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**FRESH-WATER FISHES COLLECTED IN
BRITISH HONDURAS AND GUATEMALA**

BY
CARL L. HUBBS

ANN ARBOR, MICHIGAN
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FREDERICK M. GAIGE

Director of the Museum of Zoology

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During the first field trip in the biological explorations of the Mayan area of Middle America, being conducted coöperatively by the Carnegie Institution of Washington and the University of Michigan, a few fishes were collected by the zoologists of the party, Josselyn Van Tyne and Adolph Murie. These fishes, reported on in the present paper, include two apparently undescribed forms from the almost unexplored Río Hondo system, at Uaxactun, in the Department of Petén near the northern border of Guatemala. These are *Rhamdia guatemalensis muriei* and *Mollienisia sphenops vantynei*.

Of especial interest in this collection are the large series of specimens, on which are based a further contribution to our knowledge of geographical variation in *Astyanax fasciatus*, *Pseudoxiphophorus bimaculatus*, *Xiphophorus hellerii*, and *Mollienisia sphenops*. *Platypoecilus maculatus* is given a definite locality in Guatemala for the first time.

A report on a small but interesting collection recently made by Mr. C. L. Lundell in the Río San Pedro de Mártir, in the Department of Petén, Guatemala, is interpolated. Included are four forms described as new: *Mollienisia sphenops macrura*, *Cichlasoma synspilum*, *C. hyorhynchum*, and *C. urophthalmus trispilum*.

The fishes reported upon were obtained at four stations (for locations see map):

Station 1.—A small tributary, 4 to 12 feet wide, of the Belize River, on Mountain Pine Ridge 12 miles south of El Cayo, in British Honduras; running through a meadow on the pine ridge, just above the point where the stream debouches into the jungle. The water here was very clear; vegetation, absent (except for overhanging brush); bottom, bedrock, stone and sand; current, fast on riffles, but slow in the pools, some of which were 4 or 5 feet deep; seined on March 3, 1931.

Station 2.—Belize River at El Cayo, British Honduras, in the "high bush." The water was rather clear, the bottom sandy and the current rather swift; March 16, 1931.

Station 3.—A stagnant *aguada* (water hole), about 20 feet wide and 3 feet deep, at edge of swamp, in the high tropical "bush" region at Uaxactun, Petén, Guatemala, in the hydrographic basin of Río Hondo but connected only in flood season (Pl. I). The bottom was muddy and the water warm and obviously deficient in oxygen, for the overcrowded fishes were lapping at the surface; April 20 and 21, 1931.

Station 4.—Río San Pedro de Mártir, a dark, murky stream containing

decaying vegetation, with muddy bottom and shores, and with slow current. This collection was made by Mr. C. L. Lundell on April 15 to 18, 1932, at El Paso de los Caballos, Department of Petén, Guatemala. This stream lies west of Uaxactun, heads opposite the Río Hondo, and flows westward into the Río Usumacinta.

CHARACINIDAE

1. *Astyanax fasciatus aeneus* (Günther)

Station 3, *aguada* at Uaxactun, Guatemala (77 half-grown to adults, 48 to 85 mm. to caudal).

Station 4, Río San Pedro de Mártir, Guatemala (9 half-grown, 31 to 40 mm.).

The status, nomenclature, and variation of this characin will be discussed by Hubbs and Gordon (in press). The identification of this Guatemalan material with *aeneus* is made largely on the basis of the number of principal anal rays, which vary as follows:

Number of anal rays	22	23	24	25	26	27	Ave.
Number of specimens, Station 3	5	24	25	15	3	1	23.9
Number of specimens, Station 4	1	2	4	1	1	-	23.9

The chief proportions vary thus: depth of body, 2.7 to 3.3 in standard length in specimens from Station 3 (2.9 to 3.3 in the examples from Station 4); length of head, 3.0 to 3.6 (3.0 to 3.3); length of eye, 3.7 to 4.7 in head (2.7 to 3.1); least interorbital width, 3.1 to 4.0 (3.2 to 3.7). In measuring the head, I include the wide opercular membrane. Regan (1906-1908: 172), in distinguishing a big-eyed *macrophthalmus* and a narrow-headed *angustifrons*, apparently measured the head to the osseous margin only, but probably included the fleshy rim of the interorbital. The gill-rakers, numbering 12 to 14 on the lower arm of the outer arch, are fewer than in *angustifrons* as described.

In the Río San Pedro, Mr. Lundell determined that this "sardina" reaches a length of 3 inches, swims in schools, is preyed upon by *Belonesox* and *Petenia*, and is the favorite bait of the natives.

2. *Arius aquadulce* Meek

Station 4, Río San Pedro de Mártir, Guatemala (1 half-grown, 217 mm. to caudal).

The identification of this specimen is based on the study of Hubbs and Gordon (in press). For comparison, I give here some diagnostic features: depth, 5.0; width of head, 1.45; dorsal spine, 1.8; width of occipital process 1.2 in its length; occipital keel somewhat developed on anterior

two-thirds of the plate; palatine teeth in one series, plus 1 or 2 teeth forming an incipient second series; back, sides, and fins blackish purple in preservative, the lower surface white and the intervening area flecked. Compared with our topotypes of *aquadulce*, this specimen has the occipital plate slightly wider and more definitely keeled, and the color darker. It seems closer to *aquadulce* than to *melanopus*, and may provisionally be referred to the Mexican species.

3. *Rhamdia guatemalensis muriei*, new subspecies

Plate IV, Fig. 1

Station 3, *aguada* at Uaxactun, Guatemala (56 specimens, probably half-grown, 88 to 126 mm. to caudal). The holotype is 113 mm. in standard length; Cat. No. 97881, Museum of Zoology, University of Michigan.

This subspecies seems to be most like *R. g. guatemalensis* (Günther) and *R. g. oaxacae* Meek of southern Mexico, between the ranges of which it occurs. Regan (1906-1908: 132) has regarded those forms as synonymous, but we find differences between them which appear to be significant (Hubbs and Gordon, in press). Furthermore, the Uaxactun material differs somewhat from *guatemalensis* as described, and from *oaxacae* as represented by our collections. A comparison of some proportional measurements is given in Table I.

TABLE I
COMPARISON OF PROPORTIONS IN THREE SUBSPECIES OF *RHAMDIA GUATEMALENSIS*

	<i>R. g. guatemalensis</i> (from Regan)	<i>R. g. muriei</i>	<i>R. g. oaxacae</i>
Length of head	3.8 to 4.4	3.6 to 4.0	3.6 to 4.0
Width of head	1.33 to 1.4	1.3 to 1.6	1.4 to 1.6
Length of snout	2.75 to 3.0	2.65 to 3.0	2.4 to 2.7
Pectoral spine	2.0 to 2.5	2.2 to 2.8	2.4 to 3.2
Depth, caudal peduncle	2.0 to 2.5	2.6 to 3.4	2.7 to 3.2

The figures given in Table I indicate that *muriei* has the long head of *oaxacae*, but the short snout of *guatemalensis*; the slender caudal peduncle of *oaxacae*, and the pectoral spine of intermediate length. Even more characteristic of *muriei* are two features by which it is differentiated from both *guatemalensis* and *oaxacae*: the maxillary barbels are shorter, reaching to below any point between middle of first dorsal and the most anterior part of the adipose fin, rather than to below anterior or middle portion of the long adipose; the color is very dark, and usually strongly mottled.

From other species of *Rhamdia* with a very deeply cleft caudal fin, as these are distinguished by Regan, our form differs as follows: from *parryi* and *motaguensis* in the wider mouth, longer head, and longer occipital

process; from *managuensis* in the much longer occipital process, longer barbels, and shorter caudal peduncle (much shorter instead of longer than head); from *microptera* in the shorter occipital process, larger fins (pectoral spine always more than one-third head), longer head (more instead of less than half distance from head to pelvic fin), and slenderer caudal peduncle; from *godmani* in the longer occipital process (half instead of two-fifths as long as distance to dorsal fin), slenderer caudal peduncle, and mottled color (in which two characters *godmani* agrees with *guatemalensis*); from *petenensis* in the longer and narrower head, slenderer caudal peduncle, and mottled color; from *wagneri* (direct comparison made) in the longer head, shorter snout, and the less even-edged lateral band; from *boucardi* and *nicaraguensis* in having a blackish lateral band and a pale streak on dorsal fin toward base; further from *boucardi* in having the pectoral spine longer, and the adipose fin much more than one-third as long as the standard length, and further from *nicaraguensis* in having the snout shorter.

Rhamdia g. muriei also differs markedly from the descriptions by Barbour and Cole (1906: 155-156, Pls. 1-2), of two species from *cenotes* of Yucatan. From *R. depressa*, as described, our species differs in having a blackish lateral band and a pale streak on dorsal, a longer adipose fin, shorter maxillary barbels, deeper caudal peduncle, and longer head (as Regan indicated, *boucardi* seems to be a synonym of *depressa*). From the description of *R. sacrificii*, the Uaxactun form differs in the same color features, and in being much less robust.

The proportions and coloration of *R. g. muriei* are indicated in the preceding comparisons. Dorsal rays, I, 6; anal, 9 to 14, counting rudiments; gill-rakers, 2 to 5 + 6 to 9 = 9 to 14. The chin is grey to blackish.

I take much pleasure in dedicating this subspecies to its co-collector Dr. Adolph Murie, formerly Assistant Curator of Mammals in the Museum of Zoology of the University of Michigan.

4. *Rhamdia guatemalensis oaxacae* Meek

Station 4, Río San Pedro de Mártir, Guatemala (1 adult, 173 mm. to caudal).

This specimen seems referable to *oaxacae*, as might be expected from the drainage system in which it was taken. The more diagnostic features are: length of head, 3.7; width of head, 1.55; length of snout, 2.5; pectoral spine, 2.7; depth of caudal peduncle, 2.7; maxillary barbel reaching approximately to below middle of adipose dorsal; body without definite dark mottling, though with somewhat distinct roundish pale spots, which are faintly visible also in our Vera Cruz specimens of *oaxacae*. Compared with them, the Río San Pedro example is slightly more robust, less flat-headed,

more rounded in outlines, and darker. The significance of these differences is doubtful.

Mr. Lundell found that this edible catfish lives on the bottom.

5. *Gambusia nicaraguensis* Günther

Station 4, Río San Pedro de Mártir, Guatemala (8 adults and subadults, 14 to 18 mm. long to caudal).

These specimens are characterized by their small size, large head (3.2 to 3.4) and dark coloration: the lower lip, suborbital bar, most of the anal fin, the axial septum, and the spots on the body and caudal fin are black. The large head is probably due to the smallness of the specimens, and the darkness was probably caused by the murky water inhabited, for the other fishes from the same place are also dark. The distance from the origin of the dorsal to the base of caudal equals the distance forward to head, and is contained 1.8 times in the distance from tip of snout to origin of dorsal. The anal fin in the females is rather strongly falcate. The gonopodial structure in the one completely transformed male duplicates the figures already given (Hubbs, 1926: Pl. 2).

The collector noted that "these are common, small, water-top minnows."

6. *Belonesox belizanus* Kner

Station 3, *aguada* at Uaxactun, Guatemala (1 young and 32 adults, 13 to 132 mm. long to caudal).

Station 4, Río San Pedro de Mártir, Guatemala (2 adults, male 94 and female 120 mm. long).

Mr. Lundell remarks that this predaceous cyprinodont does not reach a larger size in the Río San Pedro at El Paso de los Caballos. He watched individuals staying near the surface, darting into the schools of "*sardinas*" (*Astyanax*) to feed upon them. The specimens were caught on a hook.

7. *Pseudoxiphophorus bimaculatus taeniatus* Regan

Station 1, tributary of Belize River, Mountain Pine Ridge, British Honduras (9 half-grown to adult, 19 to 45 mm. long to caudal).

Station 3, *aguada* at Uaxactun, Guatemala (105 adults, 32 to 78 mm.).

These two series stand near the opposite extremes of variation in the southern subspecies of *Pseudoxiphophorus bimaculatus* (see Hubbs, 1924: 38, and 1926: 54, and Hubbs and Gordon, in press). The number of dorsal rays differs widely:

Number of dorsal rays	13	14	15	16	17	Ave.
Specimens from Pine Ridge, Brit. Honduras	—	—	3	5	1	15.9
Specimens from Uaxactun, Guatemala	13	51	37	4	—	14.3

In other characters the two races are also very different. The Pine Ridge race is dwarfed, and in it the scale crescents are widened and blackened medially so as to produce an effect approaching that figured by Regan (1906-1908, Pl. 14, Fig. 4) for the type of *taeniatus*. The Uaxactun race is large and robust, and in it the scale crescents are distinctly less widened and blackened medially.

The extreme characters of the Pine Ridge series are in agreement with the far southern position of this record station, but apparently out of harmony with the upland habitat, for, as will be recalled, this species varies toward higher elevation in the same manner in which it varies toward the north. The streamlet on the Pine Ridge was small, however, and the specimens were taken just below the very swift water and at only a short distance from the point where the creek debouches into the "tropical bush." I assume therefore that the population sampled represents merely an overflow from the race inhabiting the adjacent lowland.

8. *Platypoecilus maculatus* Günther

Station 3, *aguada* at Uaxactun, Guatemala (3, subadult male 26 mm., adult female 40 mm., and mature male 44 mm. long).

These specimens are the first of *Platypoecilus maculatus* to be accorded a definite locality in Guatemala. They are identified as *maculatus* on the basis of the very deep caudal peduncle (3.5 in standard length in the adult male, and 4.0 in the other two), and the low number of dorsal rays (9 in two and 10 in one specimen).

The adult male is spectacularly marked by jet black lateral splashes and spots. The other two carry almost no black, except over the hypural, where there is a black triangle pointed forward and followed by a pale area. In the female both pelvic and anal fins are black-margined; in the smaller male only the pelvic fins and in the adult male none of the fins are so marked.

9. *Xiphophorus hellerii guntheri* Jordan and Evermann

Station 1, tributary of Belize River, Mountain Pine Ridge, British Honduras (84, half-grown to mature adults, 19 to 40 mm. in standard length).

Station 3, *aguada* at Uaxactun, Guatemala (172 mature adults, 28 to 73 mm. long).

These specimens represent a dwarfed and a large race, respectively, of the southern subspecies of *Xiphophorus hellerii* (see Hubbs and Gordon, in press). They are deep-bodied, and have the lateral band absent or more or less faint, and sometimes doubled or trebled along the midsides. In the males several "parr marks" are often evident, but no black mark-

ings are developed. They are to be further discussed and their variations analyzed in a forthcoming revision of the genus by Hubbs and Gordon.

10. *Mollienisia sphenops vantynei*, new subspecies

Plate II, Fig. 1

Station 3, *aguada* at Uaxactun, Guatemala (18 mature adults, of both sexes, 47 to 89 mm. in standard length).

The holotype is a male 72 mm. long to caudal; Cat. No. 97874, Museum of Zoology, University of Michigan.

This fine form of *sphenops* closely resembles other subspecies, the character and range limits of which have not been well delimited. It is of especial interest in that it represents a transition, in regard to position of dorsal fin, to or toward the Lake Petén form originally called *Poecilia petenensis* Günther (1866: 342, and 1869: 484, Pl. 85, Figs. 3 and 4), but renamed *M. gracilis* by Regan (1913: 1012) because regarded as congeneric with *Mollienisia petenensis* Günther. *Mollienisia s. gracilis* has the origin of the dorsal, according to Regan's description of the types and to Günther's original figures, midway between base of caudal and tip of snout in the male, or the preorbital in the female. In an adult female of *M. s. gracilis* in the United States National Museum, 105 mm. long to caudal, associated with a specimen of *Mollienisia petenensis* and therefore probably from Lake Petén, the dorsal is midway between base of caudal and middle of snout. In *M. s. vantynei*, the dorsal is not so far forward, though not so backward in insertion as in most subspecies. In males the distance from base of caudal to origin of dorsal measured forward reaches to some point between front of pupil and posterior part of preorbital. In the females this distance extends to some point between rear margin of orbit and front of pupil.

M. s. vantynei differs further from *M. s. gracilis* in having a larger head and in being deeper, especially in the peduncular region (in the National Museum specimen of *gracilis* the head enters the standard length 4.4 times, the depth of caudal peduncle, 6.7 times). It agrees with *gracilis* in having the dorsal rays increased in average number: *gracilis* has 10 or 11 dorsal rays according to Regan (probably equals 9 or 10 by our method of counting, 10 in the specimen at hand), while most subspecies usually have 9. *M. s. vantynei* has 9 rays in 5 specimens and 10 rays in 13. For a form of the *sphenops* series, *vantynei* has the body strongly spotted, the caudal peduncle deep, and the dorsal fin in mature males very high, reaching the rudimentary caudal rays when depressed. As in both *sphenops* and *gracilis* the dorsal fin is short in basal length.

M. s. vantynei is also very close to *M. s. salvadoris* (Regan, 1907: 104, Pl. 14, Figs. 2 and 3), differing at least in the larger head and in the more finely spotted dorsal fin.

Head, 3.5 (3.2 to 3.6; 3.15 to 3.6);¹ interorbital, 2.3 (2.2 to 2.4; 2.0 to 2.3); orbit, 4.2 (3.7 to 4.2; 3.7 to 4.6). Greatest depth of body, 3.2 (3.0 to 3.4; 3.1 to 3.3); least depth of caudal peduncle, 1.25 (1.15 to 1.5; 1.3 to 1.6) in head, and 4.3 (4.2 to 4.7; 4.75 to 5.2) in standard length.

Length of depressed dorsal fin, 2.35 (2.25 to 3.3; 3.65 to 4.0); length of longest caudal ray, 2.95 (2.9 to 3.4; 3.3 to 3.5); length of pectoral fin, 4.0 (4.1 to 4.3; 4.3 to 4.6); length of pelvic fin, 5.6 (4.7 to 5.7, and 7.4 in one immature male; 6.5 to 7.8); length of depressed anal, 5.7 (4.2 to 5.7; 5.0 to 7.0).

The gonopodium shows the diagnostic features of *Mollienisia* as pointed out by Regan (1913: 981 and 1010) and Hubbs (1924: 11, and 1926: 72 and 76): membranous swelling along front of ray 3 modified into a prepuce-like hood; segments of this ray where concealed by hood produced backward into semi-spinous processes; a membranous hook developed at tip of ray 3; anterior spines of that ray strong; tips of all rays slender; segments of anterior branch of ray 4 neither serrate nor elongate; ray 5 with a well-developed retrorse segment.

The lateral spots are usually black and in about five rows, but are reduced to dusky dashes in some specimens of each sex. Narrow but not conspicuous dark bars are evident toward the caudal fin in developed males. The dorsal fin of high males is dusky, becoming sooty toward the extreme base which is clear; the fin is marked on the membranes by conspicuous, oval black spots, more or less definitely set off by clear spots. The caudal is rather evenly darkened out to the margin; mottled with sooty brown on the rays and spotted with black on the membranes. The fins of the females are lighter than those of the males, but those of the larger females are spotted much as in the males.

It is fitting that the name of Josselyn Van Tyne, who with Adolph Murie collected the types, should be associated with this cyprinodont. Dr. Van Tyne came close to sacrificing his life at Uaxactun.

11. *Mollienisia sphenops macrura*, new subspecies

Plate II, Figs. 2 and 3

Station 4, Río San Pedro de Mártir, at El Paso de los Caballos, Guatemala, in the stream system of Río Usumacinta; collected April 18, 1932, by C. L. Lundell (holotype a fully developed male 96 mm. long to caudal; allotype a female 98 mm. to caudal; each more than 5 inches long over all).

Holotype, Cat. No. 95516, and allotype Cat. No. 95517, Museum of Zoology, University of Michigan.

These specimens represent a magnificent form, quite as large as *M. veli-*

¹ The measurements are given according to the following formula: male holotype (9 male paratypes, some not completely differentiated; 8 female paratypes).

fera. It is extreme also in the great depth of the caudal peduncle, and in the great length of the dorsal and caudal rays in the mature male. In these respects it is approached by *M. s. ventynei*, just described, and it agrees with that form in the anterior insertion of the dorsal fin. It differs from *ventynei* in the larger size, the somewhat larger fins of the male, the more boldly marked dorsal fin in the breeding male, the slightly smaller head, and probably in the fewer average number of dorsal rays (9 in both specimens).

Compared with *M. s. gracilis*, the present form has the dorsal fin not quite so far forward, the body, especially the caudal peduncle, much deeper. From *M. s. salvadoris*, it differs in the extreme characters as pointed out above, and in the coloration of the dorsal fin. From all other named subspecies, *macrura* differs in the more anterior position of the dorsal.

Head, 3.7 in holotype (3.7 in allotype); interorbital, 2.15 (2.1); orbit, 4.2 (4.35). Greatest depth of body, 2.9 (3.2); least depth of caudal peduncle, 1.0 (1.15) in head, and 3.8 (4.45) in standard length.

Length of depressed dorsal fin, 1.8 (3.8); length of longest caudal ray, 2.8 (3.1); length of pectoral fin, 4.4 (4.4); length of pelvic fin, 7.0 (7.6); length of depressed anal, 6.15 (5.3). The gonopodium shows all the features recognized as diagnostic of *Mollienisia*.

The black lateral spots in the male are crescent-shaped and in about 8 rows, and in the female are irregular in form and in 6 rows. The ground color in alcohol is dark brown in the male and olive in the female, and there is no trace of either light or dark bars in either sex. The dorsal in the male is dark purplish, marked on the membranes with round and oval blackish spots, which are set off by a colorless ground color on the last four interradiial membranes. The caudal is dark to the margin; mottled with brown on the rays and spotted with black on the membranes. The fins of the female are lighter, but marked in the same pattern, except that the spots are fewer and less conspicuous. The dorsal fin in the female has a basal row of small sooty blotches.

12. *Cichlasoma synspilum*, new species

Plate III, Fig. 1

Station 4, Río San Pedro de Mártir, a tributary of Río Usumacinta, at El Paso de los Caballos, Department of Petén, Guatemala; collected on April 17, 1932, by C. L. Lundell (one specimen, the holotype, 69 mm. to caudal).

Holotype, Cat. No. 95518, Museum of Zoology, University of Michigan.

This species appears to be closely related² to *C. maculicauda* Regan (1905:

² While this paper was being delayed in publication, I collected numerous specimens of *C. synspilum*, and determined that it is a close relative of *C. melanurum* of Lake Petén, differing in the downward slope of the caudal band.

64 and 227, and 1906–1908: 17 and 19, Pl. 2, Fig. 3), which was described from Lake Yzabal (type-locality) and Río Motagua, Guatemala, and Río Chagres, Panama. What certainly seems to be the same species was described from southern Guatemala by Miller (1907: 114–116, Figs. 4 and 5) under the names of *C. globosum* and *C. mañana*. Of *maculicauda* we have for comparison not only the original descriptions and figures, based on Guatemala material, but also a good series of specimens from Gatún Lake, Canal Zone, including some equally small. Considering specimens of similar size, differences are as follows:

1. The body is slightly slenderer (the depth a little less instead of a little more than half the standard length).
2. The contours are less globose, as the form slightly approaches the rhomboidal and the depth decreases more rapidly backward: the distance from the chord between the ends of the dorsal base to the edge of the scaly sheath measures 5.5 instead of 3.5 times in the head; the depth above anal origin is distinctly (one-tenth) less than the greatest depth.
3. The dorsal, anal, and pelvic fins are not so sharply pointed nor so produced: the dorsal and anal when depressed do not reach more than an eye's length farther back than base of caudal rays, and the pelvic fin just reaches the anal origin.
4. The black caudal blotch is longer (nearly as long as head) and is closely preceded by a blotch about as large as the eye, and then by a smaller blotch, which is about in the position of the large blotch which is usually disrupted into specks in *maculicauda*. Such median specklings are absent in *synspilum*. The main blotch is obviously made up of 3 largely fused blotches, instead of only 1 or 2.

The descriptions would indicate that these differences will distinguish *synspilum* from typical or Guatemalan *maculicauda* as well as from the Panama form.

The depth of body, greatest below fourth dorsal spine, measures 2.1 times in the standard length. The least depth of caudal peduncle is 0.6 its length, as measured between verticals from end of anal base and base of caudal, and enters the head 2.3 times. The anterodorsal profile is gently and evenly convex. The muzzle is bluntly conical and rather short: snout, 2.8; pre-orbital, 4.8; postorbital to margin of membrane along opercle, 2.35, and to margin of subopercle, 2.1; width of convex interorbital, 2.7; diameter of orbit, 3.6. The jaws are equal. The mouth is small. The premaxillary spines extend only to above front of orbit. The largely concealed upper jaw reaches only to midway between verticals from nostril and front of eye, and

measures 4.0 times in the head. The lips are only moderately developed, and the lower is interrupted by a frenum.

The brown-tipped outer teeth in the upper jaw increase evenly in size to the moderate canines at front of jaw. The 6 anterior mandibular teeth are definitely and about evenly enlarged, and form an arc somewhat outside the small teeth which follow on each side. The median pair of teeth in each jaw are as large as those to either side. There are 9 very short gill-rakers.

Fin rays: dorsal XVII, 12; anal VI, 9; pectorals 14; caudal (principal rays) 16. The dorsal spines increase rather rapidly in height to the sixth, behind which they remain of even height if the measurement excludes the scaly sheath. The soft dorsal and anal end in blunt points, somewhat less than an eye's length behind base of caudal. That fin is slightly but evenly rounded. The longest soft rays in the dorsal and anal fin enter the head 1.5 times; the caudal fin, 1.1 times; the broadly rounded pectoral, 1.3 times; the pelvic, which ends in a slight filament, 1.15 times. The vertical fins are all scaly at their bases.

Scale rows $5\frac{1}{2} - 29 - 13$ (counting cross rows along axis of body); lateral line on $21 + 12$ or $22 + 11$ rows, with an overlap of 3 or 4 rows counting the rows downward and backward.

The general color tone is dark, without trace of bars except as these enter into the formation of the longitudinal black tail markings, described above. The main blotch runs downward and forward, being median at caudal base, but anteriorly only extending up to origin of posterior section of lateral line. No markings are visible on the head. The fins are all deep dusky. The soft dorsal bears blackish spots on the membranes, but these are conspicuous only posteriorly, where the membranes become whitish. The anal is similarly but much less distinctly colored. The caudal bears the disrupted end of the large blotch on its base, beyond which there are some light blotches, but only bare traces of dark blotches on the membranes.

The name *synspilum* refers to the fused blotches which make up the very characteristic color feature of the species.

13. *Cichlasoma hyorhynchum*, new species

Plate III, Fig. 2

Station 4, Río San Pedro de Mártir, a tributary of Río Usumacinta, at El Paso de los Caballos, Department of Petén, Guatemala; collected on April 17, 1932, by C. L. Lundell (one specimen, 86 mm. long to caudal).

Holotype, Cat. No. 95519, Museum of Zoology, University of Michigan.

This is a species of the *Thorichthys* group (see Regan, 1905: 66 and 319-332, and 1906-1908: 26). It resembles *C. affine* (Günther, 1862: 292, and 1869: 455, Pl. 79, Fig. 1) most closely, especially in having a long hog-like muzzle (the snout distinctly longer than distance between eye and pectoral

insertion). From the descriptions of *affine*, the type specimen differs in having a slightly smaller eye (4.5 in head; 1.5 in preorbital); the anal ray formula X, 6 instead of VIII or IX, 7 or 8; the anal fin with a very long filament (the longest ray an eye's length longer than head); the pectoral reaching to above next to last anal spine instead of to above the first soft ray, and the fins without light spots, except for a bare trace near end of dorsal and anal.³

C. hyorhynchum also resembles *C. aureum* and *C. ellioti* (for the characters of those species, refer to Hubbs and Gordon, in press), from which it differs, among other respects, in the much longer muzzle and shorter post-orbital, in the anal fin formula, and the longer anal filament. In form (except of snout) and in lip structure it is close to *aureum*, but in coloration, except for the very inconspicuous spots on the cheeks, it is closer to *ellioti*.

The greatest body depth, anywhere between the verticals from the origins of pelvic and anal fins, enters the length to caudal 2.15 times. The contours are much modified by the prominent muzzle, the projection of which produces a slight concavity above the eye. The profile of the nape is moderately convex. Along the dorsal base the profile drops slightly in a weak curve to the end of the spines, beyond which it becomes rather abruptly declivous. The ventral contour is almost evenly curved from mouth to end of anal base. The margins of the caudal peduncle converge backward, so that the least depth at caudal base enters the head 2.9 times, whereas the distance between ends of dorsal and anal bases measures 2.0 times; the least depth of the caudal peduncle equals its length from end of anal base to base of caudal on midline, and is 0.7 the length of caudal peduncle as measured between the vertical from those points.

The very prominent muzzle has about equally sloping contours, of which the dorsal is slightly convex, the ventral somewhat angulated. The length of the snout enters the head 2.0 times, equals the greatest distance to subopercular margin, greatly exceeds the postorbital length to margin of opercle and even exceeds the distance between eye and pectoral insertion by half-length of eye. The least suborbital width enters the head 3.2 times and equals the distance between eye and margin of opercle (without membrane). The least bony interorbital width enters the head 3.7 times. The lower jaw slightly projects. The mouth is of moderate size: the upper jaw and premaxillary spines both fail to reach vertical from front of orbit by half length of eye; length of upper jaw, 3.5. The lips are moderately developed; the lower one is hardly one-fifth as wide as long. The fold of the lower lip is continuous, though barely so over the very narrow incipient frenum.

³ Since this comparison was written, I have collected numerous topotypes of both *affine* and *hyorhynchum*. The two forms are very closely related, but recognizably distinct. Some of the differences here pointed out do not hold.

The outer teeth in the upper jaw are somewhat enlarged to form small canines along the front of the jaw. Opposite these about 6 similar mandibular teeth are set off. The anterior pair in neither jaw is specialized. There are 12 short gill rakers.

Fin rays: dorsal, XVII, 8; anal X, 6; pectoral 14; caudal 16 (principal rays). The dorsal spines are of subequal height from the sixth to the sixteenth (2.25 in head), slightly lower than the last one (2.0 in head). The soft dorsal and anal are produced into filaments; that of the anal is so long, that the longest ray is half an eye's length longer than the head. The caudal is lunate with pointed lobes, of which the upper enters the head 1.1 times. The anal spines increase in height to the last, which enters the head 2.1 times. The filamentous pelvic fin reaches the sixth anal spine and measures 1.25 times in head. The pectoral reaches to above next to last anal spine, or two-third distance to caudal, and is just as long as the head. The vertical fins are wholly devoid of scales, even at their bases.

Scale rows 6 - 26 - $11\frac{1}{2}$; lateral line on 20 + 9 or 10 rows, with an overlap of 3 or 4 rows. The upper lateral line drops abruptly one scale row at its end.

The general color tone is rather light. The bars are very faint; the anterior ones are scarcely visible. The usual lateral blotch and the subopercular blotch are deep black. A rather faint dark stripe connects the upper end of gill opening with the lateral blotch. The cheek shows traces of a median horizontal blue line and of several very small blue specks. The dorsal and anal fin show only the faintest traces of light spots, confined to the soft-rayed portions and not margined with dark. The dorsal shows a dusky marginal band, while the anal becomes blackish toward its tip and on its filament. The caudal and pectoral are dusky, while the pelvic becomes blackish toward its margin and on its filament.

The name *hyorhynchum* refers to the hog-like nose.

14. *Cichlasoma octofasciatum* (Regan)

Station 3, *aguada* at Uaxactun, Guatemala (4 adults, 53 to 66 mm. in standard length).

I identify these specimens as *octofasciatum* rather than *hedricki*, because Regan has claimed the two to be identical (see Hubbs and Gordon, in press).

The specimens 53 to 66 mm. long are mature females, showing that this is one of the smallest species of the genus. One 66 mm. is a male. It differs from the females in having the lateral band wider, the sides of head less black, and the cheeks, opercles, and body just above pectoral base spotted with black, and in some of the proportions, as indicated by the following tabulation.

These specimens agree rather well with others, from Mexico, and with the type description of *C. hedricki*.

	Male	Females
Head	2.7	2.6
Depth	2.3	2.1 to 2.15
Suborbital	5.6	6.3 to 6.5

The teeth show some variation. The anteriormost two in the upper jaw are moderately enlarged. The anteriormost four in the lower jaw are somewhat enlarged, and the median two may be either as large as or a little smaller than the teeth immediately following. One specimen has 6 equal mandibular canines.

15. *Cichlasoma urophthalmus trispilum*, new subspecies

Plate IV, Fig. 2

Station 4, Río San Pedro de Mártir, tributary of Río Usumacinta, at El Paso de los Caballos, Department of Petén, Guatemala; collected April 17, 1932, by C. L. Lundell (4 half-grown to adults, 72–109 mm. long to caudal).

Holotype, Cat. No. 95520, Museum of Zoology, University of Michigan, 109 mm. long; paratypes, No. 95521, 72–109 mm. long.

This subspecies is described as distinct, in anticipation of a report on Yucatan fishes, in which local variants of *urophthalmus* (see Evermann and Goldsborough, 1902: 146) will be regarded as subspecifically distinct. The present subspecies is characterized by a moderately robust form, the development of 2 round black spots about as large as eye in advance of the similar caudal spot, and by having these 3 spots narrowly separated or barely touching.

The greatest depth, above origin of pelvic fin, measures 2.25 times in the length to caudal base (2.1 to 2.35 times in paratypes). The body form is close to that shown in the type figure of *urophthalmus* (Günther, 1869; Pl. 72, Fig. 1), but the contours are a little more rotund. The profile is very weakly concave above the eyes. The length of the caudal peduncle, measured in vertical projection, is 0.6 (0.55 to 0.7) the least depth of the peduncle, which enters the head 2.6 (2.5 to 2.65) times.

The muzzle is evenly conical in side view. Snout, 2.8 (2.65 to 2.8); orbit 4.2 (4.0 to 4.5); interorbital, 3.4 (3.35 to 3.5); preorbital, 5.4 (5.0 to 5.7); postorbital, as measured to membrane of opercle, 2.3 (2.3 to 2.4) or 2.1 (2.2) as measured to margin of subopercle; upper jaw, 3.15 (3.15 to 3.3). The maxillary does not quite reach vertical from front of orbit. The premaxillary spines reach to above front of pupil. The lower jaw projects. The fold of the lower lip is continuous. The anteriormost pair of premaxillary teeth are well differentiated as canines, as are two teeth on either side of the smaller anteriormost pair of the mandible. There are 4 + 11 (3 or 4 + 10 or 11) short gill-rakers, and those just below the angle are broad and truncate.

Fin rays: dorsal XVI, 11; anal VI, 8; caudal 16; pectoral 15 or 16 (15). The last dorsal spine (including scaled base) enters the head 2.5 (2.3 to 2.6) times; longest soft dorsal ray 1.6 (1.5 to 1.8); caudal 1.2 to 1.25; pectoral 1.4 (1.3 to 1.4); pelvic 1.45 (1.35 to 1.4). The vertical fins are scaly at their bases.

Scale rows 5 (5 or 5½) – 28 (27 or 28) – 10½ (10½ or 11½); lateral line on 20 (19 to 22) + 10 or 11 (11 or 12) rows, with overlap on 3 or 4 rows.

The ground color is dark, crossed by 7 bands (8 on one side of one fish), all reaching the dorsal contour; those on the trunk about as wide (or a little narrower) than the interspaces. The fourth bar is somewhat blackened medially. The sixth and seventh bars are intensified medially in more or less distinct roundish black blotches, nearly as large as orbit, and slightly separated or barely connected with one another and with the jet black caudal spot, the vertical diameter of which is a little greater than that of the orbit (a little less in one paratype), and not conspicuously ocellated. About twice as much of the caudal spot is above the lateral line as below. The fins are dark but unspotted (with obscure dark marks on membranes between dorsal soft rays in one specimen).

The name *trispilum* refers to the three caudal spots.

16. *Cichlasoma friedrichstahlü* (Heckel)

Station 3, *aguada* at Uaxactun, Guatemala (2 adults, 112 and 114 mm. in standard length).

Station 4, Río San Pedro de Mártir, Guatemala (2 adults, 99 and 101 mm. long).

I find no good reason for distinguishing these specimens from *C. friedrichstahlü*, as this species has been described by Heckel (1840: 381), Günther (1862: 294, and 1869: 459), and Regan (1905: 67 and 336, and 1906–1908: 27). I also fail to see, however, how they may surely be separated from *C. motaguense* as described by Günther (1869: 463, Pl. 77, Fig. 3), and Regan (1905: 67 and 336, and 1906–1908: 28), or from *C. multifasciatum* Regan (1905: 67 and 335, and 1906–1908: 27). I suspect that these forms will prove to be synonymous, or only subspecifically distinct. It seems improbable, however, that *C. managuense* can be so regarded, although Jordan and Evermann (1898: 1528), Pellegrin (1904: 234), and Miller (1907: 119) have confounded *managuense* with *friedrichstahlü*. Meek (1907: 143) also denied the identity of *managuensis* with *motaguensis*, but also recognized both as distinct from *friedrichstahlü*. The type locality of *friedrichstahlü*, "Central-Amerika," was restricted by Jordan and Evermann without warrant to Río San Juan, outlet of Lake Nicaragua.

To compare our specimens with the published descriptions and with

Regan's key, I give the main characters for our specimens. Anterior pair of teeth in upper jaw, and the two on each side of anterior pair in lower jaw, strongly enlarged and canine-like. Mouth large, somewhat oblique, with projecting lower jaw; premaxillary spines extending to above middle of orbit, and nearly half as long as head; upper jaw extending slightly past vertical from front of orbit. Preorbital one-half to two-thirds as wide as orbit. Length of caudal peduncle (end of anal base to base of middle caudal rays), 0.7 to 0.8 depth of caudal peduncle; length of caudal peduncle as measured between verticals from anal and caudal bases, 0.5 to 0.7 depth of caudal peduncle. Last dorsal spine 3.6 to 4.1 in head, as measured without scaly base, or 3.0 to 3.4 as measured with the scaled-over base. Dorsal rays, XVIII, 9 to 11; anal, VII or VIII, 8 (10 in one).

The color pattern agrees in general with that described for *friedrichstahlü* and *motaguense*. The crossbars may be counted as high as 11 (12 in one), including 3 (4 in one) strong to barely evident ones on the trunk, and counting separately the fourth and fifth, and eighth and ninth bars (in one specimen 3 pairs) which are incompletely separated especially dorsally, and including also one in the caudal base. The bars are somewhat broken into flecks, especially ventrally. The more or less ocellated inky spots and blotches occur in two series. The main series starts with a diffuse dark mark across the upper end of the cheek, and a large blotch on the opercle, and is continued as intensifications of the dark bars along a line to the blackest and most strongly ocellated spot, which is located on the extreme caudal base. There is a trace of another ocellus on caudal base below the lateral line. The largest blotch occurs on the middle of the sides above the anal origin; it unites the fourth and fifth bars (except on one side of one specimen, in which it is doubled). The spot next following in some is also blackened, as is the next to the last, which spot is weak in one specimen and strong in others. The first body blotch follows the shoulder girdle down to the axil, with a median narrowing or interruption. The second series consists of one or two inky spots on the cheek, leading toward the more or less strongly ocellated spot located on lower part of suture separating opercle and subopercle. The fins are dark, with weak dusky spots (strong in one, presumably a male, in which spots are also conspicuous on the body and head).

Mr. Lundell noted that this is a small and common species in the Río San Pedro. "It is shaded green with spots and stripes of black. Edible."

17. *Petenia splendida* Günther

Station 3, *aguada* at Uaxactun, Guatemala (1 small adult, 161 mm. long to caudal).

Station 4, Río San Pedro de Mártir, Guatemala (1 half-grown, 144 mm. long, and heads of 3 adults).

These specimens correspond very well with the descriptions of this remarkable species.

Mr. C. L. Lundell, who collected the specimens from Río San Pedro, noted:

This is the "tenguayaqua," a game fish that often reaches a weight of more than five pounds. The fish stays among the branches of fallen trees, or lies in the lilies and along the shores catching "sardinas" [*Astyanax*].

One of the heads in preservative is pale orange with splashes of darker orange, and with irregular inky splashes on nape, eyes, snout, and lips. Concerning this specimen, Mr. Lundell noted:

This fish is exactly like the "tenguayaqua" in every respect except the coloring. The entire fish is colored a brilliant orange with darker spots of the same color. This specimen weighed more than five pounds.

So far as indicated by the head characters, this specimen is indistinguishable from *Petenia splendida*, of which it presumably represents an erythric mutant. This observation is of considerable interest, in relation to the normally erythric cichlids of Nicaraguan lakes.

18. *Symbranchus marmoratus* Bloch

Station 2, Belize River at El Cayo, British Honduras (1 female, 560 mm. in standard length, with mature ova; speared along the shore at night, on March 16).

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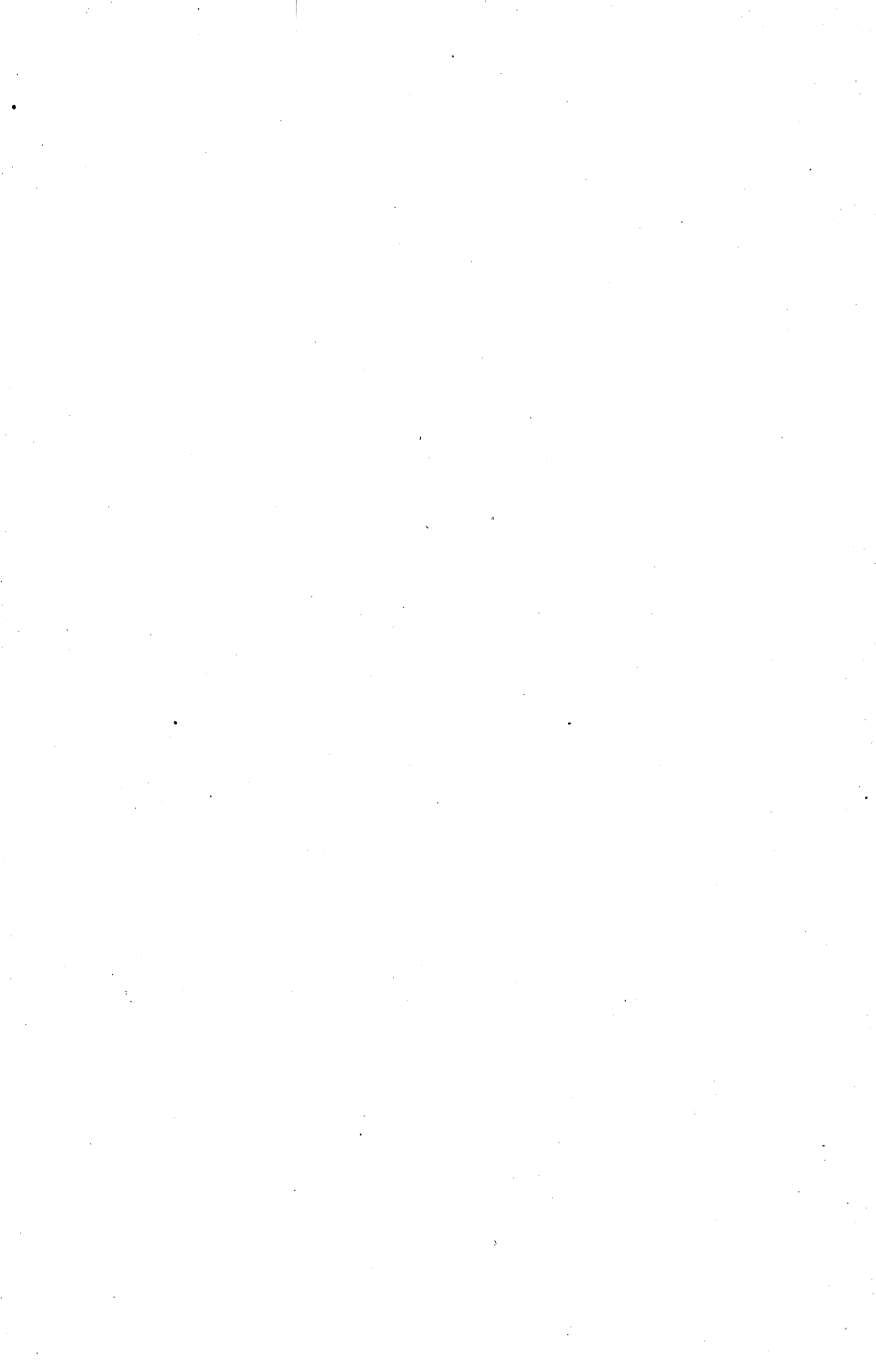


PLATE I

Aguada at Uaxactun, Guatemala, where fish collections were made (Station 3).

FISHES COLLECTED IN BRITISH HONDURAS AND GUATEMALA PLATE I

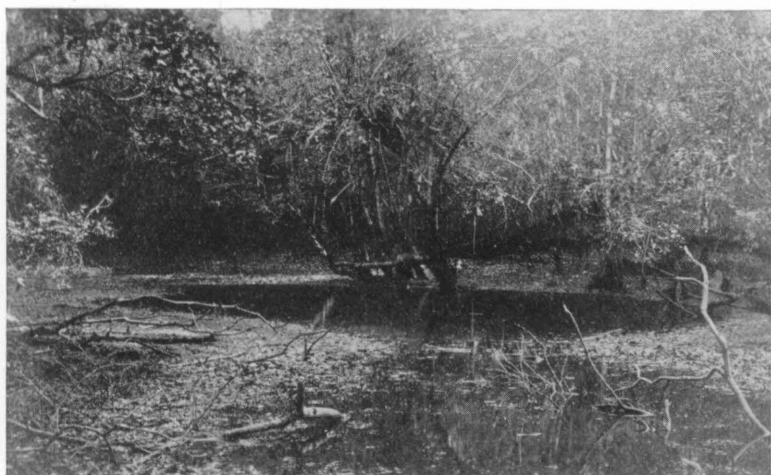


PLATE II

FIG. 1. *Mollienisia sphenops vantynei*, from the holotype (male, upper) and one paratype (female, lower).

FIGS. 2 and 3. *Mollienisia sphenops macrura*, from the holotype (male, Fig. 2) and allotype (female, Fig. 3).

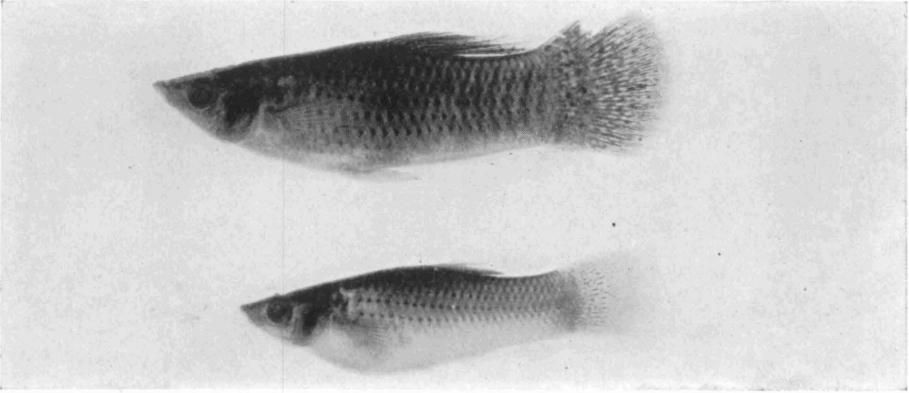


FIG. 1

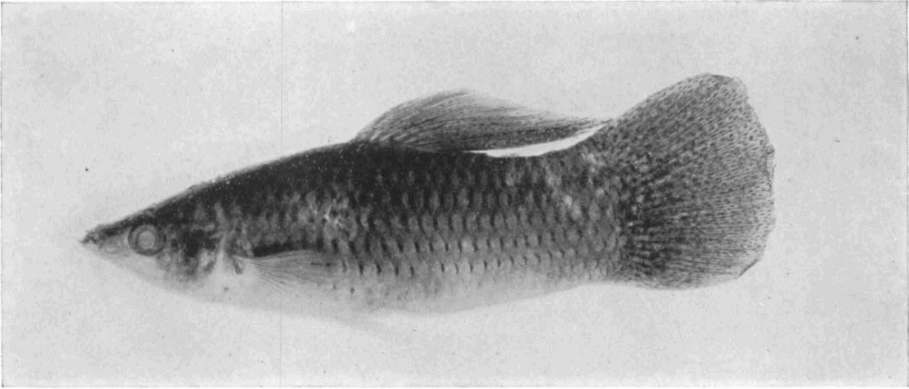


FIG. 2

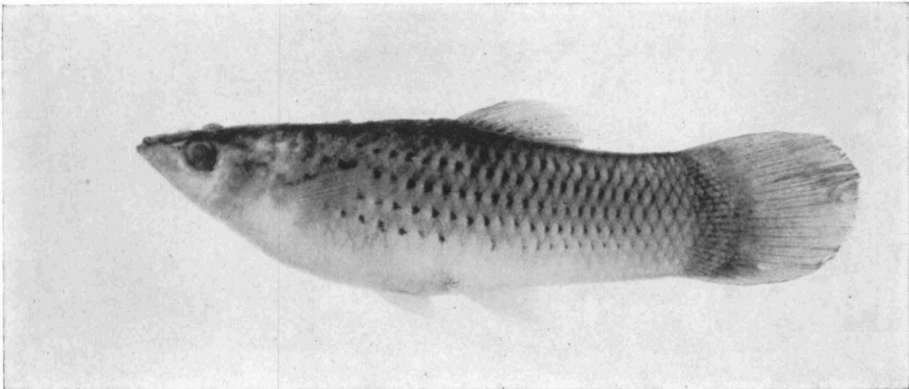


FIG. 3

PLATE III

- FIG. 1. *Cichlasoma synspilum*, from the holotype.
FIG. 2. *Cichlasoma hyorhynchum*, from the holotype.

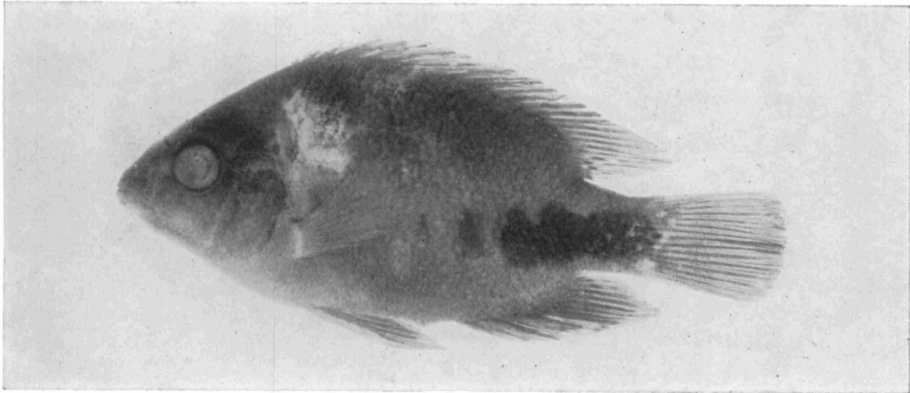


FIG. 1

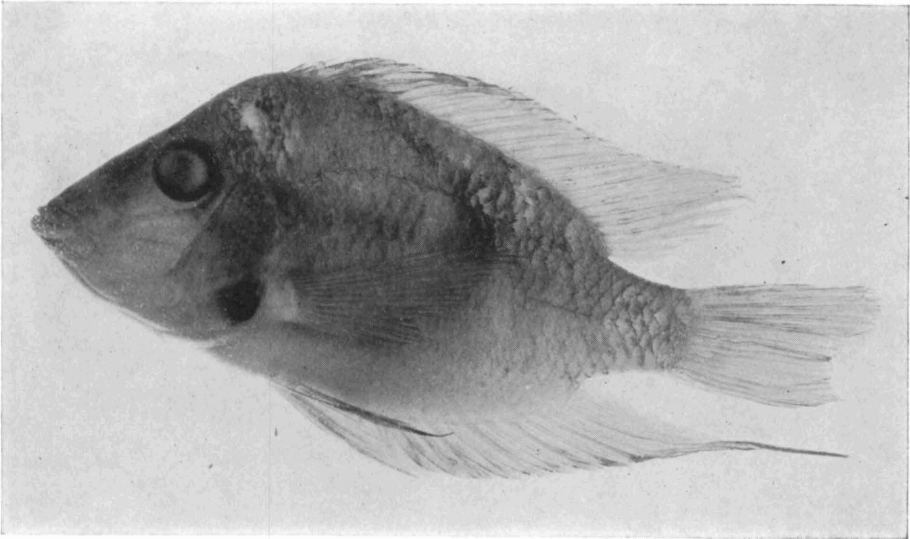


FIG. 2

PLATE IV

- FIG. 1. *Rhamdia guatemalensis muriei*, from the holotype.
FIG. 2. *Cichlasoma urophthalmus trispilum*, from the holotype.

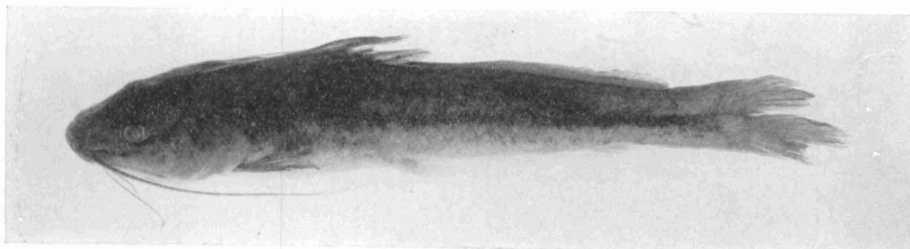


FIG. 1

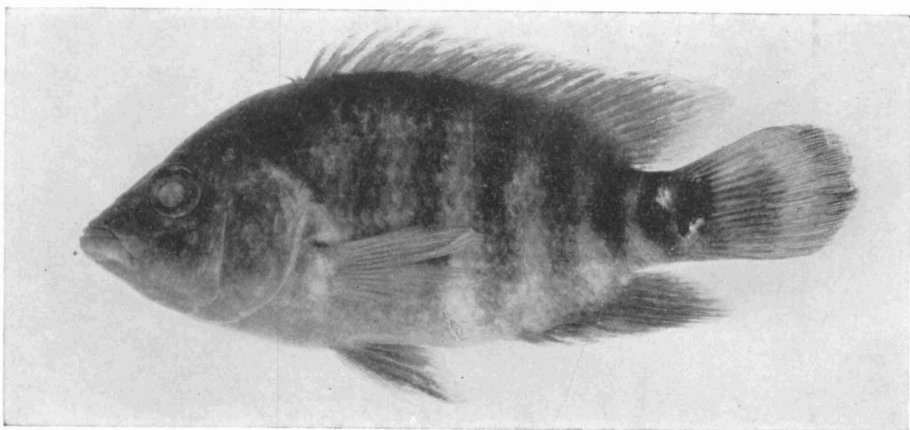


FIG. 2

