

NOTES ON A COLLECTION OF FISHES FROM THE RIVERS OF MEXICO, WITH DESCRIPTION OF TWENTY NEW SPECIES.

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INTRODUCTION.

The writers spent part of the winter of 1898-99 in Mexico, devoting their spare time to the study of the fishes in the regions visited. The collection made is not large, but it contains a surprisingly large proportion of new forms, 20 of the 42 species having not been hitherto described, a fact which indicates that the river fauna of Mexico is much richer and more characteristic than has been supposed. The specimens are in the museum of the Leland Stanford Jr. University, series more or less complete having been also sent to the United States Fish Commission, the United States National Museum, the British Museum, and the museum at Vienna. The most unexpected fact disclosed is that of the large number of very closely related species of *Chirostoma* or "pescado blanco" inhabiting the great Lake of Chapala.

We would especially acknowledge the assistance of the following gentlemen: Mr. J. E. Page and his son, for assistance in collecting near Tampico; Messrs. W. P. Mellen and W. J. Thompson, of Aguas Calientes; Mr. A. V. Temple, manager of bureau of information, Mexican Central Railroad, City of Mexico; Señor Joaquin Cuesta, of Atequiza, near Guadalajara. We are also under obligation to officials of the Mexican Central and Southern Pacific railways, and to Wells, Fargo and Company's Express.

The following is a description of the localities in which collections were made, most of the work with the seine being performed or directed by Mr. Snyder:

Rio Lerma.—The Rio Grande de Santiago, locally known as Rio Lerma, was first visited at the "Barranca" near Guadalajara, Jalisco. Here the river flows through a cañon of volcanic rock at least 2,000 feet below the surface of the surrounding tableland. The river (December 23) was swollen and muddy, the water plunging along at such a rapid rate that small seines could not be used, and no collecting was done. Rio Lerma was next examined at Ocotlan, above the great falls of Juanacatlan, near the outlet of Lake Chapala. The same high, muddy water was found, but instead of the cañon a comparatively shallow river bed which gradually spread over cornfields, marshes, and tulé lands as the lake was approached. The flooded condition of the river and the consequent absence of good seining-places made collecting at the time we visited the region very unsatisfactory. To make a thorough study of the ichthyic fauna of the lake, which is a magnificent body of water, surrounded by mountains and containing several islands, one would have to be equipped with good collecting apparatus and be prepared to spend some time in the vicinity.

Rio Verde de Aguas Calientes.—At Aguas Calientes the Rio Verde, a tributary of the Lerma, which flows into Lake Chapala, was an ideal collecting-place. The clear, cool water, shaded by trees and shrubs along the banks, winds here and there over a bed of fine gravel and sand. There are ripples and shallows, frequented by smaller fishes, and many deep pools where the larger ones live.

Rio Ixtla.—At Puente de Ixtla in Morelos considerable collections were made in the Rio Ixtla, a large, clear, cold tributary of Rio Amacusac, which in turn flows into Rio de las Balsas. At this picturesque old bridge the conditions are very favorable for collections—gravelly bottom, smooth banks, and occasionally deep holes. Some specimens were taken from the small Rio Tembernbe, a “spring branch” of Rio Ixtla.

Rio Panuco.—Collecting was done in the Rio Panuco at Tampico, and in one of its tributaries, the Rio Verde, near Rascon, San Luis Potosi. At Tampico the Panuco, a very large river, receives the Rio Tamesoe. With the two, a number of large, shallow lagoons are connected. Salt tide water backs up into the rivers and lagoons for some distance above the city. The lagoons are marshy in most places, the rushes and shrubs growing out into the water for long distances. The bottom and shores are usually of a sticky blue clay, although there are sandy beaches in some localities. By visiting the Tampico markets, many specimens of the larger species were obtained.

At Rascon the Rio Verde is a rather sluggish stream. Its bottom is of gravel in some places, while in others it is muddy. Both east and west of Rascon the current of the river is very rapid, often descending the cañon in cascades and cataracts. The water, which is heavily impregnated with lime, is light green in color. On either side of the river are great forests of palms, while dense thickets of canes, ferns, and vines make it difficult to follow the shores.

List of species obtained and of the localities in which collections were made.

Species.	Rio Verde, near Aguas Calientes.	Laguna de Chapala, near Ocotlan, Jalisco.	Laguna de Chalco, near City of Mexico.	Rio Ixtla, near Puente de Ixtla, Morelos.	Rio Verde, near Rascon, San Luis Potosi.	Rio Panuco, Rio Tamesoe and lagoons near Tampico.
<i>Lepisosteus osseus</i>						×
<i>tristechus</i>						×
<i>Istlarius balsanus</i>				×		
<i>Ameiurus dugesi</i>		×				
<i>Ictalurus furcatus</i>						×
<i>Carpjodes tumidus</i>						×
<i>Moxostoma austrinum</i>	×	×				
<i>Algansea tincella</i>	×		×			
<i>Notropis nigrotentatus</i>				×		
<i>rasconis</i>					×	
<i>calientis</i>	×					
<i>Xystrosus popoche</i>		×				
<i>Falcula chapala</i>		×				
<i>Hybopsis altus</i>	×					
<i>Tetragonopterus mexicanus</i>				×		
<i>argentatus</i>					×	
<i>Fundulus heteroclitus</i>						×
<i>robustus</i>		×				×
<i>Characodon variatus</i>	×					
<i>encaustus</i>		×				
<i>Cyprinodon elegans</i>						×
<i>Gambusia affinis</i>						×
<i>Xenendum callente</i>	×					
<i>xaliscone</i>		×				
<i>Poecilia limantouri</i>				×	×	×
<i>Mollienisia latipinna</i>						×
<i>Xiphophorus montezumæ</i>					×	
<i>Eslopsarum jordani</i>	×					
<i>argæ</i>	×					
<i>Chirostoma humboldtianum</i>			×			
<i>chapala</i>		×				
<i>promelas</i>		×				
<i>diazii</i>		×				
<i>crystallinum</i>		×				
<i>lermæ</i>		×				
<i>ocotlane</i>		×				
<i>Cichlasoma steindachneri</i>					×	
<i>Heros cyanoguttatus</i>						×
<i>istlanus</i>				×		
<i>Neotroplus carpinis</i>					×	×
<i>Philypnus dormitor</i>						×
<i>Awaous tainisca</i>				×		×

The following new genera are described in this paper: *Istlarius*; *Xystrosus*; *Falcula*; *Xenendum*.

The following is a list of the new species* described:

<i>Istlarius balsanus</i> .	<i>Xenendum xaliscone</i> .	<i>Chirostoma crystallinum</i> .
<i>Notropis rasconis</i> .	<i>Pœcilia limantouri</i> .	<i>lernaë</i> .
<i>calientis</i> .	<i>Xiphophorus montezumæ</i> .	<i>ocotlane</i> .
<i>Xystrosus popoche</i> .	<i>Eslopsarum arge</i> .	<i>Cichlasoma steindachneri</i> .
<i>Falcula chapalæ</i> .	<i>Chirostoma chapalæ</i> .	<i>Heros istlanus</i> .
<i>Characodon encaustus</i> .	<i>promelas</i> .	<i>Neetroplus carpintis</i> .
<i>Xenendum caliente</i> .	<i>diazi</i> .	

MEASUREMENTS.

The measurements given in the tables of this paper were made by means of a proportional scale. It is believed that they will show, in an approximately definite way, some of the variations of certain characters useful in determining the relationships of the species. They are expressed in hundredths of the length of the body, which is measured from the tip of the snout to the end of the last vertebra. The depth of the body is measured at its deepest part; depth of caudal peduncle at its narrowest place; length of caudal peduncle from base of last anal ray to end of last vertebra; length of head from tip of snout to posterior edge of opercle; length of snout from its tip to anterior margin of orbit; length of caudal fin from end of last vertebra to tip of upper caudal lobe. Only fully-developed fin rays are counted. The rudimentary rays of dorsal and anal, when closely adnate to the first branched ray, are counted with it as 1 ray. When the last ray is double and the two parts connected at the base, it is counted as 1 ray. Scales in the lateral series are counted to base of caudal fin; transverse series from insertion of ventrals or anal, whichever is nearer middle of body, upward and forward; on caudal peduncle, upward and forward at narrowest part.

LIST OF SPECIES.

LEPISOSTEIDÆ.

1. *Lepisosteus osseus* (Linnæus).
Plentiful in Tampico markets; said to be taken in the river and neighboring lagoons.
2. *Lepisosteus tristcechus* (Bloch & Schneider).
Collected in the markets of Tampico.

SILURIDÆ.

3. *Ameiurus dugesi* Bean.
Obtained in the markets of Guadalajara and in the Laguna de Chapala, Jalisco, Mexico.
We classify this species with the genus *Ameiurus*, believing that *Villarius* [*Villarius* Rutter, Proc. Cal. Acad. Sci., ser. 2, vol. 6, 1896, 256 (*pricei*)] is an invalid genus. *Villarius* was supposed to be distinguished by the presence of scattered villi on the skin of the sides. Such villi are, however, common to many cat-fishes, notably, *A. nebulosus*, *A. catus*, *Noturus flavus*, *Totalurus punctatus*, *Leptops olivaris*, and *Istlarius balsanus*. Small specimens of *Ameiurus dugesi* have the caudal fins tipped with black.
4. *Ictalurus furcatus* (Le Sueur).
One specimen purchased in Tampico market, said to have been caught in the Rio Tamesoc.

* These species appear at almost the same date in the fourth part of Jordan & Evermann's "Fishes of North and Middle America."

ISTLARIUS Jordan & Snyder, new genus.

Type *Istlarius balsanus* new species. Allied to *Ictalurus* and *Leptops*.

Body rather deep and compressed; head not widened nor greatly depressed; eye large; lower jaw included; teeth in villiform bands on premaxillaries and dentaries; premaxillary band convex anteriorly, with a short, angular posterior extension on each side; no division of band at symphysis; dentary band broad anteriorly, growing narrow and pointed posteriorly, with a distinct median division; no teeth on vomer or palatines; villiform teeth on upper and lower pharyngeals. Gill-rakers on first arch 17, long and slender; branchiostegals 8. Air bladder very large, extending almost to posterior end of body cavity, divided by a transverse constriction into two parts of nearly equal length, the anterior part heart-shaped, posterior part oval. Supraoccipital bone widely separated from interspinal; humeral process short, almost hidden by the skin. Lateral line extending from below insertion of dorsal to caudal; skin covered with minute hair-like villi, that of head completely concealing bones of skull. Barbels 8. Spines with distal parts soft, not branched, continuous with the hard parts; basal part of pectoral spine grooved posteriorly, weakly serrate above the groove.

Istlarius has some characters of the genus *Leptops*, notably the dentition of the upper jaw and the weakness of the fin spines, but it more closely resembles *Ictalurus*, and its relationship is probably with that genus.

5. *Istlarius balsanus* Jordan & Snyder, new species. *Bagre*. Fig. 2.

Type No. 6149, L. S. Jr. Univ. Mus. Locality, Rio Ixtla at Puente de Ixtla, Morelos, Mexico. Collected by Jordan & Snyder, January 3, 1899.

Head 4 in length; depth 4.66; depth of caudal peduncle 2.33 in head; eye 5.5; snout 2.4; distance between eyes 2.5; height of dorsal 1.4; length of base of dorsal 3; height of anal 1.66; length of base of anal 1; length of pectoral 1.5; ventrals 1.66; caudal 1; D. I, 6. A. 24.

Body deep and somewhat compressed, deepest part above ventrals, widest between pectorals; head narrow, not greatly depressed. Eye large, nearer to tip of snout than to posterior edge of opercle, a distance equal to diameter of eye; inter-orbital space convex; width of mouth, 2.5 in head; lower jaw included; upper jaw projecting a distance equal to diameter of pupil. Barbels 8; of the inferior ones, the median pair are shorter; distance between their bases equal to diameter of pupil; outer pair when extended directly backwards reaching edges of gill-covers; maxillary barbels longest, reaching upper angle of gill-opening; nostril barbels reaching middle of pupil.

Teeth in broad villiform bands on premaxillaries and dentaries, the band on upper jaw convex anteriorly, with a short, angular posterior extension on each side; no apparent division of band at symphysis; band on lower jaw broad anteriorly, narrow and pointed posteriorly; a distinct median division; no teeth on vomer or palatines; upper pharyngeal teeth in oval, villiform bands; lower pharyngeal teeth in 2 narrow oblong bands. Gillrakers on first arch 17, long and slender. Branchiostegals 8. Anterior nostril tubular, the posterior with a raised rim extending on each side from barbel to posterior edge of opening, where it is divided.

Skin of head completely concealing bones of skull. Supraoccipital bone not in contact with first interspinal. Humeral process about as long as vertical diameter of eye, almost hidden by the thick skin. Lateral line extending from a perpendicular through insertion of dorsal to caudal; skin covered with minute, hair-like villi.

Dorsal spine with its distal third soft, preceded by a small, angular, immature spine; first and second branched rays longest, the others gradually shorter. Adipose fin large, above middle of anal; length of posterior free edge three times diameter of pupil. Fifth or sixth anal ray longest; edge of fin rounded posteriorly; caudal deeply forked, lower lobe rounded, upper rather pointed. Pectoral rays I, 11, distal two-thirds of spine soft; not branched, continuous with the hard part; basal part grooved posteriorly, weakly serrate above the groove; ventrals reaching origin of anal.

Color bluish-slate above, light-silvery below; a few small dark spots on head and body; fins with dusky coloring; inferior barbels light; maxillary barbels with upper half dark; nasal barbules with

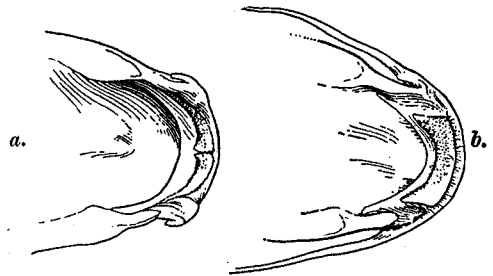


FIG. 1.—Views showing bands of teeth of *Istlarius balsanus*. (a) lower jaw, (b) upper jaw.

light edges. Some specimens have many well-defined color-spots, while others have few or none. The young have no spots. Our specimens vary in length from 10 to 60 centimeters.

Istlarius balsanus has a large and rather complex air-bladder, lying close to the spinal column and extending almost to the posterior end of body cavity. It is divided by a deep, transverse construction into two halves. The anterior part is heart-shaped and constricted dorso-ventrally. It is separated by a T-shaped partition into three chambers; of these, the anterior transverse chamber is partly

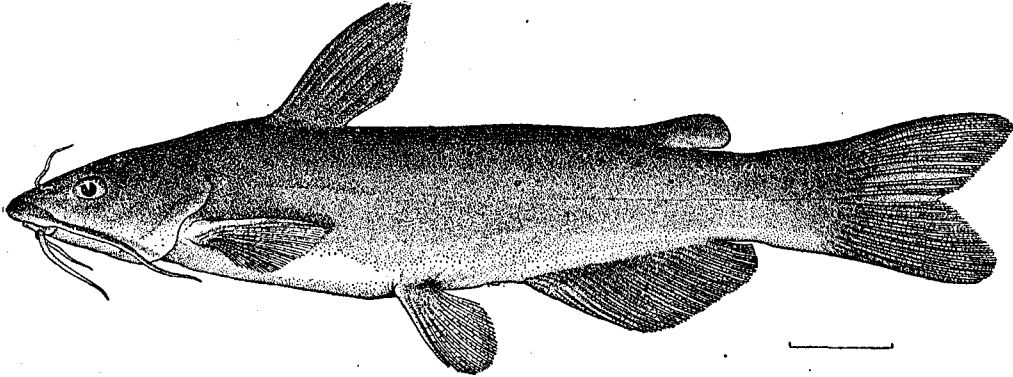


FIG. 2.—*Istlarius balsanus* Jordan & Snyder, new genus and species. Type.

divided on the median line by a fold of the dorsal wall of the bladder over the vertebral column. The transverse chamber is connected on each side with the two posterior lateral chambers by large openings in the ends of the transverse wall. The posterior half of the bladder is without partitions. It is connected with the left lateral chamber only, by a small opening.

Measurements of five specimens of Istlarius balsanus.

Measurements.	Locality: Rio Ixtla, at Puente de Ixtla, Morelos, Mexico.				
	195	238	148	123	81
Length of body in millimeters	23	21	19	21	22
Depth of body expressed in hundredths of length	12	11	10	11½	12
Depth of caudal peduncle.....	26	27	25	26	27
Length of head	11	11	11	11	12
Length of snout	21	16½	19	21	21
Length of maxillary barbel	4½	5	5	5½	6
Longitudinal diameter of orbit.....	36	38	37	36	35
Distance from snout to dorsal.....	20	17	17	18	21
Height of longest dorsal rays	77	81	77	79	77
Distance from snout to adipose fin.....	66	66	64	62	65
Length of base of anal	26	26	25	27	26
Height of longest anal rays	15½	15	14	15	16
Length of caudal fin	28	25	25	26	28
Length of pectoral fin	18	16	17	17	20
Distance from snout to ventral fin.....	51	52½	51	49	52
Length of ventral fin	15	14	14	14	15
Number of dorsal rays.....	7	7	7	7	7
Number of anal rays.....	24	23	21	23	23

CATOSTOMIDÆ.

6. *Carpiodes tumidus* Baird & Girard.

Locality, lagoons near Tampico.

In the identification of these specimens, we regard *Carpiodes tumidus* Baird & Girard as a species distinct from *Carpiodes velifer* Rafinesque. The Tampico specimens agree with the description and figure of *C. tumidus* given by Baird & Girard (Baird & Girard, Proc. Ac. Nat. Sci. Phila. 1854, 28; Girard, United States and Mexico Bound. Sur., Ichthyology, 34, plate xix, figs. 1-4). They all have the first rays of the dorsal short; in most cases the tip of the fin is rounded—in striking contrast to the very long rays and the scythe-shaped fin of *C. velifer* of the Mississippi Valley.

Measurements of five specimens of Carpiodes tumidus.

Measurements.	Collected in markets of Tampico, Mexico.				
	245	265	242	256	210
Length of body in millimeters.....	245	265	242	256	210
Depth of body expressed in hundredths of length.....	44	42	40	42	42
Depth of caudal peduncle.....	16½	16	15	16	16
Length of head.....	20½	26	25	26	26
Width of interorbital space.....	12½	13	13	13	13
Length of snout.....	9½	9	8	9	8
Diameter of orbit.....	5	5	5	5	6
Distance from snout to dorsal.....	57½	55	54½	58	56½
Height of longest dorsal rays.....	24	21	27	25	27
Distance from snout to anal fin.....	82½	82	82½	82	84
Height of longest anal rays.....	21	22	20	20	27
Distance from anal to caudal.....	13	13	12	12	13
Length of caudal fin.....	31	29	32	30	35
Length of pectoral fin.....	19	20	21	19	22
Distance from snout to ventral.....	62	61	62	61	52½
Length of ventral.....	20	21	20	22	25
Number of rays in dorsal fin.....	25	26	24	25	23
Number of rays in anal fin.....	8	9	8	8	8
Number of scales in lateral line.....	35	36	34	35	36
Number of scales above lateral line.....	7	7	8	8	8
Number of scales before dorsal.....	14	16	14	15	16

7. *Moxostoma austrinum* Bean.

Obtained from the Rio Verde, Aguas Calientes, and Rio Grande de Santiago, near Atequiza, Jalisco. Numerous specimens, about 170 millimeters in length, were taken in the Rio Verde. A large specimen from the Rio Grande de Santiago was presented to the Museum by Señor Joaquin Cuesta.

Some fin-ray and scale counts of the Rio Verde specimens are here given:

Measurements.	Locality: Rio Verde.										
	11	11	11	10	11	10	11	11	11	11	11
Number of dorsal rays.....	7	7	7	7	7	7	7	7	7	7	7
Number of anal rays.....	48	48	47	46	47	45	46	47	46	47	48
Number of scales in lateral line.....	16	15	16	15	14	15	15	15	15	15	14

CYPRINIDÆ.

8. *Algansea tincella* (Cuvier & Valenciennes).

Locality: City of Mexico market, said to have come from Lago de Chalco; Rio Verde, at Aguas Calientes.

Measurements of ten specimens of Algansea tincella.

Measurements.	Locality: Rio Verde, Aguas Calientes.									
	96	109	94	103	94	102	05	87	85	82
Length of body in millimeters.....	96	109	94	103	94	102	05	87	85	82
Depth of body expressed in hundredths of length.....	26	23	20	25	25	25	25	26	27	27
Depth of caudal peduncle.....	12½	12	13½	13	14	12½	12½	13	13	13
Length of head.....	25	24	25	25	25	25	26	25	24	25
Distance from snout to occiput.....	20	19	20	20	20	20	20	20	21	21
Width of interorbital space.....	9	8	8½	9	8	8½	9	9	9	8½
Length of snout.....	7	7½	7	7½	7	7	7½	7	7	7½
Length of maxillary.....	6½	7	7	7½	7	7	7	7	6	7
Diameter of orbit.....	4	4½	5	5	5	4	5	4	5½	5
Distance from snout to dorsal fin.....	54	53	52	55	52	53½	54	52	52	52
Height of longest dorsal rays.....	20	17	19	19	20	17	17	20	19	20
Distance from snout to anal fin.....	75	70	72	70	73	75	74	75	74	74
Height of longest anal rays.....	15	14	16	16	15	15	15	16	14	15
Distance from anal to caudal fin.....	21	20	21	19	22	20	20	21	21	22
Length of caudal fin.....	23	22	22	24	23	22	23	24	23	23
Length of pectoral fin.....	16	16	16	18	21	17	17	20	17	20
Distance from snout to ventral fin.....	55	53	53	55	51	52	52	52	53	54
Length of ventral fin.....	14	12½	14	14	15	13	14	16	13	15
Number of rays in dorsal fin.....	8	8	8	8	8	8	8	8	8	8
Number of rays in anal fin.....	7	7	7	7	7	7	7	7	7	7
Number of rays in pectoral fin.....	15	16	16	16	15	16	15	16	16	16
Number of scales before insertion of dorsal.....	30	29	31	28	27	30	29	30	30	31
Number of scales between dorsal and lateral line.....	16	15	16	15	16	17	16	16	16	16
Number of scales in lateral line.....	68	64	75	70	70	67	64	69	74	.....

We have one specimen of *Algansea tinella* from Lago de Chalco. It is not distinguishable, except in its darker color, from those taken in the Rio Verde. These differ from the description and figure of *A. dugesi* (Bean, Proc. U. S. Nat. Mus., 1892, 283) in having much smaller eyes and a deeper caudal peduncle. They have a distinct black spot at the base of the caudal. The specimens taken in the Rio Lerma, at Salamanca, by Professor Woolman, and recorded as *A. dugesi* (Woolman, Bull. U. S. F. C. 1894, 61), agree in every respect with those from the Rio Verde and are referred by us to the same species. Some of Mr. Woolman's specimens are in the museum of Stanford University.

9. *Notropis nigrotæniatus* (Günther).

Graodus nigrotæniatus Günther. Cat., VII, 485, 1868, Atlisco, Mexico.

Locality, Rio Ixtla at Puente de Ixtla, Morelos.

As shown by our specimens, *N. nigrotæniatus* differs from the closely related species, *N. rasconis* of the Rio Panuco system, in having a thicker and heavier body, a shorter snout, smaller eyes, shorter and more rounded fins, a wider lateral band, the black dots of which are distributed over a space about the width of two scales, a less distinct caudal spot, and the color-band not definite on the snout.

Measurements of two specimens of *Notropis nigrotæniatus*.

Measurements.	Locality: Rio Ixtla.	
Length of body in millimeters.....	51	60
Depth of body expressed in hundredths of length.....	26	26
Depth of caudal peduncle.....	12	11
Length of head.....	23	23
Distance from snout to occiput.....	20	20
Width of interorbital space.....	8	8
Length of snout.....	7	7½
Diameter of orbit.....	6½	6
Distance from snout to dorsal fin.....	51	52
Height of longest dorsal rays.....	21	21
Distance from snout to anal fin.....	67	66
Height of longest anal rays.....	16	17
Distance from anal to caudal fin.....	35	33
Length of caudal fin.....	25	25
Length of pectoral fin.....	20	19
Distance from snout to ventral fin.....	47	48
Length of ventral fin.....	16	16
Number of rays in dorsal fin.....	8	8
Number of rays in anal fin.....	9	8
Number of rays in pectoral fin.....	12	12
Number of scales before insertion of dorsal fin.....	14	15
Number of scales in lateral line.....	38	36

10. *Notropis rasconis* Jordan & Snyder, new species. Fig. 3.

Type specimen No. 6153, L. S. jr. Univ. Mus.

Three specimens belonging to the genus *Notropis*, which resemble very closely *N. nigrotæniatus* of the Rio de las Balsas system, were collected in the Rio Verde, near Rascon, January 25, 1899, by J. O. Snyder. They differ from that species, however, in having a more compressed body, a longer snout, larger eyes, longer and more pointed fins, and in having the color-band narrower on the body and more marked on the snout.

Head 4 in length; depth 3.50; eye 2.66 in head; snout 3.33; interorbital space 3; depth of caudal peduncle 2.25; height of dorsal 4.33 in length; anal 5.20; length of pectoral 5.5; ventral 5.5; caudal 3.5; number of scales in lateral line 33; between dorsal and occiput 15; between dorsal and ventral fins 10. D. 1, 8. A. 1, 8. P. 12.

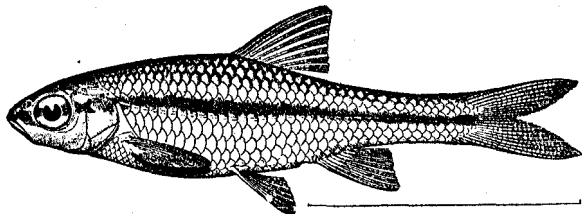


FIG. 3.—*Notropis rasconis* Jordan & Snyder, new species. Type.

Dorsal outline of body evenly rounded from snout to insertion of dorsal fin, slightly concaved from latter point to base of caudal; ventral outline evenly rounded to end of anal base; deepest part of body just anterior to insertion of dorsal; width of body one-seventh of its length. Snout pointed, mouth oblique, lower jaw included; maxillary not quite reaching vertical from anterior margin of orbit. Teeth 4-4, frail and easily detached from the arch; slightly hooked; no evident grinding surface. Gillrakers short and blunt, reduced to slight elevations on lower part of first arch.

First fully developed ray of dorsal fin longest, last ray much shorter. When the fin is elevated the posterior margin is straight; when depressed it is somewhat falcate. Anal fin similar in shape. Pectorals pointed. Tips of ventrals reaching anal. Caudal deeply forked, the lobes pointed.

Color silvery; a dark lateral band, the width of a scale, extending from tip of snout, through eye to base of caudal, where it ends in an elongate black spot; body above lateral band stippled with black; the dots grouped closely together on top of head and in a narrow dorsal band extending from occiput to insertion of dorsal, in a sharply defined black line along base of dorsal fin, and also on edges of dorsal scales. Body below dark band immaculate except a dusky line along base of anal fin. All of the fin rays dusky, especially the partly developed caudal rays, which are noticeably darker than the others.

Measurements of three specimens of Notropis rasconis.

Measurements.	Locality: Rio Verde, near Rascon.		
Length of body in millimeters.....	43	44	43
Depth of body expressed in hundredths of length.....	28	27½	24
Depth of caudal peduncle.....	11	11	11
Length of head.....	26	26	25
Distance from snout to occiput.....	23	23	24
Width of interorbital space.....	8	8	8
Length of snout.....	8	7½	8
Diameter of orbit.....	8½	8	8
Distance from snout to dorsal fin.....	55	54	52
Height of longest dorsal rays.....	23	24	24
Distance from snout to anal fin.....	69	69	68
Height of longest anal rays.....	21	19	19
Distance from anal to caudal fin.....	33	32	36
Length of caudal fin.....	29	29	30
Length of pectoral fin.....	20	20	21
Distance from snout to ventral fin.....	51	52	51
Length of ventral fin.....	17	17½	18
Number of rays in dorsal fin.....	8	8	8
Number of rays in anal fin.....	8	8	8
Number of rays in pectoral fin.....	12	12	12
Number of scales before insertion of dorsal fin.....	15	15	15
Number of scales in lateral line.....	33	34	34

11. *Notropis calientis* Jordan & Snyder, new species. Fig. 4.

Type No. 6193, L. S. jr. Univ. Mus.

Collected in the Rio Verde, at Aguas Calientes, on January 9, 1899, by J. O. Snyder.

Head 3.66 in length; depth 3.33; eye 4 in head; snout 4; interorbital space 2.66; depth of caudal peduncle 2.40; height of dorsal 4.66 in length; anal 5.75; length of pectoral 5.66; ventral 6; caudal 3.83; scales in lateral line 33; between dorsal and occiput 15; between dorsal and ventral fins 10. D. 8. A. 7.

Body deep and wide, deepest part anterior to insertion of dorsal; caudal peduncle long and slender; snout blunt, rounded; mouth oblique; jaws equal; maxillary reaching to a vertical from posterior nostril. Teeth 4-4, slender, hooked, grinding surface narrow, absent on smallest tooth. Gillrakers short, blunt; 9 on first arch. Intestinal canal short, with

but 1 convolution; peritoneum white, scales large, not notably deeper than long. Lateral line incomplete, extending only as far as posterior edge of pectoral. Dorsal fin rounded, the second, third, and fourth rays longest. Anal fin similar in shape; ventrals rounded, extending to vent; inserted directly under dorsal. Pectorals rounded. Caudal forked, the lobes rounded.

Color silvery, an indefinite dark band extending from tip of snout to end of caudal peduncle; the band distinct on snout and caudal peduncle; broader and almost obsolete on middle of body; top of head and a narrow band on median dorsal part of body dark; ventral parts of body immaculate, except a narrow, dark band extending along base of anal and ventral part of caudal peduncle; chin white; scales on upper parts, with dark edges; dorsal and caudal fins slightly dusky; other fins lighter.

This species is of small size, the mature males measuring about 34 mm. in length of body; the females 43. The males are more slender and have a little less dark color on the body. The affinities of

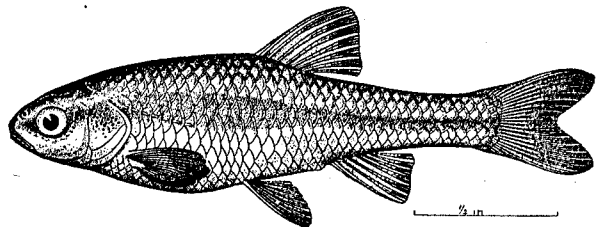


FIG. 4.—*Notropis calientis* Jordan & Snyder, new species. Type.

Notropis calientis are with *Notropis cayuga*, *N. jordani*, and others of the subgenus *Chriope*. The species may be distinguished by its small eye, the short, rounded snout, deep body, short lateral line, and rounded fins.

Measurements of ten specimens of *Notropis calientis*.

Measurements.	Locality: Rio Verde, Aguas Calientes, Mexico.									
Length of body in millimeters.....	42	44	42	41	40	38	36	36	34	32
Depth of body expressed in hundredths of length.	28	29	29	28	30	29	30	26	26	26
Depth of caudal peduncle.....	10	10	10	11	12	10	10	12	10	10
Length of head.....	26	25	26	27	27	25	25	26	26	27
Distance from snout to occiput.....	20	21	19	21	20	20	20	20	21	20
Width of interorbital space.....	10	8	10	10	10	9	10	10	9	10
Length of snout.....	7	7	7 $\frac{1}{2}$	7	7	7 $\frac{1}{2}$	7	7	8	7
Diameter of orbit.....	7	7	7	7	7	6 $\frac{1}{2}$	6 $\frac{1}{2}$	6	7	7
Distance from snout to dorsal fin.....	53	53	52	54	53	52	52	51	55	52
Height of longest dorsal rays.....	20	22	20	22	22	22	21	23	21	23
Distance from snout to anal fin.....	67	70	69	69	70	70	70	68	68	68
Height of longest anal rays.....	18	16	17	18	17	17	17	19	19	18
Distance from anal to caudal fin.....	24	24	24	24	23	23	25	25	23	26
Length of caudal fin.....	24	22	25	26	26	20	25	24	25	28
Length of pectoral fin.....	18	16	16	17	18	18	17	20	17	17
Distance from snout to ventral fin.....	52	52	53	53	56	53	51	53	50	52
Length of ventral fin.....	18	16	15	17	16	17	17	16	15	16
Number of rays in dorsal fin.....	8	8	8	8	8	8	8	8	8	8
Number of rays in anal fin.....	7	8	7	7	7	7	7	7	7	7
Number of scales before insertion of dorsal.....	14	16	15	14	15	17	16	17	17	16
Number of scales in lateral line.....	32	34	32	35	35	36	35	34	36	34

XYSTROSUS Jordan & Snyder, new genus.

Type, *Xystrosus popoche*, new species. Body long, compressed; interorbital space low and flat; mouth terminal, oblique; jaws subequal; premaxillary protractile. No barbel. No pseudobranchiæ. Gillrakers 66, long, slender, crowded on arch. Teeth 4-4, hooked, grinding surface oblique, grooved.

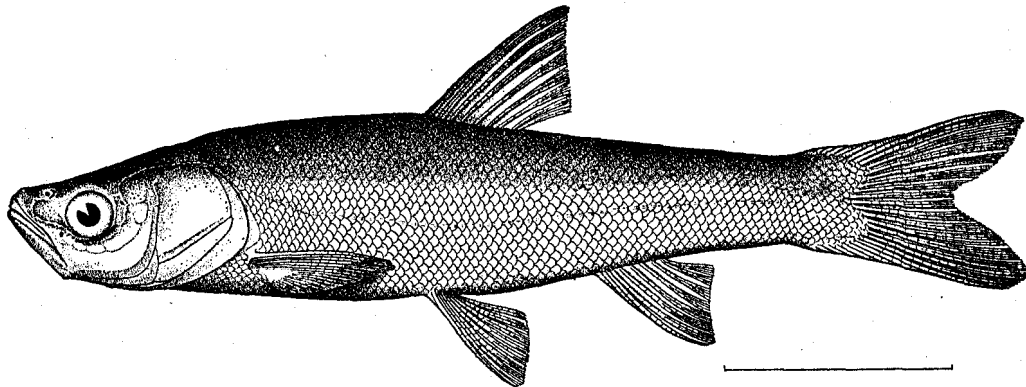


FIG. 5.—*Xystrosus popoche* Jordan & Snyder, new genus and species. Type.

Alimentary canal about twice as long as body. Peritoneum dusky. Lateral line complete, decurved above pectorals. Scales 61, evenly distributed over body. Fins falcate; dorsal inserted directly above insertion of ventral; caudal deeply forked; anal basis short.

The genus *Xystrosus* is allied to *Notropis*, differing in the long gillrakers, the small scales, and the absence of pseudobranchiæ.

12. *Xystrosus popoche* Jordan & Snyder, new species. *Popoche*. Fig. 5.

Type No. 6151, L. S. Jr. Univ. Mus. Locality, Laguna de Chapala, near Ocotlan, Jalisco, Mexico. Collected by J. O. Snyder, December 26, 1898.

Head 3.5 in length; depth 4.5; eye 4.66 in head; snout 3.60; interorbital space 2.60; depth of caudal peduncle 2.5; height of dorsal 5 in length; anal 6; length of pectoral 6; ventral 6.25; caudal 4. D. 8. A. 7. Number of scales in lateral line 61; between dorsal and occiput 24; between dorsal and lateral line 16; number of dorsal rays 8; anal 7; pectoral 16.

Body long and slender; caudal peduncle deep, compressed; head long, its upper contour slightly concave; interorbital space broad and flat; eye large, its longitudinal diameter contained 2 times in interorbital space; snout sharp, slightly turned up at end; mouth large, oblique; lips thin,

maxillary not quite extending to orbit. Gillrakers 66 on first arch, close together, slender, the length of longest half diameter of orbit. Teeth 4-4, strong, hooked, grinding surface oblique, narrow, grooved; a notch just below the hook. Alimentary canal almost twice length of body. Peritoneum dusky.

Scales not crowded anteriorly, evenly distributed over the body; lateral line shaped like the ventral contour of body, except above pectoral fins, where it is sharply decurved. Dorsal inserted directly above ventral, first ray highest, nearly three times height of last; when depressed the fin is falcate; when elevated, its edge is concave; anal similar in shape; caudal deeply forked, the tips sharp; ventrals pointed, not reaching vent; pectorals slightly rounded.

Color silvery, darker above, especially on median dorsal area, where a more or less definite dusky band extends the length of body; rays of dorsal fin and tips of caudal dusky; lower fins white.

Exact measurements of the only specimen obtained are here given. Length of body in 92 mm.; depth of body expressed in hundredths of length 23; depth of caudal peduncle $11\frac{1}{2}$; length of head $28\frac{1}{2}$; width of interorbital space $11\frac{1}{2}$; length of snout 8; diameter of orbit 6; distance from snout to dorsal fin 52; height of longest dorsal rays 20; distance from snout to anal fin 73; height of longest anal rays 17; distance from anal to caudal fin 21; length of caudal fin 25; length of pectoral fin 18; distance from snout to ventral fin 53; length of ventral fin 16.

FALCULA Jordan & Snyder, new genus.

Type, *Falcula chapalæ* new species. Body long, compressed; caudal peduncle slender; mouth large; lips thin; premaxillary protractile. No barbel. Teeth in 1 row, 4-4, hooked; grinding surface grooved. Gillrakers few, short, far apart. Alimentary canal short. Peritoneum silvery. Lateral

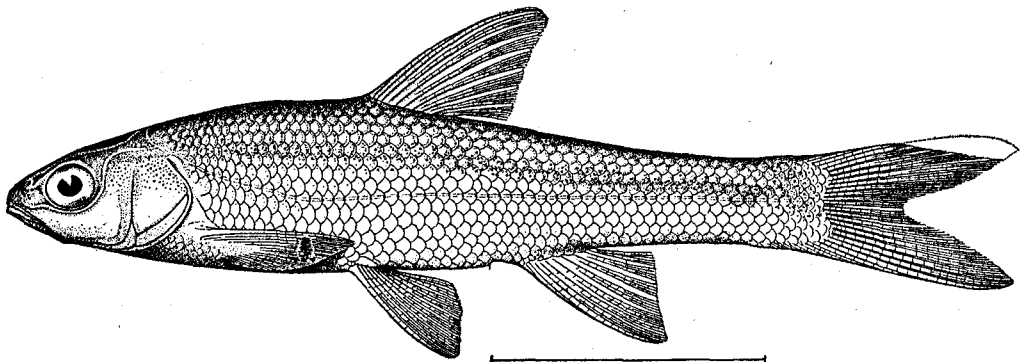


FIG. 6.—*Falcula chapalæ* Jordan & Snyder, new genus and species. Type.

line complete. Scales rather small, about 50 in lateral series. Fins high, falcate; dorsal inserted directly over ventrals; anal basis short; first simple rays of dorsal and anal rudimentary and closely adnate to first branched ray, caudal long, deeply notched.

The genus *Falcula* is related to *Notropis*, from which it differs in its small scales and in its very high, falcate fins.

13. Falcula chapalæ Jordan & Snyder, new species. Fig. 6.

Type No. 6152, L. S. Jr. Univ. Mus. Collected by J. O. Snyder, at Laguna de Chapala, near Ocotlan, Jalisco, Mexico, December 26, 1898.

Head 4 in length; depth 4.50; eye 3.66 in head; snout 3.66; interorbital space 3.66; depth of caudal peduncle 9.5 in length; height of dorsal 4; anal 5; length of pectoral 4.80; ventral 5.75; caudal 3.25; number of scales in lateral line 50; between dorsal and occiput 19; between dorsal and ventral fins 16. D. 8. A. 8. P. 17.

Body long, slender, compressed; snout pointed; its length equal to diameter of orbit or to interorbital space; mouth almost horizontal, its cleft extending to a vertical from anterior edge of orbit; lips thin. Teeth 4-4, strong, slightly hooked, the hook barely evident on lower tooth; three upper teeth with a grooved grinding surface. Gillrakers 3-7, short, pyramidal, and far apart. Alimentary canal short. Peritoneum silvery. Lateral line complete, decurved to a point in a vertical midway between pectoral and ventral fins, whence it extends in a straight line a little below middle of body to caudal. Fins all very high and pointed; dorsal inserted directly over origin of ventrals, falcate when depressed, its second ray longest; anal similar in shape; inserted at a point two-thirds the distance

from tip of snout to base of caudal; ventrals extending to vent; tips of pectorals reaching ventrals; caudal deeply forked.

Color silvery; a narrow, dark median band extending from occiput to base of caudal; dorsal scales with fine dots which give their edges a dusky color.

One specimen was taken, careful measurements of which are given. Length of body in millimeters 74; depth of body expressed in hundredths of length 25; depth of caudal peduncle 11; length of head 25; width of interorbital space 7; length of snout 7; diameter of orbit 7; distance from snout to dorsal fin 47; height of longest dorsal rays 26; distance from snout to anal fin 67; height of longest anal rays 21; distance from anal to caudal fin 27; length of caudal fin 31½; length of pectoral fin 22; distance from snout to ventral fin 62; length of ventral fin 21.

14. *Hybopsis altus* (Jordan).

Many specimens from the Rio Verde, Aguas Calientes, some of which were 165 millimeters long.

CHARACINIDÆ.

15. *Tetragonopterus mexicanus* Filippi.

Specimens of *Tetragonopterus* caught in the Rio Ixtla at Puente de Ixtla, Morelos, resemble very closely those taken in the Rio Verde near Rascon, but we believe that they belong to a different species. Besides the points of difference expressed in the following table, *T. mexicanus* of the Rio Ixtla has smaller and weaker teeth than *T. argentatus* of the Rio Verde.

Average measurements of ten specimens each of *Tetragonopterus mexicanus* from the Rio Ixtla and of *Tetragonopterus argentatus* from the Rio Verde near Rascon.

Measurements.	Tetragonopterus mexicanus.	Tetragonopterus argentatus.
Length of head expressed in hundredths of length	25.10	28.75
Distance from snout to occiput.....	25.25	28.25
Distance from lower jaw to occiput.....	26.50	28.80
Width of interorbital space.....	8.80	9.70
Length of snout.....	6.60	7.09
Diameter of orbit.....	8.40	10.10
Distance from snout to origin of dorsal fin.....	51.25	54.30

Measurements of ten specimens of *Tetragonopterus mexicanus*.

Measurements.	Locality: Rio Ixtla at Puente de Ixtla, Morelos, Mexico.											
	48	55	50	52	51	75	79	88	94	35	34	
Length of body in millimeters.....	48	55	50	52	51	75	79	88	94	35	34	
Depth of body expressed in hundredths of length.....	35	34	38	35	36	35	34	38	37	30	30	
Depth of caudal peduncle.....	12	12	12½	12½	12	12	12	12½	13	12½	12½	
Length of head.....	25	24	26	26	26	24	24	26	25	25	25	
Distance from snout to occiput.....	26	25	26½	27	26	24½	24	23½	26	24	24	
Tip of lower jaw to occiput.....	27	26	27	28	27	26	26	25½	27	25½	25½	
Width of interorbital space.....	9	8	9	8½	9	8½	8½	9	9½	9	9	
Length of snout.....	6	6	7	7½	7	6	6	7	6½	7	7	
Diameter of orbit.....	9	8½	8½	9	9	8	8	8	8	8	8	
Distance from snout to dorsal.....	54	52½	52½	50	51½	50	52	52	53	50	50	
Insertion of dorsal to adipose fin.....	35	36½	37½	37	37	35	38	37½	35	36	36	
Height of longest dorsal rays.....	25	25	26	26	26	21	23	22	24	23	23	
Distance from snout to anal fin.....	69	65	68	63	64	66	67	69	67	66½	66½	
Height of longest anal rays.....	15	15	16½	17	16	13	15	13	15	14	14	
Distance from anal to caudal fin.....	14	15	15	15	15	16½	14	15	15	16	16	
Length of caudal fin.....	25	27½	33	31	30	27	28	28	30	28	28	
Length of pectoral fin.....	23	21	25	22½	24	20	20	21	22	21	21	
Distance from snout to ventral fin.....	40	48	50	47	51	48½	49	52	50	51	51	
Length of ventral fin.....	16	16	18	18	17	15	16	15	17	15½	15½	
Number of dorsal rays.....	10	10	10	10	10	9	10	10	9	9	9	
Number of anal rays.....	22	23	21	21	23	21	23	21	20	23	23	
Number of pectoral rays.....	14	14	14	13	12	13	13	13	14	13	13	
Number of scales in transverse series.....	15	14	15	14	14	14	14	15	15	15	15	
Number of scales in lateral line.....	36	35	33	33	33	33	37	36	34	36	36	

16. *Tetragonopterus argentatus* (Baird & Girard).

The specimens of *T. argentatus* from the Rio Verde near Rascon were not more than 55 mm. long. The ventral and anal fins were dashed with a bright orange-red and the caudal was tipped with orange. A few specimens from the Rio Tamesoe were like those from the Rio Verde, except that the fins were not colored.

Measurements of ten specimens of *Tetragonopterus argentatus*.

Measurements.	Locality: Rio Verde at Rascon.									
	55	47	44	47	43	42	40	38	37	37
Length of body in millimeters.....	55	47	44	47	43	42	40	38	37	37
Depth of body expressed in hundredths of length....	35	35	36	34	34	33	34	34	35	34
Depth of caudal peduncle.....	12	12	12	11	12	12	12	12	12	12
Length of head.....	29	29	29	27½	27	20	20	28	30	30
Distance from snout to occiput.....	28	28	28	27½	27	28	28	29	30	29
Tip of lower jaw to occiput.....	28	28½	29	27½	28	29	29	30	30	30
Width of interorbital space.....	9	10	10	10	9	10	10	9	10	10
Length of snout.....	8	8	8	8	8	8	8	8	8	7½
Diameter of orbit.....	10	10	10	10	9	10	10	11	11	11
Distance from snout to dorsal fin.....	56	53	54	54	52	53	55	58	54	54
Insertion of dorsal to adipose fin.....	33	36	37	36	36½	36	37	35	38	35
Height of longest dorsal rays.....	23	22½	23½	22	22	22	22	22	24	24
Distance from snout to anal fin.....	68	69	69	64	67	69	69	69	68	68
Height of longest anal rays.....	15	15	16½	16	16	16	15	15	16	15
Distance from anal to caudal fin.....	15	15	16	15	14	16	14	15	15	14
Length of caudal fin.....	27	26	28	28	27	29	29	28	28	25
Length of pectoral fin.....	21	20	21	22	21	20	19	22	19	22
Distance from snout to ventral fin.....	51	53	54	50	50	52	51	52	48	53
Length of ventral fin.....	15	14	13	15	15	14	13	15	15	15
Number of dorsal rays.....	10	9	9	9	9	9	9	9	10	9
Number of anal rays.....	21	20	20	21	20	20	20	20	20	19
Number of pectoral rays.....	13	12	13	12	13	12	12	12	12	12
Number of scales in transverse series.....	15	15	14	13	13	14	14	14	14	13
Number of scales in lateral line.....	37	33	34	31	34	31	31	30	30	34

POECILIIDÆ.

17. *Fundulus heteroclitus* (Linnaeus). Lagoons near Tampico.

18. *Fundulus robustus* Bean. Mouth of Laguna de Chapala, Jalisco.

19. *Characodon variatus* Bean. Rio Verde, Aguas Calientes.

The large males have no dark spots.* The dark, lateral color-band is very marked. In life there was a terminal band of bright orange-yellow on the caudal, and also a washing of the same color on the lower parts of the body posterior to the ventrals. In the small males the lateral dark band is more or less broken up into spots. There are spots on other parts of the body, generally arranged in a row on the lower parts posterior to ventral fins; terminal caudal band usually absent. The large females are similar in color to the small males. The small females are more spotted.

20. *Characodon encaustus* Jordan & Snyder. New species. Fig. 7.

Type No. 6163, L. S. Jr. Univ. Mus. Locality, Laguna de Chapala, near Ocotlan, Jalisco, Mexico. Collected by J. O. Snyder, December 26, 1898.

Head 3.80 in length; depth 3.66; depth of caudal peduncle 8; eye 3 in head; snout 4; interorbital space 3.5; height of dorsal 4.5 in length; anal 6.5; length of pectoral 5.33; ventral 6.5; caudal 4.33. D. 16. A. 16. Scales in lateral series 35; transverse series counting upward and forward from origin of anal 13; on caudal peduncle 9.

Body deep, compressed; dorsal outline almost straight from snout to origin of dorsal, concave from the latter point to base of caudal; ventral outline evenly curved from snout to posterior part of base of anal. Eye very large, located nearer to snout than to posterior edge of opercle a distance equal to longitudinal diameter of pupil. Mouth small, its width equal to two-thirds diameter of pupil; maxillary protractile; lower jaw projecting. Teeth in 2 series, outer series small, bicuspid, in single row, rather firmly attached; inner series minute, in small patches. Gill-openings restricted, not extending above base of pectoral. Gillrakers slender, equal in length to half the diameter of pupil. Alimentary canal short. Air-bladder large, extending posteriorly to a point above origin of anal. Dorsal fin inserted halfway between tip of snout and base of caudal; length of base a little less than height of fin; anal inserted below middle of dorsal, its edge rounded; pectorals extending beyond bases of ventrals; ventrals extending to vent. Scales on body large; upper posterior part of head and a narrow space below and posterior to eye with scales; other parts of head naked; small scales on basal part of caudal fin. A row of large pores above eye and at lower edge of suborbital patch of scales. No lateral line.

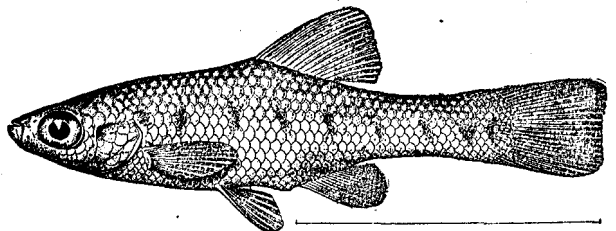


FIG. 7.—*Characodon encaustus* Jordan & Snyder, new species. Type.

Color in alcohol, light yellowish-olive; 9 short and narrow dark vertical bands on median part of body; the first above base of pectoral; the ninth at base of caudal; scales on dorsal region of body edged with black dots; upper part of head dark; upper half of orbit black; opercles silvery; dorsal fin with a little dusky; other fins without dark color.

Characodon encaustus somewhat resembles *C. eiseni* in appearance. It differs in having more rays in the dorsal and anal fins, smaller scales, a more compressed body, and less dark color on the body. One female specimen only was collected.

21. *Cyprinodon elegans* Baird & Girard.

Three small female specimens of *Cyprinodon* from lagoons near Tampico are, with some doubt, referred to the species *elegans*.

22. *Gambusia affinis* Baird & Girard.

A number of males and females of *Gambusia affinis* were collected in lagoons near Tampico, and especially in small pools left by high water.

XENENDUM Jordan & Snyder, new genus.

Type, *Xenendum caliente*, new species.

Body deep, not much compressed. Males and females of about the same size. Eye normal. Mouth vertical, lower jaw projecting. Teeth loosely attached, in 2 series; first series flat, bicuspid, in 2 or 3 rows on each jaw; second series minute, in villiform bands, sometimes absent. Gill-openings not restricted, extending above the pectoral fin a distance equal to diameter of pupil. Alimentary canal long, with many convolutions. Air-bladder present, large. Scales large. No lateral line. Dorsal and anal inserted posteriorly, the one directly over the other, their bases short; anal very

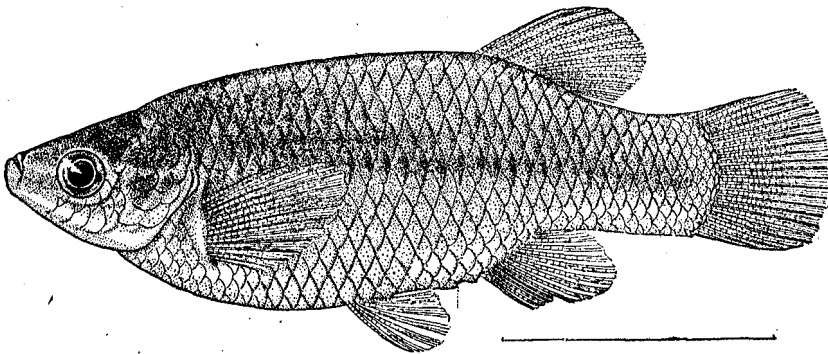


FIG. 8.—*Xenendum caliente* Jordan & Snyder, new genus and species. Type.

slightly modified in male, first rays shorter; edge of fin double convex—the notch being between the smaller and larger groups of rays. Ventral fins present. Caudal rounded, and not modified in male.

Xenendum differs notably from *Characodon* in having the bicuspid teeth loosely attached and in more than one series. *Characodon* has the bicuspid teeth firmly attached and in a single series. The actual affinities of *Xenendum* are with the genus *Goodea*, and it belongs to the subfamily *Goodeinae*, which has the general characters of the *Paciliinae*, but with bifurcate or trifurcate teeth and no great differences between the sexes. *Characodon luitpoldi* Steindachner seems to be a species of *Xenendum*.

23. *Xenendum caliente* Jordan & Snyder, new species. Fig. 8.

One male specimen, type No. 6147, L. S. Jr. Univ. Mus., from Rio Verde near Aguas Calientes, Mexico. Collected by J. O. Snyder, January 9, 1899.

Head 3.75 in length; depth 2.60; depth of caudal peduncle 5.66; eye 4 in head; snout 3.20; interorbital space 2; height of dorsal 5.66 in length; anal 6.75; length of pectoral 5; ventral 7.66; caudal 5. D. 13. A. 14. Scales in lateral series 36; transverse series counting upward and forward from origin of anal 14; on caudal peduncle 9.

Body large and thickset, deepest part at tip of pectoral; width contained $4\frac{1}{2}$ times in length; head pointed; interorbital space broad; slightly convex; length of snout about equal to diameter of orbit; mouth vertical, its width equal to length of snout; maxillary very protractile. Teeth loosely attached in 2 series, those of first series larger, flat, and notched, in 2 rows on upper jaw, 3 rows on lower, the individual teeth of each row alternating in position with those of the next; those of second series very minute in a villiform band. Gill-openings not restricted, extending above the pectoral a distance equal to diameter of pupil. Gillrakers long, slender, and close together, 40 on first arch.

Alimentary canal long (in another specimen, $4\frac{1}{2}$ times length of body), coiled many times. Peritoneum black. Genital opening close to basis of anal, covered by a thick, notched pad. Dorsal fin inserted posteriorly, rounded; its basis short, its length less than height of fin; anal inserted under dorsal, first 5 rays crowded together and shortened, edge of fin double convex—the notch being between the shorter and longer sets of rays; pectorals and ventrals with rounded edges; caudal evenly rounded. Body and head everywhere except jaws and preorbital area with scales; no lateral line.

Color light-olive, growing darker above; median dorsal area blackish, each scale with a dark, angular band, those of the sixth series below the dorsal darker, making an indistinct, narrow lateral band; all the fins except ventrals dusky.

The females differ but slightly from the males. The body of the former is more thickset, the caudal peduncle a little less deep, the fins a little lower, and the anal evenly rounded. The young are somewhat mottled in color.

Xenendum caliente differs from *X. luitpoldii* Steindachner, in having fewer scales in the lateral and transverse series and on the caudal peduncle, and in a similar way from *X. xaliscone*, besides having villiform teeth, which are absent in *X. xaliscone*.

Measurements of ten specimens of *Xenendum caliente*.

Measurements.	Locality: Rio Verde, Aguas Calientes, Mexico.									
	Male.					Female.				
Length of body in millimeters	63	71	67	63	48	72	71	73	73	45
Depth of body expressed in hundredths of length	37	34	35	36	37	40	34	33	34	35
Depth of caudal peduncle	18	17	17	17	17	16	16	17	16	16
Length of head	27	26	26	25	27	25	25	25	24	26
Width of interorbital space	13	13	13	13	13	14	13	13	13	13
Length of snout	9	9	9	9	9	9	9	8	9	8
Width of mouth	9	9	9	9 $\frac{1}{2}$	9 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	9	8	9
Diameter of orbit	6	6	6	7	7 $\frac{1}{2}$	6	6 $\frac{1}{2}$	6	6	7 $\frac{1}{2}$
Distance from snout to dorsal fin	72	70	70	71	72	74 $\frac{1}{2}$	72	70	73	73
Height of longest dorsal rays	19	18 $\frac{1}{2}$	19	19	18	17	14	16	16	15
Distance from snout to anal fin	72	72	71 $\frac{1}{2}$	70	72	72	69	69	70	71
Height of longest anal rays	15	14	14	14	13	12	12 $\frac{1}{2}$	13	12	15
Distance from anal to caudal fin	23	24	24	24	25	23	24	24	24	26
Length of caudal fin	22	20	20	21	20	21	19	20	19	19
Length of pectoral fin	20	20	20	20	20	19	19	18	13	18
Distance from snout to ventral fin	54	51	53	54	53	53	51 $\frac{1}{2}$	51	58	53
Length of ventral fin	13	14	13	13	13	12	13	13	13	14
Number of rays in dorsal	13	12	14	13	12	13	13	13	13	13
Number of rays in anal	14	14	14	14	14	14	13	14	14	13
Number of scales in lateral series	36	37	37	37	35	38	37	38	38	38
Number of scales in transverse series	14	13	13	13	14	14	14	13	14	14
Number of scales on caudal peduncle	9	9	9	9	9	9	9	10	9	9

24. *Xenendum xaliscone* Jordan & Snyder, new species. Fig. 9.

Type, a female, No. 6148, L. S. Jr. Univ. Mus. Locality, Laguna de Chapala, near Ocotlan, Jalisco, Mexico. Date, December 26, 1898. Collector, J. O. Snyder.

Head 4.66 in length; depth 3.33; depth of caudal peduncle 6.5; eye 3.80 in head; snout 3; interorbital space 1.66; height of dorsal 6.50 in length; anal 9; length of pectoral 5.25; ventral 7.50; caudal 5. D. I, 13. A. I, 14. Scales in lateral series 42, transverse series, counting upward and forward from origin of anal, 17; on caudal peduncle, 12.

Body thickset, deepest at origin of ventrals, widest at bases of pectorals; caudal peduncle deep and long. Head large and pointed; interorbital space broad, slightly convex; mouth vertical, its width equal to length of snout; maxillary very protractile. Teeth loosely attached, broader at distal ends than at bases, bicuspid, in two rows on each jaw; no villiform teeth present. Gill-openings extending above base of pectorals a distance about equal to diameter of pupil. Gillrakers long, flat, very close together, 56 on first arch. Alimentary canal long, in many folds. Peritoneum black.

Dorsal fin inserted posteriorly, first ray simple, closely attached to second; edge of fin rounded. Anal inserted on a vertical passing through base of fourth dorsal ray, similar to dorsal in shape; pectoral and ventral fins rounded; edge of caudal a little convex, basal one-fourth with scales. Scales large, everywhere on body and head except lower jaw and preorbital area; no lateral line.

Color plain, dark above, light below, the dark color leaving off rather abruptly on the head along a line passing through lower edge of eye; on the body, along a line passing from lower edge of base of pectoral to caudal, leaving lower one-fifth of caudal peduncle light; faint traces of a dark spot at base of each scale on dorsal region of body; all the fins except ventrals dusky.

One male specimen was taken. It resembles the females in general appearance. The anal fin is not advanced nor modified into an intromittent organ. Although it is injured, it shows that the first 5 or 6 rays were close together and shortened.

Xenendum xaliscone differs from *X. caliente* in not having villiform teeth; in having more scales in the lateral and transverse series and on caudal peduncle. It differs from *X. luitpoldii* (Steindachner), which is the third known species of the genus, in having a much longer snout, a more pointed head, and in not having villiform teeth.

Measurements of five female specimens of *Xenendum xaliscone*.

Measurements.	Locality: L. de Chapala near Ocotlan, Jalisco, Mexico.				
	142	124	122	110	117
Length of body in millimeters.....	142	124	122	110	117
Depth of body expressed in hundredths of length.....	32	33	32	34	33
Depth of caudal peduncle.....	16	18	17	18	17
Length of head.....	22	23	23	23	23
Width of interorbital space.....	13	14	13	14	13
Length of snout.....	7	8	8	7	7
Width of mouth.....	8	8	9	8	8
Diameter of orbit.....	6	6	6	6	6
Distance from snout to dorsal fin.....	66	64	65	66	66
Height of longest dorsal rays.....	15	15	13	15	17
Distance from snout to anal fin.....	70	69	69	69	68
Height of longest anal rays.....	11	13	12	13	13
Distance from anal to caudal fin.....	25	26	27	26	27
Length of caudal fin.....	21	21	20	21	20
Length of pectoral fin.....	18	20	19	20	21
Distance from snout to ventral fin.....	40	49	51	50	49
Length of ventral fin.....	13	14	14	13	14
Number of rays in dorsal.....	13	13	12	12	12
Number of rays in anal.....	14	14	15	14	14
Number of scales in lateral series.....	42	41	40	40	40
Number of scales in transverse series.....	17	16	16	16	17
Number of scales on caudal peduncle.....	12	12	12	12	11

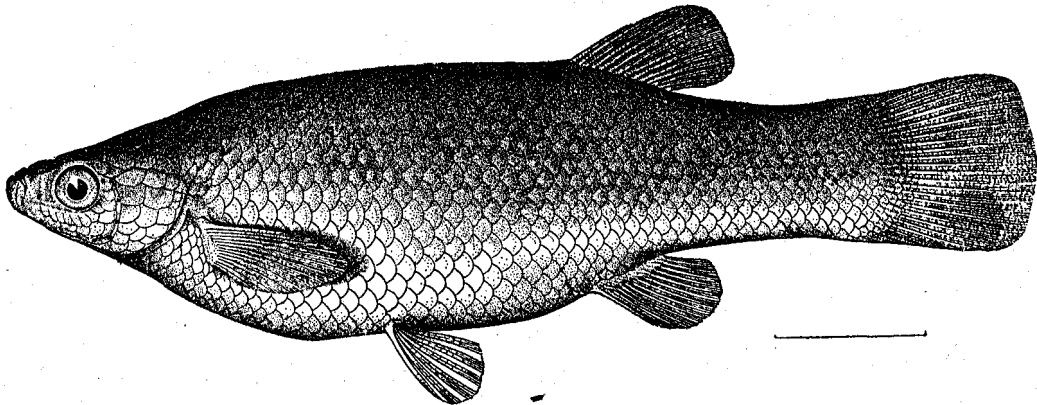


FIG. 9.—*Xenendum xaliscone* Jordan & Snyder, new species. Type.

25. *Poecilia limantouri* Jordan & Snyder, new species. Fig. 10.

Type, a male, No. 6165, L. S. Jr. Univ. Mus. From Rio Tamesoe, near Tampico, Tamaulipas, Mexico. Collected by J. O. Snyder, January 12, 1899.

Head 3.5 in length; depth 3; depth of caudal peduncle 4.6; eye 3.5 in head; snout 3; interorbital space 2; height of dorsal 5.5 in length; anal 4.5; length of pectoral 4.5; ventral 6, caudal 3.5. D. 9. A. 9. Scales in lateral series 26; transverse series 9; on caudal peduncle 8.

Body rather deep and compressed; dorsal outline angular, its highest point at insertion of dorsal; lowest point of ventral outline at base of ventrals; head pointed; interorbital space wide and flat; eye large, nearer to tip of snout than to posterior edge of opercle a distance equal to diameter of pupil. Mouth very oblique, its width twice diameter of pupil; premaxillary protractile; distal end of maxillary visible; lower jaw projecting. Teeth in two series on both jaws; the outer series in a single row, small, pointed, loosely attached; second series barely discernible, in bands. Gill-openings extending above base of pectoral a distance equal to half diameter of orbit. Gillrakers on first arch 20, small and slender. Alimentary canal very long and slender.

Body and entire head except preorbital area, lips, and lower jaw covered with large scales; 3 rows of scales on base of caudal; small scales extending on interradial membranes of caudal, a distance

beyond basal scales about equal to diameter of eye. Dorsal inserted half way between base of caudal and anterior edge of pupil, its base contained $6\frac{2}{3}$ times in length of head and body, its height $5\frac{2}{3}$; the last rays a little higher than the first. Anal advanced close to base of ventrals; first and second rays short, closely attached to the next; third ray greatly enlarged and lengthened; a loosely attached, ovate, fleshy pad near its tip; fourth and fifth rays slender, as long as the third; tips of the third and fifth rays bent toward that of the fourth; sixth to ninth rays about half as long as third. Caudal rounded, its length contained $3\frac{3}{4}$ times in head and body. Pectorals rounded; their length contained $1\frac{1}{4}$ times in head. Ventrals pointed, extending to middle of longest anal ray.

Color in alcohol, light yellowish-olive; much lighter on breast and ventral part of head; posterior edges of scales dark; lower jaw, preorbital area, upper part of head, and a narrow, median dorsal stripe, dark; basal three-fifths of dorsal fin black; distal part of fin white; boundary between white and black parts more definite on anterior than on posterior part of fin; basal two-thirds of caudal dusky; distal part without color. Other male specimens have only a few small dark spots on dorsal and caudal.

Body of female more elongate than that of male; depth of caudal peduncle $5\frac{2}{3}$ in length. Dorsal fin inserted in advance of anal, its origin above anal opening; first rays highest. Ventrals extend to posterior edge of vent, but do not reach anal. The dorsal and caudal have a little dusky coloring.

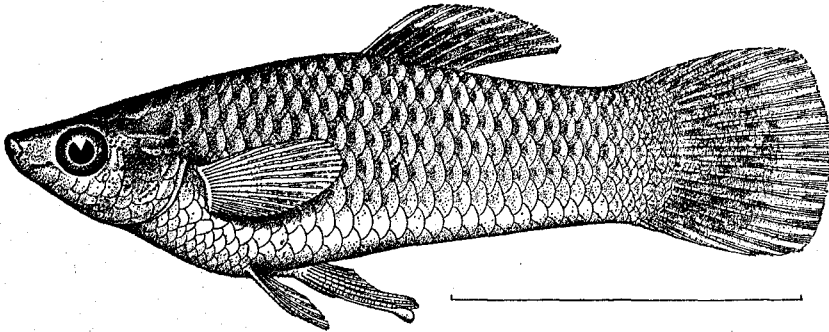


Fig. 10.—*Pacilia limantouri* Jordan & Snyder, new species. Type.

Measurements of *Pacilia limantouri*.

Measurements.	Locality: Rio Tamesoe, near Tampico, Tamaulipas, Mexico.					Locality: Rio Ixtla at Puente de Ixtla, Morelos, Mexico.							
	Male.					Female.							
Length of body in millimeters...	46	44	42	38	57	53	48	44	44	40	37	49	42
Depth of body expressed in hundredths of length.....	32	32	35	32	27	29	30	33	30	32	31	30	31
Depth of caudal peduncle.....	22	22	21	20	17	18	18	19	19	23	20	18	20
Length of head.....	28	27	29	29	28	27	26	29	29	28	28	26	27
Width of interorbital space.....	13	14	13	14	14	14	14	15	15	13	12	14	13
Length of snout.....	10	10	10	11	10 $\frac{1}{2}$	10	10	9	10	11	10	9	10
Width of mouth.....	10	9	9 $\frac{1}{2}$	9	10	10	10	9	9	8	9	9	9
Diameter of orbit.....	8	8	9	8	9	8	8	8	8	8	8	7	8
Distance from snout to dorsal.....	56	56	55	56	57	62	58	60	61	60	57	58	61
Height of longest dorsal rays.....	18	17	17	17	16	11	13	13	17	14	26	24	18
Distance from snout to anal.....	50	52	53	53	55	66	63	64	65	65	52	48	66
Height of longest anal rays.....	22	22	24	24	23	15	16	16	14	15	24	23	17
Distance from anal to caudal.....	51	50	47	49	47	33	35	34	35	34	50	50	32
Length of caudal.....	30	29	30	28	28	20	20	24	25	27	33	30	28
Length of pectoral.....	23	23	22	23	23	20	20	22	21	22	25	22	21
Distance from snout to ventral.....	45	46	48	46	46	50	47	50	52	50	45	45	52
Length of ventral.....	17	18	17	13	18	13	13	13	12	13	19	18	13
Number of rays in dorsal.....	9	9	9	9	8	9	9	9	9	9	9	9	9
Number of rays in anal.....	8	8	8	8	8	8	8	8	8	8	8	8	8
Number of scales in lateral series.....	26	27	26	27	27	26	27	26	27	28	27	26	26
Number of scales in transverse series.....	9	9	9	9	9	8	9	9	9	9	9	9	9
Number of scales on caudal peduncle.....	8	8	8	7	8	8	7	8	7	8	8	8	7

Lack of material for comparison prevents our commenting on the probable affinities between *P. limantouri* and other species of the genus.

P. limantouri was numerous in the Rio Tamesoe and the lagoons near Tampico, and also in the Rio Verde near Rascon. We identify four specimens of *Pacilia* collected at Puente de Ixtla, Morelos, with this species.

We take pleasure in dedicating this pretty fish to Señor Jose Yves de Limantour, the accomplished minister of the "Hacienda" for Mexico, in recognition of favors received through his courtesy.

26. Mollienisia latipinna Le Sueur.

A few specimens which we identify as *Mollienisia latipinna* were collected in the lagoons near Tampico. Some measurements of these are given.

Measurements of five specimens of Mollienisia latipinna.

Measurements.	Locality: Tampico, Mexico.				
	Male.		Female.		
Length of body in millimeters.....	43	35	41	37	28
Depth of body expressed in hundredths of length.....	38	36	36	34	34
Depth of caudal peduncle.....	23	21	20	20	18
Length of head.....	28	30	30	30	30
Width of interorbital space.....	15	16	15	15	15
Length of snout.....	10	10	11	10	12
Width of mouth.....	10	11	11	10	10
Diameter of orbit.....	9	10	10	10	10
Distance from snout to dorsal fin.....	53	47	52	49	48
Height of longest dorsal rays.....	21	20	15	14	16
Distance from snout to anal fin.....	56	50	66	63	64
Height of longest anal rays.....	22	24	18	16	17
Distance from anal to caudal fin.....	48	48	33	35	35
Length of caudal fin.....	30	28	25	27	28
Length of pectoral fin.....	25	25	21	23	23
Distance from snout to ventral fin.....	49	49	50	50	52
Length of ventral fin.....	19	20	15	15	15
Number of rays in dorsal.....	15	14	13	13	13
Number of rays in anal.....	8	8	8	8	8
Number of scales in lateral series.....	28	28	28	27	28
Number of scales in transverse series.....	9	8	9	9	9
Number of scales on caudal peduncle.....	7	7	7	7	7

As shown in the following table, there is considerable variation in certain characters between specimens of *M. latipinna* from different localities:

Measurements of Mollienisia latipinna.

Measurements.	Tampico, Mex.			Pensacola, Fla.			Savannah, Ga.			Withlacoochee, Fla.							
	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.					
Width of interorbital space.....	15	16	15	15	15	13	13	13	14	14	14	14	14	15	16	15	16
Diameter of orbit.....	9	10	10	10	10	7	7	8	8	8	8	8	7	7½	10	10	9
Length of snout.....	10	10	11	10	12	9	9½	8	9	9	8	8	7½	8	9	9	10
Depth of caudal peduncle.....	23	21	20	20	18	25	23	23	20	22	24	22	19	18	19	20	19
Distance from snout to dorsal	53	47	52	49	48	32	33	32	45	44	40	43	50	50	53	52	53
Distance from snout to ventrals.....	49	49	50	50	52	45	44	43	52	49	45	44	47	47	53	45	54
																52	51

27. Xiphophorus montezumæ Jordan & Snyder, new species. Fig. 11.

Type, a female; No. 6145; L. S. Jr. Univ. Mus. From Rio Verde, near Rascon, San Luis Potosi, Mexico. Collected by J. O. Snyder January 24, 1899.

Head 4.20 in length, depth 3; depth of caudal peduncle 4.66; eye 3.25 in head; snout 3.25; interorbital space 2; height of dorsal 3.50 in length; anal 5; length of pectoral 4.20; ventral 4.50; upper rays of caudal 3.33; lower rays 1.10. D.13. A.7. Scales in lateral series 29; transverse series 9; on caudal peduncle 7.

Body deep, compressed; dorsal contour arched, its highest point at insertion of dorsal; caudal peduncle narrow and very deep; head small, pointed; interorbital space wide, slightly convex; eye large, a little nearer tip of snout than to posterior edge of opercle; mouth vertical. Teeth in two series; the first in a single row, minute, flat, and pointed, the second in a villiform band, much smaller and narrower than first, brownish colored, strongly curved backward. Gill-opening extending above base of pectoral a distance equal to diameter of pupil. Gillrakers on first arch 19, slender, the length of longest equal to half diameter of eye. Intestinal canal slender and long. Peritoneum black.

Scales on head and body large. One large, round scale on interorbital space, followed by 2; a row of 11 from the latter to first dorsal ray; 3 rows of scales on base of caudal fin.

Base of dorsal fin short, 4.16 in body; first ray shortest, the others graduated to the eighth, which is longest; the ninth, tenth, and eleventh shorter; twelfth and thirteenth longer; the abrupt shortening of ninth, tenth, and eleventh rays makes a notch in outline of dorsal. Anal advanced, its origin under third ray of dorsal; first ray greatly enlarged and lengthened, second and third equally lengthened, but more slender; these three with their connecting membranes form a half tube, with a pointed end; other rays half the length of first. Upper lobe of caudal rounded; 5 lower rays forming a very long, blunt appendage. Ventrals pointed, extending almost to tip of anal. Pectorals sharply rounded.

Color yellowish-olive, marked with black. During life there were 4 narrow longitudinal orange bands, each extending along a row of scales on body. Top of head and a median dorsal band

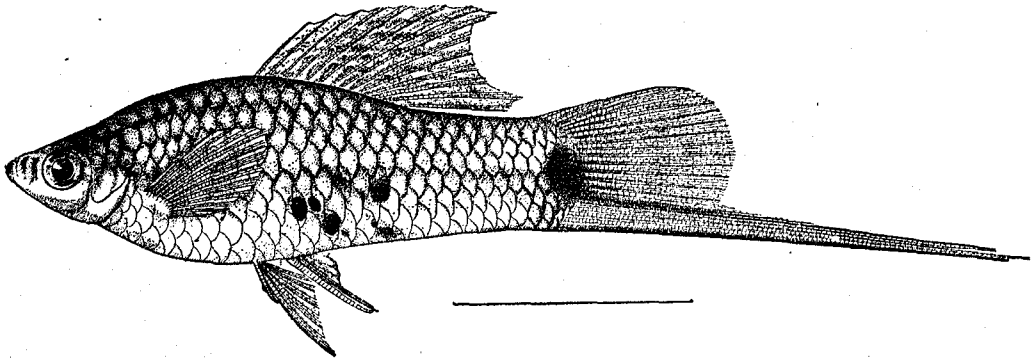


FIG. 11.—*Xiphophorus montezumae* Jordan & Snyder, new species. Type.

extending to caudal, dusky; a narrow dusky band on edge of lower jaw; 2 short vertical bands on snout; 6 upper rows of scales edged with black, or dusky; a few black spots irregularly arranged on body above ventrals; a large black spot at base of caudal, its color extending along upper edge of prolongation; a dark line extending along lower edge of caudal peduncle to end of lower caudal rays; the caudal extension with a light central portion bordered with black; the lower border wider; under part of head and belly without dark color; dorsal fin with black dots and lines; pectorals, ventrals, and anals plain.

Considerable variation in shapes of fins and in color is shown among other male specimens. In some the fins are low or short, the caudal ornament represented only by a slight lengthening of lower rays. Among individuals, apparently fully grown, there is every gradation from the undeveloped to the very long caudal extension. In every case the scales are conspicuously dark-edged. In some examples black spots crowded together form a more or less definite dark line from eye to caudal, while below this line are large, irregular, black blotches. Others have no black spots, and the dark caudal patch has almost disappeared.

The females have the fins low or short, and without special modifications; the posterior edge of caudal, with the upper part rounded, the lower pointed. Scales dark-edged, a narrow, indefinite, dark, color-band usually present along median line of sides; the dark caudal patch is rarely absent. Fully grown males are scarce, a large catch consisting mostly of females and young.

Xiphophorus montezumae is distinguished from other known species of the genus by having 7 anal rays, the scales with conspicuous dark edges, a large caudal spot, and the caudal appendage not sword-shaped, but with its end enlarged and blunt.

The following table of measurements will aid in distinguishing the species:

Measurements of eleven specimens of *Xiphophorus montezumæ*.

Measurements.	Locality: Rio Verde, near Rascon, Mexico.									
	Male.					Female.				
Length of body in millimeters.....	57½	52	57½	51	56	60	60	53	55	51
Depth of body expressed in hundredths of length.....	34½	34	36	33	36½	36	36	33	33	32
Depth of caudal peduncle.....	22½	22	21	20	20	20	19	18	17	18
Length of head.....	23	24	23	23	23	24	23	24	23	23
Width of interorbital space.....	11½	12	12	11	12	12	12	12	12	12
Length of snout.....	7	8	8	8	8	8	8	8	7½	8
Width of mouth.....	7	7½	7½	7½	8	7	7	7½	7	7½
Diameter of orbit.....	8	7½	7½	8	8	7	7	8	7½	8
Distance from snout to dorsal fin.....	46	47	47	46	47	49	49	40	50	48
Height of longest dorsal rays.....	31	28	24	25	22	20	16	14	15	16
Distance from snout to anal fin.....	55	58	58	55	57	59	61	61	64	63
Height of longest anal rays.....	19	22	22	20	21	17	16	16	17	17
Distance from anal to caudal fin.....	46	42	45	43	40	40	36½	34	32	35
Length of upper caudal rays.....	33	35	29	30	32	27	30	28	28	30
Length of lower caudal rays.....	90	83	60	43	43	36	30	22	30	30
Length of pectoral fin.....	25	26	23	25	25	24	24	22	23	22
Distance from snout to ventral fin.....	49	50	50	48	40	52	48	48	49	40
Length of ventral fin.....	23	.....	19	19	18½	16	15	15	16	16
Number of rays in dorsal.....	13	11	12	12	12	12	13	11	11	12
Number of rays in anal.....	7	7	7	7	7	7	7	7	7	7
Scales in lateral series.....	29	28	29	29	28	27	27	27	27	28
Number of scales in transverse series.....	9	9	9	8	9	9	9	9	9	9
Number of scales on caudal peduncle.....	7	7	7	7	7	7	7	7	7	7

ATHERINIDÆ.

28. *Eslopsarum jordani* (Woolman).

Two specimens of *Eslopsarum jordani* were collected, together with numerous individuals of *E. arge*, from the Rio Verde, Aguas Calientes, Mexico. *Chirostoma breve* Steindachner is probably identical with *E. jordani*, as supposed by Jordan & Evermann. An examination of a number of species of *Chirostoma* and two of *Eslopsarum* shows that the number of vertebrae, in addition to the character of the scales, furnishes a distinguishing generic feature.

	Vertebrae.
<i>Eslopsarum jordani</i>	38
<i>arge</i>	37
<i>Chirostoma humboldtianum</i>	44
<i>chapala</i>	45
<i>promelas</i>	45
<i>diazi</i>	44
<i>crystallinum</i>	44
<i>lerma</i>	44
<i>ocotlane</i>	44

The species of *Chirostoma* may be divided into two very marked groups. The one represented by the typical species *Chirostoma humboldtianum* has the flesh firm, opaque, and deep olive-green in life. The other (*Lethostole*), typified by *Chirostoma estor*, has the flesh thin, translucent, and very pale. There are correlated differences in the firmness of the bones and scales, but thus far we have found no tangible character on which to separate *Lethostole* as a genus from *Chirostoma*. The known species of *Lethostole* are *estor*, *album*, *chapala*, *grandocule*, *promelas*, *diazi*, *crystallinum*, *lerma*, and *ocotlane*.

29. *Eslopsarum arge* Jordan & Snyder, new species. Fig. 12.

Type No. 6154, L. S. Jr. Univ. Mus. Collected by J. O. Snyder January 9, 1899, in Rio Verde, near Aguas Calientes, Mexico.

Head 4.25 in length; depth 4.33; depth of caudal peduncle 2.75 in head; eye 3.66; snout 3; interorbital space 3.33; height of spinous dorsal 3.33; soft dorsal 2; anal 2; length of pectorals 1.5; ventrals 2.5; caudal 1.2. D. IV, 8. A. 16. P. 13. Scales in lateral series 40; transverse series 11; between dorsals 5. Body rather thickset, deepest part just anterior to base of ventrals; width of body equal to distance from posterior edge of orbit to tip of snout. Eye nearer to tip of snout than to posterior edge of opercle a distance equal to diameter of pupil; interorbital space convex; width of preorbital area equal to diameter of pupil. Tip of lower jaw projecting beyond that of upper; mouth large, oblique; lips not much thickened posteriorly, the lower not distinctly folded over the upper at their angle; maxillary extending posteriorly to a perpendicular passing through anterior edge of orbit, its distal end below the level of eye. Teeth large, sharp, projecting backward, in 2 definite rows on each jaw, none on vomer or palatines. Gillrakers on first arch 14, long and slender.

Air bladder extending posteriorly to a point a little past insertion of anal. Peritoneum black. Vertebrae 37. Lateral line represented on the fifth row of scales below the dorsal by a series of partly developed pores; scales large, entire, covering head and body except snout, lower jaw, preorbital area, and a small space around bases of pectoral fins; small scales extending for a short distance on interradiat membranes of caudal. First three dorsal spines of about the same height, the fourth shorter, first fully developed dorsal ray longest, the others gradually shorter, edge of fin straight; anal inserted on a perpendicular passing halfway between dorsals, its first fully developed ray longest, edge of fin slightly concave; caudal notched; pectorals rounded, extending to bases of ventrals; ventrals falling short of reaching vent a distance equal to diameter of orbit.

Translucent in life, a silvery lateral band with dark upper edge extending from upper part of base of pectoral to base of caudal, the band less distinct in region of pectoral fin; scales of back edged

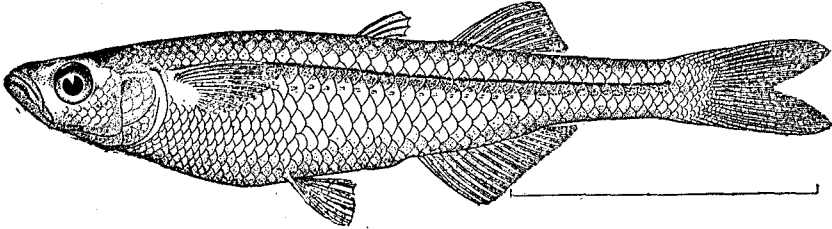


FIG. 12.—*Eslopsarum arge* Jordan & Snyder, new species. Type.

with fine, dark specks; snout, lower jaw, top of head, and upper part of eye dusky; dorsal and caudal fins with a little dusky coloring.

Specimens of *E. arge* were caught in the same seine-haul with *E. jordani*. The former differs from the latter in having a thicker body, a longer snout, a larger and less oblique mouth, a larger eye, and a wider color-band.

In the drawing accompanying the original description of *Eslopsarum jordani* the mouth is wrongly represented. Of the specimens examined, including some of the types, the mouth is much like that of *Chirostoma humboldtianum*. The cleft is not straight in outline. The lower lip folds over the upper at their union.

Measurements of ten specimens of Eslopsarum arge.

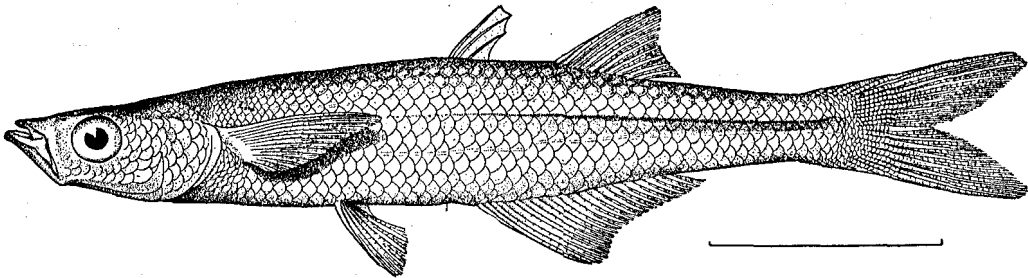
Measurements.	Locality: Rio Verde at Aguas Calientes, Mexico.									
	56	63	58	53	54	53	53	51	51	52
Length of body in millimeters.....	22	20	19	19	20	19	19	20	20	20
Depth of body expressed in hundredths of length.....	9	8	8	9	9	9	8	9	9	8½
Depth of caudal peduncle.....	24	23	23	23½	23	24	24	24	24	24
Length of head.....	18½	17½	17	18	18	17	18	18½	18	18
Distance from snout to occiput.....	20	18½	18	19	19	18	19	19	19½	19
Tip of lower jaw to occiput.....	8	7	7	8	7	7	8	7½	7½	7
Width of interorbital space.....	7	7	7	7½	7	7	8	8	8	8
Length of snout.....	6	6	6	6	6½	6	6	6½	7	6
Diameter of orbit.....	52	52	52	50	53	52	53	54	52	52
Distance from snout to spinous dorsal.....	15	14	13½	13	13	14	14	13	15	14
Insertion of spinous dorsal to soft dorsal.....	6	9	.....	8	7	7½	8	7	9½	8
Height of longest dorsal spines.....	12	14	12	14	13	13	12	15	14	13
Height of longest dorsal rays.....	60	58	59	57	61	58	57	58	57	57
Distance from snout to anal fin.....	13	13	14	11½	14	13	13	14	14	15
Height of longest anal rays.....	23	23	23	24	25	23	24	23	23	24
Distance from anal to caudal fin.....	22	20	19	20	21	22	20	22	22	21
Length of caudal fin.....	15	15½	15	15	15	16	16	16	15	16
Length of pectoral fin.....	45	43	45	41	44	42	42	43	44	43
Distance from snout to ventral fin.....	10	10	9	10	10	10	10	11	10	10
Length of ventral fin.....	4	3	4	4	3	4	3	4	4	4
Number of spines in first dorsal.....	8	8	8	9	9	8	8	8	9	9
Number of rays in second dorsal.....	15	17	16	16	14	14	14	14	15	14
Number of rays in anal.....	13	14	13	14	13	13	12	13	13	13
Number of rays in pectoral.....	40	38	40	39	40	38	38	38	36	39
Number of scales in lateral series.....	11	12	11	11	10	10	10	11	10	10
Number of scales in transverse series.....	5	5	4	5	5	5	4	4	5	5
Number of scales between dorsals.....										

30. *Chirostoma humboldtianum* (Cuvier & Valenciennes). *Pescado Blanco de Chalco.*

Specimens of *Chirostoma humboldtianum* were very plentiful in the markets of the City of Mexico. They were said to come from the Lago de Chalco. This species is darker in color and much less translucent than any other *Chirostoma* collected by us. The number of vertebrae is 44. It is the only species yet known referable to the typical subgenus *Chirostoma*.

Measurements of ten specimens of *Chirostoma humboldtianum*.

Measurements.	Collected in markets of City of Mexico.									
	186	172	182	187	170	162	100	151	154	148
Length of body in millimeters	186	172	182	187	170	162	100	151	154	148
Depth of body expressed in hundredths of length	22	22½	20½	24	20	21	19	22	20	21
Depth of caudal peduncle	9	9	9	8	8½	9	8	9	9	9
Length of head	27	29	27½	26½	28	27½	27	26½	26½	27
Distance from snout to occiput	21	21	21	21½	20½	21	20½	20	20	21
Tips of lower jaw to occiput	22	22	22	23	21½	22	22	21	21	22
Width of interorbital space	7½	8	8	7	7	7½	7½	7	7	7
Length of snout	10½	10½	10	9	9	9	9	9	9	9
Diameter of orbit	5½	6	5½	5½	6	5½	5½	6	6	6
Distance from snout to spinous dorsal	52½	56	54	54	55	54	53	52	53	52
Insertion of spinous dorsal to soft dorsal	12½	14	13½	12	13½	12	11½	13	12	12½
Height of longest dorsal spines	7	6½	7½	6	6½	7½	8	7	8	8
Height of longest dorsal rays	14	11½	14	12	12	13	14	13	13	13½
Distance from snout to anal fin	63	64	63	62	60½	60	62	60	61	59
Height of longest anal rays	14	12½	14	12½	13	13	13	13	14	14
Distance from anal to caudal fin	22	21	21	22½	20	23	23	22	22	23
Length of caudal fin	20	19	19	20	17½	19½	20	19	19	20
Length of pectoral fin	20	17	18	18	17	19	19	18	18	20
Distance from snout to ventral fin	47	48	47	47	46	45	45	45	45	46
Length of ventral fin	12	11	11	11	10	12	12	11	11	12½
Number of spines in first dorsal	6	4	5	5	4	5	4	5	5	4
Number of rays in second dorsal	11	12	11	11	10	10	11	11	10	12
Number of rays in anal	19	18	18	18	19	18	18	19	19	18
Number of rays in pectoral	15	14	15	14	14	15	14	15	14	14
Number of scales in lateral line	54	50	52	52	50	54	54	55	55	54
Number of scales in transverse series	15	15	15	14	14	14	15	14	14	15
Number of scales between dorsals	7	6	7	6	7	8	7	8	7	8

FIG. 13.—*Chirostoma chapalæ* Jordan & Snyder, new species. Type.Subgenus **LETHOSTOLE** Jordan & Evermann.**31. *Chirostoma chapalæ* Jordan & Snyder, new species. *Pescado Blanco de Chapala*. Fig. 13.**

Type No. 6155, L. S. Jr. Univ. Mus. Locality, Laguna de Chapala near Ocotlan, Jalisco, Mexico. Collected by J. O. Snyder, January 2, 1899.

Head 4 in length; depth 5.5; depth of caudal peduncle 3 in head; eye 3.66; snout 3.2; interorbital space 4; height of spinous dorsal 2.66; soft dorsal 1.75; anal 1.60; length of pectorals 1.25; ventrals 2.20; caudal 0.9. D. III-10. A. 21. P. 14. Scales in lateral series 49; transverse series 13; between dorsals 6.

Body slender, compressed, its deepest part below first dorsal. Eye large, nearer to tip of snout than to posterior edge of opercle, a distance equal to 1.5 times the diameter of pupil. Interorbital space convex, its width about equal to diameter of pupil or to preorbital area. Lower jaw projecting a little beyond tip of upper. Mouth oblique; lips thickened posteriorly, lower folding over upper at their union; premaxillaries anteriorly on a level with center of pupil; maxillary nearly vertical, its distal end in advance of a vertical from anterior edge of orbit a distance equal to two-thirds diameter of pupil. Teeth minute, in bands, not arranged in definite rows; no teeth on vomer or palatines. Gillrakers on first arch 30, very slender, the length of longest equal to diameter of orbit.

Peritoneum black. Air bladder very large, extending posteriorly to a point above middle of anal fin. Vertebrae 45. A well-defined lateral line extending along body on eighth row of scales below first dorsal. Scales large, crenate, not notably reduced in size nor closely crowded together on any part of body, except a small postoccipital patch; those anterior to pectorals small; scales extending on basal two-thirds of interradiial membranes of caudal; lower jaw, snout, and preorbital space naked. First 2 spines of dorsal highest, the following 2 a little shorter; first ray of second dorsal

highest, others gradually shorter; anal inserted a little anterior to a perpendicular passing half way between origins of dorsals; first ray longest, others successively shorter; when the fin is elevated its edge is concave; caudal deeply forked, the tips pointed, pectoral notably pointed, extending past base of ventral a distance equal to diameter of orbit; ventrals extending to vent.

Translucent in life. A silvery lateral band 1 scale wide, bright and distinct posteriorly, becoming indistinct anteriorly; upper edge of lateral band dusky; scales on dorsal part of body edged with dark dots; jaws with dark dots; upper part of eye black; the dark, pigmented arachnoid shows through the thin skull.

C. chapale is closely related to *C. grandocule* Steindachner. It differs in having a smaller eye and larger scales. The former has 44 to 51 scales in the lateral series and 12 to 14 in a transverse series, while *C. grandocule* has 60 to 62 scales in the lateral series and 15 to 16 in a transverse series.

Measurements of seven specimens of *Chirostoma chapale*.

Measurements.	Locality: Laguna de Chapala.						
Length of body in millimeters.....	88	98	78	73	70	71	66
Depth of body expressed in hundredths of length.....	19	18	18	18	19	19	18
Depth of caudal peduncle.....	9	8½	9	9	9	9	9
Length of head.....	25	23	25	23	25	26	26
Distance from snout to occiput.....	18	17	19	17	19½	19	19½
Tips of lower jaw to occiput.....	19	18½	20	18	21	20	20
Width of interorbital space.....	6	6	6	6	6½	6½	6½
Length of snout.....	8	7	8	8	8	8	8
Diameter of orbit.....	6½	6½	7½	7	7	7½	7
Distance from snout to spinous dorsal.....	54	52	52	51	53	50	52
Insertion of spinous dorsal to soft dorsal.....	14	13	14	13	14	15	14
Height of longest dorsal spines.....	9	8	9	8	8½	10	10
Height of longest dorsal rays.....	14½	14½	15	14	16	16	16
Distance from snout to anal fin.....	60	59	60	57	57½	57	58
Height of longest anal rays.....	16	14	16	16	17	18	18
Distance from anal to caudal fin.....	22	20	22	23	20	21	20
Length of caudal fin.....	23	21	24	24	23	25	25
Length of pectoral fin.....	21	20	18	17	20	21	19
Distance from snout to ventral fin.....	43	41	43	30	41	41	42
Length of ventral fin.....	11	12	13	13	14	13	12
Number of spines in first dorsal.....	4	5	5	4	4	5	4
Number of rays in second dorsal.....	10	11	11	10	11	11	11
Number of rays in anal.....	20	20	21	18	20	21	19
Number of rays in pectoral fin.....	14	14	.....	14	14	14	14
Number of scales in lateral series.....	47	50	44	46	51	47	50
Number of scales in transverse series.....	13	13	12	13	14	14	14
Number of scales between dorsals.....	6	7	7	6	7	7	7

32. *Chirostoma promelas* Jordan & Snyder, new species.

Type No. 6161, L. S. Jr. Univ. Mus. Collected by J. O. Snyder, in market of Guadalajara, Jalisco, Mexico; said to have come from Laguna de Chapala, December 23, 1898.

Head 3.40 in length; depth 4.60; depth of caudal peduncle 3.33 in head; eye 5.66; snout 2.50; interorbital space 4.50; height of spinous dorsal, 3.60; soft dorsal 2.4; anal 2; length of pectoral 1.60; ventral 2.50; caudal 1.50. D. iv-11. A. 19. P. 15. Scales in lateral series 53, 16 in transverse series, 9 between dorsals.

Head slender, triangular; eye smaller, nearer to tip of snout than to edge of opercle a distance equal to half the diameter of pupil; width of preorbital area somewhat greater than diameter of pupil; interorbital space slightly convex; snout pointed; upper jaw projecting a little beyond lower; cleft of mouth almost horizontal, lips enlarged posteriorly, the lower folding over the upper at their junction; angle of mouth on a level with lower part of pupil; maxillary almost vertical in position, its distal end not extending backward as far as anterior edge of orbit. Teeth large, curved inward, not arranged in definite rows, none on vomer or palatines. Vertebrae 45. A tolerably well-defined lateral line extending

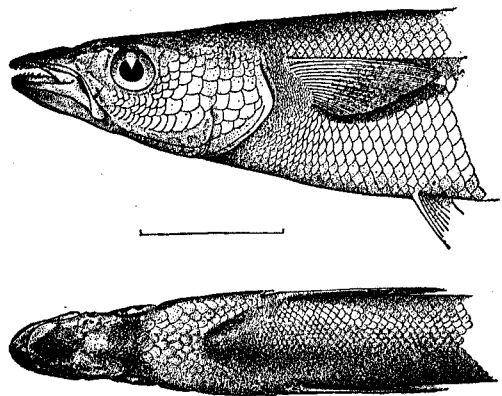


FIG. 14.—Lateral and dorsal views of head of *Chirostoma promelas*.

backward as far as anterior edge of orbit. Teeth large, curved inward, not arranged in definite rows, none on vomer or palatines. Vertebrae 45. A tolerably well-defined lateral line extending

along body about eight scales below the first dorsal, pores absent on some of the scales. Scales crenate, largest along lateral color-band; a postoccipital patch of minute, closely crowded scales extending backward nearly to a line connecting bases of pectorals; a narrow band of similar scales just posterior to gill-openings and on base of caudal; the latter extending on interradial membranes half their length; scales between dorsals not abruptly smaller than those near by, nor crowded closely together; head with scales except on snout, preorbital region, and on lower jaw.

First 3 spines of dorsal nearly equal in length, the fourth a little shorter; first dorsal ray longest, the others gradually shorter; anal inserted on a perpendicular passing midway between dorsals, first ray longest, others successively shorter, edge of fin slightly concave; pectoral pointed, extending beyond base of ventrals a distance equal to diameter of pupil; ventrals not quite reaching vent.

Color in alcohol yellowish-olive; a distinct silvery lateral band, the light color of which is underlaid with dark pigment, extending from upper part of base of pectoral to caudal, wider and brighter in color between dorsal and anal, growing narrower on caudal peduncle, widening at its end; scales of upper part of body with dusky coloring on edges; dorsals, pectoral, and caudal with dark color; eye dusky above, a dark band on interorbital space; snout and jaws black.

Chirostoma promelas is distinguishable from other known species of the genus by the projecting upper jaw and the black-colored snout. One specimen other than the type was obtained. In it the projection of the upper jaw is more pronounced than in the type. The gillrakers and abdominal viscera had been removed from both before they were purchased.

Measurements of two specimens of *Chirostoma promelas*.

Measurements.	Collected in Guadalajara market; said to have come from L. de Chapala.	
Length of body in millimeters	155	176
Depth of body expressed in hundredths of length	22	21
Depth of caudal peduncle.....	9	9
Length of head.....	30	29
Distance from snout to occiput.....	23 $\frac{1}{2}$	22 $\frac{1}{2}$
Tip of lower jaw to occiput.....	23	21 $\frac{1}{2}$
Width of interorbital space	6 $\frac{1}{2}$	6 $\frac{1}{2}$
Length of snout.....	12 $\frac{1}{2}$	12
Diameter of orbit.....	5	5
Distance from snout to spinous dorsal.....	50	56
Insertion of spinous dorsal to soft dorsal.....	12	10 $\frac{1}{2}$
Height of longest dorsal spines.....	8 $\frac{1}{2}$	6 $\frac{1}{2}$
Height of longest dorsal rays.....	13 $\frac{1}{2}$	11
Distance from snout to anal fin.....	65	63
Height of longest anal rays.....	15	13
Distance from anal to caudal fin.....	18	18
Length of caudal fin.....	20	18
Length of pectoral fin.....	18	17
Distance from snout to ventral fin.....	50	47 $\frac{1}{2}$
Length of ventral fin.....	12	10
Number of spines in first dorsal fin.....	4	4
Number of rays in second dorsal fin.....	11	11
Number of rays in anal fin.....	19	20
Number of rays in pectoral fin.....	15	15
Number of scales in lateral line.....	53	56
Number of scales in transverse series.....	16	16
Number of scales between dorsals.....	9	8

33. *Chirostoma diazi** Jordan & Snyder, new species. Fig. 15.

Type No. 6157, L. S. Jr. Univ. Mus. Obtained in market of Guadalajara, Jalisco, Mexico, by J. O. Snyder, December 23, 1898; said to have come from Laguna de Chapala.

Head 3.33 in length; depth 5; depth of caudal peduncle 3.25 in head; eye 5.33; snout 2.5; interorbital space 4.5; height of spinous dorsal 4.4; soft dorsal 2.5; anal 2.4; length of pectoral 1.6; ventral 3; caudal 1.4. D. v-11. A. 20. P. 15. Scales in lateral series 75; transverse series 22; between dorsals 22.

*Since these pages were put in type we have received a paper entitled "Description of two Atherinoid fishes from Mexico," by Dr. G. A. Boulenger, in the Ann. Mag. Nat. Hist., series 7, vol. v, Jan., 1900, pp. 54-55. In this paper two species of *Chirostoma* are described from specimens collected in Lake Chapala by Mr. A. C. Buller. One of these (*C. lucius*) is perhaps our *C. lermæ*, and the other (*C. sphyrapa*) is our *C. diazi*. These names of Boulenger have priority over ours, but it is, unfortunately, too late to suppress the latter.—D. S. J.

Body long, deeper, and more compressed than that of *C. humboldtianum*; head large, its dorsal contour straight from tip of snout to occiput; viewed from above the head is much compressed, the upper jaw sharply pointed and included by lower; interorbital space slightly convex; eye nearer tip of snout than to edge of opercle a distance equal to diameter of pupil; preorbital area a little wider than diameter of orbit; mouth oblique, its cleft extending to a horizontal from lower edge of orbit; lips thickened posteriorly, the lower forming a fold across the upper at angle of mouth; lower jaw projecting, the teeth just passing the edge of the upper; maxillary extending to a vertical from anterior edge of orbit, its distal end angular. Teeth large anteriorly, growing gradually smaller posteriorly, canine-like, sharp, projecting backward, not arranged in definite rows; none on vomer or palatines. Vertebrae 44. No lateral line.

Scales crenate, larger in region of lateral color-band, growing smaller dorsally and ventrally; abruptly smaller and closely crowded together in a region anterior to pectoral fin, extending from the isthmus to the occiput, also between the dorsal fins and along the bases of the dorsals, anal, and

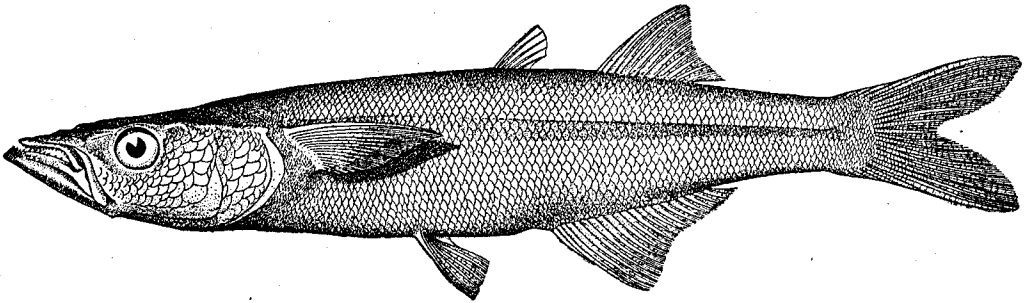


FIG. 15.—*Chirostoma diazi* Jordan & Snyder, new species. Type.

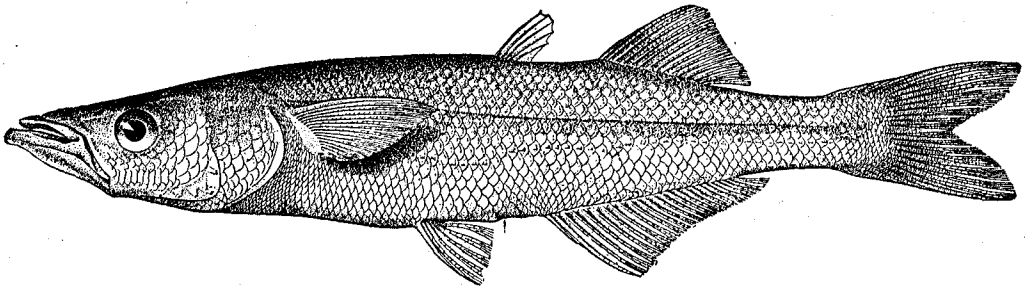


FIG. 16.—*Chirostoma crystallinum* Jordan & Snyder, new species. Type.

caudal; interradial membranes of the latter with scales extending two-thirds its length. Head with scales except on jaws, upper part of snout, and on preorbital area. Anterior spines of dorsal longest; others a little shorter; first dorsal ray longest, others gradually shorter; anal similar to soft dorsal in shape, except that its base is much longer; insertion of anal on a perpendicular passing halfway between dorsals; caudal deeply forked, the lobes obtusely pointed; pectorals sharp, extending past base of ventrals a distance equal to diameter of orbit; edge of pectorals, when extended, straight.

Body during life translucent; in alcohol greenish-olive; a silvery lateral band, in which the silver is not underlaid with black pigment, extending from axil to base of caudal; dorsal scales narrowly edged with dusky; upper part of eye dark. Our specimens are all from the market, the gill-arches and viscera having been removed. The flesh is somewhat shrunken, which probably causes the teeth to appear more prominent than in life.

Chirostoma diazi may be easily distinguished from the other known species of the genus by the small scales crowded closely together between the dorsal fins.

Named for Porfirio Diaz, the honored President of the Republic of Mexico, in recognition of his interest in the progress of science.

Measurements of six specimens of *Chirostoma diazi*.

Measurements.	Collected in Guadalajara market. Said to come from Laguna de Chapala.					
	185	188	188	186	183	183
Length of body in millimeters.....	185	188	188	186	183	183
Depth of body expressed in hundredths of length.....	19	20 $\frac{1}{2}$	22	20	20	21
Depth of caudal peduncle.....	8 $\frac{1}{2}$	8 $\frac{1}{2}$	9	9	9 $\frac{1}{2}$	9
Length of head.....	30 $\frac{1}{2}$	30	31	31	31	31
Distance from snout to occiput.....	22 $\frac{1}{2}$	22	23 $\frac{1}{2}$	22	23 $\frac{1}{2}$	22
Tip of lower jaw to occiput.....	24	23 $\frac{1}{2}$	25	24	25	24 $\frac{1}{2}$
Width of interorbital space.....	6 $\frac{1}{2}$	6	7	6 $\frac{1}{2}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$
Length of snout.....	12	12	13	12 $\frac{1}{2}$	13	12 $\frac{1}{2}$
Diameter of orbit.....	5 $\frac{1}{2}$	6	5 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$
Distance from snout to spinous dorsal fin.....	57 $\frac{1}{2}$	55	55 $\frac{1}{2}$	57 $\frac{1}{2}$	56 $\frac{1}{2}$	57 $\frac{1}{2}$
Insertion of spinous dorsal to soft dorsal.....	14	14	14 $\frac{1}{2}$	13	15	13 $\frac{1}{2}$
Height of longest dorsal spines.....	7	6 $\frac{1}{2}$	6 $\frac{1}{2}$	7	7	7
Height of longest dorsal rays.....	12	12	14	13	12	12 $\frac{1}{2}$
Distance from snout to anal fin.....	63	64	66	66 $\frac{1}{2}$	66	66 $\frac{1}{2}$
Height of longest anal rays.....	12	13	13	13 $\frac{1}{2}$	13	13
Distance from anal to caudal fin.....	17	18	18	20	19	17
Length of caudal fin.....	18 $\frac{1}{2}$	20	22	23	20	22
Length of pectoral fin.....	17	16	19	19	18 $\frac{1}{2}$	18
Distance from snout to ventral fin.....	48 $\frac{1}{2}$	47	50	50	50	50
Length of ventral fin.....	9 $\frac{1}{2}$	10 $\frac{1}{2}$	10	10 $\frac{1}{2}$	10	10
Number of spines in first dorsal.....	4	4	5	5	5	4
Number of rays in second dorsal.....	12	11	12	11	11	12
Number of rays in anal.....	21	21	21	20	21	22
Number of rays in pectoral.....	15	15	15	15	15	15
Number of scales in lateral series.....	61	70	63	69	60	63
Number of scales in transverse series.....	21	20	20	20	20	20
Number of scales between dorsals.....	21	27	21	22	26	23

34. *Chirostoma crystallinum* Jordan & Snyder, new species. Fig. 16.

Type No. 6158, L. S. Jr. Univ. Mus. Locality, Laguna de Chapala, near Ocotlan, Jalisco, Mexico. Collected by J. O. Snyder, December 26, 1898.

Head 3.25 in length; depth 4.75; depth of caudal peduncle 3.50 in head; eye 5.75; snout 2.60; interorbital space 4.50; height of spinous dorsal 4.20; soft dorsal 2.50; anal 2.25; length of pectoral 1.80; ventral 2.75; caudal 1.75. D. v-13. A. 24. P. 16. Scales in lateral series 56; transverse series 18; between dorsals 10.

Body deepest above ventrals; widest at insertion of pectorals. Head long and pointed, its upper contour straight; snout viewed from above sharply pointed, the lower jaw projecting beyond upper a distance equal to a little more than half the diameter of pupil; eye nearer tip of snout than to posterior edge of opercle a distance equal to diameter of pupil; mouth oblique, the cleft extending downward to a level with lower edge of pupil; lips thickened posteriorly, the lower folding over the upper at angle of mouth. Teeth minute, in wide patches—not arranged in definite rows—on upper and lower jaws; no teeth on vomer or palatines. Gillrakers on first arch 27, slender, the length of longest equal to diameter of pupil. Vertebrae 44.

An indefinite lateral line extending along the body about 9 scales below first dorsal; the pores absent on many of the scales. Scales crenate, largest along color-band, growing smaller above and below, much smaller and closely crowded on body anterior to pectoral fin from isthmus to occiput; a few small scales at upper end of opercle, along bases of fins, and on interradial membranes of caudal for half its length; scales between dorsals large and not crowded together; lower jaw and upper part of snout naked. First 3 spines of dorsal about the same length, reaching, when depressed, to within one-third of their length of insertion of soft dorsal; first dorsal ray longest, others gradually shorter; anal inserted on a perpendicular passing through a point halfway between origins of dorsals, base much longer than that of dorsal; first dorsal ray highest, others gradually shorter to middle of fin; all of remaining rays of about the same height; caudal deeply forked, tips bluntly pointed, pectorals pointed, extending a little past bases of ventrals; tips of ventrals extending to vent.

Body during life translucent, with a slightly bluish tinge; in alcohol yellowish; dorsal scales with dusky edges; top of head dusky; upper part of eye dark; fins, except ventrals and anal, with a little dusky color; a silvery color band extending from upper part of pectoral base to caudal; narrower on caudal, widening at base of caudal.

C. crystallinum closely resembles *C. ocotlane* in general appearance. The much shorter lower

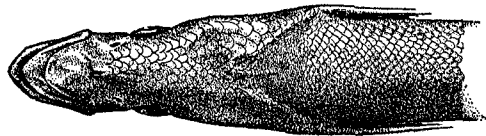


Fig. 17.—Dorsal view of head of *Chirostoma crystallinum*.

jaw and the smaller eye of *C. crystallinum* are at once distinguishing characters. Two specimens from the Guadalajara markets are shrunken, so that the orbit is larger and the teeth more evident than in those taken at Ocotlan.

Measurements of six specimens of *Chirostoma crystallinum*.

Measurements.	Laguna de Chapala.				Guadalajara market, Laguna de Chapala.	
	206	180	186	166	142	170
Length of body, in millimeters	206	180	186	166	142	170
Depth of body expressed in hundredths of length.....	22	21½	21	20	20	21
Depth of caudal peduncle	8½	9	8	9	9	8½
Length of head	30½	31	31	29	31	31½
Distance from snout to occiput	22½	22	22½	22	23	23
Tip of lower jaw to occiput	24½	23½	25	23	25	24½
Width of interorbital space	6½	7	7	6½	6	5
Length of snout	12	12	12	11½	12	12
Diameter of orbit.....	5	5	5½	5½	6½	6
Distance from snout to spinous dorsal	57½	55½	56	55	56½	56½
Insertion of spinous dorsal to soft dorsal.....	11	13½	12	13	12	12
Height of longest dorsal spines.....	6½	8	7½	8½	8	8
Height of longest dorsal rays.....	13	12	13	13½	15	14½
Distance from snout to anal fin.....	66	65	63	61½	65	66
Height of longest anal rays.....	13	14	13	14	16	16
Distance from anal to caudal fin.....	19	18	16	19	17	17½
Length of caudal fin.....	19	18	18	20	22	21
Length of pectoral fin.....	17	17	17	18½	20	20
Distance from snout to ventral fin.....	50	48	49	47	50	50
Length of ventral fin.....	11	11	11	11½	11½	12
Number of spines in first dorsal.....	4	5	5	5	5	5
Number of rays in second dorsal.....	11	12	13	11	11	11
Number of rays in anal.....	18	21	24	21	22	22
Number of rays in pectoral.....	14	14	15	14	14	14
Number of scales in lateral series.....	57	57	56	60	56	56
Number of scales in transverse series.....	18	19	18	17	19	19
Number of scales between dorsal fins.....	9	11	10	11	9	8

35. *Chirostoma ocotlane* Jordan & Snyder, new species.

Type No. 6160, L. S. Jr. Univ. Mus. Collected by J. O. Snyder, December 26, 1898, from Lago de Chapala, near Ocotlan, Jalisco, Mexico.

Head 3.33 in length, depth 4.50; depth of caudal peduncle 3.25 in head; eye 4.33; snout 2.60; interorbital space 5; height of spinous dorsal 3.5; soft dorsal 2.16; anal 2; length of pectoral 1.60; ventral 2.50; caudal 1.50. D. v-12. A. 20. Scales in lateral series 54; transverse series 19; between dorsals 11.

Body long, rather slender, deepest part above ventrals. Head long, pointed, its dorsal contour straight from tip of snout to a point a little posterior to the eye, where it curves upward; interorbital space flat; eye high up, nearer to tip of snout than to edge of opercle a distance about equal to diameter of pupil; width of preorbital space equal to diameter of pupil. Mouth oblique, cleft extending downward to a point opposite lower edge of pupil; lips growing more fleshy posteriorly, the lower forming a fold across the upper at their junction; distal end of maxillary angular; extending almost to a vertical from anterior edge of orbit; lower jaw very long, projecting beyond upper a distance equal to diameter of pupil; viewed from

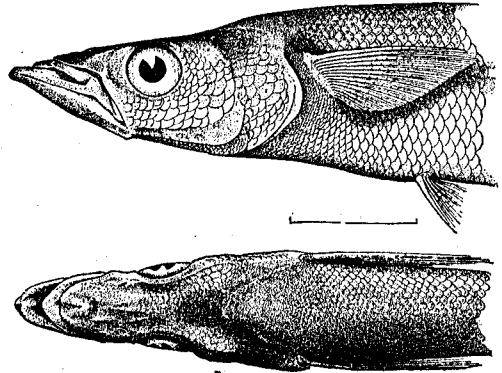


FIG. 18.—Lateral and dorsal views of head of *Chirostoma ocotlane*.

above, both jaws are a little more pointed than are those of *C. estor* or *C. humboldtianum*. Teeth on jaws in bands, minute, projecting backward; no teeth on vomer or palatines. Gillrakers slender, close together; length of longest equal to diameter of pupil. Vertebrae 44.

A rather indefinite lateral line extending along body 10 scales below the first dorsal; the pores absent on many of the scales. Scales crenate, growing smaller dorsally, larger ventrally; those on posterior part of occiput, on nape, on region anterior to pectorals—above and below—and on base of

caudal, very small and crowded together; those in the region of dorsals not reduced in size nor crowded except at insertion of fins, where there are 4 very small ones; cheeks with 5 rows; lower jaw and upper part of snout naked; basal half of interradiial membranes of caudal with minute scales. First 3 spines of dorsal highest, extending when depressed within half their length of origin of soft dorsal; first dorsal ray preceded by a shorter, simple, closely attached one; other rays successively shorter than first; edge of fin slightly concave; anal similar to soft dorsal in shape, its basis 1.66 times as long as that of soft dorsal; attachment of first ray under a point halfway between insertions of dorsals; caudal deeply forked, the lobes equal; pectorals pointed when depressed; upper rays longest, extending to a vertical, halfway between insertions of first dorsal and ventrals.

Body, during life, almost translucent, with a bluish tinge of color. In alcohol the color is a light olive-yellow; a silvery lateral band extending from axil to base of caudal, the band wider and brighter in color between dorsal and anal, growing narrow on caudal peduncle and then widening again at its posterior end; head and body above, and the lower jaw dusky; upper part of eye dark; edges of scales above lateral band with small black dots; caudal somewhat dusky on its basal third; other fins with little or no dark color.

Chirostoma ocotlane is easily distinguished from all other known species of the genus by its excessively long lower jaw. Except the jaw and somewhat larger eye it resembles *C. estor** in general appearance. The following gives some exact measurements of the type and also shows some slight individual variations.

Measurements of ten specimens of *Chirostoma ocotlane*.

Measurements.	Laguna de Chapala.	Guadalajara market, said to have come from Laguna de Chapala.									
		191	210	193	193	192	182	177	174	155	
Length of body in millimeters.....	160										
Depth of body expressed in hundredths of length.....	21½	22	22	21½	23	23	23	21½	21	18	
Depth of caudal peduncle.....	9½	8½	8½	9	9	9	9½	9	9	8½	
Length of head.....	31	31	32½	29½	32	32	32	32	32	32	
Distance from snout to occiput.....	22½	22½	23	21½	22½	23	22½	23	23	22½	
Tip of lower jaw to occiput.....	26	26	27	25	26	26½	26	26½	26½	26	
Width of interorbital space.....	6	6½	7	6	6	6	6	7	6	5½	
Length of snout.....	11½	11	12	11	12	12	12	12	12	11½	
Diameter of orbit.....	7	6½	6½	6½	7	6½	6½	7	6	7	
Distance from snout to spinous dorsal.....	56	56½	56	56	56½	57	56½	55½	55	55½	
Insertion of spinous dorsal to soft dorsal.....	13½	12	13	13	12	12½	12	12½	13½	12½	
Height of longest dorsal spines.....	9	9	8½	8½	8½	7	8	9	8½	8	
Height of longest dorsal rays.....	15	14½	13½	14	14½	13½	14	15½	15	15	
Distance from snout to anal fin.....	63½	65	66	65½	65	63	64	64	65½	64	
Height of longest anal rays.....	16	16½	15	15	16	15½	16	17	15	16	
Distance from anal to caudal fin.....	20	17½	19½	18	19	18	19	18½	18½	19	
Length of caudal fin.....	22	22	22	21	21½	21½	21½	23	22½	22	
Length of pectoral fin.....	19½	21½	21½	19	20	20	19½	22	21	21	
Distance from snout to ventral fin.....	48	50	51	48	50	48½	50	48	49	49	
Length of ventral fin.....	12	12	13	12½	12	11	13	13½	12½	12	
Number of spines in first dorsal.....	5	5	5	5	5	5	5	5	5	5	
Number of rays in second dorsal.....	12	12	11	12	12	12	12	12	12	12	
Number of rays in anal.....	20	20	19	21	19	22	21	20	21	21	
Number of rays in pectoral.....	15	15	15	15	15	15	15	15	15	15	
Number of scales in lateral line.....	54	56	55	54	56	57	53	53	57	57	
Number of scales in transverse series.....	19	18	18	19	18	20	18	19	18	17	
Number of scales between dorsals.....	11	11	11	10	12	13	12	10	11	12	

* We have reexamined the type specimen of *Chirostoma estor*. The scales are small and closely crowded on the region anterior to the pectorals from the occiput to the isthmus; they are not much reduced in size nor closely crowded together between the dorsals. The teeth on the jaws are large and numerous; not arranged in definite rows; 3 vomerine teeth almost as large as those on jaws.

Some measurements of the type of *C. estor* expressed in hundredths of length of the body, are here given: Length of body in millimeters 212; depth of caudal peduncle 7.5; length of head 31.5; distance from snout to occiput 23; tip of lower jaw to occiput 24; width of interorbital space 7; length of snout 12; diameter of orbit 5.66; distance from snout to spinous dorsal 56.5; insertion of spinous to soft dorsal 12.5; height of longest dorsal spines 7; of longest dorsal rays 11; distance from snout to anal 62.5; height of longest anal rays 12; distance from anal to caudal 22; length of caudal fin 18.5; of pectoral fin 17; distance from snout to ventral 45.5; length of ventral fin 10.5; D. v-12; A. 18; P. 14; scales 72-19, 9 between the dorsals.

The type of *Chirostoma estor* agrees externally almost perfectly with Steindachner's account of *Chirostoma album* from Lake Patzcuaro, a species which he later places in the synonymy of *C. estor*. But the type localities are widely separated, and Steindachner found no trace of the large vomerine teeth so conspicuous in *C. estor*. We therefore regard *C. album* as probably a valid species not identical with *C. estor*.

36. *Chirostoma lermæ* Jordan & Snyder, new species.

Type No. 6159, L. S. Jr. Univ. Mus. Collected in market of Guadalajara; said to have come from Laguna de Chapala, Jalisco, Mexico. Collected by J. O. Snyder, December 23, 1898.

Head 3.16 in length; depth 5.33; depth of caudal peduncle 3.66 in head; eye 5.5; snout 2.66; interorbital space 5.5; height of spinous dorsal 4.5; soft dorsal 2.5; anal 2.16; length of pectorals 1.66; ventrals 3; caudal 1.6. D-IV, 11. A. 20. Scales in lateral series 58; transverse series 20; between dorsals 11. Body slender; deepest part in region of ventrals; caudal peduncle narrow; snout long and pointed; lower jaw slightly projecting, but not enough to include the upper. Eye large, nearer tip of snout than to posterior edge of opercle a distance equal to diameter of orbit or to width of preorbital space. Cleft of mouth extending to a horizontal through lower edge of orbit; lower lip folded over the upper at their union; maxillary extending posteriorly almost to a perpendicular from anterior edge of orbit, its distal end angular. Teeth large and strong, curved backward and inward, arranged in two definite rows, those of the inner row of the upper jaw and of the outer row of the lower jaw larger; none on vomer or palatines. Vertebrae 44.

An indefinite lateral line extending along body about 10 scales below first dorsal; the pores absent on many of the scales. Scales crenate; largest along the lateral color-band; much smaller between occiput and first dorsal; those immediately posterior to occiput minute and very closely crowded; a narrow edging of similar scales along gill-openings, extending ventrally to the isthmus; scales between dorsals not much reduced in size nor crowded together; basal half of interradiation membranes of caudal with scales. First 2 spines of dorsal longest; third, shorter; fourth, about two-thirds as long as first; first dorsal ray longest, others gradually shorter; edge of fin straight; insertion of anal on a perpendicular passing through a point halfway between origins of dorsals; first ray long-

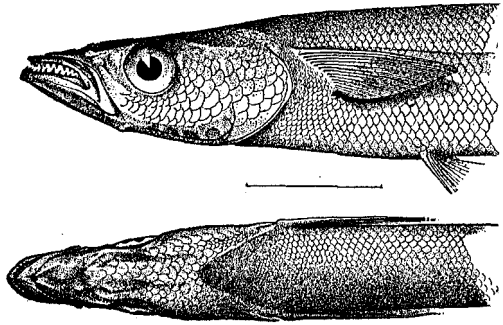


FIG. 19.—Lateral and dorsal views of head of *Chirostoma lermæ*.

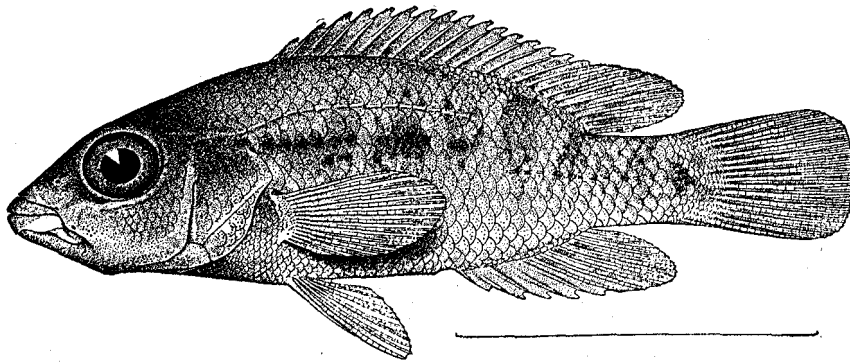


FIG. 20.—*Oichlasoma steindachneri* Jordan & Snyder, new species. Type.

est, others successively shorter, last ray one-third the length of first; caudal deeply forked, its tips rather pointed; pectoral pointed, extending beyond origin of ventrals a distance equal to diameter of pupil; ventrals reaching vent.

Color in alcohol, light olive; a silvery lateral band, a scale in width, extending from upper part of base of pectoral to base of caudal; edges of upper scales dusky; a little dark color on dorsals, caudal, and pectoral; upper and lower jaws and top of head with minute dark dots; upper part of eye dark.

C. lermæ closely resembles *C. crystallinum*. It differs markedly in having large teeth which are arranged in two rows, a shorter lower jaw, and a larger eye.

Our specimens of *C. lermæ* are all from the market of Guadalajara. The gill-arches and viscera had been removed, and the bodies are somewhat shrunken.

Measurements of four specimens of Chirostoma lermæ.

Measurements.	Collected in market of Guadalajara, said to have come from Lago de Chapala.			
	162	152	145	150
Length of body in millimeters.....	162	152	145	150
Depth of body expressed in hundredths of length.....	21	19½	19½	18
Depth of caudal peduncle.....	9	8½	8½	8
Length of head.....	31½	32	32	33
Distance from snout to occiput.....	24	24½	25	24
Tip of lower jaw to occiput.....	26	25½	26	25½
Width of interorbital space.....	6	6½	6	6
Length of snout.....	12½	12	13	13
Diameter of orbit.....	6½	6	6	6½
Distance from snout to spinous dorsal.....	56	57	59	57½
Insertion of spinous dorsal to soft dorsal.....	12	13	13	14
Height of longest dorsal spines.....	7½	6½	8	8
Height of longest dorsal rays.....	13	14	14	12
Distance from snout to anal fin.....	63½	64	67½	64
Height of longest anal rays.....	14	15	15	14½
Distance from anal to caudal fin.....	17	17	17	17½
Length of caudal fin.....	19	20	21	21
Length of pectoral fin.....	19	19	19	19½
Distance from snout to ventral fin.....	47½	49	51	49½
Length of ventral fin.....	11½	11	12	11
Number of spines in first dorsal.....	4	4	5	4
Number of rays in second dorsal.....	12	11	10	11
Number of rays in anal.....	22	20	19	20
Number of rays in pectoral.....	15	14	15	14
Number of scales in lateral series.....	54	58	55	58
Number of scales in transverse series.....	19	20	18	17
Number of scales between dorsal fins.....	12	11	11	11

CICHLIDÆ.

37. *Cichlasoma steindachneri* Jordan & Snyder, new species. Fig. 20.

Type No. 6164, L. S. Jr. Univ. Mus. Collected by J. O. Snyder, January 24, 1899, from Rio Verde, near Rascon, San Luis Potosi, Mexico.

Head 2.5 in length; depth 3; depth of caudal peduncle 7.5; eye 3.40 in head; snout 2.80; interorbital space 5; longest dorsal spine 4; ray 2; longest anal spine 2.66; ray 2; length of pectorals 1.5; ventrals 1.75; caudal 1.5. D. XVI, 10. A. v, 9. P. 14. Scales in lateral series 30; in transverse series 16; on caudal peduncle 8.

Length of head exceeding its depth a distance equal to diameter of orbit. Body elongate, deepest above ventrals; curve of dorsal outline interrupted by a slight elevation above eye and a rather rapid descent at base of soft dorsal; ventral outline less curved than dorsal; interorbital space convex; orbit somewhat elongate laterally, located slightly nearer to tip of snout than to posterior edge of opercle; its lower edge a little above a horizontal from mouth to middle of caudal peduncle; cleft of mouth almost horizontal; maxillary, except distal end, concealed by preorbital; lips thick, the lower with a narrow frenum; jaws equal, the upper moderately protractile. Teeth in 2 series on each jaw; outer series in a single row, large, canine-like, far apart; inner series minute, in bands; tips of teeth brown colored; no teeth on vomer or palatines. Gill-membranes forming a fold across the isthmus. Gillrakers on first arch 10, short and blunt.

Body covered with large weakly ctenoid scales, head with cycloid scales; upper part of head anterior to middle of orbit, snout, preorbital area and ventral part of head naked; a single row of small scales along bases of dorsal and anal fins; small scales on basal part of interradiated membranes of caudal. Lateral line interrupted at fourteenth scale, beginning again 3 scales lower and extending to base of caudal; first dorsal spine very short, others gradually longer to the sixth or seventh, after which the spines are of about the same length; sixth and seventh dorsal rays longest, about 1½ times length of longest spine; depressed fin extending to posterior edge of dark caudal spot; first anal spine shortest, one-fifth as long as fifth spine; fourth, fifth, and sixth rays longest; depressed fin extending to anterior edge of caudal spot; caudal fin evenly rounded; pectorals rounded, extending to a vertical from vent. Outer rays of pectorals longest, extending to vent.

Color in alcohol, light olive; darker above than below; an indistinct, dark lateral band extending from snout to caudal; 8 or 9 scarcely distinguishable dark vertical bands on sides of body; irregular dark spots at intersection of lateral and vertical bands; a small dark spot at base of caudal; small, distinct dark dots on anterior dorsal region of head.

Total length of type 61 millimeters. Younger examples, measuring about 43 millimeters, have the body a little deeper and the head shorter. The vertical color bands on posterior half of body are more distinct on the younger specimens.

Measurements of ten specimens of Cichlasoma steindachneri.

Measurements.	Locality: Rio Verde near Rascon, San Luis Potosi, Mexico.									
Length of body in millimeters.....	48	36	34	34	32	31	31	32	30	30
Depth of body expressed in hundredths of length.....	35	38	40	37	36	39	38	40	38	38
Depth of caudal peduncle.....	14	15	15	15	15	15	15	15	15	15
Length of head.....	40	37	38	39	35	37	38	40	37	36
Width of interorbital space.....	8	9	9	9	9	10	9	9	8	9
Length of snout.....	15	13	14	13	12	13	13	13	12	12
Diameter of orbit.....	12	12	13	12	12	12	12	13	12	12
Distance from snout to dorsal fin.....	47	45	47	45	43	45	45	46	45	46
Height of longest dorsal spine.....	12	13	14	16	14	13	14	14	15	14
Height of longest dorsal ray.....	20	20	20	21	19	19	20	18	18	19
Distance from snout to anal fin.....	72	68	67	68	69	70	69	69	66	68
Height of longest anal spine.....	16	13	15	15	14	15	14	16	15	15
Height of longest anal ray.....	19	20	20	20	17	19	23	22	20	19
Distance from anal to caudal fin.....	14	15	15	15	16	17	16	18	15	17
Length of caudal fin.....	28	28	30	28	26	25	27	30	25	25
Length of pectoral fin.....	26	29	28	26	26	27	27	31	26	25
Distance from snout to ventral fin.....	46	45	43	46	44	43	44	44	43	41
Length of ventral fin.....	23	25	24	23	20	23	23	24	23	22
Number of dorsal spines.....	16	16	16	16	16	16	15	16	16	16
Number of dorsal rays.....	10	10	10	10	9	9	11	10	10	10
Number of anal spines.....	5	5	5	5	5	5	5	5	5	5
Number of anal rays.....	8	8	8	8	7	8	8	8	8	8
Number of scales in lateral line.....	26	28	25	27	27	27	26	27	26	29
Number of scales in transverse series.....	14	14	13	14	15	15	14	15	14	14

38. *Heros cyanoguttatus* (Baird & Girard).

Some fishes from lagoons near Tampico we identify as *Heros cyanoguttatus*. They agree closely with descriptions of that species, but have a decidedly longer and sharper snout than has the specimen figured by Girard. (Girard, U. S. and Mex. Bound. Sur., Ichthyology, 30, pl. 4, figs. 9-12.)

39. *Heros istlanus* Jordan & Snyder, new species. *Mojarra*. Fig. 21.

Type No. 6150, L. S. Jr. Univ. Mus. Collected by Jordan & Snyder January 3, 1899, from Rio Ixtla at Puente de Ixtla, Morelos, Mexico.

Head 2.80 in length; depth 2.66; depth of caudal peduncle 7; eye 4.50 in head; snout 2.25; interorbital space 3.50; longest dorsal spine 2.80; ray (without filament) 1.40; longest anal spine 2.60; ray (without filament) 1.33; length of pectorals 1.50; ventrals 1.33; caudal 1.20; D. xvi, 10. A. v, 8. P. 14. Scales in lateral line 28; in transverse series 18.

Body elongate, compressed, deepest part above insertion of ventrals; dorsal outline rising rapidly to origin of dorsal, interrupted by a shallow notch above eye falling gradually to base of last spine, from which point the descent to the caudal peduncle is more abrupt; ventral outline evenly rounded. Interorbital space convex; eye large; orbit circular, equally distant from tip of snout and posterior edge of opercle; mouth horizontal, lower jaw projecting, lips thick, the lower without frenum, folding over the upper at their union; premaxillary protractile; maxillary small, nearly vertical in position, and almost hidden by the large preorbital. Teeth on both jaws in two series, the outer a single row of 24 canines, largest in front, growing smaller posteriorly; the inner series villiform; all of teeth with brown-colored tips. Gill-membranes free from isthmus. Branchiostegals 5. Gillrakers on first arch 9, short, blunt, far apart.

Body covered with large scales, the cheeks, opercles, subopercles, and occipital portion of the head with small scales; the ventral part of head, preorbital area, snout, and anterior part of interorbital space naked; one row of scales extending on bases of dorsal and anal fins; scales of body weakly ctenoid; scales of head smooth; lateral line interrupted on the nineteenth transverse row of scales, beginning again 3 scales lower down, and 2 scales in advance of where it left off and extending to base of caudal. First dorsal spine short and slender, others gradually longer and heavier; posterior spine longest; each spine with a distal extension of stiff membrane; tip of fourth ray of dorsal extending as a thread-like filament about as long as the diameter of orbit; dorsal, when depressed, extending on caudal one-third its length; first anal spine shortest; others growing gradually longer and heavier; the last $2\frac{1}{2}$ times as long as first; spines with distal attachments similar to those of dorsal; third and

fourth rays longest, united at their tips, forming a slender filament. The tip of anal extends a little farther posteriorly than that of dorsal. Caudal rounded. Tip of pectoral rounded. Ventrals located slightly posterior to bases of pectorals, extending to vent; outer ray longest, ending in a filament.

Color dark; an oblong brownish-black spot at base of each scale on sides of body, the spots growing less distinct above the pectorals; membranes of dorsal, anal, and caudal with small spots, these more distinct and regularly arranged on soft parts of dorsal and anal; pectorals and ventrals

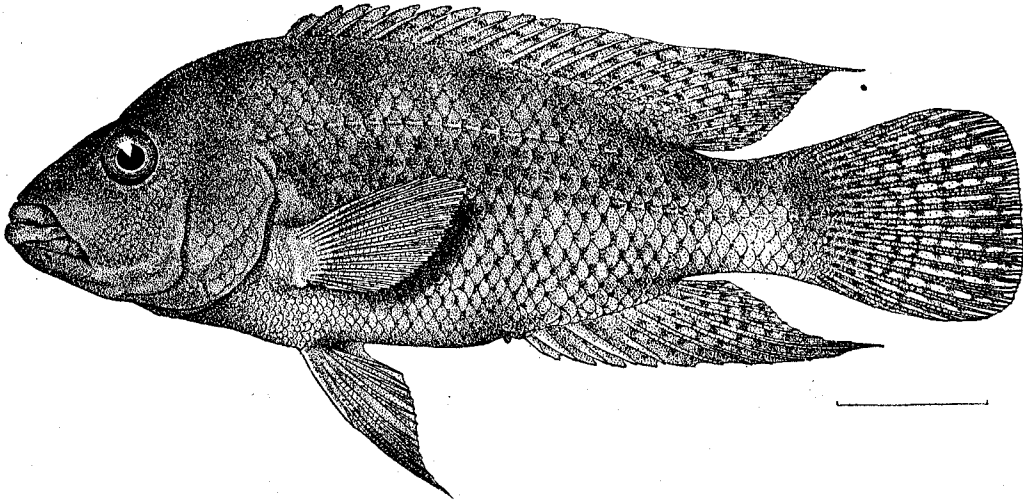


Fig. 21.—*Heros istlanus* Jordan & Snyder, new species. Type.

without spots. Young individuals have a brownish-black spot at base of caudal and on side of body at tip of pectoral, a less distinct spot at upper edge of gill-opening and also below posterior end of base of dorsal. The darker of these spots is sometimes faintly indicated on the larger individuals.

The annexed table shows the variations of some of the characters of the type and cotypes.

Measurements of ten specimens of Heros istlanus.

Measurements.	Locality: Rio Ixtla at Puente de Ixtla, Morelos, Mexico.									
	131	120	122	117	112	107	77	55	43	29
Length of body in millimeters.....	131	120	122	117	112	107	77	55	43	29
Depth of body expressed in hundredths of length.....	39	37	38	38	35	41	40	35	38	40
Depth of caudal peduncle.....	15	14	14½	15	14	15	16	15	14	15
Length of head.....	35	35	35	35	36	37	37	37	36	39
Width of interorbital space.....	11	10	10	10	10	11	10	9	9	10
Length of snout.....	15	15	14	15	16	15	15	14	14	13
Diameter of orbit.....	7½	7½	8	7	7½	8	9	9	10	12
Distance from snout to dorsal fin.....	43	41	40	42	42	43	42	42	43	44
Height of longest dorsal spine.....	13	13½	15	14	15	16	16	13	16	15
Height of longest dorsal ray.....	25	30	24	25	26	27	26	24	24	18
Distance from snout to anal fin.....	68	68	67	70	71	70	70	68	69	65
Height of longest anal spine.....	14	13	16	14	13	15	16	16	14	15
Height of longest anal ray.....	30	26	28	26	25	28	25	23	23	20
Distance from anal to caudal fin.....	16	16½	16	16	15	16	16	18	15	16
Length of caudal fin.....	31	28½	31	30	28	31	31	29	28	25
Length of pectoral fin.....	23	25	26	25	23	25	26	25	26	25
Distance from snout to ventral fin.....	42	40	40	42	44	42	44	43	43	44
Length of ventral fin.....	27	24	27	24	23	25	24	24	23	21
Number of dorsal spines.....	16	16	16	16	16	16	16	15	16	16
Number of dorsal rays.....	10	11	11	10	10	10	10	10	10	10
Number of anal spines.....	5	5	6	5	5	5	5	5	6	5
Number of anal rays.....	7	8	8	8	7	8	7	7	7	7
Number of scales in lateral line.....	28	28	28	27	27	28	27	30	28	27
Number of scales in transverse series.....	18	18	17	17	17	17	16	17	16	16

40. *Neetroplus carpintis* Jordan & Snyder, new species. Fig. 22.

Type, No. 6162, L. S. Jr. Univ. Mus. Locality, Laguna del Carpinte, near Tampico, Tamaulipas, Mexico. Collected by J. O. Snyder, January 15, 1899.

Head 2.83 in length; depth 2; depth of caudal peduncle 6; eye 5 in head; snout 2.20; interorbital space 2.66; longest dorsal spine 2.20; ray 1.25; longest anal spine 2; ray 1.33; length of pectorals, 1.40; ventrals 1.20; caudal 1.16. D. xvi, 10. A. v, 8. P. 15. Scales in lateral line 27; in transverse series 17; on caudal peduncle 7.

Body compressed, deepest part above ventrals; dorsal outline straight from tip of snout to a point above anterior edge of orbit, where it is abruptly curved upward and backward to the origin of dorsal fin; from the latter point it gradually curves downward to base of first dorsal ray, from which point the descent to the caudal peduncle is abrupt; ventral outline evenly curved from snout to caudal peduncle. Interorbital space convex, its middle portion flattened. Orbit circular, nearer to posterior edge of opercle than to tip of snout a distance equal to diameter of pupil.

Mouth oblique, lower jaw slightly projecting; lips thick; the lower with a frenum equal in width to half the diameter of pupil; upper jaw protractile; maxillary covered by preorbital except at its distal end. Teeth in 2 series in each jaw, the outer series in a single row, flat or incisor-like, larger in front, growing much smaller posteriorly; the inner series minute, in narrow bands; all the teeth loosely attached, their tips brown-colored; no teeth on vomer or palatines. Gill-membranes forming a fold across the isthmus. Gillrakers on first arch 10; short, far apart.

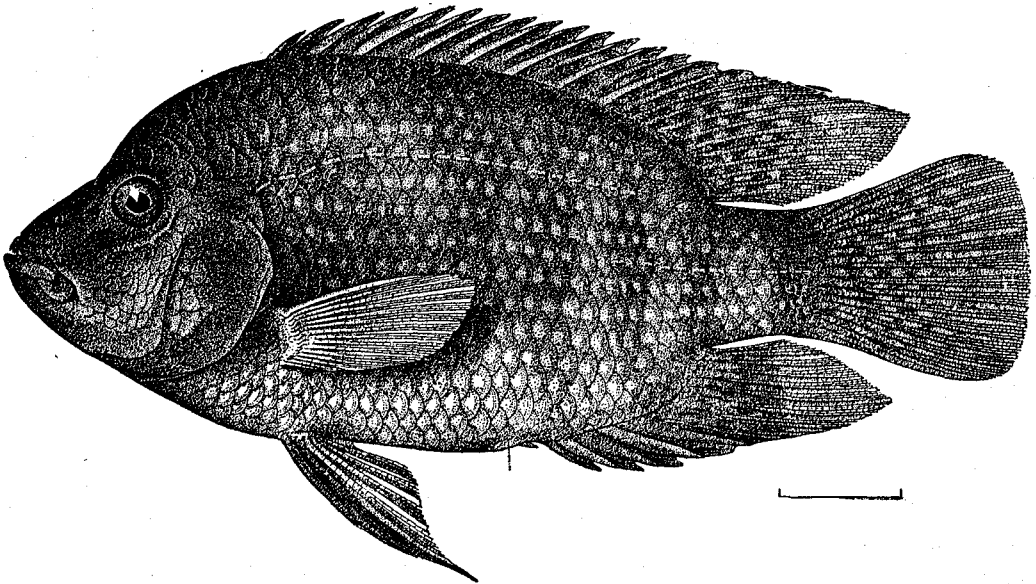


FIG. 22.—*Neetroplus carpintis* Jordan & Snyder, new species. Type.

Body covered with large, weakly ctenoid scales; cheeks, opercles, and occipital portion of head with small cycloid scales; lower jaw, snout, and anterior half of interorbital space naked; bases of posterior parts of dorsal and anal fins with small scales; interradiial membranes of caudal with very small scales on basal parts; lateral line interrupted on nineteenth row of scales, beginning again 3 scales lower down, on the third row anterior to where it left off, and extending to base of caudal; 2 short rows of mucous tubes on interradiial caudal scales, one above and the other below the end of lateral line. First dorsal spine shortest, others gradually longer and heavier, each spine with a ray-like attachment projecting above and posterior to its tip; first anal spine shortest, the others gradually longer and heavier, the fourth 3 times as long as the first; spines with distal attachments similar to those of the dorsal, third and fourth rays longest, extending posteriorly as far as those of dorsal; posterior edge of caudal somewhat convex; pectorals rounded; ventrals pointed, the outer ray much the longest, extending a little beyond the vent.

Color in alcohol, light slate; scales with lighter central spots; posterior parts of dorsal, anal, and caudal lighter; head in life covered with round and elongate spots of greenish-blue on a golden-brown background; sides of body with bluish and brownish spots irregularly arranged; pectorals and distal part of soft dorsal with yellowish tinge. In the young there are 5 or 6 dark vertical bands, about equal in width to diameter of orbit, on posterior part of body; a dark spot is sometimes present just below lateral line on a vertical through base of eleventh dorsal spine.

Neotroplus carpintis differs from *N. nematopus* and *N. nicaraguensis* in having a much deeper body and fewer dorsal and anal spines:

Species.	Dorsal.	Anal.	Lateral line.
<i>Neotroplus carpintis</i>	XV-XVII, 8-11	V, 8	24-29
<i>nematopus</i>	XIX, 10	VIII, 7	34
<i>nicaraguensis</i>	XVIII, 11	VII, 7	.....

Besides the specimens taken in the Rio Tamesoe, a number of very small individuals of *N. carpintis* were collected in the Rio Verde near Rascon. They have rather indistinct, dark vertical bands on the entire length of the body, and in most cases a series of dark spots along the sides of the body; one at the base of the caudal and another under the eleventh dorsal spine being always present and the most distinct.

Measurements of ten specimens of Neotroplus carpintis.

Measurements.	Locality: Laguna del Carpinte, near Tampico, Tamaulipas, Mexico.									
	162	161	132	129	119	66	55	57	54	49
Length of body in millimeters.....	162	161	132	129	119	66	55	57	54	49
Depth of body expressed in hundredths of length.....	51	55	55	54	55	49	49	50	49	51
Depth of caudal peduncle.....	17	17	17	16½	17	15	16	16½	16	17
Length of head.....	34	36	37	35	35½	38	38	40	38	39
Width of interorbital space.....	12	13	13	13	12½	10½	10	11	11	10
Length of snout.....	16	17	17½	17	16	15	15	16	15	15
Diameter of orbit.....	7	7	8	7½	8	9	10	10	10	11
Distance from snout to dorsal fin.....	42	43	46	43	45	44	45	46	46	45
Height of longest dorsal spine.....	17	16	18	18	18	16	15	17	17	16
Height of longest dorsal ray.....	31	31	30	28	30	23	25	26	25	27
Distance from snout to anal fin.....	73	75	72	75	71	70	72	72	70	70
Height of longest anal spine.....	16½	16½	19	18	18	18	19	19	16	18
Height of longest anal ray.....	27	29	28	28½	31	26	27	24	25	26
Distance from anal to caudal fin.....	15	14	14	14½	15	15	15	14	15	15
Length of caudal fin.....	30	33	31	30	33	30	33	29	32	33
Length of pectoral fin.....	26	27	28	26½	28	28	28	30	29	29
Distance from snout to ventral fin.....	44	45	45	45	43	44	46	46	45	45
Length of ventral fin.....	30½	30	32	30	32	29	30	30	31	29
Number of dorsal spines.....	16	16	16	16	16	16	16	17	15	16
Number of dorsal rays.....	10	8	11	10	10	10	10	8	11	10
Number of anal spines.....	5	5	5	5	5	5	5	6	5	5
Number of anal rays.....	8	8	8	8	8	8	8	7	8	8
Number of scales in lateral line.....	26	27	26	26	29	27	24	27	25	26
Number of scales in transverse series.....	17	18	16	17	16	16	17	16	16	16

GOBIIDÆ.

- 41. *Philypnus dormitor* (Lacépède). Lagoons near Tampico.
- 42. *Awaous taiaasca* (Lichtenstein). Rio Ixtla, Puente de Ixtla.