, 1879 (Milk Island, Cape Ann). Bean, Proc. U. S. Nat. Mus., 1880, 90 (Norfolk, Va.; Wood's Holl, Mass.). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 607 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 581, 1882. Goode, Hist. Aquat. Anim., 362, plate 120, 1884 (Wood's Holl, Mass.).

Roccus comes Mitchill, Report in part Fishes New York, 26, 1814 (New York).

Labrus squeteague Mitchill, Trans. Lit. and Phil. Soc. New York, 396, plate 2, fig. 1, 1815 (New York).

b. Var. *thalassinus.*

Otolithus thalassinus Holbrook, Ichth. South Carolina, 132, plate 18, fig. 2 (South Carolina). Günther, Cat. Fish. Brit. Mus., ii, 308, 1860 (Gulf of Mexico).

Cynoscion thalassinus Jordan & Gilbert, Syn. Fish. North America, 581, 1882 (copied).

Habitat.—Atlantic and Gulf coast of the United States; var. *thalassinus* from Virginia to Louisiana.

The Weak-fish is one of the most valuable food-fishes of our Atlantic coast. It is caught in large numbers, and its flesh is very excellent for the table. Its flesh, like that of most species of the genus, is very tender and easily torn, hence the common name of Weak-fish.

On the Carolina coast it has received the very inappropriate name of "Sea Trout."

Specimens of the typical *regalis* are in the museum at Cambridge from various localities on the Atlantic coast, and from Mobile and "Florida Keys," on the Gulf coast. Its occurrence in the Gulf must be infrequent, as no specimens have been obtained by Dr. Jordan at Galveston, New Orleans, Pensacola, Cedar Keys, or Key West.

The form called *Otolithus thalassinus* by Holbrook has not been recognized by later collectors, and it has usually been considered identical with *C. regalis*.

A specimen lately sent to us by Mr. Silas Stearns from Pensacola seems to answer to Holbrook's description, and we have found two similar specimens in the museum at Cambridge, one (No. 438, M. C. Z.) from Pass Christian, Mississippi, the other from Hampton Roads, Virginia. The only differential characters which we have noted are given in the analysis of species. As *C. regalis* is subject to considerable variation, we have regarded *C. thalassinus* as an extreme form or variety rather than as a distinct species. It may, perhaps, be found to inhabit a different depth of water than that which the common Weak-fish frequents.

The following is a description of our specimen from Pensacola: Depth, $4\frac{2}{3}$ in length; head, $3\frac{1}{2}$; D. X – I, 24; A. II, 11; lateral line, 56; length, 12 inches.

Body compressed; not especially elevated; of about the same depth everywhere betwen the ventrals and the vent; caudal peduncle rather long and stout.

Head pointed, subconical; profile straight, scarcely descending; eye rather large, $1\frac{2}{3}$ in snout, $5\frac{1}{3}$ in head; mouth large, oblique; premaxillary anteriorly on a level with the upper margin of the pupil; maxillary extending beyond the pupil; lower jaw strongly projecting, its tip entering the profile.

Teeth of the lower jaw in two series, anteriorly in a single series; those in front small and subequal; the inner ones recurved; those of the side much larger. Teeth of the upper jaw in two series; those of the outer series scarcely decreasing in size towards the angle; those of the inner series becoming minute on the sides; canines moderate, $\frac{1}{3}$ the diameter of the eye.

Preopercle with a striated and dentated dermal margin; gill-rakers slender; those near the angle half the length of the eye.

Lower pharyngeals weak and long, grooved below; teeth at the angle several times as large as the rest, all more or less recurved; the anterior ones specially so; teeth of the upper pharyngeals unequal.

First dorsal spine inserted above the end of the first fourth of the ventrals; the spines slender; the third highest, reaching to the ninth spine, $2\frac{2}{3}$ in head; second anal spine about twice as large as the first, $2\frac{2}{3}$ in length of eye; anal rays $2\frac{2}{3}$ in head; pectorals broken; ventrals

slightly less than 2 in head; soft dorsal apparently not scaly, but so mutilated that we cannot be certain of this.

Scales very weakly ctenoid; lateral line somewhat wavy anteriorly, becoming straight under the fourth or fifth dorsal ray.

Color, brownish above, lighter below; middle of sides with many dark dots; a dark blotch on upper corners of opercle and cheek; axil and inner margin of pectoral, black; spinous dorsal, black; soft dorsal and caudal, dusky; the rest of the fins pale.

The specimen from Pass Christian has no scales on dorsal or anal at present, but the marks showing their former presence on the basal parts of the fin are evident. Gill-rakers, X+8, the longest $\frac{2}{3}$ eye; snout $3\frac{3}{4}$ in head; D. X—I, 25; A. I, 10.

In the specimen from Hampton Roads the gill-rakers are X+9; snout $3\frac{4}{5}$ in head; D. X—I, 25. The coloration is essentially as in *regalis*, but in all these specimens it is more silvery, the dark markings less distinct.

13. CESTREUS RETICULATUS.

Otolithus reticulatus Günther, Proc. Zool. Soc. London, 1864, 149 (San José de Guatemala, Chiapam). Günther, Fishes Central America, 387, 388, and 430, 1869 (San José, Chiapam).

Cynoscion reticulatum Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 232 (Acapulco, Mexico). Jordan & Gilbert, Bull. U. S. Nat. Mus., 1881, 319 (Mazatlan; Panama).

Habitat.—Pacific coast of tropical America, Mazatlan to Panama.

This is a common food-fish of the west coast of Mexico. It considerably resembles *Cestreus nebulosus*, and is similar in size, habits, and value to the latter.

14. CESTREUS NEBULOSUS.

(The Spotted Weak-fish, or Spotted "Sea Trout.")

[Plate II.]

Labrus squeteague var. *maculatus* Mitchill, Trans. Lit. & Phil. Soc., 396, 1815 (New York) (not *Labrus maculatus* Bloch).

Cynoscion maculatum Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 285 (Pensacola, Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 607 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 581, 1883. Bean, Internat. Fishery Exhib. Berlin, 55, 1883 (Pensacola, Florida). Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 233 (Cedar Key, Florida). Goode, Hist. Aquat. Anim., 362, plate 120, 1884 (Norfolk, Va.).

Otolithus nebulosus Cuv. & Val., Hist. Nat. Poiss., v, 79, 1830 (locality unknown). Jordan, Proc. U. S. Nat. Mus., 1886, 540 (note on type of Cuvier & Valenciennes).

Otolithus carolinensis Cuv. & Val., Hist. Nat. Poiss., ix, 475, 1833 (South Carolina). DeKay, New York Fauna, Fishes, 72, 1842 (New York). Storer, Syn. Fish. North Am., 318, 1846 (copied). Holbrook, "Ichthyol. S. Carolina, 133, pl. 19, fig. 2" (S. Carolina). Günther, Cat. Fish. Brit. Mus., ii, 306, 1860 (New York, Lake Pontchartrain).

Cestreus carolinensis Gronow, Cat. Fish., ed. Gray, 49, 1854 (Carolina).

Cynoscion carolinensis Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 377 (Beaufort). Goode, Proc. U. S. Nat. Mus., 1879, 112 (St. John's River, Florida). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 131 (Pensacola). Bean, Proc. U. S. Nat. Mus., 1880, 92 (St. John's River, Florida; Norfolk, Virginia; Beaufort, N. C.; Fort Macon, N. C.).

Otolithus drummondi Richardson, Faun. Bor. Am. Fish., 70, 1836 (New Orleans). Storer, Syn. Fish. North Am., 318, 1846 (copied). Girard, U. S. & Mex. Bound. Survey, 12, plate vi, 1859 (New Orleans, Brazos Santiago, Indianola). Günther, Cat. Fish. Brit. Mus., ii, 307, 1860 (copied).

Habitat.—South Atlantic and Gulf Coast of the United States; New York to Texas.

This excellent food-fish is everywhere common on our Southern coast. The northernmost locality from which we have examined specimens is Beesley's Point, New Jersey.

The oldest specific name of the species is that of *Labrus squeteague* var. *maculatus* Mitchill. This name seems, however, to be ineligible, as there was already a *Labrus maculatus* Bloch. Next in order comes the *Otolithus nebulosus* of Cuvier & Valenciennes. This name apparently is the one which should be retained, although the later name *carolinensis* has been generally in use.

15. CESTREUS PARVIPINNIS.

(CALIFORNIA "BLUE-FISH.")

Cynoscion parvipinnis Ayres, Proc. Cal. Ac. Nat. Sci., 1861, 156 (coast of Lower California).

Cynoscion parvipinne Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (San Pedro, San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 48 (San Pedro southward). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 274 (Guaymas, Mexico). Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 320 (San Pedro, San Diego, Gulf of California). Jordan & Gilbert, Syn. Fish. North Am., 580, 1882. Rosa Smith, Proc. U. S. Nat. Mus., 1883, 234 (Todos Santos Bay, Lower California). Rosa Smith, West American Scientist, 1885, 47 (San Diego).

Otolithus magdalenæ Steindachner, Ichthyol. Beit., iii, 1875 (Magdalena Bay, Lower California).

Habitat.—Coasts of Lower California; Guaymas to the Santa Barbara Islands.

This species is common along the coasts of Southern California, as far north as San Pedro. It is an excellent food-fish, not inferior to its relative, the weak-fish of the Atlantic coast. As in the case of the latter species, the flesh of *Cestreus parvipinnis* is soft, and the fish does not bear transportation well.

Types of *Otolithus magdalenæ*, from Magdalena Bay, are preserved in the museum at Cambridge.

16. CESTREUS XANTHULUM.

Cynoscion xanthulum Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 460 (Mazatlan). Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 319 (Mazatlan). Jordan & Gilbert, Bull. U. S. Nat. Mus., 1882, 107 (Mazatlan).

Habitat.—Pacific coast of Mexico; Mazatlan.

This species is not rare about Mazatlan. The specific name (ξανθός; οὖλον) is intended to allude to the yellow color of its lips and gums. It is closely related to *Cestreus albus*, a species which seems to replace it farther south.

17. CESTREUS ALBUS.

Otolithus albus Günther, Proc. Zool. Soc. Lond., 1864, 149 (Chiapam; Panama). Günther, Fishes Central America, 387 and 429, 1869 (Chiapam). Steindachner, Neue u. Seltene Fische k. k. Zool. Mus. Wien, 36, 1879 (Panama).

Cynoscion album Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 319 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This species is not rare at Panama. Like the others of the genus, it is a food-fish of importance. Specimens from Panama are in the museum at Cambridge.

18. CESTREUS STOLZMANNI.

Otolithus stolzmanni Steindachner, Neue u. Seltene Fische k. k. Zool. Mus. Wien, 1879, 35, plate ii, fig. 1 (Tumbez, Peru).

Cynoscion stolzmanni Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 320 (Panama).

Habitat.—Pacific coast of tropical America; Panama to Peru.

This species is not rare about Panama, where specimens were obtained by Professor Gilbert. A specimen collected by Prof. Alexander Agassiz, at Panama, is in the museum at Cambridge.

19. CESTREUS NOBILIS.

(The "White Sea Bass" of California.)

Johnius nobilis Ayres, Proc. Cal. Acad. Nat. Sci., 1860, 78 (San Francisco).

Atractoscion nobilis Gill, Proc. Acad. Nat. Sci. Phila. 1862, 17 (name only). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 48 (San Francisco southward). Jordan & Gilbert, Syn. Fish. North Am., 579 and 933, 1882.

Cynoscion nobilis Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (San Francisco, Monterey Bay, Santa Barbara, San Pedro, San Diego). Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 320 (copied). Rosa Smith, West American Scientist, 1885, 47 (San Diego).

Otolithus californiensis Steindachner, Ichthyol. Beitr., iii, 31, 1875 (Lower California).

Habitat.—Coast of California, north to San Francisco.

This species is one of the largest in size of the Sciænoid fishes, reaching a weight of 60 to 70 pounds. Its flesh is more firm than that of most of the other species of *Cestreus*, but its quality is scarcely less delicate than that of the weak-fish.

The young fishes are somewhat different in color from the adult, being marked by two or three distinct dusky cross-bars on the back and sides. These young fishes are often taken by fishermen to be a distinct species, and called sea-trout. Such specimens have been described by Dr. Steindachner under the name of *Otolithus californiensis*. Typical examples of this nominal species, from San Diego, are in the museum at Cambridge.

20. CESTREUS PHOXOCEPHALUS.

Cynoscion phoxocephalum Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 318 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This species is not uncommon about Panama. It somewhat resembles *Cestreus nobilis*, but it is not known to reach the large size of the latter. The tapering form of the head reaches an extreme in this species, and the silvery luster of the scales is brighter than in any other.

A specimen of this species from Panama is in the museum at Cambridge.

21. CESTREUS LEIARCHUS.

Otolithus leiarchus Cuv. & Val., Hist. Nat. Poiss., v, 78, 1830 (Brazil; Cayenne). Günther, Cat. Fish. Brit. Mus., ii, 308, 1860 (Bahia). Jordan, Proc. U. S. Nat. Mus., 1886, 540 (note on type of Cuvier & Valenciennes).

Habitat.—Coasts of Brazil and Guiana.

This species is known to us from the examination of the type, a dried skin of a young example in the museum at Paris. The absence of the anal spine ("*leiarchus*") is due to its being covered by varnish.

The description given in our analysis is taken from an example (34500, U. S. Nat. Mus.) from unknown locality (Brevoort Coll.) and from specimens from Rio Janeiro, Porto Alegre, Bahia, and Santos, in the museum at Cambridge. *C. leiarchus* is closely related to *Cestreus phoxocephalus*, but it more strongly resembles the typical *Cestrei* than the latter species does.

22. CESTREUS VIRESCENS.

Otolithus virescens Cuv. & Val., Hist. Nat. Poiss., v, 72, 1830 (Surinam).

Cynoscion virescens Jordan, Proc. U. S. Nat. Mus., 1886, 588 (name only).

Otolithus microps Steindachner, Neue Fisch-Arten k. k. Museen Wien, Stuttgart, und Warschau, 38, plate viii, fig. 2, 1879 (Porto Alegre, Brazil).

Habitat.—Coasts of Guiana and Brazil.

We know this species from a specimen (4584, M. C. Z.) 18 inches long from Victoria, Brazil.

This specimen agrees well with Steindachner's description of *Otolithus microps*. The scanty account given by Cuvier and Valenciennes of *Otolithus virescens* agrees, so far as it goes, with *O. microps*, and with no other South American species known. We have been unable to find the type of *virescens* in the museum at Paris. There seems to be little reason for doubting the identity of the two. We have therefore taken the older name instead of *microps*.

23. CESTREUS MICROLEPIDOTUS.

Otolithus microlepidotus Cuv. & Val., Hist. Nat. Poiss., v, 79, 1830 (Surinam). Günther, Cat. Fish. Brit. Mus., ii, 311, 1860 (copied). Steindachner, Neue und Seltene Fische k. k. Zool. Mus. Wien, 39, 1879 (Maranhão).

Cynoscion microlepidotum Jordan, Proc. U. S. Nat. Mus., 1886, 588 (name only).

Habitat.—Coasts of Surinam and Brazil.

This species is known from the original discription of Cuvier and Valenciennes and from a more detailed account given by Dr. Steindachner. It would appear to be well distinguished from all the others mentioned in this paper.

24. CESTREUS STEINDACHNERI.

Cestreus steindachneri Jordan, sp. nov. (Curuça, Brazil).

Habitat.—Coasts of Brazil.

The type of this species is a specimen (10922, M. C. Z.) collected at Curuça by Professor Louis Agassiz. We have taken pleasure in naming the species for our friend, Dr. Franz Steindachner, of Vienna, who has contributed more than any one else to our knowledge of the fishes of South America.

Cestreus steindachneri seems to be allied to *C. microlepidotus*, but it is readily distinguished from that species by numerous characters. It somewhat resembles *C. acoupa*, but its scales are not half as large as in that species.

25. CESTREUS BAIRDI.

Otolithus (?) *bairdi* Steindachner, Neue Fisch-Arten k. k. Museen Wien, Stuttgart, und Warschau, 40, plate i, fig. 2, 1879 (Santos, Brazil).

Habitat.—Coast of Brazil.

We have examined a single specimen of *Cestreus bairdi*, a young example (10887, M. C. Z.) 9 inches long, from Pará.

This species has almost exactly the dentition of the species of *Archoscion*. It cannot, however, be referred to that genus, as it has the fins as in the ordinary species of *Cestreus*. The difference in the dentition is one of degree only, the lateral teeth being a little larger and more unequal than usual, and cannot be used to separate this species from the genus *Cestreus*.

Genus IV.—ANCYLODON.

Ancylodon Cuvier, Règne Animal, ed. 1, 1817 (*jaculidens* = *ancylodon*).

TYPE: *Lonchurus ancylodon* Bloch & Schneider.

This genus contains a single species, remarkable for the large size and peculiar form of its canine teeth.

ANALYSIS OF SPECIES OF ANCYLODON.

a. Body oblong, moderately compressed, the general form about as usual in *Cestreus*; mouth oblique, the lower jaw projecting; maxillary moderate, 2⅓ in head; snout rather pointed, 4¼ in head; preorbital narrow; eye 6⅓ in head; large canine of upper jaw very long, lance-shaped, *i. e.*, widened toward the tip and then abruptly pointed; about two canines in front of lower jaw on each side, also lance-shaped, but much smaller; outer teeth of upper jaw enlarged and showing something of the same form; enlarged lateral teeth of lower jaw compressed; gill-rakers moderate, slender, 3 + 8, the longest ⅔ eye; caudal fin rhombic; spinous dorsal very weak; soft dorsal and anal scaly; pectoral 1⅔ in head; lateral line becoming straight before vent; color bluish above, silvery below; caudal lobe darker; head 3¼ in length; depth 4; D. IX-I, 28; A. II, 10; scales 75 (pores), 85 rows.

26. ANCYLODON ANCYLODON.

Lonchurus ancylodon Bloch & Schneider, Syst. Ichth., 102, plate 25, 1801 (Surinam).
Ancylodon jaculidens Cuv. & Val., Hist. Nat. Poiss., v, 81, 1830 (Cayenne). Günther, Cat. Fish. Brit. Mus., ii, 311, 1860 (Surinam; West Indies). Jordan & Gilbert, Bull. U. S. Nat. Mus., 1882, 111 (Panama).
Ancylodon atricauda Günther, Shore Fishes of the Challenger Exp., 1880, 12 (Mouth of Rio de la Plata).

Habitat.—Both coasts of tropical America; Surinam; Panama.

We have not been able to compare any specimens of this species in good condition, from Surinam, with specimens from Panama. The original types in the museum at Paris are in poor condition, but we did not see, when examining them, any characters by which we could separate them from the specimens collected by Professor Gilbert at Panama.

Our description is taken chiefly from a specimen in the museum at Cambridge from Rio Grande do Sul. Others from Guiana, Montevideo, and Rio Janeiro are in the same collection.

The specimen described by Dr. Günther as *Ancylodon, atricauda* differs from our account only in having the head 3 in length and 31 rays in the soft dorsal. It is probably identical with *A. ancylodon.*

Genus V.—NEBRIS.

Nebris Cuvier & Valenciennes, Hist. Nat. Poiss., v, 149, 1830 (*microps*).

TYPE: *Nebris microps* Cuv. & Val.

This genus is one of the most peculiar in the family. The cavernous structure of the head reaches in this genus its extreme of development, the head being more spongy to the touch than in *Stelliferus, Collichthys,* or *Pachypops.* But one species is known.

We retain the name *Nebris,* notwithstanding the prior *Nebria,* as we regard the two names as sufficiently distinct. The number of vertebræ in *Nebris* is 10 + 14. The genus, therefore, belongs to the *Sciæninæ* and not to the *Otolithinæ.*

ANALYSIS OF SPECIES OF NEBRIS.

a. Body plump, anteriorly tapering to the slender caudal peduncle; profile straight head broad, heavy, extremely spongy above, eye minute, 9½ in head, 2½ in snout, 4 in interorbital area; 1½ in width of maxillary, which is very broad; mouth very large, oblique; lower jaw projecting, premaxillary anteriorly on a level with the middle of the eye; maxillary extending to below posterior margin of orbit, 2½ in head; teeth all minute, those of the lower jaw in a single series; those in upper jaw in a band which widens backwards; tongue large and thick; head entirely scaly; margin of the preopercle indistinct, with a very wide membranous edge, which is nearly covered with scales; gill-rakers long and slender, 5 + 15; scales small, cycloid; lateral line little arched; the bases, at least of all the soft fins, densely covered with small scales; dorsal spines feeble, shorter than the dorsal rays; caudal lanceolate; pectorals 1½ in head; ventrals 1½; color silvery, darker above; pectorals dusky on their inner margin; head 3 in length; depth 4½. D. VIII-I, 31; A. II-13. Scales 18-50 (pores)-18 ..... MICROPS, 27.

27. NEBRIS MICROPS.

Nebris microps Cuv. & Val., Hist. Nat. Poiss., v, 149, plate 112, 1830 (Surinam). Günther, Cat. Fish, Brit. Mus., ii, 316, 1860 (copied). Steindachner, Ichthyol. Beitr., iv, 10, 1875 (Bay of Panama). Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 111 (Panama).

Habitat.—Both coasts of Central America, Surinam, Panama.

The specimen from which our description is taken was obtained by Professor Gilbert at Panama, where the species is not rare.

The original type of the species, from Surinam, has been examined by us, but it is not in very good condition, and no characters distinguishing it from the Panama form were noted. No direct comparison of Atlantic and Pacific specimens has yet been made. Numerous specimens from Panama are in the museum at Cambridge.

Genus VI.—LARIMUS.

Larimus Cuvier & Valenciennes, Hist. Nat. Poiss., v, 145, 1830 (*breviceps*).
Amblyscion Gill, Proc. Acad. Nat. Sci. Phila., 1863, 165 (*argenteus*).
Monosira Poey, Anales de Hist. Nat. Esp., 1881, 326 (*stahli*).

TYPE: *Larimus breviceps* Cuvier & Valenciennes.

This genus seems to be a very natural one, and well worthy of distinction, although it is very closely related to *Bairdiella* and other more typical Sciænoids. The short snout and oblique mouth reach an extreme in *Larimus argenteus*, but no definite generic line can be drawn between that species and the others. Besides the following, one other species, *Larimus peli* Bleeker, is known, from Guinea. The species called *Larimus auritus* (*Brachydeuterus auritus* Gill) is not a Sciænoid fish at all, but allied to *Pomadasis*.

ANALYSIS OF SPECIES OF LARIMUS.

a. Dorsal with 27 to 30 soft rays; mouth extremely oblique or vertical.

b. Mouth large, the cleft vertical; profile slightly convex, nearly horizontal; no traces of dark stripes along the rows of scales; snout very short, 5½ in head; eye large, 4⅔; profile slightly convex, little oblique; snout very short, 5½ in head; maxillary not extending beyond anterior margin of pupil, 2 in head; teeth all minute; preopercle with a striated and ciliated membranaceous border; gill-rakers ⅔ length of eye, 7+16; scales on head all cycloid; highest dorsal spine 2⅓ in head; ventrals a little shorter than pectorals, which are about as long as head; color plumbeous above, golden below and on sides; a black axillary spot; a large steel-blue opercular spot. Head 3⅓ in length; depth 3⅓. D. X-I, 27; A. II, 6. Scales 6–49–6 ..... ARGENTEUS, 28.

bb. Mouth not quite vertical; upper parts with dark streaks along the rows of scales; profile slightly convex, a little oblique; snout very short, 6 in head; eye 4; maxillary extending to below front of orbit, 2 in head; teeth in lower jaw uniserial, in upper uniserial in front, in about two series laterally; preopercle with a ciliated, membranous border; gill-rakers slender and long, 10+21; dorsal spines weak, the highest 1⅔ in head; ventrals a little shorter than pectorals, which are as long as head; scales large, those on head chiefly cycloid; color plumbeous-silvery, with more or less conspicuous oblique blackish streaks

following the rows of scales above; a black axillary spot; region about pseudobranchiæ dusky. Head 3⅓; depth 3. D. X-I, 28; A. II, 6. Scales 6-48-7 ..... BREVICEPS, 29.

aa. Dorsal rays 24 to 26; mouth lower and less oblique, the snout more convex and the profile descending forwards.

c. [Color white, with faint streaks and without vertical dark bars; second anal spine long, nearly 2 in head; body deep; snout short, 5 in head; eye 3½ in head; mouth large, maxillary 2 in head, lower mandible produced and curved; a pore on each side of the symphysis; gill-rakers long and slender; teeth uniserial, numerous, and very small, those of the lower jaw slightly larger; pectorals lanceolate, reaching beyond vent, slightly longer than head. Head 3⅓ in length; depth 3. D. X-I, 25; A. II, 5.] (*Pocy.*) STAHLI, 30.

cc. Color grayish, silvery below, with about seven dark vertical cross-bars; second anal spine short, 3½ in head. Body heavy forwards, much compressed, the back somewhat elevated; profile convex; snout very short and blunt, 5½ in head; eye 4, about equal to the flattish interorbital area; mouth large, less oblique than in other species; tip of premaxillary on level of middle of pupil; maxillary 2 in head reaching to below posterior third of eye; lower mandible with a slight knob at its symphysis, a small pore on each side of it; teeth minute, firm, in a single series in each jaw; pharyngeal teeth all long and slender; the pharyngeal bones small and narrow, sub-triangular; gill-rakers extremely elongate, as long as eye, 12 + 24; preopercle with minute cilia; third and fourth dorsal spines about 2½ in head; second anal spine short, one-fourth shorter than the first anal ray; scales large, ctenoid; anal and soft dorsal with a scaly sheath at base; color in life grayish olive above, with some silvery; below, clear silver white, back with 7 to 9 rather conspicuous darker vertical bars extending to below middle of sides; fins dusky-olive; anal fin and lower rays of caudal yellow, ventrals orange yellow, dusky towards tip; lower side of head very bright silvery; inside of mouth and lining of gill cavity, cheeks and opercles, with some light yellow. Head 3½ in length, depth 3. D. X-I, 24 to 26. A. II, 5 to 6. Scales 5-49-9 to 11 ..... FASCIATUS, 31.

28. LARIMUS ARGENTEUS.

Amblyscion argenteus Gill, Proc. Acad. Nat. Sci. Phila., 1863, 165 (West coast Central America).

Larimus argenteus Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 110 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This singular fish is not uncommon about Panama, where several specimens were obtained by Professor Gilbert. Of all the known species of *Sciænidæ* this one has the mouth most nearly vertical. There is, however, in its structure nothing to warrant its separation as a distinct genus, *Amblyscion*. Many specimens from Panama are in the museum at Cambridge.

29. LARIMUS BREVICEPS.

Larimus breviceps Cuv. & Val., Hist. Nat. Poiss., v, 146, pl. cxl, 1830 (Brazil, San Domingo). Storer, Syn. Fish. North Am., 321, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 268, 1860 (San Domingo). Günther, Fishes Central America, 387 and 425, 1869. Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 107 (Mazatlan). Gilbert, loc. cit., 112 (Punta Arenas). Bean & Dresel, Proc. U. S. Nat. Mus., 1884, 158 (Jamaica).

Habitat.—Both coasts of tropical America, north to Mazatlan and San Domingo.

We have not been able to compare directly Atlantic and Pacific examples of this species, so that we cannot be quite sure as to their identity. The specimen now before us from Jamaica has the dark streaks on the scales much less sharply defined than Mazatlan examples, but we have no other evidence of difference. Specimens entirely similar to this are in the museum at Cambridge from Brazil, Porto Rico, and from Jérémie, Hayti.

30. LARIMUS STAHLI.

Monosira stahli Poey, Fauna Puerto-Riqueña, 326, plate vi, 1881 (Porto Rico).

Habitat.—West Indian Fauna, Porto Rico.

This species is known from Poey's description and figure only. The nominal genus, *Monosira*, supposed to be distinguished by the uniserial teeth, is strictly synonymous with *Larimus*, and the species is evidently very close to *Larimus breviceps*.

A specimen of *Larimus* in the museum at Cambridge (Panama, Dr. Jones) agrees better with *L. stahli* than with *L. breviceps*. It has the mouth less oblique than in the latter, and but 24 soft rays in the dorsal fin.

31. LARIMUS FASCIATUS.

Larimus fasciatus Holbrook, Ichthyology S. Carolina, 153, plate 22, fig. 1, 1860 (Charleston). Günther, Cat. Fish. Brit. Mus., ii, 269, 1860 (copied). Uhler & Lugger, Fishes of Maryland, 102, 1876. Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 578, 1883.

Habitat.—South Atlantic coast of the United States.

Our specimens of this species were procured at Charleston by Mr. Charles C. Leslie. Specimens are in the museum at Cambridge, from Charleston and from Florida.

Genus VII.—ODONTOSCION.

Odontoscion Gill, Proc. Acad. Nat. Sci. Phila., 1862, 18 (*dentex*).

TYPE: *Corvina dentex* Cuv. & Val.

As here understood, this genus consists of a single species, which may be described as a *Larimus* armed with canine teeth. It also approaches closely to *Bairdiella*, one of the species of which genus (*Bairdiella archidium*) would be placed in *Odontoscion* were it not for the plectroid spine on the preopercle.

ANALYSIS OF SPECIES OF ODONTOSCION.

a. Teeth in both jaws in a single series; the two front teeth in lower jaw large canines, some of the teeth on the side of the lower jaw also enlarged, canine-like; teeth of the upper jaw largest forward, smaller than those in the lower jaw; body oblong, compressed, the profile straight and rather steep; snout short, blunt, 4 in head; eye large, 3⅓ to 4 in head; preopercle rounded without any distinct spines, with crenulated membranaceous margin; highest dorsal spine 2 in head; distance from first anal spine to middle of base of caudal 3⅓ in length; distance from vent to first anal

spine 1½ in base of anal; mouth large, oblique, maxillary reaching beyond middle of orbit, 2 in head; preorbital very narrow, about 4 in eye; gill-rakers long and stiff, 5 + 14; lower pharyngeals small, with conical teeth; scales thin, ctenoid; soft dorsal and anal scaly; scales below lateral line in nearly horizontal series; dorsal spines long and slender, separated from soft dorsal; the spine of soft dorsal short and stout; caudal subtruncate, upper lobe longer; anal short and high, second anal spine 2½ in head; ventrals half way to anal, pectorals 1⅔ in head; color dusky silvery, everywhere soiled with dark points, which form faint streaks along the series of scales; snout and anterior part of the chin black; upper part of base of pectoral and axil black. Head 3 to 3½ in length; depth 3½. D. XI or XII-I, 23; A. II, 8. Scales 7–49 to 52–10.....DENTEX, 32.

32. ODONTOSCION DENTEX.

(CORVINA.)

Corvina dentex Cuv. & Val., Hist. Nat. Poiss., v, 139, plate 109, 1830 (San Domingo). Storer, Syn. Fish. North Am., 320, 1846 (copied).

Larimus dentex Günther, Cat. Fish. Brit. Mus., ii, 269, 1860 (Jamaica, Trinidad).

Odontoscion dentex Gill, Proc. Acad. Nat. Sci. Phila., 1862, 18 (name only). Poey, Synopsis, 325, 1868 (Cuba); Enumeratio, 49, 1875 (Cuba). Jordan, Proc. U. S. Nat. Mus., 1886, 44 (Havana).

Habitat.—West Indian fauna.

This small species is generally common in the West Indies, where it is a food-fish of some importance. The numerous specimens before us are from Havana, where the species is known to the fishermen as *Corvina.*

Genus VIII.—CORVULA.

Corvula Jordan & Eigenmann, genus novum.

TYPE: *Johnius batabanus* Poey.

We propose the above name for four species of American Sciænoids, allied to *Bairdiella* in nearly all respects, but having the preopercle unarmed as in *Larimus.* The typical species is remarkable in form and coloration, but it is probably congeneric with the others with which we here associate it.

ANALYSIS OF SPECIES OF CORVULA.

a. Body rather short and deep; depth 2½ to 3½ in length; distance from insertion of ventrals to first anal spine about equal to depth of body; color silvery, usually with faint dusky streaks along the rows of scales.

b. [Dorsal rays XI-I, 26; posterior dorsal rays much shorter than the anterior ones; eye very large, 3½ in head; dorsal outline strongly convex, somewhat elevated anteriorly; ventral outline considerably, strongly convex; snout short, 5 in head; mouth moderate, somewhat oblique, reaching to below hinder margin of pupil; tip of premaxillary little above lower margin of orbit; maxillary 2½ in head; teeth in narrow bands, the outer series of the upper jaw enlarged; longest dorsal spine 1⅔ in head; the highest (third or fourth) dorsal ray 2 in head; base of anal and soft dorsal with a scaly sheath, the membranes with minute scales; second anal spine small, 2½ in head; color brownish, paler below; upper two-thirds of body with dark streaks along the rows of scales; pectoral and especially anal with dark points; base of spinous dorsal light yellow; numerous dark dots on belly, lower part of sides, and under side of head. Head 3 in length; depth 2½; D. XI-I, 26; A. II, 10; scales 7–50–10.] (*Steindachner.*).....MACROPS, 33.

bb. Dorsal rays X-I, 28; depth, 2⅔ in length; posterior rays of soft dorsal rays higher than the anterior ones; eye small, 5 in head; dorsal outline strongly and regularly convex and elevated; ventral outline straight; snout acute, not rounded, 3½ in head; mouth moderate, oblique, maxillary extending beyond pupil; its length 2⅔ in head; teeth of the lower jaw bluntish, in two series anteriorly, in a single series laterally; those of the inner series largest; teeth of the upper jaw in a narrow band, the outer series enlarged; preopercle with a crenulate membranous margin; gill-rakers slender, about half as long as the eye, 7 + 13; dorsal spines slender, the longest 1½ in head; soft dorsal rounded posteriorly; 16th dorsal ray highest, 2 in head; caudal convex; second anal ray 2½ in head; pectoral short and broad, slightly shorter than ventrals which are 1⅔ in head; scales large, those about the head, nape, and anterior part of breast cycloid, the remainder ctenoid; color, silvery white, darker above; sides and back with rather distinct dark lines along the scales; spinous dorsal, tips of ventrals and anal dusky; upper part of head brownish; lower part of head, cheek, and breast with numerous rusty dots, base of soft dorsal and anal rusty; head 3½ in length; depth 2¾. D. X-I, 28; A. II, 8; scales 7-52-8.....SIALIS, 34.

bbb. Dorsal rays X to XII-I, 23 to 25; depth of body about 3½ in length; form of *C. sialis*, but the body more elongate; jaws equal; outer teeth above enlarged lower teeth nearly uniserial; eye large, 4¼ in head; snout bluntish, 4⅓; maxillary 2½ in head, extending to middle of pupil; preopercle with flexible serræ; second anal spine, 3⅔ in head; caudal fin subtruncate. Head 3½ in length; depth about 3½. D. XII-I, 22 to 24; A. II, 9; scales about 46; color silvery, with faint streaks along the rows of scales above.....SUBÆQUALIS,* 35.

aa. Body rather elongate and compressed, the depth 3½ in length; distance from insertion of ventrals to first anal spine half greater than depth of body; coloration dusky, with conspicuous dark streaks along the rows of scales.

c. Body oblong, compressed, the depth nearly uniform from ventrals to vent; profile nearly straight and horizontal; mouth rather wide; maxillary 2⅔ in head, reaching middle of eye; upper jaw with several series of minute teeth and an outer somewhat enlarged series; lower jaw with a single series of rather strong teeth, a pair of minute canine-like teeth at the symphysis; snout short, without pores, 3½ in head; chin with 5 large pores; preopercle with a crenulate, dermal border; gill-rakers slightly longer than pupil, 5 + 13; lower pharyngeals with many small teeth, some of the inner ones much elongate; eye slightly shorter than snout, 4½ in head, about equal to the interorbital area; scales large, their exposed edges much striated, the striæ ending in cilia; scales below lateral line in undulate, sub-horizontal series; lateral line slightly curved, becoming straight above anal; soft portions of vertical fins densely covered with scales; soft dorsal and anal with a scaly sheath at their base; dorsal caudal and anal rounded behind; ventrals slightly longer than pectorals, 1¼ in head. Color coppery-grayish, with many minute brown points; scales of back and sides each with a dark spot, these forming very distinct dusky stripes along the series of scales; stripes below the lateral line mostly of continuous spots, those above broken and irregular; upper part of head and fins uniform brownish with many minute points. Head 3⅔ in length; depth 3½. D. XI-I, 26; A. II, 8; scales 6-50-7....BATABANA, 36.

* The following is the substance of Poey's account of his *Corvina subæqualis:* Body rather elongate; eye 3½ in head; snout short, rounded; mouth moderate; maxillary extending to below anterior margin of pupil, the jaws subequal; teeth in fine bands, the outer series longer, and larger above than below; symphysis with four pores; preopercle finely dentate; dorsal fins separated; second dorsal spine stout; caudal with a salient angle; base of anal scaly; anal spine rather strong, its insertion rather posterior; color silvery; depth 3⅔ (with caudal); head 3⅔. D. X-I, 25; A. II, 7.

33. CORVULA MACROPS.

Corvina macrops Steindachner, Ichthyol. Beitr., iii, 24, fig. 2, 1875 (Panama).
Sciæna macrops Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 316 (copied). Jordan, Proc. U. S. Nat. Mus., 1885, 382 (Panama).

Habitat.—Pacific coast of tropical America, Panama.

This species is apparently rare at Panama. Specimens were obtained there by Dr. Gilbert, but as these have been destroyed we have copied our diagnosis from Steindachner. We do not find the species in the museum at Cambridge.

34. CORVULA SIALIS.

Corvula sialis Jordan & Eigenmann, sp. nov. (Key West).

Habitat.—Florida Keys.

The only specimen of this species, as yet known (No. 26575, U. S. Nat. Mus.), was collected by Mr. Silas Stearns at Key West, Fla., in 1880. We give here a detailed description of this specimen:

Depth, $2\frac{3}{4}$ ($3\frac{3}{7}$ in total); head, $3\frac{1}{7}$ ($3\frac{9}{7}$ in total); D. X-I, 28; A. II, 8. Length, $6\frac{1}{2}$ inches.

Body compressed; the back elevated, regularly rounded from snout to posterior margin of soft dorsal; ventral outline almost straight from chin to first anal spine; base of anal oblique; caudal peduncle short and thick.

Profile slightly convex posteriorly, somewhat depressed over the eyes; snout rather acute, slightly longer than eye; eye $4\frac{3}{4}$ in head, $1\frac{1}{3}$ in interorbital area; preorbital one-half as wide as eye; mouth moderate; maxillary extending past pupil, its length $2\frac{1}{5}$ in head; premaxillary anteriorly on level with the lower border of the orbit; lower jaw included; maxillary broad, not entirely concealed by the preorbital when the mouth is shut. Teeth of the lower jaw blunt, conical, in two series, those of the inner series much larger than those of the outer series; upper jaw with a narrow band of villiform teeth and an outer series of larger teeth, which are remote from each other and decrease in size towards the angle of the mouth.

Chin with five small pores; snout with six pores, arranged in a ∴ shaped figure.

Preopercle with a narrow, crenulate, membranous border; opercle with two scarcely distinguishable spines; scapular scale entire.

Gill-rakers moderately developed, about half as long as the eye, 5+12; pseudobranchiæ large.

Scales about the head in front of dorsal and on anterior part of breast cycloid, marked with concentric striæ; those on top of the head imbedded, indistinct; scales of the body all ctenoid; membranes of caudal, anal, and soft dorsal densely covered with minute scales nearly to their tips.

First dorsal spine short, inserted over the base of the pectoral; fourth dorsal spine highest, reaching to soft dorsal, $1\frac{1}{3}$ in head; anterior

dorsal rays shorter than the middle and posterior ones; the eleventh longer than the fourth by an eye's diameter, little more than half the length of the head; soft dorsal very broadly rounded posteriorly; caudal short, broad, rounded behind; anal inserted posteriorly, the tips of the anal extending nearly as far as the tips of the dorsal; second anal spine moderate, scarcely more than two-thirds the length of the rays, little less than 3 in head; ventrals lanceolate, slightly longer than the rounded pectorals, $1\frac{1}{3}$ in head.

Color (in spirits), light brownish above, silvery on sides and below; the centers of the scales with many dark dots, these forming horizontal lines along the series of scales below the lateral line and oblique, irregular, often interrupted, lines above the lateral line; all the fins with dark dots; spinous dorsal dusky; soft dorsal brownish for two-fifths of its height; the other three-fifths pale; anal and tips of ventrals dusky; pectoral pale; head with many minute rusty dots; these aggregated, and forming brownish spots on the maxillary and lower part of the head.

35. CORVULA SUBÆQUALIS.

Corvina subæqualis Poey, Ann. Lyc. Nat. Hist., New York, 1875, 58 (Cuba). Poey, Enumeratio, 48, 1875 (Cuba).

Habitat.—West Indian fauna.

We refer two specimens from Saint Thomas to this species, although they differ in some respects from Poey's description of *Corvina subæqualis*. The specimens are in the museum at Cambridge, and are in rather poor condition. The more elongate body and the smaller number of dorsal rays distinguish *subæqualis* readily from *sialis*.

36. CORVULA BATABANA.

Johnius batabanus Poey, Memorias, ii, 184, 1860 (Batabano, Cuba); Synopsis, 324, 1868 (Cuba); Enumeratio, 49, 1875 (Cuba); Fauna Puerto-Riqueña, 327, 1881 (Porto Rico).

Larimus batabanus Jordan, Proc. U. S. Nat. Mus., 1886, 43 (Havana).

Habitat.—West Indian fauna.

This rare species is known to us from a single specimen, obtained by Dr. Jordan in Havana, and from several specimens sent by Professor Poey to the museum at Cambridge. Its strongly marked coloration is a very unusual trait in this family. It diverges in several ways from the other species referred by us to *Corvula*, but we think that all should be placed in one genus.

Genus IX.—PLAGIOSCION.

Plagioscion Gill, Proc. Acad. Nat. Sci. Phila., 1861, 82 (a generic description only no species or type being indicated).

Diplolepis Steindachner, Beiträge zur Kenntniss der Sciænoiden Brasiliens, 1863, 2 (*squamosissimus*; name preoccupied in *Hymenoptera*).

Plagioscion Jordan & Eigenmann (*squamosissima*).

TYPE: *Sciæna squamossissima* Heckel.

This genus consists of fresh-water Sciænoids, inhabiting the rivers of South America. The genus seems to us a valid one, although closely allied to *Corvula* and *Pseudotolithus*, from both of which it is well distinguished by the peculiar squamation of the lateral line. This character suggested to Dr. Steindachner the name *Diplolepis*, a name which is, unfortunately, preoccupied. As no species of *Plagioscion* was named by the describer of that genus, we have hesitated as to the propriety of making use of that name. The original description of *Plagioscion* must, however, certainly have been based on some species of the present genus, as it agrees with no other American form. We have therefore retained the name given by Dr. Gill in preference to coining some new one for the group.

Like most fresh-water fishes, the species of *Plagioscion* are subject to many variations, especially in regard to the size of the second anal spine. But three of the numerous nominal species seem to us valid.

ANALYSIS OF SPECIES OF PLAGIOSCION.

a. Second anal spine small, scarcely longer than eye, its length 4 to 5¼ in head; teeth of lower jaw with the inner series considerably enlarged; snout of moderate length, 5 in head; eye, 5½; maxillary, 2⅔ in head; gill-rakers rather long, X+12; pseudobranchiæ usually small on one side and obsolete on the other; upper part of the preopercle crenulate on its bony margin; pectoral fin short, 1⅔ in head; anal spine, 4½ to 5½, its length subject to much variation; caudal convex; ventrals filamentous at tip. Color, silvery; darker above, the axil with a large black spot. Head 3⅓ in length; depth 3⅓. D. X-I, 31 or 32. A. II, 7. Scales (large ones or pores) 49 to 53. Lower pharyngeals narrow, armed with villiform teeth..... SQUAMOSISSIMUS, 37.

aa. Second anal spine large and strong, its length 2 to 3 in head.

b. [Teeth of lower jaw with the inner series considerably enlarged; snout very short, blunt, 5½ in head; head depressed above the eyes; mouth large, rather oblique, subinferior, the maxillary 2⅓ in head, reaching past eye; back elevated; ventral outline nearly straight; caudal peduncle slender; preorbital broad, a little narrower than eye, which is 5½ in head; preopercle rounded, nearly or quite entire; teeth of outer series in upper jaw and inner series of lower notably enlarged; dorsal spines slender, the highest 2⅔ in head; pectoral 1⅔ in head; ventrals 1⅔; scales all ctenoid; head 3⅔; depth 3⅔; D. X-I, 31 to 33. A. II, 6. Enlarged scales in lateral line about 50; about 100 in a longitudinal series above it. Color grayish above, silvery below; upper vertical fins punctate; lower fins yellowish; axil dark.] (*Steindachner.*) ..... SURINAMENSIS, 38.

bb. Teeth of lower jaw subequal, those of the inner row scarcely enlarged; head very convex above, not spongy; preopercle with a broad membranous margin, which is slightly crenulate; preorbital broad, as broad as eye; mouth large, oblique, the lower jaw slightly included, the maxillary 2¼ in head; snout bluntish, 3⅓ in head; eye 6 in head; gill-rakers X + 13, slender and moderately long, the longest about ⅔ diameter of eye; outer teeth above somewhat enlarged; pectorals long, 1⅓ in head, shorter than the ventrals, which have filamentous tips; second anal spine 2⅓ to 2⅔ in head; dorsals connected, the soft dorsal largely scaly at base; caudal rhombic, the middle rays produced. Color plain silvery, the axil dusky. Head 3⅓; depth 3⅓. D. X-I, 34 to 36. A. II, 7. Scales 49 (pores); 80 cross-series. AURATUS, 39.

37. PLAGIOSCION SQUAMOSISSIMUS.

Sciæna squamosissima Heckel, Annalen des Wiener Museum, ii, 438, 1840. Reinhardt, Videnskab. Medd. Naturhist. Forening Kjöbenhavn, 108, 1854. Steindachner, Beitr. zur Kenntniss der Fisch-Fauna Süd-America's, 1879, 3 (Amazon, Orinoco, Rio Negro).

Pachyurus squamosissimus Günther, Cat. Fish. Brit. Mus., ii, 526, 1860 (copied).

Diplolepis squamosissimus Steindachner, Sciæn. Brasil., 2, 1863 (Brazil).

? *Sciæna rubella* Schomburgk, Naturalists' Library, Fishes of Guiana, ii, 133, 1843 (Rivers of Guiana). (D. IX, 34; A. II, 6; anal spines presumably small.)

Johnius crouvina Castelnau, Anim. Nouv. ou Rares de l'Amér. du Sud, Poissons, 11, plate v, fig. 1, about 1855 (Rio Crixas, Rio Araguay).

Sciæna crouvina Günther, Cat. Fish. Brit. Mus., ii, 287, 1860 (copied).

Johnius amazonicus Castelnau, Anim. Nouv. ou Rares de l'Amér. du Sud, Poiss., 12, plate iv, fig. 1, about 1855 (Amazon).

Sciæna amazonica Günther, Cat. Fish. Brit. Mus., ii, 284, 1860 (River Chapin, Pará).

? *Corvina monacantha* Cope,* Trans. Am. Phil. Soc., 1866, 402 (near Parimaribo, Dutch Guiana.

? *Sciæna monacantha* Jordan, Proc. U. S. Nat. Mus., 1886, 587 (name only).

Habitat.—Rivers of Guiana and Brazil.

We have examined specimens of this species from Obidos, Avary, Rio Puty, Tajaparu, Içá, Coary, Rio Trombetas, and Lake Hyanuary in Brazil. Our description is chiefly taken from 10867, M. C. Z., from Obidos, and 10857 from Coary.

We regard the *Johnius amazonicus* and *Johnius crouvina* of Castelnau as identical, and we follow Dr. Steindachner in placing both in the synonymy of the earlier *Sciæna squamosissima* of Heckel. We have seen no specimens of this species from Guiana. It seems to us, however, that the scanty descriptions published of *Sciæna rubella* and *Corvina monacantha* resemble this species more than any other, although it is not impossible that both should be referred to *Plagioscion surinamensis*. If the latter should be found to be the only species of the genus in Guiana, it should stand as *Plagioscion rubellus*.

83. PLAGIOSCION SURINAMENSIS.

Pseudosciæna surinamensis Bleeker, Arch. Néerl. Sci. Exact. et Nat., viii, 458, 1873 (Surinam).

Sciæna surinamensis Steindachner, Fisch-Fauna des Cauca, 1880, 4 (Rio Cauca). Jordan, Proc. U. S. Nat. Mus., 1886, 587 (name only).

Sciæna magdalenæ Steindachner, Zur Fisch-Fauna des Magdalenen-Stromes, 6, 1878 (Rio Magdalena).

Sciæna magdalenæ Jordan, Proc. U. S. Nat. Mus., 1886, 587 (name only).

Habitat.—Rivers of the northern part of South America.

*The following is the substance of Professor Cope's description of *Corvina monacantha*:

First ventral ray produced as a filament which reaches past the vent; pseudobranchiæ none; eyes 5 in head; depth equal to length of head; preopercle sharply serrate on its vertical margin; pharyngeal patches of teeth small, the teeth bristly; caudal fin sublanceolate; pectorals as long as ventrals without filaments; anal spine short, single in typical specimens; color, silvery, grayish above; no spots. D. X-I, 33; A. I, 5. Scales 10-49-16.

This species is known to us from descriptions only. We can see no evident difference between the *magdalenæ* and the *surinamensis* as described by Steindachner and Bleeker. We therefore refer the former to the synonymy of the latter. As already stated, this may be the original *Sciæna rubella* of Schomburgk.

39. PLAGIOSCION AURATUS.

Johnius auratus Castelnau, Anim. Nouv. ou Rares de l'Amér. du Sud, 12, plate iv, fig. 2, 1855 (Rio Ucayala).

Sciæna aurata Günther, Cat. Fish. Brit. Mus., ii, 287, 1860 (copied).

Habitat.—Rivers of Brazil.

This species seems to be very abundant in the rivers of Brazil. We have examined specimens, old and young, from Tajapuru, Cachiura, Caneta, Pará, Rio Sao Francisco, Avary, Obidos, Rio Puty, and Teffy. A specimen (10855, M. C. Z.) from Tajapuru has especially served as the type of our description.

Genus X.—BAIRDIELLA.

Bairdiella Gill, Cat. Fish. East Coast North America, 33, 1861 (*argyroleuca=chrysura*).

TYPE: *Bodianus argyroleucus* Mitchill = *Dipterodon chrysurus* Lacépède.

This genus is characterized by the oblique mouth, little cavernous skull, few rows of teeth, slender gill-rakers, and the preopercle armed with a plectroid spine. It seems to us a natural group, and perhaps worthy of recognition as a distinct genus, although its relationships with *Ophioscion* and especially with *Stelliferus* are very close. The numerous species are all American, and some of them are remarkable for the great size of the second anal spine. In others, this spine is quite small. These variations among species unquestionably closely allied shows how slight is the systematic value to be attached to the size of this spine.

ANALYSIS OF SPECIES OF BAIRDIELLA.

a. Teeth of lower jaw unequal, mostly biserial, some of those of the inner series very slender, canine-like; two small canines on front of lower jaw, inserted on a symphyseal knob; second anal spine very small, 3 in head (species approaching *Odontoscion*).

b. Body moderately compressed, the back little elevated; profile somewhat concave anteriorly; snout acute, slightly longer than eye; eye 4¼ to 5 in head; mouth large, terminal, very oblique; maxillary extending to below posterior margin of pupil, 2¼ in head; teeth of the upper jaw long and slender, in 3 to 4 series, the inner ones depressible backward, the outer ones enlarged and fixed; 5 or 6 distinct serræ near the angle of preopercle, the lowest a robust flattish spine directed downwards; gill-rakers slender, 6+15; longest dorsal spine 2¼ in head; anal fin small, its base slightly oblique; second anal spine shorter than the first rays, 3 in head; pectorals about as long as ventrals, 1¼ in head; scales about the head cycloid, the rest all cte-

noid; membranes of soft dorsal and anal scaled for nearly half their height; color lustrous bluish gray above, silvery below; middle of sides with indistinct lengthwise streaks formed by clusters of dark dots in the centers of the scales; snout and tip of lower jaw blackish; a dark blotch on opercle above; sides of head bright silvery; fins light straw color; upper half of pectorals dusky; spinous dorsal finely speckled with black; axil brown above; lining of opercle black above; iris bright yellow; head 3 in length; depth 3½; D. X-I, 24 or 25; A. II, 8. Scales 9-52-7 ..... ARCHIDIUM, 40.

aa. Teeth of the lower jaw unequal, chiefly biserial, those of the inner series somewhat enlarged; no distinct c anines; second anal spine moderate or large; preorbital narrow (*Bairdiella*).

c. Second anal spine moderate, 2⅓ in head, not as long as the soft rays, not reaching to tip of last ray when depressed; mouth large, somewhat oblique, the premaxillary on the level of lower part of the eye; maxillary reaching middle of eye, 2⅔ in head; body oblong, compressed, the back a little elevated, the profile depressed over the eyes; snout prominent, bluntish, as long as eye, which is 4¼ in head; upper teeth in two series, the outer row slender, enlarged; lower teeth in two series, the inner larger, similar to the outer in upper jaw; preopercle serrate, the teeth near the angle larger; the lowest and largest directed downward; gill-rakers slender, rather long, 8 + 16; scales on head cycloid; base of anal little oblique; ventral outline rather regularly rounded; dorsal spines slender, the highest 2¼ in head; caudal long, double truncate; pectorals about as long as the ventrals, 1⅔ in head; soft dorsal and anal scaled at least half their height. Color greenish above, silvery below; back and sides more or less densely punctate with dark dots (especially in northern specimens), these forming narrow, somewhat irregular streaks along the sides; fins plain, mostly yellow in life. Head 3 in length; depth 3. D. XI-I, 22; A. II, 10. Scales 8-52-8. CHRYSURA, 41.

cc. Second anal spine very long, nearly or quite ⅔ length of head, reaching when depressed beyond the tip of the last soft ray; base of anal fin very oblique, making an abrupt angle with the straightish ventral outline.

d. Mouth terminal, very oblique, the premaxillary anteriorly on the level of the middle of the eye; body subrhomboidal and angular in outline; profile steep, slightly convex; snout short, 5 in head; mouth moderate, the maxillary reaching middle of eye, 2⅔ in head; teeth in upper jaw in two or three series, the outer considerably enlarged, all of them more or less depressible; gill-rakers long, 8 + 16; dorsal spines stout, the highest about 2 in head; second anal spine enormous, larger than in any other species, 1⅔ in head; longer than any of the rays; second anal spine and the anterior rays extending beyond the tips of the last rays; the margin of the fin concave, ventrals slightly longer than pectorals, 1⅛ in head; opercular scales and some of the scales of the cheek and top of the head ctenoid, those of the interorbital space and a few on the lower parts of the cheek and opercle cycloid; color bluish-gray above and on sides, silvery below; a dark, ill-defined bluish-gray blotch on opercle; mouth yellow within; black towards the tip of the lower jaw; spinous dorsal with black punctulations and a black margin, soft dorsal dusky yellow; caudal and anterior rays of the anal brighter yellow; caudal and membrane between anal spine and first ray with black dots; axil of pectorals and inner membrane of the upper rays of the pectoral brownish. Head 3⅓ in length; depth 3⅓. D. X-I, 23; A. II, 8. Scales 8-49-9 ..... ENSIFERA, 42.

dd. Mouth not quite terminal, the premaxillary anteriorly scarcely on level of lower margin of orbit; preorbital narrow, but broader than in the preceding species.

e. Dorsal rays X-I, 28; dorsal spines very slender, the highest 1⅛ in head; dorsal outline convex, especially anteriorly; ventral outline straightish; profile straightish anteriorly; eye moderate, as long as snout, 4⅛ in head; maxillary 2⅛ in head, reaching much beyond middle of eye; teeth in the upper jaw in a narrow band, the outer series enlarged; gill-rakers 8 + 19; basal half of soft dorsal scaly; anal spine very strong, its tip reaching past tip of last anal ray; pectorals about equal the ventrals, 1⅛ in head; color grayish silvery above, silvery on sides and below; dorsal region with faint streaks produced by the darker centers of the scales; sides without dots; spinous dorsal blackish; ventrals and pectorals pale; a dark axillary spot; lining of gill cavity with dusky blotches. Head 3¼ in length; depth 3¼. D. X-I, 28; A. II, 8. Scales 8–51–10 ..... ICISTIA, 43.

ee. Dorsal rays X-I, 23; dorsal spines rather stiff, the highest 2 in head; second anal spine rather strong, curved, 1⅞ in head, as long as first soft ray, and reaching beyond tips of other rays; body oblong, compressed, scarcely angular in outline; profile straight, rather steep, the snout short and rather acute; eye as long as snout, 4⅛ in head; mouth moderate, nearly horizontal; premaxillary on level of lower part of orbit; maxillary reaching beyond middle of eye, 2⅜ in head; teeth as in *B. icistia;* preopercle strongly serrate; gill-rakers 9 + 18. Ventrals slightly longer than pectorals, which are 1⅞ in head; caudal truncate; color soiled grayish above, silvery below; faint, dark streaks along the rows of scales; spinous dorsal and anterior part of anal densely covered with dark dots; head 3⅓ in length; depth 3⅓. D. X-I, 23; A. II, 8. Scales 7–50–8 ..... RONCHUS, 44.

aaa. Teeth of the lower jaw subequal in a rather narrow villiform band; mouth inferior or subinferior, little oblique; preorbital broader, gill-rakers shorter, and pores and slits on snout more conspicuous than in other species. (Species approaching *Ophioscion.*)

f. Snout sharp, the head slender, narrow above, the interorbital space not broader than eye; anal spine very long and strong, 1⅞ in head; pectoral fin short, 1⅓ in head; form of body irregularly rhomboidal, the base of the anal fin being oblique; profile almost straight anteriorly; eye moderate, slightly shorter than snout, 4⅞ in head; snout 4⅓ in head; mouth large, inferior, almost horizontal, maxillary reaching beyond pupil, 2⅞ in head; upper jaw with a band of villiform teeth and an outer series of enlarged teeth; lower teeth in a moderate band, the inner series slightly enlarged, especially in young examples; gill-rakers comparatively short, 8 + 15; dorsal spines short and stout, slightly more than 2 in head; caudal rounded; anal spine 1⅞ in head; basal half of the soft dorsal and anal covered with scales; color, bluish above, silvery below, a rather broad area from snout to caudal covered with brownish dots; upper fins and anterior half of anal with many dots. Head 3 in length; depth 3; D. XI-I, 21; A. II, 8. Scales 7–51–8. ARMATA, 45.

ff. Snout bluntish; the head rather stout and broad above; the interorbital space more or less broader than eye; second anal spine stout, shortish, about half length of head.

g. Dorsal rays X-I, 18; scales large, about 44 in the lateral line; pectoral not longer than caudal, which is 1⅓ in head; body rather elongate; back a little elevated and compressed; profile somewhat depressed

over eyes; snout rather truncate, about 4 in head; eye about 4 in head; lower jaw much shorter than upper; mouth horizontal, maxillary extending scarcely beyond middle of eye; teeth in upper jaw in a villiform band, the outer series somewhat enlarged; gill-rakers about as long as pupil; longest dorsal spine little more than half length of head; second anal spine about 2 in head, $\frac{2}{3}$ the height of the soft rays; caudal fin long, double truncate, the middle rays produced; ventrals reaching vent; color light reddish-brown, with dark punctulations; caudal yellow; anal almost black; lining of gill-cavity dusky; head $3\frac{2}{3}$ in length; depth $3\frac{1}{2}$. D. X–I, 18; A. II, 8; scales 5–44–X.

ALUTA, 46.

gg. Dorsal rays X–I, 21 or 22; scales moderate, 50 to 55 in the lateral line; pectoral $1\frac{1}{7}$ in head; caudal $1\frac{2}{3}$ in head; back somewhat elevated, the form of the body much as in *Sciæna sciera* and related species; preorbital broader than in other species of *Bairdiella*, $\frac{1}{4}$ width of eye; eye 5 in head; snout bluntish $4\frac{2}{3}$; interorbital space $3\frac{2}{3}$; head thick, somewhat more cavernous than in related forms; premaxillary entirely below level of eye; maxillary $2\frac{2}{3}$ in head; teeth of outer series of upper jaw enlarged; lowest serræ on preopercle smaller and less turned forward than in the other species; dorsal spines rather stout, the second strong, the third longest, $1\frac{1}{4}$ in head; second anal spine shorter than the soft rays, $2\frac{1}{4}$ in head; the form and size of these spines very variable; gill-rakers short and slender, X+15, the longest not as long as pupil; caudal fin double truncate; color soiled brassy, irregularly mottled, with large patches of shining golden brown; faint dark stripes along the rows of scales above, those below lateral line nearly horizontal, those above oblique; head $3\frac{1}{3}$ in length; depth 3. D. X–I, 21 or 22; A. II, 9; scales, 6–50 to 55–13....CHRYSOLEUCA, 47.

40. BAIRDIELLA ARCHIDIUM.

Odontoscion archidium Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 317 (Panama). Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 111 (Panama).

Habitat.—Pacific coast of tropical America, Panama.

This species is not very common about Panama, where three specimens were taken by Dr. Gilbert. Although it bears a very strong resemblance to *Odontoscion dentex*, it should, we think, rather be placed in *Bairdiella* than in *Odontoscion*. It has the very small anal of *Odontoscion* and the spur-like preopercular spine of *Bairdiella*, while in its dentition it is intermediate.

41. BAIRDIELLA CHRYSURA.

(THE MADEMOISELLE; YELLOW-TAIL.)

[Plate III.]

Perca punctata Linnæus, Syst. Nat., ed. xii, 482, 1766, in part (South Carolina) (not *Perca punctatus* of ed. x, which is *Enneacentrus fulvus*). Bonnaterre, Encycl. Méth., 1788, 126. Goode & Bean, Proc. U. S. Nat. Mus., 1885, 201 (notes on Linnæan Fishes).

Bairdiella punctata Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 377 (Beaufort).

Sciæna punctata Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 280 (Pensacola; Galveston). Jordan & Gilbert, Syn. Fish. North Am., 570, 1883.

Dipterodon chrysurus Lacépède, Hist. Nat. Poiss., iii, 64, 1802 (after Linnæus).

Sciæna chrysura Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Jordan & Gilbert, Syn. Fish. North America, 933, 1883. Swain, Proc. U. S. Nat. Mus., 1884, 233 (Cedar Key, Florida).

Bairdiella chrysura Goode, Hist. Aquat. Anim., 375, plate 126, 1884.

Bodianus argyroleucus Mitchill, Trans. Lit. & Phil. Soc. New York, 417, plate 6, fig. 3, 1815 (New York).

Corvina argyroleuca Cuv. & Val., Hist. Nat. Poiss., v, 105, 1830 (Martinique (?), United States). DeKay, New York Fauna, Fishes, 74, plate 18, fig. 51, 1842 (New York). Storer, Syn. Fish. North Am., 319, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 299, 1860 (copied).

Bairdiella argyroleuca Goode, Proc. U. S. Nat. Mus., 1879, 113 (St. John's River, Florida). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 131 (Pensacola). Bean, Proc. U. S. Nat. Mus., 1880, 93 (Brunswick, Ga.; St. John's River, Florida).

Bodianus pallidus Mitchill, Trans. Lit. & Phil. Soc., 1, 420, 1815 (New York).

Homoprion xanthurus Holbrook, Ich. S. Car., ed. 1, 1856, 170, pl. 24 (not *Leiostomus xanthurus* Lacépède.

Homoprion subtruncatus Gill, Cat. Fish. E. Coast, 1861, 33 (after Holbrook).

Habitat.—South Atlantic and Gulf coasts of the United States, north to New York.

This species is very abundant on our sandy shores from Long Island to Texas. It reaches but a small size, hence, although an excellent pan fish, it has no great economic value.

Unlike most of the other species of the genus, its second anal spine is little enlarged.

The oldest name of this species, *Perca punctata* L., is not available, as there was at that time already another *Perca punctata*, also named by Linnæus. The appropriate name, *chrysura*, being next in order of date, must, therefore, be adopted.

42. BAIRDIELLA ENSIFERA.

Corvina armata Steindachner, Ich. Beitr., iii, 28, 1875 (Panama) (not of Gill).

Sciæna ensifera Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 313 (Bay of Panama). Gilbert, Bull. U. S. Fish Com., 1882, 112 (Punta Arenas).

Corvina fulgens Vaillant, Miss. Sci. au Mexique, 164, 1883 (Pacific coast of Mexico).

Habitat.—Pacific coast of tropical America.

This species is not uncommon about Panama. Of all the American Sciænoids this species has the largest anal spine in proportion to the size of the body. The *Corvina fulgens*, lately described by Dr. Vaillant, seems to be identical with *Bairdiella ensifera*.

Numerous specimens of this species from Panama are in the museum at Cambridge. They had been wrongly identified as "*Corvina armata*" by Dr. Steindachner.

43. BAIRDIELLA ICISTIA.

(CORBINETA.)

Sciæna icistia Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 356 (Mazatlan). Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 316 (Mazatlan). Jordan & Gilbert, Bull. U. S. Fish. Com., 1882, 107 (Mazatlan).

Habitat.—Pacific coast of Mexico, Mazatlan.

This species is rather common about Mazatlan, where numerous specimens were taken by Dr. Gilbert. It is readily distinguished from other species by the weakness of its dorsal spines, as well as by the large number of the anal rays.

44. BAIRDIELLA RONCHUS.

(RONCO; CORVINA.)

Corvina ronchus Cuv. & Val., Hist. Nat. Poiss., v, 107, 1830 (Maracaibo; Surinam). Storer, Syn. Fish. North Am., 320, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 299, 1860 (San Domingo, Jamaica, Bahia). Günther, Fishes Central America, 387, 1869 (Atlantic coast Central America). Cope, Ichthyol. Lesser Antilles, 471, 1870 (St. Martin).

Bairdiella ronchus Poey, Synopsis, 324, 1868 (Cuba). Poey, Enumeratio, 48, 1875 (Cuba). Poey, Fauna Puerto-Riqueña, 326, 1881 (Porto Rico).

Sciæna ronchus Jordan, Proc. U. S. Nat. Mus., 1886, 44 (Havana).

Habitat.—Atlantic coasts of tropical America.

This species seems to be generally common in the West Indies and along the coast of Brazil.

The numerous specimens before us are from Havana. The species is called *Corvina* in the Havana markets, where it is a food-fish of some importance.

Many specimens from Rio Janeiro and from Havana are in the museum at Cambridge. There is considerable individual variation, but there seems to be no specific difference between Cuban and Brazilian examples.

A number of specimens in poor condition are also in the museum, supposed to have been obtained by Captain Perry at Vera Cruz. These have the snout longer, the eye smaller, and the fins higher than usual in *ronchus*, and they may represent a different species. In these the snout is 4 in head, the eye $4\frac{1}{2}$, the longest dorsal spines $1\frac{3}{4}$, the second anal spine $1\frac{2}{7}$. D. X–I, 24.

45. BAIRDIELLA ARMATA.

Bairdiella armata Gill, Proc. Acad. Nat. Sci. Phila., 1863, 164 (west coast Central America). Bean & Dresel, Proc. U. S. Nat. Mus., 1884, 156 (Jamaica).

Corvina armata Günther, Fishes Central America, 387 and 428, 1869 (Pacific coast of Central America).

Sciæna armata Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 316 (Panama). Gilbert, Bull. U. S. Fish Com., 1882, 112 (Punta Arenas). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 276 (Panama).

Corvina acutirostris Steindachner, Ichthyol. Beitr., iii, 28, 1875, plate 4 (Panama).

Corvina (Homoprion) acutirostris Steindachner, Zur Fisch-Fauna des Magdalenen-Stromes, 9, 1878 (Caiman on Rio Magdalena).

Habitat.—Both coasts of tropical America.

This species is not uncommon on the Pacific coast about Panama, and it is equally abundant on the Atlantic coast, where it seems to ascend the rivers.

There is no doubt of the identity of *Corvina acutirostris* with *Bairdiella armata*, the type of the latter having been examined by Dr. Gilbert.

Bairdiella armata is close to *B. ronchus*, and the character of the dentition of the lower jaw, which we have used to divide *Bairdiella* into minor groups, becomes here of slight importance.

We have examined specimens of this species from Panama, Rio Magdalena, San Matheo, Camaru, Cannarivieras, Curuça, Bahia, Pernambuco, Maranhão, and Itabapuana. The specimen from the latter locality (10837, M. C. Z.) is nearly a foot long, and has the spines a little shorter and stouter than in Panama examples.

46. BAIRDIELLA ALUTA.

Sciæna aluta Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 232 (La Union, San Salvador.

Habitat.—Pacific coast of Central America.

This species is known only from the original type collected by Captain Nichols at La Union.

This specimen strongly resembles *Bairdiella chrysoleuca*, apparently differing only in the larger scales, fewer dorsal rays, longer caudal fin, and larger eyes. The two characters last mentioned may be due to youth, the type of *aluta* being smaller than any *chrysoleuca* examined by us. The other characters are possibly results of extreme variation. It is, therefore, probable that the two nominal species will prove to be identical.

47. BAIRDIELLA CHRYSOLEUCA.

Corvina chrysoleuca Günther, Fish. Central America, 387 and 427, plate 67, fig. 1, 1869 (Panama).

Sciæna chrysoleuca Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 316 (Panama).

? *Sciæna aluta* Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 232 (La Union).

Habitat.—Pacific coast of tropical America.

A few specimens of this species were obtained at Panama by Professor Gilbert. Two others are in the museum at Cambridge (No. 10826, from Panama). The species is quite variable, especially in the armature of its preopercle.

This species, although technically a *Bairdiella*, shows numerous affinities with *Sciæna sciera* and other species of *Ophioscion*. It marks the transition from one group of Sciænoids to the other, from those related to *Larimus* to those allied to *Sciæna*, *Pogonias*, and *Eques*.

Genus XI.—STELLIFERUS.

Les Stellifères Cuvier, Règne Animal, ed. i, 1817, 283 (*stellifer*).

Stelliferus Stark, "Elements Nat. Hist., i, 459, 1828" (*stellifer*) (*fide* Gill).

Homoprion Holbrook, Ichth. S. Carol., 1st ed., 1856, 168 (*lanceolata*).

TYPE: *Bodianus stellifer* Bloch.

This group is composed of small species, all American, allied to *Bairdiella* and *Ophioscion*, but distinguished by the remarkably spongy and cavernous structure of the bones of the skull. The septa are reduced to the thinness of the walls of honeycomb. The skull is also very broad and much depressed between the eyes.

The generic name *Homoprion* was based on a species each of *Stelliferus* and *Bairdiella*. It was restricted by Gill to the former group, and should therefore be regarded as a synonym of *Stelliferus*. We have not examined the paper of Stark, but we understand that *Stelliferus* is a latinization of Cuvier's "Les Stellifères," based on *Bodianus stellifer*.

ANALYSIS OF SPECIES OF STELLIFERUS.

a. Preopercle with two spines only, the upper directed backward, the lower more or less downward.

b. Jaws subequal, the mouth very oblique; teeth of lower jaw unequal, not villiform, those of the inner series enlarged; mouth very large, oblique, the jaws equal, the snout not projecting beyond the premaxillaries, which are on the level of the eye; maxillary 2 in head, extending beyond eye; interorbital width nearly half head; preopercle with two spines only, the upper directed backward, the lower downward; body robust, subrhomboidal; profile steep, straightish; snout short, prominent, as long as eye, 4⅔ in head; teeth of the upper jaw anteriorly in two separated series, the outer of which is composed of enlarged teeth; posteriorly in a broad band of villiform teeth; gill-rakers long and slender, scarcely shorter than eye, 21 + 27; dorsal spines low, the first two and last two somewhat thickened, the rest slender; highest spine 2 in head; caudal rounded, shorter than head, 1⅓ in head; second anal spine robust, 1½ in head; ventrals 1⅓ in pectorals, which are slightly longer than the head; scales about head, on breast, antedorsal region, and several series along the base of the dorsals cycloid, the rest ctenoid; bases of anal and soft dorsal densely scaly; a series of scales on membrane of each spine in the dorsal fin. Color dusky above, pale below, with some silvery luster; middle of sides conspicuously punctulate; upper fins all brownish, punctulate with darker; ventrals, anal, and pectoral pale, the anal and pectoral dusted with dark points; opercle blackish within; head 3⅔ in length; depth 4⅓. D. XI-I, 24; A. II, 8; scale s7-48-6.....OSCITANS, 48.

bb. Jaws not equal, the lower jaw included; mouth less oblique; teeth of lower jaw subequal, in a narrow, villiform band.

c. Mouth large, maxillary 2 in head; lower preopercular spine directed downward and backward; body moderately deep, the anterior profile straightish and steep, a little depressed over the eyes; eye rather large, 4⅓ in head; snout 4⅓; interorbital area broad and flattish, its width 2⅔ in head; head narrower and less depressed than in *S. fürthi*; mouth oblique, the lower jaw included, the premaxillary in front a little above lower edge of pupil; maxillary 2 in head, reaching to posterior margin of eye; teeth of lower jaw in a narrow band of about 3 series, those of the inner series very slightly enlarged; gill-rakers extremely long and slender, about X + 30, the longest slightly less than eye; preopercle strongly rounded, the lower spinule directed backward and downward; scales large; lateral line becoming straight over the anal spine; caudal pointed; longest dorsal

spine 1⅝ in head; second anal spine 2⅙; pectoral 1⅓; head 3⅓ in length; depth 3⅓; D. XI-I, 21; A. II, 9; scales 48 (pores); color rather pale, the pectoral with dark points; gill cavity dark within.....RASTRIFER, 49.

cc. Mouth moderate, the maxillary reaching to behind pupil, 2⅓ in head; lower spine of preopercle directed downward and forward; bones of side of head little cavernous; interorbital width more than ⅓ head; mouth low, little oblique, the maxillary reaching to behind pupil, 2⅓ in head; eye 4⅝ in head; gill-rakers shorter and fewer than in *S. rastrifer*; snout short, thick, and blunt, protruding beyond the premaxillaries which are on the level of the eye; profile steep; body rather short and deep, the back elevated; highest dorsal spine 1⅔ in head; second anal spine small, 2¼ in head, shorter than soft rays; ventrals 2⅓ in head; pectorals scarcely shorter than head; color dull silvery, darker above; lower fins pale; head 3⅔ in length; depth 2⅔ to 3; D. XI-I, 23; A. II, 9; scales 6—46—10.....FÜRTHII, 50.

aa. Preopercle with numerous (6 to 20) serræ, those near the angle more or less enlarged; lower teeth subequal, in a narrow band.

d. Lowermost spinule of preopercle enlarged, directed downward (as in *Bairdiella*); caudal fin subtruncate; body deep, robust, moderately compressed; nuchal region compressed; profile steep, depressed over the eye, the snout projecting; head broad, flattish, and soft above, but less cavernous than in the other species; interorbital space 3 in head; a sharp ridge above orbits as in other species; snout very blunt, short, and thick, 4⅓ in head; mouth oblique, the lower jaw included; maxillary reaching middle of pupil, 2⅓ in head; eye 4⅓ in head; gill-rakers long and slender, X + 21, the longest, ⅔ eye; preopercle with 6 or 7 sharp teeth above, the one at the angle enlarged and turned downward; dorsal spines moderate; second anal spine short, stoutish, ⅔ length of first soft ray, 3 in head; caudal subtruncate, the upper lobe slightly produced; pectorals rather long, 1⅛ in head, reaching beyond tips of ventrals; color soiled silvery, with faint darker streaks along the rows of scales; dorsal with dark points; other fins pale; head 3⅓; depth 3; D. XIII-I, 22; A. II, 11; scales 51.....MINOR, 51.

dd. Lowermost spinule of preopercle not directed downwards; caudal fin pointed.

e. Mouth large, oblique, the maxillary 2 to 2⅓ in length of head; snout very short, little projecting.

f. Preopercle with three or four spines next the angle, divergent, considerable larger than the others.

g. Pectoral fin long, 1⅓ in head; body deep, compressed; head short, deep, more compressed than in related species, the interorbital space less depressed, its width 3⅓ in head, the supraocular ridges less prominent; anterior profile evenly convex; eye rather large, 4⅓ in head; snout very short and blunt, 4⅙; mouth oblique, large, the maxillary 2 in head, reaching posterior border of eye; the premaxillary on the level of lower part of eye; preopercle very convex, forming an arc of a circle; gill-rakers long and slender, X + 18, the longest ⅔ eye; dorsal spines slender, rather low, the longest 1⅔ in head; second anal spine long and rather stout, 1⅔ in head; color dull silvery, the fins not very dark; head 3⅓ in length; depth 3⅓; D. XI-I, 19; A. II, 8; scales 48.....STELLIFER, 52.

gg. Pectoral fin short, about 1⅔ in head; interorbital space 3 in head; second anal spine 2⅓; body rather slender; snout as long as eye, 4⅓

in head; mouth moderate, oblique, the maxillary not quite half length of head, extending just past pupil; premaxillary in front on level of lower margin of pupil; teeth above in broad bands, the outer row enlarged; gill-rakers 13 + 22, about ⅔ length of eye; scales on head cycloid; dorsal spines slender, the first two somewhat stronger, the highest about 2 in head; caudal long, lanceolate, 1⅓ in head; second anal spine little shorter than the highest dorsal spine; first ventral ray filiform; pectoral about as long as ventral, 1⅔ in head; color grayish olive above, silvery below; fins all nearly uniform dusky; the ventrals margined with white; many black dots along the sides; base of anal fin and inner lining of opercle dusky; head 3¼ in length; depth 3¼; D. XI-I, 20 to 23; A. II, 7 or 8; scales 5 — 47 to 50 — 8 ..... LANCEOLATUS, 53.

ff. Preopercle with numerous short, straight spinules, which decrease in size regularly from angle upwards; eye small; mouth terminal, moderate, the maxillary extending past the pupil, its length 2⅔ in head; premaxillaries anteriorly opposite lower margin of orbit, the snout scarcely projecting beyond them; head extremely spongy and cavernous; interorbital width less than ⅓ head; profile straight; snout short, blunt, 5 in head, equal to diameter of eye; upper jaw with a band of villiform teeth, the outer series enlarged; margin of preopercle rounded, its spines all small; gill-rakers ⅔ length of eye, 11 + 18 in number; first two dorsal spines stout, the highest 2 in head; second anal spine 2 in head; pectorals as long as ventrals, 1¼ in head; scales on cheeks mostly ctenoid, on top of head cycloid; color dark brownish above, everywhere soiled with dark points; a dark temporal blotch; lower jaw black within, behind the front teeth; lower fins dusky; head 3⅓ in length; depth 3⅓; D. XII-I, 23; A. II, 7 or 8; scales 5—48—7 ..... ERICYMBA, 54.

ee. Mouth small, inferior, nearly horizontal; the maxillary 3 to 3½ in head; the snout thick, blunt, and protuberant, the premaxillaries entirely below the level of the eye; lower jaw cavernous.

h. Eye large, 3½ in head; lower teeth on preopercle enlarged; preorbital moderate; its width about half diameter of eye; body moderately elongate; anterior profile straight and rather steep; interorbital area flattish, very spongy, narrower than in *S. microps;* its width 3½ in head; snout thick, blunt, protruding, 4½ in head; eye very large; mouth small, inferior, horizontal, the maxillary extending to posterior border of pupil, 3½ in head; teeth as in related species, in moderate bands, those above slightly enlarged; preopercle rounded, sharply serrate, the serræ largest near the angle, some 12 of them present; gill-rakers rather long, very slender, about X + 18; dorsal spines slender, the longest 1⅔ in head; soft dorsal less scaly than in other species, lower than in *S. microps*, the longest ray 2¼ in head; second anal spine 2 in head; pectoral 1½; color soiled grayish above, with faint dark streaks along the rows of scales; silvery below; fins somewhat punctulate; head 3⅔; depth 3½; D. XI-I, 20; A. III, 7; scales 48 ..... NASO, 55.

hh. Eye small, 5 to 6 in head; teeth on preopercle subequal; preorbital thick and swollen, much broader than eye; body moderately elongate; snout thick, blunt, convex, and protuberant; head above less cavernous than usual in the genus, more so below; preopercle (as usual in this genus) forming the arc of a circle; mouth rather small, the maxillary 3 in head; snout 4; gill-rakers about X + 16, shorter than in *S. rastrifer*, about ½ diameter of eye; no pores or

slits at end of snout; interorbital space $2\frac{2}{3}$ in head; dorsal spines low, the longest $1\frac{2}{3}$ in head; soft dorsal high, the longest ray $2\frac{1}{3}$ in head; second anal spine rather large, $1\frac{2}{3}$ in head; pectoral $1\frac{1}{3}$. Color pale, nearly plain; faint oblique streaks along the rows of scales, those below lateral line running obliquely upward and backward; scales of sides with many brown dots. Head $3\frac{1}{3}$; depth $3\frac{1}{4}$. D. X–I, 19; A. II, 8. Scales 51.....MICROPS, 56.

48. STELLIFERUS OSCITANS.

Sciæna oscitans Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 312 (Bay of Panama); 1882, 111 (Panama); Proc. U. S. Nat. Mus., 1882, 376 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This species is not uncommon about Panama; numerous specimens from that locality are in the museum at Cambridge. In the dentition and form of its mouth it differs from the other species, approaching the genus *Bairdiella*.

49. STELLIFERUS RASTRIFER.

Stelliferus rastrifer Jordan, sp. nov.

Habitat.—Coast of Brazil.

This species seems to be generally common on the coast of Brazil. Specimens are in the museum at Cambridge from Rio Janeiro, Santos, Maranhão, Bahia, Cachiura, and Abrolhos Islands. The specimen specially described (10815, M. C. Z.) is $5\frac{1}{2}$ inches in length and was obtained at Santos.

The species is allied to *Stelliferus fürthi*, from which it is distinguished, among other things, by the long and numerous gill-rakers (hence the name—*rastrum*, a rake).

50. STELLIFERUS FÜRTHI.

Corvina (*Homoprion*) *fürthi* Steindachner, Ichthyol. Beitr., iii, 26, fig. 3, 1875 (Panama).

Sciæna fürthi Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 315 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

One specimen of this species was taken by Professor Gilbert at Panama. Several others from the same locality are in the museum at Cambridge.

51. STELLIFERUS MINOR.

Corvina minor Tschudi, Fauna Peruana, Ichthyol., 8, 1844 (Peru).

Sciæna minor Günther, Cat. Fish. Brit. Mus., ii, 295, 1860 (copied).

Corvina (*Homoprion*) *agassizi* Steindachner, Ichthyol. Beiträge, ii, 26, 1875 (Caldera, Callão, Payta).

Habitat.—Pacific coast of South America.

The specimens of this species in the museum at Cambridge are from Callão, in Peru. There seems to be no doubt of the identity of *Corvina*

agassizi with the *Corvina minor* of Tschudi. The name *minor* was given to indicate the small size of the species as compared with *Corvina deliciosa*. The name seems a little unfortunate, as this species reaches a larger size than any other in the genus *Stelliferus*. It bears a considerable resemblance to the species of *Bairdiella*, but its nearest affinities are with *Stelliferus stellifer*.

52. STELLIFERUS STELLIFER.

Bodianus stellifer Bloch, Ichthyologia, plate 231, 1790 ("Cape of Good Hope"). Bloch & Schneider, Syst. Ichth., 331, 1801 (copied).

Sciæna (*Stelliferus*) *stellifera* Jordan, Proc. U. S. Nat. Mus., 1886, 540 (notes on type of *trispinosa*).

Corvina trispinosa, Cuv. & Val., Hist. Nat. Poiss., v, 109 (Brazil; Cayenne). Steindachner, Sciænoiden Brasiliens, 14, 1863 (Pará).

Habitat.—Coasts of Guiana and Brazil. Our description of this species is taken from specimens in the museum at Cambridge, from Bahia.

We have also examined the original type of *Corvina trispinosa* in the museum at Paris. It is doubtless true th at Bloch's type of *Bodianus stellifer* came from Surinam rather than from Africa. His figure represents some species of *Stelliferus*, and Cuvier and Günther are probably right in identifying this figure with *Corvina trispinosa*. Still this identification is not free from doubt, and it may be better to call the species *Stelliferus trispinosus*.

53. STELLIFERUS LANCEOLATUS.

Homoprion lanceolatus Holbrook, Ichthyol. S. Carolina, ed. 1, 168, plate 23, 1856 (Port Royal Sound). Girard, U. S. and Mex. Bound. Survey, 11, 1859 (Saint Joseph's Island, Texas).

Sciæna lanceolata Günther, Cat. Fish. Brit. Mus., ii, 289, 1860 (copied). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 605 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 931, 1883.

Stelliferus lanceolatus Goode, Proc. U. S. Nat. Mus., 1881, 113 (Saint John's River, Florida). Bean, Internat. Fishery Exhib. Berlin, 55, 1883 (Matanzas River Inlet, Florida).

Sciæna stellifera Jordan & Gilbert, Syn. Fish. North America, 569, 1883 (Pensacola).

Habitat.—South Atlantic and Gulf Coast of the United States, Charleston to Texas.

This small fish is rather rare on our coast, the specimens seen by us being few and all from rather deep water; the one here described was obtained at Charleston by Dr. Gilbert.

54. STELLIFERUS ERICYMBA.

Sciæna ericymba Jordan & Gilbert, Bull. U. S. Fish. Com., 1881, 311 (Bay of Panama).

Habitat.—Pacific coast of tropical America; Panama.

This small species is rather common about Panama. The cavernous character of the head is more marked in this species than in any other.

55. STELLIFERUS NASO.

Stelliferus naso Jordan, MSS.

Habitat.—Coast of Brazil.

This species is represented in the museum at Cambridge by many young specimens from Cachiura, the longest about 4 inches in length. The label of the bottle, in Dr. Steindachner's handwriting, indicates that he has regarded it as a species distinct from *S. microps*, although he has published no description of the species.

56. STELLIFERUS MICROPS.

Corvina stellifera Günther, Cat. Fish. Brit. Mus., ii, 299, 1830 (West Indies). (Not *Bodianus stellifer* Bloch.)

Corvina microps Steindachner, Ichthyol. Not., i, 6, plate ii, fig. 1, 1864 (Guiana).

Habitat.—Coast of Brazil and Guiana.

The specimens of this species (4581, M. C. Z.) examined by us, were collected at Pará by Dr. Steindachner. The largest is 3½ inches in length.

Genus XII.—SCIÆNA.

Sciæna part Artedi, Genera Piscium, 1738. (Includes *umbra* and *cirrosa*.)

Sciæna Linnæus, Systema Naturæ, ed. x, 289, 1758 (*umbra; cirrosa*).

Johnius Bloch, Ichthyologia, x, 107, 1793 (*carutta*, &c., later restricted by Gill to *Johnius carutta*).

Sciæna Cuvier, Règne Animal, ed. i, 297, 1817 (restricted to *Sciæna umbra*, a Linnæan species, and to *Sciæna aquila*, a non-Linnæan one) (not of Règne Animal, ed. ii, which is *Pseudosciæna*).

Bola Francis Hamilton, Fishes of the Ganges, 1822 (*coitor chaptis*, &c.).

Sciæna Cuvier, Règne Animal, ed. ii, 1829 ("*umbra*" = *aquila*; and of all subsequent authors except Bleeker; not of Linnæus, nor of Artedi, to both of whom *Sciæna aquila* was unknown; not of the first edition of the Règne Animal).

Corvina Cuvier, Règne Animal, ed. ii, 1829 (*nigra* = *umbra*).

Cheilotrema Tschudi, Fauna Peruana, Fische, 1845, 13 (*fasciatum*).

Rhinoscion Gill, Proc. Ac. Nat. Sci. Phila., 1861, 85 (*saturnus*).

Pseudosciæna Bleeker, Nederland. Tydsskr. f. Dierkunde, i, 1863 (*aquila*).

Sciænops Gill, Proc. Ac. Nat. Sci. Phila., 1863, 30 (*ocellata*).

Ophioscion Gill, Proc. Ac. Nat. Sci. Phila., 1863, 164 (*typicus*).

Callaus Jordan, subgenus novum (*deliciosus*).

TYPE: *Sciæna umbra* Linnæus.

We are compelled to place in a single genus the great bulk of those *Sciænidæ* which have short gill-rakers, inferior mouth, and no barbels on the lower jaw. In spite of the marked differences between the extremes of the series, the intergradation in characters is so perfect that we are unable to draw any sharp distinctive lines among them. This is especially true when the Asiatic species, forming the groups called *Bola* and *Johnius*, are taken into account. It is also true that one of the species of *Bairdiella* (*chrysoleuca*) is very close to some of the members of the present group. In this case, however, there is really one

difference—the length of the gill-rakers, which, though small, is constant, and holds good in all the known species.

With a view to the discovery of a basis for generic subdivision, we have especially compared the following species: *Sciæna* (*Sciænops*) *ocellata*, *Sciæna* (*Pseudosciæna*) *aquila*, *Sciæna* (*Bola*) *diacantha*, and *Sciæna* (*Callaus*) *deliciosa*. If these species could be satisfactorily arranged in different genera, it would be comparatively easy to find characters on which to detach the rather more aberrant types of *Sciæna* (*umbra*), *Cheilotrema* (*saturna* and *fasciata*), *Ophioscion*, and *Johnius*.

The four species first mentioned agree in the position of the anal fin. Its second spine is very weak in *aquila* and adnate to the first ray. It is somewhat so in the others and it is not large in any. In *Johnius* (*dussumieri*) it is also small, but in *Sciæna*, *Cheilotrema*, and *Ophioscion* it is considerably enlarged.

The scales are smallest in *aquila*, largest in *ocellata*, but the difference is not sharp enough to warrant generic division. In all four of the species first mentioned the preorbital is flat and rather broad, broadest in *deliciosa* (7 in head) and narrowest in *aquila*—10½. In the other forms it is generally still broader and more gibbous.

The slits and pores about the snout are distinct in *ocellata* and *deliciosa*, little marked in *diacantha* and nearly or quite obsolete in *aquila*. In *Johnius*, *Sciæna*, *Cheilotrema*, and *Ophioscion* these are more or less distinct.

In all the four species the mouth is of moderate size, slightly oblique, with the lower jaw included, the maxillary reaching to opposite the posterior border of the eye. The mouth is largest in *ocellata*, smallest in *aquila*. In all the others (*Ophioscion*, &c.) the mouth is still smaller. The upper teeth are nearly alike in all of these; of the four mentioned they are largest in *diacantha*, smallest in *deliciosa*. In some East Indian species (referable to *Bola?*) these teeth are still larger, some of them almost canine-like.

The lower teeth are rather large, and chiefly uniserial in *diacantha* and other species of *Bola;* in two or three rows, the inner enlarged in *deliciosa* and *aquila;* in a broad band, some of the inner enlarged in *ocellata*. In *Johnius*, *Cheilotrema*, *Sciæna*, and most of the species of *Ophioscion*, the lower teeth are in a broad band and equal.

The preopercle is sharply serrate in youth, becoming entire with age in *ocellata*. In *aquila* it is vaguely crenulate in youth, becoming finally entire. In *diacantha* it remains more or less crenulate. In *deliciosa* the preopercle is edged by fine flexible serræ. In *Ophioscion* the preopercle is always sharply serrate. In *Sciæna*, *Cheilotrema*, and *Johnius* it is always entire or at least without bony serratures.

Among the four species first mentioned, the gill-rakers are smallest in *diacantha* (X + 7), when they are short and thick, the longest not half the pupil. They are longest in *deliciosa*; when they are slender (X + 12) as long as pupil. In *aquila* and *ocellata* they are X + 8 or 9,

rather slender and short, about $\frac{2}{3}$ length of pupil. In most of the species of the other groups (*Ophioscion*, &c.) they are very few, short and thickish, usually not more than half the length of the pupil. The form of the body offers nothing which can be used for generic distinction, as the intergradations are very perfect. The same can be said of the form and the squamation of the fins.

We may, however, recognize for convenience' sake a number of subgenera, all but one (*Bola*) of them being represented by species occurring within our limits.

We think that there is no doubt that the generic name, *Sciæna*, should go with *Sciæna umbra* (the type of *Corvina* Cuvier), if the laws of nomenclature followed by us be admitted.

There are three members of the present family found in European waters. Two of these, *cirrosa* and *umbra*, were known to Linnæus and to Artedi, and on these the genus was primarily based. The third, *aquila*, was unknown to these authors, and could not therefore with any sort of propriety be taken as the type of a Linnæan genus. The group was first knowingly subdivided by Cuvier in 1817. First separating *cirrosa* as the type of the genus *Umbrina*, he retains in *Sciæna* proper ("les Sciènes proprement dites") two species ("*Sciæna umbra* L." and "*Sciæna aquila* nobis"). This is a perfectly proper arrangement, and of this genus, *Sciæna*, as thus restricted by Cuvier, *Sciæna umbra* must be regarded as the type.

Later, in 1829, this *Sciæna umbra* was made the type of the new genus *Corvina*, as *Corvina nigra* Cuvier, while the non-Linnæan species "*aquila*" was left as the type of *Sciæna*. This arrangement has been followed by nearly all recent writers, but it is manifestly inadmissible, except to authors to whom, as to Cuvier, all laws of nomenclature are subordinate to personal caprice or convenience.

Recently Dr. Bleeker has proposed to take, as the type of *Sciæna*, the *Umbrina cirrosa*, because this is the species mentioned first by Artedi. In the rules now generally followed, this matter of being placed first in the genus is not regarded as an element of any importance. The restriction proposed by Bleeker must therefore give way to the earlier one of Cuvier, and the name *Sciæna* must be regarded as synonymous with *Corvina*. There is the less to be regretted from the fact that *Corvina* has usually been regarded as a generic name for all Sciænoids with conspicuous anal spines, and members of a dozen different genera have been from time to time referred to it.

ANALYSIS OF SPECIES OF SCIÆNA.

a. Preopercle, with its bony margin armed with strong persistent spines, which do not disappear with age; (caudal fin not lunate; soft dorsal and anal scaly; species of small size). (*Ophioscion* Gill.)

b. Caudal fin convex or lanceolate, the middle rays longest, often nearly as long as head; soft dorsal with 16 to 23 rays; head low, the snout somewhat projecting.

c. Anterior profile of head nearly straight; maxillary about 3 in head.

d. [Maxillary not extending to front of eye; depth of body $4\frac{1}{2}$ in total (with caudal); head $4\frac{2}{3}$; eye 4 in head; snout 3; preopercle with larger teeth at the angle; mouth longer than broad; mouth inferior, the snout extending beyond the premaxillary; teeth all alike and minute; maxillary extending to below posterior nasal opening; profile ascending uniformly to first dorsal, convex at the snout and nape; highest dorsal spine $1\frac{2}{3}$ in head; highest dorsal rays not half head; second anal spine robust, scarcely half as long as head; first anal ray $1\frac{1}{3}$ in head; caudal rhomboidal $\frac{9}{7}$ in head; soft dorsal scaly for half its height; pectoral equals ventral, $1\frac{1}{2}$ in head; membranes of fins with numerous dark points; D. X-I, 16; A. II, 7; scales 11-52-16.] (*Steindachner.*) ..... GILLI, 57.

dd. Maxillary extending to opposite posterior edge of pupil; its length $3\frac{1}{4}$ in head; body compressed, moderately deep, the head low, subconic, acutish but blunted at tip; snout projecting, the usual slits and pores well developed; its length $4\frac{1}{2}$ in head; eye small, $4\frac{2}{3}$ in head; mouth small, inferior, horizontal; teeth in lower jaw equal, in the upper nearly so, the outer row a little enlarged; preopercle with a vertical limb and rounded angle, the latter with about 8 rather strong teeth on it; interorbital space $3\frac{1}{3}$ in head; preorbital wide, about as broad as eye; gill-rakers very short, thicker than high; scales regularly arranged, those below lateral line in horizontal series; lateral line becoming straight before anal; dorsal spines rather stout, the longest $1\frac{1}{3}$ in head; second anal spine shortish and very stout, 2 in head; longest soft ray of dorsal 3 in head; caudal rounded, shorter than head; pectoral $1\frac{1}{3}$ in head. Color, soiled brassy; a faint small dark spot on each scale of back and sides, these forming dusky streaks along the rows of scales; fins all dark with dark points. Head $3\frac{2}{3}$ in length; depth $3\frac{1}{3}$; D. X-I, 22 to XI-I, 23; A. II, 7; scales 51. ADUSTA, 58.

cc. Anterior profile more or less concave, especially in old examples, the head being very low and slender; caudal fin lanceolate, almost as long as head; snout short and bluntish, projecting a little beyond the premaxillaries, about as long as eye; eye $3\frac{1}{4}$ in head; mouth small, low, maxillary not extending to below middle of eye, $2\frac{1}{2}$ in head; teeth in both jaws in moderate bands, the outer series of the upper jaw enlarged; highest dorsal spine $1\frac{1}{3}$ in head; anal spine very thick, strong; as long as the rays, $1\frac{1}{4}$ in head; pectorals about as long as ventrals; first ventral ray filiform. Color, grayish; anal and ventral fins largely black. Head $3\frac{1}{4}$ in length; depth $3\frac{1}{3}$; D. X-I, 22; A. II. 7; scales 5—50—7..... TYPICA, 59.

bb. Caudal fin irregularly double truncate or *f* shaped, much shorter than the head; soft dorsal with 24 or 25 rays.

e. Teeth in the lower jaw equal, in a broad villiform band.

f. Snout much projecting beyond the premaxillaries; head low, slender, blunt, somewhat spongy; body rather deep, compressed; the back considerably elevated; profile steep, concave over the head; snout shorter than the eye, which is 4⅓ in head; mouth small, maxillary reaching to below middle of eye, 3 in head; outer series of teeth in the upper jaw slightly enlarged; highest dorsal spine slightly more than half length of head; anal spine moderate, shorter than the rays, 2⅔ in head; first ventral ray filamentous pectorals much longer than the ventrals, scarcely shorter than the head. Color, dull brown above, lighter below; upper fins brown; spinous dorsal dusky at tip; anal black; ventrals and pectorals dusky. Head 3⅓ in length; depth 3; D. XI-I, 25; A. II, 8; scales 5-51-8.....IMICEPS, 60.

ff. Snout scarcely projecting beyond the premaxillaries; head not very slender; body robust; profile steep; snout rather acute, somewhat longer than eye, which is about 5⅓ in head; mouth moderate; maxillary 3 in head, reaching beyond middle of orbit; teeth in broad villiform bands, the outer series in upper jaw larger; highest dorsal spines, 2 in head; caudal irregularly double truncate, the median rays longest, 1⅔ in head; the upper angle not produced; second anal spine stout, scarcely shorter than the rays, 2 in head; pectorals as long as the ventrals, 1¼ in head. Color, steel gray above, dull silvery below, everywhere densely covered with brown points, these becoming more numerous and larger below; narrow, very distinct dark lines following the series of scales, those below the lateral line horizontal, those above extending obliquely upward and backward; fins plain; edge of the spinous dorsal and the whole of the anals and ventrals blackish. Head 3⅔ in length; depth 3⅓; D. X-I, 24; A. II, 7; scales 6-50-9.....SCIERA, 61.

ee. Teeth in lower jaw unequal, a series of larger ones being present besides those of the villiform band; upper lobe of caudal produced, acute, the lower lobe rounded; form of *S. sciera;* [head somewhat compressed, the snout obtuse, a little longer than eye, which is about 5 in head; premaxillaries below level of eye, the snout projecting beyond them; margin of preopercle with wide-set spinous teeth; preorbital nearly as wide as eye; maxillary reaching beyond middle of eye 3¾ in head; third dorsal spine 1½ in head; second anal spine very strong, 2 in head. Color, dusky silvery, with distinct purplish brown streaks along the series of scales; fins, brown. Head 3⅓ in length; depth 3; D. X-I, 25; A. II, 8; scales 6-?-15.] (*Günther.*).....VERMICULARIS, 62.

aa. Preopercle, with its bony margin sharply serrate in young examples, becoming entire with age; body rather elongate, not much compressed. (*Sciænops* Gill.)

i. Caudal fin slightly concave, about half as long as head; a large black ocellus at its base above. Body elongate, rather robust, back somewhat arched; profile rather steep, somewhat convex; head long, rather low; eye small, 7 in head; snout bluntish, rather long, 4 in head; mouth large, nearly horizontal; maxillary not quite reaching posterior border of orbit, $2\frac{1}{2}$ in head; teeth in both jaws in villiform bands, the outer series of the upper jaw much enlarged; lower teeth subequal; gill-rakers 5 + 7, shorter than the diameter of the pupil; longest dorsal spine $2\frac{1}{3}$ in head; second anal spine $1\frac{2}{3}$ in the longest ray, $3\frac{2}{3}$ in head; pectorals as long as ventrals, 2 in head; scales of the breast imbedded, cycloid; soft dorsal scaleless; color grayish-silvery, iridescent; each scale with a center of dark points, these forming rather obscure, irregular, undulating brown stripes along the rows of scales; a jet black ocellated spot about as large as eye at base of caudal above; this sometimes duplicated; the body occasionally covered with ocelli. Head $3\frac{1}{3}$ in length; depth $3\frac{1}{4}$. D. X–I, 24; A. II, 8. Scales 4–50–7 ..... OCELLATA, 63.

aaa. Preopercle, with its bony margin entire or irregularly crenulate or ciliate, never distinctly serrate.

j. Second anal spine small and slender, $3\frac{1}{2}$ to $4\frac{1}{2}$ in head; mouth small, the back not greatly elevated.

k. Body more or less elongate, little compressed, formed as in *Ophioscion;* teeth of lower jaw equal (*Johnius* Bloch).

l. [Caudal rhombic, its length $\frac{2}{3}$ that of head; no black ocellus at its base. Body rather elongated, the form much as in *Sciæna* (*Ophioscion*) *typica*, but the head less depressed; profile, depressed above eye; eye 4 in head, as long as the snout, which is rather long, bluntish at tip; preorbital, $\frac{2}{3}$ length of eye; mouth moderate, horizontal; maxillary extending to below middle of eye, $2\frac{1}{2}$ in head; teeth in many series; outer series of the upper jaw somewhat longer, those of the lower jaw all subequal; preopercle entire (in the figure); scales of the cheek cycloid; those of the opercle and body ctenoid; 46 series of scales above the lateral line; 40 below it; spinous dorsal little longer than high, the spines slender, scarcely flexible, the third longest, 2 in head; soft dorsal densely scaly, the longest ray $2\frac{2}{3}$ in head; second anal spine small, little longer than the eye, $3\frac{1}{2}$ in head; pectorals $1\frac{2}{3}$ in head. Color, greenish or bluish gray above, silvery below; fins yellowish. Head $3\frac{1}{3}$ to $3\frac{1}{4}$; depth $3\frac{1}{2}$ to $3\frac{2}{3}$; D. X-I, 28 or 29; A. II, 7; lateral line, 45.] (*Bleeker.*) ..... HETEROLEPIS, 64.

kk. Body rather elongate, considerably compressed; teeth in lower jaw unequal, those of the inner series more or less enlarged; mouth rather large; preopercle with flexible serræ.

m. Slits and pores of snout anteriorly obsolete, or nearly so (*Pseudosciæna* Bleeker).

n. Caudal peduncle long, the caudal fin subtruncate; profile rather steep, the snout pointed, 4 in head; eye small, 5 to 6; preorbital narrow, about 2½ in eye; mouth rather large, little oblique, the maxillary reaching beyond pupil, 2½ in head; teeth above in a narrow band, the outer enlarged; teeth in lower jaw in few series, some of those in the inner considerably larger; lower jaw included; snout 3⅓ in head; preopercle serrulate, the teeth all membranaceous, becoming obsolete with age; gill-rakers 4 + 8, short and slender; scales small, those below lateral line in oblique series, as well as those above; dorsal spines weak, the longest 2⅔ in head; pectoral short, 1⅓ in head; second anal spine very small, 4⅓ in head, about half as long as soft rays, the insertion well forward; caudal subtruncate; soft dorsal scaleless. Color grayish, darker above; a gray blotch on opercle; fins reddish. Head 4 in length; depth 4½; D. X–I, 26 to 29; A. II, 7. Scales 8–52 to 55–18.

AQUILA, 65.

mm, Slits and pores on snout anteriorly well developed (*Callaus* Jordan).

o. Head and body compressed, the back arched, the outline oblong-elliptical; profile straightish, rather steep; head bluntish, the snout 4⅓ in head; eye rather large, 5⅓ in head, as wide as the broad preorbital; maxillary extending to middle of pupil, 3⅓ in head; mouth rather large, a little oblique, the lower jaw slightly included; preopercle finely and evenly serrate, the serræ flexible and not bony; gill-rakers slender and very short, scarcely as long as pupil, X + 12 in number; teeth in moderate bands, some of the outer moderately enlarged above, some of the inner ones below, these smaller than those of the upper jaw; soft dorsal and anal scaled at base only; dorsal spines moderate; second anal spine small, 4⅓ in head; caudal lunate, its upper lobe the longer; pectoral long, 1⅓ in head; color bluish above with faint dark horizontal streaks, following the rows of scales; axil dark; fins pale; head 3 in length; depth 3$\frac{1}{10}$; D. X–I, 23; A. II, 9. Scales 50.....DELICIOSA, 66.

jj. Second anal spine long and stout, its length 2 to 3 in head; back elevated; mouth small, inferior; snout with conspicuous slits and pores.

p. Vertical fins high; membranes of dorsal and anal scaleless; caudal fin subtruncate, its middle rays the longest (*Sciæna*).

q. Dorsal spines slender and weak, the 4th to 6th subequal, 1⅔ in length of head; ventrals long and lanceolate, the outer rays reaching almost to vent, scarcely shorter than head; body rather short and deep, the back elevated, profile steep, depressed above the eye; ventral outline slightly arched; snout blunt,

scarcely longer than eye, 4⅔ in head; eye 5⅔ in head; preorbital broad, nearly as wide as eye; mouth rather small, inferior, maxillary reaching middle of eye, 2⅔ in head; teeth in both jaws in broad, villiform bands, the outer series above somewhat enlarged; pharyngeal teeth all more or less conical, the inner series somewhat rounded and molar-like; gill-rakers short, flattened, 5 + 8; preopercle with an irregular entire border; dorsal spines all thin and slender; middle rays of soft dorsal highest 1⅓ in head; caudal subtruncate, the middle rays longest; second anal spine stout and long, about 2 in head, reaching when depressed beyond the last ray; first and second soft rays elongate 1⅔ in head, the rest rapidly decreasing in length; pectorals 1⅓ in head; scales strongly ctenoid, those about the head cycloid; a scaly sheath at base of anal and soft dorsal. Color dark golden, each scale with many blackish dots, these forming stripes along the rows of scales; rows of scales below lateral line undulating; membranes of dorsal spines blackish; anal black, the last two rays pale; ventrals black, their first rays with the outer border white, caudal edged with dusky below and behind. Head 3⅓ in length; depth 3. D. X–I, 23; A. II, 7. Scales 8–60–17 ..... UMBRA, 67.

pp. Vertical fins low, the membranes of the dorsal and anal closely scaled; caudal fin lunate, the upper lobe the longer. (*Cheilotrema* Tschudi.)

r. Dorsal rays X–I, 27 or 28; snout moderately blunt; second anal spine 2⅓ in head; dorsal spines gradually shortened behind the third, which is 2⅓ in head; ventrals short, 1⅓ in head; body oblong, the back considerably elevated; profile steep, the nape convex; snout short and blunt, but less so than in *S. fasciata*, 3⅓ in head; eye, 5; preorbital broad, nearly as wide as eye; teeth as in *Sciæna umbra*, the bands broader; pharyngeal teeth all conic, the inner series enlarged; gill-rakers short, thick, 6 + 9; middle rays of soft dorsal longest, 2⅓ in head; second anal spine long and stout, 2⅓ in head, not reaching nearly to tip of last ray; first anal rays scarcely elongate, about 2 in head; pectorals broad, 1⅓ in head; all scales of of head strongly ctenoid; a scaly sheath at base of anal and soft dorsal. Color blackish, with coppery luster, each scale with a cluster of dark points, an obscure, broad, pale cross-band extending downward from front of soft dorsal to tips of ventrals; fins rather dark, belly silvery, dusted with dark specks; suborbital region coppery, with round, dark dots; membrane about angle of opercle jet black; tips of ventral and anal black; young ("*Corvina jacobi*") with three broad longitudinal dark bands. Head 3⅓ in length; depth 2⅓. D. X–I, 27; A. II, 7. Scales, 10–55 to 60–17 ..... SATURNA, 68.

rr. Dorsal rays XI–I, 23; snout extremely short and blunt; second anal spine 2⅓ in head. Body deep, the back elevated; anterior profile very steep and somewhat convex; the back a little compressed; snout low, thick, blunt, and short, 3⅔ in head, its pores and slits conspicuous; mouth inferior, horizontal, the maxillary reaching middle of eye, 3 in head; teeth in broad bands, the outer above somewhat enlarged; preopercle with membranaceous serræ; preorbital very broad, as broad as eye; gill-rakers very short and thick, rough, as long as high, 5 or 6 of them developed; eye 5½ in head; dorsal spines moderate, the longest 2⅔ in head; second anal spine stout and rather shorter than in related species; longest soft ray of dorsal 2⅓ in head; pectoral shortish, 1⅔. Color dusky, the young with two or three vague blackish cross-bands; fins all dusky. Head 3⅓ in length; depth 2½. D. XI–I, 23; A. II, 8. Scales 57.

FASCIATA, 69.

57. SCIÆNA GILLI.

Corvina gilli Steindachner, Ichthyol. Notizen, vi, 29, 1867 (Rio de la Plata).

Habitat.—Atlantic coast of South America.

We know this species from the account given by Dr. Steindachner. It is very close to *Sciæna adusta*, and may prove to be the same, but the description seems to indicate some differences.

58. SCIÆNA ADUSTA.

Sciæna (*Corvina*) *adusta* Agassiz, Spix Pisc. Bras., 126, plate 70, 1829 (Montevideo). Jenyns, Zool. Beagle, Fishes, 42, 1842 (Maldonado; Montevideo). Günther, Cat. Fish. Brit. Mus., ii, 289, 1860 (South America).

Habitat.—Coast of Brazil and the West Indies.

We refer to this species several specimens in the museum at Cambridge from Pernambuco, Fonteboa, and Jérémie, Hayti. Our description is drawn chiefly from the largest example (22417, M. C. Z., 7 inches long) collected at Pernambuco by Rev. J. C. Fletcher. These specimens agree almost perfectly with the figure of *Sciæna adusta*, given by Agassiz, the only discrepancy being that the second anal spine is a little longer than is shown in the figure. They agree fairly with the descriptions of Jenyns and Günther, except in the number of rays in the soft dorsal. In Agassiz's text, as well as by Jenyns and Günther, 28 soft rays are enumerated. We count 22 and 23 in different specimens. But in Agassiz's plate but 19 or 20 are shown, and it has occurred to us that the number 28 in the description was a misprint for 18 or for 20, and that possibly this number, 28, may have been copied without verification by Jenyns and by Günther. If this is not so Agassiz's description must refer to one species, the one examined by Günther and Jenyns, and his figure to another, the one examined by us. In that case our species must receive a new name. But we regard this as highly improbable, and refer all these accounts to the synonymy of *Sciæna adusta*.

59. SCIÆNA TYPICA.

Ophioscion typicus Gill, Proc. Acad. Nat. Sci. Phila., 1863, 165 (west coast Central America).

Corvina ophioscion Günther, Fish. Central America, 387 and 428, 1866 (Panama).

Sciæna ophioscion Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 315 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This species is not uncommon about Panama. In its slender head and lanceolate caudal fin it would seem to differ widely from most of the related forms. Its relations with *S. sciera* are, however, close, and *S. imiceps* is evidently intermediate.

The undesirability of such words as "*typicus*" as specific names is very evident in this case. If we follow the law of priority we have a name which is self-contradictory, as this is one of the species most unlike the real type of *Sciæna*.

60. SCIÆNA IMICEPS.

Sciæna imiceps Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 309 (Bay of Panama).

Habitat.—Pacific coast of tropical America; Panama.

This small species is not rare at Panama. It resembles the species of *Stelliferus*, and it has real affinities with the latter group. The head is, however, different, being low and narrow, and little cavernous, while the gill-rakers are very short, as in the other species referred to *Ophioscion*.

61. SCIÆNA SCIERA.

(CORBINETA.)

Sciæna vermicularis Jordan & Gilbert, Bull. U. S. Fish Com., 1881, 315 (Mazatlan; Panama) (not *Corvina vermicularis* Günther). Gilbert, l. c., 1882, 112 (Punta Arenas).

Sciæna sciera Jordan & Gilbert, Proc. U. S. Nat. Mus., 1884, 480 (Panama).

Habitat.—Pacific coast of tropical America.

This species is one of the most abundant of the Sciænoid fishes on the Pacific coast of Mexico. It was at first taken by Jordan and Gilbert for the *Corvina vermicularis* of Günther, but the latter species is well distinguished by the enlarged teeth * of the lower jaw and by the sharp upper lobe of the caudal.

62. SCIÆNA VERMICULARIS.

Corvina vermicularis Günther, Fish. Central America, 387 and 427, plate 67, fig. 2, 1869 (Panama).

Sciæna vermicularis Jordan, Proc. U. S. Nat. Mus., 1885, 381 (Panama).

Habitat.—Pacific coast of tropical America; Panama.

This species is rare about Panama. One specimen was obtained by Dr. Gilbert in 1883. Besides this, only Dr. Günther's original type is on record.

* This character is not mentioned in the description of *S. vermicularis*. We give it on the strength of our remembrance of the species, as no specimens of the species now exist in any American museum.

63. SCIÆNA OCELLATA.

(THE RED DRUM, OR CHANNEL BASS; "RED-FISH.")

[Plate IV.]

Perca ocellata Linnæus, Syst. Nat., ed. xii, 483, 1766 (South Carolina). Goode & Bean, Proc. U. S. Nat. Mus., 1835, 202 (examination of Linnæan types).

Centropomus ocellatus Lacépède, Hist. Nat. Poiss., iv, 257, 279, 1802.

Corvina ocellata Cuvier & Val., Hist. Nat. Poiss., 134, plate 108, 1830 (New Orleans). DeKay, New York Fauna, Fishes, 75, plate 21, fig. 61, 1842 (New York). Storer, Syn. Fish. North Am., 319, 1846 (copied). Holbrook, Ichthyol. S. Carolina, ed. 1, 149, plate 21, fig. 2, 1855 (South Carolina).

Johnius ocellatus Girard, U. S. & Mex. Bound. Survey, 14, plate viii, fig. 1–4, 1859 (Indianola, Tex.).

Sciæna ocellata Günther, Cat. Fish. Brit. Mus., ii, 289, 1860 (America). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 280 (Pensacola, Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 571, 1883. Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 233 (Cedar Key, Florida). Goode, Hist. Aquat. Anim., 371, plate 125, 1884.

Sciænops ocellatus Gill, Proc. Acad. Nat. Sci. Phila., 1863, 30 (name only). Uhler & Lugger, Fishes of Maryland, 100, 1876 (southern part Chesapeake Bay). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 378 (Beaufort). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 113 (St. John's River, Florida). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 132 (Pensacola). Bean, Proc. U. S. Nat. Mus., 1880, 93 (St. John's River, Florida; Beaufort, N. C.; Fort Macon, N. C.).

Lutjanus triangulum Lacépède, Hist. Nat. Poiss., iv, 181 and 217, plate 24, fig. 3, 1802.

Sciæna imberbis Mitchill, Trans. Lit. & Phil. Soc., New York, 411, 1815 (New York).

Habitat.—South Atlantic and Gulf coasts of the United States, New York to Texas.

This species is common along our coast, especially to the southward, where it one of the largest and most important of the food-fishes. On the Texas coast, where it is known as "Red-fish," or "Pescado Colorado," it exceeds in economic value all other fishes found there.

64. SCIÆNA HETEROLEPIS.

Johnius heterolepis Bleeker, Archives Néerlandaises, viii, 1873, with plate (Surinam).

Habitat.—Surinam.

We know this species solely from Dr. Bleeker's account of it. It much resembles the species of *Ophioscion*, but from these it is apparently separated by the entire preopercle, which, in the figure, is represented much as in *Sciæna* and *Johnius*.

65. SCIÆNA AQUILA.

(THE MAIGRE.)

? *Labrus hololepidotus* Lacépède, Hist. Nat. Poiss., iii, 517, plate 21, fig. 2, 1802 (Cape of Good Hope).

Cheilodipterus aquila Lacépède, loc. cit., v, 685, 1803.

Sciæna aquila Cuv. & Val., v, 28, pl. 100. Günther, ii, 291, and of writers generally.

Perca vanloo Risso, Ichthyol. Nice, ed. i, 298, plate 9, fig. 30, 1810.

Sciæna umbra Cuvier, Mém. Mus., i, 1 (not of Linnæus).

? *Sciæna capensis* Smith, "Ill. S. Afr. Fishes, plate 15."

Habitat.—Coasts of Southern Europe (said to range southward to the Cape of Good Hope).

Our description of this species is taken from specimens in the museum at Cambridge from Cadiz, Spain.

If the accepted synonymy be correct, and the species found at the Cape of Good Hope be identical with the Maigre of Europe, the species should stand as *Sciæna hololepidota.* But this identity seems rather assumed than proved. The Australian "Jew-fish," until lately also identified with *Sciæna aquila*, is now recognized as a distinct species (*Sciæna neglecta* Ramsay). It is, therefore, not improbable that the form found at the Cape is also different.

This species reaches a large size. It is in many respects analogous to *Sciæna ocellata*, which species is perhaps its nearest relative among the American forms.

66. SCIÆNA DELICIOSA.

Corvina deliciosa Tschudi, Faun. Peru. Ichthyol., 8, 1845 (Peru).
Sciæna deliciosa Günther, Cat. Fish. Brit. Mus., ii, 295, 1860 (copied).

Habitat.—Pacific coast of South America, north to Panama.

This species is said to be one of the most abundant food-fishes on the coast of Peru. A great number of specimens are in the museum at Cambridge. Most of them are from Callao, but a few from Panama.

This is a strongly marked species, having no very near relatives anywhere, and, if the other subgenera are to be noticed, this must form an additional one, for which we have suggested the name of *Callaus* (from Callao). It resembles *Genyonemus lineatus* as much as any of our species, but it reaches a much larger size and it has no barbels.

67. SCIÆNA UMBRA.

Sciæna No. 2 Artedi, Genera, 39; Syn., 65, 1734 (Venice; Rome).
Sciæna umbra Linnæus, Syst. Nat., ed. x, 289, 1758 (based on Artedi).
Sciæna nigra Bloch, Icthyologia, vi, 35, taf. 297, 1792.
Johnius niger Bloch & Schneider, Syst. Ichth., 76, 1801.
Corvina nigra Cuv. & Val., and of most recent authors.
Coracinus chalcis Pallas, Zoographia Rosso-Asiatica, iii, 256, 1811.
Corvina canariensis Cuv. & Val., Hist. Nat. Poiss., v, 93, 1830 (Canaries).

Habitat.—Coasts of Southern Europe.

This species is generally common in the Mediterranean. The specimens examined by us are from Venice.

As there can be no possible doubt that this is the original *Sciæna umbra* of Linnæus, we have adopted the name *umbra* instead of the more frequently used name *nigra.*

68. SCIÆNA SATURNA.

(Red Roncador, Black Roncador.)

Amblodon saturnus Girard, U. S. Pac. R. R. Survey, 98, 1859 (San Diego, California).
Corvina saturna Günther, Cat. Fish. Brit. Mus., ii, 288, 1860 (San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (Santa Barbara, San Pedro, San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 49 (Santa Barbara southward). Rosa Smith, West American Scientist, 1885, 47 (San Diego).

Rhinoscion saturnus Gill, Proc. Acad. Nat. Sci. Phil., 1862, 17 (California).
Sciæna saturna Jordan & Gilbert, Syn. Fish. North America, 572, 1883.
Johnius saturnus Jordan, Cat. Fish. North America, 93, 1885 (name only).
Corvina (Johnius) jacobi Steindachner, Ichthyol. Beitr., viii, 3, 1879 (San Diego), based on young specimens.
Sciæna jacobi Jordan & Gilbert, Syn. Fish. North America, 571, 1883 (copied). Rose Smith, West American Scientist, 1885, 47 (San Diego).

Habitat.—Coast of Southern California, north to Santa Barbara.

This species is common on the coast of Southern California, where it is a food-fish of some importance, and is usually known as the Red Roncador or Black Roncador. It reaches a length of something more than a foot.

The nominal species, called *Corvina jacobi*, described from young specimens taken at San Diego, is doubtless identical with *Corvina saturna*. The only difference indicated by Steindachner which could have any serious importance is in the coloration. In the species of *Hæmulon*, *Anisotremus*, and other analogous groups the young often have exactly the coloration assigned to *C. jacobi*, while the adult may be very differently marked. We have not seen the very young of *saturna*, but have no doubt that it passes through the "*jacobi*" coloration in the course of its development.

69. SCIÆNA FASCIATA.

Cheilotrema fasciatum Tschudi, Faun. Peru. Ichthyol., 13, plate i, 1845 (Peru).
Corvina fasciata Günther, Cat. Fish. Brit. Mus., i, 305, 1860 (copied).
Corvina fasciata Steindachner, Ichthyol. Not., vii, 21, 1868 (Chili).

Habitat.—Pacific coast of South America.

Our account of this species is taken from a large specimen (10839, M. C. Z.) from Payta, Peru.

The species is closely related to *Sciæna saturna*, but it is a more robust fish with heavier head. The genus *Rhinoscion*, based on *S. saturna*, is perfectly identical with *Cheilotrema*. The name *fasciata* is not a fortunate one, as the dark bands are not conspicuous and not permanent.

Genus XIII.—RONCADOR.

Roncador Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 28 (*stearnsi*).

TYPE: *Corvina stearnsi* Steindachner.

This genus contains, so far as known, a single species, a large Sciæ-noid of the California coast, much resembling *Aplodinotus grunniens* and having similar teeth, except that the lower pharyngeals in *Roncador* are separate. The Spanish name, *Roncador* (grunter), is one of general application to these fishes, but on the California coast it is used most particularly for the present one.

ANALYSIS OF SPECIES OF RONCADOR.

a. Body oblong, heavy forward; the back elevated and compressed; depth 3 in length; head 3½ to 3⅔; profile long, steep, and convex, abruptly rounded at the snout; snout very blunt, 3½ in head, about equal to the interorbital space; eye 5

in head; mouth moderate, low, subinferior, the lower jaw included; maxillary 2⅓ in head, reaching at least to below middle of eye; preorbital nearly as broad as eye; teeth in both jaws in broad villiform bands, none of them enlarged; lower pharyngeals large, with many rounded molars, the outer series and a patch at the outer corner, composed of villiform teeth; gill-rakers slender, rather short, 7+15; posterior margin of preopercle with short, stout teeth; dorsal spines strong, the longest 2 in head; caudal lunate, the upper lobe the longer; second anal spine stout, 3½ in head; pectorals much longer than ventrals, about as long as head; scales below lateral line in slightly oblique series. Color grayish silvery, with bluish luster, some streaks of dark points along the rows of scales; breast and belly with two dusky longitudinal streaks; a very conspicuous jet black spot as large as eye at base of pectoral; axil and lining of gill cavity black. D. X–I, 24; A. II, 8; scales 6–60–9.....STEARNSI, 70.

70. RONCADOR STEARNSI.

(THE RONCADOR.)

[Plate V.]

Corvina stearnsi Steindachner, Ichthyol. Beitr., iii, 22, 1875 (San Diego).

Roncador stearnsi Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 28 (San Diego) (gen. nov.). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (Santa Barbara, San Pedro, San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 49 (Santa Barbara, southward). Jordan & Gilbert, Syn. Fish. North Am., 572, 1883. Rosa Smith, Proc. U. S. Nat. Mus., 1883, 234 (Todos Santos Bay, Lower California). Goode, Hist. Aquat. Anim., 379, plate 129, 1884 (Santa Barbara, Cal.). Rosa Smith, West American Scientist, 1885, 47 (San Diego). Jordan, Cat. Fish. North America, 93, 1885 (name only).

Habitat.—Coast of Southern California, north to Santa Barbara.

This species is rather common on the coast of Southern California, where it is a food-fish of some importance. It reaches a weight of 5 or 6 pounds.

The black ocellus on the base of the pectoral fin in this species is as characteristic as that at the base of the caudal in *Sciæna ocellata.*

Genus XIV.—LEIOSTOMUS.

Leiostomus Lacépède, Hist. Nat. Poiss., iv, 439, 1802 (*xanthurus*).
Liostomus Gill, Proc. Ac. Nat. Sci., 1863, 63 (corrected orthography).

TYPE: *Leiostomus xanthurus* Lacépède.

This genus, as now understood, contains but a single species. It is distinguished from *Sciæna* chiefly by the obsolescence of the teeth in the lower jaw, and by the more paved teeth of the pharyngeals. The soft rays of the dorsal fin and especially of the anal are more numerous than in related groups.

ANALYSIS OF SPECIES OF LEIOSTOMUS.

a. Body short, deep, much compressed; back in front of dorsal compressed to a sharp edge; profile steep, convex, depressed over the eyes; dorsal outline convex, highest at front of dorsal; depth 3 in length; head 3½ to 3⅓; snout very blunt, as

long as eye, 3½ to 3⅔ in head; mouth small, inferior, horizontal; maxillary 3 in head, extending to below pupil; no teeth in lower jaw, in the adult; upper jaw with a narrow series of minute teeth; gill-rakers short, slender, 8 + 22; lower pharyngeals small, with three series of molars posteriorly and many villiform teeth anteriorly; preopercle entire; preorbital broad, 1½ in eye; third dorsal spine highest, 1½ in head; soft dorsal with the sheath at its base, formed by a single series of scales; caudal long and forked, as long as head; anal long and slightly falcate; second anal spine, 2½ in the longest ray, 4 in head; ventrals ⅓ shorter than pectorals which are as long as the head; scales small, strongly ctenoid, extending on caudal and base of pectorals but not on other fins; lateral line little curved anteriorly; scales below lateral line in oblique series. Color bluish above, silvery below; about 15 narrow dark wavy bands extending from the dorsal downward and forward to below lateral line; a round black humeral spot rather smaller than eye; fins plain olivaceous, the caudal not yellow. D. X-I, 31; A. II, 12; scales 9-60 to 70-12 ..... XANTHURUS, 71.

71. LEIOSTOMUS XANTHURUS.

(THE SPOT; GOODY; POST-CROAKER; OLDWIFE; LAFAYETTE.)

[Plate VI.]

Leiostomus xanthurus Lacépède, Hist. Nat. Poiss., iv, 439, plate 10, fig. 1, 1802 (Carolina). Cuv. & Val., Hist. Nat. Poiss., v, 142, 1830 (Martinique). DeKay, New York Fauna, Fishes, 70, 1842 (New York). Storer, Syn. Fish. North Am., 321, 1846 (copied). Gill, Proc. Acad. Nat. Sci. Phila., 1863, 63 (N. Y. to S. C.). Uhler & Lugger, Fishes of Maryland, 99, 1876 (Lower Potomac, Chesapeake Bay, Sinepuxent Bay). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 377 (Beaufort). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 281 (Pensacola, Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 574, 1883. Bean, Internat. Fishery Exhib. Berlin, 55, 1883 (Brazos Santiago, Tex.; Pensacola, Fla.). Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 233 (Cedar Key, Florida). Jordan & Meek, Proc. U. S. Nat. Mus., 1884, 237 (St. John's River, Florida). Goode, Hist. Aquat. Anim., 370, plate 124, 1884 (Newport, R. I., and southward). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Homoprion xanthurus Holbrook, Ichthyol. S. Carolina, ed. 1, 170, 1856 (South Carolina). Girard, U. S. and Mex. Bound. Survey, 11, 1859 (Brazos Santiago, St. Joseph's, Texas).

Sciæna xanthurus Günther, Cat. Fish. Brit. Mus., ii, 288, 1860 (New York).

Mugil obliquus Mitchill, Trans. Lit. and Phil. Soc., New York, 405, 1815 (New York).

Leiostomus obliquus DeKay, New York Fauna, Fishes, 69, plate 60, fig. 195, 1842 (New York). Storer, Syn. Fish. North Am., 321, 1846 (copied). Holbrook, Ichthyol. S. Carolina, ed. 1, 164, plate 24, fig. 2, 1856 (South Carolina). Girard, U. S. and Mex. Bound. Survey, 11, 1859 (Brazos Santiago, Tex.; Indianola). Gill, Proc. Acad. Nat. Sci. Phila., 1863, 32 (north to Mass.). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 377 (Beaufort). Bean, Proc. U. S. Nat. Mus., 1880, 93 (St. John's River, Florida; Wood's Holl).

Sciæna obliqua Günther, Cat. Fish. Brit. Mus., ii, 288, 1860 (North America).

Sciæna multifasciata Lesueur, Journ. Ac. Nat. Sci. Phila., ii, 225, 1821.

Leiostomus humeralis Cuv. & Val., Hist. Nat. Poiss., v, 141, plate 110, 1830 (New York).

Leiostomus philadelphicus Goode, Proc. U. S. Nat. Mus., 1879, 113 (St. John's R.). Goode & Bean, l. c., 1879, 131 (Pensacola) (not *Perca philadelphica* L.).

Habitat.—South Atlantic and Gulf coasts of United States; Cape Cod to Texas; Martinique (?).

This species is one of the most common food-fishes of our southern coast, being an excellent pan-fish. Notwithstanding the numerous nominal species which authors have recognized, there is no evidence whatever of the existence of more than one species of *Leiostomus* on our coasts.

The name *xanthurus* is an unfortunate one, as in this species the caudal fin is never yellow. This name came about through confusion with *Bairdiella chrysura*, in which species the caudal fin is bright yellow.

Genus XV.—PACHYURUS.

Pachyurus Agassiz, Spix Pisces Brasiliens., 1829, 123 (*squamipennis*).
Lepipterus Cuvier & Valenciennes, Histoire Naturelle des Poissons, v, 151, 1830 (*francisci*).

TYPE: *Pachyurus squamipennis* Agassiz.

This genus is composed of fresh-water Sciænoids inhabiting the rivers of Brazil. It is well separated from *Sciæna* (*Ophioscion*) by the weak dentition. Two groups or subgenera are readily distinguished by the form of the mouth, the group called *Lepipterus* agreeing in this respect very closely with the species called *Pachypops*, from which *Lepipterus* can only be separated by the absence of the small barbels at the chin, which are usually present in the species of *Pachypops*. As these barbels are quite small, and in individuals even occasionally absent, Dr. Steindachner has proposed to unite *Pachypops* with *Lepipterus* as a subgenus under *Pachyurus*. There is no doubt that *Pachypops*, *Lepipterus*, and *Pachyurus* together constitute a single natural group. The characters drawn from the form of the mouth and of the preorbital are subject to intergradation. Unless the presence of the barbel can here, as elsewhere, be used as a mark of generic distinction, all the species must be placed in *Pachyurus*. It seems to us, however, that convenience is but served by placing all the species in which barbels are habitually developed in one genus (*Pachypops*), and those which never have them in another (*Pachyurus*).

ANALYSIS OF SPECIES OF PACHYURUS.

a. Mouth terminal, oblique, small, but larger than in other species; the maxillary reaching front of pupil, its length about 2¾ in head; jaws subequal; caudal fin densely covered with scales, so that it is thick to the touch; preorbital scarcely turgid (*Pachyurus*).

b. Body compressed; the back elevated, the nape especially compressed; head low and narrow; profile depressed above the eyes, so that the sharp, projecting snout leaves a considerable concavity in the line of the profile; teeth in broad bands, all equally minute in both jaws; preorbital broad, broader than eye; skull not specially cavernous; pores and slits on snout obsolete; preopercle sharply but rather finely serrate on the bony border; eye large, 5½ in head; snout 3¾; interorbital width 5½; gill-rakers almost obsolete, 2 + 4 in number, not higher than wide; pseudobranchiæ small; caudal fin rhombic, much thickened; soft dorsal scaly, but not thickened; longest

dorsal spine 2½ in head; anal scaleless, its second spine very strong, 1½ in head; pectoral 1⅔ in head; color silvery, with narrow dark streaks above the lateral line; both dorsals profusely covered with fine dark spots; head 3½; depth 3½. D. X-I, 35; A. II, 7; scales 67 to 68; those in the lateral line scarcely larger ..... SQUAMIPINNIS, 72.

aa. Mouth small, inferior, the maxillary barely reaching front of eye, about 3½ in head; lower jaw included; caudal fin less thickened; preorbital more or less cavernous and turgid (*Lepipterus* Cuv. & Val.).

c. [Dorsal rays X-I, 33; body elongate; head long and depressed over the eyes; depth 6 in length; head 4; maxillary concealed under preorbital; teeth in fine bands; mouth small, maxillary not reaching to front of eye; preopercle serrate; dorsal spines feeble, flexible, and little elevated; dorsal rays subequal; caudal rounded; dorsal and caudal completely scaled; second anal spine curved and compressed, larger and stronger than in related species; color entirely silvery, with numerous darker lines along the back; brown spots on second dorsal. D. X-I, 33; A. II, 7.] (*Cuv. & Val.*).. FRANCISCI, 73.

cc. Dorsal rays X-1, 26 to 29.

d. Second anal spine very long, 2 in head; anterior profile more or less concave, rather steep posteriorly; profile of snout convex; snout 3 in head; mouth small, with very small teeth overlapped by the turgid and translucent preorbital; eye large, 4½ in head; maxillary 3⅓; caudal fin rhombic, densely scaled, but less thickened than in *P. squamipinnis;* soft dorsal much scaly; anal naked; dorsal spines slender, the longest 2 in head, about as long as second anal spine; preopercle strongly serrate; gill-rakers very small; pectoral 1⅓ in head; color brownish, silvery below; traces of 2 or 3 faint dark streaks on posterior part of body above; spinous dorsal mostly black; soft dorsal with some dark spots; head 3½ to 3⅔ in length; depth 3⅓ to 3¼. D. X-I, 26 to 29; A. II, 6 to 8; scales 65 (pores) to 70 (series).. BONARIENSIS, 74.

dd. [Second anal spine shorter, 3 in head; body slightly compressed and somewhat elongate; head conical, elongate; snout produced and somewhat pointed, 2⅔ in head; eye 4 in head; preorbital much swollen, concealing the maxillary; mouth inferior, small; maxillary not reaching to below eye; preopercle with moderate spinous teeth; longest dorsal spines ⅔ of depth of body; all the spines slender; soft dorsal scaly ⅓ of its height; caudal pointed; second anal spine 3 in head; anal rays naked, shorter than dorsal rays; scales small, finely ciliated; teeth minute, scarcely perceptible in upper jaw, in a fine villiform band below; body and second dorsal with blackish spots; head 4 in length; depth 4½. D. X-I, 26; A. II, 7; scales 9-85-20.] (*Günther.*) ..... SCHOMBURGKI, 75.

72. PACHYURUS SQUAMIPINNIS.

Pachyurus squamipinnis (misprinted "*squamipennis*") Agassiz, Spix. Pisc. Bras., 123, plate 71, 1829 (Brazil). Günther, Cat. Fish. Brit. Mus., ii, 281, 1860 (Atlantic Ocean). Steindachner, Ichthyol. Beitr., viii, 13, 1879 (Rio São Francisco; Rio das Velhas).

Pachyurus lundii (Reinhardt, MS.). Lütken, Velhas-Flodens Fiske, xx, 1875 (Rio das Velhas).

Habitat.—Rivers of Brazil.

The numerous specimens of this species which we have examined are from the Rio das Velhas, in Brazil. The largest of these (8634, M. C. Z.) is about 15 inches long.

73. PACHYURUS FRANCISCI.

Lepipterus francisci Cuv. & Val., Hist. Nat., v, 152, plate 113, 1830 (Rio São Francisco).

Pachyurus francisci Günther, Cat. Fish. Brit. Mus., ii, 281, 1860 (copied).

Pachyurus corvina (Reinhardt MS.), Lütken, Velhas-Flodens Fiske, xx, 1875 (Rio das Velhas).

Habitat.—Rivers of Brazil.

We know this species from descriptions only.

74. PACHYURUS BONARIENSIS.

Pachyurus bonariensis Steindachner, Ichthyol. Beitr., viii, 8, 1879 (Rio de la Plata).

Habitat.—Basin of the Rio de la Plata.

We have examined three specimens of this species in the Museum of Comparative Zoology. Two of them, each about a foot in length, are from Buenos Ayres, the other from Rosario.

75. PACHYURUS SCHOMBURGKI.

Pachyurus schomburgki Günther, Cat. Fish. Brit. Mus., ii, 282, 1860 (Rio Capin; Carife; Pará). Steindachner, Ichthyol. Beiträge, viii, 11, 1879 (Pará; Cameta; Obidos; Lake Saraca; Rio Negro; Rio Branco).

Pachyurus nattereri Steindachner, Beitr. zur Kenntn. der Sciæn. Brasil., 10, plate iii, 1863 (Rio Branco; Rio Negro).

Habitat.—Rivers of Brazil.

This species is known to us from descriptions only. We have failed to recognize it in the collections at Cambridge. We follow Steindachner in regarding his *Pachyurus nattereri* as a synonym of *schomburgki*.

Genus XVI.—PACHYPOPS.

Pachypops Gill, Proc. Ac. Nat. Sci. Phila., 1861, 87 (*trifilis*).

TYPE: *Micropogon trifilis* Müller & Troschel.

This genus, like *Pachyurus*, is composed entirely of fresh-water species, inhabiting the Amazon region. It differs from *Pachyurus* only in the presence of small barbels at the chin, and in some individuals these appendages may be rudimentary or even wanting. For this reason Dr. Steindachner has proposed to regard this character as of no systematic importance, and to place these species in the subgenus *Lepipterus* under *Pachyurus*. But unless it can be shown that the *Pachyuri* sometimes possess barbels, it seems to us better to retain the two groups as distinct genera.

ANALYSIS OF SPECIES OF PACHYPOPS.

a. Dorsal rays X–I, 25 to 27; body without conspicuous dark brown spots; caudal rhombic; teeth all equally small.

b. Maxillary scarcely reaching front of eye, its length 4 to 4½ in head; barbels 3, minute (sometimes obsolete); snout prominent, blunt, 2½ in head; eye very large, 3 in head; mouth very small, overlapped by the turgid preorbital; teeth small, equal; gill-rakers very small; soft dorsal and anal completely scaled; pectorals 1½ in head; caudal rhombic, 1½ in head; second anal spine 2½ in head;

longest dorsal spine 1½. Color uniform dusky, paler below; dorsals punctate with black. Head 3½; depth 4. D. X-I, 25 to 27; A. II, 6. Scales 58.

FURCRÆUS, 76.

bb. [Maxillary reaching line of front of eye, its length 3½ in head; barbels 3, well developed; body oblong, compressed; eye not very large, 3½ to 3⅝ in head; snout prominent, rounded, 3½ in head; preorbital broad; teeth equal; preopercle rather finely serrate; soft dorsal closely scaled; anal scaly at base only; pectoral, 1⅔ in head; caudal rhombic, 1½ in head; second anal spine, 2⅛; third dorsal spine, 1¾. Color silvery, with 5 dusky longitudinal bands; dorsals edged with black, the membranes of the spinous part with longitudinal series of dark dots. Head 3⅓; depth 3½. D. X-I, 26; A. II, 6. Scales 50 to 55.] (*Steindachner.*).....TRIFILIS, 77.

aa. Dorsal rays X-I, 31 or 32; back and dorsal fins sprinkled with round dark spots; caudal fin not rhombic; outer teeth above slightly enlarged. Body rather elongate, the back elevated; head rather slender, depressed above the eye; snout rather long, bluntish at tip, 3 in head; eye large, 5 in head; mouth small, low, inferior, scarcely overtipped by the snout, the maxillary reaching front of eye, 3⅓ in head; teeth in broad bands, the outer teeth of upper jaw somewhat enlarged; barbels at chin 3, minute, not longer than nostril; preopercle sharply serrate. Gill-rakers slender, very short; preopercle and especially preorbital much swollen, cavernous, and translucent; mandible not cavernous; dorsal spines strong, the longest 2 in head, as long as the large anal spine; pectoral 1⅔ in head; caudal fin *f*-shaped, the upper lobe pointed. Color brown, with round dark-brown spots scattered over the back and sides, these forming streaks along the rows of scales, which are more or less irregular or interrupted, the spots not being confluent; both dorsals with rows of similar spots; ventrals dusky. Head 3½ in length; depth 3⅓. D. X-I, 31 or 32; A. II, 6 to 8. Scales 75 (8-67-13).....ADSPERSUS, 78.

76. PACHYPOPS FURCRÆUS.

Perca furcræa Lacépède, Hist. Nat. Poiss., iv, 398, 424, 1802 (? Surinam).

Corvina furcræa Cuv. & Val., Hist. Nat. Poiss., v, 111, 1830 (same type).

Pachypops furcræus Steindachner, Beitr. zur Kenntniss Sciænoiden Brasiliens, 7, plate 1, 1863 (Rio Negro).

Pachyurus furcræus Steindachner, Ichthyol. Beitr., viii, 12, 1879 (Surinam; Rio Trombetas; Rio Negro; Amazon, near Cameta).

Corvina biloba Cuv. & Val., Hist. Nat. Poiss., v, 112, 1830 (habitat not known).

Pachypops biloba Steindachner, Ichth. Notiz., 206, 1864 (Surinam).

Habitat.—Rivers of Brazil and Guiana.

Specimens of this species are in the museum at Cambridge from Rio Trombetas, Rio Negro, Obidos, and Cameta. The specimen here described was obtained in Rio Negro by Rev. J. C. Fletcher.

This species was named in honor of a French chemist, Fourcroi.

77. PACHYPOPS TRIFILIS.

Micropogon trifilis Müller and Troschel, Schomburg Reise, iii, 622, 1848 (Guiana). Günther, Cat. Fish. Brit. Mus., ii, 273, 1860 (copied).

Pachypops trifilis Gill, Proc. Acad. Nat. Sci. Phila., 1861, 87 (copied). Steindachner, Beitr. zur Kenntniss Sciænoiden Brasiliens, 7, plate ii, figs. 1-3, 1863 (Rio Guaporé; Rio Negro).

Pachyurus trifilis Steindachner, Ichthyol. Beitr., viii, 12, 1879 (synonymy).

Habitat.—Rivers of Brazil and Surinam.

This species is known to us from Dr. Steindachner's descriptions and figure only.

78. PACHYPOPS ADSPERSUS.

? *Corvina grunniens* Schomburgk, Nat. Libr. Fish. Guiana, 1843, 136 (Rio Essequibo).
Pachyurus (*Lepipterus*) *adspersus* Steindachner, Ichthyol. Beitr., viii, 5, 1879 (Rio Parahyba, Rio Doce, Rio San Antonio, Mucuri).

Habitat.—Rivers of Brazil.

We have examined numerous specimens of this species in the museum at Cambridge from Rio Doce, Santa Clara, Rio San Antonio, and Menchez. The specimen described, 15 inches in length, is from the Rio Doce.

The scanty description of *Corvina grunniens* indicates some river Sciænoid, with distinctly spotted dorsal and anal fins, and with the fin rays D. IX, 32; A. II, 7. The account comes nearest among known species to *Pachypops adspersus*, and if this species occurs in the Essequibo it should probably stand as *Pachypops grunniens*. But without a better knowledge of the local fauna of Guiana, such an identification would be premature.

Genus XVII.—POLYCIRRHUS.

Polycirrhus Bocourt, Nouv. Arch. Mus. d'Hist. Nat., iv, 22, 1868 (*dumerili*).

TYPE: *Polycirrhus dumerili* Bocourt.

This genus is composed of three species of Sciænoid fishes, distinguished from *Micropogon* chiefly by the absence of serræ on the preopercle, and from *Genyonemus* by having the normal number of dorsal spines. All the known species are marked by well-defined dark cross-bands, and all belong to the fauna of South America.

ANALYSIS OF SPECIES OF POLYCIRRHUS.

a. Dorsal rays about IX-I, 22; caudal fin double truncate; body rather elongate, the back somewhat elevated, the head low and small; profile steep; ventral outline straightish; snout not very short, somewhat acute, 3¼ in head; interorbital area broad, convex, 3 in head; eye 5½; mouth small, entirely inferior, maxillary extending past middle of eye, 2⅔ in head; teeth small, villiform, the outer scarcely larger; preopercle rounded, its edge with soft cilia; third dorsal spine 3 in head; soft dorsal with a scaly sheath, its membranes with small scales; ventrals filiform at tip, 1¼ in head; anal inserted well forward, its second spine 2¾ in head; caudal double truncate; lateral line much arched anteriorly. Color, bluish-gray, silvery below; 6 rather broad distinct cross-bars extending down to edge of belly; two inconspicuous dark cross-bars on head; lower fins pale. Head 3⅜ to 3⅔ in length; depth 3⅜ to 3¼. D. IX-I, 22 to 25; A. II, 7 or 8; scales 6–47 to 52–9 ..... DUMERILI, 79.

aa. Dorsal rays X-I, 26 to 32.

b. Caudal fin obliquely truncate, or somewhat pointed. Dorsal rays X-I, 29 to 31; snout short, 3¾ to 4¼ in head; body more elongate than in *P. dumerili*, the snout lower, shorter, and more pointed; maxillary 3½ to 3¾ in head; gill-rakers minute; fins scaly; soft dorsal rays 3 in head; eye 4¼ to 6; longest dorsal spine 2⅔; caudal 1⅕ in head; second anal spine very small, 4⅓ in head; pectoral 1¾; preopercle ciliated on its membranous border. Coloration less marked than in *P. dumerili*, the darker cross-bands narrower, more numerous (about 8), and less sharply defined; the anterior band sometimes reduced to a large round black blotch above base of pectoral; pectoral mostly dusky. Head 4; depth 3½. D. X-I, 29 to 31; A. II, 8; scales about 7–58–11.. BRASILIENSIS, 80.

bb. Caudal fin slightly lunate or S-shaped; body compressed, rather robust; head low, little compressed, the snout extremely short and blunt, 4⅓ in head; gill-rakers small and slender; barbels well developed, about as in the other species; eye 4⅔ in head; mouth larger and more oblique than in the other species; the maxillary 3⅓ in head; pectoral 1¼ in head; longest dorsal spine 2; second anal spine 3⅔. Color soiled, hardly silvery; about eight short, rather faint, dark cross-bands, as wide as the interspaces; fins all dusky. Head 3⅔ in length; depth 3⅔. D. X-I, 26; A. II, 9; scales 55.....PERUANUS, 81.

79. POLYCIRRHUS DUMERILI.

Polycirrhus dumerili Bocourt, Nouv. Arch. Mus. d'Hist. Natur., iv, 22, 1868 (La Union). Jordan, Proc. Acad. Nat. Sci. Phila., 1883, 288 (La Union) (note on Bocourt's type).

Genyonemus fasciatus Steindachner, Ichthyol. Beitr., ii, 31, 1875 (Panama). Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 111 (Panama).

Habitat.—Pacific coast of Central America; Panama.

This small species is rather abundant about Panama. An examination of Bocourt's type of *Polycirrhus dumerili* has shown its identity with the *Genyonemus fasciatus* of Steindachner. The specimens in the museum at Cambridge are from Panama.

80. POLYCIRRHUS BRASILIENSIS.

Genyonemus brasiliensis Steindachner, Ichthyol. Beitr., ii, 34, 1875 (Pará, Santos).

Micropogon ornatus Günther, Shore Fishes Challenger, 13, plate vii, fig. A, 1880 (mouth of Rio de la Plata).

Habitat.—Coast of Brazil.

The specimens of this species in the Museum of Comparative Zoology are from Rio Janeiro and Santos. The identity of *ornatus* with *brasiliensis* has been claimed by Dr. Steindachner. Günther's description does not agree very well with the specimens examined by us, which are a part of the number of Dr. Steindachner's original types. It is not likely, however, that they belong to a different species.

81. POLYCIRRHUS PERUANUS.

Genyonemus peruanus Steindachner, Ichthyol. Beiträge, ii, 27, 1879 (Callao; Payta).

Habitat.—Coast of Peru.

The specimens of this species in the museum at Cambridge are from Callao and Payta. They are among the original types of Dr. Steindachner.

Genus XVIII.—GENYONEMUS.

Genyonemus Gill, Proc. Acad. Nat. Sci. Phila., 1861, 87 (*lineatus*).

TYPE: *Leiostomus lineatus* Ayres.

This genus contains but a single species, abundant along the coast of California.

Although in a general way allied to *Polycirrhus* and *Micropogon*, it has some points of resemblance to *Corvula* and *Bairdiella*, and especially to *Sciæna deliciosa*.

ANALYSIS OF SPECIES OF GENYONEMUS.

a. Body oblong, somewhat compressed, the back little elevated; depth 3⅓ to 3⅔ in length; head 3⅓ to 3½; profile little convex, rather abruptly decurved at the snout; snout 4⅓ in head; mouth subinferior, somewhat oblique; maxillary 3 in head, reaching posterior margin of pupil, lower jaw included; teeth in villiform bands, the outer series above slightly enlarged; chin with five small pores and two series of minute barbels; preorbital two-thirds width of eye, which is 5⅓ in head; preopercle with a crenulate membranous border; opercle with radiating striæ; gill-rakers short and slender, 7+19; third dorsal spine highest, 1½ in head; first soft rays of dorsal highest, decreasing in height to the last; caudal lunate; first ventral ray produced as a filament, 1½ in head; pectoral slightly longer than ventrals; scales large, strongly ctenoid, those below lateral line in horizontal series; color silvery with brassy luster and black punctulations, these forming faint, oblique dark lines along the rows of scales; fins yellowish; axil black. D. XIII-I, 21 or 22; A. II, 11; scales 7-54-10 ..... LINEATUS, 82.

82. GENYONEMUS LINEATUS.

Leiostomus lineatus Ayres, Proc. Cal. Acad. Nat. Sci., 1855, 25 (San Francisco). Girard, Proc. Acad. Nat. Sci. Phila., 1856, 135 (San Francisco). U. S. Pac. R. R. Survey, 99, plate 22 B, fig. 1–4, 1859 (San Francisco).

Sciæna lineata Günther, Cat. Fish. Brit. Mus., ii, 288, 1860 (copied).

Genyonemus lineatus Gill, Proc. Acad. Nat. Sci. Phila., 1861, 89 (name only). Gill, Proc. Acad. Nat. Sci. Phila., 1862, 17 (name only). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (San Francisco, Monterey Bay, San Luis Obispo, Santa Barbara, San Pedro, San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 49 (San Francisco, southward). Jordan & Gilbert, Syn. Fish. North America, 574, 1883. Jordan, Cat. Fish. North America, 94, 1885 (name only).

Habitat.—Coast of Southern California, north to San Francisco.

This little fish is generally common along the coast of Southern California, where it is a food-fish of some importance and is usually known as the "Little Roncador."

Genus XIX.—MICROPOGON.

Micropogon Cuvier & Valenciennes, Hist. Nat. Poiss., v, 213, 1830 (*lineatus*= *furnieri*.)

TYPE: *Micropogon lineatus* Cuv. & Val.= *Umbrina furnieri* Desmarest.

The species of this well-marked genus are very closely related and are all American.

ANALYSIS OF SPECIES OF MICROPOGON.

a. Dorsal rays X-I, 28 to 30.

b. Scales comparatively small, about 9 in a vertical series between front of dorsal and lateral line, 12 in an oblique series; outer teeth of upper jaw evidently enlarged; dark spots on scales above lateral line not forming continuous stripes; 16 scales in an oblique series from vent upward and forward to lateral line. Body rather robust, the back elevated; profile regularly rounded, scarcely depressed above eyes; snout 3 in head; eye 5 in head; preorbital broader than eye; preopercle strongly serrate along its whole posterior margin; maxillary reaching front of pupil, 3 in head; gill-rakers slender, very short, numerous, about 7 + 16; third dorsal spine 2 in head; pectoral 1⅔ in

head; caudal double truncate, 1⅞ in head; second anal spine 3 in head. Color brassy, paler below; middle part of body with short, irregular dusky vertical bars crossing the lateral line; many dark-brown spots on sides of back, irregularly placed, and not forming continuous streaks along the rows of scales; usually some of these coalesce to form two dark streaks concurrent with the back. Head 3 in length; depth 3½. D. X-I, 28 or 29; A. II, 7; lat. l. 54 ..... UNDULATUS, 83.

bb. Scales larger, 7 in a vertical series from front of dorsal to lateral line, 9 or 10 in an oblique series; teeth of outer series in upper jaw scarcely enlarged; dark spots on back forming continuous dark streaks nearly as wide as the pale interspaces; body a little more slender than in *M. undulatus*; profile almost straight, a little depressed above the eye; snout long, 3 in head; eye small, 6 in head, 1½ in interorbital area; preorbital wider than eye; maxillary 3 in head, reaching front of pupil; teeth in broad, villiform bands; preopercle less strongly serrate than in *M. undulatus;* third dorsal spine highest, 1¾ in head; dorsals connected by a low membrane; dorsal with a sheath at its base formed by a single series of scales; soft dorsal naked; second anal spine 5 in head; scales of the breast and head cycloid; a dark spot on opercle; axil dusky; short vertical bars extending across lateral line; many oblique lines above these; markings more regular, though less sharply defined than in *M. undulatus*. Head 3⅞ in length; depth 3¼ to 3⅜. D. X-I, 30; A. II, 7; lateral line 54 ..... FURNIERI, 84.

aa. Dorsal rays X-I, 24 to 26; outer teeth of upper jaw scarcely enlarged; scales rather large; snout little projecting; lateral line 48 (oblique series, 53 pores); scales between front of dorsal and lateral line, vertically 6 or 7; obliquely 8; 16 in an oblique series from vent; profile gibbous above the eyes, depressed at the nape; eye 1¾ in snout, 6 in head; mouth broad, inferior, slightly oblique; maxillary entirely concealed by the broad preorbital, which is wider than the eye; maxillary extending to below anterior margin of the orbit; teeth in both jaws in villiform bands, those of the outer series of the upper jaw somewhat enlarged; preopercle with two strong spines at the angle and many smaller ones above these; gill-rakers little developed, not half the length of the pupil, 7 + 12; third dorsal spine highest, reaching to first soft ray, 1¾ in head; soft rays of dorsal subequal; caudal double truncate; anal spine moderate, 1⅔ in the rays, 3¼ in head; pectorals ⅛ longer than ventrals, slightly less than 1½ in head; scales on cheek, opercle, and breast cycloid, the rest ctenoid; soft dorsal with a weak scaly sheath anteriorly; soft dorsal and anal naked; lateral line arched anteriorly, becoming straight slightly in front of anal fin. Color, grayish silvery; dorsal region and sides above lower edge of pectorals marked with dark streaks extending obliquely upward and backward along the series of scales; about ten short oblique bars extending downward and forward across the arched portion of the lateral line; lining of gill cavity blackish; fins all yellowish; tip of spinous dorsal blackish; upper edge of pectoral and border of soft dorsal dusky. Head 3¼ in length; depth 3¼. D. X-I, 24 to 26; A. II, 7; scales 7-53-10 ..... ECTENES, 85.

aaa. Dorsal rays X-I, 20 to 22; outer teeth of upper jaw scarcely enlarged; snout somewhat projecting; scales still larger; lateral line 42 (49 pores); scales above the lateral line, vertically, 5 or 6; obliquely, 8; 12 in an oblique series from vent; maxillary extending scarcely beyond the vertical from the anterior margin of the eye; body less elongate than in *Micropogon ectenes*; highest dorsal spines 1½ in head; anal spine about 4 in head; coloration essentially as in *Micropogon ectenes*. Head 3½ in length; depth 3⅔. D. X-I, 20 to 22; A. II, 7. Scales 7-48-15. ..... ALTIPINNIS, 86.

83. MICROPOGON UNDULATUS.

(THE CROAKER.)

[Plate VII.]

Perca undulata Linnæus, Syst. Nat., ed. xii, 483, 1766 (South Carolina). Bloch & Schneider, Syst. Ichth., 87, 1801.

Micropogon undulatus Cuv. & Val., Hist. Nat. Poiss., v, 219, 1830 (New Orleans). Storer, Syn. Fish. North Am., 325, 1846 (copied). Holbrook, Ichth. S. Carolina, 145, plate 21, fig. 2, 1856 (South Carolina). Girard, U. S. & Mex. Bound. Survey, 13, plate xii, 1859 (mouth Rio Grande, Indianola, Galveston, Saint Joseph's Island, Texas). Günther, Cat. Fish. Brit. Mus., ii, 271, 1860 (in part) (New York). DeKay, New York Fauna, Fishes, 84, 1862 (New York). Uhler & Lugger, Fishes of Maryland, 102, 1876 (southern part Chesapeake Bay). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 378 (Beaufort). Goode, Proc. U. S. Nat. Mus., 1879, 113 (Saint John's River, Florida). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 132 (Pensacola). Bean, Proc. U. S. Nat. Mus., 1880, 94 (Saint John's River, Florida). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 282 (Pensacola; Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Bean, Internat. Fishery Exhib. Berlin, 56, 1883 (Arlington, Florida). Jordan & Gilbert, Syn. Fish. North Am., 575, 1883. Jordan, Proc. U. S. Nat. Mus., 1884, 36 (Pensacola). Goode, Hist. Aquat. Anim., 378, plate 128, 1884 (Newport, R. I., and southward). Goode & Bean, Proc. U. S. Nat. Mus., 1885, 202, Linnæan types (South Carolina).

Sciæna croker Lacépède, Hist. Nat. Poiss., iv, 309, 314, 316, 1802 (Carolina).

Bodianus costatus Mitchill, Trans. Lit. and Phil. Soc. New York, 417, 1815 (New York).

Micropogon costatus DeKay, New York Fauna, Fishes, 83, plate 72, fig. 230, 1842 (New York). Storer, Syn. Fish. North Am., 325, 1846 (copied).

Habitat.—South Atlantic and Gulf coasts of the United States, Cape Cod to Texas.

This species is generally common along our Atlantic coast, becoming very abundant southward, but not extending into the West Indies. It is a food-fish of some importance.

84. MICROPOGON FURNIERI.

(VERRUGATO.)

*Umbrina furnieri** Desmarest, Première Décade Ichthyol., 22, plate ii, fig. 3, 1823 (Cuba).

Micropogon furnieri Jordan, Proc. U. S. Nat. Mus., 1884, 37 (Havana). Bean & Dresel, Proc. U. S. Nat. Mus., 1884, 157 (Jamaica). Jordan, Proc. U. S. Nat. Mus., 1886, 44 (Havana).

Sciæna opercularis Quoy & Gaimard, Voy. Uran., Zool., 347, 1824 (Rio Janeiro).

Micropogon lineatus Cuv. & Val., Hist. Nat. Poiss., v, 215, plate 119 (Brazil; Porto Rico; Havana).

Micropogon argenteus Cuv. & Val., Hist. Nat. Poiss., v, 218 (Surinam).

Micropogon undulatus Günther, Cat. Fish. Brit. Mus., ii, 271, 1860 (in part; not *Perca undulata* L.) (Surinam; Bahia; Guatemala; Cuba; Jamaica). Günther, Fishes Central America, 387, 1869 (Atlantic coast of Central America). Poey, Synopsis, 325, 1868 (Cuba). Poey, Enumeratio, 48, 1875 (Cuba). Günther, An. & Mag. Nat. Hist., July, 1880 (Rio Plata). Poey, Fauna Puerto-Riqueña, 325, 1881 (Porto Rico).

* This species, although named for its discoverer, Marcellin Fournier, is always written *furnieri* by Desmarest.

Habitat.—West Indies and coasts of South America.

This species is generally common in the West Indies and southward along the coast of Brazil. It is very close to the northern *Micropogon undulatus*, and for this reason its real distinction from the latter has been generally overlooked until quite lately. We have examined numerous specimens from Cuba and from Rio Janeiro.

85. MICROPOGON ECTENES.

Micropogon ectenes Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 355 (Mazatlan); Bull. U. S. Fish Com., 1882, 107 (Mazatlan).

Habitat.—Pacific coast of Mexico; Mazatlan.

This species was found by Professor Gilbert in moderate abundance at Mazatlan, where it seems to take the place of the closely allied *Micropogon altipinnis*.

86. MICROPOGON ALTIPINNIS.

Micropogon altipinnis Günther, Proc. Zool. Soc., 1864, 149 (San José; Panama; Chiapam). Günther, Fish. Central America, 387 and 425, 1869 (Chiapam; San José; Panama). Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 111 (Panama).

Habitat.—Pacific coast of Central America.

This species is closely related to the others of the genus. It was found by Dr. Gilbert at Panama. Specimens from Panama are also in the museum at Cambridge.

Genus XX.—UMBRINA.

Sciæna (part) Artedi, 1738 (includes *Corvina*).

Sciæna (part) Linnæus, Systema Naturæ, ed. x, 289, 1758 (*umbra; cirrosa*).

Umbrina Cuvier, Règne Animal, ed. i, 297, 1817 (*cirrosa; Sciæna* L. being restricted to *Sciæna umbra*, a Linnæan, and *Sciæna aquila*, a non-Linnæan species).

Sciæna Bleeker,* Poissons de la Côte de Guinée, 1862, 66 (*cirrosa;* not the earliest restriction to a Linnæan type).

Umbrina Günther, Gill, Jordan & Gilbert, and of authors generally.

TYPE: *Sciæna cirrosa* Linnæus.

This genus contains a considerable number of species, most of them being American. It agrees with *Sciæna* in nearly all respects, excepting the presence at the chin of a short, thick barbel. A similar barbel is found in the genus *Menticirrhus*, but notwithstanding the fact that all European writers have confounded *Menticirrhus* with *Umbrina*, the two genera are not among the most closely related in this family.

* "Je note ici que l'espèce typique du genre *Sciæna* Art. étant l'*Umbrina cirrosa* CV., le nom de *Sciæna* devra être appliqué aux espèces dont Cuvier a fait des Umbrina, et ne pourra plus être employé dans le sens de Cuvier. Ni M. Günther ni M. Gill, dans leurs travaux sur les Sciénoïdes, paraissent avoir fait attention à ce que le nom générique d'Artedi est mal employé par les auteurs modernes, et M. Gill cite même le *Sciæna aquila* comme le type du genre." (*Bleeker, l. c.*)

In quoting *Umbrina cirrosa* as the type of Artedi's genus *Sciæna*, Bleeker means merely that it is the one placed first by Artedi in the list of species.

We find ourselves unable to follow Bleeker in using the name *Sciæna* for the group usually called *Umbrina*, for reasons which may be again briefly stated. *Sciæna* was originally (Artedi, 1738; Linnæus, 1758) founded on the typical species of the two modern genera *Umbrina* and *Corvina*. In 1817, *Umbrina* was set off from this group and *Sciæna* was made to apply to the group later called *Corvina*, a third species (*aquila*) being added to *Sciæna*. Later (1829) *Corvina* was separated by Cuvier. This gave *Umbrina*, *Corvina*, and *Sciæna*, the latter name then standing for *aquila*. In 1862, Bleeker proposed to use *Sciæna* for the type of *Umbrina*, because in enumerating his species of *Sciæna*, Artedi had made the *Umbrina* "No. 1" and the *Corvina* "No. 2." This is, however, a matter of no significance. In our view but one arrangement of these names is allowable. *Umbrina* must stand, *Sciæna* must take the place of *Corvina*, and the third species (*aquila*) must take a new name—*Pseudosciæna* Bleeker.

ANALYSIS OF SPECIES OF UMBRINA.

a. Dorsal rays X-I, 22 to 24.

b. Snout moderate, 3½ in head; stripes on body yellowish, bordered with steel blue; preopercle with its bony margin distinctly serrate, the teeth at the angle broad and flattish. Body rather deep, the back elevated, the dorsal outline regularly rounded, highest at first dorsal spines; profile steep; snout low, bluntish, 3½ in head; eye small, 1⅔ in snout, 1⅓ in interorbital area, about 5½ in head; mouth moderate, inferior; maxillary reaching front of eye, 3½ in head; preorbital one-third broader than eye; teeth villiform, in broad bands, the outer above little enlarged; lower pharyngeal teeth stout, conical, the inner posterior series slender. Spinous dorsal high the third spine 1½ in head; soft dorsal scaleless; second anal spine small, 1⅔ in soft rays, 2⅔ in head; pectorals little shorter than ventrals, which are 1⅔ in head; caudal slightly lunate, the upper lobe the longer. Color olivaceous, silvery below; upper parts with many wavy lines, yellowish in color, and each bordered on each side by a distinct streak of steel blue; the lines partly following the rows of scales, running nearly straight upward and backwards at the shoulders, more nearly horizontal, more irregular and more or less broken posteriorly; free membrane of opercle jet black within and without; gill cavity pale. Head 3⅓ in length; depth 3⅓ to 3½. D. X-I, 22 to 24; A. II, 7; scales 9-51 (pores)-12; about 65 transverse series of scales..... CIRROSA, 87.

bb. [Snout very short, 4½ in head; stripes on body dusky. Body somewhat elongate; the ventral outline straightish, dorsal outline elevated and much convex; profile steep and convex, slightly depressed over the eyes; snout bluntish, 4½ in head; eye 6 in head, about equal to the broad preorbital; mouth subinferior, horizontal; maxillary reaching past middle of eye, 3½ in head; barbel very short; dorsal spines rather strong, the longest 2½ in head; anterior dorsal rays highest; base of membrane scaly; caudal slightly lunate; anal spine very strong, 3 in head; ventrals shorter than pectorals, which are 1½ in head; scales very thin, covered with minute scales on their base; scales below the lateral line in horizontal series; lateral line regularly arched to above posterior margin of anal. Coloration much as in *Micropogon undulatus*; conspicuous undulating black lines follow the series of scales on whole of body above the pectoral; pectoral, ventral, and anal blackish, with broad whitish margin. Head 3½ in length; depth 3. D. IX-I, 24; A. II, 9; scales 6-60 (about)-10.] (*Günther.*) REEDI, 88.

aa. Dorsal rays X–I, 26 to 28; serræ of preopercle slender, not notably flattened.

c. Body with about nine dark vertical cross-bands, besides narrow undulating streaks along the rows of scales. Body rather stout, the back somewhat arched; eye 3½ in head; preopercle finely denticulate; mouth moderate, the maxillary reaching to below middle of eye; teeth subequal, villiform, in broad bands; gill-rakers minute, slender, 5 + 9; second dorsal spine highest, 1¾ in head; second anal spine about 2½; pectorals short, 1⅔ in head; ventrals 1½; lateral line little arched. Head 3¾; depth 3. D. X–I, 26 to 28; A. II, 6 or 7; scales 5–48–10.....BROUSSONETI, 89.

cc. Body without dark cross-bands, the rows of scales above with distinct undulating streaks.

d. Snout bluntish, short, 4½ in head; serræ of preopercle comparatively numerous and strong, subterete. Body not very deep, the profile somewhat depressed over the eyes; eye 1½ in snout, 1⅛ in interorbital space, 5 in head; preorbital not quite so broad as eye; mouth inferior, the maxillary reaching to middle of eye, 2⅔ in head; teeth in broad bands, the outer series above little enlarged; gill-rakers shortish, rather stout, shorter than pupil, 6+9; pharyngeal teeth longer and more numerous than in *cirrosa;* highest dorsal spine 1⅔ in head; caudal slightly lunate; second anal spine strong, 2½ in head; color bluish above, silvery below; a dusky blotch on center of opercle; back and sides with distinct streaks of deep olive following the centers of the rows of scales, these lines regular and not interrupted; they run obliquely upward and backward below as well as above the lateral line, those below being more nearly horizontal; fins chiefly bright yellow; membrane of opercle pale; lining of gill cavity dusky. Head 3⅔ in length; depth 3⅓. D. X–I, 27; A. II, 6 or 7; lat. l. with about 50 pores; about 60 transverse rows of scales.....RONCADOR, 90.

dd. Snout longer than eye, 3 to 3½ in head; preopercle distinctly serrate.

e. Second anal spine large, 2 in head; profile straight, moderately steep; snout rather acute; eye 4⅛ in head; mouth small, inferior, the maxillary nearly reaching middle of orbit, its length 2½ in head; teeth subequal; gill-rakers scarcely developed, 4 + 9; third dorsal spine highest, 1⅔ in head; anterior dorsal rays much longer than posterior ones; anal fin pointed, the second soft ray longest, the second spine very strong, 2 in head; ventrals slightly longer than pectorals, 1⅔ in head; lateral line moderately arched anteriorly; color bluish, silvery below; conspicuous dark lines following the rows of scales, those below lateral line oblique as well as those above; spinous dorsal dusky. Head 3⅔ in length; depth 3½. D. X–I, 26; A. II, 6; scales 5–48–8.....XANTI, 91.

ee. Second anal spine short and thickish, 3 in head. Back elevated, the anterior profile steep and rather convex; snout blunt, much protruding; mouth small, horizontal; the maxillary reaching just past pupil, 3 in head; eye 5 in head; preopercle finely and sharply serrate; gill-rakers very small; pectoral short, 1½ in head; longest dorsal spine 2; caudal fin slightly lunate, the upper lobe the longer; scales above lateral line in very oblique series, in oblique series below lateral line anteriorly; color, grayish, yellow below; faint dark lines along the scales on the upper half of the body, golden lines on scales below; dorsals finely punctulate; fins pale; gill cavity pale within. Head 3⅔ to 3¾; depth 3⅓ to 3½. D. X–I, 28 or 29; A. II, 6; lat. l. 50 to 53.....GALAPAGORUM, 92.

aaa. Dorsal rays X–I, 31 to 33; preopercle with its edge weakly crenulate; snout very blunt, not longer than eye, 4 in head; back elevated; profile depressed posteriorly, anteriorly gibbous; mouth rather large, subterminal; maxillary reaching posterior border of pupil, 2½ in head; gill-

rakers short and slender, 5+9; second dorsal spine highest, 2 in head; soft rays high; second anal spine 2½ in head; pectorals slightly shorter than ventrals, which are 1⅔ in head. Color bluish, silvery below, dark streaks along the rows of scales very faint, broader than the pale interspaces. Head 3⅓ in length; depth 3. D. X-I, 33; A. II, 7; scales 8-53-9.

DORSALIS. 93.

87. UMBRINA CIRROSA.

Sciæna No. 1. Artedi, Genera 38, 1734 (Mediterranean).
Sciæna cirrosa Linnæus, Syst. Nat., ed. x, 289, 1758 (Mediterranean; after Artedi).
Johnius cirrhosus Bloch & Schneider, Syst. Ichth., 72, 1801.
Umbrina cirrhosa of recent writers generally.
Perca umbra Lacépède, Hist. Nat. Poiss., iii, 16, 1802 (not *Sciæna umbra* Linnæus).
Chilodipterus cyanopterus Lacépède, Hist. Nat. Poiss., iii, 546, plate 6, fig. 3, 1802 (on a painting by Plumier).
Coracinus boops Pallas, Zoographia Rosso-Asiat., iii, 259, 1811.
Umbrina vulgaris Guichenot, Expl. de l'Algérie, 43, 1850 (coast of Algeria).
Sciæna cestreus Gronow, Cat. Fish., ed. Gray, 52, 1854 (Mediterranean).

Habitat.—Mediterranean Sea.

This handsome species is rather common in the waters of Southern Europe. Our specimens are from Venice and Palermo.

88. UMBRINA REEDI.

Umbrina reedi Günther, Shore Fishes, Challenger, 25, plate xiii, fig. B, 1880 (Juan Fernandez).

Habitat.—Coast of Chili.

We know this species from Günther's description only.

89. UMBRINA BROUSSONETI.

Umbrina broussoneti Cuv. & Val., Hist. Nat. Poiss., v, 187, 1830 (Jamaica). Storer, Syn. Fish. North Am., 324, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 277, 1860 (San Domingo, Jamaica). Cope, Ichthyol. Lesser Antilles, 471, 1870 (St. Martin). Jordan & Gilbert, Syn. Fish. N. Am., 576, 1883 (specimens described from Indian River, Florida).
Umbrina coroides Cuv. & Val., Hist. Nat. Poiss., v, 187, 1830 (Brazil). Storer, Syn. Fish. North Am., 323, 1846 (copied). Poey, Enumeratio, 48, 1875 (Cuba).

Habitat.—West Indian Fauna; Florida to Brazil.

This species is known to us from two specimens taken by Dr. J. A. Henshall in the Indian River, Florida. These agree on the whole better with *Umbrina coroides* C. & V., than with *Umbrina broussoneti;* but we think that Dr. Günther is probably right in regarding the two nominal species as identical.

We have also examined specimens from Jérémie, Hayti, and from Pernambuco in the museum at Cambridge.

90. UMBRINA RONCADOR.

(THE YELLOW-FINNED RONCADOR.)

Umbrina undulata Steindachner, Ichthyol. Beitr., iii, 21, 1875 (San Diego) (not of Girard).
Umbrina xanti Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 48 (Santa Barbara southward). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (Santa Barbara, San Pedro, San Diego) (not of Gill).

Umbrina roncador Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 277 (west coast Lower California). Jordan & Gilbert, Syn. Fish. North Am., 576, 1883. Rosa Smith, West American Scientist, 1885, 47 (San Diego).

Habitat.—Coast of Southern California; north to Santa Barbara.

This species is rather common along the coast of Southern California from Santa Barbara as far south as Cerros Island. It is a handsome species, brightly colored in life, and of some value as food.

91. UMBRINA XANTI.

Umbrina xanti Gill, Proc. Acad. Nat. Sci. Phila., 1862, 256 (Cape San Lucas). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 363 (Cape San Lucas). Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 107 (Mazatlan) and 111 (Panama). Gilbert, Bull. U. S. Nat. Mus., 1882, 112 (Punta Arenas).

Umbrina analis Günther, Fishes Central America, 387 and 426, 1869 (Panama).

Habitat.—Pacific coast of tropical America, Cape San Lucas to Panama.

This species is rather common along the west coast of Mexico, specimens having been taken by Dr. Gilbert, at Mazatlan, Punta Arenas, and Panama. These are identical with Gill's types of *U. xanti* and with Günther's *U. analis*, both of which have been examined by us.

92. UMBRINA GALAPAGORUM.

Umbrina galapagorum Steindachner, Ichthyol. Beitr., vii, 20, 1878 (James Island, Galapagos).

Habitat.—Galapagos Archipelago.

This species is known from Dr. Steindachner's original types, most of which are still in the Museum of Comparative Zoology.

93. UMBRINA DORSALIS.

Umbrina dorsalis Gill, Proc. Acad. Nat. Sci. Phila., 1862, 257 (Cape San Lucas). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 363 (Cape San Lucas). Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 107 (Mazatlan).

Habitat.—Pacific coast of Mexico.

This species seems to be rather rare. A large example was taken by Dr. Gilbert at Mazatlan, and this has been compared by us with the types of *U. dorsalis*, young examples taken at Cape San Lucas by Mr. Xantus.

Genus XXI.—MENTICIRRHUS.

Menticirrhus Gill, Proc. Acad. Nat. Sci. Phila., 1861, 86 (*alburnus*).
Cirrimens Gill, Proc. Acad. Nat. Sci. Phila., 1862, 17 (*ophicephalus*).
Umbrula Jordan & Eigenmann, subgenus nov. (*littoralis*).

TYPE: *Perca alburnus* Linnæus = *Cyprinus americanus* Linnæus.

This genus is one of the most strongly marked in the family. It has been confounded by all European writers with *Umbrina*, with which it has not very much in common except the presence of the barbel at the chin. All the species are American, and most of them are closely re-

lated to each other. Two of them, however (*littoralis*, *elongatus*), while retaining the external form and appearance of the others, differ from them widely in the form of the lower pharyngeal teeth and in the presence of gill-rakers. These we have placed in a distinct subgenus, which we have called *Umbrula*. Another species (*ophicephalus*) is also somewhat aberrant and represents a third subgenus (*Cirrimens*).

The species of *Menticirrhus* are all bottom fishes. The low, elongate body, the large pectorals, and the obsolete air-bladder are all characters related to this peculiarity of habit.

ANALYSIS OF SPECIES OF MENTICIRRHUS.

a. Dorsal spines about 13; head very low, thick, sub-terete, the snout blunt and very prominent; lower pharyngeals with acute teeth; gill-rakers obsolete. (*Cirrimens* Gill.)

b. Body formed as usual in *Menticirrhus*; long and low, little compressed; head with very convex cross-outlines, high in front, gibbous above the nostrils; profile depressed above eye; snout 3½ in head; projecting for one-third its length; eye small, 5 or 6; mouth very small, inferior, the outer teeth in the upper jaw moderately enlarged; maxillary reaching to opposite middle of eye, 3⅔ in head; gill-rakers minute, reduced to little fleshy projections; gill openings contracted, the membranes more united below than in other species; preopercle with flexible cilia; lower pharyngeals small, the teeth mostly pointed; spinous dorsal high, the longest spines 1⅓ in head; pectorals short, 1⅓ in head, not reaching tips of ventrals; caudal S-shaped, the lower lobe the longer. Color, dark gray; pectorals dusky. Head 4; depth 4. D. XII-I, 23; A. I, 8; scales 74 (pores) ..... OPHICEPHALUS, 94.

aa. Dorsal spines usually eleven; head not terete, more depressed, with lower snout.

c. Gill-rakers obsolete, reduced to tubercular prominences, covered with teeth similar to those on the other gill arches; lower pharyngeals narrow, the teeth villiform or cardiform, all of them acute or conical, none with rounded heads (molar); teeth in the outer series of upper jaw more or less enlarged; scales on breast large. (*Menticirrhus.*)

d. Soft dorsal rather short, its rays I, 18 to I, 22; snout prominent.

e. Snout very prominent, 3½ in head, its tip slightly turned upward, projecting beyond the premaxillaries for a distance about two-thirds diameter of the eye; spinous dorsal elevated, its longest spines 1½ in head, reaching beyond front of soft dorsal; eye large, but considerably smaller than in *M. nasus*, 5½ in head; mouth comparatively small, inferior, the maxillary reaching middle of eye, 3½ in head; posterior margin of spinous dorsal deeply concave; rays of soft dorsal low, subequal; caudal deeply *f*-shaped, the upper lobe much the longer, 1⅓ in head; ventrals short, 1⅔ in pectorals; pectorals 1½ in head; lateral line concurrent with the back. Color, bluish above, silvery below; spinous dorsal dusky; lining of gill cavity and inner side of pectorals dusky. Head 3½ in length; depth 4. D. X-I, 22; A. I, 8; scales 6-50-10 ..... SIMUS, 95.

ee. Snout less prominent, about 4 in head, its tip not recurved; dorsal spines not elevated, the longest barely reaching soft dorsal, 1⅓ in head.

f. Dorsal rays X-I, 22; eye very large, 4⅓ in head; snout projecting beyond lower jaw for a distance about equal to half the diameter of the eye; mouth small, inferior, the maxillary reaching to below middle of eye, 3 in head; pectoral 1⅓ in head, caudal fin *f*-shaped, the upper lobe pointed, the lower rounded. Color, silvery; fins blackish. Head 3¼ in length; depth 4. D. X-I, 22; A. I, 8; scales 6-54-14 ....NASUS, 96.

ff. Dorsal rays X-I, 19 or 20.

g. Snout low and pointed, 3⅞ in head, projecting much beyond the premaxillaries; eye rather large, 5⅓ in head; body long and low, with rather depressed profile, and low, sharp snout; maxillary extending beyond pupil, 3 in head; preopercular serræ somewhat bony, stiffer, and more distinct than in any other species, rather small and distant; gill-rakers minute, about half length of nostril; outer teeth of upper jaw much enlarged, as in *M. alburnus*; scales on breast large; dorsal spines high, the longest reaching beyond front of soft dorsal, 1⅓ in head; pectorals rather short, 1⅓. Color, plain, dark gray above, paler below; gill cavity dusky; lower fins all dark. Head 3⅓; depth 4. D. IX-I, 20; A. I, 9; scales 55 (pores).
AGASSIZI, 97.

gg. Snout rather short and blunt, 4 in head, projecting beyond premaxillaries for about half a diameter of the eye; eye small, 7 in head; maxillary reaching nearly to posterior margin of eye, 3 in head; outer teeth of upper jaw much enlarged; pectoral long, 1⅓ in head; ventral 2 in head; longest dorsal spine as long as pectoral, anal spine half as long as the rays; upper lobe of caudal not produced. Color, plumbeous, bright silvery below; lower fins mostly black. Head 3 in length; depth 4. D. X-I, 18 to 20; A. I, 9; scales 6-50-14.
PANAMENSIS, 98.

dd. Soft dorsal longer, its rays I, 23 to I, 25.

h. Mouth comparatively large, the maxillary reaching to below middle of eye, 2⅔ to 3⅓ in head; teeth on lower pharyngeals acute; back and sides usually with oblique dusky bars; lower lobe of caudal longest.

i. Outer teeth of upper jaw decidedly enlarged; dorsal spines not much elevated, the longest usually not reaching front of soft dorsal, 1⅓ to 1⅔ in head. Coloration, grayish silvery, the dark markings not pronounced and often obsolete.

j. Dorsal rays X-I, 22 or 23; snout rather shorter and less pointed than in *M. americanus*, 3⅓ in head; mouth smaller, the maxillary 3 in head. Coloration usually plain, sometimes very dark, otherwise as in *Menticirrhus americanus*. Head 3⅔; depth 4½. D. X-I, 22 or 23 (rarely 24); A. I, 7; scales 55 (6-52-10) .....MARTINICENSIS, 99.

jj. Dorsal rays X-I, 24 or 25; snout longer, 3⅓ in head; maxillary reaching nearly to middle of eye, 2⅔ to 3 in head; eye small, 2 in snout; teeth villiform, in broad bands, the outer series of the upper jaw very much enlarged, larger than in the other species; ventrals short, 1⅓ in pectorals; pectorals 1⅓ in head; caudal *f*-shaped, the broad rounded lower lobe longer than the acute upper; scales all ctenoid, those of the breast larger and regularly placed. Color, grayish silvery, with obscure darker clouds along the back and sides; these marks

forming dusky bars, running obliquely forward and downward to considerably below the lateral line, these often obsolete; the bar at the nape saddle-like; lining of gill cavity dusky; pectoral yellowish, dusky at tip; an obscure dusky streak along lower parts of sides running into lower lobe of caudal. Head 3½; depth 4 to 5. D. X–I, 24 or 25; A. I, 7; scales 6–55 (pores)–12.....AMERICANUS, 100.

ii. Outer teeth of upper jaw less enlarged; spinous dorsal elevated, the longest spine reaching past front of soft dorsal, its length 1½ in head; coloration strongly marked, body scarcely silvery. Profile slightly depressed above the eyes; eyes small, 2⅓ in snout, 2 in interorbital area, about 7 in head; snout long, bluntish, 3⅔ in head; mouth large; maxillary reaching middle of eye, 2⅔ in head; ventrals 1½ in pectorals, which are 1½ in head; scales all ctenoid. Color dusky gray above, sometimes blackish, the back and sides with distinct dark oblique cross-bands running downwards and forwards, the anterior one at the nape extending downward, meeting the second and thus forming a V-shaped blotch on each side; a dark lateral streak bounding the pale color of the belly, most distinct posteriorly, and extending on lower lobe of caudal; inside of gill-cavity scarcely dusky; pectorals dark. Head 3¾ to 4 in length; depth 4⅛ to 4⅔. D. X–I, 26 or 27; A. I, 8; scales 7–53 (pores)–14.....SAXATILIS, 101.

hh. Mouth smaller, the maxillary reaching scarcely to front of eye, 3⅓ in head; teeth on lower pharyngeals bluntish; coloration grayish, with dark streaks along the rows of scales. Snout long, little projecting, 3⅓ in head; eye small, 7 in head, 2½ in snout, 1¾ in interorbital area; outer teeth in upper jaw moderately enlarged, about as in *M. saxatilis;* lower pharyngeals a little broader than in *M. americanus*, the teeth coarser, and many of them bluntish, none of them really molar, those of the inner posterior corner of the bone much enlarged; ventrals 1½ in pectorals, which are 1⅓ in head; scales all ctenoid. Color sooty-grayish, with bright reflections; the back, all the fins, and under side of head dusky; undulating lines along sides running upward and backward, made of dark points in center of each scale; back often with very faint dark cross-bars; edge of opercle dusky; lining of gill-cavity slightly dusky. Head 4 in length; depth 4 to 5. D. X–I, 25 or 26; A. I, 8; scales 7–60–11.....UNDULATUS, 102.

cc. Gill-rakers present, very short and somewhat slender; lower pharyngeals rather broad; some or nearly all of the teeth molar, *i. e.*, enlarged, with thickened, rounded heads, the molar teeth covering at least the anterior portion of the bone; teeth in the outer series of upper jaw scarcely larger than the others; scales on breast small. (*Umbrula* Jordan & Eigenmann.)

k. Upper lobe of caudal longer than lower; scales rather small, about 25 in an oblique series from vent forward to lateral line; axillary scale one-third length of pectoral; snout very little projecting; gill-rakers very short, 3+5, the longest about one-third diameter of pupil; lower pharyngeal bones narrower than in *littoralis*, the molar teeth smaller, covering the whole anterior part of the bone; conical teeth on posterior part of the bone, the outermost row enlarged; body

more elongate than in other species; profile low, little convex; eye small, 2½ in snout, 7 in head; snout long, 3 in head; mouth small, the maxillary scarcely reaching front of eye, 3 in head; second dorsal spine 1⅞ in head; anterior soft rays of dorsal almost twice as long as the posterior ones, caudal with an *f*-shaped margin; ventrals 1⅞ in pectorals; pectorals 1⅞ in head. Color bluish on sides and back, silvery below, without stripes or bands. Head 3⅓ in length; depth 4⅔. D. X-I, 22 to 24; A. I, 7; scales 5-53-13.....ELONGATUS, 103.

kk. Upper lobe of caudal not longer than lower; scales rather large, 15 to 18 in an oblique series from vent upward and forward to lateral line; axillary scale not one-fourth length of pectoral; snout distinctly projecting beyond mouth, 3½ in head; gill-rakers larger than in other species, the longest about ½ length of pupil, the number X + 7; lower pharyngeal bones broad, most of the teeth developed as coarse molars, only those along the posterior margin conical; maxillary reaching past front of orbit, 3½ in head; outer teeth of upper jaw scarcely enlarged; longest dorsal spines reaching past front of soft dorsal, the free margin of the fin concave; caudal rather deeply lunate, the lower lobe rounded, the upper pointed; ventrals 1⅞ in pectorals, which are 1⅛ in head. Color silvery gray above, with bluish and bronze reflections, immaculate; a dark-bronze shade along sides on level of pectorals, extending to tail and along cheeks; belly below this abruptly white; dorsals light brown, spinous dorsal black at lip, the base narrowly white; caudal pale, its tip usually black; inner lining of pectoral and ventrals blackish; gill cavity pale. Head 3½ in length; depth 4⅔. D. X-I, 23 to 25; A. I, 7; scales 6-53 (pores)-12.....LITTORALIS, 104.

94. MENTICIRRHUS OPHICEPHALUS.

Umbrina ophicephalus Jenyns, Zool. Beagle, Fish, 45, 1842 (Coquimbo, Chili). Günther, Cat. Fish. Brit. Mus., ii, 277, 1860 (copied).

Cirrimens ophicephalus Gill, Proc. Acad. Nat. Sci. Phila., 17, 1862.

Habitat.—Coast of Chili and Peru.

This singular species is represented by numerous specimens large and small in the Museum of Comparative Zoology. These are from Caldera, Chili (8603, M. C. Z.), and from Callao, Peru. It seems to us that the name *Cirrimens* proposed for this species can be used for a subgenus only.

95. MENTICIRRHUS SIMUS.

Menticirrhus nasus Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 107 and 111 (Mazatlan and Panama) (not *Umbrina nasus* Günther). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Menticirrhus simus Jordan & Eigenmann, sp. nov.

Habitat.—Pacific coast of tropical America; Mazatlan to Panama.

This species is known to us from the specimens collected by Dr. C. H. Gilbert at Mazatlan and Panama.

It was at first identified somewhat doubtfully with *Menticirrhus nasus* by Jordan and Gilbert. The examination of the original type of *Um-*

brina nasus has convinced Dr. Jordan that this is a different species. We here describe in detail the typical specimen under the name of *Menticirrhus simus*.

Menticirrhus simus sp. nov. Type No. 28292, U. S. Nat. Mus.

Depth 4 in length (5 in total); head $3\frac{1}{2}$ ($4\frac{1}{3}$). D. X–I, 22; A. I, 8; scales 6–52–10.

Body robust; back somewhat compressed and regularly arched; depth about uniform between the first dorsal spine and the first soft ray; caudal peduncle rather heavy; distance from last dorsal ray to beginning of middle caudal ray slightly more than 2 in head.

Head subconical; profile steep, slightly depressed over the posterior part of eyes; snout abruptly blunted, turned up anteriorly, suggesting the form of snout in the genus *Heterodon;* five large incisions in the upper lip, three large oval and three small round pores above them, as in other species of *Menticirrhus*; snout $3\frac{1}{2}$ in head; eye $5\frac{2}{3}$ in head; mouth horizontal, inferior, the snout extending $\frac{1}{4}$ of its length beyond the premaxillary; maxillary extending past middle of eye, slightly more than 3 in head.

Teeth in lower jaw villiform in rather broad bands; upper jaw with a band of small teeth and an outer series of enlarged ones; largest teeth of the outer series slightly longer than the anterior nostril; preopercle with fine widely placed teeth on its membranous border; gill-rakers obsolete; pseudobranchiæ very large; lower pharyngeal teeth villiform, those of the inner series much enlarged; first dorsal beginning behind base of pectoral; the first spine minute; the second spine highest, reaching to third dorsal ray, $1\frac{1}{3}$ in head; posterior margin of spinous dorsal deeply concave; dorsal soft rays low, subequal; caudal unequally lunate, the upper lobe much the longer, $1\frac{1}{5}$ in head; anal inserted under fifth dorsal ray; its spine weak, 5 in head; the anterior anal rays much the longer, but not extending to tip of last rays; ventrals $1\frac{3}{5}$ in pectorals; pectorals $1\frac{1}{6}$ in head.

Scales large; all strongly ctenoid; those in the lateral line and those above it more or less covered with smaller ones. Soft dorsal, with a very narrow scaly sheath. Bases of pectorals and caudal densely scaly, the rest of the fins naked. Color, grayish above, lighter below; lower parts of sides with numerous dark points; faint lines following the rows of scales above; spinous dorsal dusky, anal with dark specks; axil and inner margin of pectoral dusky; other fins plain; lining of gill cavity dusky.

This species differs from *Menticirrhus nasus* (Günther) in the size of the eye, the size of the teeth, and the size and shape of the snout. Dr. Jordan has examined the type of *M. nasus* and verified the description of Günther. The large size of the eye in *M. nasus* is not due to the immaturity of the typical example.

96. MENTICIRRHUS NASUS.

Umbrina nasus Günther, Fishes Central America, 387 and 426, 1869 (Panama). Jordan, Proc. Acad. Nat. Sci. Phila., 1883, 289 (Central America).

Habitat.—Pacific coast of tropical America, Mazatlan to Panama.

This species is known to us from Dr. Günther's original type. No others have since been taken, if, as we suppose, our *Menticirrhus simus* is really a distinct species.

97. MENTICIRRHUS AGASSIZI.

Menticirrhus agassizi Jordan, sp. nov. (Caldera).

Habitat.—Coast of Chili.

This species is known from a single specimen, 6½ inches long, in the Museum of Comparative Zoology, from Caldera, Chili. It was found mixed with specimens of *Menticirrhus ophicephalus*, in bottle 8603.

This species is named in honor of Professor Louis Agassiz.

98. MENTICIRRHUS PANAMENSIS.

Umbrina panamensis Steindachner, Ichthyol. Beitr., iv, 9, 1875 (Panama).

Menticirrhus panamensis Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 107 (Mazatlan); l. c., 111 (Panama). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Habitat.—Pacific coast of tropical America, Mazatlan to Panama.

This species is known to us from specimens taken by Dr. Gilbert at Panama and Mazatlan.

99. MENTICIRRHUS MARTINICENSIS.

Umbrina martinicensis Cuv. & Val., Hist. Nat. Poiss., v, 186, 1830 (Martinique). Storer, Syn. Fish. North Am., 323, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 277, 1860 (copied). Jordan, Proc. U. S. Nat. Mus., 1886, 539 (note on type of Cuvier & Valenciennes).

Umbrina gracilis Cuv. & Val., Hist. Nat. Poiss., v, 189, 1830 (Brazil). Günther, Cat. Fish. Brit. Mus., ii, 277, 1860 (copied). Jordan, Proc. U. S. Nat. Mus., 1886, 539 (note on type of Cuvier & Valenciennes).

Umbrina arenata Cuv. & Val., Hist. Nat. Poiss., v, 190 (Brazil). Jenyns, Zool. Beagle, Fishes, 44, 1842 (Bahia Blanca; Maldonado). Günther, Cat. Fish. Brit. Mus., ii, 276, 1860 (Jamaica).

Umbrina phalæna Steindachner, Ichth. Notizen, ix, 20, 1869 (Santos, Brazil).

Umbrina januaria Steindachner, Ichthyol. Beitr., v, 122, 1876 (Rio Janeiro).

Habitat.—West Indies to Patagonia.

We have examined the types of *Umbrina martinicensis* and *U. gracilis* in the museum at Paris. We have also examined numerous specimens in the museum at Cambridge, apparently identical with these, from Rio Janeiro, Rio Grande do Sul, Victoria, Bahia, and Montevideo. The species seems to be as common in South America as its analogue *M. americanus* is in North America. The two are exceedingly alike, and *martinicensis* is probably a geographical variety of the other, distinguished perhaps by a slightly smaller number of rays in the dorsal fin.

Were it not that the Sciænoid fauna of South America is chiefly different from that of North America, we should scarcely hesitate to place *martinicensis* in the synonymy of *americanus*. *Umbrina januaria* is apparently based on the specimens from Rio Janeiro examined by us. *Umbrina gracilis* was based on the dried skin of a young example, distorted and varnished.

Umbrina arenata, as described by Cuvier & Valenciennes, does not differ at all from *M. martinicensis*. As described by Dr. Günther, the scales are 72 to 78 in *arenata*. It is evident, however, that Günther has counted not the pores, but the number of vertical series of scales, and these range from 70 to 80 in nearly all of our species, the number exceeding the number of pores by about 20, and similarly exceeding the number of oblique series. We see no reason, therefore, for not placing *arenata* in the synonymy of *martinicensis*.

100. MENTICIRRHUS AMERICANUS.

(THE CAROLINA WHITING.)

[Plate VIII.]

Alburnus americanus (the Whiting) Catesby, Nat. Hist. Carolinas, etc., pl. 12, f. 2 (Jordan, Proc. U. S. Nat. Mus., 1884, 195).

Cyprinus americanus Linnæus, Syst. Nat., ed. x, 321, 1758 (based on the Whiting of Catesby) (not *Cyprinus americanus* of the twelfth edition, which is a Cyprinoid, *Notemigonus bosci* Cuv. & Val.).

Perca alburnus Linnæus, Syst. Nat., ed. xii, 482, 1886 (on specimens sent from Charleston by Dr. Garden). Schöpf, Schrift. Naturf. Freunde Berlin, viii, 162, 1788. Bloch & Schneider, Syst. Ichth., 87, 1801.

Centropomus alburnus Lacépède, Hist. Nat. Poiss., iv, 249, 257, 264, 1802.

Sciæna alburnus Gronow, Cat. Fish., ed. Gray, 51, 1854 (South Carolina).

Umbrina alburnus Cuvier & Valenciennes, v, 180, 1830 (in part). Holbrook, Ichthyol. S. Carolina, 136, plate 20, fig. 2, 1856 (South Carolina). Günther, Cat. Fish. Brit. Mus., ii, 275, 1860.

Menticirrhus alburnus Uhler & Lugger, Fishes of Maryland, 101, 1876 (Chesapeake Bay). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 378 (Beaufort). Goode, Proc. U. S. Nat. Mus., 1879, 113 (Saint John's River, Florida). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 132 (Pensacola). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 282 (Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 577, 1883; Goode, Hist. Aquat. Anim., 376, plate 127 b, 1884. Goode & Bean, Proc. U. S. Nat. Mus., 1885, 202 (Linnæan types). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Umbrina phalæna Girard, Proc. Acad. Nat. Sci. Phila., 1858, 167 (Indianola, Brazos Santiago). Girard, U. S. and Mex. Bound. Survey, 13, 1859.

Habitat.—South Atlantic and Gulf coasts of the United States, Chesapeake Bay to Texas.

This species is very common on the sandy coasts of our Southern States, where it is a food-fish of some importance.

As elsewhere stated, this may be identical with the South American *Menticirrhus martinicensis*.

This species has generally received the specific name of *alburnus* given to it by Linnæus in the twelfth edition of the Systema Naturæ. In the tenth edition of the Systema, Linnæus had already given the specific name of *americanus* to the Whiting of Catesby. There is no doubt that Catesby had this common species in mind, although his rude figure resembles the Surf Whiting (*littoralis*) fully as much as it does the common Whiting.

101. MENTICIRRHUS SAXATILIS.

(THE KING-FISH; SEA MINK.)

[Plate IX.]

Johnius saxatilis Bloch & Schneider, Syst. Ichth., 75, 1801 (New York).

Menticirrhus saxatilis Jordan, Proc. Acad. Nat. Sci. Phila., 288, 1883 (note on type of Bloch & Schneider). Jordan, Proc. U. S. Nat. Mus., 1884, 129 (Key West). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Umbrina alburnus DeKay, New York Fauna, Fishes, 78, plate 7, fig. 20, 1842 (New York). Storer, Syn. Fish. North Am., 323, 1846 (Massachusetts) (not *Perca alburnus* L.).

Sciæna nebulosa Mitchill, Trans. Lit. & Phil. Soc. New York, 406, plate 3, fig. 5, 1815 (New York) (not of Gmelin).

Umbrina nebulosa Storer, Fishes Massachusetts, 35, 1839 (near Boston light house). Ayres, Fishes of Brookhaven, L. I., 259, 1842. Storer, Hist. Fish. Mass., 124, plate ix, fig. 4, 1867 (Boston light-house; Lynn; Provincetown). Günther, Cat. Fish. Brit. Mus., ii, 275, 1860 (New York).

Menticirrhus nebulosus Goode & Bean, Fish. Essex Co. and Mass. Bay, 17, 1879 (Danvers; Spite Bridge; Marblehead light-house). Bean, Proc. U. S. Nat. Mus., 1880, 93 (Wood's Holl, Mass; Noank, Conn.; Cohasset Narrows, Mass). Goode, Proc. U. S. Nat. Mus., 1881, 113 (St. John's River, Florida). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 282 (Pensacola). Jordan & Gilbert, Syn. Fish. North America, 577, 1883. Goode, Hist. Aquat. Anim., 375, plate 127a, 1884.

Habitat.—Atlantic and Gulf coasts of the United States, Boston to Key West and Pensacola, most common northward.

This species is generally common along the coasts of our Northern States, its greatest abundance being north of the limit of *M. americanus*, a species which it very closely resembles, the differences being of comparatively little importance. Southward its distribution seems to be peculiar. A large specimen was obtained by Dr. Jordan at Pensacola and several small ones at Key West. All these are very dark in color, but not otherwise evidently different from the common northern form. The name *saxatilis* should be used for this species. The original type of *Johnius saxatilis*, sent by Schöpf (?) to Bloch, is still in the museum at Berlin, where it has been examined by us. The name *saxatilis* for the Whiting, like that of *regalis* for the Weak-fish, came about through a confusion of the vernacular names, the supposed "King-fish" being named "*Johnius regalis*" by Bloch, and the supposed "Rock-fish," "*Johnius saxatilis*."

102. MENTICIRRHUS UNDULATUS.

(THE CALIFORNIA WHITING OR "SUCKER.")

Umbrina undulata Girard, Proc. Acad. Nat. Sci. Phila., 1854, 148 (San Diego, Cal.). Girard, U. S. Pacif. R. R. Survey, 121, 1859 (San Diego, Cal.).

Menticirrhus undulatus Gill, Proc. Acad. Nat. Sci. Phila., 1862, 17 (name only). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (Santa Barbara, San Pedro, San Diego). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 48 (Santa Barbara, southward). Jordan & Gilbert, Syn. Fish. North Am., 578 and 933, 1883. Rosa Smith, West American Scientist, 1885, 47 (San Diego). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Habitat.—Coast of Southern California, north to Santa Barbara.

This species is rather common along the sandy coasts of Southern California, where it is a food-fish of moderate importance. Girard's type of *Umbrina undulata* has been examined by us. It is a young example of this species.

103. MENTICIRRHUS ELONGATUS.

Umbrina elongata Günther, Proc. Zool. Soc. Lond., 1864, 148 (Chiapam). Günther, Fishes Central America, 387 and 425, plate 64, fig. 2, 1869 (Chiapam). Steindachner, Ichthyol. Beitr., iv, 9, 1875 (Panama north to "San Diego," confounded with *M. undulatus*).

Menticirrhus elongatus Jordan & Gilbert, Bull. U. S. Fish Com., 1882, 107 (Mazatlan). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Umbrula elongata Jordan & Eigenmann.

Habitat.—Pacific coast of tropical America, Mazatlan to Panama.

This species is rather common on the west coast of Mexico. Its relations are evidently with *M. littoralis*, but in several respects it represents a transition towards *Menticirrhus undulatus*, its nearest relative among the typical *Menticirrhi*.

104. MENTICIRRHUS LITTORALIS.

(THE SURF WHITING; SILVER WHITING.)

Umbrina littoralis Holbrook, Ichthyol. S. Carolina (first edition), 142, plate 20, fig 1, 1856 (South Carolina). Günther, Cat. Fish. Brit. Mus., ii, 276, 1860 (copied).

Menticirrhus littoralis Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 378 (Beaufort). Bean, Proc. U. S. Nat. Mus., 1880, 93 (Florida). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 283 (Pensacola, Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 606 (Charleston). Jordan & Gilbert, Synopsis Fish. North Am., 933, 1883. Bean, Internat. Fishery Exhib., 56, 1883 (Matanzas River Inlet, Florida). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Umbrula littoralis Jordan & Eigenmann.

Habitat.—South Atlantic and Gulf coasts of the United States, North Carolina to Texas.

This species is generally common in the surf along the sandy shores of the Southern States. It resembles *M. americanus* somewhat in external characters so that it has often been confounded with it by careless observers. Its technical distinctions are, however, numerous, and in the

form of its pharyngeal teeth it differs in a marked degree from all the other species of *Menticirrhus* except *M. elongatus*. Were it not that *M. elongatus* and *M. undulatus* are both in several respects intermediate between *M. littoralis* and the typical forms of *Menticirrhus*, we should regard the subgenus *Umbrula*, based on *M. littoralis*, as certainly worthy of full generic rank.

Genus XXII.—PARALONCHURUS.

Paralonchurus Bocourt, Nouv. Arch. Mus., iv, 21, 1869 (*petersi*).

TYPE: *Paralonchurus petersi* Bocourt.

This genus seems to be most nearly related to *Lonchurus*, being in some respects intermediate between that and ordinary Sciænoids. But one species has been described.

ANALYSIS OF SPECIES OF PARALONCHURUS.

a. Body long and low; head slender, flattish, somewhat spongy above, with protuberant snout; eye 8½ in head; snout 3⅔; interorbital area 3¼; mouth horizontal; maxillary 2⅔ in head; teeth in villiform bands; upper jaw with a conspicuous outer row of larger ones; chin with 5 pores, a multifid barbel at the symphysis; rami with a row of slender barbels along inner edge; dorsal low, highest behind; soft dorsal scaled at base only; caudal pointed, as long as head; anal spines small; second spine as long as snout; pectorals very large, 2⅔ in body; scales rather large, cycloid; color light olive with faint stripes on rows of scales; pectoral dusky; other fins plain. Head 3¼ in length; depth 4. D. X–I, 30; A. II, 9; scales 8–50–16 ..... PETERSI, 105.

105. PARALONCHURUS PETERSI.

Paralonchurus petersi Bocourt, Nouv. Archives du Muséum, iv, 1869, 22 (San Salvador). Jordan, Proc. U. S. Nat. Mus., 1886 (Panama).

Habitat.—Pacific coast of tropical America, Panama.

This rare species is now known to us from the original account of Dr. Bocourt and from Dr. Jordan's notes on the original type in the museum at Paris. Specimens were later taken by Dr. Gilbert at Panama, but all of these have been destroyed by fire.

A second species of *Paralonchurus* was obtained by Dr. Gilbert, but the typical specimens were destroyed by fire and no description has been published.

The following is Bocourt's description:

"D. X–I, 30; A. II, 9. C. 17; P. 21; V. I, 5. L. lat. 50. L. trans. $\frac{8}{1\frac{1}{2}}$.

"CARACTÈRES.—Corps allongé comprimé; la plus grande hauteur, prise à la naissance des pectorales, est contenue quatre fois dans la longueur (la caudale non comprise), la tête y entrant trois fois et demie. Museau déprimé, percé en avant d'un gros pore; deux lobes arrondis au-devant de la bouche, au-dessus de chacun desquels se trouve un autre pore. Diamètre horizontal de l'œil, compris trois fois et demie dans la largeur de l'espace interorbitaire, et près de dix fois dans la

longueur de la tête. Bouche placée sous le museau, l'extrémité du maxillaire ne dépassant pas verticalement le bord postérieur de l'orbite. Quatre pores sous la mâchoire inférieure; entre les deux premiers on aperçoit un petit barbillon multifide touchant à la symphyse, et il y en a dix d'une grande ténuité placés sur chacune des branches de la mâchoire inférieure. Préopercule arrondi; une crénelure membraneuse existe sur son bord postérieur. Ligne latérale infléchie au-dessus de l'anale. Pectorales très développées. Dorsale profondément échancrée et à rayons épineux faibles; le premier, très court, prend naissance au-dessus de l'origine des pectorales; le quatrième, le plus long, égale la largeur de l'espace interorbitaire. Ventrales attachées au même niveau que les précédentes. Anale petite, et à épines médiocres. Caudale pointue, sa longueur égale celle de la tête. Anus plus éloigné, de l'extrémité de la queue que du bout du museau. Vessie aérienne épaisse, argentée et prolongée en une pointe très déliée. Écailles cycloïdes.

"Un seul exemplaire a été rapporté de La Union, République du Salvador.

"Longueur totale, 0^{m} 256."

Genus XXIII.—LONCHURUS.

Lonchurus Bloch, Syst. Ichth., plate 360, 1793 (*barbatus* = *lanceolatus*).

TYPE: *Lonchurus barbatus* Bloch.

This genus contains apparently but a single species, a rather rare inhabitant of the Caribbean waters. This species we have not been able to examine.

The genus seems to be one of the most remarkable of the family. Except its analogue, *Paralonchurus*, it seems to have no very near relatives.

ANALYSIS OF SPECIES OF LONCHURUS.

a. [Body long and low; the profile straightish, depressed over the eyes; interorbital area as broad as eye, which is as long as snout; snout small, 10 in head; snout soft, depressed, with conspicuous pore at tip; mouth oblique, subinferior; maxillary reaching a little beyond eye; teeth in fine bands; barbels 2, not longer than eye; preopercle with crenulate, membranaceous margin; upper ray of pectoral much elongate, 2½ in body; caudal elongate lanceolate, 4 in body; first ray of ventral reaching front of anal; anal short and high, its spines weak, inserted before middle of soft dorsal; scales mostly cycloid; lateral line becoming straight above anal; color brownish; pectoral and caudal fins black, other fins dusky. Depth 4 in length. D. X or XI–I, 38 to 40; A. II, 7 or 8; lateral line 60 to 70.] (*Cuvier & Valenciennes.*) ..... LANCEOLATUS, 106.

106. LONCHURUS LANCEOLATUS.

Perca lanceolata Bloch, Nov. Act. Sc. Copenh., iii, 383.

Lonchurus lanceolatus Günther, Cat. Fish. Brit. Mus., ii, 317, 1860 (copied).

Lonchurus barbatus Bloch, Ichthyol., plate 360, 1793. Bloch & Schneider, Syst. Ichthyol., 102, 1801 (Surinam). Cuv. & Val., Hist. Nat. Poiss., v, 193, 1830 (described from Bloch's type).

Lonchurus depressus Bloch & Schneider, Syst. Ichthyol., 102, 1801 (Surinam). Cuv. & Val., Hist. Nat. Poiss., v, 195, 1830 (copied). Günther, Cat. Fish. Brit. Mus., ii, 317, 1860 (West Indies).

Habitat.—Coast of Guiana.

This remarkable species we have had no opportunity to examine. We follow the suggestion of Dr. Günther, in regarding the nominal species, *Lonchurus depressus*, as a synonym of *L. lanceolatus*.

Genus XXIV.—POGONIAS.

Pogonias Lacépède, Hist. Nat. Poiss., iii, 138, 1802 (*fasciatus* = *cromis*).
Pogonathus Lacépède, Hist. Nat. Poiss., v, 121, 1803 (*courbina* = *cromis*).

TYPE: *Pogonias fasciatus* Lacépède.

This genus contains, so far as known, but a single species, a large coarse fish of our Atlantic coasts.

ANALYSIS OF SPECIES OF POGONIAS.

a. Body oblong, the back much elevated, ventral outline almost straight, the depth rapidly diminishing from the first dorsal spine backwards; depth 2½ to 3 in length; head 3⅓; profile rather steep and slightly convex; mouth moderate, inferior, the maxillary not reaching middle of eye, 3⅓ in head; teeth in broad bands, the outer series above scarcely enlarged; snout blunt, longer than eye, 3½ to 4 in head; lower pharyngeals large, completely united, covered with many blunt molars and a small patch of conical teeth at the outer posterior corner; gill-rakers 4 + 12, very short, slender; dorsal spines high but slender, the 4th highest, 2 in head; caudal subtruncate; second anal spine very large, about 2 in head; pectorals about as long as head; scales large, those on breast small; color grayish silvery, with 4 or 5 broad dark vertical bars, these disappearing with age; fins blackish. D. X–I, 19 to 21; A. II, 5 or 6; scales 5–47 to 50–9 ..... CROMIS, 107.

x. Body deep, the depth about 2⅓ in length; snout blunt, 3¾ in head. D. X–I, 21; scales 47; back usually without distinct oblique streaks. Var. *cromis*, 107 (*a*).

xx. Body more elongate, the depth about 3 in length; snout more acute, 3⅔ in head. D. X–I, 19; scales 50; color more silvery, with oblique faint dark streaks along the rows of scales above..... Var. *courbina*, 107 (*b*).

107. POGONIAS CROMIS.

(THE DRUM.)

[Plates X and XI.]

a. Var. *cromis.*

Labrus cromis Linnæus, Syst. Nat., ed. xii, 479, 1766 (Carolina). Gmelin, Syst. Nat., 1292, 1788 (Carolina).

Pogonias cromis Goode & Bean, Fishes of Essex County and Massachusetts Bay, 17, 1879 (Provincetown). Goode & Bean, Proc. U. S. Nat. Mus., 1879, 131 (Pensacola). Bean, Proc. U. S. Nat. Mus., 1880, 93 (St. John's River, Florida; near Charleston, S. C.). Jordan, Cat. Fish. North America, 93, 1885 (name only).

Labrus chromis Schöpf, Schrift. Naturforsch. Freunde Berlin, viii, 158, 1788 (New York).

Sciæna chromis Bloch & Schneider, Syst. Ichth., 82, 1801 (Carolina). Lacépède, Hist. Nat. Poiss., iv, 314, 1802.

Pogonias chromis Cuvier, Règne Animal, plate 29, fig. 1, 1829. Cuv. & Val., Hist. Nat. Poiss., v, 206, 1830 (New York; Montevideo). DeKay, New York Fauna, Fishes, 80, 1842 (New York). Storer, Syn. Fish. North Am., 324, 1846 (copied). Holbrook, Ichth. S. Carolina, ed. 1, 112, plate 16, fig. 2 (South Carolina). Günther, Cat. Fish. Brit. Mus., ii, 270, 1860 (Lake Pontchartrain). Uhler & Lugger, Fishes of Maryland, 98, 1876 (Eastern Shore, Maryland). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 377 (Beaufort). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 280 (Pensacola; Galveston). Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 605 (Charleston). Jordan & Gilbert, Syn. Fish. North Am., 568, 1883. Jordan & Swain, Proc. U. S. Nat. Mus., 1884, 233 (Cedar Key). Jordan & Meek, Proc. U. S. Nat. Mus., 1884, 237 (St. John's River, Florida). Goode, Hist. Aquat. Anim., 367, plates 121 and 122, 1884.

Pogonias fasciatus Lacépède, Hist. Nat. Poiss., iii, 137, 1802. Cuv. & Val., Hist. Nat. Poiss., v, 210, pl. 118, 1830 (New York). DeKay, New York Fauna, Fishes, 81, pl. 14, fig. 40, 1842 (New York). Storer, Syn. Fish. North Am., 324, 1846 (copied). Girard, U. S. & Mex. Bound. Survey, 11, 1859 (Brazos Santiago). Holbrook, Ichthyol. S. Carolina, 118, pl. 16, fig. 1, 1860 (South Carolina). Günther, Cat. Fish. Brit. Mus., ii, 270, 1860 (copied). Günther, Ann. and Mag. Nat. Hist., July, 1880 (Rio Plata).

Mugil grunniens Mitchill, Report in part Fishes New York, 16, 1814 (New York).

Labrus grunniens Mitchill, Trans. Lit. and Phil. Soc., 405, 1815 (New York).

Mugil gigas Mitchill, Report in part Fishes New York, 16, 1814 (New York).

Sciæna gigas Mitchill, Trans. Lit. and Phil. Soc., 413, 1815 (New York).

Pogonias gigas Ayres, Fishes of Brookhaven, L. I., 260, 1842 (Brookhaven, L. I.).

Sciæna fusca Mitchill, Trans. Lit. and Phil. Soc., 409, 1815 (New York).

b. Var. *courbina.*

Pogonathus courbina Lacépède, Hist. Nat. Poiss., v, 121, 1803 (Rio Plata).

Habitat.—Atlantic coasts of America; Long Island to Montevideo.

This species is common on the sandy coasts of the United States, where it reaches a very large size. It is probably the largest of all the *Sciænidæ*. It is a rather coarse fish, of no great value as food.

There is no doubt that all the North American names belong to a single species, the form called *fasciatus* being simply the young.

The South American form (*courbina*) is scarcely different from the Northern. We have examined specimens in the museum at Cambridge from Rio Grande do Sul and other localities in Brazil. We have found only the slight differences noticed in the analysis above.

Genus XXV.—APLODINOTUS.

Aplodinotus Rafinesque, Journ. de Phys., 1819, 418 (*grunniens*).

Amblodon Rafinesque, Journ. de Phys., 1819, 418 (based on the pharyngeal teeth of *A. grunniens*, supposed to belong to a species of Buffalo-fish).

Haploidonotus Gill, Proc. Acad. Nat. Sci. Phil., 1861, 102 (*grunniens*) (amended orthography).

Eutychelithus Jordan, Man. Vert., ed. i, 242, 1876 (*richardsoni*=*grunniens*).

TYPE: *Aplodinotus grunniens* Rafinesque.

This genus contains a single species, a large coarse fish, confined to the fresh waters of the United States. The genus differs from *Roncador* chiefly in the complete union of the very large lower pharyngeal bones.

ANALYSIS OF SPECIES OF APLODINOTUS.

a. Body oblong; back much elevated and compressed; depth 2¼ in length; head 3⅓; profile long and steep, straightish; head slightly compressed; mouth moderate, subinferior, low; the maxillary reaching past middle of eye, 3 in head; teeth in villiform bands, the outer above scarcely enlarged; lower pharyngeals completely united; the teeth less blunt than in *Pogonias;* gill-rakers short, thickish, 6+14; preopercle obscurely serrated; snout bluntish, longer than eye, 4⅓ in head; dorsal spines strong and high; second spine highest, 2⅓ in head; a scaly sheath at the base of spines; the two dorsals connected; second anal spine very large, more than half the length of the head; caudal double truncate; scales rather thin and deep, the series somewhat oblique; scales on breast rather large; color grayish silvery, dusky above, sometimes very dark; back sometimes with oblique dusky streaks along the rows of scales. D. X, 30; A. II, 7; scales 9-55-13.

GRUNNIENS, 108.

108. APLODINOTUS GRUNNIENS.

(THE FRESH-WATER DRUM, GASPERGOU, THUNDER-PUMPER, SHEEPSHEAD, CROAKER, BUBBLER, WHITE PERCH.)

[Plate XII.]

Aplodinotus grunniens Rafinesque, Journ. de Phys., 1819, 88 (Ohio R.). Graham, Preliminary List Kansas Fishes, 77, 1884 (Kansas River). Jordan, Cat. Fish. North America, 93, 1885 (name only).

Amblodon grunniens Rafinesque, Ichth. Ohiensis, 24, 1820 (Ohio R.). Agassiz, Am. Journ. Sci. and Arts, 1854 (Tennessee R.). Girard, U. S. Pac. R. R. Survey, 96, plate 23, 1859 (St. Louis; Arkansas R.; Poteau R.; Milk R.).

Haploidonotus grunniens Gill, Proc. Acad. Nat. Sci. Phila., 1861, 104. Jordan, Fishes of Upper Georgia, 319, 1876 (French Broad R.; Cumberland R.). Jordan, Man. Vert., ed. i, 241, 1876. Nelson, Fishes Illinois, 44, 1876 (Lake Michigan). Jordan, Cat. Fish. Illinois, 50, 1878 (La Salle; Peoria). Bean, Proc. U. S. Nat. Mus., 1880, 94 (Sandusky, O.; Cincinnati, O.; Detroit, Mich.; Au Sable Riv., Mich.). Jordan & Gilbert, Syn. Fish. North America, 567, 1883. Jordan, Ohio Geol. Survey, iv, 983, 1883 (Ohio R.; Great Lakes). Forbes, Catalogue Fish. Illinois, 62, 1884 (Lake Michigan; Illinois R., Ohio R.). Goode, Hist. Aquat. Anim., 370, plate 123, 1884.

Sciæna oscula Lesueur, Journ. Acad. Nat. Sci. Phila., 1822, 252, plate 13. Kirtland, Rept. Zool. Ohio, 168, 192, 1838 (Ohio).

Corvina oscula Cuv. & Val., Hist. Nat. Poiss., v, 98, 1836 (copied). Richardson, Faun. Bor. Amer., iii, 68, 1836. Kirtland, Bost. Journ. Nat. Hist., iii, 350, plate 6, fig. 3, 1840. DeKay, New York Fauna, Fishes, 73, plate 21, fig. 63, 1842 (New York). Storer, Syn. Fish. North Am., 319, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 297, 1860 (Ohio Canal; Lake Pontchartrain).

Sciæna grisea Lesueur, Journ. Acad. Nat. Sci. Phila., 1822, 254.

Corvina grisea DeKay, New York Fauna, Fishes, 76, 1842 (New York).

Corvina richardsoni Cuv. & Val., Hist. Nat. Poiss., v, 100 (Lake Huron). Richardson, Faun. Bor. Amer., 64, 77, 1836. DeKay, New York Fauna, Fishes, 76, plate 20, fig. 55, 1842. Storer, Syn. Fish. North Am., 320, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 298, 1860 (copied).

Haploidonotus richardsoni Gill, Proc. Acad. Nat. Sci. Phila., 1861, 105 (name only).

Eutychelithus richardsoni Jordan, Man. Vert., ed. i, 242, 1876 (copied).

Amblodon concinnus Agassiz, Amer. Jour. Sci. Arts, 1854, 307 (Tennessee R.).

Haploidonotus concinnus Gill, Proc. Acad. Nat. Sci. Phila., 1861, 104 (name only). Jordan, Man. Vert., ed. i, 242, 1876 (copied).

Amblodon lineatus Agassiz, Am. Jour. Sci. Arts, 1855, 307 (Osage River).
Haploidonotus lineatus Gill, Proc. Acad. Nat. Sci. Phila., 1861, 105 (name only). Jordan, Man. Vert., ed. i, 242, 1876 (copied).
Amblodon neglectus Girard, Proc. Acad. Nat. Sci. Phila., 1858, 167 (Rio Grande). Girard, U. S. and Mex. Bound. Survey, 12, plate v, fig. 6–10, 1859 (Rio Grande, Matamoras).
Haploidonotus neglectus Gill, Proc. Acad. Nat. Sci. Phila., 1861, 105 (name only).
Corvina (*Amblodon*) *neglecta* Steindachner, Ichth. Notizen, vi, 1867, 38 ("southern part of the west coast of the United States").

Habitat.—Fresh waters of the Eastern United States, chiefly west of the Alleghanies; Great Lakes to Dakota, and Texas.

This species is one of the common inhabitants of our deep and sluggish rivers and of our lakes. Under favorable circumstances it reaches a large size, and a weight of 40 to 50 pounds. It is held in rather low esteem as a food-fish, its flesh being rather coarse and flavorless. In the lake region, as the "Sheepshead," it is altogether worthless, but farther south it holds a higher rank, the "White Perch" of the Ohio being regarded as a tolerable food-fish. In Texas the same species, as the "Gaspergou," is regarded as one of the best of the river fish.

There is no doubt that all of the nominal species above enumerated should be referred to a single one, *A. grunniens*.

Genus XXVI.—EQUES.

Eques Bloch, Ichthyologia, 1793 (*americanus=lanceolatus*).
Equietus Rafinesque, Analyse de la Nature, 1815, 86 (substitute for *Eques*, the latter name being considered too short).
Pareques (Gill Mss.) Goode, Bull. U. S. Nat. Mus., v, 50, 1875 (*acuminatus*).

TYPE: *Eques americanus* Bloch = *Chætodon lanceolatus* L.

This genus is one of the most remarkable in the family in respect to its osteology, as well as to the coloration of some of its species: One of the four known species, *Eques acuminatus*, resembles considerably *Sciæna* and other typical members of the family, while the bizarre form and coloration of *Eques lanceolatus* gives it some resemblance to the Chætodonts. The two other species are, however, intermediate, and we know of no sufficient character on which *Pareques* can be maintained as a distinct genus.

ANALYSIS OF SPECIES OF EQUES.

a. Dorsal rays X to XII–I, 36 to 46; first five or six of the interneurals* wedged in between the neurals of the second and third vertebræ, the rest between third and fourth. (*Pareques* Gill.)

b. Profile elongate, rather steep, but not nearly vertical; distance from snout to first dorsal spine about equal to depth of body (form approaching that of *Sciæna umbra*).

c. Dorsal spines little elevated, the longest about 5½ in length of body; vertical fins unspotted; body oblong, compressed, the back somewhat elevated; eye about equal to snout, 4 in head; interorbital area not quite as broad as eye; preorbital 1½ in eye; mouth larger than in *Eques punctatus*, max-

* Not examined in *Eques pulcher*.

illary reaching past middle of orbit; teeth of upper jaw slightly enlarged; gill-rakers short, rather slender, 6 + 9; caudal peduncle and fin less deep than in *Eques punctatus*; second anal spine slightly shorter than soft rays, 2½ in head; soft dorsal scaly; scales large, the series below lateral line slightly oblique; longitudinal streaks on body not following the rows of scales ..... ACUMINATUS, 109.

x. Color nearly black, with longitudinal whitish stripes on the body, not on the fins; one stripe from upper edge of eye straight to upper edge of caudal peduncle, one just above this to last rays of soft dorsal, two confluent behind from nape to middle of soft dorsal, two below the first from pectoral to base of caudal, the lowest to edge of caudal peduncle; fins dusky. Head 3; depth 2⅔. D. X-I, 38 to 40; A. II, 7; scales 50; eye 4 in head; snout 3¼; maxillary 3; second anal spine 2½; longest dorsal spine 1⅔; pectoral 1¼. (West Indian specimens.) ..... Var. *acuminatus*, 109 (*a*).

xx. Coloration dark smutty brown, with traces only of seven paler streaks; region at base of soft dorsal darker; spinous dorsal, tips of ventrals, and inside of gill cavity black; fins otherwise smutty. Head 3⅓ in length; depth 2⅔. D. X-I, 40; A. II, 7; scales 6-51-10; second anal spine 2½; eye 4; snout 4; maxillary 2⅔. (Specimens from Charleston.)

Var. *umbrosus*, 109 (*b*).

cc. Dorsal spines elongate, the longest 2⅔ in length of body; soft parts of vertical fins with white spots; body robust, the back much compressed, the general form much as in *Eques acuminatus*, but the caudal peduncle deeper and more compressed; profile rather steep, depressed over the eye; snout slightly longer than eye, 3½ in head; eye as wide as interorbital region; preorbital broad, as wide as eye; mouth small, sub-inferior; maxillary almost entirely concealed below the preorbital, 2½ in head, reaching to below middle of eye; teeth in both jaws in broad bands, the outer series of the upper jaw enlarged; preopercle entire, the membrane with slight cilia; gill-rakers small, slender, 6 + 11; lower pharyngeals small; the teeth all conical, those of the posterior angle and inner series somewhat enlarged; anterior dorsal spines as high as body; membranes of the soft portions of the vertical fins closely scaled to the tip; caudal broadly rounded; anal short and high; second spine about ⅔ of longest ray, 3 in head; anal spine placed midway between base of pectoral and base of caudal; pectorals and ventrals short and equal, 1½ in head. Color, dark brown, a light bar in front of eye extending around the chin, a second pale bar extending around the head immediately behind the eyes, a third extending from in front of dorsal over base of pectorals; a light bar along base of soft dorsal; a light bar extending from behind the elevated portion of the spinous dorsal downwards, dividing into two, the branches running straight back, the upper branch to beginning of last fourth of soft dorsal, the lower branch to base of caudal; 2 or 3 light, undulating longitudinal bars below these; fins all dark brown, the soft portions of the vertical fins with many whitish stellate spots. Head 3⅔ in length; depth 3. D. XI or XII-I, 46; A. II, 6 or 7; scales 8-55 to 59-11 or 12... PUNCTATUS, 110.

bb. [Profile very steep, "steeper than in *Eques lanceolatus*." Body deepest below first dorsal spine, thence rapidly tapering to the narrow caudal peduncle; eye 3 in head; snout 1⅓ in eye; mouth subinferior, the thick convex snout projecting beyond it; first ventral ray filiform, 3½ in body; longest dorsal spines 1⅔ to 2⅔ in length of body, their height nearly twice that of the body below them; color olivaceous, three dark-brown longitudinal bands along the sides, the middle one from eye backwards reaching tips of the middle caudal rays; the upper from occiput backward to end of soft dorsal; the lower from lower corner of eye to behind anal; two very

faint broad cross-bars, the anterior from base of first dorsal to ventrals, the next from middle of soft dorsal to anal; tip of snout and chin black; an oblique bar below eye; spinous dorsal, pectoral, and ventral black, edged with white; edges of caudal yellowish; anal with brown points anteriorly. Head $3\frac{2}{3}$ to $3\frac{1}{2}$ in total length; depth the same. D. X-I, 37 or 38; A. II, 7; lat. l. 50.] (*Steindachner.*).....PULCHER, 111.

aa. Dorsal rays XIV or XV-I, 53; about twelve of the anterior interneurals wedged in between the occiput and the neural spine of the third vertebra; profile almost vertical, the distance from tip of snout to first dorsal spine much less than depth of body. (*Eques.*)

d. Body deepest below first dorsal spine, rapidly tapering to the narrow caudal peduncle; profile very steep, little convex; eye little longer than snout, about 4 in head; preorbital broad, nearly as wide as eye; mouth small, slightly oblique; maxillary reaching to below anterior fourth of eye; teeth all villiform in broad bands, the outer scarcely enlarged; preopercle with a fringed membranous border; gill-rakers very short and slender, 6+9; anterior dorsal spines much elongate, $1\frac{3}{4}$ in body; soft rays low, the membranes scaled to the tips; anal small; its second spine 3 in head; ventrals $1\frac{1}{3}$ in head; pectorals scarcely shorter; color, light yellowish; a narrow brownish band from the corner of the mouth up across the middle of the eye, and meeting its fellow on top of head; another broader band edged with a narrow white line on each side from the nape down and back over opercle, meeting its fellow between the ventral fins and extending to the tips of their outer rays; a third and still broader band, also bordered by white, extending from the tips of the dorsal spines to their base, then downward and backward to the tips of the middle caudal rays; body below this band silvery white; above it somewhat darker. Head 4 in length; depth $2\frac{2}{3}$. D. XIV to XVI-I, 53; A. II, 5; scales irregular, with smaller ones intermixed.....LANCEOLATUS, 112.

109. EQUES ACUMINATUS.

a. Var. *acuminatus.*

Grammistes acuminatus Bloch & Schneider, Syst. Ichth., 184, 1801.

Eques acuminatus Castelnau, Anim. Nouv. ou Rares de l'Amér. du Sud, 10, 1855. Günther, Cat. Fish. Brit. Mus., ii, 280, 1860 (Cuba). Poey, Memorias, ii, 370, 1861 (Cuba); Synopsis, 325, 1868 (Cuba). Cope, Ichthyol. Lesser Antilles, 471, 1870 (St. Croix). Poey, Enumeratio, 49, 1875 (Cuba). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Pareques acuminatus Goode, Bull. U. S. Nat. Mus., v, 50, 1876 (Bermudas). Bean, Internat. Fish. Exhib. Berlin, 54, 1883 (Key West).

Eques lineatus Cuv. &. Val., Hist. Nat. Poiss., v, 1830, 169 (Brazil).

b. Var. *umbrosus.*

Sciæna acuminata Jordan & Gilbert, Syn. Fish. North Am., 573, 1883 (Pensacola).

Eques acuminatus umbrosus Jordan & Eigenmann, var. nov. (Charleston; Pensacola).

Habitat.—West Indian fauna, South Carolina to Brazil; var. *umbrosus* on the United States coast.

This species is not uncommon in the West Indies. In several respects it differs widely from the type of the genus *Eques*, in all these respects approaching the type of the genus *Sciæna*. It however seems impossible to regard *Pareques* as a genus distinct from *Eques*, as in several

regards *Eques punctatus* is intermediate between *Eques acuminatus* and *Eques lanceolatus*.

A third species of the subgenus *Pareques* was obtained by Professor Gilbert at Panama, but the types were destroyed by fire before a description could be published.

Northern specimens of this species (Charleston, Pensacola, Key West) are much more plainly colored than the ordinary West Indian form. We propose for such the varietal name of *Eques acuminatus umbrosus*, taking as our type a specimen from Charleston sent us by Mr. Charles C. Leslie.

Of the ordinary striped form we have examined specimens in the museum at Cambridge from Rio Janeiro, Porto Rico, St. Thomas, and Sombrero. Our description of var. *acuminatus* is especially drawn from No. 563, M. C. Z., from the island of Sombrero.

110. EQUES PUNCTATUS.

(SERRANA.)

Serrana hispanis Parra, Piezas de Hist. Nat. de Cuba, 2, plate 2, lower figure, 1787 (Cuba).

Eques punctatus Bloch & Schneider, Syst. Ichth., 106, 1801 (based on Parra, 2, plate 2, fig. 2). Desmarest, Première Décade Ichthyol., 40, plate iii, fig. 2, 1823 (Cuba). Cuv. & Val., Hist. Nat. Poiss., v, 167, plate 116, 1830 (Cuba, Martinique). Storer, Syn. Fish. North Am., 322, 1846 (copied). Günther, Cat. Fish. Brit. Mus., ii, 281, 1860 (Jamaica). Poey, Proc. Acad. Nat. Sci. Phila., 1863, 176 (Parra, plate 2, lower figure). Poey, Synopsis, 325, 1868 (Cuba). Cope, Ichthyol. Lesser Antilles, 471, 1870 (St. Croix). Poey, Enumeratio, 49, 1875 (Cuba). Jordan, Proc. U. S. Nat. Mus., 1886, 43 (Cuba).

Habitat.—West Indian fauna.

This handsomely colored species is not uncommon in the West Indies, The specimen here described was obtained by Dr. Jordan at Havana. Others are in the museum at Cambridge, from Cuba and from Jérémie. Hayti.

111. EQUES PULCHER.

Eques pulcher Steindachner, Ichth. Notizen, vi, 43, 1867 (Barbadoes).

Habitat.—West Indian fauna; Barbadoes.

This species is known from Steindachner's description only.

112. EQUES LANCEOLATUS.

(SERRANA.)

Guapena, Edwards, "Gleanings, plate 210" ("Caraibes islands").

Chætodon lanceolatus Linnæus, Syst. Nat., ed. x, 277, 1758 (based on Edwards, plate 210). Linnæus, Syst. Nat., ed. xii, 466, 1766. Gmelin, Syst. Nat., 1254, 1788 (copied).

Sciæna lanceolata Castelnau, Anim. Nouv. ou Rares de l'Amér. du Sud, 10, 1855.

Eques lanceolatus Günther, Cat. Fish. Brit. Mus., ii, 279, 1860 (West Indies). Poey, Enumeratio, 49, 1875 (Cuba). Poey, Synopsis, 325, 1868 (Cuba). Poey, Proc. Acad. Nat. Sci. Phila., 1863, 177 (Parra, plate 2). Cope, Ichth. Lesser Antilles, 471, 1870 (St. Croix; St. Martin). Jordan & Gilbert, Syn. Fish. North Am., 932, 1883 (Pensacola). Jordan, Cat. Fish. North America, 94, 1885 (name only).

Serrana Parra, Piezas de Hist. Nat. de Cuba, plate 2, upper figure, 1787 (Cuba).
Eques americanus Bloch, Ichthyol., plate 347, 1793. Bloch & Schneider, Syst. Ichth., 105, 1801.
Eques punctatus var. Bloch & Schneider, Syst. Ichth., 106, 1801 (based on Parra, plate 2, fig. 1).
Eques balteatus Cuvier, Règne Animal, plate 29, fig. 2, 1829. Cuv. & Val., Hist. Nat. Poiss., v, 165, 1830 (Martinique). Storer, Syn. Fish. North Am., 322, 1846 (copied).
Sciæna edwardi Gronow, Cat. Fish., ed. Gray, 53, 1854.

Habitat.—West Indian fauna, ranging northward to Pensacola.

This interesting fish is widely distributed in the West Indian waters. The specimen described by us is in the National Museum, having been taken near Pensacola.

RECAPITULATION.

The following is a list of the species of *Sciænidæ* recognized by us as occurring in the waters of America and Europe. The distribution in general of each species is indicated by the use of the following letters:

E. Europe.
N. Atlantic coast, north of Cape Hatteras.
S. South Atlantic and Gulf coast.
W. West Indies.
C. California.
P. Pacific coast of Mexico and Central America.
F. Rivers of North America.
B. Coasts of Brazil.
A. Rivers of South America (Amazon).
V. Pacific coast of South America.

Subfamily I.—OTOLITHINÆ.

1. Seriphus Ayres.

1. *Seriphus politus* Ayres. C.

2. Archoscion Gill.

§ *Isopisthus* Gill.

2. *Archoscion remifer* (Jordan & Gilbert). P.
3. *Archoscion parvipinnis* (Cuv. & Val.). W., B.

§ *Archoscion.*

4. *Archoscion analis* (Jenyns). V.

3. Cestreus Gronow. (To be called *Cynoscion*, if *Cestreus* be regarded as preoccupied by *Cestræus.*)

5. *Cestreus prædatorius* Jordan & Gilbert. P.
6. *Cestreus acoupa* (Lacépède). B.
7. *Cestreus squamipinnis* (Günther). P.
8. *Cestreus othonopterus* (Jordan & Gilbert). P.
9. *Cestreus striatus* (Cuvier). B.
10. *Cestreus obliquatus* (Valenciennes). W. (Doubtful species; unknown to us.)
11. *Cestreus nothus* (Holbrook). S.
12. *Cestreus regalis* (Bloch & Schneider). N., S.
12 (*b*). —— —— *thalassinus* (Holbrook). S.
13. *Cestreus reticulatus* (Günther). P.
14. *Cestreus nebulosus* (Cuv. & Val.). S.
15. *Cestreus parvipinnis* (Ayres). C.

16. *Cestreus xanthulum* (Jordan & Gilbert). P.
17. *Cestreus albus* (Günther). P.
18. *Cestreus stolzmanni* (Steindachner). P.
19. *Cestreus nobilis* (Ayres). C.
20. *Cestreus phoxocephalus* (Jordan & Gilbert). P.
21. *Cestreus leiarchus* (Cuv. & Val.). W., B.
22. *Cestreus virescens* (Cuv. & Val.). B.
23. *Cestreus microlepidotus* (Cuv. & Val.). B.
24. *Cestreus steindachneri* Jordan. B.
25. *Cestreus bairdi* (Steindachner). B.

4 **Ancylodon** Cuvier.

26. *Ancylodon ancylodon* (Bloch & Schneider). B., P.

Subfamily II.—SCIÆNINÆ.

5. **Nebris** Cuv. & Val.

27. *Nebris microps* Cuv. & Val. B., P.

6. **Larimus** Cuv. & Val.

28. *Larimus argenteus* (Gill). P.
29. *Larimus breviceps* (Cuv. & Val.). W., B., P. (Perhaps more than one species included in the synonymy.)
30. *Larimus stahli* (Poey). W.
31. *Larimus fasciatus* Holbrook. S.

7. **Odontoscion** Gill.

32. *Odontoscion dentex* (Cuv. & Val.). W.

8. **Corvula** Jordan & Eigenmann.

33. *Corvula macrops* (Steindachner). P.
34. *Corvula sialis* Jordan & Eigenmann. S.
35. *Corvula subæqualis* (Poey). W.
36. *Corvula batabana* (Poey). W.

9. **Plagioscion** Gill.

37. *Plagioscion squamosissimus* (Heckel). A.
38. *Plagioscion surinamensis* (Bleeker). A.
39. *Plagioscion auratus* (Castelnau). A.

10. **Bairdiella** Gill.

40. *Bairdiella archidium* (Jordan & Gilbert). P.
41. *Bairdiella chrysura* (Lacépède). S.
42. *Bairdiella ensifera* (Jordan & Gilbert). P.
43. *Bairdiella icistia* (Jordan & Gilbert). P.
44. *Bairdiella ronchus* (Cuv. & Val.). W., B.
45. *Bairdiella armata* Gill. P., W., B.
46. *Bairdiella alata* (Jordan & Gilbert). P. (Doubtful species.)
47. *Bairdiella chrysoleuca* (Günther). P.

11. **Stelliferus** Stark.

48. *Stelliferus oscitans* (Jordan & Gilbert). P.
49. *Stelliferus rastrifer* Jordan. B.
50. *Stelliferus fürthi* (Steindachner). P.
51. *Stelliferus minor* (Tschudi). V.
52. *Stelliferus stellifer* (Bloch). B.
53. *Stelliferus lanceolatus* (Holbrook). S.
54. *Stelliferus ericymba* (Jordan & Gilbert). P.
55. *Stelliferus naso* Jordan. B.
56. *Stelliferus microps* (Steindachner). B.

12. Sciæna (Artedi) Linnæus.

§ *Ophioscion* Gill.

57. *Sciæna gilli* (Steindachner). B.
58. *Sciæna adusta* Agassiz. B., W.
59. *Sciæna typica* (Gill). P. (*Nomen ineptum;* perhaps to be called *Sciæna ophioscion.*)
60. *Sciæna imicops* (Jordan & Gilbert). P.
61. *Sciæna sciera* Jordan & Gilbert. P.
62. *Sciæna vermicularis* Günther. P.

§ *Sciænops* Gill.

63. *Sciæna ocellata* Linnæus. S.

§ *Johnius* Bloch.

64. *Sciæna heterolepis* Bleeker. B. (Species unknown to us.)

§ *Pseudosciæna* Bleeker.

65. *Sciæna aquila* (Lacépède). E. (Perhaps to be called *Sciæna hololepidota.*)

§ *Callaus* Jordan.

66. *Sciæna deliciosa* Tschudi. V.

§ *Sciæna* (= *Corvina* Cuvier).

67. *Sciæna umbra* Linnæus. E.

§ *Cheilotrema* Tschudi.

68. *Sciæna saturna* (Girard). C.
69. *Sciæna fasciata* (Tschudi). V.

13. Roncador Jordan & Gilbert.

70. *Roncador stearnsi* (Steindachner). C.

14. Leiostomus Lacépède.

71. *Leiostomus xanthurus* Lacépède. S. (W.?)

15. Pachyurus Agassiz.

§ *Pachyurus.*

72. *Pachyurus squamipinnis* Agassiz. A.

§ *Lepipterus* Cuv. & Val.

73. *Pachyurus francisci* (Cuv. & Val.). A.
74. *Pachyurus bonariensis* Steindachner. A.
75. *Pachyurus schomburgki* Günther. A.

16. Pachypops Gill. (Perhaps a subgenus under *Pachyurus.*)

76. *Pachypops furcræus* (Lacépède). A.
77. *Pachypops trifilis* (Müller & Troschel). A.
78. *Pachypops adspersus* (Steindachner). A. (Perhaps to be called *P. grunniens.*)

17. Polycirrhus Bocourt.

79. *Polycirrhus dumerili* Bocourt. P.
80. *Polycirrhus brasiliensis* (Steindachner). B.
81. *Polycirrhus peruanus* (Steindachner). V.

18. Genyonemus Gill.

82. *Genyonemus lineatus* (Ayres). C.

19. Micropogon Cuvier & Valenciennes.

83. *Micropogon undulatus* (Linnæus). S.
84. *Micropogon furnieri* (Desmarest). W., B.
85. *Micropogon ectenes* Jordan & Gilbert. P.
86. *Micropogon altipinnis* Günther. P.

20. Umbrina Cuvier.

87. *Umbrina cirrosa* (Linnæus). E.
88. *Umbrina reedi* Günther. V.
89. *Umbrina broussoneti* Cuv. & Val. S., W., B.
90. *Umbrina roncador* Jordan & Gilbert. C.
91. *Umbrina xanti* Gill. P.
92. *Umbrina galapagorum* Steindachner. V.
93. *Umbrina dorsalis* Gill. P.

21. Menticirrhus Gill.

§ *Cirrimeus* Gill.

94. *Menticirrhus ophicephalus* (Jenyns). V.

§ *Menticirrhus.*

95. *Menticirrhus simus* Jordan & Eigenmann. P.
96. *Menticirrhus nasus* (Günther). P.
97. *Menticirrhus agassizi* Jordan. V.
98. *Menticirrhus panamensis* (Steindachner). P.
99. *Menticirrhus martinicensis* (Cuv. & Val.). W., B. (Doubtful species; probably a variety of the next.)
100. *Menticirrhus americanus* (Linnæus). S.
101. *Menticirrhus saxatilis* (Bloch & Schneider). N., S.
102. *Menticirrhus undulatus* (Girard). C.

§ *Umbrula* Jordan & Eigenmann.

103. *Menticirrhus elongatus* (Günther). P.
104. *Menticirrhus littoralis* (Holbrook). S.

22. Paralonchurus Bocourt.

105. *Paralonchurus petersi* Bocourt. P.

23. Lonchurus Bloch.

106. *Lonchurus lanceolatus* (Bloch). B.

24. Pogonias Lacépède.

107. *Pogonias cromis* (Linnæus). S.
107(*b*). —— —— *courbina* (Lacépède). B.

25. Aplodinotus Rafinesque.

108. *Aplodinotus grunniens* Rafinesque. F.

26. Eques Bloch.

§ *Pareques* Gill.

109. *Eques acuminatus* (Bloch & Schneider). W.
109(*b*). —— —— *umbrosus* Jordan & Eigenmann. S.
110. *Eques punctatus* (Bloch & Schneider). W.
111. *Eques pulcher* (Steindachner). W.

§ *Eques.*

112. *Eques lanceolatus* (Linnæus). W., S.

INDIANA UNIVERSITY,
Bloomington, Ind., July 25, 1887.

Note on Cestreus and Cynoscion.

The generic name *Cynoscion* Gill must be used instead of *Cestreus* for the Weak-fishes. Professor Gill calls my attention to the prior use of *Cestreus* by McClelland (Journ. Nat. Hist., v. 2, p. 151) in 1842, for a genus of gobies (= *Prionobutis* Bleeker). The type, *Cestreus minimus* McClelland = *Eleotris amboinensis* Day. For the Sciænoid genus, *Cestreus* (1854), must give place to *Cynoscion*.

LIST OF PLATES.

PLATE I.

PLATE II.

PLATE III.

PLATE IV.

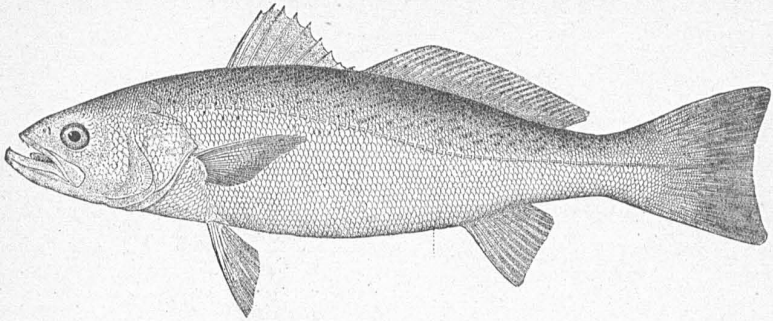

FIG. 1.—CYNOSCION REGALE (Bloch & Schneider). The Weak-fish, or Squeteague.
(No. 10421, U. S. N. M., from Wood's Holl, Massachusetts.)

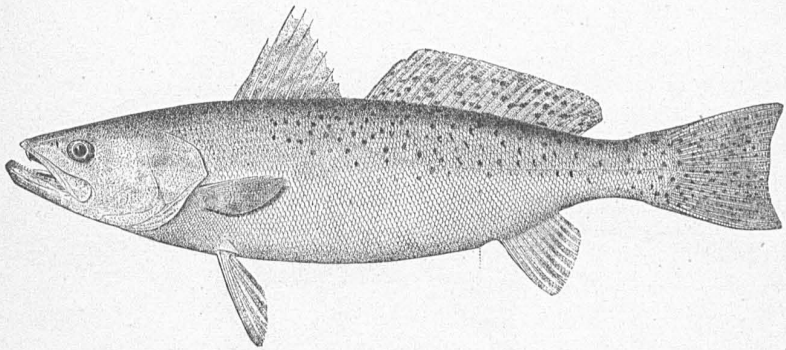

FIG. 2.—CYNOSCION NEBULOSUM (Cuvier & Valenciennes). The Spotted Weak-fish.
(No. 15000, U. S. N. M., from Norfolk, Virginia.)

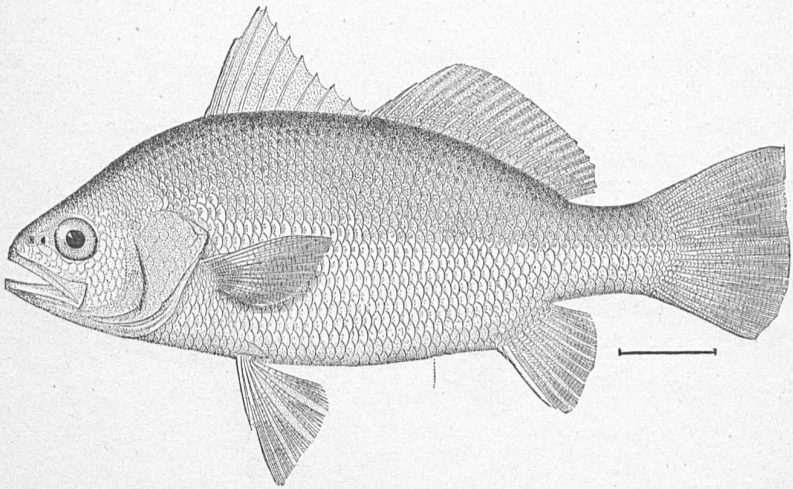

FIG. 3.—BAIRDIELLA CHRYSURA (Lacépède). The Mademoiselle, or Yellow-tail.
(No. 771, U. S. N. M., from Beesley's Point, New Jersey.)

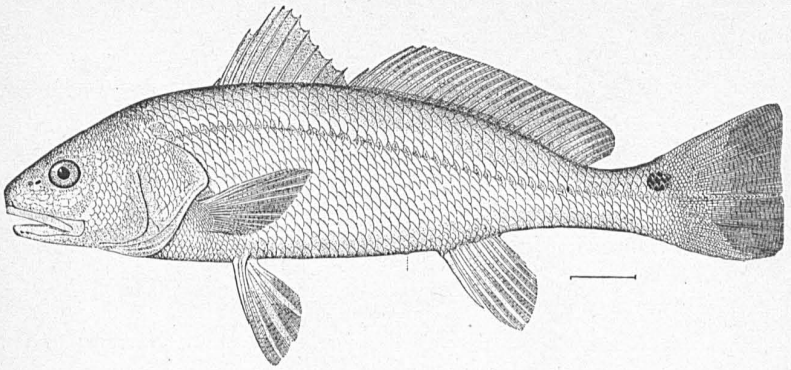

FIG. 4.—SCIÆNA OCELLATA Linnæus. The Red Drum, or Channel Bass.
(No. 622, U. S. N. M., from Indianola, Texas.)

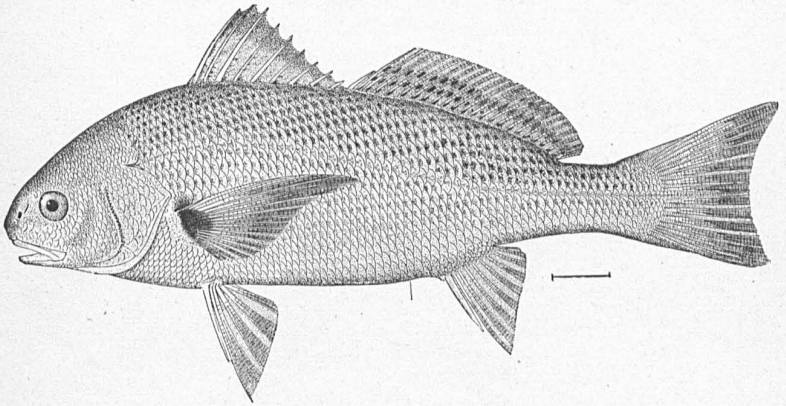

FIG. 5.—RONCADOR STEARNSI (Steindachner). The Roncador.
(No. 26864, U. S. N. M., from Santa Barbara, California.)

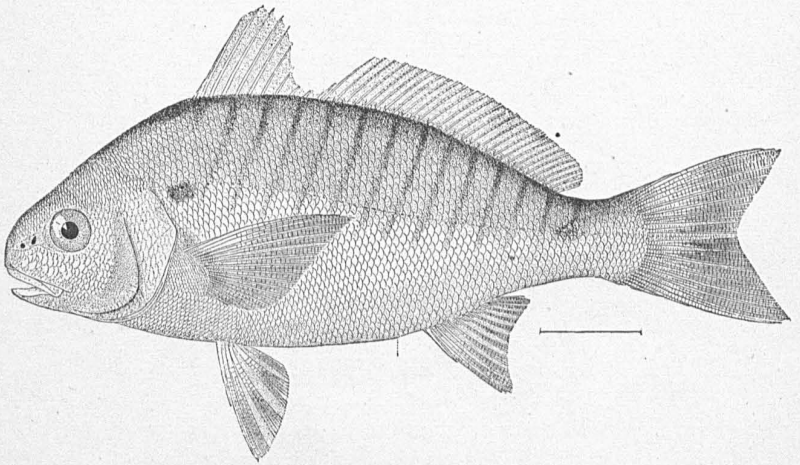

FIG. 6.—LEIOSTOMUS XANTHURUS Lacépède. The Spot.
(No. 20222, U. S. N. M., from Newport, Rhode Island.)

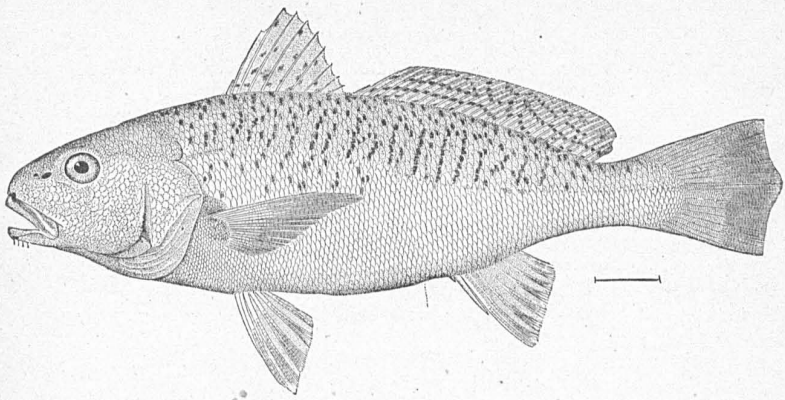

FIG. 7.—MICROPOGON UNDULATUS (Linnæus). The Croaker.
(No. 20742, U. S. N. M., from Newport, Rhode Island.)

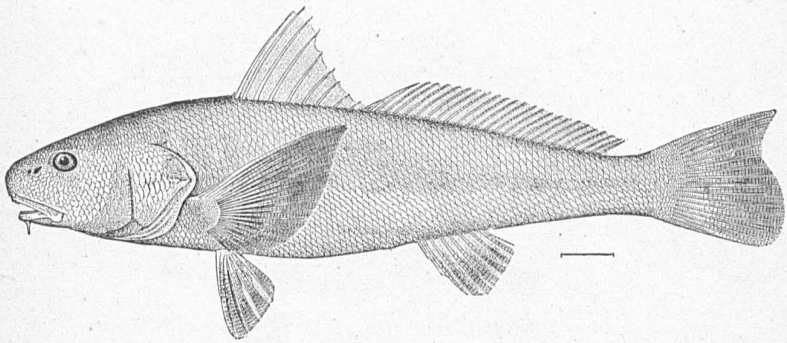

FIG. 8.—MENTICIRRHUS AMERICANUS (Linnæus). The Carolina Whiting.
(No. 22832, U. S. N. M., from Pensacola, Florida.)

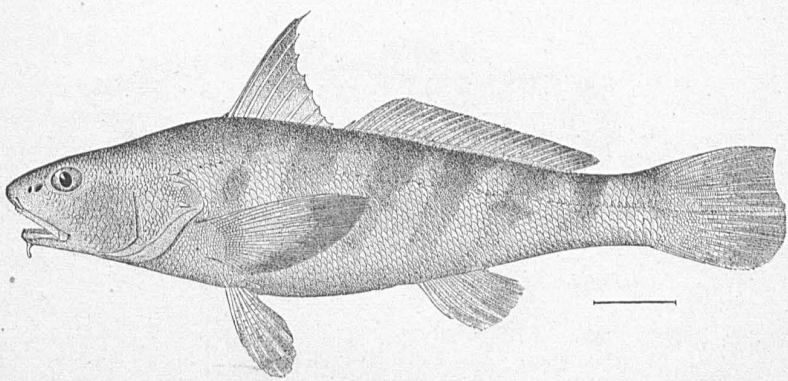

FIG. 9.—MENTICIRRHUS SAXATILIS (Bloch & Schneider). The King-fish.
(No. 25403, U. S. N. M., from Charleston, South Carolina.

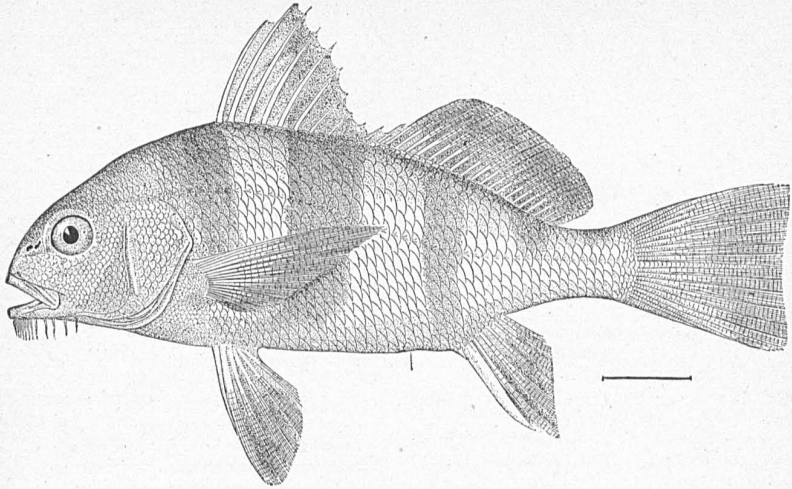

FIG. 10.—POGONIAS CROMIS Linnæus. The Drum (young).
(No. 18036, U. S. N. M., from Matanzas River Inlet, Florida.)

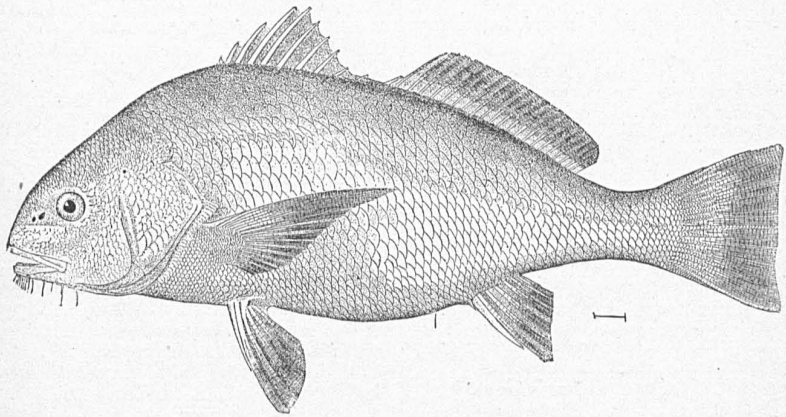

FIG. 11.—POGONIAS CROMIS Linnæus. The Drum (adult).
(No. 22936, U. S. N. M.)

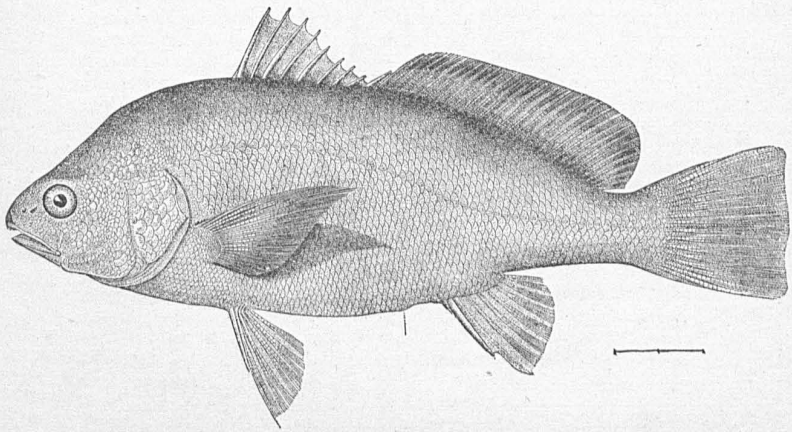

FIG. 12.—APLODINOTUS GRUNNIENS Rafinesque. The Fresh-water Drum, or Gaspergou.
(No. 10542, U. S. N. M., from Ecorse, Michigan.)

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[NOTE.—The references are to page-figures in brackets.]